FUJITSU

ETERNUS SF Storage Cruiser 14.0

User's Guide

Windows/Solaris/Linux

Preface

Purpose

This manual explains the procedures to operate storage management of ETERNUS SF Storage Cruiser (hereinafter "ESC").

ETERNUS SF is an integrated storage system management software series provided by Fujitsu.

Target readers

The manual is intended for operations managers who use ESC for storage management.

The procedure used for actual system configuration assumes that the reader knows the basic configuration procedure for the installation target server, storage units, and their network.

Organization

This manual is composed as follows.

Explains client screen functions and how to operate them.

Explains how to customize definition files.

Explains basic troubleshooting and also provides information on where to find further help.

Explains how to use mail client function program (henceforth stxsmail) which sends event information with bat linkage of the Windows version manager.

Explains how to check version of installed ETERNUS SF Storage Cruiser

Explains the tool used to upgrade ETERNUS SF Storage Cruiser

Explains the terms used in this manual.

Notational conventions

- This manual omits trademarks and registered trademarks of the following product name.

 Solaris(TM) 8 Operating System
 Solaris(TM) 9 Operating System
 Solaris(TM) 10 Operating System
 Red Hat(R) Enterprise Linux(R) AS v.3, Red Hat(R) Enterprise Linux(R) ES v.3
 Red Hat(R) Enterprise Linux(R) AS 3.9, Red Hat(R) Enterprise Linux(R) ES 3.9
 Red Hat(R) Enterprise Linux(R) AS v.4, Red Hat(R) Enterprise Linux(R) ES v.4
 Red Hat(R) Enterprise Linux(R) AS 4.5, Red Hat(R) Enterprise Linux(R) ES 4.5
 Red Hat(R) Enterprise Linux(R) AS 4.6, Red Hat(R) Enterprise Linux(R) ES 4.6
 Red Hat(R) Enterprise Linux(R) AS 4.7, Red Hat(R) Enterprise Linux(R) ES 4.7
 Red Hat(R) Enterprise Linux(R) AS 4.8, Red Hat(R) Enterprise Linux(R) ES 4.8
 Red Hat(R) Enterprise Linux(R) 5
 Red Hat(R) Enterprise Linux(R) 5.1
 Red Hat(R) Enterprise Linux(R) 5.2
 Red Hat(R) Enterprise Linux(R) 5.3
 SUSE(R) Linux Enterprise Server 9 for EM64T
 VMware(R) Infrastructure 3 Foundation
 VMware(R) Infrastructure 3 Standard
 VMware(R) Infrastructure 3 Enterprise
 Microsoft(R) Windows(R) 2000 Server
 Microsoft(R) Windows(R) 2000 Advanced Server
 Microsoft(R) Windows(R) 2000 Professional
 Microsoft(R) Windows(R) XP Professional
 Microsoft(R) Windows(R) XP Home Edition
 Microsoft(R) Windows Vista(R) Home Basic
 Microsoft(R) Windows Vista(R) Home Premium
 Microsoft(R) Windows Vista(R) Business
 Microsoft(R) Windows Vista(R) Enterprise
 Microsoft(R) Windows Vista(R) Ultimate
 Microsoft(R) Windows Server(R) 2003, Standard Edition
 Microsoft(R) Windows Server(R) 2003, Standard x64 Edition
 Microsoft(R) Windows Server(R) 2003, Enterprise Edition
 Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition

Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems

Microsoft(R) Windows Server(R) 2003, Datacenter Edition for Itanium-based Systems

Microsoft(R) Windows Server(R) 2003 R2, Standard Edition

Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition

Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition

Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition

Microsoft(R) Windows Server(R) 2008 Standard

Microsoft(R) Windows Server(R) 2008 Enterprise

Microsoft(R) Windows Server(R) 2008 Datacenter

Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM)

Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V(TM)

Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM)

Microsoft(R) Windows Server(R) 2008 for Itanium-based Systems

- The Solaris(TM) Operating System is described as "Solaris OS".

- The Manager and Agent of this software are described as follows.

Type	Platform	Notation in this manual
Manager	Solaris OS	"Solaris OS Manager" or "Solaris OS version"
	Linux	"Linux Manager" or "Linux version"
	Windows operating system	"Windows Manager" or "Windows version"
Agent	Solaris OS	"Solaris OS Agent" or "Solaris OS version"
	Linux (*1)	"Linux Agent" or "Linux version"
	Windows operating system	"Windows Agent" or "Windows version"
	HP-UX	"HP-UX Agent" or "HP-UX version"
	Vmware	"VMware Agent" or "VMware version"

*1: SUSE Linux Enterprise Server 9 for EM64T is included.

- The reference items, menu names, button names, etc. are described as follows.

Type	Notation in this manual
Reference items in this manual	Its title is enclosed in " ".
Reference items in other manual	Its title is enclosed in " ".
Menu names	Its name is enclosed in [ ]. The order in which menu items are selected is indicated in the form [ ] - [ ].
Button names	Its name is enclosed in < >.
Character strings and values that need to be emphasized	Its strings are enclosed in " ".
Variable parts	It is indicated by using *italic* text.

Abbreviations

The product name or products might be described by the abbreviation as follows.

Proper name	Notation in this manual
Solaris 8 Operating System	Solaris 8 OS
Solaris 9 Operating System	Solaris 9 OS
Solaris 10 Operating System	Solaris 10 OS

Proper name	Notation in this manual	
Microsoft Windows 2000 Server Microsoft Windows 2000 Advanced Server Microsoft Windows 2000 Professional	When referring to these products as a group, "Windows 2000" will be indicated.	
Microsoft Windows XP Professional Microsoft Windows XP Home Edition	When referring to these products as a group, "Windows XP" will be indicated.	
Microsoft Windows Vista Home Basic Microsoft Windows Vista Home Premium Microsoft Windows Vista Business Microsoft Windows Vista Enterprise Microsoft Windows Vista Ultimate	When referring to these products as a group, "Windows Vista" will be indicated.	
Windows Server 2003, Standard Edition Windows Server 2003, Enterprise Edition Windows Server 2003 R2, Standard Edition Windows Server 2003 R2, Enterprise Edition	When referring to these products as a group, "Windows Server 2003 (x86)" will be indicated.	When referring to these products as a group, "Windows Server 2003" will be indicated. The supported operating systems are different with ESC Manager, Agent and Client. For details, refer to the ETERNUS SF Storage Cruiser Installation Guide.
Windows Server 2003, Standard x64 Edition Windows Server 2003, Enterprise x64 Edition Windows Server 2003 R2, Standard x64 Edition Windows Server 2003 R2, Enterprise x64 Edition	When referring to these products as a group, "Windows Server 2003 (x64)" will be indicated.	
Windows Server 2003, Enterprise Edition for Itanium-based Systems Windows Server 2003, Datacenter Edition for Itanium-based Systems	When referring to these products as a group, "Windows Server 2003 (IPF)" will be indicated.	
Windows Server 2008 Standard Windows Server 2008 Enterprise Windows Server 2008 Datacenter Windows Server 2008 Standard without Hyper-V Windows Server 2008 Enterprise without Hyper-V Windows Server 2008 Datacenter without Hyper-V Windows Server 2008 for Itanium-based Systems	When referring to these products as a group, "Windows Server 2008" will be indicated. The supported operating systems are different with ESC Manager, Agent and Client. For details, refer to the ETERNUS SF Storage Cruiser Installation Guide.	
Red Hat Enterprise Linux AS (v.2.1 for x86)	RHEL-AS2.1(x86)	
Red Hat Enterprise Linux ES (v.2.1 for x86)	RHEL-ES2.1(x86)	
Red Hat Enterprise Linux AS (v.3 for x86)	RHEL-AS3(x86)	
Red Hat Enterprise Linux ES (v.3 for x86)	RHEL-ES3(x86)	
Red Hat Enterprise Linux AS (3.9 for x86)	RHEL-AS3.9(x86)	
Red Hat Enterprise Linux ES (3.9 for x86)	RHEL-ES3.9(x86)	
Red Hat Enterprise Linux AS (v.4 for x86)	RHEL-AS4(x86)	
Red Hat Enterprise Linux AS (v.4 for EM64T)	RHEL-AS4(EM64T)	
Red Hat Enterprise Linux AS (v.4 for Itanium)	RHEL-AS4(IPF)	
Red Hat Enterprise Linux ES (v.4 for x86)	RHEL-ES4(x86)	
Red Hat Enterprise Linux ES (v.4 for EM64T)	RHEL-ES4(EM64T)	
Red Hat Enterprise Linux AS (4.5 for x86)	RHEL-AS4.5(x86)	
Red Hat Enterprise Linux AS (4.5 for EM64T)	RHEL-AS4.5(EM64T)	
Red Hat Enterprise Linux AS (4.5 for Itanium)	RHEL-AS4.5(IPF)	
Red Hat Enterprise Linux ES (4.5 for x86)	RHEL-ES4.5(x86)	
Red Hat Enterprise Linux ES (4.5 for EM64T)	RHEL-ES4.5(EM64T)	
Red Hat Enterprise Linux AS (4.6 for x86)	RHEL-AS4.6(x86)	

Proper name	Notation in this manual
Red Hat Enterprise Linux AS (4.6 for EM64T)	RHEL-AS4.6(EM64T)
Red Hat Enterprise Linux AS (4.6 for Itanium)	RHEL-AS4.6(IPF)
Red Hat Enterprise Linux ES (4.6 for x86)	RHEL-ES4.6(x86)
Red Hat Enterprise Linux ES (4.6 for EM64T)	RHEL-ES4.6(EM64T)
Red Hat Enterprise Linux AS (4.7 for x86)	RHEL-AS4.7(x86)
Red Hat Enterprise Linux AS (4.7 for EM64T)	RHEL-AS4.7(EM64T)
Red Hat Enterprise Linux AS (4.7 for Itanium)	RHEL-AS4.7(IPF)
Red Hat Enterprise Linux ES (4.7 for x86)	RHEL-ES4.7(x86)
Red Hat Enterprise Linux ES (4.7 for EM64T)	RHEL-ES4.7(EM64T)
Red Hat Enterprise Linux AS (4.8 for x86)	RHEL-AS4.8(x86)
Red Hat Enterprise Linux AS (4.8 for EM64T)	RHEL-AS4.8(EM64T)
Red Hat Enterprise Linux AS (4.8 for Itanium)	RHEL-AS4.8(IPF)
Red Hat Enterprise Linux ES (4.8 for x86)	RHEL-ES4.8(x86)
Red Hat Enterprise Linux ES (4.8 for EM64T)	RHEL-ES4.8(EM64T)
Red Hat Enterprise Linux 5 (for x86)	RHEL5(x86)
Red Hat Enterprise Linux 5 (for Intel64)	RHEL5(Intel64)
Red Hat Enterprise Linux 5 (for Intel Itanium)	RHEL5(IPF)
Red Hat Enterprise Linux 5.1 (for x86)	RHEL5.1(x86)
Red Hat Enterprise Linux 5.1 (for Intel64)	RHEL5.1(Intel64)
Red Hat Enterprise Linux 5.1 (for Intel Itanium)	RHEL5.1(IPF)
Red Hat Enterprise Linux 5.2 (for x86)	RHEL5.2(x86)
Red Hat Enterprise Linux 5.2 (for Intel64)	RHEL5.2(Intel64)
Red Hat Enterprise Linux 5.2 (for Intel Itanium)	RHEL5.2(IPF)
Red Hat Enterprise Linux 5.3 (for x86)	RHEL5.3(x86)
Red Hat Enterprise Linux 5.3 (for Intel64)	RHEL5.3(Intel64)
Red Hat Enterprise Linux 5.3 (for Intel Itanium)	RHEL5.3(IPF)
VMware Infrastructure 3 Foundation VMware Infrastructure 3 Standard VMware Infrastructure 3 Enterprise	When referring to these products as a group, "VMware" will be indicated.
Softek Storage Cruiser	SSC
PRIMECLUSTER Global Disk Services	GDS
PRIMECLUSTER Global File Services	GFS
Symfoware Server Enterprise Extended Edition Symfoware Server Enterprise Edition	When referring to these products as a group, "Symfoware" will be indicated.
HITACHI JP1/HiCommand Dynamic Link Manager	HDLM

Description of this product and notation of this manual

This software and its manual have been developed based on Softek Storage Cruiser (SSC) and Systemwalker Resource Coordinator Storage manager. Output messages or windows may therefore contain references to "Softek Storage Cruiser" or "SSC", "Systemwalker Resource Coordinator" or "Resource Coordinator" accordingly.

Related manuals

The following manuals are provided with ESC. Please refer to these manuals as required.

- ETERNUS SF Storage Cruiser Installation Guide

  Explains the configuration procedure.

- ETERNUS SF Storage Cruiser User's Guide (This manual)

  Contains a product description, explanations of functions, and methods of operation and maintenance.

- ETERNUS SF Storage Cruiser Message Guide

  Explains the messages displayed by storage resource manager.

- ETERNUS SF Storage Cruiser Event Guide

  Explains the messages displayed by storage resource manager regarding hardware status.

- ETERNUS SF Storage Cruiser User's Guide for Virtual Storage Conductor

  Explains the functions and methods of operating Virtual Storage Conductor.

ETERNUS SF homepage

The latest technical information can be seen on the ETERNUS SF homepage (http://www.fujitsu.com/global/services/computing/storage/software/).

At first, reference to the ETERNUS SF homepage is recommended.

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・ The following model numbers are different in Japan and other countries.
When the model number of Japan appears in the text, please take it as referring to the model number of the other countries.

Japan	Other countries
PG-FC106	S26361-F2843-E1
PG-FC105	S26361-F2624-E1
PG-FC102	SNP:SY-F2244E2-P, SNP:SY-F2244E2-A, SNP:SY-F2244L2-P
PG-FCD101	S26361-F3023-E1
GP7B8FC1	GP7B8FC1U
PW008FC2	PW008FC2U
PW008FC3	PW008FC3U
PG-FC201	S26361-F3141-E1
PG-FC107	S26361-F3141-E10, S26361-F3141-E210
PG-FC202	S26361-F3306-E1,S26361-F3306-E201
PG-FC203/203L	S26361-F3961-E1,S26361-F3961-E201
PG-FCD201	S26361-F3306-E601
SE0X7F11F	SE0X7F11X
SE0X7F12F	SE0X7F12X
XSEFC401AF	XSEFC401AU,XSEFC401AX
XSEFC402AF	XSEFC402AU,XSEFC402AX

This product model is not the same in all regions. Please check with your sales representative to see the model name in your area.

・ The following product names are different in Japan and other countries.
When the product name of Japan appears in the text, please take it as referring to the product name of the other countries.

Japan	Other countries
SafeDisk	SynfinityDisk
SafeCluster	SynfinityCluster
SafeFile	SynfinityFile

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Contents

Chapter 1 Overview

1.1 Recent Trends in Storage Systems

Social systems utilizing IT (Information Technology) have been deployed in various situations of our lives. For example, those situations are ticket booking at convenience stores, cash dispensing on ATMs, e-mailing on mobile phones, photo mailing, internet connection, parcel delivery confirmation on the Internet and so on. The 24-hour and 365-day running service that can handle explosive concentrated access is required for these social systems.

- IT supports social infrastructure without stopping for 24 hours and 365 days.
- IT solves the concentration of access promptly.

By mobile phones

At convenience stores

Ticket Reservation
ATM

E-mail
The Internet

Confirmation Service by the Internet

Home-delivery Service
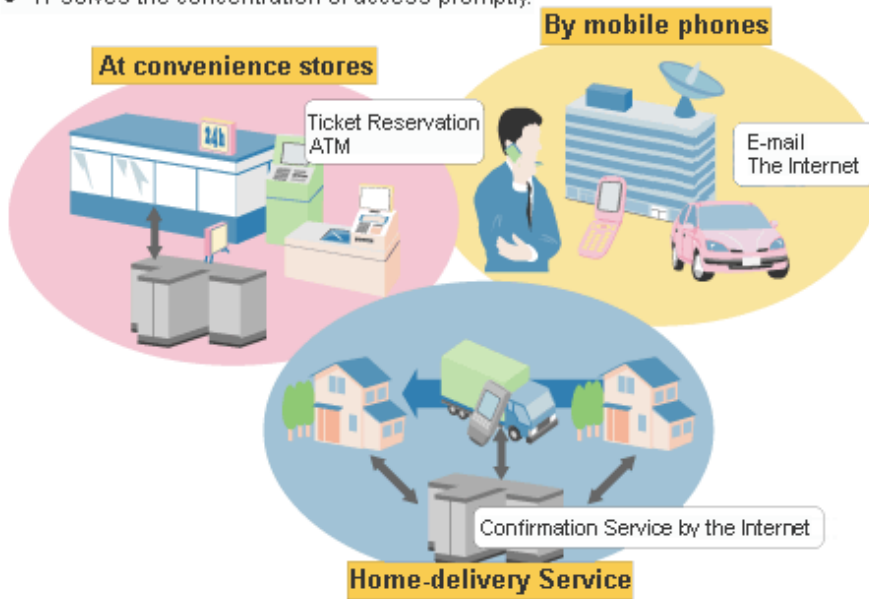
IT has permeated all over our lives, storage data volume increases and more management efforts are likely required. In addition, immediate recovery is required if any failure should occur because important business data is stored in the storage and therefore continuous data access is mandatory. These requirements are exemplified in questionnaire responses as shown in the following chart that many storage investors attach importance to reliability of the administrative and system as criterion for their investment.

Criteria of Storage Investment (N=200, multiple answers)

Reliability of system
Initial investment cost
Easiness of operation management
Operation management cost
System of support
Extendibility
Availability

0   20   40   60   80   100   120   140
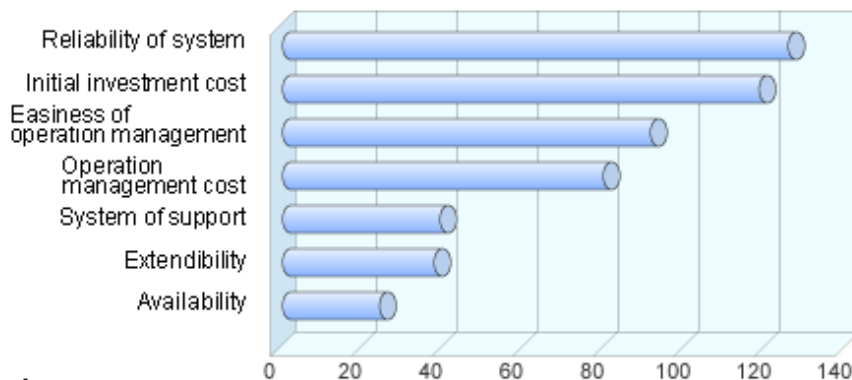
Source: IDC Japan, 2003
Investigation concerning storage use realities and network storage introduction of domestic enterprises

Under these circumstances, network storages, such as a SAN and a NAS that give storages independence from server nodes and consolidate data distributed on several server nodes have become to be deployed more and more, as an alternate to a direct attached storage (DAS). With DASs, storage management is required on each server node, and as a result, unused areas are often found on many storage devices. By contrast, consolidating storage devices enables you to reduce administrative costs through centralized management and promotes more effective use of storage capacity. For this reason, the network storage such as a SAN should be a propulsion method that optimizes an entire system from the aspect of storages.

However, as storage devices and servers increase, and the SAN configuration becomes more complex, higher level know-how for designing optimal configuration concerning reliability and performance is required. Also it is more difficult to pinpoint a failed part and to figure out which data in which operation is affected by that error. This implies that the correlation between storages and applications can now hardly be managed manually because of the complex coupling structure of server nodes and storage devices. In other words, a traditional management method is almost impossible to be extended in order to maintain a certain service level for the system.

1.2 Product Features

This software stands behind the stable operation of a multi-vendor storage system environment such as a SAN, a DAS, and a NAS using the configuration that provide integrated management of storage-related resources and functions of connection, fault, and performance management.

Configuration management realizing total management of devices in an entire system

This function displays the status of each device in a current entire storage system and the status of physical connection between devices graphically on the GUI. You can drill down from an icon of each device to the detail window to get detail information which part of the device (for example, a Fibre Channel switch port) is connected to which part.

Correlation management realizing total management of small-sized resources of all devices

This function not only manages detail configuration within the storage devices but also automatically obtains the physical paths from disks, file systems of the related server nodes, multi paths, mirrored disks, and database configuration information and displays information correlating these data on a single window.

It used to be very hard to recognize the correlation between entities because those entities were supported by their own management tools and were displayed in various formats respectively. In this software, the correlation of entities can be displayed in a common display format on a single window, and consequently the entire configuration can simply be grasped and an error can be detected if any configuration error should exist. Additionally, such configuration information can be saved in a file, and the configuration can be viewed off-line and compared to the previous one.
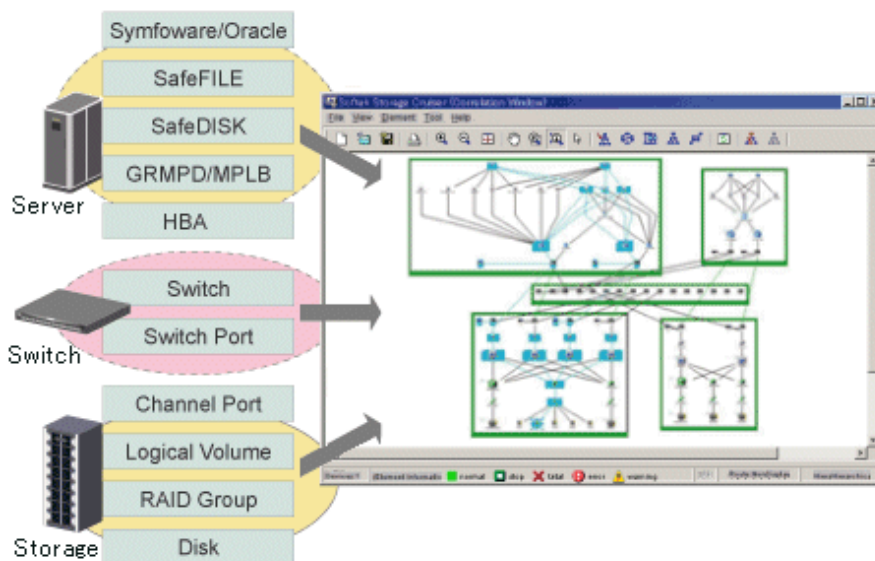
Access path display

This function displays the actual access path from a database used by an application to a physical disk and the connection relation on a window. For example, it is useful in the following situations:

- When a failure occurs on a part or parts must be replaced

    The data and operation it affects can be recognized immediately.

- When performance delay occurs on some volume

    The data and operation it affects can be recognized immediately with the threshold monitoring function as storage performance. It is also simplified to review the storage system tuning.

- When a business is delayed

    The shorter time is consumed to solve the problem because the correlated storage entities can be recognized immediately.

Status and detail information of each entity

Properties are retained for each component and history of events such as failures managed, for example, by the version number, re-edition date, and device of that component can also be viewed.

Fault management function for facilitating to locate of failed parts and affected areas

Failures that occur on devices are properly displayed in an understandable way. In addition, the detailed display on the Correlation window enables you to pinpoint the cause by part. The path display provides detailed information about the areas affected by the failed part allowing for fast and accurate recovery.

Error information can be automatically reported to Systemwalker, integrated administrative software, and other venders' Management Software, and centralized management of the system becomes available.

Optimal environment delivery via performance information management

Performance information of managed devices can be managed and displayed. Performance information of devices are stored on the administrative server, past performance information can be accessed as well as real-time performance information. Additionally, because performance information can be viewed in a graphic format, you can simply see the picture of the performance statuses and load statuses of devices.

In addition, threshold values can be set on devices so that alarms are reported when those threshold values are exceeded. The bottleneck causes and locations can be identified, and as a result, the configuration of devices is improved and the operation in the optimal environment is delivered.

Performance information can be viewed from the Report window of Systemwalker Service Quality Coordinator Enterprise Edition Server (for Agent) 12.x.

1.3 Summary of Each Function

This section explains the function that this software provides for storage systems.

1.3.1 Configuration management

Main view

This view, the core component of this software, is used to manage an entire device system that can be accessed with a login account.

The icon for each category (server/storage/SAN) is displayed in the map area.

Category view

When a category (server/storage/SAN) is selected, the domains or SAN device types registered in that category are map-viewed.

When the SAN category is selected, all of the devices that can be accessed with the login account are reflected in the tree.

Domain view

This view manages the devices (hosts or storage) that are registered in each domain and their related devices.

One device is map-viewed with one icon.

Server domain is a logical unit for server node management.

Storage domain is a logical unit for storage management.

Base domain means the logical unit of the physical resource of server or storage in server domain or storage domain, which managed by this software.

SAN view

When a device type of the SAN category is selected, the devices of that device type are map-viewed.

Side view

This view is used to display only the devices and Fibre Channel switch that are physically or logically connected to a device or to manage access paths. (The access paths are managed only when a server node or storage is selected.)

To display the Side view, select and double-click a device icon in the Domain view.

Access path management

This function manages and sets access paths automatically by performing integrated management of security functions provided from the server node side, Fibre Channel switch side, and storage side.

An access path can be automatically recognized and displayed from the binding/zoning information that has already been set in a device. Because the access path is collectively managed, based on the security information for each device, even if the physical Fibre Channel cable, a SAN route that forms the access path, is disconnected, the access path can be displayed as an error.

For access paths managed by this software, the configuration definition of a device can be changed manually as well as automatically from this software. In such cases, it can check whether the manual configuration changes were performed correctly.

Correlation Window

This window is used to show devices and the Fibre Channel switch that are logically connected to each device. Unlike the Side view, the window can display logical elements of each device in detail.

- ETERNUS disk storage systems: a disk, RAID group, Thin Provisioning Pool, volume, Host Affinity, port, CM, CA, DA
- Fibre Channel switch: a port
- Server Node: Definitions related to host for a port, HBA, multi-path instance, mirror disk instance, file system, and database

These elements are graphically displayed.

If an element has a state, the state can be displayed. Therefore, the location of a problem can be identified immediately.

In addition, clicking an element displays related elements explicitly. Therefore, affected elements can easily be identified in the event of a problem.

The Correlation window can be launched/displayed in one of the following three manners.

- Click [File] - [Correlation Window] on the menu bar to display the Correlation window. Then, select a device icon in the Domain view or SAN view and drop it onto the Correlation window. The details of the device are then displayed in the Correlation window.

- When the icon of a device is double-clicked in the Domain view or SAN view, its side window is displayed. In the Side view, the frame of the device that is selected in the Domain view or SAN view is displayed in black. If the device with the black frame is double-clicked, the Correlation window opens to display details of that device.

- Click a device icon in the Domain view or SAN view to display a pop-up menu. When [Send] - [Correlation Window] are selected, the Correlation window opens to display details of that device.

P Point
Devices subject to storage management must be registered with this software. To register a device, the IP address of the device is required. In addition, a user ID and password for management are required for the Fibre Channel switch.

1.3.2 Fault management

The fault management function of this software has the four features described below.

Asynchronous fault event monitoring using event notification from devices

This software processes an SNMP Trap from a device and monitoring information from Agent, properly decodes them, and displays them as an asynchronous event.

Since the displayed contents of the event are more detailed and easier to understand than decodes generated by a normal SNMP MIB compiler, they support smooth operation.

The display format (show, hide, display color) for events can be customized in detail by using an XML file. Therefore, operation can be made suitable for the environment used. In addition, fault management of a device not supported by this software is dynamically enabled by adding and editing the XML file.

Since events can be linked to the Systemwalker Centric Manager linkage and Shell files that can be edited as desired by users, operation can be made suitable for the environment used.

See
For details of customization, see "C.6 SNMP Trap XML Definition File".

Fault monitoring using the device polling function (automatic operation by Manager)

The device polling function is a function for this software to observe regularly the state of all devices connected with LAN by using SNMP, ping or unique protocol. When the SNMP Trap from the device cannot be received, the change in the state of the device can be detected and the network error between each device and the administrative server of this software can be detected by this function.

The state change is reflected in the event log and the icon color.

This function is effective to the manual embedded device.

Fault monitoring by checking the current status of devices (manual operation performed by users)

The icon color of a device changes depending on the current status of the device by acquiring latest information.

If a problem occurs, the color of the corresponding category icon or device icon becomes red or yellow. The component with the fault can be identified by placing the device icon appropriately in the Correlation window. (For some faults, however, the icon color of the devices with the faults is not changed, and only events are displayed.)

Fault monitoring by revolving light icon

Revolving light icon lights in red, yellow or green when there is a change in the state of the device.

Click the revolving light icon and select <OK> button of shown dialog. Then, latest information is obtained and the icon color is changed in accordance with the current status of the device (Processing same as above-mentioned "Fault monitoring by checking the current status of devices" is done.)

 See

For information about revolving light icon, see "Table 6.2 Revolving light icon state state".

When fault monitoring is begun, fault monitoring is continued only by starting the manager regardless of the operation of the client.

 Note

Fault monitoring is done by way of LAN. Fault monitoring can be done only to the device that LAN can connect.

1.3.3   Performance management

When the performance information reservation command is issued from the Main View, Domain view or SAN view for devices from which performance information is to be obtained, the performance management part of this software uses SNMP to obtain performance information from the devices and saves the obtained information on the management server. The information can be displayed and managed in the Performance Management window. To manage the performance information of a device, display the Performance Management window from [File], and then drag the device icon from the Domain view or SAN view and drop it in the window.

Performance control functionality supports the fiber channel switch and ETERNUS disk storage systems. This function can be used to obtain the detailed operational status and load status of a device. Additionally, by knowing the number of active disks, it is possible to verify the Eco-mode status of the ETERNUS disk storage system.

In addition, a threshold can be set for particular information. The function can detect a potential bottleneck and be used to address the problem.

The performance information can be referenced using Systemwalker Service Quality Coordinator. For details, refer to the Systemwalker Service Quality Coordinator manual.

 See

For details about supported devices, refer to "1.3.7 Support levels".

Information targeted for performance management

The information managed by the performance control is different for the fibre channel switch and ETERNUS disk storage systems. On the following tables, "A" indicates "Available", "N/A" indicates "Not Available".

- Fibre Channel switch

	Performance information (Unit)	Fibre Channel switch
Port	Transfer rates of send/receive data (MB/S)	A
	Number of CRC errors	A

・ ETERNUS disk storage systems

	Performance information (Unit)	ETERNUS8000, ETERNUS4000 (except models 80 and 100)	ETERNUS6000	ETERNUS4000 (models 80 and100), ETERNUS3000 (except model 50), ETERNUS GR series (GR720 or higher)	ETERNUS2000	ETERNUS DX60/DX80
LUN Logical Volume RAID Group	Read/Write count (IOPS)	A	A	A	A	A
	Read/Write data transfer rate (MB/S)	A	A	A	A	A
	Read/Write response time (msec)	A	A	A	A	A
	Read/Pre-fetch/ Write cache hit rate (%)	A	A	A	A	A
Disk drive	Disk busy rate (%)	A	A	A	A	A
CM	Load (CPU usage) rate (%)	A	A	A	A	A
	Copy remaining amount (GB)	A	A	N/A	A	A
CA	Load factor (CPU usage rate) (%)	N/A	A	N/A	N/A	N/A
	Read/Write count (IOPS)	A	A	N/A	N/A	N/A
	Read/Write data transfer rate (MB/S)	A	A	N/A	N/A	N/A
CM Port	Read/Write count (IOPS)	N/A	N/A	N/A	A	A
	Read/Write data transfer rate (MB/S)	N/A	N/A	N/A	A	A
DA	Load factor (CPU usage rate) (%)	N/A	A	N/A	N/A	N/A
	Read/Write count (IOPS)	N/A	A	N/A	N/A	N/A
	Read/Write data transfer rate (MB/S)	N/A	A	N/A	N/A	N/A

	Performance information (Unit)	ETERNUS8000, ETERNUS4000 (except models 80 and 100)	ETERNUS6000	ETERNUS4000 (models 80 and100), ETERNUS3000 (except model 50), ETERNUS GR series (GR720 or higher)	ETERNUS2000	ETERNUS DX60/DX80
Device	Number of active disks (Disk)	A	N/A	N/A	A	A
	Power consumption (W)	N/A	N/A	N/A	N/A	A
	Temperature(C)	N/A	N/A	N/A	N/A	A

📒 Note

・ Do not execute performance monitoring for a single device from more than one administrative server(*) at the same time.
  * The Softek Storage Cruiser administrative servers, the ETERNUS SF Storage Cruiser administrative servers or the Systemwalker Resource Coordinator administrative servers.

・ When RAID Consolidation is being performed in ETERNUS6000, the RAIDGroup response time will not be displayed.

・ LogicalVolume(LUN) and RAIDGroup performance information including LogicalVolume, created by LUN Concatenation in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100) that firmware versions are before V11L40, will not be displayed.

・ ETERNUS disk storage systems main frame volume and performance information for MVV and SDV are not supported. RAIDGroup performance information including SDV cannot be guaranteed.

・ ETERNUS6000 CA performance information displays FC-CA port or FC-RA port performance information. Performance information during the execution of REC and ROPC will be displayed as Write performance information, even if FC-RA port is set up on the Initiator or the Target.

・ ETERNUS8000 and ETERNUS4000 (except models 80 and 100) CA performance information displays FC-CA port or FC-RA port performance information. Performance information during the execution of REC and ROPC will be displayed as follows.

  - It will be displayed as Read performance information, if FC-RA port is set on the Initiator.

  - It will be displayed as Write performance information, if FC-RA port is set on the Target.

・ The performance information for the number of active disks, power consumption, and temperature can be managed by setting perf.conf (detailed configuration file for storage performance management).

・ The CPU and ROE usage rates are displayed for the CM load (CPU usage) for ETERNUS4000 models 400 and 600 and ETERNUS8000 models 800, 1200 and 2200. For other ETERNUS disk storage systems, the ROE usage rate is not displayed. Also, for ETERNUS disk storage systems that do not have a ROE, the parity generation processing for RAID5 and RAID6 and encryption processing that would otherwise be performed by the ROE are performed by the CM and the CM-CPU.

・ Performance information for Thin Provisioning Volume and RAID Group used by Thin Provisioning Pool in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100), will not be displayed.

Information for threshold monitoring

Information for threshold monitoring differs between the fibre channel switch and the ETERNUS disk storage systems.

・ Fibre Channel switch

Port throughput (%)

* A port throughput value (MB/s) is monitored as the percentage (%) of an allowable tolerance to a maximum transfer capability (MB/s).

・ ETERNUS disk storage systems

Response time (msec) of LUN (OLU)

Average use (busy) rate (%) of RAIDGroup (RLU, LUN_R)

CM load (CPU usage) rate (%)

Note
For the CM load (CPU usage) rate, the ROE usage rate is not monitored.

1.3.4 Energy-saving operation for storage device

The following ETERNUS disk storage systems have an Eco-mode which controls the ON/OFF status for a disk drive spindle rotation based on MAID (Massive Arrays of Idle Disks) technology.
By stopping the spindle rotation at times when there is no disk drive access, it is possible to cut power consumption and provide an even more eco-friendly environment.

Storage device name	Firmware version
ETERNUS DX60/DX80	All versions
ETERNUS2000 models 50, 100 and 200	V10L50 or later
ETERNUS4000 models 300 and 500	V11L50 or later
ETERNUS4000 models 400 and 600	All versions
ETERNUS8000 models 700, 900, 1100 and 2100	V11L50 or later
ETERNUS8000 models 800, 1200 and 2200	All versions

In this software, the following functionality is provided for the above ETERNUS disk storage systems.

Controlling the Eco-mode

The Eco-mode can be controlled via GUI operations in the administrative client or by executing the storageadm command in the administrative server.

See
For details, refer to "6.1.13 How to control the Eco-mode".

Displaying the performance information for the number of active disks

Among all disks loaded in the ETERNUS disk storage system, the disks that "Motor Status" is not "Idle" are displayed as the "number of active disks".

By using the performance information for the number of active disks, the effects of energy-saving operations can be easily verified.

See
For details, refer to "7.2.7.6 Displaying the number of active disks, power consumption, and temperature performance information".

Displaying power consumption and temperature performance information (ETERNUS DX60/DX80 only)

The amount of power used by an ETERNUS disk storage system device as a whole is displayed as "Power consumption".

The peripheral temperature (fan intake temperature) of an ETERNUS disk storage system is displayed as "Temperature".

By using the performance information for power consumption, the effects of energy-saving operations can be easily verified.

By using the performance information for temperature, the air-conditioning effects at the device periphery can be easily verified.

See
....
For details, refer to "7.2.7.6 Displaying the number of active disks, power consumption, and temperature performance information".
....

Concerns in storage system operation when using Eco-mode

There are following concerns when using Eco-mode in storage system operation.

Unit of the Eco-mode control

The Eco-mode can be controlled for each RAID group. Therefore, when different transactions (type, online time, etc.) use a RAID group, the disk drives of its RAID group may not be able to be stopped depending on the operating policy of the transaction. Please consider the relation between RAID group and transactions in the design of the storage system operation using Eco-mode.

Uncontrollable RAID groups

The Eco-mode is not available for the following RAID groups.

- A RAID group for which the system disk is included

- A RAID group for which it is set in the NAS area

- A RAID group for which the mainframe volumes, MVV volumes or MVV Concatenation volumes are registered

- A RAID group for which no volumes are registered

- A RAID group that includes an SSD

- A RAID group used by Thin Provisioning function.

Stopping disk drives

The ETERNUS disk storage system stops a disk drive after confirming that its disk drive is not accessed within a certain period of time (30 minutes). Therefore, time more than its period is needed until the disk drive stops actually even if the "stop request" in this software is executed.

The ETERNUS disk storage system does not stop a disk drive while the configuration of the RAID group or volume is changed and the Advanced Copy to access to its disk drive is done. Therefore, the disk drives may not be stopped even if the "stop request" in this software is executed. The disk drives will stop when the procedure is completed in the ETERNUS disk storage system.

Starting disk drives

When it is accessed to the stopped disk drive, the ETERNUS disk storage system starts its disk drive rotation. But, a few minutes (about thee minutes) is needed until the disk drive becomes the accessible status.

Continuous disk drive rotation

When the number of the starting disk drive rotation exceeds the number of certain times (three times), the ETERNUS disk storage system judges that its disk drive is used with high frequency and does not stop its disk drive rotation. Therefore, even if the "stop request" in this software is executed, after the disk drive status changes from "Idle" to "Active" and there is no access to its disk drive, its disk drive status may not change to "Idle".
The number of the starting disk drive rotation per one day is cleared to zero when time of ETERNUS disk storage system becomes 00:00.

1.3.5 Storage capacity virtualization operation

The ETERNUS disk storage systems below are equipped with a storage capacity virtualization function that uses Thin Provisioning technology.

Storage device name	Firmware version
ETERNUS4000 models 400 and 600	V20L30 or later

Storage device name	Firmware version
ETERNUS8000 models 800, 1200, and 2200	V20L30 or later

Thin provisioning technology virtualizes and allocates storage resources, thus enabling the physical capacity of the storage to be reduced. Environments where thin provisioning have been installed manage physical disks as a common disk pool, and allocations to servers are treated as allocations to a virtual volume. When writing to a virtual volume, physical disks are allocated from the disk pool in accordance with the size of the data being written. Physical disks can be extended in accordance with the disk pool busy rate without affecting the servers. This enables users to start operation using only a small physical disk capacity to make large capacity virtual disk allocations to servers, thus keeping the initial investment low (small start).

In this software, the following functionality is provided for the above ETERNUS disk storage systems with Thin Provisioning.

Configuration management

This function makes the associations between virtual volumes and physical disks visible. The relationship management window graphically displays the associations between the configuration that is virtualized by means of thin provisioning (disk pool and virtual volumes) and the physical configuration (RAID groups and physical disks). This function makes it easy to check the affected location when a physical disk fault or other problem occurs.

Threshold monitoring and capacity management

This function monitors the disk pool threshold values and performs capacity management. Threshold values are established for the physical disk pool and these values are monitored so that consumption of the physical capacity does not cause disk pool shortages. When the disk busy rate reaches the threshold value, an alarm notifies the user, thus preventing operation stoppages. This function also makes changes to the capacity of the physical disk pool visible. It displays graphs of the amount of disk pool capacity used, both now and in the past, thus giving users forewarning of the capacity becoming exhausted and indicating when physical disks might need to be extended.

 See
. . . .
For details, refer to "6.6 Thin Provisioning management".
. . . .

Notes on storage capacity virtualization operation

There are following concerns when managing storage capacity virtualization operations.

Constructing a thin provisioning environment

This product cannot construct (design and setup) a thin provisioning environment. Use ETERNUSmgr to construct the environment in advance.

Operations that are not possible

This product cannot perform the following operations related to thin provisioning:

- Performance monitoring of disk pools, virtualization volumes, and RAID Groups that contain disk pools

- Setting and deleting of disk pools, virtualization volumes, and Affinity Groups that include virtualization volumes

1.3.6 Virtual Storage Conductor

Virtual Storage Conductor (hereinafter called VSC) is a component of ESC that provides the virtual storage function on a Fibre Channel switch in the network layer, without dependence on the storage hardware's physical attributes.

Virtual disk creation

VSC manages the virtual disk in storage pool that allows you to create a volume of a size independent of the storage logical unit (Logical Volume) size.

Server-free data service

VSC provides the server-free data service function, which copies data using the resources of the virtualization switch without using the resources (CPU and memory) of the job server.

1.3.7 Support levels

Note: This function is not supported in all regions. Please check with your sales representative to see if this function is supported in your area.

The scope of the storage management functions of this software that can be used varies with the storage device model being used. For this software, the scope of available functions is represented as support levels, which are used as settings of the fault monitoring function and for other purposes. The table below lists the support levels that can be selected.

Support level	Typical device name	Device detection	Fault management			Management window linkage	FC connection line drawing	Detail display of correlation management (*1)	Performance management
			SNMP Trap monitoring	Device polling monitoring (*2)	Acquisition of device state				
A	ETERNUS DX60/ DX80 ETERNUS8000 ETERNUS6000 ETERNUS4000 ETERNUS3000 (except model 50) ETERNUS2000 ETERNUS SN200 (except model 250) ETERNUS SN200MDS (*6) PRIMERGY BX600 Fibre Channel switch blade ETERNUS VS900 (except model 200)	Automatic (*3)	Y1	Y1	Y1	Y1	Automatic	Y1	Y1 (*10)

Support level	Typical device name	Device detection	Fault management			Management window linkage	FC connection line drawing	Detail display of correlation management (*1)	Performance management
			SNMP Trap monitoring	Device polling monitoring (*2)	Acquisition of device state				
B	Solaris OS, Windows, Linux, HP-UX server node on which ESC or SSC Agent is already installed ETERNUS LT270,LT250, LT160 (*6) ETERNUS VS900 model 200 (*6) ETERNUS VD800 (*8) McDATA FibreChannel switch (*6) VMware Infrastructure 3 Version 3.5 or later (*11) VMware ESXi 3.5 or later (*11)	Automatic (*3)	Y1	Y1	Y1	Y1	Automatic	Y1	-
E	ETERNUS SX300 ETERNUS SX300S ETERNUS LT120 ETERNUS LT130 ETERNUS LT200 ETERNU	Manual	Y1 (*6)	Y1 (*9)	-	Manual setting	Manual	Y2	-

Support level	Typical device name	Device detection	Fault management			Management window linkage	FC connection line drawing	Detail display of correlation management (*1)	Performance management
			SNMP Trap monitoring	Device polling monitoring (*2)	Acquisition of device state				
	S LT210 ETERNUS LT220 ETERNUS LT230 ETERNUS NR1000F series, NR1000C series								
I	Other devices that are manually embedded	Manual	- (*4)	- (*5)	-	Manual setting	Manual	Y2	-
J	Tape encryption device	Manual	Y1 (*7)	Y1	-	Manual setting	Manual	Y2	-

*1: [Y1] indicates that detail information on device internal elements can be displayed. [Y2] indicates that information on the device and FC port can be displayed.

*2: Fibre Channel Switch blade devices using SNMP can be used with ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80,ETERNUS SN200 series Fibre Channel switch and PRIMEGRY BX600 Fibre Channel switch blade. A server node with Agent already installed uses a unique protocol. The other devices use ping for monitoring.

*3: The "Detect device in subnet" function is not supported by the devices below. Use the "Detect by IP address" function to specify an IP address for each device. For server nodes, use the "Register server" function.

- ・ Firmware version v4.0 or above ETERNUS SN200 (Brocade)

- ・ Solaris OS, Windows, Linux, HP-UX server node on which ESC or SSC Agent is already installed

- ・ ETERNUS LT270,LT250 or LT160

- ・ ETERNUS VS900

- ・ ETERNUS VD800

- ・ PRIMERGY BX600 Fibre Channel switch blade

- ・ VMware Infrastructure 3 Version 3.5 or later

- ・ VMware ESXi 3.5 or later

*4: For devices supporting SNMP Traps, this function is enabled by creating a SNMP Trap XML definition file.

*5: For devices supporting LAN, ping monitoring is enabled by specifying an IP address at manual embedding.

*6: SNMP Trap transmission must be set for each device. (This software does not automatically make said setting.)

*7: Since no vendor-specific trap is available, only traps common to devices can be displayed.

*8: In the disk array device of ETERNUS VD800, access paths to the FC-CA port to be connected to a host server cannot be set or deleted. Logical information of the FC-CA port to be connected to a host server is not displayed in the related management information. Use VDSC (Virtual Disk Service Console) to set the access paths or check the display of logical information.

*9: ETERNUS SX300, ETERNUS SX300S do not support device-polling monitoring.

*10: The performance information can be referenced using Systemwalker Service Quality Coordinator. However, the ETERNUS SN200 MDS series Fibre Channel switch is not supported.

*11: The fault monitoring function by receiving SNMP Traps is not supported.

1.4 ESC Configuration

ESC consists of the following programs: ESC Manager, ESC Agent, and ESC Client.

This guide refers to devices on which respective programs were installed as the administrative server, the server node, and the administrative client. These programs can be installed on a single device and operated as well. In that manner, there is no restriction on the order of installation of these programs.

ESC Manager (administrative server) is the central management part of ESC that obtains and sets information about devices involved in the storage system on the LAN. Important data among those used for controls are stored in the database.

ESC Agent (server node) controls information about home software such as an HBA and a multipath driver on the server node using the storage and communicates with ESC Manager. When there are several server nodes, it must be installed on each of them.

ESC Client functions as the ESC GUI (screen control part) used to connect to ESC Manager. Multiple clients can be connected to the same ESC Manager at the same time.

Figure 1.1 ESC Configuration
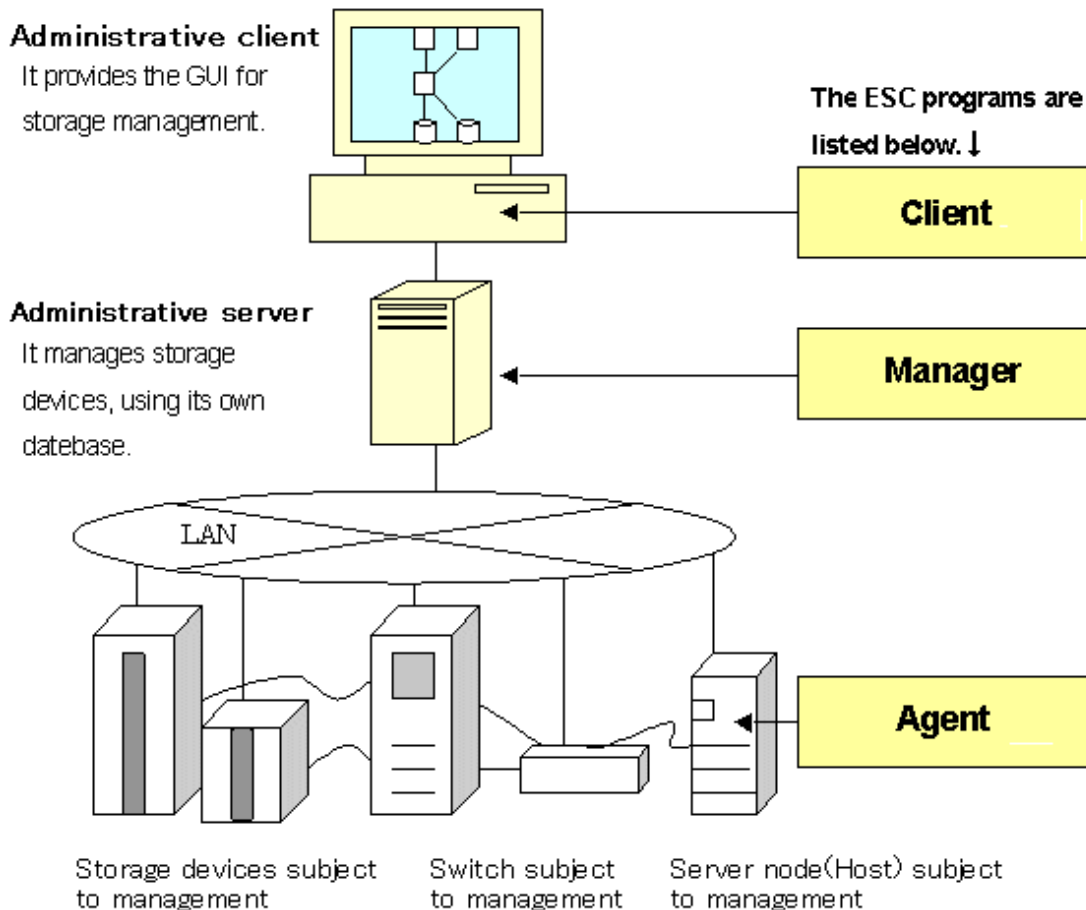
1.5 Function comparison of ESC and SSC

Function different with ESC and SSC

For the following function, user interface of ESC and SSC are different.

Function	SSC	ESC
Login account	The default login account is as follows: ・ manage ・ monitor	There is no default login account. Login account is set when install ESC Manager.
Exit client program	[File] - [Exit] client application will finish.	[File] - [Log out] log out and return to the login screen.

Function that ESC doesn't provide

For the following function that supported by SSC, is not supported by ESC.

・ Page setting ([File] - [Page setup]) for Resource View ("Resource View" is defined in "6.1 Resource View")

・ Print ([File] - [Print]) for Resource View ("Resource View" is defined in "6.1 Resource View")

・ Access path diagnose ([Operation] - [Access Path] - [Diagnose])

・ Change screen color ([View] - [Option] - [Change Screen Color])

・ Dynamically display real-time performance graph on the performance windows (<Dynamic ON> button, <Dynamic OFF> button)

・ Login account's single sign on with Systemwalker Centric Manager

・ Command "setswnode" for changing the manager's IP address is unnecessary for ESC

Chapter 2 Function Outline

This chapter describes how this software monitors for faults in devices consisting of a storage system and explains the fault information displayed and actions to be taken if an error occurs.

🗂 See

. . . .

For details on fault monitoring, refer to "1.3.2 Fault management".

For details on events, refer to the "ETERNUS SF Storage Cruiser Event Guide".

For details on the support levels mentioned in this chapter, refer to "1.3.7 Support levels".

. . . .

This software performs the fault monitoring operation as explained below by processing events that are asynchronously reported by monitoring information from Agent and an SNMP Trap from each device. The SNMP Trap must be correctly set in the device that supports that SNMP Trap.

The Manager's event processing function is a resident function that is always when Manager is started (when the administrative server is started up). Therefore, a client does not need to be started when a fault is only reported by Systemwalker Centric Manager linkage or Shell/ bat linkage.
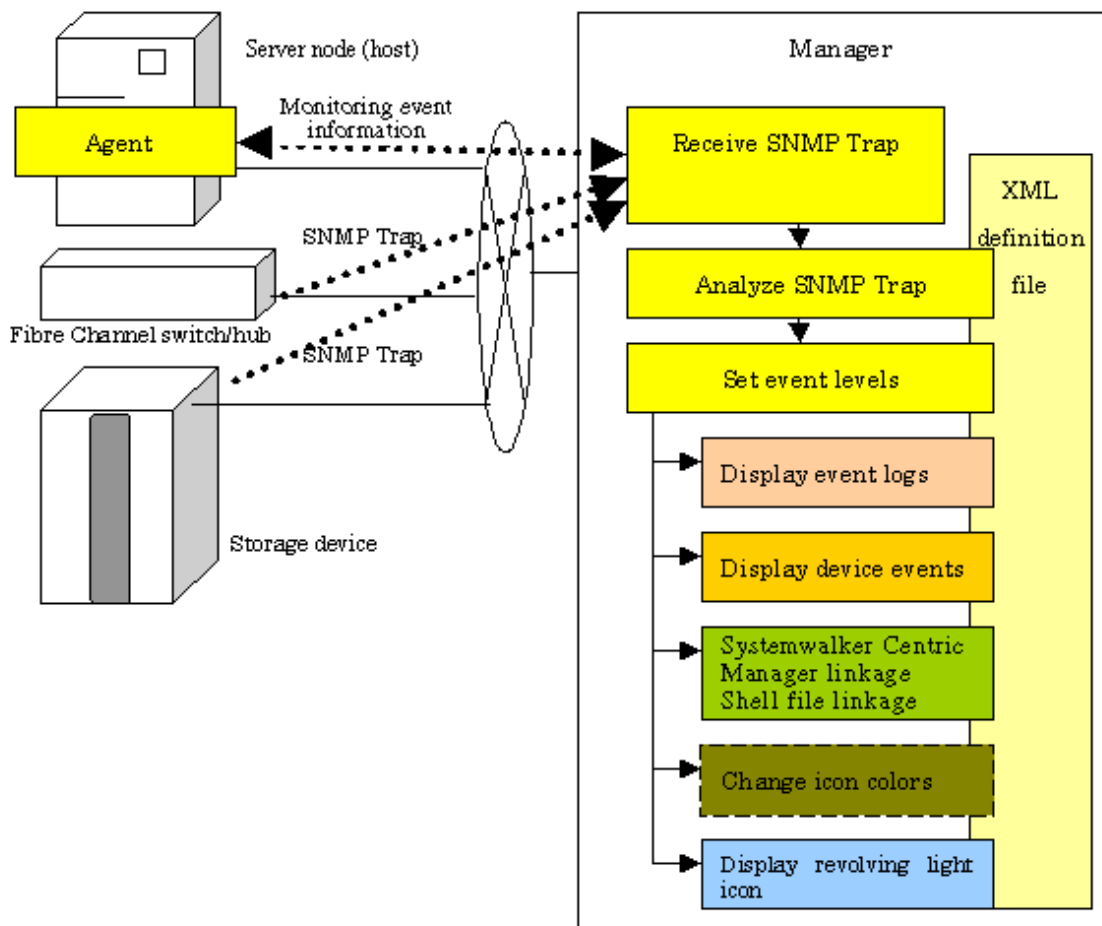
Manager processes event monitoring information from Agent in the same manner as for an SNMP Trap.

2.1 Receiving SNMP Traps

First, set up an environment in which devices can send SNMP Traps.

Server node

SNMP Trap transmission place addresses are automatically set for the server node agent when this software registers devices.

If Manager operates across multiple networks, however, this software may not be able to set correct settings for the server node agent. In this event, check whether SNMP Trap transmission place addresses are correctly set for the server node agent. The files indicated below for the server nodes specify the SNMP Trap transmission place addresses of the server node agent. Check the addresses, and edit any address that must be corrected. To operate according to the contents of the file the restart of Agent is needed.

Server node OS	Place of file
Windows	$TMP_DIR\Agent\var\sanm.ip ($TMP_DIR means "Work Directory" specified at the Agent installation.)
Solaris OS, Linux, HP-UX	/var/opt/FJSVssage/sanm.ip

Note

For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment, the fault monitoring function by receiving SNMP Traps is not supported.

Support levels A, B

When this software registers devices, SNMP Trap transmission place addresses are automatically set for devices to be managed.

However, if Manager operates across multiple networks, this software may not be able to set the correct setting for each device to be managed. In this case, check whether SNMP Trap transmission target addresses are correctly set for the managed devices.

Support levels E, I (for devices supporting SNMP Traps)

The SNMP Trap transmission place address is set on a device to the administrative server. For details of this setting, refer to the operation manual of the device.

Support level I (for devices not supporting SNMP Traps)

Fault monitoring by the mechanism is disabled since said devices do not support the SNMP Trap function.

Other server nodes (including Solaris OS and Windows server nodes without an agent) do not support fault management.

Note

If the Manager cannot receive the SNMP Trap, check the following:

Solaris OS Manager:

- Check whether the SNMP Trap monitoring daemon is running. If not, start it. For details about checking and starting the daemon, refer to "12.1.2.1 Starting and stopping the SNMP Trap monitoring daemon".

- If ESC Manager and Systemwalker Centric Manager are running on the same server, check whether Systemwalker Centric Manager SNMP Trap monitoring daemon is running. If not, start it. For details about checking and starting the daemon, refer to Systemwalker Centric Manager manual.

- ESC Manager and Systemwalker Centric Manager use the same SNMP Trap monitoring service. Therefore, the SNMP Trap monitoring daemon stops if Systemwalker Centric Manager is uninstalled. In this case, either restart the OS or start the SNMP trap monitoring daemon after Systemwalker CentricManager has been uninstalled.

- If the IP address of administrative server is changed, execute the procedure of "9.1.2.1 Changing the IP address of the administrative server".

Windows Manager:

- Check whether the SNMP Trap monitoring service is running. If not, start it. For details about checking and starting the service, refer to "12.3.2.2 Starting and stopping the SNMP Trap monitoring service".

- ESC Manager, Systemwalker Resource Coordinator Virtual server Edition, and Systemwalker Centric Manager use the same SNMP Trap monitoring service. Therefore, if ESC Manager and Systemwalker Resource Coordinator Virtual server Edition and Centric Manager are running on the same server, refer to "4.3.2 Advisory notes" - "Restrictions in the mixed environment of Systemwalker Centric Manager and Systemwalker Resource Coordinator Virtual server Edition" in the ETERNUS SF Storage Cruiser Installation Guide.

- If the IP address of administrative server is changed, execute the procedure of "9.1.2.1 Changing the IP address of the administrative server".

Linux Manager:

- Check whether the SNMP Trap monitoring daemon is running. If not, start it. For details about checking and starting the daemon, refer to "12.2.2.1 Starting and stopping the SNMP Trap monitoring daemon".

- When ESC manager and Systemwalker Centric Manager are running on the same server, check whether Systemwalker Centric Manager SNMP Trap monitoring daemon is running. If not, start it. Refer to Systemwalker Centric Manager manual for details on checking and starting the daemon.

- The ESC manager and Systemwalker Centric Manager use the same SNMP Trap monitoring service. When Systemwalker Centric Manager is uninstalled the SNMP Trap monitoring daemon will stop. In this case, after uninstalling Systemwalker Centric Manager, restart the operating system or start the SNMP Trap monitoring daemon.

- If the IP address of administrative server is changed, execute the procedure of "9.1.2.1 Changing the IP address of the administrative server".

2.2 Analyzing SNMP Traps

The Manager processes SNMP Traps according to the support levels of the mechanism for devices, as described below.

- Server node agent

  SNMP Traps are decoded.

- Support levels A, B and E

  SNMP Traps are decoded. Incidentally, the only SNMP Traps decoded are those for which event display and linkage are required.

- Support level I (for devices supporting SNMP Traps)

  Device-specific SNMP Traps are not decoded.

  Note that SNMP Traps not supported by this software can be decoded, however, by creating a SNMP Trap XML definition file. For details, see "C.6 SNMP Trap XML Definition File".

Information

Methods of decoding SNMP Traps can be customized. For details, refer to "C.6 SNMP Trap XML Definition File".

2.3 Device Polling

The Manager checks the statuses of registered devices by using SNMP, ping or unique protocol at intervals of 60 seconds (default). It is as follows which polling method.

Polling method	Protocol	Devices
Device status	SNMP	ETERNUS GR series ETERNUS series ETERNUS NR1000 series
Communication status	SNMP	ETERNUS SN200 series Fibre Channel switch PRIMEGRY BX600 fibre channel switch blade
	unique protocol	server nodes for which Agent is installed
	private protocol	VMware Infrastructure 3 Version 3.5 or later VMware ESXi 3.5 or later
	ping	Devices supporting automatic detection, other than the above devices. Manually embedded devices for which IP addresses are set.

・ Device status polling method

For devices using SNMP, the system obtains status information using the respective vendor's private MIB. If the status has been changed compared with that stored by Manager, the system displays a device event and changes the device icon color according to the change.

・ Communication status polling method

Changes in device status cannot be detected. However, if an abnormality occurs in the device or in a network between the device and the Manager and there is no response to a communication (non-communicating state), then an event is displayed and the icon color changes to gray. The next time there is a response to polling, the previous state (the one before the non-communicating state) is restored.

For VMware Infrastructure 3 Version 3.5 or later and VMware ESXi 3.5 or later, this software uses a private protocol of VMware. The communication status polling method does not detect changes in the device status, but does detect the non-communicating status. The polling is performed only for VM hosts; VM guests are not polled. When the non-communicating state is detected for a VM host, this software judges that the VM host and all the VM guests included in it are in the non-communicating state.

With either SNMP or ping, Systemwalker Centric Manager linkage and Shell/bat linkage are enabled by default. The swsag code reported to Centric Manager is 4822. The linkage behavior can be modified. For information see "C.10 Device Polling Setting File".

Users can customize polling intervals, the time at which operation stops, the specification of devices to be excluded from polling operation, and other device polling functions. For details, see "C.10 Device Polling Setting File".

📒 Note

・ This function does not support manual embedding devices for which no IP address is set.

・ When the device polling detects a change in network or device status, any event of "Device Polling Event" in the "ETERNUS SF Storage Cruiser Event Guide" is displayed. However, when the state change of device is detected by executing [Refresh] operation, the following events are not displayed. Confirm the state from a device icon.

📖Information

To use SNMP, define "public" as the community name. For information on communication with a different community name, see "SNMP_COMMUNITY_NAME_FOR_IP" in the "C.2 sanma.conf Parameter", so that an appropriate community name can be set.

2.4 Setting Event Levels

The Manager takes appropriate action for events as described below according to the support level of the mechanism for a device.

There are three event levels: Error, Warning, and Information.

- Server node agent

  Some statuses on Client are changed but some are not changed.

  On Solaris OS and Windows server nodes, the status can be properly changed for failures HBAs and multipath.

  For failures in another middleware on Solaris OS and Windows server nodes, only events are displayed but the server node icon color is not changed in the resource management view (only the statuses of multipath and HBAs influence the colors of server node icons in the resource management view for a processing time matter). However, on the Correlation window, such failures may influence the server node icons as circumstances demand.

- Support levels A, B and E

  Statuses on Client are changed appropriately.

  However, when the status of a device, whose support level is A or B, is displayed, the current status is read from the device again. The status displayed at this time is the status reported by the unit.

- Support level I (for devices supporting SNMP Traps)

  The client status is not changed.

Information

The event level for individual SNMP Traps can be customized. For details, refer to "C.6 SNMP Trap XML Definition File".

Chapter 3 Operation Design

3.1 LAN Connections

Manager manages devices, using the LAN I/Fs of a device subject to management.

Connect the LAN for management to all devices subject to management.

In this case, transactions affected by management can be minimized by separating the LAN for management from that for transaction.

3.1.1 Network requirements

When a firewall is placed between Manager and a device subject to management, set the following port numbers to be able to pass the firewall.

Communication with the client

Transmission destination	Port/protocol	Transmission start direction	Function
Manager	23456/tcp	Client -> manager	GUI display/operation
Device subject to management	Depends on the device subject to management	Depends on the device subject to management	Calling Management Software

Communication with the manager

Transmission destination device	Port/protocol	Transmission start direction	Function
Server node (Agent)	4917/tcp	Manager -> device	Configuration management, Polling monitoring
	162/udp	Device -> Manager	Fault management
VMware Infrastructure 3 Version 3.5 or later VMware ESXi 3.5 or later	433/tcp	Manager -> device	Configuration management, Polling monitoring
Fibre Channel switch ETERNUS SN200 series BX600 Fibre Channel switch blade	161/udp	Manager -> device	Configuration management, Performance management, Polling monitoring
	23/tcp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
Virtualization switch device ETERNUS VS900 model 200	5988/tcp	Manager -> Brocade SMI Agent	Configuration management
	162/udp	Device -> Manager	Fault management
	7420/tcp	Manager -> device	Virtual Storage Conductor
	ping/icmp	Manager -> device	Polling monitoring
Virtualization switch device ETERNUS VS900 model 300 SN200 model 540 Virtualization blade	161/udp	Manager -> device	Configuration management, Performance management, Polling monitoring

Transmission destination device	Port/protocol	Transmission start direction	Function
	23/tcp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
	7420/tcp	Manager -> device	Virtual Storage Conductor
Disk storage system ETERNUS DX60/DX80 ETERNUS2000 ETERNUS3000 (except model 50) ETERNUS4000 ETERNUS6000 ETERNUS8000 ETERNUS GR series (except GR710 and GR720)	161/udp	Manager -> device	Configuration management, Performance management, Polling monitoring
	1999/tcp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
Disk storage system ETERNUS3000 model 50 ETERNUS GR710, GR720	161/udp	Manager -> device	Configuration management, Polling monitoring
	80/tcp	Manager -> device	Configuration management
	1999/tcp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
Hitachi SANRISE1000/2000	161/udp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
	ping/icmp	Manager -> device	Polling monitoring
EMC Symmetrix 3000/5000/ESP/ 8000	161/udp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
	ping/icmp	Manager -> device	Polling monitoring
Tape library unit LT270,LT250,LT160	161/udp	Manager -> device	Configuration management
	162/udp	Device -> Manager	Fault management
	ping/icmp	Manager -> device	Polling monitoring
Bridge unit Crossroads	161/udp	Manager -> device	Configuration management
	23/tcp	Manager -> device	Configuration management
	ping/icmp	Manager -> device	Polling monitoring
Network disk array NR1000	162/udp	Device -> Manager	Fault management
	161/udp	Manager -> device	Polling monitoring
Manual embedding, and others	162/udp	Device -> Manager	Fault management
	ping/icmp	Manager -> device	Polling monitoring

3.1.2 SNMP Community

The manager and managed devices use the following SNMP community.

Transmission destination device	Default	Access	Method of settings
Fibre channel switch ETERNUS SN200 series BX600 Fibre channel switch blade	public	read	Refer to "4.2.1.1 Setting" for detailed settings.
	private	read/write	

Transmission destination device	Default	Access	Method of settings
Virtualization switch device ETERNUS VS900 (except model 200) ETERNUS3000 (except model 50)	public	read	Refer to "4.2.1.1 Setting" for detailed settings.
	private	read/write	
SN200 MDS(Cisco MDS) Fibre Channel switch	public	read	Refer to "4.2.4.1 Settings" for detailed settings.
McDATA Fibre channel switch	public	read	Refer to "4.2.5.1 Settings" for detailed settings.
ETERNUS DX60/DX80 ETERNUS2000 ETERNUS3000 ETERNUS4000 ETERNUS6000 ETERNUS8000 ETERNUS GR series	public	read	Refer to "4.3.1.1 Setting" for detailed settings.

Information
. . . .

For changing the community name to use, change it by referring to "SNMP_COMMUNITY_NAME_FOR_IP" of "C.2 sanma.conf Parameter".
. . . .

Chapter 4 Environment Configuration

This chapter provides settings and notes required for devices to be managed.

Flow of All Operations

Whether building a new storage system or using this software for an existing storage system, start the environment setup and operation according to the procedure indicated in the figure shown below. Software can be installed and set up on individual devices in any sequence.

Note that once this software is installed and devices to be managed are registered, fault monitoring and fault recovery are performed for the registered devices while the administrative server is active, without having to start the Client window (GUI window). Also, performance information is stored for devices subject to performance management.
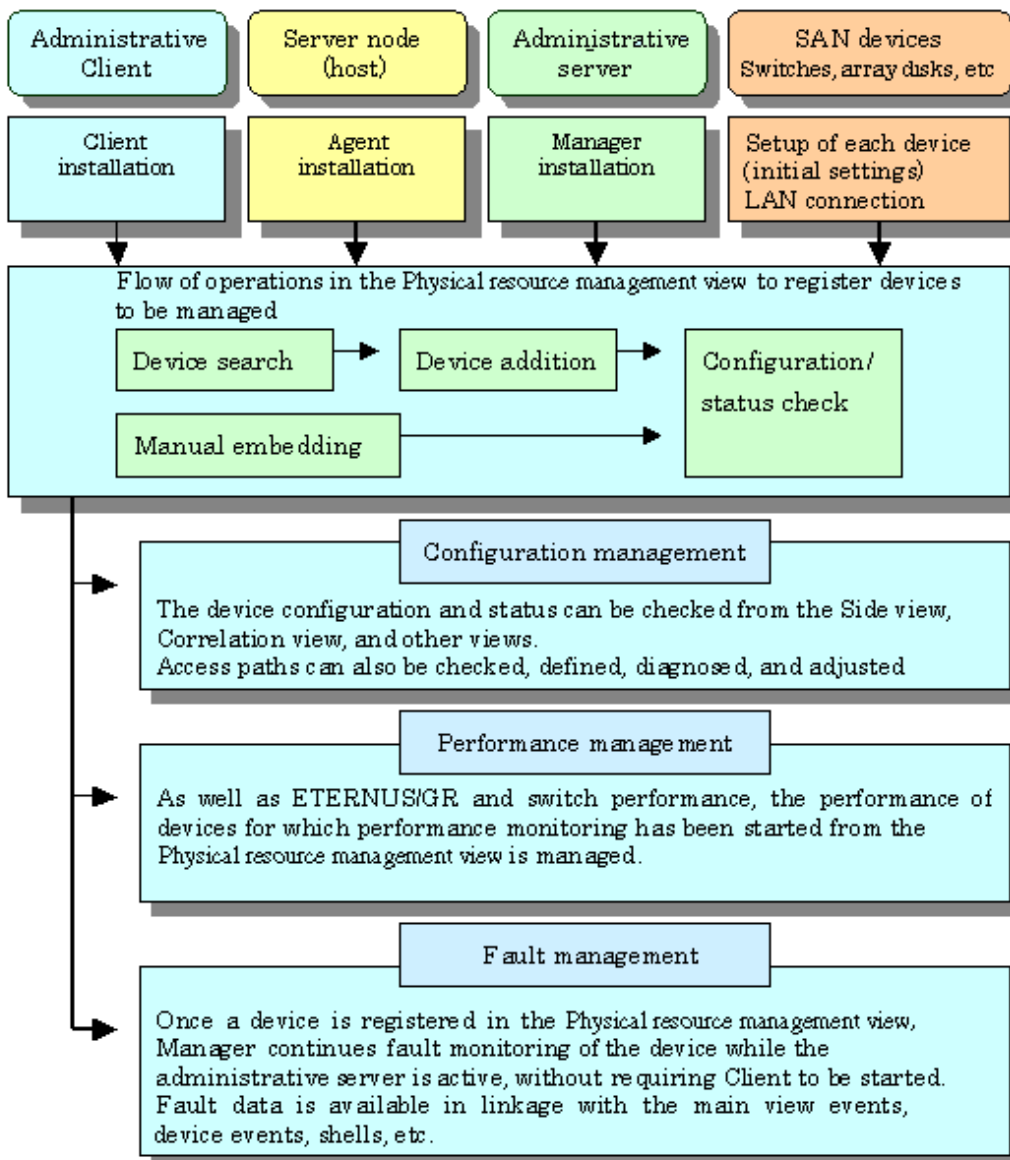
4.1 Server Node (Host)

4.1.1 Solaris OS server node (host)

Two methods are used for managing Solaris OS server nodes: one method installs Agent on the host, and the other does not.

When Agent is installed, the following functions are available: the configuration data is automatically loaded from the server node; the system fault and status is monitored for Fujitsu's multipath disk control mechanism, mirror disks, and file systems; the line drawing for FC connection is performed; the access path settings are configured including server node HBA binding (storage affinity). Without Agent installed, the host can still be registered manually but status reading/access path setting/fault monitoring is disabled.

See

For information about products that can be monitored by Agent, see "10.5 Server Node Middleware that can be Managed".

Note

The limitations when Solaris OS server nodes are managed using the Agent:

- HBA WWNN (World Wide Node Name) and PID binding (storage affinity) settings are not supported.

  The access path is managed automatically in this software using WWPN (World Wide Port Name). Accordingly, if WWNN, PID, or TID binding has already been set in the server node HBA (host bus adapter), the settings must be changed to WWPN binding before the device is registered in this software. Server nodes that are used to perform WWNN, PID, or TID binding cannot be registered in this software.

- If device files of more than one controller number are generated

  If more than one device driver type is used to access storage of a different type from a single HBA, device files for at least 2 controller numbers may be generated for the single HBA. This software does not support this status.

  If there is a problem with information gathering or display, manage the server nodes using the manual embedding function. For details on the manual embedding function, refer to "5.2.6 Registering a Manually Embedded Device".)

The methods used to manage Solaris OS server nodes installed in SUN-made HBAs and Fujitsu-made HBAs using Agents are different. These differences are shown in the table below.

Function	Fujitsu-made HBAs	SUN-made HBAs
Access path settings	Specify the target number and LUN when the access path is set.	Settings are not configured in the settings file, so enter the default values for the target number and LUN when the access path is set. The command for enabling recognition of the LUN must also be entered. The dialog for entering target number is not displayed.
Access path color	If the LUN is recognized, the color changes from Blue to Green.	This is always blue in the normal status. When the path status of the multipath is not "normal", access path color is red.
Side view HBAs	This is displayed as the logic HBA number before recognition of the LUN, and in Cx format after recognition of the LUN.	The logical HBA number is always displayed.
Beacon blinking	Possible.	Not possible (the menu cannot be selected).
Server Node view server multipath display	This is displayed when there is a multipath environment. The path can also be displayed by selecting the multipath instance name.	Information on the multipath driver device is not displayed. Therefore, multipath driver's path information cannot be displayed.
Resource view server property multipath information	This is displayed when there is a multipath environment.	This is not displayed (only the option name is displayed).

Function	Fujitsu-made HBAs	SUN-made HBAs
Resource view HBA property connection admission WWPN, target number, and LUN information	This is displayed.	The connection admission WWPN and LUN information are displayed. The target number is not displayed.
Resource view access path property connection admission WWPN, target number, and LUN information	The connection admission WWPN, target number, and LUN information are displayed.	The connection admission WWPN and LUN information are displayed. The target number is not displayed.
Element display except for Relationship Management window HBA nodes and HBA ports	Raw devices, multipath devices, and file systems (ufs, zfs) are displayed.	A file system (ufs,zfs,QFS/SAM-QFS/SAM-FS) will be displayed. A multipath device (MPxIO) is displayed. The raw device is displayed.
Relationship Management window HBA port property connection admission WWPN, target number, and LUN information	This is displayed.	The connection admission WWPN and LUN information are displayed. The target number is not displayed.
Relationship Management window access path property connection admission WWPN, target number, and LUN information	The connection admission WWPN, target number, and LUN information are displayed.	The connection admission WWPN and LUN information are displayed. The target number is not displayed.
Multipath path display	It is possible to show a light blue color on the information of the access path and the storage information area, by selecting and clicking a multipath device file name on the server icon in the resource control window. In the relationship management window, path and correlated device icon can be displayed in color by Route Search.	In the relationship management window, the path from a multipath device to the HBA port can be displayed. Additionally, in the relationship management window, correlated device icon can be displayed in color by Route Search.

4.1.1.1   SNIA HBA API library settings

To manage the HBAs that are installed at Solaris OS server nodes, the SNIA HBA API library that an HBA vendor distributes must be installed.

When using PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1

Install the SNIA HBA API library by installing the driver (FUJITSU PCI Fibre Channel 2.2.1 or 3.0).

When FUJITSU PCI Fibre Channel 2.2.1 is installed, it must be patched (by 912069-17 or later).

Note that FUJITSU PCI Fibre Channel 2.2 cannot be used any more.

Emulex Corporation LP9000/9002S/9002L/9802/10000

Install HBAnyware (SNIA HBA API) according to the instructions in the driver's handbook.

Using SE0X7F11F or SE0X7F12F

After installing the driver (FUJITSU PCI Fibre Channel 4.0 or higher), the SNIA HBA API library must be changed according to the following procedure.

1. Change the link from "/usr/lib/libfchba.so" to "/opt/FJSVpfca/sbin/libfchba.so" to "/opt/FJSVpfca/sbin/libfchba1.so".

```
# rm /usr/lib/libfchba.so
# ln -s /opt/FJSVpfca/lib/libfchba1.so /usr/lib/libfchba.so
```

2. Reboot.

```
# /usr/sbin/shutdown -y -i6 -g0
```

Using XSEFC401AF or XSEFC402AF

The SNIA HBA API library is included in the driver that is handled in the OS, therefore it has no settings.

When using SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, SG-XPCI2FC-QF2-Z

There is no need to set up SNIA HBA API library, as it is included in the driver which is bundled with the operating system.

4.1.1.2 N-port settings

N port setting is needed on the side of HBA when connecting with the Fibre Channel switch. The method of setting the port of HBA as N port depends on the HBA type. Each method for setting is shown below.

PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F driver

Describe the following port type in the /kernel/drv/fjpfca.conf file in each instance name of fjpfca(Adapter).

```
port=
"fjpfca0:nport",
"fjpfca1:nport";
```

Emulex Driver (LPFC/LPFS driver)

The topology parameter of /kernel/drv/lpfc.conf or lpfs.conf file is set to 2 as follows:

```
# topology: link topology for initializing the Fibre Channel connection.
# 0 = attempt loop mode, if it fails attempt point-to-point mode
# 2 = attempt point-to-point mode only
# 4 = attempt loop mode only
# 6 = attempt point-to-point mode, if it fails attempt loop mode
# Set point-to-point mode if you want to run as an N_Port.
# Set loop mode if you want to run as an NL_Port.
topology=2;
```

XSEFC401AF or XSEFC402AF driver

Specify "2" for the emlxsX-topology parameter in the /kernel/drv/emlxs.conf file.

```
#
# +++ Fibre Channel specific parameters +++
#
# topology: link topology for initializing the Fibre Channel connection.
#
#          0 = attempt loop mode, if it fails attempt point-to-point mode
#          2 = attempt point-to-point mode only
#          4 = attempt loop mode only
#          6 = attempt point-to-point mode, if it fails attempt loop mode
#
# Set point-to-point mode if you want to run as an N_Port.
# Set loop mode if you want to run as an NL_Port.
#
# Range: Min:0 Max:6 Default:0
#
emlxs0-topology=2;
emlxs1-topology=2;
```

SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, SG-XPCI2FC-QF2-Z driver

N port settings are not required.

4.1.1.3 Database monitoring settings

Note that database monitoring requires the following actions to be taken in advance:

Registering user information

Execute the defusr command, and register the user information necessary for database monitoring. For information about the defusr command, see "12.5.1.1 User information setting command (defusr)".

For information about particulars specified in the defusr command, see descriptions of monitoring each database.

Monitoring for Symfoware

Define the environment variables necessary for database access (e.g., LD_LIBRARY_PATH) in the sstorageagt.conf file. For information about the sstorageagt.conf file, see "C.8 sstorageagt.conf Parameter". For information about the necessary environment variables, refer to the appropriate Symfoware manual. In order to use multiple RDBs, a Symfoware statement must be defined in the Correlation.ini parameter. For information about the Correlation.ini parameter, see "C.7 Correlation.ini Parameter". The registration of the user information by the defusr command is unnecessary.

Monitoring for Oracle

The JDBC driver is used to access Oracle. In the sstorageagt.conf file, define an environment for using the JDBC driver; and, using an Oracle statement in the Correlation.ini parameter, specify the number of the port used for access. For information about the sstorageagt.conf file, see "C.8 sstorageagt.conf Parameter". For information about the Oracle statement in the Correlation.ini parameter, see "C.7 Correlation.ini Parameter". For information about definitions necessary for the JDBC driver environment, refer to the appropriate Oracle manual.

The key name of the defusr command must be assigned the instance name subject to configuration management.

4.1.2 Windows server node (host)

This software provides two methods for managing Windows hosts: one method installs Agent on the host, and the other does not.

When Agent is installed, the following functions can be implemented: the configuration data is automatically loaded from the server node; the line drawing for FC connection is performed; the system fault and status is monitored for Fujitsu's multipath disk control mechanism or msdsm (the multi path driver that is built into Windows operating system since Windows Server 2008 by the standard). Without Agent installed, the host can still be registered manually but status reading/access path setting/fault monitoring is disabled.

📑 See
....
For information about the products that can be observed by Agent, see "10.5 Server Node Middleware that can be Managed".
....

📝 Note
....
If the PG-FC105 driver is reinstalled, or the PG-FC105 adapter and other option cards are added , reduced , or replaced, there may be entries for which "(Disconnected)" is displayed for "Emulex Configuration Tool". In this case, delete the entry according to the procedure shown below. If this entry is not deleted, invalid information may be displayed in the client window.

1. Click [Start] - [Run].

2. Enter "elxcfg" and then click the <OK> button.
   The Emulex Configuration Tool starts up, and the list of PG-FC105s loaded in the server nodes is displayed in Available Adapters. The example of the list that is displayed as follows:

```
Emulex LP-9000 Adapter, Bus 1 Slot 7 (Present)
Emulex LP-9000 Adapter, Bus 1 Slot 8 (Present)
```

3. Select the entry for which "(Disconnected)" is displayed, click the [File] menu and select [Remove].

4.1.2.1 SNIA HBA API library settings

To manage the HBAs that are installed in Windows server nodes, the SNIA HBA API library that an HBA vendor distributes must be installed.

When PG-FC105 (Driver v5-2.13a4) is used

By installing a PG-FC105 driver, the SNIA HBA API library is installed.

PG-FC105 (other than Driver v5-2.13a4), PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD201, Emulex Corporation LP9000, 9002L, 9802, 1050, 1050Ex

Install HBAnyware (SNIA HBA API) according to the user's guide for the HBA card or the driver's handbook.
If PG-FC202 or PG-FCD201 is used, change $INS_DIR\Agent\bin\HBAAPI.dll to another name (for example, HBAAPI.dll.bak).
($INS_DIR means "Program Directory" specified at the Agent installation.)
If HBAAPI.dll does not exist, file name change is not necessary.

PG-FCD101, PG-FCD102, QLA2340

Copy $INS_DIR\Agent\lib\HBAAPI.dll to $INS_DIR\Agent\bin\HBAAPI.dll.
($INS_DIR means "Program Directory" specified at the Agent installation.)
If the copy destination directory already contains the same file, the file need not be copied.

MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, or MC-08FC71

Install HBAnyware (SNIA HBA API) by referring to the operation manual of the HBA card or the driver manual.

4.1.2.2 N-port settings

To connect Emulex Corporation LP7000, 8000, 9000, 9002L, 9802, 1050, 1050Ex, to a Fibre Channel switch, N-port settings are required on the HBA side.

To make up a SAN by connecting Emulex Corporation LP7000, 8000, 9000, 9002L, 9802, 1050, 1050Ex to the fibre channel switch, use the driver parameter in the registry to indicate explicitly that the topology is an N-port. The following indicates the procedure for setting the topology in the driver parameter:

1. Open the registry editor.

   Select [Start] - [Run...] from the task bar, and then execute the following:

   regedit.exe

2. Open the keyword of the following registry key, and then set the Topology value to 1:

```
HKEY_LOCAL_MACHINE\
System\
   CurrentControlSet\
    Services\
     lpxnds\
      Parameters\
        Device\
        "DriverParameter"      Topology=1
```
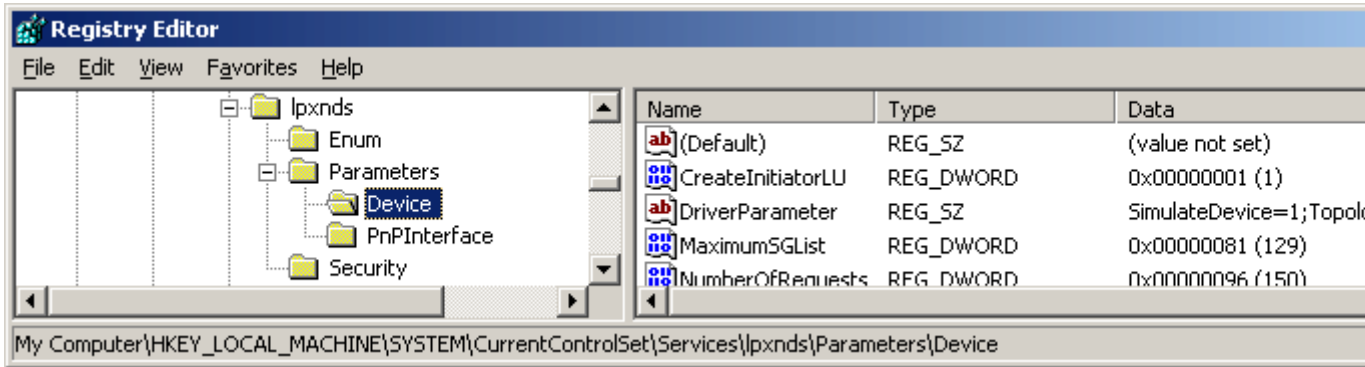
- The DriverParameter value depends on the version of the driver used. The Topology word may not exist depending on the driver version. In this event, the Topology word must be added. For details, see the readme file supplied with the driver or contact the HBA vendor.

- If the system accommodates more than one Emulex HBA and you want to connect them to Fibre Channel using different topologies, follow the above procedure for each HBA. For details, see the readme file supplied with the driver or contact the HBA vendor.

- The procedure involves changing the registry contents. Take particular care when carrying out the procedure because, if any part of the registry becomes corrupted as a result of an operation mistake or an operation that is not in the procedure, restarting the Windows system may not be possible.

4.1.2.3   Database monitoring settings

Note that database monitoring requires the following actions to be taken in advance:

Registering user information

Execute the defusr command, and register the user information necessary for database monitoring. For information about the defusr command, see "12.6.1.1 User information setting command (defusr)". For information about particulars specified in the defusr command, see descriptions of monitoring each database.

Monitoring Symfoware

Define the environment variables necessary for database access (for example, PATH) in the sstorageagt.conf file. For information about the sstorageagt.conf file, see "C.8 sstorageagt.conf Parameter". For information about the necessary environment variables, refer to the Symfoware manual. In order to use multiple RDBs, a Symfoware statement must be defined in the Correlation.ini parameter. For information about the Correlation.ini parameter, see "C.7 Correlation.ini Parameter". The registration of the user information by the defusr command is unnecessary.

Monitoring Oracle

The JDBC driver is used to access Oracle. In the sstorageagt.conf file, define an environment for using the JDBC driver, and specify the port number used for access in an Oracle statement in the Correlation.ini parameter. For information about the sstorageagt.conf file, see "C.8 sstorageagt.conf Parameter". For information about the Oracle statement in the Correlation.ini parameter, see "C.7 Correlation.ini Parameter". For information about definitions necessary for configuring the JDBC driver, refer to the Oracle manual. The key name of the defusr command must be assigned the instance name subject to configuration management.

Monitoring SQL Server

To access an instance with a name or to log in with SQL Server authentication, an SQLServer statement must be defined in the Correlation.ini parameter. For information about the Correlation.ini parameter, see "C.7 Correlation.ini Parameter". Although any key name can be specified for the defusr command, it must be identical with the key name described in the SQLServer statement in the Correlation.ini parameter.

4.1.3 Linux server node (host)

This software provides Linux server nodes with two management methods. In one method Agent is installed and in the other method Agent is not installed.

When Agent is installed, automatic import of the server node configuration from Manager, FC connection plot, and fault and status monitoring of the Fujitsu's multipath disk control mechanism become available. Without Agent installed, the host can still be registered manually but status reading/access path setting/fault monitoring is disabled.

See
....
For information about the products that can be observed by Agent, see "10.5 Server Node Middleware that can be Managed".
....

4.1.3.1 SNIA HBA API library settings

It is necessary to install the HBA API library that the HBA vender distributes to manage HBA installed in the Linux server node.

PG-FC105, PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD201

Execute the next item of "Checking whether the HBA API library has been installed".

- ・ Driver version is V1.23a-0/V420q-1
  Install the SNIA HBA API common library (supporting Common HBA API Version 2.18) as follows.

  1. If /usr/lib/libHBAAPI.so file exists, save it.

  2. Copy /opt/FJSVssage/lib/libHBAAPI.so in /usr/lib/ or create the symbolic link as follows:

     ```
     # ln -s /opt/FJSVssage/lib/libHBAAPI.so /usr/lib/libHBAAPI.so
     ```

  3. As for libemulexhbaapi.so (SNIA HBA API vendor library), contact your Fujitsu systems engineer (SE).

- ・ If the driver version is not V1.23a-0 or V4.20q-1
  As for HBA API library, contact your Fujitsu systems engineer (SE).

Checking whether the HBA API library has been installed

Check whether the following two conditions are met to determine the installation status. If both the conditions are met, the HBA API library has been installed.

1. All of the following files exist.
   - /usr/lib/libHBAAPI.so
   - /usr/lib/libemulexhbaapi.so
   - /etc/hba.conf

2. Executing the following command results in an integer that is 1 or larger. (The command is one line.)

   ```
   egrep -c [^[:blank:]]+[[:blank:]]+/usr/lib/libemulexhbaapi.so /etc/hba.conf
   ```

PG-FCD101, PG-FCD102

Execute the next item of "Checking whether the HBA API library has been installed". Install SNIA HBA API common library which corresponds to this software (corresponding to Common HBA API Version 2.18) as follows.

1. If /usr/lib/libHBAAPI.so file exists, save it.

2. Copy /opt/FJSVssagt/lib/libHBAAPI.so in /usr/lib/ or create the symbolic link as follows:

   ```
   # ln -s /opt/FJSVssage/lib/libHBAAPI.so /usr/lib/libHBAAPI.so
   ```

3. As for libqlsdm.so (SNIA HBA API vendor library), contact your Fujitsu systems engineer (SE).

Checking whether the HBA API library has been installed

Check whether the following two conditions are met to determine the installation status. If both the conditions are met, the HBA API library has been installed.

1. All of the following files exist.
   - /usr/lib/libHBAAPI.so
   - /usr/lib/libqlsdm.so
   - /etc/hba.conf

2. Executing the following command results in an integer that is 1 or larger. (The command is one line.)

   ```
   egrep -c [^[:blank:]]+[[:blank:]]+/usr/lib/libqlsdm.so /etc/hba.conf
   ```

MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, MC-08FC71

Install HBAnyware (SNIA HBA API) by referring to the operation manual of the HBA card or the driver manual.

4.1.3.2 Using the udev device

Information

. . . .

・ The udev device is a Linux function that always assigns a fixed device name, even if the hardware configuration is changed.

It assigns a device name that starts with "/dev/disk", unlike for existing device names, such as "/dev/sda".
"/dev/disk/by-path/xxxxxxxx" xxxxxxxx is information generated from the disk location information
"/dev/disk/by-id/yyyyyyyy" yyyyyyyy is information generated from the disk ID information

In the following explanations, device names that start with "/dev/disk/by-path" are shown as "by-path", and device names that start with "/dev/disk/by-id" are shown as "by-id". Existing device names, such as "/dev/sda", are shown as compatible device names.

. . . .

If the Linux udev function is used for devices monitored using ESC, use "by-id".
"by-id" is a symbolic link to "/dev/sd?name", therefore the relationship for "by-id" and the compatible device name displayed in this software can be checked by using the "ls -l /dev/disk/by-id" command.

Example

. . . .

The method shown below checks "by-id" for "/dev/sdb"

```
# ls -l /dev/disk/by-id/
Total 0
lrwxrwxrwx 1 root root  9  April  3 21:28 scsi-1FUJITSU_300000690000 -> ../../sdb
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690000-part1 -> ../../sdb1
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690000-part2 -> ../../sdb2
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690000-part3 -> ../../sdb3
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690000-part7 -> ../../sdb7
lrwxrwxrwx 1 root root  9  April  3 21:28 scsi-1FUJITSU_300000690001 -> ../../sdc
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690001-part1 -> ../../sdc1
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690001-part2 -> ../../sdc2
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690001-part3 -> ../../sdc3
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690001-part7 -> ../../sdc7
lrwxrwxrwx 1 root root  9  April  3 21:28 scsi-1FUJITSU_300000690002 -> ../../sdd
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690002-part1 -> ../../sdd1
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690002-part2 -> ../../sdd2
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690002-part3 -> ../../sdd3
lrwxrwxrwx 1 root root 10  April  3 21:28 scsi-1FUJITSU_300000690002-part7 -> ../../sdd7
```

Accordingly, it is possible to determine that "by-id" of "/dev/sdb" is "/dev/disk/by-id/scsi-1FUJITSU_300000690000".

. . . .

P **Point**

・・・

- ・ "by-path" for the device that is connected to the Fibre Channel switch may change, therefore specify "by-id".

- ・ Linux device nodes are displayed as compatible device name "sd?" in this software. The "by-id" and "by-path" are not displayed. Check the relationship using the command as shown above.

・・・

4.1.3.3 Database monitoring settings

To monitor databases, the following must have been executed:

Registering user information

Use the defusr command to register the user information that is required to monitor databases. Refer to 12.7.1.1 User information setting command (defusr) for details of the defusr command. For the contents to be specified in the defusr command, refer to the explanation for monitoring each database.

Monitoring Symfoware

Define in the sstorageagt.conf file the environment variables (such as LD_LIBRARY_PATH) that are required to access databases. Refer to "C.8 sstorageagt.conf Parameter". For the required environment variables, refer to the Symfoware manuals. For multiple-RDB operation, the Symfoware statement for the Correlation.ini parameter must be specified. Refer to "C.7 Correlation.ini Parameter". Note that user information registration by the defusr command is not required.

Monitoring Oracle

The JDBC driver is used to access Oracle. Use the sstorageagt.conf file to define the environment for using the JDBC driver and define the port number for accessing Oracle in the Oracle statement for the correlation.ini parameter.
Refer to "C.8 sstorageagt.conf Parameter" and "C.7 Correlation.ini Parameter" for details of the Oracle statement for the correlation.ini parameter. For the required JDBC driver environment definitions, refer to the Oracle manuals. As the defusr command key name, specify an instance name subject to configuration management.

4.1.4 HP-UX server node (host)

This software provides two methods for managing the HP-UX server node. In one method, Agent is installed on the node, in the other, it isn't.

Installing Agent enables automatic loading of server node configuration data from the manager and displaying FC connections in the form of lines. It also enables system fault monitoring and status monitoring for PV-LINK (a function of LVM) from the manager. When Agent is not installed, nodes can still be registered manually, but status inquiry, setting access paths, and fault monitoring cannot be performed.

See

・・・

See "10.5 Server Node Middleware that can be Managed" for information on products that can be monitored by Agent.

・・・

To manage the HBA mounted on an HP-UX server node, the HBA API library must be installed. When in doubt, contact your HBA sales representative.

4.1.5 Other server nodes (hosts) (AIX and the like or Solaris OS/Windows/ Linux/HP-UX without Agent)

This software also provides a method for manually managing server nodes that are not supported by Agent or Solaris OS/Windows/Linux/ HP-UX environments in which Agent is not installed.

Status inquiry or automatic reading of configuration data from a device cannot be performed, but the configuration can be changed by displaying the devices on the screen and manually editing the configuration.

See

For information on the procedure for registering a managed server without Agent, see "5.2.6 Registering a Manually Embedded Device".

4.1.6 Softek Storage Cruiser Agent server node (host)

This software can manage server nodes on which Softek Storage Cruiser is installed. It can manage the all versions of the Agent.

See

For information on models which Softek Storage Cruiser Agentsupport, see "1.5.1 Hardware requirements" in the "Softek Storage Cruiser User's Guide".

The registered server node is managed as managed server node only for monitoring, and device icon is displayed in the GUI window.
The functions shown below can be used for server nodes registered in this software. For information about middleware products that can be managed using correlation window, refer to "1.5.2 Software requirements" in the "Softek Storage Cruiser User's Guide" for the appropriate version.

- ・ Resource configuration management

- ・ Physical resource view

- ・ Correlation window

- ・ Access path management

See

For information on the procedure for registering a serve node, see "5.2.1 Device search".

4.1.7 VMware server node (host)

4.1.7.1 VMware Infrastructure 3 Version 3.0

This software installs Agents on the host operating system of VMware Infrastructure 3 Version 3.0 (VMware) server node and manages them.

The VMware server node is treated the same as the Linux server node in the following manuals.

- ・ ETERNUS SF Storage Cruiser User's Guide (This guide)

- ・ ETERNUS SF Storage Cruiser Message Guide

- ・ ETERNUS SF Storage Cruiser Event Guide

See

Refer to "4.1.3 Linux server node (host)" for details of environmental settings.

Note

- ・ This software cannot manage the guest operating system for VMware server node.

- This software operates both on the VMware server node and the Linux server node. However controllable middleware differs between them. For details, refer to "10.5 Server Node Middleware that can be Managed".

4.1.7.2 VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later)

This software supports VMware Infrastructure 3 Version 3.5 (or later) and VMware ESXi 3.5 (or later). It communicates directly with VMware ESX or VMware ESXi without using an Agent, and displays information about the VM host and VM guests.

Configuration management

This software communicates with the VM host (VMware ESX or VMware ESXi) to acquire information about the VM host itself and any VM guests (virtual machines and guest operating systems) on the VM host, and graphically displays the relationship between the VM host and the VM guests in Resource View and Correlation window.

- Device registration

    To register a VM host and its VM guests with this software, the IP address, login name and password of the VM host are required.
    By registering a VM host, all of the VM guests on the VM host are automatically registered.
    It is not possible to register VM guests by specifying them individually.

- Device deletion

    When VM hosts are deleted from this software, the VM guests on the VM host are automatically deleted.
    When the VM guest is specified, its VM guest is only deleted from this software.

- Access path management

    This software supports setting up, deleting and inheriting the access paths associated with the HBA for the VM host.
    This software does not support access path management for VM guests because it does not support HBA management.

    When the access path environment modification (setting up, deleting and inheriting) is executed, reboot the VM host or execute the following procedures by using VMware Infrastructure Client.

    1. Select the "Configuration" tab

    2. Select "Storage Adapters" from Hardware lists.

    3. From Hardware lists, select the device corresponding to HBA that the access path setting was changed.

        At this time, select the device of the same name as logical HBA number displayed in the HBA property on the Resource View.

    4. Execute "Rescan" from pop-up menu.

Fault management

- Receiving SNMP Trap

    The fault management by using SNMP Trap function is not supported.

- Device polling

    This software supports device polling for VM hosts. Device polling can be used to determine whether communications are possible between the Manager and VM hosts.
    If a VM host cannot communicate, its VM guests will also be treated as though they cannot communicate.
    This software cannot detect status changes for VM guests because it does not support device polling for VM guests.
    Check the status of VM guests by selecting [Refresh] from the [View] menu.

Changing environment

- Changing the host name or IP address

    When the hostname or IP address of a VM host is changed, it is necessary to delete its VM host from this software and register its VM host again after changing the hostname or IP address. For details, refer to the following sections.

    - "9.1.2.2 Changing the IP address of a server node (host)"

- "9.1.2.4 Changing the name of a server node (host)"

Execute [Refresh], if any of the following have been changed: the virtual machine name of a VM guest, or the IP address or host name of a guest operating system.

- New creation of VM guest

When new VM guest is created, specify the VM host including new VM guest and execute [Register virtual machines].

- User name and password

When [Refresh] is executed under the condition that user name or password of VM host has been changed, its changing is detected by this software and the monitoring status of its VM host and VM guest will be "invalid Password". When the user name or password of the VM host has been changed, select [Change account for device management] from the [Device] menu and set the new username or password in this software.

- Moving VM guest between VM hosts

This software cannot detect automatically for moving VM guest between VM hosts by using VMware VMotion function and VMware HA function. Moved VM guest is treated as though it cannot communicate. Therefore, execute the following procedures for moving VM guest.

1. Select the destination VM host for moving VM guest from Side view, and delete its VM guest.

2. Select the target VM host for moving VM guest, and execute [Register virtual machines].

Note
・ It is recommended that VMware Tools be installed on the guest operating system.

・ VMware Tools must be installed on the guest operating system in order to display information about the guest operating system (such as the IP address, host name, and the type and version of the operating system).

・ If VMware Tools is not running, the virtual machine name will be displayed as the device name for VM guests. When VMware Tools is started, the host name for the guest operating system will be displayed as the device name for VM guests.

・ If VMware Tools has been installed, the device status of VM guests will be "normal" if VMware Tools is running. If VMware Tools is stopped, the device status will change to "stop" (even if the guest operating system is running).

・ If VMware Tools has not been installed, then the VM guests device status will be "normal" if the virtual machine is running and "stop" if the virtual machine is stopped, regardless of the status of the guest operating system.

・ When it is not possible to communicate with the VM host, the monitoring status of VM host and all VM guests on its VM host becomes "unmonitored".

・ When it is not possible to communicate with the VM host because of inconsistency for user name and password, the monitoring status of VM host and all VM guests on its VM host becomes "invalid Password".

4.2 Fibre Channel Switch

4.2.1   SN200 (Brocade) Fibre Channel switch

This software supports ETERNUS SN200 series Fibre Channel switch, Brocade Fibre Channel switch, Fibre Channel switch with ETERNUS GR740D installed, and PRIMERGY BX600 Fibre Channel switch blade.

The settings that must be directly defined on the device side before this software manages these Fibre Channel switches are explained below. For details, refer to the manual supplied with the respective device.

4.2.1.1　Setting

IP address, subnet mask, and gateway address (required)

Define the IP address, subnet mask, and gateway address for a LAN. If the Fibre Channel switch is equipped with an operation panel, these settings can be defined from the operation panel. If the Fibre Channel switch is equipped with a serial port, define them by issuing the ipAddrSet command via the serial port.

User name and password for Fibre Channel switch control

For Fibre Channel switch control, this software is used to log in using telnet to the device. Control requires a user name and password of the administrator security level. The factory default settings of user name and password are "admin" and "password", respectively.

If the password has been changed on the device side, this software recognizes the change and displays the device icon as a warning when [Refresh] is selected. Also, the monitoring status of the device becomes "invalid Password".

In order for the setting to match the changed device setting, select the device icon in the domain view of the physical resource view, and select [Device] - [Change account for device management] from the main menu.

For some types of devices, the change of the password on the device side cannot be recognized automatically, and the status does not become "invalid Password". Click [Device] - [Change account for device management] in the main menu for these devices as well.

When connected to a cascade, some types of devices cannot automatically recognize the changed password; therefore the status doesn't become "invalid Password". In this case, delete the device and register it again. Refer to "5.2 Registering device" for details on deleting and registering devices.

Domain name

A domain name is a unique name defined for a Fibre Channel switch in a SAN. Such names are necessary for a cascade connection of multiple Fibre Channel switches. Since domain names are automatically defined by firmware built into the individual Fibre Channel switches, the name need not be considered during definition and management of access paths using this software.

However, the domain names are important elements in manual port zoning. In such cases, make sure that no identical value is set for any two Fibre Channel switches in the cascade connection. If a Fibre Channel switch is equipped with an operation panel, a domain name can be set from the operation panel. If a Fibre Channel switch is equipped with a serial port or if network settings are defined for the Fibre Channel switch, log in to the switch, and set a domain name by executing the configure command.

SysName (recommended)

Register a switch name for Fibre Channel switch control. This software uses this switch name as SysName. SysName should be a name that is not identical to any other name registered with this software. If the Fibre Channel switch is equipped with an operation panel, a switch name can be set from the operation panel. If the Fibre Channel switch is equipped with a serial port or if the network settings are defined for the Fibre Channel switch, log in to the switch, and set a switch name by executing the switchName command.

Zoning setting

Zoning is recommended. Zoning is not required for the GR740D built-in Fibre Channel switch.

No zoning is set for Fibre Channel switches by factory default. When such Fibre Channel switches are connected to server nodes or storage devices, they are placed in a state where their security levels are undefined (which makes all of the Fibre Channel switches accessible from every server node). To prevent inadvertent access from destroying data on the storage side, do not make an attempt from the server node to make write access to a storage device by using the format or other command, until an access path is defined by this software.

If suppression of write access attempts is not guaranteed, thereby allowing data to be written inadvertently to the storage device, stop all access paths of the Fibre Channel switches by creating a temporary zone using telnet as shown below. After defining this setting, connect the server node and storage device to the Fibre Channel switch, and set up an access path using this software. When setting up a cascade connection between the Fibre Channel switch and another Fibre Channel switch for which zoning is already set, you need not define this setting because zoning information is copied. The setting is also not necessary if the Fibre Channel switch is to operate without the zoning setting.

```
zoneCreate"SNM_0001","00:0B:00:00:0E:00:00:00;00:0C:00:00:0E:00:00:00"
cfgCreate"SNM_BCSI","SNM_0001"
cfgEnable"SNM_BCSI"
cfgSave
```

If the Fibre Channel switches are to be cascaded for operation, cascade the switches before executing the above command. Execute this command on a Fibre Channel switch where the latest firmware has been installed.

Create a temporary zone when using the host affinity and zoning operation command (storageadm zone). For details, refer to "12.1.1.5 Host affinity and zoning operation command (storageadm zone)".

If this zone has been created, all accesses will be blocked. For this reason, do not implement this measure while the target Fibre Channel switch environment is operating. Implement this measure either immediately after the Fibre Channel switch environment has been installed and before operations have started (or while operations are paused).

SNMP community setting

This software communicates with the Fibre Channel switch by using "public" or "private" for the SNMP Community name. To change the SNMP Community name, change the settings on the device side, and adjust the settings of this software accordingly. For information about changing the Community name, refer to "SNMP_COMMUNITY_NAME_FOR_IP" in the "C.2 sanma.conf Parameter".

SNMP-MIBsetting

For the SNMP-MIB setting of the Fibre Channel Switch (except for the ETERNUS SN200 model 250M and Brocade AP7420), set the following by specifying the telnet command snmpMibCapSet. Specify "yes" for the "FA-MIB" and "SW-TRAP" items. Leave the other items unspecified. Simply press ENTER for these unspecified items.

```
sn200:admin> snmpMibCapSet
  The SNMP Mib/Trap Capability has been set to support
  FE-MIB SW-MIB SW-TRAP FA-TRAP
  FA-MIB (yes, y, no, n): [no] yes
  SW-TRAP (yes, y, no, n): [yes] yes
  FA-TRAP (yes, y, no, n): [yes]
  SW-EXTTRAP (yes, y, no, n): [no]
  Committing configuration...
  done.
sn200:admin>
```

The output of the above command may depend on the firmware version of the Fibre Channel switch. Change the settings of only the "FA-MIB" and the "SW-TRAP" items.

If "FA-MIB" is not "yes", physical connection information, port zoning information, and port speed (transfer rate) information on each port of the Fibre Channel switch is erroneously recognized. Additionally, the fault monitoring function does not run if "SW-TRAP" is not "yes".

4.2.1.2   Zoning

This software uses the one-to-one WWPN zoning of the Fibre Channel switch as the basis for setting up and removing access paths (logical paths). However, it also supports other types of zoning settings at their respective levels. The functions that it supports for the different types of zoning are as follows:

No zoning setting (With this software, this is called the "no security state".)

This is a state that has no zoning setting. In this state, the Fibre Channel switch permits access between all ports. It is the factory default setting. However, if a Fibre Channel switch is connected in cascade to another Fibre Channel switch with a zoning setting, the zoning setting information is copied when cascade connection communication is established.

This software can perform management normally for the Fibre Channel switches without a zoning setting. Also, when registering a Fibre Channel switch with this software, you can specify whether to set zoning in response to a subsequent software attempt to set up an access path.

With no zoning setting, the Fibre Channel switch operates with security management delegated to the binding and affinity capabilities of server nodes and storage devices.

WWPN zoning setting

The WWPN zoning setting is a method by which zoning is defined based on the WWPN of a Fibre Channel port. A WWPN value that is unique throughout the world is defined for each port. As a result, no wrong access path is created even if the port connection place of the Fibre Channel switch is changed.

All access path control functions of this software are effective for access paths defined in the one-to-one WWPN zoning setting. For other defined access paths, this software can read access and display path information, but it cannot delete the access paths. To delete

an access path, use the zoning information in the Fibre Channel switch properties, or Fibre Channel switch Management Software, or the telnet capability of the Fibre Channel switch.

Port zoning setting

The port zoning setting is a method by which zoning is defined based on the specification of the port connection place of the Fibre Channel switch. A new port zoning setting must be defined if the port connection place of the Fibre Channel switch is changed.

As for the access path control functions, this software can read information about access paths for which port zoning is set, display the paths, and manage their status, but it cannot delete the access paths. To delete an access path, use the zoning information in the Fibre Channel switch properties, Fibre Channel switch Management Software, or the telnet capability of the Fibre Channel switch.

WWNN zoning setting

The WWNN zoning setting is a method by which zoning is defined based on the WWNN of a Fibre Channel port. Though a WWNN can be shared by several Fibre Channel ports, its definition differs from company to company.

As for the access path control functions, this software cannot display or delete access paths for which WWNN zoning is set. However, it can perform fault management of the Fibre Channel switch.

Different types of zoning settings can be defined for the Fibre Channel switch. To allow this software to provide complete zoning security, however, changing the existing zoning setting to the one-to-one WWPN zoning setting is recommended.

The zoning setting can be defined in the Zone Administration window of WEBTOOLS of the Fibre Channel switch. Note that settings in WEBTOOLS are dependent on the device and firmware.

For example, in the WEBTOOLS window of SN200M40 (v2.4) shown below, WWPNs are the values indicated by blue round disks on the Member Selection List and WWNNs are the values displayed next to the folder icons above the blue round disks.
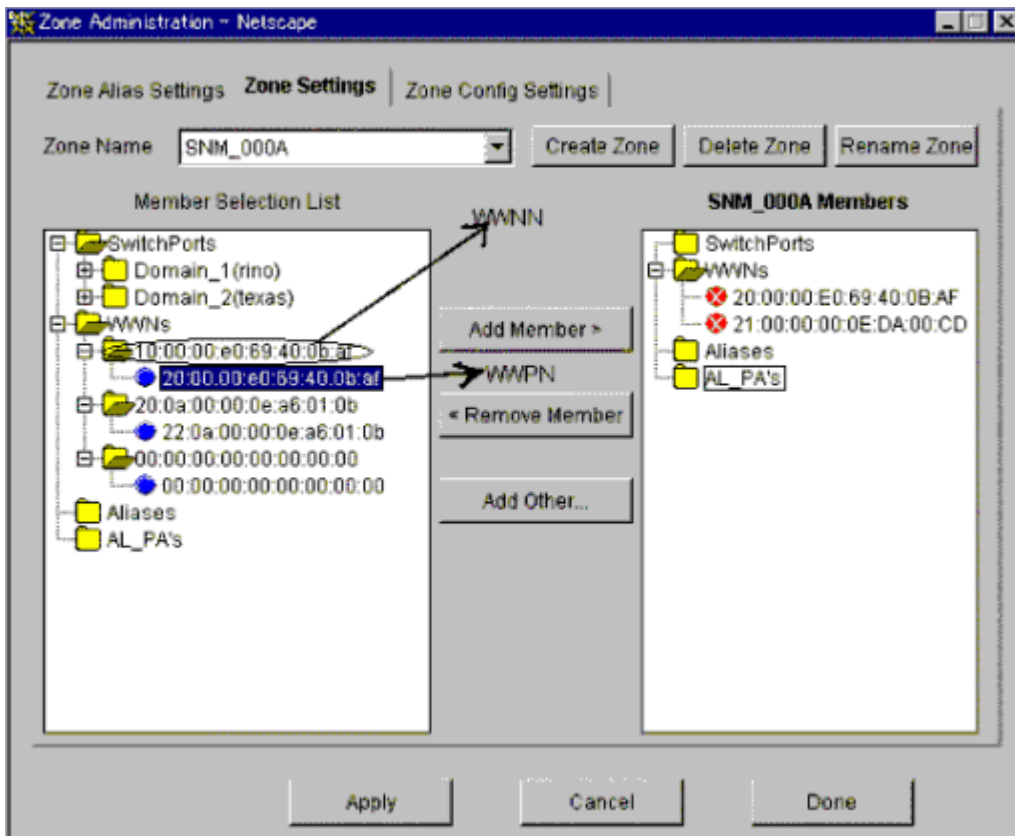
4.2.1.3 Problem-handling (FAQ)

The device cannot be detected.

- Check whether the SNMP Community settings on the device side agree with the settings of this software. For details, see "SNMP community setting".

- For devices that do not support [Detect device in subnet] as described in "1.3.7 Support levels", use [Detect by IP address] with the IP address specified.

- Check whether the Ethernet port communication speed has been set correctly.

- When the SNMP connection authorization list is set up, make sure to include authorization for access from the manager.

The physical connection line of the FC cable is not displayed.

- Check whether all the Fibre Channel switches connected in cascade are registered in this software. Register all the Fibre Channel switches that have not been registered.

- If the network communication with the device is disabled, the physical connection line cannot be displayed. Make sure that the device is powered on and there is no problem with the LAN connection. Furthermore, check whether the SNMP Community settings on the device side agree with the settings of this software. For details, see "SNMP community setting".

- If the network communication is disabled because of device replacement or maintenance, the physical connection line is not displayed.

A warning for a device is displayed (in yellow).

- Check whether a hardware error (FC port, FAN, power supply, temperature, etc.) has occurred.

- Check whether a monitoring status in device properties is "invalid Password". If so, the password on the device side has been changed. Refer to "User name and password for Fibre Channel switch control" and change the registration information of this software.

- When the device is powered on or rebooted, initialization is performed in the device. While the initialization is being performed, if [Refresh] is executed, a warning message for the device may appear. If no error occurs on the device, execute [Refresh] again after the initialization of the device. The display then becomes normal (in green).

A warning for an access path is displayed (in yellow).

- There is no zoning setting for configuring the access path.

- If a monitoring status in device properties is "invalid Password," see "A warning for a device is displayed (in yellow).".

An error in an access path is displayed (in red).

- See "The physical connection line of the FC cable is not displayed.".

A warning for a server node is displayed (in yellow).

- See "The physical connection line of the FC cable is not displayed.".

When replacing a device

- See "8.2.1 Replacement of Fibre Channel switch".

When changing SNMP Community of a device

- See "SNMP community setting".

When changing the password of a device

- See "User name and password for Fibre Channel switch control".

When a device disappear from domain view

- If a device network is not accessible, the device icon will disappear from the domain view. Refer to "The physical connection line of the FC cable is not displayed." for details. In this case, the device may be displayed on SAN view.

When PG-FCD101 or PG-FCD102 is not displayed

- Check whether there are zoning settings in the Fibre Channel switch that is connected to PG-FCD101 or PG-FCD102. If there are no zoning settings, refer to "Zoning setting" and then create a temporary zoning.

 Note

・ The ETERNUS SN200 series, Brocade Fibre Channel switch can define six monitoring device addresses (SNMP Trap transmission places) per device and a different SNMP Community name for each of these addresses. This software uses "public" for the entry that

is set for the SNMP Community name. If this entry is already used, this software overwrites it. If the SNMP Community name on the device side has been changed from "public" and the settings of this software have been changed accordingly, the entry with the changed SNMP Community name is used.

・ The ETERNUS SN200 series, Brocade Fibre Channel switch features the QuickLoop function that accomplishes FC-AL hub emulation. However, this software does not support Fibre Channel switches for which this function is enabled.

・ This software can control access paths to the GR740D (including the Fibre Channel switch). Note that the Fibre Channel switch of the GR740D cannot be connected in cascade to another Fibre Channel switch.

・ This software communicates with the Fibre Channel switch using SNMP and telnet.

・ It is recommended of Fibre Channel switch redundancy (cascading).

At present, the Fibre Channel switch zoning information cannot be restored from the database of this software. Therefore, multiple Fibre Channel switches must be connected in cascade to prevent the zoning information stored on the Fibre Channel switches from being erased. The zoning information is stored separately on each of the Fibre Channel switches connected in cascade. Even if one of the Fibre Channel switches fails, the zoning information is stored by the other switches.
The Fibre Channel switch zoning information is changed using the access path setting. When cascade connection is not used, be sure to save the device configuration information (configUpload file) after making changes in the settings. For details on storing configuration information, refer to the manuals that come with the device.

However, cascade connections should not be implemented between two or more ETERNUS VS900 model 300.

・ To manage Fibre Channel switches with this software, all the Fibre Channel switches that are connected in cascade must be registered with this software. If any Fibre Channel switch is connected in cascade but not registered with this software, the SAN environment cannot be correctly managed.

・ Use the manual embedding function to register the ETERNUS SN200 model 250M and Brocade AP7420 Fibre Channel Switches as Fibre Channel Hub devices. This registration makes SNMP Trap fault monitoring available to the Fibre Channel Switches.

・ In consideration of incompatibility of Fibre Channel switch firmware, this software checks the firmware version number.
If this software detects firmware that it does not support, all functions including the configuration management is restricted.
The following message is output to the event log. (XXXXXX is the version number of the detected firmware.)
"Unsupported Firmware Version XXXXXX"
Contact your Fujitsu CE or SE because patches need to be applied to this software.

・ The FC routing function is not supported.
If a cascade is connected using the FC routing function, the cascade connection line is not displayed in the client window.
For this reason, an error is displayed (in Red) for the access path that goes through the cascade connection line, and a warning is displayed (in Yellow) for the server node that is used to configure the access path.

・ For GbE ports that are used in the FCIP tunneling function, 8 virtual ports per single GbE port are displayed in the client window.
A warning is displayed (in Yellow) in the client window for the FC ports for which the FCIP tunneling function is disabled. Monitor the occurrence of errors using SNMP Trap.

・ This software does not support the Administrative Domain (Admin Domain).

4.2.2 VS900 Virtualization switch

This software supports the ETERNUS VS900 Virtualization switch (a virtualization switch device).

See

・ For ETERNUS VS900 model 200, refer to "4.2.6 VS900 model 200 Virtualization switch".

・ Refer to "4.2.1 SN200 (Brocade) Fibre Channel switch" for information about the items that need to be set up directly on the device side before these virtualization switches can be managed with this software.

・ Refer to the "ETERNUS SF Storage Cruiser User's Guide for Virtual Storage Conductor" for more information about creating environments and designing operations for virtualization switch devices.

4.2.3   PRIMERGY BX600 Fibre Channel switchblade

For PRIMERGY BX600 Fibre Channel switchblade, refer to "4.2.1 SN200 (Brocade) Fibre Channel switch".

4.2.4   SN200 MDS(Cisco MDS) Fibre Channel Switch

This software supports the ETERNUS SN200 MDS fibre channel switch and Cisco MDS fibre channel switch.

The following section explains the settings required beforehand for managing these fibre channel devices on this software. For detailed information on these items, see the manual supplied with the device.

4.2.4.1   Settings

IP address, subnet mask, and gateway address (required)

Specify the IP address of LAN, subnet mask, and gateway address. Log in to the fibre channel switch device from the serial port, and specify them using the ip address command. Use the following procedure to specify the IP address.

```
switch# config t
switch(config)# ip default-gateway [gateway address]
switch(config)# interface mgmt 0
switch(mgmt 0)# ip address [IP address] [subnet mask]
switch(mgmt 0)# exit
switch(config)# exit
```

SysName (recommended)

Register the device name for the fibre channel switch management. This device name is used as SysName of this software. This name should not overlap with other target items for management. Log in to the fibre channel switch, and specify the device name using the switchname command. Use the following procedure to specify the device name.

```
switch# config t
switch(config)# switchname [device name]
switch(config)# exit
```

SNMP Community setting

This software uses the fibre channel switch and the Community name "public" for communication. It uses "public" for reading the device information.

The Community name "public for this fibre channel switch is not registered at factory shipment. Use the following procedure for registering the Community name.

```
switch# config t
switch(config)# snmp-server community public
switch(config)# exit
```

To change the SNMP Community name, change the setting of the device, and also change the setting of this software accordingly. For information on the settings of this software, refer to "SNMP_COMMUNITY_NAME_FOR_IP" in the "C.2 sanma.conf Parameter".

SNMP Trap send destination setting

SNMP Trap is used for error monitoring. However, this fibre channel switch does not support the automatic setting function of the SNMP Trap send destination address. Register the SNMP Trap send destination address by using the following procedure.

```
switch# config t
switch(config)# snmp-server host [IP address of the site manager] traps version 1 public
switch(config)# exit
```

SNMP Trap filter setting

The SNMP Trap filter for this fibre channel switch is set up at factory shipment. However, this software cannot perform proper error monitoring with the SNMMP Trap filter setting at factory shipment. Change the SNMP Trap filter setting by using the following procedure.

```
switch# config t
switch(config)# snmp-server enable traps entity fru
switch(config)# snmp-server enable traps fcdomain
switch(config)# snmp-server enable traps license
switch(config)# snmp-server enable traps vrrp
switch(config)# snmp-server enable traps link ietf-extended
switch(config)# exit
```

4.2.4.2   Problem-handling (FAQ)

When the device cannot be detected

- Check whether the SNMP Community settings on the device side match the settings of this software. See "SNMP Community setting".

- Check whether the Ethernet port communication speed has been set correctly.

When the physical connection line of the FC cable is not displayed

- If the network communication with the device is disabled, the physical connection line cannot be displayed. Make sure that the device is powered on and there is no problem with the LAN connection. Furthermore, check whether the SNMP Community settings on the device side agree with the settings of this software. For details, see "SNMP Community setting".

- If the network communication is disabled because of device replacement or maintenance, the physical connection line is not displayed.

When a warning for a device is displayed (in yellow)

- Check whether a hardware error (FC port, FAN, power supply, temperature, etc.) has occurred.

- When the device is powered on or rebooted, initialization is performed in the device. While the initialization is being performed, if [Refresh] is executed, a warning message for the device may appear. If no error occurs on the device, execute [Refresh] again after the initialization of the device. The display then becomes normal (in green).

When replacing a device

- See "8.2.1 Replacement of Fibre Channel switch".

When changing SNMP Community of a device

- See "SNMP Community setting".

Note

・ Use SNMP protocol version 1 for managing the device. For error monitoring with SNMP Trap, also use SNMP protocol version 1.

・ The management is performed with SNMP communication only. You don't have to log in to the device through TELNET. When you register with this software, you don't have to enter your user name or password.

・ Use the ping command for polling monitoring.

・ Zoning management is not supported. For information on how to display the zoning information or to set up zoning, see the manual supplied with the device. When the access path is set up, only the settings of server and storage are changed.

・ The operations of cascade connection are not supported. Even if the device is connected in cascade, the information about cascade connection is not properly displayed. As a result, the access path through the cascade connection is not properly displayed.

・ The access path display of a manually embedded device is not supported.

・ On the related management window, the path search function and End to End list display function are not supported.

・ The performance information cannot be referenced using Systemwalker Service Quality Coordinator.

・ The beacon function is not supported.

4.2.5 McDATA Fibre Channel switch

This software supports McDATA Fibre Channel switch.

The items that must be set in the device to manage these Fibre Channel devices in this software are explained below. For details about these items, refer to the manual included with the device.

4.2.5.1 Settings

IP address, subnet mask, and gateway address (required)

The LAN IP address, subnet mask, and gateway address are set. Log on to the Fibre Channel switch device from the serial port, and configure the settings using the config ip ethernet command. Set the IP address using the following procedure.

```
switch# config ip ethernet [IP address] [Gateway address] [Subnet mask]
```

Domain name

A domain name is a unique name defined for a Fibre Channel switch in a SAN. Such names are necessary for a cascade connection of multiple Fibre Channel switches.

Set a value that is not duplicated inside the Fibre Channel switch to be cascaded. To use a cascade connection, log on to the Fibre Channel switch, and configure the settings using the config switch prefDomainId command. Set the domain name according to the procedure shown below.

```
switch# config switch prefDomainId [Domain name]
```

SysName (recommended)

Register the device name used for Fibre Channel switch management. This device name is used as SysName in this software. It is recommended that you register a name that is not a duplicate of another management target.

Log on to the Fibre Channel switch and configure the settings using the config system name command. Set the device name using the following procedure.

```
switch# config system name [Device name]
```

SNMP community settings (required)

This software uses the Fibre Channel switch and the SNMP Community name "public" for communication. It uses "public" for reading the device information.

The SNMP Trap send destination address must also be specified for the command used to set the SNMP Community name. For this reason, the settings shown in "SNMP Trap send destination settings" below are also required.

Set the SNMP Community name using the following procedure.

```
switch# config snmp addCommunity [Registration number] public enabled [SNMP Trap send destination address] 162
```

To change the SNMP Community name, change the device settings, and change the settings of this software to match. For details about changing the settings of this software, refer to "SNMP_COMMUNITY_NAME_FOR_IP" in the "C.2 sanma.conf Parameter".

SNMP Trap send destination settings

Although SNMP Trap is used in fault monitoring, the SNMP Trap send destination address automatic settings function is not supported for this Fibre Channel switch. Register the SNMP Trap send destination address using the following procedure.

```
switch# config snmp addCommunity [Registration number] public enabled [SNMP Trap send destination
address] 162
```

4.2.5.2 Problem-handling (FAQ)

When a device cannot be detected:

- Check whether the SNMP Community settings on the device side match the settings of this software.
  For details, refer to "SNMP community settings (required)".

- Check whether the Ethernet port communication speed has been set correctly.

When the physical connection line of the FC cable is not displayed:

- If the network communication with the device is disabled, the physical connection line cannot be displayed. Make sure that the device is powered on and there is no problem with the LAN connection.
  Furthermore, check whether the SNMP Community settings on the device side match the settings of this software. For details, refer to "SNMP community settings (required)".

- The following occurs if the network communication is disabled because of maintenance, for example, for device replacement.

When a warning for a device is displayed (in Yellow):

- Check whether a hardware fault (for the FC port, FAN, power, or temperature) has occurred.

- Initialization processing is performed internally in the device when the device is powered on or restarted.
  If the [Refresh] operation is executed during initialization processing, a warning may be displayed for the device.
  If an error has not occurred in the device, normal display (in Green) can be achieved by executing [Refresh] again after initialization processing in the device is complete.

When replacing a device:

- Refer to "8.2.1 Replacement of Fibre Channel switch".

When changing the SNMP Community of a device:

- Refer to "SNMP community settings (required)".

Note

・ Devices are managed using SNMP protocol version 1. SNMP Trap fault monitoring also uses SNMP protocol version 1.

・ Since management is only performed using SNMP communication, there is no TELNET logon to the device. For this reason, there is no need to enter a user name or password when registering the device this software.

・ ping is used for the polling monitoring.

・ Zoning management is not supported. Before displaying zoning information or configuring zoning settings, refer to the manual included with the device first. If the access path has been set, only the settings for server and storage are changed.

・ Display of the manually embedded device access path is not supported.

・ The path search function and the End to End list display function are not supported in the relationship management window.

・ The performance management function is not supported.

・ The beacon function is not supported.

・ 140 ports are used for McDATA Intrepid 6140 Fibre Channel switch, but 144 ports are displayed in the client window. Of these, 4 ports, numbers 128 to 131, are ports that do not actually exist. This port information in the window is all dummy information.

・ 12 ports from the 132nd to the 143rd of the McDATA Interpid 6140 are implemented on the back side of the device, but all ports are displayed in the client window as they are implemented on the front side.

4.2.6　VS900 model 200 Virtualization switch

This software supports ETERNUS VS900 model 200 Virtualization switch.

4.2.6.1　Settings

For the system design and configuration building of the VS900, refer to the "ETERNUS SF Storage Cruiser User's Guide for Virtual Storage Conductor".

4.2.6.2　Points of concern

・Brocade SMI Agent

SMI-used for VS900 management. SMI-S requires Brocade SMI Agent for VS900 management. Download Brocade SMI Agent and the related user's guide from http://storage-system.fujitsu.com/ (Fujitsu Storage System Information site), and then install it on your system according to said user's guide.

Brocade SMI Agent can be used on the same administrative server as the site manager of ETERNUS SF Storage Cruiser. Brocade SMI Agent must be started up on every node that constitutes the cluster when using Brocade SMI Agent in a cluster system because it does not function as a cluster service. To search for a VS900 device, use the cluster-inherited IP address.

・Fault Management

When Brocade SMI Agent stops, VS900 management and virtual storage management are disabled. Note that using the device polling function (that enables SNMP Traps to be directly received from the VS900 and ping commands directly executed on the VS900), however, makes fault management available.

The events below may be displayed when Brocade SMI Agent stops.

- Unit status changed: OK

- Unit status changed: Warning

- Unit status changed: Error

These events indicate that a device cannot communicate with the VS900 as a configuration management and that a virtual storage management, but can communicate with the VS900 via the device polling function. Moreover, when a device can communicate directly with the VS900, said device can also receive SNMP Trap events from the VS900.

The event below may be displayed regardless of whether Brocade SMI Agent is running.
Note that this event indicates that a device cannot communicate directly with the VS900 or receive SNMP Trap events.

- Connection Timeout

・proxy Switch

Brocade SMI Agent communicates with a certain Fibre Channel Switch in a fabric (or group of Fibre Channel Switches in a cascade connection). This Fibre Channel Switch is called a proxy switch.

Brocade SMI Agent is used to select and set a Fibre Channel Switch as a proxy switch. To manage multiple fabrics, specify as many proxy switches as the number of fabrics to be managed.

If a proxy switch fault or related abnormality causes a communication error between Brocade SMI Agent and a proxy switch, configuration management and virtual storage management are disabled just like when Brocade SMI Agent stops.

If a communication error occurs between Brocade SMI Agent and a proxy switch, you must first remove the cause of the communication error, and then restart the Brocade SMI Agent program.

The same symptom occurs when a cascade connection of Fibre Channel Switches in the fabric is broken by a disconnected FC cable or FC port fault. Restore the connection and restart the Brocade SMI Agent program.

・SNMP Trap Event

The VS900 supports SNMP Traps through Fibre Alliance MIB. For details of SNMP Traps, refer to "2.7.1 Explanation of Fibre Alliance MIB Support Device Events" in the "ETERNUS SF Storage Cruiser Event Guide".

・ The cascade connection line

The physical connection line between the VS900 Virtualization switches is not displayed.

4.2.6.3 Problem-handling (FAQ)

The device cannot be detected.

- Please confirm whether neither Internet Protocol address of the server that Brocade SMI Agent is installed nor information on Brocade SMI Agent (NameSpace and Login account and Login password and Port Number etc.) are wrong. There is a possibility that the problem solves if Internet Protocol address that you specified for the device detecting is changed. (When the server in which Brocade SMI Agent is installed has two or more Internet Protocol addresses.)

- Please confirm Brocade SMI Agent has started. Moreover, the device might be detected by restarting Brocade SMI Agent.

- Please confirm whether information set to Brocade SMI Agent is correct. To make set information effective, you should restart Brocade SMI Agent.

- Please refer to Installation Guide on Brocade SMI Agent for the setting of Brocade SMI Agent.

The device cannot be registered.

- Please confirm whether information on VS900 set to the hosts file of the administrative server is correct. The hosts file is in the following.

OS Type	Full path name of hosts file
Windows	%SystemRoot%\system32\drivers\etc\hosts
Solaris OS, Linux	/etc/hosts

- Please confirm whether information on the administrative server is correctly set to VS900. It is necessary to reboot VS900 to make set information effective.

- Please refer to "ETERNUS SF Storage Cruiser User's Guide for Virtual Storage Conductor" for the setting of the administrative server concerning VS900. Please refer to "ETERNUS VS900 Model 200 System Build Procedure" for the system construction procedure of VS900.

🔔 Note
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・ The software does not support a function to set an access path to the VS900. To build a SAN environment including the VS900, use the Zone Administration window of WEBTOOLS of the VS900 or the telnet command for zone setting.

・ Among VS900 zoning information, only WWPN zoning information can be displayed. If any zoning other than WWPN zoning is configured, access paths and zoning information cannot be displayed.

・ This software does not support a function for automatically setting a SNMP Trap send destination address for the VS900. To set such an address, use WEBTOOLS or the telnet command.

・ This software does not support a function to monitor VS900 performance.

・ This software does not support a VS900 beacon function.

・ This software does not support a "Detect device in subnet" function for the VS900. Therefore, use the "Detect by IP address" function with an IP address specified instead.
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4.3 Disk Array

4.3.1 Disk array ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80, ETERNUS VD800, GR

4.3.1.1 Setting

To manage the ETERNUS8000 series, the ETERNUS6000 series, the ETERNUS4000 series, the ETERNUS3000 series, ETERNUS2000 series, ETERNUS DX60/DX80 and GR series with this software, set up devices while keeping in mind the points listed below. Read the term "ETERNUS VD800 disk array unit" in this manual as "ETERNUS3000 series".

🗂 See
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For settings details, refer to the ETERNUSmgr/GRmgr User's Guides supplied with ETERNUSmgr/GRmgr of each device, such as the "ETERNUSmgr User's Guide," "GR710/GR720/GR730 GRmgr User's Guide," and "GR740 GRmgr User's Guide".

For the GR820 or GR840, GRmgr must be purchased separately.
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1. root password setting

   Set the root password for logging in to ETERNUSmgr/GRmgr.

2. Community setting in SNMP (Agent) environment settings

   This software communicates with the GR/ETERNUS product by using "public" for the Community name at an initial value. Therefore, the Community name setting on the GR/ETERNUS product side must be either of the ones explained below a and b. Note that the Community name can be changed. For information on changing the Community name, see below c and "SNMP_COMMUNITY_NAME_FOR_IP" parameter in sanma.conf at "Appendix C Customization".

   a. Any Community is not set. (initial)
      "Public" (Access: read Only, address: all hosts, and view: all Object) is set by an initial value.

   b. Specify "public" for the Community name explicitly.
      In this case, specify either the IP address of the administrative server on which Manager is installed or 0.0.0.0 (to receive messages from all hosts) as the IP address.

   c. Specify other than "public" for the Community name explicitly.
      The administrative server is specified with the Community name and the administrative server's IP address. However, when the manager is running in a cluster system, the manager communicates with ETERNUS/GR by using the physical IP address of the cluster system, therefore the Community setup are described by the same number as the physical IP addresses.

   ### 📝 Example
   ....

   "ssc" is the specified Community name for SNMP communication with the operation management server (IP Address: 10.10.10.10):

   ```
   community ssc 10.10.10.10
   ```

   "ssccom" is the specified Community name for SNMP communication with the operation management server operating as a cluster system operation (physical IP_A: 10.10.10.11, physical IP_B: 10.10.10.12):

   ```
   community ssccom 10.10.10.11
   community ssccom 10.10.10.12
   ```
   ....

3. Trap setting in SNMP Agent Configuration Setting

   Since the manager's SNMP Trap receiving module has not judged this Community name, all SNMP Traps sent to the administrative server can be received. Even in an environment where the Community name is specified other than "public", it is not necessary to

change this community name in trap setting. The Community name of the trap destination is recommended to be set as "public", not same as the Community name of SNMP Community under the consideration of security.

If the maximum number of SNMP Trap transmission places of the ETERNUS/GR is already registered, no new IP address can be added. Therefore, make sure that the number of SNMP Trap transmission places is less than the maximum number.

4. Device name setting (SysName) in SNMP (Agent) environment settings

Register a nickname for storage management. This software uses this value as SysName.

5. Network environment settings (excluding the GR740, GR820, GR840)

If the administrative server resides outside the location indicated by the IP address, subnet mask, gateway, and subnet, the subnet of the opration management server must be registered as the destination network address.

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When an administration server is in a cluster:

If you specify the IP address of an administration server as a destination network address, specify both physical IP address of each node on administration servers in a cluster and IP address taken over.

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6. Logoff

After completing definition of the settings with ETERNUSmgr/GRmgr, be sure to log off from ETERNUSmgr/GRmgr. In the ETERNUS8000, ETERNUS6000, ETERNUS4000 and ETERNUS3000 series, ETERNUS2000 series, ETERNUS DX60/DX80, or in GR710/720, the registration of devices in this software and use of the Storage Volume Configuration Navigator device setup function are only possible when not logged onto ETERNUSmgr/GRmgr.

Note

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Access paths can be set from this software even while a user is logged in to ETERNUSmgr(ETERNUS6000, ETERNUS4000 models 80 and 100, ETERNUS3000)/GRmgr. If a change to access path settings is made simultaneously from both ETERNUSmgr/GRmgr and this software, configuration information of the device may be destroyed. Therefore, when changing access path settings from this software, make sure that no setting change operation is in progress on the ETERNUSmgr/GRmgr side.

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Information

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For this software, the host access control function of ETERNUS disk array devices and GR series devices is called "host affinity function", and zone numbers are called "AffinityGroup numbers". Defining them with more global names such as these makes it possible to address future multivendor device management needs. For definitions of other names, see "A.1 Notational Conventions of Window Elements and Abbreviations".

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To use this software to set the server node and storage access path (the SAN environment containing the Fibre Channel switch), refer to "6.3.3.1 Preparations". The following settings must also be configured in the device.

RAID settings

RAID group/LogicalVolume setup is executed using Storage Volume Configuration Navigator or ETERNUSmgr/GRmgr. For storage devices not supported by Storage Volume Configuration Navigator, execute the setup using ETERNUSmgr/GRmgr.
For details about Storage Volume Configuration Navigator, refer to "11.1.5 Operation procedure".

Affinity Group/Zone settings for storage

AffinityGroup/Zone is created in the storage device using Storage Volume Configuration Navigator or ETERNUSmgr/GRmgr. For storage devices not supported by Storage Volume Configuration Navigator, create AffinityGroup/Zone using ETERNUSmgr/GRmgr.
For details about Storage Volume Configuration Navigator, refer to "11.1.5 Operation procedure".
The setting method by using ETERNUSmgr/GRmgr is as follows.

Storage device		Setting method
ETERNUS8000 models 700, 900, 1100 and 2100 ETERNUS6000 ETERNUS4000 models 300 and 500	ETERNUSmgr	Make AffinityGroup settings common within a storage system by using the [Set AffinityGroup] menu from the [Setting RAID/Setting Host] menu.
ETERNUS8000 models 800, 1200 and 2200 ETERNUS4000 models 400 and 600	ETERNUSmgr	Make AffinityGroup settings common within a storage system by using the [Set AffinityGroup] menu from the [Configuration] - [Setting Host] menu.
ETERNUS4000 models 80 and 100 ETERNUS3000(except model 50)	ETERNUSmgr GRmgr	Make Affinity Group/Zone settings common within a storage system by using the [Append/Delete Zone(s)] menu from the [Setting RAID/Setting Host] menu.
ETERNUS3000 model 50 ETERNUS GR710 ETERNUS GR720 ETERNUS GR730	ETERNUSmgr GRmgr	Make Affinity Group settings that are based on the port setting or LUNMapping settings. To specify a port, select the port by using the [Set Host Interface Mode] menu from the [Setting] menu. To make LUNMapping settings, use the [Zone management] menu from the [Addressing mode] menu. Before making Affinity Group settings, make settings for [Host-Zone management].
ETERNUS2000	ETERNUSmgr	Set up a common Affinity Group within the storage from the "Host Affinity." In ETERNUSmgr for the ETERNUS2000, a wizard format is used to set up from the AffinityGrop all the way to HostAffinity. However, the "HostAffinity" in "Step5: Select HBAs" will be set up as non-selection (no HBA allocation).
ETERNUS DX60 ETERNUS DX80	ETERNUSmgr	Set up a common Affinity Group within the storage. By using the [Configure LUN Mapping] menu from the [Volume Settings] - [Host I/F Management] menu.
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	GRmgr	Make the zone settings common within a storage system by using the menu for Mapping settings.

Connection topology settings

Make the Fabric Connection setting (N port) for the FC-CA port to be connected with the switch.
The setting method by using ETERNUSmgr/GRmgr is as follows.

Storage device		Setting method
ETERNUS8000 models 700, 900, 1100 and 2100 ETERNUS6000 ETERNUS4000 models 300 and 500	ETERNUSmgr	1. From the [Set CA Parameters] menu in the [Setting RAID/Setting Host] menu, select the FC-CA to be used for the SAN. 2. From [Connection Topology], select [Fabric Connection], and click the <Set> button.
ETERNUS8000 models 800, 1200 and 2200 ETERNUS4000 models 400 and 600	ETERNUSmgr	1. From the [Set CA Parameters] menu in the [Configuration] - [Setting Host] menu, select the FC-CA to be used for the SAN. 2. From [Connection Topology], select [Fabric Connection], and click the <Set> button.
ETERNUS4000 models 80 and 100 ETERNUS3000(except model 50)	ETERNUSmgr GRmgr	1. From the [Set CA Port] menu in the [Setting RAID/Setting Host] menu, select the FC-CA to be used for the SAN.

Storage device		Setting method
		2. From [FC Connection Settings], select [Fabric Connection], and click the <Set> button.
ETERNUS3000 model 50 ETERNUS GR710 ETERNUS GR720 ETERNUS GR730	ETERNUSmgr GRmgr	1. From the [Set Host Interface Mode] menu in the [Setting] menu, select the port. 2. From [FC Connection Settings], select [Fabric Connection] (N port setting), and click the <Set> button.
ETERNUS2000	ETERNUSmgr	1. From the [Port] tab in the [Settings] menu, select a port from the port tree on the left window. 2. From the [Connection Topology], select the [Fabric Connection] and click the <OK> button.
ETERNUS DX60 ETERNUS DX80	ETERNUSmgr	1. From the [Volume Settings] - [Host I/F Management], select a [Set FC Port Parameters] menu. 2. select a port from the port setting window. From [Connection],select the [Fabric] and click the <OK> button.
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	GRmgr	1. From the [CA Setting] menu, select the FC-CA to be used for the SAN. 2. Disable loop connection.

Host interface settings

Make the host affinity setting (recommended) for the FC-CA. If "Affinity Group/Zone settings for storage" is executed using Storage Volume Configuration Navigator, the host affinity settings are essential.

The setting method by using ETERNUSmgr/GRmgr is as follows.

Storage device		Setting method
ETERNUS8000 models 700, 900, 1100 and 2100 ETERNUS6000 ETERNUS4000 models 300 and 500	ETERNUSmgr	1. From the [Set CA Parameters] menu in the [Setting RAID/Setting Host] menu, select the FC-CA to be used for the SAN. 2. Set [Affinity Mode] to ON (recommended), and click the <Set> button.
ETERNUS8000 models 800, 1200 and 2200 ETERNUS4000 models 400 and 600	ETERNUSmgr	1. From the [Set CA Parameters] menu in the [Configuration] - [Setting Host] menu, select the FC-CA to be used for the SAN. 2. Set [Affinity Mode] to ON (recommended), and click the <Set> button.
ETERNUS4000 models 80 and 100 ETERNUS3000(except model 50)	ETERNUSmgr GRmgr	1. From the [Set CA Port] menu in the [Setting RAID/Setting Host] menu, select the FC-CA to be used for the SAN. 2. From [Addressing Mode Settings], select [Host Table Setting Mode]. Since this software automatically makes settings for [Append/Delete Authorized Host(s)] in [Host Table Setting Mode], no such setting need be made here. 3. Lastly, click the <Set> button.

Storage device		Setting method
ETERNUS3000 model 50 ETERNUS GR710 ETERNUS GR720 ETERNUS GR730	ETERNUSmgr GRmgr	1. From [Set Host Interface Mode] in the [Setting] menu, select a port for this setting. 2. If [Zone Management] in the [Addressing Mode] menu is enabled, check [Authorized hosts only] to enable it (recommended). If [Host-Zone management] is enabled, another setting need not be made. In both addressing modes, this software automatically makes the setting for [Authorized hosts only] and HostAffinity setting (if [Zone Management] is selected, this software automatically specifies values only when [Authorized hosts only] is enabled).
ETERNUS2000	ETERNUSmgr	1. From the [Port] tab in the [Settings] menu, select a port from the port tree on the left window. 2. Check the [Affinity Mode] box of the [General Setting] and click the <OK> button.
ETERNUS DX60 ETERNUS DX80	ETERNUSmgr	1. From the [Volume Settings] - [Host I/F Management], select a [Set FC Port Parameters] menu. 2. select a port from the port setting window. From [Host Affinity],select [Enable] and click the <OK> button.
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	GRmgr	1. From the [CA Setting] menu, select the FC-CA to be used for the SAN. 2. Enable (recommended) the security function.

Note that this software automatically sets and deletes the Host WWN definitions and Host WWN-Affinity Group/Zone definitions of ETERNUS disk storage systems, and thus settings need not be made manually.

Date-time settings

To set the date-time for the device, perform the procedure shown below. If the date-time is set during performance monitoring, briefly stop performance monitoring and then restart it.

1. Stop performance monitoring of the device for which date-time is set.

2. Set date-time for the device.

3. After the date-time settings are complete, restart performance monitoring of the device.

Device configuration changing

To change the configuration for the device, the device configuration information kept by performance management must be updated. Update the configuration information according to the procedure in "7.2.11 Updating configuration information".

WWPN changing of CA port

If the WWPN of CA port is changed by storage migration function, refer to "D.4.8 Using the storage migration function",

4.3.1.2 Problem-handling (FAQ)

Unable to detect ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80, or GR series

- This software uses SNMP communication to find devices. Therefore, a storage device whose SNMP function is inactive cannot be detected. The storage device's SNMP function must be started.

Press the <Set> button in the ETERNUSmgr/GRmgr SNMP environment setting window. The SNMP function is started by once pressing the <Set> button. Therefore, if the <Set> button is not pressed at all, the SNMP function remains inactive.

- If the server running the manager is not defined as a destination server on the server running SNMP trap transmission, auto-detection may not work. If this is the case, check the SNMP trap transmission settings and make sure the server running the manager is defined.

- If the SNMP community name is changed and Manager is in the cluster environment, settings on the storage device side may be incorrect. See "Changing SNMP community name" given below.

- Check the network environment, access authorization and communication mode settings referring to section "4.3.1.1 Setting" for details. Make sure that one communication mode is not set to "Auto Negotiation" while the other is set to "Full (full duplex)"

Unable to detect GR740, GR820, GR840

- Check whether GRG (GRGateway) is active on the maintenance PC. If it is inactive, execute GRG.exe. Also, register GRG.exe in the Startup menu.

- If the SNMP community name is changed and Manager is in the cluster environment, the settings on the storage device side may be incorrect. See "Changing SNMP community name" given below.

Changing SNMP community name

This software implements SNMP communication using the community name public by default. If "Set SNMP Agent Environment"-"Set Community" is not set at all for ETERNUS and GR storage devices, "public" (access: readOnly, address: all hosts, view: all objects) has been set as the initial value. If at least one community is set, this software communicates with only the specified community settings.
When the SNMP community name for the ETERNUS and GR storage devices is to be changed, storage device settings are required. See "2. Community setting in SNMP (Agent) environment setting" in "4.3.1.1 Setting".

Timeout occurs in communication.

Check the communication settings and make sure that one communication mode is not set to "Auto Negotiation" while the other is set to "Full (full duplex)".

4.3.2   Disk array ETERNUS SX300, ETERNUS SX300S

This software supports fault management (SNMP trap monitoring only) of the disk array ETERNUS SX300, ETERNUS SX300S. Follow the procedure below to register the disk array as a manually embedded device:

1. Registering the SANtricity installation server

   SNMP traps of ETERNUS SX300 and ETERNUS SX300S are sent from the server on which the device management software SANtricity is installed.
   The SANtricity installation server must be registered with this software to perform SNMP trap monitoring.
   Register the SANtricity installation server with this software by using either of the following methods:

   - Install ETERNUS SF Storage Cruiser Agent on the SANtricity installation server, and then register the server as a managed server node.

   - Use the manual embedding function to register the SANtricity installation server as a manually embedded host
     (Be sure to enter the IP address of the server node).

2. Registering the ETERNUS SX300, ETERNUS SX300S device

   Use the manual embedding function to register the ETERNUS SX300, ETERNUS SX300S device with this software.
   The following information must be set for the registration:

   - Specify the device name marked in SANtricity in "Device name". (E.g. SX3RF2B-000001)
     Note that monitoring cannot be performed correctly if the device name is incorrect.

   - Enter the IP address of the SANtricity installation server in "IP address".

3. SNMP trap setting

Set the trap transmission destination on the SANtricity installation server so that SNMP traps of ETERNUS SX300, ETERNUS SX300S will be sent to the operation management server.
If the operation management server is defined as a cluster, the logical IP address of the cluster needs to be set.

4.4 Tape Library Devices

4.4.1 Tape library devices LT270, LT250 and LT160

This software supports all functions of the LT270, LT250 and LT160 except performance monitoring. Note that this software does not have a function to automatically detect LT270, LT250 and LT160 devices. The LT270, LT250 and LT160 devices can be detected by specifying their IP addresses for Device Search.

1. Connection to a network

   Make the settings to connect the LT270, LT250 and LT160 to a network, and then connect the devices to the network. At the same time, start up the SNMP Agent function. For details of how to make these settings, refer to the manuals supplied with the LT270, LT250 and LT160 devices.

2. Setting Community for SNMP Environment setting

   Select "public" as the Community name (GET). The Community name can be changed as desired. To change the Community name, see "Appendix C Customization".

3. Name (SysName) of a device for SNMP (Agent) Environment setting

   Specify a nickname for the LT270, LT250 and LT160 device for management purposes. This software uses Sysname for said nickname value.

4. SNMP Trap setting

   Manager does not add the SNMP Trap transmission place that was set at the device's registration to the device. Therefore, use the LT270, LT250 and LT160 Management Software to specify the SNMP Trap transmission place as the IP address of the administrative server on which this software runs. When the administrative server is defined by a cluster, the logical IP address of the cluster must be specified.

5. Setting and displaying an access path

   This software does not use the HostAffinity setting of the LT270, LT250 and LT160, but displays access paths by using SwitchZoning or StorageAffinity of the server node.

4.4.2 Tape library devices LT120, LT130, LT200, LT210, LT220, LT230, HP Surestore Tape Library, and Overland Storage NEO 2000 Tape Library

This software supports the collaboration of Fault Management and the Management Software of the following tape library devices. The connection configuration is edited on-screen.

・ ETERNUS LT120, LT130, LT200, LT210, LT220, LT230

・ HP Surestore Tape Library

・ Overland Storage NEO 2000 Tape Library

1. Connection to a network

   Make the settings to connect the tape library device to a network, and then connect these devices to the network. Similarly, make the settings to connect the built-in bridges of the ETERNUS LT130 and NEO 2000 Tape Library to the network, and then connect these bridges to the network. For details of how to make these settings, refer to the manuals supplied with the tape library device.

2. SNMP Trap setting

Use the Management Software of the tape library device to specify the SNMP Trap transmission place as the IP address of the administrative server on which this software runs. When the administrative server is defined by a cluster, the logical IP address of the cluster must be specified. After making this setting, restart the devices.

3. Collaboration of Management Software

Use the Management Software (provided with the tape library device) for device management of such items as detailed device status and the various settings of the ETERNUS LT120, LT130, LT200, LT210, LT220 and LT230. The Management Software can be invoked directly by the Device Icon. Register each device in the resource view. From the Properties of Device Icon, select [Management Software] and click <Change> button. Specify the following names for the Management Software:

- ETERNUS LT130, LT200, LT210, LT220, LT230 and NEO 2000 Tape Library:

"http://IP-address-of-IP-address"

- ETERNUS LT120 and Surestore Tape Library:

Refer to the manual supplied.

4.5 Bridge

4.5.1 Bridge device Crossroads

This software supports Automatic Device Recognition, Status Management, Management Window Correlation, and Draw FC Connection Lines of the bridge device Crossroads. Note that this software only supports "Initiator mode".

1. Connection to a network

    a. Network environment setting

    Set the IP address, subnet mask, and gateway address by referring to the user's manual supplied with the device.

    b. User name and password for controlling the bridge device

    The device uses user name "root" and password "password" by factory default. Change these values as desired. The user name and password are required for "Add Device" operation in the GUI window.

    c. Setting Community for SNMP Environment setting

    Select "public" as the Community name (GET). The Community name can be changed as desired. To change the Community name, see "Appendix C Customization".

2. SNMP Trap setting

The SNMP Trap settings function is not available.

3. Detailed settings inside the bridge device

This software collects and displays part of the physical configuration and the device status. For the other detailed management information, use the Web-based management tool. This tool can be invoked directly from this software by clicking the Bridge Device icon.

4.5.2 Tape encryption device

This software supports Status Management, Management Window Correlation, and Draw FC Connection Lines of the tape encryption device.
However, when the tape encryption device is connected with the library, it is not possible to draw in the FC connection Line with the library.

1. Connection to a network

Make the settings to connect the tape encryption device to a network, and then connect said device to the network. For details of how to make these settings, refer to the manuals supplied with the tape encryption device.

2. SNMP Trap setting

Use the Management Software used for SNMP Trap setting to the SNMP Trap transmission place as the IP address of the administrative server on which this software runs. When the administrative server is defined in a cluster, the logical IP address of the cluster must be specified. After making this setting, restart the device.

3. Detailed settings inside the tape encryption device

This software collects and displays part of the physical configuration and the device status. For other detailed management information, use the Web-based management tool. This tool can be invoked directly from this software by clicking the Tape Encryptor icon.

4.6 Network Disk Array and Cache Server NR1000

This software supports fault management and linkage to the Management Software for network disk array devices and the cache server NR1000. Embed a device and register its IP address by seeing "5.2.6 Registering a Manually Embedded Device".

1. Connecting to the network

Make the required settings for the cache server NR1000 to connect to a network, and then connect to the network.
For details on how to connect to a network, see the manual that comes with the NR1000 unit.

2. Activating SNMP

The device polling function uses SNMP to acquire the device status of the NR1000 series. Enable the SNMP function so that device information can be acquired using SNMP. For detailed information on making settings, see the manual that comes with the NR1000 unit.

"Public" is used as the default Community name, but any name can be set. To change the Community name, see "Appendix C Customization".

3. SNMP trap setting

Make the required settings on the NR1000 unit so that SNMP traps of the NR1000 unit will be sent to the operation management server.
If the operation management server is defined as a cluster, the logical IP address of the cluster needs to be set.

4. Management software cooperation

Use the attached management software for device management such as checking the detailed device status of the NR1000 unit and the various settings. The management software can be called directly from the NR1000 icon. After registering the device in the resource view, select the <Change> button of [Management Software] from the properties menu displayed after right-clicking the device icon to set the program pathname for the device management software to one of the following:

   - NR1000C: "http://device IP address:3132/"

   - NR1000F: "http://device IP address/na_admin/"

4.7 VD800 Virtual Disk Controller

This software supports fault management and management software linkage for the VD800 virtual disk controller.

1. Hierarchical control processor settings

Softek Storage Cruiser 1.2.1 (hereafter referred to as SSC) Agent is installed on the hierarchical control processor (server node) contained in the VD800.
To monitor the hierarchical control processor as a server node monitored by this software, make the following settings to register the hierarchical control processor with this software:

a. Make a setting in /etc/services.

SSC Agent communicates with the operation management server through LAN port number 4917 by default.
Therefore, include this port number in the /etc/services file as shown below to declare use of the port number.
If no port number is specified, SSC Agent is started with port number 4917.

📩 **Example**
. . . .

Contents of /etc/services file setting

```
# service name    port number/protocol name
sscruisera        4917/tcp
```
. . . .

If the port number is already being used, change the port number to one that is not.
If changing the port number, however, use the one corresponding to the same service name set on the operation management server.

b. Make a setting in the /etc/hosts file.

Include an IP address that enables communication with the operation management server (manager).
In an environment in which IP addresses are converted (such as NAT), specify an IP address that enables communication from the operation management server, instead of the IP address of a server node.

📩 **Example**
. . . .

Example of /etc/hosts file setting:

```
10.10.10.10 spm-0-ext
```
. . . .

c. Specify the SSC Agent startup IP address.

Specify an IP address that enables communication with the operation management server (manager).
Specify the IP address defined in the /etc/hosts file of b. as the startup address in the following command:

```
# /opt/FJSVssagt/bin/setagtip -i startup IP address
```

After executing the above command, stop and restart SSC Agent.
Execute the following commands to stop and restart SSC Agent.

Stopping SSC Agent:

```
# /opt/FJSVssagt/bin/pstorageagt
```

Starting SSC Agent:

```
# /opt/FJSVssagt/bin/sstorageagt
```

d. Search for and register the hierarchical control processor.

Select the base domain of the resource view, right-click in the base domain view, and select [Register] - [Register a server].
In the displayed view, specify the IP address (Agent startup IP address) used for communication with the manager of the hierarchical control processor, and click the <OK> button.

When search and registration processing is completed, the hierarchical control processor (server node) icon is displayed in the base domain.

2. Fibre Channel switch, disk array device, and tape library device contained in the VD800

[Device settings]

Construct and set up the environment for the Fibre Channel switch, disk array device, and tape library device contained in the VD800, as described in this manual.

[Device registration]

Refer to "5.2.1 Device search" to register the devices.

Chapter 5 Startup and Setting

This chapter explains device definitions and operation flowcharts required for operating this software.

5.1 Opening and Closing

5.1.1 Opening the resource view

5.1.1.1 Client window transitions

Transitions of the Client window are as follows:
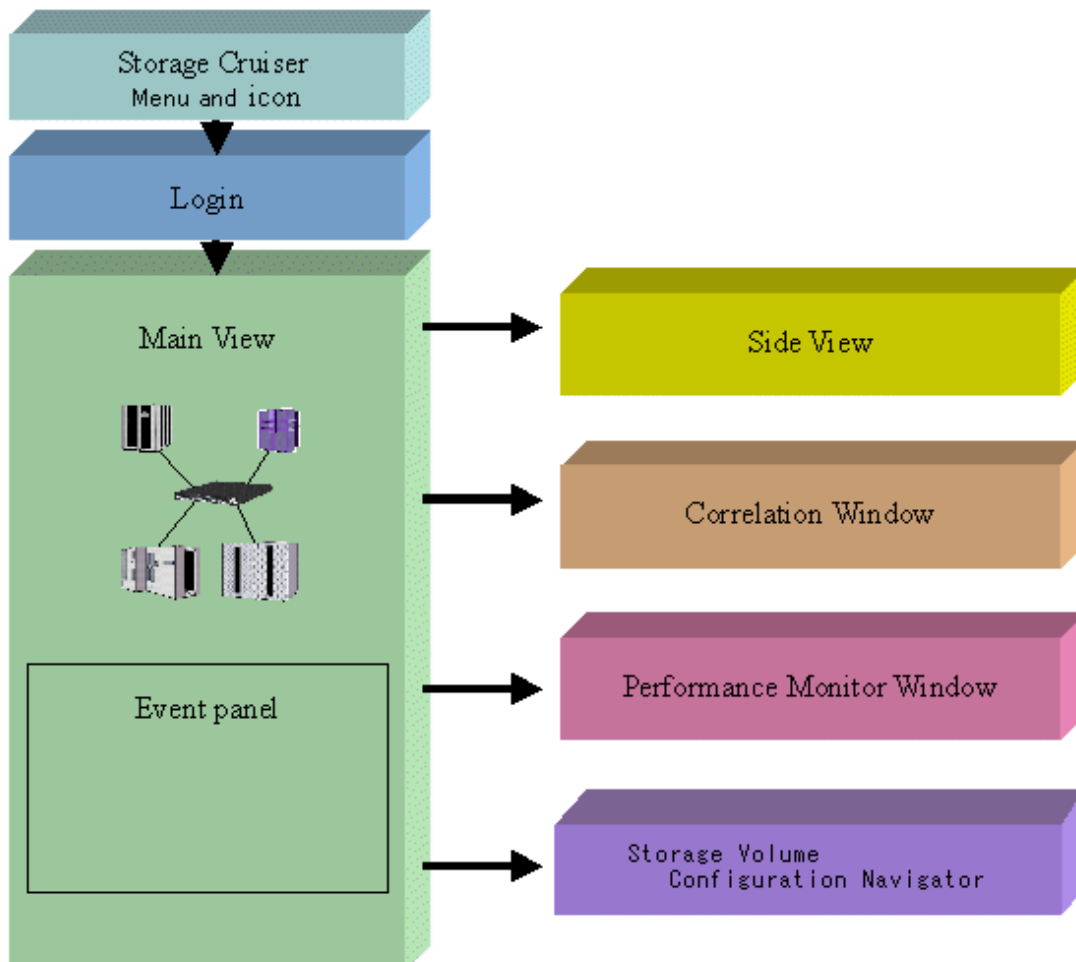
5.1.1.2 Login

1. On the administrative client, take one of the following actions:

    - Select [Programs] - [ETERNUS SF Storage Cruiser] - [Storage Cruiser] from the Start menu

    - Double-click the Storage Cruiser icon on the desktop

2. The login window shown below is displayed. Enter the administrative server address (IP address/node name) where Manager is operating, and the user name/password, and then click the <Login> button. If at this point, you want to change the communication port number to the administrative server, click the <Port> button and change the port number.
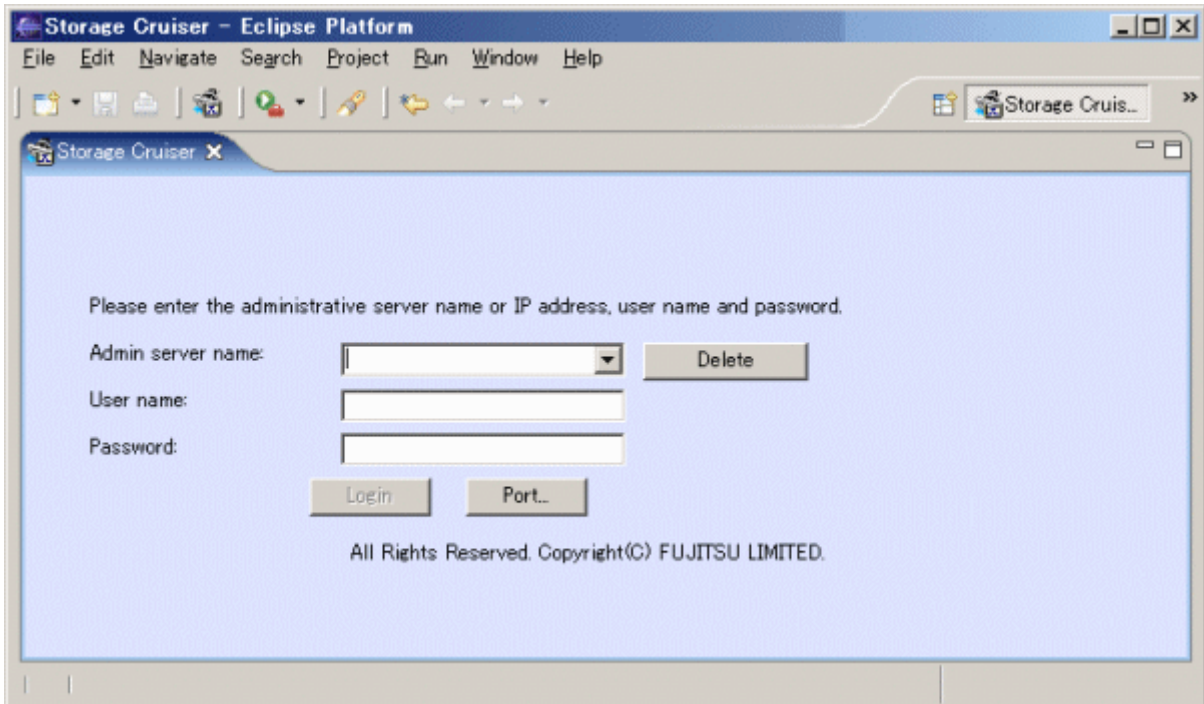
Information

- Note that the user registration, password, and access authority can be changed. Refer to "5.4 Setting Up a Login Account".

- Administrative server information (IP address/node name) is managed from a personal computer on which Client is installed. To not use any item of administrative server information, select the name of the applicable server, and select <Delete> button.

- If at this point, you want to change the communication port number to the administrative server, click the <Port> button and change the port number.
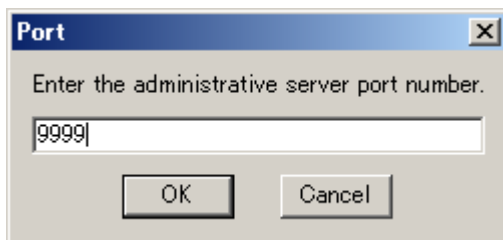
3. The client window is displayed.

5.2 Registering device
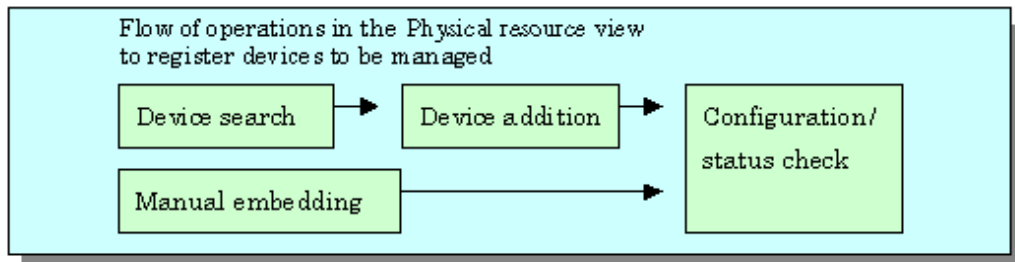
When monitored server nodes have duplicated server node names or monitored storage devices have the same SysName, device names assigned for finding, adding, or manual embedding of the corresponding devices may already exist in the management database.

In this case, the device name may be registered with trailing ".suffix-number".
A suffix number is assigned in ascending order from 0.
Example: ServerNode.0, ServerNode.1, and ServerNode.2 ...

5.2.1 Device search

For device management using this software, it is necessary to first conduct a device search and then display the devices to be managed on an GUI window. There are two methods for conducting a device search.

・ Detecting for devices in the same subnet as the administrative server automatically

・ Detecting a device by specifying IP address

Icons indicating detected devices are placed in the undefined state, and these device icons are displayed in violet. Once a device is detected, its icon is recorded as undefined in the database. To delete this icon, delete the corresponding device.

Information
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・ The following devices are added automatically when devices is detected.

  - SMI-S device (ETERNUS VS900 model 200, etc)

  - ESC Agent, SSC Agent

  - The VM host and VM guest (VMware Infrastructure 3 Version 3.5 or later, VMware ESXi 3.5 or later)

・ When detecting devices, the ESC and SSC agent automatically adds the device.

・ For the device in SAN catagory which is classified as SAN device, it may not be displayed in domain view after executing device search. To display the device, choose the device type from tree or SAN category.
. . . .

Detecting for devices in the same subnet as the administrative server automatically

On the tree, select main view item or the base domain in the storage category and then select [File] - [Detect SAN devices] - [Detect device in subnet]. Either of these operations displays the icons of those devices that are supported by Manager and that are subject to the automatic detection function. SNMP-based broadcast processing is performed internally, and the icons of the devices supported by this software are automatically displayed. The automatic device detection function can be used for other subnets as well, by the changing of the definition file. (For details, see "Appendix C Customization".) However, note that this function is supported only in those environments where broadcast transmission passes through other subnets.

Note
. . . .

  - When [View] - [Change] and [List View] is selected, device search from the physical resource view cannot be performed.

- If [Detect device in subnet] does not work, make a check as follows:

    - For devices that do not support [Detect device in subnet] as described in "1.3.7 Support levels," use the method described below "Detecting a device by specifying IP address".

    - For each device, check the SNMP communication settings. If the SNMP Community name on the device side has been changed, also change the settings of this software accordingly (see "Appendix C Customization".)

    - "Detect device in subnet" fails when IP address on the Slave CM side is set with ETERNUS. Please refer to "D.4.10 No detection of device in the subnet is possible" for the coping process.

Detecting a device by specifying IP address

- To detect ESC Agent or SSC Agent

Select main view item or the base domain in the server category on the tree, and then select [File] - [Register] - [Register a server]. Alternatively, right-click anywhere in the map view, and select [Register] - [Register a server] from the pop-up menu displayed. When the device search window is displayed as shown below, enter an IP address, such as "10.10.10.10", and click the <OK> button.
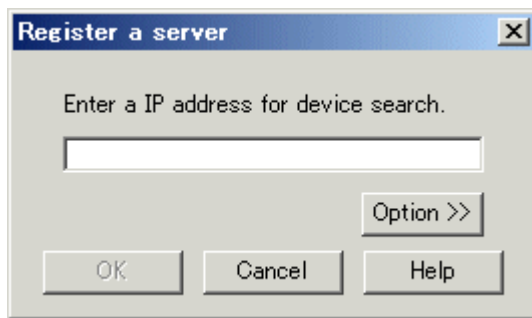
- To detect the VM host and VM guest (VMware Infrastructure 3 Version 3.5 or later, VMware ESXi 3.5 or later)

Select main view item or the base domain in the server category on the tree, and then select [File] - [Register] - [Register a server]. Alternatively, right-click anywhere in the map view, and select [Register] - [Register a server] from the pop-up menu displayed. Then, select [Option >>] in the displayed window.
When the following window is displayed, enter an IP address of the VM host, such as "10.10.10.10". Then, enter the user name and password used to login the VM host, and click the <OK> button.

 Information

- By registering a VM host, all of the VM guests on the VM host are automatically registered.

- For VM guest that is set up after registering VM host, select an icon of VM host including its VM guest in Main view and register it. Registering method is as follows:
(1) Select Main view from tree, or select Base domain in the Server category
(2) Select [File] - [Register] - [Register virtual machines] or select [Register] - [Register virtual machines] from the pop-up menu displayed by right-clicking anywhere in the map view.

Note

- To register a VM host (and its VM guests) with this software, the IP address, login name and password of the VM host are required.

- It is not possible to register VM guests by specifying them individually.

- To detect any device other than above devices

Select main view item or the base domain in the storage category on the tree, and then select [File] - [Detect SAN devices] - [Detect by IP address]. Alternatively, right-click anywhere in the map view, and select [Detect SAN devices] - [Detect by IP address] from the pop-up menu displayed. When the device search window is displayed as shown below, enter an IP address, such as "10.10.10.10", and click the <OK> button.

Automatic detection

This function is used to search for devices except SMI-S device. Enter an IP address (such as "10.10.10.10") and click the <OK> button.

Detection by type specification

This function is used to search for SMI-S device.

For detection of a SMI-S Switch device (Searching for ETERNUS VS900 model 200), from the pull-down menu, select "SMIS Switches", enter the following information, and then click the <OK> button.

Input information	Description
IP address information	Enter the IP address (such as "10.10.10.10") of the administrative server on which SMI Agent is installed to manage the ETERNUS VS900 model 200. When the cluster system uses SMI Agent, specify the cluster-inherited IP address.
NameSpace	This is name space information used to access SMI Agent. Enter "root/brocade1".
Login account	Enter an account name with which you can log in to the administrative server on which SMI Agent is installed. This is not an account name used to log in to a switch device.
Login password	Enter a password with which you can log in to the administrative server on which SMI Agent is installed. This is not a password used to log in to a switch device.
Port Number	Enter the port number of SMI Agent. The default port number is 5988. If another application is using 5988 on the administrative server on which SMI Agent is installed, change the port number of SMI Agent by referring to the "SMI Agent User's Guide," and then specify a new port number.

Devices that are successfully detected are automatically added. If this automatic addition fails, said devices must be added manually. For details of how to add devices, see "5.2.2 Adding a device (changing from the violet icon state to the registered state)".

When asked for a user name and a password, enter the Login account and Login password indicated above.

Note

・ If such a search for a product in the ETERNUS8000 series, the ETERNUS6000 series, the ETERNUS4000 series, the ETERNUS3000 series , the ETERNUS2000 series or GR series fails, check the following items:

   - The SNMP environment has not been set up from ETERNUSmgr/GRmgr since installation of the device:

   The SNMP agent of the device is not active. Set up the SNMP environment as instructed in "4.3.1 Disk array ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80, ETERNUS VD800, GR".

   - In the case of GR740, GR820, GR840:

   Check whether the GRG (GR Gateway) is running on the maintenance PC. If not, register GRG.exe from the Windows start menu, and activate it.

   - In the case of ETERNUS DX60, ETERNUS DX80

   For ETERNUS DX60 and ETERNUS DX80 device detection, specify the IP address on the Master CM side. If the IP address on the CM slave side was specified for detection when the device was registered, access path settings and settings in Storage Volume Configuration Navigator are not possible.

・ If such a search for ESC or SSC Agent fails, check the following items:

   - Check whether ESC or SSC Agent is activated. If not, activate ESC or SSC Agent.

   - Check the binding of the storage affinity. If the storage affinity is set to the WWNN, PID, or TID binding, set the storage affinity to the WWPN binding.

5.2.2 Adding a device (changing from the violet icon state to the registered state)

To enable management of undefined devices whose icons are displayed in violet, the devices must be registered with this software.

1. Take one of the following actions:
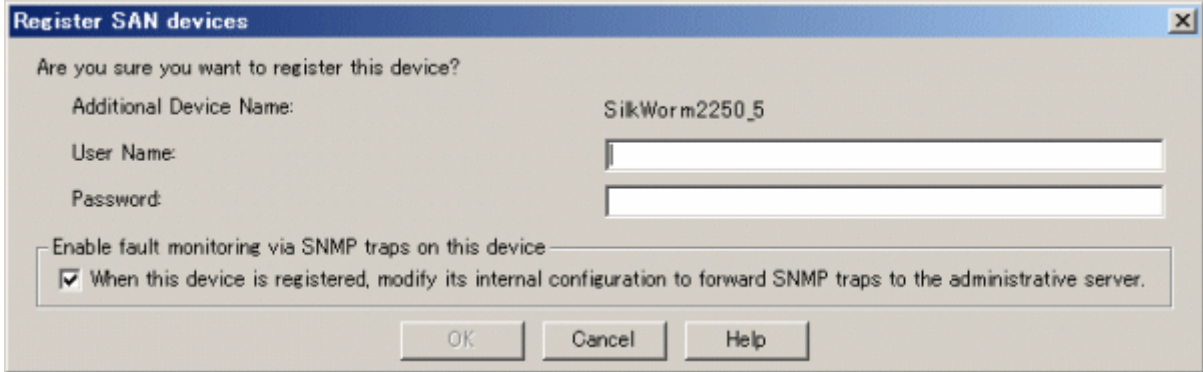
   - Select the icon of a device to be registered and then select [File] - [Register] - [Register SAN devices], or

- Right-click the device icon and select [Register] - [Register SAN devices] in the pop-up menu.

Note

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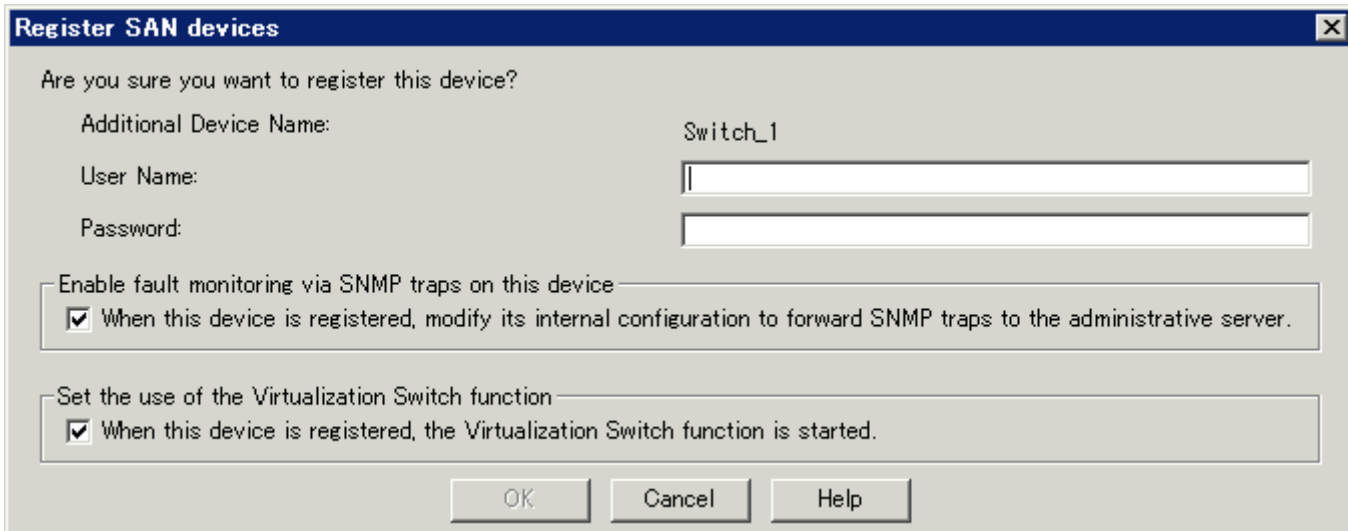
When [View] - [Change] and [List View] is selected, device addition cannot be performed from the resource view.

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2. When the "Register SAN devices" dialog described below is displayed, enter necessary data in each field.

When the adding device is ETERNUS VS900 model 300, the check box that sets to start the virtualization switch function displayed in the "Register SAN devices" dialog as follows. Please add a device in the condition that "When this device is registered, the Virtualization Switch function is started." box is checked.

- User name and password

  To manage the device, this software must recognize the user name and password associated with the device.

  Since each device requires different information, the items displayed in the dialog change accordingly.

  <Required information>

    - For SN200 (Brocade) fibre channel switch and the PRIMERGY BX600 fibre channel switch blade, a user name and password with administrator rights will be required.

    - For SN200MDS (Cisco MDS) Fibre Channel switch, there is no required information.

    - For Crossroads, specify the account name and password registered by the user.

    - For the ETERNUS3000 model 50, GR710, GR720, specify the password of the root account.

    - For the ETERNUS3000 (except model 50) and GRs other than the above, no user name and password are required.

- Check box of "Enable fault monitoring via SNMP traps on this device"

 When a device is added, this software automatically sets the SNMP Trap transmission place address for the device so that it can monitor for faults by using the SNMP Trap. For information about the device types for which the address automatic setting function can be used, see "1.3.7 Support levels". This setting is usually automatically made. However, when fault monitoring using this software is not necessary, this function can be disabled by unchecking the check box in the dialog.

📖Information

- If the function is disabled and if the SNMP Trap setting is made manually, the "Event Notification function setup" field on the displayed list will become "Un-setting up". If the administrative server has multiple IP addresses, verifying that the correct IP address is set as the SNMP Trap transmission place for each managed device is recommended after using this function.

- For information about fault monitoring required for an added device after the function is disabled, see "5.2.4 Function for setting event notification destinations". For a detailed explanation of the automatic setup, see "5.2.5 SNMP Trap transmission place automatic setting function".

- The check box of "Enable fault monitorinig via SNMP traps on this device" is invalid for the device which does not support the function of automatically setting SNMP Trap transmission place.

- Check box of "Set the use of the Virtualization Switch function"

 Set up ETERNUS VS900 model 300 to either operate as a normal switch or a virtualization switch. To operate an ETERNUS VS900 model 300 as a virtualization switch, select the "Set the use of the Virtualization Switch function" check box. To operate an ETERNUS VS900 model 300 as a normal switch, clear this check box.

3. Selecting the <OK> button registers the device.

4. When a Fibre Channel switch is embedded for which no zoning setting is defined (no security state), the window shown below is displayed.
 Check "Do not configure WWPN_Zoning on the switch when access paths are created." to start the operation without security. In such a case, when an access path is set from this software, no zoning is set for the Fibre Channel switch.
 Check "Configure WWPN_Zoning on the switch when access paths are created." to set WWPN zoning when an access path is set from this software. Considering the security of the Fibre Channel switch, the recommended selection is [Configure WWPN_Zoning on the switch when access paths are created] (bottom selection box).
 Clicking <Initialize> button resets "Do not configure WWPN_Zoning on the switch when access paths are created." and "Configure WWPN_Zoning on the switch when access paths are created." to their initial settings.
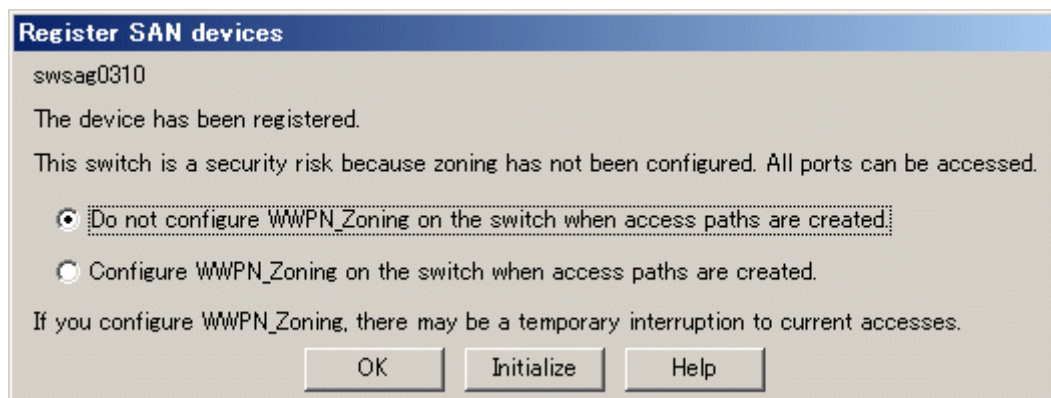
📒Note

If a device to be managed cannot be accessed, or if it is in any of the states described below, it cannot be registered.

- Fibre Channel switch

 - Telnet was used to login to the target device.
  Action: Log out, and then perform the registration process.

- ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series, ETERNUS DX60/DX80, GR series

  - User is logged into ETERNUSmgr/GRmgr of the target device.
    Action: Log out, and then perform the registration process.

During the device registration process, if telnet is used to login to the Fibre Channel switch connected to the device to be registered, the physical line between the Fibre Channel switch and the device cannot be displayed because information cannot be obtained from the Fibre Channel switch. In this event, log out and execute [Refresh].

5.2.3 Deletion

Deleting devices other than the virtualization switch

This function cancels the registration of a device being managed by this software, thereby deleting that device from the range of management. It is used in such cases as when a device has been removed.

Information

Individual VM guests for VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) can be deleted from the management target for this product by first deleting the VM guest using VMware management software and then deleting the VM guest using this procedure. If the VM guest is still on the VM host it will be registered again automatically.

Note

When VM hosts (VMware Infrastructure 3 Version 3.5 or later or VMware ESXi 3.5 or later) are deleted from this product, the VM guests on the VM host are automatically deleted.

1. Take one of the following actions:

    - Click the icon of the target device, and select [File] -[Delete] from the menu, or

    - Right-click the device icon to display a pop-up menu, and then select [Delete].

   ### Note

   When [View] - [Change] and [List View] is selected, device deletion cannot be performed from the resource view.

2. Clicking the <OK> button deletes the selected device.

3. If a dialog such as the one shown below opens, access path settings associated with the target device can be deleted. For example, when a server node is removed, the switch zoning setting and affinity setting for the device become unnecessary. This software can automatically delete such unnecessary security settings. When "Delete the access path" is selected in this dialog, all of the access path settings for the deleted device are deleted. If the access path settings must remain, such as if you want to continue to use the device while placing it outside the range of management, select "Do not change the access path".

- 68 -
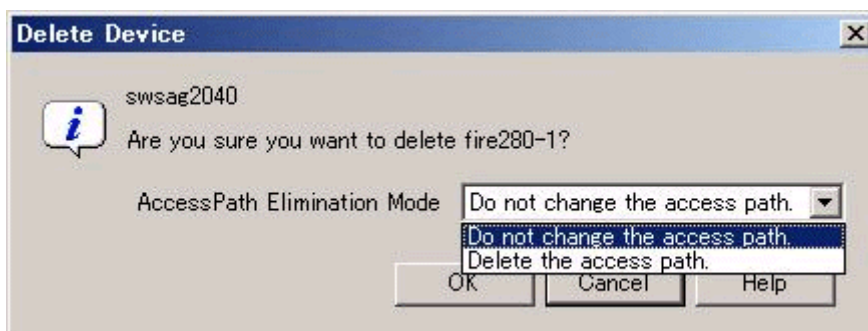
The deleted device is displayed when it is detected again by the automatic device detection function of this software.

Deletion of a virtualization switch device

1. Take one of the following actions:

   - Click the Virtualization Switch icon, select [File] - [Delete] from the menu, or

   - Right-click the device icon and select [Delete] from the pop-up menu.

2. When the virtualization switch device contains no virtual storage configuration information, perform ordinary deletion.

3. When the virtualization switch device contains virtual storage configuration information, the following message dialog box appears on the Client window.

   These message dialog box appear, when the deletion device is virtualization switch device and the device contains configuration information of the virtualization switch and virtual storage devices.

   - When the deletion device is ETERNUS VS900 model 300
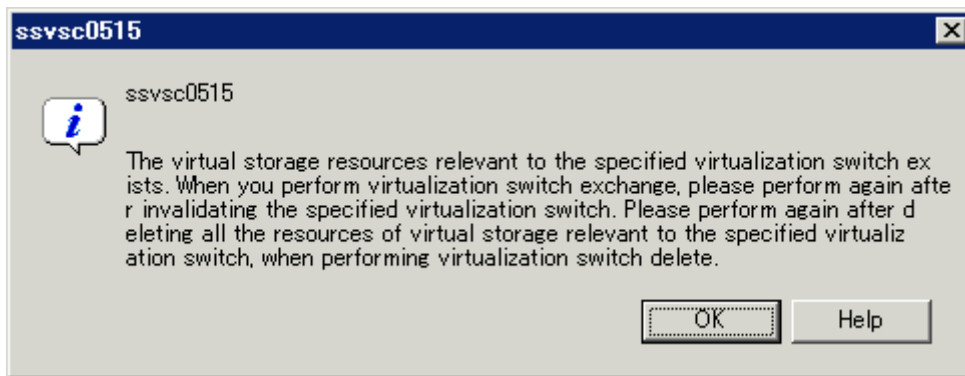
   Replace or delete the virtualization switch by following the messages that are displayed.

   - When the deletion device is other device
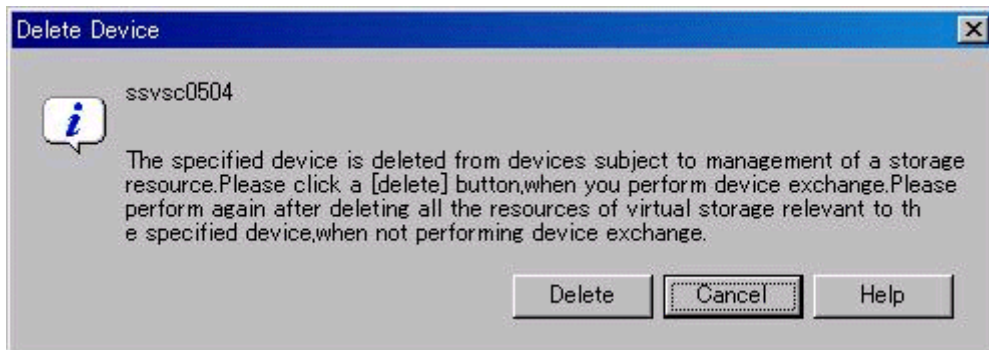
   Implement one of the following procedures, depending on the condition. For details, refer to the virtualization switch manual.

Conditions	Procedures
To delete the virtualization switch without replacing it	1. Click the <Cancel> button in the message dialog box to stop device deletion. 2. From the menu on the Client window, select [File] - [Virtual Storage Window] - [View and Create], start up the Virtualization Switch Display And Create window, and then delete all virtual storage configuration information of the switch device. 3. Repeat deletion of the virtualization switch.

Conditions	Procedures
To replace the virtualization switch	1. Click the <Delete> button in the message dialog box. Save the virtual storage configuration information and delete the target virtualization switch device.

5.2.4 Function for setting event notification destinations

If fault monitoring is required for a device after the SNMP Trap transmission place address automatic setting function is disabled for the device during the device addition process, follow the procedure given below.

1. Select a device from the Main view, Domain view or SAN view of this software. Then, right-click the device in the map view of the main view, domain view or SAN view and select [Event Notification function setup] from the pop-up menu.

   The list display function is useful for checking whether an event notification and transmission destination is set. Check the "Event Notification function setup" field in the list. For a device with "Un-setting up" indicated, an event notification and transmission destination is not yet set.

Information

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Note that in automatic SNMP Trap setup, the device is placed in the "Un-setting up" state. The field becomes blank for a manually embedded or unregistered device.

. . . .

2. A dialog such as the one shown below is displayed. When the <OK> button is clicked, this software automatically sets an SNMP Trap transmission place address for the device to enable fault monitoring using the SNMP Trap. For a detailed explanation of automatic setup, see "5.2.5 SNMP Trap transmission place automatic setting function".
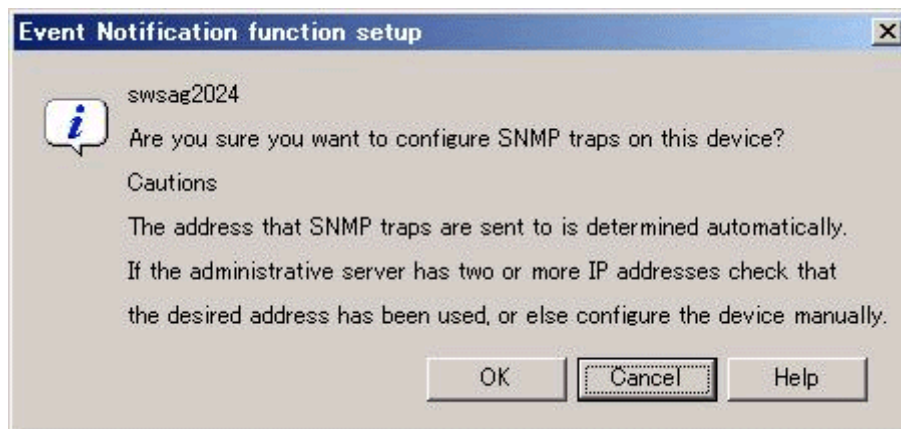
5.2.5 SNMP Trap transmission place automatic setting function

The SNMP Trap transmission place automatic setting function, which is executed at the time of a device search or device addition, and its accuracy are explained with the figures below.

Administrative server with only one IP address

This software automatically identifies IP address A of the administrative server and sets "IP address A" as the SNMP Trap transmission place for each managed device.
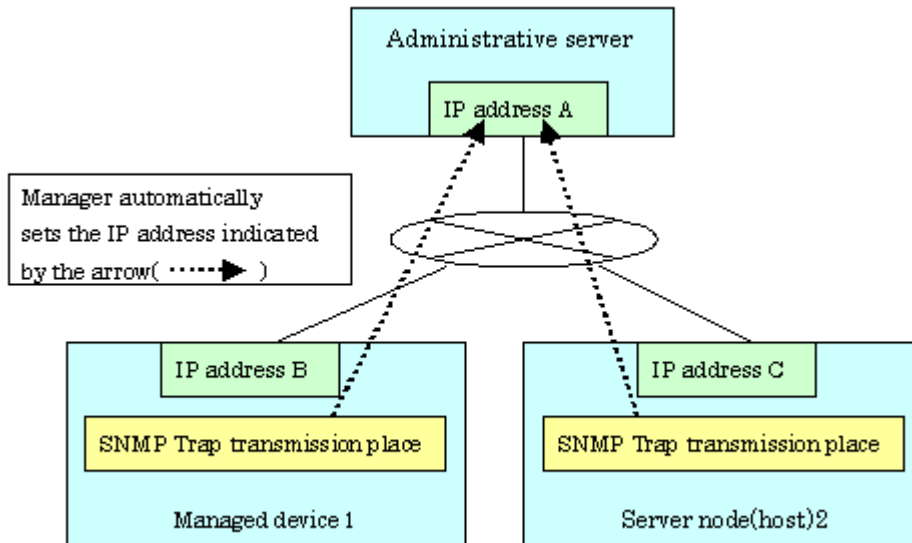
Administrative server with two or more IP addresses

Such an administrative server has a cluster or redundant LAN configuration or is connected to multiple subnets, and it has two or more IP addresses.

From the multiple IP addresses of the management server, this software selects the one that is most suitable as the transmission IP address for each device. However, this logic does not work in all cases. In the environment shown in the figure below, for example, this software may set "IP address D" as the SNMP Trap transmission place for Managed device 1. This is because addresses cannot be automatically detected in some cases due to the nature of current LAN technology. In such an environment, therefore, it is necessary to check the SNMP Trap transmission place setting of each device after the device addition process and, if required, set SNMP Trap transmission places directly on the device side.

In the figure below, specify "IP address A" as the SNMP Trap transmission place for Managed device 1, and "Logical IP address F" as the SNMP Trap transmission place for Server node 2. For information about how to set SNMP Trap transmission place addresses of server nodes manually, see "2.1 Receiving SNMP Traps".
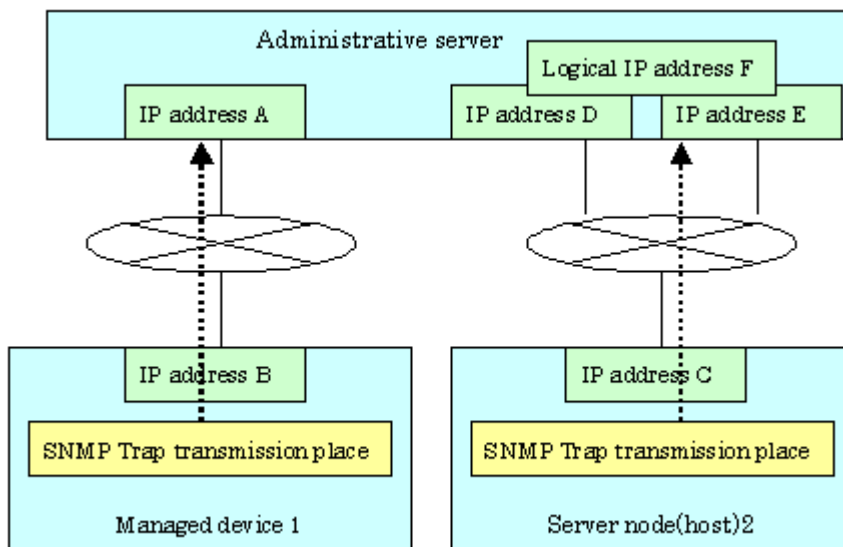
Point

In order for the server node to send the SNMP Trap, agent must be installed on the host.

5.2.6 Registering a Manually Embedded Device

Some devices (such as managed servers without an agent, tape units, and NAS devices) cannot be retrieved by device search. Register these devices with this software by using the manual embedding function.

1. Open the Main view or SAN view window, select [File] - [Manual Configuration window] from the menu, or select [Manual Configuration window] from the pop-up menu to display the Manual Configuration window.

2. Select [Operation] - [Create New Device] from the menu or select [Create New Device] from the pop-up menu in the Manual Configuration window.
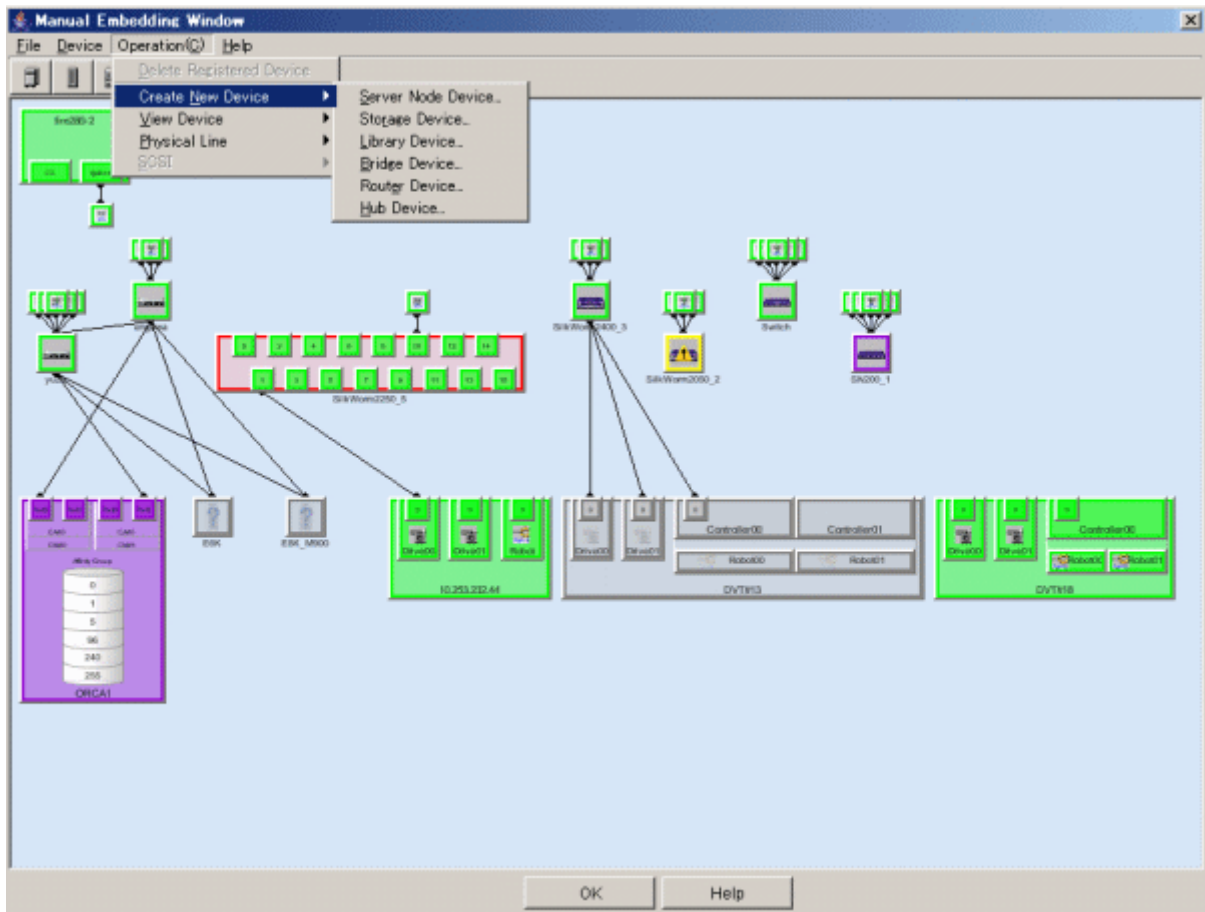
3. Select the device type from the submenu (listing the types of devices that can be selected for addition). Server node, Storage, Library, Bridge, Router, or Hub can be selected for the device type. Select Storage for the NR1000.

4. A dialog box for entering the product type appears. Select the product type. If no product types listed are applicable, select "Other". The following is an example of selecting Storage for the device type.
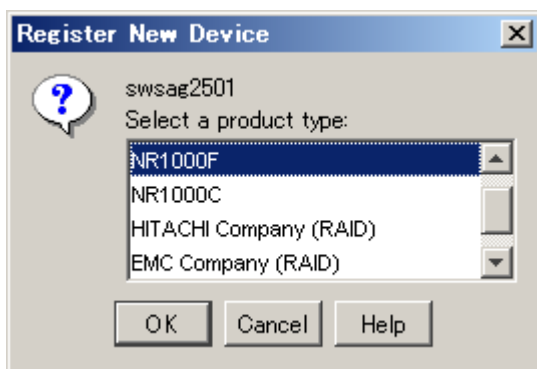
5. A dialog box for entering device information appears. Be sure to enter the storage type because it is used as an important key during internal processing. An icon that is displayed for this product on the window can be selected using "Display Icon Setup".
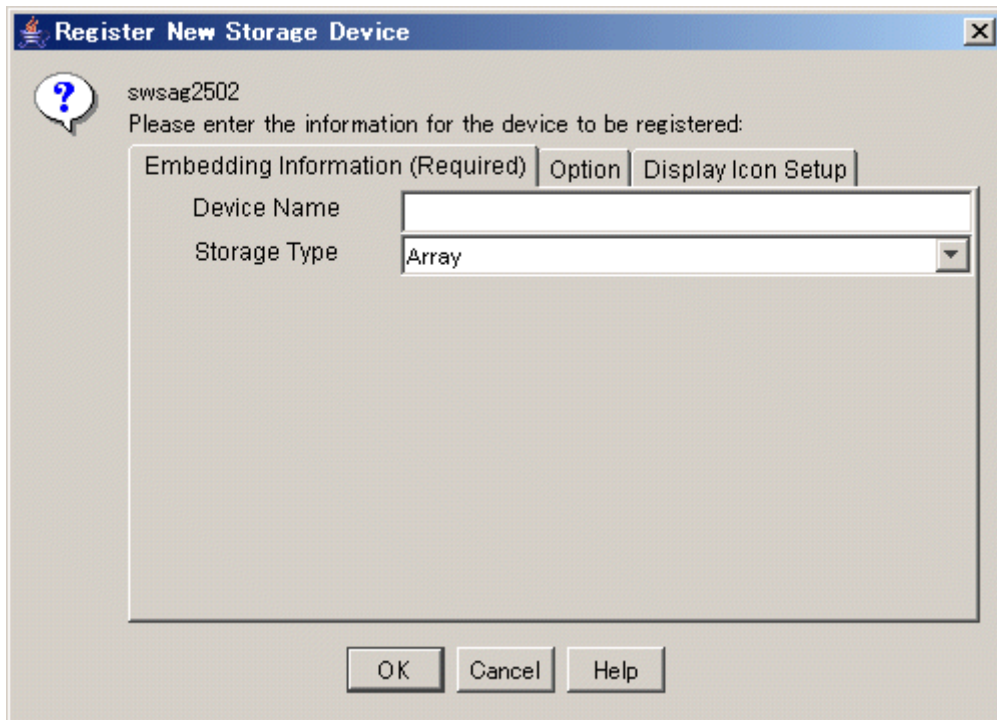
- "Embedding Information (Required)"

  - For "Device Name", specify a unique name that can be used to manage the device. This software uses the name as a key for identifying the device. For this reason, the name must be different from the names of other devices and server nodes within SAN management. For ETERNUS SX300, ETERNUS SX300S units, be sure to set the device name marked SANtricity.

  - When Storage has been selected for the device type, select the storage type from the drop-down list for "Storage Type" from among Disk, Tape, Array, Robot, and Other. Select "Other" for the NR1000.

  - When Bridge for a device other than a tape encryption device has been selected for the device type, specify the number of SCSI busses connected to the bridge for "Number of SCSI bus" and select [SCSI Bus Setup]. Dialog box swsag2504 appears. Enter the initiator number on the bridge side of the SCSI bus, and select <OK> button. Dialog box swsag2506 appears. Specify information on the devices to be connected to the SCSI bus in the SCSI ID/LUN part, and select <OK> button. If 2 or a larger number is specified for the number of SCSI busses, the procedure from swsag2504 is repeated for the number of busses.

  - When Router has been selected for the device type, "Number of FC Ports" and "Number of WAN Ports" are automatically set if template is selected for the product type. If "Other" is selected, enter data according to the router device configuration.

  - When Library has been selected for the device type, "Number of Bridge" and "Number of Drive" are automatically set if template is selected for the product type. If "Other" is selected, enter data according to the library device configuration.

- "Option"

  - For "Manufacture Name", "Product Name", "Serial Number" (for Storage type only), "OS Type", and "OS Version" (for Server Node type only), specify appropriate information on the device. This information is displayed as property information for this software.

  - For "IP Address", specify the IP address of the device when the device is connected to a LAN. If the IP address is specified here when the device supports the SNMP Trap transmission function, this software receives SNMP Traps from the device and displays them in the event log and device event information (in the device properties). The device is also subjected to the device polling function and automatically monitored with ping (or SNMP depending on the device).
    For the LT120/LT130/LT200/LT210/LT220/LT230, NR1000, and Edge, be sure to specify the IP address of the device here. However, do not specify the IP address if the device is not connected to a LAN. If the IP address is specified here for a device not connected to a LAN, the device is put in the communication disable state by the polling monitoring function

and cannot be restored until it is connected to a LAN. For ETERNUS SX300, ETERNUS SX300S, enter the IP address of the SANtricity installation server in "IP address".

- For "Management Software", specify how to execute software used to manage the device. Doing so enables the specified software to be called directly from the properties displayed for the device icon on the GUI window. If the Management Software can be started from the Web client, specify the corresponding URL beginning with http:// or https://. If the Management Software is an application that runs on the client, specify the full path to the executable file (c:\test\test.exe, for example).

- "Display Icon Setup"

Select an icon to be used for the device.

6. The embedded device is displayed as a light-color icon.

7. Exit from the Manual Configuration window.

Select [File] - [Exit] or select the <OK> button on the lower part of the screen.

8. After the Manual Configuration window is changed, a dialog box appears asking "Do you want to update the administrative server with the latest information?" Select the <OK> button to update information.
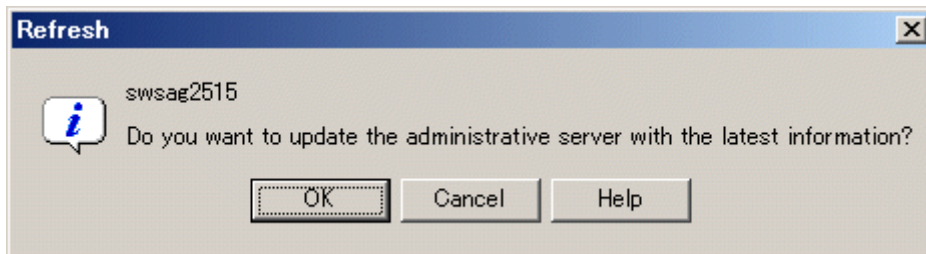
5.3 Checking Management Status

Check whether the setup is correct. Use the following steps to check the setup:

[Test 1] Check whether every device (excluding the server node agent) can correctly receive SNMP Traps

This software receives generic traps 0 to 5, which are SNMP Traps not unique to a specific vendor, and it decodes their contents and displays information about each event (that does not use Systemwalker Centric Manager linkage or Shell/bat linkage.) As one of generic traps 0 to 5, a COLD START trap is issued by an ordinary device. When using this trap to test whether the software can correctly receive an SNMP trap.

A device sends the COLD START trap and other traps by turning OFF and ON the device to be managed, performing a variety of setup tasks (setup of the SNMP environment for ETERNUS/GR), doing other such work. Check whether the event is displayed with regard to the above operation and trap.

However, generic traps 0 to 5 are not normally required, so after the test is completed, you can disable display of generic traps 0 to 5 by using the following method:

Edit the following definition file:

Platform of Manager	File location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\sanma.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/sanma.conf

Edit one description as follows (0=Hide, 1=Show): DISPLAY_SNMP_STANDARD_EVENT = 0;.

Select [Tool] - [Option] - [Re-read Definition File] from the physical resource view to incorporate the definition file into a program.

[Test 2] Check whether server node (agent) can correctly receive SNMP Traps

The server node (Agent) provides the following command that issue SNMP Trap for the test.

Platform of Agent	Command location
Windows	$INS_DIR\Agent\bin\traptest [*ip-address*] ($INS_DIR means "Program Directory" specified at the Agent installation.)
Solaris OS, Linux, HP-UX	/opt/FJSVssage/bin/traptest [*ip-address*]

In case that server node has more than 1 IP address, please input the IP address which is communicate with the admin server.

Please make sure the IP address input is correct, if the event can not be received correctly.

If the IP address is set correctly, the following event will be output when the command is executed.

SNMP Trap test command cannot linkage to Shell/bat. Please modify the SNMP definition if necessary.

To modify SNMP Trap definition, please modify ESC agent SNMP trap definition file which is located 1_3_6_1_4_1_211_4_1_3_21_2_2.xml. SNMP trap test is defined as the first number of "Specific Trap Type". You may change the action for this trap. For SNMP Trap definition file, please refer to "C.6 SNMP Trap XML Definition File".

See

. . . .

For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment, the fault monitoring function by receiving SNMP Traps is not supported. Therefore, it is no necessary to execute this test.

. . . .

[Test 3] Check Systemwalker Centric Manager linkage and Shell/bat linkage of events.

Events cannot be linked with Systemwalker Centric Manager or Shell/bat for the standard SNMP Trap. To test the Systemwalker Centric Manager linkage and Shell/bat linkage of an SNMP Trap from a device, execute a tentative SNMP Trap command for the test. This command changes internal information of an SNMP Trap so that the SNMP Trap seems to have been sent from a device being monitored, and it sends such an SNMP Trap to the system's own port for receiving the SNMP Trap. Since descriptions of events are linked to Systemwalker Centric Manager and Shell/bat, Systemwalker Centric Manager linkage and Shell/bat linkage can be tested. To test the Shell/bat linkage of an SNMP Trap of the server node agent, use the method described in [Test 2].

For the IP address of an argument, specify the IP address of a device (ETERNUS/GR or Fibre Channel switch) registered with this software. The contents of this simulated SNMP Trap are loaded into the event log and reflected in device events (in device properties). To display the event log, click [Refresh] on the menu displayed by the GUI, or press the [F5] key. (Loading and reflecting the information may take a long time.)

The commands shown below are executed to generate a simulated SNMP Trap for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, GR device registered with this software. Using these commands, the manager creates the simulated trap, receives the same trap, and checks whether the displayed event and shell/bat linkage are correct. Here, the simulated trap is a fan fault with "public" as the Community name. This simulated trap has arbitrary test information that is distinct from actual trap information.

Also, the ETERNUS (except model 50) can issue an SNMP trap from the device by using the "SNMP trap sending test" function of ETERNUSmgr. Though the test uses a simulated trap, its results are the same as those from a test that sends a real trap and checks the response, since the trap is sent from an actual ETERNUS machine.

Platform of Manager	Command location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\bin\grtraptest *ip-address* ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/bin/grtraptest *ip-address*

The commands shown below are executed to generate a simulated SNMP Trap for a Fibre Channel switch registered with this software. (A simulated error that is a port fault is issued.):

Platform of Manager	Command location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\bin\swtraptest *ip-address* ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/bin/swtraptest *ip-address*

5.4 Setting Up a Login Account

ESC define login account by user unit, the user account access is privileged (authorization). This chapter describes how to change the authority level. Since ESC has many functions that can effect on the server node job, such as access path setting, please take care of user account setting.

5.4.1 Access authority

The management account has the following type.

These authorities are exclusive to Storage Cruiser, and not related to operating system authorities.

Table 5.1 Administrators and their access authority

Authority level	Resource management	Access authority
Privileged administrators	Entire system	All function
Non-privileged administrators	Monitor the entire system, but can not change the setting.	Reference only. No authority to change the system setting

The operations each administrator can perform are as follows.
In the table, "A" means "available", "N/A" means "not available".

Operation	Privileged administrators	Non-privileged administrators
Change the account authority level	A	N/A
Display account authority information	A	A
Move the icon	A	A
Device search	A	N/A
Device registration	A	N/A
Device delete	A	N/A
Access path setting	A	N/A
Access path delete	A	N/A
Access path inheritance	A	N/A

Operation	Privileged administrators	Non-privileged administrators
Call management software	A	A
Display device property	A	A
Display version information	A	A
Show help	A	A
Correlation management	A	A
Performance management setting	A	N/A
Performance date display	A	A
Manually embedded device	A	N/A
Set SNMP Trap transmission	A	N/A
Change property of manually embedded device	A	N/A
Delete zoning information from switch property	A	N/A
Create application	A	N/A
Delete application	A	N/A
Set relation information to an application	A	N/A
Delete relation information to an application	A	N/A
Change application's property	A	N/A

5.4.2 Login Account setting

5.4.2.1   How to create a management account

1. Select [Tool] - [Authentication] in the logical resource view.

   The "Attestation setup" window will appear.

2. Click <Registration> button.

3. Specify the following information in the "Login account registration" window:

   User name

   The name must start with an alphabetic character and can be up to 16 alphanumerical characters (including underscores, "_", periods, ".", and hyphens, "-") long.

   Password (confirm password)

   The password is a string of alphanumerical characters and symbols, up to 16 characters long.
   The password cannot start with "{".

   Authority level

   Either Privileged Administrator or Non-privileged Administrator is selected.

4. Clicking <OK> button creates the management account.

Information
....
Login account is Storage Cruiser's unique account and does not relate to any operating system user accounts.
....

 Note

....

The user name of login account cannot be changed. If you want to change it, delete it once and create a new account again.

....

5.4.2.2 How to change the authority level

1. Select [Tool] - [Authentication] in the logical resource view.

   The "Attestation setup" window will appear.

2. Select a management account in which the authority level must be changed in the "Attestation setup" window, then click <Change> button.

   The "Change registered user information" window will appear.

3. Click <Authority-level change> button.

   The "Authority-level change" window will appear.

4. Change the authentication level.

5. Clicking <OK> button completes authentication level change. The completion notification message dialog will appear.

 Note

....

If the management account was used to log in to another client before changing the authority level, it is necessary to exit the client and login again using the same account.

....

5.4.2.3 How to delete a management account

1. Select [Tool] - [Authentication] in the logical resource view.

   The "Attestation setup" window will appear.

2. Select the management account, and then click <Delete> button.

   The confirm dialog will appear.

3. Clicking <OK> button on the confirm dialog will complete management account deletion.

5.4.2.4 How to change the password

1. Select [Tool] - [Authentication] in the logical resource view.

   The "Attestation setup" window will appear.

2. Select the management account, and then click <Change> button.

   The "Change registered user information" window will appear.

3. Click <Right-to-password change> button.

   The "Right-to-password change" window will appear.

4. Specify the following information:

   User name

   Specify the management account you will change.

- 78 -

Current password

Specify the current password.

New password (new password confirmation entry)

Enter the new password.
The new password is a string of alphanumerical characters and symbols, up to 16 characters long.

The password cannot start with "{".

Information

- If privileged administrators change the password of the other management account, it is not necessary to enter the current password.

- The password is valid only in this software and therefore does not affect users of the operating system and other software.

5. Clicking <OK> button completes password change. The completion notification message dialog will appear.

Note

If the management account was used to login to another client before changing the authority level, it is necessary to exit the client and login again using the same account.

Chapter 6 Operation

Configuration management is made by using each view of the resource view and the Correlation window. This chapter explains how to use each window.

6.1 Resource View

The resource view consists of the following views:

Main View

The view shown by click the first menu at the left tree.

Category View

There are three categories in the MainView tree; they are Server, Storage and SAN.

Domain View

When a domain icon is double-clicked in the server category or storage category view, device icons related to a device that is registered in that domain are displayed.

SAN View

When a SAN device type is selected from the SAN category view, devices of that device type that can be accessed with a login account are map-viewed.

Side View

The view shown by click server domain view, storage domain or double click the device in SAN View.

6.1.1 Main view

This view is used to display all the devices that are registered on the resource view. The category icons of the managed devices are displayed.

When a device is connected with a Fibre Channel, a physical connection line is automatically displayed. Even if two physical Fibre Channel cables are connected, one line is indicated.

By clicking [View] - [Refresh], the latest SAN status of all devices is loaded and displayed.
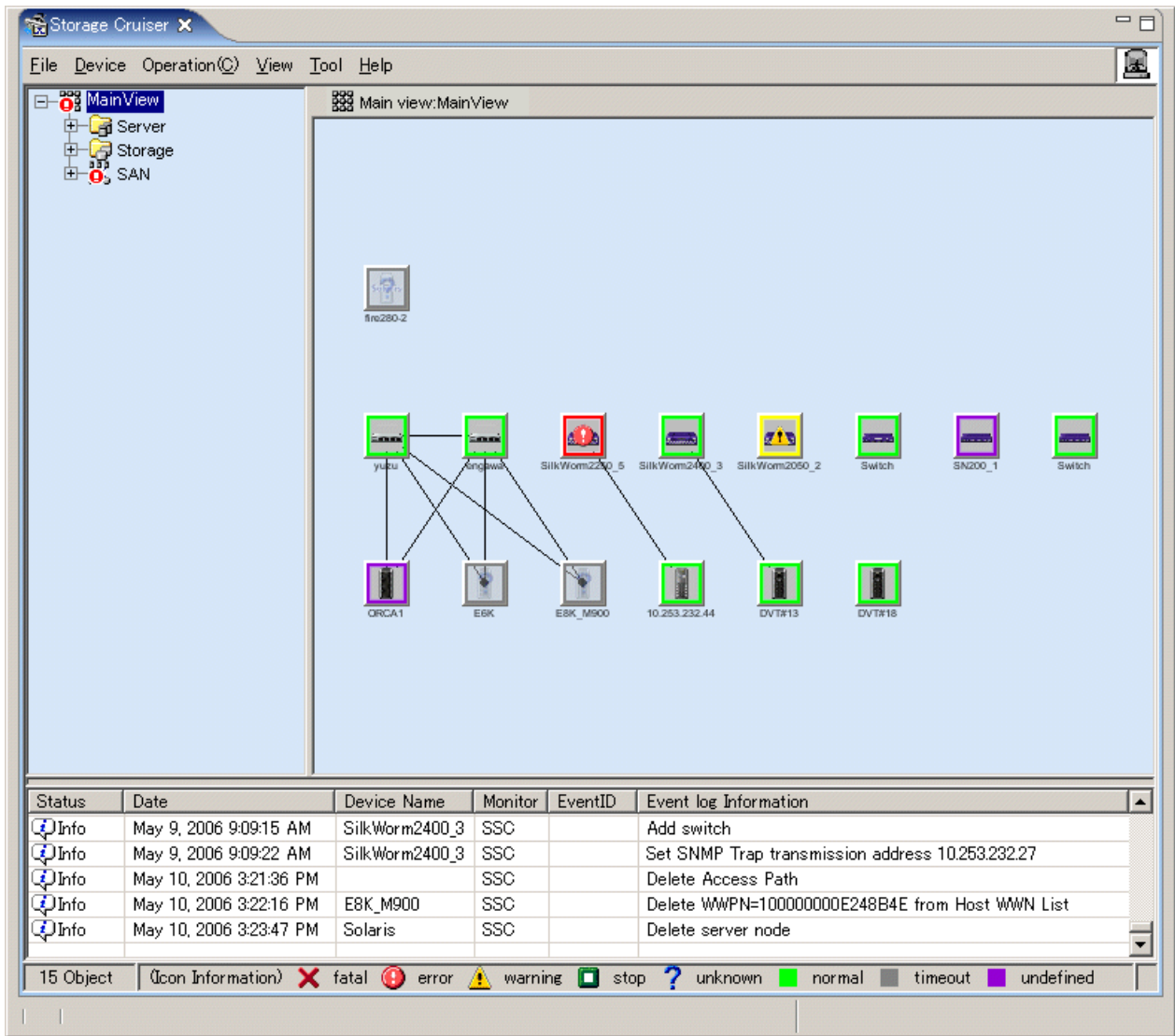
Each device icon can be freely positioned. It should be positioned in an easy-to-manage location. The device icon in each view is displayed depending on the device status as follows.

Table 6.1 Device status indications

Icon state	Color	Icon	Description	Action to be taken
normal	Green		The device is operating normally.	None
warning	Yellow	⚠	An attention-level error was detected in the device. Resources can be available.	Replace the faulty part, and execute recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
error	Red	🔴	An error was detected in the device though the cause is not found. Resources are not available.	Replace the faulty part, and execute recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
stop	Green	⬛	Stop status.	None

Icon state	Color	Icon	Description	Action to be taken
fatal	Red	✖	Faulty parts are detected in this resource. Resources are not available.	None
unknown	Grey	?	Status unknown	None
timeout	Gray		The device is defined in this software, but it cannot recognize it. The device properties displayed by the GUI are the values that were retrieved the last time that the device was recognized. However, if the device is a Fibre Channel switch that enters the timeout state, the GUI does not display the Fibre Channel physical line under the Fibre Channel switch. The GUI indicates errors for all access paths using the Fibre Channel switch because this software cannot check the statuses of these paths.	The power supply of the device may be off or Agent may not be operating; also, a LAN error may have occurred. If you changed the IP addresses manually, also refer to "9.1.2 Changing the operating environment" and perform operations to reflect the changes of the IP addresses. If the device uses the SNMP protocol for communication, the community name of the device may differ between the target device and admin server. If the community name of the target device has been changed, set the community name by referring to "C.2 sanma.conf Parameter", and reflect the setting file on this software. -> Check the device status, and select [Refresh] from the menu.
undefined	Violet		The device is undefined in this software.	Define the device.

Revolving light icon lights when there is a change in the state of the displayed device. Revolving light icon is displayed as follows:

Table 6.2 Revolving light icon state

Icon (Color)	State	Description	Action to be taken
(Green)	Information	The state change occurs.	Click the revolving light icon and update to latest information.
(Yellow)	Warning	The trouble at the warning level occurs.	Click the revolving light icon and update to latest information and recover. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
(Red)	Error	The trouble occurs.	Click the revolving light icon and update to latest information and recover. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
(Grey)	Normal	There is no state change.	None.

This software automatically analyzes and displays the connection status of each Fibre Channel physical line between devices, such as that between a server node and a Fibre Channel switch and that between a Fibre Channel switch and storage.

The current version of this software automatically displays the connection status of Fibre Channel physical lines between the devices listed in the following table.

Table 6.3 Fibre Channel physical lines whose connection status can be automatically read

HBA	Solaris OS		Windows		Linux	HP-UX
	PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F	LP-9000, LP-9002S, LP-9002L, LP-9802, LP-10000, XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, SG-XPCI2FC-QF2-Z	PG-FCD101, PG-FCD102, QLA2340	LP-9000, LP-9002L, LP-9802, LP-1050, LP-1050Ex, PG-FC105, PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD201, MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, MC-08FC71	PG-FC105, PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD101, PG-FCD102, PG-FCD201, MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, MC-08FC71	A6795A, A5158A, A6826A, AB378A, AB378B, AB379A
Fibre Channel switch	Yes	Yes	Yes	Yes	Yes	Yes
Fibre Channel hub	Yes (*1)	No	Yes (*1)	No	No	No
One-to-one connection (FC-AL topology)	Yes	No	Yes	No	No	No

*1: These are converted to individual lines connecting several HBAs and a CA.

Information
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For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment:

- Displaying the device status

    The device status of VM host and VM guest is displayed as an icon. On the Main view and Domain view, the device status for both VM host and VM guest is displayed in the VM host icon.
    For details of the device status, refer to "Device Status" of "B.7.2 Server node (VM host) properties" or "Device Status" of "B.7.3 Server node (VM guest) properties".

View		Displaying the device status
Main view Domain view (map-view)	VM host	Displays by using an icon of VM host. The icon of VM host displays the device status of itself and VM guest. The device status of VM guest is displayed on the right-bottom area in an icon of VM host. The meaning of icons displayed on the right-bottom is as follows. For details, refer to "Device Status" of "B.7.3 Server node (VM guest) properties".

Icons	Meaning
✖	fatal
🛑	error
⚠	warning
■	stop

View		Displaying the device status	
		Icons	Meaning
		?	unknown
		Not displayed	normal
		The display examples are as follows. **[Display example 1]** The status of VM host is "warning" (⚠), and the status of VM guest is "error" (🔴). **[Display example 2]** The status of VM host is "normal", and the status of VM guest is "unknown" (?). The device status of VM host is not influenced by the device status of VM guest. For example, the icon of VM host is displayed as "normal" (green color) when the status of VM host is "normal" and the status of VM guest is "error". In this case, the icon of VM host is not displayed as "error" (red color). The icon of VM host is displayed as "normal" (green color) and 🔴 icon is displayed on the right-bottom in the icon of VM host.	
	VM guest	The device status of VM guest is displayed on the right-bottom in the icon of VM host.	
Side view	VM host	Displays by using an icon of VM host.	
	VM guest	Displays by using an icon of VM guest.	
Tree	VM host	Displays by using an icon of VM host.	
	VM guest	Displays by using an icon of VM guest.	
List view	VM host	Displays in "Device Status" of the display items.	
	VM guest	Not displays the VM guest information.	

· Tree

The VM host is displayed under the [MainView] - [Server] - [Base domain]. The VM guests are displayed under the VM host that manages their VM guests.
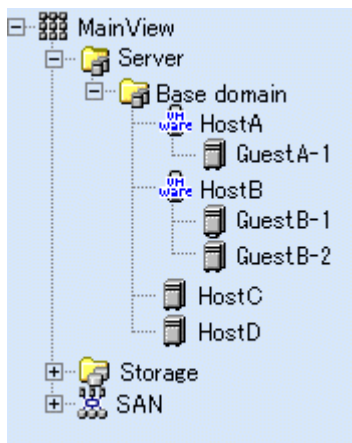
The status of VM guest is displayed according to the display priority level of the upper class (MainView, Server and Base domain) without VM host. The order of the display priority level is "error", "warning", "unknown" and "normal".
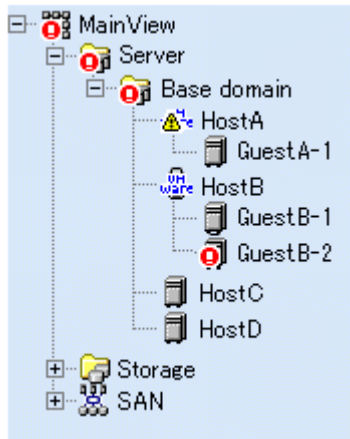
In the above case, the status of the upper class for the VM guest (GuestB-2) is as follows.

Class	Status
VM guest (GuestB-2)	The status is "error". This information is not reflected on VM host (HostB).
VM host (HostB)	Displays the status of VM host only. The status of VM guests managed by this VM host is not reflected.
Base domain	Displays the highest priority level in the VM host (HostA , HostB) and VM guest (GuestA-1, GuestB-1, GuestB-2) and host (HostC, HostD).
Server	The status of the Base domain is reflected.
MainView	Displays the highest priority level in the "Server" and "Storage" and "SAN".

6.1.2 Category view

When a category icon is double-clicked on the resource view, or SAN device type registered in the category (server, storage, or SAN) is displayed in the map area.
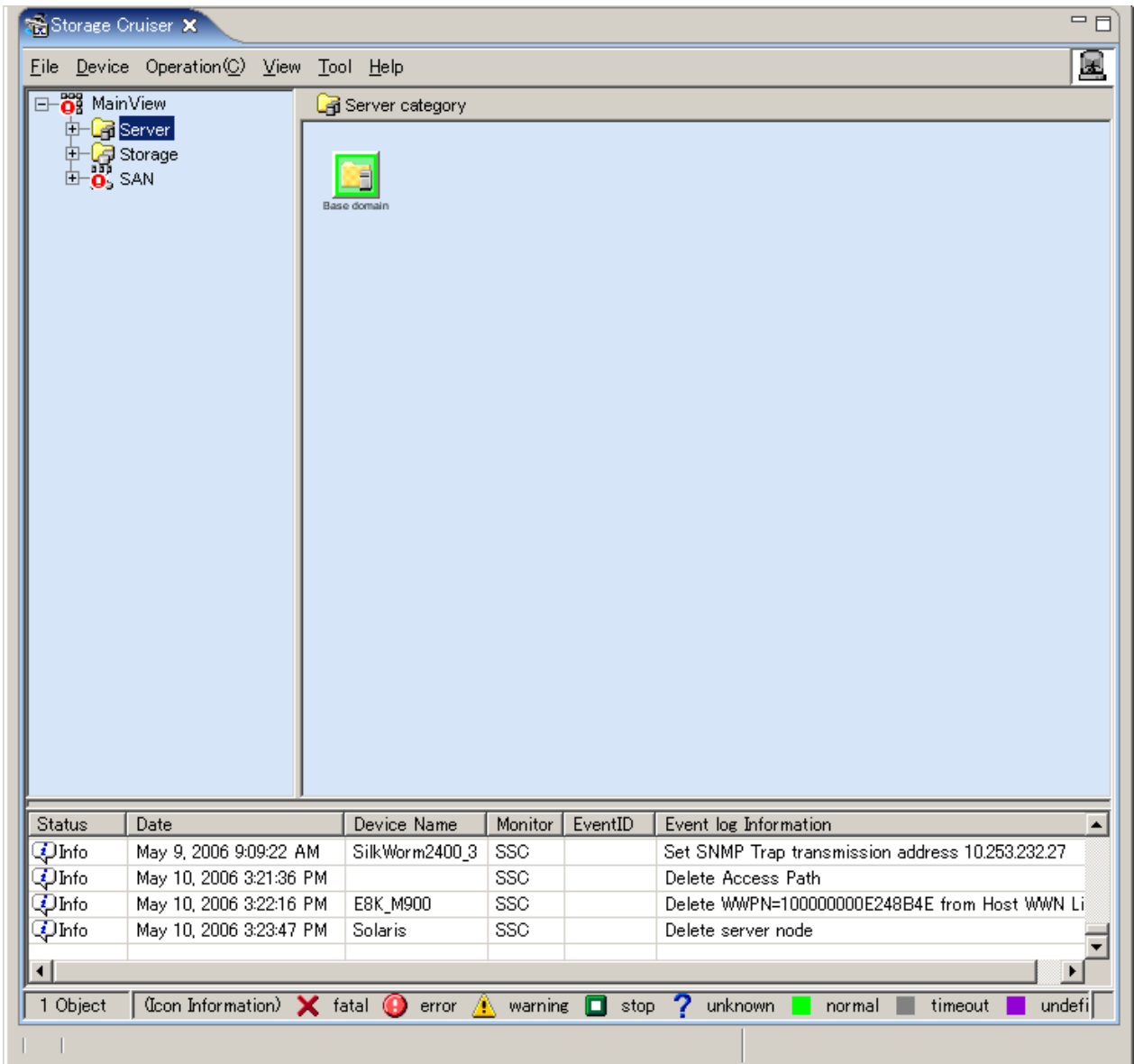
When the SAN category is selected, all devices that can be accessed with a login account are displayed on the tree.
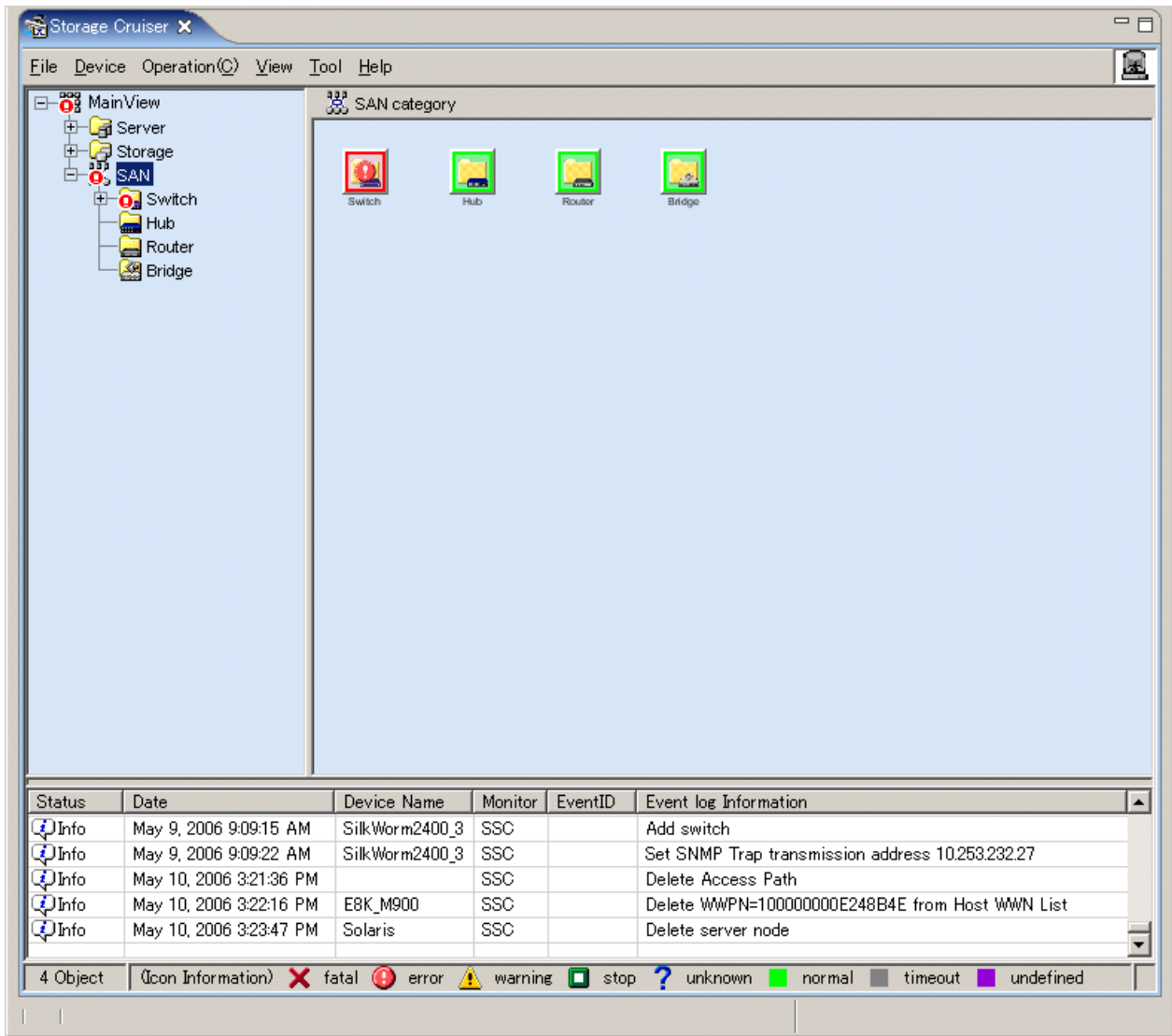
6.1.3 Domain view

When a base domain icon is double-clicked in the server category or storage category view, device icons related to a device that is registered in base domain are displayed. (Even if two physical Fibre Channel cables are connected, one line is displayed.)

By clicking [View] - [Refresh], the latest status of a device that is managed in the base domain is displayed.
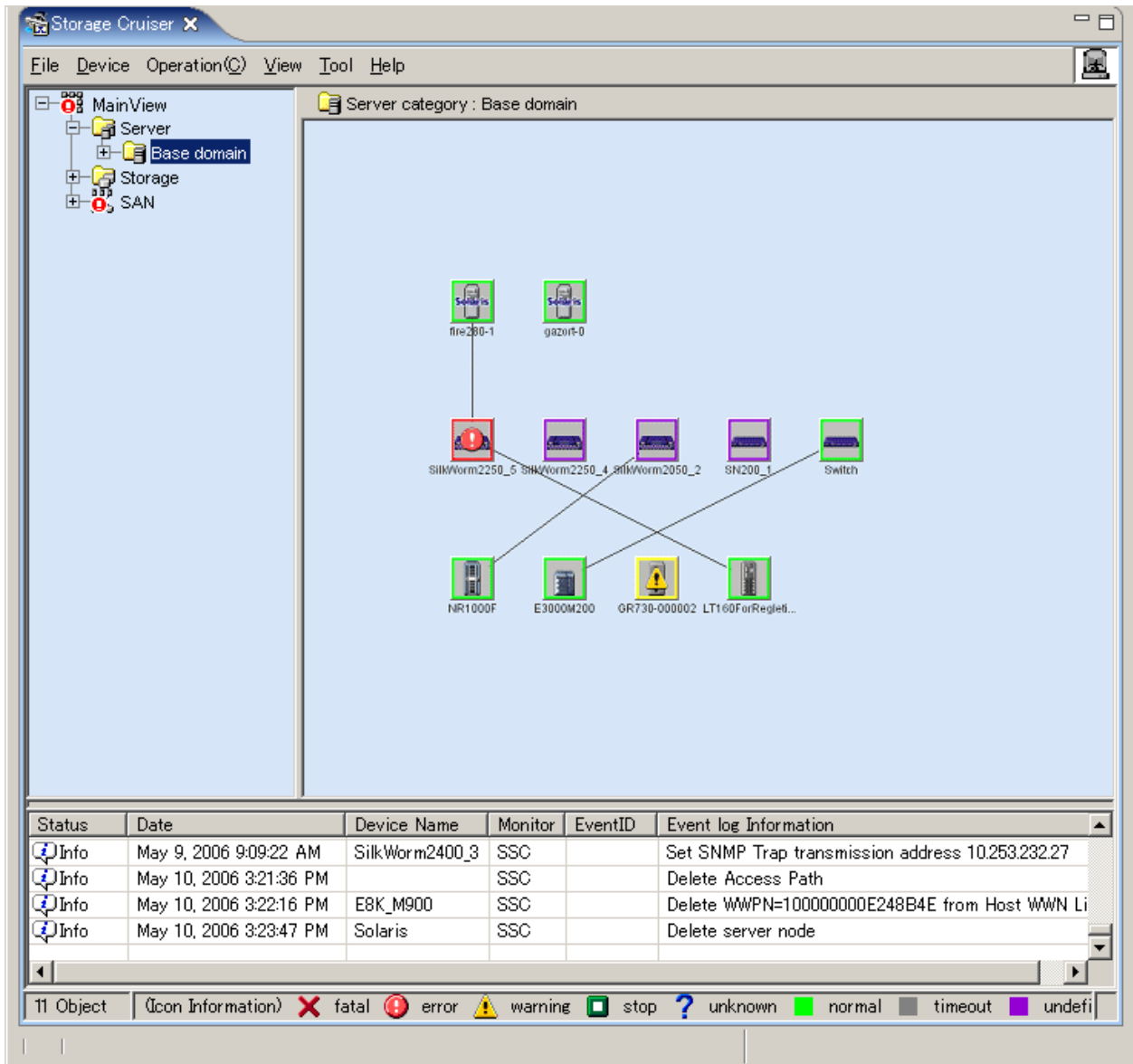
Each device icon can be freely positioned. It should be positioned in an easy-to-manage location.

📖Information
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For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment:

Refer to "6.1.1 Main view" for the displaying the VM host and VM guests.
• •

6.1.4 SAN view

When a SAN device type is selected from the SAN category view, devices of that device type that can be accessed with a login account are map-viewed.
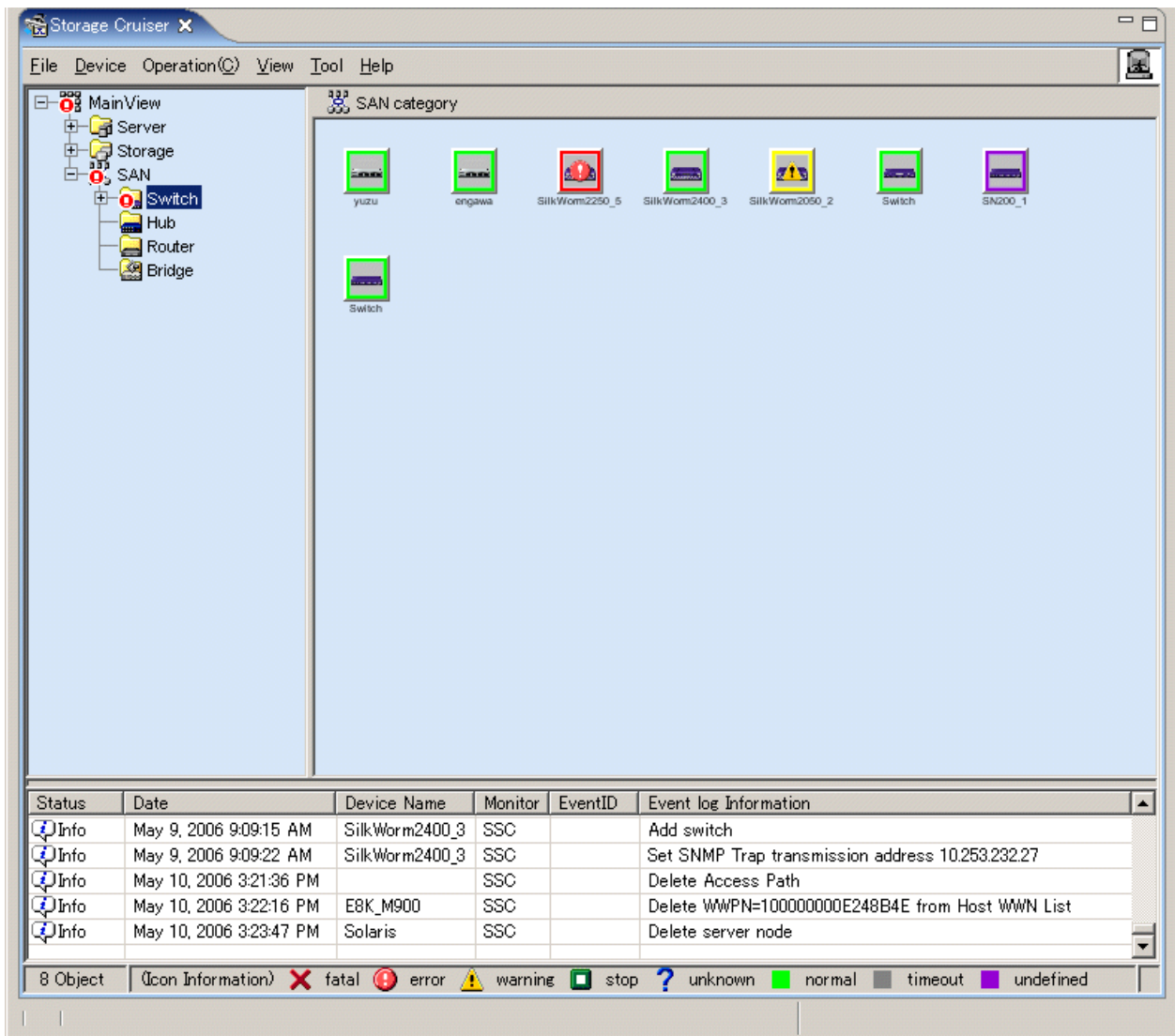
6.1.5 Side view

Double-clicking a device icon in the main view, domain view or SAN view displays a view showing Fibre Channel port details such as the access paths, physical lines, HBAs, and CAs of devices logically related to the selected device. This view can be used to manage access paths and check the statuses of HBAs and CAs.

Information

For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment:

When a VM host is specified, its VM host and all VM guests on its VM host are displayed.
When a VM guest is specified, its VM guest and a VM host including its VM guest are displayed.
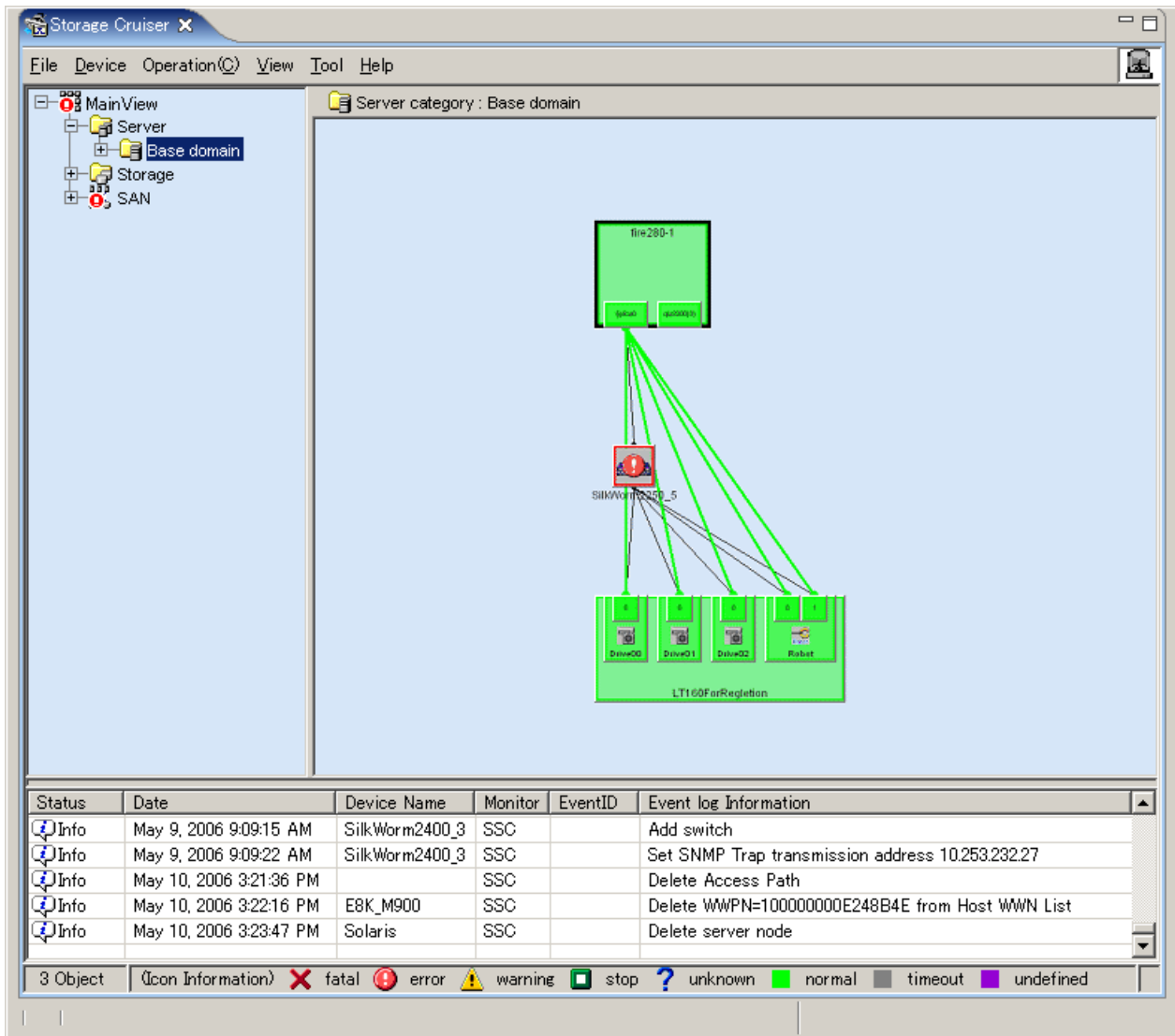
🖰 Note

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Note that double-clicking a switch icon disables the display and setting of an access path.

In the virtual storage environment, this view screen shows no device that is logically related to each device.

- -

Table 6.4 Host bus adapter (HBA) status indications

Icon state	Color	Description	Action to be taken
normal	Green	The server node has the HBA.	None
warning or error	Yellow (*1) or red	All access paths of the HBA are blocked, the FC cable is loose, or one other such error has occurred in the HBA. (The icon state depends on the notification information from the HBA driver. For example, if the FC cable is loose, the icon state is "Error" for certain HBAs.)	Replace the faulty part, and perform recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
timeout	Gray	The previously recognized HBA is not recognized.	If the HBA is in a state other than the timeout state, check if

Icon state	Color	Description	Action to be taken
			the HBA is correctly installed in the device. If the HBA has already been removed from the device, select the HBA, and click [Delete HBA].
The access path must be inherited.	Yellow (*2)	This software detected replacement of the HBA. (An HBA with a different WWPN is mounted in the same slot of the server node.)	Reconstruct access paths according to the WWPN of the new HBA. -> "6.3.5 Access path inheritance"

*1: Be sure to check the status because this icon color is the same as that indicating "This access path must be inherited".

*2: Be sure to check the status because this icon color is the same as that indicating "Warning".

Table 6.5 Storage CA (channel adapter) and Fibre Channel switch port status indications

Icon state	Color	Description	Action to be taken
normal	Green	The CA is properly mounted.	None
error	Red	CA operation has degraded.	Replace the faulty part, and execute recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
timeout	Gray	The previously recognized CA cannot be recognized.	The power supply of the device may be off or Agent may not be operating; also, a LAN error may have occurred.

The port numbers of ETERNUS SN200 model 320 (Brocade Corporation Brocade 12000) and ETERNUS SN200 model 340 (Brocade Corporation Brocade 24000) are displayed as numbers 0 to 15 to agree with real machine indications.

However, if an error occurs in a port, the port serial number is displayed as indicated below. It is, therefore, difficult to determine which port failed. To solve this problem, port numbers in the switch port information to be list-displayed are displayed using serial numbers to make it easy to determine real machine port locations from the event information.

The operation is explained below.

1. Information that indicates a port error is displayed in the event log display.

   In the event log, the information is displayed by using the serial number of the port.

2. Using the event information, open the side view for the switch of the port where the error occurred.
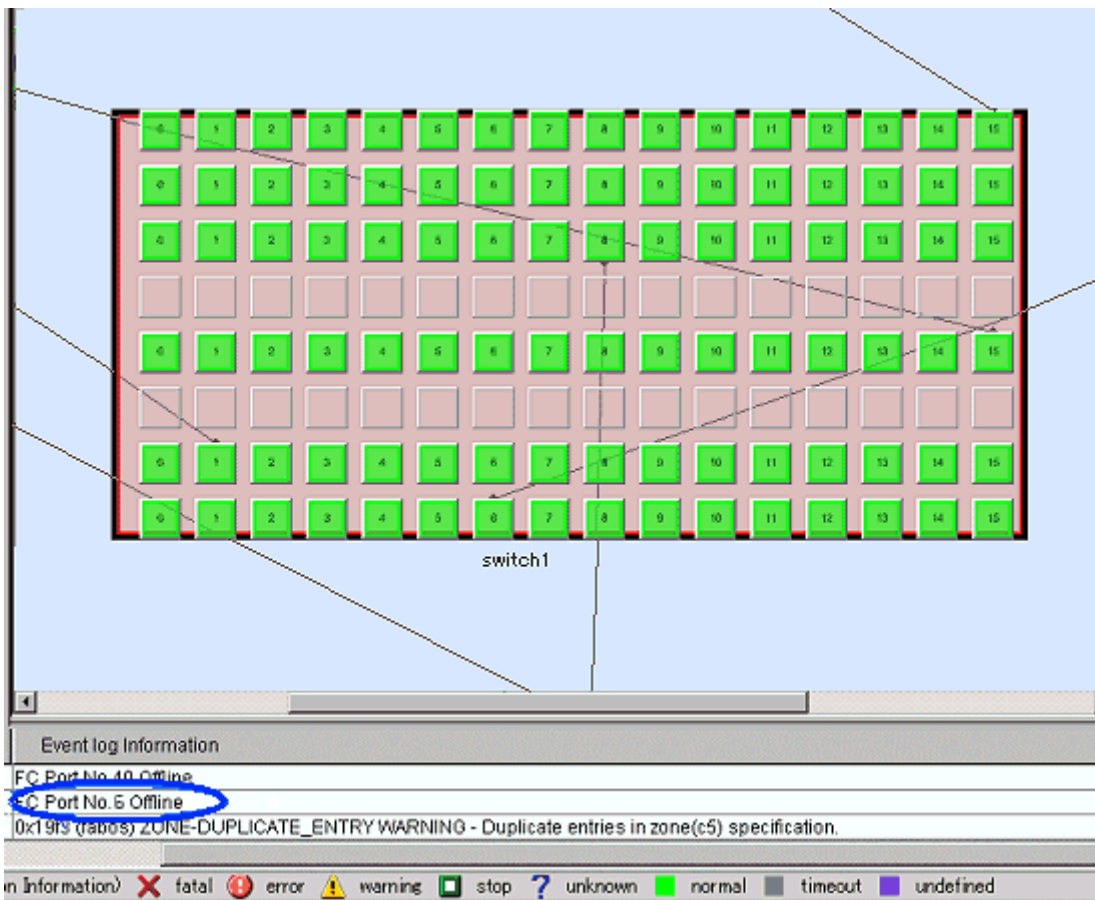
3. Select [View] - [Change] - [Map/List View] from the menu.

   [Map/List View] does not need to be selected if it is already selected.

Change	▶	Map View
Node identifier	▶	List View
Icon Size	▶	● Map/List View (D)
Icon Position Setup	▶	
Show/Hide	▶	
🔃 Refresh	F5	

switch1

Event log Information

FC Port No.40 Offline

FC Port No.6 Offline

0x19f3 (fabos) ZONE-DUPLICATE_ENTRY WARNING - Duplicate entries in zone(c5) specification.

(Icon Information) ❌ fatal 🔴 error ⚠ warning ⬜ stop ❓ unknown 🟩 normal ⬛ timeout 🟪 undefined

4. The switch port information is displayed in the list view.

Port Number	Device Name	Device Status	Current FC Port Typ
0	switch1	normal	F
1	switch1	normal	F

ormation
nect Access Path
ed
ete router
ete CA=201000E0000E1025
Vrcx:INFO:21115:site manager started
Vrcx:INFO:21115:site manager started

5. From the port number list in the switch port information, find the port number that is reported by the event.

6. Select the row of the port number that is reported by the event.

The port in the map that corresponds to the port number is selected to be displayed.

Switch Port Information

Port Number	Device Name	Device Status	Current FC Port Typ
0	swtich1	normal	F
1	swtich1	normal	F
2	swtich1	normal	F
3	swtich1	normal	F
4	swtich1	normal	F
5	swtich1	normal	F
6	switch1	normal	F

rmation

nnect Access Path

led
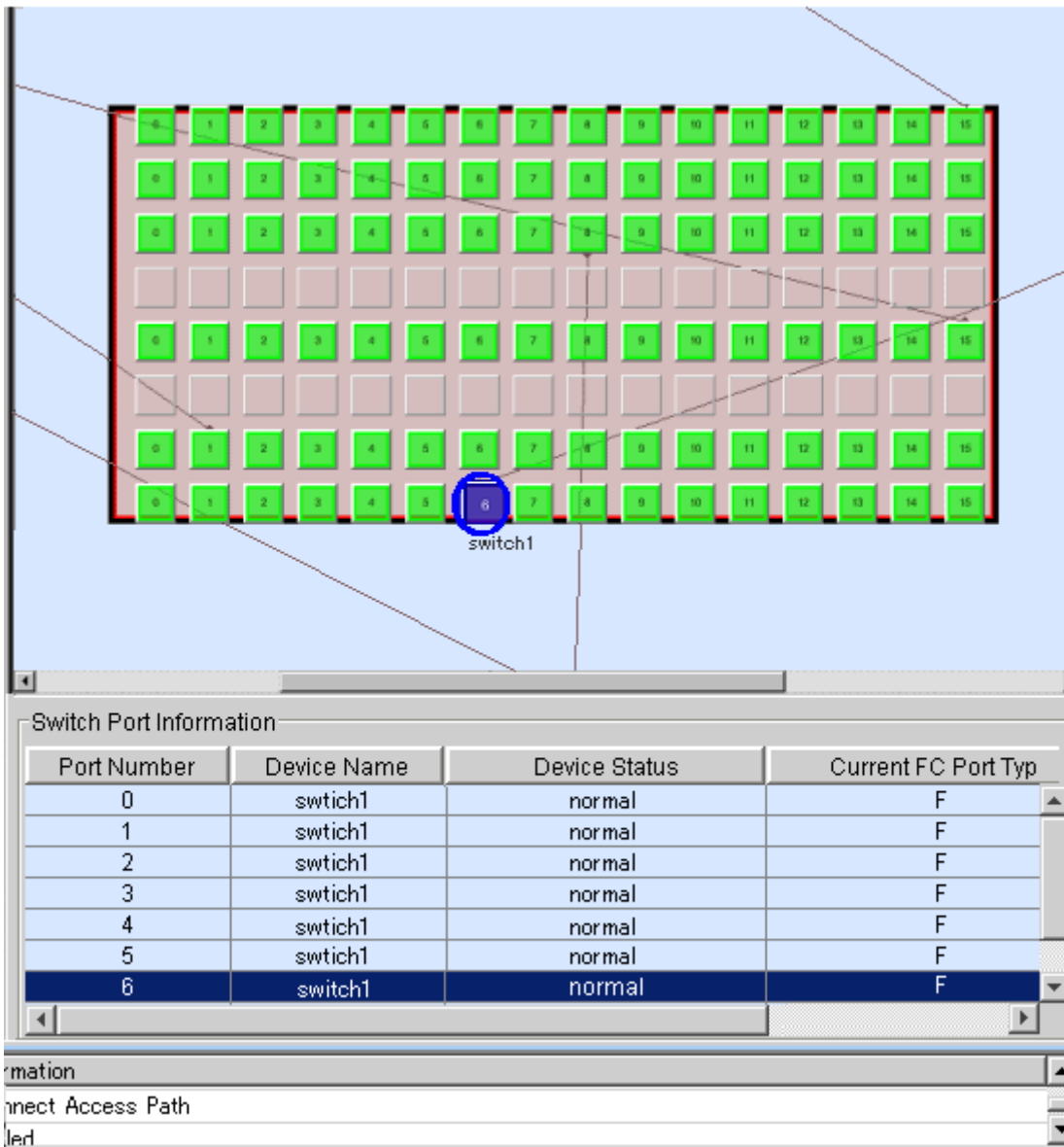
7. From the slot location and port number of the port that is selected in the map, the real machine port location where the error occurred can be recognized.

6.1.6 Editing the lines indicating physical connections of a manually embedded device

This section explains how to edit the lines indicating physical connections of manually embedded devices.

1. Open the Manual Configuration window.

   Switch to the Main view, SAN view and select [File] - [Manual configuration window] from the menu or select [Manual configuration window] in the pop-up menu. All of the Fibre Channel switches, bridges, or routers are displayed.

2. Embedding a Fibre Channel switch port in a manually embedded device.

   An UnknownFC port among Fibre Channel switch ports displayed in the Manual Configuration window indicates port connection place information that cannot be recognized. Click the UnknownFC port, and drag and drop it on the manually embedded device. (This operation cannot be performed by selecting [Physical Line] - [Edit] from the [Operation] menu.) A dialog then appears, and you can enter port information in this dialog. Enter port information, including options that can be recognized, in the dialog.

The left part of the figure below shows the status before an UnknownFC port of a Fibre Channel switch is dropped on a manually embedded test device. The right part shows the status after the UnknownFC port was dropped on the device.
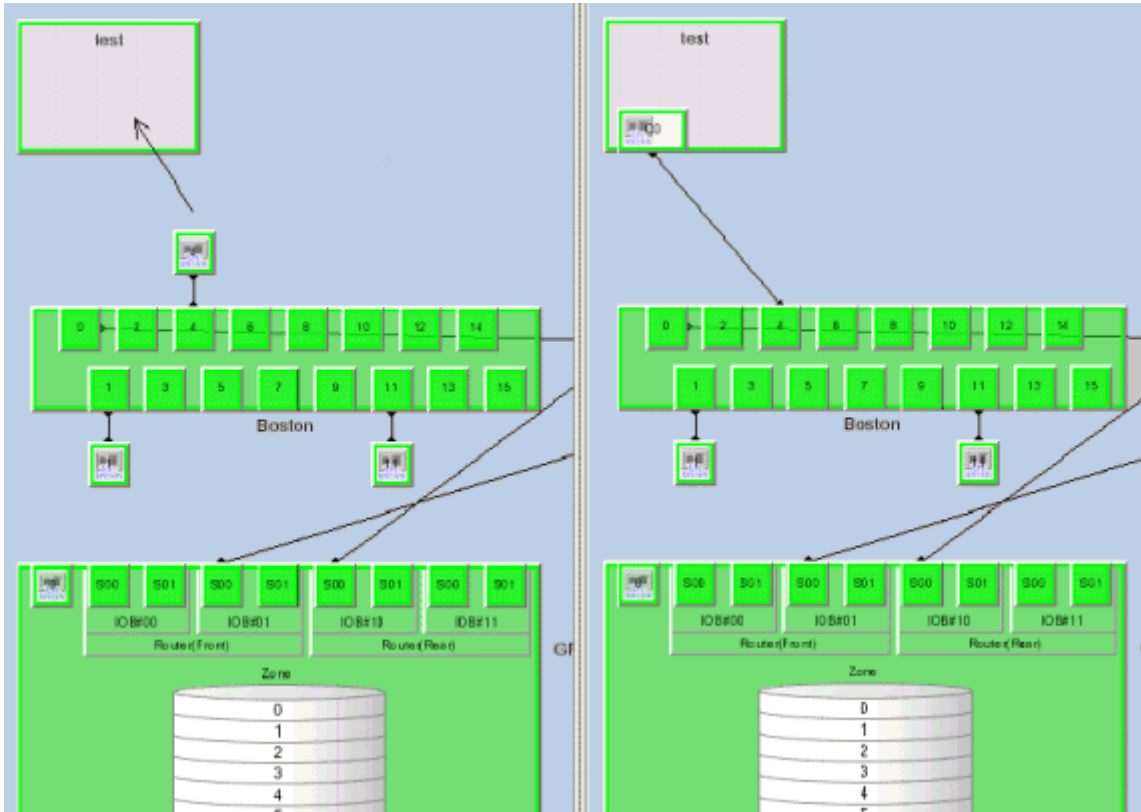
3. Embedding an UnknownFC port of a Fibre Channel switch in a library or tape encryption device or bridge device (including the connection between the bridge and library devices).

Click the UnknownFC port of the Fibre Channel switch, and drag and drop it on the library device (upper FC port of the LT series) or bridge device. (This operation cannot be performed by selecting [Physical Line] - [Edit] from the [Operation] menu.) A dialog then appears, and you can enter port information in this dialog. Enter port information, including options that can be recognized, in the dialog.

When connecting the bridge device to the library device, click the device icons such as the robot or tape icon, displayed on the bridge device, and drag and drop them as though they are on the library device.

The connection between the library and the tape encryption device cannot be done.

The two figures below show an example of dropping port 2 (UnknownFC port) of Fibre Channel switch Switch on LT120 library device aa and an example of dropping port 0 (UnknownFC port) of Fibre Channel switch Switch on the boulder bridge. In these examples, the robot icon and tape icon of the bridge boulder are also dropped on the golden library.
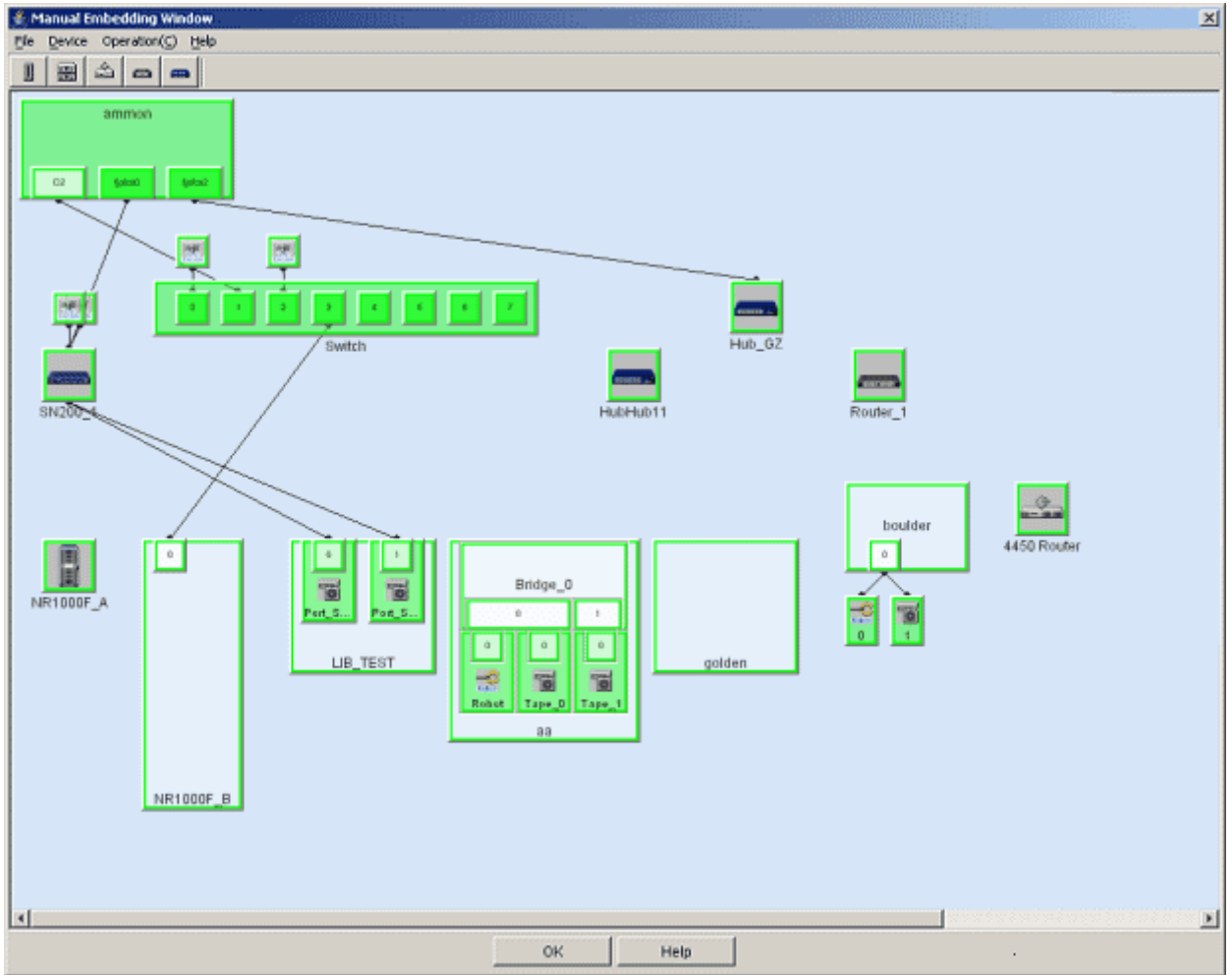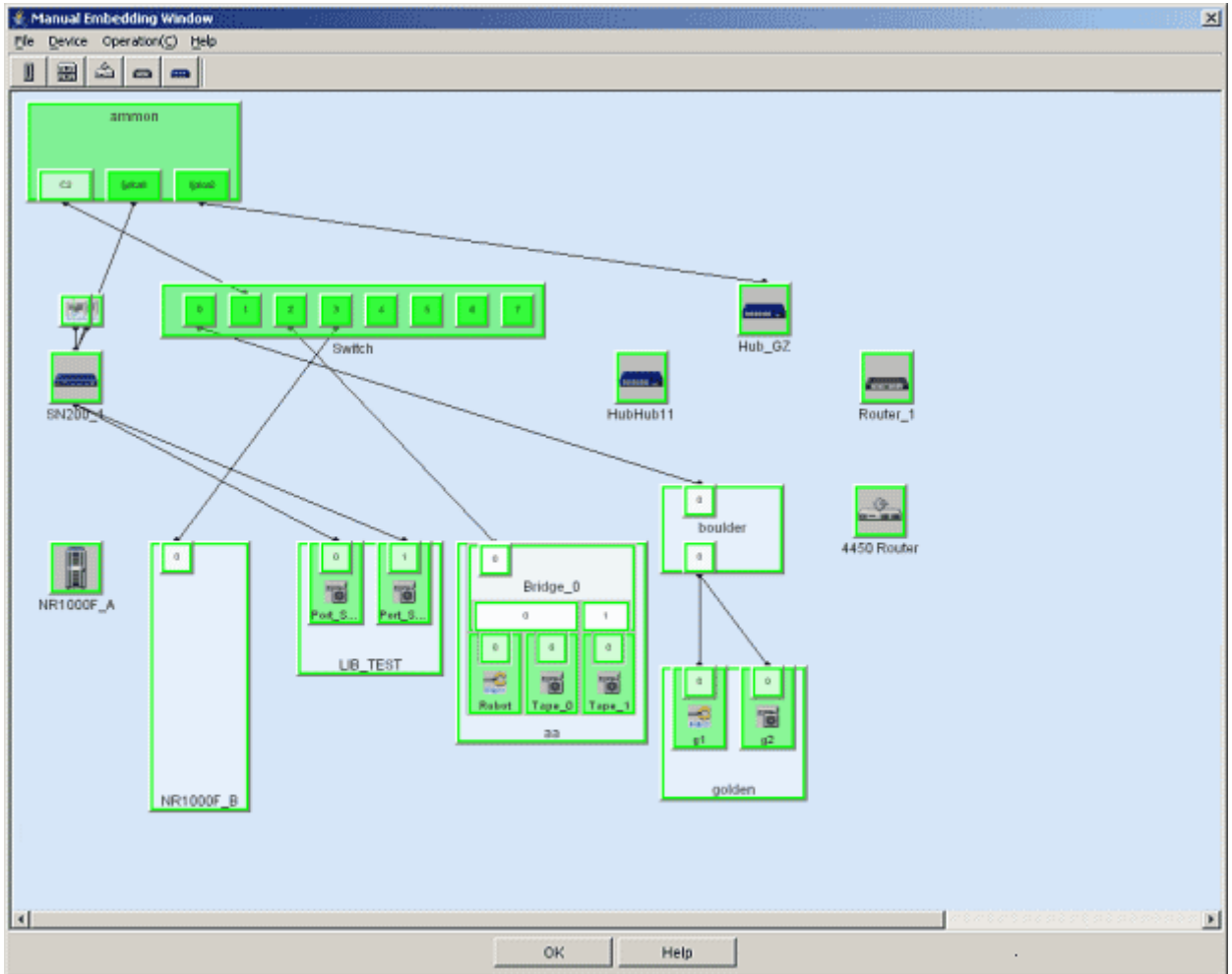
4. Canceling manual embedding of an UnknownFC port.

   To restore the UnknownFC port to its original state, right-click the set port/adapter, and select [Delete Registered Device] on the pop-up menu.

5. Close the Manual Configuration window.

   Select [File] - [Exit] or select the <OK> button in the lower part.

6. When a change is made in the Manual Configuration window, a dialog box "Do you want to update the administrative server with the latest information?" is displayed. Select the <OK> button to refresh the information.
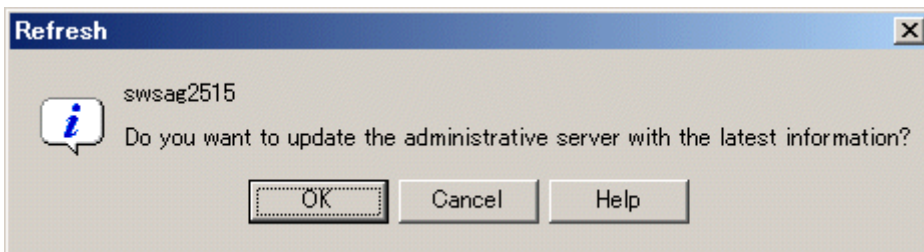
6.1.7 Physical line editing of one-to-one connection (only the HBAs that do not support automatic read), router device

This software cannot be used to automatically secure connection information for most FC-AL 1 to 1 connections or router devices. For this reason, it provides a function enabling editing and management of physical lines. The Manual Configuration window is used for the editing of physical lines. One-to-one connections require that each device port be recognized in advance and that the Manual Configuration

window be displayed. Therefore, a manually embedded server node cannot be connected to a manually embedded storage system without a Fibre Channel switch.

1. Open the Manual Configuration window.

   Switch to the Main view, SAN view and select [File] - [Manual configuration window] from the menu or select [Manual configuration window] on the pop-up menu. Manually created devices and their related devices and devices with an UnknownFC port connected are displayed.

2. Devices related to this operation are displayed in the Manual Configuration window.

   Select [Operation] - [View Device] - [Add] from menu or [View Device] - [Add] from the pop-up menu. The dialog for selecting devices to be displayed appears. Devices registered with this software are displayed in the left frame of the dialog. Select a target device, and click the <>> Add> button to move the device to the right frame.
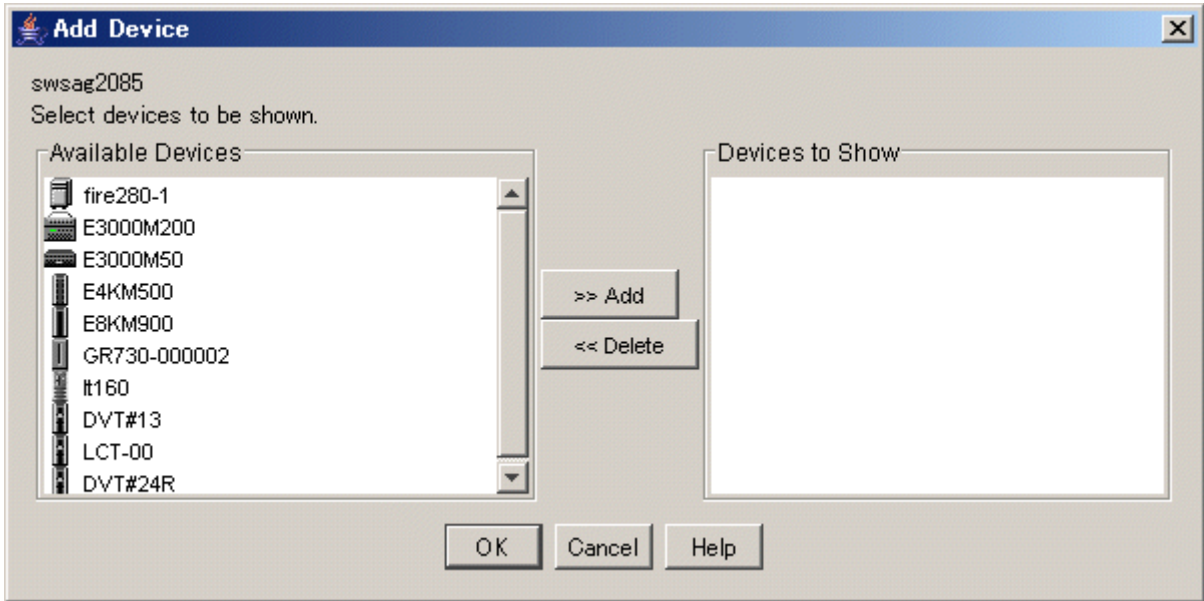
3. Change the sizes of all device icons to be used to the port display size.

   Select a device icon, and set [Change Detail View] to [ON] from the pop-up menu.

4. Change the edit mode to physical line edit mode.

   Select [Operation] - [Physical Line] - [Edit] from menu.

5. Connect ports that are actually connected.

   To connect a port that is actually connected but whose connection is not displayed in the window, click the port to select it, drag it to the corresponding remote port, and drop it there. (This operation must be performed in physical line edit mode.)

6. Close the Manual Configuration window.

   Select [File] - [Exit] or select the <OK> button in the lower part.

7. When a change is made in the Manual Configuration window, a dialog box "Do you want to update the administrative server with the latest information?" is displayed. Select the <OK> button to refresh the information.
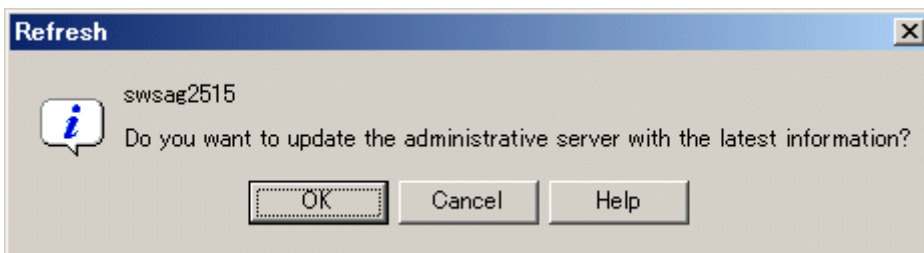
> 📒 **Note**

. . . .

The router device can connect a physical line only between switch devices. Moreover, only one physical line can be connected between one router device and one switch.

. . . .

6.1.8 Editing the physical lines between ETERNUS3000 model 50, GR710 with port extension mechanism and server nodes without the automatic display lines

If the physical line between HBA port of a connected server node and FC-CA port of storage is not automatically displayed in port extension mechanism (hub) connection environment, execute the editing of the connected physical line by the following procedure:

1. Embedding the port extension mechanism (hub) by the manual embedding function of this software.

   Display port extension mechanism (hub) unit by the manual embedding function in this software.

   a. Switch to the Main view, SAN view and select [File] - [Manual configuration window] from menu to display the Manual Configuration window.

   b. Select [Operation] - [Create New Device] - [Hub Device] from menu or [Create New Device] - [Hub Device] from the pop-up menu.
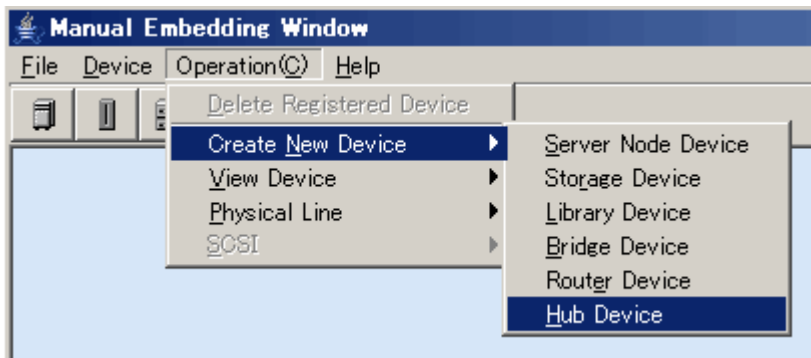
   c. Select "Others" in the dialog to fill in the product type.
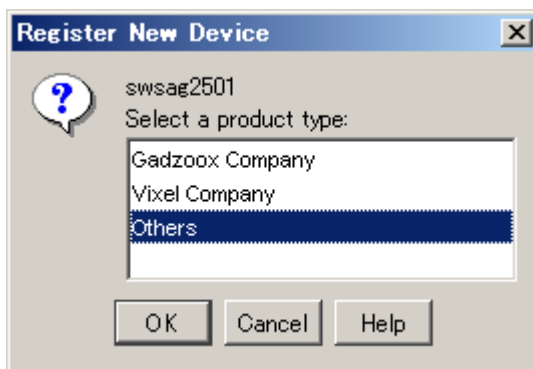
   d. Specify the following information in the dialog to fill in device information. The specified information is displayed as property information of this software.

   Embedding information tag: Specify an arbitrary device name in the device name and select "4" as the number of ports.
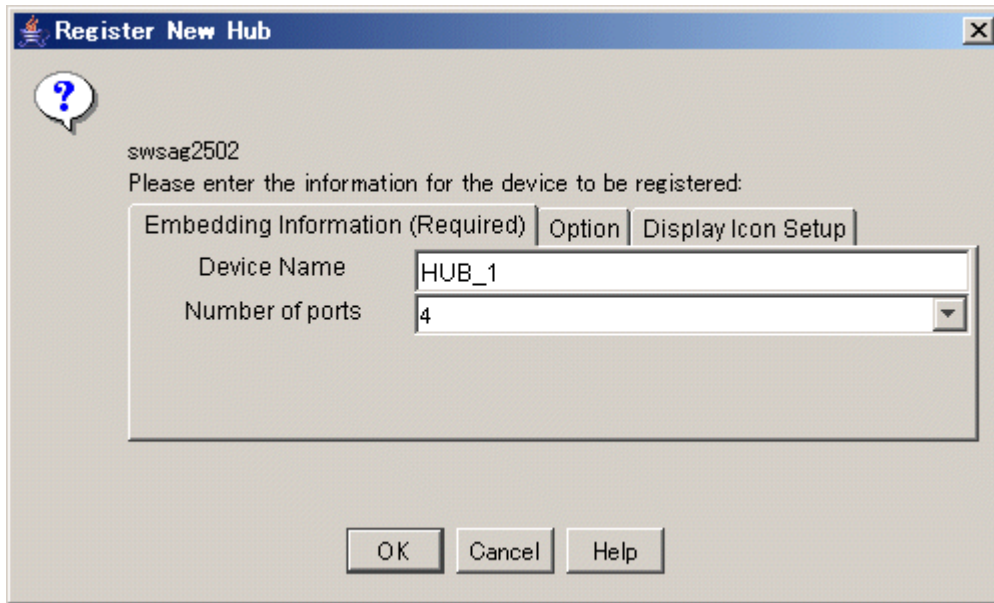
Option tag: Fill in the product company name and the product name (optional) and don't fill anything in for the IP address. Hub is displayed by clicking the <OK> button.

Because a port extension mechanism (hub) physically includes two port units (hubs), each with four ports, re-execute the steps from b to create and display a total of two hubs (device names should be different). In the following example, two hubs are created:
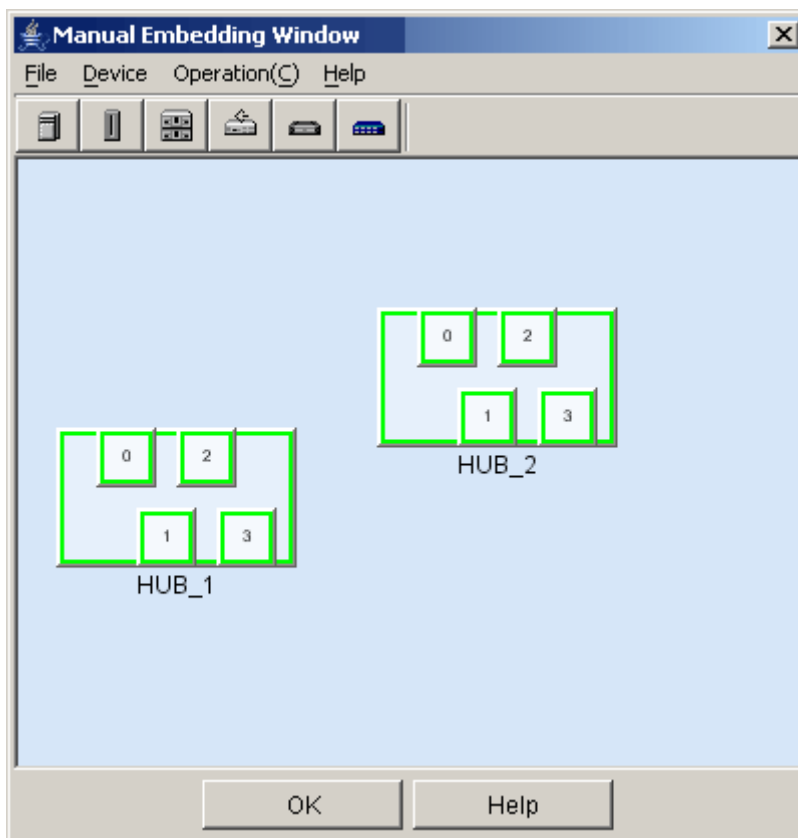
2. Connecting the lines with the manual embedding function in this software.

   Draw the physical lines between the created port extension mechanism (hub), HBA ports and FC-CA ports.

   a. Display the device connected with the port extension mechanism (hub)

   On the Manual Configuration window, select [Operation] - [View Device] - [Add] from menu or [View Device] - [Add] from the pop-up menu and choose server nodes and ETERNUS3000 model 50, GR710 devices which connected with the port

extension mechanism (hub) from the "Availavle Devices" frame and then add them on the other side of the "Devices to Show" frame.
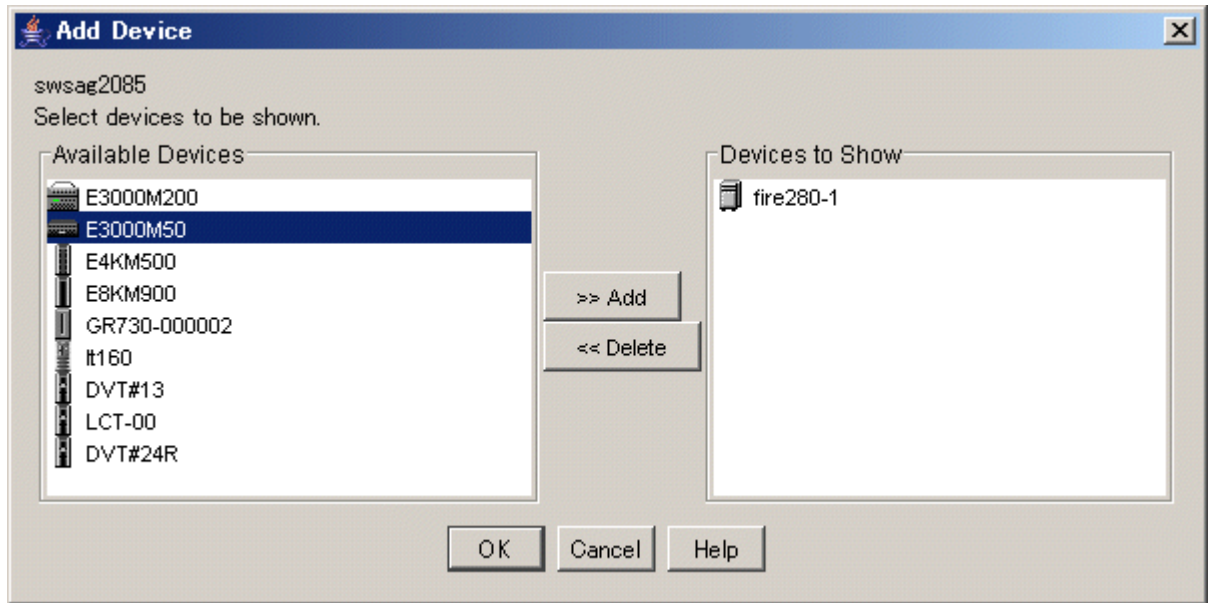
b. The added devices are displayed in the Manual Configuration window by clicking the <OK> button.
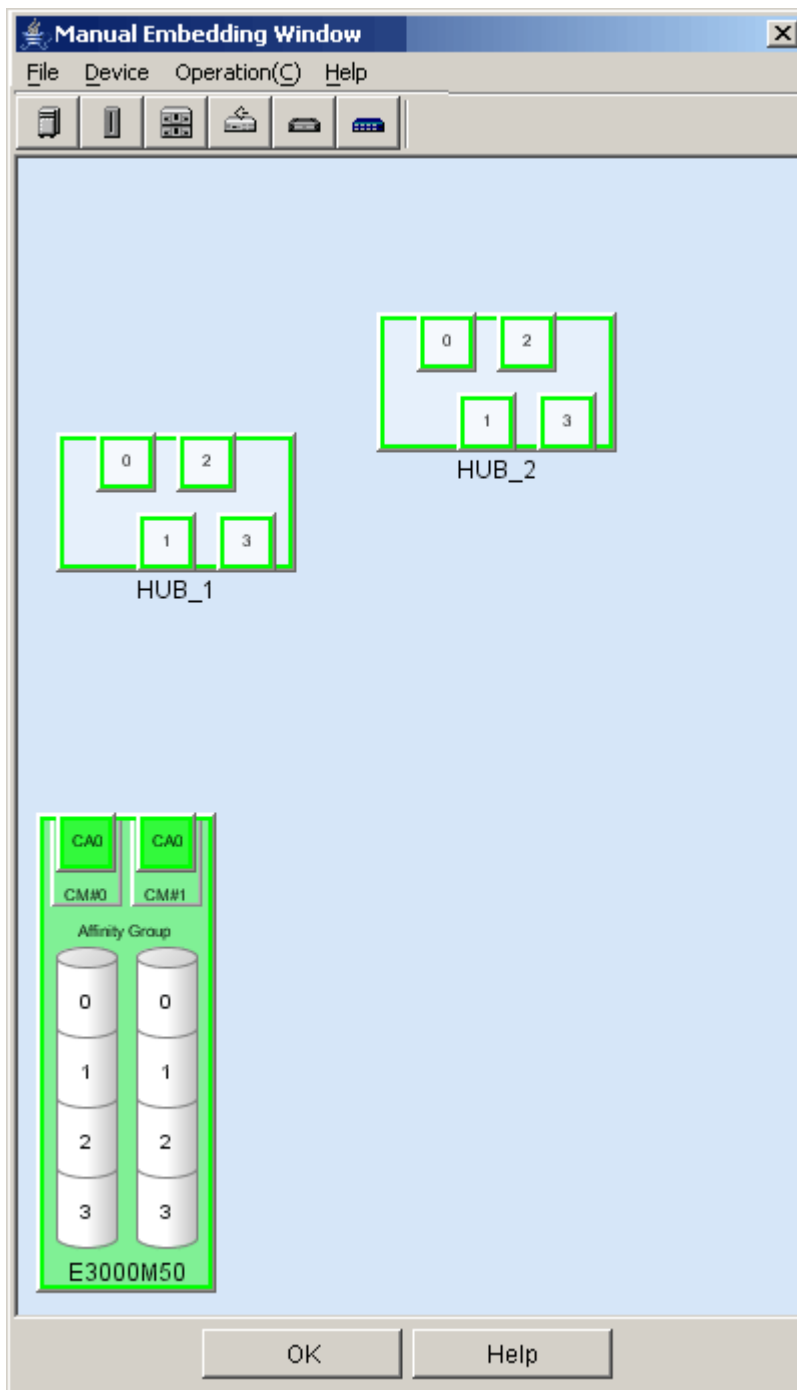
c. Select [Operation] - [Physical Line] - [Edit] from menu. It is not necessary to select, if the check mark is already displayed at [Edit]. The physical lines can be edited while the check mark is displayed at [Edit].
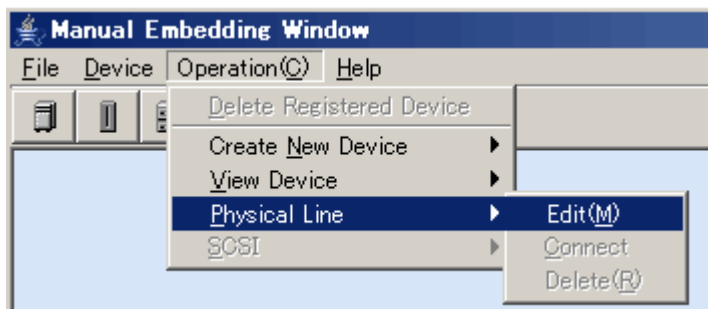
d. Select the port that is to be connected, drag and drop it to draw the physical line to the destination port.
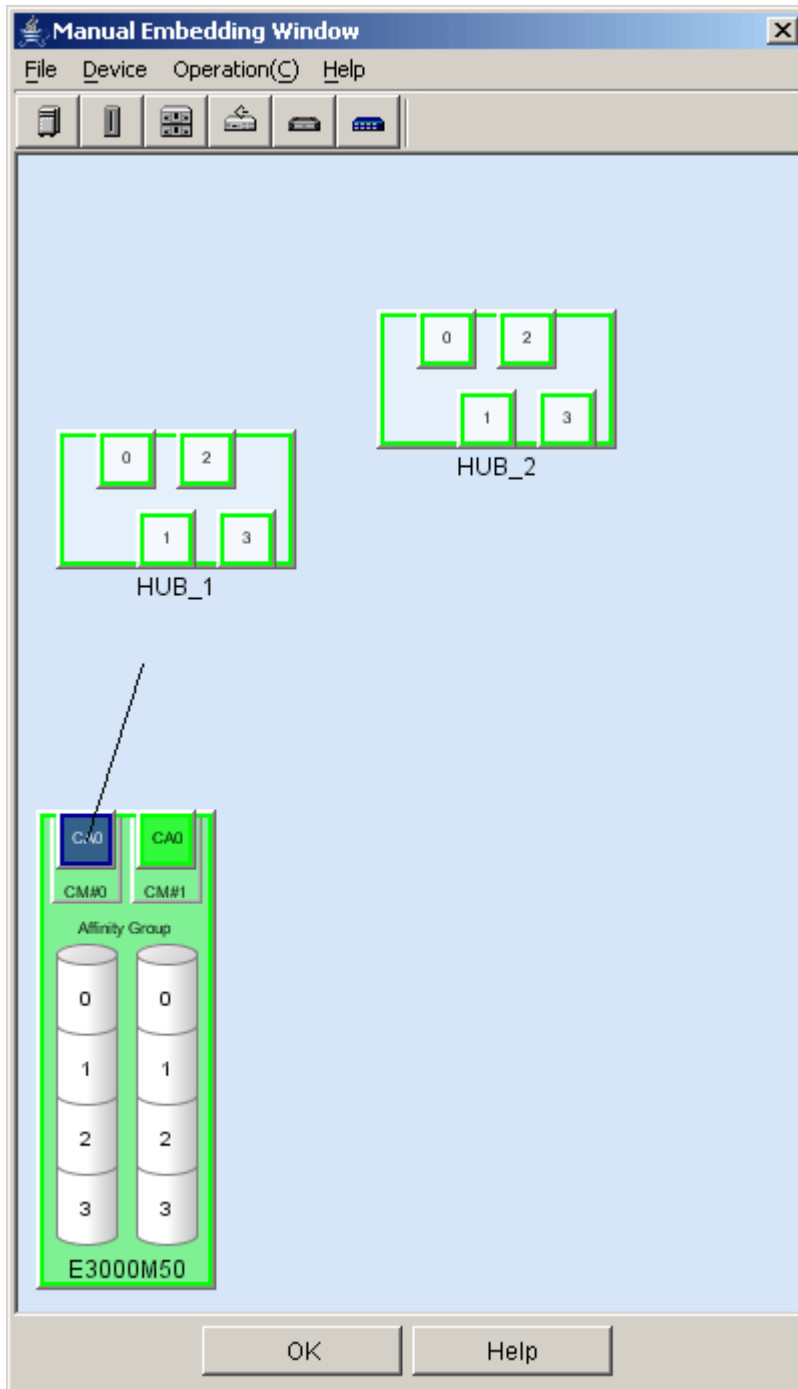
The physical line connected to the destinotion port is displayed after drag and drop operation.
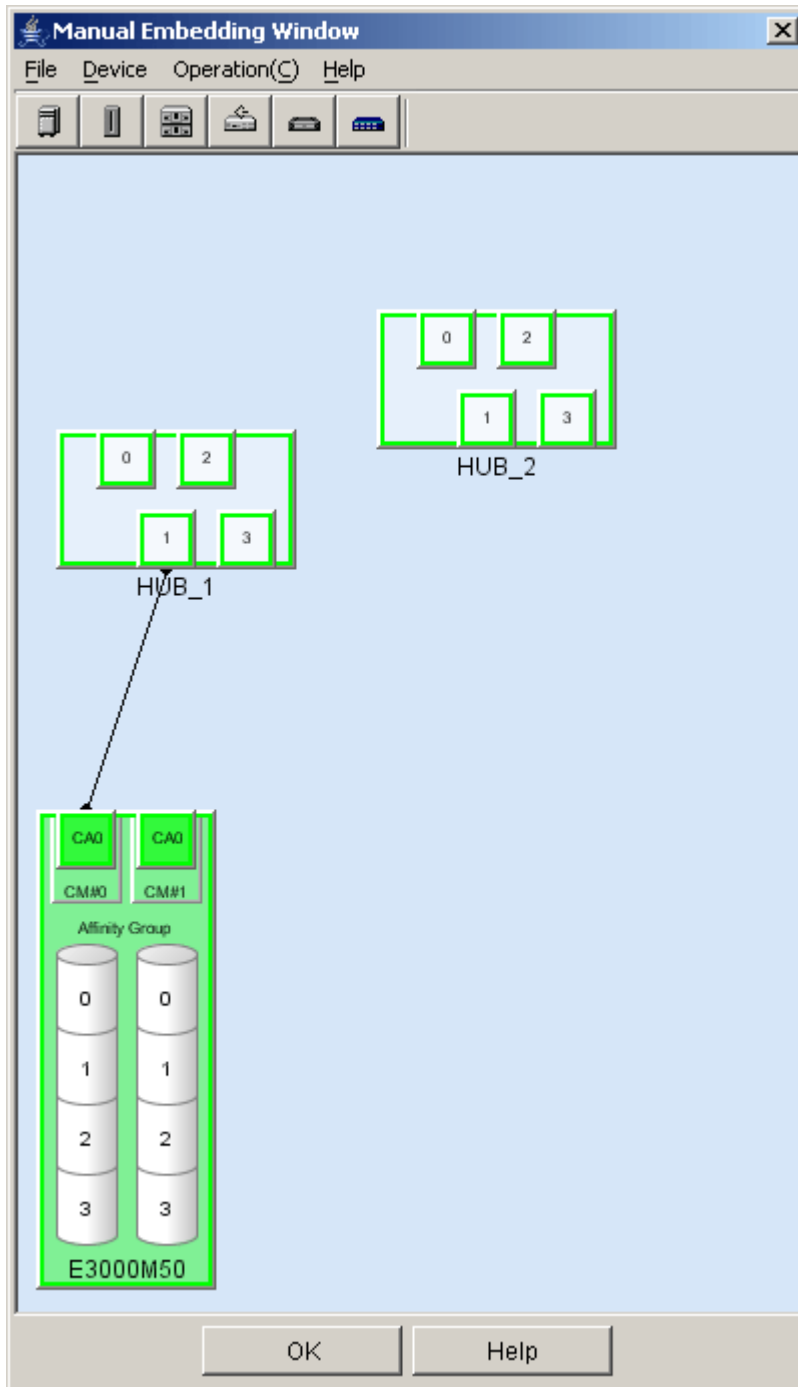
The physical connection between a port and other port can be created by selecting the source port and destination port, and selecting [Physical Line] - [Connect] from pop-up menu. The physical line created as described is between the port extension mechanism (hub) and the storage FC-CA port or the HBA port of the server node. If the port number of the port extension mechanism (hub) differs from the actual port number of the device, this is not a problem. The created physical line can be deleted and another physical line can be drawn. To delete the physical line, select it, right-click it, and select [Physical Line] - [Delete].

e. Create all the physical lines of ports that should be connected to the port extension mechanism (hub), then select [File] - [Exit] in the menu of the Manual Configuration window or select the <OK> button in the lower part to close the Manual Configuration window.

f. A dialog box "Do you want to update the administrative server with the latest information?" is displayed. Select the <OK> button.
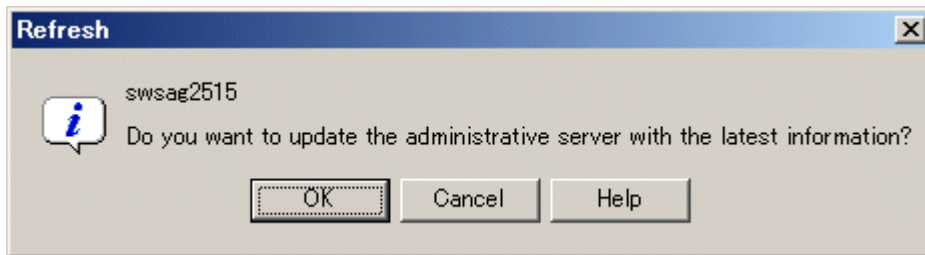
The created physical lines and port extension mechanism (hub) are displayed by the click of the <OK> button.

The following figure shows the Side view of storage. The storage connection environment includes port extension mechanism (hub) devices (two manually embedded hub devices), an ETERNUS3000 model 50, and two server nodes. The physical lines of their connections were created and edited in the Manual Configuration window.
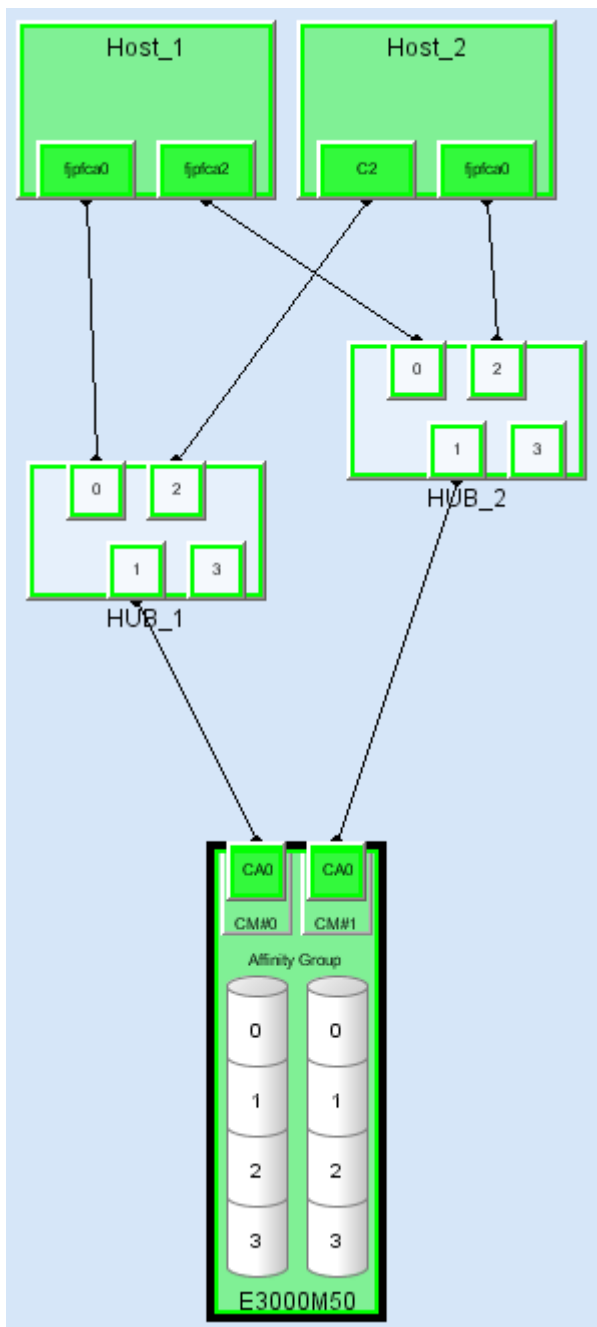
6.1.9 Calling Management Software

Call Management Software corresponding to a device icon of this software. Select and right-click the device icon to display a pop-up menu. Selecting [Call management software] on this pop-up menu calls the Management Software.

If the device that you want to manage is not an ETERNUS3000 or GR device, you can change the Management Software call method.

To change the Management Software call method, edit the method by clicking the button that opens the Management Software Change dialog from "Property" of the each device. (This software supports both URL call and direct command execution.) The telnet can be started from the Management Software by describing it by the following formats.

Example: telnet://connected-server-name (Or, connected-server-IP-address)

6.1.10 Device recognition method (beacon function)

This software provides the Beacon function that causes the LED(s) of a device to blink as a way of determining which device actually corresponds to the selected device icon. This function can be used even while devices are in operation.

Double-click a device icon of this software to display the Side view of the device. Select and right-click the devices listed in the Side view to display their pop-up menus. Select [Blink Beacon] - [Start] from each pop-up menu so that the Beacon LED(s) of a device blinks for three minutes. No menu with this selection is available for devices that do not support this function. To stop blinking, select [Blink Beacon] - [Stop] from the appropriate pop-up menu.

Use of this method for recognizing devices and support of the function are explained below.

Recognized devices	Supported function
Fibre Channel switch	LEDs of all the ports blink in turn.
Fibre Channel hub (Gadzoox)	The power indication LED blinks.
HBA (GP7B8FC1A, GP7B8FC1-G and GP7B8FC1)	The two LEDs (LINK and CHK) of the host bus adapter (HBA) blink at the same time.
HBA (PW008FC2A, PW008FC2-G, PW008FC3 and SE0X7F11F)	The LINK LED of the HBA blinks.
HBA (SE0X7F12F)	The selected host bus adapter (HBA) port LINK LED blinks.

6.1.11 Unregistering CA and HBA (FC adapter) icons

CA and HBA (FC adapter) icons (including a manually embedded device) can be deleted. An access path cannot be inherited for deleted CA and HBA (FC adapter) icons.

1. Click the CA or HBA icon to be unregistered, and select [File] - [Delete] from menu. Alternatively, right-click the CA or HBA icon to display a pop-up menu, and select [Delete].

2. Click <OK> button to continue unregistration.

3. When the dialog shown below appears, access path settings of the selected CA or HBA (FC adapter) can be deleted. For example, if a CA or HBA (FC adapter) is removed, switch zoning and storage affinity settings of the CA or HBA (FC adapter) are not required. This software can automatically delete such unnecessary security settings. If "Delete the access path" is selected in this dialog, all

of the access path settings are deleted from the device to be deleted. If access path settings must be kept because you want to continue operation outside management of this software, select "Do not change the access path".
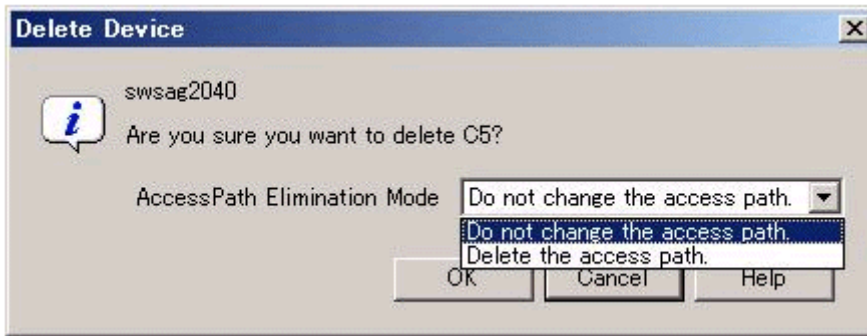
6.1.12 Other useful functions

・ Wallpaper function

The following file created as a JPG file can be used as wallpaper for the map view of the GUI window Main view (when the entire configuration is displayed). The $INS_DIR means "Destination Folder" specified at the Client installation.
The client must be restarted to reflect the wallpaper.

$INS_DIR\Client\eclipse\plugins\com.fujitsu.systemwalker.rcnr.client_x.x.x\icons\san_backimage.jpg
(x.x.x will be different depending on the product version.)

6.1.13 How to control the Eco-mode

This software can use the Eco-mode that controls the ON/OFF status for the disk drive spindle rotation for storage devices. While the RAIDGroup that is being used from the server is being verified, the disk drive spindle rotation ON/OFF status for the RAIDGroup can be controlled.

There are two Eco-modes: the "storage device Eco-mode" and the "RAIDGroup Eco-mode". The ON/OFF status can be set for each. When the storage device Eco-mode is set to ON, the "E" mark showing that the storage device Eco-mode is ON is displayed as following.

Figure 6.1 Display example of "E" mark in the Main view

Figure 6.2 Display example of "E" mark in the Side View
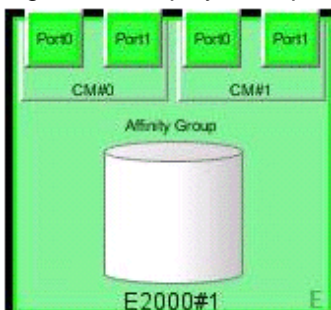
When the storage device Eco-mode is set to ON, the RAIDGroup Eco-mode can be set to ON/OFF.
When the RAIDGroup Eco-mode is set to ON and its schedule is set to "External", the spindle rotation of the disk drive that is used to configure the RAIDGroup can control the ON/OFF status. However, the Eco-mode operation for the "Uncontrollable RAID groups" can not be done.

The method for controlling the Eco-mode is explained below.

To enable the Eco-mode, log in as a privileged administrator (ensuring that the device has been registered in advance). The details of the information displayed in window, refer to "B.7.12 Storage properties".

Procedure to set the storage device Eco-mode to ON

1. Select either the Main view or Side view.

2. Click the device icon for the storage device for which the storage device Eco-mode is to be set to ON, and then perform either of the following:

    - Selects [File] - [Property] from the menu.

    - Right-click it, and select [Property] from the pop-up menu.

3. Click the [Eco-mode information and set] tab in the displayed property window.

4. When [Current Eco-mode setting] is OFF, click the <Change...> button.
   When [Current Eco-mode setting] is ON, there is no need to perform the following tasks since the storage device Eco-mode has already been set to ON.

5. A change Eco-mode settings dialog is displayed. Click the <OK> button.

This completes the procedure to set the storage device Eco-mode to ON.

Procedure to set the storage device Eco-mode to OFF

1. Select either the Main view or Side view.

2. Click the device icon for the storage device for which the storage device Eco-mode is to be set to OFF, and then perform either of the following:

    - Selects [File] - [Property] from the menu.

    - Right-click it, and select [Property] from the pop-up menu.

3. Click the [Eco-mode information and set] tab in the displayed property window.

4. When [Current Eco-mode setting] is ON, click the <Change...> button.
   When [Current Eco-mode setting] is OFF, there is no need to perform the following tasks since the storage device Eco-mode has already been set to OFF.

5. A change Eco-mode settings dialog is displayed. Click the <OK> button.

This completes the procedure to set the storage device Eco-mode to OFF.

Procedure to set the RAIDGroup Eco-mode to ON

1. Select either the Main view or Side view.

2. Click the device icon for the storage device for which the RAIDGroup Eco-mode is to be set to ON, and then perform either of the following:

    - Selects [File] - [Property] from the menu.

    - Right-click it, and select [Property] from the pop-up menu.

3. Click the [Eco-mode information and set] tab in the displayed property window.

4. When [Current Eco-mode setting] is OFF, set the storage device Eco-mode to ON according to "Procedure to set the storage device Eco-mode to ON".

5. After the storage device Eco-mode has been set to ON, click the <Eco-mode ON...> button.

6. A RAIDGroup Eco-mode ON settings dialog is displayed. Select the RAIDGroup for which the RAIDGroup Eco-mode is to be set to ON, and then click the <OK> button.
   The RAIDGroups for which the Eco-mode is set to ON and its schedule is "External" are not displayed in this dialog.

7. A confirmation dialog is displayed. If there are no problems, click the <OK> button.

This completes the procedures to set the RAIDGroup Eco-mode to ON and to set the schedule to "External". As a result, it is possible to control the Eco-mode by software.

Procedure to set the RAIDGroup Eco-mode to OFF

1. Select either the Main view or Side view.

2. Click the device icon for the storage device for which the RAIDGroup Eco-mode is to be set to OFF, and then perform either of the following:

   - Selects [File] - [Property] from the menu.

   - Right-click it, and select [Property] from the pop-up menu.

3. Click the [Eco-mode information and set] tab in the displayed property window.

4. When [Current Eco-mode setting] is OFF, set the storage device Eco-mode to ON according to "Procedure to set the storage device Eco-mode to ON".

5. After the storage device Eco-mode has been set to ON, click the <Eco-mode OFF...> button.

6. A RAIDGroup Eco-mode OFF settings dialog is displayed. Select the RAIDGroup for which the RAIDGroup Eco-mode is to be set to OFF, and then click the <OK> button.
   The only RAIDGroups for which the Eco-mode is set to ON and its schedule is "External" are displayed in this dialog.

7. A confirmation dialog is displayed. If there are no problems, click the <OK> button.

This completes the procedure to set the RAIDGroup Eco-mode to OFF.

Procedure to start the disk drive that is used to configure the RAIDGroup

1. Click the <Start of disk...> button.

2. The "Start of disk" dialog is displayed. Check the [Device that permits access] field, and verify that there are no problems if the disk drive is started. Next, select the RAIDGroup for which the disk drive is to be started, and then click the <OK> button.

3. A confirmation dialog is displayed. If there are no problems, click the <OK> button.

   A dialog showing that a request was made to the device to start the disk drive is displayed. It takes a while to start the disk drive. To verify the status, check the [Status] field of [Eco-mode information on RAID Group]. At that time, it is possible to update to the latest information by clicking the <Refresh> button.

Procedure to stop the disk drive that is used to configure the RAIDGroup

1. Set the Eco-mode of the RAIDGroup for which you want to stop the disk drive to ON according to "Procedure to set the RAIDGroup Eco-mode to ON".

2. Click the <Stop of disk...> button.

3. The "Stop of disk" dialog is displayed. Check the [Device that permits access] field, and verify that there are no problems if the disk drive that is started is stopped. Next, select the RAIDGroup for which the disk drive is to be stopped, and then click the <OK> button.

4. A confirmation dialog is displayed. If there are no problems, click the <OK> button.

   A dialog showing that a request was made to the device to stop the disk drive is displayed. It takes a while to stop the disk drive. To verify the status, click the <Refresh> button.

🛈 Information
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The stopping and starting of the disk drive that is used to configure the RAIDGroup can also be performed using a command. For the using method of its command, refer to as follows.

- Solaris OS version : "12.1.1.7 Disk control command (storageadm spindle)"

- Linux version: "12.2.1.7 Disk control command (storageadm spindle)"

- Windows version: "12.3.1.8 Disk control command (storageadm spindle)"

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Information

When the following operations are executed, the control status for the RAIDGroup becomes to "stop request".

- ・ The power supply of storage device is turned off and on.
- ・ The Eco-mode of the RAIDGroup is changed from OFF to ON.
- ・ The Eco-mode schedule of the RAIDGroup is changed to "External".
- ・ The Eco-mode of storage device is changed from OFF to ON.

6.2 Correlation Window

This window displays correlation configurations in detail for a device. The Correlation window can display physical configurations such as FC cable connections between devices as lines between devices. It can also display logical configurations such as Logical Volume and RAID Group as elements (explained in a subsequent section).

6.2.1 Correlation window

The Correlation window can be invoked in one of the following three manners.

- ・ Clicking [File] - [Correlation Window] from the menu bar
- ・ Double-clicking the device framed in black in the Side view
- ・ Selecting the device in the Main view, Domain view or SAN View and executing [To Send] - [Correlation Window] on the pop-up menu

The following explains how to view detail information on devices invoking the Correlation window.

Starting from the menu bar

Select [File] - [Correlation Window] from a view of the resource view or select [Correlation Window] in the pop-up menu of the Main view, Domain view or SAN View. The Correlation window as shown on the lower right is then displayed.
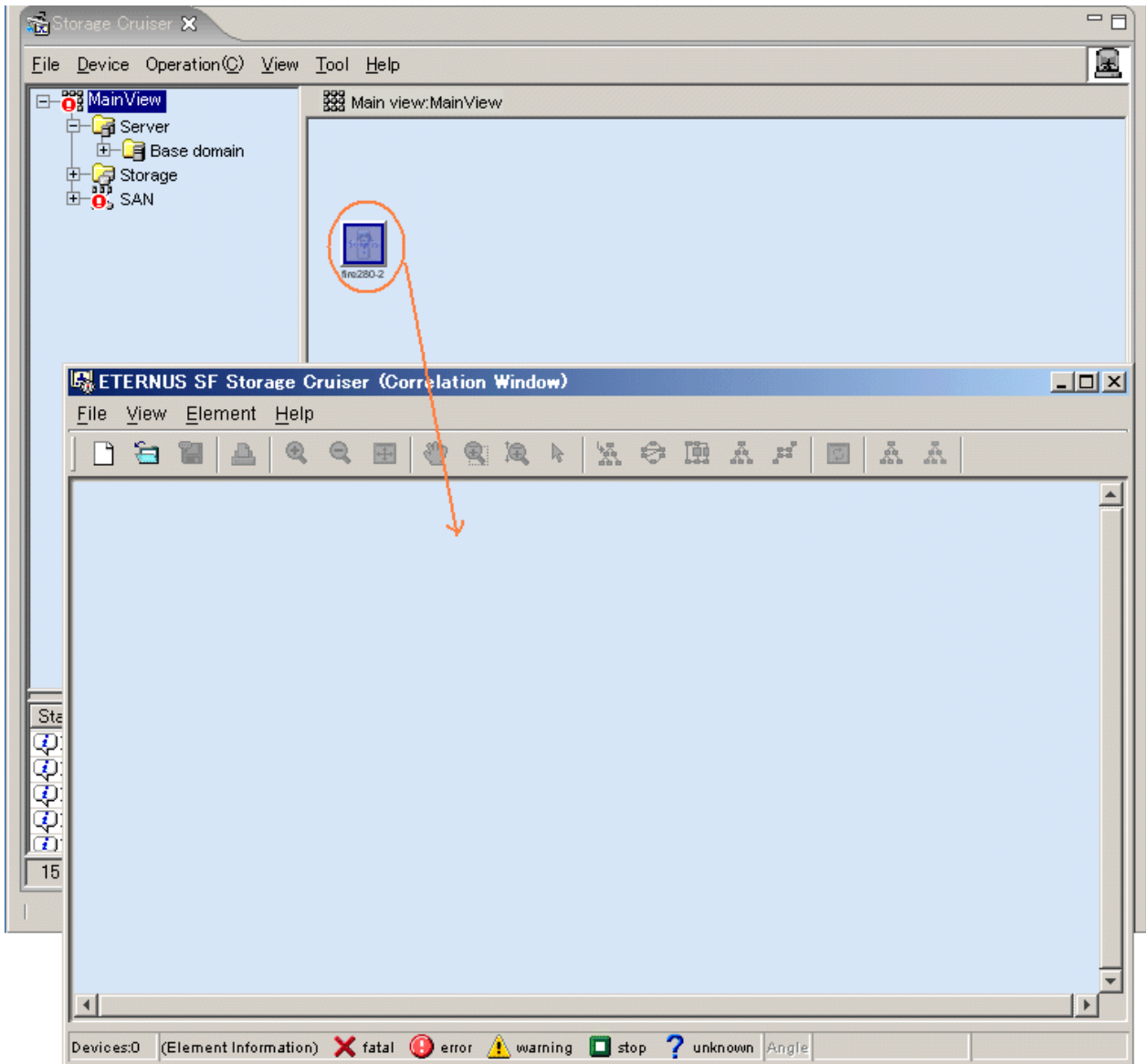
Dragging a device icon from the Main view, Domain view or SAN View and dropping it on the Correlation window displays detailed information of the selected device in the Correlation window.

However, Fibre Channel switches, hubs, routers, and ports cannot be dropped on the Correlation window.

Starting from the side view

When the icon of a device is double-clicked in the Main view, Domain view or SAN view, the Side view of that device is displayed. In the Side view, the frame of the device selected in the Domain view or SAN view is displayed in black. The device with this black frame is to be the currently selected device. When the device with the black frame is double-clicked in the Side view, the Correlation window opens to display details of that device. At this point, the double-clicked device is displayed by selecting [Change Detail View] - [ON]. If the Correlation window has already been opened, details of the device are additionally displayed in that window. When a device with no black frame is double-clicked in the Side view, the Side view of that device opens to display that device with a black frame. Fibre Channel switches, hubs, routers, and boards are not displayed in the Correlation window. The following illustrates the flow of windows switched with double-click.
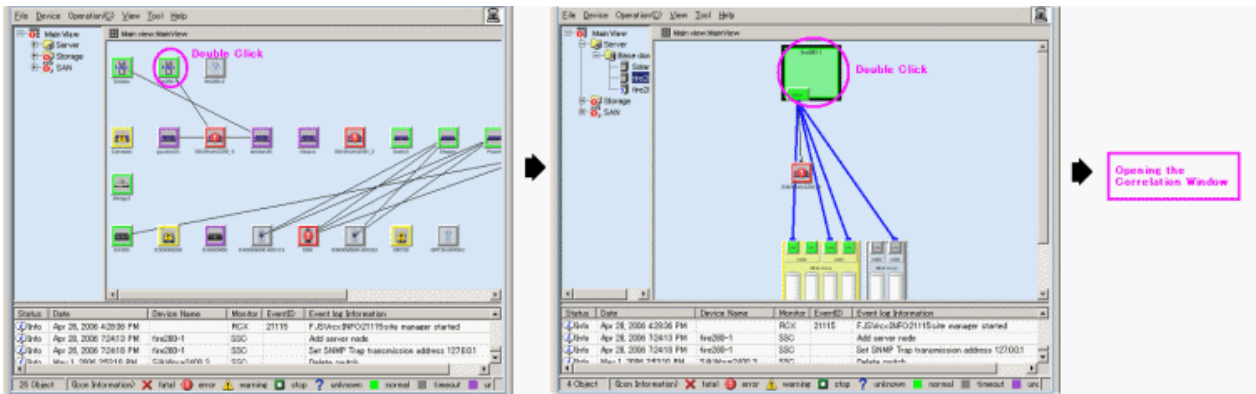
Several device icons can be selected in the Main view, Domain view or SAN view and dragged in the window. A device icon can be also dragged to an existing Correlation window to add the device to it.

Starting from the pop-up menu

Click the icon of a device in the Main view, Domain view or SAN View to display the pop-up menu. By executing [To Send] - [Correlation Window], the Correlation window is started and the detail information on the device is displayed in the Correlation window. The selected device is displayed by selecting [Change Detail View] - [ON]. When the Correlation window is already active, the detail information on the device is added and displayed in the current Correlation window. However, Fibre Channel Switches, hubs, routers and ports can not be displayed on the Correlation window. The following flowchart illustrates the procedure after [To Send] - [Correlation Window] is executed.
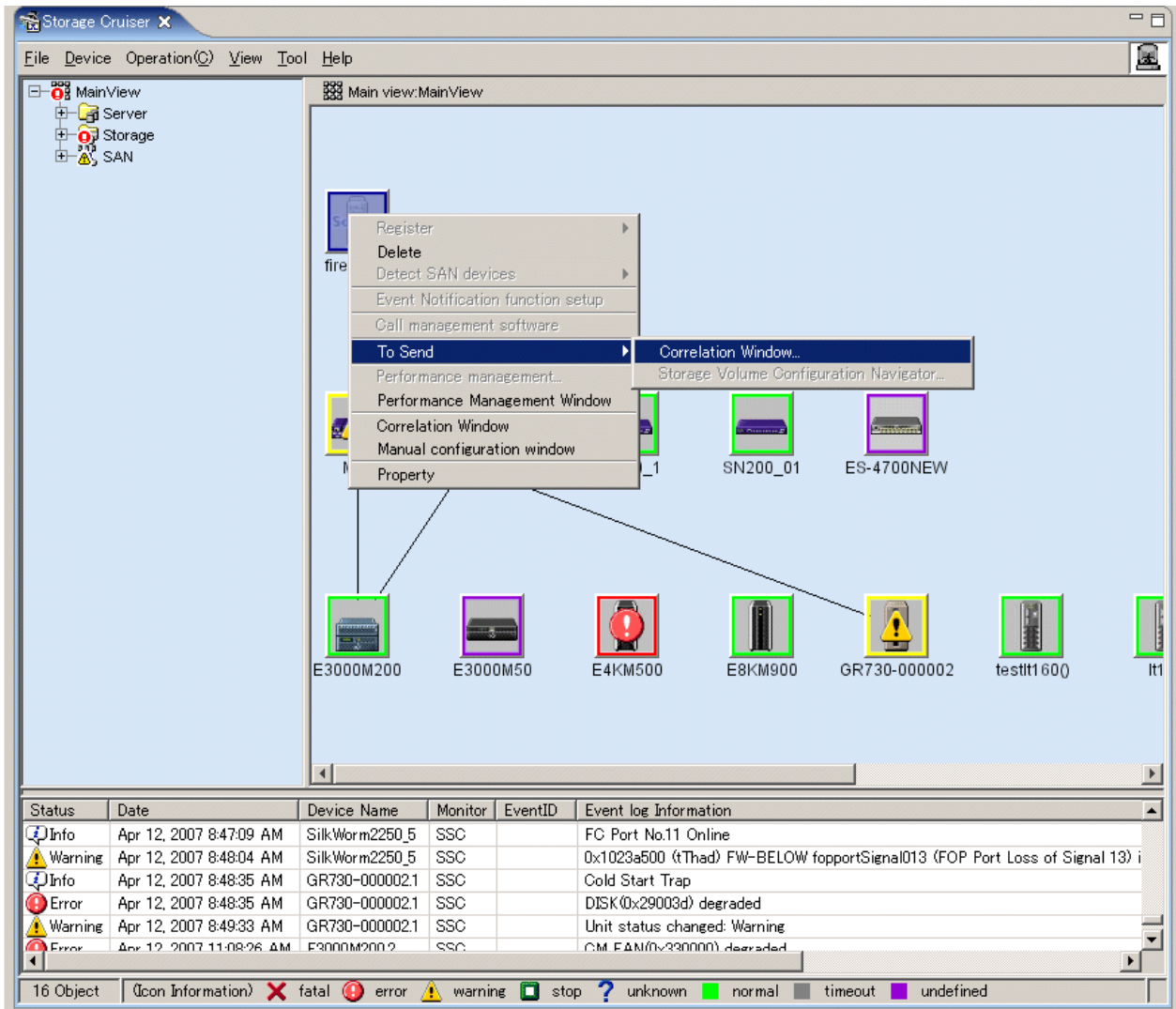
Related management display check

When the Correlation window starts up, the dialog box below appears. Select a display method and location where to acquire information, and then click the <OK> button.
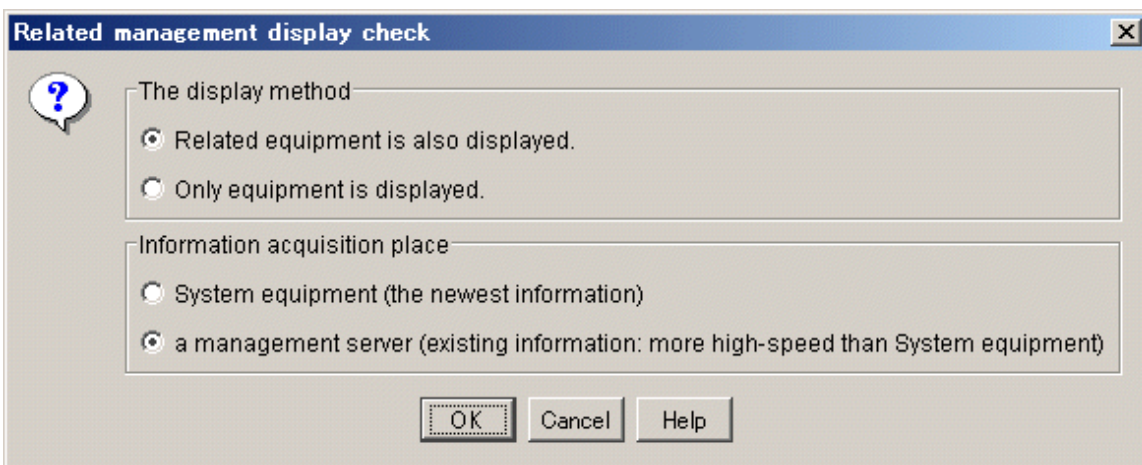
The amount of detailed correlation information depends on the configuration used, so several minutes may be required to obtain detailed correlation information. In particular, it takes a long time to obtain detailed correlation information from a real device. However, once

obtained, detailed correlation information is stored on the admin server. If "a management server" is selected as the information acquisition place in this dialog for the next time the Correlation window is opened, correlation information is displayed relatively quickly, based on the information stored on the admin server instead of that on a real device.

Moreover, the relating device is not able to be displayed by selecting "Only equipment is displayed" in the method of the display in this dialog. To check the latest system device status in the Correlation window opened with this state, select [View] - [Refresh] from the Correlation window menu.

The admin server does not have data when the Correlation window is first opened. Therefore, at this time, information is obtained from real device regardless of the selection (management server or system equipment).

Correlation window

To display the Correlation window, drag & drop the device to the Correlation Window, double-click the device icon on the Side view, or right click the device icon then select [To Send] - [Correlation Window] to select [Change Detail View] - [ON].
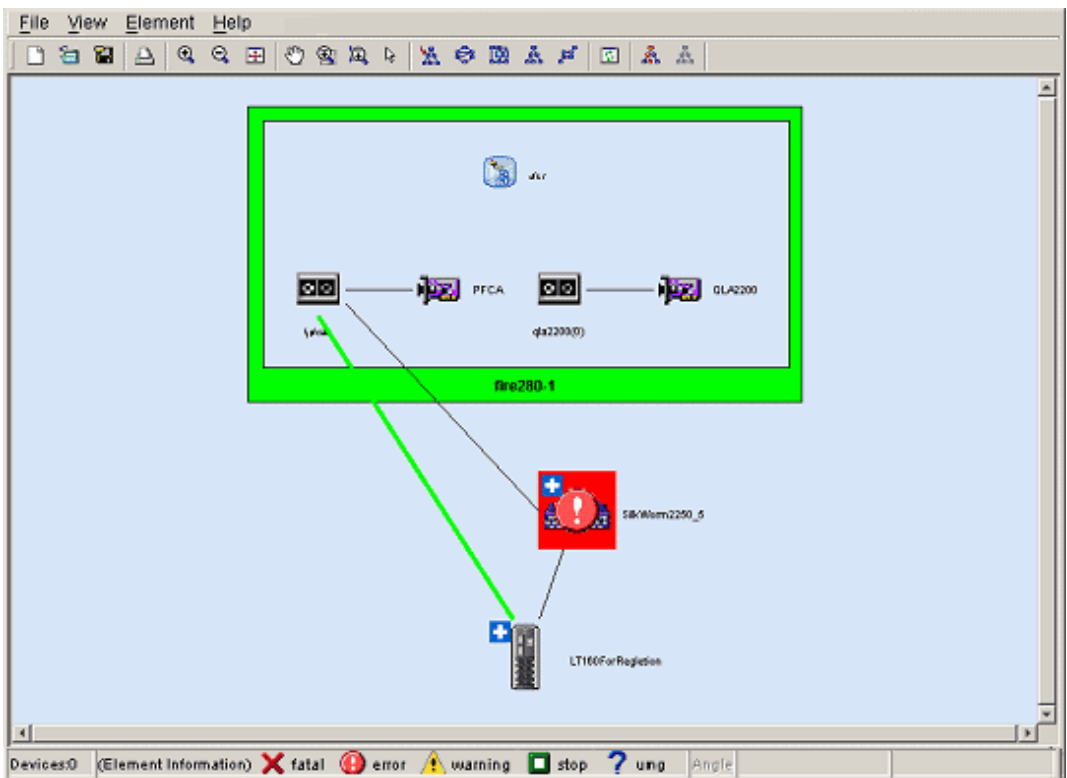
Selecting [File] - [New creation] from the menu in the Correlation window clears the client window device data displayed in the Correlation window.

In the Correlation window, you can move icons easily. After operations in the Correlation window, you can return the window to the default display by using [View] - [Zoom] - [Fit] or [View] - [Layout]. (For details, see "B.8.2 Menus".)

Also, the UnknownFC port is displayed as one device.

Note that devices such as internal bridge devices are displayed as externally independent devices of devices such as the LT120 and LT130.

Information
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For VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later) environment:

When a VM host is specified and "Related equipment is also displayed." is selected, all VM guests on its VM host are not displayed. When a VM guest is specified and "Related equipment is also displayed." is selected, its VM guest and a VM host including its VM guest are displayed.
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6.2.2 Displaying elements in a device

Selecting a device icon and then selecting [Element] - [Detail] - [Expand] in the Correlation window displays detailed information about the selected icon. Alternatively, selecting [Detail] from the pop-up menu of a selected icon displays the same detailed information. The window below shows detailed information of devices in the server node. The detailed items of devices displayed in the window are called elements.
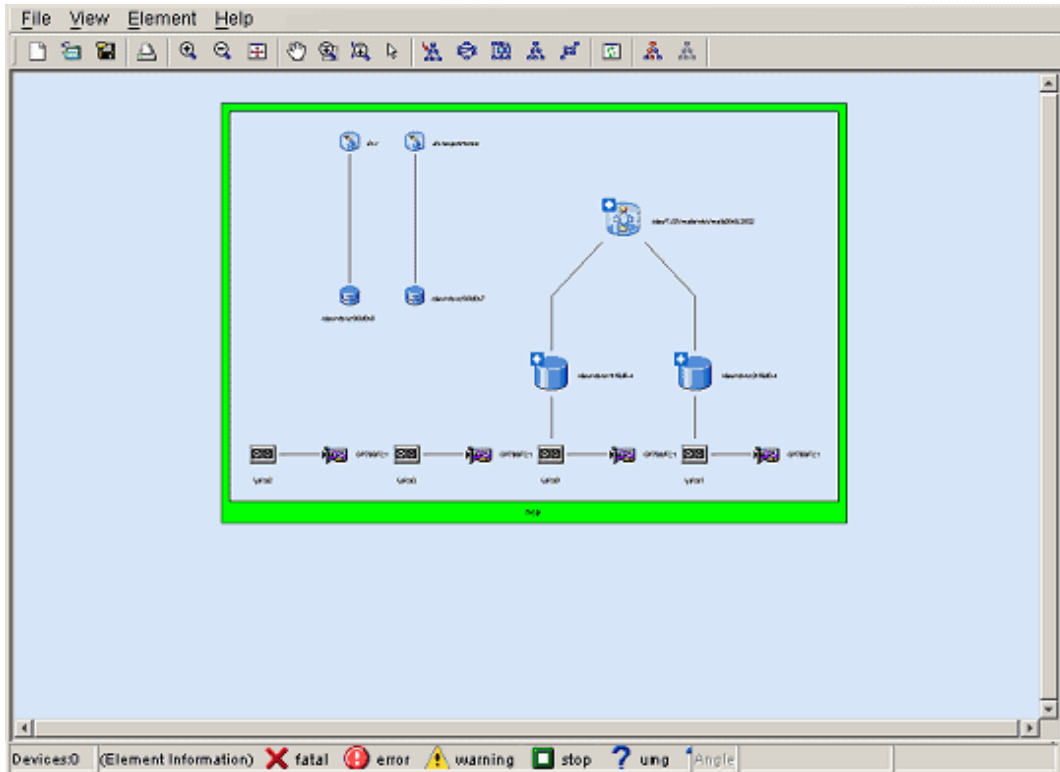
To return the display from detailed information to the original device icon, select the frame of the device, and then select [Element] - [Detail] - [Collapse] in the Correlation window; select [Detail] - [Collapse] from the pop-up menu, or double-click the frame of the device.

Select [Select] from the toolbar and double-clicking an area without an element (in the above figure, pale blue portion of [Inside Frame] for a device) displays the selected devices in the full Correlation window, shown as below.
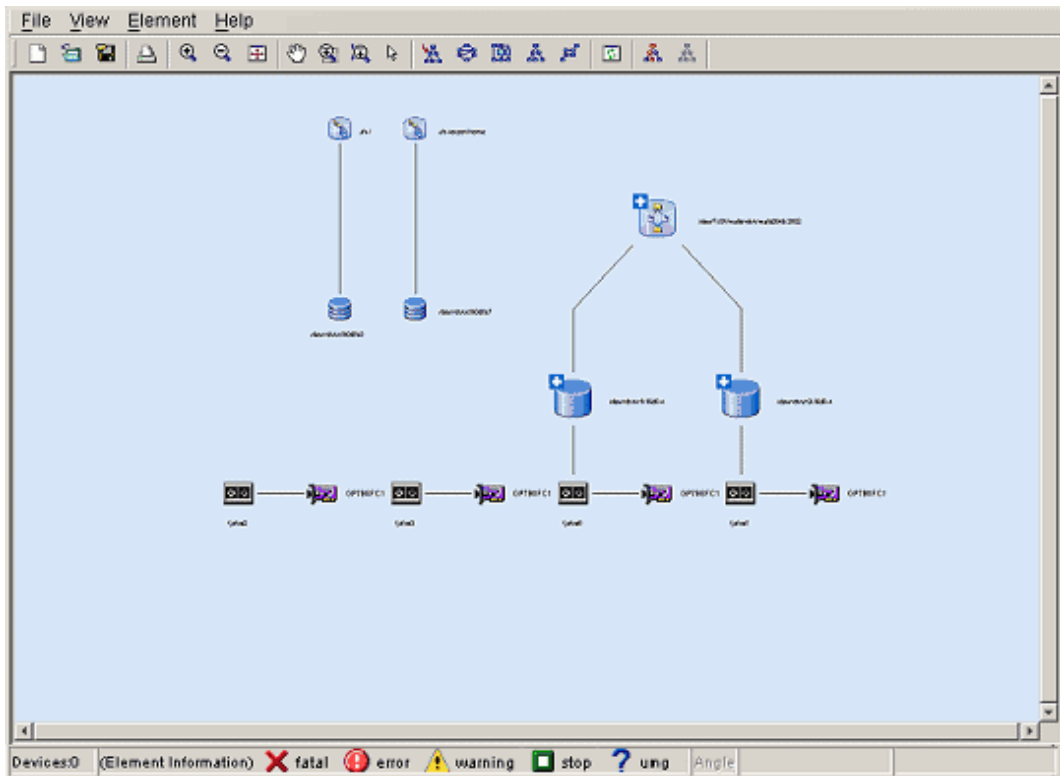
To display the original window, double-click an area without an element in the window.

Displaying details (detail information) of device icons makes the Correlation window seem complicated because the number of elements becomes very large. For this reason, this software supports the show element function (see "6.2.7 Show element", for details) and element integration function (see "6.2.8 Element integration", for details) for a clearer window. These functions are as follows:

The initialization of the show element function are as follows:

- For the server node

  Displays except MultiPath Driver (Slice) and Raw Device (Disk).

- For storage

  Displays CA (Port), Affinity Group, LUN, Logical Volume, RAID Group, and Disk.

Elements which can be integrated are as follows:

- For the server node

  DBMS (File type), DBMS (File), File System (Space), Mirror Driver (Volume), MultiPath Driver (Disk), Raw Device (Disk)

- For storage

  LUN, Logical Volume, and Disk

Each device icon and each element icon in the Correlation window indicates the status of a device or element, as described in the table below.

Icon state	Color of icon frame	Icon	Description	Action to be taken
normal	Transparent or green		The device is operating normally.	None
warning	Yellow	⚠	An warning-level error was detected on the device. The degraded level differs depending on the unit type and element type. For details,	Replace the faulty part, and execute recovery processing. However, if a middleware element on the server node is faulty, recover it while referring

Icon state	Color of icon frame	Icon	Description	Action to be taken
			see "B.7 Resource View Properties".	to the general description of the respective product. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
error	Red		An error was detected on the device. The degraded level differs depending on the unit type and element type. For details, see "B.7 Resource View Properties".	Replace the faulty part, and execute recovery processing. However, if a middleware element on the server node is faulty, recover it while referring to the general description of the respective product. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
stop	Green		The resource is stopped and not available.	None
fatal	Red		An error occurred in this resource, and the resource is not available.	None
unknown	Grey		The status cannot be obtained.	None
timeout	Gray		The device is registered with this software but cannot be recognized by the software. The device properties displayed by the GUI contain the values retrieved the last time the device was recognized. If a Fibre Channel switch enters this state, the GUI does not display any Fibre Channel physical line under control of the Fibre Channel switch. In addition, the software does not recognize any access path using this Fibre Channel switch. Accordingly, the GUI indicates errors for all such access paths.	The power supply of the device may be off, or Agent may not be operating, or a LAN error may have occurred. If you changed the IP addresses manually, also refer to "9.1.2 Changing the operating environment" and perform operations to reflect the changes of the IP addresses. If the device uses the SNMP protocol for communication, the community name of the device may differ between the target device and admin server. If the community name of the target device has been changed, set the community name by referring to "C.2 sanma.conf Parameter", and reflect the setting file on this software. ->Check the device status, and click [View] - [Refresh].
undefined	Violet		The unit (device) is undefined in this software.	Define the unit (device) in the resource view.

Detailed information about each element can be displayed in the Properties dialog. The storage system status can easily be determined because the Properties dialog can be displayed for all elements. In the examples shown below, the MultiPath Drive element and ETERNUS3000 RAID Group element are selected for the Properties dialog.

After selecting an element to display detail information, select [Property] from the pop-up menu or double-click the element.

Each property value is explained in "B.9 Correlation Window Properties".
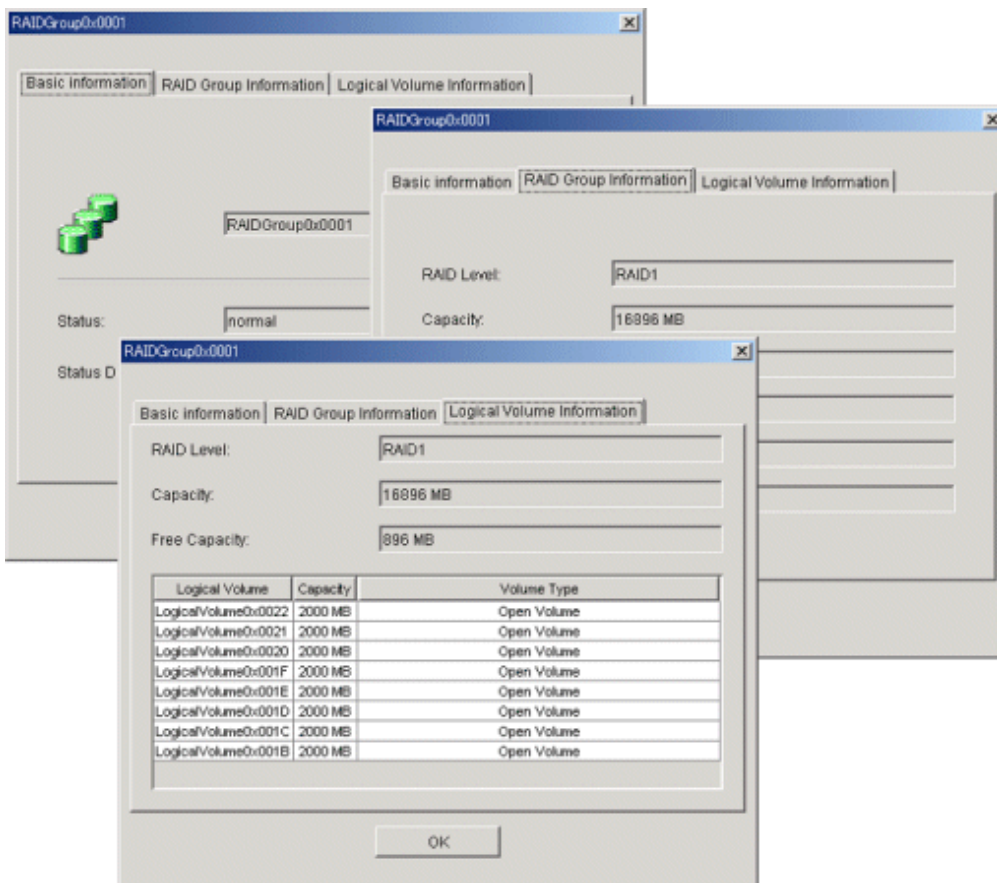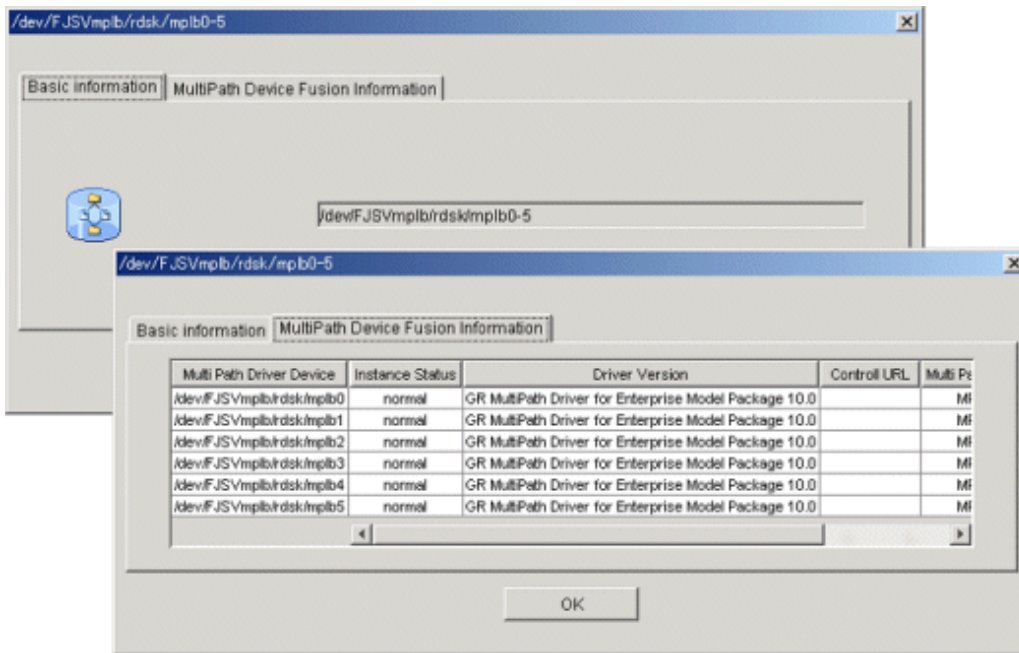
6.2.3 Displaying path statuses

You can determine the current statuses of the access path and multipath from their colors.

For access path status display, see "6.3.2.4 Access path status display".

The multipath status is displayed as follows:

Multipath status	Color	Description	Action to be taken
normal	Black	The multipath is operating.	None
warning	Yellow	The multipath is stopped or is not operating under multipath management.	If the multipath is in this status, use of one of the access paths making up this path results in an error. Take appropriate action for the access path error according to "8.1 Windows Displayed in the Event of a Fault and Troubleshooting".

6.2.4 Registering and unregistering application elements

Agent cannot recognize user business processes running separately and other applications operating on a server. For this reason, this software supports a function that enables applications to be created manually. Application elements are elements displayed in the Correlation window.

You can manually create application elements and associate them with DBMS (Data Base), file system, and raw device, etc. You can also select several elements and register an application. Select the elements that you want to associate, and then select [Creation] - [Create application] from the pop-up menu. The following Creating Application dialog appears:

For Name of Application, specify an application name related to the selected element (required).

For Administrator information, specify a manager name for this application (optional). The specified manager name is reflected in property manager information about the element.

For Control URL, specify the URL for starting Management Software of this application or a command execution method (optional).

For Memo information, enter memo information (optional). The memo information entered here is reflected in element property memo information.

These settings (except Name of Application) can be changed with the change button which exists in the property of the application element.
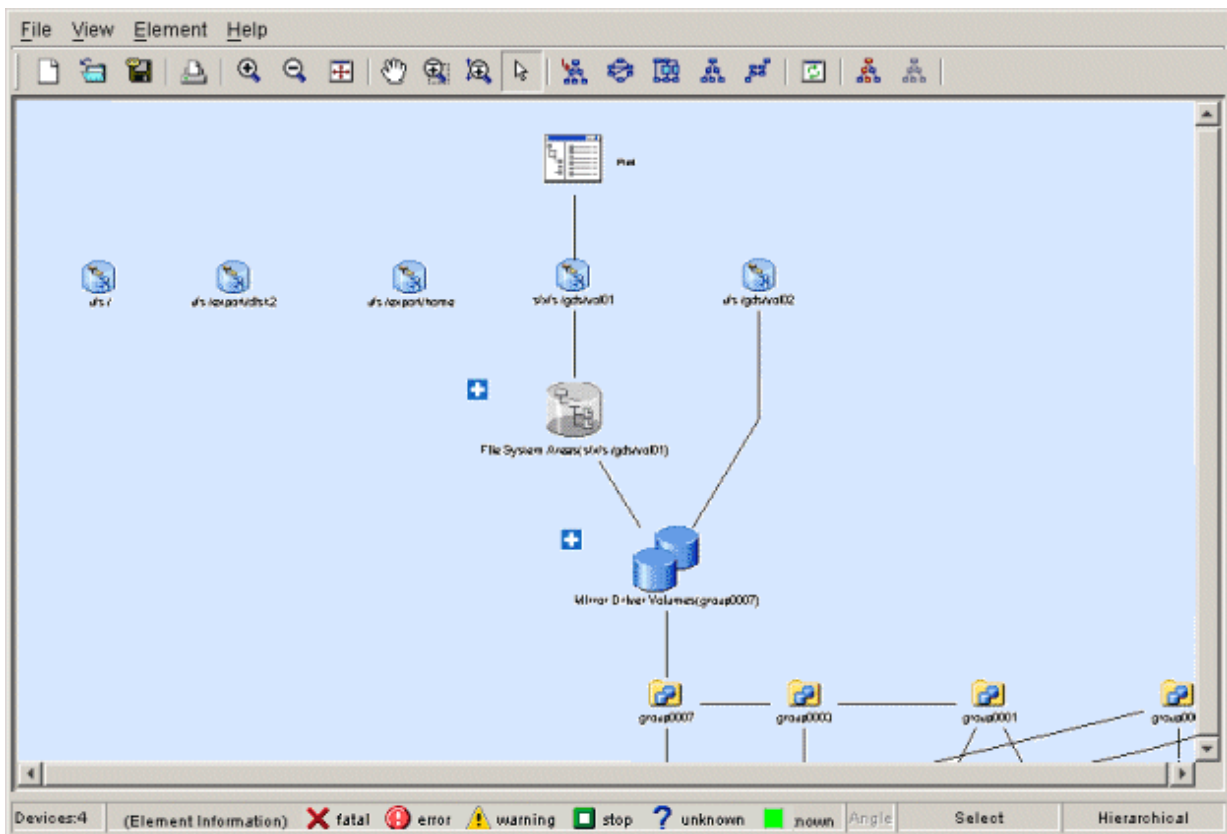
You can delete a registered application. Select the application to have to be deleted, and then select [Delete] - [Delete application] on the pop-up menu.

You can also add a link between an application and an element. Dragging the element and dropping it on the application displays the dialog shown below. Selecting <OK> button in this dialog adds a link between the application and element.
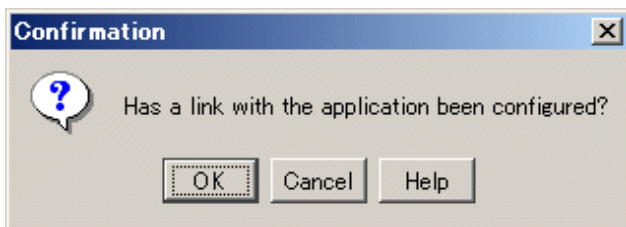
Conversely, to delete the link between an application and an element, select the link, and then select [Delete] - [Related deletion with an application] from the pop-up menu. You can delete several links from the same application.

![Note icon] **Note**

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If information about associated elements (e.g., DBMS (database) or file system) cannot be obtained when reread information is registered after application registration, the application icon is displayed in the warning color. Each element that uses old database information and cannot obtain the current information is displayed in gray.

In such cases, check for why the information could not be obtained (e.g., whether DBMS is operating normally and whether the file system configuration of the server node containing access paths and other configurations are correct). The elements of this status can be associated with the application.

If an element is unnecessary because of a change in operation or other reason, delete the link to it or the related application.

If an admin server name or an IP address is changed, application information is not inherited. In such cases, register the application element again.

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6.2.5　Route search

By clicking the Route Search Execution icon on the toolbar on the Correlation window while selecting a device icon or element, this displays all of the correlated device icons, element icons, and links in distinct colors. A device icon or element selected is displayed in different colors from the corelated device icons, element icons, and link. Clicking the Route Search Clearance icon on the on the toolbar clears the route. The following shows examples of the operation:
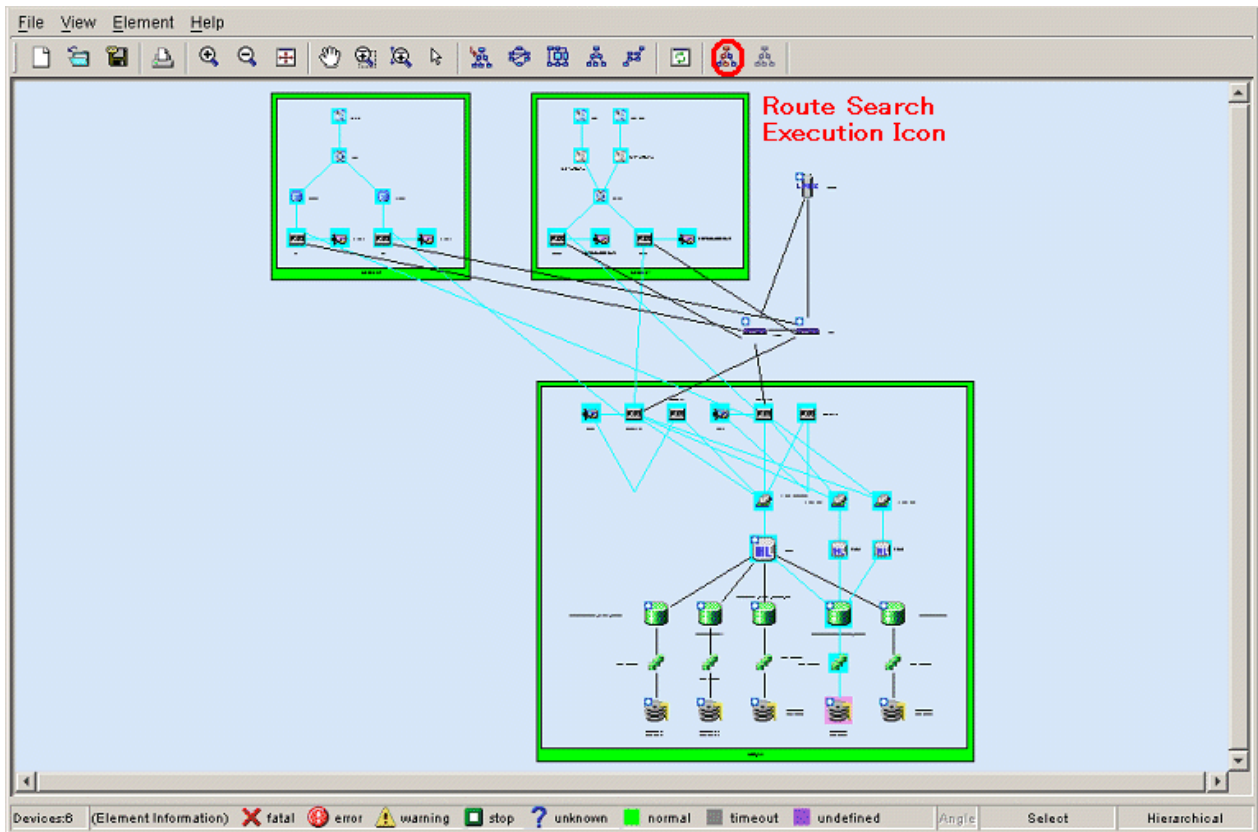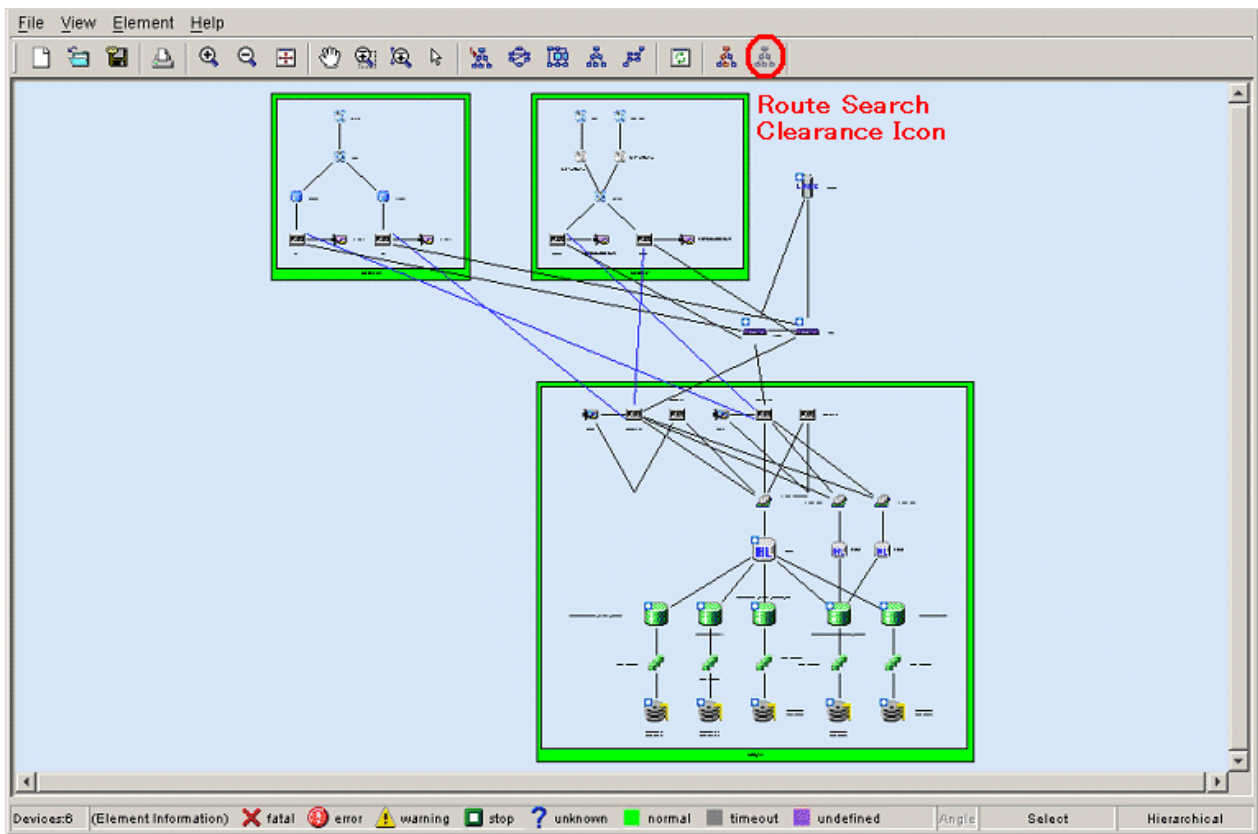
The upper figure above shows a Correlation window displayed after the Route Search Execution icon on the toolbar is clicked. The lower figure above shows a Correlation window displayed after the Route Search Clearance icon on the toolbar is clicked. Even if the device icon display is changed to the device detailed information display, an integration icon is changed to a table element, or a layer is added with the show element function, the display of the route can be kept up. The following shows examples of operation.
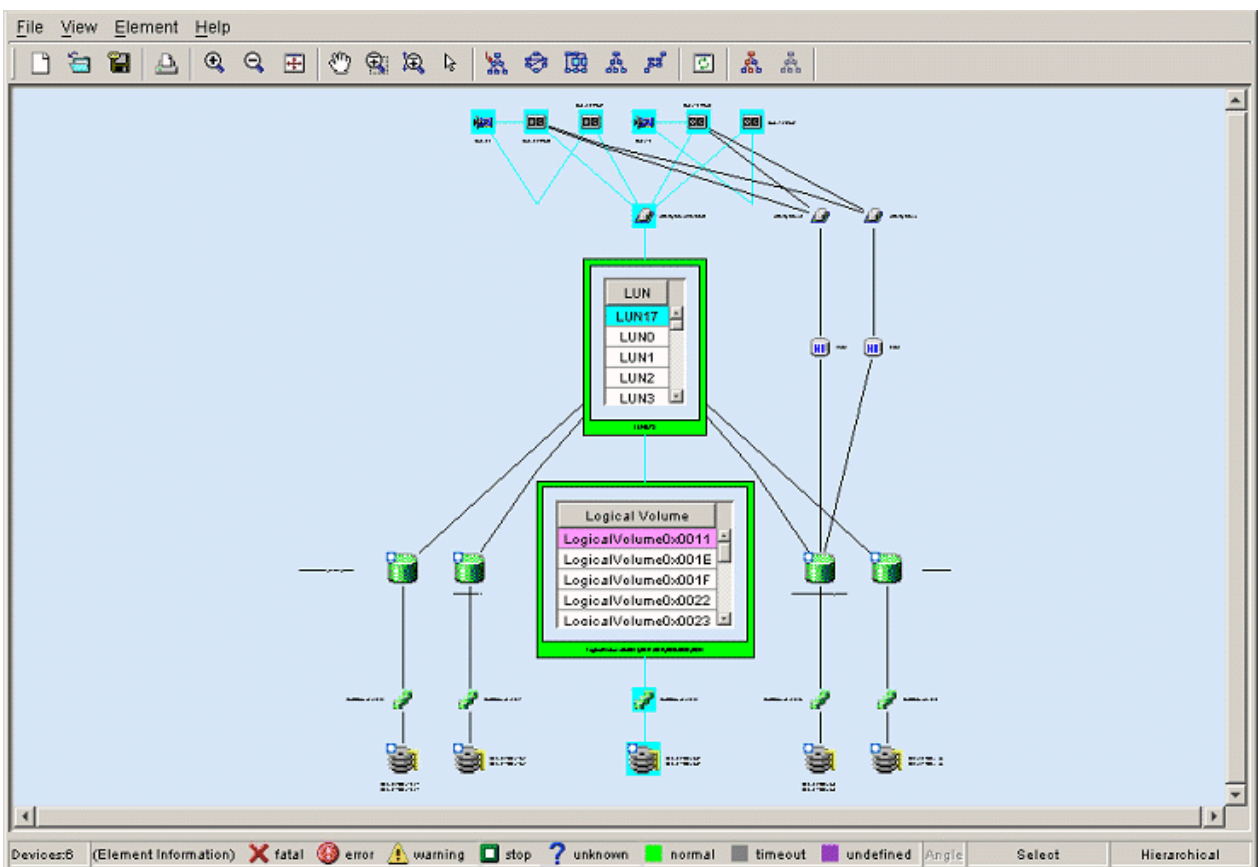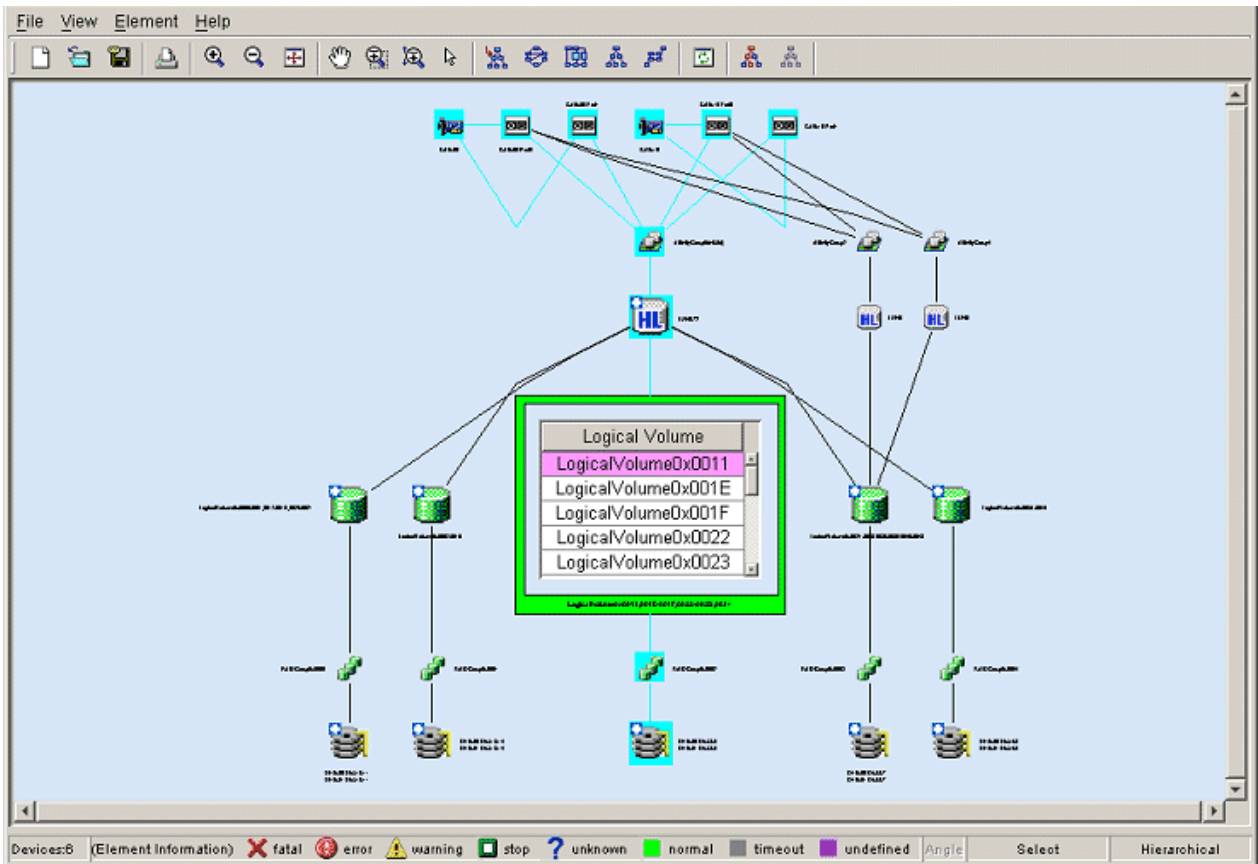
The upper figure above shows a Correlation window displayed after a table is selected from table elements for Logical Volume of storage and the Route Search Execution icon on the toolbar is clicked. The lower figure above shows a Correlation window displayed after an

LUN integration icon of storage is displayed as a table element. As shown in the figure, since route search is still effective, simply expanding the LUN integration icon into a table element provides information on LUN correlations. The following explains these features using some operation examples.

[Check all the disk related to a certain application]

To determine the disk and storage that contains the disk area used by the application, select the application and click the Route Search Execution icon from the toolbar in the Correlation window. A window opens to show the related element icons and links in the colors shown below. You can now easily determine which disk of which storage is being used.

📝 Note

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In a Linux server node equipped with PG-FC 105 (driver version V4.20q.1), PG-FC 106 (driver version V4.20q.1), PG-FCD101 or PG-FCD102, you cannot determine the disk areas that are used by the application because routes beyond the HBA port cannot be searched.

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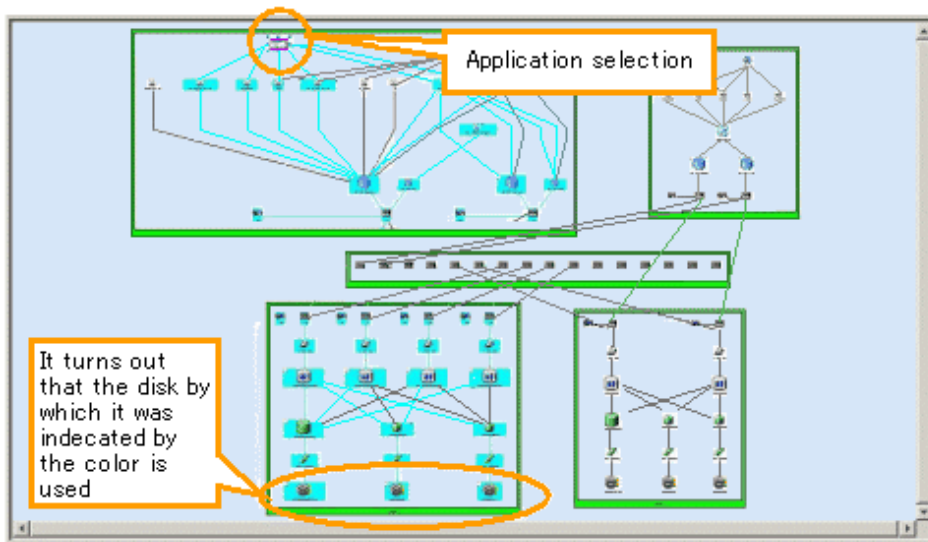
[Checking the multipath configuration]

To determine a multi-path configuration, select a multi-path driver element and click the Route Search Execution icon from the toolbar in the Correlation window. A window opens to show the related element icons and links in the colors shown below. You can now easily determine which path and route are being used.

📝 Note

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In a Linux server node equipped with PG-FC 105 (driver version V4.20q.1), PG-FC 106 (driver version V4.20q.1), PG-FCD101 or PG-FCD102, you cannot determine the multi-path configuration beyond the HBA port because routes beyond the HBA port cannot be searched.

. . . .
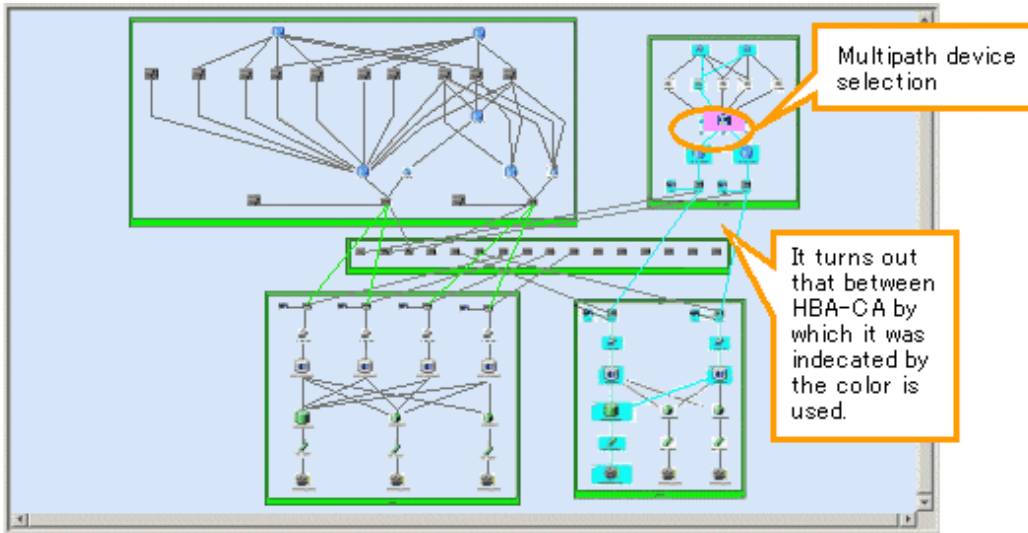
[Check all the applications related to a certain disk]

To determine the application of the server node using the disk, select a disk element and click the Route Search Execution icon from the toolbar in the Correlation window. A window opens to show the related element icons and links in the colors shown below. You can now easily determine which application of which server node uses the disk.

📒 Note

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In a Linux server node equipped with PG-FC 105 (driver version V4.20q.1), PG-FC 106 (driver version V4.20q.1), PG-FCD101 or PG-FCD102, you cannot determine which application uses the disk because routes beyond the HBA port cannot be searched.

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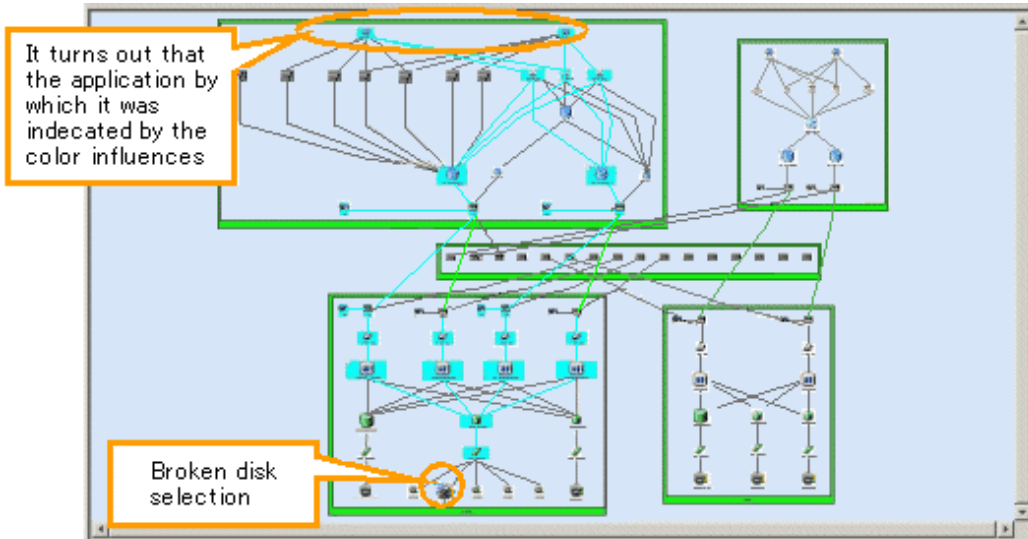
📒 Note

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When AffinityGroups are linked to ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS2000 or ETERNUS DX60/DX80, the AffinityGroup not used is not subject to a route search. Thus, the element icon of the AffinityGroup not used is not displayed in color. If a route search is executed by selecting the element icon of the AffinityGroup not used, only the specified icon is displayed in color.

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6.2.6 End to End list display

The End to End list is displayed at the bottom of the Correlation window when selecting [View] - [List] from the menu bar of Correlation window. The End to End list displays the list of correlated element. When the check on [View] - [List] from the menu bar of the Correlation window is removed, the End to End list becomes non-display. Default is non-display. When select the device and display Correlation Window, select "Related equipment is also displayed."(The display method) in a dialog of "Related management display check".

The display form of the list is different according to connected pattern of the access path. Therefore, select the tab to switch the display of End to End list. Connected pattern which can be displayed is as follows:

- ・ Access path connection between a HBA port and a CA port

- ・ Access path connection between a HBA port and other HBA port

- ・ Access path connection between a CA port and other CA port

- ・ Access path connection between a HBA port and a UnknownFC port

- ・ Access path connection between a CA port and a UnknownFC port

- ・ Access path connection between a Unknown port and other UnknownFC port

The tab of the list isn't display when the list does not exist. Moreover, End to End list isn't displayed when the all lists don't exist even if the [View] - [List] menu is checked. [List] menu of the menu bar is displayed in the gray.

Figure below is the End to End list of the system which connects the access path between the HBA port and the CA port and between the HBA port and the UnknownFC port. It is the example of the display when the tab between the HBA port and the CA port is selected.

Kind of AccessPath	File System (Mount Point)	File System (Domain)	Mirror Drive (Volume)
fjpfca0-CA0x12:Port0	sfxfs /gds/vol01	META	volume0001
fjpfca0-CA0x12:Port0	sfxfs /gds/vol01	META	volume0001
fjpfca0-CA0x12:Port0	sfxfs /gds/vol01	DATA	volume0001
fjpfca0-CA0x12:Port0	sfxfs /gds/vol01	DATA	volume0001

HBAPort-CAPort | CAPort-CAPort

Selecting [File] - [CSV preservation of a list] from the menu bar in the Correlation window saves the End to End list in a CSV file.

Selecting [Visible] from the header pop-up menu provides ON/OFF check boxes to turn visibility of items in the End to End list on or off. However, it cannot set all items invisibility. All items are saved when the list is saved to a CSV file, regardless of whether display or non-display is selected for items.

6.2.7 Show element

Displaying details (detail information) of device icons makes the Correlation window seem complicated because the number of elements becomes very large. For this reason, this software supports the show element function that provides a clearer Correlation window.

The show element function specifies whether to display the elements on each layer. Select [Element] - [Visible] from the menu bar in the Correlation window, or select [Visible] from the pop-up menu. The dialog box shown below on the left appears. In the dialog box, select the elements to be displayed. The following dialog box has the default displayed element settings when the server node is selected. All check boxes except those of MultiPath Driver (Slice) and Raw Device (Slice) are selected. The Correlation window displayed at this time is as shown below on the right.
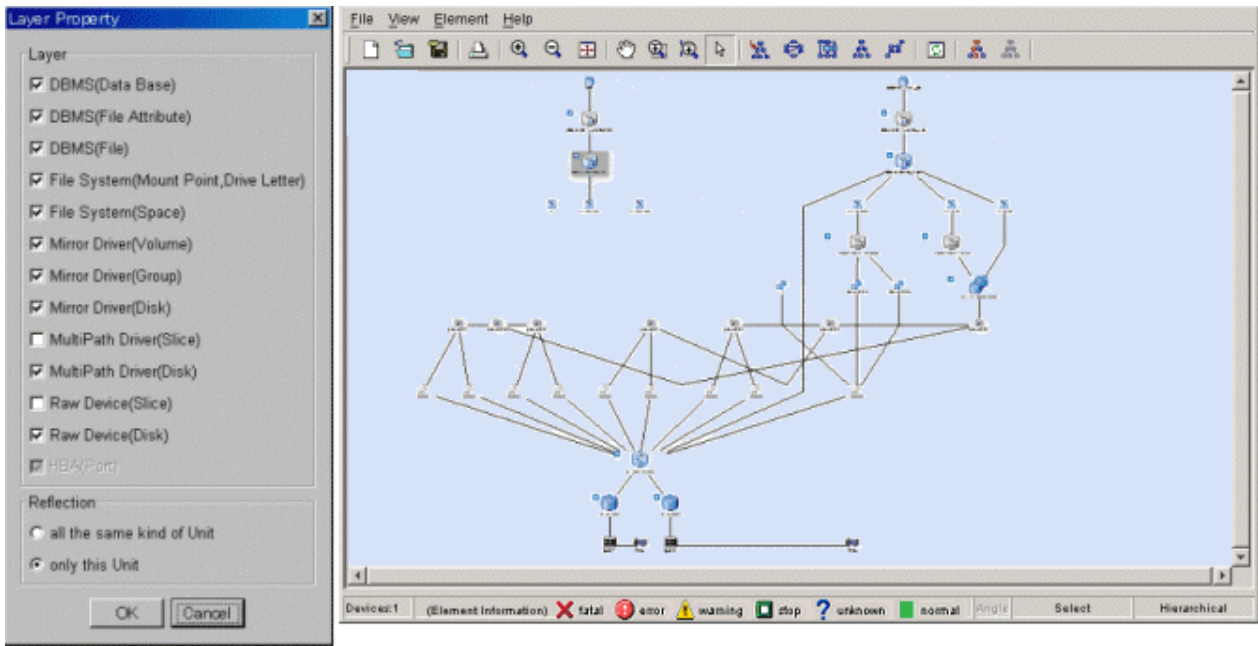
AS shown below on the left, removing the check of check boxes of File System and Mirror Driver layers hides the selected layers as shown below on the right.
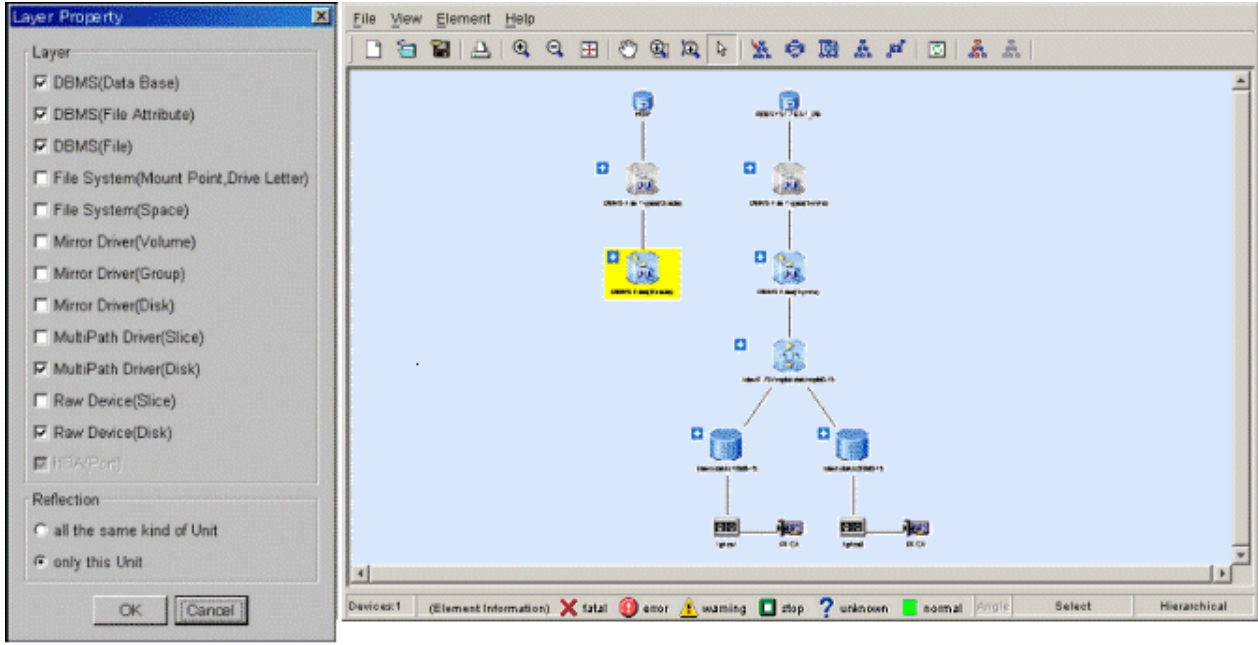
Likewise, you can check and uncheck any check boxes in the Show and Hide dialog to adjust the elements displayed in the window. Check box selection is disabled in cases where the minimum amount of information, such as an HBA (port) data, is displayed as required; and in such cases, the contents displayed cannot be controlled.

Settings of this check box are saved to the client. When all the same kind of Unit is selected in Reflection in the dialog of Layer Property, the settings are reflected in all the same kind of units. When only this Unit is selected, the settings are reflected only in the unit currently selected. It classifies it as homogeneous Units is sorted by OS for the seven node and by product name for the storage.

6.2.8 Element integration

Displaying details (detail information) of may make the Correlation window seem complicated because the number of elements becomes very large. For this reason, this software supports the element integration function that provides a clearer Correlation window. The elements integration function integrates and displays elements that can be integrated. The elements which can be integrated are as follows:

- ・ For the server node

  Raw Device (Disk), MultiPath Driver (Disk), Mirror Driver (Volume), File System (Space), DBMS (Database), DBMS (File), DBMS (File Attribute)

- ・ For storage

  LUN, Logical Volume, Disk

Element integration icons are bigger than other icons. To distinguish element integration icons from other icons, a positive sign (+) is added to the upper left of element integration icons.

The integrated elements can be displayed as the following table (table element) when selecting [Table Element] - [ON] from the pop-up menu while selecting the element integration icon or double clicking the element integration icon.
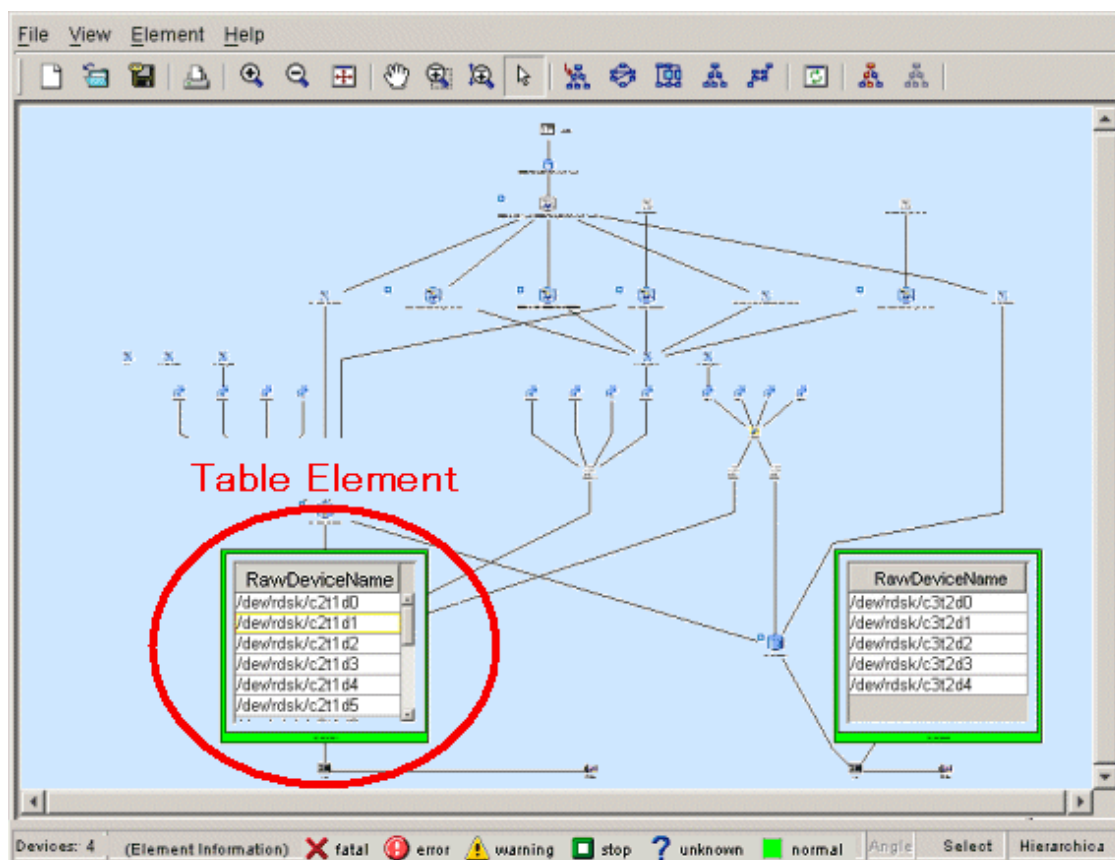
By integrating elements, more easily viewable screen can be displayed. However, this setting is not saved. The element integration icon is displayed when the Correlation window is reactivated.

To return the table element, to the element integration icon, select [Table Element] - [OFF] from pop-up menu while selecting the table element.

Select the element integration icon which wants to be displayed and select [Property] from pop-up menu to display detailed information on each element. For information about each property, see "B.9 Correlation Window Properties". The following example is properties of DBMS Files (Oracle).

DBMS Files(Oracle)

Basic information | DB File Information

File Name	File Status	Status Description	Log Group Number	
/export/disk2/oracle/OraHome1/oradata/hop/control01.ctl	normal	CURRENT		200
/export/disk2/oracle/OraHome1/oradata/hop/control02.ctl	normal	CURRENT		200
/export/disk2/oracle/OraHome1/oradata/hop/control03.ctl	normal	CURRENT		200
/export/disk2/oracle/OraHome1/oradata/hop/cwmlite01.dbf	normal	ONLINE		200
/export/disk2/oracle/OraHome1/oradata/hop/drsys01.dbf	normal	ONLINE		200
/export/disk2/oracle/OraHome1/oradata/hop/example01.dbf	normal	ONLINE		200
/export/disk2/oracle/OraHome1/oradata/hop/indx01.dbf	normal	ONLINE		200
/export/disk2/oracle/OraHome1/oradata/hop/odm01.dbf	normal	ONLINE		200
/export/disk2/oracle/OraHome1/oradata/hop/system01.dbf	normal	SYSTEM		200
/export/disk2/oracle/OraHome1/oradata/hop/tools01.dbf	normal	ONLINE		200

OK

To correlate the element in the element integration icon with the application, first, execute the operation to display the element integration icon as the table element. Next, select the elements (element table) that first make are to be correlated as follows and select [Creation] - [Create application] from pop-up menu. It is also possible to select two or more tables as shown in figure below.
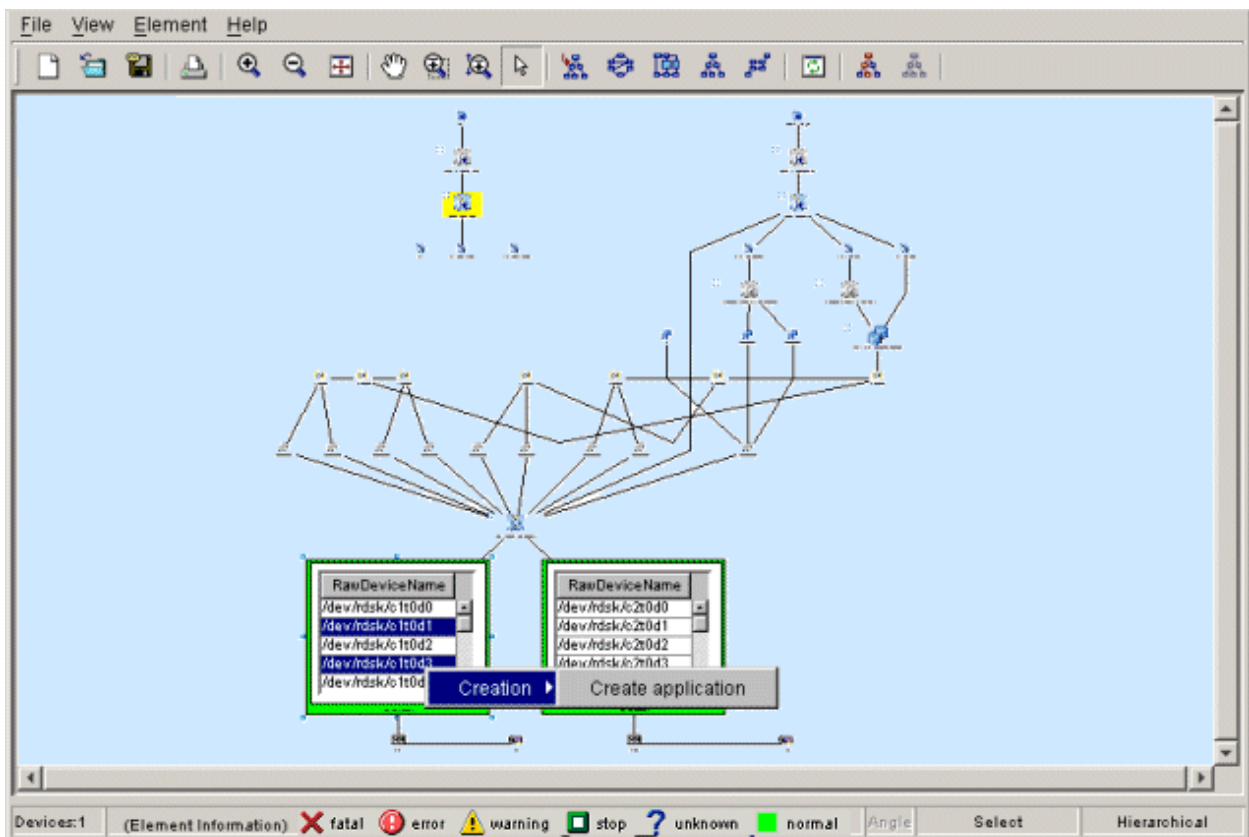
To display the correlation between the application and the table element is, click the application whose correlation is to be displayed and click the Route Search Execution icon from the toolbar, and the correlating table is displayed in the color. For information about route search, see "6.2.5 Route search".

To search the route of the element in the element integration icon, first, execute the operation to display the element integration icon as the table element. Next, click the [Route Search Execution] icon from the toolbar. Then, when selecting the element which wants to be displayed from the table, the correlated elements are displayed in the color.
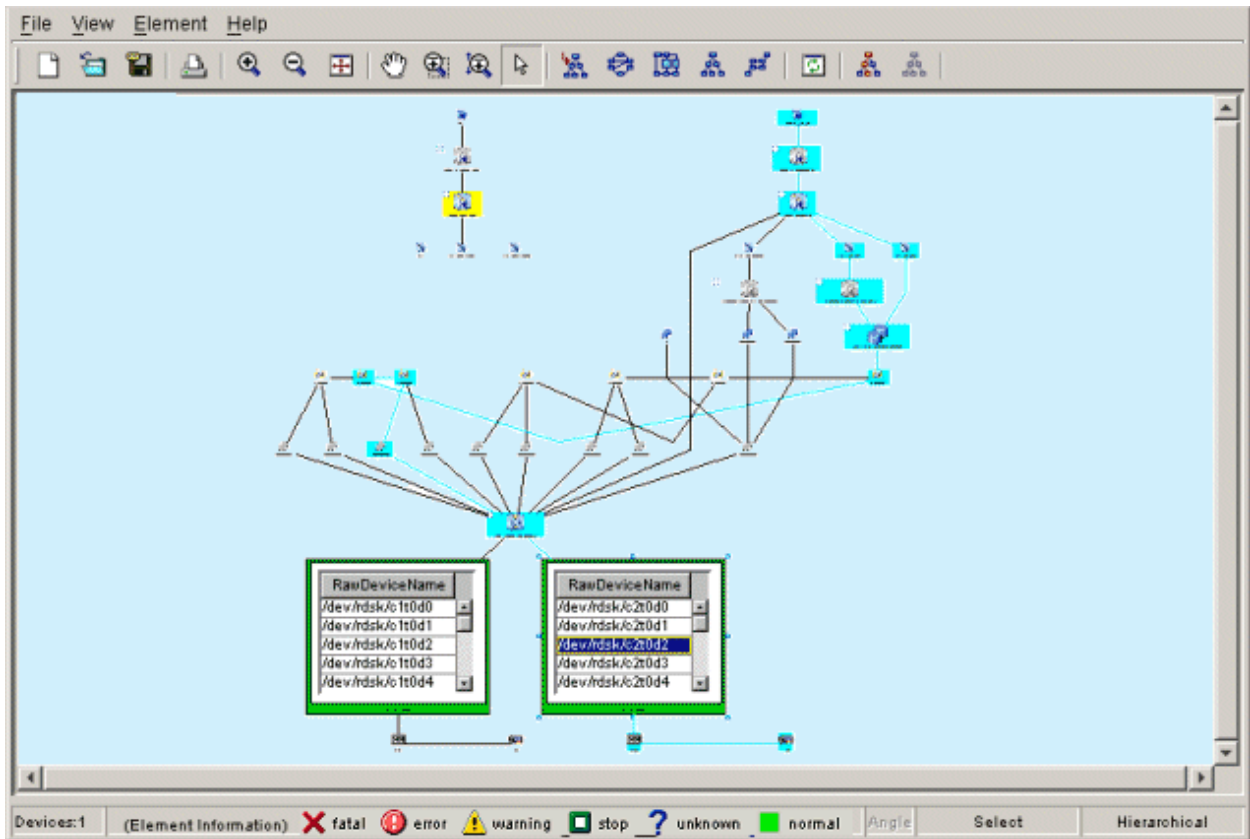
When searching the route, the color of the correlated table, which is in the table element, is changed when the element integration icon is displayed as the table element. Which element correlates can be easily recognized.

When large-scale configuration storage such as ETERNUS8000, ETERNUS6000 or ETERNUS4000 is displayed on the Correlation window, the Correlation window can look complicated though it depends on the model and the configuration. For that reason RAID Group Integration function is supported as a function to make the screen look simple. By using this function, the number of the displayed element can be decreased and the display time for the Correlation window can be shortened. If the large-scale configuration storage exists in the system, it is suggested that RAID Group integration mode should be switched on.

See

For setting of RAID Group integration mode, see "C.11 RAID Group Integration Mode Definition File".

The following figures show the Correlation windows in case that RAID Group integration mode is OFF and ON.

Figure 6.3 Display example when RAID Group integration mode is OFF
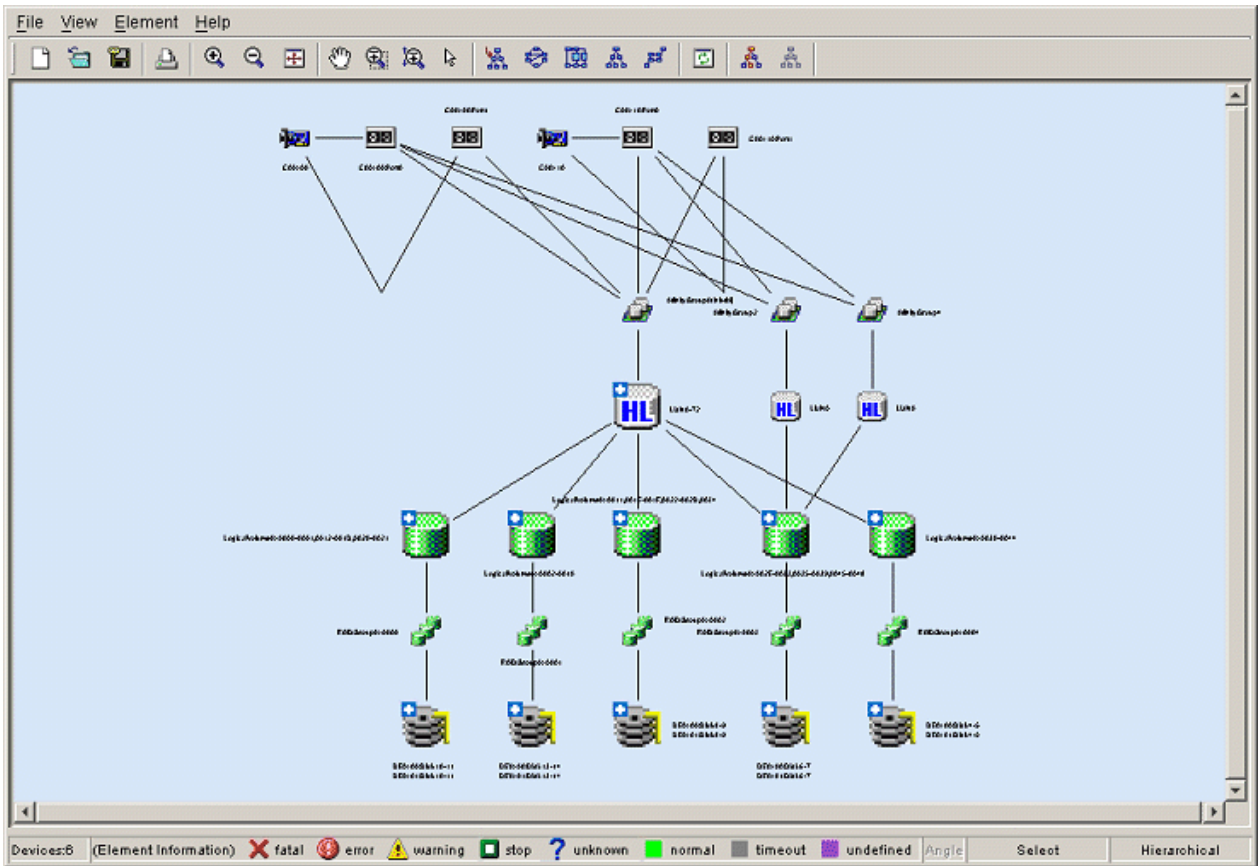
Figure 6.4 Display example when RAID Group integration mode is ON
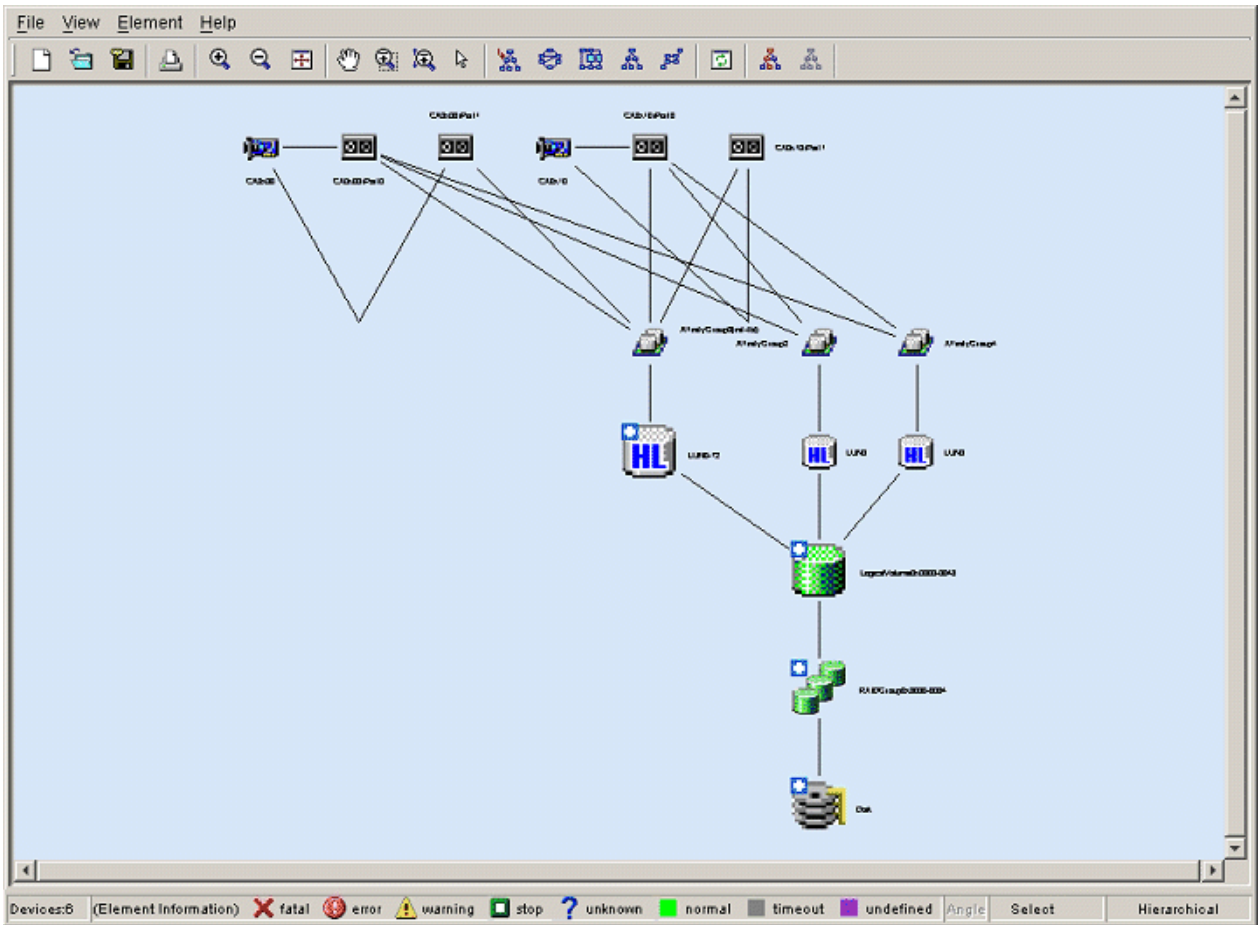
6.2.9 Disk allocation

This is a function that can display the location of disk allocation of storage. Select the storage which has to be displayed and select [Element] - [Action] - [Disk Map] from the menu bar. The following disk allocation is displayed:

Disk Map

Device name: E8000MC-0000000022

Disks
Total	218
Assigned	97
Not Assigned	121

Disk Details
System Disk	32
Data disk	50
Hot Spare	15
D. Hot Spare	–

Rack Image — CE, Base, Ext.1

RAIDGroups
Group	Level	TPP	Num	Color
0x0007	RAID1	–	2	
0x0008	RAID1+0	0x0004	4	
0x0009	RAID5	0x0005	4	
0x000A	RAID1+0	0x0004	4	
0x000B	RAID1+0	0x0004	4	
0x000C	RAID5	0x0005	4	
	System		32	
	Hot Spare		15	

Base Rack | Expansion Rack1

Up (DE0x0C – DE0x0F) | Center (DE0x08 – DE0x0B) | Down (DE0x04 – DE0x07)

Slot 10				
Slot 9				
Slot 8	0x000A RAID1+0	0x000A RAID1+0	0x000A RAID1+0	
Slot 7	0x0009 RAID5	0x0009 RAID5	0x0009 RAID5	0x0009 RAID5
Slot 6	0x000C RAID5	0x000C RAID5	0x0008 RAID1+0	0x0008 RAID1+0
Slot 5	0x000B RAID1+0	0x000B RAID1+0	0x000C RAID5	0x000C RAID5
Slot 4	Hot Spare	Hot Spare	Hot Spare	Hot Spare
Slot 3				
	DE-ID 0x0C (Loop ID:0C)	DE-ID 0x0D (Loop ID:0D)	DE-ID 0x0E (Loop ID:0E)	DE-ID 0x0F (Loop ID:0F)

OK

GR740, ETERNUS3000, ETERNUS4000, ETERNUS6000 and ETERNUS8000 may be offered in a format that one case is equipped with several racks. To make it clear how disks are deployed on respective racks, information is displayed on each tab by rack. Selecting the tab of a rack you want to view displays disk information corresponding to the rack.

The device name indicates the name of a selected storage device.

Assigned disk information indicates the number of disks assigned to RAIDGroups. System disks (displayed as system) are classified as assigned disks. Hot spares and Dedicated Hot Spare are classified as assigned disks with disk icons displayed as HS. A common RAIDGroup is identified in the same color. The disk locations can easily be recognized on this window. Unassigned disk information indicates the number of disks mounted on the storage but not assigned to RAIDGroups. A disk icon displayed in white represents an unassigned disk.

The total number is the sum of assigned and unassigned disks. The locations of disks that are not mounted on the storage are indicated with disk icons in gray.

Groups in RAID information indicate RAID groups. Levels indicate the RAID levels of the corresponding RAID groups, TPP indicates the TPP numbers belonging to the RAID groups, the number indicates the number of disks making up the corresponding RAID group, the color schemes indicates the corresponding RAID groups.

If no TPP belong to a RAID group, then a hyphen (-) is displayed instead of a TPP number.

The disk arrangement corresponds to the actual device deployment. Slots are deployed from the left to right for GR series and from the right to left for ETERNUS series. DE-ID on the left indicates the drive enclosure ID.

A dedicated hot spare is indicated by a disk icon and the text "HS", with the assigned RAID group number displayed at the top and "D. Hot Spare" displayed at the bottom.

If a disk fails, the frame of that disk is displayed in red. If this disk is alternated with a hot spare, the hot spare is displayed in the assigned color. Placing a mouse on a failed disk brings up the detailed error information.

The RAID group information and disk arrangement windows correlate with each other. Selecting a RAID group in RAID group information causes that the disks related to the RAID group are displayed in distinct colors on the disk arrangement window. Selecting a disk on the disk arrangement window causes that all disks in the RAID group configuring the disk and the RAID group in RAID information are displayed in distinct colors as well. When a selected RAID group belongs to a rack currently hidden, tabs for the related disks are displayed.

6.2.10 Initialization of each display

The initialization of the Correlation window is shown below. The End to End list is an initial display when the access path between HBA port and CA ports is connected.

Element name	End to End list	Show element	Element integration	Description
Business (Application)	Yes	Yes	-	Indicates an application. This element can be created manually.
DBMS (Data Base)	Yes	Yes	Yes	Indicates a database unit.
DBMS (File type)	Yes	Yes	Yes	Indicates a database file type.
DBMS (File System)	Yes	Yes	Yes	Indicates a database file.
File System (Mount Point)	Yes	Yes	-	Indicates the mount point of the file system.
File System (Domain)	Yes	Yes	Yes	Indicates the space (area) used by the file system.
Mirror Driver (Volume)	Yes	Yes	Yes	Indicates a mirror disk volume.
Mirror Driver (Group)	Yes	Yes	-	Indicates a mirror disk group.
Mirror Driver (Disk)	Yes	Yes	-	Indicates a mirror disk.
Mirror Driver (Class)	-	Yes	-	Indicates a mirror disk class.
Multipath Driver (Slice)	Yes	-	-	Indicates a multipath slice.
Multipath Driver (Disk)	Yes	Yes	Yes	Indicates a multipath disk.
Raw Device (Slice)	Yes	-	-	Indicates a Raw device slice. However, only the slices used from DBMS, File System, Mirror Driver, and MultiPath Driver are displayed.
Raw Device (Disk)	Yes	Yes	Yes	Indicates the Raw device disk of storage connected from an HBA.
HBA	Yes	Yes	-	Indicates the FC-HBA card of a server node.
HBA (Port)	Yes	Yes	-	Indicates the port installed in an FC-HBA card.
Switch (Port)	Yes	Yes	-	Indicates a Fibre Channel switch port.
CA (Port)	Yes	Yes	-	Indicates the port where a storage channel adapter is installed.
CA	Yes	Yes	-	Indicates a storage channel adapter.
CM	Yes	Yes	-	Indicates a storage controller.
IOB	-	Yes	-	Indicates a storage IF unit.
Router	-	Yes	-	Indicates a storage router.
DA	-	Yes	-	Indicates a storage device adapter.

Element name	End to End list	Show element	Element integration	Description
Affinity Group (also called ZONE)	Yes	Yes	-	Indicates a storage affinity group (= zone).
LUN	Yes	Yes	Yes	Indicates the LUN number of a logical volume defined in a storage affinity group (= zone).
Logical Volume (=LUNV, OLU)	Yes	Yes	Yes	Indicates a logical volume (= LUNV, OLU) of storage.
Thin Provisioning Pool(=TPP)	Yes	Yes	-	Indicates a physical disk pool of storage.
RAID Group	Yes	Yes	-	Indicates a RAID unit of storage.
Disk	Yes	Yes	Yes	Indicates a single disk unit of storage.
DE	-	-	-	Indicates a storage disk enclosure.
Battery/Capacitor	-	-	-	Indicates a storage battery/capacitor.

6.2.11 Other useful functions

・ File handling

Selecting each menu in [File] from the Correlation window menu bar enables you to read the configuration data displayed in the Correlation window from a file and save the data to a file.

Menu command name	Description
Open	Reads and displays configuration data. The data displayed in the current Correlation window is cleared.
Save	Saves the configuration data displayed in the current Correlation window to the currently specified file.
Save As	Saves the configuration data displayed in the current correlation window in a *.ccw file with a new name.
CSV preservation of a list	Saves the contents displayed on the End to End list to the specified file in the CSV format. Other applications can use the saved contents because the contents are in the CSV format.

・ Print

Selecting [File] - [Print] from the Correlation window menu bar enables the Topology map (frame where the device is displayed) to be printed in the format specified in Page Setup.

As for the size of the form and the layout when printing, a specified value in [Page Setup] is given to priority.

・ Page Setup

Selecting [File] - [Page Setup] from the Correlation window menu bar displays the following dialog in which you can set a page format for printing:
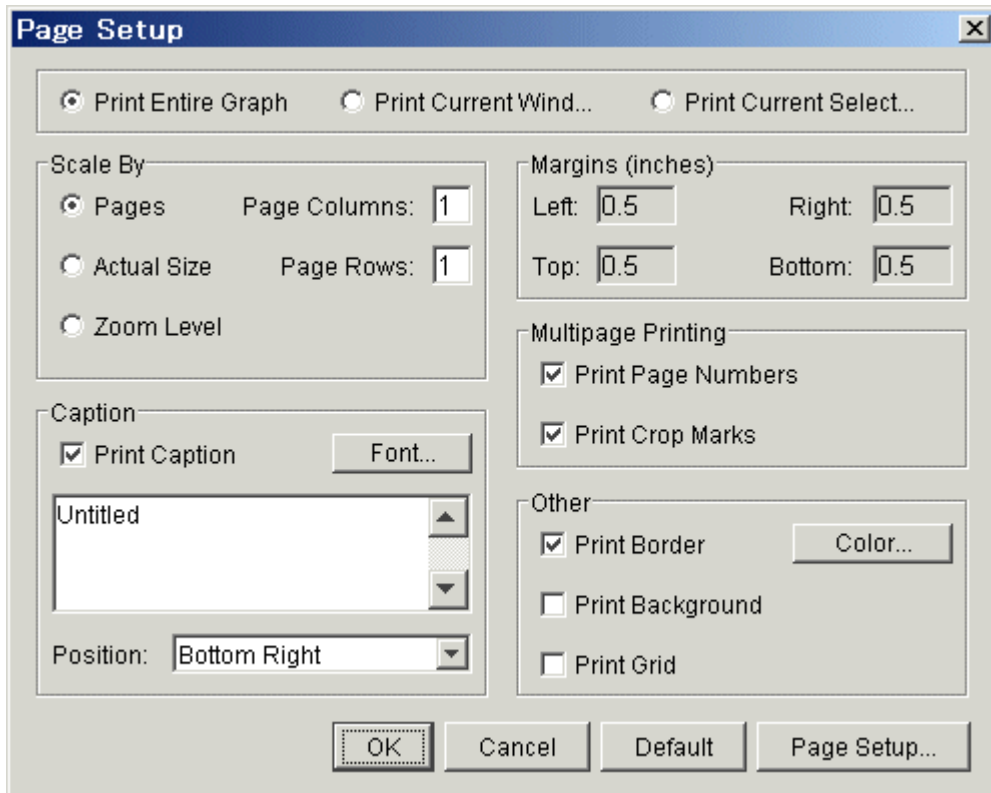
(Print range)

  - Print Entire Graph

  Prints all objects (including undisplayed objects) on the Topology map.

  - Print Current Window

  Prints only the objects displayed on the Topology map.

  - Print Current Selection

  Prints only the objects currently selected on the Topology map.

[Scale By] (Scaling)

  - Pages

  Prints the map on pages measuring "Page Columns (horizontal) x Page Rows (vertical)".

  Note: The map is not printed if 0 is specified for Page Columns and Page Rows.

  - Actual Size

  Prints the map with the default icon size as a reference.

  Note: The map is not printed if 0 is specified for Page Columns and Page Rows.

  - Zoom Level

  Prints the map in the currently displayed size.

  Note: The map is not printed if 0 is specified for Page Columns and Page Rows.

[Caption] (Title)

  - Print Caption

  Adds the title displayed in the text area.

  - Font...

  Sets the title font.

Note: If the dialog is closed and then opened again after the font has been changed, the font setting is reflected in the text area.

- Position

Sets the title position.

[Margins(Inches)] (Margin)

[Multipage Printing] (Setting for printing multiple pages)

- Print Page Numbers

Prints the page and the coordinates at which the page is located on the map.

- Print Crop Marks

Prints the page including only the edges and border lines of adjacent pages, if they are contained in the screen.

[Other] (Others)

- Print Border

Prints the page including the page margin and the border lines of adjacent pages between screens.

- Color...

Specifies a border line color.

- Print Background

Prints the background. (Unsupported)

- Print Grid

Prints ruled lines. (Unsupported)

(Lower button)

- Default

The setting of this "Page Setup" dialog is returned to default.

- Page Setup...

A common page setting dialog to Windows is displayed.

・ Overview

Selecting [View] - [Overview] from the Correlation window menu bar displays the Overview. The Overview displays the whole correlation structure in the window. The Overview linked with the Correlation window. The red frame in the Overview indicates the range of display in the active Correlation window. When the red frame in the Overview is moved, the range of display in the Correlation window is moved accordingly. In addition, when the red frame of the overview is scaled, the range of display in the Correlation window is scaled accordingly.
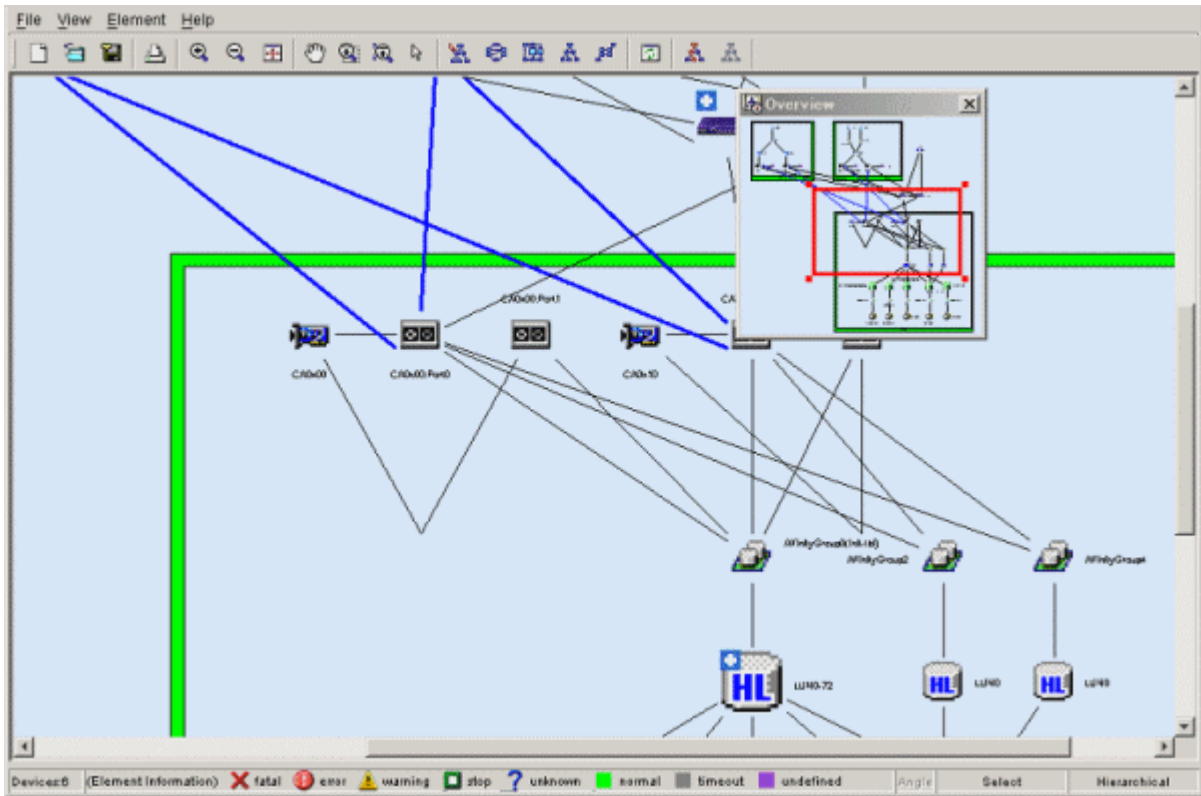
- Marquee

   Marquee is used to display only the portion selected in the Correlation window. By selecting [Marquee] on the Correlation window toolbar and specifying the range of display, you can display the selected portion in the entire Correlation window. In the following figure, the range of display of the selected portion is specified with the toolbar Marquee icon selected. However, when the mouse cursor is moved to the table element, it is changed from the [Marquee] to the [Select]. Move the mouse cursor to other than the table element, and select the range again.
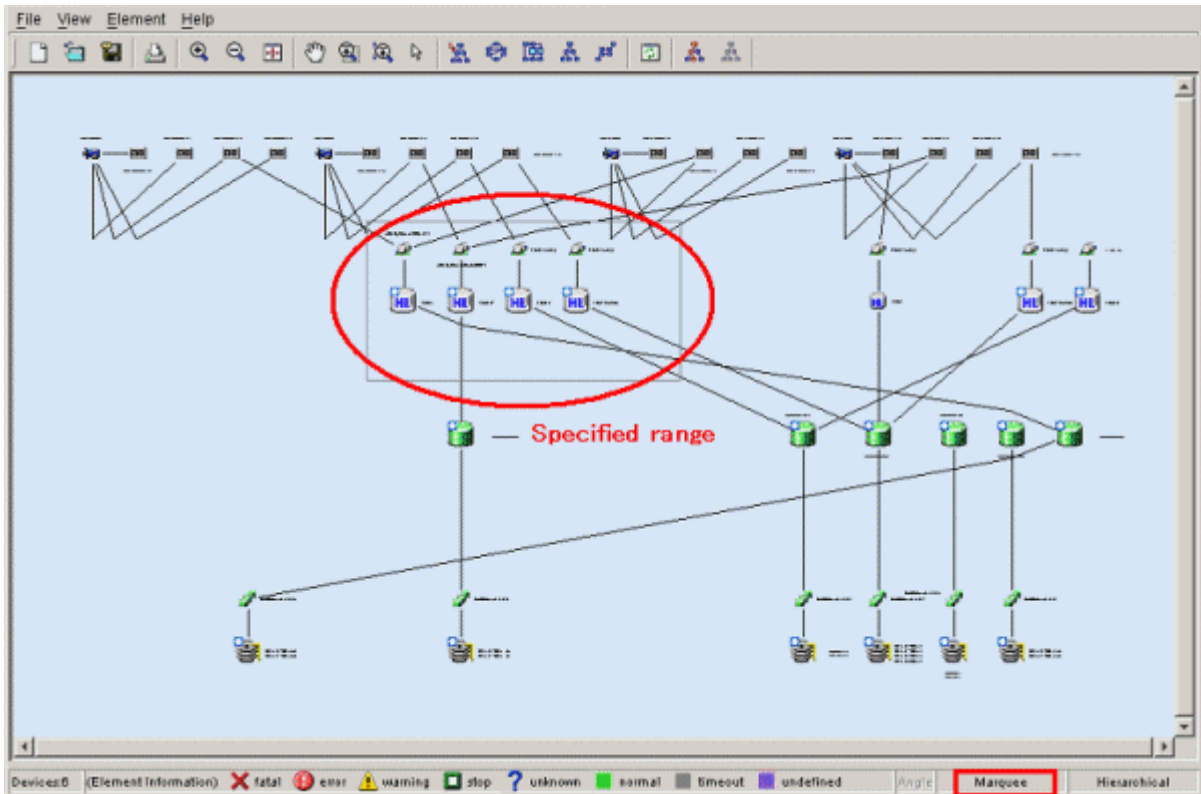
As shown in the following figure, the portion within the specified range is displayed in the entire Correlation window:
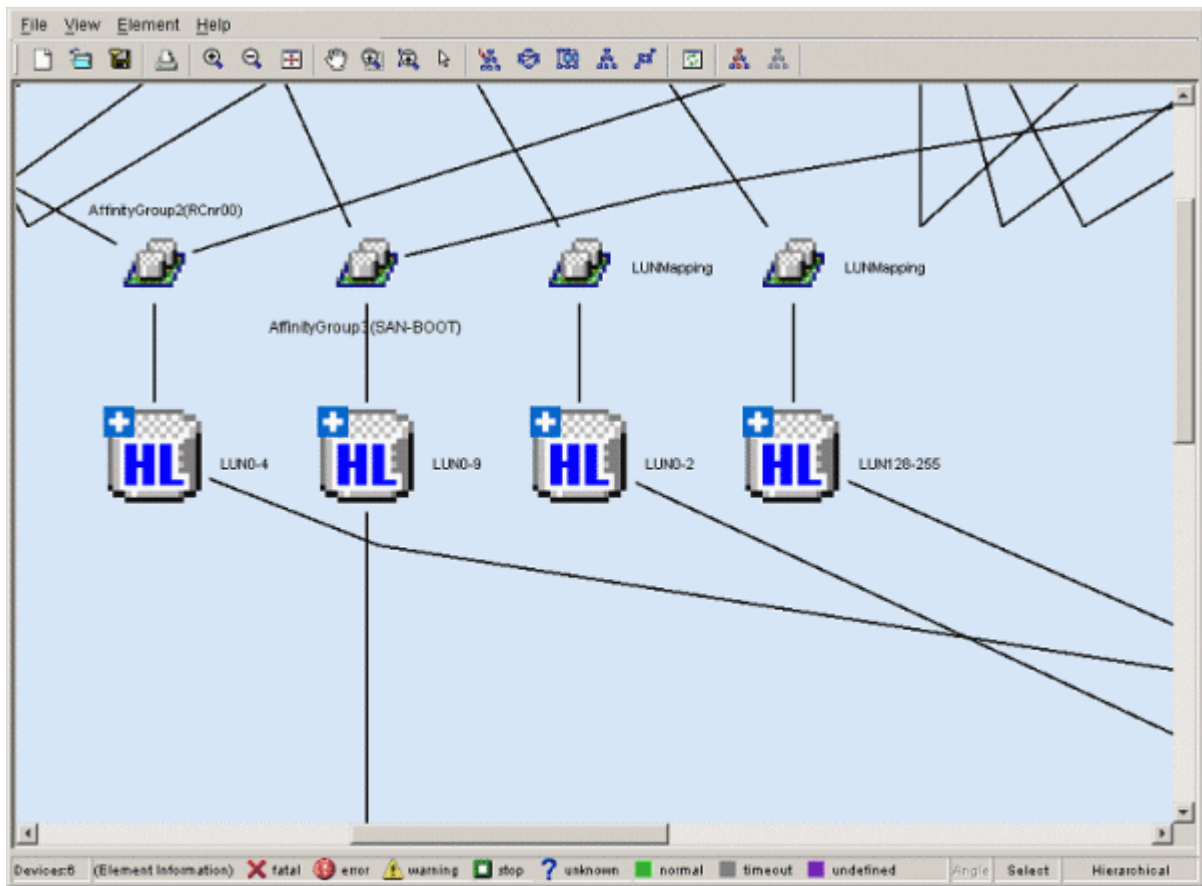
- InteractiveZoom

  To magnify or reduce the display in the Correlation window, use InteractiveZoom together with the mouse. To magnify the display in the Correlation window, select [InteractiveZoom] on the Correlation window toolbar, and move the mouse down while holding down the left mouse button. Moving the mouse up reduces the display in the Correlation window. The following figure shows magnified and reduced displays in the window. However, when the mouse cursor other than the table element, it is changed from the [InteractiveZoom] to the [Select]. Move the mouse cursor other than the table element.
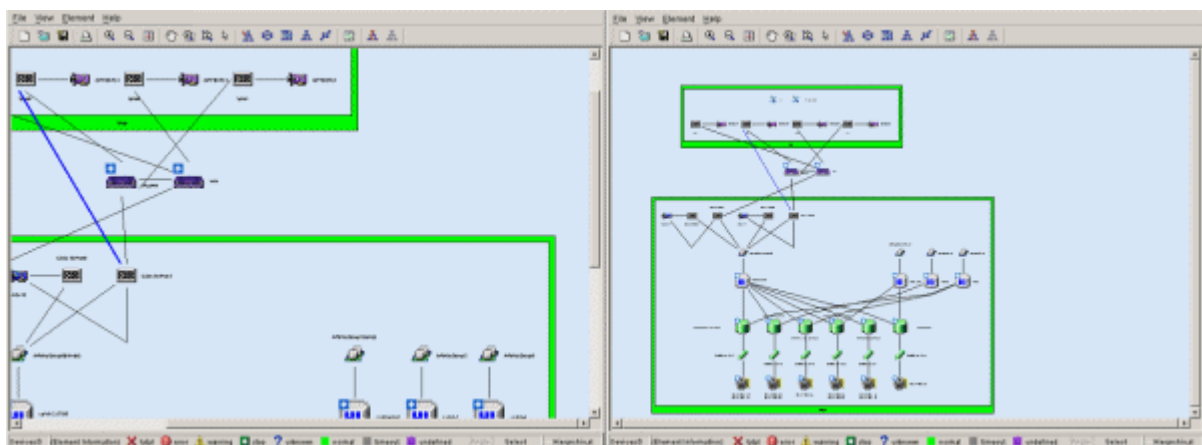
- Call management software

  The Management Software for each element can be invoked from the Correlation window. In each property, the Management Software is displayed as follows.
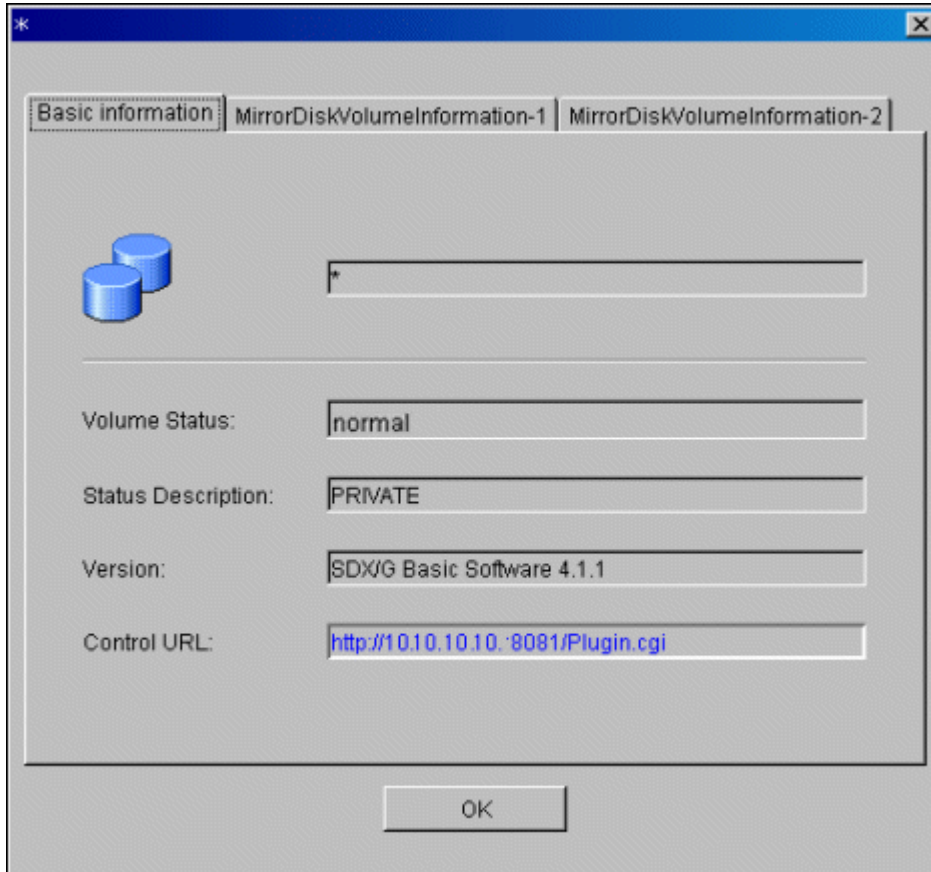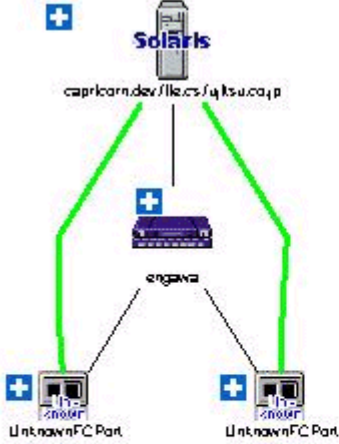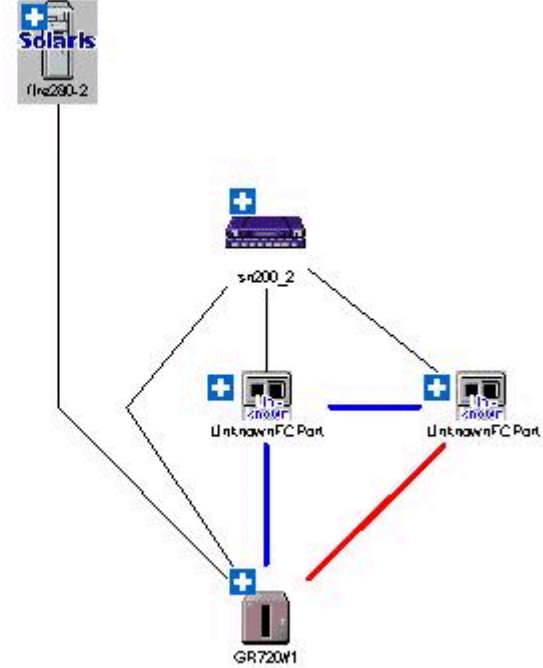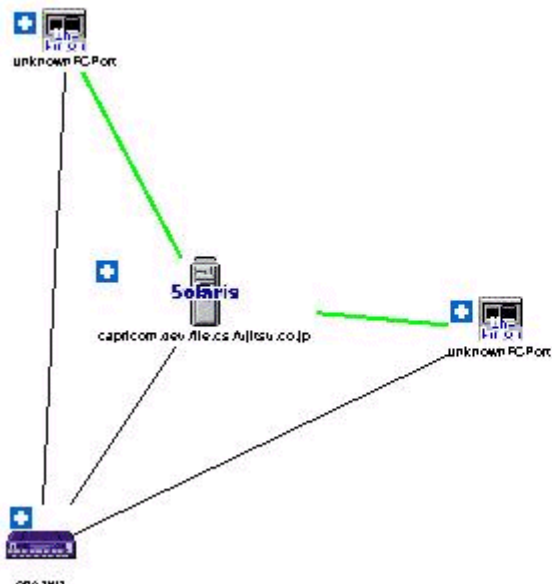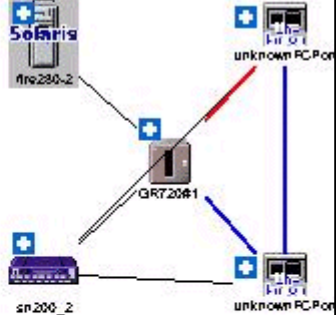
Clicking the URL displayed for "Management Software" displays related Management Software as shown in the following figure:
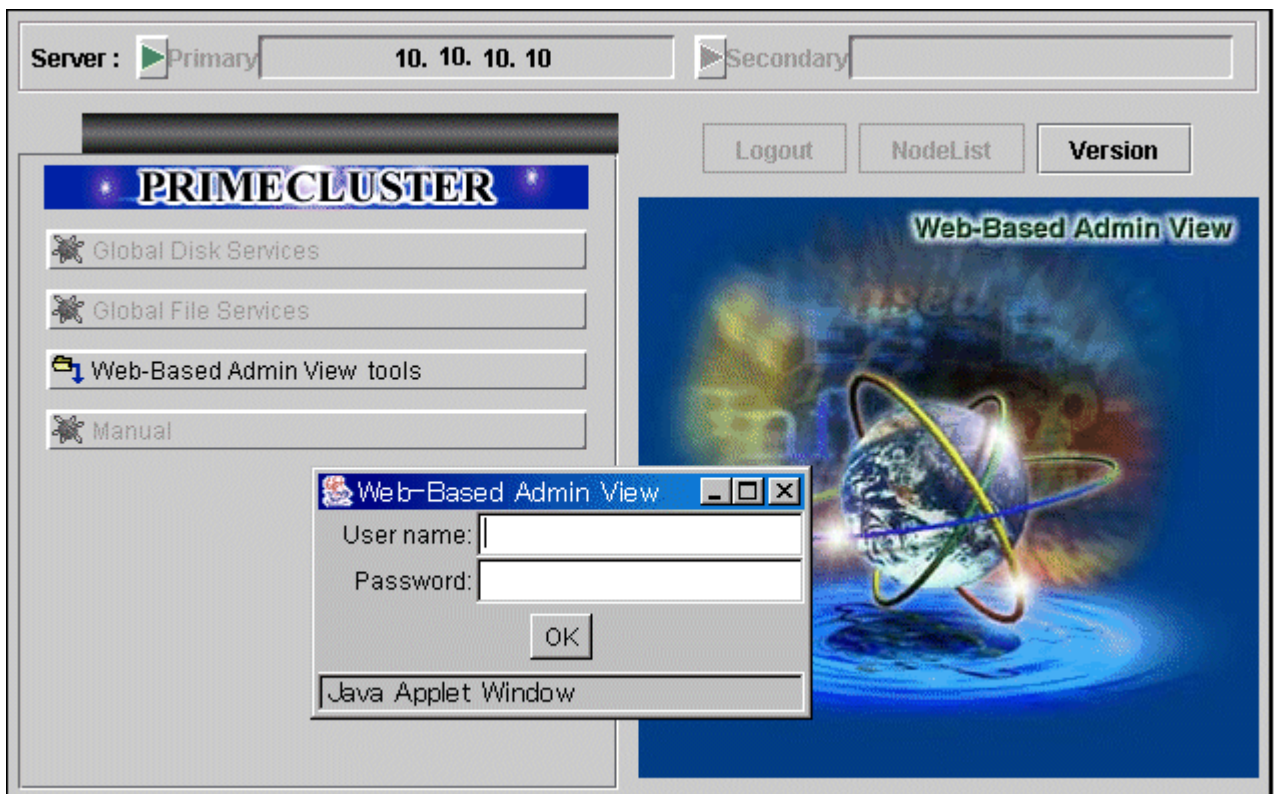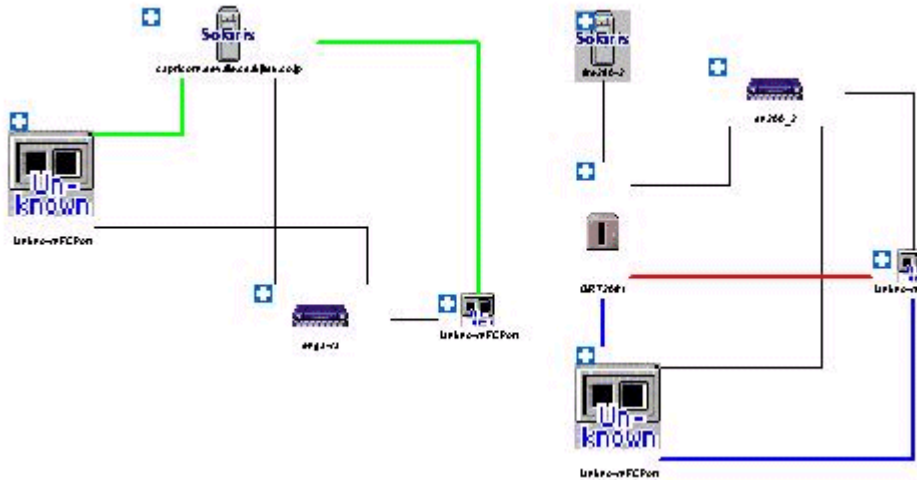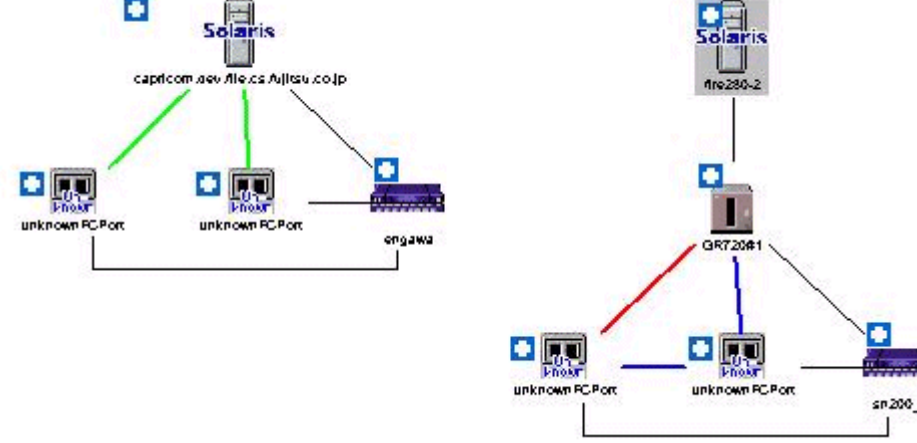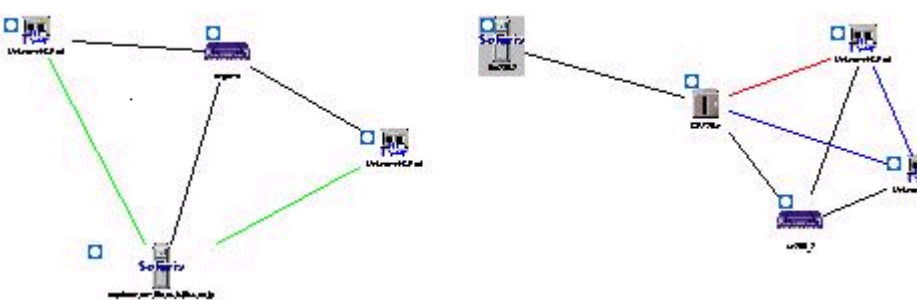
・ Layout

Device icons and element icons can be displayed with different layout logic (algorithms). To use the function, select a layout icon on the toolbar.

The hierarchical layout (Hierarchical) is usually selected. Selecting other layouts, however, enables you to check the relationship between devices from different perspectives.

Layout name	Toolbar display	Display example
Hierarchical (Default)		
Circular		

Layout name	Toolbar display	Display example
Orthogonal		
Tree		
Symmetric		

・ Orthogonal Line Mode

The element arrangement is displayed by orthogonal line mode when selecting [View] - [Orthogonal Line Mode] from the menu bar of the Correlation window, and the display of the portrait can be shortened. The window displayed in orthogonal line mode is displayed as follows. However, the orthogonal line is not displayed between device icons.
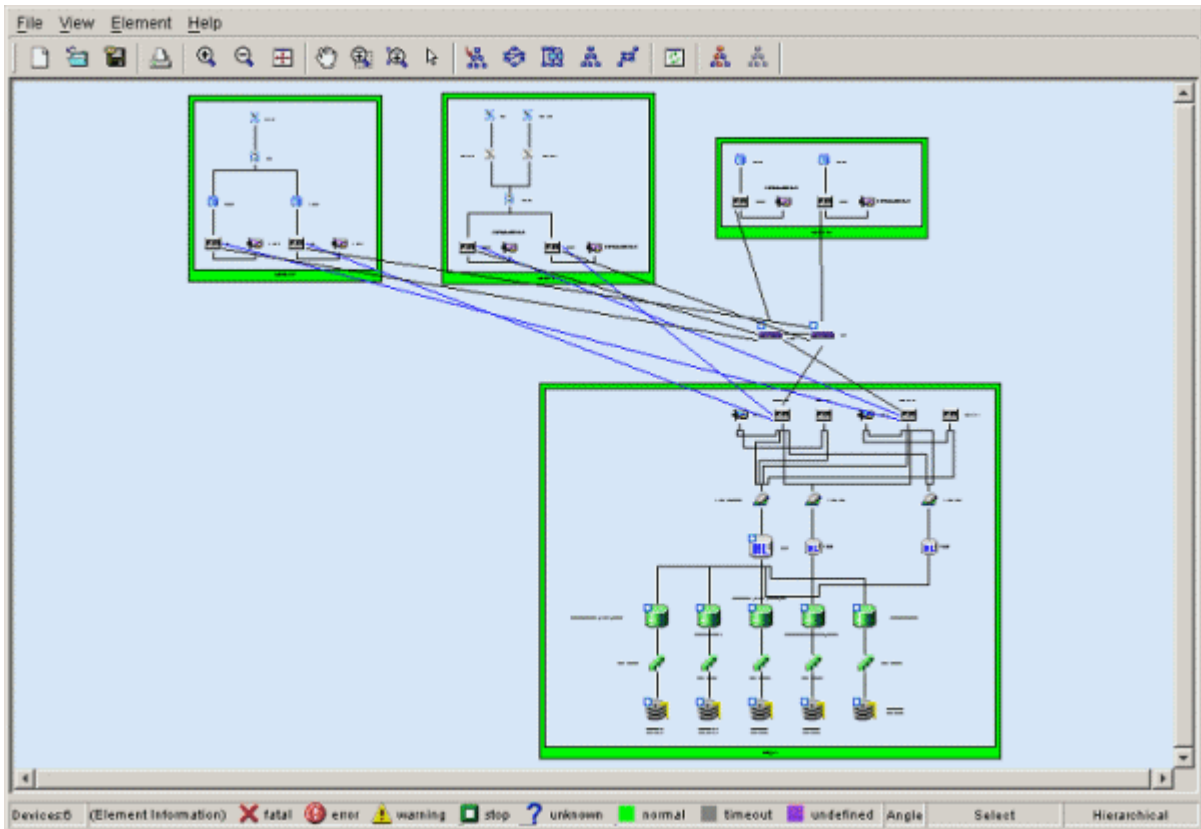
· Table Element Display Magnification Setting

When [Table Element Magnification] of [Element] is selected from the menu bar of the Correlation window, the dialog of the table element display magnification setting is displayed. The magnification to which the table element is displayed can be set in this dialog. The display magnification which can be set to the range 1-100. All the table elements displayed in the Correlation window are displayed at the set display magnification.

Moreover, the default of the display magnification is twice. The display magnification set in this dialog is saved in the client. Even if the display magnification of the table element is enlarged, the screen size does not grow. Therefore, even if the display magnification of the table element is enlarged more than a current value, the table element might seem not to be displayed greatly. However, the element icon and an integrated element icons other than the table element are actually displayed small.

· Correlation Window Unit Start

In the Correlation window, the function (SaveAs) to save the composition data displayed in a present Correlation window in the file and the function (Open) to read this composition data and display is supported. The saved composition data can be displayed on the window of the client which exists in another place by using this function. However, when the administrative client which exists in another place is not connected with the admin server, the saved composition data cannot be displayed on the window. Therefore, a Correlation window unit start is supported in this software.

When saved composition data (CCW file) is double-clicked, the Correlation window is started. This operation becomes the same operation as the selection of the file from the Correlation window by selecting [File] - [Open] from the menu.

Note

If one Correlation window is opened to display the composition data stored in a file and another Correlation window is opened to display different composition data before retrieval of the composition data for the first window is completed, the first Correlation window may freeze. Do not open more than one Correlation window at the same time to display composition data. If the Correlation window freezes, forcibly close the window by using the task manager. Then, perform Correlation window unit start again.

6.3　Access Path Management

6.3.1　What is an access path?

In this software, the logical paths of server node and storage devices are defined as access paths.

Access paths are generated by the following access control functions of the server node, Fibre Channel switch, and storage.

Server node storage affinity

Fibre Channel adapter manufacturers provide host storage affinity. To set the definition of a channel adapter (CA) that can be accessed and the ID of the corresponding server node side, write the world wide port name (WWPN) used by Fibre Channel for the CA on the storage side, in the definition file. Host storage affinity is also called LUN mapping or WWPN binding. This software refers to this function as storage affinity. Define the settings of this function in definition files such as /kernel/drv/sd.conf and /kernel/drv/fjpfca.conf (PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F), /kernel/drv/sd.conf (SN10-FC01, JNI), /kernel/drv/lpfc.conf, or lpfs.conf (LP-9000, 9002S, 9002L, 9802, 10000).

Solaris OS environment HBAs supported in this product all support this function (except XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 and SG-XPCI2FC-QF2-Z , which do not). Windows/Linux/HP-UX environment HBAs do not support this function, however. To collect the information described above, Agent must be installed.

Fibre Channel switch zoning

Switch manufacturers provide Fibre Channel switch zoning. Information such as the WWN/port number used by Fibre Channel for the host bus adapter (HBA) on the server node side and the WWN/port number of channel adapters (CAs) on the storage side is combined in a zone unit, and access from ports other than the port defined for the zone are restricted.

Storage host affinity

Storage manufacturers provide storage host affinity. The storage side recognizes the WWPN of the HBA on the server node side in order to restrict access. Associations of WWPNs of HBAs with storage areas (AffinityGroup/Zone) can also be set. ETERNUS8000, ETERNUS6000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 and ETERNUS DX60/DX80 refer to storage host affinity as Set Affinity Group, Set Host-Affinity Group. ETERNUS4000 models 80 and 100, ETERNUS3000 and GR series refer to storage host affinity as Host Table Settings, zone definition, on host affinity.

Integrated access path control

This software integrates and manages these functions to facilitate definition of settings that make use of the characteristics of SAN security and each function.

This software currently supports storage affinity only for the Solaris OS server node and host affinity only for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80 and GR series. An increase in the number of devices supported by this software is scheduled. Without using storage affinity and host affinity, it can control access paths only by using the zoning function of Fibre Channel switches. It controls access paths according to the functions and settings of individual devices.

6.3.2　Access path display (display of the logical relationship between a server node and storage systems)

This software gathers information from each device and displays the status of access paths or the status of logical access paths from the server node. This function is effective for verifying the validity of system configuration setup and recognizing the effect of a resource error because it enables the logical relationship in the more complicated SAN environment to be easily determined.

In the Solaris OS versions, only PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F and SE0X7F12F can display access paths with FC-AL connections. In the Windows versions, only Fujitsu GP5-FC102, PG-FC102, PG-

FCD101, PG-FCD102 and Qlogic HBAs can display access paths. If the server node operates under the Solaris OS and the storage system is a library, tape, or bridge device, only the following tape driver can display access paths:

st, ftla, fsct, IBMtape, mt, lb, sg.

6.3.2.1 Access path display in the host view or storage view

The "Server Node view" and "Storage view" can be used to check access path display. In each view, enable access path display by selecting [View] - [Show/Hide] from the menu and checking [Access Path View]. Physical paths are displayed in black, and access paths are displayed in blue, yellow, or red.
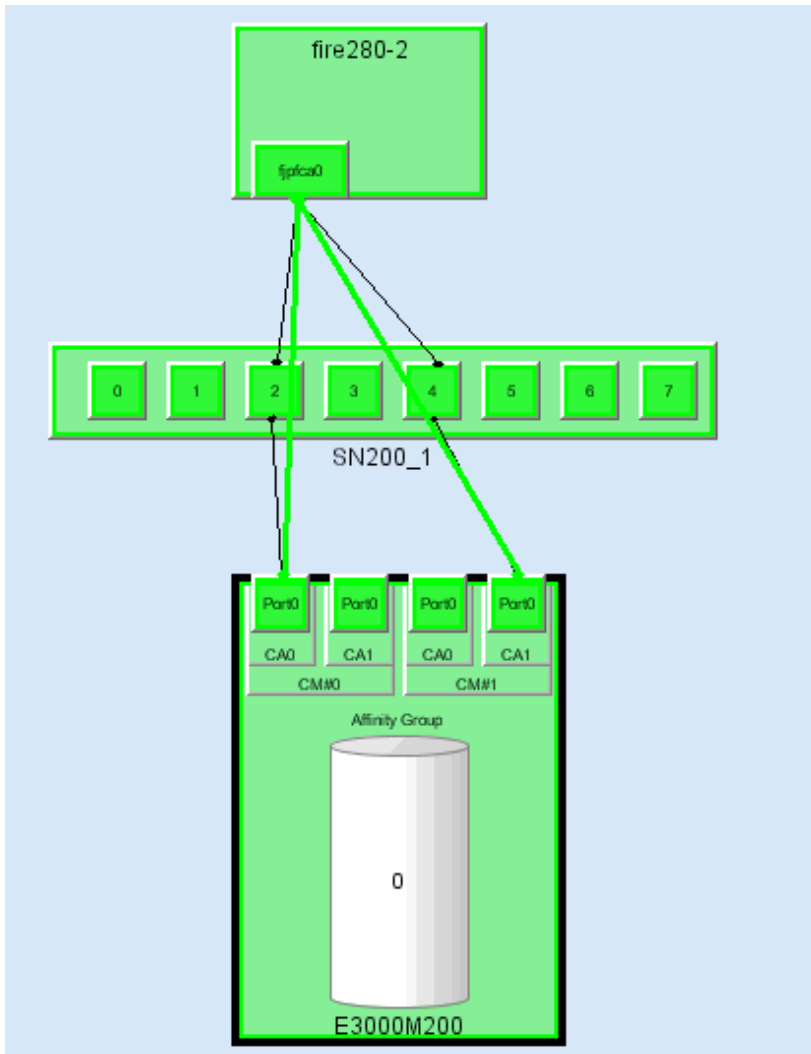
6.3.2.2 Access Path display from a server node

Clicking an HBA displays in light blue all access paths managed by the HBA and the area allocated to the HBA for storage (for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80 and GR series, items up to the Affinity Group (zone) number are displayed).

To determine which device file in the server node is associated with one of these displayed access paths, check "Properties" of the HBA, or open an access path dialog box from the list in "Access Path Information" shown in the following figure.

If the Solaris OS device file is cxtyd*s*, for example, the control number is x and the target ID of access path information is y in HBA "Property". (If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2,SG-XPCI2FC-QF2,SG-XPCI1FC-QL2 or SG-XPCI2FC-

QF2-Z, however, the controller number, target ID, and LUN cannot be displayed.) In the following figure, the correlation of device files c2t0d0 to c2t0d15 can be recognized because the controller number of the selected HBA is 2, the target ID is 0, and LUN is 0-15.
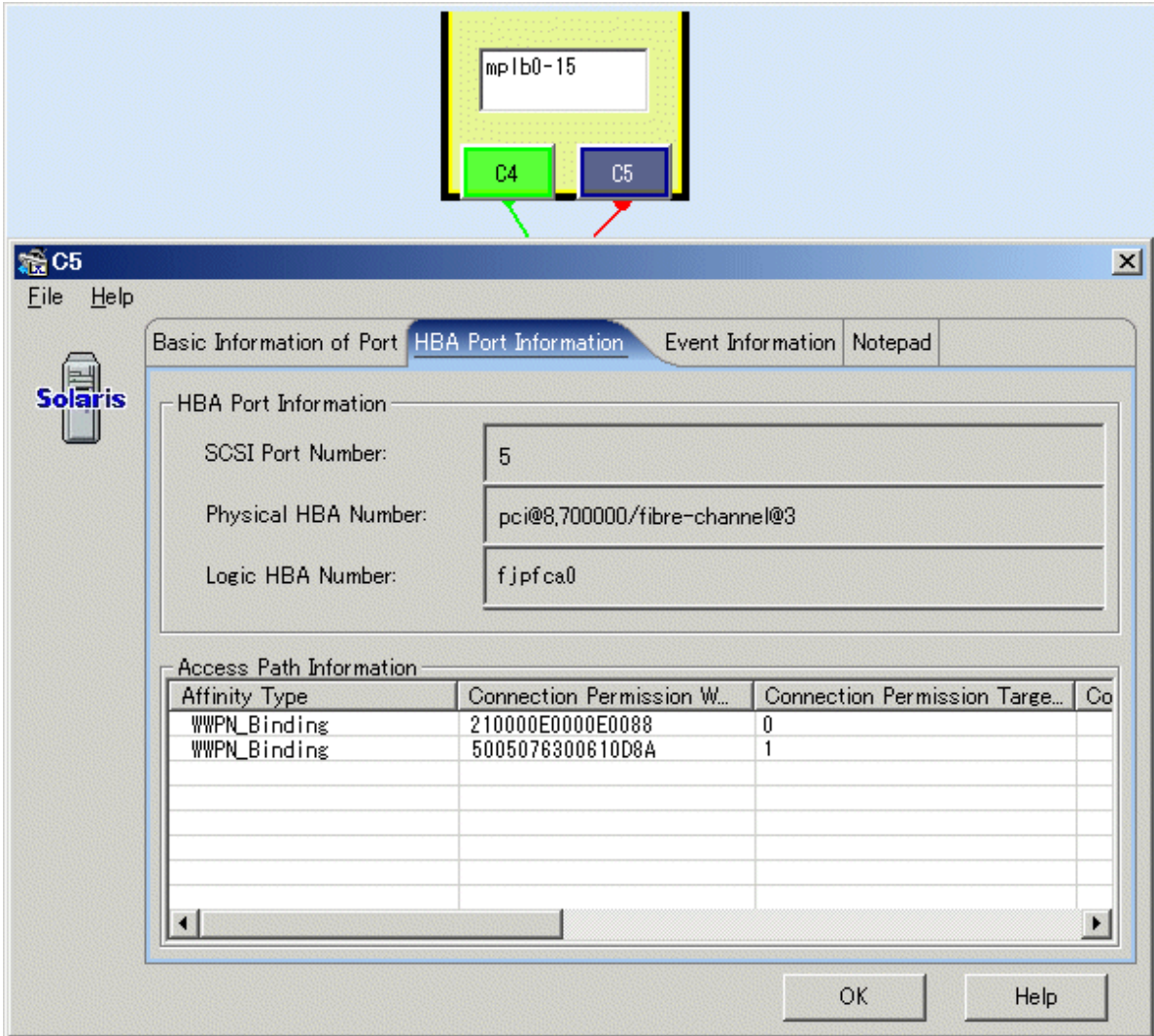
Also, you can determine the target ID and LUN by selecting [Property] on the pop-up menu. (If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z, however, the target ID and LUN cannot be displayed.) As shown in the figure below, the pop-up menu is displayed by clicking and then right-clicking on an access path. In "Property", "Error Description" can be displayed. The reason for the abnormal access path is written in "Error Description". (No reason may be partially written.)

C5 --> Port0AccessPath Information

File Help

| Access Path Information (HBA) | Access Path Information (FC Port) | HBA Port Information | FC Port Information | Error Description |

Affinity Type:	Another_Binding
Connection Permission WWPN:	2041000B5D6A0112
Connection Permission Target Number:	
Connection Permission AffinityGroup:	0
Connection Permission LUN:	
Current FC Class:	Class_Unknown
Access Path Status:	Normal

OK   Help

Clicking on a selected access path displays in light blue the physical paths constituting the access path, as shown in the figure below. However, if several Fibre Channel switches in the access path are cascaded, intermediate paths between the Fibre Channel switches cannot be displayed.
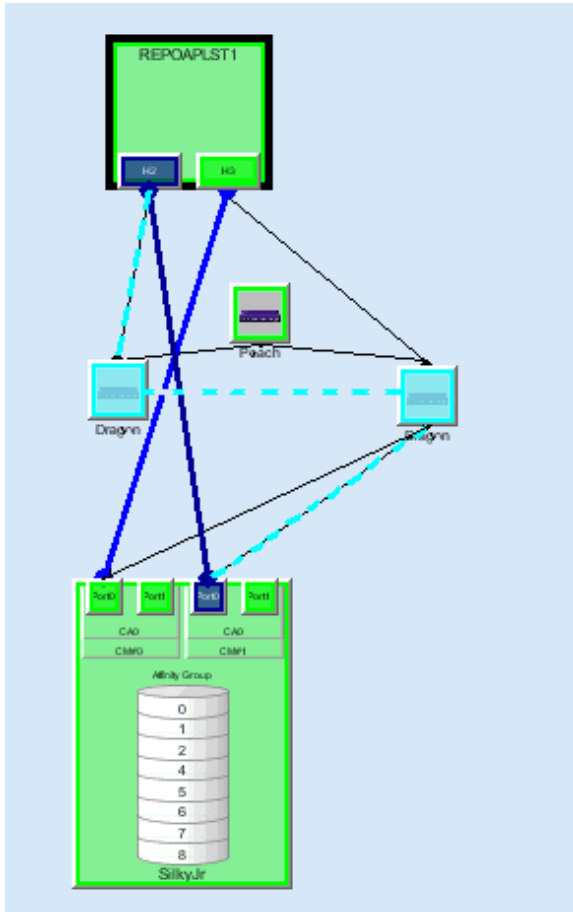
When the Fujitsu multipath disk control mechanism or msdsm (the multi path driver that is built into Windows operating system since Windows Server 2008 by the standard) is used in Solaris OS, Windows or Linux environment, the device file name of the multipath disk mechanism is displayed on the server node. In Solaris OS, Windows (In case of SSC agent, only using the HBA produced by QLOGIC Co.), and Linux (unless the HBA is PG-FC105 (driver version:V4.20q-1), PG-FC106 (driver version:V4.20q-1), PG-FCD101, or PG-FCD102) environments, it is possible to display the access path that configures the device file and the storage area information in turquoise by left-clicking this device file name to select it. With this function, you can visually determine the relationship between storage media and the device files in the server node, so the function improves the efficiency of storage system operation management.
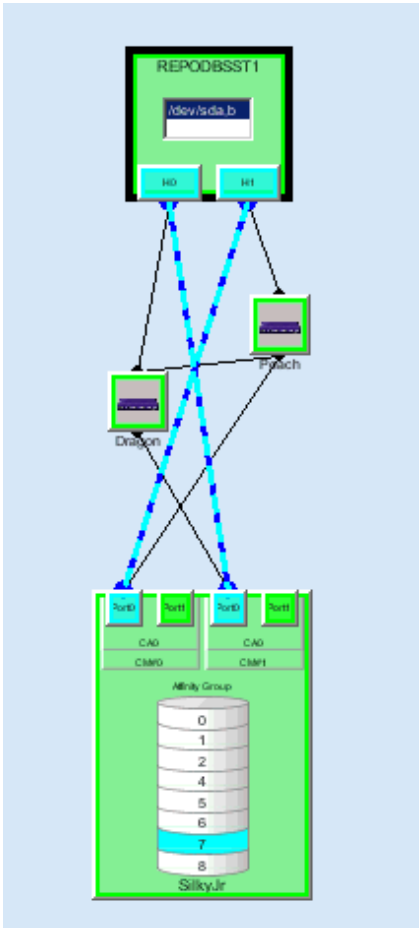
With only the side view displayed, the FcHba-FcHba (or FcCa-FcCa) access path is not displayed. When FcHba (or FcCa) with the FcHba-FcHba (or FcCa-FcCa) access path is clicked, the access path destination FcHba (or FcCa) and its access path are highlighted.
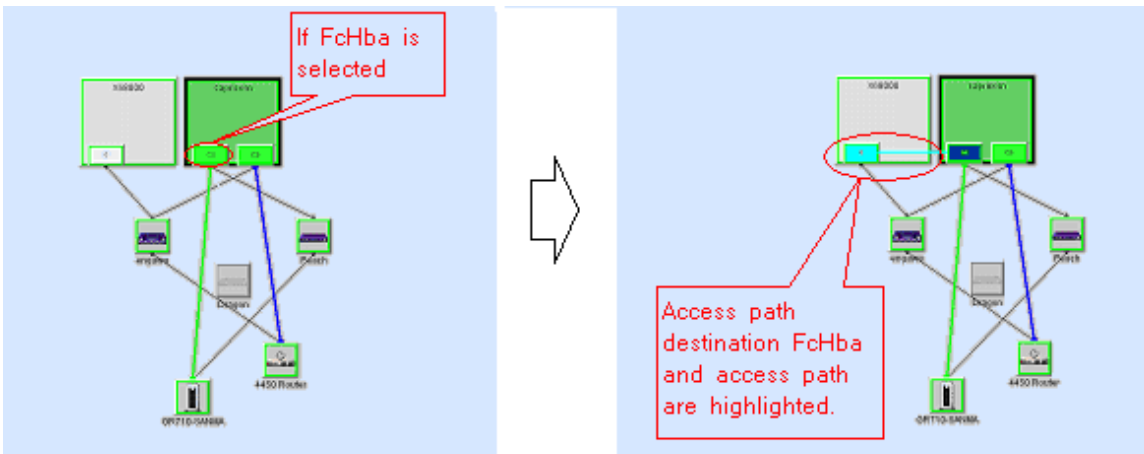
6.3.2.3 Access path display from a storage system

Clicking a channel adapter (FC port) of a storage system where access paths are created displays in light blue all access paths and HBAs managed by the channel adapter.

By left-clicking the representation of the storage area (Affinity Group (zone)/indicated as the colum in the figure), all access paths and HBAs that are managed by the related CA are displayed in blue. In Solaris OS, Windows (In case of SSC agent, only using HBA by QLOGIC Co.) and Linux (only using HBA except for PG-FC105 (driver version:V4.20q-1), PG-FC106 (driver version:V4.20q-1), PG-FCD101, PG-FCD102) environment, if the Fujitsu multipath disk control mechanism or msdsm is set up, the corresponding device file name is also displayed in light blue.

6.3.2.4 Access path status display

Table 6.6 Access path status display

Access path status		Color	Description	Action to be taken
OK	(WWPNBINDING)	Green	The access path is normal. ・ If the server node OS is Solaris OS: Indicates that storage affinity (WWPN binding) has been set in the server node and that the LUN is recognized by the OS, if the HBA is not XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z. ・ If the server node OS is not Solaris OS: Indicates that the HBA binding type is WWPN.	None
	(ANOTHERBINDING)	Blue	The access path is normal. ・ If the server node OS is Solaris OS: If the HBA is not XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z, indicates that storage affinity (LUN mapping) has not been set in the server node, but that the access path has been set using the Fibre Channel switch zoning information or storage host affinity information. (If the HBA is PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, or SE0X7F12F, and there is a Fibre Channel switch environment, the storage cannot be accessed solely with these settings. The access path for this path must be set. There is no problem with Loop connections.) If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, SG-XPCI2FC-QF2-Z, and the access path status is Normal, the access path color is always Blue. This indicates that the access path is set using either the Fibre Channel switch zoning information or the storage host affinity information. ・ If the server node OS is not Solaris OS: Indicates that the access path has been set using the Fibre Channel switch zoning information or storage host affinity	None. However, the LUN cannot be accessed if there is a Fibre Channel switch environment and the HBA is of a type shown in a) or b). Take the action shown indicated below. a) If the HBA is PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, or SE0X7F12F 1) Configure the HBA N-port settings. Refer to "4.1.1.2 N-port settings", and check the N-port settings. If the settings are incorrect, correct them. The N-port settings may be deleted by use of the ETERNUS multipath driver path remove command. 2) Set the access path If the path status does not change to Green after configuring the N-port settings, refer to "6.3.3 Access path setting", select this path, and set the access path. If the HBA is XSEFC401AF or XSEFC402AF, the following action is required to make the LUN be recognized by the OS: 1) Set the HBA N-port(This procedure is a necessary procedure only for the fiber channel switch environment.) Refer to "4.1.1.2 N-port settings", and check the N-port settings. If the settings are incorrect, correct them. 2) Make the OS recognize the LUN

Access path status	Color	Description	Action to be taken
		information, and that the HBA binding type is not WWPN.	Check the storage *Ap_id* using the cfgadm -al command, and make the OS recognize the LUN using the cfgadm -c configure *Ap_id* command. For details about the commands, check the man command. When HBA is SG-XPCI1FC-QF2,SG-XPCI2FC-QF2,SG-XPCI1FC-QL2,SG-XPCI2FC-QF2-Z, the following actions are required to make the OS recognize the LUN. 1) Check the storage Ap_id by the cfgadm -al command which makes the OS recognize the LUN and then make the OS recognizes the LUN. Command details can be checked by the man command.
Access path error	Red	The access path is disconnected due to an error (if the multipath control mechanism is installed). Or Another part failure caused or may have caused an access path error. (This state also occurs if a device in the access path is faulty.) Moreover, this state also occurs when the Fibre Channel cable on a route is disconnected.	Replace the faulty part, and execute recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
Config miss Match and The access path must be inherited.	Yellow	"Yellow" indicates "Config miss Match" or "The access path must be inherited". Right-click the access path, and select [Properties] on the pop-up menu. Check the access path status.	
		"Config miss Match" Access path settings are incorrect. (Example: WWPN binding is set on the server node side but zoning is not set on the Fibre Channel switch side.) Or the access path cannot be confirmed because the Fibre Channel switch is not registered. For example, one possible cause is that the Fibre Channel switch has erroneous zoning information.	If the Fibre Channel switch is not registered, register it. Right-click the access path, open "Properties" from the pop-up menu, and check "Error contents". Set or delete the access path as required.
		"The access path must be inherited". The access path must be inherited because the HBA has been replaced.	See "6.3.5 Access path inheritance".

You can know the reason of the Access Path error or the Config miss Match from the Access Path Properties. (see "B.7.5 Access path properties".)

Note

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The Solaris OS server node uses special file /dev/rdsk/cXtX, /dev/rmt to obtain WWPN binding information. For this reason, to recognize WWPN binding, this special file (device file) must be created in advance. If any unused special file is in /dev/rdsk/, /dev/rmt, it causes the access path display to be incorrect. If access path display by this software differs from that by system equipment, clarify the special files defined in the following operations:

- For Solaris 2.6 OS

```
# touch /reconfigure
# /usr/sbin/shutdown -y -i6 -g0 (server node restart processing)
```

- Solaris 7, 8, 9,10 OS (For the environment which uses hard disk driver (HDDV), and does not use multipath control (ETERNUS/GR Multipath Driver, MPLB, MPHD))

```
# touch /reconfigure
# /usr/sbin/shutdown -y -i6 -g0 (server node restart processing)
```

After the server node has been restarted

```
# format (Loading processing to HDDV driver's kernel)
# disks -C
```

- Solaris 7, 8, 9,10 OS (For the environment which uses both hard disk driver (HDDV) and multipath control (ETERNUS/GR Multipath Driver, MPLB, MPHD), or uses neither.)

```
# touch /reconfigure
# /usr/sbin/shutdown -y -i6 -g0 (server node restart processing)
```

After the server node has been restarted

```
# disks -C
```

6.3.3 Access path setting

In a storage system where a Fibre Channel switch is between a server node and storage, this software automatically changes the security settings supported by each device and sets an access path, as shown in the figure below. If no security mechanism is provided on the device side, setting up security may not be possible. However, the security mechanisms of other devices create access paths. If none of the devices constituting these access paths is equipped with a security function, security cannot be set up but the access paths can be accessed from the server node. This software can set an access path only in the Fibre Channel switch environment.

Even if the access path state is "Config miss Match," you can create a correct access path by setting the access path properly. Select the access path whose state is "Config miss Match" in the Access Path window, and set the access path.

This function can set an access path not only between a server node (HBA) and storage (CA) but also between a server node (HBA) and a bridge port, between two server nodes (HBAs), and between storage systems (CAs).

 Note

Each storage system has requirements, such as HBA types used, for guaranteeing operation according to the mutual connection verification status. Set each access path so that these requirements are satisfied. For more information about the requirements, contact the respective storage system distributor.
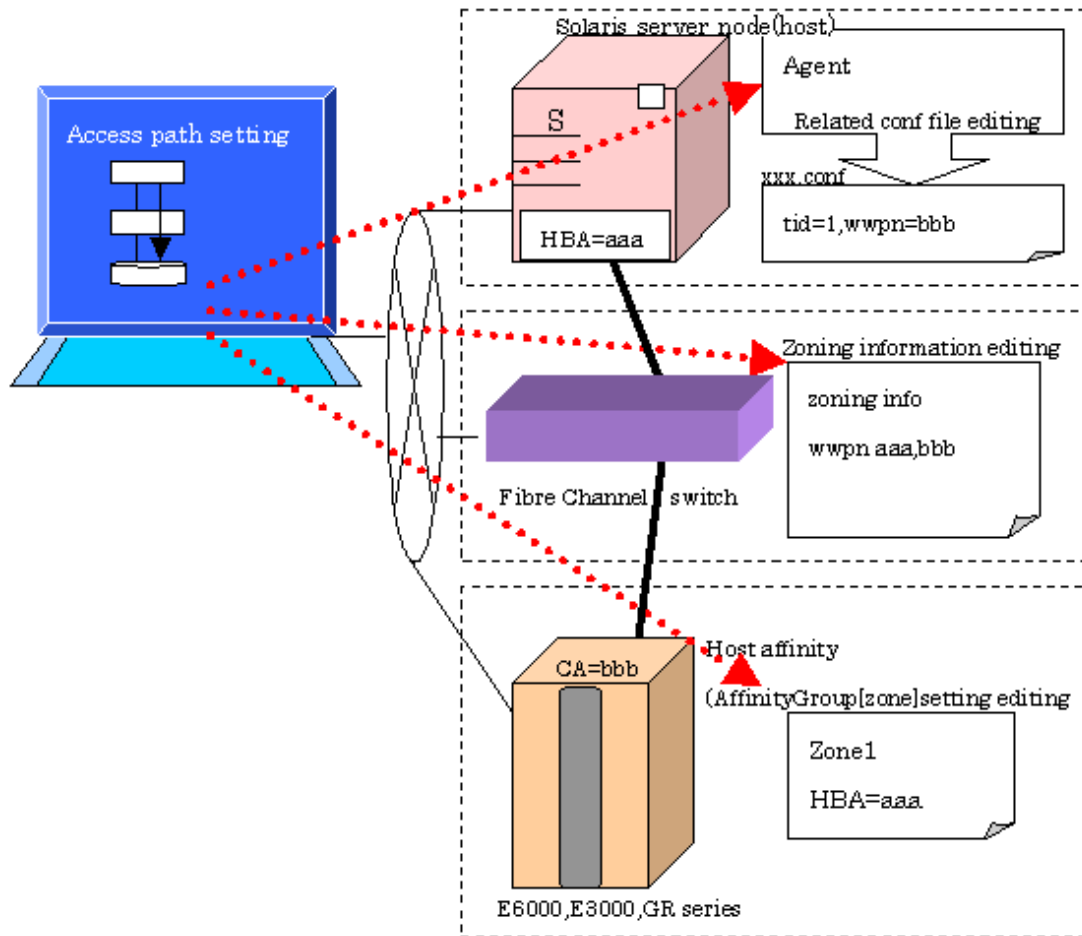
Access path setting

Table 6.7 Security information that this software sets in a device when setting an access path

Device type			Contents set by this software

Solaris OS server node	Agent available	PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F	• Partner device is a disk (excluding a manually embedded disk) unit:
			  Setting of sd.conf LUN / setting for associating fjpfca.conf TID with WWPN
			
			• Partner device is a tape, library, bridge, or manually embedded disk:
			  Setting for associating fjpfca.conf TID with WWPN
			
			• Partner device is an HBA:
			  No setting

		SN10-FC01, FC64-1063	• Partner device is a disk (excluding a manually embedded disk):
			  Setting for associating sd.conf TID and LUN with WWPN
			
			• Partner device is a tape, library, or HBA:
			  No setting

		LP-7000, 8000, 9000, 9002S, 9002L, 9802, 10000	• Partner device is a disk (excluding a manually embedded disk):
			  Setting for associating sd.conf/lpfc.conf or lpfs.conf TID and LUN with WWPN
			
			• Partner device is a tape, library, bridge, or manually embedded disk:
			  Setting for associating lpfc.conf or lpfs.conf TID and LUN with WWPN
			
			• Partner device is an HBA:
			  No setting

		QLA-2200	• Partner device is a disk (excluding a manually embedded disk): Setting for associating sd.conf/qla2200.conf TID and LUN with WWPN

Device type			Contents set by this software
			・ Partner device is a tape, library, bridge, or manually embedded disk: Setting for associating qla2200.conf TID and LUN with WWPN ・ Partner device is an HBA: No setting
		HBA (other than above cases)	No setting
	Agent unavailable		No setting
Windows server node	Agent available/unavailable		No setting
Linux server node	Agent available/unavailable		No setting
HP-UX server node	Agent available/unavailable		No setting
Other server nodes	Agent unavailable		No setting
Fibre Channel switch	With zoning setting		WWPN one-to-one zoning is set. (However, this zoning is not set if the Fibre Channel switch side already has sufficient port zoning.)
	Without zoning setting		No setting (However, if "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box is displayed allowing the user to select whether to execute the zone setting.)
ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/ DX80, GR	With security setting		Setting of HBA WWPN for security
	Host affinity (zone) setting		Setting of HBA WWPN to the affinity group (zone)
	Without security setting		No setting
Other storage/tapes/bridges			No setting

6.3.3.1 Preparations

Notes

- ・ Only the administration account whose authority level is "privileged administrator" can set access paths.

- ・ To change the HOST ID (Target ID) of a set access path, delete the path and then set it again with a new ID.

- ・ To change the specified AffinityGroup/zone name on the ETERNUS/GR side of a set access path, delete the path and then set it again with a new zone.

- ・ From the [View] menu, select [Refresh], and verify that all Fibre Channel switches cascaded to the Fibre Channel switch associated with the access path setting are correctly recognized in the current status. Once an access path is changed because a Fibre Channel switch is temporarily disconnected from the cascade connection, the old cascade connection cannot easily be recovered. (In this event, execute the cfgClear command to delete zoning information for the Fibre Channel temporarily disconnected from the cascade connection. This enables cascade reconnection.)

- ・ When an access path is set for an ETERNUS storage device, "Host response" must be set for the storage device according to the environment. For details, refer to the related ETERNUS disk array manual.

・ When setting an access path that is configured in the FC routing functionality LSAN zone in this software, manually set the LSAN zone in the device in advance.

Checking storage settings

Check the following settings on the storage side before setting an access path:

・ ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series, ETERNUS DX60/DX80 and GR series

By setting up the zone (host affinity) function, you can use storage areas efficiently on a storage area network. To use this zone function, you must set up a zone on the storage side before setting an access path. Set up a Affinity Group/zone with ETERNUSmgr/GRmgr, or consult with your Fujitsu customer engineer.

・ ETERNUS DX60, ETERNUS DX80

If linked affinity groups are used, then the WWN settings of the server nodes to be used must be set in advance.
Use ETERNUSmgr to set the WWN settings. When updating settings, set the [Host Specific Mode] to [HP-UX Mode].

Connected state of the FC cable between devices

・ When setting an access path, an HBA and CA must be physically connected via a Fibre Channel switch.

・ When HBA and CA are connected via FC hub or in FC-AL one-to-one correspondence, the setting of the access paths is not supported. Set to the server node and storage manually.

Device status

・ Each HBA must be connected to a Fibre Channel switch and operate as the N port or NL public.

・ All of a Fibre Channel switch on the way of the access path setting, HBAs, server nodes, CAs and storages should be operating normally.

Using ETERNUS multipath driver 2.0.1 or later

The access path setting function of this software does not write access path setting information to /kernel/drv/sd.conf in an environment in which the ETERNUS multipath driver is installed. However, the setting information is written to /kernel/drv/fjpfca.conf or /kernel/drv/lpfc.conf.

Therefore, to use the access path setting function of this software to build a multipath, follow the procedure below.

1. Install the ETERNUS multipath driver (mpdpkgadd command).

   After installation is completed, you are asked whether you want to configure the environment for the multipath driver. Enter "n" to exit.

   ```
   Do you want to make a multipath configuration now? [y,n,?,q] n
   ```

2. Make access path settings by using this software.

   Make access path settings to build a multipath configuration.
   The access path setting information with these settings is written to fjpfca.conf or lpfc.conf.

3. Configure the environment for the multipath driver (grmpdautoconf command).

   For details on interactive processing, see the ETERNUS multipath driver manual.
   However, if you are asked whether you want to make ETERNUS and switch settings, enter "n" (No & skip).

   ```
   Do you want to set Host affinity & set a switch zoning?
   ```

```
    Yes ---> hit the 'y' key.
    No & skip ---> hit the 'n' key.
    Quit ---> hit the 'q' key.

Please input [y,n,q]n
```

Note

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Do not use this software to set any access path in a multipath configuration before installing the ETERNUS multipath driver (steps 1 and 2 cannot be reversed). If an access path is thus configured before the ETERNUS multipath driver is installed, the multipath driver has conflicting environmental conditions since setting information is written to sd.conf (an undefined target ID is used in sd.conf).

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Using the hard disk driver (HDDV) and multipath disk control (GR Multipath Driver, MPLB, MPHD)

- When the hot system expansion function of a server node is disabled, the access path setting function writes access path information in /kernel/drv/sd.conf on the server node side. For this reason, when using the HDDV and GR Multipath Driver, MPLB, MPHD, set access paths according to the sd.conf rewrite timing specified for environment setup in the respective manuals.

- To add a logical unit access path to the host being used with the HDDV or Multipath disk control (ETERNUS Multipath Driver, GR Multipath Driver, MPLB, MPHD), or to set an additional logical unit in the server node, configure with [Set Access Path] the required setting for ETERNUS Multipath Driver, GR Multipath Driver, MPLB, MPHD, HDDV.

- If the HDDV version is 2.2 or higher and hot system expansion is enabled by in hddvadm -M, hot system expansion can be implemented for the logical unit in the Solaris 9 OS or in a special environment. Before hot system expansion, specify the hddv.conf editing method and hddvadm -M use method and set up the special environment manually according to the related HDDV manual. (When using hddvadm -M, this software does not edit files named hddv.conf and sd.conf. Edit these files manually to add definitions separately. It edits the file named fjpfca.conf automatically.)

Note

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Do not supposed to execute the grmpdautoconf command of GR Multipath Driver (GR Multipath Driver is 1.0.4 or higher) in the environment that hot system expansion of hddvadm -M is unavailable in Solaris OS server node (Agent is available). The HDDV multipath environment can be automatically constructed as the number of sd.conf TID for Agent setting and the number of hddv.conf TID for GR Multipath Driver setting are doubly defined. If the access path setting is executed in the above environment of this software, execute HDDV driver multipath disk control construction by using the constructing procedure from sd driver (standard settings). If hot system expansion of hddvadm -M is available in an environment, the grmpdautoconf command can be executed because the definition setting for sd. conf is not performed in the access path setting of this software.

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6.3.3.2   Setting

Set access paths for the Fibre Channel. You can set a new access path and clarify access path settings (correction in the event of an access path setting conflict), and also change settings of logical unit expansion in the access path.

1. Set up an access path environment
2. [Solaris OS]Preprocessing for device definition file

When changing setting of an existing access path

Is target storage displayed? — Yes

No

3,4,5. Add a view device

6,7,8. Select and connect HBA and CA

9.[E8000,E6000,E4000,E3000,E2000,DX60,DX80,GR] Specify an E8000 or E6000 or E4000 or E3000 or E2000 or DX60 or DX80 or GR affinity group (zone)

10,11. [Solaris OS (Agent available)]Enter a LUN/TID

12. [Switch zone unavailable] Specify zoning setting available or zoning setting

No

13. Check values entered for access path setting

Yes

When setting multiple access paths simultaneously

14.15. Set and check an access path

16. [Solaris OS (tape)] Edit st.conf, etc.

17. [Old GR version] GR reboot

18.19.[Solaris OS hot system expansion] Command

22.[Windows] Reboot

20.[Solaris OS non-hot system expansion] Reboot

23. 24.[Linux] [HP-UX] Reboot

21.[Solaris OS] disks –C

25.[Other servers] Device dependent

26.Check access paths from a server

Access path setting procedure

1. Configure the access path environment by installing additional storage and connecting a Fibre Channel cable, etc.

2. Preprocessing for the device driver definition file

   - When ETERNUS Multipath Driver 2.0.1 or higher is used

     No preprocessing needs to be performed.

   - Solaris 8 OS and Solaris 9 OS

     - This procedure changes the disk array control driver from sd to hddv when the grmpdautocon command is executed in the GR Multipath Driver environment (v1.0.4 or later) or when the hot system expansion function (hddvadmM) is enabled for setting a hard disk driver (hereinafter abbreviated as hddv).

       Check whether the hddv configuration information file (hddv.conf) has been created.

       # ls /kernel/drv/hddv.conf

       If the file is not found, execute the following command and create the hddv.conf file:

       # hddvadm -M

       When the file is found, check whether the file content is of class or parent type.

       (Example)

       Example of hddv.conf of the parent type

name="hddv" parent="scsi" target=16 lun=0;

Example of hddv.conf of the class type

name="hddv" class="scsi" target=16 lun=0;

The class type of file requires no preprocessing. (All hddv.conf files created by the hot system expansion command [hddvadm M] are of the class type.)

For the parent type of file, follow the instructions below to initialize the non-hot system expansion environment and move into the hot system expansion environment. To directly use the non-hot system expansion environment, follow the procedure for setting non-hot system expansion (hddvamd m).

1. Execute hddvadm -i.

2. Confirm that /kernel/drv/hddv.conf is not present.

3. Delete the entries made for recognizing the disk array device from the sd configuration information file (sd.conf).

4. Execute the following command and create an hddv configuration information file (hddv.conf):
hddvadm -M

📝 Note

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Before setting the access path, do not execute the grmpdautoconf command without executing the hddvadm M command that enables the hot system expansion environment. Otherwise, the TargetID of sd.conf and TargetID of hddv.conf of the GR Multipath Driver setting may be defined twice. Consequently, a HDDV multi-path environment may be automatically created due to the duplicated TargetID definition.

In a non-hot system expansion environment, sd.conf is described by "access-path setting". Therefore, the TargetID of sd.conf may match that of hddv.conf, which is edited later. This duplicated TargetID definition must be avoided. In a hot system expansion environment (hddvadm M), sd.conf is not described by "access-path setting". Therefore, the TargetID definition will not be duplicated.

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- In the MPLB2.0 or MPLB2.1 environment with non-hot system expansion specified (hddvadm -m), the commands for adding and removing paths are not supported. Accordingly, the multipath configuration must be canceled once. Execute the destroy command of #iompadm to cancel the multipath configuration.

- In the multipath disk control (GR multipath driver, MPLB, MPHD, or HDDV) environment with non-hot system expansion is specified (hddvadm -m), execute the following command on the target server node:

hddvadm -i

By executing this hddvadm -i command, hddv.conf file moves to sd.conf and mphd.conf/mplb.conf file is saved. However, in the hot system expansion environment or in the hddvadm -M execution environment, hot system expansion can be performed without executing the hddvadm -i command. Therefore, this command need not be set.

This software automatically edits sd.conf (in the hot system expansion environment) and the configuration definition files (*.conf) of the target HBA when an access path is being set. Stop all programs affected by the editing of these files.

Steps 3 to 7 given below are a procedure for setting a new access path. If target storage is already displayed, start from step 6. To change the settings of an existing access path, select that path, and start from step 8.

3. Select the target server node, and open the "Server Node view".

4. From the [Operation] menu, select [View Device] - [Add] to display the Add View Device dialog. Select the access path target storage from "Available Devices" in this dialog, and move it to "Devices to Show" by clicking the <>> Add> button. After completing view device addition, click the <OK> button.
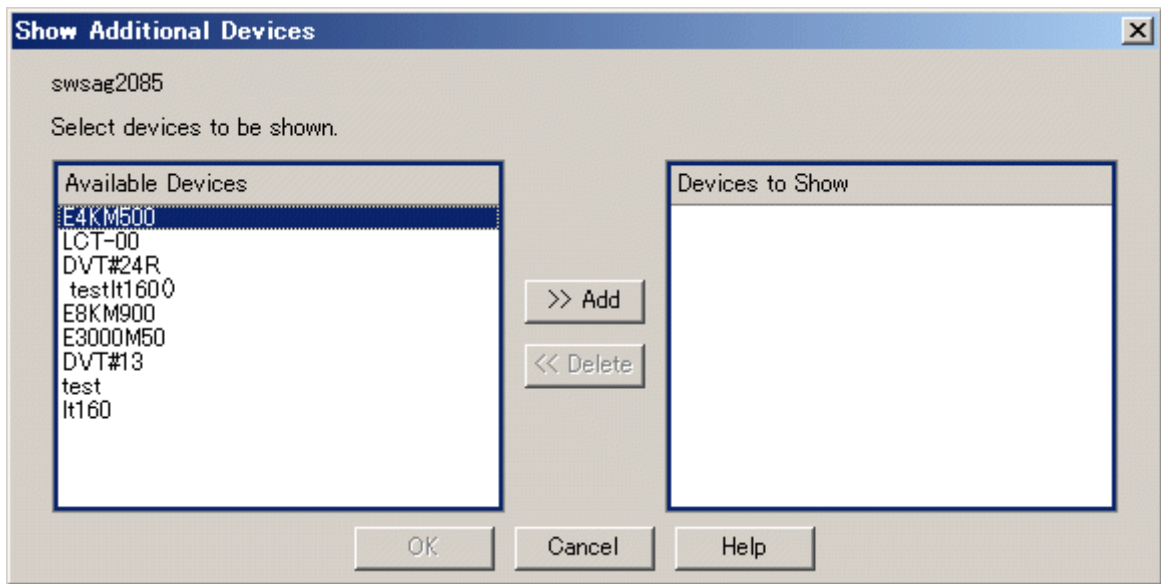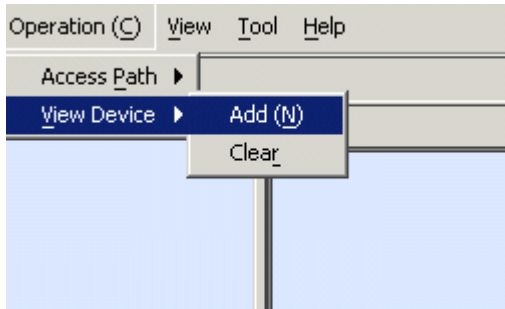
5. The selected storage is displayed in the window.
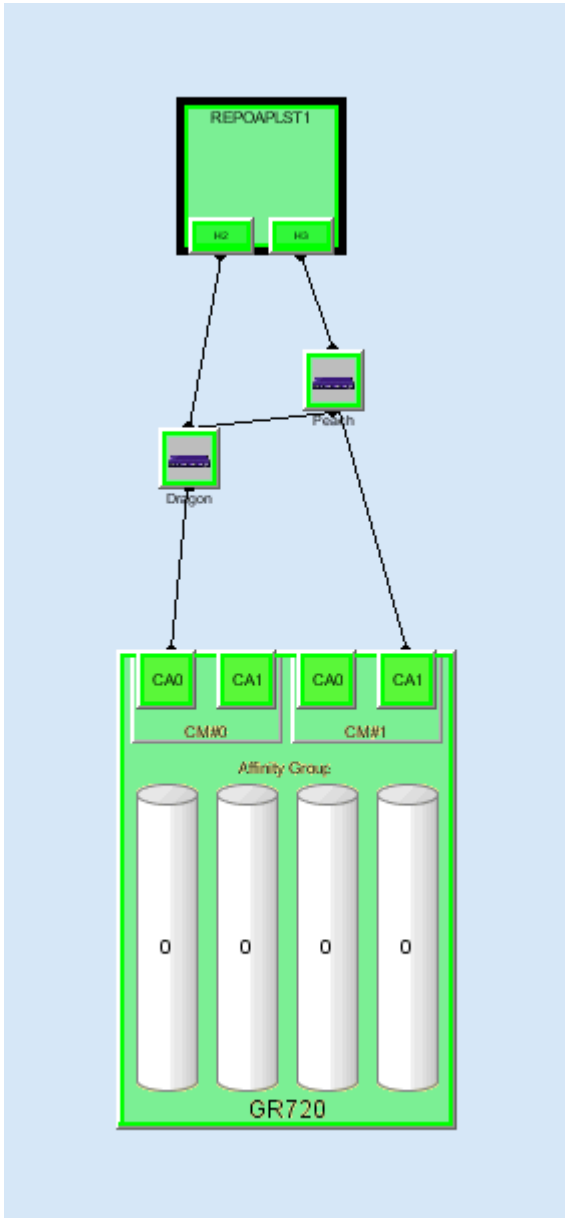
6. Click to select the HBA of the server node side on which an access path is to be created.

7. While holding down the Ctrl key, click to select the CA of the storage side on which an access path is to be created.

8. Select [Access Path] - [Connect] from the menu displayed by right-clicking.

You can also perform steps 6 to 8 simply by dragging & dropping the relevant port icons (e.g., by dragging the HBA port and dropping it on the CA port).
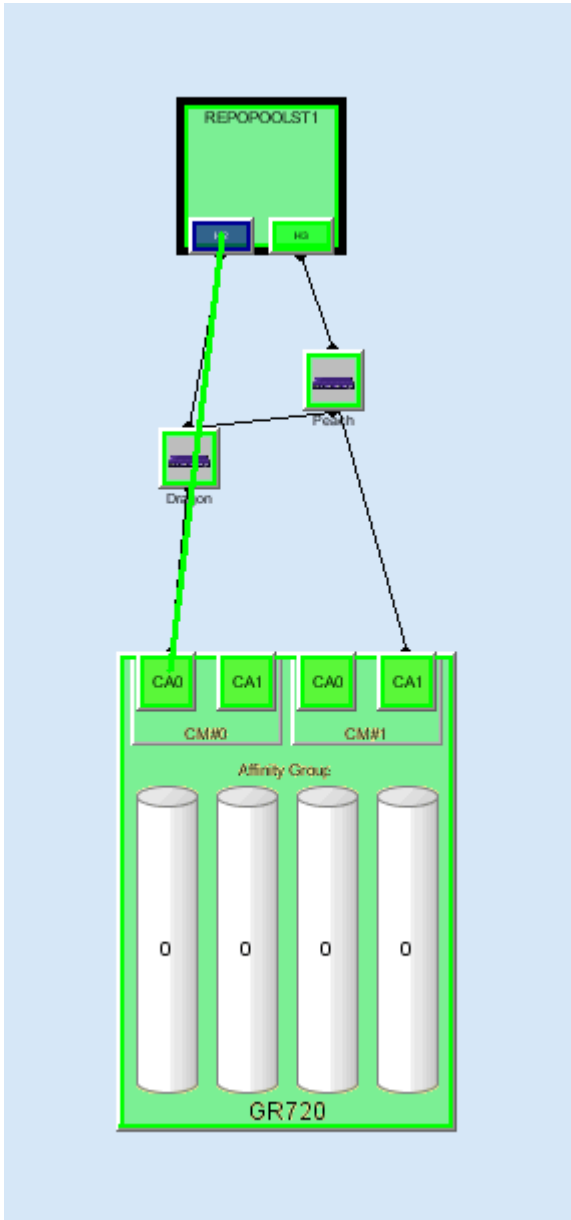
![Note]

Note

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After performing the above steps, move the mouse. (The drag & drop operations may not be accepted by the system).

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9. [For the storage that is ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80 or GR series] If Affinity Group (zone) is set on the storage side, select the Affinity Group (zone) used by the access path. For this task, you can use a function that can automatically fetch and select the Affinity Group (zone) set on the storage side.
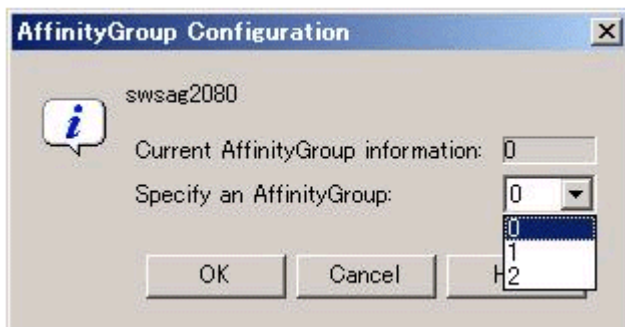
10. [Solaris OS server node (Agent available)] Enter the Target ID (X of Solaris OS special file /dev/rdsk/c?tXd?s?) corresponding to the access path. (The "Target ID Configuration" dialog appears only in an HBA-device environment in which Target IDs can be specified. If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z, the "Target ID Configuration" dialog is not appeared.)

    If a Fujitsu-made multipath disk control is used, specify 16 or a greater number for Target ID.

11. [Solaris OS server node (Agent available)] Enter the LUN used by the access path. (The "LUN Configuration" dialog appears only in an HBA-device environment in which LUNs can be specified.)

    At this time, information for LUNs already accessible from the server node is registered at the currently set LUN information place. If a new access path is set, no value is registered at this place. The LUN set in the zone on the selected storage side is registered as the initial value of "Specify a LUN".

    If a LUN is added in this step, the corresponding LUN is added to the /kernel/drv/sd.conf file on the server node. If a LUN is deleted, another path may be using the LUN. For this reason, this software does not automatically delete the LUN from the /kernel/drv/sd.conf file. To delete the definition, edit the /kernel/drv/sd.conf file on the server node side.
    In a hot system expansion environment of ETERNUS Multipath Driver 2.0.1 or later, or the multipath disk control (GR Multipath Driver, MPLB, MPHD, HDDV 2.2 or higher), contents of the sd.conf file are not modified. Specify TIDs and LUNs in the hddv.conf file for the multipath disk control. For details, refer to the handbook for HDDV 2.2 or higher.

    If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z, click the <OK> button without changing the initial value.
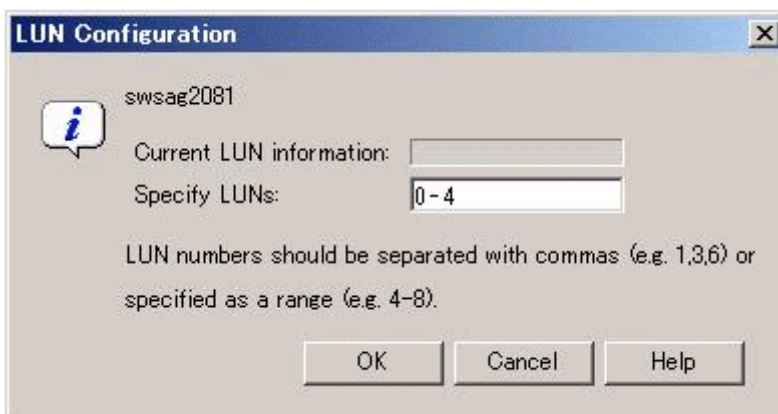
12. [For the Fibre Channel switch that is in no-zone status] If "Configure WWPN_Zoning on the switch when access paths are created." is selected when the Fibre Channel switch is registered with this software, a dialog opens to ask about whether to set zoning in the Fibre Channel switch. The security function of the Fibre Channel switch is used if zoning is set in a place without zoning. Note that operation of other active access paths is disabled by this security function. In such a configuration, it is recommended to stop operation of other access paths, and set the access paths again from this software. If "Do not configure WWPN_Zoning on the switch when access paths are created." is selected when the Fibre Channel switch is registered with it, the above dialog does not appear. To change "Do not configure WWPN_Zoning on the switch when access paths are created." to "Configure WWPN_Zoning on the

switch when access paths are created.", change the setting according to the property zoning information about the Fibre Channel switch.

13. Check access path information when it is displayed. If the displayed information need not be modified, click <OK> button. This software sets an access path for the device.

📑 Note

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If a storage area used in this access path setting is defined in another HBA, an area collision warning message is output. (Only the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 series, ETERNUS DX60/DX80 and the GR series provide this check mechanism on the storage side.) The access path setting is required if the storage area is defined from several HBAs in multipath disk control or on the cluster system. In other configurations, recheck the settings because data may have been corrupted.

. . . .

14. The message showing the normal end of the access path is displayed. Check the contents, and click the <OK> button.

15. In Solaris OS server nodes, the status of this access path is normal (Blue). In other OS server nodes, the status of this access path is normal (Green) or normal (Blue). At this time, a momentary HBA error causes the HBA to go to "warning!" status. From [View], execute [Refresh] and then verify that the latest status is effective. When setting several access paths simultaneously, perform step 6 and after to add the access paths. When an access path is set in Windows2000 or Windows2003, devices are automatically recognized according to the number of the LUNs set in the access path, and a device addition message is displayed. Alternatively, the device addition message may be output to the event log as Removable Storage. However, a prerequisite is that the device support plug&play. (ETERNUS/GR supports this function.)
For ETERNUS storage devices, "Host response" related to [Host worldwide name] of the preset host affinity is "00" for the ETERNUS3000 or "Default" for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS2000 and ETERNUS DX60/

DX80.

Change the "Host response" setting by ETERNUSmgr, if necessary. For details, refer to the related ETERNUS disk array manual.
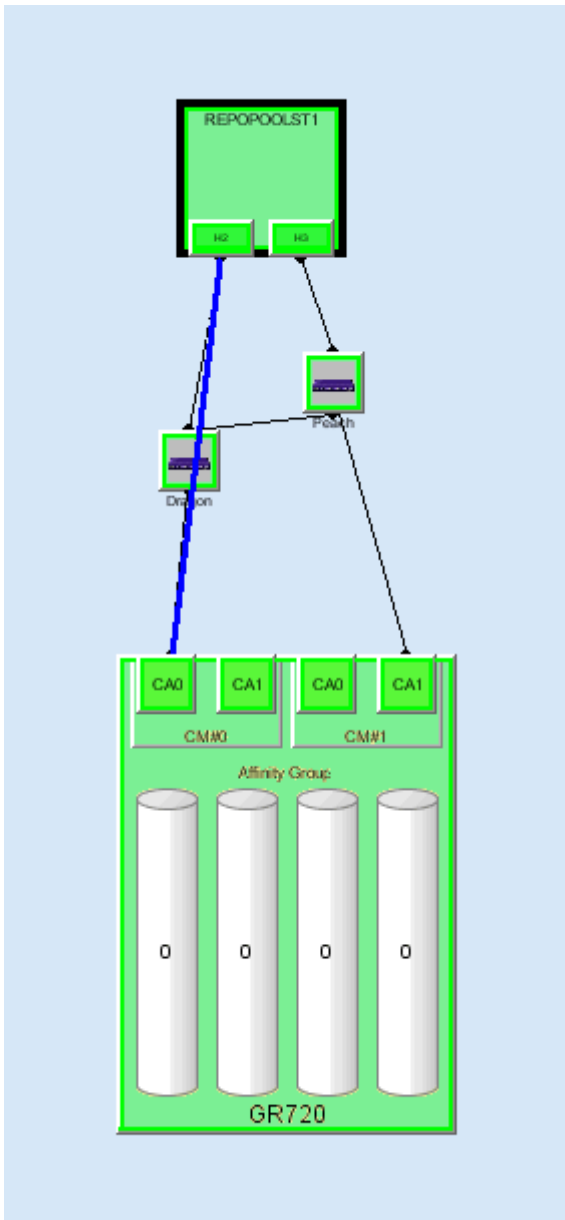
16. [Setting an access path for a tape in Solaris OS] Write information such as a LUN number in a configuration definition file (e.g., st.conf) for the target tape driver. If the HBA is the SN10-FC01 or FC64-1063, however, WWPN binding information must also be written. After the access path has been set, the following tape driver can display LUN information: st,ftla,fsct,IBMtape,mt,lb,sg.

17. [GR720, GR730 (version V11L21 or earlier), GR740, GR820, GR840 (version V03L52P1939 or earlier)] Restart the GR device. The device must be restarted to reflect the GR settings defined from this software. However, unspecified versions and some of the GR740, GR820, GR840 P19 versions (for these versions, contact Fujitsu) need not be restarted because the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 and ETERNUS DX60/DX80 series supports the hot system configuration setting reflection function.

18. [Under the hddvadm-M execution environment, where the hot system expansion function of multi-path disk control (ETERNUS Multipath Driver 2.0.1 or later, GR Multipath Driver 1.0.4 or later) has been set in the Solaris OS server node] Execute the command below on the target server node to enable the server node to recognize the storage device.

   - When PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F or SE0X7F12F is set as the access path for HBA, the driver validates the set information. Execute a command to change the hot system expansion properties of the driver. Execute the following FUJITSU PCI Fibre Channel driver command:

     ```
     # /usr/sbin/FJSVpfca/fc_config -v
     ```

     Note that the server must be rebooted for a FUJITSU PCI Fibre Channel driver that does not support this command. Use the following command to reboot the server node:

     ```
     # /usr/sbin/shutdown -y -i6 -g0
     ```

   - To automatically build a multipath device, execute the grmpdautoconf command. For details on the command, see the driver manual.

     ```
     # /usr/sbin/grmpdautoconf
     ```

     To automatically build a multipath device that uses the ETERNUS multipath driver and has a path passing through multiple Fibre Channel switches, execute the command after confirming path redundancy and specifying the "-X" option (because the grmpdautoconf command cannot check whether the redundancy of a path passing through multiple Fibre Channel switches is guaranteed).

     ```
     # /usr/sbin/grmpdautoconf -X
     ```

19. [On a Solaris OS server node with multipath disk control (GR multipath driver 1.0.3 or earlier, MPLB, MPHD, HDDV2.2 or later) and hot system expansion specified (hddvadm -M execution environment)] Execute the following command on the target server node so that the target server node recognizes the storage unit.

   - When PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F or SE0X7F12F is set as the access path for HBA, the driver validates the set information. Execute a command to change the hot system expansion properties of the driver. Execute the following FUJITSU PCI Fibre Channel driver command:

     ```
     # /usr/sbin/FJSVpfca/fc_config -v
     ```

     Note that the server must be rebooted for a FUJITSU PCI Fibre Channel driver that does not support this command. Use the following command to reboot the server node:

     ```
     # /usr/sbin/shutdown -y -i6 -g0
     ```

   - In Solaris 9 OS, hddv.conf is edited if needed (see the multipath disk control (GR Multipath Driver, MPLB, MPHD, HDDV) various driver manuals). The following command is executed on the server node to fetch a storage device.

     ```
     # update_drv -f hddv
     ```

   - If the Solaris OS version is other than the Solaris 8 OS and Target ID which is specified at this software access path setting is already defined (reserved) in hddv.conf file, execute the command below on the target host to fetch device information.

     ```
     # /usr/sbin/hddvadmdr
     ```

   - If the Solaris OS version is other than the Solaris 8 OS and Target ID which is specified at this software access path setting is not defined (not reserved) in hddv.conf file, write the target ID into hddv.conf and execute the command below on the target host to fetch device information.
     To reserve space for future expansion, during hddv.conf editing, remove the comment characters on the lines for the Target ID and LUN involved. Then, after the next reboot, hot system expansion is enabled without another reboot. If the Fibre Channel interface is used to reserve this space, specify 16 or a higher number for the Target ID. Make sure that the Target ID number is not the same as that in sd.conf.

     ```
     # touch /reconfigure
     # /usr/sbin/shutdown -y -i6 -g0
     ```

With the above setting, the hddv driver can recognize the logical storage unit. If necessary, execute the command that builds an extension path to the multipath instance or the command that configures the multipath instance. For information about the commands,

refer to the applicable driver manual (mplbconfig/iompadm add/iompadm new). After executing this driver command, click the multipath instance in the Server view. The extension path in addition to the existing path is highlighted. This indicates a correctly incorporated path.

20. [Under the hddadm-m execution environment, where the non-hot system expansion function of multi-path disk control (GR Multipath Driver, MPLB, MPHD, or HDDV) has been set in the Solaris OS server node or under the environment that does not use the multi-path disk control] Execute the following command on the target server node to enable the server node to recognize the device:

    If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z

    - Check the storage *Ap_id* using the cfgadm -al command, and make the OS recognize the LUN using the cfgadm -c configure *Ap_id* command. For details about the commands, check the man command.

    - Non-GR Multipath Driver, MPLB, MPHD, or HDDV environment (including the tape environment)

    ```
    # touch /reconfigure
    # /usr/sbin/shutdown -y -i6 -g0
    ```

    - GR Multipath Driver, MPLB, MPHD, or HDDV environment

    ```
    # touch /reconfigure
    # /usr/sbin/shutdown -y -i6 -g0
    # hddvadm -m (The required part of sd.conf is moved to hddv.conf, and the saved mphd.conf/
    mplb.conf file is restored.)
    # touch /reconfigure
    # /usr/sbin/shutdown -y -i6 -g0 (mphc.conf/mplb.conf is restored. The existing instances of
    various drivers (mplb/mphd/hddv) are built.)
    ```

    According to the environment, execute the command that builds an extension path to the multipath instance or the command that configures the multipath instance. For information about the commands, refer to the applicable driver manual (mplbconfig/iompadm add/iompadm new). After executing this driver command, click the multipath instance in the Server view. The extension path in addition to the existing path is highlighted. This indicates a correctly incorporated path.

21. [Solaris OS server node] Arrange the files in /dev/rdsk with # disks -C command.

22. [Windows] Restart the unit so that the device is recognized. Even if the device is automatically r ecognized by Windows 2000 or Windows 2003, Fujitsu recommends restarting the unit so that the device is recognized again.

23. [Linux server node] Restart the unit so that the device is recognized.

24. [HP-UX server node] Restart the unit to execute device recognition. After restart, check the connection of the device and search for the device file (for example, /dev/dsk/c5t1d0) with #ioscan -funC disk command. If the device file does not exist, create the device file by executing #insf-H <H/W pathname > -e command for H/W path in which the device file is not detected.

25. [Other server nodes] Perform operations for device recognition.

    When the operating system is VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later), reboot the VM host or execute "Rescan" for the HBA that the access path has been set by using VMware Infrastructure Client. For the using method of VMware Infrastructure Client, refer to "Access path management" of "Configuration management" in "4.1.7.2 VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later)".

26. Check the access path from this software.

    [For Solaris OS server node] /dev/rdisk/cXtXdX is created on the server node side. Note that executing [Refresh] from this software displays the access path. If it is possible to check that the LUN was recognized by the OS, the access path will change to normal (Green).

    (If the HBA is XSEFC401AF, XSEFC402AF, SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2 or SG-XPCI2FC-QF2-Z, it is not possible to check whether LUN is recognized by the OS. For this reason, the access path remains as Normal (Blue) and does not change.)

    [Windows server node] A device is generated on the server node side. Using the same method, you can also set access path specification by selecting the server node from storage.

[Linux server node] A device is generated on the server node side. Using the same method, you can also set an access path by selecting the server node from storage.

[HP-UX server node] A device is generated on the server node side. Using the same method, you can also set an access path by selecting the server node from storage.

🔔 Note

You can set an access path between server nodes (HBAs) and between storage systems (CAs) by performing drag&drop operations between ports in the Server node view. In such cases, the only action necessary is to set one-to-one WWPN zoning on the Fibre Channel switch. Therefore, one requirement is that WWPN zoning of the Fibre Channel switch can be set. The GUI window cannot display access paths between server nodes(HBAs) and between storage systems (CAs) in a diagram. Check the zoning information in Fibre Channel switch properties. Also, delete an access path according to this zoning information.

To define the GR740 configuration after setting an access path, read existing GR740 configuration definition information from the device, edit it, and transfer it to the GR side. If the existing information is not used on the GR740 side, security settings defined by this software may be overwritten.

6.3.4 Deleting an access path

This software can delete access paths set by it and access paths for which one-to-one WWPN zoning is set for Fibre Channel switches. It can delete access paths only in the Fibre Channel switch environment.

Such an access path can be deleted even if the access path state is Config miss Match. Select and delete the access path whose state is Config miss Match in the window.

Delete an access path for which one-to-one WWPN zoning is set for a Fibre Channel switch between server nodes (HBAs) or between storages (CAs) according to the zoning information in Fibre Channel switch properties.

The access path cannot be deleted to change the zone status of the switch to non-zoning (No Security). All the zoning settings of the switch are deleted when a user request to delete an access path is processed, this software creates a dummy zone. Although the loss of zone security as a result of deleting zoning can lead to inadvertent accessing of disk areas during operation, the dummy zone created prevents data destruction.

When changing the zone status of the switch to non-zoning (No Security), manually change the zone status of the switch to No Security. Note that this dummy zone will not be deleted even if access path addition processing is executed.

6.3.4.1 Preparations

Notes

- Only an administration account, whose authority level is "privileged administrator", can delete access paths.

- You cannot delete access paths defined during setup other than for setting one-to-one WWPN zoning such as port zoning, WWNN zoning, or multi-port WWPN zoning in a Fibre Channel switch. (Only the one-to-one WWPN zoning setting is valid in this software.) In such cases, delete a zone from the zone information of Fibre Channel switch properties, or log in directly to the Fibre Channel, and change the setup.

- Select [View] - [Refresh] from the menu or press [F5] key, and verify that all Fibre Channel switches cascaded to the Fibre Channel switch associated with the access path setting can be correctly recognized in the current status. Once an access path is changed because a Fibre Channel switch is temporarily disconnected from the cascade connection, the old cascade connection cannot easily be recovered. (In this event, execute the cfgClear command to delete zoning information for the Fibre Channel temporarily disconnected from the cascade connection. This enables cascade reconnection.)

- When deleting an access path that is configured in the FC routing functionality LSAN zone in this software, manually delete the LSAN zone in the device in advance.

Server node setting

- If Fujitsu multipath disk control mechanism or msdsm on the Windows server node, be sure to shut down the server node before deleting an access path. If an access path is deleted while the server node is in operation, a very long time is required to shut down the server node later because of the operation of Windows path detection logic.

- To delete the access path of Fujitsu multipath disk control mechanism or msdsm on the same server node as the admin server from this software, shut down the admin server, disconnect the FC cable from the access path to be deleted, restart the admin server, and delete the access path.

- For Unix, execute umount for the access path to be deleted.

Physical removal

- When ETERNUS Multipath Driver 2.0.1 or higher is used and the access path to be deleted is physically connected to a Fibre Channel switch for which no zone is set, physically remove the access path in advance such as by disconnecting the cable for which access path deletion is to be executed.

6.3.4.2 Setting

Delete a set access path. You can also delete the access path whose state is [Config miss Match] (incorrectly set access path).

1. [Solaris OS (GR Multipath Driver, MPLB, MPHD environment)] Release the multipath setting.

   Refer to the relevant driver's manual for information on the command and command parameters.

   - If GR Multipath Driver or MPLB 2.2 and higher, execute the following command:

     # mplbconfig (arguments are required, -d option)

   - If MPLB 2.1 and former or MPHD, execute the following command:

     # iompadm (arguments are required , destroy option)

     MPLB2.1 or earlier and MPHD do not support the commands that add and remove paths. Delete the multipath instance by using the above command (iompadm destroy).

2. [Solaris OS (GR Multipath Driver, MPLB, MPHD, HDDV environment)] Release HDDV.

   When the hot system expansion function of server node is disabled, execute the following commands:

   # hddvadm –i

   hddv.conf is moved to sd.conf, and the mphd.conf/mplb.conf file is saved.

3. [Windows] If Fujitsu multipath disk control mechanism or msdsm is set, shut down the Windows server node. If the Windows server node is active in this environment, this software suppresses access path deletion.

4. In this software, click the target access path, and select [Operation] - [Access Path] - [Delete] from the menu. Alternatively, click the target access path to select it, right-click it, and then, select [Access Path] - [Delete] from the pop-up menu.

5. Select the displayed access path to be deleted. Then, click the <OK> button to confirm deletion and delete it. (When an access path used for Windows 2000 or Windows 2003 is deleted, a warning message appears as many times as the number of LUNs set for the access path.)

6. [Solaris OS (Agent available)] After the access path has been deleted, its state may remain Config miss Match (yellow) until the server node is restarted. (If WWPN binding is set on the server node)

7. [ETERNUS Multipath Driver 2.0.1 or higher] Execute the grmpdautoconf command to implement path removal.
   (For details of the command specifications, see the *ETERNUS Multipath Driver User's Guide.*)

   # /usr/sbin/grmpdautoconf -d

> 📋 **Note**
>
> ···
>
> If the HBA is the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F, the port property described in /kernel/drv/fjpfca.conf may be deleted by executing the grmpdautoconf command. After executing the grmpdautoconf command, reset the property as needed. For details on the setting contents, see "4.1.1 Solaris OS server node (host)".
>
> ···

8. [GR720, GR730 (version V11L21 or earlier), GR740, GR820, GR840 (version V03L52P1939 or earlier)] Restart the GR device. The device must be restarted to reflect the GR settings defined from this software. However, unspecified versions and some of the GR740, GR820, GR840 P19 versions (for these versions, contact Fujitsu) need not be restarted because the GR side supports the hot system configuration setting reflection function.

9. [Solaris OS] Follow the procedure below so that the server node recognizes the storage unit.

In the hot system expansion (hddvadm -M) environment of ETERNUS Multipath Driver 2.0.1 or higher, GR multipath driver, MPLB, MPHD, or HDDV, execute the command shown below. After path removal, the server must be restarted to enable the Fibre Channel card definition of the server node.

```
# /usr/sbin/shutdown -y -i6 -g0 (restarts the server)
# disks -C  (execute with Solaris 7 OS or higher)
```

In an environment using the GR multipath driver, MPLB2.2 or later, MPHD, and HDDV with non-hot system expansion or normal specified (hddvadm -m), execute the following operations:

- If the deleted target ID is not used in the sd.conf file, edit sd.conf to delete the target ID. (Do not delete it if it is used by another device.)

- #touch /reconfigure

- # /usr/sbin/shutdown -y -i5 -g0

- Start it in single user mode.

- # hddvadm -m (The required part of sd.conf is moved to hddv.conf, and the saved mphd.conf/mplb.conf file is restored.)

- #touch /reconfigure

- #/usr/sbin/shutdown -y -i6 -g0 (Instances for each driver (mplb/mphd/hddv) are configured when the definition file is restored.)

- # disks -C (execute with Solaris 7 OS or higher)

In an environment using MPLB2.1 or earlier

- If the deleted target ID is not used in the sd.conf file, edit sd.conf to delete the target ID. (Do not delete it if it is used by another device.)

- #touch /reconfigure

- # /usr/sbin/shutdown -y -i5 -g0

- Start it in single user mode.

- # hddvadm -m (The required part of sd.conf is moved to hddv.conf, and the saved mphd.conf/mplb.conf file is restored.)

- #touch /reconfigure

- # /usr/sbin/shutdown -y -i6 -g0

- # disks -C (execute with Solaris 7 OS or higher)

- Reconfigure the multipath by using the new #iompadm command.

In an environment where neither the hard disk driver (HDDV) nor multipath control (GR multipath driver, MPHD MPLB) is used

- #touch /reconfigure

- # /usr/sbin/shutdown -y -i6 -g0

- # disks -C (execute with Solaris 7 OS or higher)

10. Check the access path from this software.

11. [Windows] Restart the device.

12. [Linux] Restart the device.

13. [HP-UX] Restart the device.

14. [Other server nodes] Perform operations for device deletion recognition.

   When the operating system is VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later), reboot the VM host or execute "Rescan" for the HBA that the access path has been set by using VMware Infrastructure Client. For the using method of VMware Infrastructure Client, refer to "Access path management" of "Configuration management" in "4.1.7.2 VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later)".

· Storage affinity (WWPN binding) is deleted but LUN settings of the related /kernel/drv/sd.conf file are not deleted in consideration of security. If a definition must be deleted, edit the /kernel/drv/sd.conf file directly on the server node side.

6.3.5 Access path inheritance

This software sets WWPN-based security settings on a device to form an access path. However, when the faulty part such as an adapter (controller) is replaced, the WWPN name may be changed because it is unique.

Devices whose WWPNs are changed when the faulty part such as an adapter (controller) is replaced: All HBAs and bridges such as the LT120, LT130, LT160 and LT230.
Devices whose WWPNs are not changed when the faulty part such as an adapter (controller) is replaced: The ETERNUS series, GR series, LT250, LT270, and Symmetrix, etc.

Operation can be performed as is if WWPNs are not changed. If WWPNs are changed because an adapter (controller) is replaced, security functions of the WWPNs constituting the access path must be changed to those of new WWPNs. This operation is defined as "access path inheritance" and it provides a function that automatically reconfigures the WWPN security settings managed by this software.

🔔 Note
. . . .
When access path inheritance is executed, a host response of the ETERNUS Disk storage system is reset to the default configuration.Therefore, set the host response again by ETERNUSmgr after executed access path inheritance in the changed host response environment.

Although when a new host bus adapter is registered with ETERNUS Disk storage system and set a host response for the host bus adapter by ETERNUSmgr before executing access pass inheritance, the host response is used.
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🔖 See
. . . .
For Replacement of the parts of supported device and access path inheritance, refer to "8.3 Replacement of the Parts of Supported Device".
. . . .

6.3.6 Zoning editing of a Fibre Channel switch

This software uses one-to-one WWPN zoning in general access path setting. Also, it provides a function that checks for the type of zoning is set on the Fibre Channel switch. If an unused zoning setting remains after a device is deleted because of an undeleted access path, this window can be used to delete the unused zoning setting.

"Zoning Information" displayed in Fibre Channel Switch property serves this function.

The zone name set in the Fibre Channel switch and the WWPN defined in the zone name are displayed as these properties.

If one-to-one zoning is set, two WWPNs exist under one zone name. If zoning is set based on several WWPNs and port information, WWPN information where simultaneous both-way access is possible is displayed under the zone name.

You can delete a zone displayed next to the Delete check box directly by checking the check box and clicking the <Delete the checked zoning information> button.

6.3.7 To manage Fibre Channel switch that has already set in port zoning

One-to-one WWPN zoning setting is recommended in this software to realize the complete zoning security management as described in "4.2.1 SN200 (Brocade) Fibre Channel switch", though port zoning is possible to be performed. The procedure to change into one-to-one WWPN zoning setting is as follows.

1. Confirm that all the monitored devices are connected with all the switch ports.

2. It is necessary that the sanma.conf file must be changed. Refer to "C.2 sanma.conf Parameter" and specify 1 in SET_SW_ZONING_ALWAYS.

   By selecting [Tool] - [Option] - [Re-read Definition File] from the menu or restarting the administrative Manager operates to cause the change to be reflected the contents of this file.

3. Display "Zoning Information" shown in Fibre Channel Switch property.

4. Open host server or storage side view based on port zoning information.

P Point
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If a host node name or a storage name in "Zoning Information" displayed in Fibre Channel switch property is not shown, register the device connected with Fibre Switch Port by using manual embedding function.
....

5. Select access path and execute [Access Path] - [Connect].
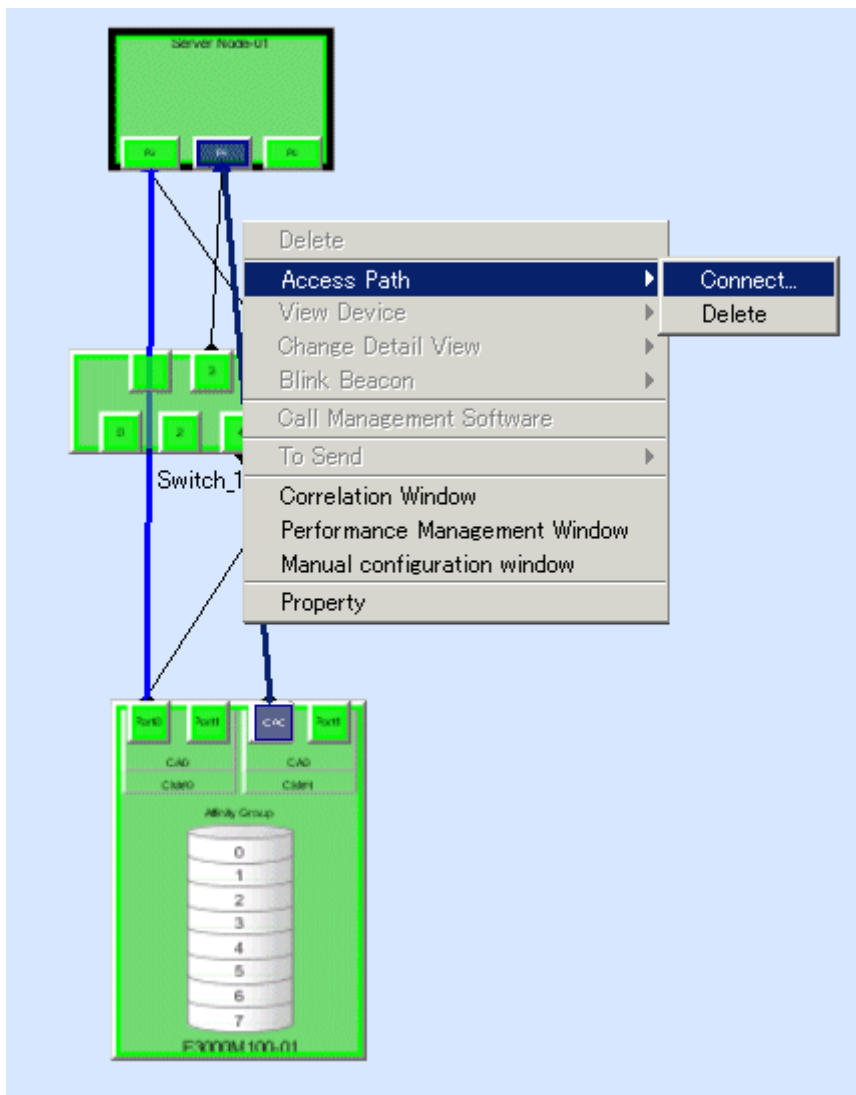
6. Display "Zoning Information" of Fibre Channel switch again after normally finishing the access path setting.
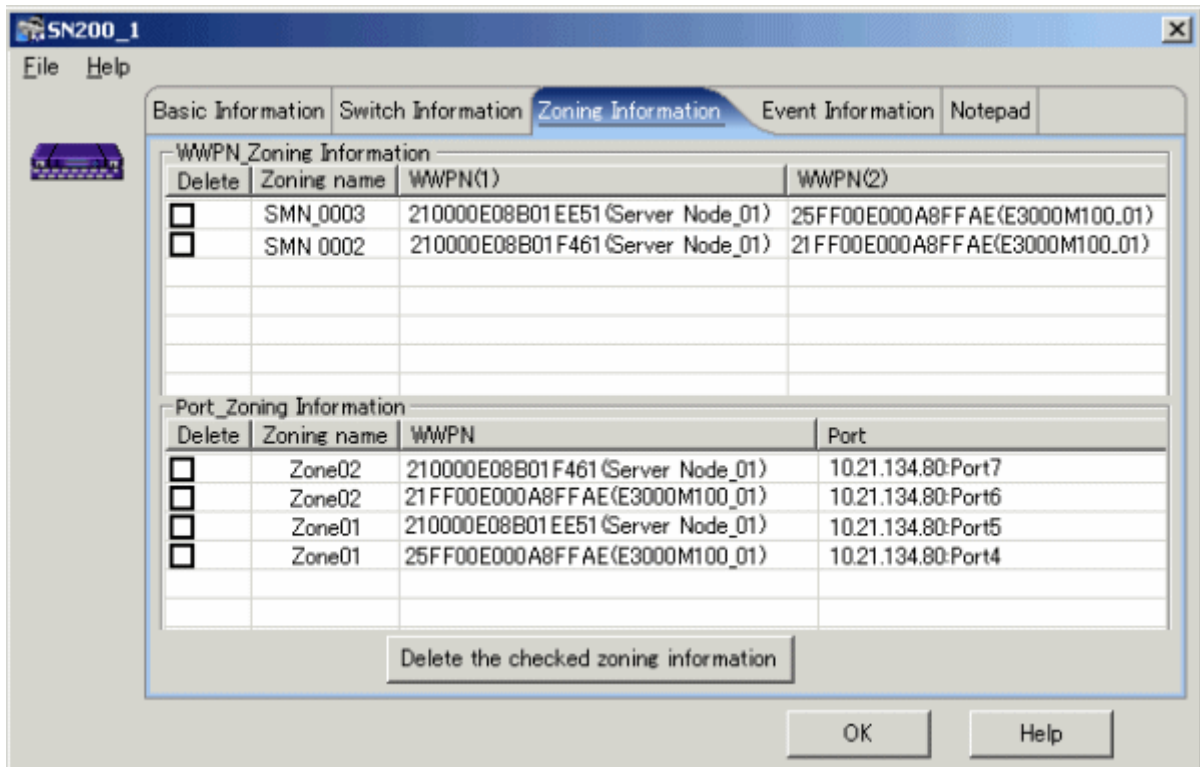
7. Confirm that the same contents of WWPN zoning as those of port zoning is displayed and delete the specified port zoning.
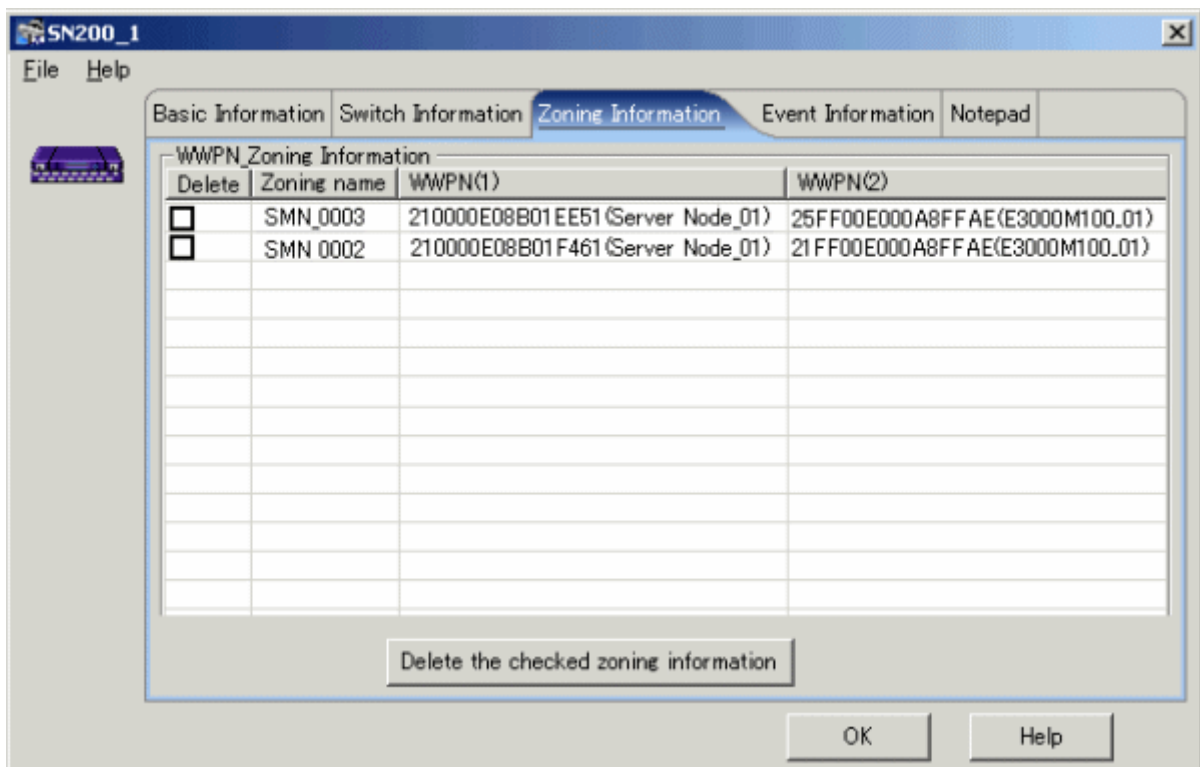
📝 Note

If the multiple port zoning setting is executed, remember not to delete the multiple port zoning until WWPN zoning relevant to each other is set.
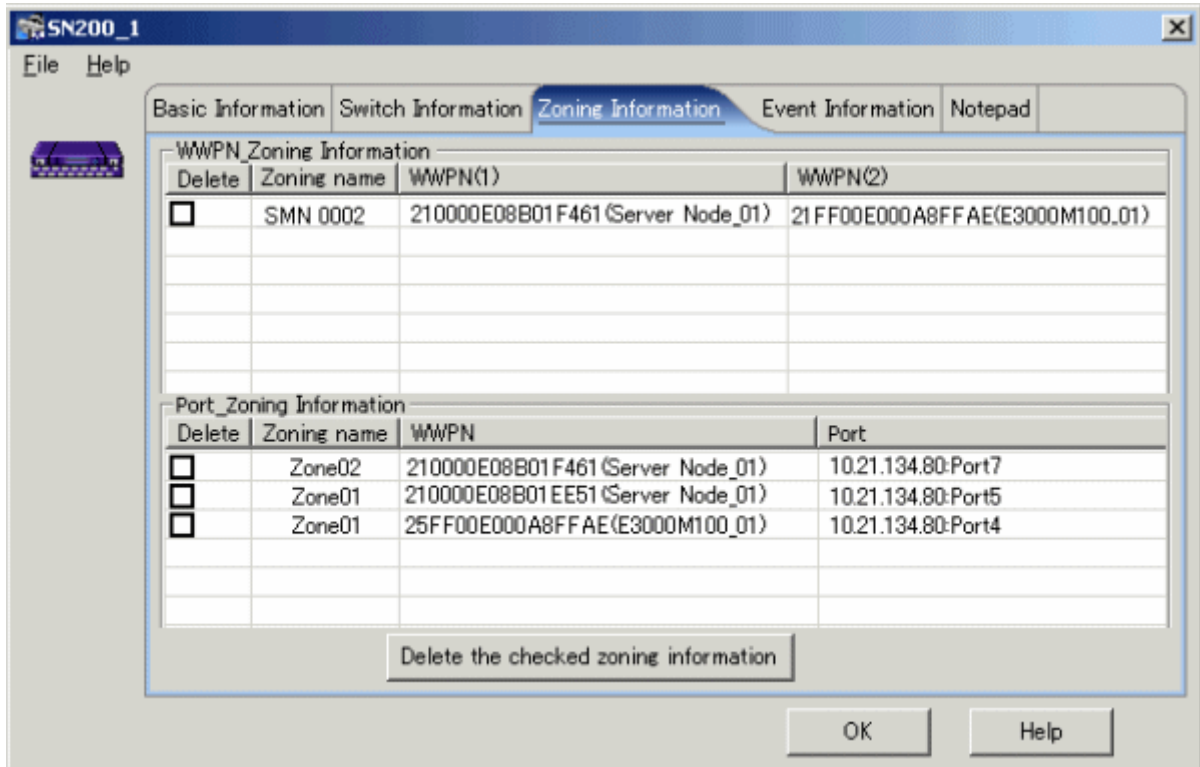
8. Repeat the procedure from steps 3 to 7.

9. If necessary, return the setting that is executed in step 2 to the former setting.

To change the zoning setting can be executed in zone administration window in WEBTOOLS in Fibre Channel switch and by Telnet function.

P Point

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The change to the zoning settings is performed on a Fibre Channel switch equipped with the latest firmware in the fabric (all of the Fibre Channel switches in the cascading connection) that contains the Fibre Channel switch selected when this properties window is opened.

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6.4 Event Display and Linkage

This software receives and decodes an SNMP Trap that is sent from a device, and handles a device status change as an event for managing device errors.

The event is created based on the contents of SNMP traps and user settings.

The processing described below is performed for generated events.

- Displaying event logs

- Displaying device events

- Systemwalker Centric Manager linkage

- Shell/Bat linkage

- External script linkage

As for the following event, this software only displays event logs and device events (as for some events only event logs are displayed), and other processing are not performed.

- Events by user operations (all the events in "Chapter 1 Events Related to Operation of This Product " in " ETERNUS SF Storage Cruiser Event Guide")

- Trap events common to devices (the trap common to devices in "Chapter 2 Events in Notifications Sent from Monitored Devices " in " ETERNUS SF Storage Cruiser Event Guide")

- Start of performance data re-collection/Success of performance data re-collection event (Success of performance data re-collection, Success of performance data re-collection in "2.8 Explanation of Performance Management Traps" in "ETERNUS SF Storage Cruiser Event Guide")

- Event that indicates when the state changes into error(red) in the device polling function ("When the state changes into error(red)"in the device polling function "Chapter 3 Device Polling Event" in " ETERNUS SF Storage Cruiser Event Guide")

🛅 See

For detailed information on how to customize SNMP Trap processing, see "Appendix C Customization".

Displaying event logs

Generated events are displayed in the event log of Client. To display the event log, select [View] - [Show/Hide] - [Event Log] from the menu, and select Show/Hide. Events are displayed shown as below.

Displayed items and descriptions	details
Status	Displays the level of a displayed event.
Date	Displays time and date event occurred in Month DD, YYYY HH:MM:SS AM (or PM).
Device Name	Displays the name of a device on which the event occurred. This may not be displayed for events by user operations.
Monitor	Indicates the name of the admin server that detected the monitor event. An example of display names for each administrative Manager is as follows: Name for ETERNUS SF Storage Cruiser ----- SSC
Event ID	Displays this ID when the event has the corresponding ID. This ID is defined in the administrative Manager that is monitoring the event.
Event Information	Indicates event details. Refer to ETERNUS SF Storage Cruiser Event Guide for the detail information.

A displayed example of an event log is shown below. One line of an event log can be copied in the clipboard. By this function, event log information can be attached to E-mail text to be sent.

The procedure is as follows:
Select the event log to copy, and display the pop-up menu and execute [Copy EventLog to ClipBoard]. This execution enables the event log information to be copied in the client clipboard.

Status	Date	Device Na...	Monitor	EventID	Event log Information
Info	Oct 8, 2003 3:40:23 PM	Swich1	SSC		Add switch
Info	Oct 8, 2003 3:43:48 PM	Switch2	SSC		Add switch
Info	Oct 8, 2003 3:47:06 PM	Switch2	SSC		Set SNMP Trap Transmission Address 1(
Warning	Oct 8, 2003 3:49:33 PM	GR740-0001	SSC		Connection Timeout

Displaying device events

Generated events are displayed as device events of Client. Users can check for device events from "Property" for a device.

Systemwalker Centric Manager linkage

Also, generated events are reported to Systemwalker Centric Manager. For information on settings required in advance, see "10.2 Linkage with Systemwalker Centric Manager". The importance levels of the events are also reported.

> 📘 **Note**
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>
> Events of the server node agent is not reported to Systemwalker Centric Manager. (Shell/Bat linkage is operated.) Execute fault monitoring by message monitoring function of Systemwalker Centric Manager.
>
> ....

Shell/Bat linkage

A generated event is specified in the call argument of the Shell file, such shown as below.

Platform of Manager	File name (full path)
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\trapop.bat arg1 arg2 arg3 arg4 arg5 arg6 ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/trapop.sh arg1 arg2 arg3 arg4 arg5 arg6

> The "arg1" is the fault detail for the target device.
> The "arg2" is the IP address for the target device.
> The "arg3" is the server node name (FQDN) for the target device (if the full domain name cannot be confirmed, the IP address is set).
> The "arg4" is the number of milliseconds that have elapsed from 00:00:00 GMT 01 Jan 1970 ("zero") to the current time.
> The "arg5" is the fault level ("INFO", "WARNING"," ERROR").
> The "arg6" is the icon name for the target device.

Rewriting the content of these shell/bat files enables the e-mail linkage of fault information or other Management Software linkage (such as issuing commands to Management Software and writing information to a log file managed by Management Software).

Sample Shell/Bat files are installed in the directories shown below. Copy this sample and create Shell/Bat files for linkage.

Platform of Manager	File location
Windows	$ENV_DIR\Manager\opt\FJSVssmgr\lib\sample\trapop.bat ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/lib/sample/trapop.sh

If the Shell/Bat linkage function is not used, there is no need to create these Shell/Bat files.

External script linkage

Any external script other than trapop.sh/trapop.bat of Shell/Bat linkage can be executed. Up to two scripts can be defined in each SNMP Trap XML definition file. Arguments for calling such scripts are common to those for Shell/Bat linkage.

For information about the methods for defining, see "C.6 SNMP Trap XML Definition File".

> 📘 **Note**
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>
> · External script linkages must be defined in the SNMP Trap XML definition file. Therefore, they are not available on devices where XML definition files are not provided.
>
> · For shell scripts or batch files in Shell/Bat linkages or external script linkages, do not output processing results and processing progress on the screen (for example, do not perform such a process as displaying a message with the echo command). Be sure to describe "@echo off" at the head under Windows.
>
> ....

Users can customize the displaying of events and descriptions of linkage for individual SNMP Traps. For details, see "C.6 SNMP Trap XML Definition File".

The following is an example of each Shell/Bat file.

- trapop.sh sample for Solaris OS and Linux

  The events of this software are reported by mail. (This requires the SMTP server and Manager to be running on the admin server. The path of the mail command may differ from the sample. Change it so that it is appropriate for the operating environment.)

```
#!/bin/sh
#HOSTNAME=`/bin/hostname`
#MAILCMD=/bin/mail#TMP_FILE=tmp_mail_file.$4
#
#echo "To: $MAILADDRESS" > $TMP_FILE
#echo "Subject: SAN manager($HOSTNAME) event mail" >> $TMP_FILE
#echo "" >> $TMP_FILE
#echo "---------------------------------" >> $TMP_FILE
#echo " Storage System manager event mail " >> $TMP_FILE
#echo "---------------------------------" >> $TMP_FILE
#echo $1 >> $TMP_FILE
#
#$MAILCMD $MAILADDRESS < $TMP_FILE
#/bin/rm -f $TMP_FILE
```

After defining the setting in trapop.sh as described above, executing grtraptest command which is described in "[Test 3] Check Systemwalker Centric Manager linkage and Shell/bat linkage of events." in "5.3 Checking Management Status" transfers mail to a destination. Therefore, whether it is possible to link with Shell/Bat can be confirmed by generating SNMP Trap.

```
---------------------------------
  Storage system manager event mail
---------------------------------
UX;SSC: ERROR: swsag4402:CM FAN(0x330000) degraded in
MONTEREY(GR720(GR72A2)[11.22.33.44])
```

The first two characters indicate the OS of the server on which SAN resource management is operating.
"UX"=UNIX   "AP"=WINDOWS

- Sample of trapop.bat for Windows

  The event of this software is notified by mail. (To actually operate, an UNIX system server with sendmail that supports the SMTP protocol or a Windows Server that support standard SMTP service is necessary.)

```
@echo off
rem ## CAUTIONS ##  Please do not comment out or delete the line of "@echo off"

rem set INSTALL_DIR=install-dir                 <- Write the install DIR
rem set MAIL_SERVER_ADDRESS=mail@server.address    <- Write the address of mail server
rem set MAIL_FROM=StorageManager                <- Write the mail address of the sender
rem set MAIL_TO=your@e-mail.address             <- Write the mail address of the receiver

rem cd %INSTALL_DIR%\etc\opt\FJSVssmgr\current
rem set STXSMAIL=stxsmail.exe
rem set TMP_FILE=tmp_mail_file.%4

rem echo From: %MAIL_FROM% > %TMP_FILE%
rem echo To: %MAIL_TO% >> %TMP_FILE%
rem echo Subject: Storage system manager(%COMPUTERNAME%) event mail >> %TMP_FILE%
rem echo.>> %TMP_FILE%
rem echo --------------------------------- >> %TMP_FILE%
rem echo  Storage system manager event mail  >> %TMP_FILE%
rem echo --------------------------------- >> %TMP_FILE%
rem echo %1 >> %TMP_FILE%

rem set MAILCMD=%STXSMAIL% %MAIL_SERVER_ADDRESS% %TMP_FILE%
```

```
rem %MAILCMD%
rem del %TMP_FILE%
```

Event information can be sent by starting the stxsmail program with the mail client function in the Bat file.

To edit this Bat file properly, please refer to "Appendix E Mail client function program with the Windows Version of Manager (stxsmail)" for details.

Execute "[Test 3] Check Systemwalker Centric Manager linkage and Shell/bat linkage of events." of "5.3 Checking Management Status" with the above setting, the mail as below is forwarded to the destination mail address. By this way, the Bat linkage can be confirmed.

```
---------------------------------
  Storage system manager event mail
---------------------------------
UX;SSC: ERROR: swsag4402:CM FAN(0x330000) degraded in
MONTEREY(GR720(GR72A2)[11.22.33.44])
```

The first two characters indicate the OS of the server on which SAN resource
management is operating.
"UX"=UNIX   "AP"=WINDOWS

P Point

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To perform Systemwalker Centric Manager linkage, Shell linkage, or external script linkage, either register the IP address and host name information for each device in the DNS server that is referenced by the administrative server, or define them in the /etc/hosts file on the administrative server so that the names of the devices registered in this software can be resolved.

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6.5 Revolving Light Icon

The flasher icon is displayed on the upper right corner of the resource management or Side view to inform that information on a device registered with this software was updated.

The dialog is displayed when lighting revolving light icon is clicked, the device status is updated to latest information when <OK> button is selected, and the latest state of the device is displayed on the screen.

Moreover, the trouble level can be distinguished by the color of revolving light.

Displaying revolving light icon

Display revolving light icon on the status bar(under of the window) on the upper right corner of the resource management view or Side view.
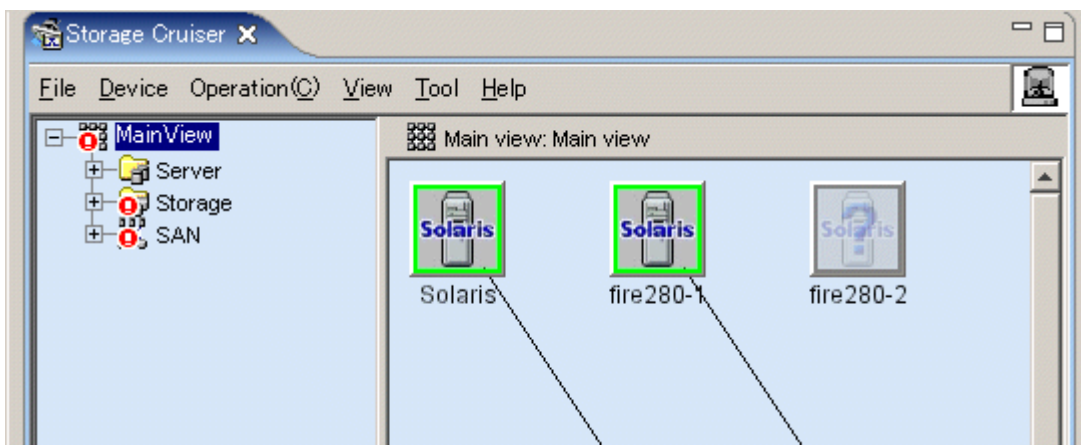
Color of revolving light icon

Revolving light icon is displayed the state change of the device in red, yellow and green and notifies the event level. When the state of the device is changeless, it displays it in the gray.

For information about details and color of revolving light icon, see "Table 6.2 Revolving light icon state", in "6.1.1 Main view".

Updating to latest information

The dialog is displayed when revolving light icon is clicked, the device status is updated to latest information when <OK> button is selected, and the latest state of the device is displayed on the screen.
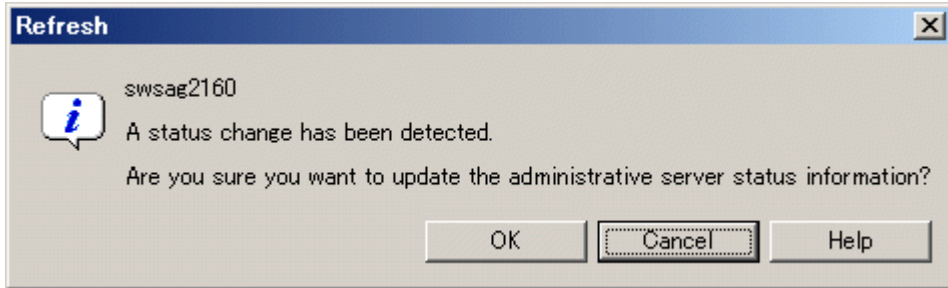
When <Cancel> button is selected, the update process to latest information is not done. Update to latest information by either of the following methods:

- Click revolving light icon again and display dialog and select <OK> button.

- Select [View] - [Refresh].

- Press the [F5] key.

When the <Help> button is selected, the pertinent message of Message Guide is shown.

Priority of Revolving light icon lighting

Revolving light icon lights in order with high event level.

Event level	low ------------------------> high
Color	gray -> green -> yellow -> red

For example, revolving light icon lights in red when the event at the trouble level is generated when Revolving light icon lights in yellow.
Revolving light icon lights in red when the event at the information level is generated when Revolving light icon lights in red.

6.6 Thin Provisioning management

This product can manage storage capacity virtualization operations that use the Thin Provisioning function of the ETERNUS disk storage system. The functions below are provided.

Threshold monitoring

This function monitors the threshold values for the Thin Provisioning Pool capacity used. It can also change the threshold values.

Capacity management

This function displays graphs showing the Thin Provisioning Pool capacity and changes in the capacity used.

This product provides the following two methods for starting Thin Provisioning at a disk storage system:

・ Device registration of a disk storage systems where the Thin Provisioning function has been enabled

・ Enabling the Thin Provisioning function at a disk storage system that is already registered as device, and then selecting [View] - [Refresh] from the menu bar

For storage systems where Thin Provisioning management has been started, a "T" mark is displayed with the device icon as shown below.

Figure 6.5 Example of "T" mark display on the Main view

Figure 6.6 Example of "T" mark display on the side view
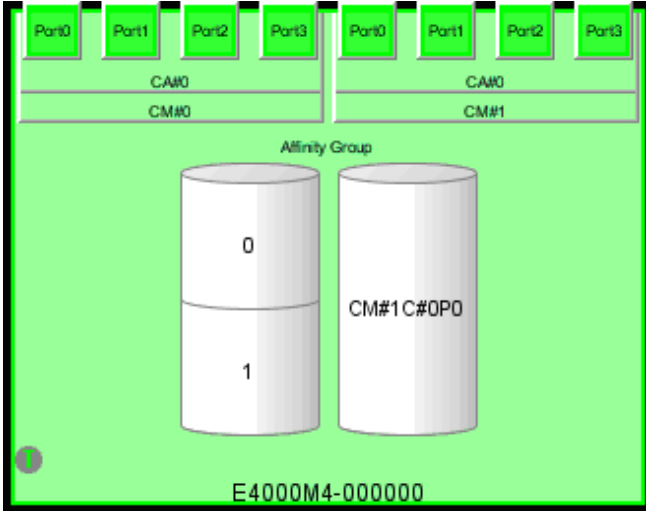
The "T" mark indicates the Thin Provisioning Pool Threshold monitoring status.

"T" mark color	Explanation of status
Green	Normal For all Thin Provisioning Pool, the capacity used is less than the "Caution threshold value".
Yellow	Caution There is a Thin Provisioning Pool where the capacity used is less than the "Warning threshold value" but greater than or equal to the "Caution threshold value".
Red	Warning There is a Thin Provisioning Pool where the capacity used is greater than or equal to the "Warning threshold value".

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For detail on the monitoring status of Thin Provisioning Pool threshold values, refer to "6.6.1 Threshold monitoring".

Thin Provisioning Pool monitor window

This window is used for monitoring Thin Provisioning Pool threshold values and managing capacity. To display this window, select [File] - [Thin Provisioning Pool monitor window] from any of the views in the Resource management window.

📚 See

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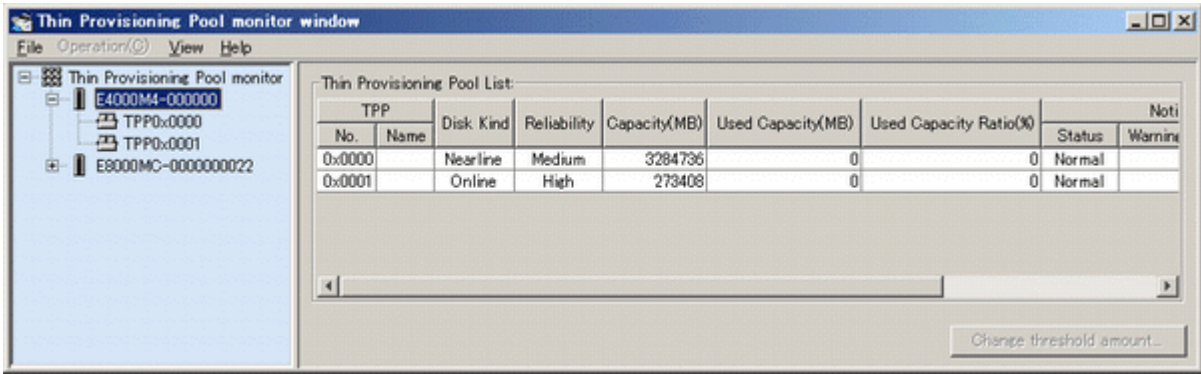
For the contents displayed in the Thin Provisioning Pool monitor window, refer to "B.11 Thin Provisioning Pool monitor window operations".

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6.6.1 Threshold monitoring

The Thin Provisioning Pool monitor window monitors the threshold values for Thin Provisioning Pool capacity usage.

Threshold values and Threshold monitoring status

When a device is selected from the tree in the Thin Provisioning Pool monitor window, the values of the "Caution threshold value" and the "Warning threshold value" set for each Thin Provisioning Pool and the Threshold monitoring status are displayed in a table. The "Caution threshold value" and the "Warning threshold value" are prepared at the disk storage system, and are the threshold values for Thin Provisioning Pool capacity usage. The Thin Provisioning Pool Threshold monitoring status depends on the capacity used, as displayed in the table below. The icons indicating the Threshold monitoring status are displayed in the tree and in the TPP part of the table.

Threshold monitoring status	Icon	Explanation of status
Normal	None	The Thin Provisioning Pool capacity used is less than the "Caution threshold value".
Caution	⚠️	The Thin Provisioning Pool capacity used is less than the "Warning threshold value" and greater than or equal to the "Caution threshold value".
Warning	🛑	The Thin Provisioning Pool capacity used is greater than or equal to the "Warning threshold value".

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- The information displayed in the Thin Provisioning Pool monitor window was current at the time it was fetched from the disk storage system. To refresh information, in the Thin Provisioning Pool monitor window, select [View] - [Refresh].

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For details on the Thin Provisioning Pool monitor window, refer to "B.11.1 Thin Provisioning Pool monitor window".

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Threshold value settings

The initial values for the "Caution threshold value" and the "Warning threshold value" are set by the disk storage system when a Thin Provisioning Pool is created. If required, change the settings for the capacity threshold values.

Procedure for setting threshold values

1. In the Resource management window menu, select [File] - [Thin Provisioning Pool monitor window].

2. In the tree of started Thin Provisioning Pool monitor window, select the device where the Thin Provisioning Pool is registered, then in the table, select the Thin Provisioning Pool (multiple Thin Provisioning Pool can be selected - in this case all selected Thin Provisioning Pool will have the same threshold value).

3. Start the dialog box for changing the notification threshold values in one of the following ways:

   - In the Thin Provisioning Pool monitor window menu, select [Operation] - [Change threshold amount].

   - In the Thin Provisioning Pool monitor window, click <Change threshold amount> button.

4. In the dialog box, enter values at "Warning (%)" and "Caution (%)", then click <OK>. The value can be selected by selecting the [Both], [Warning only], or the [Caution only] button.

See

For details on the dialog box for changing notification threshold values, refer to "B.11.5 Dialog for changing notification threshold values".

Action to take when threshold values are exceeded

If threshold values are exceeded, then follow the procedures below:

- Detection of status change

  When a threshold value is exceeded, the product receives an SNMP Trap that notifies it of the change in Thin Provisioning Pool status at the disk storage system, and displays the status change in the event log.

  In addition, the "T" mark on the icon in the Resource management window for the disk storage system changes to the color that indicates the Thin Provisioning Pool status.

- Refreshing

  Check the event display and then select [View] - [Refresh] in the Resource management window to obtain the latest information from the device. If the Thin Provisioning Pool monitor window is open, then select [View] - [Refresh] in the Thin Provisioning Pool monitor window.

- Checking the status from the Thin Provisioning Pool monitor window

  Start the Thin Provisioning Pool monitor window and check the Thin Provisioning Pool status. Extend disks or take other action in accordance with the exceeded threshold values.

See

If the SNMP Trap that notifies of changes in the Thin Provisioning Pool status is not received due to packet loss or other reason, then the product detects the change by polling the Thin Provisioning Pool information of the disk storage system. Since the polling interval is one hour, the time from status change to detection is within one hour. The polling intervals can be customized. For details, refer to "C.13 Polling Service Setting File".

Note

When a Thin Provisioning Pool is selected from the tree on the Thin Provisioning Pool monitor window, the screen displays the values set for the "Caution threshold value" for each logical volume and the Threshold monitoring status. The threshold values are provided at the disk storage system and relate to the logical volume capacity that is not yet allocated. The logical volume Threshold monitoring states depend on the capacity not yet allocated, as shown below. Icons indicating the Threshold monitoring status are displayed for the logical volumes in the table.

Threshold monitoring status	Icon	Explanation of status
Normal	None	The unallocated capacity of the logical volume is less than the "Caution threshold value".
Caution	⚠	The unallocated capacity of the logical volume is greater than or equal to the "Caution threshold value".

- Changes in the Threshold monitoring status of logical volumes do not affect the color of the "T" mark on disk storage system icons in the Resource management window.

- This product does not display an event when logical volume threshold values are exceeded.

- This product cannot set logical volume threshold values.

6.6.2 Capacity management

Changes in the Thin Provisioning Pool capacity must be understood in order to draw up plans for adding disks that suit the usage circumstances. The Capacity management window displays graphs of changes in the Thin Provisioning Pool capacity and the capacity used, now and in the past. This enables users to know when to add physical disks to the Thin Provisioning Pool, and simplifies the revision of threshold value settings.

The Capacity management window is started from the Thin Provisioning Pool monitor window.

Start procedure for Capacity management window

1. In the Resource management window menu, select [File] - [Thin Provisioning Pool monitor window].

2. In the started Thin Provisioning Pool monitor window, select the Thin Provisioning Pool in one of the following ways:

   - In the tree, select the Thin Provisioning Pool.

   - In the tree, select the device that has registered the Thin Provisioning Pool, then in the table, select the Thin Provisioning Pool(multiple Thin Provisioning Pool can be selected).

3. Start the Capacity management windows in one of the following ways:

   - In the Thin Provisioning Pool monitor window menu, select [Operation] - [Capacity management window].

   - If selecting the Thin Provisioning Pool in the tree, right-click and in the context menu, select [Capacity management window].

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For details of the Capacity management window, refer to "B.11.6 Capacity management window".

See

Values displayed on the graph are obtained by the polling service at one o'clock every day. The polling execution time can be customized. For details, refer to "C.13 Polling Service Setting File".

Chapter 7 Performance Management

7.1 Overview

This software supports performance management functionality for fibre channel switch and ETERNUS disk storage systems. This functionality enables users to get details about the operation and load statuses of devices. However, this software does not support performance management functionality in relation to the ETERNUS disk storage system main frame volume, MVV, SDV, Thin Provisioning Volume and RAID Group used by Thin Provisioning Pool.

Additionally, by knowing the number of active disks, it is possible to verify the Eco-mode status of the ETERNUS disk storage system.

The performance information can be referenced using Systemwalker Service Quality Coordinator. However, some performance information is not supported. For details, refer to the Systemwalker Service Quality Coordinator manual.

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For details about supported devices, refer to "1.3.7 Support levels".
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Note
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- Do not execute performance monitoring for a single device from more than one administrative server(*) at the same time.
  * The Softek Storage Cruiser administrative servers, the ETERNUS SF Storage Cruiser administrative servers or the Systemwalker Resource Coordinator administrative servers

- The performance management functionality always starts up when the administrative server starts up. For devices in which performance management settings have been configured, performance information collection starts in the background. Accordingly, performance information is collected regardless of whether GUI window display. To stop performance information collection, execute performance management stop processing.
....

7.1.1 Performance Information Types

The following information can be managed: Performance monitoring can be set at different intervals, refer to "7.2.3 Setting monitoring intervals" for the settings available for each device.
On the following tables, "A" indicates "Available", "N/A" indicates "Not Available".

- Fibre Channel switch

	Performance information (Unit)	Fibre Channel switch
Port	Transfer rates of send/receive data (MB/S)	A
	Number of CRC errors	A

・ ETERNUS disk storage system

	Performance information (Unit)	ETERNUS8000, ETERNUS4000 (except models 80 and 100)	ETERNUS6000	ETERNUS4000 models 80 and 100, ETERNUS3000 (except model 50), ETERNUS GR series (GR720 or higher)	ETERNUS2000	ETERNUS DX60/DX80
LUN Logical Volume RAID Group	Read/Write count (IOPS)	A	A	A	A	A
	Read/Write data transfer rate (MB/S)	A	A	A	A	A
	Read/Write response time (msec)	A	A	A	A	A
	Read/Pre-fetch/ Write cache hit rate (%)	A	A	A	A	A
Disk drive	Disk busy rate (%)	A	A	A	A	A
CM	Load (CPU usage) rate (%)	A	A	A	A	A
	Copy remaining amount (GB)	A	A	N/A	A	A
CA	Load factor (CPU usage rate) (%)	N/A	A	N/A	N/A	N/A
	Read/Write count (IOPS)	A	A	N/A	N/A	N/A
	Read/Write data transfer rate (MB/S)	A	A	N/A	N/A	N/A
CM Port	Read/Write count (IOPS)	N/A	N/A	N/A	A	A
	Read/Write data transfer rate (MB/S)	N/A	N/A	N/A	A	A
DA	Load factor (CPU usage rate) (%)	N/A	A	N/A	N/A	N/A
	Read/Write count (IOPS)	N/A	A	N/A	N/A	N/A

	Performance information (Unit)	ETERNUS8000, ETERNUS4000 (except models 80 and 100)	ETERNUS6000 -	ETERNUS4000 models 80 and 100, ETERNUS3000 (except model 50), ETERNUS GR series (GR720 or higher)	ETERNUS2000	ETERNUS DX60/DX80
	Read/Write data transfer rate (MB/S)	N/A	A	N/A	N/A	N/A
Device	Number of active disks (Disk)	A	N/A	N/A	A	A
	Power consumption (W)	N/A	N/A	N/A	N/A	A
	Temperature(C)	N/A	N/A	N/A	N/A	A

📝 **Note**

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- When RAID Consolidation is performed in ETERNUS6000 the RAIDGroup response time will not be displayed.

- LogicalVolume(LUN) and RAIDGroup performance information including LogicalVolume, created by LUN Concatenation in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100) that firmware versions are before V11L40, will not be displayed.

- Performance information about the ETERNUS disk storage system main frame volume and MVV/SDV are not supported, and performance information values for RAIDGroup cannot be guaranteed.

- On ETERNUS6000 devices, CA performance information relates to the FC-CA or FC-RA port. Furthermore, performance information obtained during the execution of REC and ROPC is displayed as Write performance information, regardless of whether FC-RA port is set up on the Initiator side or the Target side.

- ETERNUS8000 and ETERNUS4000 (except models 80 and 100) CA performance information displays FC-CA port or FC-RA port performance information. Performance information during the execution of REC and ROPC will be displayed as follows.

    - It will be displayed as Read performance information, if FC-RA port is set on the Initiator.

    - It will be displayed as Write performance information, if FC-RA port is set on the Target.

- The performance information for the number of active disks, power consumption and temperature can be managed by setting to perf.conf file. For the settings, refer to "C.4 perf.conf Parameter".

- The CPU and ROE usage rates are displayed for the CM load (CPU usage) for ETERNUS4000 models 400 and 600 and ETERNUS8000 models 800, 1200 and 2200. For other ETERNUS disk storage systems, the ROE usage rate is not displayed. Also, for ETERNUS disk storage systems that do not have a ROE, the parity generation processing for RAID5 and RAID6 and encryption processing that would otherwise be performed by the ROE are performed by the CM and the CM-CPU.

- Performance information for Thin Provisioning Volume and RAID Group used by Thin Provisioning Pool in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100), will not be displayed.

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7.1.2 Performance Graph Window Types

This software also provides graph windows with the following time units:

One-hour Graph window

Based on the time selected as monitoring interval, a line graph for a one-hour period is displayed. For example, if the monitoring interval is 30 seconds, a line graph for a one-hour period with values obtained at an interval of 30 seconds is displayed.

Values displayed on the graph are the mean value of the monitoring interval. However, the CM copy remaining volume graph, the number of active disks graph, power consumption graph and temperature graph display information obtained at the time the graph was produced.

One-day Graph window

Based on the mean values for 10-minute periods, a line graph for a one-day period is displayed.

One-week Graph window

Based on the mean values per hour, a line graph for a one-week period is displayed.

Information

・ If the summer time functionality of the operating system is enabled, a part of the graph that is supposed to show the data around the switch to summer time may not be displayed correctly.

・ Each performance graph may not be able to be displayed at every monitoring interval, per 10-minutes and per 60-minutes, depending on the LAN traffic condition or network environment (e.g. the administrative server and target device of the performance monitoring exist in the different subnets).

7.1.3 Threshold Monitoring Types

Threshold monitoring is supported for Fibre Channel switch and ETERNUS disk storage systems.

The threshold monitoring functionality sends an alarm or report when Fibre Channel switch or ETERNUS disk storage systems performance value reaches a certain level (threshold value) under certain conditions in daily transaction operations.

The advantage of using the threshold monitoring is that the symptom of Fibre Channel switch or ETERNUS disk storage systems performance drop caused by changes in data processing rates and transaction processing rates can be automatically and reliably detected in daily transaction operations.

The effect that can be expected from the threshold monitoring functionality is that operations in the most suitable environment are enabled. This is accomplished by preventing the adverse effect of performance drops through early detection of bottleneck locations, identification of their causes, and improvement of device configuration.

The threshold monitoring functionality can manage the following information:

・ Fibre Channel switch

  - Port throughput (%)

    A port throughput value (MB/s) is monitored as the percentage (%) of an allowable tolerance to a maximum transfer capability (MB/s).

・ ETERNUS disk storage system

  - Response time (msec) of LUN (OLU)

  - Average use (busy) rate (%) of RAIDGroup (RLU, LUN_R)

  - CM load (CPU usage) rate (%)

The threshold monitoring functionality provides the Threshold Monitoring Alarm Log and Condition Report windows.

From all devices monitored by the functionality, the Threshold Monitoring Alarm Log window displays a list of threshold monitoring alarm items detected on individual devices.

The Condition Report window provides the following four windows:

- Logical Volume response time error

  This is displayed if the Logical Volume response time of a monitored device is found to have reached the state specified in threshold settings. Guidelines for actions to be taken are also displayed.

- RAID Group load error

  This is displayed if the RAID Group utilization of a monitored device reaches the specified state. Guidelines for actions to be taken are also displayed.

- CM load error

  This is displayed if the CM load ratio of a monitored device reaches the specified state. Guidelines for actions to be taken are also displayed.

- Port throughput load error

  It is displayed when the transfer/receive usage rate of port of a monitored device reached the specified state. Measures indicator is also displayed.

Note

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- The threshold monitoring function is always started when the administrative server is started, and the functionality starts threshold monitoring and obtaining performance information at the same time for a device for which performance management is specified. Accordingly, performance information is obtained and thresholds are monitored regardless of when display of the GUI window starts. To end threshold monitoring, stop threshold monitoring from this software.

- For the CM load (CPU usage) rate, the ROE usage rate is not monitored.

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7.2 Flow of Performance Management

When a user gives an instruction for performance management of a target device from a GUI window, the performance management unit issues SNMP Traps periodically through a LAN to devices to obtain performance information, and it saves the information as performance data on the administrative server. This software displays the performance data in the Performance Management window and manages the device.

Figure 7.1 Flow of performance management
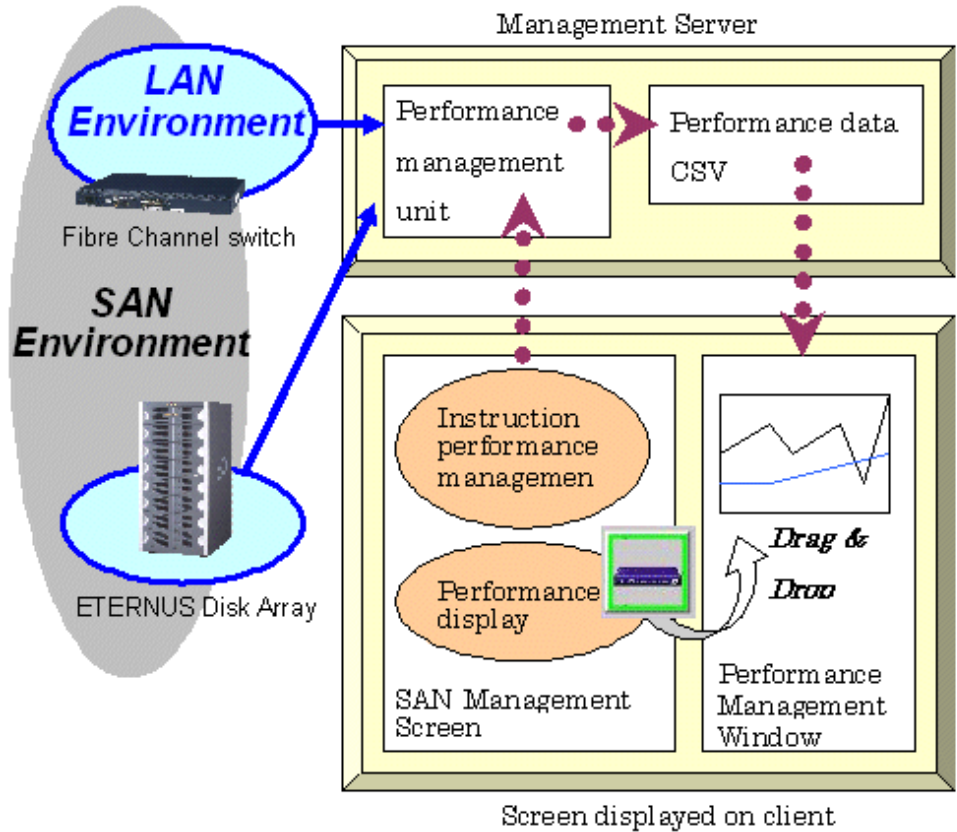
7.2.1 Checking disk space on the administrative server

To conduct performance monitoring, sufficient disk space is required on the administrative server for performance data storage. Make sure that sufficient disk space is ensured referring to the Installation Guide. This software is capable of deleting performance data overdue the specified holding period. The default is seven days and data exceeded this period are automatically deleted. This period can be modified. To change the number of days to store performance data refer to "7.7 Definition File".

7.2.2 Instruction for performance management

To display the dialog for setting the monitoring state, click the target device in the SAN view of the resource view, and then select [Device] - [Performance management] from the menu or right-click [Performance management] from the pop-up menu.

Figure 7.2 ETERNUS disk storage system performance management settings window
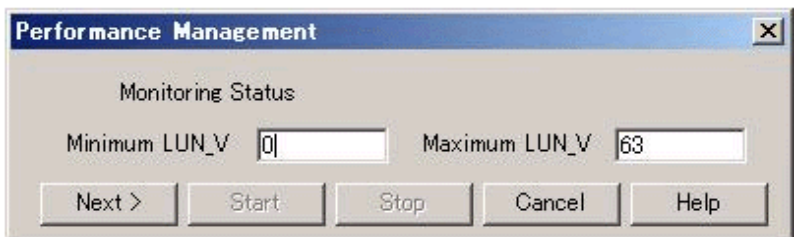
Figure 7.3 Fibre Channel switch performance management settings window

In ETERNUS disk storage systems, enter the minimum and maximum values for the performance information securement target Logical Volume (LUN_V). Setting LUN can reduce the effect of obtaining performance information on disk areas where performance data is saved and reduce the load. Setting LUN prevents allocation of more space than necessary for Logical Volume. Consequently, the recommended entry for Logical Volume is the minimum value for obtaining performance data.

📖Information
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Since performance information is obtained internally in units of 64 for Logical Volume, performance information in the neighboring area of the Logical Volume setting is also obtained.

For example, if a range of 70 to 80 is set for Logical Volume (LUN_V) on the screen, the information of Logical Volume between 64 and 127 is obtained internally.
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If the device configuration has changed, update the device configuration information maintained by the performance management functionality. For details about the update procedure, refer to "7.2.11 Updating configuration information".
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7.2.3 Setting monitoring intervals

Enter the interval at which performance information is secured in the ETERNUS disk storage systems and Fibre Channel switch common settings. You can specify 5, 10, 30, 60, 300, or 600 seconds as the interval. However, intervals that can be specified vary depending on device models and the number of Logical Volumes indicating performance level being maintained.

Monitoring condition		Specifiable interval (seconds)					
Device model name	Number of LogicalVolumes whose performance is maintained	5	10	30	60	300	600
ETERNUS4000 models 80 and 100 ETERNUS3000 ETERNUS2000 ETERNUS DX60/DX80 ETERNUS GR740, GR820, GR840 ETERNUS GR720, GR730	128 or less	A	A	A	A	A	N/A
	129 to 2,047	N/A	N/A	A	A	A	N/A
	2,048 or more	N/A	N/A	N/A	A	A	N/A
ETERNUS6000	64 or less	N/A	A	A	A	A	N/A
	65 to 2,047	N/A	N/A	A	A	A	N/A
	2,048 or more	N/A	N/A	N/A	A	A	N/A
ETERNUS8000 ETERNUS4000 (except models 80 and 100)	256 or less	N/A	N/A	A	A	A	A
	257 to 1,024	N/A	N/A	N/A	A	A	A
	1,025 to 8,192	N/A	N/A	N/A	N/A	A	A
	8,193 or more	N/A	N/A	N/A	N/A	N/A	A

Monitoring condition		Specifiable interval (seconds)					
Device model name	Number of LogicalVolumes whose performance is maintained	5	10	30	60	300	600
ETERNUS SN200 series Fibre Channel switch ETERNUS SN200 MDS	-	A	A	A	A	N/A	N/A

"A" indicates "Available", and "N/A" indicates "Not Available".

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In LAN traffic or cross-subnet (where there is a gateway between the performance monitoring target device and the administrative server) situations, it may not be possible to obtain the performance information inside the monitoring interval that was set. Please change the monitoring interval when you cannot acquire performance information on each monitoring interval.
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 Note
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- When the transfer rate of FC port exceeds 4Gbps on the operating ETERNUS SN200 series Fibre Channel switch or PRIMERGY BX600 Fibre Channel switch blade, set the performance monitoring interval to any one of 5, 10 or 30 seconds. If the performance monitoring interval is set to 60 seconds, the correct performance value may be not acquired from the device.

- On the performance information for the number of active disks, power consumption and temperature, the performance monitoring interval sets 60 seconds if its interval is set to shorter than 60 seconds.
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When you click <Start> button in this dialog, an instruction to obtain performance information is issued to the performance management unit (see "Figure 7.1 Flow of performance management"), and the performance management unit obtains performance information of the device through the LAN and saves it as performance data. Since the performance management unit is started as a daemon of the administrative server, the unit continues obtaining performance information while the administrative server is active, even if no GUI window is displayed.

The logical configuration of the storage device is recognized, and the obtaining of performance information starts. At the start of obtaining performance information of the selected storage system, an amount of time (tens of seconds to several minutes) is spent to obtain the logical configuration before any performance information is actually obtained.

When performance monitoring starts, the "P" mark appears in green at the upper left of the device icon on the map display. If the Performance Management window is open and the corresponding Fibre Channel switch and storage system are displayed in the tree, the device name is displayed in the same color as that of the "P" mark.
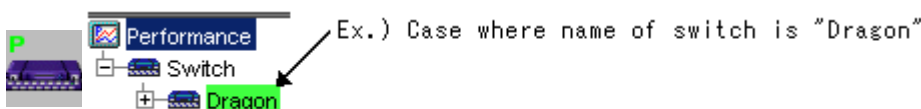
The table below lists "P" mark colors and their corresponding statuses and actions to be taken. The color may differ from that of the current status. Click [Refresh] on the GUI window or press the [F5] key to check the latest status.

"P" mark color	Status	Appropriate action
Green	Performance is being monitored. (Normal)	Performance is being monitored.
Yellow	Performance monitoring is being recovered (e.g. device time-out).	The administrative server cannot communicate with a device. Check the network status and device status. Log off, when ETERNUSmgr/GRmgr is in a login state.
Red	Writing to the performance information file failed.	Check the write permission to the file and the capacity of the file system.
	Wrong registered password of GR	Reregister devices with this software, and restart performance monitoring.

"P" mark color	Status	Appropriate action
	Internal error	Contact a FUJITSU maintenance engineer.

7.2.4 Starting the performance management window

To display performance information, it is necessary to open the Performance Management Window. There are 2 methods to open the Performance Management Window as follows.

- ・ Select [File] - [Performance Management Window] in Resource View

- ・ Select [Performance Management Window] from the pop-up menu displayed by right-click on Map view area of Resource View

7.2.5 Displaying performance information of the selected device

You can display the performance information of a device in the Performance Management window by dragging a device icon displayed in the resource view and dropping it in the Performance Management window. You can create multiple Performance Management windows. Also, multiple device icons can be dropped in a single Performance Management window to display information about those devices.

In addition, the performance information can be output to the CSV format file by using the performance information operation command (storageadm perfdata). For the command details, refer to following sub sections.

- ・ Solaris OS Manager : "12.1.1.6 Performance information operation command (storageadm perfdata)"

- ・ Linux Manager : "12.2.1.6 Performance information operation command (storageadm perfdata)"

- ・ Windows Manager : "12.3.1.7 Performance information operation command (storageadm perfdata)"

7.2.6 Displaying Fibre Channel switch performance information

From the device tree view in the Performance Management window, select and right-click the port number of the Fibre Channel switch whose performance information you want to display, and then select [Show Performance Graph] from the resulting pop-up menu.
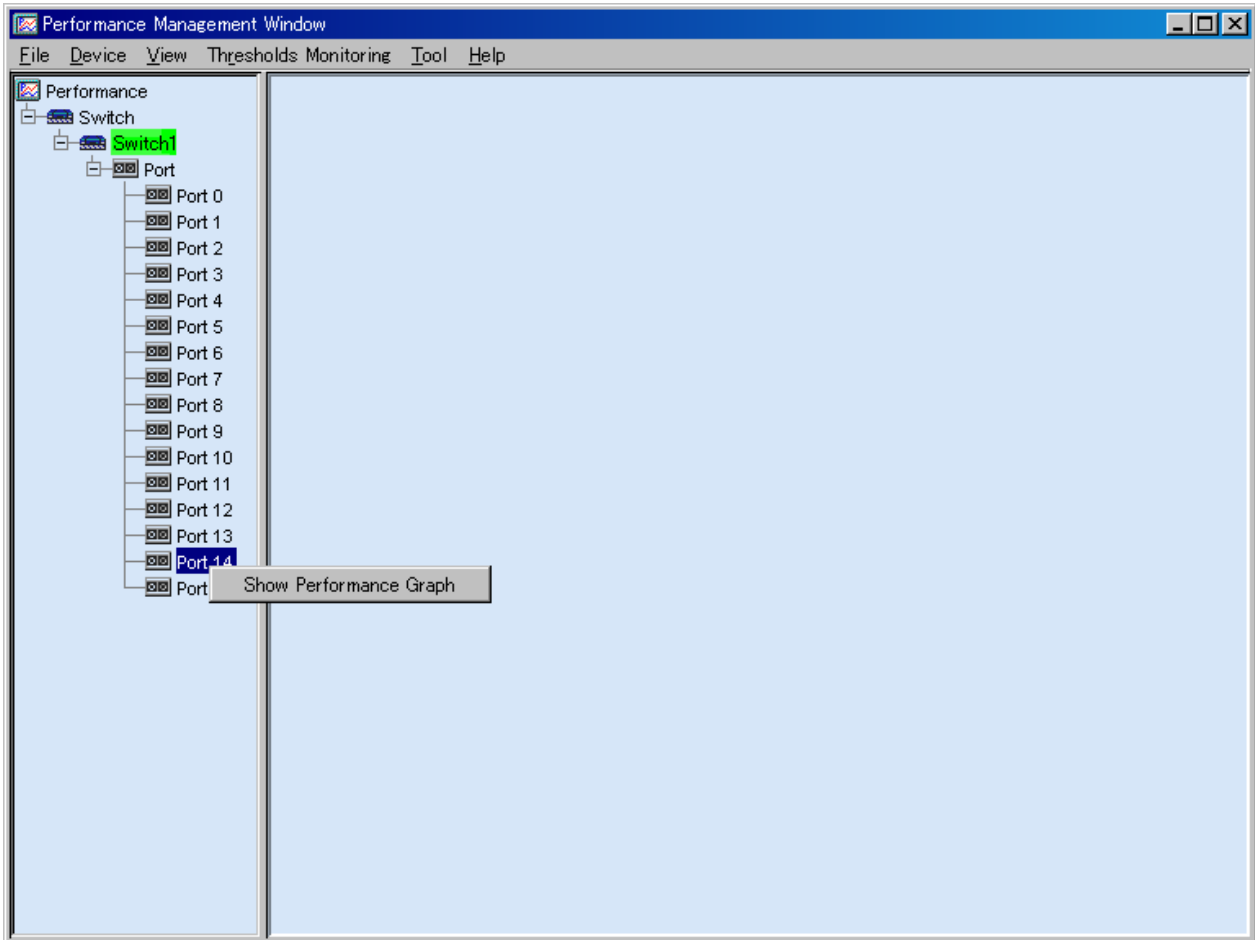
The dialog shown below appears. In the dialog, select the items to be displayed.

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
Throughput	Displays a data transfer rate (MB/S). Here, select an information type. Select one of the following three: (1) displaying the graphic window for the transmitting-side performance of a port, (2) displaying the graphic window for the receiving-side performance, and (3) displaying one graphic window where both transmission

Items	Explanation
	and reception performances are displayed at the same time. The transmission and reception performances can be selected at the same time but, if the combined transmission-reception performances are selected, neither the individual transmission performance nor the reception performance can be selected.
Error	Displays the graph of a CRC error count that occurs in the port.

The window shown below displays a result of selections in the above dialog. One-hour Graph windows of send throughput and receive throughput are displayed. Using the graphs, you can determine the operating status of the port. See "B.10.5 Graph window functions".
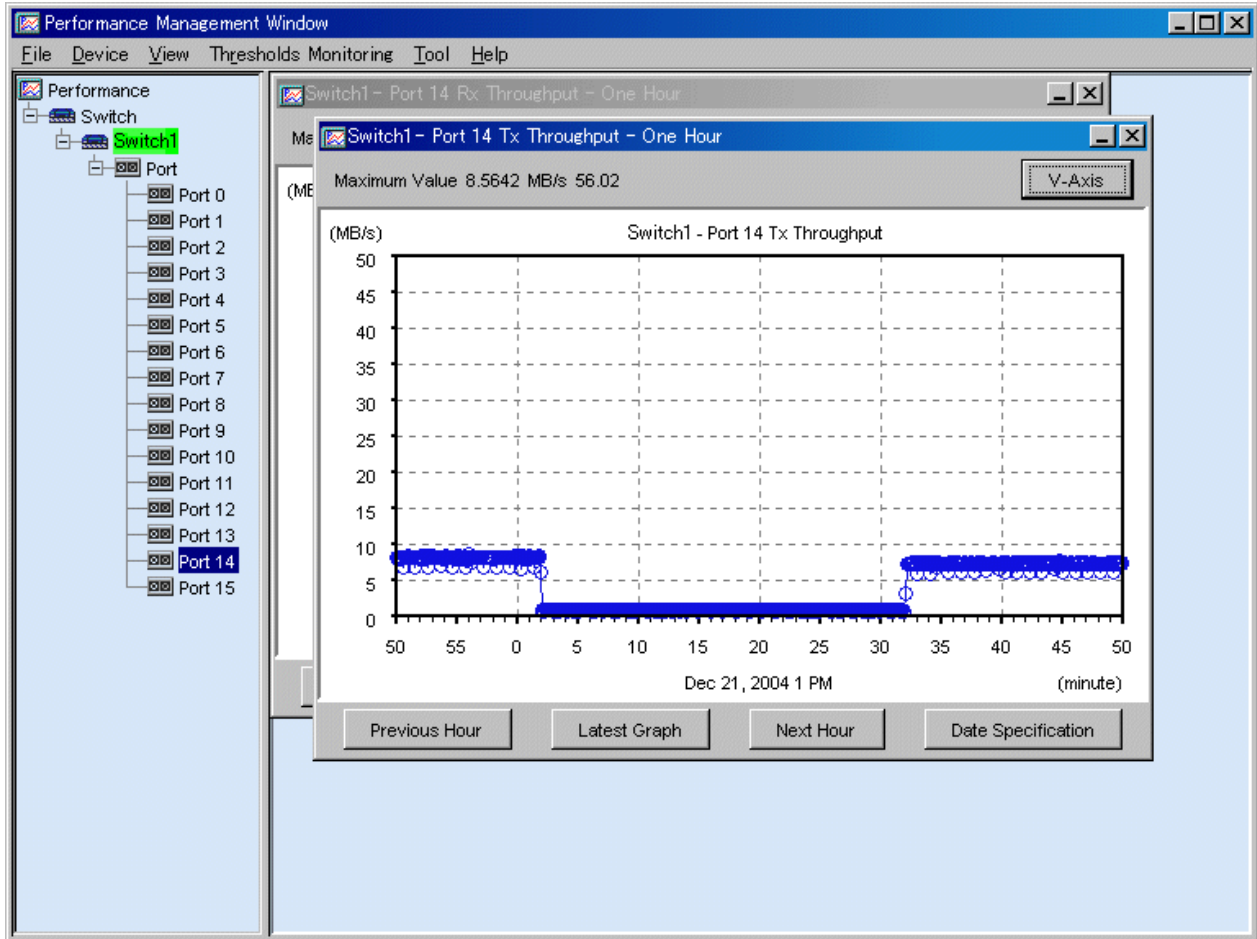
To display performance information of multiple ports at the same time, click multiple ports in the tree while holding down the [Ctrl] or [Shift] key, and then right-click a selected port to display a graph.

In this case, "Open Window for Every Port" is added to the dialog displayed immediately before a graph is displayed. If you check the check box, one window for each port opens.

If you do not check the check box, you can select "Total of Throughput" in the dialog. If you select it, the total values of the ports are displayed in a graph. Otherwise, values of each port are displayed in the same graph window. Incidentally, if "Send/Receive" is selected, "Total of Throughput" must be selected.
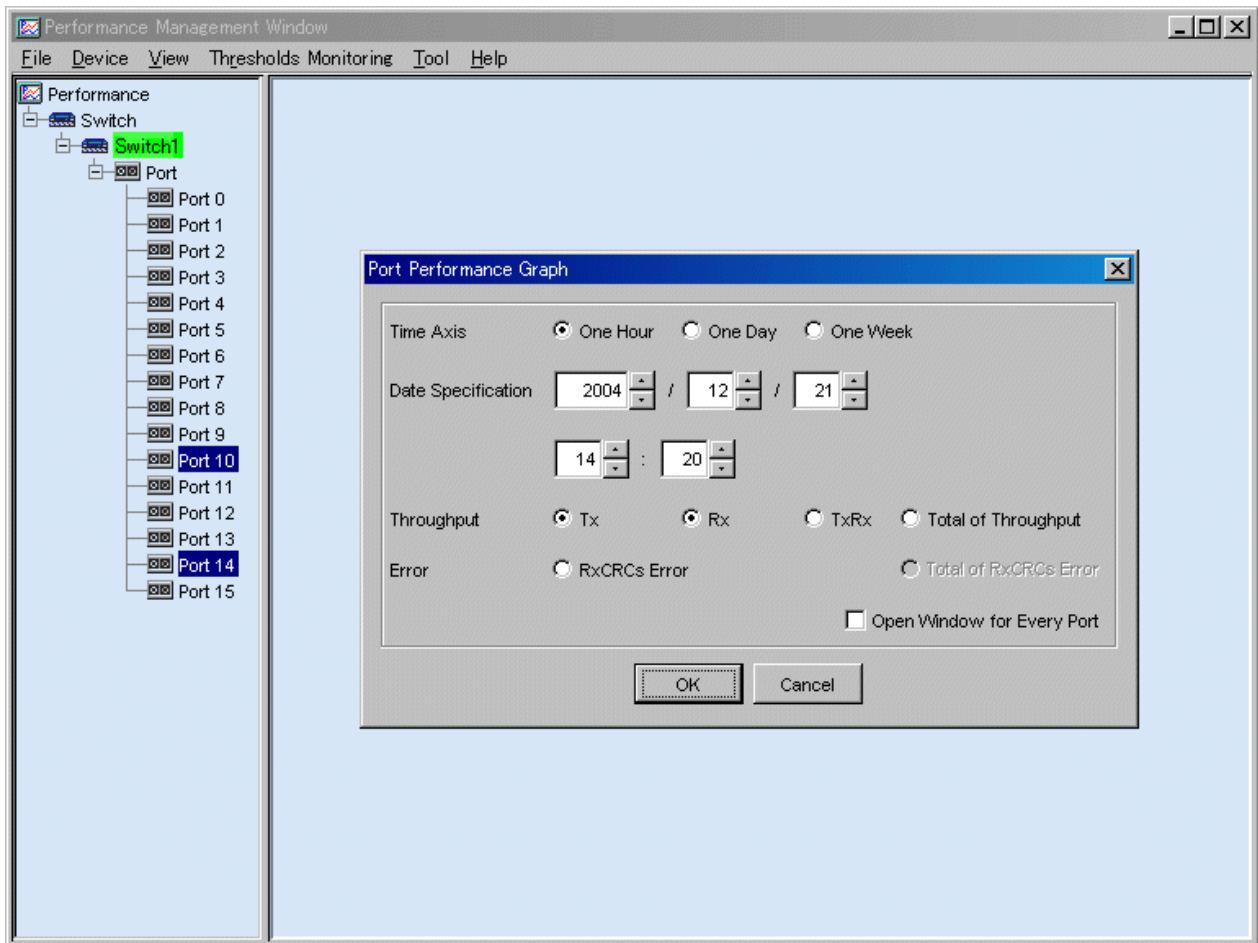
The window shown below is an example where "Open a window for each port" and "Total of Throughput" are not selected. To check the correspondence between ports and lines in the graph in the window, select a button for a line in the graph. In this example, port 14 is frequently used.
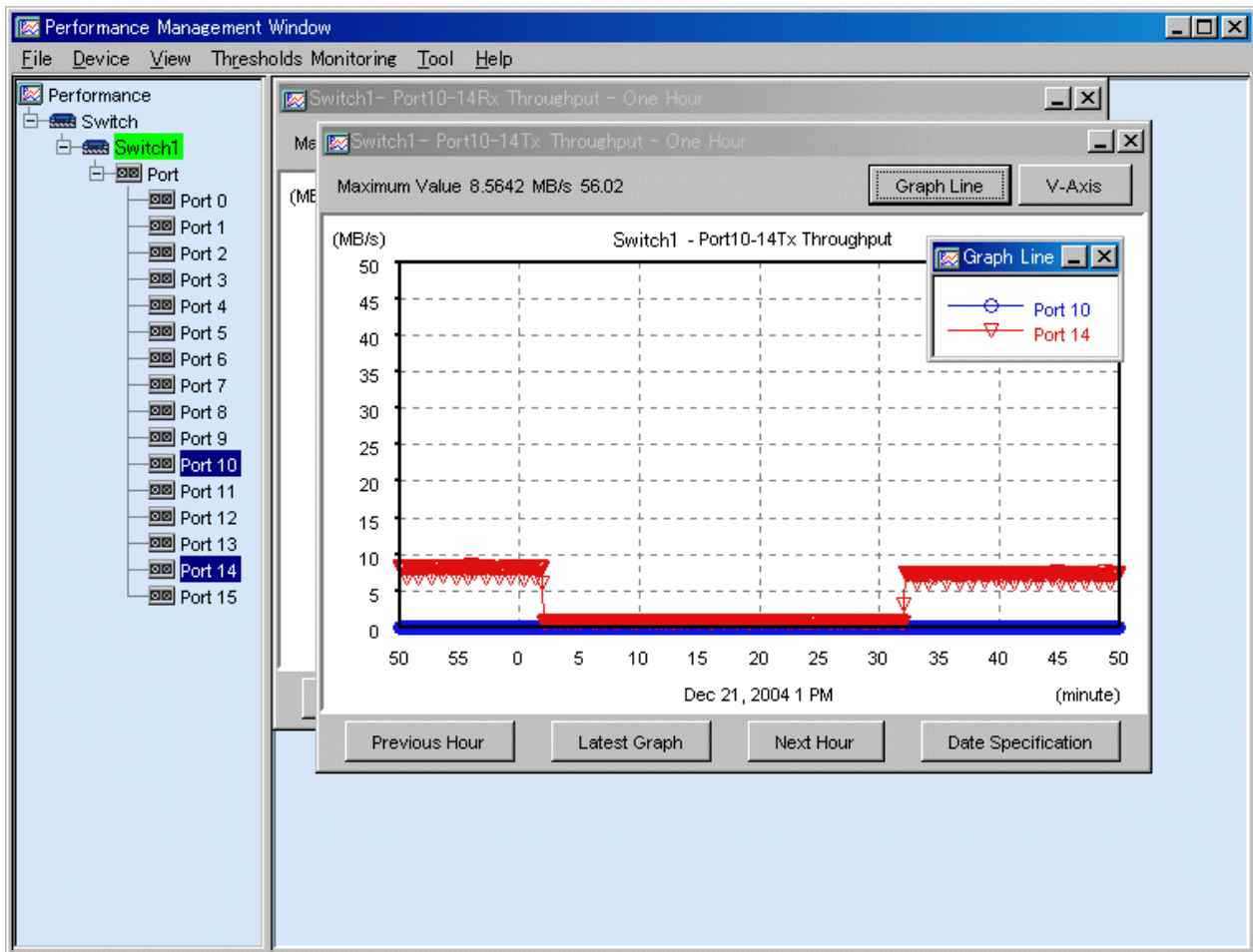
7.2.7　Displaying storage performance information

When the ETERNUS disk storage system icon is dragged and dropped to the performance management window, a storage logic configuration tree will be displayed as below.

"AffinityGroup" indicates a number of the zone functionality of the selected storage system.

"LUN" indicates a logical unit number from the point of view of the server node. Since this is allocated with Logical Volume (OLU and LUN_V) that specifies a number unique to a device managed in the device, this is expressed as "LUN X(Logical Volume X)" in the tree.

"RAID Group" located under "LUN" indicates that LUN is included in "RAID Group" (rank). [Disk](=physical drive) under [RAIDGroup] or [RAIDGroup [X- X]] indicates the drive used to configure the rank. [LogicalVolume] under [RAIDGroup] or [RAIDGroup [X- X]] indicates the numbers of other LogicalVolumes that belong to the same RAIDGroup. [RAIDGroup X- X] also has devices that are not shown.

The properties are displayed as tool tips. For details about items that can be checked in these tool tips, refer to "B.10.3 The tree view".

Figures beginning with "0x" are values expressed in hexadecimal notation. Other numbers are decimal numbers.
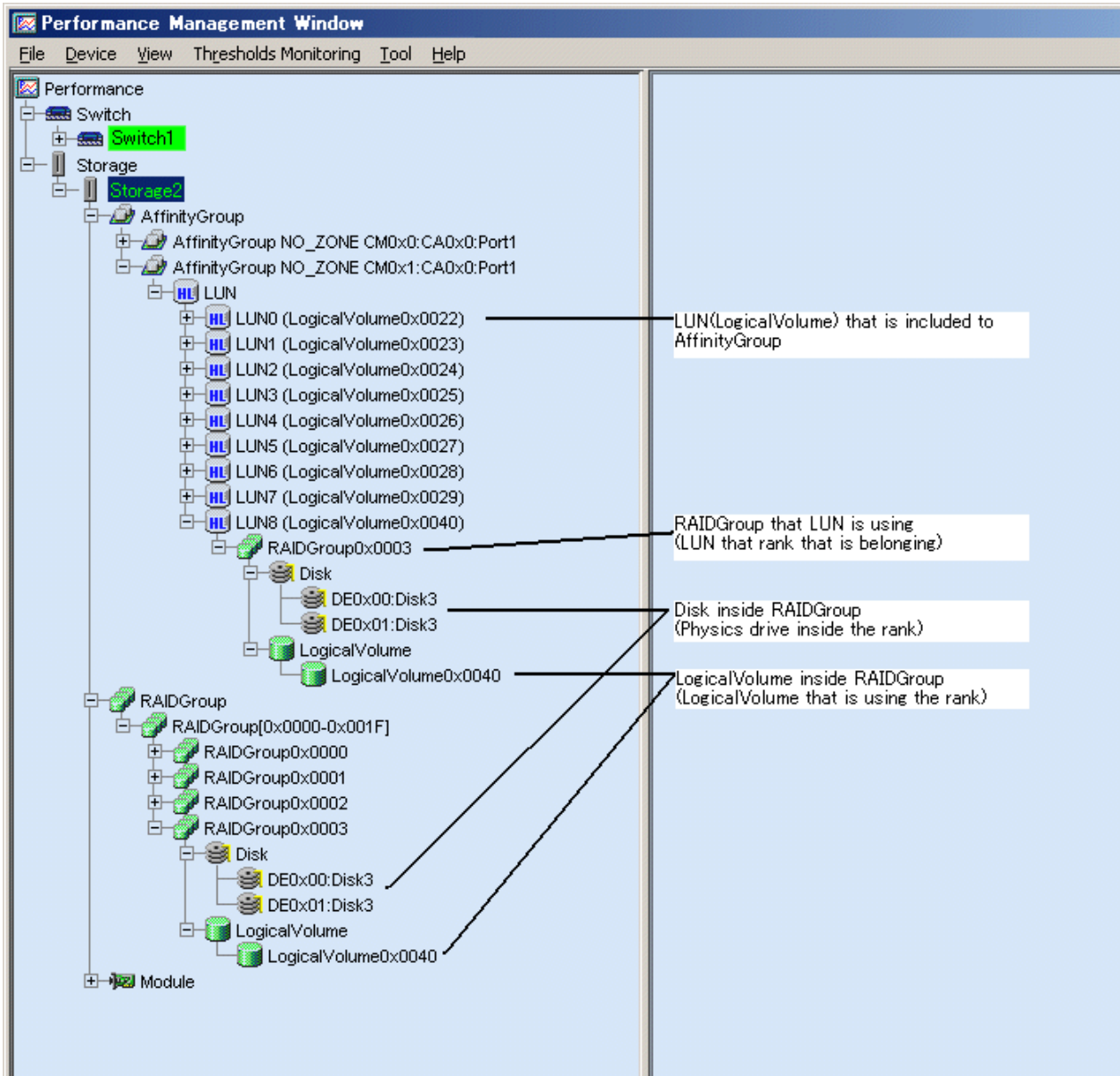
7.2.7.1 Displaying LUN and RAIDGroup performance information

From the device tree in the Performance Management window, select the number of the LUN or RAID Group whose performance information you want to display, right-click to display a pop-up menu, and select [Show Performance Graph].

You can select multiple numbers. To do so, click LUN or RAID Group while holding down the [Ctrl] or [Shift] key, right-click and slect [Show Performance Graph].

The dialog shown below appears. In the dialog, select the graph window to be displayed.

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
IOPS	Indicates how many times I/O is issued per second.
Throughput	Displays a data transfer rate (MB/S).
Response Time	Displays an average I/O processing time (ms).
Cache Hit Rate	Displays a ratio (%) at which cache is hit.

Note

・ When RAID Consolidation is performed in ETERNUS6000 the RAIDGroup response time will not be displayed.

・ LogicalVolume(LUN) and RAIDGroup performance information including LogicalVolume, created by LUN Concatenation in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100) that firmware versions are before V11L40, will not be displayed.

・ The ETERNUS disk storage system main frame volume and performance information about MVV/SDV are not supported. The value for the performance information about the RAID Group containing SDV also cannot be guaranteed.

・ Performance information for Thin Provisioning Volume and RAID Group used by Thin Provisioning Pool in the ETERNUS8000 and ETERNUS4000 (except models 80 and 100), will not be displayed.

For the IOPS, Throughput, and Response Time, one of the following three can be selected: (1) displaying a READ graphic window, (2) displaying a Write graphic window, and (3) displaying one graphic window where R/W (Read and Write information) items are displayed at the same time. Read and Write can be selected at the same time but, if R/W is selected, the individual Read and Write graphic windows cannot be selected.

For the Cache Hit Rate, one of the following four can be selected: (1) displaying a Read hit-ratio graphic window, (2) displaying a Write hit-ratio graphic window, (3) displaying a pre-fetch hit-ratio graphic window, and (4) displaying one graphic window where all R/W/P information (Read, Write, and Pre-fetch hit ratios) is displayed at the same time. Read, Write and pre-fetch can be selected at the same time but, if R/W/P is selected, the individual Read, Write, and pre-fetch graphic windows cannot be selected.

If multiple logical units are selected be displayed on a graph, "Open Window for Every LUN" is displayed. Select it to open one graph window for each LUN.

If it has not been selected, "Total" is displayed in the dialog. If you select "Total", the "Total" graph appears. Otherwise, the information about multiple units is displayed in the same graph window. If "R/W/P" or "R/W" is selected, "Total" must be selected.

7.2.7.2 Displaying disk (physical drive) performance information

From the device tree view in the Performance Management window, select the number of the disk whose performance you want to display, right-click to display a pop-up menu, and select [Show Performance Graph].

You can select multiple disks. To select multiple disks, click multiple disks while holding down the [Ctrl] or [Shift] key, right-click and select [Show Performance Graph].

The dialog shown below appears. In the dialog, select the graph window to be displayed.

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.

If multiple logical units are specified for displaying a graph, "Open Window for Every Disk" is displayed in the dialog. If you select it, one graph window opens for each disk. Otherwise, the information about multiple disks is displayed in the same graph window.

7.2.7.3 Displaying CM performance information

To display the performance graph, select the CM/CM CPU from the performance management window and use a right mouse click to display the pop-up menu, and then click on [performance graph display].

The performance graph of multiple CMs/CM CPUs can be displayed at the same time. To select multiple CMs/CM CPUs, click them while holding down the [Ctrl] or [Shift] key, right-click and select [Show Performance Graph]. When [performance graph display] is clicked, the dialog shown below appears. In the dialog, select the graph window to be displayed.

Selecting "Open Window for Every CM" on the dialog when multiple items are selected displays chart windows for respective modules.

ETERNUS4000 models 80 and 100, ETERNUS3000 (except model 50), GR(ETERNUS GR720 or higher)

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
Load	Displays the CPU usage (%) of CM module.

ETERNUS8000 models 700, 900, 1100 and 2100, ETERNUS6000, ETERNUS4000 models 300 and 500, ETERNUS2000

Items		Explanation
Time Axis		Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification		Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
Graph	Load	Displays the CPU usage (%) of CM module.
	Copy Residual Quantity	Displays the remaining copy volume (GB) of advanced copy (EC/OPC). When both EC and OPC are operating, a total of the remaining copy volumes of EC and OPC is displayed.

ETERNUS8000 models 800, 1200 and 2200, ETERNUS4000 models 400 and 600

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
Load	Displays the CPU usage (%) of each processor.
Copy	Displays the remaining copy volume (GB) of advanced copy (EC/OPC). When both EC and OPC are operating, a total of the remaining copy volumes of EC and OPC is displayed.

7.2.7.4   Displaying CA and CMPort performance information

To display the performance graph, select the CA/CMPort from the performance management window and use a right mouse click to display the pop-up menu, and then click on [performance graph display].

The performance graph of multiple CAs/CMPorts can be displayed at the same time. To select multiple CAs/CMPorts, click them while holding down the [Ctrl] or [Shift] key, right-click and select [Show Performance Graph]. When [performance graph display] is clicked, the dialog shown below appears. In the dialog, select the graph window to be displayed.

Selecting "Open Window for Every PORT" on the dialog when multiple items are selected displays chart windows for respective modules.

ETERNUS2000

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
IOPS	Displays the number of I/O issued per second.
Throughput	Displays the data transfer volume (MB/S).

ETERNUS6000
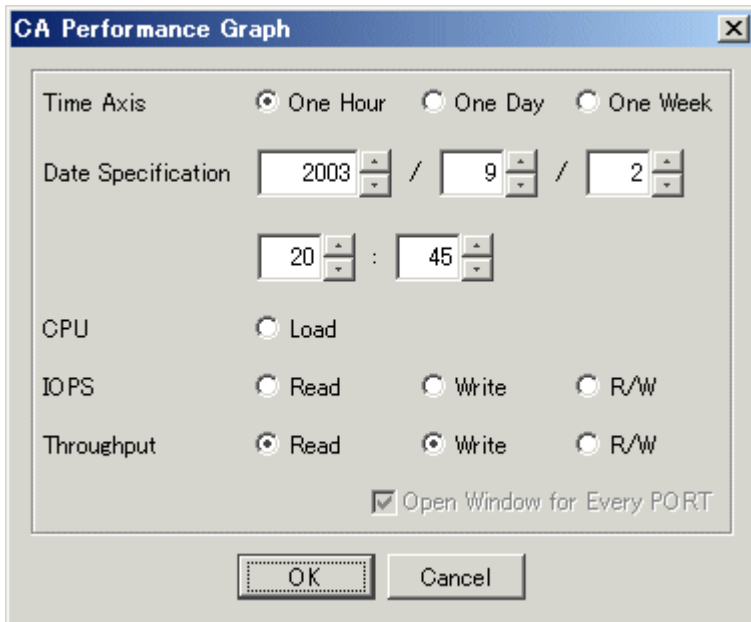
Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.

Items	Explanation
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
CPU	Displays the CPU usage (%).
IOPS	Displays the number of I/O issued per second.
Throughput	Displays the data transfer volume (MB/S).

Other ETERNUS disk storage systems (except ETERNUS3000 and ETERNUS GR series)

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
IOPS	Displays the number of I/O issued per second.
Throughput	Displays the data transfer volume (MB/S).

7.2.7.5 Displaying DA performance information

To display the performance graph, select the DA from the performance management window and use a right mouse click to display the pop-up menu, and then click on [performance graph display].

The performance graph of multiple DAs can be displayed at the same time. To select multiple DAs, click them while holding down the [Ctrl] or [Shift] key, right-click and select [Show Performance Graph]. When [performance graph display] is clicked, the dialog shown below appears. In the dialog, select the graph window to be displayed.

Selecting "Open Window for Every PORT" on the dialog when multiple items are selected displays chart windows for respective modules.

ETERNUS6000

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
CPU	Displays the CPU usage (%) of DA.
IOPS	Displays the number of I/O issued per second of DA.
Throughput	Displays the data transfer volume (MB/S) of DA.

7.2.7.6 Displaying the number of active disks, power consumption, and temperature performance information

To display the performance graph, select the storage device from the performance management window and use a right mouse click to display the pop-up menu, and then click on [performance graph display].

The dialog shown below appears. In the dialog, select the graph window to be displayed.
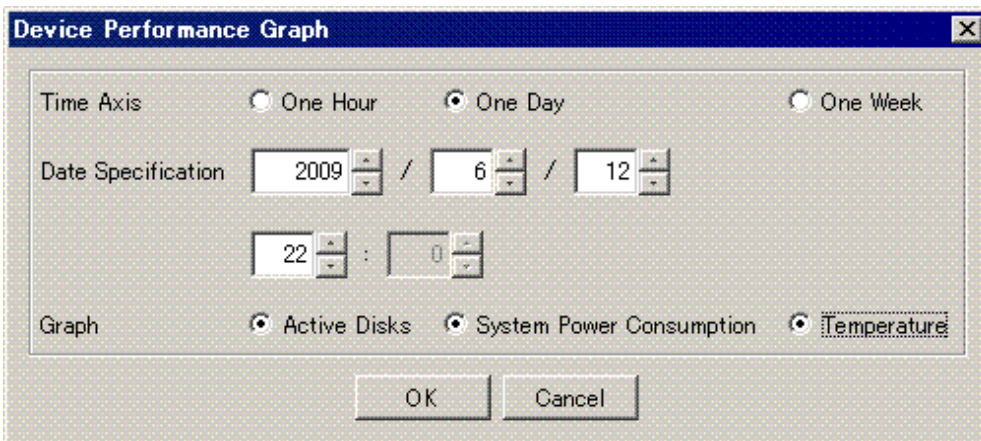
The dialog box below is displayed if the ETERNUS disk storage system does not support power consumption and temperature information.

Items	Explanation
Time Axis	Select the time interval for a graph that you want to display. Select one hour, one day, or one week. Refer to "7.1.2 Performance Graph Window Types" for details.
Date Specification	Specify the date and time to be displayed in the center of the graph. The current time is displayed. You may select the date and time of a graph that you want to display. A period of up to 7 days can be specified.
Graph	Shows number of active disks, power consumption, and temperature performance information.

The performance information for the number of active disks, power consumption and temperature can be managed by setting to perf.conf file. For the settings, refer to "C.4 perf.conf Parameter".

![Note icon] **Note**

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When the specified ETERNUS disk storage system has no Eco-mode function, the number of active disks, power consumption and temperature graph is not displayed. For the ETERNUS disk storage systems that have the Eco-mode function, refer to "1.3.4 Energy-saving operation for storage device".

Before the displaying the performance information for the number of active disks, power consumption and temperature, it is necessary to upgrade to the firmware that supports the Eco-mode operation and change the composition of the device. For the details of those procedures, refer to "7.2.11 Updating configuration information".

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7.2.8   Operating graph windows

If the amount of performance data is large (in particular, when the ETERNUS disk storage system device RAIDGroup or multiple selections are chosen), or if load on a LAN is heavy, a long time may be required to display a graph after the <Previous Hour> or <Next Hour> button is clicked. In such cases, right-click the mouse on the graph window to open a pop-up menu. The pop-up menu has a command for opening a graph window from which the time range of a graph can be changed. Select the command, and open the One-day Graph window from the graph window so that hour-by-hour information is displayed, move the cursor in the One-day Graph window to the time that you want to check, right-click to display a pop-up menu, and select [One-hour Graph Window] for a smooth transition to a graph centered on this time.

To display the maximum value graph, click the <Peak> button in the One-day Graph window, or One-week Graph window. You can then move the cursor to the time of the maximum value and right-click to display a pop-up menu, enabling a smooth transition to a graph centered on this time of the maximum value in the same way as described above.

Refer to "B.10.5 Graph window functions".

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About the number of active disks, power consumption and temperature graph window:

The <Peak> button is not displayed on the number of active disks, power consumption and temperature graph window. Therefore, the maximum value graph cannot be displayed.
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7.2.9   Examples of use of performance management

If an I/O delay from the server node to a storage system occurs, the user can check for the cause in the storage system by using the methods described below. These are only examples, so all causes of I/O delays cannot be determined by use of these methods.

1. Identify the time when the I/O processing delay occurred and the access path where the delay occurred.

2. Use this software to check the AffinityGroup number and LUN number of the ETERNUS disk storage system defined in the target access path.

3. Using performance management, display and check the target LUN performance values.

4. If a response of the LUN unit takes a long time, check RAID Group performance. If a response of RAID Group also takes a long time, find another Logical Volume belonging to RAID Group, and find the LUNs to which the Logical Volume is allocated. Check the I/O statuses of these LUNs, and check for a heavy load on RAID Group. If there is a heavy load, move the appropriate LUN to another RAID Group, or take other appropriate action.

7.2.10   Instruction for stopping performance management

Click the target device on the GUI window. Select [Device] - [Performance management] from the menu, or right-click and select [Performance management] from the pop-up menu. Then, select <Stop> button in the window for setting the monitoring status.

7.2.11   Updating configuration information

Device configuration information is independently maintained in the performance management functionality.

To change the device configuration, update the device configuration information that is maintained by the performance management functionality according to the procedure shown below. Also perform the update if the configuration for a device used to execute performance monitoring and threshold monitoring has been changed.

If the configuration for a device used to execute performance monitoring and threshold monitoring has been changed, the configuration information before the update is used for performance monitoring and threshold monitoring. Performance information and threshold monitoring, shown in the procedure below, cannot be guaranteed prior to the configuration information update.

<Configuration information update procedure>

1. Record the performance monitoring settings contents (if performance monitoring is used)

    <Recorded settings contents>

      - Interval before obtaining performance information (in seconds)

      - Performance monitoring targets (Minimum LUN_V, Maximum LUN_V)

2. Record the threshold monitoring settings contents (if threshold monitoring is used)

    <Recorded settings contents>

      - Threshold monitoring time settings

        - Threshold monitoring time (start time, stop time)

        - Alarm display time (start time, stop time)

- Alarm display frequency

- Threshold monitoring settings

- Target

- Threshold

- Threshold monitoring Interval

- Alarm tolerance level

- Alarm tolerance time

- Rearm

3. Stop threshold monitoring (if threshold monitoring is used)

   Refer to "7.3.7 Instruction for stopping threshold monitoring".

4. Stop performance monitoring (if performance monitoring is used)

   Refer to "7.2.10 Instruction for stopping performance management".

5. For the storage device, the firmware is upgraded and the composition of the device is changed.

Note

The upgrade of firmware is needed only when the firmware version of the storage device must be changed to the version that supports the Eco-mode operation because of executing the performance management for the number of active disks. For the ETERNUS disk storage systems that have the Eco-mode function, refer to "1.3.4 Energy-saving operation for storage device".

6. In the menu bar of the Performance Management window, click [Device] - [Create Device Configuration File].

7. Start performance monitoring based on the settings contents recorded in step 1. (if performance monitoring is used).

   Refer to "7.2.2 Instruction for performance management" and "7.2.3 Setting monitoring intervals".

8. Start threshold monitoring based on the settings contents recorded in step 2. (if threshold monitoring is used).

   Refer to "7.3.3 Setting the threshold monitoring hours" and "7.3.4 Setting the threshold monitoring information".

7.2.12 Performance data

Performance data is saved in CSV files in the following directory of the administrative server:

Platform of administrative server	Location
Windows	$TMP_DIR\Manager\var\opt\FJSVssmgr\current\perf ($TMP_DIR means "Work Directory" specified at the Manager installation.)
Solaris OS, Linux	/var/opt/FJSVssmgr/current/perf

You can save these files by saving the entire directory as necessary, and you can display old information as necessary by recovering it in the same format.

However, the automatic deletion functionality operates in the performance data. When restoring, execute it after confirming days of the data retention duration. For the data retention duration, refer to "C.4 perf.conf Parameter".

Example

Case of Solaris OS:

・ Backup

```
# cd /var/opt/FJSVssmgr/current/perf/
# tar -hcf - csv |compress -c > csv.backup.tar.Z
```

・ Restore

```
# cd /var/opt/FJSVssmgr/current/perf/
# uncompress -c /var/opt/FJSVssmgr/current/perf /csv.backup.tar.Z | tar -xvf -
```

7.3 Flow of Threshold Monitoring

When a user uses the Performance Management window to issue an instruction for threshold monitoring of the devices subject to performance management, the performance management unit of this software periodically issues SNMP Traps through the LAN to the devices to obtain device performance information. The threshold-monitoring unit then sequentially analyzes the performance information.

If a problem is detected from the performance information, it is displayed as an alarm in the event log in the SAN Management window and displayed in the Threshold Monitoring Alarm Notification Log window of the Performance Management window.

Information

When a problem is displayed as an alarm in the event log, the event level is shown as [Warning].
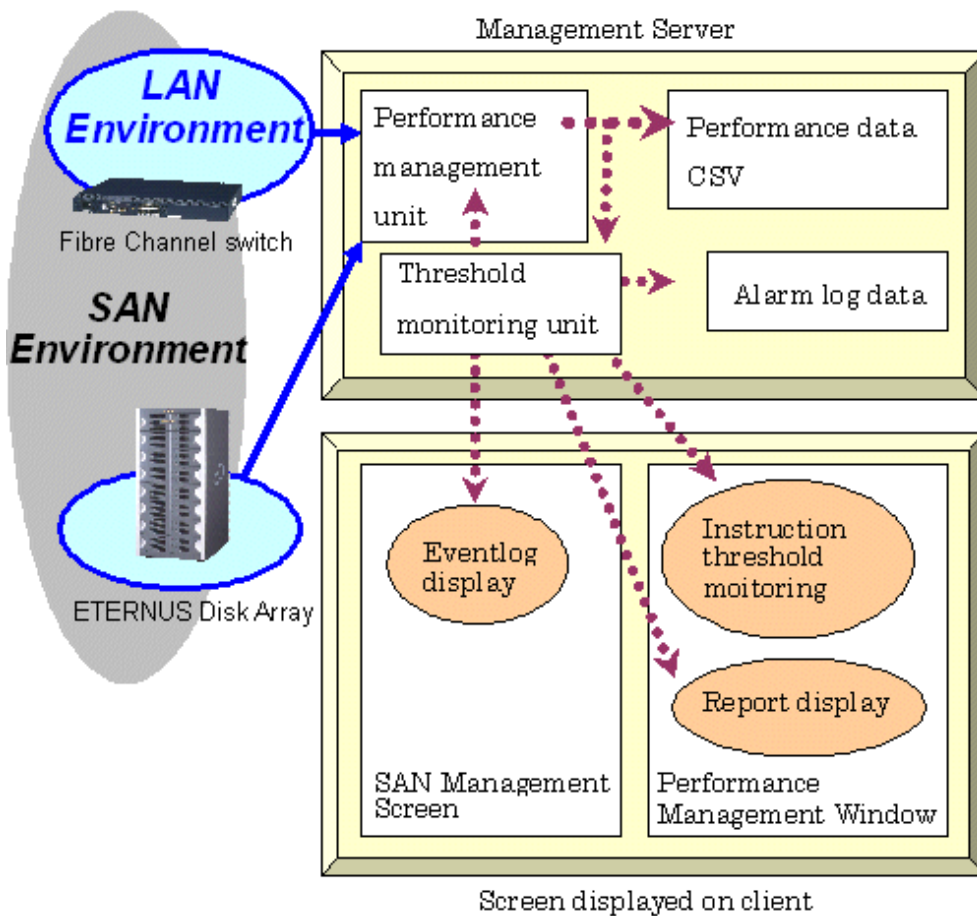
7.3.1 Checking disk space on the administrative server

For threshold monitoring, users must prepare disk space on the administrative server to save condition reports of the threshold monitoring alarm notification log. About 4 MB is required. Make sure that the server has sufficient disk space. This software has a functionality for deleting condition report data whose set retention duration days have passed. Data stored for 366 days or more is automatically deleted. Change this retention duration setting as required. For details, see Alarm Delete Setting in the "B.10.6 Threshold monitoring dialog functions".

7.3.2 Instruction for threshold management

Select the device name tree node from the GUI window Performance Management window tree, and select [Thresholds Monitoring] from the menu. Then, a variety of threshold monitoring setup menus appear. To use the menus, however, performance information of the device must have already been obtained by performance management.
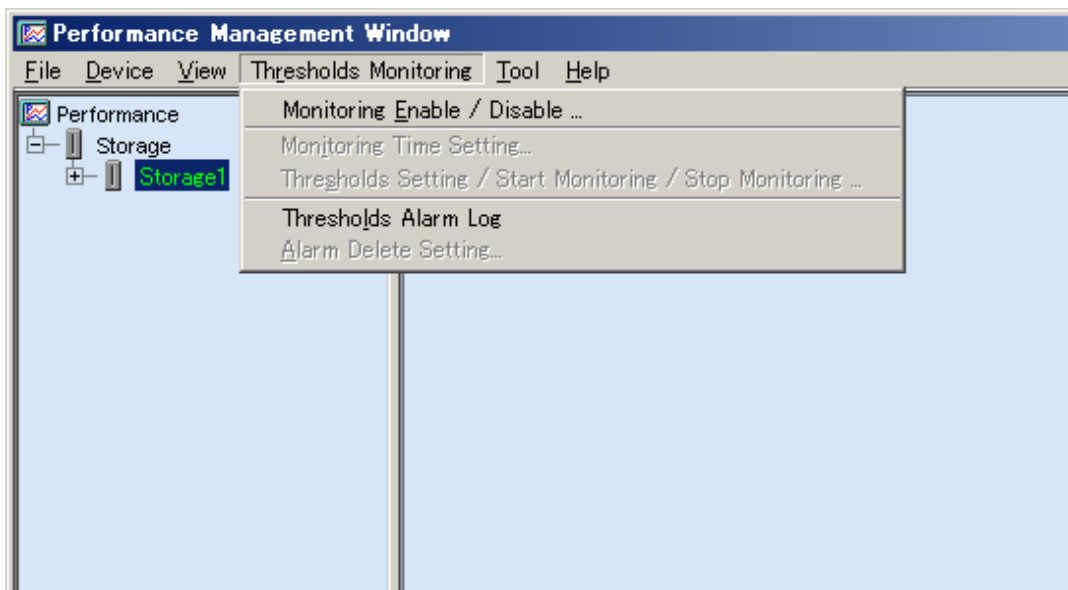
Select [Monitoring Enable / Disable]. This enables threshold monitoring, and you can set up different kinds of threshold monitoring.

7.3.3 Setting the threshold monitoring hours

To set a time period for threshold monitoring, select [Monitoring Time Setting]. If no time period is set, thresholds are monitored and alarms are reported for all time periods. Large volumes of threshold monitoring alarm logs may be reported depending on threshold settings. Users are recommended to set a time period if performance is a concern in a system environment where load varies considerably depending on how to use a target device.
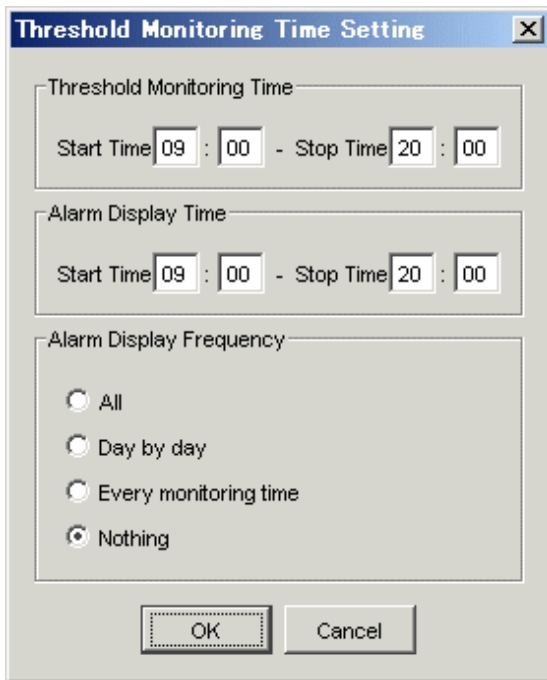
7.3.4 Setting the threshold monitoring information

Next, select [Threshold Setting / Start Monitoring / Stop Monitoring], define threshold setting information of the target device, and issue an instruction to start monitoring. Threshold monitoring then starts. Incidentally, since the threshold monitoring unit is started as a daemon of the administrative server along with the performance management unit, the threshold monitoring unit continues threshold monitoring while the administrative server is active, even if no GUI window is displayed. Moreover, refer to "B.10.6 Threshold monitoring dialog functions" for the setting of threshold setting information.
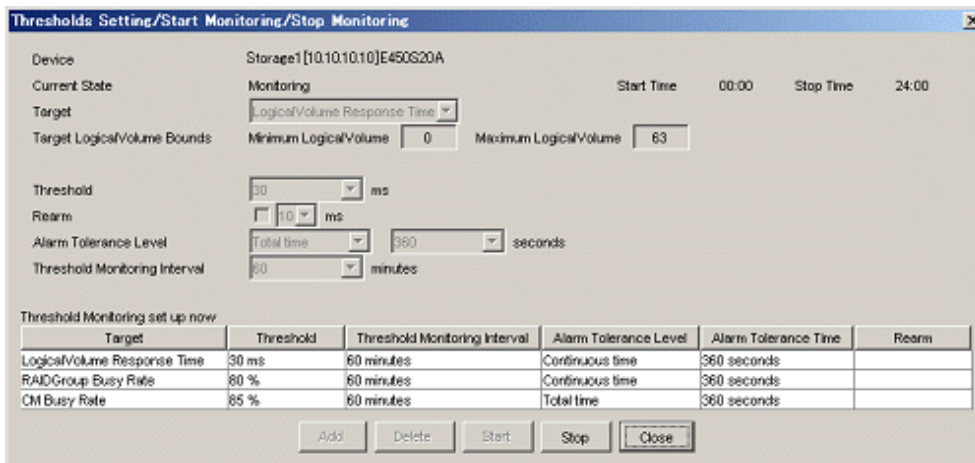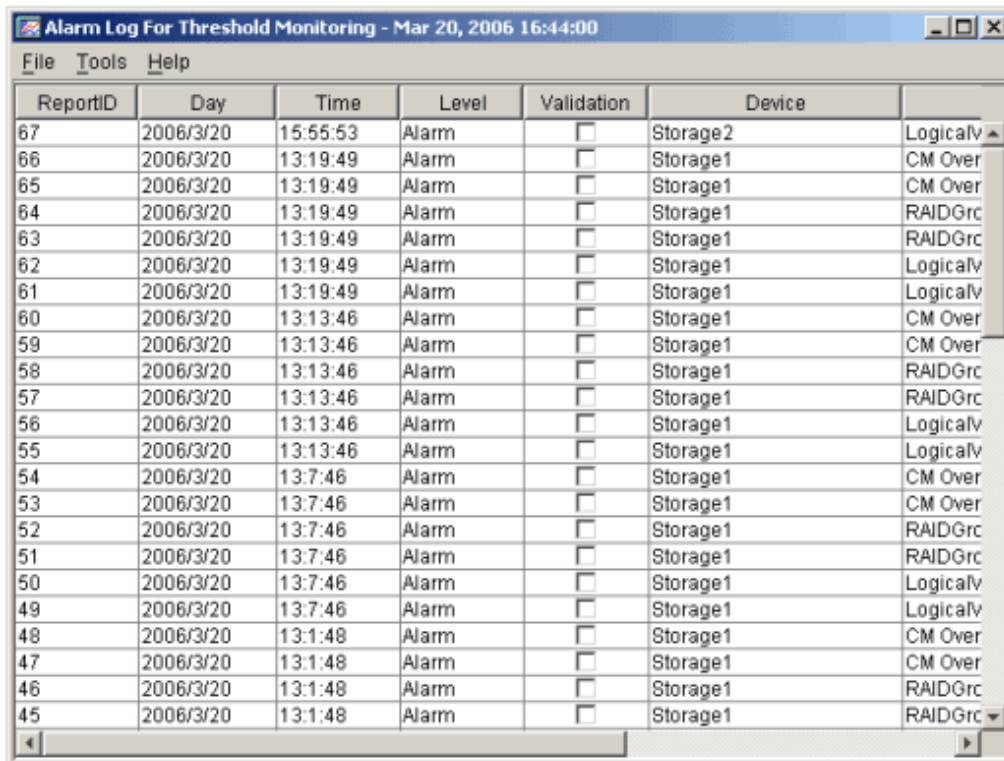
Note

For the CM load (CPU usage) rate, the ROE usage rate is not monitored.

7.3.5 Displaying threshold monitoring alarm logs

To display threshold monitoring alarm logs, open the Performance Management window, select [Thresholds Monitoring] - [Thresholds Alarm Log] from the menu. The displayed list is a list of logs of alarms detected by threshold monitoring. To open the Performance Management window, select [File] - [Performance Management Window] from the GUI menu.

ReportID	Day	Time	Level	Validation	Device	
67	2006/3/20	15:55:53	Alarm	☐	Storage2	LogicalV
66	2006/3/20	13:19:49	Alarm	☐	Storage1	CM Over
65	2006/3/20	13:19:49	Alarm	☐	Storage1	CM Over
64	2006/3/20	13:19:49	Alarm	☐	Storage1	RAIDGrc
63	2006/3/20	13:19:49	Alarm	☐	Storage1	RAIDGrc
62	2006/3/20	13:19:49	Alarm	☐	Storage1	LogicalV
61	2006/3/20	13:19:49	Alarm	☐	Storage1	LogicalV
60	2006/3/20	13:13:46	Alarm	☐	Storage1	CM Over
59	2006/3/20	13:13:46	Alarm	☐	Storage1	CM Over
58	2006/3/20	13:13:46	Alarm	☐	Storage1	RAIDGrc
57	2006/3/20	13:13:46	Alarm	☐	Storage1	RAIDGrc
56	2006/3/20	13:13:46	Alarm	☐	Storage1	LogicalV
55	2006/3/20	13:13:46	Alarm	☐	Storage1	LogicalV
54	2006/3/20	13:7:46	Alarm	☐	Storage1	CM Over
53	2006/3/20	13:7:46	Alarm	☐	Storage1	CM Over
52	2006/3/20	13:7:46	Alarm	☐	Storage1	RAIDGrc
51	2006/3/20	13:7:46	Alarm	☐	Storage1	RAIDGrc
50	2006/3/20	13:7:46	Alarm	☐	Storage1	LogicalV
49	2006/3/20	13:7:46	Alarm	☐	Storage1	LogicalV
48	2006/3/20	13:1:48	Alarm	☐	Storage1	CM Over
47	2006/3/20	13:1:48	Alarm	☐	Storage1	CM Over
46	2006/3/20	13:1:48	Alarm	☐	Storage1	RAIDGrc
45	2006/3/20	13:1:48	Alarm	☐	Storage1	RAIDGrc

Window title: Alarm Log For Threshold Monitoring - Mar 20, 2006 16:44:00 — File Tools Help

7.3.6 Displaying condition reports

Details of the list displayed by [Thresholds Monitoring] - [Thresholds Alarm Log] are displayed. Users can determine the appropriate actions and guidelines to take for different threshold monitoring alarms in the displayed report logs. To display the details, move the cursor to the report line of the threshold monitoring alarm log to be referred to, and double-click on the line.

```
LogicalVolume Response Time Abnormal  LogicalVolume0x0000        _ □ ×
File
Title :                          LogicalVolume Response Time Abnormal  LogicalVolume0x0000
Date :                           2006/3/20  15:55:53
Level :                          Alarm
Report ID :                      67
Device :                         E360S10A  Storage2
IP Address :                     10.10.10.10

Threshold :                      30 ms
Threshold Monitoring Interval :  60 minutes
Alarm Tolerance Time :           Total time,360 seconds
Rearm :
┌──────────────────────────────────────────────────────────────┐ ▲
│Report Detail :                                                 │
│The response time delay of LogicalVolume0x0000 that is defined to RAIDGroup0x000│
│0 was detected.                                                 │
│ The monitoring condition of the other object that it is related is as follows.│
│ CM Monitoring Condition :                                      │
│[CM0x00] Normal                                                 │ ▼
└──────────────────────────────────────────────────────────────┘
☐ Validation
┌──────────────────────────────────────────────────────────────┐
│Note:                                                           │
│                                                                │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```

7.3.7 Instruction for stopping threshold monitoring

From the Performance Management window menu in the GUI window, select [Thresholds Monitoring] - [Threshold Setting / Start Monitoring / Stop Monitoring]. To end threshold monitoring, click the <Stop> button in the window displayed for setting a threshold.

7.4 Evaluation Criteria for Thresholds in Threshold Monitoring

Storage thresholds

Standard storage thresholds are listed below.

	Online response-oriented system	Batch throughput-oriented system
LogicalVolume Response	30 ms or less	-
RAIDGroup Busy Rate	60% or less	80% or less
CM Busy Rate	80% or less	90% or less

For a response-oriented system such as for online applications, implementing LogicalVolume responses within 30 ms is a standard for stress-free storage operation. To implement responses within 30 ms, suppress the RAIDGroup busy rate to 60% or less and the CM busy rate to 80% or less.

In a throughput-oriented system such as for batch applications, LogicalVolume responses are extended to a few milliseconds because sequential access increases the cache hit ratios. However, the cache hit ratios are greatly affected by application access and the values change a great deal. As a result, responses may vary from a few milliseconds to 50 ms or more. Thus, for batch applications, there is no standard threshold for LogicalVolume responses.

To improve throughputs for batch applications, users must optimize the use of storage resources. Note, however, that performance may deteriorate rapidly if the above threshold is exceeded. For this reason, make it a standard to suppress the RAIDGroup busy rate to 80% or less and the CM busy rate to 90% or less.

During hours in which advanced copy is processing, advanced copy processing itself increases the CM busy rate.
For this case, set thresholds in consideration of execution of advanced copy.

Thresholds of switch ports

The threshold and lower limit value vary depending on the type of applicable switch (1 Gbps, 2 Gbps etc). When the switch type is 1 Gbps, the maximum value (100% use rate) is 100 MBps. When the switch type is 2 Gbps, the maximum value is 200 MBps. For the threshold, specify the allowable utilization (%) corresponding to the maximum value.

For instance, when 90% is specified for the threshold of a 2 Gbps type switch, the threshold of the throughput is:
200 MBps x 90% = 180 MBps (total of reception and transmission)
An alarm is given when the throughput reaches 180 MBps.

Switch port threshold monitoring is effective when there is a difference in the numbers of paths between the server and storage.

Figure A Application + backup system
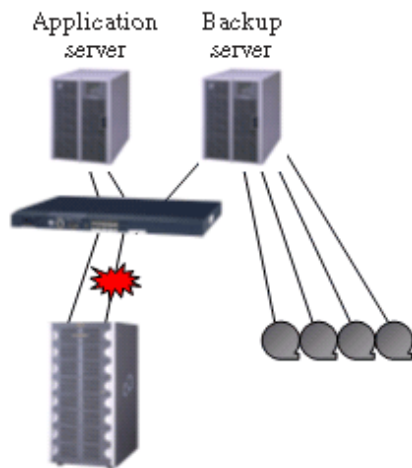
Figure B Cluster system (example: Oracle RAC)
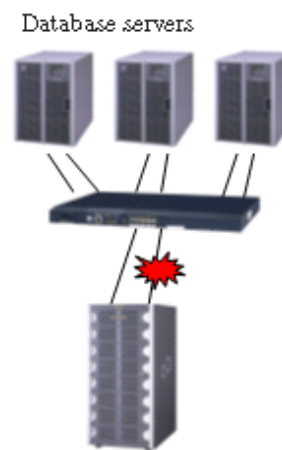
7.5 Examples of Threshold Monitoring

This section provides an overview of threshold monitoring in the form of key examples to enable users to determine what situations require thresholds and the types of thresholds that should be set for them.

Case 1: Online application system at company A

Material - System operation standard and performance requirements (excerpt)

1. Online application service hours: 8:00 to 18:00 everyday

2. Online application busy hours: 12:00 to 15:00 everyday

3. This system requires that operator terminal operation be stress-free even with workload during the busy hours.
   Therefore, the target performance of I/O response shall be "30 ms or less," which is a general standard.
   The target I/O response performance in hours other than the busy hours shall be "10 ms or less," one third of 30 ms, according to the workload proportion (the workload in the busy hours is about three times higher than that in other hours).

4. During the busy hours, processing for data reference, updating, and addition may occur concurrently and continue for up to 60 minutes.
   If a state in which an I/O response taking 30 ms or more occurs for a period equivalent to 10% (6 minutes) of the said continuous execution, operation at the operator terminal may undergo stress. Therefore, make the settings so that an alarm log will be generated when such state occurs.

5. If I/O responses during the busy hours come down to 10 ms or less, the same as the performance target in other hours, the I/O response delays that occurred previously shall be deemed as instantaneous symptoms.
   Therefore, an alarm log need not be generated when this state occurs.

6. The event log need not be displayed every time an alarm log is generated but can be displayed only once a day.
   (This is because the system administrator checks the condition report once a day.)

Illustration of operational status of company A's online application system (transition of LogicalVolume responses)
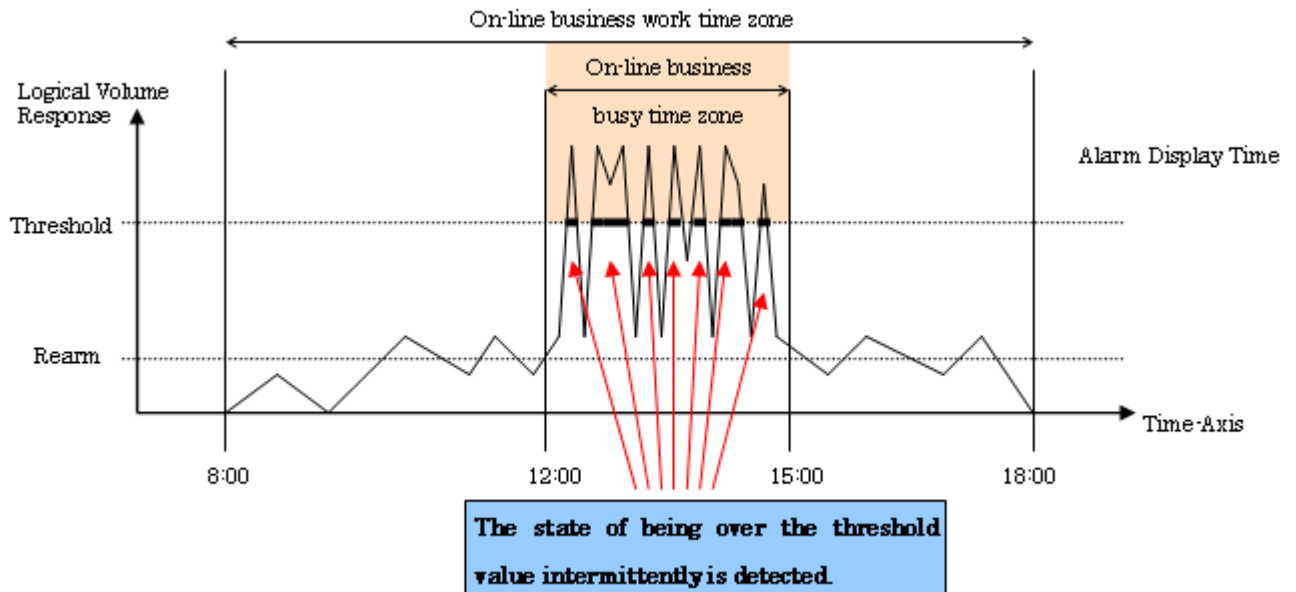
An example of threshold monitoring setting for company A's online application system

Number corresponding to Material	Setting item	Setting
1	Threshold Monitoring Time	8:00-18:00
2	Alarm Display Time	12:00-15:00
3	Target	LogicalVolume Response
3	Threshold	30 ms
4	Threshold monitoring Interval	60 minutes
4	Alarm Tolerance Level	Total time: 360 seconds
5	Rearm	10 ms
6	Alarm Display Frequency	Day by day

Case 2: Online shopping system of company B

Material - System operation standard and performance requirements (excerpt)

1. Online application service hours: 24 hours a day for 365 days a year

2. Online application busy hours: Cannot be specified.

3. This system features that the number of accesses gradually increases as the number of member customers increases after start of the production run. It is assumed that the load on storage will also increase gradually. Measures need to be taken when the busy rate of storage resources (CM and disk) comes over 60% to 80%.

4. This system executes credit card transactions every 5 minutes. Therefore, for five minutes immediately before each transaction, product retrieval and order processing must be executed without stress. If the storage resource is kept in busy state (a state in which the busy rate exceeds 60% to 80%) for five minutes, transactions may be affected. Therefore, make settings so that an alarm log will be generated when such state occurs.

5. Event log shall be displayed every time an alarm log is generated. The system administrator checks the condition report when an event log is displayed.

Illustration of operational status of company B's online shopping system (transition of CM busy rate)

The state of being over the threshold value continuously is detected.
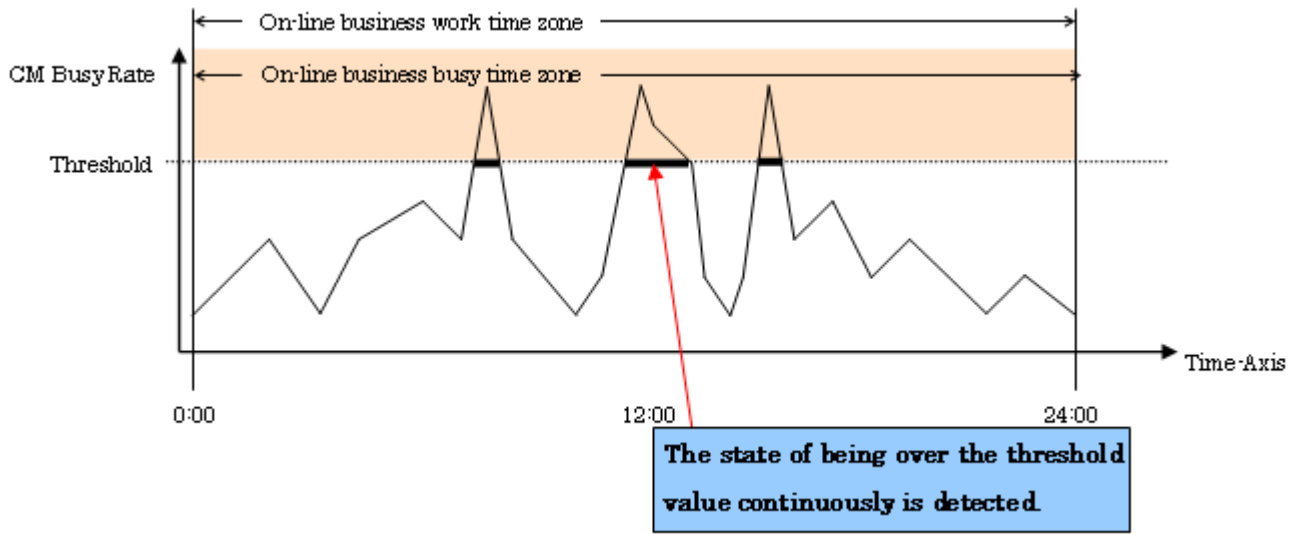
An example of threshold monitoring setting for the company B's online shopping system

Number corresponding to Material	Setting item	Setting
1	Threshold Monitoring Time	0:00-24:00
2	Alarm Display Time	0:00-24:00
3	Target	CM Busy Rate
3	Threshold	60%
4	Alarm Tolerance Level	Continuous time: 300 seconds
5	Alarm Display Frequency	All

Number corresponding to Material	Setting item	Setting
1	Threshold Monitoring Time	0:00-24:00
2	Alarm Display Time	0:00-24:00
3	Target	RAIDGroup Busy Rate
3	Threshold	80%
4	Alarm Tolerance Level	Continuous time: 300 seconds
5	Alarm Display Frequency	All

Case 3: Batch processing with multiple database servers (cluster system) of company C

Material - System operation standard and performance requirements

1. System service hours: 24 hours a day, 365 days a year

2. Batch processing hours: 20:00 to 23:00 every night

3. This cluster system is an Oracle RAC system consisting of three nodes. There is no problem with the batch processing performance because the amount of processed data is currently small. As the amount of data increases in the future, however, we have concerns over bottlenecks in the performance of FC path transfer between the FC switch and storage.
If an FC path bottleneck occurs, it must be eliminated quickly.

4. Assume the state in which the port throughput reaches about 80% of the maximum transfer capability as an FC path bottleneck, and make settings so that an alarm log is generated when such state continues for 30 minutes or more.

5. Event log need not be displayed every time an alarm log is generated but can be displayed only once even when an alarm log is generated more than once in the batch processing hours. The system administrator checks the condition report when an event log is displayed.

Illustration of batch processing with multiple database servers (cluster system) at company C (transition of port throughputs)

The state of being over the threshold value continuously is detected.
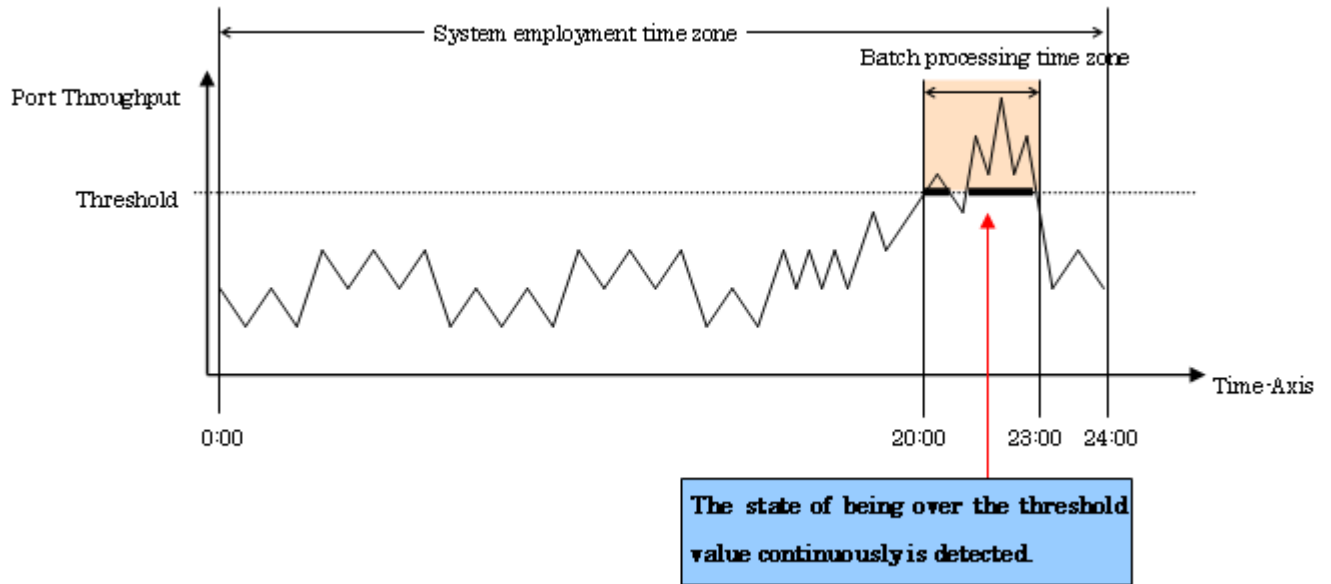
An example of threshold monitoring setting for business system backup operation at company C

Number corresponding to Material	Setting item	Setting
1	Threshold Monitoring Time	0:00-24:00
2	Alarm Display Time	20:00-23:00
3	Target	Port Throughput
3	Threshold	80%
4	Alarm Tolerance Level	Continuous time: 1,800 seconds
5	Alarm Display Frequency	Every monitoring time

7.6 Condition Report and Corrective Measures for Problems

7.6.1 Delay in LogicalVolume response

```
Report Detail:
The response time delay of LogicalVolume YYYY that is defined to RAIDGroup XXXX was detected.
The monitoring condition of the other object that it is related is as follows.
CM Monitoring Condition :    <- (1)
[CM0x00] Alarm
[CM0x01] Normal
[CM0x10] Normal
[CM0x11] Normal
```

```
Monitoring condition of RAIDGroup XXXX : Alarm      <- (2)


The block size of I/O at the time of the response time delay detection is 8K bytes.      <- (3)


Relevant Graph :
Please refer to the response time graph of LogicalVolume YYYY.


Action :
1. There is the possibility of RAIDGroup overload condition. Please confirm the RAIDGroup overload
alarm and
refer the measure guide.
2. There is the possibility of CM overload condition.Please confirm the CM overload alarm and refer
the measure guide.
If the device has ROE, there is the possibility of ROE overload condition. Please refer to ROE busy
rate.
If the ROE detected a high load state, refer to the busy rate of each CM, and distribute I/O to
RAIDGroups
under control of a CM with a low load.
3. It is posible that time is required to I/O processing because the block size is big.
Please review the threshold value.
```

Description of (1)

Indicates the state of each CM during the same time zone as the LogicalVolume response delay is detected. However, the state of each ROE is not indicated.

Alarm	An alarm log indicating a CM load error is generated during the same time zone. If the CM in charge of the LogicalVolume in which a response delay was detected is in the high load state, a response delay due to a CM bottleneck is assumed. Refer to the guidelines for corrective measures for alarms for the relevant CM.
Monitoring	The CM is monitoring for alarm detection because the threshold has been exceeded several times although no events have been detected as an alarm.
Normal	・ When the CM busy rate is defined as a threshold monitoring target No CM bottleneck has occurred during the same time zone.Check the RAIDGroup defining the LogicalVolume for alarms. ・ When the CM busy rate is not defined as a threshold monitoring target The CM busy rate is not monitored. ("Not detected" is displayed irrespective of the CM busy rate.)

Description of (2)

Indicates the state of the RAIDGroup in which the relevant LogicalVolume is defined during the same time zone as the LogicalVolume response delay is detected.

High load state detected	An alarm log indicating a RAIDGroup load error is generated during the same time zone. A response delay due to bottlenecks of disks configuring a RAID is assumed. Refer to the guidelines for RAIDGroup corrective measures for alarms for the relevant RAIDGroup.
Monitoring	The CM is monitoring for alarm detection because the threshold has been exceeded several times although no events have been detected as an alarm.
Not detected	・ When the RAIDGroup busy rate is defined as a threshold monitoring target There is no bottleneck of disks comprising the RAID in the same time zone. ・ When the RAIDGroup busy rate is not defined as a threshold monitoring target The RAIDGroup busy rate is not monitored. ("Not detected" is displayed irrespective of the RAIDGroup busy rate.)

Descrition of (3)

Indicates the I/O block size at the time of detection of a LogicalVolume delay response.
If the CM and ROE in charge of the relevant LogicalVolume or the ROE for assigned CM or the defined RAIDGroup is not in the

high load state, an alarm is not attributable to CM and disk bottlenecks but may be attributable to an unreasonably large I/O block size for the threshold.

For instance, when a response delay is detected while the threshold of the LogicalVolume response is set to 30 ms, no CM and disk bottlenecks have occurred, but the I/O block size may be 512K bytes. In this case, the most highly probable cause of the response delay is a large I/O block size. Generally, the larger the I/O block size, the larger the response delay. When the standard response is set to 30 ms, an I/O block size of 512K bytes or more is a rough indication for a response delay due to the I/O block size.

Take measures such as reviewing the threshold of the LogicalVolume response or reducing the I/O block size in the application.

7.6.2 RAIDGroup load error

```
Report Detail:
The high overload condition of RAIDGroup XXXX was detected.

Relevant Graph :
Please refer to the graph of RAIDGroup XXXX busy rate.
Please refer to the IOPS graph of each LogicalVolume of RAIDGroup XXXX.

Action:
1. There is the possibility that I/O is focusing on LogicalVolume in same RAIDGroup.   <- (1)
    Please move the LogicalVolumes in the overloaded RAIDGroup to other RAIDGroups (or new extension
RAIDGroup) to distribute I/O.
```

Description of (1)

Indicates the guidelines for corrective measures for disk bottlenecks.

Take measures such as distributing I/O loads by relocating the LogicalVolume data with the highest IOPS in the relevant RAIDGroup to a RAIDGroup with less disk utilization or a newly created RAIDGroup.

7.6.3 CM load error

```
Report detail:
The high overload condition of CM XX was detected.
The monitoring condition of the other object that it is related is as follows.
CM Monitoring Condition :    <- (1)
[CM0x00] Alarm
[CM0x01] Normal
[CM0x10] Normal
[CM0x11] Normal

Relevant Graph:
Please refer to the graph of CM busy rate. If the device has ROE, please refer to the graph of ROE
busy rate.
Please refer to the IOPS graph of each LogicalVolume.    <- (2)

Action :
1. There is the possibility that I/O is focusing on RAIDGroups under the same CM.    <- (2)
   Please refer the monitoring condition of each CM and disperse the I/O to the RAIDGroup under the
low overload CM.

2. The case of monitoring condition of each CM are all "Monitoring" or "Alarm",
It is possibility that CM number is insufficient to I/O demand.
Please consider GR hard extension or upgrade.
```

Description of (1)

Indicates the states of other CMs during the same time zone as the relevant CM detected a high load state. However, the state of each ROE is not indicated.

Alarm	An alarm log indicating a load error in the relevant CM is generated during the same time zone.
Monitoring	The CM is monitoring for alarm detection because the threshold has been exceeded several times although no events have been detected as an alarm.
Normal	The relevant CM did not cause a bottleneck during the same time zone.

Description of (2)

If only the relevant CM detected a high load state, I/O access is unevenly concentrated on the CM.
Refer to the IOPS graphs of RAIDGroups and LogicalVolumes and take measures such as distributing I/O loads of each CM.

Point

CM is put in high load state when a transaction is in contention with advanced copy.
In this case, review the operation mode so that advanced copy is executed in a time slot in which a transaction load is relatively small.
Alternatively, if the same CM controls both the copy source and target volumes (RAIDGroups), use separate CMs to control the source and target volumes.

7.6.4 Port throughput load error

```
Report detail:
Port X in the high load state was detected.
The maximum transfer rate of the relevant port is 1 Gbps.

Related graph:
Refer to the Port X throughput graph.

Guidelines for corrective measure:
1. I/O is probably concentrated on the same port.
   Check the setting of the path of the relevant port, or consider adding a path switch. <- (1)
```

Description of (1)

An I/O load is concentrated on the relevant port. Access is probably biased to the same port due to a change in logical paths or setting errors made during expansion. Examine the port load balance by referring to the send/receive graphs of all ports of the relevant switch.

7.7 Definition File

The following items for performance management can be set up in perf.conf file.

・ The number of days to retain performance data

・ The number of generations of log files (perflog.*)

・ Whether or not the number of active disks, power consumption and temperature performance management is to be used

See

Refer to "C.4 perf.conf Parameter" for the settings.

Chapter 8 Maintenance of Devices to be Managed

8.1 Windows Displayed in the Event of a Fault and Troubleshooting

If a fault occurs on a device, an error description of the fault is output to the event log and device events in the resource view, the icon color of the device also changes to red [Error] or yellow [Warning] if the support level of the device is A or B. (The criteria of red and yellow color-coding depends on the device definition.) If this software can identify an access path affected by the fault, the access path status is changed to "Access Path Error" (red).

For a device whose support level is I, an error description of a fault on the device is not output to the event log and device events by default. Neither is the color of the device icon changed. However, if all of the following conditions are satisfied, it is possible to output an error description of the fault to the event log and device events and to change the color of the device icon:

- The device supports SNMP Traps.

- The device IP address is specified during manual embedding.

- The SNMP Trap XML definition file has been created.

See
. . . .
For information on how to create the SNMP Trap XML definition file, see "C.6 SNMP Trap XML Definition File".
. . . .

According to the displayed status, take action in the sequence of steps below.
Incidentally, for middleware errors not involving server node HBA and multipath faults, only events are reported. To troubleshoot middleware errors, refer to the appropriate middleware manuals.

1. If the storage system, library, or bridge is in the [Error] or [Warning] state:

   Double-click the storage system, library, or bridge on the GUI window to display the respective view. Right-click the icon of the target device, and select [Call management software] from the pop-up menu. From the Storage Maintenance window that is then displayed, identify the part of storage with the error. To replace the failed component, contact a FUJITSU engineer (CE) as necessary.

   If a channel adapter (CA) fails and Refresh is performed, "Error" is displayed for the CA in the "Storage view" (only for the ETERNUS and GR machines). Likewise, if a robot or tape in the library device fails and Refresh is performed, "Error" is displayed for the robot or tape (only for LT270/LT250/LT160).

2. If [Error] or [Warning] is indicated for a Fibre Channel switch or hub:

   Double-click the Fibre Channel switch or hub on the GUI window to move to the Fibre Channel Switch/Hub view. Right-click the icon of target Fibre Channel switch or hub, and select [Call management software] from the pop-up menu. From the Device Maintenance window that is then displayed, identify the failed component of the Fibre Channel switch or hub. To replace the failed component, contact a FUJITSU engineer (CE) as necessary.

   If a port is in the abnormal state because of a GBIC or other some error, [Error] is indicated for the port in the Fibre Channel Switch/Hub view. In this event, the status of the affected access path is displayed as [Access Path Error]. To identify the special file name affected (device file name), refer to the properties of the access path.

   If an access path is defined in the settings of an access path of this software, the zoning setting of the Fibre Channel switch is defined as WWPN zoning. Therefore, if a port of the Fibre Channel switch fails, the Fibre Channel cable connected to it can be reconnected to another Fibre Channel switch port, and operation can be restarted.

   Also, see "A warning for a device is displayed (in yellow)" in "4.2.1.3 Problem-handling (FAQ)".

3. If a server node is in the [Error] or [Warning] state:

   Check the physical route of the access path indicated with [Access Path Error] in the "Server Node view" of this software. If no faulty device is on the route, check whether a Fibre Channel cable along the route is disconnected. If you cannot identify the cause, contact a FUJITSU engineer.

On the server node that msdsm (the multi path driver that is built into Windows operating system since Windows Server 2008 by the standard) is set effectively the server node becomes [Warning] state even if the single path (access path that is not redundant configuration) exists. This depends on the msdsm specification. Because the information of the access path that corresponds to [Access Path Error] disappears from OS, this software cannot be distinguished from the single path. If access path is configured with the single path, set the msdsm ineffectively.

Also, see "A warning for a device is displayed (in yellow)" in "4.2.1.3 Problem-handling (FAQ)".

4. If an access path is in the [Access Path Error] state:

Refer to the properties of the access path in the [Access Path Error] state as indicated in the "Server Node view", and identify the special file name affected. The affected special file name /dev/rdsk/cXtYd?s? of the Solaris OS can be identified by specifying X and Y, where X is the controller number of the HBA properties and Y is the target ID of the access path properties.

[Solaris OS server node] For an access path configured using multipath disk control (ETMPD, MPLB, MPHD, and GRMPD), refer to multipath disk control manuals for information on taking action on the server node as described below. To replace an HBA, follow the HBA replacement procedure given below.

Type of Multipath disk control	Manual name
ETMPD	ETERNUS Multipath Driver User's Guide
MPHD	Multipath Disk Control Guide
MPLB	Multipath Disk Control Load Balance Option (MPLB) Guide
GRMPD	GR Multipath Driver User's Guide

- Obtaining path statuses (iompadm info)

  Check the current path configuration and status. If the multipath disk was not accessed, FAIL may not be detected.

- I/O stop related to a failed access path (iompadm change)

  ETMPD/MPLB/GRMPD has a function to automatically stop input and output affected from the failed part.

- Replacement of failed components (if necessary) and troubleshooting

  To replace a failed component, contact a FUJITSU engineer (CE).

- I/O restart of a stopped access path (iompadm restart)

  For an access path not configured using multipath disk control (ETMPD, MPLB, MPHD, and GRMPD), a job performed with the target special file mounted is affected. Stop the job and take appropriate action for the fault. To replace a failed component, contact a FUJITSU engineer (CE). To replace an HBA, follow one of the procedures given in Steps 5 and 6, "Host bus adapter (HBA) replacement procedure".

5. [For Solaris OS server node] Host bus adapter (HBA) replacement procedure

For a server node that does not support the hot system replacement function, turn off the server node in order to replace the HBA. Do not restart or shut down the server node in reconfigure mode during replacement. (This is because the special file name is changed if the reboot -r command, boot -r command, or other such command is executed.) Only for a server node that supports the hot system replacement function, operation can continue while the HBA is replaced and the process described in "6.3.5 Access path inheritance" is followed. For more information on hot system replacement, refer to the appropriate device manuals.

a. Shutting down the server node

  Confirm that the /reconfigure file does not exist, and turn off the device.

```
# ls /reconfigure
/reconfigure: No such file or directory
```

  Confirm that the file does not exist as described above. If the "reconfigure" file is found, delete it, create the "reconfigure" file after HBA replacement, and then reboot the server node.

  To delete the "reconfigure" file, enter the following command:

```
# rm /reconfigure
```

  After deleting the "reconfigure" file, execute the Is command to verify that the file does not exist.

Shut down the server node without reconfiguration.

```
# /usr/sbin/shutdown -y -i0 -g0
```

b. Replacing the HBA

To replace a failed component, contact a FUJITSU engineer (CE).

c. Activating the server node

Activate the server node.

No access path, however, is recovered here. This is because the zoning is based on old HBA information is defined on the storage system and Fibre Channel switch.

d. Inheriting access paths (resetting security)

Follow the process of "inheriting an access path" from this software, and define the zoning setting so that the method of access based on the new HBA information can be the same as that for the previous access path of the storage system and Fibre Channel switch.

e. Reboot the server node

Reboot the server node without reconfiguration (reboot -r, boot -r, etc. are prohibited.)

```
# /usr/sbin/shutdown -i6
```

The access path is recovered here. Accordingly, the path for multipath disk control is also recovered.

6. [For Windows, Linux, HP-UX and other server nodes] Host bus adapter (HBA) replacement procedure

For a server node that does not support the hot system replacement function, turn off the server node in order to replace the HBA. Only for a server node that supports the hot system replacement function, operation can continue while the HBA is replaced and the access path is inherited. For more information on hot system replacement, refer to the appropriate device manuals.

a. Shutting down the server node

b. Replacing the HBA

c. Activating the server node
No access path, however, is recovered here. This is because zoning based on old HBA information is defined on the storage and Fibre Channel switch.

d. Inheriting access paths (resetting security)
Follow the process of "inheriting an access path" from this software, and define the zoning setting so that the method of access based on the new HBA information can be the same as that for the previous access path of the storage system and Fibre Channel switch.

e. Reactivating the server node

7. Actions to take on this software after component replacement

Select [View] - [Refresh] from the menu to obtain the current device status. When the device state is recovered because of the replacement, the device state returns to and is displayed as the normal state.

For the device status edited in the LT120, LT130, LT200, LT210, LT220, LT230, NR1000 configuration, and edited with the Manual Configuration window, those are not recovered automatically. After the device is recovered, return the state for the device manually. There are following two methods to return the state for the device manually.

- Right-click the device icon in the Resource View, select [Property] from the pop-up menu. Click <Change> button of "Device Status", select "normal" in the list of "Change Device Status" dialog.

- Right-click the device icon in the manual configuration window, select [Change Device Information] from the pop-up menu, select "normal" in the "Device Status" list.

When the server node is in the [Error] or [Warning] state though the state of the storage system or the Fibre Channel switch has returned to the normal state:

Recover the failed path by following the instructions in multipath disk control (ETMPD, GRMPD, MPLB, and MPHD) manuals. After recovering the path of multipath disk control, select [Refresh] again to check the current device status.

Type of Multipath disk control	Manual name
ETMPD	ETERNUS Multipath Driver User's Guide
MPHD	Multipath Disk Control Guide
MPLB	Multipath Disk Control Load Balance Option (MPLB) Guide
GRMPD	GR Multipath Driver User's Guide

8.2 Replacement of Supported Device

You cannot update information of a monitored device that has been registered in this software by executing [View] - [Refresh] on the resource view. To update, first delete the icon of the old device on the resource view, then search for and add the device. For the other procedures required by each device, see the description below.

8.2.1 Replacement of Fibre Channel switch

This section explains the replacement procedure for Fibre Channel switch (hereafter, refer to switch) registered in this software.

When [View] - [Refresh] is executed by resource view when the replacement of the switch has already been completed, a new switch is replaced with the old switch icon and is displayed in violet. In this case, execute the replacement procedure from "Registration of the new switch to this software" in step 4. Since, however, the addition work is required when performance monitoring has been set for an old switch, contact Fujitsu system engineer (SE).

1. Stop of performance monitoring to switch to be replaced
   (When it is not a monitoring device, this operation is unnecessary.)

   When switch is to be replaced is as performance monitoring device, the performance monitoring is stopped by [Performance management] - [Stop] of the pop-up menu. However, execute the performance monitoring stop after stopping the threshold monitoring when monitoring the threshold. The "P" mark displayed on the left of the object device icon disappears after stopping the performance monitoring.

2. Registration and deletion of switch to be replaced

   Select [File] - [Delete] from the menu bar of either the SAN view, and delete the replacement target switch from the devices registered with this software. When deletion from the registered devices is completed, the GUI window no longer displays the icon of the target device.

3. Physical replacement of old and new switch

   As for the replacement work for the device, contact a FUJITSU engineer (CE) and perform the replacement according to the maintenance procedure manual for the device.

   When replacing a switch that is not connected in cascade, you may have to manually perform zoning settings again if the switch configuration information (configUpload file) has not been stored. After registering the new switch in this software, perform Step 5, "Setting of switch zoning" below. For details of the switch configuration information (configUpload file), see the manual that comes with this device.

4. Registration of new switch to this software

   Register new switch to resource of this software.

   - Search of new switch

     Select [File] - [Detect SAN devices] from menu bar of the Base domain view from storage category and detect the new switch. When the object device is detected, the icon is displayed in violet. (For details, refer to "5.2.1 Device search".)

   - Registration of the new switch to this software

     Select [File] - [Register] - [Register SAN devices] from menu bar of Switch view from SAN catagory, and register the device to this software. When registration is normally completed, new switch is displayed by a green icon. (For details, refer to "5.2.2 Adding a device (changing from the violet icon state to the registered state)".)

5. Setting of switch zoning

   If zoning has been set, a cascade connection has not been set, and configuration information (the configUpload file) has not been saved for the previous switch (that which is being replaced), it is necessary to set the zoning manually.

   If zoning has not been set or a cascade connection has been set for the switch, there is no need to set the zoning manually.

   If there is configuration information (the configUpload file), refer to the maintenance manual for the device.

   The access path will be displayed as yellow color, because the old switch, which is managed by this software, zoning setting does not exist. These access paths are displayed as definition conflicts because the new switch does not have the zoning information that was stored on the switch defined for access paths in this software. Specify the following:

   Set the access path displayed in the yellow between HBA-CA again. Set the access path to which yellow is displayed based on the procedure of the access path setting again. When the settings were successfully made, the access path is displayed in green or blue.

   ## 🛑 Note
   ···
   When the zoning in the switch is set by zonings (Between HBA-HBA, CA-CA, HBA-UnknownFC, CA-UnknownFC, and UnknowFC-UnknownFC) other than the access path route between HBA-CA on the management of this software, the access path of those zonings are not displayed in the Side view at all regardless of before and after the replacement. Therefore, there is no alarm display of the access path definition contradiction between above-mentioned HBA-CA after replacing the switch. Execute the access path setting with this software again in HBA-HBA and CA-CA, set the zoning with Web Tools of the switch or set the zoning by the telnet command to the switch when zonings other than the access path route between HBA-CA has been set with old switch.
   ···

6. Performance monitoring beginning setting to new switch
   (When it is not a monitoring device, this operation is unnecessary.)

   Execute the following when switch is a device to be the performance-monitored.

   Start the performance monitoring by selecting [Performance management] - [Start] from the pop-up menu. When the performance monitoring setting is normally done and the monitoring is begun, the "P" mark of green is displayed on the left of the icon. (See "Chapter 7 Performance Management" for details.)

   Moreover, do the threshold monitoring setting again when the threshold monitoring setting is done. (Refer to "7.3 Flow of Threshold Monitoring" for details.)

8.2.2 Replacing Faulty Parts and Faulty Device at Manually Embedded Device Failure

If WWPN is changed because of a faulty component of a manually embedded device such as an adapter (CA) or drive is replaced, this software cannot automatically detect the replacement. Perform the following operation manually to execute access path inheritance:

1. Select [View] - [Refresh] from the menu.

2. Double-click the replaced device in the SAN view to display the view of the device. The figure on the lower left shows an example of the view before replacement of the adapter (CA), and the figure on the lower right shows an example of the view after replacement

of the adapter (CA). Because the Fibre Channel switch cannot recognize the old adapter, the icon of the old adapter is in the "timeout" state.
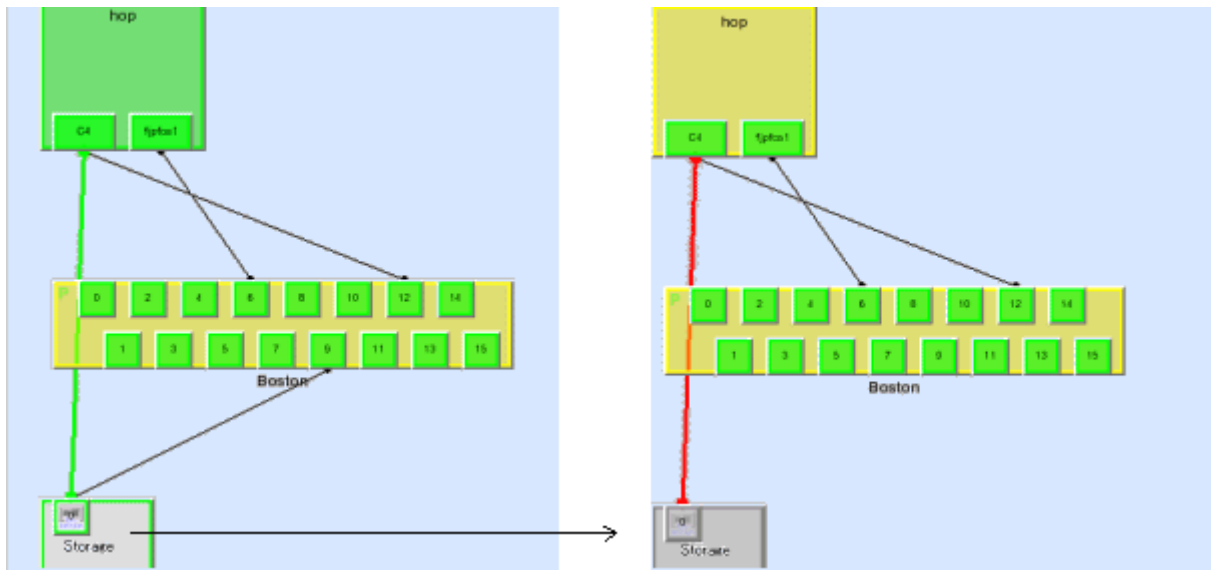
3. Embed the new adapter into the target storage device. To do so, open the Manual Configuration window, search for the [Unknown] icon of the new adapter, and drag the icon and drop it on the device. After completion of embedding, exit the Manual Configuration window. An example of the Manual Configuration window is shown below. The new adapter connected to port 5 of the Fibre Channel switch is embedded into the storage device.
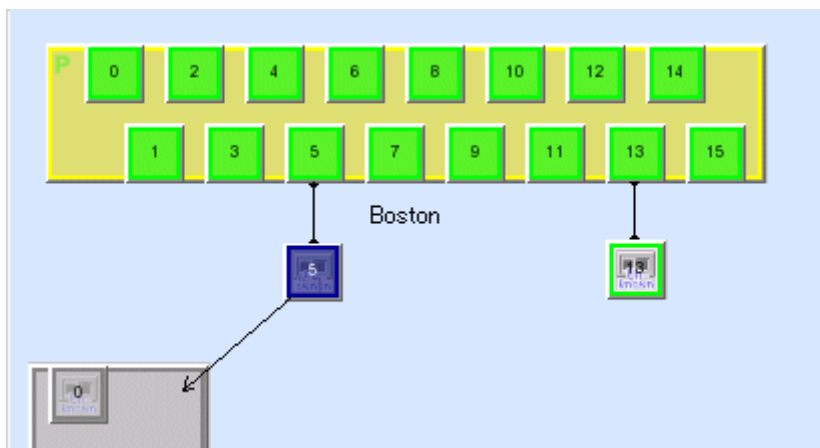
4. In the "Storage view" in which no icon is selected, select [Operation] - [Access Path] - [Inherit] - [Mode Start] from the menu. A dialog box appears with the message "The access path inheritance operation will be enabled". A port through which this software cannot recognize a device connected to the Fibre Channel switch is displayed as an Unknown FC port in a white square icon

connected to the Fibre Channel switch. If a new HBA corresponds to this icon, perform the following operation assuming the icon is the new HBA.
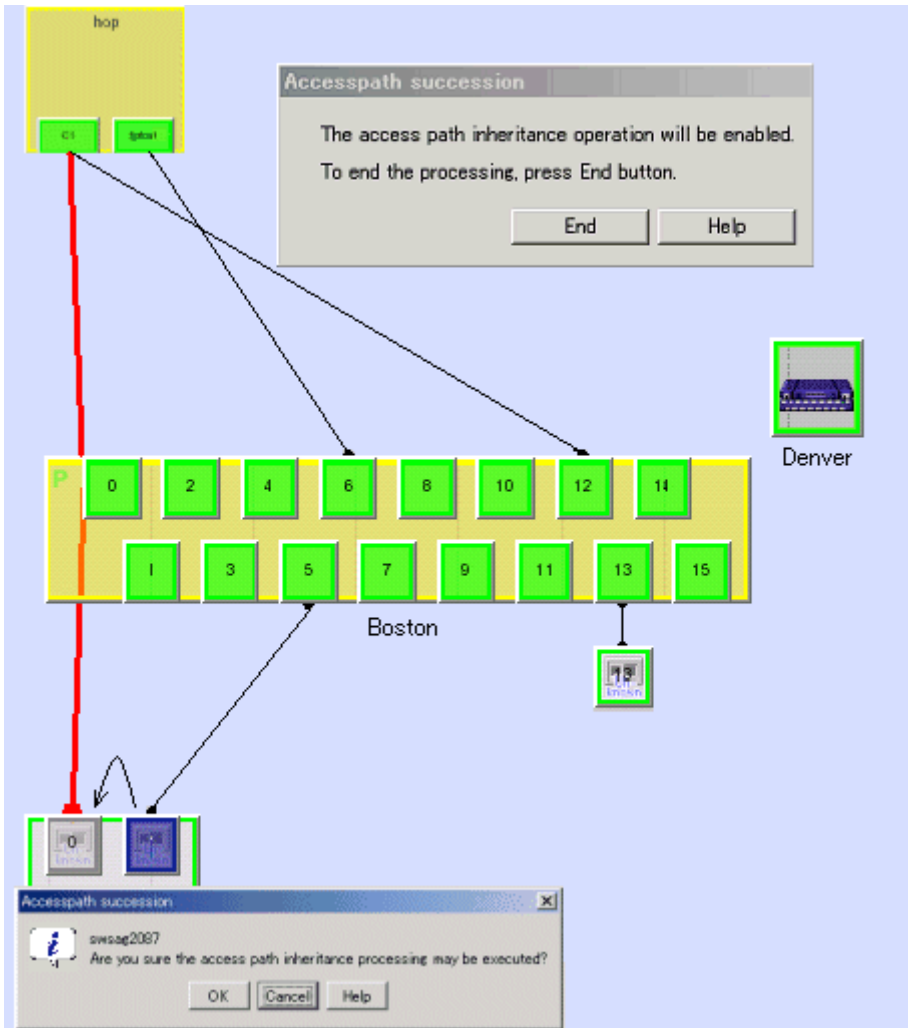
5. Under this condition, drag the new adapter icon and drop it on the old adapter icon. A dialog box appears confirming whether to inherit the access path. Select <OK> button to inherit the access path. During inheritance processing, this software deletes the access path setting from the related devices that was created in the old adapter information and adds the access path setting created in new adapter information to the related devices.

Device type			Setting by this software
Solaris OS server node	With Agent	PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F	Changes the setting of association between fjpfca.conf TID and WWPN to new adapter WWPN (*1)
		LP9000, 9002S, 9002L, 9802, 10000	Changes the setting of association between lpfc.conf or lpfs.conf TID, LUN and WWPN to the new adapter WWPN
		Other HBA	No setting
	Without Agent		No setting

Device type		Setting by this software
Windows server node	With/without Agent	No setting
Linux server node	With/without Agent	No setting
HP-UX server node	With/without Agent	No setting
Other server node	Without Agent	No setting
Fiber channel switch	With zoning setting	Deletes one-to-one WWPN zoning created with an old adapter WWPN and uses one-to-one WWPN zoning created with a new adapter WWPN (no setting if access path inheritance is not required because of port zoning)
	Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.

*1: This software does not change the fjpfca.conf setting if the chgfcctl/clchgfc command included with the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F driver is executed before access path inheritance.

6. Access path inheritance by drag & drop can be performed for multiple adapters until <End> button is selected from the "The access path inheritance operation will be enabled" dialog box.

7. A server node that does not support hot configuration change must be restarted after the setting is changed.

8.3 Replacement of the Parts of Supported Device

The following explains how to replace the parts of supported device managed by this software.

📝 Note

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・ Before executing access path inheritance, select [View] - [Refresh] from the menu, and verify that all Fibre Channel switches cascaded to the Fibre Channel switch related to access path setting are correctly recognized in the current status. Once an access path is changed in a state where a Fibre Channel switch is temporarily disconnected from the cascade connection, the old cascade connection cannot easily be recovered. (In this event, execute the cfgClear command to delete zoning information for the Fibre Channel temporarily disconnected from the cascade connection. This enables cascade reconnection.)

・ FUJITSU PCI Fibre Channel utility command chgfcctl/clchgfc
chgfcctl/clchgfc is executed when storage adapter (CA), drive and so on are replaced. chgfcctl/clchgfc indicates the hot system replacement of Fibre Channel device and executes the editing of fjpfca.conf. However, because chgfcctl/clchgfc does not set Fibre Channel switch zoning again, execute the access path inheritance. If chgfcctl/clchgfc is executed before the access path inheritance, the setting of fjpfca.conf is not executed in this software. If the access path inheritance is executed without executing the chgfcctl/clchgfc command, the restart of server nodes and hot system configuration change must be executed. If the access path inheritance is executed, cfgfcctl/clchgfc need not be executed. Even if cfgfcctl/clchgfc is executed and the warning message (swsag0019) is displayed, it does not mean the trouble. For the detail of cfgfcctl/clchgfc, refer to FUJITSU PCI Fibre Channel manual.

・ If the HBA of a Linux server node is replaced while the OS is running, the HBA state does not change to "The access path must be inherited" even if the replacement is performed in the same slot. Refer to "8.3.2 HBA state is other than "The access path must be inherited" after the HBA on the server node is replaced" before making the settings.

・ If the HBA of a Solaris OS server node is replaced while the OS is running, the HBA state does not change to "The access path must be inherited" even if the replacement is performed in the same slot. Refer to "8.3.2 HBA state is other than "The access path must be inherited" after the HBA on the server node is replaced" before making settings.

・ For access path inheritance in environments that use the FC routing functionality, the settings for the LSAN zone that is required in the FC routing functionality cannot be modified using this software. Before using access path inheritance, manually modify the required LSAN zone settings on the server nodes, Fibre Channel switches, and storage devices.

・ When the operating system is VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later), reboot the VM host or execute "Rescan" for the HBA that the access path has been set by using VMware Infrastructure Client. For the using method of VMware Infrastructure Client, refer to "Access path management" of "Configuration management" in "4.1.7.2 VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later)".

8.3.1   HBA state is "The access path must be inherited" after the HBA on the server node is replaced

If the HBA (host bus adapter support type) of a server node where Agent is installed is replaced, this software automatically recognizes this replacement and changes the HBA icon state in the Host view to [Changed] (yellow). (This is detected when an HBA that has a different WWPN is installed in the same slot (physical port number) of the host.) The procedure for access path inheritance at this time is given below.

Point

Before executing the following procedures, read the notes in "8.3 Replacement of the Parts of Supported Device".

1. Select [View] - [Refresh] from the menu.

2. Click the HBA icon in the "Server Node view" to select it, and select [Operation] - [Access Path] - [Inherit] - [Inherit] from the menu.
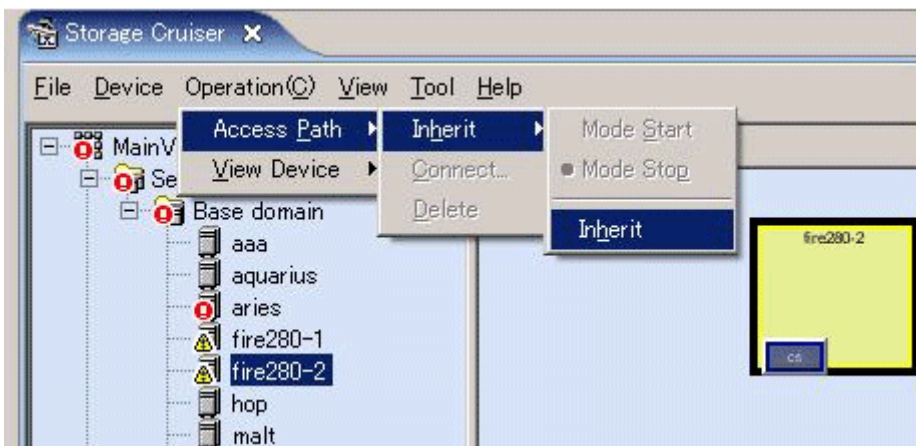
3. When the dialog shown below appears, select "Normal mode" to use it. (In the normal mode, access path inheritance does not terminate if an error occurs during access path inheritance. If you want to clear the access path inheritance state in the event of an error, select the force mode.)
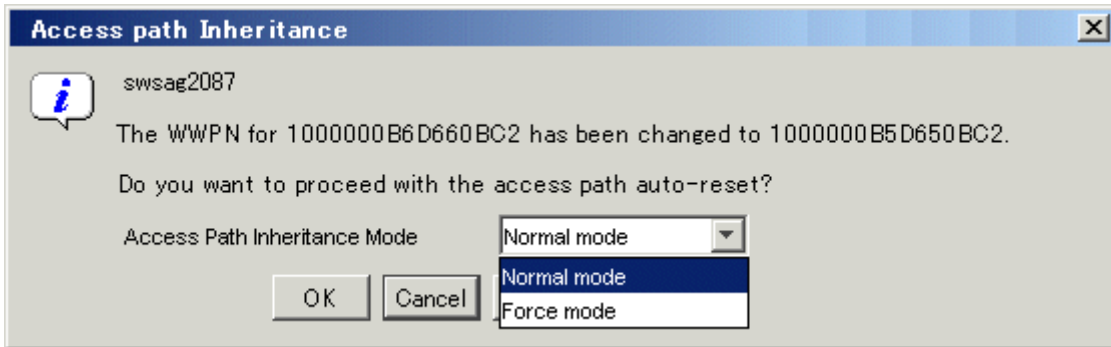
4. Based on the following table, this software delete the access path settings created according to old adapter information from the related device, and add the access path settings created according to new adapter information to the device.

Device type		Setting by this software
Fibre Channel switch	With zoning setting	Deletion of the one-to-one WWPN zoning created with the WWPN of the old adapter, and setting of the one-to-one WWPN zoning created with the WWPN of a new adapter (but no setting of an access path if port zoning does not require access path inheritance)
	Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.
ETERNUS DX60/DX80 ETERNUS2000 ETERNUS3000 ETERNUS4000 ETERNUS6000 ETERNUS8000 GR	Security setting	Deletion of the old WWPN and setting of a new WWPN for the HBA in the security setting.
	Host affinity (zone) setting	Deletion of the old WWPN of the HBA from the security setting, and setting of a new WWPN in the affinity group(zone)
	Without security setting	No setting
Other storage/tapes/bridges		No setting

5. The reboot of server node is required when storage is ETERNUS GR series, depending on the following firmware version.

Storage devices	Firmware version
ETERNUS GR720 ETERNUS GR730	before V11L21
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	before V03L52P1939

6. The server node side can use this driver as is. Depending on the driver used, however, the command for starting path use must be executed. (The following driver requires execution of the command for starting path use -> VxVM: This driver uses the "vxdctl enable" command.)

8.3.2 HBA state is other than "The access path must be inherited" after the HBA on the server node is replaced

This software cannot set the "The access path must be inherited" state for an HBA if an HBA in another slot is replaced, for the HBA on the server node to which a manually embedded device is connected is replaced, or for an unsupported HBA that is replaced.

If an HBA in another slot is replaced, inherit the access paths by dragging the new HBA icon and dropping it on the old HBA icon (drag&drop). Execute the following procedure. However, if the device requires server node-side settings, the settings must be defined manually.

Refer to, "8.2.2 Replacing Faulty Parts and Faulty Device at Manually Embedded Device Failure" if the HBA on the server node to which a manually embedded device is connected is replaced, or an unsupported HBA is replaced.

🅿 Point

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Before executing the following procedures, read the notes in "8.3 Replacement of the Parts of Supported Device".

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1. Select [View] - [Refresh] from the menu.

2. Double-click the new device icon in the SAN view to display the view of the device.

3. Without any icon selected, select [Operation] - [Access Path] - [Inherit] - [Mode Start] from the menu. The "Access path Inheritance" dialog appears.

4. If the new HBA icon is dragged and dropped on the old HBA icon (drag&drop) in this state, the Check Access Path Inheritance dialog appears. Selecting <OK> button in this dialog executes access path inheritance. Based on the table shown below, this software deletes the access path settings created by the old HBA information from the related device and adds the access path settings created by the new HBA information to the device with inheritance processing. However, none is set for the host. Add storage affinity settings manually if they are required on the server node side.

Device type		Settings by this software
Fibre Channel switch	With zoning setting	Deletion of the one-to-one WWPN zoning created with the WWPN of the old adapter, and setting of the one-to-one WWPN zoning created by the WWPN of a new adapter (but no setting of an access path if port zoning does not require access path inheritance)
	Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.
ETERNUS DX60/DX80 ETERNUS2000 ETERNUS3000 ETERNUS4000 ETERNUS6000 ETERNUS8000 GR	Security setting	Deletion of the old WWPN and setting of a new WWPN for the HBA in the security setting.
	Host affinity (zone) setting	Deletion of the old WWPN of the HBA from the security setting, and setting of a new WWPN in the affinity group (zone).
	Without security setting	No setting
Other storage/tapes/bridges		No setting

5. Using drag&drop operations, you can inherit the access paths for several adapters until you select <End> button in the "Access path Inheritance" dialog.

6. The reboot of server node is required when storage is ETERNUS GR series, depending on the following firmware version.

Storage devices	Firmware version
ETERNUS GR720 ETERNUS GR730	before V11L21

Storage devices	Firmware version
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	before V03L52P1939

8.3.3 Replacement of a server node that agent is already installed

When an entire Solaris OS server node device, that Agent installation is already finished, is replaced, delete all access paths from the old server node before this software detects the new server node, and set new host access paths.

When an entire Windows, Linux, or HP-UX server node device with Agent installed is replaced, inherit the access path by following the procedure given below.

P Point

Before executing the following procedures, read the notes in "8.3 Replacement of the Parts of Supported Device".

1. Set a new server node with an IP address different from that of the old server node, and install Agent. If the new server node cannot be set with a different IP address, delete all access paths from the old server node before this software detects the new server node, and set new server node access paths.

2. Select [View] - [Refresh] from the menu.

3. Double-click the new device icon in the SAN view to display the view of the device.

4. Select [Operation] - [View Device] - [Add] to display the old server node.

5. Without any icon selected, select [Operation] - [Access Path] - [Inherit] - [Mode Start]. The "Access path Inheritance" dialog appears.

6. If the new HBA icon is dragged and dropped on the old HBA icon (drag&drop) in this state, the Check Access Path Inheritance dialog appears. Selecting <OK> button in this dialog executes access path inheritance. It deletes the access path settings created by the old HBA information from the related device and adds the access path settings created by the new HBA information to the device with inheritance processing. However, if the device requires such StorageAffinity settings on the server node side, they must be defined manually.

Device type		Settings by this software
Fibre Channel switch	With zoning setting	Deletion of the one-to-one WWPN zoning created with the WWPN of the old adapter, and setting of the one-to-one WWPN zoning created with the WWPN of a new adapter (but no setting of an access path if port zoning does not require access path inheritance)
	Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.
ETERNUS DX60/DX80 ETERNUS2000 ETERNUS3000 ETERNUS4000 ETERNUS6000 ETERNUS8000 GR	Security setting	Deletion of the old WWPN and setting of a new WWPN for the HBA in the security setting.
	HostAffinity(Zone) setting	Deletion of the old WWPN of the HBA from the security setting, and setting of a new WWPN in the affinity group (zone).
	Without security setting	No setting
Other storage/tapes/bridges		No setting

7. Using drag&drop operations, you can execute access path inheritance for several adapters until you select <End> button in the "Access path Inheritance" dialog.

8. The reboot of server node is required when storage is ETERNUS GR series, depending on the following firmware version.

Storage devices	Firmware version
ETERNUS GR720 ETERNUS GR730	before V11L21
ETERNUS GR740 ETERNUS GR820 ETERNUS GR840	before V03L52P1939

8.3.4   Replacement of the faulty parts of ETERNUS, GR, LT250, LT270

ETERNUS, GR, LT250, LT270, and Symmetrix devices do not require the access path inheritance because the WWPN is not changed for the replacement of an adapter (CA) etc.

8.3.5   Replacement of the faulty parts of LT160

Execute the following procedure because the WWPN is changed for the replacement of an adapter (CA) and the faulty parts like drivers etc.

P Point

. . . .
Before executing the following procedures, read the notes in "8.3 Replacement of the Parts of Supported Device".
. . . .

1. Select [View] - [Refresh] from the menu.

2. Double-click the replaced device in the SAN view to display the view of the device. The old adaptor (CA) and module are displayed as "timeout" and the new adaptor and module are displayed.
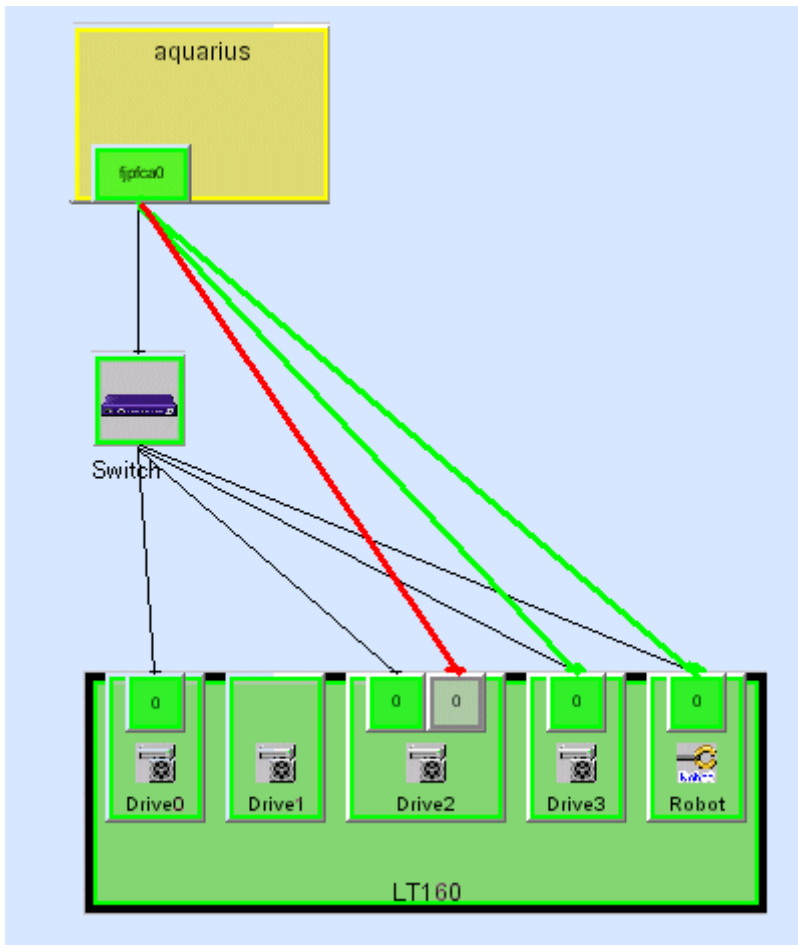
3. From the "Storage view", select [Operation] - [Access Path] - [Inherit] - [Mode Start] without any icon selected. The "Access path Inheritance" dialog appears. If the new adaptor icon is dragged and dropped on the old adaptor icon (drag&drop) in this state, the Check Access Path Inheritance dialog appears. Selecting <OK> button in this dialog execute access path inheritance.
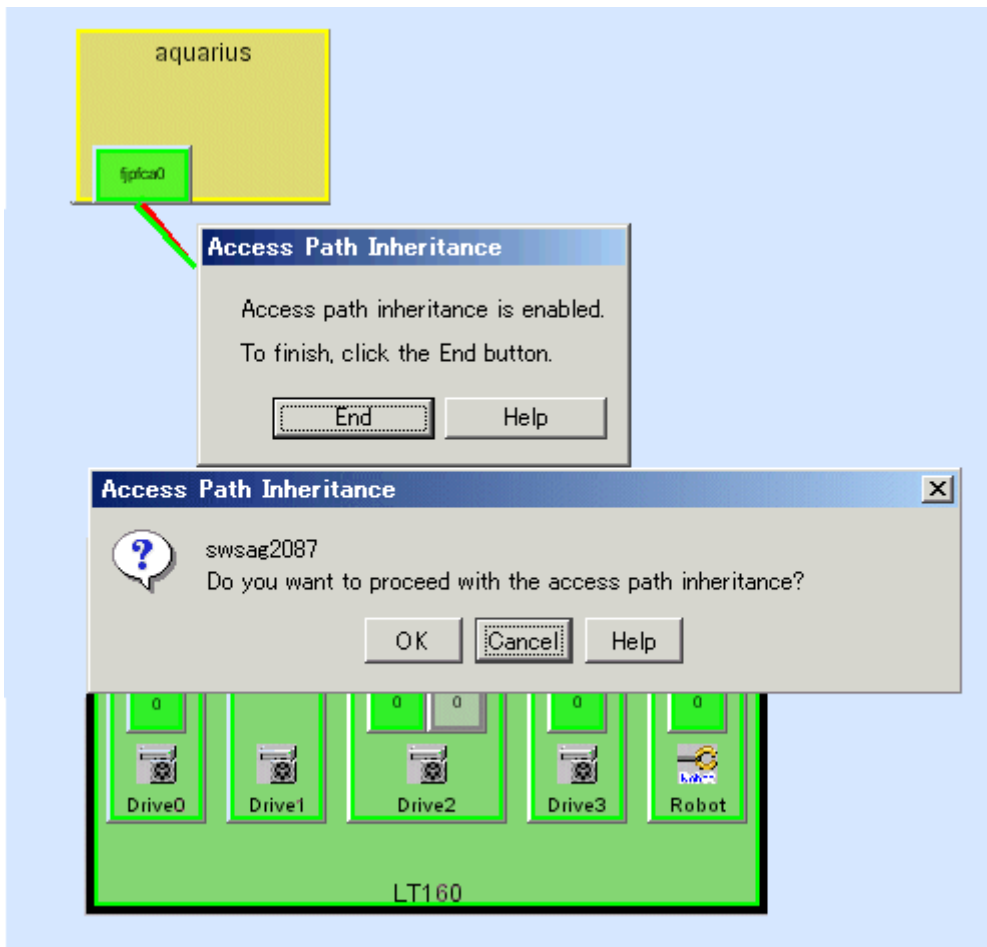
4. This software deletes access path setting that is based on the old adaptor information for access path inheritance in the related devices and adds the access path setting that is based on the new adaptor information in the related devices.

Device type			Settings by SSC
Solaris OS server node	Agent available	PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F	Change of the setting associating fjpfca.conf TID with WWPN to WWPN of a new adapter (*1)
		LP-9000, 9002S, 9002L, 9802, 10000	Changes of the setting associating lpfc.conf or lpfs.conf TID and LUN with WWPN to WWPN of a new adapter
		HBA (other than the above cases)	No setting
	Agent unavailable		No setting
Windows server node	Agent available/unavailable		No setting

Device type		Settings by SSC
Linux server node	Agent available/unavailable	No setting
HP-UX server node	Agent available/unavailable	No setting
Other server nodes	Agent unavailable	No setting
Fibre Channel switch	With zoning setting	Deletion of the one-to-one WWPN zoning created with the WWPN of the old adapter, and setting of the one-to-one WWPN zoning created with the WWPN of a new adapter (but no setting of an access path if port zoning does not require access path inheritance)
	Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.

*1: If the chgfcctl/clchgfc command attached to PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F driver is executed before the access path inheritance, this software does not set fjpfca.conf.

5. Using drag&drop operations, you can execute access path inheritance for several adapters until you select <End> button in the "Access path Inheritance" dialog.

6. The server node side must be restarted for server nodes that do not support hot system configuration change after a setup change. On the server nodes that support hot system configuration change, it is necessary to execute commands that instruct the hot system configuration change for OS and HBA driver. For example, when the HBA driver is FUJITSU PCI Fibre Channel, the chgfcctl or clchgfc command must be executed.

8.3.6 Replacement of an ETERNUS DX60/DX80, ETERNUS2000, ETERNUS3000, ETERNUS4000, ETERNUS6000, ETERNUS8000, GR, LT160, LT250, LT270, Symmetrix, or Crossroads device

When replacing an entireETERNUS DX60/DX80, ETERNUS2000, ETERNUS3000, ETERNUS4000, ETERNUS6000, ETERNUS8000, GR, LT160, LT250, LT270, Symmetrix, or Crossroads device, inherit the access paths by following procedure given below.

P Point

Before executing the following procedures, read the notes in "8.3 Replacement of the Parts of Supported Device".

1. Match the hardware configuration definitions of the new device with those of the old device.

2. Set the new device with an IP address different from that of the old device, and register it with this software. If the new host cannot be set with a different IP address, delete all access paths from the old host before this software detects the new device, and set new device access paths.

3. Select [View] - [Refresh] from the menu.

4. Double-click the new device icon in the SAN view to display the view of the device.

5. Select [Operation] - [View Device] - [Add] to display the old device.

6. Without any icon selected, select [Operation] - [Access Path] - [Inherit] - [Mode Start]. The "Access Path Inheritance" dialog appears.

7. If the new adapter icon is dragged and dropped on the old adapter icon (drag&drop) in this state, the Check Access Path Inheritance dialog appears. Selecting <OK> button in this dialog executes access path inheritance. Inheritance processing deletes the access path settings created by the old adapter information from the related device and adds the access path settings created by the new adapter information to the device.

Device type			Settings by this software
Solaris OS server node	Agent available	PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F	Change of the setting associating fjpfca.conf TID with WWPN to WWPN of a new adapter
		LP-9000, 9002S, 9002L, 9802, 10000	Change of the setting associating lpfc.conf or lpfs.conf TID and LUN with WWPN to WWPN of a new adapter
		HBA (other than the above cases)	No setting
	Agent unavailable		No setting
Windows server node	Agent available/unavailable		No setting
Linux server node	Agent available/unavailable		No setting
HP-UX server node	Agent available/unavailable		No setting
Other server nodes	Agent unavailable		No setting
Fibre Channel switch		With zoning setting	Deletion of the one-to-one WWPN zoning created with the WWPN of the old adapter, and setting of the one-to-one WWPN zoning created with the WWPN of a new adapter (but no setting of an access path if port zoning does not require access path inheritance)
		Without zoning setting	No setting However, when "Operation for setting WWPN zoning" has been selected for the Fibre Channel switch, a dialog box allowing the user to enable or disable the zoning setting is displayed.

8. Using drag&drop operations, you can inherit the access paths for several adapters until you select <End> button in the "Access Path Inheritance" dialog.

9. The server node side must be restarted for server nodes that do not support hot system configuration change after a setup change. On the server nodes that support hot system configuration change, it is necessary to execute commands that instruct the hot system configuration change for OS and HBA driver. For example, when the HBA driver is FUJITSU PCI Fibre Channel, the chgfcctl or clchgfc command must be executed.

Chapter 9 Maintenance of the Administrative Environment

This chapter explains how to maintain databases, and it describes the appropriate action to take for troubleshooting.

9.1 Maintenance of Manager

9.1.1 Maintenance of manager

9.1.1.1 Collecting data for troubleshooting

If any problem occurs in a system that uses this software, collect troubleshooting information according to "D.1 Troubleshooting information".

9.1.1.2 Backup of Manager

9.1.1.2.1 Backup of Solaris OS Manager

Perform the backup according to the procedure shown below, in which the backup destination directory is described as "*backup_location*". For details about backup in a cluster environment, refer to "9.1.1.2.2 Backup of Solaris OS Manager (cluster environment)".

1. Stop the Manager.

   ```
   # /opt/FJSVssmgr/sbin/managerctl stop
   ```

2. Back up device management information.

   For ordinary backup tasks, perform "Backing up device management information". For version upgrading from older versions, perform "Version upgrading from older versions".

   Backing up device management information:

       Create a backup directory.

   ```
   # mkdir -p backup_location/var/opt/FJSVssmgr/current/opencimom/logr
   ```

       Copy files to the backup location.

   ```
   # cp -Rp /var/opt/FJSVssmgr/current/opencimom/logr/* backup_location/var/opt/FJSVssmgr/
   current/opencimom/logr/
   ```

   Version upgrading from older versions:

       Use cimbackup.sh to back up the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".

       Create a backup directory.

   ```
   # mkdir -p backup_location/logr
   ```

       Move to the directory that contains cimbackup.sh, then execute cimbackup.sh as follows:

   ```
   # ./cimbackup.sh backup_location/logr
   ```

3. Back up essential files.

   Create the backup directories.

   ```
   # mkdir -p backup_location/etc/opt/FJSVtrccb/2.0
   # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/ac
   # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/db
   # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/sr
   # mkdir -p backup_location/var/opt/FJSVssmgr/current
   # mkdir -p backup_location/var/opt/FJSVssmgr/current/vsccompose
   ```

   Copy the subdirectories and files to the backup location.

   ```
   # cp -Rp /etc/opt/FJSVtrccb/2.0/* backup_location/etc/opt/FJSVtrccb/2.0/
   # cp -Rp /var/opt/FJSVtrccb/2.0/ac/* backup_location/var/opt/FJSVtrccb/2.0/ac/
   # cp -Rp /var/opt/FJSVtrccb/2.0/db/* backup_location/var/opt/FJSVtrccb/2.0/db/
   # cp -Rp /var/opt/FJSVtrccb/2.0/sr/* backup_location/var/opt/FJSVtrccb/2.0/sr/
   # cp -Rp /var/opt/FJSVssmgr/current/vsccompose/* backup_location/var/opt/FJSVssmgr/current/
   vsccompose/
   # cp -p /var/opt/FJSVssmgr/current/systemevent.csv backup_location/var/opt/FJSVssmgr/current/
   ```

   If there are no subdirectories or files, backup is unnecessary.

4. Back up files that are related to the performance management function.

   If you are not using the performance management function, this step is unnecessary.

   Create the backup directories.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current
   # mkdir -p backup_location/var/opt/FJSVssmgr/current/perf
   ```

   Copy the subdirectories and files to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/perf.conf backup_location/etc/opt/FJSVssmgr/current/
   # cp -Rp /var/opt/FJSVssmgr/current/perf/* backup_location/var/opt/FJSVssmgr/current/perf/
   ```

5. Back up files for which the maximum memory that can be used is customized.

   If the maximum memory that can be used is not customized, backup is unnecessary.

   Create the backup directory.

   ```
   # mkdir -p backup_location/opt/FJSVssmgr/bin
   ```

   Copy the files to the backup location.

   ```
   # cp -p /opt/FJSVssmgr/bin/manager.ini backup_location/opt/FJSVssmgr/bin/
   ```

6. Back up other files that can be customized.

   If there are files that are not customized, backup is unnecessary. Backup is also unnecessary if these files do not exist.

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current
   ```

   Copy the files to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/sanma.conf backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/ssmgr.conf backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/trapop.sh backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/traprm.sh backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/VscCommitScript backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/FJSVssvsc.ini backup_location/etc/opt/FJSVssmgr/current/
   ```

7. Back up the SNMP trap XML definition file.

   If you have not customized the SNMP trap XML definition file, this step is unnecessary.

In the example shown below, SNMP trap XML definition file "1_3_6_1_1588_2_1_1_1.xml" has been customized. Back up each customized file separately, as shown in the example.

Create the backup directory.

```
# mkdir -p backup_location/etc/opt/FJSVssmgr/current/snmpth
```

Copy the files to the backup location.

```
# cp -p /etc/opt/FJSVssmgr/current/snmpth/1_3_6_1_1588_2_1_1_1.xml backup_location/etc/opt/
FJSVssmgr/current/snmpth/
```

8. Back up the device polling settings file.

   If you have not customized the device polling settings file, this step is unnecessary.

   In the example shown below, the device polling settings file "DP_config.xml" has been customized. Back up each customized file separately, as shown in the example.

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current/devicepolling
   ```

   Copy the files to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/devicepolling/DP_config.xml backup_location/etc/opt/
   FJSVssmgr/current/devicepolling/
   ```

9. Back up the polling service setting file.

   If this file has not been customized, then this step is unnecessary.

   To backup the file, follow the steps below:

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current/polling
   ```

   Copy the file to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/polling/pollingService.xml backup_location/etc/opt/FJSVssmgr/
   current/polling/
   ```

10. Restart the Manager.

    ```
    # /opt/FJSVssmgr/sbin/managerctl start
    ```

9.1.1.2.2   Backup of Solaris OS Manager (cluster environment)

1. Stop all cluster services that the Manager belongs to.

2. Mount the shared disk on the primary node.

3. Perform steps 2, 3, 4, 6, 7 and 8 of "9.1.1.2.1 Backup of Solaris OS Manager" on the primary node.

4. Perform step 5 of "9.1.1.2.1 Backup of Solaris OS Manager" on both nodes.

5. Unmount the shared disk that was mounted in step 2.

6. Start all cluster services that the Manager belongs to.

9.1.1.2.3   Backup of Linux Manager

Perform the backup according to the procedure shown below, in which the backup destination directory is described as "*backup_location*". Refer to "9.1.1.2.4 Backup of Linux Manager (cluster environment)" for details on backing up in a cluster environment.

1. Stop the manager.

    ```
    # /opt/FJSVssmgr/sbin/managerctl stop
    ```

2. Back up device management information.

    For ordinary backup tasks, perform "Backing up device management information". For version upgrading from older versions, perform "Version upgrading from older versions".

    Backing up device management information:

    > Create a backup directory.
    >
    > ```
    > # mkdir -p backup_location/var/opt/FJSVssmgr/current/opencimom/logr
    > ```
    >
    > Copy files to the backup location.
    >
    > ```
    > # cp -Rp /var/opt/FJSVssmgr/current/opencimom/logr/* backup_location/var/opt/FJSVssmgr/
    > current/opencimom/logr/
    > ```

    Version upgrading from older versions:

    > Use cimbackup.sh to back up the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".
    >
    > Create a backup directory.
    >
    > ```
    > # mkdir -p backup_location/logr
    > ```
    >
    > Move to the directory that contains cimbackup.sh, then execute cimbackup.sh as follows:
    >
    > ```
    > # ./cimbackup.sh backup_location/logr
    > ```

3. Back up essential files.

    Create a backup directories.

    ```
    # mkdir -p backup_location/etc/opt/FJSVtrccb/2.0
    # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/ac
    # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/db
    # mkdir -p backup_location/var/opt/FJSVtrccb/2.0/sr
    # mkdir -p backup_location/var/opt/FJSVssmgr/current
    # mkdir -p backup_location/var/opt/FJSVssmgr/current/vsccompose
    ```

    Copy the subdirectories and files to the backup location.

    ```
    # cp -Rp /etc/opt/FJSVtrccb/2.0/* backup_location/etc/opt/FJSVtrccb/2.0/
    # cp -Rp /var/opt/FJSVtrccb/2.0/ac/* backup_location/var/opt/FJSVtrccb/2.0/ac/
    # cp -Rp /var/opt/FJSVtrccb/2.0/db/* backup_location/var/opt/FJSVtrccb/2.0/db/
    # cp -Rp /var/opt/FJSVtrccb/2.0/sr/* backup_location/var/opt/FJSVtrccb/2.0/sr/
    # cp -Rp /var/opt/FJSVssmgr/current/vsccompose/* backup_location/var/opt/FJSVssmgr/current/
    vsccompose/
    # cp -p /var/opt/FJSVssmgr/current/systemevent.csv backup_location/var/opt/FJSVssmgr/current/
    ```

    If there are no subdirectories or files, backup is unnecessary.

4. Back up the files relating to performance management functionality. When performance management functionality is not used, this procedure is unnecessary.

    Create the backup directories.

    ```
    # mkdir -p backup_location/etc/opt/FJSVssmgr/current
    # mkdir -p backup_location/var/opt/FJSVssmgr/current/perf
    ```

    Copy the subdirectories and files to the the backup location.

    ```
    # cp -p /etc/opt/FJSVssmgr/current/perf.conf backup_location/etc/opt/FJSVssmgr/current/
    # cp -Rp /var/opt/FJSVssmgr/current/perf/* backup_location/var/opt/FJSVssmgr/current/perf/
    ```

5. Back up the file created when memory use is customized (that is, when the maximum amount of memory that can be used is defined). If memory usage has not been customized this backup is not necessary as the file will not exist.

   Create the backup directory.

   ```
   # mkdir -p backup_location/opt/FJSVssmgr/bin
   ```

   Copy the file to the backup location.

   ```
   # cp -p /opt/FJSVssmgr/bin/manager.ini backup_location/opt/FJSVssmgr/bin/
   ```

6. Back up other files created as a result of customization.The following procedure shows all customization files; however these files are only created when settings are made therefore some may not exist for the backup procedure.

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current
   ```

   Copy the files to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/sanma.conf backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/ssmgr.conf backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/trapop.sh backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/traprm.sh backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/VscCommitScript backup_location/etc/opt/FJSVssmgr/current/
   # cp -p /etc/opt/FJSVssmgr/current/FJSVssvsc.ini backup_location/etc/opt/FJSVssmgr/current/
   ```

7. Back up the SNMP trap XML definition file.

   This step is only required if customizations have been performed.

   In the example shown below, the existence of the SNMP trap XML definition file "1_3_6_1_1588_2_1_1_1.xml" indicates SNMP has been customized. Back up each file separately, as shown in the example.

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current/snmpth
   ```

   Copy the file to thebackup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/snmpth/1_3_6_1_1588_2_1_1_1.xml backup_location/etc/opt/
   FJSVssmgr/current/snmpth/
   ```

8. Back up the device polling settings file.

   This step is only required if customizations have been performed.

   In the example shown below, the existence of the device polling settings file "DP_config.xml" indicates that device polling has been customized. Back up each customized file separately, as shown in the example.

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current/devicepolling
   ```

   Copy the files to the backup location.

   ```
   # cp -p /etc/opt/FJSVssmgr/current/devicepolling/DP_config.xml backup_location/etc/opt/
   FJSVssmgr/current/devicepolling/
   ```

9. Back up the polling service setting file.

   If this file has not been customized, then this step is unnecessary.

   To backup the file, follow the steps below:

   Create the backup directory.

   ```
   # mkdir -p backup_location/etc/opt/FJSVssmgr/current/polling
   ```

   Copy the file to the backup location.

```
# cp -p /etc/opt/FJSVssmgr/current/polling/pollingService.xml backup_location/etc/opt/FJSVssmgr/
current/polling/
```

10. Restart the Manager.

```
# /opt/FJSVssmgr/sbin/managerctl start
```

9.1.1.2.4 Backup of Linux Manager (cluster environment)

1. Stop all cluster services that relate to the Manager.

2. Mount a shared disk on the primary node.

3. Perform steps 2, 3, 4,6,7 and 8 of "9.1.1.2.3 Backup of Linux Manager" on the primary node.

4. Perform step 5 of "9.1.1.2.3 Backup of Linux Manager" on both nodes.

5. Un-mount the disk mounted in step 2.

6. Restart all cluster services that relate to the Manager.

9.1.1.2.5 Backup of Windows Manager

Perform the backup according to the procedure shown below.

Information

About description in the procedure

- ・ $BAK_DIR means the backup destination directory.

- ・ $INS_DIR means "Program Directory" specified at the Manager installation.

- ・ $ENV_DIR means "Environment Directory" specified at the Manager installation.

- ・ $TMP_DIR means "Work Directory" specified at the Manager installation.

1. Stop the Manager.

   Go to [Control Panel] - [Administrative Tools] - [Services], select "ETERNUS SF Storage Cruiser Manager" and stop the service.

2. Back up device management information.

   For ordinary backup tasks, perform "Backing up device management information". For version upgrading from older versions, perform "Version upgrading from older versions".

   Backing up device management information:

   Using Explorer, create the following backup directory:

   - $BAK_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr

   Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$TMP_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr	$BAK_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr

   Version upgrading from older versions:

   Use cimbackup.bat to back up the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".

   Using Explorer, create the following backup directory:

- $BAK_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr

Move to the directory that contains cimbackup.bat, then execute cimbackup.bat as follows:

cimbackup.bat "$BAK_DIR\logr"

3. Back up essential files.

If there are no subdirectories or files, backup is unnecessary.

Using Explorer, create the following backup directories:

- $BAK_DIR\Manager\etc\opt\FJSVtrccb\2.0

- $BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\ac

- $BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\db

- $BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\sr

- $BAK_DIR\Manager\var\opt\FJSVssmgr\current

- $BAK_DIR\Manager\var\opt\FJSVssmgr\current\vsccompose

Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$ENV_DIR\Manager\etc\opt\FJSVtrccb\2.0	$BAK_DIR\Manager\etc\opt\FJSVtrccb\2.0
$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\ac	$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\ac
$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\db	$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\db
$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\sr	$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\sr
$TMP_DIR\Manager\var\opt\FJSVssmgr\current\vsccompose	$BAK_DIR\Manager\var\opt\FJSVssmgr\current\vsccompose

Using Explorer, copy the following file to the backup location.

Source file	Destination directory
$TMP_DIR\Manager\var\opt\FJSVssmgr\current\systemevent.csv	$BAK_DIR\Manager\var\opt\FJSVssmgr\current

4. Back up files that are related to the performance management function.

If you are not using the performance management function, this step is unnecessary.

Using Explorer, create the following backup directories:

- $BAK_DIR\Manager\etc\opt\FJSVssmgr\current

- $BAK_DIR\Manager\var\opt\FJSVssmgr\current\perf

Using Explorer, copy the following files to the backup location.

Source file	Destination directory
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\perf.conf	$BAK_DIR\Manager\etc\opt\FJSVssmgr\current

Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$TMP_DIR\Manager\var\opt\FJSVssmgr\current\perf	$BAK_DIR\Manager\var\opt\FJSVssmgr\current\perf

5. Back up files that can be customized.

If there are files that are not customized, backup is unnecessary. Backup is also unnecessary if these files do not exist.

Using Explorer, create the following backup directories:

- $BAK_DIR\Manager\opt\FJSVssmgr\bin

- $BAK_DIR\Manager\etc\opt\FJSVssmgr\current

Using Explorer, copy the following files to the backup location.

Source file	Destination directory
$INS_DIR\Manager\opt\FJSVssmgr\bin\manager.ini	$BAK_DIR\Manager\opt\FJSVssmgr\bin
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current \sanma.conf	$BAK_DIR\Manager\etc\opt\FJSVssmgr\current
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current \ssmgr.conf	
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\trapop.bat	
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\traprm.bat	
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current \VscCommitScript.bat	
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current \FJSVssvsc.ini	

6. Back up the SNMP trap XML definition file.

If you have not customized the SNMP trap XML definition file, this step is unnecessary.

In the example shown below, SNMP trap XML definition file "1_3_6_1_1588_2_1_1_1.xml" has been customized. Back up each customized file separately, as shown in the example.

Using Explorer, create the following backup directory:

- $BAK_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth

Using Explorer, copy the file to the backup location.

Source file	Destination directory
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth \1_3_6_1_1588_2_1_1_1.xml	$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth

7. Back up the device polling settings file.

If you have not customized the device polling settings file, this step is unnecessary.

In the example shown below, the device polling settings file "DP_config.xml" has been customized. Back up each customized file separately, as shown in the example.

Using Explorer, create the following backup directory:

- $BAK_DIR\Manager\etc\opt\FJSVssmgr\current\devicepolling

Using Explorer, copy the file to the backup location.

Source file	Destination directory
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\devicepolling \DP_config.xml	$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \devicepolling

8. Back up the polling service setting file.

This step is only required if customizations have been performed.

In the example shown below, the existence of the device polling settings file "pollingService.xml" indicates that device polling has been customized. Back up each customized file separately, as shown in the example.

Using Explorer, create the following backup directory:

- $BAK_DIR\Manager\etc\opt\FJSVssmgr\current\polling

Using Explorer, copy the file to the backup location.

Source file	Destination directory
$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\polling \pollingService.xml	$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \polling

9. Restart the Manager.

   Go to [Control Panel] - [Administrative Tools] - [Services], select "ETERNUS SF Storage Cruiser Manager" and start the service.

9.1.1.3 Restoring Manager

9.1.1.3.1 Restoring Solaris OS Manager

Perform restore for the backup performed in "9.1.1.2.1 Backup of Solaris OS Manager" according to the procedure shown below.

To restore after reinstalling the Manager, first complete the entire installation and setup according to the description in "4.1 [Solaris OS] Manager" in the ETERNUS SF Storage Cruiser Installation Guide.

To upgrade from a Manager in a previous version, proceed according to the Notes for each procedure.

For details about restoring in a cluster environment, refer to "9.1.1.3.2 Restoring Solaris OS Manager (cluster environment)".

1. Stop the Manager.

   ```
   # /opt/FJSVssmgr/sbin/managerctl stop
   ```

2. Restore the device management information.

   For ordinary restoration tasks, perform "Restoring device management information". For version upgrading from older versions, perform "Version Upgrading from older versions".

   Restoring device management information

   Delete the subdirectories and files under the restore destination directory displayed below.

   Do not delete the restore destination directories. Create them if they do not exist.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/opencimom/logr/*
   ```

   Copy the files from the backup directory.

   ```
   # cp -Rp backup_location/var/opt/FJSVssmgr/current/opencimom/logr/* /var/opt/FJSVssmgr/
   current/opencimom/logr/
   ```

   Version upgrading from older versions

   Use cimrestore.sh to restore the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".

   Delete the subdirectories and files under the restore destination directory displayed below.

   Do not delete the restore destination directories. Create them if they do not exist.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/opencimom/logr/*
   ```

   Move to the directory that contains cimrestore.sh, then execute cimrestore.sh as follows:

   ```
   # ./cimrestore.sh backup_location/logr
   ```

3. Restore essential files.

   Delete the subdirectories and files in the restore destination directories shown below.

   Do not delete the restore destination directories themselves. If these directories do not exist, create them.

```
# rm -rf /etc/opt/FJSVtrccb/2.0/*
# rm -rf /var/opt/FJSVtrccb/2.0/ac/*
# rm -rf /var/opt/FJSVtrccb/2.0/db/*
# rm -rf /var/opt/FJSVtrccb/2.0/sr/*
# rm -rf /var/opt/FJSVssmgr/current/vsccompose/*
```

Please delete systemevent.csv the restoration ahead.

```
# rm -rf /var/opt/FJSVssmgr/current/systemevent.csv
```

Copy the subdirectories and files from the backup location.

```
# cp -Rp backup_location/etc/opt/FJSVtrccb/2.0/* /etc/opt/FJSVtrccb/2.0/
# cp -Rp backup_location/var/opt/FJSVtrccb/2.0/ac/* /var/opt/FJSVtrccb/2.0/ac/
# cp -Rp backup_location/var/opt/FJSVtrccb/2.0/db/* /var/opt/FJSVtrccb/2.0/db/
# cp -Rp backup_location/var/opt/FJSVtrccb/2.0/sr/* /var/opt/FJSVtrccb/2.0/sr/
# cp -Rp backup_location/var/opt/FJSVssmgr/current/vsccompose/* /var/opt/FJSVssmgr/current/
vsccompose/
# cp -p backup_location/var/opt/FJSVssmgr/current/systemevent.csv /var/opt/FJSVssmgr/current/
```

If there are no subdirectories or files, restore is unnecessary.

4. Restore files that are related to the performance management function.

   If you are not using the performance management function, this step is unnecessary.

   Delete the subdirectories and files in the restore destination directories shown below.

   Do not delete the restore destination directories themselves. If these directories do not exist, create them.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/perf/*
   ```

   Copy the subdirectories and files from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/perf.conf /etc/opt/FJSVssmgr/current/
   # cp -Rp backup_location/var/opt/FJSVssmgr/current/perf/* /var/opt/FJSVssmgr/current/perf/
   ```

5. Restore files for which the maximum memory that can be used is customized.

   If the maximum memory that can be used is not customized, restore is unnecessary.

   Copy the files from the backup location.

   ```
   # cp -p backup_location/opt/FJSVssmgr/bin/manager.ini /opt/FJSVssmgr/bin/
   ```

6. Restore the other files that can be customized.

   If there are files that are not customized, restore is unnecessary. Restore is also unnecessary if the files do not exist.

   Copy the files from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/sanma.conf /etc/opt/FJSVssmgr/current/
   # cp -p backup_location/etc/opt/FJSVssmgr/current/ssmgr.conf /etc/opt/FJSVssmgr/current/
   # cp -p backup_location/etc/opt/FJSVssmgr/current/trapop.sh /etc/opt/FJSVssmgr/current/
   # cp -p backup_location/etc/opt/FJSVssmgr/current/traprm.sh /etc/opt/FJSVssmgr/current/
   # cp -p backup_location/etc/opt/FJSVssmgr/current/VscCommitScript /etc/opt/FJSVssmgr/current/
   # cp -p backup_location/etc/opt/FJSVssmgr/current/FJSVssvsc.ini /etc/opt/FJSVssmgr/current/
   ```

7. Restore the SNMP trap XML definition file.

   If you have not customized the SNMP trap XML definition file, this step is unnecessary.

   Copy the SNMP trap XML definition file from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/snmpth/*.xml /etc/opt/FJSVssmgr/current/
   snmpth/
   ```

> **Note**
> ....
> Do not copy the file if you are upgrading from a previous version. Instead, reflect the contents of the customization in the previous version, according to the description in "C.6 SNMP Trap XML Definition File".
> ....

8. Restore the device polling settings file.

   If you have not customized the device polling settings file, this step is unnecessary.

   Copy the device polling settings file from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/devicepolling/*.xml /etc/opt/FJSVssmgr/
   current/devicepolling/
   ```

   > **Note**
   > ....
   > Do not copy the file if you are upgrading from a previous version. Instead, reflect the contents of the customization in the previous version, according to the description in "C.10 Device Polling Setting File".
   > ....

9. Restore the polling service setting file.

   If this file has not been customized, then this step is unnecessary.

   Copy the file from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/polling/*.xml /etc/opt/FJSVssmgr/current/
   polling/
   ```

   > **Note**
   > ....
   > Do not copy the file if you are upgrading from an older version. Instead, reflect the customization of the older version file. For details on how to do that, refer to "C.13 Polling Service Setting File".
   > ....

10. Restart the Manager.

    ```
    # /opt/FJSVssmgr/sbin/managerctl start
    ```

9.1.1.3.2   Restoring Solaris OS Manager (cluster environment)

Perform restore for the backup performed in "9.1.1.2.2 Backup of Solaris OS Manager (cluster environment)" according to the procedure shown below.

To restore after reinstalling the Manager, first complete the entire installation and setup according to the description in "Appendix A High-availability admin servers" in the ETERNUS SF Storage Cruiser Installation Guide.

1. Stop all cluster services that the Manager belongs to.

2. Mount the shared disk on the primary node.

3. Perform steps 2, 3, 4, 6, 7and 8 of "9.1.1.3.1 Restoring Solaris OS Manager" on the primary node.

4. Perform step 5 of "9.1.1.3.1 Restoring Solaris OS Manager" on both nodes.

5. Unmount the shared disk that was mounted in step 2.

6. Start all cluster services that the Manager belongs to.

9.1.1.3.3　Restoring Linux Manager

The following procedure explains the process to restore files that were backed up using the procedure described above in "9.1.1.2.3 Backup of Linux Manager".

If the manager is to be restored by a reinstallation process all of the steps outlined in "4.2 [Linux] Manager" in the ETERNUS SF Storage Cruiser Installation Guide must be followed.

If the manager is to be restored by an upgrade process the procedures applicable to the upgrade must be followed.

For details about restoring in a cluster environment, refer to "9.1.1.3.4 Restoring Linux Manager (cluster environment)".

1. Execute the following command to stop the Manager.

   ```
   # /opt/FJSVssmgr/sbin/managerctl stop
   ```

2. Restore the device management information.

   For ordinary restoration tasks, perform "Restoring device management information". For version upgrading from older versions, perform "Version Upgrading from older versions".

   Restoring device management information

   Delete the subdirectories and files under the restore destination directory displayed below.

   Do not delete the restore destination directories. Create them if they do not exist.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/opencimom/logr/*
   ```

   Copy the files from the backup directory.

   ```
   # cp -Rp backup_location/var/opt/FJSVssmgr/current/opencimom/logr/* /var/opt/FJSVssmgr/
   current/opencimom/logr/
   ```

   Version upgrading from older versions

   Use cimrestore.sh to restore the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".

   Delete the subdirectories and files under the restore destination directory displayed below.

   Do not delete the restore destination directories. Create them if they do not exist.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/opencimom/logr/*
   ```

   Move to the directory that contains cimrestore.sh, then execute cimrestore.sh as follows:

   ```
   # ./cimrestore.sh backup_location/logr
   ```

3. Ressential files.

   Delete the subdirectories and files in the restore destination directories shown below.

   Do not delete the restore destination directories themselves. If these directories do not exist, create them.

   ```
   # rm -rf /etc/opt/FJSVtrccb/2.0/*
   # rm -rf /var/opt/FJSVtrccb/2.0/ac/*
   # rm -rf /var/opt/FJSVtrccb/2.0/db/*
   # rm -rf /var/opt/FJSVtrccb/2.0/sr/*
   # rm -rf /var/opt/FJSVssmgr/current/vsccompose/*
   ```

   Delete the restore destination files.

   ```
   # rm -rf /var/opt/FJSVssmgr/current/systemevent.csv
   ```

   Copy the subdirectories and files from the backup location.

   ```
   # cp -Rp backup_location/etc/opt/FJSVtrccb/2.0/* /etc/opt/FJSVtrccb/2.0/
   # cp -Rp backup_location/var/opt/FJSVtrccb/2.0/ac/* /var/opt/FJSVtrccb/2.0/ac/
   # cp -Rp backup_location/var/opt/FJSVtrccb/2.0/db/* /var/opt/FJSVtrccb/2.0/db/
   # cp -Rp backup_location/var/opt/FJSVtrccb/2.0/sr/* /var/opt/FJSVtrccb/2.0/sr/
   ```

```
# cp -Rp backup_location/var/opt/FJSVssmgr/current/vsccompose/* /var/opt/FJSVssmgr/current/
vsccompose/
# cp -p backup_location/var/opt/FJSVssmgr/current/systemevent.csv /var/opt/FJSVssmgr/current/
```

Only files and subdirectories created during the backup procedure will be available to restore.

4. Restore files that are related to the performance management function.

   This step is only required if the performance management function file was backed up.

   Delete the subdirectories and files in the restore destination directories shown below.

   Do not delete the restore destination directories themselves. If these directories do not exist, create them.

   Copy the subdirectories and files from the backup location.

```
# cp -p backup_location/etc/opt/FJSVssmgr/current/perf.conf /etc/opt/FJSVssmgr/current/
# cp -Rp backup_location/var/opt/FJSVssmgr/current/perf/* /var/opt/FJSVssmgr/current/perf/
```

5. Restore files for which the maximum memory that can be used is customized.

   This step is only required if the file was backed up.

   Copy the files from the backup location.

```
# cp -p backup_location/opt/FJSVssmgr/bin/manager.ini /opt/FJSVssmgr/bin/
```

6. Restore the other files that can be customized.

   This step is only required if customization had taken place and the relative file was backed up.

   Copy the files from the backup location.

```
# cp -p backup_location/etc/opt/FJSVssmgr/current/sanma.conf /etc/opt/FJSVssmgr/current/
# cp -p backup_location/etc/opt/FJSVssmgr/current/ssmgr.conf /etc/opt/FJSVssmgr/current/
# cp -p backup_location/etc/opt/FJSVssmgr/current/trapop.sh /etc/opt/FJSVssmgr/current/
# cp -p backup_location/etc/opt/FJSVssmgr/current/traprm.sh /etc/opt/FJSVssmgr/current/
# cp -p backup_location/etc/opt/FJSVssmgr/current/VscCommitScript /etc/opt/FJSVssmgr/current/
# cp -p backup_location/etc/opt/FJSVssmgr/current/FJSVssvsc.ini /etc/opt/FJSVssmgr/current/
```

7. Restore the SNMP trap XML definition file.

   This step is only required if the definition file was backed up.

   Copy the SNMP trap XML definition file from the backup location.

```
# cp -p backup_location/etc/opt/FJSVssmgr/current/snmpth/*.xml /etc/opt/FJSVssmgr/current/
snmpth/
```

Note

Do not copy the file if you are upgrading from a previous version, refer to "C.6 SNMP Trap XML Definition File" in the manual for that version.

8. Restore the device polling settings file.

   This step is only necessary if the file was backed up.

   Copy the device polling settings file from the backup location.

```
# cp -p backup_location/etc/opt/FJSVssmgr/current/devicepolling/*.xml /etc/opt/FJSVssmgr/
current/devicepolling/
```

Note

Do not copy the file if you are upgrading from a previous version, refer to "C.10 Device Polling Setting File" in the manual for that version.

9. Restore the polling service setting file.

   If this file has not been customized, then this step is unnecessary.

   Copy the file from the backup location.

   ```
   # cp -p backup_location/etc/opt/FJSVssmgr/current/polling/*.xml /etc/opt/FJSVssmgr/current/
   polling/
   ```

   Note

   ···
   Do not copy the file if you are upgrading from an older version. Instead, reflect the customization of the older version file. For details on how to do that, refer to "C.13 Polling Service Setting File".
   ···

10. Restart the Manager.

    ```
    # /opt/FJSVssmgr/sbin/managerctl start
    ```

9.1.1.3.4 Restoring Linux Manager (cluster environment)

The following procedure explains the process to restore files that were backed up using the procedure described above in "9.1.1.2.4 Backup of Linux Manager (cluster environment)".

If the manager is to be restored by a reinstallation process all of the steps outlined in "4.2 [Linux] Manager" in the ETERNUS SF Storage Cruiser Installation Guide must be followed.

1. Stop all cluster services that relate to the Manager.

2. Mount a shared disk on the primary node.

3. Perform steps 2, 3, 4, 6, 7, and 8 of "9.1.1.3.3 Restoring Linux Manager" on the primary node.

4. Perform step 5 of "9.1.1.3.3 Restoring Linux Manager" on both nodes.

5. Un-mount the shared disk that was mounted in step 2.

6. Start all cluster services that relate to the Manager.

9.1.1.3.5 Restoring Windows Manager

Perform restore for the backup performed in "9.1.1.2.5 Backup of Windows Manager" according to the procedure shown below.

To restore after reinstalling the Manager, first complete the entire installation and setup according to the description in "4.3 [Windows] Manager" in the ETERNUS SF Storage Cruiser Installation Guide.

To upgrade from a Manager in a previous version, proceed according to the Notes for each procedure.

Information

···
About description in the procedure

- ・ $BAK_DIR means the backup destination directory.

- ・ $INS_DIR means "Program Directory" specified at the Manager installation.

- ・ $ENV_DIR means "Environment Directory" specified at the Manager installation.

- ・ $TMP_DIR means "Work Directory" specified at the Manager installation.
···

1. Stop the Manager.

   Go to [Control Panel] - [Administrative Tools] - [Services], select "ETERNUS SF Storage Cruiser Manager" and stop the service.

2. Restore the device management information.

For ordinary restoration tasks, perform "Restoring device management information". For version upgrading from older versions, perform "Version Upgrading from older versions".

Restoring device management information

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $TMP_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr

By using Explorer, copy the subdirectories and files from the backup location.

Source directory	Destination directory
$BAK_DIR\Manager\var\opt\FJSVssmgr\current \opencimom\logr	$TMP_DIR\Manager\var\opt\FJSVssmgr\current\opencimom \logr

Version upgrading from older versions

Use cimrestore.bat to restore the device management information. For details on this file, refer to "Appendix G Version Upgrade Tool".

Delete the subdirectories and files under the restore destination directory displayed below.

Do not delete the restore destination directories. Create them if they do not exist.

- $TMP_DIR\Manager\var\opt\FJSVssmgr\current\opencimom\logr

Move to the directory that contains cimrestore.sh, then execute cimrestore.sh as follows:

cimrestore.bat "$BAK_DIR\logr"

3. Restore essential files.

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $ENV_DIR\Manager\etc\opt\FJSVtrccb\2.0
- $TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\ac
- $TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\db
- $TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\sr
- $TMP_DIR\Manager\var\opt\FJSVssmgr\current\vsccompose

By using Explorer, delete the following file.

- $TMP_DIR\Manager\var\opt\FJSVssmgr\current\systemevent.csv

By using Explorer, copy the subdirectories and files from the backup location.

Source directory	Destination directory
$BAK_DIR\Manager\etc\opt\FJSVtrccb\2.0	$ENV_DIR\Manager\etc\opt\FJSVtrccb\2.0
$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\ac	$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\ac
$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\db	$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\db
$BAK_DIR\Manager\var\opt\FJSVtrccb\2.0\sr	$TMP_DIR\Manager\var\opt\FJSVtrccb\2.0\sr
$BAK_DIR\Manager\var\opt\FJSVssmgr\current \vsccompose	$TMP_DIR\Manager\var\opt\FJSVssmgr\current\vsccompose

By using Explorer, copy the following file from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\var\opt\FJSVssmgr\current \systemevent.csv	$TMP_DIR\Manager\var\opt\FJSVssmgr\current

If there are no subdirectories or files, restore is unnecessary.

4. Restore files that are related to the performance management function.

   If you are not using the performance management function, this step is unnecessary.

   By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

   Do not delete the restore destination directories themselves. If these directories do not exist, create them.

   - $TMP_DIR\Manager\var\opt\FJSVssmgr\current\perf

   By using Explorer, copy the following file from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\perf.conf	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current

   By using Explorer, copy the subdirectories and files in the following directories from the backup location.

Source directory	Destination directory
$BAK_DIR\Manager\var\opt\FJSVssmgr\current\perf	$TMP_DIR\Manager\var\opt\FJSVssmgr\current\perf

5. Restore files that can be customized.

   If there are files that are not customized, restore is unnecessary. Restore is also unnecessary if the files do not exist.

   By using Explorer, copy the following files from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\opt\FJSVssmgr\bin\manager.ini	$INS_DIR\Manager\opt\FJSVssmgr\bin
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \sanma.conf	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \ssmgr.conf	
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\trapop.bat	
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\traprm.bat	
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \VscCommitScript.bat	
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current \FJSVssvsc.ini	

6. Restore the SNMP trap XML definition file.

   If you have not customized the SNMP trap XML definition file, this step is unnecessary.

   By using Explorer, copy the SNMP trap XML definition file from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth *.xml	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth

Note

Do not copy the file if you are upgrading from a previous version. Instead, reflect the contents of the customization in the previous version, according to the description in "C.6 SNMP Trap XML Definition File".

7. Restore the device polling settings file.

If you have not customized the device polling settings file, this step is unnecessary.

Using Explorer, copy the device polling settings file from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\devicepolling\DP_config.xml	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\devicepolling

Note

Do not copy the file if you are upgrading from a previous version. Instead, reflect the contents of the customization in the previous version, according to the description in "C.10 Device Polling Setting File".

8. Restore the polling service settings file.

If you have not customized the polling service settings file, this step is unnecessary.

Using Explorer, copy the polling service settings file from the backup location.

Source file	Destination directory
$BAK_DIR\Manager\etc\opt\FJSVssmgr\current\polling\pollingService.xml	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\polling

Note

Do not copy the file if you are upgrading from a previous version. Instead, reflect the contents of the customization in the previous version, according to the description in "C.13 Polling Service Setting File"

9. Restart the Manager.

Go to [Control Panel] - [Administrative Tools] - [Services], select "ETERNUS SF Storage Cruiser Manager" and start the service.

9.1.2 Changing the operating environment

9.1.2.1 Changing the IP address of the administrative server

Follow the procedure given below to change the IP address of the administrative server.

1. Change the system IP address on the administrative server.

2. Reboot the administrative server.

3. Start the ESC Client, connect to the new IP address of the administrative server. When it connected to the administrative server successfully, delete the old IP address of administrative server when start the ESC client next time by click <delete> button in the login dialog.

Point

If the administrative server is cluster environment, it is necessary to reconstruct the cluster.

Please refer to "Appendix A High-availability admin servers" in ETERNUS SF Storage Cruiser Installation Guide for detail information.

For the device which is under fault management automatically by SNMP trap, it is necessary to change the SNMP Trap transmission place IP address setting. To change SNMP trap transmission setting, refer to "SNMP Trap transmission place IP address change command" in "Chapter 12 Command References", and execute the command.

・・・

9.1.2.2   Changing the IP address of a server node (host)

Follow the procedure given below to change the IP address of a server node.

・ Changing the IP address of a server node for which Agent is installed

   1. On the GUI screen, delete the device icon of the server node (without changing the access path).

   2. Change the system IP address on the server node.

   3. Stop the server node Agent on the server node.

   4. Execute the agent information change command on the server node to change the start IP of server node Agent.

      For the command that change to Agent start IP, refer to "Agent information change command" in "Chapter 12 Command References" for the detail information.

   5. Restart the server node Agent on the server node.

   6. On the GUI screen, perform [Register a server] with the new IP address.

・ Changing the IP address of a VM host for which Agent is not installed

   1. On the GUI screen, delete the device icon of the VM host (without changing the access path).

   2. Change the IP address of the VM host.

   3. On the GUI screen, perform [Register a server] with the new IP address.

・ Changing the IP address of a guest operating system for which Agent is not installed

   1. Change the IP address of the guest operating system.

   2. On the GUI screen, perform [Refresh].

9.1.2.3   Changing the server name of the administrative server

No special work is required.

9.1.2.4   Changing the name of a server node (host)

Follow the procedure given below to change the name of a server node.

・ Changing the name of a server node for which Agent is installed

   1. On the GUI screen, delete (no access path change) a device icon of the server node that changes the server node name.

   2. Change the server node name on the server node.

   3. Stop the server node Agent on the server node.

   4. Execute the agent information change command on the server node to change the setting of server node Agent.

      For the command that change the Agent settings, refer to "Agent information change command" in "Chapter 12 Command References" for the detail information.

   5. Restart the server node Agent on the server node.

6. On the GUI screen, perform [Register a server] on the server node.

・ Changing the host name of a VM host for which Agent is not installed

1. On the GUI screen, delete (no access path change) a device icon of the VM host that changes the host name.

2. Change the host name of the VM host.

3. On the GUI screen, perform [Register a server] for the VM host.

・ Changing the virtual machine name of a VM guest or the host name of a guest operating system, for which Agent is not installed

1. Change the virtual machine name of the VM guest or the host name of a guest operating system.

2. On the GUI screen, perform [Refresh].

Note

Information of an associated application element created in the Correlation window is not inherited when the server node name is changed. Register the application element again.

9.1.2.5 Changing the IP address or the SNMP community name of a supported device

To change the IP address of a device with support level A or B registered with this software or to change the SNMP community name, follow the procedure below:
When the IP address of a device with support level A or B registered with this software is changed, this software can automatically change the IP address part in the properties of the same device.

To change the IP address

Referring "Detecting a device by specifying IP address" in "5.2.1 Device search" to perform device detection by specifying an IP address. Based on this operation, this software detects that the IP address of a registered device has been renewed and automatically changes the IP address information of the target device on this software.
For a device with support level A or B, excluding the server node, IP address information for multiple devices in the subnet can be automatically changed by performing "Detecting for devices in the same subnet as the administrative server automatically" in "5.2.1 Device search".

Note

・ If the IP address is changed for a device where performance management is performed, then follow the procedure below to reflect the new IP address. For details on the procedure, refer to "7.2.11 Updating configuration information".

1. Configure the performance monitoring.

2. Configure the threshold value monitoring (if threshold value monitoring is performed).

3. Stop threshold value monitoring (if threshold value monitoring is performed).

4. Stop performance monitoring.

5. Detect the device with the new IP address.

6. Create a configuration file.

7. Start performance monitoring based on the settings specified in step 1.

8. Start threshold value monitoring based on the settings specified in step 2 (if threshold value monitoring is performed).

・ The device management software calling information is not changed automatically. Manually rewrite this information from the properties of each of the device icons.

To change the SNMP community name

1. Set the community name of each target device.

    For information on the community name of each target device, see "Chapter 4 Environment Configuration".

2. Set up the admin server.

    Set the SNMP_COMMUNITY_NAME_FOR_IP to the setting file by referring to "C.2 sanma.conf Parameter", and reflect the contents of the setting file on this software.

9.1.2.6   Changing the operation management of the cluster system (node name takeover)

In the environment of a Cluster System Operation, Node name inheritance may be used for Inherit network setting. Node name takeover affects the Name of a Server node.

In changing the Name of a Server node by setting Node name inheritance, refer to "9.1.2.4 Changing the name of a server node (host)".

9.1.2.7   Changing the port number

ESC uses the following four ports.

Port	Description
nfport 23456/tcp	Used for communication between administrative server and client
sscruisera 4917/tcp	Used for communication between administrative server and managed server node
ssvscme 7420/tcp ssvscme 7420/udp	Used for communication between the administrative server and virtual switches when using Virtual Storage Conductor

These port numbers are managed as internal information by the site domain server, domain admin servers, managed server node files (*1), and admin clients. When not setting the port numbers in the files (*1), the numbers above will be used by default.

*1: The files for managed server nodes are as follows:

Type	File name (full path)
Windows	%SystemRoot%\system32\drivers\etc\services
Solaris OS	/etc/inet/services
Linux, HP-UX	/etc/services

If you change the port number, set the same number for the other server nodes in ESC that used the previous number.

Example

When nfport of the administrative server is set as 23456:

Set 23456 for nfport of the client.

See

For further details about the ports, refer to "3.1.1 Network requirements".

Change the port number as follows.

How to change the port number of the administrative server and managed server nodes

You can change the port numbers by editing each file as follows:

File editing

Platform	Method of editing
Windows	Edit %SystemRoot%\system32\drivers\etc\services file using an editor application.
Solaris OS	Edit the /etc/inet/services file using the vi(1) command.
Linux, HP-UX	Edit the /etc/services file using the vi(1) command.

Procedure

1. Change the file

   Administrative server (Solaris OS, Linux)

   Change the lines under /etc/inet/services.

   ```
   # service names    port nos. /protocol names
     nfport          23456/tcp
     sscruisera      4917/tcp
     ssvscme         7420/tcp
     ssvscme         7420/udp
   ```

   Administrative server (Windows)

   Change the lines under %SystemRoot%\system32\drivers\etc\services.

   ```
   # service names    port nos. /protocol names
     nfport          23456/tcp
     sscruisera      4917/tcp
     ssvscme         7420/tcp
     ssvscme         7420/udp
   ```

   Managed server nodes (Solaris OS)

   Change the lines under /etc/inet/services.

   ```
   # service names    port nos. /protocol names
     sscruisera      4917/tcp
   ```

   Managed server nodes (Windows)

   Change the lines under %SystemRoot%\system32\drivers\etc\services.

   ```
   # Service names    port nos. /Protocol names
     sscruisera      4917/tcp
   ```

Managed server nodes (Linux)

Change the lines under /etc/services.

```
# service names    port nos. /protocol names
  sscruisera        4917/tcp
```

Managed server nodes (HP-UX)

Change the lines under /etc/services.

```
# service names    port nos. /protocol names
  sscruisera        4917/tcp
```

2. Restart all the server nodes where the port numbers have been changed.

See

. . . .

For changing the port numbers used by Virtual Storage Conductor, refer to "Chapter 3 Building an Environment" in the "ETERNUS SF Storage Cruiser User's Guide for Virtual Storage Conductor".

. . . .

Change the port number of the admin client

Change the port number with which the admin client is connected to the site admin server.

1. Start ESC by selecting [start] - [All Programs] - [ETERNUS SF Storage Cruiser] of the admin client or double-clicking the icon on the desktop.

   The login window will appear.

2. Click <Port> button.

   The "Port number" window will appear.

3. Set the port number to be changed, and click <OK> button.

   You are returned to the login window.

4. Click <Login> button on the login window, then connect to the admin server.

   The port number becomes enabled as setting information of the site admin server when the network connection to the administrative server succeeds.

9.1.2.8   Changing the configuration of supported devices

After hardware product is added to or removed from the supported devices or after information is added to or deleted from the configuration settings (for a disk array unit, change in a RAID Group, Logical Volume, etc.) for the supported devices or such information is modified, the information of the target device must manually be updated in the following windows:

・ Main view

   Execute [View] - [Refresh] to read the latest conditions of SAN from all the devices. The target device information is updated and displayed.

・ Relationship management window

   When the Relationship management window is being displayed, execute [View] - [Refresh] to read the latest condition of the target device. The target device information is updated and displayed. To display the Relationship management window, see "6.2.1 Correlation window".

・ Performance management window

Select the target device in the tree of the Performance management window, and then select [Device] - [Create Device Configuration File] from the menu to read the latest condition of the target device. The target device information is updated and displayed. For details, see "7.2.11 Updating configuration information".

9.1.2.9 Changing the password of supported devices

Follow the procedure given below to change the password of a device which is been registed to this software.

Objected Device	Conduction
ETERNUS SN200 series (Brocade) Fiber Channel switch PRIMEGY BX600 fiber channel switch blade	Refer to "User name and password for Fibre Channel switch control" in "4.2.1.1 Setting" to change the registered information.
VMware Infrastructure 3 Version 3.5 or later VMware ESXi 3.5 or later	Change the information registered in this software by referring to " User name and password" of "Changing environment" in "4.1.7.2 VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later)"

Except for the devices described above, there is no necessary to do any deal with this software when change the device's password.

9.2 [Solaris OS Version] Maintenance of Agent

9.2.1 Definition files

When an access path is set from this software, Agent automatically modifies the following files that contain device definitions on a server node and Fibre Channel environment definitions:

・ Path setting

/kernel/drv/sd.conf shared to different vendors' HBAs

・ Storage affinity setting

- If the HBA is the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F:

/kernel/drv/fjpfca.conf

- If the HBA is the Emulex LP9000/9002S/9002L/9802/10000:

/kernel/drv/lpfc.conf or lpfs.conf

In the event that a server node operation becomes abnormal after the setting of an access path from this software, a backup copy of the setting files that was created beforehand can be used for recovery.

The backup file is stored in /var/opt/FJSVssage/backup. The file name is the old file name suffixed with a serial number starting from 1.

9.2.2 Action to take for troubleshooting

If an Agent error (message ID = 3400) is output to /var/adm/messages during the setting or deletion of an access path, a definition file may not have been updated successfully. In this event, stop Agent, and take the following action:

1. As a user having root authority, enter the following command to stop Agent:

   ```
   # /opt/FJSVssage/bin/pstorageagt
   ```

2. Execute the ps command as follows to confirm that Agent is stopped:

   ```
   # /bin/ps -ef|grep FJSVssage
   ```

3. As necessary, save the following files to any directory:

   - /kernel/drv/sd.conf

   - /kernel/drv/fjpfca.conf

   - /kernel/drv/lpfc.conf

   - /kernel/drv/lpfs.conf

4. Restore the following definition files:
   Restore the original file from the backup file that is stored in the backup file storage area (/var/opt//FJSVssage/backup).

5. Restart the server node.

   Solaris 8, 9, 10 OS

   ```
   # touch /reconfigure
   # /usr/sbin/shutdown -y -i6 -g0
   After the server node is restarted, enter the following command:
   # disks -C
   ```

Other examples of major errors and the appropriate action to be taken are explained below.

・ Agent detects an environment error when a new HBA is added (except in cases where the HBA is a replacement).
  The server node may not have been started in re-configuration mode after the addition of the HBA. In this event, restart the server node in re-configuration mode.

・ Agent detects an environment error when a new HBA driver is installed.
  The server node may not have been started in re-configuration mode after installation of the driver. In this event, restart the server node in re-configuration mode.

9.2.3 Collecting data for troubleshooting

If any problem occurs in Agent, collect troubleshooting information according to "D.1 Troubleshooting information".

9.2.4 Changing the administrative environment

9.2.4.1 Changing the IP address of a server node (host)

For detail, please refer to "9.1.2.2 Changing the IP address of a server node (host)".

9.2.4.2 Changing the port number

For detail, please refer to "9.1.2.7 Changing the port number".

9.3 [Windows Version] Maintenance of Agent

9.3.1 Action to take for troubleshooting

Major errors related to Agent running on a Windows 2000 and Windows Server 2003 server node and the corrective action to be taken are explained below. In the Event viewer or the GUI window, confirm the occurrence of the errors described below.

Manager cannot detect Agent.

1. If all access paths under multipath control have been deleted by mistake, follow the recovery procedure given below.

   - Restart the Windows server node.
     After an access path is deleted, multipath control no longer controls the path, and the related device is not recognized.

   - "Refresh" the GUI window. The monitoring status of [HOST Property] in the Server node view of the GUI window then becomes normal.

   - Set the access path that was deleted by mistake.

2. Communication with Agent is disabled when an access path is connected.
   Depending on the particular system environment, Agent may not be able to communicate when an access path is set in the Windows 2000 environment. This is because the simultaneous operation of the access path connection and the plug&play function of Windows 2000 places a temporary heavy load on the system. In such cases, select [Refresh] in the GUI window.
   If communication remains disabled, the problem described in Item 3 may have occurred. See Item 3 below.

3. Too many devices are connected to the Windows server node.
   If too many devices are recognized by the Windows server node, Agent cannot perform processing within the response time, leading to a communication failure. In this event, check the connection configuration, and reduce the number of devices recognized by the Windows server node.
   Access paths can be set for approximately 100 devices per one Windows server node, but the number of devices varies depending on the server node environment.

4. Anti-virus software "Real Time Scan" is operated
   If an anti-virus program performs a real-time scan on a Windows server node, it is possible that the server cannot be detected or that "communication disabled" is displayed. It is because file access processing by agent takes more time than usual and it leads to timeout. Change the setting value of SNMP_HCM_TIMEOUT of sanma.conf to higher value on the side of manager to be able to detect and display the applicable server.
   See, "C.2 sanma.conf Parameter" for path of sanma.conf and the procedure for reflecting it.

The GUI window contents differ from the physical configuration.

1. An access path from an Emulex HBA cannot be drawn.
   The Topology value in a driver parameter in the registry may be incorrect.
   This caused by values in the registry being reset to default values, which occurs at either of the times: when a driver is re-installed; and when a driver is automatically re-installed because of the installation a new HBA having a different model number from that of a HBA already installed in a Windows 2000 or Windows Server 2003 machine (e.g., LP9802 and LP1050).
   Using the registry editor, check the driver parameters of the HBA, correct any incorrect value that you find, and then select [Refresh].
   For information about driver parameters, see "4.1.2 Windows server node (host)".

9.3.2 Collecting data for troubleshooting

If any problem occurs in Agent, collect troubleshooting information according to "D.1 Troubleshooting information".

9.3.3 Changing the administrative environment

9.3.3.1   Changing the IP address of a server node (host)

For detail, please refer to "9.1.2.2 Changing the IP address of a server node (host)".

9.3.3.2   Changing the port number

For detail, please refer to "9.1.2.7 Changing the port number".

9.4 [Linux Version] Maintenance of Agent

9.4.1   Collecting data for troubleshooting

If any problem occurs in Agent, collect troubleshooting information according to "D.1 Troubleshooting information".

9.4.2   Changing the administrative environment

9.4.2.1   Changing the IP address of a server node (host)

For detail, please refer to "9.1.2.2 Changing the IP address of a server node (host)".

9.4.2.2   Changing the port number

For detail, please refer to "9.1.2.7 Changing the port number".

9.5 [HP-UX Version] Maintenance of Agent

9.5.1   Collecting data for troubleshooting

If any problem occurs in Agent, collect troubleshooting information according to "D.1 Troubleshooting information".

9.5.2   Changing the administrative environment

9.5.2.1   Changing the IP address of a server node (host)

For detail, please refer to "9.1.2.2 Changing the IP address of a server node (host)".

9.5.2.2   Changing the port number

For detail, please refer to "9.1.2.7 Changing the port number".

9.6 Maintenance of Client

9.6.1 Collecting data for troubleshooting

If any problem occurs in Agent, collect troubleshooting information according to "D.1 Troubleshooting information".

Chapter 10 Linkage to Other Software

This chapter describes the operating methods conducting centralized administration in Systemwalker Centric Manager and other administrative software.

10.1 Operating Methods in a ETERNUS SF Storage Cruiser Environment

This software can not use the environment of ETERNUS SF Storage Cruiser.

10.2 Linkage with Systemwalker Centric Manager

Linkage with Systemwalker Centric Manager enables it to be used for centralized monitoring of storage devices. Linkage through window operations enables smooth troubleshooting of storage devices.
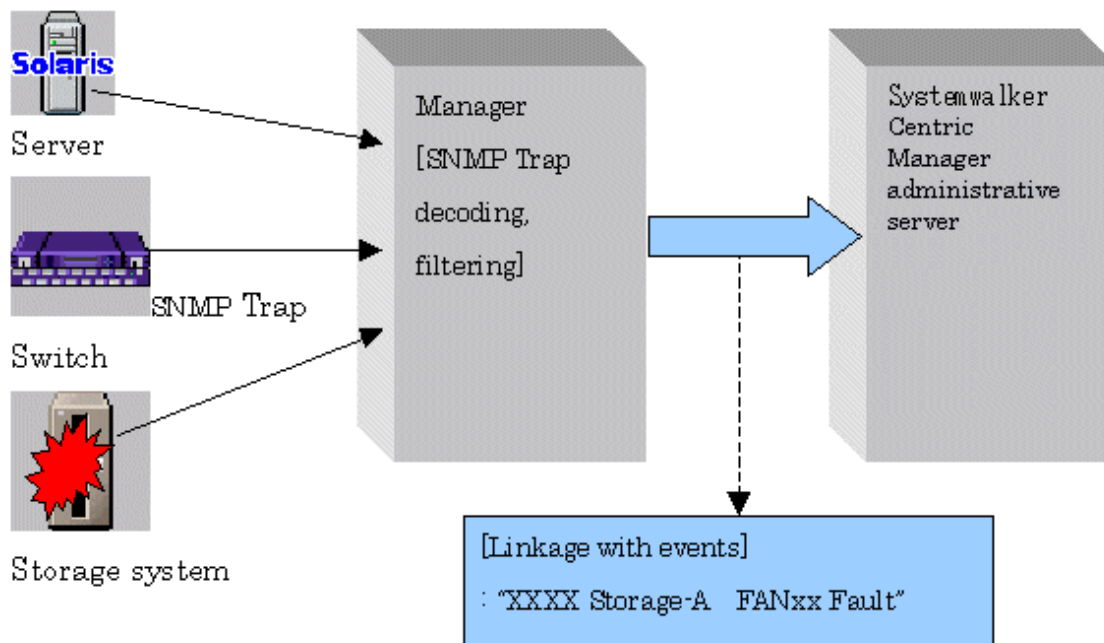
10.2.1 Linkage function with Systemwalker Centric Manager

Centralized event monitoring

Icons of the devices managed by this software are displayed in the monitoring window of the Systemwalker Centric Manager administrative client.

When an SNMP Trap is received from a monitored device, this software obtains only an event related to a fault and decodes it appropriately. This event is sent to Systemwalker Centric Manager to display the event. As a result, Systemwalker Centric Manager can be used to integrate existing server node management and storage device monitoring of this software. Moreover, functions such as Systemwalker Centric Manager e-Mail and pager can then be used for fault monitoring of the server node and storage devices.

By directly managing the storage equipment from Systemwalker Centric Manager, easier setup is achieved and more comprehensible troubleshooting reports are produced.

The icon for a device where a fault has occurred is indicated by "X" in Systemwalker Centric Manager, and information about the fault is displayed as event contents. When the event content is checked and action is taken for the fault, "Action" will be marked for the event. This operation clears the "X" state. The "X" state is not restored automatically by recovery from the fault.

"SSC" is indicated in the message for an event linked by this function to Systemwalker Centric Manager.

Linkage through window operations

On the Systemwalker Centric Manager monitoring window, select a menu item that was added to this software from the pop-up menu of a node of the faulty storage device, and then start it. This facilitates troubleshooting of the faulty storage device.

10.2.2 Required versions

Linkage of Systemwalker Centric Manager with this software requires one of the following versions of Systemwalker Centric Manager:

- Solaris OS , Linux
  SystemWalker Centric Manager GEE V11 or later
  SystemWalker Centric Manager-M EE/SE V11 or later

- Windows
  SystemWalker Centric Manager-M EE/SE V11 or later

10.2.3 Preparations

Preparations for linkage of Systemwalker Centric Manager with this software are described below.

- Register the storage devices to be managed with this software before setting up a link with Systemwalker Centric Manager.

- So that the names of the devices registered in this software can be resolved, either register the IP address and host name information for each device in the DNS server that is referenced by the administrative server, or define them in the /etc/hosts file on the administrative server.

- To detect node names and achieve software linkage, the Systemwalker Centric Manager administrative server and the administrative server of this software should both be managed by the DNS server, and have the same /etc/hosts definition. Please confirm the settings.

- The Systemwalker Centric Manager administrative server must be the same server, or Systemwalker Centric Manager Agent must be installed on the administrative server of this software.
  Also, the Systemwalker Centric Manager administrative server or Systemwalker Centric Manager Agent on the same server must be operating during the linkage operation.

10.2.4 Setup procedure

Follow the procedure below on the Systemwalker Centric Manager operation management client.
Log in to the administrative client with a user name belonging to the Administrator group of the local group.

10.2.4.1 Setup from Systemwalker Centric Manager administrative client

```
┌─────────────────────────────────────────┐
│ Use Systemwalker Centric Manager         │
│ administrative client to detect the node.│
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│ Register the start methods in the popup menu │
│ of a node.                               │
└─────────────────────────────────────────┘
```
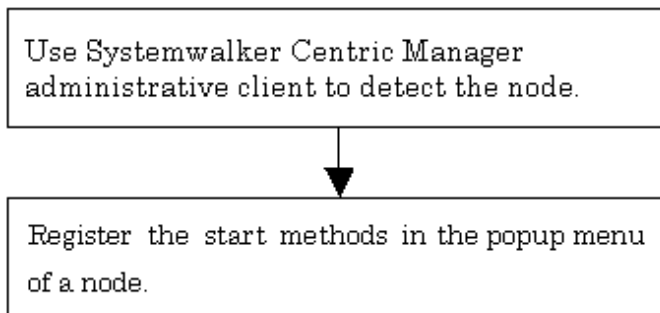
1. On the Systemwalker Centric Manager administration client, follow the procedure to detect a node in a subnet that contains storage devices.

2. Register the window start method in the pop-up menu of the node.

   Register the start method of this software in the pop-up menu of the node of the storage device, using the Systemwalker Centric Manager mpaplreg command. (Client must be installed on the same PC.)

   For use of the mpaplreg command, see "12.4.1 Systemwalker Centric Manager window linkage command (mpaplreg)". (The example below uses "ESC" as the menu name and "tama" as the server node name. Change these names according to the environment if necessary.

   ```
   mpaplreg -a -m ESC -p tama -c "\"C:\Program Files\ETERNUS-SSC\Client\bin\rcxclient.exe\""
   ```

   Enclose the entire start command (-c option value) specified with the mpaplreg command within double quotation marks ("), and enclose the start command (C:\Program Files\...\rcxclient.exe) with [\"] and [\"].

📖 Note

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- The operating environment must be set up in such a way that the administrative server recognizes the association between "Name" and "IP" in case that Systemwalker Centric Manager detects the server node by "Name", but not "IP". Please confirm that the name is registered in /etc/hosts or on the DNS server. Software linkage from this software to Systemwalker Centric Manager will fail if the administrative server does not recognize the association between an IP number and a node name.

- Perform this operation each time a storage device is added.

- When the event that is displayed as Info in the status item of the event log window is reported to Systemwalker Centric Manager, it is regarded as "Display Mode: general" and is not displayed on the monitoring window. If you want to display it, execute [Display Mode in the Monitored Viewer] from [Action] - [Action Setting] - [Message] from the Systemwalker Centric Manager menu. For the detail about [Display Mode in the Monitored Viewer], refer to the Systemwalker Centric Manager manual.

- If the starting method of this software administrative server is changed, execute the following command to delete the registered menu, and register it again. (In the example below, the menu name is "ESC.")

  ```
  mpaplreg -d -m ESC
  ```

- Confirm the content of registration by the following commands when the icon of this software is not displayed in the pop-up menu of the node though the menu addition by the mpaplreg command has normally. (In the example below, the menu name is "ESC.")

  ```
  mpaplreg -v -m ESC
  ```

- After completing the procedure, restart the Systemwalker Centric Manager server of an administrative client, and execute "node detection" in the monitoring area. Updating of registered icons is enabled in the display.

- A parameter error (swsag5101) occurs if the mpaplreg command contains an invalid parameter when starts from the batch file.

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10.2.4.2 Action to be taken if Systemwalker Centric Manager administrative server and this software adminitrative server are the same server

If the Systemwalker Centric Manager administrative server and administrative server of this software are the same server, both Systemwalker Centric Manager and this software receive and display SNMP Traps from devices. Perform the following task to prevent Systemwalker Centric Manager from directly receiving and displaying SNMP Traps from devices:

Suppressing Systemwalker Centric Manager reception of SNMP Traps from devices managed by this software
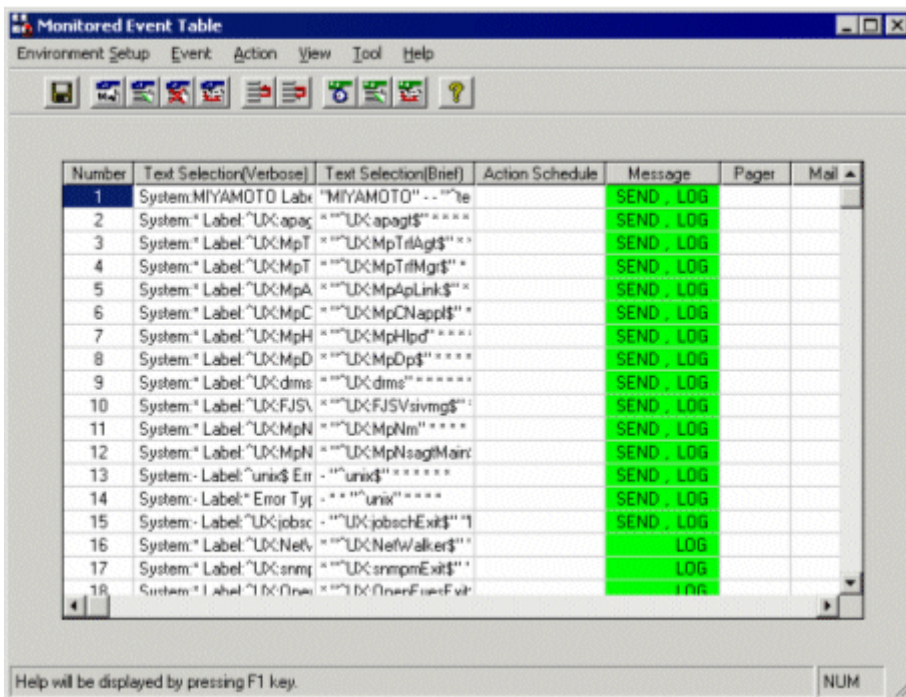
If the same server node has the Systemwalker Centric Manager administrative server and administrative server of this software, following the steps given below to prevent Systemwalker Centric Manager from direct reception of SNMP Traps of devices managed by this software. As a result, SNMP Traps would be received and decoded by this software and only SNMP Traps necessary for fault monitoring would be posted to Systemwalker Centric Manager. Consequently, when the SNMP Trap display function supported by Systemwalker Centric Manager is used, multiple traps appear for a single event or unnecessary SNMP Traps are displayed.

📖Information

· ·

These settings are not required if the Systemwalker Centric Manager-supported SNMP Trap display function is enabled.

· ·

1. From a Systemwalker Centric Manager administrative client, select [Event] - [Action Definition] in "System Monitoring."

   The Monitored Event Table appears.

2. Select [Event] - [Event Addition] in the Monitored Event Table dialog.

   The Event Definition dialog appears.
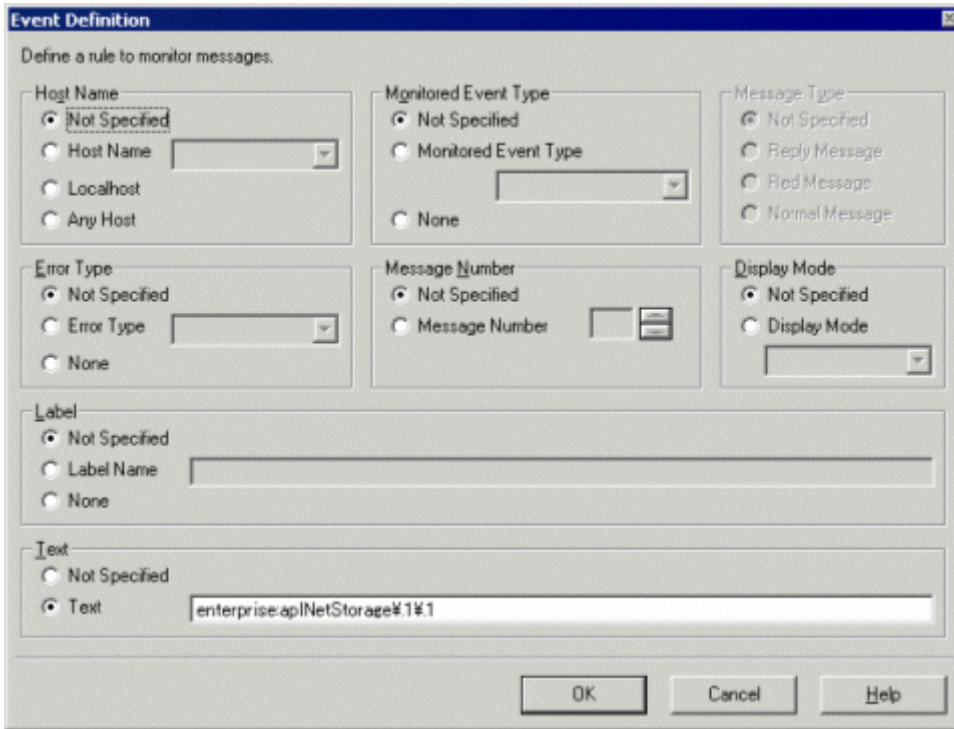
Define the following items:

Host Name

Check "Not specified".

Monitored Event Type

Check "Not specified".

Error Type

Check "Not specified".

Message Number

Check "Not specified".

Display Mode (only for Systemwalker Centric Manager 5.1 or later)

Check "Not specified".

Label

Check "Not specified".

Text

Specify one of the values shown below for an event definition.
Be sure to define this item only when individual devices are being managed. Otherwise, the item need not be defined.

Table 10.1 Lists of text

Device	Value
ETERNUS DX60/DX80 ETERNUS2000 series ETERNUS3000 series ETERNUS4000 series ETERNUS6000 series ETERNUS8000 series ETERNUS GR series	enterprise:aplNetStorage\.1

Device	Value
ETERNUS SX300 ETERNUS SX300S	enterprise:enterprises\.1123\.1\.205 enterprise:enterprises\.1123\.4\.300
Hitachi SANRISE	enterprise:enterprises\.116\.3\.11
EMC Symmetrix (ECC Agent)	enterprise:enterprises\.1139\.1
ETERNUS LT120 HP Surestore	enterprise:enterprises\.11\.2\.3\.9\.7\.1 enterprise:enterprises\.11\.2\.3\.9\.7\.2
ETERNUS LT130	enterprise:enterprises\.3351\.1\.3\.2\.6
ETERNUS LT160	enterprise:aplNetStorage\.3\.1
ETERNUS LT200	enterprise:enterprises\.119\.1\.83\.1\.21
ETERNUS LT210, LT220, LT230	enterprise:enterprises\.119\.1\.83\.1\.1 enterprise:enterprises\.119\.1\.83\.1\.2
ETERNUS LT250	enterprise:aplNetStorage\.3\.5
ETERNUS LT270	enterprise:aplNetStorage\.3\.2
ETERNUS NR1000	enterprise:enterprises\.789
BrocadeFC-Switch ETERNUS SN200 series Fibre Channel switch PRIMERGY BX600 fiber channel switch blade	enterprise:enterprises\.1588\.2\.1\.1
GadzooxFC-Hub	enterprise:enterprises\.1754\.1\.2\.2
Performance Agent trap	enterprise:aplSANMgr
Cisco MDS ETERNUS SN200 MDS	enterprise:enterprises\.9\.9\.117\.2 enterprise:enterprises\.9\.9\.289\.1\.3 enterprise:enterprises\.9\.9\.302\.1\.3 enterprise:enterprises\.9\.9\.91\.2
McDATA FC-Switch	enterprise:enterprises\.289
LT130, BrocadeFC-Switch, SN200, BX600 fiber channel switch blade, Cisco MDS, SN200 MDS, McDATA FC-Swtich, GadzooxFC-Hub common	enterprise:experimental\.94 (*)

*: The device not supported with Storage Cruiser includes the device which reports on SNMP Trap of this experimental\.94 and the event of those devices is controlled.

3. Select [Action] - [Action Setting] for the event set in step 2.

The Action Definition dialog appears.
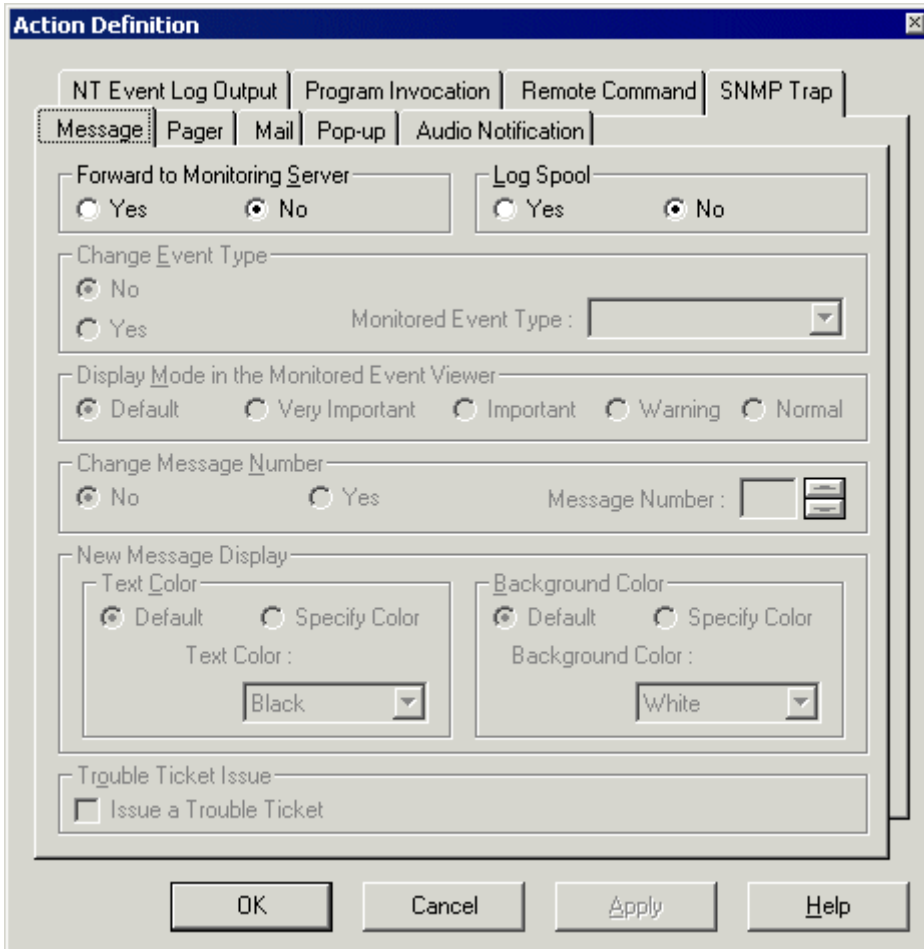
Select the [Message] tab, and define the following items:

Forward to Monitoring Server

Check "No"

Log Spool

Check "No"

4. Repeat Steps 1 to 3 for each of the text messages in the "Table 10.1 Lists of text".
If the SNMP standard trap is reported as an event from a storage device, refer to the above description, and suppress transmission of the SNMP standard trap according to your operation mode.

10.2.4.3   Setting confirmation test

In case that the target device is a device of theETERNUS DX60/DX80, ETERNUS2000 series, ETERNUS3000, ETERNUS4000 series, ETERNUS6000 series, ETERNUS8000 series, GR series, or a Fibre Channel switch, a suitable procedure and command are provided to confirm whether software linkage to Systemwalker Centric Manager is set up correctly. Run the test described in "5.3 Checking Management Status" to check whether operation is correct.

The figure below shows an example of the Systemwalker Centric Manager window displayed during event linkage with Systemwalker Centric Manager.
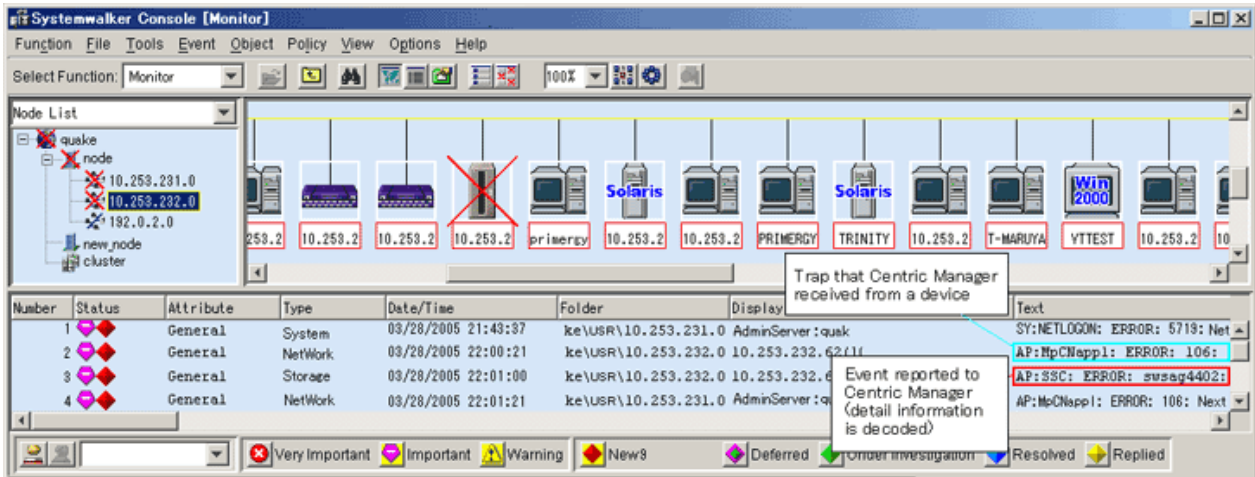
10.3 Linking with Systemwalker Service Quality Coordinator

Linkage with Systemwalker Service Quality Coordinator, Systemwalker Service Quality Coordinator can make use of performance information of storage devices and Fibre Channel switches.

Please refer to "Systemwalker Service Quality Coordinator User's Guide" for detail information.

Items that can be linked to Systemwalker Service Quality Coordinator

Fibre Channel switch

	Performance information (Unit)
Port	Transfer rates of send/receive data (MB/S)
	Number of CRC errors

ETERNUS disk storage systems

	Performance information (Unit)
LUN LogicalVolume RAIDGroup	Read/Write count (IOPS)
	Read/Write data transfer rate (MB/S)
	Read/Write response time (msec)
	Read/Pre-fetch/Write cache hit rate (%)
Disk drive	Disk busy rate (%)
CM	Load (CPU usage) rate (%)

📄 **Note**

・ The performance information that can be managed depends on the version of Systemwalker Service Quality Coordinator.

・ The ETERNUS SN200 MDS series Fibre Channel switch is not supported.

・ The CM load (CPU usage) rate for ETERNUS 4000 (models 400 and 600) and ETERNUS 8000 (models 800, 1200 and 2200) includes the ROE load (CPU usage) rate.

10.4 Linkage with Other Administrative Software

Events can be sent to other administrative software.

The Shell/bat linkage function is used for such linkage. For details, see "6.4 Event Display and Linkage".

10.5 Server Node Middleware that can be Managed

The table below lists the server node middleware products that can be managed. Please contact your Fujitsu systems engineer (SE) for the latest support information.
In the "Failure monitoring" column, "A" indicates "Available" and "N/A" indicates "Not Available".

OS type	Middleware type	Product name	Version	Failure monitoring
Solaris 7 OS Solaris 8 OS Solaris 9 OS	Multipath driver	ETERNUS Multipath Driver	2.0.1 or later	A
		GR Multipath Driver (GRMPD)	1.0 or later	A
		Multipath disk control load balancing option (MPLB)	2.0 or later	A
		Multipath disk control (MPHD)	2.0 or later	A
		HITACHI JP1/HiCommand Dynamic Link Manager (hereinafter referred to as HDLM)	05-41	A
	Mirror disk driver	PRIMECLUSTER Global Disk Services	All versions	A
	File system	UFS	-	N/A
		PRIMECLUSTER Global File Services	All versions	A
	Database (*11)	Oracle Database	8i (8.1.6 or later), 9i, 10g	N/A
		Symfoware Server Enterprise Extended Edition (*2)	5.0.1 or later	N/A
		Symfoware Server Enterprise Edition	5.0 or later	
Solaris 10 OS (*7, *8)	Multipath driver	ETERNUS Multipath Driver	2.0.1 or later	A
		MPxIO	-	A
	Mirror disk driver	PRIMECLUSTER Global Disk Services	4.1A40 or later	A
	File system	UFS	-	N/A
		ZFS (*10)	-	N/A
		QFS	-	N/A
	Database (*11)	Oracle Database	10g	N/A
		Symfoware Server Enterprise Extended Edition (*2)	7.0 or later	N/A
		Symfoware Server Enterprise Edition	7.0 or later	N/A
Windows 2000	Multipath driver	GR Multipath Driver (GRMPD)	1.0 or later	A

OS type	Middleware type	Product name	Version	Failure monitoring
		Multipath control for Windows 2000	V2.0 or later	A
	File system	NTFS(FAT) (*1)	-	N/A
	Database	Symfoware Server Enterprise Edition	V5.0L10 or later	N/A
		SQLServer 2000	-	N/A
		Oracle Database	8i (8.1.6 or later), 9i, 10g (*5)	N/A
Windows Server 2003 (x86)	Multipath driver	GR Multipath Driver (GRMPD)	V1.0L13 or later	A
		ETERNUS Multipath Driver	V2.0L10 or later	A
	File system	NTFS(FAT) (*1)	-	N/A
	Database	Symfoware Server Enterprise Edition	V5.0L30 or later	N/A
		SQLServer 2000	SP3 or later	N/A
		Oracle Database	9i (9.2.0 or later), 10g (*5)	N/A
Windows Server 2003(x64)	Multipath driver	ETERNUS Multipath Driver	V2.0L11 or later	A
	File system	NTFS(FAT) (*1)	-	N/A
Windows Server 2003 (IPF)	Multipath driver	ETERNUS Multipath Driver	V2.0L01 or later	A
	File system	NTFS(FAT) (*1)	-	N/A
Windows Server 2008	Multipath driver	ETERNUS Multipath Driver	V2.0L14 or later	A
		msdsm (*9)	6.0 or later	A
	File system	NTFS(FAT) (*1)	-	N/A
RHEL-AS2.1(x86) RHEL-ES2.1(x86)	Multipath driver	GR Multipath Driver (GRMPD)	V1.0L03 or later (*3, *4)	A
	Mirror disk driver	PRIMECLUSTER Global Disk Services	4.0 A20 or later	A
	File system	ext2, ext3	-	N/A
		PRIMECLUSTER Global File Services	4.0 A20 or later	A
	Database	Symfoware Server Enterprise Edition	V6.0L10 or later	N/A
		Oracle Database	9i, 10g (*5)	N/A
RHEL-AS3(x86) RHEL-ES3(x86) RHEL-AS3.9(x86) RHEL-ES3.9(x86)	Multipath driver	GRMultipath driver(GRMPD)	V1.0L04 or later (*4)	A
	Mirror disk driver	PRIMECLUSTER Global Disk Services	4.1 A20 or later	A
	File system	ext2, ext3	-	N/A
		PRIMECLUSTER Global File Services	4.1 A20 or later	A
	Database	Symfoware Server Enterprise Edition	V6.0L10 or later	N/A

OS type	Middleware type	Product name	Version	Failure monitoring
		Oracle Database	9i, 10g (*5)	N/A
RHEL-AS4(x86) RHEL-ES4(x86) RHEL-AS4(EM64T) RHEL-ES4(EM64T) RHEL-AS4.5(x86) RHEL-ES4.5(x86) RHEL-AS4.5(EM64T) RHEL-ES4.5(EM64T) RHEL-AS4.6(x86) RHEL-ES4.6(x86) RHEL-AS4.6(EM64T) RHEL-ES4.6(EM64T) RHEL-AS4.7(x86) RHEL-ES4.7(x86) RHEL-AS4.7(EM64T) RHEL-ES4.7(EM64T) RHEL-AS4.8(x86) RHEL-ES4.8(x86) RHEL-AS4.8(EM64T) RHEL-ES4.8(EM64T)	Multipath driver	ETERNUS Multipath driver	V2.0L02 or later (*6)	A
	File system	ext2,ext3	-	N/A
RHEL-AS4(IPF) RHEL-AS4.5(IPF) RHEL-AS4.6(IPF) RHEL-AS4.7(IPF) RHEL-AS4.8(IPF)	Multipath driver	ETERNUS Multipath driver	V2.0L01 or later	A
	File system	ext2, ext3	-	N/A
RHEL5(x86) RHEL5(Intel64) RHEL5(IPF) RHEL5.1(x86) RHEL5.1(Intel64) RHEL5.1(IPF) RHEL5.2(x86) RHEL5.2(Intel64) RHEL5.2(IPF) RHEL5.3(x86) RHEL5.3(Intel64) RHEL5.3(IPF)	Multipath driver	ETERNUS Multipath driver	V2.0L11 or later	A
	File system	ext2,ext3	-	N/A
SUSE Linux Enterprise Server 9 for EM64T	File system	ext2, ext3, reiserfs	-	N/A
HP-UX 11.0 HP-UX 11i HP-UX 11iv2	Multipath driver	PV-LINK (LVM function)	-	A
	Mirror disk	LVM	-	N/A

OS type	Middleware type	Product name	Version	Failure monitoring
HP-UX 11iv3	Multipath driver	PV-LINK (LVM function)	-	A
		Native multipath function	-	A
	Mirror disk	LVM	-	N/A
VMWare (*12)	File system	ext2, ext3	-	N/A

*1: File systems created on a dynamic disk or mounted drives are not supported.

*2: The in-doubt log file of Symfoware is not supported.

*3: A patch (GRMPD V1.0L03 patch01) must be applied to GRMPD V1.0L03.

*4: GRMPD V1.0L04, to which GRMPD V1.0L04 patch03 has been applied, is required for using GRMPD and GDS together.

*5: The database file created on the ASM (Automatic Storage Management) disk group is not supported.

*6: For V2.0L02, the application of the patch (ETERNUS multipath driver V2.0L02 patch01) is required.

*7: When using zone in Solaris 10 OS, monitoring of non-global zone is not supported.

*8: When HBA made of SUN is used, only file systems UFS, ZFS and QFS, or Multipath driver MPxIO are supported.

*9: The "msdsm" is the multi path driver that is built into Windows operating system since Windows Server 2008 by the standard.

*10: If a normal file is used as a virtual device for a ZFS storage pool, an icon for the ZFS area will be displayed. However, displaying the connection lines to the icon for the file system that includes this file is not supported.

*11: If the resources relating to the database have been created as QFS or ZFS files, the file information icon for the database will be displayed. However, displaying the connection lines to the icon for the file system that includes the files is not supported.

*12: VMware Infrastructure 3 Version 3.0 only.

About monitoring function, only which marked with "A" is supported.

Chapter 11 Storage Volume Configuration Navigator

This chapter explains the Storage Volume Configuration Navigator.

11.1 Outline

11.1.1 Features

The Storage Volume Configuration Navigator will standardize Storage device's complicated volume configuration methods varied from model to model and relieve administrators of the liability to create volumes through graphical operation windows.

Only specifying the required capacity and numbers of volumes can automatically create LogicalVolumes to the Storage device (Automatic creation of LogicalVolume configuration) without considering any difference in models.

In addition, configurations created through the automatic configuration function can manually be corrected (manual configuration).

Saving a configuration of operational environment in a file makes it possible to correct at Offsite. The configuration corrected at Offsite can be reflected at one time at Onsite.

11.1.2 Supported configurations

Storage Volume Configuration Navigator cannot perform configuration design and setup for RAID groups that include volumes other than open volumes, snap data volumes, and SDPVs. It can design and set up logical volumes for RAID groups only if they exclusively contain open volumes, snap data volumes and SDPVs.

Note that Storage Volume Configuration Navigator and ETERNUSmgr cannot change device configurations at the same time. Do not use ETERNUSmgr to change the device configuration from the time Storage Volume Configuration Navigator reads the device configuration data until the designed configuration is reflected to the actual device. If ETERNUSmgr has been used to change the device configuration, then perform the design process again, starting with reading the device configuration.

The table below shows the requisites for use of Storage Volume Configuration Navigator:

Configuration read		No requisites apply.
Configuration design Configuration settings	New	[If creating a RAID group] No requisites apply. [If creating a volume] Only open volumes can be created. Mainframe volumes, Snap Data Volumes, SDPVs, MVVs, MVV Concatenation and LUN Concatenation volumes, and Thin Provisioning Volumes cannot be created.
	Update	[If updating a RAID group] Design and setup is possible only if the RAID group exclusively contains only open volumes, snap data volumes, and SDPVs. Design and setup is not possible if the RAID group contains mainframe volumes, MVVs, or MVV Concatenation or LUN Concatenation volumes. Design and setup is not possible if the RAID group comprises a TPP. [If creating a volume in an existing RAID group] Volumes can be created for the RAID groups that meet the first condition above. Only open volumes can be created.

		Mainframe volumes, Snap Data Volumes, SDPVs, MVVs, MVV Concatenation and LUN Concatenation volumes, and Thin Provisioning Volumes cannot be created.

The table below lists the devices that can operate with Storage Volume Configuration Navigator and the target items. "A" indicates "Available", "N/A" indicates "Not Available".

Model name	Configuration target		Configuration read	Configuration design	Configuration settings
ETERNUS8000	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
		RAID6	A	A（Note 1）	A（Note 1）
	TPP		A	N/A	N/A
	Hot spare		A	A	A
	Volume type	Open volume	A	A（Note 2）	A（Note 2）
		Mainframe volume	A	N/A	N/A
		MVV	A	N/A	N/A
		Snap Data Volume	A	N/A	N/A
		SDPV	A	N/A	N/A
		MVV Concatenation	A	N/A	N/A
		LUN Concatenation	A	N/A	N/A
		Thin Provisioning Volume（Note 3）	A	N/A	N/A
	Affinity type	AffinityGroup	A	A	A
		Linked AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A
ETERNUS4000 (except for models 80 and 100)	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
		RAID6	A	A（Note 1）	A（Note 1）
	TPP		A	N/A	N/A
	Hot spare		A	A	A
	Volume type	Open volume	A	A（Note 2）	A（Note 2）
		Snap Data Volume	A	N/A	N/A
		SDPV	A	N/A	N/A
		LUN Concatenation	A	N/A	N/A
		Thin Provisioning Volume（Note 3）	A	N/A	N/A
	Affinity type	AffinityGroup	A	A	A
		Linked AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A

Model name	Configuration target		Configuration read	Configuration design	Configuration settings
ETERNUS4000 models 80 and 100	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
	Hot spare		A	A	A
	Volume type	Open volume	A	A	A
	Affinity type	AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A
ETERNUS6000	RAID level	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
	Hot spare		A	A	A
	Volume type	Open volume	A	A（Note 2）	A（Note 2）
		Mainframe volume	A	N/A	N/A
		MVV	A	N/A	N/A
		MVV Concatenation	A	N/A	N/A
		RAID Consolidation	A	N/A	N/A
	Affinity type	AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A
ETERNUS3000	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
	Hot spare		A	A	A
	Volume type	Open volume	A	A	A
	Affinity type	AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A
ETERNUS2000	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
		RAID6	A	A（Note 1）	A（Note 1）
	Hot spare		A	A	A
	Volume type	Open volume	A	A（Note 2）	A（Note 2）
		Snap Data Volume	A	N/A	N/A
		SDPV	A	N/A	N/A
		LUN Concatenation	A	N/A	N/A
	Affinity type	AffinityGroup	A	A	A

Model name	Configuration target		Configuration read	Configuration design	Configuration settings
		Linked AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A
ETERNUS DX60, DX80	RAID group	RAID0	A	N/A	N/A
		RAID1+0	A	A（Note 1）	A（Note 1）
		RAID1	A	A（Note 1）	A（Note 1）
		RAID5	A	A（Note 1）	A（Note 1）
		RAID5+0	A	A（Note 1）	A（Note 1）
		RAID6	A	A（Note 1）	A（Note 1）
	Hot spare	Hot spare	A	A	A
		Dedicated Hot Spare	A	A	A
	Volume type	Open volume	A	A（Note 2）	A（Note 2）
		Snap Data Volume	A	N/A	N/A
		SDPV	A	N/A	N/A
		LUN Concatenation	A	N/A	N/A
	Affinity type	AffinityGroup	A	A	A
		Linked AffinityGroup	A	N/A	N/A
		LUN Mapping	A	N/A	N/A

Note 1: Configuration design and settings are not possible if the target RAID group contains volumes other than open volumes, snap data volumes, and SDPVs,.

Note 2: Configuration design and settings are not possible if the RAID group that contains the target volume contains volumes other than open volumes, snap data volumes, and SDPVs,.

Note 3: The target devices are ETERNUS4000 models 400/600 and ETERNUS8000 models 800/1200/2200.

11.1.3 Automatic creation of LogicalVolume configuration

Based on the specified capacity of a LogicalVolume, number of LogicalVolumes and RAID level, the automatic LogicalVolume configuration creation (hereafter referred to as the automatic configuration function) automatically creates LogicalVolumes and assigns them to a RAIDGroup. It is also possible to specify automatic creation of a RAIDGroup to which LogicalVolumes should be assigned. Using this function thus makes it possible to easily configure a RAIDGroup and LogicalVolumes with excellent serviceability and availability.

The automatic configuration function creates and assigns LogicalVolumes as follows:

Checking the hot spare disk capacity and creating a hot spare disk

To secure sufficient availability, the automatic configuration function checks the hot spare capacity prior to LogicalVolume assignment. If a required hot spare disk does not exist or the capacity is too small, the function automatically configures a hot spare disk.

LogicalVolume assignment order

LogicalVolumes with larger capacities are preferentially assigned to a RAIDGroup. By preferentially allocating LogicalVolumes with larger capacities, a RAIDGroup can be used effectively and efficiently.

Example of logical volume allocation

RAIDGroup

LogicalVolume

Free space 10

Free space 15

5

RAIDGroup0x0001   RAIDGroup0x0002

For assigning logical volumes with capacities 8 and 10 sequentially to RAIDGroups beginning from RAIDGroup 0x0001

8

10
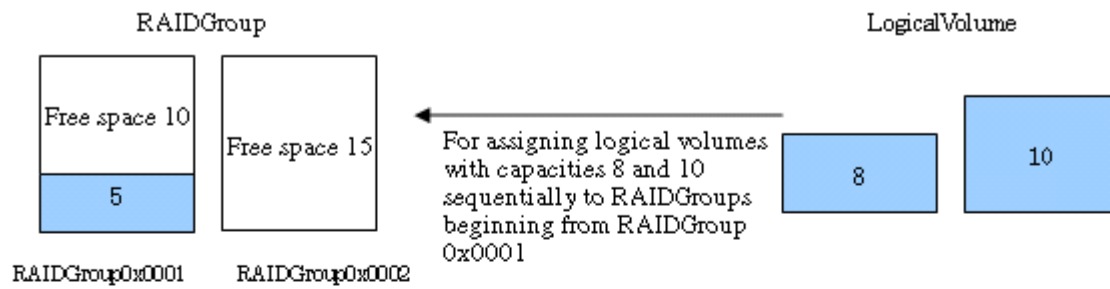
If logical volumes with small capacities are assigned preferentially

Free space 2

8

5

Free space 5

10

RAIDGroup0x0001   RAIDGroup0x0002

- Free space 2 is generated in RAIDGroup 0x0001.
  → Any small-size free space generated may not be used for logical volume assignment and end up as useless dead space.
- Free space 5 remains in RAIDGroup 0x0002.
  → The maximum capacity of logical volumes that can be assigned is only 5.

If logical volumes with larger capacities are assigned preferentially

10

5

Free space 7

8

RAIDGroup0x0001   RAIDGroup0x0002

- No free space remains in RAIDGroup 0x0001.
  → The RAIDGroup can be used effectively without waste.
- Free space 7 remains in RAIDGroup 0x0002.
  → The maximum capacity of logical volumes that can be assigned is 7, which is larger than the free space that remains when logical volumes with smaller capacities are assigned preferentially.

LogicalVolume assignment areas within a RAIDGroup

When two or more free spaces exist in a RAIDGroup, LogicalVolumes are assigned preferentially beginning from an area with smaller free space. Doing so enables the effective and efficient use of a RAIDGroup.

Example of logical volume allocation

RAIDGroup

Free space 3
5
Free space 7

RAIDGroup0x0001

LogicalVolume

3

For assigning a logical volume with capacity 3 to RAIDGroup 0x0001
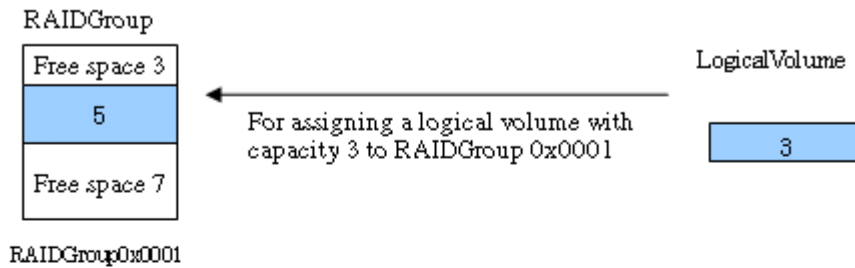
If the logical volume is preferentially assigned to an area with a larger free space

Free space 3
5
Free space 4
3

RAIDGroup0x0001

The maximum capacity of logical volumes that can be assigned to RAIDGroup 0x0001 is 4.
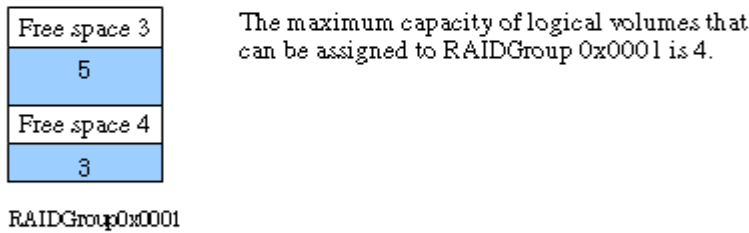
If the logical volume is preferentially assigned to an area with a smaller free space

3
5
Free space 7

RAIDGroup0x0001

The maximum capacity of logical volumes that can be assigned to RAIDGroup 0x0001 is 7.

→ It is possible to further assign a logical volume or logical volumes with larger capacity than that remaining after an area with larger free space is preferentially allocated.
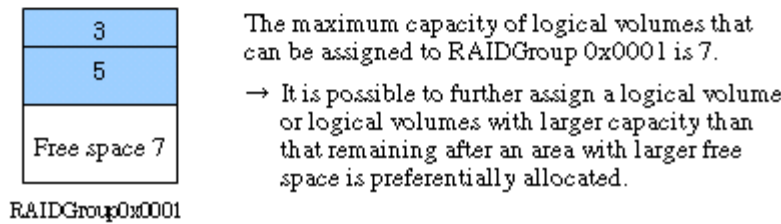
RAIDGroup allocation order

A RAIDGroup is allocated according to LogicalVolume assignment as shown below. The RAIDGroup to be used can also be selected from a list of existing RAIDGroups.

- Distribution to individual RAIDGroups

A RAIDGroup with the smallest allocation to LogicalVolumes is allocated preferentially.
Distributing LogicalVolumes to RAIDGroups can distribute loads. If two or more RAIDGroups have the same size of LogicalVolume allocation, the one with the smallest RAIDGroup number is allocated preferentially.

- Order of RAIDGroup numbers

RAIDGroups with smaller numbers are allocated preferentially.

Configuring a RAIDGroup (only when RAIDGroup configuration permission is given)

The automatic configuration function configures a RAIDGroup by selecting disks evenly from individual groups to secure availability.

11.1.4 Manual configuration

The configurations of LogicalVolumes and RAIDGroups created by the automatic configuration function are automatically correctable. The following operations are manually available.

・ Create and delete RAID groups, and add and delete disks.

・ Create and delete LogicalVolumes.

・ Create and delete hot spares.

The above operations make it possible to create rough configurations at a time by the automatic configuration function and make correction of details by manual configuration.

11.1.5 Operation procedure

Storage Volume Configuration Navigator designs and sets a storage device configuration according to the following steps:

How to perform and define configuration design in advance at Offsite

1. Starting (offsite)

   Start Storage Volume Configuration Navigator by selecting it from the Start menu or clicking the corresponding desktop icon.

2. Loading the device configuration

   If the real device configuration has been saved in advance to a file onsite, load the file. In this case, steps 3 "Creating a device unit" and step 4 "Mounting disks" do not need to be performed.

3. Creating a device unit

   Click the icon of the device, whose configuration is to be designed and set, from the unit stencil to create a device unit on the design window. For more information, see "11.2.6 Creating a device unit (for new designing offsite)".

4. Mounting disks

   Mount disks according to the real device configuration in the device unit. If a required DE has not been mounted on the location where a disk is to be mounted, mount a DE first. For more information, see "11.2.7 Mounting disks (for new designing offsite)".

5. Configuring RAIDGroups and LogicalVolumes

   Configure RAIDGroups and LogicalVolumes in the device unit. Using the automatic configuration function can greatly simplify the designing process. See "11.2.8 Executing automatic configuration" for more information on the automatic configuration function. Manual configuration is also possible. In addition, editable RAID levels and LogicalVolumes in the Storage Volume Configuration Navigator are as follows.Unsupported RAID levels and LogicalVolumes are not editable. For details, see "11.1.2 Supported configurations".

   - Supported RAID levels
     RAID1+0, RAID1, RAID6, RAID5+0 and RAID5 are supported.
     However, if an unsupported LogicalVolume (except Snap Data Volume and SDPV) is associated with RAID groups, even a supported RAID level is not editable.

   - Supported LogicalVolumes
     Open Volumes are supported. However, even if it is an Open Volume, a concatenated volume is not supported.

   Follow the procedure below for manual configuration:

   1. Configuring RAIDGroups

      Configure RAIDGroups in the device unit. For details, see "11.2.9 Creating a RAIDgroup (manual creation)".

   2. Allocating LogicalVolumes

      Allocate LogicalVolumes to the RAIDGroups thus configured. For details, see "11.2.12 LogicalVolume creation (manual operation)".

   3. Creating a hot spare disk

      Create a hot spare disk in the device unit. For details, see "11.2.14 Creating a hot spare disk (manual operation)".

6. Creating AffinityGroups and Allocating LUNs

   Create AffinityGroups within a device unit to allocate LUNs.
   When creating AffinityGroup, LogicalVolumes are required within the device unit.
   For details, see "11.2.15 AffinityGroup operation(manual creation)".

7. Saving as a file

   Save the configuration whose design is complete as a file. For details, see "11.2.24 Reading and saving a file".

8. Starting (onsite)

   Start Storage Volume Configuration Navigator by selecting it from the Start menu or clicking the corresponding desktop icon.

9. Loading the file

   Load the file that was saved in Step 7. For details, see "11.2.24 Reading and saving a file".

10. Login

    Log in to the operation management server at Onsite with a privileged administrator.

    For details, see "11.2.18 Login".

11. Entering an IP address

    To specify the real device for which the data of the device configuration created in the device unit is to be defined, enter the IP addresss of the real device in the device unit. For details, see "11.2.19 Entering IP address". Note that this operation is not required if a device configuration was created by loading the real device configuration from the file.

12. Device matching

    Make sure that the IP address entered in the device unit is correct and define the correspondence between the device unit and the real device on a one-to-one basis. For details, see "11.2.20 Device matching".

13. Setting the device

    Set the data of the device configuration created in the device unit for the real device. For details, see "11.2.21 Device setup".

14. Access path setting

    After setting device configuration data to a real device, an access path can be set through the access path management function. For details of access path management, see "6.3 Access Path Management".

How to perform and define configuration design at Onsite

1. Changing the storage device configuration

   For changing hardware configurations such as adding disks or DE of a storage device, it is required to be executed before read operation of the device configuration.

2. Starting Storage Volume Configuration Navigator and loading the device configuration

   Select a registered device on the resource view and then select [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu to start. Or, select [File] - [Storage Volume Configuration Navigator] from the menu of the resource view to start, and drag and drop the device icons displayed on the resource view to the design window of the Storage Volume Configuration Navigator to read the device configuration data.

   For details, see "11.2.23 Device loading". In addition, when selecting "Storage Configuration Navigator" from the start menu or desktop icons to start, it is necessary to login with a privileged administrator before drag and drop.

3. Offsite designing and saving of device configuration data to a file

   If you want to perform configuration design at Offsite based on the current Storage device configuration, save in a file the device configuration displayed on the design window. Start the Storage Volume Configuration Navigator at Offsite to design. For details, see "How to perform and define configuration design in advance at Offsite".

4. Configuring RAIDGroups and LogicalVolumes

   Configure RAIDGroups and LogicalVolumes in the device unit. Using the automatic configuration function can greatly simplify the designing process. See "11.2.8 Executing automatic configuration" for more information on the automatic configuration function. Manual configuration is also possible. In addition, editable RAID levels and LogicalVolumes in the Storage Volume Navigator are as follows. Unsupported RAID levels and LogicalVolumes are not editable. For details, see "11.1.2 Supported configurations".

   - Supported RAID levels
     RAID1+0, RAID1, RAID6, RAID5+0 and RAID5 are supported.

However, if an unsupported LogicalVolume (except Snap Data Volume and SDPV) is associated with RAID groups, even a supported RAID level is not editable.

- Supported LogicalVolumes
  Open Volumes are supported. However, even if it is an Open Volume, a concatenated volume is not supported.

Follow the procedure below for manual configuration:

1. Configuring RAIDGroups

   Configure RAIDGroups in the device unit. For details, see "11.2.9 Creating a RAIDgroup (manual creation)".

2. Allocating LogicalVolumes

   Allocate LogicalVolumes to the RAIDGroups thus configured. For details, see "11.2.12 LogicalVolume creation (manual operation)".

3. Creating a hot spare disk

   Create a hot spare disk in the device unit. For details, see "11.2.14 Creating a hot spare disk (manual operation)".

5. Creating AffinityGroups and Allocating LUNs

   Create AffinityGroups within a device unit to allocate LUNs.
   When creating AffinityGroup, LogicalVolumes are required within the device unit.
   For details, see "11.2.15 AffinityGroup operation(manual creation)".

6. Device matching

   Define the correspondence between the device unit and the real device on a one-to-one basis. For details, see "11.2.20 Device matching".

7. Setting the device

   Set the data of the device configuration created in the device unit for the real device. For details, see "11.2.21 Device setup".

8. Access path setting

   After setting device configuration data to the real device, access path can be set with access path management functions. For details of access path management, see "6.3 Access Path Management".

11.2 Menu List and Screen Explanation

The Storage Volume Configuration Navigator window configuration is explained below:
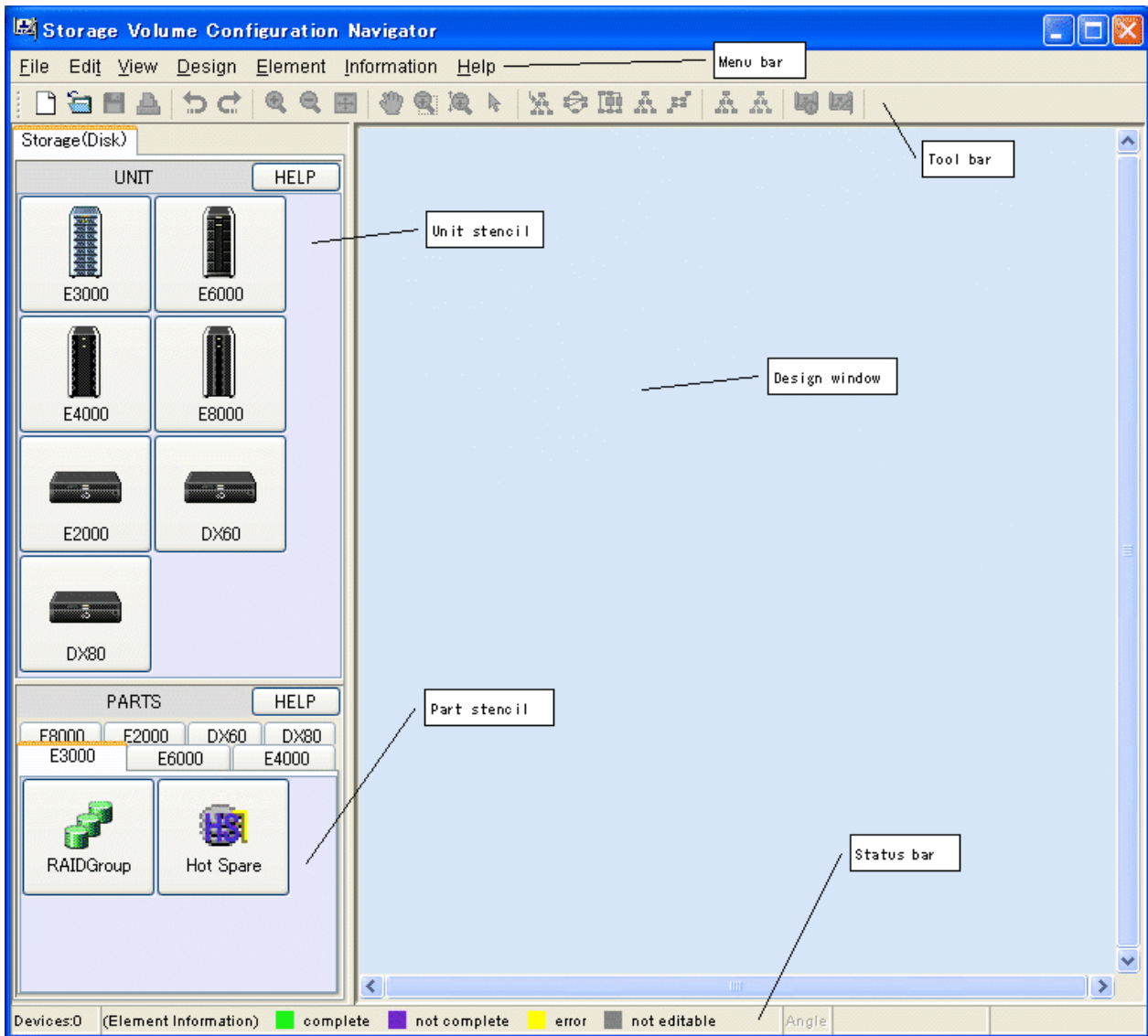
・ Menu bar

　Used to give an operation instruction.

・ Toolbar

　Displays the icons of frequently used functions so that each function can be started simply by clicking the corresponding icon.

・ Unit stencil

　Displays the icons of the devices for which configuration design can be performed. Click the icon of the device for which configuration design is to be started, and the device unit is then displayed on the design window.

・ Part stencil

　Displays the icons of the parts that configure the devices displayed on the unit stencil. Clicking a part icon while selecting the device icon on the design window adds the part to the device unit.

・ Design window

　Used to perform configuration design.

・ Status bar

　Provides examples of status displays on the design window.

11.2.1 Menu bar, toolbar, and pop-up menus

This section explains the operations that can be performed from the menu bar, toolbar, and pop-up menus.
In the column of Toolbar and Pop-up, "A" indicates "Available", "N/A" indicates "Not Available".

Menu	Menu item	Submenu item	Toolbar	Pop-up	Function
File	New creation		A	N/A	Starts new configuration design.
	Open		A	N/A	Opens a device configuration file that has been saved previously.
	Save		A	N/A	Saves the device configuration data to the current file in overwrite mode.
	Save as		N/A	N/A	Saves the device configuration data to a new file with a name assigned.
	Page setup		N/A	N/A	Sets the print page.
	Print		A	N/A	Prints the design window.
	Quit		N/A	N/A	Quits the window.
Edit	Undo		A	N/A	Returns the edit state one state prior.
	Redo		A	N/A	Returns the edit state one state subsequent.
View	Zoom	In	A	N/A	Enlarges the display magnification.
		Out	A	N/A	Reduces the display magnification.
		Fit	A	N/A	Automatically adjusts the screen display magnification according to the size of the screen.
	Hand tool		A	N/A	Used to grasp the display on the design window to move (scroll) the display. This item is not displayed on the menu bar.
	Marquee tool		A	N/A	Displays the specified range on the screen. This item is not displayed on the menu bar.
	Interactive zoom		A	N/A	Enables changing the screen display magnification by moving the mouse cursor up and down. This item is not displayed on the menu bar.
	Selection tool		A	N/A	Normal cursor. This item is not displayed on the menu bar.
	Layout	Hierarchical	A	N/A	Automatically optimizes the layout of the devices and elements displayed on the design window. Selecting this menu after manually changing the layout or display elements can rearrange the display so that relationships between elements can be checked with ease.
		Circular	A	N/A	
		Orthogonal	A	N/A	
		Tree	A	N/A	
		Symmetric	A	N/A	
	Orthogonal Line Mode		N/A	N/A	When this mode is selected, the lines connecting the elements in the device are displayed as straight lines, similarly to a circuit diagram. This mode is effective for allowing compact display when a large number of elements are displayed. Selecting this menu again cancels this mode.
	Tool Bar		N/A	N/A	Selects Show/Hide of the toolbar.

Menu	Menu item	Submenu item	Toolbar	Pop-up	Function
	Overview		N/A	N/A	Opens the window displaying the entire configuration data controlled on the design window. In overview mode, not only can the display range of the design window be displayed, but also can a range of the design window to be displayed be specified by using the mouse.
Design	Log in		N/A	N/A	Logs in to the administrative server. (*1)
	Auto Configuration		N/A	A	Starts the automatic configuration function.
	Verification All		A	N/A	Checks the configuration for problems.
	Make LogicalVolume		N/A	A	Makes a LogicalVolume in the RAIDGroup.
	Delete		N/A	A	Deletes the selected device unit or part.
	Copy Device		N/A	A	Copies a selected deice unit.
	Disk Operation		N/A	A	Mounts a disk or DE.
	RAIDGroup Operation		N/A	A	Configures a RAIDGroup.
	AffinityGroup Operation		N/A	A	Creates AffinityGroup. This item cannot run under ETERNUS3000, ETERNUS6000, ETERNUS4000 models 80 and100.
	Input IP Address		N/A	A	Enters an IP address for the newly created device unit.
	Device Matching		N/A	A	Defines the correspondence between device configuration data and a real device. (*2)
	Cancel Device Matching		N/A	A	Cancels device matching performed previously. (*2)
	Device Setup		A	N/A	Applies device configuration data to the device. (*2)
	Path search		A	N/A	Executes path search. This item is not displayed on the menu bar.
	Path search clear		A	N/A	Clears the result of path search. This item is not displayed on the menu bar.
Element	Detail	Expand	N/A	A	Used to specify whether to display the elements in the device unit. Select [Expand] to display detail elements. If [Collapse] is selected, detail elements are not displayed but only the icon of the device unit is displayed.
		Collapse	N/A	A	
	Table Element	ON	N/A	A	Displays the integrated element icon selected by the mouse as table elements. When [ON] is selected, table elements are displayed as an integrated element icon. When [OFF] is selected, the integrated element icon is displayed as table elements.
		OFF	N/A	A	

Menu	Menu item	Submenu item	Toolbar	Pop-up	Function
	Table Element Magnification		N/A	N/A	Changes the display magnifications of all table elements.
	Property		N/A	A	Displays the properties of the selected elements.
Information	Disk Map		N/A	A	Displays disk allocation information.
Help	Help		N/A	N/A	Displays the User's Guide.
	Message Reference		N/A	N/A	Displays the Messages.
	Version Information		N/A	N/A	Displays client information.

*1 Only a privileged administrator can login.

*2 The user must login as a privileged administrator to execute operation.

11.2.2 Unit stencil

The unit stencil displays the icons of devices for which device configuration data can be newly created.
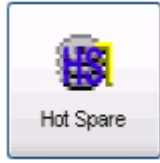
Icon	Device name	Explanation	Remarks
E3000	ETERNUS3000	Used to create an ETERNUS3000(Except for Model 50) device unit.	(*1)
E6000	ETERNUS6000	Used to create an ETERNUS6000 device unit.	(*1)
E4000	ETERNUS4000	Used to create an ETERNUS4000 device unit.	(*1)
E8000	ETERNUS8000	Used to create an ETERNUS8000 device unit.	(*1)
E2000	ETERNUS2000	Used to create an ETERNUS2000 device unit.	(*1)
DX60	ETERNUS DX60	Used to create an ETERNUS DX60 device unit.	(*1)

Icon	Device name	Explanation	Remarks
DX80	ETERNUS DX80	Used to create an ETERNUS DX80 device unit.	(*1)

*1: If a device registered on the resource view is selected and started by selecting [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu, only the device selected at start-up is operated.

11.2.3 Part stencil

The part stencil displays the icons of the parts that can be added to device units.

Icon	Part name	Explanation	Remarks
RAID Group	RAIDGroup	Used to create a RAIDGroup.	
Hot Spare	Hot spare	Used to create a hot spare disk.	

11.2.4 Display explanation

The state of each resource on the design window is indicated using color coding.

Color	Target	Explanation	Remarks
Green	Device unit	Device setting is complete.	
Violet	Device unit	Device setting is incomplete, or the device configuration is being edited.	
Yellow	Device unit	Device setting failed.	
Gray	Device unit and element	This device unit or element cannot be edited.	

11.2.5 Starting and exiting

Storage Volume Configuration Navigator can be started using any one of the three methods below:

・ [Method-1]: Select a device registered on the resource view, and then select [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu.

　If a device registered on the resource view is selected and started by this method, it is necessary to select the device on the resource view in advance and execute [Register] - [Register SAN devices] from the pop-up menu.

・ [Method-2]: Select [File] - [Storage Volume Configuration Navigator] from the resource view.

・ [Method-3]: Click the icon of Storage Volume Configuration Navigator installed in the client (hereafter referred to as standalone start)

If a device registered on Method-1, a device reading screen is displayed that specifies how to read the specified storage device into the design window. According to the screen, read the device configuration data to work on device configuration design.

Select [File] - [Quit] to exit the Navigator.
In addition, if a device registered on Method-1, the Storage Configuration Navigator will automatically exit by closing the dialog displayed when configuration is not let to read or cannot be read. Also, the Storage Volume Configuration Navigator is started by Method-1 or Method-2, it will automatically exit by closing the dialog displayed in the same way even when start-up is not enabled.

11.2.6 Creating a device unit (for new designing offsite)

To design a new device configuration, first create the device unit to be designed on the design window. To do so, click the target device icon on the unit stencil as shown in the figure below.
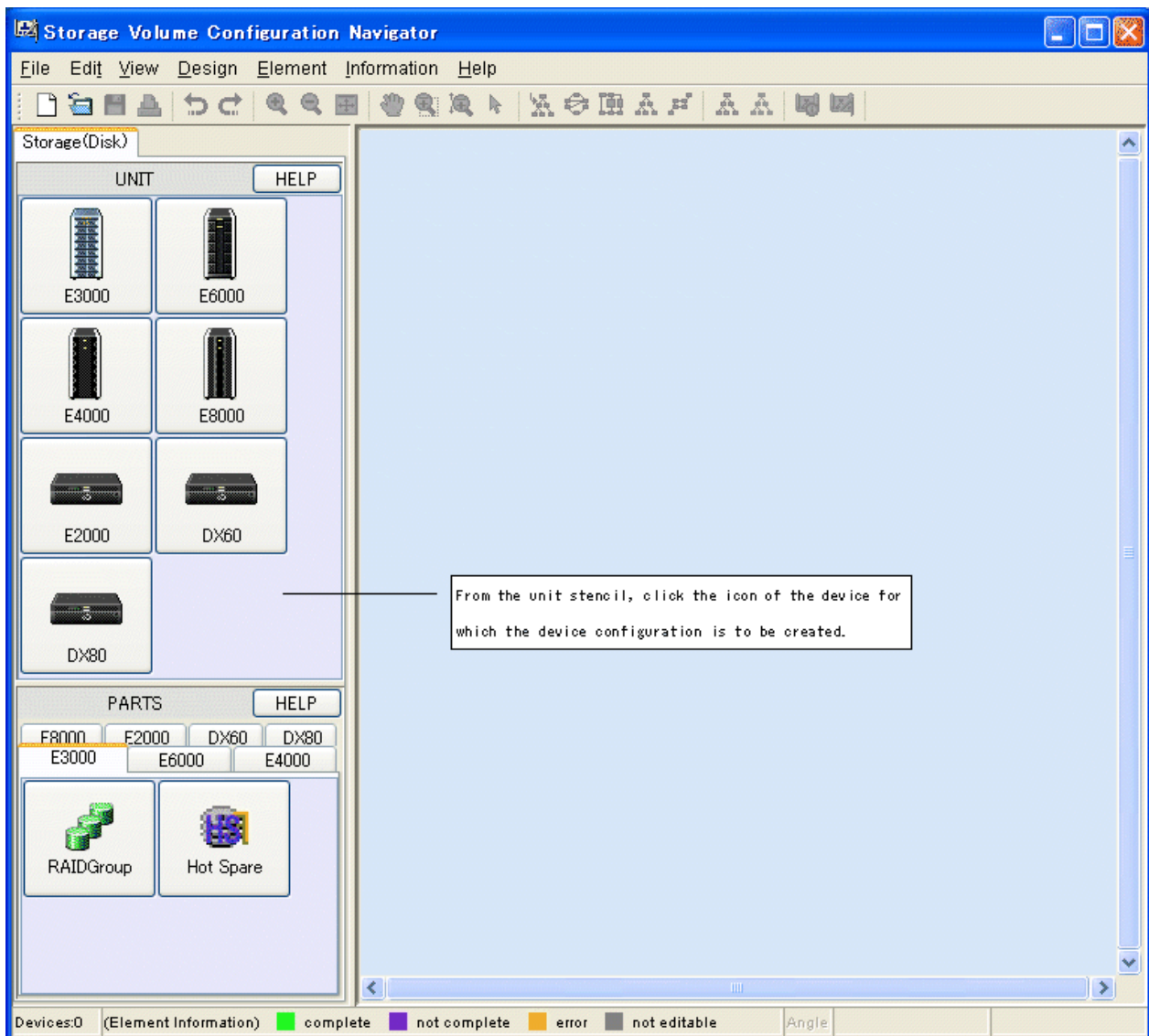
When the device icon is clicked, a device creation window appears as shown below:
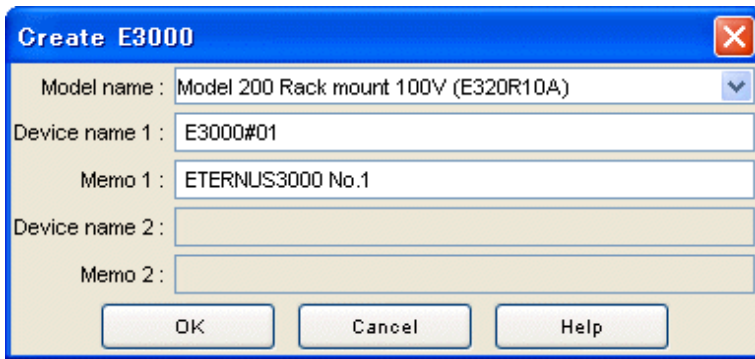
Enter the necessary information in the window.

1. Select the device model from the dropdown menu of [Model name].
   A model number ending with "*" (example: E320R10*) can be used as a device having the same model number before the "*". However, a model number ending with "*" cannot be supported for ETERNUS2000.
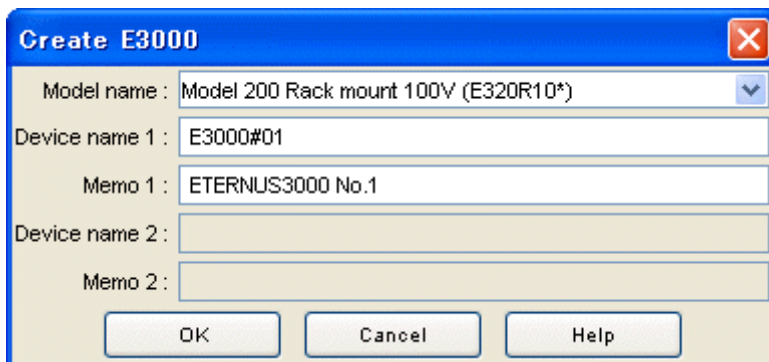
2. Enter the name of the target device in the [Device name 1] field. The device name entered here is a temporary name used for identification on the design window. Executing the device matching operation replaces the name with the one defined on the administrative server. [Device name 2] is enabled only when a dual configuration model is specified. Enter the name of a device. The specified name is assigned to each of the duplicated devices.

3. Enter a memo in [Memo 1] as necessary. The memo information entered here is a memo on the design window and cannot be referenced on the resource view after a configuration is set for the device. [Memo 2] is enabled only when a dual configuration model is specified. Enter memo information.

4. Click the <OK> button.

The above operations create a device unit on the design window. Continue to perform the disk mount operation and then execute the automatic configuration function to automatically configure a RAIDGroup and LogicalVolumes. A RAIDGroup and LogicalVolumes can also be configured manually.
The device configuration data for the created device is set in the real device after the real device configuration data is initialized.

11.2.7 Mounting disks (for new designing offsite)

This section explains how to add a disk to the device unit and how to delete a disk from the device unit.

If the automatic configuration function is used to automatically configure a RAIDGroup and LogicalVolumes for the device unit that has been newly created, disks must be added in advance by this procedure according to the configuration of the real device.

This is because the automatic configuration function makes a configuration within the range of the disks already mounted. Disks must also be added in advance by this procedure even in cases where a RAIDGroup is to be configured manually.

A disk can also be added to, or deleted from, the real device unit displayed with the device load operation.

When a volume shortage occurs during operation, for instance, a RAIDGroup and LogicalVolumes need to be created. If free disks are required to create them do not exist, the required disks must be added to the real device. To be prepared for this type of situation, the user can use the procedure explained here to add disks to the disk mount positions and then execute the automatic configuration function or

configure a RAIDGroup and LogicalVolumes manually. Doing so enables the user to create in advance the device configuration after disk addition without actually adding disks to the real device.

Mount a disk according to the following procedure:

1. While selecting a device unit, select [Design] - [Disk Operation] from the menu bar or select [Disk Operation] from the pop-up menu to open the disk operation window. The figure below shows how the disk operation window is opened.
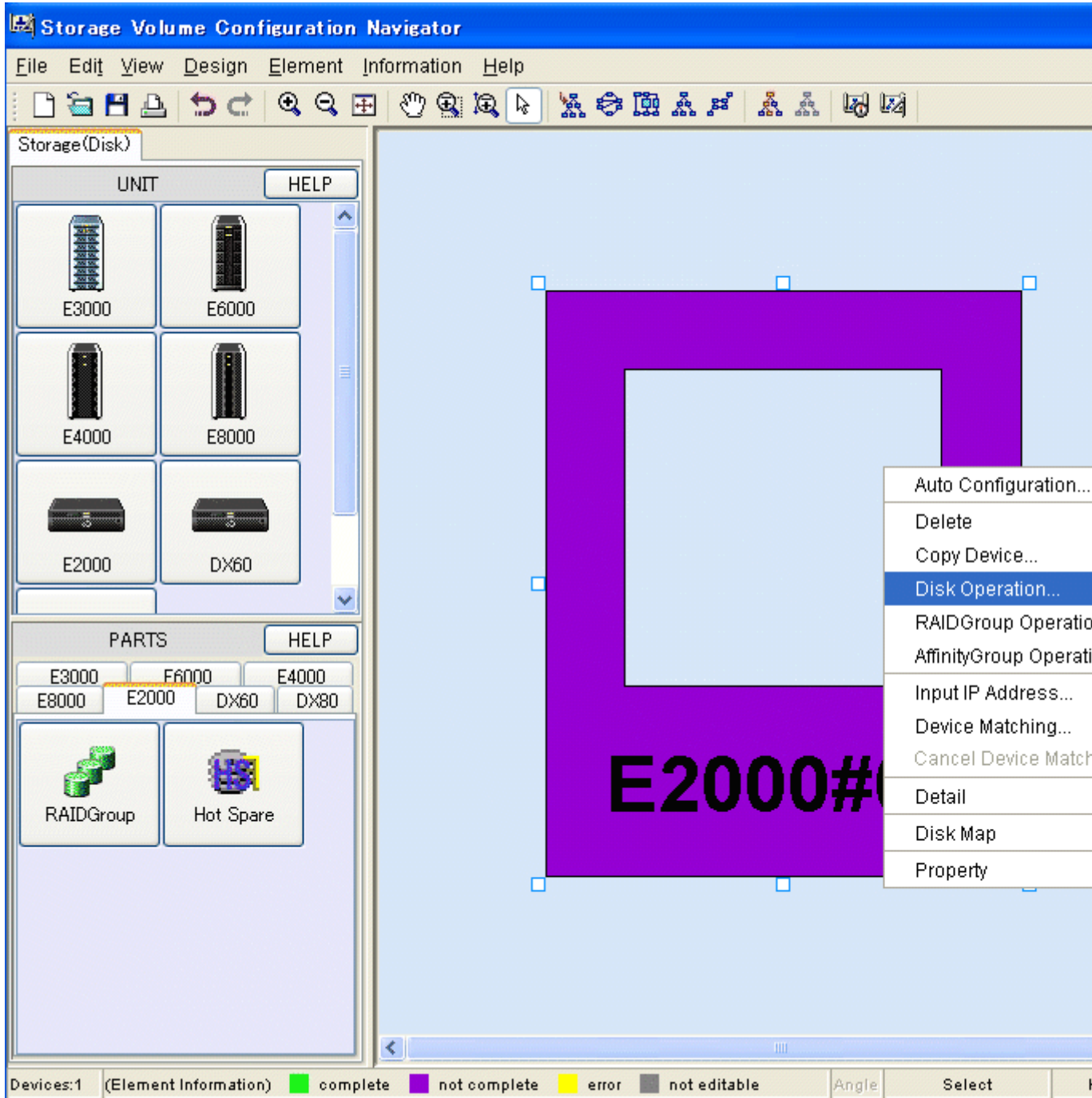
2. Check whether a DE is already mounted at the position where a disk is to be mounted. If not, mount a DE by following the procedure below. If a DE is already mounted, this operation is not required.

   To delete an existing DE, select the [Select DE] check box, and click the <Delete> button.

Select the [Select DE] check box at the position where a DE is to be mounted.

Click the <Create> button.
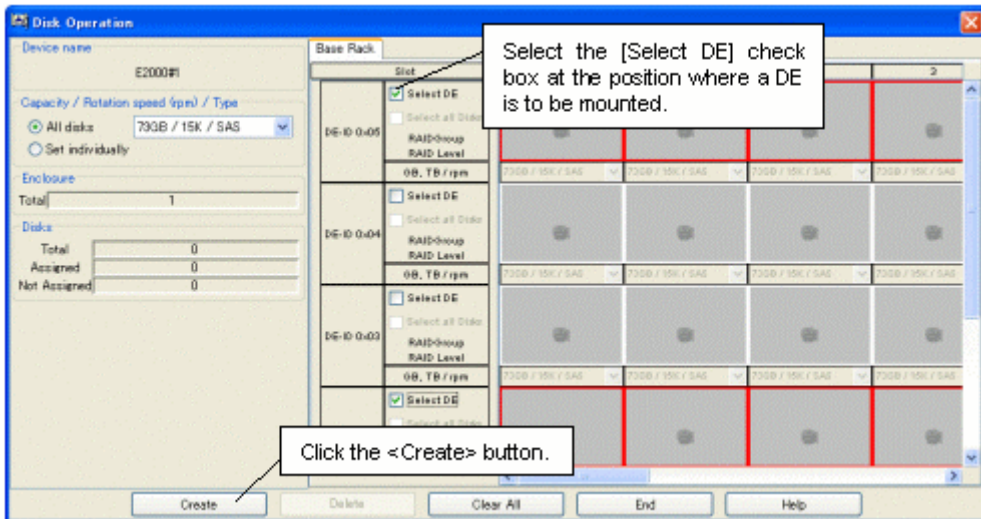
3. Specify the type of the disk to be mounted. The disk type can be specified either for all disks (All disks) or for individual slots (Set individually).Select either [All disks] or [Set individually] from [Capacity / Rotation speed (rpm) / Type]. When [All disks] is selected, click the down arrow and select the type of the disks to be added. When [Set individually] is selected, select the type of the disk to be added to each disk slot. Disk types are displayed as follows:

Description on the screen	Disk type name
FC	Fibre Channel Disk
FC(N)	Nearline FC Disk
SAS	SAS Disk
SAS(N)	Nearline SAS Disk
SATA(N)	Nearline SATA Disk
SSD	SSD

Select [All disks] or [Set individually] from [Capacity / Rotation speed (rpm) / Type].
This example is selected the "73GB capacity, 15000rpm, SAS type" disks in [All disks] mode.
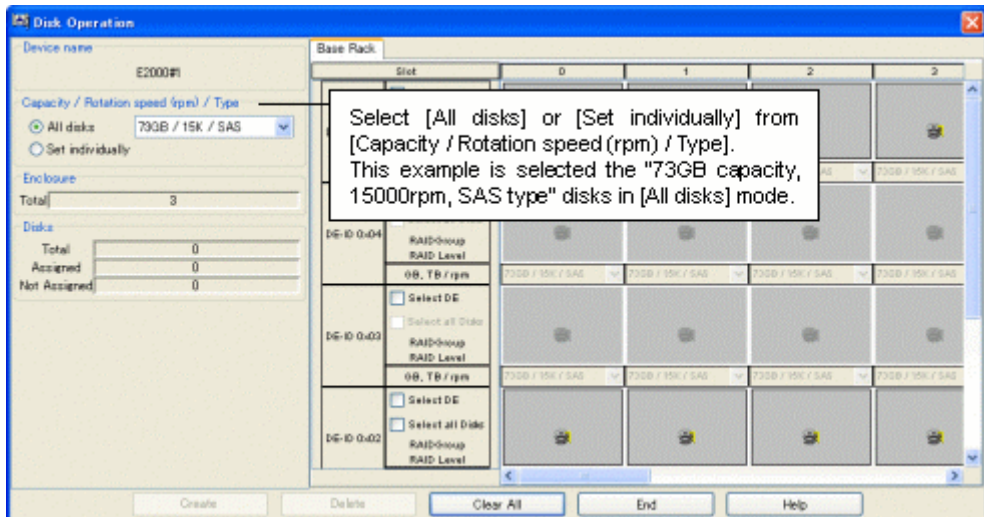
4. After specifying the disk type, specify the position where the disks are to be mounted. The disk mount position can be specified either for all disk mount positions in a DE or for individual slots. After specifying the disk mount positions, click the <Create> button. The figure below shows how disks are mounted.
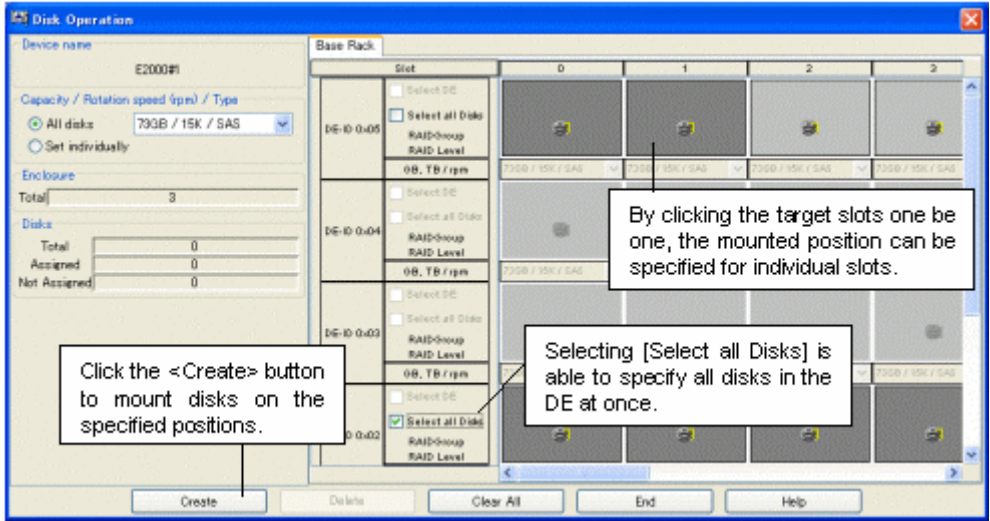
To delete a disk, select the disk and click the <Delete> button.

11.2.8 Executing automatic configuration

The automatic configuration function can be used to automatically configure LogicalVolumes. This function automatically allocates a RAIDGroup and LogicalVolumes in an optimum configuration for the device unit. Automatic configuration is enabled for both a device unit created from the unit stencil and a device unit loaded from the real device with the device load function. For either type of device unit, automatic configuration can be performed even after the device configuration is changed by disk operation or RAIDGroup operation. The device configuration created by automatic configuration can also be reconfigured manually.

The following explains how to operate the automatic configuration function.

1. While selecting a device unit, select [Design] - [Auto Configuration] from the menu bar or select [Auto Configuration] from the pop-up menu to open the disk operation window. The figure below shows how the disk operation window is opened.
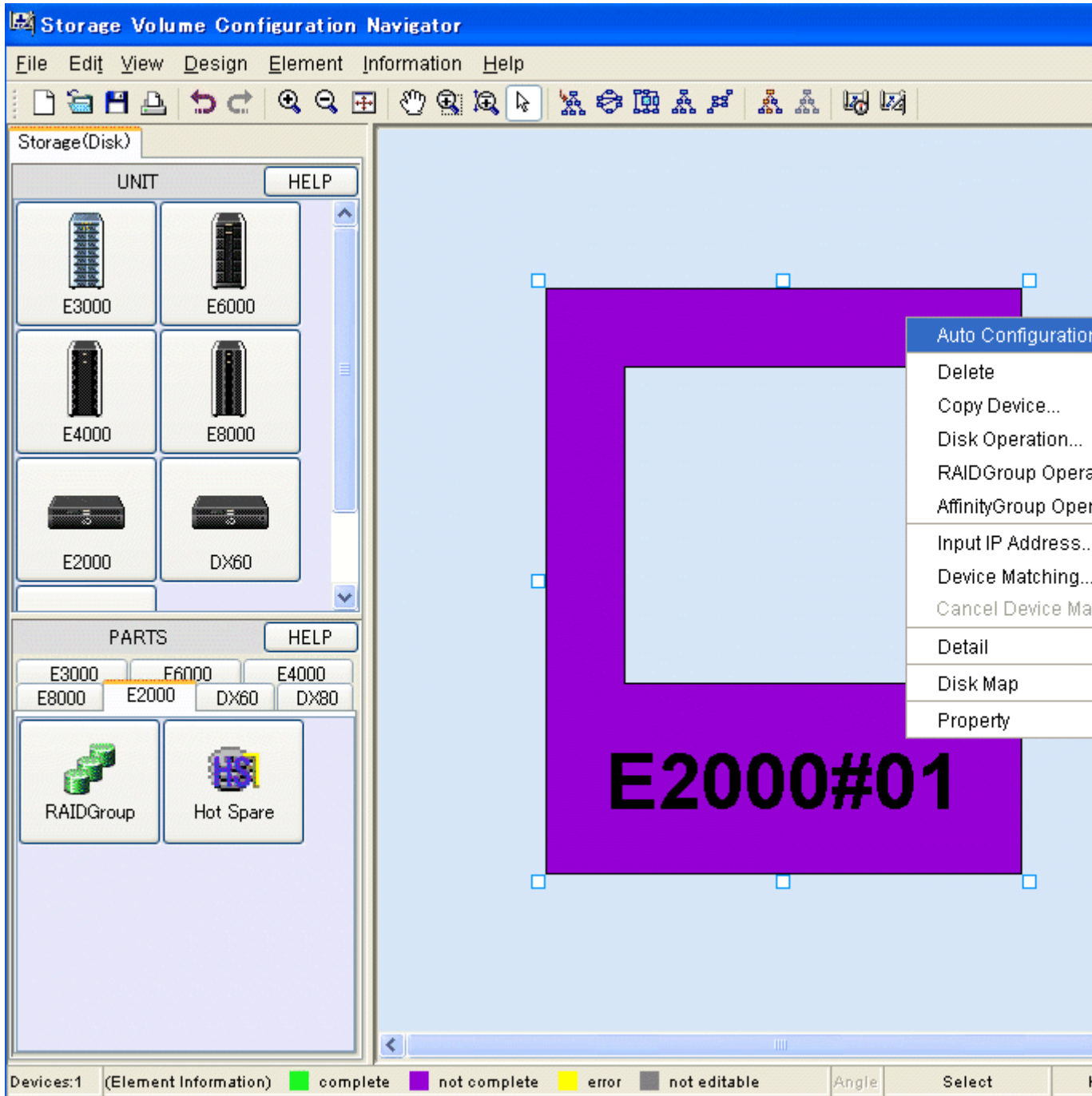
2. Enter the necessary information on the auto configuration window. The auto configuration window is shown below.

The following explains the meanings of individual parameters and how to use the window.

Define LogicalVolumes

Enter information on the LogicalVolumes to be created. Specify the capacity of a LogicalVolume for [Capacity(MB)]. Specify the number of LogicalVolumes to be created for [Number of create]. For [RAID Level], select the RAID level of the RAIDGroup to which the LogicalVolumes are to be assigned. After specifying the above parameters, click the <>>> button to move the specified LogicalVolume parameters to [LogicalVolumes to be created]. To delete a LogicalVolume parameter from [LogicalVolumes to be created], select the corresponding field and click the <<<> button.

LogicalVolume Distribution

Specify how the RAIDGroup and LogicalVolumes are to be configured.

LogicalVolume assignment method

Select a volume assignment method in [Please specify the usage of a RAIDGroup]. In other words, specify the RAIDGroup to which the LogicalVolumes specified in [Define LogicalVolumes] are to be assigned. Select one of the following two methods:

[Create a new RAIDGroup]

No existing RAIDGroups are used but free disks are used to create a RAIDGroup, after which the LogicalVolumes are assigned to the created RAIDGroup.

[Use an existing RAIDGroup]

LogicalVolumes are assigned by searching the existing RAIDGroups for free space. Clicking the <Select> button lists existing RAIDGroups. The user can uncheck a certain RAIDGroup to prevent it from being allocated to LogicalVolumes. (*1) If the option "If there is not enough free space create a new RAIDGroup" is selected, a new RAIDGroup is created for allocating LogicalVolumes only when the existing RAIDGroups run short of free space.

*1: RAID groups that cannot be edited with Storage Volume Configuration Navigator are not displayed (for more information, see "11.1.5 Operation procedure").

LogicalVolume assignment method

Select one of the options under [Distribution]

When [Distribute volumes evenly across RAIDGroups] is selected, LogicalVolumes are assigned to target RAIDGroups as evenly as possible.

When [Assign volumes to the lowest available RAIDGroup number] is selected, LogicalVolumes are assigned in order of RAIDGroup numbers.

3. After entering all necessary parameters, click the <Execute> button.

This completes the procedure for automatically allocating LogicalVolumes.

11.2.9 Creating a RAIDgroup (manual creation)

Select a device unit and click a RAIDGroup icon on the part stencil to open the RAIDGroup operation window. Alternatively, select a device unit and select [Design] - [RAIDGroup Operation] from the menu bar or select [RAIDGroup Operation] from the pop-up menu to open the RAID group operation window. The RAIDGroup operation window is shown below.
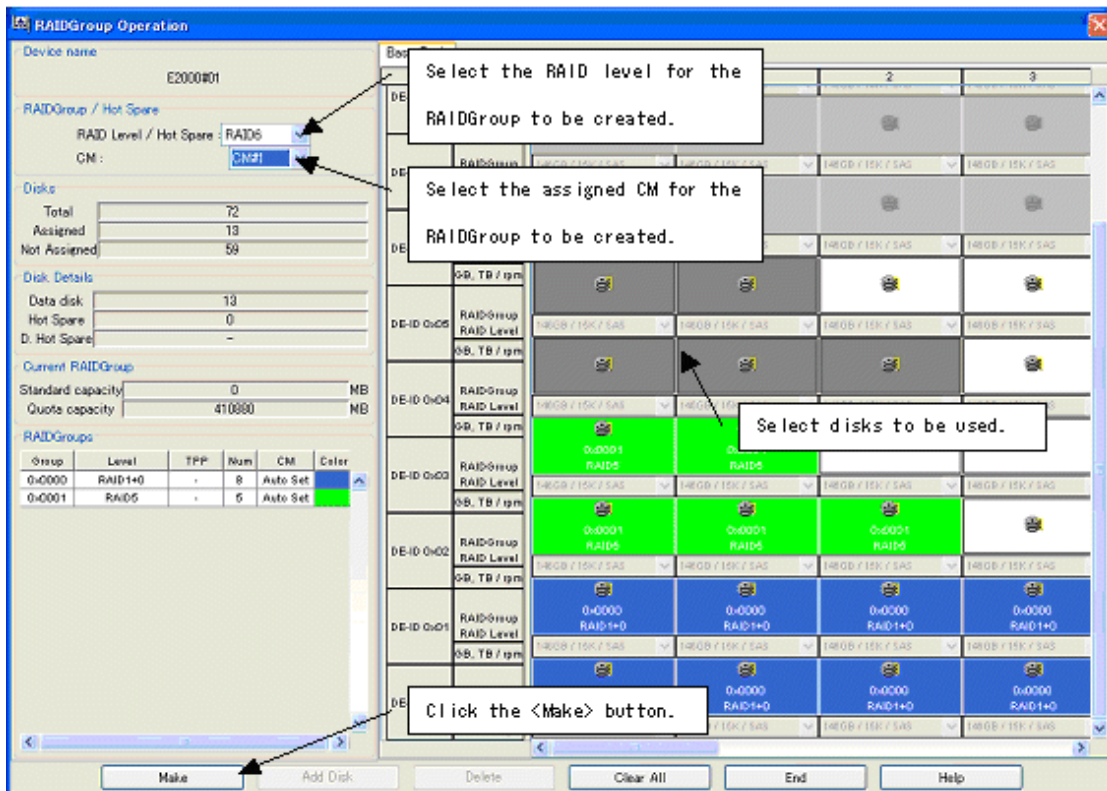
In the RAID group operation window displayed, create a RAID group, hot spare disk or dedicated hot spare disk as follows:

1. Select the RAID level of the RAIDGroup to be created. Select the RAID level from [RAIDGroup / Hot Spare] - [RAID Level / Hot Spare]. If [Hot Spare] is selected here, a hot spare disk can be created. Also if [D. Hot Spare] is selected here, a dedicated hot spare disk can be created.

2. Select the assigned CM of the RAIDGroup to be created. Select a CM from [RAIDGroup / Hot Spare] - [CM]. If [Hot Spare] or [D. Hot Spare] is selected in step 1, it is not able to select a CM.

Information
. . . .
It is not able to set the assigned CM, if the storage device is ETERNUS3000, ETERNUS4000 models 80 and 100, or ETERNUS6000.
. . . .

3. Select the disks to be composed with the RAIDGroup,hot spare disk or dedicated hot spare disk. Clicking the button representing a disk puts the disk in the selected state, and clicking the button again deselects the disk.Select both the disks to be composed with the RAIDGroup and dedicated hot spare disk if create a dedicated hot spare disk.

4. After selecting all necessary disks, click the <Make> button.

This completes the procedure for creating the specified RAIDGroup.hot spare disk or dedicated hot spare disk.

11.2.10 Adding disks to a RAIDgroup (manual operation)

To add a disk to a RAIDGroup, select the target RAIDGroup on the design window and select [Design] - [RAIDGroup Operation] from the menu bar or select [RAIDGroup Operation] from the pop-up menu. The RAIDGroup operation window is shown below.
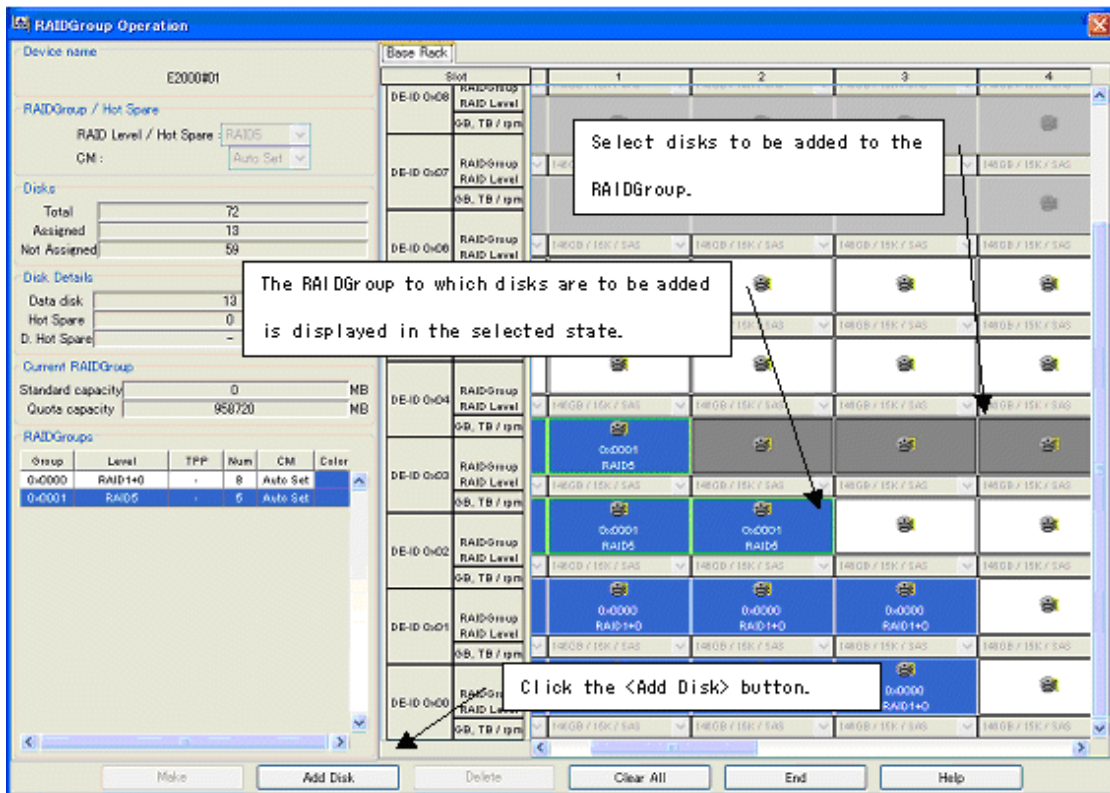
The RAIDGroup operation window opens with the activated RAIDGroup displayed in the selected state. Add a disk to the RAIDGroup as follows:

1. Select the disk to be added to the RAIDGroup.

2. Click the <Add Disk> button.

This completes the procedure for adding the specified disk to the RAIDGroup.

📒 Note

. . . .

When the disk is added to the RAIDGroup or the disk is deleted from the RAIDGroup, both the RAID level and the assigned CM cannot be changed for its RAIDGroup.

. . . .

11.2.11 Deleting a RAIDGroup (manual operation)

To delete a RAIDGroup, select the RAIDGroup to be deleted from the design window and select [Design] - [Delete] from the menu bar or select [Delete] from the pop-up menu. Gray LogicalVolumes cannot be deleted.
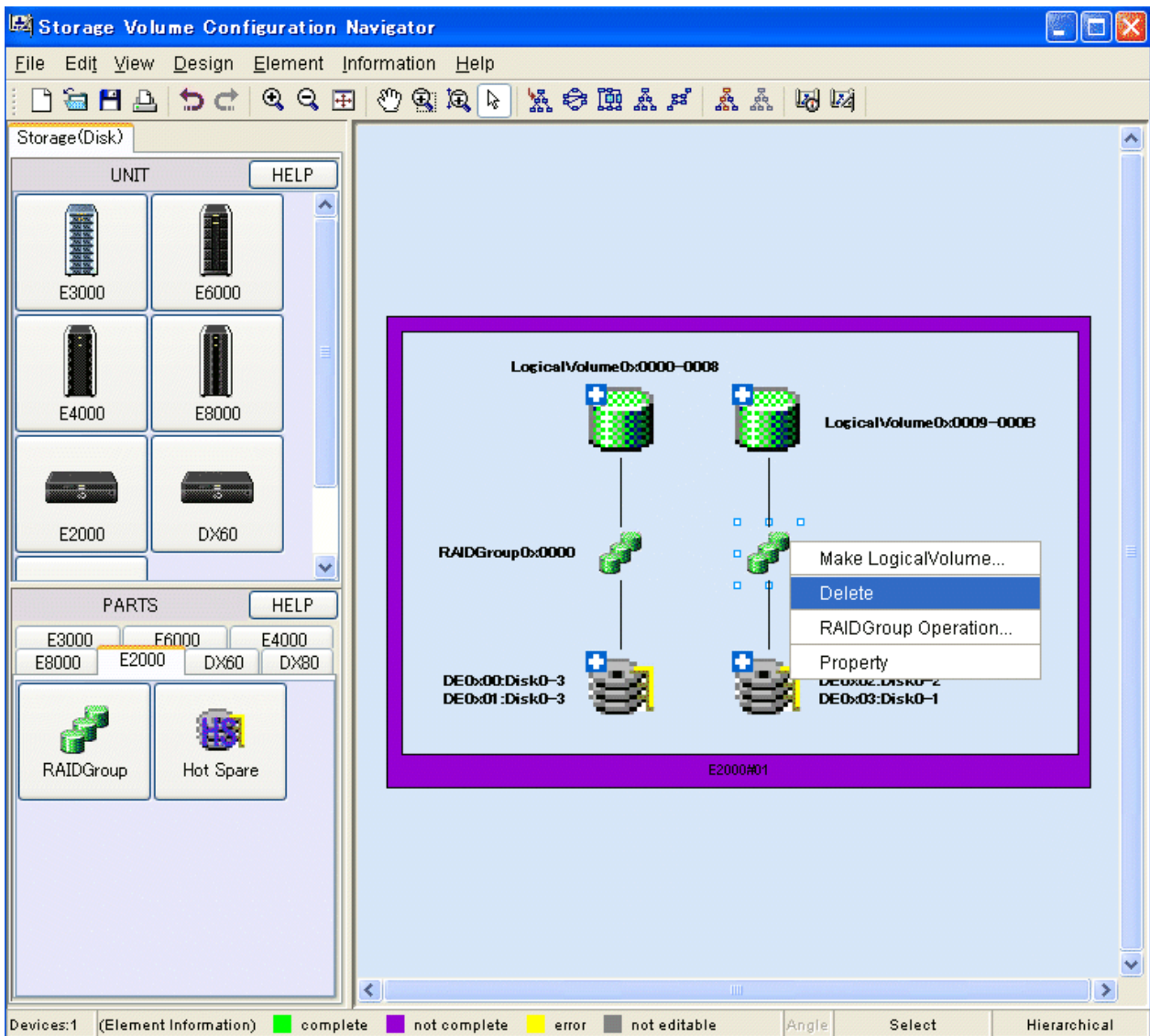
11.2.12 LogicalVolume creation (manual operation)

Select the RAIDGroup in which a LogicalVolume is to be created, and select [Design] - [Make LogicalVolume] or select [Make LogicalVolume] from the pop-up menu to open the LogicalVolume creation window.
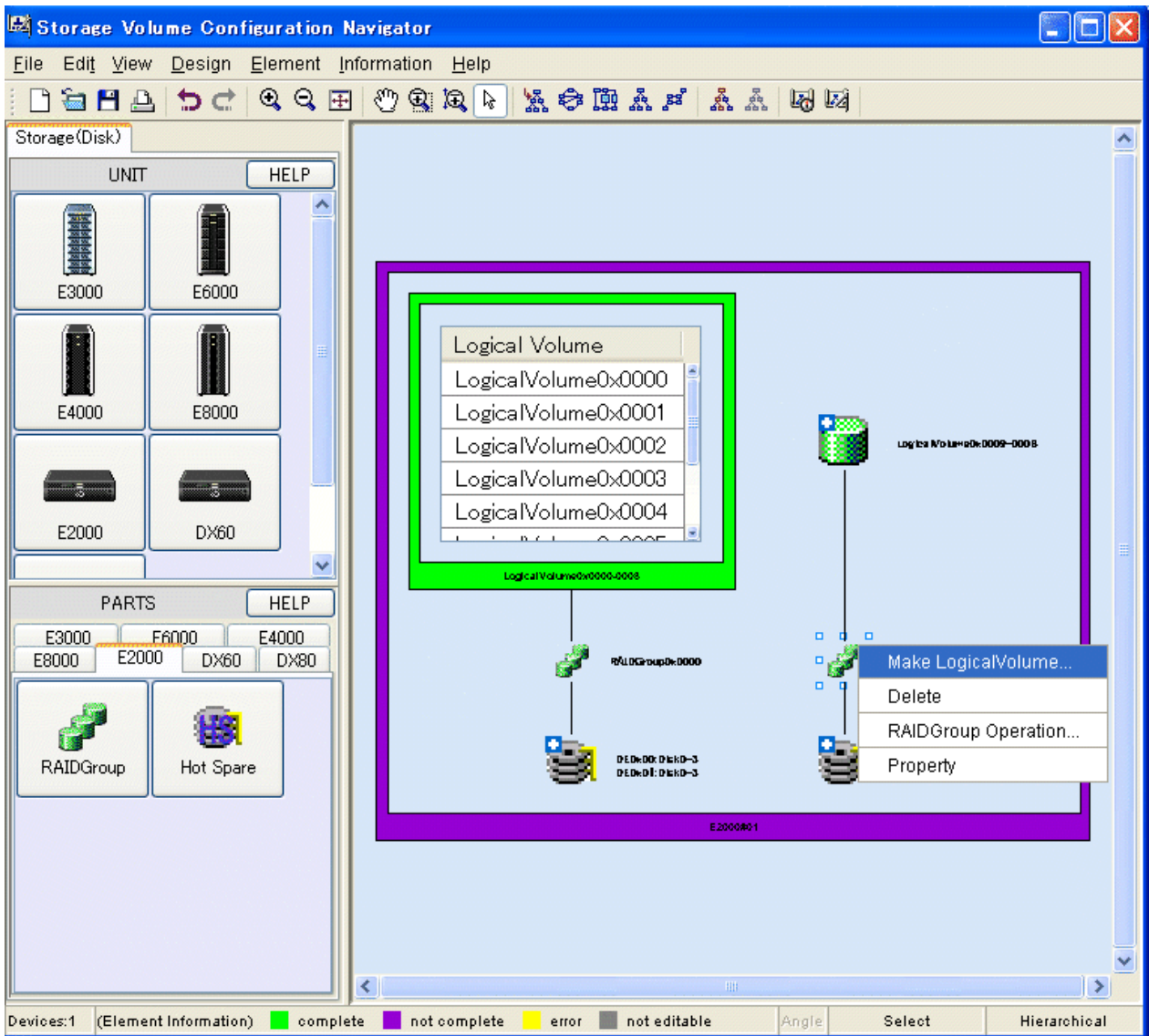
The LogicalVolume creation window is shown below:
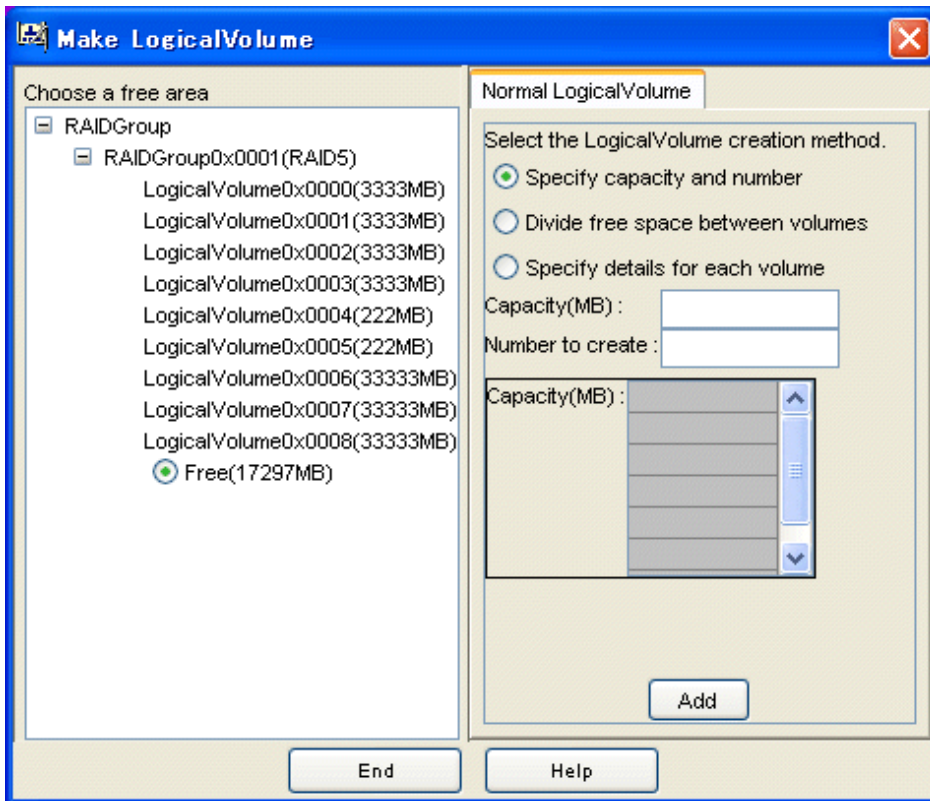
Create a LogicalVolume using the LogicalVolume creation window as follows:

1. From the RAIDGroup tree, select the free space to be allocated to a new LogicalVolume.

2. Select one of the following three methods of LogicalVolume creation:

    - [Specify capacity and number]

      Specify the capacity of a LogicalVolume for [Capacity(MB)] and the number of LogicalVolumes for [Number to create].

    - [Divide free space between volumes]

      The LogicalVolume capacity is allocated evenly according to the number specified for [Number to create] in the specified free space areas.

    - [Specify details for each volume]

      The capacity of the LogicalVolumes to be allocated is entered only once to create LogicalVolumes.

3. After entering all necessary parameters for creating LogicalVolumes, click the <Add> button.

    This completes the procedure for assigning LogicalVolumes to the specified RAIDGroup.

11.2.13 Deleting a LogicalVolume (manual operation)

To delete a LogicalVolume, select the LogicalVolume to be deleted from the design window and select [Design] - [Delete] from the menu bar or select [Delete] from the pop-up menu. Gray LogicalVolumes cannot be deleted. The figure below shows how a LogicalVolume is deleted.
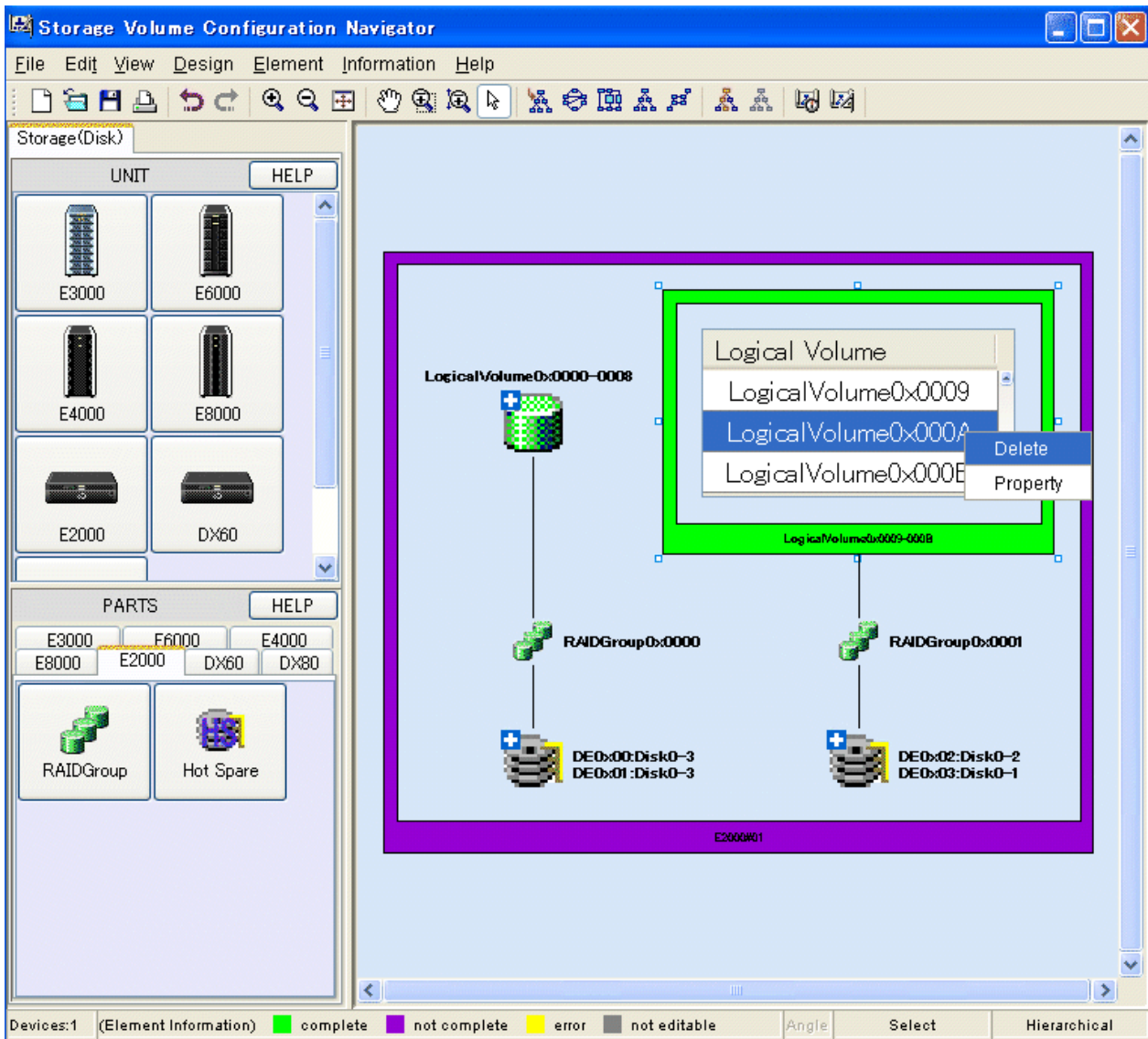
11.2.14 Creating a hot spare disk (manual operation)

While selecting a device unit, click the Hot Spare icon on the part stencil to open the hot spare disk operation window. The hot spare disk operation window is shown below.
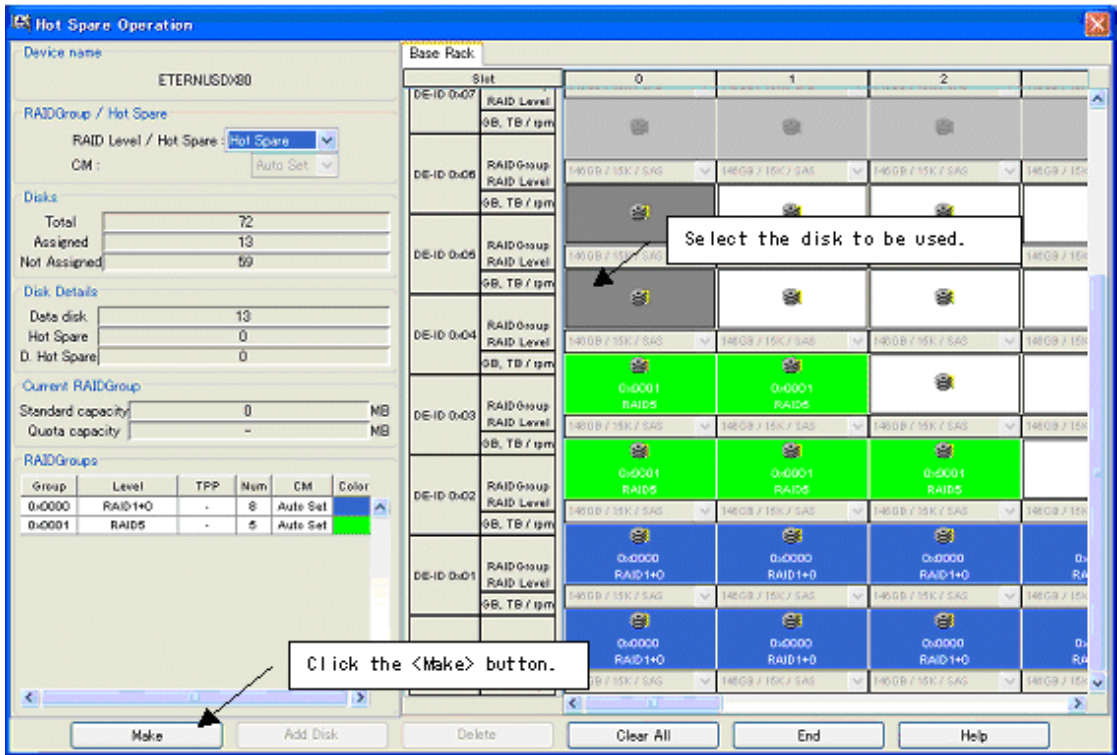
1. Create a hot spare disk or dedicated hot spare disk using the hot spare disk operation window as follows:Select the RAID level of the RAIDGroup to be created. Select the RAID level from [RAIDGroup / Hot Spare] - [RAID Level / Hot Spare]. If [Hot Spare] is selected here, a hot spare disk can be created.Also if [D. Hot Spare] is selected here, a dedicated hot spare disk can be created.

2. Select the disks to be composed with the hot spare disk or dedicated hot spare disk. Clicking the button representing a disk puts the disk in the selected state, and clicking the button again deselects the disk.Select both the disks to be composed with the RAIDGroup and dedicated hot spare disk if create a dedicated hot spare disk.

3. After selecting all necessary disks, click the <Make> button.

This completes the procedure for creating a hot spare disk or dedicated hot spare disk. A hot spare disk or dedicated hot spare disk can also be created using the RAIDGroup operation window.

11.2.15 AffinityGroup operation(manual creation)

Select a device unit and then select [Design] - [AffinityGroup Operation] from the menu or [AffinityGroup Operation] from the pop-up menu to start the AffinityGroup operation window.The AffinityGroup operation window is shown below.AffinityGroup cannot be operated by ETERNUS3000, ETERNUS6000, ETERNUS4000 models 80 and 100.

Setting AffinityGroup in the Storage will allow it to set an access path by access path management functions. For access path management, see "6.3 Access Path Management"
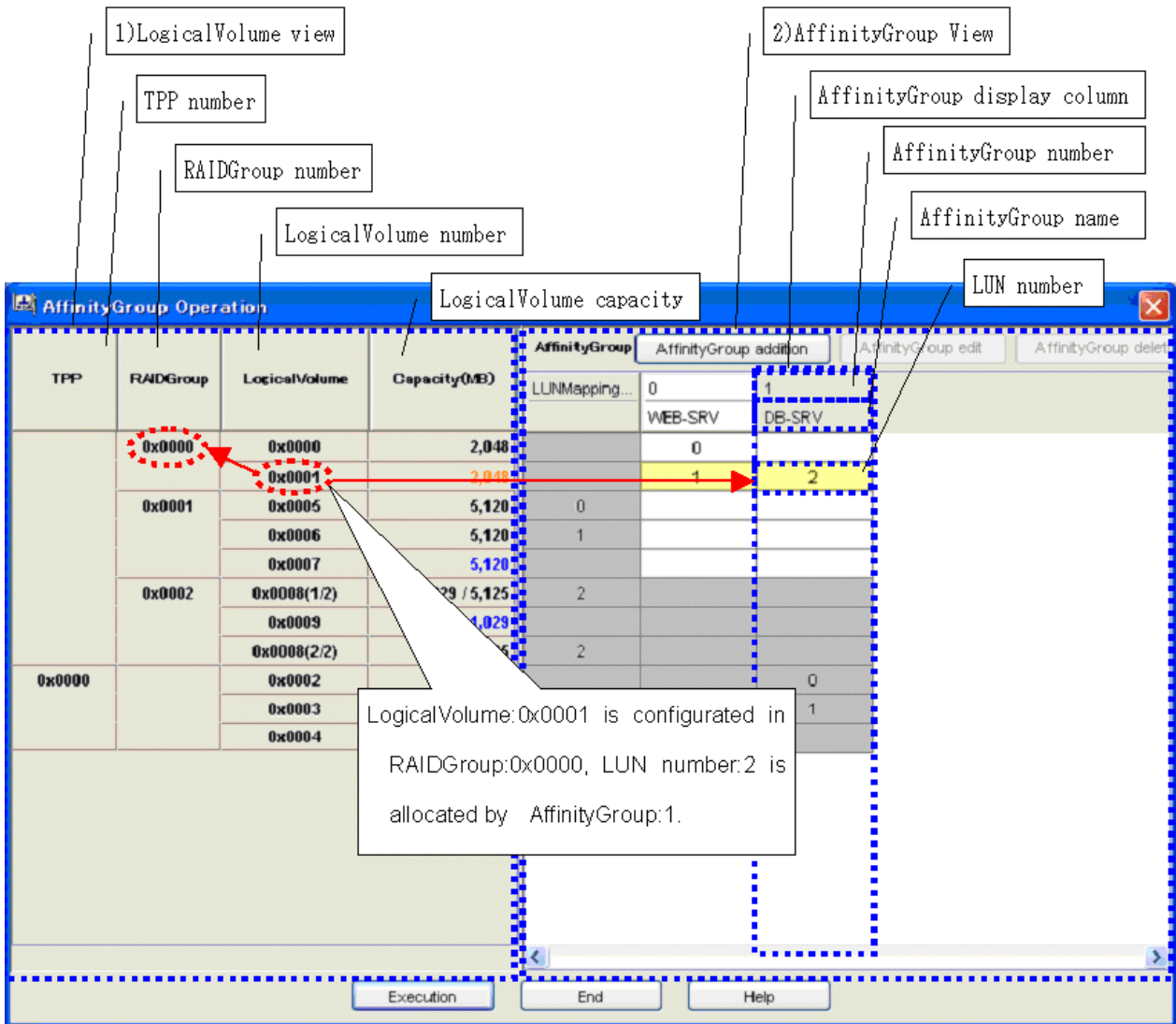
The following are descriptions of the configuration of the AffinityGroup operation window.

LogicalVolume view

A LogicalVolume view is displayed that is configured in the device unit selected at start-up of the Affinity operation window

RAIDGroup number

RAIDGroup numbers are displayed. RAIDGroups to which LogicalVolumes are not allocated are not displayed.

TPP number

TPP numbers are displayed. TPP to which LogicalVolumes are not allocated are not displayed.

LogicalVolume numbers

A LogicalVolume numbers is displayed by RAIDGroup.
To a LogicalVolume to which LUN concatenation is executed is displayed [(Serial number/LogicalVolume concatenated total number)], following the LogicalVolume number.

Example

When 0x0008(1/2) is displayed:

LogicalVolume Number is 0x0008, a serial number is 1 and LogicalVolume concatenated total number is 2.

LogicalVolume capacity

The capacity of LogicalVolume is displayed. The unit is MB.

Depending on the allocation to AffinityGroups, font colors vary as follows.

Font color	Meaning
Black	Allocated
Blue	Unallocated
Orange	Allocated to multiple AffinityGroups or to LUNMapping. (shared with LogicalVolume)

A LogicalVolume to which LUN concatenation is executed is shown in [relevant amount/totoal amount].

AffinityGroup view

The views of AffinityGroups and LUNMappings are displayed that are configured in the device unit selected at start-up of the AffinityGroup operation window.

AffinityGroup number

AffinityGroup numbers are displayed in decimal. If AffinityGroups are concatenated, all the numbers of concatenated AffinityGroups are displayed set off with commas.

For LUNMappings, port names are displayed.

AffinityGroup name

Aliases of AffinityGroups and LUNMappings are displayed.

LUN number

A LUN number allocated to the LogicalVolume in a LogicalVolume view in the same row is displayed in decimal by AffinityGroup and by LUNMapping.

The cell color changes as follows depending on the relevant LogicalVolume state.

Cell color	Meaning
White	LUN number is editable. Also, a relevant LogicalVolume is not allocated to multiple AffinityGroups or LUNMappings (Multiple LUN numbers are not allocated).
Yellow	LUN number is editable. Also, a relevant LogicalVolume is allocated to multiple AffinityGroups or LUNMappings (Multiple LUN numbers are Allocated).
Gray	LUN number is not editable. If a LUN number falls under the following, it is not editable. ・ LogicalVolume of a type that is not supported by the Storage Volume Configuration Navigator. ・ LUNMapping ・ Concatenated AffinityGroup

The following are descriptions of operation procedures of the AffinityGroup operation window.

AffinityGroup addition

1. Press the <AffinityGroup addition> button on the AffinityGroup operation window.

2. Then, the AffinityGroup add dialog is displayed. Enter a group number and a group name. Group names are optional.

3. Press the <OK> button.

Once the maximum number of AffinityGroups has been created no more can be added.

Allocating LUN and changing LUN number

1. If you want to allocate a LUN (or change a LUN number), focus on a cell at which a row of LogicalVolume and a column of AfiinityGroup are intersected.

2. Enter the LUN number you want to allocate.

Automatic allocation of LUN

1. Select multiple cells to which you want to allocate LUNs and at which multiple rows of LogicalVolume and multiple columns of AffinityGroup are intersected.

2. Select [Automatic allocation] from the pop-up menu displayed by right click of mouse.

For automatic allocation of LUN, LUN numbers are allocated in ascending order from the smallest LUN number that is not allocated in the relevant AffinityGroup.

Unallocating LUN

1. Focus on a cell to which you want to unallocated a LUN and at which a row of LogicalVolume and a column of AffinityGroup are instersected.

2. Press the delete key or the backspace key.

You cannot create any AffinityGroup without LUN.

Unallocating multiple LUNs

1. Drag multiple cells to which you want to unallocated LUNs and at which multiple rows of LogicalVolume and multiple columns of AffinityGroup are intersected.

2. Select [Unallocation] from the pop-up menu displayed by right click of mouse.

You cannot create any AffinityGroup without LUN.

Changing AffinityGroup number and AffinityGroup name

1. Press the <AffinityGroup edit> button with an AffinityGroup number or an AffinityGroup name you want to change selected. Or, select [AffinityGroup edit] from the pop-up menu.

2. Then the AffinityGroup change dialog is displayed. Enter a desired group number and a desired group name.

3. Press the <OK> button.

In the following case, AffinityGroup number is not changeable.

- AffinityGroup to which a host affinity is set.

In the following cases, AffinityGroup numbers and AffinityGroup names are not changeable.

- AffinityGroup to which a LogicalVolume is allocated that is allocated to an unsupported RAIDGroup.

- AffinityGroup to which an unsupported LogicalVolume is allocated.

- Concatenated AffinityGroup.

- LUNMapping

Deleting AffinityGroup

1. Press the <AffinityGroup deletion> button with an AffinityGroup number or an AffinityGroup name you want to delete selected. Or select [AffinityGroup deletion] from the pop-up menu.

2. Then the confirmation dialog to delete AffinityGroup is displayed. If it is all right, press the <OK> button.

In the following cases, AffinityGroups cannot be deleted.

- AffinityGroup to which a LogicalVolume that is allocated to an unsupported RAIDGroup is allocated.

- AffinityGroup to which an unsupported LogicalVolume is allocated.

- Concatenated AffinityGroup

- AffinityGroup to which a host affinity is set.

- LUNMapping

Reflecting to the design window

If you want to reflect created or corrected contents to the design window, press the <Execution> button.

Whenever the <Execution> button is pressed on the design window after the AffinityGroup operation window exits, the Return/Redo commands are executable.

Exiting the operation window

To exit the AffinityGroup operation window, press the <End> button. If the <End> button is pressed before the <Execution> button, created or corrected contents are not reflected to the design window but the window exits.

11.2.16 Copy Device

This function allows you to efficiently create a device configuration containing similar device units. First create an original device unit, use Copy Device to copy as many device units as desired, and then edit the devices.

![Note icon] Note

. . . .

If a device registered on the resource view is selected and started by selecting [To Send]-[Storage Volume Configuration Navigator] from the pop-up menu, only the device selected at start-up is operable.

. . . .

Copy Device can be operated as shown below.

1. Selecting an original device unit of which you want to make a copy, select "Copy Device" from the menu bar and pop-up menu. The following Copy Device window then appears.
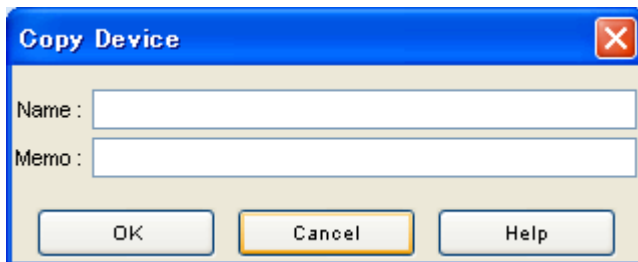
2. Enter the name you want to assign to a copied device unit in the [Name] text box. This is a temporary name used for identifying the device on the design window. The device matching operation renames the temporary names as device names specified in the operation management server.

3. Write any necessary information in the [Memo] text box. This memo information is only valid on the design window. You cannot browse this information on the resource view after configuring the devices.

4. Click <OK> button.

With these operations, the copied device unit is now created on the design window. Now you can edit the configuration.

11.2.17 Displaying disk assignment information

Storage Volume Configuration Navigator can display how disks are currently assigned to a device unit. Select a device unit, and select [Information] - [Disk Map] from the menu bar or select [Disk Map] from the pop-up menu to open the disk map window. The disk map window is shown below.
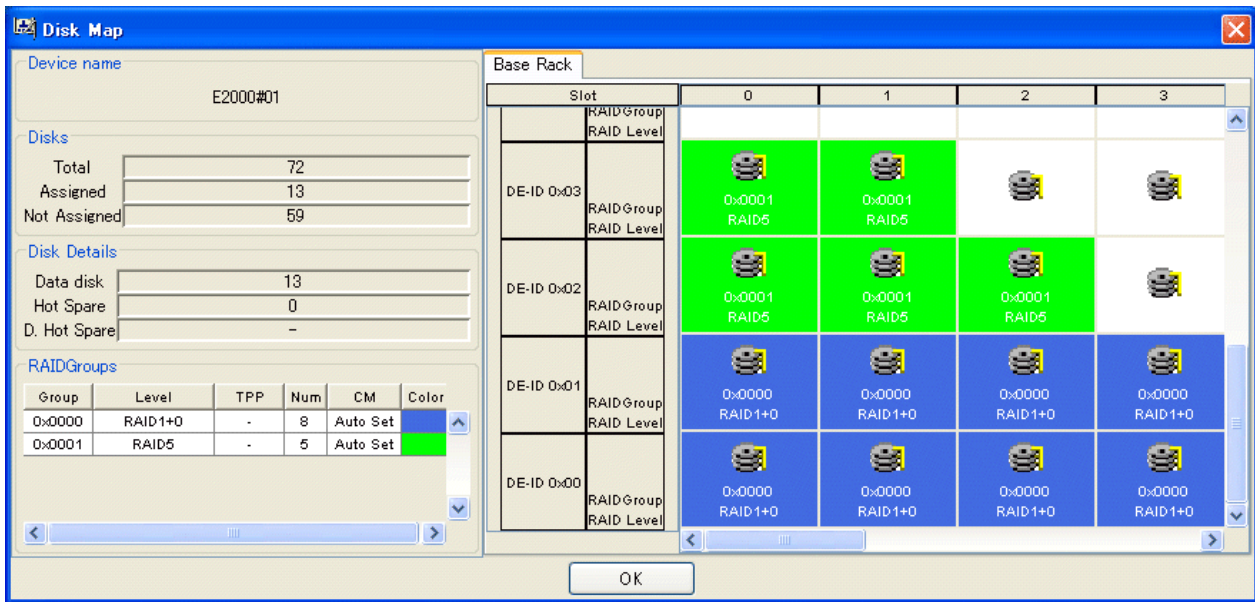
11.2.18 Login

When Storage Volume Configuration Navigator is started in standalone mode, the user must login to the operation management server before reading the real device configuration, device matching, and device setting. Select [Design] - [Log in] from the menu bar to open the login window. The login window is shown below.
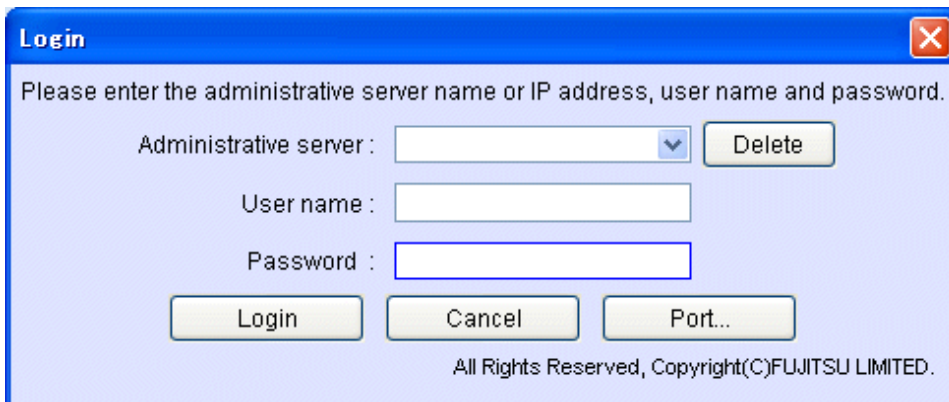
1. For [Administrative server], enter the address of the administrative server.

2. For [User name], enter the user name with administrator authority.

3. For [Password], enter the password.

4. Click <Login> button to login.

If a device registered to the resource view is selected and started by selecting [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu, or started by selecting [File] - [Storage Volume Configuration Navigator] from the menu on the resource view, login operation is not required.

11.2.19 Entering IP address

The IP address of the real device must be specified as information required to associate the device unit created virtually with the real device. The device matching operation explained later searches for the real device that matches the IP address entered here, and maps the device unit to the detected real device.

To open the Input IP address window, select a device unit, and select [Design] - [Input IP Address] from the menu bar or select [Input IP address] from the pop-up menu. The Input IP address window is shown below.
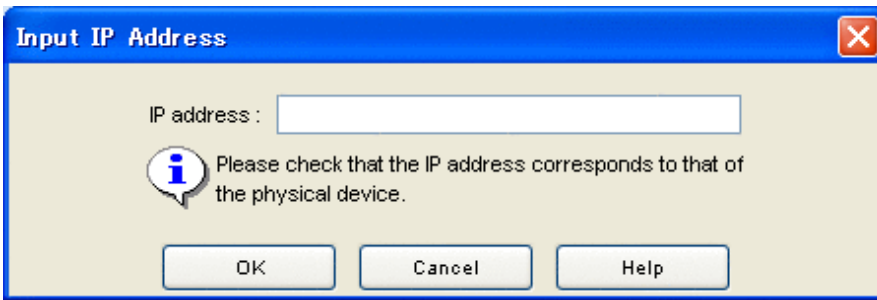
🅿 Point
. . . .
Make sure that the IP address to be entered matches the information set to the real device.
. . . .

Enter an IP address as follows:

1. Select a virtual device unit displayed on the design window.

2. Select [Input IP address] from the menu.

3. Enter an IP address.

4. Click <OK> button.

11.2.20 Device matching

The device matching operation checks or specifies the real device to which the settings of the device unit displayed in the edit window should be applied. For a device unit that has been created virtually, execute this operation after entering an IP address. If designing is performed offsite, login as a privileged administrator to the operation management server before executing this operation.

To open the device matching window, select the device unit to be matched, and select [Design] - [Device Matching] from the menu bar or select [Device Matching] from the pop-up menu. The device matching window is shown below.

Point
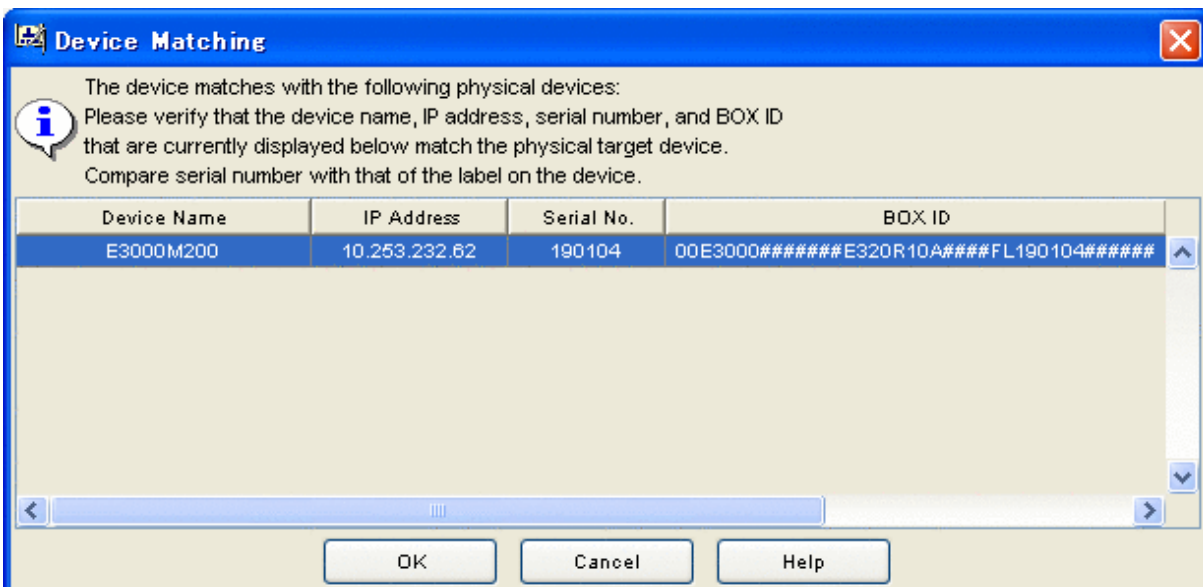
The device matching window displays information on the real device with an IP address that matches the one defined for the device unit selected on the design window. Check the IP address, serial number, and BOX ID displayed to make sure that the device is the right one for which the configuration setting is to be performed.

The operation procedure is explained below:

1. From the list of real devices, select the target device to verify the device matching.

2. Click <OK> button to validate the device matching.

If the device name entered in the device unit creation window differs from that of the real device during device matching, a message indicating that the device name of the real device is to be replaced appears. Similarly, when you select a model number ending with an "*" in the device unit creation window, a message indicating that the product name of the real device is to be replaced also appears. Click the <OK> button.

11.2.21 Device setup

The device setup operation applies the device configuration of the device unit created on the design window to the real device associated with the device matching operation. To open the device setup window, select [Design] - [Device Setup] from the menu bar, or select the device setup icon from the toolbar. If designing is performed offsite, login as a privileged administrator to the operation management server before executing this operation. The device setup window is shown below.
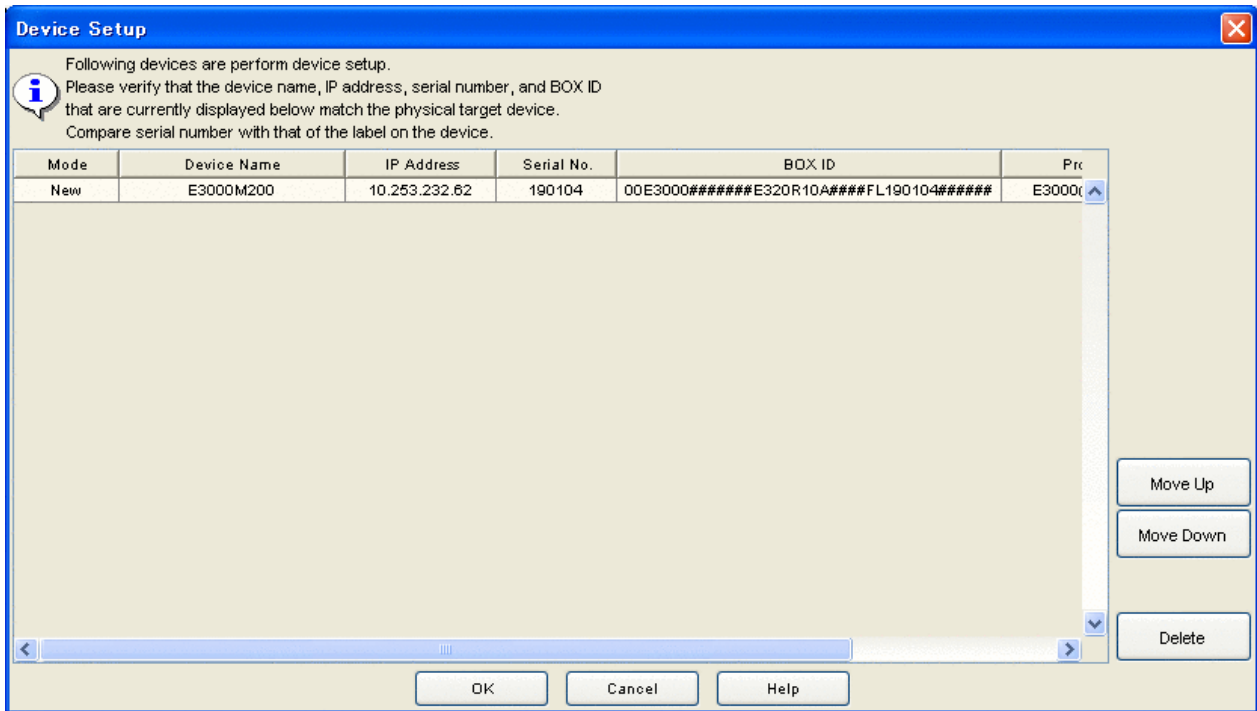
The items displayed in the [Mode] are different as follows depending on device creating method and device loading method.

Displayed items	Displayed devices
New	Devices that newly designed at offsite Devices that selected "NEW" in [Processing mode] at the device loading procedure
Update	Devices that selected "Update" in [Processing mode] at the device loading procedure

 Note
....

Before starting device setup, be sure to check the following to verify that there are no problems.

- Make sure in advance that the real device to which device configuration data is to be applied is correct.

- For the device that [Mode] is "New", execute the device setup operation after deleting the LogicalVolume by referring the manuals of the storage device.

- If the LogicalVolume is deleted, all data of its LogicalVolume is deleted. Make sure in advance that the reconfiguration will not cause any problems.
....

The operation procedure is explained below:

1. The device configuration is applied sequentially to real devices from the upper to lower of the list. Use the <Move up> and <Move down> button to adjust the order of application. A device that need not be set up can be deleted using the <Delete> button.

2. Click <OK> button to start device setup.

3. The Device Setup Progress Status window is displayed during the device setup. The contents that are set up in the machine, and the overall device setup progress rate, can be verified in this window.

 Information
....

About the Device Setup Progress Status window:

This window is not displayed, when the storage device is ETERNUS3000, ETERNUS4000 models 80 and 100, or ETERNUS6000.
Additionally, the progress status of ETERNUS3000, ETERNUS4000 models 80 and 100, and ETERNUS6000 is not displayed when there is a mixture of these devices.
....

4. After the device settings have been configured, the <OK> button in the Device Setup Progress Status window is enabled.

After the device settings have been configured, click the <OK> button in the Device Setup Progress Status window to display the Device Setup Result window. The data displayed in the device setup result window is as follows:

Device setup result list

The device setup result is displayed for each device. The message displayed at [Setup result] is as follows:

Message	Explanation
Normal	Device configuration setting is completed.
Unset	In this configuration, device configuration data cannot be set in the real device. Alternatively, device setup was not performed for this device because an error occurred in a device for which device setup was attempted earlier.
Error	Device setup failed.

 Note
....

The unsupported configuration is not reflected. For details of the supported configuration, refer to "11.1.2 Supported configurations".
....

11.2.22 General verification

The general verification function checks the configuration of the device unit displayed on the design window for problems.

To start general verification, select [Design]-[Verification All] from the menu or click the general verification icon on the toolbar.

The table below provides a summary of what items are checked and what messages are output as the result of checking. Note that device setup is possible even if a warning message with a message number of the type 4xxxxx has been displayed.

Checking	Message No.	Message text
When disks are mounted on the ETERNUS3000, check whether disks are mounted in ascending order of DE numbers in each loop and also in ascending order of slot numbers beginning from 0 in each DE.	42520, 42521	Install disks in order from slot 0, starting with the lower number DEs (loop ID:X).
Check whether the number of disks mounted on the device satisfies the requirements. (ETERNUS3000)	62531, 62532, 62533, 62535	There are insufficient disks. There must be at least X.
Check whether the number of disks mounted on the device satisfies the requirements. (ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS2000,ETERNUS DX60, DX80)	62531, 62533, 62536, 62537, 62538, 62541, 62542, 62543, 62546, 62550, 62551, 62553, 62556, 62557, 62558, 62559, 62560	There are insufficient disks. There must be at least X.
Check whether the number of disks mounted on the device satisfies the requirements. (ETERNUS8000)	62552	There are insufficient disks. Check necessary number of Disk.
Check whether disks are mounted sequentially, without skipping any slot, from the beginning in each DE. (ETERNUS6000)	42530	Install the disks starting with the first one.
Check whether the DEs are mounted continuously. (ETERNUS3000)	42532, 42533	The loop ID:X DEs were not installed in sequence.
Check whether the DEs are mounted continuously. (ETERNUS6000)	42534	The DEs were not installed in sequence.
A hot spare disk must be mounted in each loop. Check whether a hot spare disk is missing in any loop.	42535	One loop does not contain a hot spare disk.
When nearline FC disks are mounted, check whether at least 12 nearline disks (except the system disk) are mounted. (ETERNUS6000)	42536	Install 12 or more disks that are not nearline FC disks.
When nearline FC disks are mounted, check whether at least 24 nearline disks (except the system disk) are mounted. (ETERNUS6000)	42537	Install 24 or more disks that are not nearline FC disks.
When the SAS disk is used for RAID group configuration disk, check whether the hot spare of the SAS disk is mounted. (ETERNUS2000,ETERNUS DX60, DX80)	42538	The hot spare of the SAS disk is not found.
When the nearline SATA disk is used for RAID group configuration, check whether the hot spare of the nearline SATA disk is mounted. (ETERNUS2000)	42539	The hot spare of the nearline SATA disk is not found.
When the fiber channel disk is used for RAID group configuration disk, check whether the hot spare of the fiber channel disk is	42540	One loop does not contain the hot spare of the fibre channel disk.

Checking	Message No.	Message text
mounted. (ETERNUS8000, ETERNUS4000)		
When the nearline FC disk is used for RAID group configuration disk, check whether the hot spare of the nearline FC disk is mounted in each loop. (ETERNUS8000, ETERNUS4000)	42541	One loop does not contain the hot spare of the nearline FC disk.
When the nearline SATA disk is used for RAID group configuration disk, check whether the hot spare of the nearline SATA disk is mounted in each loop. (ETERNUS8000, ETERNUS4000)	42542	One loop does not contain the hot spare of the nearline SATA disk.
When the nearline SAS disk is used for RAID group configuration disk, check whether the hot spare of the nearline SAS disk is mounted. (ETERNUS2000,ETERNUS DX60, DX80)	42544	The hot spare of the nearline SAS disk is not found.
When SSD is used by the RAID group configuration disk, check whether the SSD hot spare is mounted in each loop. (ETERNUS4000, ETERNUS8000)	42545	One loop does not define the SSD hot spare.
Check whether two or more disks are mounted in each DE.	62521	Install the two data disks in the first slots of the DE.
Check whether the same number of DEs are mounted in individual loops. (ETERNUS3000)	62522	The number of DEs is different in loop ID:0 and loop ID:1.
Check whether disks are mounted in Slots 0 to 3 of DE0x00. (ETERNUS3000)	62523	Install disk between slot 0 and 3 in DE0x00.
Check whether DEs are mounted in ascending order of the DE numbers. (ETERNUS8000, ETERNUS4000, ETERNUS2000,ETERNUS DX60, DX80)	62529	DE is not installed in sequence.
Check whether the maximum capacity of the hot spare disk is greater than the maximum capacity of disks related to RAIDGroups. Check this for each loop.	62530	One of the hot spare disks is not working.
Check whether the maximum capacity of the SAS disk defined as hot spare is greater than that of the SAS disk used in RAID Groups. (ETERNUS2000,ETERNUS DX60, DX80)	62544	Hot spare disk with insufficient capacity found in SAS disk.
Check whether the maximum capacity of the nearline SATA disk defined as hot spare is greater than that of the nearline SATA disk used in RAIDGroups. (ETERNUS2000)	62545	Hot spare disk with insufficient capacity found in nearline SATA disk.
Check for each loop whether the maximum capacity of the fibre channel disk defined as hot spare is greater than that of the fibre channel disk used in RAIDGroups. (ETERNUS8000, ETERNUS4000)	62547	One loop that has hot spare disk with insufficient capacity found in fibre channel disk.
Check for each loop whether the maximum capacity of the nearline FC disk defined as hot spare is greater than that of the nearline FC disk used in RAIDGroups. (ETERNUS8000, ETERNUS4000)	62548	One loop that has hot spare disk with insufficient capacity found in nearline FC disk.
Check for each loop whether the maximum capacity of the nearline SATA disk defined as hot spare is greater than that of the nearline	62549	One loop that has hot spare disk with insufficient capacity found in nearline SATA disk.

Checking	Message No.	Message text
SATA disk used in RAIDGroups. (ETERNUS8000, ETERNUS4000)		
Check whether the maximum capacity of the nearline SAS disk defined as hot spare is greater than that of the nearline SAS disk used in RAID Groups. (ETERNUS2000,ETERNUS DX60, DX80)	62554	Hot spare disk with insufficient capacity found in nearline SAS disk.
Check for each loop whether the maximum capacity of the SSD defined as hot spare is greater than that of the SSD used in RAIDGroups. (ETERNUS4000, ETERNUS8000)	62561	One loop that defines an SSD hot spare disk with insufficient capacity found.

11.2.23 Device loading

The device configuration of a storage device is readable from the resource view. When starting up a single device, log in to the operation management server with a privileged administrator before operation.
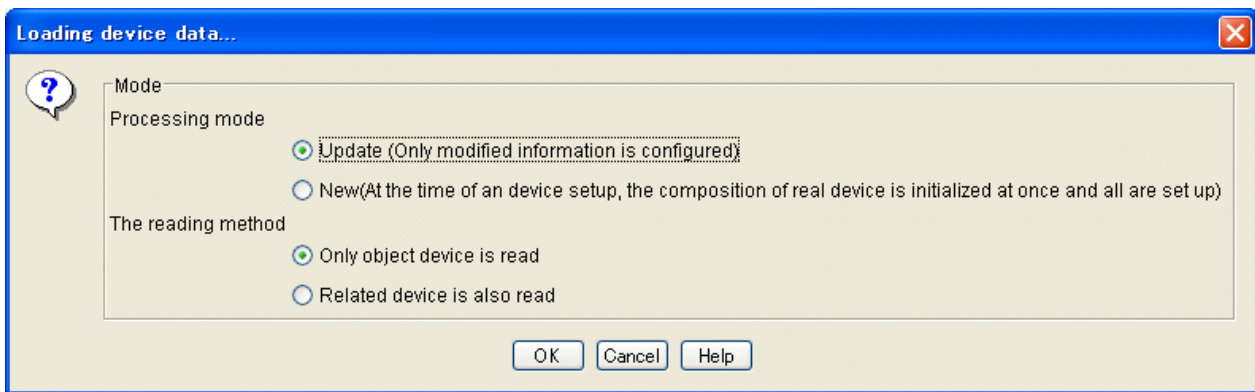
The operation procedure is explained below:

1. Select one of the following modes from [Processing mode]:

   Update

   When configuration data is set in the device, only the updated portions of the data are set in the device.

   New

   The device configuration data edited based on the device configuration that has been loaded is set in the real device after the real device configuration data is initialized.

2. Select one of the following methods from [The reading method]:

   Only object device is read

   Only the device configuration of the specified storage device is loaded.

   Related device is also read

   Configuration data for switches and hosts related to the specified storage device is also read.

3. Click the <OK> button.

A storage device in one of the following states cannot be loaded:

・ Storage device whose device status is other than normal or warning

・ Storage device using a hot spare disk, which means a storage device in one of the following states:

   - A RAIDGroup is using the hot spare disk.

- The storage device is being copied back.

- The storage device is being rebuilt.

・ Storage device within which a LogicalVolume of LUN concatenation is being created.

11.2.24 Reading and saving a file

Device configuration data created on the design window can be saved by selecting [File] - [Save As] from the menu bar. The device configuration data thus saved can be read by selecting [File] - [Open] from the menu bar.

 Note
. . . .
If a device registered on the resource view is selected and started by selecting [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu, only the device configuration data is allowed to save.
. . . .

11.3 Messages

This section explains the information, warning, or error messages that Storage Volume Configuration Navigator displays.

11.3.1 Information messages

22520

22520: Could not connect to administrative server.

Explanation

The operation was attempted while the user was not logged in to the operation management server.

Response

Login to the operation management server and then reexecute the operation.

22521

22521: Account information incorrect.

Explanation

The authentication information does not match that in the window in which the device to be loaded was specified.

Response

Match the authentication information, and reload the device.

22522

22522: The device reading to Storage Volume Configuration Navigator that selects the device and was started cannot be operated.

Explanation

If a device registered on the resource view is selected and started by selecting [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu, reading to the device is allowed by drag and drop.

Response

Perform the device load operation after starting Storage Volume Configuration Navigator by selecting it from the Start menu or by clicking the corresponding desktop icon, or start the storage device by selecting [File] - [Storage Volume Configuration Navigator] from the resource view.

22523

22523: Error authenticating account. Check username and password.

Explanation

Authentication failed with the entered account information.

Response

Check the user information and password, and then retry the operation.

22526

22526: Only privileged administrators can perform this operation.

Explanation

The specified account information does not indicate a privileged administrator.

Response

Make sure that the account information is of a privileged administrator, and then retry the operation.

22527

22527: xxx is not found on the network. Check specified administrative server is valid.

Explanation

The specified operation management server name is not found in the network.

Response

Check the operation management server name, and then retry the operation.

22529

22529: Specify logical volume information.

Explanation

Automatic configuration was executed without entering LogicalVolume information in the auto configuration window.

Response

Enter LogicalVolume information and then execute auto configuration.

22530

22530: Invalid logical volume capacity.

Explanation

An invalid value was specified for the LogicalVolume capacity in the auto configuration window.

Response

Specify a valid value for the LogicalVolume capacity of the LogicalVolume information.

22531

22531: Invalid number of logical volumes.

Explanation

An invalid value was specified for the number of LogicalVolumes in the auto configuration window.

Response

Specify a valid value for the number of LogicalVolumes of LogicalVolume information.

22532

22532: Logical volume could not be assigned to this composition.

Explanation

The number of disks is insufficient for creating RAIDGroups to which the specified LogicalVolumes can be assigned.

Response

Add disks to the device.
For a real device, add disks to the real device, execute device loading, and then perform automatic configuration again.

22533

22533: Disk not installed in specified device.

Explanation

No disks are mounted on the device for which automatic configuration is to be performed.

Response

Mount disks on the device.
For a real device, mount disks on the real device, execute device loading, and then perform automatic configuration again.

22534

22534: Logical volume capacity exceeds the maximum capacity.

Explanation

The specified capacity of LogicalVolumes exceeds the maximum LogicalVolume capacity that can be assigned to the device.

Response

Specify a smaller value for the LogicalVolume capacity.

22535

22535: The number of logical volumes exceeds the maximum that can be assigned to this device.

Explanation

The sum of the specified number of LogicalVolumes and the number of existing LogicalVolumes exceeds the maximum number that can be assigned to the device.

Response

Reduce the number of LogicalVolumes to be created.

22536

22536: DE not installed.

Explanation

No DE is mounted on the device. Automatic configuration cannot be executed for a device without a DE.

Response

Mount DEs on the device.
For a real device, modify the real device configuration, execute device loading, and then perform automatic configuration again.

22537

22537: DE composition invalid.

Explanation

The configuration of the DEs mounted on the device contains an error.

Response

Check and correct the DE configuration of the device.
For a real device, correct the real device configuration, execute device loading, and then perform automatic configuration again.

22538

22538: Install disk between slot 0 and 3 in DE0x00.

Explanation

Disks must always be mounted as backup disks in DE0x00 Slot0 to Slot3.

Response

Perform disk operation to mount disks in DE0x00 Slot0 to Slot3.
For a real device, modify the real device configuration, execute device loading, and then perform automatic configuration again.

22539

22539: Install disk between slot 0 and 1 in the DE.

Explanation

Disks are not mounted in DE0x10 or expansion DE Slot0 and Slot1.

Response

Perform disk operation to mount disks in DE0x10 or expansion DE Slot0 and Slot1.
For a real device, modify the real device configuration, execute device loading, and then perform automatic configuration again.

22540

22540: Could not find hot spare disk with sufficient capacity.

Explanation

A hot spare disk could not be secured because any disk has a free space exceeding the largest disk capacity, from among the disks already allocated to the RAIDGroup.

Response

Perform disk operation to mount a disk having a free space exceeding the largest disk capacity among the disks already allocated to the RAIDGroup.
For a real device, modify the real device configuration, execute device loading, and then perform automatic configuration again.

22541

22541: RAID group capacity is insufficient.

Explanation

The current capacity of the existing RAIDGroups is insufficient for assigning the specified LogicalVolumes. The number of the RAID groups allocated the specified LogicalVolume is insufficient. Therefore the number of LogicalVolume exceeded the number that it is assigned to the RAID group.

Response

Perform RAIDGroup operation to create a RAIDGroup and then execute automatic configuration. Alternatively, execute automatic configuration by specifying that a new RAIDGroup be created.

22543

22543: Install the two data disks in the first slots of the DE.

Explanation

Data disks must be mounted in the first two slots of each DE.

Response

Perform disk operation to mount data disks in the first two slots of each DE. System disks are not included.
For a real device, modify the real device configuration, execute device loading, and then perform automatic configuration again.

22555

22555: The number of logical volumes exceeds the maximum that can be assigned per RAID group.

Explanation

The number of LogicalVolumes exceeds the maximum number of LogicalVolumes that can be assigned to a RAIDGroup.

Response

Reduce the number of LogicalVolumes to a number that can be assigned to a RAIDGroup.

22556

22556: Selected disk cannot be used as a hot spare disk.

Explanation

Disks used as backup disks and system disks cannot be used for hot spare disks.

Response

Specify disks other than backup disks and system disks as hot spare disks.

22557

22557: The capacity of the selected disk is insufficient for use as a hot spare disk.

Explanation

The specified disk cannot be defined as a hot spare disk because its capacity is too small.

Response

For the ETERNUS3000, specify the disk having the largest capacity, from among those mounted on the device.
For the ETERNUS6000, ETERNUS4000 and ETERNUS8000, specify a disk of the same Loop and of the maximum capacity.

22558

22558: Selected composition invalid. Add the disk to a different loop on the same DA.

Explanation

For a RAID5 configuration of the ETERNUS6000, disks must be selected on the same DA.

Response

Select disks on the same DA. For information about the DA configuration, refer to the ETERNUS6000 SA/SE Handbook.

22559

22559: Device name required.

Explanation

A required device name has not been specified.

Response

Specify a device name.

22560

22560: Specified device name already in use.

Explanation

An existing device has the same name.

Response

Specify a unique name.

22563

22563: RAID group capacity insufficient.

Explanation

The RAIDGroup does not have sufficient free space for creating the specified LogicalVolumes.

Response

Reduce the LogicalVolume capacity.

22564

22564: Maximum number of RAID groups already exist.

Explanation

An attempt was made to create more RAIDGroups than permitted in the device.

Response

Create RAIDGroups within a range not exceeding the maximum number permitted in the device.

22565

22565: Contains unsupported disks.

Explanation

An unsupported disk is mounted on the real device.

Response

Remove the unsupported disk from the real device, and then reload the device.

22566

22566: Disks must be equally distributed across loops.

Explanation

The disks configuring of a RAIDGroup are not allocated evenly between loops.

Response

Select the disks configuring a RAIDGroup again so that they are allocated evenly.

22567

22567: The specified number of logical volumes cannot be created.

Explanation

The RAIDGroup does not have sufficient free space for creating as many LogicalVolumes as specified.

Response

Create LogicalVolumes in a RAIDGroup that has sufficient free space.

22568

22568: RAID1+0 requires an even number of disks to be assigned to the group.

Explanation

An odd number of disks were specified although a RAIDGroup with RAID level RAID1+0 must be created with an even number of disks.

Response

Specify an even number of disks to create a RAIDGroup, or add disks so that the total number of disks making up a RAIDGroup is an even number.

22569

22569: Selected disk composition not recommended.The recommended composition is 4 per loop ID:0 and 4 per loop ID:1. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. In consideration of performance and reliability, mount four disks each in Loop ID 0 and Loop ID 1.

Response

Mount four disks each in Loop ID 0 and Loop ID 1. Note that this configuration is not always required.

22570

22570: Selected disk composition not recommended.Recommended composition is 8 or less per loop ID: 0 and loop ID:1 respectively. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. Eight or more disks are selected for each loop. In consideration of performance and reliability for this device, assign eight or fewer disks each to Loop ID 0 and Loop ID 1.

Response

Assign eight or fewer disks each to Loop ID 0 and Loop ID 1. Note that this configuration is not always required.

22571

22571: The specified number of disks is not recommended. Recommended composition is 8.Selecting disks from different loops will enhance performance and reliability. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. In consideration of performance and reliability, mount four disks each in Loop ID 0 and Loop ID 1.

Response

Mount four disks each in Loop ID 0 and Loop ID 1. Note that this configuration is not always required.

22572

22572: The specified number of disks is not recommended. Recommended composition is 16.Selecting disks from different loops will enhance performance and reliability. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. In consideration of performance and reliability, allocate 16 or fewer disks evenly in each loop.

Response

Allocate 16 or fewer disks evenly in each loop. Note that this configuration is not always required.

22573

22573: The specified number of disks is not recommended. Recommended composition is 5. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. It is recommended to allocate five disks.

Response

Allocate five disks evenly in each loop. Note that this configuration is not always required.

22574

22574: The specified number of logical volumes could not be created because this will cause the total number to exceed the maximum allowable for the device.

Explanation

The specified number of LogicalVolumes to be created causes the total number to exceed the maximum allowable number for the device.

Response

Change the number of LogicalVolumes to be created so that the total number does not exceed the maximum allowable number, and then retry the operation.

22575

22575: The specified number of disks is not recommended. Recommended composition is 5.Distribute disks evenly across loop ID:0 and loop ID:1 to enhance performance and reliability. Continue anyway?

Explanation

The selected disks do not meet a configuration recommended for a RAIDGroup. For RAID5, the recommended configuration consists of five disks, and disks are allocated evenly to loops.

Response

Select five disks for configuring a RAIDGroup in such a way that the disks are allocated evenly to individual loops. Note that this configuration is not always required.

22576

22576: Specify the number of logical volumes to create.

Explanation

The number of LogicalVolumes to be created is not specified.

Response

Specify the number of LogicalVolumes and then retry the operation.

22577

22577: Specify the logical volume capacity.

Explanation

The LogicalVolume capacity is not specified.

Response

Specify the LogicalVolume capacity and then retry the operation.

22578

22578: The specified number of disks is not recommended. Recommended composition is 10. Continue anyway?

Explanation

The number of selected disks does not meet a configuration recommended for a RAIDGroup. The recommended number of disks is 10.

Response

Select 10 disks. Note that this configuration is not always required.

22579

22579: Selected disk composition not recommended. It's also recommended to use disks of the same capacity. Continue anyway?

Explanation

The capacities of the selected disks are uneven. When the capacities of the disks making up a RAIDGroup are uneven, a RAIDGroup is configured based on the value of the disk with the smallest capacity. Disks with larger capacities cannot be used effectively.

Response

Configure a RAIDGroup with disks having the same capacities. Note that this configuration is not always required. Refer to the SA/SE Handbook for details.

22580

22580: Selected disk composition not recommended. It's also recommended to use disks of the same speed. Continue anyway?

Explanation

The numbers of rotations of the selected disks are uneven. In this case, a RAIDGroup is configured based on the value of the disk with the smallest number of rotations and this may lead to a performance-related problem. Note that this is not checked if the configuration of a real device has been read from a file.

Response

Configure a RAIDGroup with disks having the same numbers of rotations. Note that this configuration is not always required. Refer to the SA/SE Handbook for details.

22581

22581: Selected disk composition not recommended. It's also recommended to use disks of the same capacity and speed. Continue anyway?

Explanation

The capacities and the numbers of rotations of the selected disks are uneven. If the numbers of rotations making up a RAIDGroup are uneven, a RAIDGroup is configured based on the value of the disk having the smallest number of rotations and a problem may occur in performance. If the capacities are uneven, a RAIDGroup is configured based on the value of the disk with the smallest capacity and disks with larger capacities cannot be used effectively.

Note that this matter is not checked if the configuration of a real device is read from a file.

Response

Configure a RAIDGroup with disks having the same capacities and rotations. Note that this configuration is not always required. Refer to the SA/SE Handbook for details.

22582

22582: Selected disk composition not recommended. To enhance performance and reliability, distribute disks evenly across loop ID:0 and loop ID:1. Continue anyway?

Explanation

The selected disks are not allocated evenly in each loop. Taking performance and reliability into consideration, allocate the disks as evenly as possible.

Response

Select disks again so that the disks are allocated evenly in each loop. Note that this configuration is not always required. Refer to the SA/SE Handbook for details.

22583

22583: The RAID group cannot be created unless the DA has a redundant configuration.

Explanation

Since the selected disks within the DA are both located on the same path, both disks become unusable in case of a failure in the path.

Response

When using disks in the same DA (when the LoopID numbers are displayed in the same color), select disks that are located on different paths. (Select one disk having an even LoopID number and the other having an odd LoopID number.)

22584

22584: The specified number of disks is not recommended. Recommended composition is 8. Continue anyway?

Explanation

The selected number of disks does not meet a recommended configuration. Eight disks are recommended.

Response

Select eight disks and reconfigure the RAIDGroup. Note that this configuration is not always required. Refer to the SA/SE Handbook for details.

22585

22585: The selected composition cannot be created. Assign the disk to a different loop.

Explanation

For the ETERNUS6000, disks in the same loop cannot be selected to configure RAID1+0.

Response

Select disks from different loops and retry the operation. Refer to the SA/SE Handbook for details.

22586

22586: RAID5 requires that disks be distributed evenly across loops.

Explanation

Deletion failed because deleting disks making up a RAIDGroup results in an unbalanced number of disks in each loop.

Response

Perform deletion so that the numbers of disks in individual loops are equal.

22587

22587: The number of disks assigned to one loop must not exceed half of all disks making up a RAID group.

Explanation

A half or more of the disks configuring a RAIDGroup are specified in one loop. The number of disks assigned to one loop must not exceed half of all disks making up a RAIDGroup.

Response

Specify disks so that the number of disks assigned to one loop is less than half of all disks.

22588

22588: Cannot change the composition of the RAID group that contains logical volumes.

Explanation

A RAIDGroup containing a LogicalVolume cannot be reconfigured.

Response

Delete the LogicalVolumes and then reconfigure the RAIDGroup.

22589

22589: Selected disk composition not recommended. Selecting disks from a different loop will enhance performance and reliability.

Explanation

The selected disks are not allocated as recommended between loops. Distribute disks evenly to loops from the points of view of performance and reliability.

Response

Allocate disks again so that they are distributed evenly to loops. Note that this configuration is not always required.

22590

22590: Hot spare disk with insufficient capacity found on loop ID:0 and loop ID:1.

Explanation

Recovery from a disk error will not be possible because the capacity of the disk configuring the RAIDGroup exceeds that of the existing hot spare disk.

Response

Assign to a hot spare disk, the disk having a capacity exceeding that of any disk configuring the RAIDGroup.

22591

22591: Hot spare disk with insufficient capacity found on loop ID:0.

Explanation

Recovery from a disk error will not be possible because the capacity of the disk in Loop ID 0 configuring the RAIDGroup exceeds that of the existing hot spare disk.

Response

Assign to a hot spare disk in Loop ID 0, the disk having a capacity exceeding that of any disk in Loop ID 0 configuring the RAIDGroup.

22592

22592: Hot spare disk with insufficient capacity found on loop ID:1.

Explanation

Recovery from a disk error will not be possible because the capacity of the disk in Loop ID 1 configuring the RAIDGroup exceeds that of the existing hot spare disk.

Response

Assign to a hot spare disk in Loop ID 1, the disk having a capacity exceeding that of any disk in Loop ID 1 configuring the RAIDGroup.

22593

22593: A hot spare disk with insufficient capacity was found in the following loops:

Explanation

Recovery from a disk error will not be possible because the capacity of the disk configuring the RAIDGroup exceeds that of the existing hot spare disk.

Response

Assign to a hot spare disk, the disk having a capacity exceeding that of any disk configuring the RAIDGroup.

22594

22594: RAID1+0 requires an even number of disks on each loop. Delete a disk.

Explanation

When deleting disks configuring a RAIDGroup in the RAID level RAID1+0, delete them so that each loop has the same number of remaining disks.

Response

Perform deletion again so that each loop has the same number of remaining disks.

22595

22595: Delete a disk to ensure even number, as required for RAID1+0 RAID groups.

Explanation

The number of disks configuring a RAIDGroup in the RAID level RAID1+0 must be an even number.

Response

Perform deletion again so that the number of remaining disks configuring the RAIDGroup becomes an even number.

22596

22596: Cannot delete disk because that would put the number of disks below the minimum required by RAID1+0.

Explanation

Deletion failed because the number of disks configuring a RAIDGroup in the RAID level RAID1+0 will be less than the number required for the minimum allowable configuration.

Response

Perform deletion again so that the number of remaining disks does not become smaller than that required for the minimum allowable configuration. For details of the number of disks, refer to the SA/SE Handbook for the respective device.

22597

22597: Cannot delete disk because that would put the number of disks below the minimum required by RAID5.

Explanation

Deletion failed because the number of disks configuring a RAIDGroup in the RAID level RAID5 will be less than the number required for the minimum allowable configuration.

Response

Perform deletion again so that the number of remaining disks does not become smaller than that required for the minimum allowable configuration. For details of the number of disks, refer to the SA/SE Handbook for the respective device.

22598

22598: Cannot delete one of the logical volumes.

Explanation

A LogicalVolume used by the server cannot be deleted.

Response

Release the LogicalVolume from the server and then delete the LogicalVolume.

22599

22599: Cannot delete one of the RAID groups.

Explanation

The RAIDGroup cannot be deleted because it contains a LogicalVolume that cannot be deleted. Alternatively, the RAIDGroup cannot be deleted because it is not supported.

Response

An attempt was made to delete the RAIDGroup containing a LogicalVolume being used. Check the system configuration.

22600

22600: RAID group maximum capacity exceeded.

Explanation

Using the selected disks exceeds the maximum capacity allowed for a RAIDGroup.

Response

Reduce the number of selected disks or select disks with smaller capacities to configure a RAIDGroup.

22601

22601: Selected disk composition not recommended. Use the highest speed disks in the loop as hot spares. Continue anyway?

Explanation

The selected disks do not meet a recommended configuration. Selecting a disk featuring the fastest rotation speed in the loop as a hot spare disk prevents degradation of performance when the hot spare disk is incorporated into the RAIDGroup.

Response

Select the disk featuring the fastest rotation speed in the loop and then retry the operation.

22602

22602: Different size disks cannot be used to create a RAID group.

Explanation

The capacities of the disks making up a RAIDGroup are not the same.
(ETERNUS6000)

Response

Select disks making up a RAIDGroup again in such a way that the capacities of individual disks are the same.

22603

22603: Different speed disks cannot be used to create a RAID group.

Explanation

The numbers of rotations of the disks making up a RAIDGroup are not the same.
(ETERNUS6000)

Response

Select disks making up a RAIDGroup again in such a way that the numbers of rotations of individual disks are the same.

22604

22604: Disks of different size and speed cannot be used to create a RAID group.

Explanation

The capacities and the numbers of rotations are not equal among the disks making up a RAIDGroup.
(ETERNUS6000)

Response

Select disks making up a RAIDGroup in such a way that the capacities and the numbers of rotations are equal among the disks.

22605

22605: Are you sure you want to cancel composition?

Explanation

This message confirms whether the configuration currently displayed can be abandoned to load a new configuration onto the design window.

Response

If the configuration currently displayed on the design window is required, save the configuration into a file and then perform configuration load operation.

22606

22606: Specified device already exists. Overwrite?

Explanation

This message confirms whether the configuration displayed on the design window can be overwritten when the device to be loaded is the same as the device unit displayed on the window.

Response

If you do not want to overwrite the configuration on the design window, save the configuration into a file and then perform configuration load operation.

22607

22607: Cannot read from multiple devices simultaneously.

Explanation

More than one device cannot be selected for device load operation.

Response

Specify one device at a time for device load operation.

22608

22608: Device not supported.

Explanation

The device that was specified for device load operation is not supported.

Response

Perform device load operation by specifying a supported device.

22609

22609: Cannot read from device while it is in error state.

Explanation

The device in one of the following states cannot be loaded:

- ・ The status of the device is error.
- ・ The RAIDGroup is using a hot spare disk.
- ・ Copy-back is in progress.
- ・ Rebuilding is in progress.
- ・ Storage device within which a LogicalVolume of LUN concatenation is being created.

Response

Remove the problem cause and then reload the device.

22610

22610: Save composition?

Explanation

Exiting was instructed before saving the configuration on the design window.

Response

To save the configuration on the design window, click <OK> button.

22617

22617: There is no device on which device matching can be performed.

Explanation

The device used for device matching is not registered with the operation management server.

Response

Register the relevant device with the operation management server and then retry the operation.

22619

22619: There was no device on which device matching could be performed.

Explanation

A device for which device matching has been performed is not found.

Response

Perform device matching and then retry the operation.

22621

22621: No RAID group can be selected.

Explanation

No RAIDGroup exists.

Response

Using the automatic configuration function, create a RAIDGroup to which LogicalVolumes can be assigned, and then retry the operation.

22622

22622: Data is stored in the logical volume and the RAID group. When the logical volume and RAID group are deleted, all data contained in these groups will be erased. Continue anyway?

Explanation

This message warns that data will be deleted if a LogicalVolume is deleted.

Response

Make sure that deleting the specified LogicalVolume causes no problems, and then delete it.

22623

22623: Cannot create RAID group with the selected RAID level using nearline FC disks.

Explanation

Nearline FC disks cannot be used at the selected RAID level.

Response

Confirm disks with which a RAID group of the selected RAID level can be created. For details, refer to the SA/SE handbook.

22625

22625: Selected disk composition not recommended. Use the highest capacity disks in the loop as the hot spares. Continue anyway?

Explanation

The selected disk is not configured in the recommended way. For a hot spare disk, select the disk having the largest capacity in the loop.

Response

Select the disk having the largest capacity in the loop, and retry the operation.

22626

22626: RAID group cannot be created for the selected composition.

Explanation

A RAIDGroup cannot be created with the selected disk configuration.

Response

Refer to the SA/SE Handbook, and specify a disk configuration with which a RAIDGroup can be created.

22627

22627: Device cannot be copied because it contains an unsupported RAID group.

Explanation

The from-copy device unit cannot be copied because it contains an unsupported RAID group. RAID levels of the supported RAID group are RAID1+0, RAID1, RAID5, RAID5+0 and RAID6.

Response

Unsupported RAID groups were found in the storage device configuration when loading the device configuration from real devices. Delete the unsupported RAID groups of the real devices, reload the device configuration, and then execute Copy Device again. Otherwise, create a new device unit and make copies of it.

22628

22628: Device cannot be copied because it contains a volume consolidation.

Explanation

The from-copy device unit cannot be copied because it contains an unsupported linked volume.

Response

Linked volumes were found in the storage device configuration when loading the device configuration from real devices. Delete the linked groups of the real devices, reload the device configuration, and then execute Copy Device again. Otherwise, create a new device unit and make copies of it.

22629

22629: Device cannot be copied because it contains a mainframe logical volume.

Explanation

The device cannot be copied because the device unit specified as the copy source contains an unsupported mainframe volume.

Response

Unsupported mainframe volumes are found in the storage device configuration because the device configuration was read from actual devices. Delete the unsupported mainframe volumes in the actual devices, reload the device configuration, and then execute Copy Device again. Or, create a new device unit and execute Copy Device again using the new device as a copy source.

22630

22630: Cannot copy device.

Explanation

The device cannot be copied because the device unit specified as the copy source is a manual assembly unit or a storage device that cannot be edited.

Response

A manual assembly unit or a storage device that cannot be edited is found in the device configuration because the device configuration was read from actual devices. Create a new device unit and execute Copy Device again using the new device as a copy source.

22631

22631: The file does not exist.

Explanation

The file to be opened is not found.

Response

Confirm that the file to be opened exists and try to open it again.

22632

22632: File format is not supported.

Explanation

The unsupported format file was saved or opened.

Response

Select a ".cnc" file and try to save or open it again.

22633

22633: It cannot create to selected device.

Explanation

The selected device unit cannot be edited. Therefore, you cannot specify the device to add components.

Response

Select the device unit you want to edit on the resource view, load it into Storage Volume Configuration Navigator, and then restart the job.

22634

22634: It cannot operate other than the device you are editing.

Explanation

If a device registered on the resource view is selected and started by selecting [To Send] - [Storage Volume Configuration Navigator] from the pop-up menu, no other storage devices than the storage device specified at start-up are not editable.

Response

Perform the device read operation for the device to be edited by starting Storage Volume Configuration Navigator by selecting it from the Start menu or by clicking the corresponding desktop icon, or start the storage device by selecting [File] - [Storage Volume Configuration Navigator] from the resource view.

22635

22635: RAID1 does not allow addition of disks.

Explanation

No disk can be added in the RAID1 level.

Response

Create a new RAID1.

22636

22636: Cannot delete disk because that would put the number of disks below the minimum required by RAID1.

Explanation

No more disks can be deleted because doing so puts the number of disks that constitute the RAID group of RAID1 under the minimum configuration.

Response

No disks can be deleted because the current disks are required for the minimum configuration. For details of the number of component disks, refer to the SA/SE Handbook.

22637

22637: Cannot delete one of the disks.

Explanation

Disks in an unsupported RAID level or in a RAID group containing an unsupported LogicalVolume cannot be deleted.

Response

Delete the disks in the unsupported RAID level or in the RAID group containing an unsupported LogicalVolume from the actual device, and then reread the device.

22638

22638: Device cannot be copied because it contains an MVV logical volume.

Explanation

Copy Device failed because the device unit specified as the copy source contained an unsupported MVV volume.

Response

Unsupported MVV volumes are found in the storage device configuration because the device configuration was read from actual devices. Delete the unsupported MVV volumes from the actual devices, reload the device configuration, and then execute Copy Device again. Or, create a new device unit and execute Copy Device again using the new device as a copy source.

22639

22639: Device cannot be copied because it contains an unknown logical volume.

Explanation

Copy Device failed because the device unit specified as the copy source contained an unsupported volume.

Response

Unsupported volumes are found in the storage device configuration because the device configuration was read from actual devices. Delete the unsupported volumes from the actual devices, reload the device configuration, and then execute Copy Device again. Or, create a new device unit and execute Copy Device again using the new device as a copy source.

22640

22640: An invalid disk was specified for installation between slot 0 and 3 in DE0x00.

Explanation

From the disks specified for Slot0 through Slot3 of DE0x0, there is a disk that cannot be mounted as a backup disk.

Response

Using disk operation, specify a disk that can be mounted as a backup disk. For information on disks that cannot be mounted as a backup disk, refer to the "ETERNUS3000 SA/SE Handbook".

22643

22643: Select disks from the same BRT pair.

Explanation

Disks in different pair BRTs (the disks have different Loop ID colors) cannot be selected.

Response

Select disks in the same pair BRT (the disks must have the same Loop ID color), and perform the operation again. For details, refer to the SA/SE handbook.

22646

22646: Cannot add disk to the RAID group with the selected RAID level.

Explanation

Disks cannot be added to a RAID group of the selected RAID level.

Response

Create a new RAID group of the selected RAID level.

22647

22647: Cannot remove disk from the RAID group with the selected RAID level.

Explanation

A disk that is a component of a RAID group of the selected RAID level cannot be deleted.

Response

A disk that is a component of a RAID group of the selected RAID level cannot be deleted.

22649

22649: Select disks from different loop IDs in the BRT pair.

Explanation

The RAID group cannot be created by selecting disks with the same Loop ID in a pair BRT (the disks have the same Loop ID color).

Response

Select disks with different Loop IDs in the pair BRT (the disks must have the same Loop ID color), and perform the operation again. For details, refer to the SA/SE handbook.

22651

22651: Select disks for disk pairs from different loop IDs.

Explanation

Disks that are to be paired are selected from the same Loop ID.

Response

Select disks to be paired from the different Loop IDs, and perform the operation again. For details, refer to the SA/SE handbook.

22652

22652: Allocation of the selected disks is not recommended. Disks for disk pairs should be selected from a different BRT pairs. Continue anyway?

Explanation

Disks to be paired are selected from the same pair BRT (the disks have the same Loop ID color). Select disks to be paired from different pair BRTs (the disk must have different Loop ID colors).

Response

Perform again the configuration in which disks to be paired are selected from different pair BRTs (the disk must have different Loop ID colors). However, it is not necessary to always use such a configuration. For details, see the SA/SE handbook.

22654

22654: Allocation of the selected disks is not recommended. Disks should be selected from the same loop ID. Continue anyway?

Explanation

Disks from different Loop IDs are selected. Allocate disks from the same LoopID.

Response

Perform again the configuration in which disks from the same Loop ID are selected. However, it is not necessary to always use such a configuration. For details, see the SA/SE handbook.

22655

22655: Allocation of the selected disks is not recommended. An equal number of disks should be selected from different loop IDs. Continue anyway?

Explanation

Disks from the same Loop ID are selected. Allocate disks evenly from different Loop IDs.

Response

Perform again the configuration in which disks from different Loop IDs are selected evenly. However, it is not necessary to always use such a configuration. For details, see the SA/SE handbook.

22657

22657: Cannot remove disk. Delete disks such that remaining paired disks are on different loop IDs.

Explanation

Since disks of the same Loop ID are to be paired in this configuration, they cannot be deleted.

Response

Perform the deletion in a way that disks to be paired are of different Loop IDs. For details, see the SA/SE handbook.

22658

22658: Disks to be paired are allocated to the same BRT pair. The recommended configuration is the one in which disks to be paired are allocated to different BRT pairs.

Explanation

Disks to be paired are allocated from the same pair BRT (the disks have the same LoopID color). The recommenced configuration is the one in which disks to be paired are allocated in different pair BRTs (the disk must have different LoopID colors).

Response

Reselect disks in a way that disks to be paired are of different pair BRTs (the disk must have different LoopID colors). However, it is not necessary to always use such a configuration. For details, see the SA/SE handbook.

22660

22660: Logical volume capacity is below the minimum.

Explanation

LogicalVolume was specified with a capacity with which creation is impossible.

Response

Perform the operation in a way that the capacity of the LogicalVolume to be created becomes no less than the minimum capacity. For details, see the SA/SE handbook.

22661

22661: Cannot add disk because that would put the number of disks over the maximum required by RAID6.

Explanation

As the number of disks configuring RAID groups in RAID6 becomes larger than the maximum configuration, disks cannot be added.

Response

Disks cannot be added because of the maximum configuration. For details of the maximum configuration, refer to SA/SE handbooks for respective devices.

22662

22662: Cannot delete disk because that would put the number of disks below the minimum required by RAID6.

Explanation

Disks cannot be deleted because the number of disks configuring RAID groups in RAID6 is less than the minimum configuration.

Response

Disks cannot be deleted because of the minimum configuration. For details of the minimum configuration, refer to SA/SE handbooks for respective devices.

22663

22663: Allocation of the selected disks is not recommended. An equal number of disks should be selected from different loop IDs. Continue anyway?

Explanation

Arrange disks evenly with different LoopIDs.

Response

Retry to make a configuration where disks are evenly selected with different LoopIDs. In addition, it is not always necessary to make this configuration. For details, refer to the SA/SE handbook.

22664

22664: The device cannot be copied because it contains the LUNMapping.

Explanation

Since an unsupported LUNMapping exists in a device unit specified by copy source, device copy is not allowed.

Response

It is when the configuration is being read from a real device that LUNMapping exists in the configuration of a storage device. After enabling the security setting for FC port on the real device, read the device configuration again to execute device copy.

22665

22665: The device cannot be copied because it contains the concatenated AffinityGroup.

Explanation

Since an supported AffinityGroup exists in a device unit specified by the copy source, device copy is not allowed.

Response

It is when the configuration is being read from a real device that a concatenated AffinityGroup exists in the configuration of a storage device. After deleting the concatenated AffinityGroup in the real device, read the device configuration again and execute device copy. In addition, create a new device unit and retry device copy with the device unit as a copy source.

22666

22666: Cannot delete one of the AffinityGroups.

Explanation

Since a LogicalVolume with an unallocated LUN is allocated to an AffinityGroup, the AffinityGroup cannot be deleted. Or it cannot be deleted because of a concatenated AffinityGroup or a AffinityGroup set by the Host AffinityGroup.

Response

The AffinityGroup or concatenated AffinityGroup to which a LogicalVolume in use is allocated is about to be deleted. Check the system configuration.

22667

22667: An invalid disk was specified for installation. Install same capacity and speed disk between slot0 and 3 in DE0x00.

Explanation

The same capacity and speed disk must be installed between slot0 and 3 in DE0x00.

Response

The same capacity and number of rotations of a disk must be specified between slot0 and 3 in DE0x00.

22668

22668: The specified number of disks is not recommended. Recommended composition is 6. Continue anyway?

Explanation

The specified number of disks is not recommended. Recommended composition is 6.

Response

The recommendation is to use 6 as the number of disks; however this is not a requirement.

22669

22669: Hot spare disk with insufficient capacity found in following disk type. Create hot spare disk of following type.

Explanation

The disk capacity for the created RAID group configuration is greater than the hot space capacity of the existing same disk type so that a recovery cannot be performed when a disk error occurred.

Response

Define the maximum disk capacity within the device and use SAS and nearline SATA disks as the hot spare.

22670

22670: An invalid disk was specified for installation on following slot.

Explanation

An attempt was made to install an invalid disk type.

Response

A valid disk type must be specified.

22671

22671: The loop that has hot spare disk with insufficient capacity found in following disk type. Create hot spare disk of following type in each loop.

Explanation

The disk capacity for the created RAID group configuration is greater than the hot space capacity of the existing same disk type and loop.

Response

Specify the applicable maximum disk space for the type of hot spare disk used in the loop.

22672

22672: Cannot delete logical volumes, because these contain following volume type.

Explanation

The specified logical volume cannot be deleted, because it contains unsupported logical volume.

Response

Specify the logical volume that has no unsupported logical volume, and then re-execute.

22673

22673: Device cannot be copied because it contains following compositions.

Explanation

The Copy Device cannot be executed, because the specified copy destination device unit contains unsupported compositions.

Response

When the device configuration has been loaded from actual devices, there are unsupported compositions in the storage device configuration. Delete the unsupported compositions from the actual devices, reload the device configuration, and then re-execute Copy Device. Otherwise, create a new device unit, and re-execute Copy Device specifying it with the copy destination.

22674

22674: Invalid format of IP address.

Explanation

The syntax or value of IP address is invalid.

Response

Specify a valid value within the range from 0.0.0.0 to 255.255.255.255.

22675

22675: IP address already in use.

Explanation

The device that has the specified IP address already exists.

Response

Specify a valid IP address.

22676

22676: Enter IP address.

Explanation

The IP address is not set to the device unit.

Response

Specify an IP address.

22677

22677: IP address of the storage was changed.

Explanation

The IP address of the target device has been changed to another IP address.

Response

Turn back the IP address of the target device to a value at loading, then re-execute.

22678

22678: The another storage which has same IP address is registered.

Explanation

The target device is not registered. Another device that has the specified IP address is registered.

Response

Delete the registered information of another device, and register the target device in the same IP address again.

22679

22679: An invalid disk was specified for installation. Install same capacity and speed disk between slot0 and 1 in DE0x00.

Explanation

The same capacity and speed disk must be installed between slot0 and 1 in DE0x00.

Response

The same capacity and number of rotations of a disk must be specified between slot0 and 1 in DE0x00.

22680

22680: Selected disk composition not recommended. It's also recommended to use disks of the same type. Continue anyway?

Explanation

The type of the selected disks is uneven. In this case, there is the case that cannot use performance of a disk effectively.

Response

Configure a RAIDGroup with disks having the same disk type. Note that this configuration is not always required. Refer to the "ETERNUS SF Storage Cruiser SA/SE Handbook" for details.

22681

22681: Cannot add disk because that would put the number of disks over the maximum required by RAID5+0.

Explanation

The RAID5+0 disk cannot be added because it would exceed the maximum number of disks comprising a RAID group.

Response

The disk cannot be added because of the maximum number of disks that can be configured. For details on the number of disks, refer to the SA/SE handbooks of each device.

22682

22682:Cannot delete disk because that would put the number of disks below the minimum required by RAID5+0.

Explanation

The RAID5+0 disk cannot be deleted because there would be less than the minimum number of disks comprising a RAID group.

Response

The disk cannot be deleted because of the minimum number of disks that can be configured. For details on the number of disks, refer to the SA/SE handbooks of each device.

22683

22683:The specified number of disks is not recommended. Recommended composition is 4. Continue anyway?

Explanation

The selected number of disks is not the recommended configuration. The recommended configuration is 4 disks.

Response

Select 4 disks and revise the RAID group configuration. Note that it is not absolutely essential to use this configuration.

22684

22684:The specified number of disks is not recommended. Recommended composition is 3. Continue anyway?

Explanation

The selected number of disks is not the recommended configuration. The recommended configuration is 3 disks.

Response

Select 3 disks and revise the RAID group configuration. Note that it is not absolutely essential to use this configuration.

22685

22685:Cannot change the composition of the RAID group to that is allocated Dedicated Hot Spare.

Explanation

The configuration of a RAID group that has a dedicated hot spare cannot be changed.

Response

Delete the dedicated hot spare and then change the RAID group configuration.

22686

22686:The cpacity of Dedicated Hot Spare is insufficient.

Explanation

The disk cannot be deleted because the dedicated hot spare has insufficient capacity.

Response

Revise the configuration so that the dedicated hot spare capacity is not less than the minimum capacity for the disks that comprise the RAID group.

22687

22687:The cpacity of the selected disk is insufficient for use as a Dedicated Hot Spare disk.

Explanation

The specified disk cannot be defined as a dedicated hot spare because it has insufficient capacity.

Response

Specify a disk with capacity greater than or equal to the minimum capacity for the disks that comprise the RAID group.

22688

22688:Dedicated Hot Spare cannot be created.

Explanation

A dedicated hot spare cannot be defined for a RAID group that cannot be edited.

Response

The RAID group configuration cannot be edited at the moment, because it is being read in from the real device.

For details refer to "11.1.2 Supported configurations".

22689

22689:Cannot delete one of the Dedicated Hot Spare.

Explanation

A dedicated hot spare defined in a RAID group that cannot be edited cannot be deleted.

Response

The RAID group configuration cannot be edited at the moment, because it is being read in from the real device.

For details refer to "11.1.2 Supported configurations".

11.3.2 Warning messages

42520

42520: Install disks in order from slot 0, starting with the lower number DEs (loop ID:0).

Explanation

When disks are mounted on the ETERNUS3000, check whether disks are mounted in ascending order of DE numbers in each loop and also in ascending order of slot numbers beginning from 0 in each DE. A disk that fails to satisfy these conditions exists in Loop ID 0.

Response

Mount disks in ascending order of DE numbers in each loop and also in ascending order of slot numbers beginning from 0 in each DE.

42521

42521: Install disks in order from slot 0, starting with the lower number DEs (loop ID:1).

Explanation

When disks are mounted on the ETERNUS3000, check whether disks are mounted in ascending order of DE numbers in each loop and also in ascending order of slot numbers beginning from 0 in each DE. A disk that fails to satisfy these conditions exists in Loop ID 1.

Response

Mount disks in ascending order of DE numbers in each loop and also in ascending order of slot numbers beginning from 0 in each DE.

42530

42530: Install the disks starting with the first one.

Explanation

Disks are not sequentially mounted (with some slots skipped) from the beginning in each DE. (ETERNUS6000)

Response

Mount disks sequentially without skipping a slot from the beginning of each DE. For details of the disk mounting method, refer to the SA/ SE handbook.

42532

42532: The loop ID:0 DEs were not installed in sequence.

Explanation

DEs are not continuously mounted in Loop ID 0. (ETERNUS3000)

Response

Mount DEs in ascending order of DE numbers in Loop ID 0 without skipping.

42533

42533: The loop ID:1 DEs were not installed in sequence.

Explanation

DEs are not continuously mounted in Loop ID 1. (ETERNUS3000)

Response

Mount DEs in ascending order of DE numbers in Loop ID 1 without skipping.

42534

42534: The DEs were not installed in sequence.

Explanation

DEs are not continuously mounted. (ETERNUS6000)

Response

Mount DEs in ascending order of DE numbers.

42535

42535: One loop does not contain a hot spare disk.

Explanation

Although a hot spare disk must be mounted in each loop, a hot spare disk is missing in a certain loop.

Response

Mount a hot spare disk in each loop.

42536

42536: Install 12 or more disks that are not nearline FC disks.

Explanation

The number of disks installed in the unit is less than the required number. It is necessary to install required number of disks or more.

Response

When nearline FC disks are mounted, it is necessary that at least 12 nearline disks (except the system disk) be mounted. For real devices, read the devices after correcting the configuration of the real devices. For details, see the SA/SE handbook.

42537

42537: Install 24 or more disks that are not nearline FC disks.

Explanation

The number of disks installed in the unit is less than the required number. It is necessary to install the required number of disks or more.

Response

When nearline FC disks are mounted, it is necessary that at least 24 nearline disks (except the system disk) be mounted. For real devices, read the devices after correcting the configuration of the real devices. For details, see the SA/SE handbook.

42538

42538: The hot spare of the SAS disk is not found.

Explanation

The maximum capacity of the SAS hot spare disk has not been defined.

Response

Define the maximum disk capacity for the SAS hot spare disk.

42539

42539: The hot spare of the nearline SATA disk is not found.

Explanation

The maximum capacity of the nearline SATA hot spare disk has not been defined.

Response

Define the maximum capacity for the nearline SATA hot spare disk.

42540

42540: One loop does not contain the hot spare of the fibre channel disk.

Explanation

A RAID group loop has been created without a fibre channel hot spare disk.

Response

Define a fibre channel hot spare disk (include a maximum capacity) in the RAID Group loop.

42541

42541: One loop does not contain the hot spare of the nearline FC disk.

Explanation

A nearline FC disk RAID group has been created without a fibre channel hot spare disk.

Response

.Define a fibre channel hot spare disk (include a maximum capacity) in the nearline FC disk RAID group.

42542

42542: One loop does not contain the hot spare of the nearline SATA disk.

Explanation

A nearline SATA disk RAID group has been created without a nearline SATA hot spare disk.

Response

Define a nearline SATA hot spare disk (include a maximum capacity) in the nearline SATA disk RAID group.

42543

42543: There was a composition not reflected in the device

Explanation

The configuration data on the design window may be inconsistent with the actual device configuration. The following unsupported configuration is not reflected.

- ・ RAID0, and related configuration of it
- ・ Snap Data Volume
- ・ SDPV
- ・ MVV
- ・ Logical volume of MVV concatenation
- ・ Mainframe volume
- ・ Logical volume of LUN concatenation
- ・ LUN Mapping, and related mapping of it
- ・ Concatenated AffinityGroup, and related mapping of it

Response

Reload the actual device configuration.

42544

42544: The hot spare of the nearline SAS disk is not found.

Explanation

The maximum capacity of the nearline SAS hot spare disk has not been defined.

Response

Define the maximum disk capacity for the nearline SAS hot spare disk.

42545

42545:One loop does not contain the hot spare of the SSD.

Explanation

An SSD RAID group has been created, but one loop does not have an SSD hot spare defined.

Response

Define a disk as a maximum capacity SSD hot spare in each of the loops created by the SSD RAID group.

11.3.3 Error messages

62000

62000: Unexpected Error occurred. msg

Explanation

An unexpected exception occurred.

Response

Collect this message and other information, and contact your Fujitsu certified service engineer to investigate the issues.

62001

62001: Internal Program Error occurred.

Explanation

An internal error occurred.

Response

Collect this message and other information, and contact your Fujitsu certified service engineer to investigate the issues.

62002

62002: Network Error occurred. (node)

Explanation

An error occurred during communication between Manager and the operation target device node ("node" may not be displayed).

Response

Check the network environment for problems.

62056

62056: Timeout error occurred in LogicalVolume format operation.

Explanation

Format processing was instructed to the device but start processing was not completed within the monitoring time.

Response

Check the formatting condition of the relevant volume. If the formatting has not begun, execute formatting again.

62057

62057: LogicalVolume format operation failed

Explanation

Format processing that was instructed to the device terminated abnormally.

Response

Check the formatting condition of the relevant volume. If the formatting has not begun, execute formatting again.

62101

62101: The device (name) does not supported by the Storage Volume Configuration Navigator

Explanation

A device that was not supported by Storage Volume Configuration Navigator was specified for operation.

Response

Start operation by specifying a device supported by Storage Volume Configuration Navigator.

62102

62102: Failed to create the work directory(dir) for the Storage Volume Configuration Navigator.

Explanation

Processing was interrupted because a work directory could not be created.

Response

Check whether an error such as a space shortage occurred in the system volumes on the operation management server.

62103

62103: Failed to create the work file(file) for the Storage Volume Configuration Navigator.

Explanation

Processing was interrupted because a work file could not be created.

Response

Check whether an error such as a space shortage occurred in the system volumes on the operation management server.

62104

62104: Failed to read the work file(file) for the Storage Volume Configuration Navigator.

Explanation

Processing was interrupted because the work file could not be read.

Response

Check whether an error occurred in the system volumes on the operation management server.

62105

62105: Unrecovered error occurred. msg

Explanation

Processing was interrupted because an unrecoverable error occurred.

Response

Collect the message and other information for an investigation, and contact your Fujitsu certified service engineer.

62121

62121: CMnum not found in the configuration of the storage

Explanation

Regarding the CM module of the target storage device, the actual device configuration does not agree with the defined configuration data. The configuration data before configuration editing was probably inconsistent with the actual device configuration.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62122

62122: CAnum1:Portnum2 not found in the configuration of the storage

Explanation

Regarding the CM module of the target storage device, the actual device configuration does not agree with the defined configuration data. The configuration data before configuration editing was probably inconsistent with the actual device configuration.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62123

62123: The type of CAnum of the storage is type.

Explanation

Regarding the CM module type of the target storage device, the actual device configuration does not agree with the defined configuration data. The configuration data before configuration editing was probably inconsistent with the actual device configuration.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62124

62124: DEnum1:Disknum2 not found in the configuration of the storage

Explanation

Regarding the disks of the target storage device, the actual device configuration does not agree with the defined configuration data. The configuration data before configuration editing was probably inconsistent with the actual device configuration.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62125

62125: The capacity of DEnum1:Disknum2 of the storage is num3GB.

Explanation

Regarding the disk capacity of the target storage device, the actual device configuration does not agree with the defined configuration data. The configuration data before configuration editing was probably inconsistent with the actual device configuration.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62126

62126: The disk type of DEnum1:Disknum2 of the storage is different.

Explanation

The actual disk type of the storage target disk does not match the type defined in configuration settings.

Response

The edited configuration settings data cannot be used because it conflicts with the configuration of the actual device. Save the previous configuration data and edit the configuration again.

62130

62130: The configuration data is inconsistent.

Explanation

Processing was interrupted because an inconsistency was detected in the defined configuration data.

Response

Collect the message and other information for an investigation, and contact your Fujitsu certified service engineer.

62131

62131: RAIDGroupnum2 assigned to LogicalVolumenum1 does not exist.

Explanation

Regarding the RAID group of the target storage device, the actual device configuration does not agree with the defined configuration data. The RAID group configuration of the device was probably changed after the actual device configuration data was saved.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62132

62132: The Hot Spare Disk (DEnum1:Disknum2) is assigned to RAIDGroupnum3.

Explanation

Regarding the disk settings of the target storage device, the actual device configuration does not agree with the defined configuration data. The disk settings of the device were probably changed after the actual device configuration data was saved.

Response

The defined configuration data that was edited cannot be used because it is inconsistent with the actual device configuration. Save the latest configuration data and edit it again.

62133

62133: Dynamic reconfiguration function was not started.

Explanation

Dynamic reconfiguration processing was instructed to the storage device but start processing was not completed within the monitoring time.

Response

Collect the message and other information, and contact your Fujitsu certified service engineer to investigate the issues.

62134

62134: Dynamic reconfiguration change does not become effective.

Explanation

Dynamic reconfiguration processing that was instructed to the storage device was interrupted because an error response was made.

Response

Collect the message and other information, and contact your Fujitsu certified service engineer to investigate the issues.

62135

62135: The function(%1) does not supported by the Storage Volume Configuration Navigator.

Explanation

The function (%1) is not supported by the Storage Volume Configuration Navigator.

%1 includes the following function.

- ・ "Joint AffinityGroup"

  Indicates concatenated affinity group functions.

- ・ "Thin Provisioning"

  Indicates Thin Provisioning functions.

Response

Respond in accordance with the function included in %1.

- ・ Joint AffinityGroup:

  The configuration at the Storage Volume Configuration Navigator is not changeable.
  Change the configuration with reference to the Storage device manual.

- ・ Thin Provisioning:

  The configuration at the Storage Volume Configuration Navigator is not changeable.
  Change the configuration with reference to the Storage device manual.

62137

62137: The devices, RAID cannot be putting set for the ECO Mode.

Explanation

Since the device or RAID was in Ecomode, processing was aborted.

Response

After cancelling Ecomode of the device or RAID, resume the operation.

62138

62138: Because the setting of Storage Migration exists, it is not possible to set it.

Explanation

The device setting can not be done, because the port of FC-Initiator exists.

Response

Change the port besides FC-Initiator, and then do the device setting again.

62145

62145: The main frame volume already exists in the storage.

Explanation

A new configuration cannot be set up because a mainframe volume exists in the storage device.

Response

Storage Volume Configuration Navigator does not permit a mainframe volume configuration already existing at the time of the new configuration setup to be deleted. Delete the mainframe volume while referring to the storage device manual, and re-execute this operation.

62146

62146: The main frame volume (LogicalVolumenum)exists in the RAIDGroup.

Explanation

Reconfiguration was attempted for the RAID group containing the mainframe volume.

Response

Storage Volume Configuration Navigator does not permit the mainframe volume to be reconfigured. Reconfigure it while referring to the storage device manual.

62147

62147: LogicalVolume exists in storage.

Explanation

A new configuration cannot be set up because a LogicalVolume exists in the target device.

Response

Storage Volume Configuration Navigator does not permit a LogicalVolume configuration already existing at the time of the new configuration setup to be deleted. Delete the LogicalVolume while referring to the storage device manual, and re-execute the operation.

62150

62150: Specified RAIDGroup cannot be registered.

Explanation

A RAID group could not be created because of a disk status error.

Response

Check the storage device for disk status errors. If an error is found, maintain the relevant disk drive and then re-execute the operation.

62151

62151: Specified LogicalVolume cannot be registered.

Explanation

A LogicalVolume could not be created because of a RAID group status error.

Response

Check the storage device for RAID group status errors. If an error is found, maintain the relevant RAID group and then re-execute the operation.

62152

62152: Specified HotSpare cannot be registered.

Explanation

HotSpare could not be created because of a disk status error.

Response

Check the storage device for disk status errors. If an error is found, maintain the relevant disk drive and then re-execute the operation.

62153

62153: Specified RAIDGroup cannot be deleted.

Explanation

The RAID group could not be deleted because of a RAID group status error.

Response

Check the storage device for RAID group status errors. If an error is found, maintain the relevant RAID group and then re-execute the operation.

62154

62154: Specified LogicalVolume cannot be deleted.

Explanation

A LogicalVolume could not be deleted because of a RAID group or LogicalVolume status error.

Response

Check the storage device for RAID group or LogicalVolume status errors. If an error is found, maintain the relevant RAID group or LogicalVolume and then re-execute the operation.

62155

62155: Specified HotSpare cannot be deleted.

Explanation

HotSpare could not be deleted because of a disk status error.

Response

Check the storage device for disk status errors. If an error is found, maintain the relevant disk drive and then re-execute the operation.

62521

62521: Install the two data disks in the first slots of the DE.

Explanation

A DE consists of fewer than two disks. Two or more disks must be mounted on each DE.

Response

Perform disk operation to mount data disks in the first two slots of each DE. System disks are not included.

For a real device, modify the real device configuration and then execute device loading.

62522

62522: The number of DEs is different in loop ID:0 and loop ID:1.

Explanation

The same number of DEs should be mounted in each loop but is not. (ETERNUS3000)

Response

Mount the same number of DEs in each loop.

62523

62523: Install disk between slot 0 and 3 in DE0x00.

Explanation

Disks should be mounted as backup disks in slots 0 to 3 of the DE0x00 but are not.

Response

Mount disks in DE0x00 slots 0 to 3.

62524

62524: Device matching failed.

Explanation

An error occurred in the operation management server during device matching.

Response

Make sure that the operation management server operates normally.

62525

62525: Device setup not complete on one device.

Explanation

The relevant device cannot be set up because an error occurred before setup.

Response

Remove the error cause and retry the operation.

62526

62526: Internal program error.

Explanation

An internal inconsistency occurred in the Storage Volume Configuration Navigator.

Response

Write down this message and contact your Fujitsu engineer.

62527

62527: Could not read definition file.

Explanation

The configuration definition file could not be loaded.

Response

Write down this message and contact your Fujitsu engineer.

62528

62528: Error in definition file.

Explanation

The configuration definition file may have been destroyed.

Response

Write down this message and contact your Fujitsu engineer.

62529

62529: DE is not installed in sequence.

Explanation

DEs are not mounted in ascending serial order of the DE numbers (ETERNUS4000, ETERNUS8000 and ETERNUS2000,ETERNUS DX60, DX80).

Response

Mount DEs in ascending serial order of the DE numbers.

62530

62530: One of the hot spare disks is not working.

Explanation

A hot spare disk was defined but did not function as a hot spare disk because its capacity was too small.

Response

Define the disk with the largest capacity in the loop as a hot spare disk.

62531

62531: There are insufficient disks. There must be at least 4.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount four or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62532

62532: There are insufficient disks. There must be at least 5.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount five or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62533

62533: There are insufficient disks. There must be at least 8.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount eight or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62535

62535: There are insufficient disks. There must be at least 20.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 20 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62536

62536: There are insufficient disks. There must be at least 16.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 16 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62537

62537: There are insufficient disks. There must be at least 32.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 32 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62538

62538: There are insufficient disks. There must be at least 128.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 128 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62539

62539: Exception occurred.

Explanation

An unexpected exception occurred.

Response

Troubleshoot by referring to the following section in the manual below to collect necessary data, and then call your Fujitsu systems engineer (SE).
"ETERNUS SF Storage Cruiser User Guide" 9.1.1.1 How to collect data for trouble investigation

62540

62540: IOException occurred.

Explanation

An I/O exception occurred. Any attempt to open a file will fail when the file is being opened. Any attempt to save a file will fail when the file is being saved.

Response

Check the target directory authority of the file.

62541

62541: There are insufficient disks. There must be at least 176.

Explanation

The required number of disks mounted on the device is not met. More than the required number of disks is required.

Response

Mount 176 or more disks. In case of a real device, correct the configuration of the real device before device read.

62542

62542: There are insufficient disks. There must be at least 184.

Explanation

The required number of disks mounted on the device is not met. More than the required number of disks is required.

Response

Mount 184 or more disks. In case of a real device, correct the configuration of the real device before device read.

62543

62543: There are insufficient disks. There must be at least 192.

Explanation

The required number of disks mounted on the device is not met. More than the required number of disks is required.

Response

Mount 192 or more disks. In case of a real device, correct the configuration of the real device before device read.

62544

62544: Hot spare disk with insufficient capacity found in SAS disk.

Explanation

The capacity of the hot spare in the defined SAS disk is insufficient so that the disk does not work as the hot spare.

Response

Define the correct maximum capacity for the SAS hot spare disk.

62545

62545: Hot spare disk with insufficient capacity found in nearline SATA disk.

Explanation

The capacity of the hot spare in the defined nearline SATA disk is insufficient so that the disk does not work as the hot spare.

Response

Define the correct maximum capacity for the nearline SATA hot spare disk.

62546

62546: There are insufficient disks. There must be at least 6.

Explanation

The minimum number of disks (6) has not been mounted.

Response

Mount at lest 6 disks. Check the configuration of the actual device and then reload the device.

62547

62547: One loop that has hot spare disk with insufficient capacity found in fibre channel disk.

Explanation

The capacity of the fibre channel hot spare disk is smaller than the capacity defined in the RAID Group on the same loop.

Response

Define the correct maximum capacity for the fibre channel hot spare disk.

62548

62548: One loop that has hot spare disk with insufficient capacity found in nearline FC disk.

Explanation

The capacity of the nearline FC hot spare disk is smaller than the capacity defined in the RAID Group on the same loop.

Response

Define the correct maximum capacity for the nearline FC hot spare disk.

62549

62549: One loop that has hot spare disk with insufficient capacity found in nearline SATA disk.

Explanation

The capacity of the nearline SATA hot spare disk is smaller than the capacity defined in the RAID Group on the same loop.

Response

Define the correct maximum capacity for the nearline SATA hot spare disk.

62550

62550: There are insufficient disks. There must be at least 136.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 136 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62551

62551: There are insufficient disks. There must be at least 144.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 144 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62552

62552: There are insufficient disks. Check necessary number of Disk.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount the number of requirement or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62553

62553: There are insufficient disks. There must be at least 2.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount two or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62554

62554: Hot spare disk with insufficient capacity found in nearline SAS disk.

Explanation

The capacity of the hot spare in the defined nearline SAS disk is insufficient so that the disk does not work as the hot spare.

Response

Define the correct maximum capacity for the nearline SAS hot spare disk.

62556

62556: There are insufficient disks. There must be at least 28.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 28 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62557

62557: There are insufficient disks. There must be at least 64.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 64 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62558

62558: There are insufficient disks. There must be at least 72.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 72 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62559

62559: There are insufficient disks. There must be at least 80.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 80 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62560

62560: There are insufficient disks. There must be at least 88.

Explanation

The number of disks mounted on the device does not satisfy the requirements. More disks must be mounted.

Response

Mount 88 or more disks. For a real device, correct the configuration of the real device and then perform device loading.

62561

62561:One loop that has hot spare disk with insufficient capacity found in SSD.

Explanation

The capacity of the defined SSD hot spare is smaller than the disk capacity for disks comprising the RAID group of the same loop.

Response

Define an SSD as a maximum capacity hot spare within the loop.

Chapter 12 Command References

This chapter explains how to use commands.

12.1 [Solaris OS Version] Administrative Server Commands

This section explains command operations on the Solaris OS Administrative server.

12.1.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.1.1.1 Administrator login account creation command (scsetup)

NAME

scsetup - creates administrative login account

SYNOPSIS

/opt/FJSVssmgr/bin/scsetup

DESCRIPTION

This command sets administrative login account and performs creation of a CLI encryption key.
Only OS administrator (root) user can execute this command. This command only can execute when admin server stop. Refer to "12.1.2.2 Starting and stopping the daemons of the administrative server at specific times" for the detail information.

OPTIONS

None.

USAGE

This command set the parameter by the following interface.

```
Input a new CLI crypt key [length:4-56]: any key

Are you sure? [y,n,q?] y

Input a new user name [length:1-16]: username

Input a new password [length:1-16]: password

Retype a new password [length:1-16]: password

Are you sure? [y,n,q?] y
```

CLI encryption key

Please enter the CLI encryption key to be used (between 4 and 56 characters). Double-byte characters, single-byte alphanumerical characters, symbols, and strings composed entirely of single or double-byte characters can be used. Notice that CLI encryption is required for ETERNUS SF Storage Cruiser internal use only, and users don't have to remember the key.

Username

Enter the user name of the login account for administrators (between 1 and 16 characters). The name must start with an alphabetic character, and alphanumerical characters (including underscores, "_", periods, ""., and hyphens, "-") can be used.

Password

Enter the password of the login account for administrators (between 1 and 16 characters). The password is a string of alphanumerical characters and symbols, but can not start with "{".

Password confirmation

For password confirmation, enter the password of the administrator again.

EXAMPLES

```
# /opt/FJSVssmgr/bin/scsetup
```

12.1.1.2   SNMP Trap transmission place IP address change command (sanadmsh chtraprcvip)

NAME

sanadmsh chtraprcvip - changes SNMP Trap transmission place IP address

SYNOPSIS

```
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip -h
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip -all -oldip xxx.xxx.xxx.xxx [-newip yyy.yyy.yyy.yyy]
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip DeviceID -oldip xxx.xxx.xxx.xxx [-newip yyy.yyy.yyy.yyy]
```

DESCRIPTION

After the IP address of the administrative server is changed, delete the old IP address of the administrative server that is the SNMP Trap transmission place from the devices registered with this software, and add the new IP address. Only OS administrator (root) user can execute this command.

Although the SNMP Trap transmission place setting for a device may be changed with the Management Software on the device, this software provides this command to facilitate changing of the transmission place.

OPTIONS

-h

Displays help about the argument format of this command.

-all

Applies SNMP Trap transmission place setting to all devices managed by this software. Executing the command specified with this argument outputs device names and execution results in execution order to the standard output. If the administrative server has more than one IP address, for example, if the management server is connected to multiple subnets, a device may not be set with the correct SNMP Trap transmission place. After this setting is performed, check whether the correct administrative server address is set as the SNMP Trap transmission place setting on the device side.

DeviceID

Applies SNMP Trap transmission place setting to the limited devices. Specify the device type according to the following tables. Afterwards, specify how to recognize the device.

Device type	Device recognition method (one of which must be specified)
-host -storage -library -switch -hub -bridge	ip:xxx.xxx.xxx.xxx sysname:SysName name of a device SNMP setting nickname:Device management name that is set for this software.

-oldip *xxx.xxx.xxx.xxx*

Specify the old IP address of the administrative server. Delete this IP address from the SNMP transmission place address of managed devices.

-newip *yyy.yyy.yyy.yyy*

Specify the new IP address of the new administrative server. Add this IP address to the SNMP transmission place address. If this argument is omitted, the IP address of the new administrative server is automatically specified. It is recommended to enter the argument considering the administrative server that has multiple IP afddresses.

USAGE

Execute the command after changing the IP address of Manager. The command may be executed for all devices managed by this software by the one command or for a specific device.

Devices that can be targets of the command are devices for which SNMP Trap transmission place settings can be defined automatically from this software.

The monitoring status of every target device must be normal.

EXAMPLES

- Execute the SNMP Trap transmission place change on all managed devices that can automatically execute SNMP Trap transmission place setting.

      # /opt/FJSVssmgr/bin/sanadmsh chtraprcvip -all -oldip 10.10.10.10 -newip 20.20.20.20

- Execute the SNMP Trap transmission place change on server nodes that sysname is defined in host1.

      # /opt/FJSVssmgr/bin/sanadmsh chtraprcvip -host sysname:host1 -oldip 10.10.10.10 -newip 20.20.20.20

12.1.1.3 SN200 (Brocade), BX600 Fibre Channel switch blades SNMP Trap test (swtraptest)

NAME

swtraptest - tests of SNMP Trap

SYNOPSIS

    /opt/FJSVssmgr/bin/swtraptest *fibre-channel-switch-ip-address*

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell.

A simulated Fibre Channel switch SNMP Trap (FC Port fault) is created and issued to the administrative server.

For *fibre-channel-switch-ip-address*, specify the IP address of the Fibre Channel switch which is to check the SNMP trap setting by this command.

The Fibre Channel switch must be a device managed by this software.

OPTIONS

None.

EXAMPLES

· Executing this command for a Fibre Channel switch whose IP address is 11.11.11.11

```
# /opt/FJSVssmgr/bin/swtraptest 11.11.11.11
```

NOTES

Even the input IP address is not for a FC device, this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.1.1.4 ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80 and GR SNMP Trap test (grtraptest)

NAME

grtraptest - tests of SNMP Trap

SYNOPSIS

```
/opt/FJSVssmgr/bin/grtraptest storage-ip-address
```

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell.

The administrative server internally generates pseudo SNMP traps (FAN fault) of the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80 and GR device, and issues them to the administrative server itself.

For *storage-ip-address*, specify the IP address of the storage which is to check the SNMP trap setting by this command.

The storage device must be a device managed by this software.

OPTIONS

None.

- Executing the command for a storage device whose IP address is 12.12.12.12

```
# /opt/FJSVssmgr/bin/grtraptest 12.12.12.12
```

NOTES

Even the input IP address is other than ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, ETERNUS DX60/DX80, GR series, this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.1.1.5   Host affinity and zoning operation command (storageadm zone)

NAME

storageadm zone - operates the host affinity and Fibre Channel switch zoning

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm zone add -storage cawwpn,affinitygroup -hba hbawwpn
/opt/FJSVssmgr/sbin/storageadm zone delete -storage cawwpn,affinitygroup -hba hbawwpn
/opt/FJSVssmgr/sbin/storageadm zone info [-ipaddr ipaddr[,ipaddr,...]]
```

DESCRIPTION

This command is used to set/delete/display the storage device host affinity and Fibre Channel switch zoning. Only OS administrator (root) user can execute this command.

Specify the storage device CA WWPN, affinity group, and WWPN of the set HBA in the command parameter to set/delete the storage device host affinity and Fibre Channel switch zoning. The set host affinity and zoning is also displayed.

The target storage device and Fibre Channel switch must be devices managed by this software.

OPERANDS

add

This sets the host affinity and zoning.

delete

This deletes the host affinity and zoning.

info

This displays the host affinity and zoning.

-storage *cawwpn,affinitygroup*

Specify the storage device CA WWPN and affinity group for which the host affinity is set or deleted.

-hba *hbawwpn*

Specify the WWPN of the HBA set for host affinity and zoning.

-ipaddr *ipaddr[,ipaddr,...]*

Displays the host affinity information set in the specified IP address, Fibre Channel switch zoning information, or storage device CA.

To display more than one item of storage device information, specify the IP address using a comma (",").

If this omitted, all the storage device and Fibre Channel switch information registered in this software is displayed.

EXAMPLES

- Adding the host affinity and zoning

```
# /opt/FJSVssmgr/sbin/storageadm zone add -storage 1111111111111111,3 -hba 2222222222222222
```

- Deleting the host affinity and zoning

```
# /opt/FJSVssmgr/sbin/storageadm zone delete -storage 1111111111111111,3 -hba 2222222222222222
```

- Displaying the host affinity and zoning

```
# /opt/FJSVssmgr/sbin/storageadm zone info
<<< FC Switch Zone Information >>>
DEVICE_NAME(IP_ADDRESS)        ZONE_NAME       ZONE_WWPN
------------------------------ --------------- --------------------------------
Switch1(10.10.10.10)           SNM_0001        1111111111111111;2222222222222222
                               SNM_0002        3333333333333333;4444444444444444
--------------------------------------------------------------------------------


<<< FC CA Zone Information >>>
DEVICE_NAME(IP_ADDRESS)        CA_WWPN          AFFINITY_GROUP  HBA_WWPN
------------------------------ --------------- --------------- ----------------
E4000M300(10.10.10.11)         1111111111111111 3               2222222222222222
--------------------------------------------------------------------------------
```

NOTES

- The storage device and Fibre Channel switch for which set/delete/display is performed must have been registered in this software. This command cannot be used to register Fibre Channel switches if zoning has not been set. Create a temporary zone and then register the Fibre Channel switch in this software. For details on creating a temporary zone, refer to "4.2.1.1 Setting".

- Please execute this command after confirming the state of the server is below. (When the server where HBA specified for "-hba" option is installed is registered in this software.)

  - The server had to have started when "Add" option was specified.

  - The server had to have stopped when "Delete" option was specified.

- Fibre Channel switch zoning is set for the Fibre Channel switch connected to the specified storage device CA.

- The Fibre Channel switch and storage device must be connected using a Fibre Channel cable. If the Fibre Channel cable is not connected, Fibre Channel switch zoning is not set. Connect the Fibre Channel cable, and then re-execute the command.

- Zone settings (creation of the AffinityGroup) must be configured in the ETERNUS disk array device in advance, using Storage Volume Configuration Navigator or ETERNUSmgr.

- Only the ETERNUS SN200 (except model 250M) and Brocade (except AP7420) Fibre Channel switch and PRIMERGY BX600 switch blades are supported.
  For ETERNUS VS900 model 300, only "info" operand is supported. When ETERNUS VS900 model 300 is specified at the "info" operand, the WPN of the virtual initiator of ETERNUS VS900 model 300 is displayed on the HBA_WWPN line of <<< FC CA Zone Information >>>.

- The following conformation message is output when "delete" is specified. To continue, enter 'y'. To cancel, enter 'n'.

```
Are you sure? [y/n]:
```

12.1.1.6 Performance information operation command (storageadm perfdata)

NAME

storageadm perfdata - operates the performance information

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm perfdata export outdirname -ipaddr ipaddr [-date start_time[-
end_time]]
```

DESCRIPTION

This command outputs the performance information of the storage devices and Fibre Channel switches. Only OS administrator (root) user can execute this command.

By specifying the IP address of the device that outputs the performance information and the date in the command operand, the storage device and Fibre Channel switch performance information is output in CSV format.

The target storage device and Fibre Channel switch must be devices managed by this software when performance monitoring is either still running or already completed.

The supported devices are as follows.

・ ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000, ETERNUS DX60/DX80

・ The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

The details of CSV files are as follows.

The port information of Fibre Channel switch

Items	Explanation
File name	PORT.csv

Header line	・ Case of ETERNUS SN200 series
	  Date,PortX - Tx Throughput, PortX - Rx Throughput, PortX - CRC Error, ...
	
	・ Case of ETERNUS SN200 MDS series
	  Date,PortX - Tx Throughput, fcX/X - Rx Throughput, fcX/X - CRC Error, ...

Data line	*date,port0s,port0r,port0e, ... ,portNs,portNr,portNe* The following information is output for each field. (After *date*, the information is repeated for the actual number of ports.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *port0s* : Port0 Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *port0r* : Port0 Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *port0e* : Port0 Number of CRC errors at *date* (Decimal notation. The unit is Count.) *portNs* : PortN Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *portNr* : PortN Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *portNe* : PortN Number of CRC errors at *date* (Decimal notation. The unit is Count.)

The CM performance information of storage device

ETERNUS8000 models 700, 900, 1100 and 2100, ETERNUS4000 models 300 and 500, ETERNUS2000, ETERNUS DX60/DX80

Items	Explanation
File name	CM.csv
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX - Copy Remain, ...
Data line	*date,CM00u,CM00r, ... ,CMNNu,CMNNr* The following information is output for each field. (After *date*, the information is repeated for the actual number of CMs.)

Items	Explanation
	date : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *CM00u* : CM0x00:CPU0 (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CM00r* : CM0x00:CPU0 (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.) *CMNNu* : CM0xNN:CPUN (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CMNNr* : CM0xNN:CPUN (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

*1: The CPU number is not output when the storage device is ETERNUS2000.

ETERNUS8000 models 800, 1200 and 2200, ETERNUS4000 models 400 and 600

Items	Explanation
File name	CM/*nnnn*.csv (*nnnn* indicates the CM number by hexadecimal notation. CM numbers are assigned in ascending order, starting with 0000 for the lowest CM CPU number in the device. CM0x0 CPU0 is 0000, CM0x0 CPU1 is 0001, CM0x1 CPU0 is 0002, CM0x1 CPU1 is 0003, : CM0x7 CPU0 is 000E, CM0x7 CPU1 is 000F.)
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX(ROE) - CPU Use Rate, CM0xXX:CPUX - Copy Remain
Data line	*date,cpu,roe,remain* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *cpu* : CM0xXX:CPUX CPU Load at *date* (Decimal notation. The unit is %.) *roe* : CM0xXX:CPUX ROE Load at *date* (Decimal notation. The unit is %.) *remain* : CM0xXX:CPUX CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

The LogicalVolume performance information of storage device

Items	Explanation
File name	LogicalVolume/*nnnn*.csv (*nnnn* indicates the LogicalVolume number by hexadecimal notation.)
Header line	Date, LogicalVolume0xXXXX - Read IOPS, LogicalVolume0xXXXX - Write IOPS, LogicalVolume0xXXXX - Read Throughput, LogicalVolume0xXXXX - Write Throughput, LogicalVolume0xXXXX - Read Response Time, LogicalVolume0xXXXX - Write Response Time, LogicalVolume0xXXXX - Read Cache Hit Rate, LogicalVolume0xXXXX - Write Cache Hit Rate, LogicalVolume0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The RAIDGroup performance information of storage device

Items	Explanation
File name	RAIDGroup/*nnnn*.csv (*nnnn* indicates the RAIDGroup number by hexadecimal notation.)
Header line	Date, RAIDGroup0x0xXXXX - Read IOPS, RAIDGroup0x0xXXXX - Write IOPS, RAIDGroup0x0xXXXX - Read Throughput, RAIDGroup0x0xXXXX- Write Throughput, RAIDGroup0x0xXXXX - Read Response Time, RAIDGroup0x0xXXXX - Write Response Time, RAIDGroup0x0xXXXX - Read Cache Hit Rate, RAIDGroup0x0xXXXX - Write Cache Hit Rate, RAIDGroup0x0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The Disk performance information of storage device

Items	Explanation
File name	Disk/*nnnn*.csv (*nnnn* indicates the DE number by hexadecimal notation.)
Header line	Date, DE0xXX:SlotX - busy time, ...
Data line	*date,Disk0, ... ,DiskN* The following information is output for each field. (After *date*, the information is repeated for the actual number of Disks.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *Disk0* : Disk0 Disk busy rate at *date* (Decimal notation. The unit is %.) *DiskN* : DiskN Disk busy rate at *date* (Decimal notation. The unit is %.)

The CA/CM Port performance information of storage device

Items	Explanation
File name	Port/*nnnn*.csv (*nnnn* indicates the CA/CM Port number by hexadecimal notation. CA/CM port numbers are assigned in ascending order, starting with 0000 for the lowest CA/CM port number in the device. CM0x0 CA0x0 Port0 is 0000, CM0x0 CA0x0 Port1 is 0001, : CM0x7 CA0x3 Port2 is 007E, CM0x7 CA0x3 Port3 is 007F.)

Header line	・ Case of CA Port
	
	  Date, CM0xX:CA0xX:PortX - Read IOPS, CM0xX:CA0xX:PortX - Write IOPS, CM0xX:CA0xX:PortX - Read Throughput, CM0xX:CA0xX:PortX - Write Throughput
	
	・ Case of CM Port
	
	  Date, CM0xX:PortX - Read IOPS, CM0xX:PortX - Write IOPS, CM0xX:PortX - Read Throughput, CM0xX:PortX - Write Throughput

Items	Explanation
Data line	*date,read,write,through-r,through-w* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.)

The number of active disks performance information of storage device

Items	Explanation
File name	ACTIVE_DISK.csv
Header line	Date, Total Disks, Active Disks
Data line	*date,total,active* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *total* : Overall number of loaded disk devices at *date* (Decimal notation. The unit is Disk.) *active* : Overall number of active disk devices at *date* (Decimal notation. The unit is Disk.)

Power consumption performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_POWER_CONSUMPTION.csv
Header line	Date, System Power Consumption
Data line	*date*, *power* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *power:* Power used by the device as a whole at *date* (Decimal notation. The unit is W.)

Temperature performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_TEMPERATURE.csv
Header line	Date, System Temperature
Data line	*date*, *temperature* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *temperature:* Air intake temperature at device at *date* (Decimal notation. The unit is degrees Centigrade.)

OPERANDS

export

Outputs performance information for the specified date in CSV format.

outdirname

Specify the directory that outputs performance information.
Performance information is output to the *outdirname* directory based on the following configuration.

```
outdirname
  ├─ Start_time – Stop_time      Example: 200706010000-200706020000
  │    ├─ Device A               (Storage device)
  │    │    ├─ Disk ─────────── 0000.csv
  │    │    │                       :
  │    │    ├─ LogicalVolume ── 0000.csv
  │    │    │                       :
  │    │    ├─ Port ─────────── 0000.csv
  │    │    │                       :
  │    │    ├─ RAIDGroup ────── 0000.csv
  │    │    │                       :
  │    │    ├─ ACTIVE_DISK.csv
  │    │    ├─ SYSTEM_POWER_CONSUMPTION.csv
  │    │    ├─ SYSTEM_TEMPERATURE.csv
  │    │    └─ CM.csv
  │    └─ Device B              (Fibre Channel switch)
  │         └─ PORT.csv
```

☐ indicates a directory.

OPTIONS

-ipaddr *ipaddr*

Specify the IP address of the device that outputs performance information.

The output target device must satisfy the following conditions:

- Storage devices, Fibre Channel switches and Fibre Channel switch blades that output performance information must be registered in this software, and the device must be one of the following performance monitoring targets:

  - ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 and ETERNUS DX60/DX80

  - The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

For the settings of performance monitoring, refer to "7.2.2 Instruction for performance management".

-date *start_time*[-*end_time*]

Specify the start and end times for the output of performance information in YYYYMMDDhhmm format. The start and end times must be concatenated using a hyphen ("-"), as follows:

```
YYYYMMDDhhmm-YYYYMMDDhhmm
```

If the hyphen ("-") and end time are omitted, the command execution time will be the end time.

If this option is omitted, a time 30 minutes before the command execution time will be the start time, and the command execution time will be the end time.

- Output of performance information from 00:00 on 01/01/2008 to 23:59 on 01/01/2008 for a device with IP address 10.101.12.13 to the /tmp/work directory:

```
# /opt/FJSVssmgr/sbin/storageadm perfdata export /tmp/work -ipaddr 10.101.12.13 -date
200801010000-200801012359
```

- Output of performance information from 00:00 on 01/01/2008 to now for a device with IP address 10.101.12.13 to the /tmp/work directory:

```
# /opt/FJSVssmgr/sbin/storageadm perfdata export /tmp/work -ipaddr 10.101.12.13 -date 200801010000
```

NOTES

- The full path of an existing directory must be specified in *outdirname*.

- The time that is specified for the -date option start time must be earlier than the end time. Additionally, the time that is specified for the start and end times must be later than 00:00 on 01/08/2001, and earlier than the command execution time.

12.1.1.7　Disk control command (storageadm spindle)

NAME

storageadm spindle - controls disks

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]]
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]] [-s] [-f]
/opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr ipaddr [{-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server}]
```

DESCRIPTION

Starts or stops the storage device RAID disk rotation. Only OS administrator (root) user can execute this command.

If a storage device was specified when the status was displayed, the rotation status of the disk that was used to configure RAID is displayed.
If a server was specified, the storage device RAIDGroup number and volume number used by the server are displayed.

By specifying the storage device IP address and RAIDGroup number in the command operand, the rotation of the disk that was used to configure the storage device RAID is started or stopped.

By specifying the server IP address, the rotation of the storage device disk used by the server is started or stopped.

The target storage device and server must be devices managed by this software.

OPERANDS

start

Starts the disk that is used to configure the storage device RAIDGroup.

stop

Stops the disk that is used to configure the storage device RAIDGroup.

info

Displays the storage device RAIDGroup Eco-mode information, or the storage device information used by the server.

OPTIONS

Options that can be specified when the start operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the start target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to start rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

Options that can be specified when the stop operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the stop target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to stop rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

-s

Processing continues without the output of a confirmation message.

-f

Related RAIDGroup disks are forcibly stopped.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

    Specify the status display target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
    Specify this option when the storage device IP address has been specified in the -ipaddr option.

    If this option is omitted, the information for all the RAIDGroups in the specified storage device is displayed.

-server

    Specify this option when the server IP address is specified to display the storage device RAIDGroup Eco-mode information and volume number used by the server.
    Specify this option when the server IP address has been specified in the -ipaddr option.

EXAMPLES

・ Starting the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
# /opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr 10.10.10.10 -raid 0x0000,0x0001
```

・ Stopping the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
# /opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr 10.10.10.10 -raid 0x0001
```

・ Stopping the disk that is used by the server by specifying the server:

```
# /opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr 10.10.10.20 -server
```

・ Displaying the Eco-mode status of all storage device RAIDGroups:

```
# /opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr 10.10.10.10
<<< ECO Mode RAID Group Information >>>
RAIDGROUP_NUMBER(NAME)   MODE DISK_STATUS        CONTROL SCHEDULE
----------------------- ---- ------------------- ------- ---------------
0x0000(data1)            ON   Idle                OFF     External
0x0001(data2)            ON   in the boot process ON      01-NAME0001
0x0002                   OFF  Active              -
0x0003                   -    Active              -
-----------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
RAIDGROUP_NUMBER(NAME)	Displays the RAIDGroup number by the hexadecimal number of four digits. When the name is set on the RAIDGroup, its name is displayed by enclosing in ().
MODE	Displays the Eco-mode status that is set on the RAIDGroup. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAIDGroup. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAIDGroup. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
SCHEDULE	Displays the Eco-mode schedule set on RAIDGroup by the following format. The schedule name of External is displayed as "External".

Field title	Explanation
	number-name The "number" is displayed in decimal number, and "name" is displayed in eight characters or less.

· Displaying the storage device RAIDGroup number and volume number that are used by the server:

```
# /opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr 10.10.10.20 -server
<<< ECO Mode RAID GROUP information for Server >>>
IP_ADDRESS      RAID   MODE DISK_STATUS        CONTROL STOP
--------------- ------ ---- ------------------ ------- ----
10.10.10.10     0x0000 ON   Idle               OFF
                0x0001 ON   Active             ON      *
------------------------------------------------------------

<<< Disk use information on Server >>>
IP_ADDRESS      RAID   VOLUME
--------------- ------ ------------------------------------------------------------
10.10.10.10     0x0000 0x0000,0x0001,0x0002,0x0003,0x0004,0x0005,0x0006,0x0007,
                       0x0008,0x0009,0x000A,0x000B,0x000C,0x000D,0x000E,0x000F
                0x0001 0x0010,0x0011,0x0012,0x0013,0x0014,0x0015,0x0016,0x0017,
                       0x0018,0x0019,0x001A,0x001B,0x001C,0x001D,0x001E,0x001F
--------------------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
Fields of <<< ECO Mode RAID GROUP information for Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
MODE	Displays the Eco-mode status that is set on the RAIDGroup. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAIDGroup. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAIDGroup. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
STOP	Although the stopping the disks used from the specified server is directed, when any disks in this RAIDGroup are used from other server or this RAIDGroup cannot be stopped because of any following states, displays "*". · The RAIDGroup for which the system disk is included · The RAIDGroup for which it is set in the NAS area · The RAIDGroup for which the mainframe volumes, MVV volumes or MVV Concatenation volumes are registered
Fields of <<< Disk use information on Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.

Field title	Explanation
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
VOLUME	Displays the volume number by the hexadecimal number of four digits. The volumes used from the specified server are displayed.

NOTES

・ There are RAIDGroups that cannot do the Eco-mode operation. Refer to "Uncontrollable RAID groups" in the "1.3.4 Energy-saving operation for storage device".

・ The RAIDGroup Eco-mode must be ON to operate the RAIDGroup start/stop control. For details on the procedure for setting the RAIDGroup Eco-mode to ON, refer to "6.1.13 How to control the Eco-mode".

・ If disk rotation is started and stopped by specifying the server IP address, do not change the storage device connection.

・ For stopping the disk rotation by specifying the server IP address, if one or more share disks are contained on the stopped disks, the disk rotation cannot be stopped. Check the status of all servers that use their share disks, and judge whether share disks can be stopped or not. If share disks can be stopped, specify the -f option.

・ For stopping the disk rotation by specifying the server IP address, if the disks used from other server are included in the RAIDGroup that stop target disk exists, the disk rotation cannot be stopped. To stop the disk rotation, either specify server IP address for all servers that use the disk of its RAIDGroup, or specify the -f option. When you specify -f option, check the status of all related servers, and judge whether disks can be stopped or not. It is recommended that the server and the RAIDGroup be the compositions of couple 1.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including unused disks, the disk rotation cannot be stopped. Re-execute either specify the -f option or specify the RAIDGroup.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including the stop target disk is any of "Uncontrollable RAID groups", the disk rotation cannot be stopped.

・ If the volume that belongs to the specified stop target RAIDGroup is concatenated with a different RAIDGroup using the LUN concatenation functionality, the disk is not stopped even if the stop operand is specified. To stop all related RAIDGroup disks, either specify all of the related RAIDGroups, or specify the -f option. However, if the related RAIDGroup is any of "Uncontrollable RAID groups", the disk control cannot be executed.

・ The following confirmation message is output when the stop operand is specified. To continue, enter "y". To cancel, enter "n". This confirmation message is not output when the -s option is specified.

```
Are you sure? [y/n]:
```

・ The information of storage device that can control disks is displayed on the storage device information used by the server. The information of storage device that cannot control disks is not displayed. When both the disk controllable storage device and the disk uncontrollable storage device are connected with the server, the information of disk controllable storage device is only displayed.

・ The disk does not stop when the RAIDGroup status is as follows:

  - Part of the storage device controller module and the module for the disk drive access route contain a fault.

  - The disk drive that was used to configure the RAIDGroup is faulty.

  - There is AdvancedCopy copy data.

  - There is an EC/REC session (including when there is no copy data). The disk does, however, stop when the EC/REC status is Suspend.

  - There is a QuickOPC/SnapOPC session (including when there is no copy data).

12.1.1.8 Virtualization switch access path setting command (storageadm virtualzone)

NAME

storageadm virtualzone - Operates on the host affinities and zonings for virtualization switches

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm virtualzone add -storage cawwpn,affinitygroup -ipaddr ipaddr [-update
all] [-f [-s]]
/opt/FJSVssmgr/sbin/storageadm virtualzone add -hba hbawwpn -vt vtwwpn [-update all] [-f [-s]]
/opt/FJSVssmgr/sbin/storageadm virtualzone delete -storage cawwpn,affinitygroup -ipaddr ipaddr [-s] [-
update all]
/opt/FJSVssmgr/sbin/storageadm virtualzone delete -hba hbawwpn -vt vtwwpn [-s] [-update all]
```

DESCRIPTION

This command adds or deletes zonings for Fibre Channel switches and host affinities for storage devices associated with virtualization switches (virtual targets and virtual initiators).

- ・ Adds or deletes zonings between the HBA and a virtualization switch (virtual target)

- ・ Adds or deletes host affinities and zonings between the CA and a virtualization switch (virtual initiator)

Only OS administrator (root) user can execute this command.

The target storage devices and Fibre Channel switches must be devices managed by this software. The only Fibre Channel switch supported is ETERNUS VS900 model 300.

OPERANDS

add

Adds the host affinity and zoning.

delete

Deletes the host affinity and zoning.

OPTIONS

Options that can be specified when the add operand or delete operand is specified

-storage *cawwpn,affinitygroup*

Specify the channel adapter WWPN and the affinity group number of the storage device where the host affinity is to be set up.

Specify the channel adapter WWPN using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 11:11:11:11:11:11:11:11. Specify the affinity group number using either decimal notation or hexadecimal notation. For example, affinity group number 16 can be specified using decimal notation as "-storage 1111111111111111,16" or in hexadecimal notation as "-storage 1111111111111111,0x10".

-ipaddr *ipaddr*

Specify the IP address of the virtualization switch to which the virtual initiator (to be set in host affinities and zonings) belongs.

-hba *hbawwpn*

Specify the WWPN for the HBA to be set in zonings.

Specify the WWPN for the HBA using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

-vt *vtwwpn*

Specify the WWPN for the virtual target to be set in zonings.

Specify the WWPN for the virtual target using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

Options that can be specified when the add operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are added. The "storageadm zone info" command is better for updating information after multiple settings have been made.

-f

Specify this option to forcibly set up WWPN zoning on a Fibre Channel switch where zoning has not been set up.

When specifying this option, check the security settings for the Fibre Channel switch. Specify this option only when setting up WWPN zoning.

Note that specifying this option will have no effect in the following situation (the command will run in the same way as if the option were omitted):

- When zoning settings have already been made on the target Fibre Channel switch

-s

Processing continues without the output of a confirmation message.
Only when -f option is specified, this option can be specified.

Options that can be specified when the delete operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are deleted. The "storageadm zone info" command is better for updating information after multiple settings have been deleted.

-s

Processing continues without the output of a confirmation message.

EXAMPLES

- Adding zoning settings between the HBA and a virtualization switch (virtual target)

  # /opt/FJSVssmgr/sbin/storageadm virtualzone add -hba 1111111111111111 -vt 2222222222222222

- Deleting zoning settings between the HBA and a virtualization switch (virtual target)

  # /opt/FJSVssmgr/sbin/storageadm virtualzone delete -hba 1111111111111111 -vt 2222222222222222

- Adding zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter

  # /opt/FJSVssmgr/sbin/storageadm virtualzone add -storage 1111111111111111,3 -ipaddr 10.10.10.10

- Deleting zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter.

  # /opt/FJSVssmgr/sbin/storageadm virtualzone delete -storage 1111111111111111,3 -ipaddr 10.10.10.10

NOTES

· The storage devices and Fibre Channel switches where settings are to be added or deleted must be registered with this software.
This command cannot make settings for Fibre Channel switches where zoning settings have not been made. To perform zoning for Fibre Channel switches using this command, create provisional zoning before registering the Fibre Channel switches with this software. Refer to "Zoning setting" under "4.2.1.1 Setting" for information about how to create provisional zoning.
If the -f option is specified, zoning settings can be made forcibly on Fibre Channel switches where zoning settings have not been made.
However, if provisional zoning is created, or if settings are made forcibly by specifying the -f option, all accesses to zones other than those specified by the -f option will be blocked. For this reason, this action should not be taken while the target Fibre Channel switch environment is operating. Take this action either before operations start immediately after the Fibre Channel switch environment has been installed, or while operations are stopped.

· Fibre Channel switch zoning will be set up on the Fibre Channel switch equipped with the latest firmware in the fabric that contains the specified virtualization switch.

· When the "add" operand is specified, the channel adapter specified by the -storage option and the virtualization switch specified by the -ipaddr option must be connected, otherwise host affinities will not be set up on the storage device, zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the channel adapter and the virtualization switch with a Fibre Channel cable.

· When the "add" operand is specified, the HBA specified by the -hba option and the virtual target specified by the -vt option must be connected, otherwise zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the HBA and the virtual target with a Fibre Channel cable.

· Before executing this command, zone settings must be made (an affinity group must be created) on the ETERNUS disk storage system using either Storage Volume Configuration Navigator or ETERNUSmgr.

· This command only supports the ETERNUS VS900 model 300.

· A confirmation message will be output in the situations below. Enter "y" to continue or "n" to cancel. The confirmation message can be suppressed by specifying the -s option.

    - If the -f option is specified with the "add" operand but the -s option is not specified

    - If the -s option is not specified with the "delete" operand

A confirmation message is as follows.

```
Are you sure? [y/n]:
```

SEE ALSO

Host affinity and zoning operation command (storageadm zone)

12.1.2 Starting and stopping daemons

This section explains the commands for starting and stopping daemons.

12.1.2.1 Starting and stopping the SNMP Trap monitoring daemon

Only OS administrator (root) user can execute following commands.

Starting the SNMP Trap monitoring daemon

Enter the following command to start the SNMP Trap monitoring daemon:

```
# /opt/FJSVswstt/bin/mpnm-trapd start
```

Stopping the SNMP Trap monitoring daemon

Enter the following command to stop the SNMP Trap monitoring daemon:

```
# /opt/FJSVswstt/bin/mpnm-trapd stop
```

Checking the SNMP Trap monitoring daemon

Enter the following command to confirm if the process exists.

```
# /bin/ps -ef | grep nwsnmp-trapd | grep -v grep
```

12.1.2.2 Starting and stopping the daemons of the administrative server at specific times

Start or stop the following daemons in a batch operation:

・ Admin server daemon

・ SNMP Trap monitoring daemon

Only OS administrator (root) user can execute following commands.

Starting daemons of the administrative server

Enter the following command to start the administrative server:

```
# /opt/FJSVssmgr/sbin/managerctl start
```

Stopping daemons of the administrative server

Enter the following command to stop the administrative server:

```
# /opt/FJSVssmgr/sbin/managerctl stop
```

Information

In an environment in which the SAN administration manager in SystemWalker/StorageMGR-M V5.1/V10 or Softek SANView4.1 CD-ROM sub-directory is installed, the SNMP Trap monitoring daemon is controlled by SystemWalker/StorageMGR-M (SAN administration manager in Softek SANView4.1 CD-ROM sub-directory), so only the admin server daemon is started and stopped by the above commands.

12.1.3 Troubleshooting information collection

This section explains the commands for collecting troubleshooting information of the Manager.

12.1.3.1 Troubleshooting information collection of Manager (managersnap)

NAME

managersnap - Collects the troubleshooting information of Manager

SYNOPSIS

```
/opt/FJSVssmgr/sbin/managersnap [-dir dirname] [-all]
```

DESCRIPTION

Collect information of the Manager on the administrative servers. Only OS administrator (root) user can execute this command.

The managersnap is the command used to collect information on administrative server when a problem occurs.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name for *dirname*.
When this option is omitted, the troubleshooting information is stored on /tmp directory.

The collected information is gathered in the file that its name starts by "managersnap_". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 40MB
All troubleshooting information	more than "80 + (2 * number of registered device)" MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

- Collecting the troubleshooting information for initial investigation.

```
# /opt/FJSVssmgr/sbin/managersnap
```

12.1.4 Commands for storage management

The following sections explain the commands for managing the storage device.

The following table shows the correspondence between types of commands and the storage devices where they can be used. Only OS administrator (root) user can execute these commands. In the following table, "A" indicates "Available" and "N/A" indicates "Not Available".

Command name	ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 ETERNUS DX60/DX80	Other storage devices
storageadm disk	A	N/A
storageadm raid	A	N/A
storageadm volume	A	N/A
storageadm affinity	A	N/A
storageadm ecomode	A	N/A

12.1.4.1 Disk management command (storageadm disk)

NAME

storageadm disk - Manages disks

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm disk info -ipaddr ipaddr [-csv]
```

DESCRIPTION

This command displays information of disks in the ETERNUS disk storage system that is registered in this software.

OPERANDS

info

Displays detail information of disks in the ETERNUS disk storage system that is registered in this software.

OPTIONS

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-csv

Displays the disk information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・ Displaying the disk information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm disk info -ipaddr 192.168.0.1
<<< Disk Information >>>
NUMBER DE    SLOT USAGE          STATUS    RGNO   SIZE  DISKTYPE MOTOR
------ ---- ---- -------------- --------- ------ ----- -------- ---------------
0      0x00 0    System Disk    Available 0x0002 300GB SAS      Active
1      0x00 1    System Disk    Available 0x0001 300GB SAS      Idle
2      0x00 2    System Disk    Available 0x0002 300GB SAS      In the boot process
3      0x00 3    System Disk    Available 0x0003 300GB SAS      In the stop process
4      0x00 4    Data Disk      Available 0x0003 300GB SAS      Active
-----------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the disk information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm disk info -ipaddr 192.168.0.1 -csv
NUMBER,DE,SLOT,USAGE,STATUS,RGNO,SIZE,DISKTYPE,MOTOR
0,0x00,0,System Disk,Available,0x0002,300GB,SAS,Active
1,0x00,1,System Disk,Available,0x0001,300GB,SAS,Idle
2,0x00,2,System Disk,Available,0x0002,300GB,SAS,In the boot process
3,0x00,3,System Disk,Available,0x0003,300GB,SAS,In the stop process
4,0x00,4,Data Disk,Available,0x0003,300GB,SAS,Active
```

12.1.4.2 RAID management command (storageadm raid)

NAME

storageadm raid - Manages RAID groups

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm raid add -ipaddr ipaddr -disk
DE_number:slot_number,DE_number:slot_number[,DE_number:slot_number,...] -level RAIDlevel [-name
alias_name] [-cm assigned_CM] [-csv]
/opt/FJSVssmgr/sbin/storageadm raid delete -ipaddr ipaddr -raidgroup RAIDGroup_number [-f] [-s]
/opt/FJSVssmgr/sbin/storageadm raid info -ipaddr ipaddr [-raidgroup RAIDGroup_number] [-csv]
/opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr ipaddr -raidgroup RAIDGroup_number
[,RAIDGroup_number,...] -on|-off [-s]
```

DESCRIPTION

This command is used to create/delete/display and sets eco-mode for a RAID group in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates a RAID group

delete

Deletes a RAID group

info

Displays a RAID group information

ecomode

Sets eco-mode for the RAID group

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-disk *DE_number:slot_number,DE_number:slot_number[,DE_number:slot_number,...]*

Specify DE numbers and slot numbers for the storage device using either decimal or hexadecimal notation, placing a colon (":") in the middle of each DE number and slot number pair, and using commas (",") to separate pairs. For example, two pairs can be specified as "-disk 1:1, 1:2" in decimal notation or "-disk 0x1:0x1,0x1:0x2" in hexadecimal notation.

Be sure to specify at least two DE number/slot number pairs.

-level *RAIDlevel*

Specify the RAID level by the minuscule as follows.

Characters that can be specified	Created RAID level
raid0	RAID0
raid1	RAID1
raid1+0	RAID1+0
raid5	RAID5
raid6	RAID6

-name *alias_name*

Specify an alias for the RAID group to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-cm *assigned_CM*

Specify the assigned CM number for the RAID group using two digits, as in the following table. If this option is omitted, the assigned CM number will be set up automatically ("auto" will be specified).

Storage device	Assigned CM	Characters to be specified	Remarks
ETERNUS DX60/DX80 ETERNUS2000	CM#0	00	For the first digit, enter the assigned CM number. For the second character, always enter "0".
	CM#1	10	
Other	CM#0 CPU#0	00	For the first digit, enter the assigned CM number. For the second digit, enter the number of the CPU within the CM entered for the first digit.
	CM#0 CPU#1	01	
	CM#1 CPU#0	10	
	CM#1 CPU#1	11	
	:	:	
	CM#7 CPU#0	70	
	CM#7 CPU#1	71	

-csv

Displays the RAID group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number to be deleted, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-s

Processing continues without the output of a confirmation message.

-f

If there are volumes within the RAID group, the volumes will be deleted before the RAID group is deleted. However, the command will terminate with an error without deleting the volumes if any of the following conditions apply to the RAID group:

- The volumes in the RAID group have been mapped

- There are volumes other than open volumes

- There are LUN concatenated volumes

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number for which detailed information is to be displayed, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-csv

Displays the RAID group information in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the ecomode operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup [*RAIDGroup_number, ...*]

Specify the RAID group number for which detailed information is to be displayed, using decimal and/or hexadecimal notations.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-on

Set eco-mode to ON for the specified RAID group. The only possible specifications are -off and -on. This option cannot be set if eco-mode cannot be set for any one of the specified RAID groups.

-off

Set eco-mode to OFF for the specified RAID group. The only possible specifications are -off and -on.

-s

Continues processing without asking for confirmation.

EXAMPLES

・Creating a RAID group and displaying the created RAID group in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid add -ipaddr 1.2.3.4 -disk 1:10,1:11,1:12,1:13,1:14,1:15 -
level raid5
<<< RAID ADD >>>
RGNO
------
0x0000
------
INFO:swsag0001:Command terminated normally.
```

・Creating a RAID group and displaying the created RAID group in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid add -ipaddr 1.2.3.4 -disk 1:10,1:11,1:12,1:13,1:14,1:15 -
level raid5 -csv
RGNO
0x0000
```

・Deleting a RAID group.

```
# /opt/FJSVssmgr/sbin/storageadm raid delete -ipaddr 1.2.3.4 -raidgroup 16
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・Displaying the RAID group information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4
<<< RAID Information >>>
RGNO    NAME USAGE       LEVEL   STATUS    CM       TOTAL_CAPACITY FREE_CAPACITY
------- ---- ----------- ------- --------- -------- -------------- -------------
0x0000       Open,System RAID5   Available CM0CPU0  407775         0
```

```
0x0001      Open,SDV    RAID5    Available   CM1CPU0   410880          285440
0x0002      Open        RAID1    Available   CM0CPU1   136960          345367
--------------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY
0x0000,,"Open,System",RAID5,Available,CM0CPU0,407775,0
0x0001,,"Open,SDV",RAID5,Available,CM1CPU0,410880,285440
0x0002,,Open,RAID1,Available,CM0CPU1,136960,345367
```

・ Displaying the RAID group detail information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -raidgroup 0x0000
<<< RAID Information >>>
RGNO    NAME USAGE        LEVEL   STATUS    CM        TOTAL_CAPACITY FREE_CAPACITY
------  ---- -----------  ------- --------- --------  -------------- -------------
0x0000       Open,System RAID5    Available CM0CPU0   407775         0

NO      CONCATENATION NAME        TOTAL_CAPACITY ALLOCATED     STATUS    TYPE
                                                 CAPACITY
------  ------------- ----------- -------------- ------------- --------- -------
0x0001 1/3           sample      102400         102400        Available Open
0x0001 2/3           sample      1024           1024          Available Open
Free   -                         2048           2048
0x0004 -                         1536           1536          Available Open
--------------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group detail information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -raidgroup 0x0000 -csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY,NO,CONCATENATION,NAME,TOTAL_CAPACITY
,ALLOCATED_CAPACITY,STATUS,TYPE
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,1/3,sample,
102400,102400,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,2/3,sample,1024,1024,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,Free,-,,2048,2048,,
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0004,-,,1536,1536,Available,Open
```

・ RAID group eco-mode set to ON.

```
# /opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr 1.2.3.4 -raidgroup 0x0000 -on
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ RAID group eco-mode set to OFF.

```
# /opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr 1.2.3.4 -raidgroup 0x0000 -off
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

NOTES

・ The following confirmation message will be output if the -s option is not specified with the "delete" operand. Enter "y" to continue or "n" to cancel.
This confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Setting eco-mode for a RAID group with an eco-mode schedule already set results in the following:

   - RAID group eco-mode set to ON -> Eco-mode ON overwrites the RAID group eco-mode schedule.

- RAID group eco-mode set to OFF -> An error occurs (unless the eco-mode schedule is software-controlled),.

・ If eco-mode operation is not possible for the specified RAID group, then the command terminates with an error.
For details of RAID groups for which eco-mode operatioin is not possible, refer to "1.3.4 Energy-saving operation for storage device" > "Uncontrollable RAID groups".

12.1.4.3　Volume management command (storageadm volume)

NAME

storageadm volume - Manages volumes

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm volume add -ipaddr ipaddr -size capacity -raidgroup RAIDGroup_number [-
name alias_name] [-csv]
/opt/FJSVssmgr/sbin/storageadm volume delete -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-s]
/opt/FJSVssmgr/sbin/storageadm volume format -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-s]
/opt/FJSVssmgr/sbin/storageadm volume info -ipaddr ipaddr [-volume volume_number,...] [-csv]
/opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr ipaddr [-volume volume_number,...] [-csv]
```

DESCRIPTION

This command is used to create/delete/format/display volumes in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

　　Creates a volume.

delete

　　Deletes volumes.

format

　　Formats volumes.

info

　　Displays volume information.

nomapping

　　Displays the information of volumes that are not mapped to affinity group.

OPTIONS

Options that can be specified when the add operand is specified

　　-ipaddr *ipaddr*

　　　　Specify the IP address of the storage device.

　　-size *capacity*

　　　　Specify the size of the volume to be created in MB or GB. 1 GB is equivalent to 1024 MB.
　　　　For example, 1024 MB is specified as "-size 1024MB" or "-size 1GB".

-raidgroup *RAIDGroup_number*

Specify the RAID group number for which a volume is to be created, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-name *alias_name*

Specify an alias for the volume to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-=`_+|~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

Displays the created volume number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand or format operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Specify the numbers for the volumes to be deleted or formatted, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the info operand or nomapping operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Enter the number of the volume to be output for which information is to be output, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

If this option is omitted, information will be displayed for all target volumes.

-csv

Displays the volume information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・ Creating a volume and displaying the created volume in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume add -ipaddr 1.2.3.4 -size 1024MB -raidgroup 16
<<< Volume ADD >>>
NUMBER
------
0x0001
------
INFO:swsag0001:Command terminated normally.
```

・ Creating a volume and displaying the created volume in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume add -ipaddr 1.2.3.4 -size 1024MB -raidgroup 16 -csv
NUMBER
0x0001
```

・ Deleting a volume.

```
# /opt/FJSVssmgr/sbin/storageadm volume delete -ipaddr 1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Formatting a volume.

```
# /opt/FJSVssmgr/sbin/storageadm volume format -ipaddr 1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Displaying the volume information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume info -ipaddr 1.2.3.4
<<< Volume Information >>>
NUMBER   NAME      TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO   ENCRYPT
-------  --------  -------------- --------- ------ ------------- ------ -------
Unknown            0              Available F6427G -             0x0001 -
0x0001             100            Available SDV    -             0x0000 -
0x0002             425            Available Open   -             0x0002 -
Unknown            1166           Available MVV(G) -             0x0001 -
Unknown            2332           Available MVV(G) 2             0x0001 -
0x0005             150            Available Open   -             0x0002 -
0x0006             4700           Available Open   3             0x0000,0x0002 -
-----------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the volume information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume info -ipaddr 1.2.3.4 -csv
NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
Unknown,,0,Available,F6427G,-,0x0001,-
0x0001,,100,Available,SDV,-,0x0000,-
0x0002,,425,Available,Open,-,0x0002,-
Unknown,,1166,Available,MVV(G),-,0x0001,-
Unknown,,2332,Available,MVV(G),2,0x0001,-
0x0005,,150,Available,Open,-,0x0002,-
0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

・ Displaying the unused volume information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr 1.2.3.4
<<< Volume Information >>>
NUMBER   NAME      TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO   ENCRYPT
-------  --------  -------------- --------- ------ ------------- ------ -------
Unknown            0              Available F6427G -             0x0001 -
0x0001             100            Available SDV    -             0x0000 -
0x0002             425            Available Open   -             0x0002 -
Unknown            1166           Available MVV(G) -             0x0001 -
Unknown            2332           Available MVV(G) 2             0x0001 -
0x0005             150            Available Open   -             0x0002 -
0x0006             4700           Available Open   3             0x0000,0x0002 -
-----------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the unused volume information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr 1.2.3.4 -csv
NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
Unknown,,0,Available,F6427G,-,0x0001,-
0x0001,,100,Available,SDV,-,0x0000,-
0x0002,,425,Available,Open,-,0x0002,-
Unknown,,1166,Available,MVV(G),-,0x0001,-
Unknown,,2332,Available,MVV(G),2,0x0001,-
0x0005,,150,Available,Open,-,0x0002,-
0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

NOTES

・ Only open volumes can be created.

・ The volumes that are created are formatted automatically.

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "format" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Volumes cannot be deleted by specifying the volume numbers for volumes that are not open volumes.

・ Volumes cannot be deleted by specifying the volume numbers for LUN concatenated volumes.

・ Volumes that have been mapped to an affinity group cannot be deleted.

・ The Thin Provisoning Volume is not able to create. However, it possible to remove.

12.1.4.4   AffinityGroup management command (storageadm affinity)

NAME

storageadm affinity - Manages affinity groups

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-lun LUN_number] [-affinitygroup affinitygroup_number] [-name alias_name] [-csv]
/opt/FJSVssmgr/sbin/storageadm affinity delete -ipaddr ipaddr -affinitygroup affinitygroup_number [-
s]
/opt/FJSVssmgr/sbin/torageadm affinity update -ipaddr ipaddr -affinitygroup affinitygroup_number {-
add -volume volume_number[,volume_number,...] [-lun LUN_number[,LUN_number,...]] | -delete [-volume
volume_number[,volume_number,...] | -lun LUN_number[,LUN_number,...]]} [-s]
/opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr ipaddr [-affinitygroup affinitygroup_number] [-
csv]
```

DESCRIPTION

This command is used to create/delete/modify/display affinity groups in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

> Creates an affnity group.

delete

> Deletes an affinity group.

update

> Updates the configuration of an affinity group.

info

> Displays the affinity group information.

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

> Specify the number of the volume to be set to an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
> For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.

-lun *LUN_number*,...

> Specify the LUN number to be allocated to the volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified, use commas (",") to separate LUN numbers.
> For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.

> If this option is omitted, LUN numbers will be allocated in order, starting from 0.

-affinitygroup *affinitygroup_number*

> Specify the affinity group number to be created, using either decimal or hexadecimal notation.
> For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

> If this option is omitted, the affinity group numbers that can be created within the target storage device will be allocated automatically.

-name *alias_name*

> Specify an alias for the affinity group to be created. This option is required for ETERNUS2000, but can be omitted for ETERNUS4000 and ETERNUS8000. If this option is omitted, an alias will not be set up.

> Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

> Displays the created affinity group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

> Specify the number of the affinity group to be deleted, using either decimal or hexadecimal notation.
>
> For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-s

> Processing continues without the output of a confirmation message.

Options that can be specified when the update operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

> Specify the number of the affinity group whose configuration is to be changed, using either decimal or hexadecimal notation.
>
> For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-add

> Adds volumes in the affinity group.
>
> When the number for the allocated volume/LUN is specified, this command terminates abnormally.

-delete

> Deletes volumes from an affinity group.
>
> The command will terminate abnormally if a volume number or LUN number of a volume that has not been mapped is specified, or if deleting the specified mapping will mean that there are no more mappings.

-volume *volume_number*[,*volume_number*,...]

> Specify the volume number of the volume to be added to or deleted from an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
>
> For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.
>
> This option cannot be specified together with the -lun option when deleting volumes from an affinity group. Delete volumes by specifying either this option or the -lun option, not both together.

-lun *LUN_number*[,*LUN_number*,...]

> Specify the LUN number to be allocated to a volume or released from a volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified, use commas (",") to separate LUN numbers.
>
> For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.
>
> If this option is omitted when LUN numbers are being allocated, LUN numbers will be automatically allocated, starting with the smallest free LUN number.
>
> When LUN numbers are being released from volumes, this option cannot be specified together with the -volume option. Release LUN numbers by specifying either this option or the -volume option, but not both together.

-s

> Processing continues without the output of a confirmation message.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

> Specify the number of the affinity group for which detailed information is to be displayed, using either decimal or hexadecimal notation.
>
> For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.
>
> If this option is omitted, a list of affinity groups will be displayed.

-csv

Displays the affinity group information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・Creating an affnity group and displaying the created affinity group in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr 1.2.3.4 -volume 16,17,18 -lun 0,1,2 -
affinitygroup 16
<<< AffinityGroup ADD >>>
NUMBER
------
0x0010
------
INFO:swsag0001:Command terminated normally.
```

・Creating an affnity group and displaying the created affinity group in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr 1.2.3.4 -volume 16,17,18 -lun 0,1,2 -
affinitygroup 16 -csv
NUMBER
0x0010
```

・Deleting an affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity delete -ipaddr 1.2.3.4 -affinitygroup 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Adding a LUN in the affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity update -ipaddr 1.2.3.4 -affinitygroup 16 -add -volume 19
-lun 3
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Deleting a LUN from the affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity update -ipaddr 1.2.3.4 -affinitygroup 16 -delete -volume
19
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Displaying the affinity group lists in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4
<<< AffinityGroup Information >>>
NUMBER NAME
------ -------------
0x0000 AG00
0x0001 AG01
0x0002 AG02
0x0003 AG03
-------------------
INFO:swsag0001:Command terminated normally.
```

・Displaying the affinity group lists in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -csv
NUMBER,NAME
0x0000,AG00
0x0001,AG01
```

```
      0x0002,AG02
      0x0003,AG03
```

・ Displaying the affinity group detail information (mapping) in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -affinitygroup 16
<<< AffinityGroup Information >>>
NUMBER NAME           LUN     VOLUME  VOLUME NAME
------ -------------- ------- ------- ----------------------
0x0010 abcd           0x0000 0x0001  sample
                      0x0002 0x0004
-----------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the affinity group detail information (mapping) in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -affinitygroup 16 -csv
NUMBER,NAME,LUN,VOLUME,VOLUME NAME
0x0010,abcd,0x0000,0x0001,sample
0x0010,abcd,0x0002,0x0004,
```

NOTES

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "update" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ The command will terminate abnormally if the -delete option is specified with the "update" operand in such a way that there are no items of mapping information for the affinity group.

・ The command will terminate abnormally if the number for a following volume that cannot be set to an affinity group is specified with the "update" operand.

  - The volumes that do not exist in the storage device

  - The volumes other than open volumes

  - The LUN concatenated volumes

12.1.4.5 Eco-mode command (storageadm ecomode)

NAME

storageadm ecomode － Operates the eco-mode

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm ecomode on -ipaddr ipaddr
/opt/FJSVssmgr/sbin/storageadm ecomode off -ipaddr ipaddr [-s]
/opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr ipaddr [-csv]
```

DESCRIPTION

This command toggles and displays eco-mode information for ETERNUS disk storage systems registered to this product.

OPERANDS

on

Sets eco-mode to ON.

off

Sets eco-mode to OFF.

info

Displays eco-mode status.

OPTIONS

When on is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

When off is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-s

Continues processing without asking for confirmation.

When info is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-csv

Displays the eco-mode status of the ETERNUS disk storage system in CSV format.

EXAMPLES

・ Setting eco-mode to ON:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode on -ipaddr 1.2.3.4
INFO:swsag0001:Command terminated normally.
```

・ Setting eco-mode to OFF:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode off -ipaddr 1.2.3.4
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ Displaying eco-mode information:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr 1.2.3.4

<<< EcoMode Information>>
STATUS
------
ON
------
INFO:swsag0001:Command terminated normally.
```

・ Displaying eco-mode information in CSV format:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr 1.2.3.4 -csv
STATUS
ON
```

NOTES

・If off is specified without -s, then the confirmation message below is displayed:

```
Are you sure? [y/n]:
```

・If the device eco-mode settings are as follows, the command terminates with an error:

    - An error occurs if the eco-mode is already on when the processing to switch eco-mode on is executed.

12.1.4.6　Performance monitoring command（storageadm perfctl）

NAME

storageadm perfctl － Performs monitoring operations

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm perfctl start -ipaddr ipaddr [-interval time]
/opt/FJSVssmgr/sbin/storageadm perfctl stop -ipaddr ipaddr
/opt/FJSVssmgr/sbin/storageadm perfctl status -ipaddr ipaddr
```

DESCRIPTION

This command starts and stops performance monitoring for the NR1000F series and displays the performance monitoring status.

OPERANDS

start

Starts performance monitoring.

stop

Stops performance monitoring.

status

Displays the performance monitoring status.

OPTIONS

When start is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-interval *time*

Specify either 10, 30, 60, or 300 (seconds unit) as the performance monitoring interval. If this option is omitted, monitoring is performed at 30 second intervals.

When stop is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

When status is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

EXAMPLES

- Starting performance monitoring at 60-second intervals.

  ```
  # /opt/FJSVssmgr/sbin/storageadm perfctl start -ipaddr 1.2.3.4 -interval 60
  ```

- Stopping performance monitoring.

  ```
  # /opt/FJSVssmgr/sbin/storageadm perfctl stop -ipaddr 1.2.3.4
  ```

- Displaying the performance monitoring status.

  ```
  # /opt/FJSVssmgr/sbin/storageadm perfctl status -ipaddr 1.2.3.4

  <<< Performance Monitor Status>>
  DEVICE_NAME(IP_ADDRESS)          STATUS              INTERVAL[SEC]
  ------------------------------ ------------------- ---------------
  NR1000F(1.2.3.4)                 Monitoring          60
  -----------------------------------------------------------------

  INFO:swsag0001:Command terminated normally.
  ```

Status description

- The table below shows the status types and their meanings:

Monitoring	Normal monitoring is in progress.
Stop	Performance monitoring is stopped.
Recovering	Retry is in progress, after communication was interrupted or an attempt failed.
Error	Stopped with an error, after an unsuccessful retry.
	Collect the required troubleshooting data and then contact the Fujitsu systems engineer (SE). For details, refer to "D.1 Troubleshooting information"

NOTES

- The NR1000F series must be registered in this product.

- If NR1000F series performance is to be monitored when creating new storage in a manually incorporated device, then use the settings below:

  For "product type", select "NR1000F".

  Specify the **-ipaddr** option.

- If -interval is set to a value other than 10, 30, 60, or 300, then the actual interval is set according to the table below (an error will occur if it is set to a negative value or a value greater than or equal to 2147483648):

-interval *time* values	Monitoring interval (in secs)
$time = 0$	30
$0 < time <= 10$	10
$10 < time <= 30$	30
$30 < time <= 60$	60
$60 < time$	300

12.2 [Linux Version] Administrative Server Commands

This section explains command operations on the Linux Administrative server.

12.2.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.2.1.1 Administrator login account creation command (scsetup)

NAME

scsetup - creates administrative login account

SYNOPSIS

```
/opt/FJSVssmgr/bin/scsetup
```

DESCRIPTION

This command sets administrative login account and perform creation of a CLI encryption key.
Only OS administrator (root) user can execute this command. This command only can execute when admin server stop. Refer to "12.2.2.2 Starting and stopping the daemons of the administrative server at specific times" for the detail information.

OPTIONS

None.

USAGE

This command set the parameter by the following interface.

```
Input a new CLI crypt key [length:4-56]: any key

Are you sure? [y,n,q?] y

Input a new user name [length:1-16]: username

Input a new password [length:1-16]: password

Retype a new password [length:1-16]: password

Are you sure? [y,n,q?] y
```

CLI encryption key

Please enter the CLI encryption key to be used (between 4 and 56 characters). Double-byte characters, single-byte alphanumerical characters, symbols, and strings composed entirely of single or double-byte characters can be used. Notice that CLI encryption is required for ETERNUS SF Storage Cruiser internal use only, and users don't have to remember the key.

Username

Enter the user name of the login account for administrators (between 1 and 16 characters). The name must start with an alphabetic character, and alphanumerical characters (including underscores, "_", periods, ".", and hyphens, "-") can be used.

Password

Enter the password of the login account for administrators (between 1 and 16 characters). The password is a string of alphanumerical characters and symbols, but cannot start with "{".

Password confirmation

For password confirmation, enter the password of the administrator again.

EXAMPLES

```
# /opt/FJSVssmgr/bin/scsetup
```

12.2.1.2 SNMP Trap transmission place IP address change command (sanadmsh chtraprcvip)

NAME

sanadmsh chtraprcvip - changes SNMP Trap transmission place IP address

SYNOPSIS

```
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip -h
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip -all -oldip xxx.xxx.xxx.xxx [-newip yyy.yyy.yyy.yyy]
/opt/FJSVssmgr/bin/sanadmsh chtraprcvip DeviceID -oldip xxx.xxx.xxx.xxx [-newip yyy.yyy.yyy.yyy]
```

DESCRIPTION

After the IP address of the administrative server is changed, delete the old IP address of the administrative server that is the SNMP Trap transmission place from the devices registered with this software, and add the new IP address. Only OS administrator (root) user can execute this command.

Although the SNMP Trap transmission place setting for a device may be changed with the Management Software on the device, this software provides this command to facilitate changing of the transmission place.

OPTIONS

-h

Displays help about the argument format of this command.

-all

Applies SNMP Trap transmission place setting to all devices managed by this software. Executing the command specified with this argument outputs device names and execution results in execution order to the standard output. If the administrative server has more than one IP address, for exsample, if the management server is connected to multiple subnets, a device may not be set with the correct SNMP Trap transmission place. After this setting is performed, check whether the correct administrative server address is set as the SNMP Trap transmission place setting on the device side.

DeviceID

Applies SNMP Trap transmission place setting to the limited devices. Specify the device type according to the following tables. Afterwards, specify how to recognize the device.

Device type	Device recognition method (one of which must be specified)
-host -storage -library -switch -hub -bridge	ip:xxx.xxx.xxx.xxx sysname:SysName name of a device SNMP setting nickname:Device management name that is set for this software.

-oldip *xxx.xxx.xxx.xxx*

Specify the old IP address of the administrative server. Delete this IP address from the SNMP transmission place address of managed devices.

-newip *yyy.yyy.yyy.yyy*

Specify the new IP address of the new administrative server. Add this IP address to the SNMP transmission place address. If this argument is omitted, the IP address of the new administrative server is automatically specified. It is recommended to enter the argument considering the administrative server that has multiple IP addresses.

USAGE

Execute the command after changing the IP address of Manager. The command may be executed for all devices managed by this software by the one command or for a specific device.

Devices that can be targets of the command are devices for which SNMP Trap transmission place settings can be defined automatically from this software.

The monitoring status of every target device must be normal.

EXAMPLES

- Execute the SNMP Trap transmission place change on all managed devices that can automatically execute SNMP Trap transmission place setting.

  ```
  # /opt/FJSVssmgr/bin/sanadmsh chtraprcvip -all -oldip 10.10.10.10 -newip 20.20.20.20
  ```

- Execute the SNMP Trap transmission place change on server nodes that sysname is defined in host1.

  ```
  # /opt/FJSVssmgr/bin/sanadmsh chtraprcvip -host sysname:host1 -oldip 10.10.10.10 -newip 20.20.20.20
  ```

12.2.1.3 SN200 (Brocade), BX600 Fibre Channel switch blades SNMP Trap test (swtraptest)

NAME

swtraptest - tests of SNMP Trap

SYNOPSIS

```
/opt/FJSVssmgr/bin/swtraptest fibre-channel-switch-ip-address
```

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell.

A simulated Fibre Channel switch SNMP Trap (FC Port fault) is created and issued to the administrative server.

For *fibre-channel-switch-ip-address*, specify the IP address of the Fibre Channel switch which is to check the SNMP trap setting by this command.

The Fibre Channel switch must be a device managed by this software.

OPTIONS

None.

EXAMPLES

・ Executing this command for a Fibre Channel switch whose IP address is 11.11.11.11

```
# /opt/FJSVssmgr/bin/swtraptest 11.11.11.11
```

NOTES

Even the input IP address is not for a FC device, this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.2.1.4   ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 and GR SNMP Trap test (grtraptest)

NAME

grtraptest - tests of SNMP Trap

SYNOPSIS

```
/opt/FJSVssmgr/bin/grtraptest storage-ip-address
```

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell.

The administrative server internally generates pseudo SNMP traps (FAN fault) of the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 and GR device, and issues them to the administrative server itself.

For *storage-ip-address*, specify the IP address of the storage which is to check the SNMP trap setting by this command.

The storage device must be a device managed by this software.

OPTIONS

None.

EXAMPLES

・ Executing the command for a storage device whose IP address is 12.12.12.12

```
# /opt/FJSVssmgr/bin/grtraptest 12.12.12.12
```

NOTES

Even the input IP address is other than ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, GR series, this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.2.1.5 Host affinity and zoning operation command (storageadm zone)

NAME

storageadm zone - operates the host affinity and Fibre Channel switch zoning

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm zone add -storage cawwpn,affinitygroup -hba hbawwpn
/opt/FJSVssmgr/sbin/storageadm zone delete -storage cawwpn,affinitygroup -hba hbawwpn
/opt/FJSVssmgr/sbin/storageadm zone info [-ipaddr ipaddr[,ipaddr,...]]
```

DESCRIPTION

This command is used to set/delete/display the storage device host affinity and Fibre Channel switch zoning. Only OS administrator (root) user can execute this command.

Specify the storage device CA WWPN, affinity group, and WWPN of the set HBA in the command parameter to set/delete the storage device host affinity and Fibre Channel switch zoning. The set host affinity and zoning is also displayed.

The target storage device and Fibre Channel switch must be devices managed by this software.

OPERANDS

add

This sets the host affinity and zoning.

delete

This deletes the host affinity and zoning.

info

This displays the host affinity and zoning.

-storage *cawwpn,affinitygroup*

Specify the storage device CA WWPN and affinity group for which the host affinity is set or deleted.

-hba *hbawwpn*

Specify the WWPN of the HBA set for host affinity and zoning.

-ipaddr *ipaddr[,ipaddr,...]*

Displays the host affinity information set in the specified IP address, Fibre Channel switch zoning information, or storage device CA.

To display more than one item of storage device information, specify the IP address using a comma (",").

If this omitted, all the storage device and Fibre Channel switch information registered in this software is displayed.

EXAMPLES

- Adding the host affinity and zoning

  ```
  # /opt/FJSVssmgr/sbin/storageadm zone add -storage 1111111111111111,3 -hba 2222222222222222
  ```

- Deleting the host affinity and zoning

  ```
  # /opt/FJSVssmgr/sbin/storageadm zone delete -storage 1111111111111111,3 -hba 2222222222222222
  ```

- Displaying the host affinity and zoning

  ```
  # /opt/FJSVssmgr/sbin/storageadm zone info
  <<< FC Switch Zone Information >>>
  ```

```
DEVICE_NAME(IP_ADDRESS)          ZONE_NAME       ZONE_WWPN
----------------------------- --------------- --------------------------------
Switch1(10.10.10.10)             SNM_0001        1111111111111111;2222222222222222
                                 SNM_0002        3333333333333333;4444444444444444
----------------------------------------------------------------------------

<<< FC CA Zone Information >>>
DEVICE_NAME(IP_ADDRESS)          CA_WWPN          AFFINITY_GROUP  HBA_WWPN
----------------------------- --------------- --------------- ----------------
E4000M300(10.10.10.11)           1111111111111111 3               2222222222222222
----------------------------------------------------------------------------
```

NOTES

・ The storage device and Fibre Channel switch for which set/delete/display is performed must have been registered in this software.

This command cannot be used to register Fibre Channel switches if zoning has not been set. Create a temporary zone and then register the Fibre Channel switch in this software. Refer to "4.2.1.1 Setting" for details on creating temporary zones.

・ Please execute this command after confirming the state of the server is below. (When the server where HBA specified for "-hba" option is installed is registered in this software.)

- The server had to have started when "Add" option was specified.

- The server had to have stopped when "Delete" option was specified.

・ Fibre Channel switch zoning is set for the Fibre Channel switch connected to the specified storage device CA.

・ The Fibre Channel switch and storage device must be connected using a Fibre Channel cable. If the Fibre Channel cable is not connected, Fibre Channel switch zoning is not set. Connect the Fibre Channel cable, and then re-execute the command.

・ Zone settings (creation of the AffinityGroup) must be configured in the ETERNUS disk array device in advance, using Storage Volume Configuration Navigator or ETERNUSmgr.

・ Only the ETERNUS SN200 (except model 250M) and Brocade (except AP7420) Fibre Channel switch and PRIMERGY BX600 switch blades are supported.
For ETERNUS VS900 model 300, only "info" operand is supported. When ETERNUS VS900 model 300 is specified at the "info" operand, the WPN of the virtual initiator of ETERNUS VS900 model 300 is displayed on the HBA_WWPN line of <<< FC CA Zone Information >>>.

・ The following conformation message is output when "delete" is specified. To continue, enter 'y'. To cancel, enter 'n'.

```
Are you sure? [y/n]:
```

12.2.1.6 Performance information operation command (storageadm perfdata)

NAME

storageadm perfdata - operates the performance information

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm perfdata export outdirname -ipaddr ipaddr [-date start_time[-
end_time]]
```

DESCRIPTION

This command outputs the performance information of the storage devices and Fibre Channel switches. Only OS administrator (root) user can execute this command.

By specifying the IP address of the device that outputs the performance information and the date in the command operand, the storage device and Fibre Channel switch performance information is output in CSV format.

The target storage device and Fibre Channel switch must be devices managed by this software when performance monitoring is either still running or already completed.

The supported devices are as follows.

- ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000

- The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

The details of CSV files are as follows.

The port information of Fibre Channel switch

Items	Explanation
File name	PORT.csv

Header line	- Case of ETERNUS SN200 series
	   Date,PortX - Tx Throughput, PortX - Rx Throughput, PortX - CRC Error, ...
	
	- Case of ETERNUS SN200 MDS series
	   Date,PortX - Tx Throughput, fcX/X - Rx Throughput, fcX/X - CRC Error, ...

Data line	*date,port0s,port0r,port0e, ... ,portNs,portNr,portNe* The following information is output for each field. (After *date*, the information is repeated for the actual number of ports.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *port0s* : Port0 Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *port0r* : Port0 Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *port0e* : Port0 Number of CRC errors at *date* (Decimal notation. The unit is Count.) *portNs* : PortN Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *portNr* : PortN Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *portNe* : PortN Number of CRC errors at *date* (Decimal notation. The unit is Count.)

The CM performance information of storage device

ETERNUS8000 models 700, 900, 1100 and 2100, ETERNUS4000 models 300 and 500, ETERNUS2000

Items	Explanation
File name	CM.csv
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX - Copy Remain, ...
Data line	*date,CM00u,CM00r, ... ,CMNNu,CMNNr* The following information is output for each field. (After *date*, the information is repeated for the actual number of CMs.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *CM00u* : CM0x00:CPU0 (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CM00r* : CM0x00:CPU0 (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.) *CMNNu* : CM0xNN:CPUN (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CMNNr* : CM0xNN:CPUN (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

*1: The CPU number is not output when the storage device is ETERNUS2000.

ETERNUS8000 models 800, 1200 and 2200, ETERNUS4000 models 400 and 600

Items	Explanation
File name	CM/*nnnn*.csv (*nnnn* indicates the CM number by hexadecimal notation. CM numbers are assigned in ascending order, starting with 0000 for the lowest CM CPU number in the device. CM0x0 CPU0 is 0000,

Items	Explanation
	CM0x0 CPU1 is 0001, CM0x1 CPU0 is 0002, CM0x1 CPU1 is 0003, : CM0x7 CPU0 is 000E, CM0x7 CPU1 is 000F.)
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX(ROE) - CPU Use Rate, CM0xXX:CPUX - Copy Remain
Data line	*date,cpu,roe,remain* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *cpu* : CM0xXX:CPUX CPU Load at *date* (Decimal notation. The unit is %.) *roe* : CM0xXX:CPUX ROE Load at *date* (Decimal notation. The unit is %.) *remain* : CM0xXX:CPUX CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

The LogicalVolume performance information of storage device

Items	Explanation
File name	LogicalVolume/*nnnn*.csv (*nnnn* indicates the LogicalVolume number by hexadecimal notation.)
Header line	Date, LogicalVolume0xXXXX - Read IOPS, LogicalVolume0xXXXX - Write IOPS, LogicalVolume0xXXXX - Read Throughput, LogicalVolume0xXXXX - Write Throughput, LogicalVolume0xXXXX - Read Response Time, LogicalVolume0xXXXX - Write Response Time, LogicalVolume0xXXXX - Read Cache Hit Rate, LogicalVolume0xXXXX - Write Cache Hit Rate, LogicalVolume0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The RAIDGroup performance information of storage device

Items	Explanation
File name	RAIDGroup/*nnnn*.csv (*nnnn* indicates the RAIDGroup number by hexadecimal notation.)
Header line	Date, RAIDGroup0x0xXXXX - Read IOPS, RAIDGroup0x0xXXXX - Write IOPS, RAIDGroup0x0xXXXX - Read Throughput, RAIDGroup0x0xXXXX- Write Throughput, RAIDGroup0x0xXXXX - Read Response Time, RAIDGroup0x0xXXXX - Write Response Time, RAIDGroup0x0xXXXX - Read Cache Hit Rate, RAIDGroup0x0xXXXX - Write Cache Hit Rate, RAIDGroup0x0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.)

Items	Explanation
	through-w : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The Disk performance information of storage device

Items	Explanation
File name	Disk/*nnnn*.csv (*nnnn* indicates the DE number by hexadecimal notation.)
Header line	Date, DE0xXX:SlotX - busy time, ...
Data line	*date,Disk0, ... ,DiskN* The following information is output for each field. (After *date*, the information is repeated for the actual number of Disks.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *Disk0* : Disk0 Disk busy rate at *date* (Decimal notation. The unit is %.) *DiskN* : DiskN Disk busy rate at *date* (Decimal notation. The unit is %.)

The CA/CM Port performance information of storage device

Items	Explanation
File name	Port/*nnnn*.csv (*nnnn* indicates the CA/CM Port number by hexadecimal notation. CA/CM port numbers are assigned in ascending order, starting with 0000 for the lowest CA/CM port number in the device. CM0x0 CA0x0 Port0 is 0000, CM0x0 CA0x0 Port1 is 0001, : CM0x7 CA0x3 Port2 is 007E, CM0x7 CA0x3 Port3 is 007F.)

Header line	・ Case of CA Port
	
	   Date, CM0xX:CA0xX:PortX - Read IOPS, CM0xX:CA0xX:PortX - Write IOPS, CM0xX:CA0xX:PortX - Read Throughput, CM0xX:CA0xX:PortX - Write Throughput
	
	・ Case of CM Port
	
	   Date, CM0xX:PortX - Read IOPS, CM0xX:PortX - Write IOPS, CM0xX:PortX - Read Throughput, CM0xX:PortX - Write Throughput

Data line	*date,read,write,through-r,through-w* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.)

The number of active disks performance information of storage device

Items	Explanation
File name	ACTIVE_DISK.csv
Header line	Date, Total Disks, Active Disks

Items	Explanation
Data line	*date*,*total*,*active* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *total* : Overall number of loaded disk devices at *date* (Decimal notation. The unit is Disk.) *active* : Overall number of active disk devices at *date* (Decimal notation. The unit is Disk.)

Power consumption performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_POWER_CONSUMPTION.csv
Header line	Date, System Power Consumption
Data line	*date*, *power* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *power*:Power used by device as a whole at *date* (Decimal notation. The unit is W.)

Temperature performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_TEMPERATURE.csv
Header line	Date, System Temperature
Data line	*date*, *temperature* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *temperature:* Air intake temperature at the device at *date* (Decimal notation. The unit is degrees Centigrade.)

OPERANDS

export

Outputs performance information for the specified date in CSV format.

outdirname

Specify the directory that outputs performance information.
Performance information is output to the *outdirname* directory based on the following configuration.

```
outdirname
 │
 ├─ Start_time − Stop_time      Example: 200706010000-200706020000
 │   │
 │   ├─ Device A                (Storage device)
 │   │   │
 │   │   ├─ Disk ─────────── 0000.csv
 │   │   │                      :
 │   │   ├─ LogicalVolume ── 0000.csv
 │   │   │                      :
 │   │   ├─ Port ─────────── 0000.csv
 │   │   │                      :
 │   │   ├─ RAIDGroup ────── 0000.csv
 │   │   │                      :
 │   │   ├─ ACTIVE_DISK.csv
 │   │   ├─ SYSTEM_POWER_CONSUMPTION.csv
 │   │   ├─ SYSTEM_TEMPERATURE.csv
 │   │   └─ CM.csv
 │   │
 │   └─ Device B                (Fibre Channel switch)
 │       └─ PORT.csv
```

☐ indicates a directory.

OPTIONS

-ipaddr *ipaddr*

Specify the IP address of the device that outputs performance information.

The output target device must satisfy the following conditions:

- Storage devices, Fibre Channel switches and Fibre Channel switch blades that output performance information must be registered in this software, and the device must be one of the following performance monitoring targets:

    - ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000

    - The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

For the settings of performance monitoring, refer to "7.2.2 Instruction for performance management".

-date *start_time*[-*end_time*]

Specify the start and end times for the output of performance information in YYYYMMDDhhmm format. The start and end times must be concatenated using a hyphen ("-"), as follows:

```
YYYYMMDDhhmm-YYYYMMDDhhmm
```

If the hyphen ("-") and end time are omitted, the command execution time will be the end time.

If this option is omitted, a time 30 minutes before the command execution time will be the start time, and the command execution time will be the end time.

EXAMPLES

- Output of performance information from 00:00 on 01/01/2008 to 23:59 on 01/01/2008 for a device with IP address 10.101.12.13 to the /tmp/work directory:

```
# /opt/FJSVssmgr/sbin/storageadm perfdata export /tmp/work -ipaddr 10.101.12.13 -date
200801010000-200801012359
```

- Output of performance information from 00:00 on 01/01/2008 to now for a device with IP address 10.101.12.13 to the /tmp/work directory:

```
# /opt/FJSVssmgr/sbin/storageadm perfdata export /tmp/work -ipaddr 10.101.12.13 -date 200801010000
```

NOTES

- The full path of an existing directory must be specified in *outdirname*.

- The time that is specified for the -date option start time must be earlier than the end time. Additionally, the time that is specified for the start and end times must be later than 00:00 on 01/08/2001, and earlier than the command execution time.

12.2.1.7   Disk control command (storageadm spindle)

NAME

storageadm spindle - controls disks

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]]
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]] [-s] [-f]
/opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr ipaddr [{-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server}]
```

DESCRIPTION

Starts or stops the storage device RAID disk rotation. Only OS administrator (root) user can execute this command.

If a storage device was specified when the status was displayed, the rotation status of the disk that was used to configure RAID is displayed.
If a server was specified, the storage device RAIDGroup number and volume number used by the server are displayed.

By specifying the storage device IP address and RAIDGroup number in the command operand, the rotation of the disk that was used to configure the storage device RAID is started or stopped.

By specifying the server IP address, the rotation of the storage device disk used by the server is started or stopped.

The target storage device and server must be devices managed by this software.

OPERANDS

start

Starts the disk that is used to configure the storage device RAIDGroup.

stop

Stops the disk that is used to configure the storage device RAIDGroup.

info

Displays the storage device RAIDGroup Eco-mode information, or the storage device information used by the server.

OPTIONS

Options that can be specified when the start operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the start target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to start rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

Options that can be specified when the stop operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the stop target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to stop rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

-s

Processing continues without the output of a confirmation message.

-f

Related RAIDGroup disks are forcibly stopped.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

> Specify the status display target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
> Specify this option when the storage device IP address has been specified in the -ipaddr option.
>
> If this option is omitted, the information for all the RAIDGroups in the specified storage device is displayed.

-server

> Specify this option when the server IP address is specified to display the storage device RAIDGroup Eco-mode information and volume number used by the server.
> Specify this option when the server IP address has been specified in the -ipaddr option.

EXAMPLES

- Starting the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
# /opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr 10.10.10.10 -raid 0x0000,0x0001
```

- Stopping the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
# /opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr 10.10.10.10 -raid 0x0001
```

- Stopping the disk that is used by the server by specifying the server:

```
# /opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr 10.10.10.20 -server
```

- Displaying the Eco-mode status of all storage device RAIDGroups:

```
# /opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr 10.10.10.10
<<< ECO Mode RAID Group Information >>>
RAIDGROUP_NUMBER(NAME)   MODE DISK_STATUS        CONTROL SCHEDULE
----------------------- ---- ------------------ ------- ---------------
0x0000(data1)            ON   Idle               OFF     External
0x0001(data2)            ON   in the boot process ON     01-NAME0001
0x0002                   OFF  Active             -
0x0003                   -    Active             -
-----------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
RAIDGROUP_NUMBER(NAME)	Displays the RAIDGroup number by the hexadecimal number of four digits. When the name is set on the RAIDGroup, its name is displayed by enclosing in ().
MODE	Displays the Eco-mode status that is set on the RAIDGroup. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAIDGroup. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAIDGroup. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
SCHEDULE	Displays the Eco-mode schedule set on RAIDGroup by the following format. The schedule name of External is displayed as "External".

Field title	Explanation
	number-name
	The "number" is displayed in decimal number, and "name" is displayed in eight characters or less.

· Displaying the storage device RAIDGroup number and volume number that are used by the server:

```
# /opt/FJSVssmgr/sbin/storageadm spindle info -ipaddr 10.10.10.20 -server
<<< ECO Mode RAID GROUP information for Server >>>
IP_ADDRESS      RAID   MODE DISK_STATUS        CONTROL STOP
--------------- ------ ---- ------------------ ------- ----
10.10.10.10     0x0000 ON   Idle               OFF
                0x0001 ON   Active             ON      *
------------------------------------------------------------

<<< Disk use information on Server >>>
IP_ADDRESS      RAID   VOLUME
--------------- ------ -------------------------------------------------------
10.10.10.10     0x0000 0x0000,0x0001,0x0002,0x0003,0x0004,0x0005,0x0006,0x0007,
                       0x0008,0x0009,0x000A,0x000B,0x000C,0x000D,0x000E,0x000F
                0x0001 0x0010,0x0011,0x0012,0x0013,0x0014,0x0015,0x0016,0x0017,
                       0x0018,0x0019,0x001A,0x001B,0x001C,0x001D,0x001E,0x001F
-----------------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
Fields of <<< ECO Mode RAID GROUP information for Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
MODE	Displays the Eco-mode status that is set on the RAIDGroup. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAIDGroup. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAIDGroup. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
STOP	Although the stopping the disks used from the specified server is directed, when any disks in this RAIDGroup are used from other server or this RAIDGroup cannot be stopped because of any following states, displays "*". · The RAIDGroup for which the system disk is included · The RAIDGroup for which it is set in the NAS area · The RAIDGroup for which the mainframe volumes, MVV volumes or MVV Concatenation volumes are registered
Fields of <<< Disk use information on Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.

Field title	Explanation
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
VOLUME	Displays the volume number by the hexadecimal number of four digits. The volumes used from the specified server are displayed.

NOTES

・ There are RAIDGroups that cannot do the Eco-mode operation. Refer to "Uncontrollable RAID groups" in the "1.3.4 Energy-saving operation for storage device".

・ The RAIDGroup Eco-mode must be ON to operate the RAIDGroup start/stop control. For details on the procedure for setting the RAIDGroup Eco-mode to ON, refer to "6.1.13 How to control the Eco-mode".

・ If disk rotation is started and stopped by specifying the server IP address, do not change the storage device connection.

・ For stopping the disk rotation by specifying the server IP address, if one or more share disks are contained on the stopped disks, the disk rotation cannot be stopped. Check the status of all servers that use their share disks, and judge whether share disks can be stopped or not. If share disks can be stopped, specify the -f option.

・ For stopping the disk rotation by specifying the server IP address, if the disks used from other server are included in the RAIDGroup that stop target disk exists, the disk rotation cannot be stopped. To stop the disk rotation, either specify server IP address for all servers that use the disk of its RAIDGroup, or specify the -f option. When you specify -f option, check the status of all related servers, and judge whether disks can be stopped or not. It is recommended that the server and the RAIDGroup be the compositions of couple 1.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including unused disks, the disk rotation cannot be stopped. Re-execute either specify the -f option or specify the RAIDGroup.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including the stop target disk is any of "Uncontrollable RAID groups", the disk rotation cannot be stopped.

・ If the volume that belongs to the specified stop target RAIDGroup is concatenated with a different RAIDGroup using the LUN concatenation functionality, the disk is not stopped even if the stop operand is specified. To stop all related RAIDGroup disks, either specify all of the related RAIDGroups, or specify the -f option. However, if the related RAIDGroup is any of "Uncontrollable RAID groups", the disk control cannot be executed.

・ The following confirmation message is output when the stop operand is specified. To continue, enter "y". To cancel, enter "n". This confirmation message is not output when the -s option is specified.

```
Are you sure? [y/n]:
```

・ The information of storage device that can control disks is displayed on the storage device information used by the server. The information of storage device that cannot control disks is not displayed. When both the disk controllable storage device and the disk uncontrollable storage device are connected with the server, the information of disk controllable storage device is only displayed.

・ The disk does not stop when the RAIDGroup status is as follows:

- Part of the storage device controller module and the module for the disk drive access route contain a fault.

- The disk drive that was used to configure the RAIDGroup is faulty.

- There is AdvancedCopy copy data.

- There is an EC/REC session (including when there is no copy data). The disk does, however, stop when the EC/REC status is Suspend.

- There is a QuickOPC/SnapOPC session (including when there is no copy data).

12.2.1.8 Virtualization switch access path setting command (storageadm virtualzone)

NAME

storageadm virtualzone - Operates on the host affinities and zonings for virtualization switches

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm virtualzone add -storage cawwpn,affinitygroup -ipaddr ipaddr [-update
all] [-f [-s]]
/opt/FJSVssmgr/sbin/storageadm virtualzone add -hba hbawwpn -vt vtwwpn [-update all] [-f [-s]]
/opt/FJSVssmgr/sbin/storageadm virtualzone delete -storage cawwpn,affinitygroup -ipaddr ipaddr [-s] [-
update all]
/opt/FJSVssmgr/sbin/storageadm virtualzone delete -hba hbawwpn -vt vtwwpn [-s] [-update all]
```

DESCRIPTION

This command adds or deletes zonings for Fibre Channel switches and host affinities for storage devices associated with virtualization switches (virtual targets and virtual initiators).

- ・ Adds or deletes zonings between the HBA and a virtualization switch (virtual target)

- ・ Adds or deletes host affinities and zonings between the CA and a virtualization switch (virtual initiator)

Only OS administrator (root) user can execute this command.

The target storage devices and Fibre Channel switches must be devices managed by this software. The only Fibre Channel switch supported is ETERNUS VS900 model 300.

OPERANDS

add

Adds the host affinity and zoning.

delete

Deletes the host affinity and zoning.

OPTIONS

Options that can be specified when the add operand or delete operand is specified

-storage *cawwpn,affinitygroup*

Specify the channel adapter WWPN and the affinity group number of the storage device where the host affinity is to be set up.

Specify the channel adapter WWPN using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 11:11:11:11:11:11:11:11. Specify the affinity group number using either decimal notation or hexadecimal notation. For example, affinity group number 16 can be specified using decimal notation as "-storage 1111111111111111,16" or in hexadecimal notation as "-storage 1111111111111111,0x10".

-ipaddr *ipaddr*

Specify the IP address of the virtualization switch to which the virtual initiator (to be set in host affinities and zonings) belongs.

-hba *hbawwpn*

Specify the WWPN for the HBA to be set in zonings.

Specify the WWPN for the HBA using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

-vt *vtwwpn*

Specify the WWPN for the virtual target to be set in zonings.

Specify the WWPN for the virtual target using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

Options that can be specified when the add operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are added. The "storageadm zone info" command is better for updating information after multiple settings have been made.

-f

Specify this option to forcibly set up WWPN zoning on a Fibre Channel switch where zoning has not been set up.

When specifying this option, check the security settings for the Fibre Channel switch. Specify this option only when setting up WWPN zoning.

Note that specifying this option will have no effect in the following situation (the command will run in the same way as if the option were omitted):

- When zoning settings have already been made on the target Fibre Channel switch

-s

Processing continues without the output of a confirmation message.
Only when -f option is specified, this option can be specified.

Options that can be specified when the delete operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are deleted. The "storageadm zone info" command is better for updating information after multiple settings have been deleted.

-s

Processing continues without the output of a confirmation message.

EXAMPLES

- Adding zoning settings between the HBA and a virtualization switch (virtual target)

  # /opt/FJSVssmgr/sbin/storageadm virtualzone add -hba 1111111111111111 -vt 2222222222222222

- Deleting zoning settings between the HBA and a virtualization switch (virtual target)

  # /opt/FJSVssmgr/sbin/storageadm virtualzone delete -hba 1111111111111111 -vt 2222222222222222

- Adding zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter

  # /opt/FJSVssmgr/sbin/storageadm virtualzone add -storage 1111111111111111,3 -ipaddr 10.10.10.10

- Deleting zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter.

  # /opt/FJSVssmgr/sbin/storageadm virtualzone delete -storage 1111111111111111,3 -ipaddr 10.10.10.10

NOTES

- The storage devices and Fibre Channel switches where settings are to be added or deleted must be registered with this software.
  This command cannot make settings for Fibre Channel switches where zoning settings have not been made. To perform zoning for Fibre Channel switches using this command, create provisional zoning before registering the Fibre Channel switches with this software. Refer to "Zoning setting" under "4.2.1.1 Setting" for information about how to create provisional zoning.
  If the -f option is specified, zoning settings can be made forcibly on Fibre Channel switches where zoning settings have not been made.
  However, if provisional zoning is created, or if settings are made forcibly by specifying the -f option, all accesses to zones other than those specified by the -f option will be blocked. For this reason, this action should not be taken while the target Fibre Channel switch environment is operating. Take this action either before operations start immediately after the Fibre Channel switch environment has been installed, or while operations are stopped.

- Fibre Channel switch zoning will be set up on the Fibre Channel switch equipped with the latest firmware in the fabric that contains the specified virtualization switch.

- When the "add" operand is specified, the channel adapter specified by the -storage option and the virtualization switch specified by the -ipaddr option must be connected, otherwise host affinities will not be set up on the storage device, zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the channel adapter and the virtualization switch with a Fibre Channel cable.

- When the "add" operand is specified, the HBA specified by the -hba option and the virtual target specified by the -vt option must be connected, otherwise zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the HBA and the virtual target with a Fibre Channel cable.

- Before executing this command, zone settings must be made (an affinity group must be created) on the ETERNUS disk storage system using either Storage Volume Configuration Navigator or ETERNUSmgr.

- This command only supports the ETERNUS VS900 model 300.

- A confirmation message will be output in the situations below. Enter "y" to continue or "n" to cancel. The confirmation message can be suppressed by specifying the -s option.

  - If the -f option is specified with the "add" operand but the -s option is not specified

  - If the -s option is not specified with the "delete" operand

  A confirmation message is as follows.

```
Are you sure? [y/n]:
```

SEE ALSO

Host affinity and zoning operation command (storageadm zone)

12.2.2 Starting and stopping daemons

This section explains the commands for starting and stopping daemons.

12.2.2.1   Starting and stopping the SNMP Trap monitoring daemon

Only OS administrator (root) user can execute following commands.

In the case of PRIMEQUEST environment

How to start a SNMP Trap-monitoring daemon

Input the following command to start a SNMP Trap-monitoring daemon

```
# /etc/init.d/sw-trapd start
```

How to stop a SNMP Trap-monitoring daemon

Input the following command to stop a SNMP Trap-monitoring daemon.

```
# /etc/init.d/sw-trapd stop
```

 Note

....

However, do not stop the daemon unless there is a special reason, for it affects software using snmptrapd (e.g.:PSA, ServerView).

....

How to check that a SNMP Trap-monitoring daemon has started

Input the following command to check if the process exists.

```
# /bin/ps -ef | grep nwsnmp-trapd | grep -v grep
```

In other cases than the PRIMEQUEST environment

Starting the SNMP Trap monitoring daemon

Enter the following command to start the SNMP Trap monitoring daemon:

```
# /opt/FJSVswstt/bin/mpnm-trapd start
```

Stopping the SNMP Trap monitoring daemon

Enter the following command to stop the SNMP Trap monitoring daemon:

```
# /opt/FJSVswstt/bin/mpnm-trapd stop
```

Checking the SNMP Trap monitoring daemon

Enter the following command to confirm if the process exists.

```
# /bin/ps -ef | grep nwsnmp-trapd | grep -v grep
```

12.2.2.2 Starting and stopping the daemons of the administrative server at specific times

Start or stop the following daemons in a batch operation:

- Admin server daemon

- SNMP Trap monitoring daemon

Only OS administrator (root) user can execute following commands.

Starting daemons of the administrative server

Enter the following command to start the administrative server:

```
# /opt/FJSVssmgr/sbin/managerctl start
```

Stopping daemons of the administrative server

Enter the following command to stop the administrative server:

```
# /opt/FJSVssmgr/sbin/managerctl stop
```

 Information

....

A SNMP Trap daemon is not stop in the PRIMEQUEST environment.

....

12.2.3 Troubleshooting information collection

This section explains the commands for collecting troubleshooting information of the Manager.

12.2.3.1 Troubleshooting information collection of Manager (managersnap)

NAME

managersnap - Collects the troubleshooting information of Manager

SYNOPSIS

```
/opt/FJSVssmgr/sbin/managersnap [-dir dirname] [-all]
```

DESCRIPTION

Collect information of the Manager on the administrative servers. Only OS administrator (root) user can execute this command.

The managersnap is the command used to collect information on administrative server when a problem occurs.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name for *dirname*.
When this option is omitted, the troubleshooting information is stored on /tmp directory.

The collected information is gathered in the file that its name starts by "managersnap_". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 40MB
All troubleshooting information	more than "80 + (2 * number of registered device)" MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

・ Collecting the troubleshooting information for initial investigation.

```
# /opt/FJSVssmgr/sbin/managersnap
```

12.2.4 Commands for storage management

The following sections explain the commands for managing the storage device.

The following table shows the correspondence between types of commands and the storage devices where they can be used. Only OS administrator (root) user can execute these commands. In the following table, "A" indicates "Available" and "N/A" indicates "Not Available".

Command name	ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 ETERNUS DX60/DX80	Other storage devices
storageadm disk	A	N/A
storageadm raid	A	N/A
storageadm volume	A	N/A
storageadm affinity	A	N/A
storageadm ecomode	A	N/A

12.2.4.1   Disk management command (storageadm disk)

NAME

storageadm disk - manages disks

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm disk info -ipaddr ipaddr [-csv]
```

DESCRIPTION

This command displays information of disks in the ETERNUS disk storage system that is registered in this software.

OPERANDS

info

Displays detail information of disks in the ETERNUS disk storage system that is registered in this software.

OPTIONS

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-csv

Displays the disk information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・ Displaying the disk information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm disk info -ipaddr 192.168.0.1
<<< Disk Information >>>
NUMBER DE   SLOT USAGE          STATUS    RGNO   SIZE  DISKTYPE MOTOR
------ ---- ---- -------------- --------- ------ ----- -------- ---------------
0      0x00 0    System Disk    Available 0x0002 300GB SAS      Active
```

```
1       0x00 1    System Disk    Available 0x0001 300GB SAS       Idle
2       0x00 2    System Disk    Available 0x0002 300GB SAS       In the boot process
3       0x00 3    System Disk    Available 0x0003 300GB SAS       In the stop process
4       0x00 4    Data Disk      Available 0x0003 300GB SAS       Active
-----------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

- Displaying the disk information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm disk info -ipaddr 192.168.0.1 -csv
NUMBER,DE,SLOT,USAGE,STATUS,RGNO,SIZE,DISKTYPE,MOTOR
0,0x00,0,System Disk,Available,0x0002,300GB,SAS,Active
1,0x00,1,System Disk,Available,0x0001,300GB,SAS,Idle
2,0x00,2,System Disk,Available,0x0002,300GB,SAS,In the boot process
3,0x00,3,System Disk,Available,0x0003,300GB,SAS,In the stop process
4,0x00,4,Data Disk,Available,0x0003,300GB,SAS,Active
```

12.2.4.2   RAID management command (storageadm raid)

NAME

storageadm raid - manages RAID groups

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm raid add -ipaddr ipaddr -disk
DE_number:slot_number,DE_number:slot_number[,DE_number:slot_number,...] -level RAIDlevel [-name
alias_name] [-cm assigned_CM] [-csv]
/opt/FJSVssmgr/sbin/storageadm raid delete -ipaddr ipaddr -raidgroup RAIDGroup_number [-f] [-s]
/opt/FJSVssmgr/sbin/storageadm raid info -ipaddr ipaddr [-raidgroup RAIDGroup_number] [-csv]

/opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr ipaddr -raidgroup RAIDGroup_number
[,RAIDGroup_number,...] -on|-off [-s]
```

DESCRIPTION

This command is used to create/delete/display a RAID group in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates a RAID group

delete

Deletes a RAID group

info

Displays a RAID group information

ecomode

Sets eco-mode for the RAID group

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-disk *DE_number:slot_number,DE_number:slot_number*[,*DE_number:slot_number,...*]

Specify DE numbers and slot numbers for the storage device using either decimal or hexadecimal notation, placing a colon (":") in the middle of each DE number and slot number pair, and using commas (",") to separate pairs. For example, two pairs can be specified as "-disk 1:1, 1:2" in decimal notation or "-disk 0x1:0x1,0x1:0x2" in hexadecimal notation.

Be sure to specify at least two DE number/slot number pairs.

-level *RAIDlevel*

Specify the RAID level by the minuscule as follows.

Characters that can be specified	Created RAID level
raid0	RAID0
raid1	RAID1
raid1+0	RAID1+0
raid5	RAID5
raid6	RAID6

-name *alias_name*

Specify an alias for the RAID group to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-cm *assigned_CM*

Specify the assigned CM number for the RAID group using two digits, as in the following table. If this option is omitted, the assigned CM number will be set up automatically ("auto" will be specified).

Storage device	Assigned CM	Characters to be specified	Remarks
ETERNUS DX60/DX80 ETERNUS2000	CM#0	00	For the first digit, enter the assigned CM number.
	CM#1	10	For the second character, always enter "0".
Other	CM#0 CPU#0	00	For the first digit, enter the assigned CM number.
	CM#0 CPU#1	01	For the second digit, enter the number of the CPU within the CM entered for the first digit.
	CM#1 CPU#0	10	
	CM#1 CPU#1	11	
	:	:	
	CM#7 CPU#0	70	
	CM#7 CPU#1	71	

-csv

Displays the RAID group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number to be deleted, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-s

Processing continues without the output of a confirmation message.

-f

If there are volumes within the RAID group, the volumes will be deleted before the RAID group is deleted. However, the command will terminate with an error without deleting the volumes if any of the following conditions apply to the RAID group:

- The volumes in the RAID group have been mapped

- There are volumes other than open volumes

- There are LUN concatenated volumes

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number for which detailed information is to be displayed, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-csv

Displays the RAID group information in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the ecomode operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup [*RAIDGroup_number,* ...]

Specify the RAID group number for which detailed information is to be displayed, using decimal and/or hexadecimal notations.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-on

Set eco-mode to ON for the specified RAID group. The only possible specifications are -off and -on. This option cannot be set if eco-mode cannot be set for any one of the specified RAID groups.

-off

Set eco-mode to OFF for the specified RAID group. The only possible specifications are -off and -on.

-s

Continues processing without asking for confirmation.

EXAMPLES

・ Creating a RAID group and displaying the created RAID group in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid add -ipaddr 1.2.3.4 -disk 1:10,1:11,1:12,1:13,1:14,1:15 -
level raid5
<<< RAID ADD >>>
RGNO
------
0x0000
------
INFO:swsag0001:Command terminated normally.
```

・ Creating a RAID group and displaying the created RAID group in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid add -ipaddr 1.2.3.4 -disk 1:10,1:11,1:12,1:13,1:14,1:15 -
level raid5 -csv
RGNO
0x0000
```

・ Deleting a RAID group.

```
# /opt/FJSVssmgr/sbin/storageadm raid delete -ipaddr 1.2.3.4 -raidgroup 16
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4
<<< RAID Information >>>
RGNO    NAME USAGE        LEVEL   STATUS    CM       TOTAL_CAPACITY FREE_CAPACITY
------ ---- ----------- ------- --------- -------- -------------- -------------
0x0000      Open,System RAID5   Available  CM0CPU0  407775          0
0x0001      Open,SDV    RAID5   Available  CM1CPU0  410880          285440
0x0002      Open        RAID1   Available  CM0CPU1  136960          345367
-------------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY
0x0000,,"Open,System",RAID5,Available,CM0CPU0,407775,0
0x0001,,"Open,SDV",RAID5,Available,CM1CPU0,410880,285440
0x0002,,Open,RAID1,Available,CM0CPU1,136960,345367
```

・ Displaying the RAID group detail information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -raidgroup 0x0000
<<< RAID Information >>>
RGNO    NAME USAGE        LEVEL   STATUS    CM       TOTAL_CAPACITY FREE_CAPACITY
------ ---- ----------- ------- --------- -------- -------------- -------------
0x0000      Open,System RAID5   Available CM0CPU0  407775          0

NO      CONCATENATION NAME        TOTAL_CAPACITY ALLOCATED     STATUS    TYPE
                                                 CAPACITY
------ ------------- ----------- -------------- ------------- --------- -------
0x0001 1/3           sample      102400         102400        Available Open
0x0001 2/3           sample      1024           1024          Available Open
Free   -                         2048           2048
0x0004 -                         1536           1536          Available Open
-------------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group detail information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm raid info -ipaddr 1.2.3.4 -raidgroup 0x0000 -csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY,NO,CONCATENATION,NAME,TOTAL_CAPACITY
,ALLOCATED_CAPACITY,STATUS,TYPE
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,1/3,sample,
102400,102400,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,2/3,sample,1024,1024,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,Free,-,,2048,2048,,
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0004,-,,1536,1536,Available,Open
```

・ RAID group eco-mode set to ON.

```
# /opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr 1.2.3.4 -raidgroup 0x0000 -on
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ RAID group eco-mode set to OFF.

```
# /opt/FJSVssmgr/sbin/storageadm raid ecomode -ipaddr 1.2.3.4 -raidgroup 0x0000 -off
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

NOTES

・ The following confirmation message will be output if the -s option is not specified with the "delete" operand. Enter "y" to continue or "n" to cancel.
This confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Setting eco-mode for a RAID group with an eco-mode schedule already set results in the following:

- RAID group eco-mode set to ON -> Eco-mode ON overwrites the RAID group eco-mode schedule.

- RAID group eco-mode set to OFF -> An error occurs (unless the eco-mode schedule is software-controlled),.

・ If eco-mode operation is not possible for the specified RAID group, then the command terminates with an error.
For details of RAID groups for which eco-mode operatioin is not possible, refer to "1.3.4 Energy-saving operation for storage device" > "Uncontrollable RAID groups".

12.2.4.3 Volume management command (storageadm volume)

NAME

storageadm volume - manages volumes

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm volume add -ipaddr ipaddr -size capacity -raidgroup RAIDGroup_number [-
name alias_name] [-csv]
/opt/FJSVssmgr/sbin/storageadm volume delete -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-s]
/opt/FJSVssmgr/sbin/storageadm volume format -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-s]
/opt/FJSVssmgr/sbin/storageadm volume info -ipaddr ipaddr [-volume volume_number,...] [-csv]
/opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr ipaddr [-volume volume_number,...] [-csv]
```

DESCRIPTION

This command is used to create/delete/format/display volumes in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

> Creates a volume.

delete

> Deletes volumes.

format

> Formats volumes.

info

> Displays volume information.

nomapping

> Displays the information of volumes that are not mapped to affinity group.

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-size *capacity*

> Specify the size of the volume to be created in MB or GB. 1 GB is equivalent to 1024 MB.
> For example, 1024 MB is specified as "-size 1024MB" or "-size 1GB".

-raidgroup *RAIDGroup_number*

> Specify the RAID group number for which a volume is to be created, using either decimal or hexadecimal notation.
> For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-name *alias_name*

> Specify an alias for the volume to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.
>
> Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

> Displays the created volume number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand or format operand is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

> Specify the numbers for the volumes to be deleted or formatted, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
> For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the info operand or nomapping operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Enter the number of the volume to be output for which information is to be output, using either decimal or hexadecimal notation.
If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

If this option is omitted, information will be displayed for all target volumes.

-csv

Displays the volume information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・ Creating a volume and displaying the created volume in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume add -ipaddr 1.2.3.4 -size 1024MB -raidgroup 16
<<< Volume ADD >>>
NUMBER
------
0x0001
------
INFO:swsag0001:Command terminated normally.
```

・ Creating a volume and displaying the created volume in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume add -ipaddr 1.2.3.4 -size 1024MB -raidgroup 16 -csv
NUMBER
0x0001
```

・ Deleting a volume.

```
# /opt/FJSVssmgr/sbin/storageadm volume delete -ipaddr 1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Formatting a volume.

```
# /opt/FJSVssmgr/sbin/storageadm volume format -ipaddr 1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Displaying the volume information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume info -ipaddr 1.2.3.4
<<< Volume Information >>>
NUMBER   NAME     TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO   ENCRYPT
-------  -------- -------------- --------- ------ ------------- ------ -------
Unknown           0              Available F6427G -             0x0001 -
0x0001            100            Available SDV    -             0x0000 -
0x0002            425            Available Open   -             0x0002 -
Unknown           1166           Available MVV(G) -             0x0001 -
Unknown           2332           Available MVV(G) 2             0x0001 -
0x0005            150            Available Open   -             0x0002 -
0x0006            4700           Available Open   3             0x0000,0x0002 -
```

```
--------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the volume information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume info -ipaddr 1.2.3.4 -csv
NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
Unknown,,0,Available,F6427G,-,0x0001,-
0x0001,,100,Available,SDV,-,0x0000,-
0x0002,,425,Available,Open,-,0x0002,-
Unknown,,1166,Available,MVV(G),-,0x0001,-
Unknown,,2332,Available,MVV(G),2,0x0001,-
0x0005,,150,Available,Open,-,0x0002,-
0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

・ Displaying the unused volume information in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr 1.2.3.4
<<< Volume Information >>>
NUMBER   NAME     TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO   ENCRYPT
-------- -------- -------------- --------- ------ ------------- ------ -------
Unknown           0              Available F6427G -             0x0001 -
0x0001            100            Available SDV    -             0x0000 -
0x0002            425            Available Open   -             0x0002 -
Unknown           1166           Available MVV(G) -             0x0001 -
Unknown           2332           Available MVV(G) 2             0x0001 -
0x0005            150            Available Open   -             0x0002 -
0x0006            4700           Available Open   3             0x0000,0x0002 -
--------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the unused volume information in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm volume nomapping -ipaddr 1.2.3.4 -csv
NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
Unknown,,0,Available,F6427G,-,0x0001,-
0x0001,,100,Available,SDV,-,0x0000,-
0x0002,,425,Available,Open,-,0x0002,-
Unknown,,1166,Available,MVV(G),-,0x0001,-
Unknown,,2332,Available,MVV(G),2,0x0001,-
0x0005,,150,Available,Open,-,0x0002,-
0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

NOTES

・ Only open volumes can be created.

・ The volumes that are created are formatted automatically.

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "format" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Volumes cannot be deleted by specifying the volume numbers for volumes that are not open volumes.

・ Volumes cannot be deleted by specifying the volume numbers for LUN concatenated volumes.

・ Volumes that have been mapped to an affinity group cannot be deleted.

・ The Thin Provisoning Volume is not able to create. However, it possible to remove.

12.2.4.4   AffinityGroup management command (storageadm affinity)

NAME

storageadm affinity - manages affinity groups

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr ipaddr -volume volume_number[,volume_number,...]
[-lun LUN_number] [-affinitygroup affinitygroup_number] [-name alias_name] [-csv]
/opt/FJSVssmgr/sbin/storageadm affinity delete -ipaddr ipaddr -affinitygroup affinitygroup_number [-
s]
/opt/FJSVssmgr/sbin/torageadm affinity update -ipaddr ipaddr -affinitygroup affinitygroup_number {-
add -volume volume_number[,volume_number,...] [-lun LUN_number[,LUN_number,...]] | -delete [-volume
volume_number[,volume_number,...] | -lun LUN_number[,LUN_number,...]]} [-s]
/opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr ipaddr [-affinitygroup affinitygroup_number] [-
csv]
```

DESCRIPTION

This command is used to create/delete/modify/display affinity groups in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates an affnity group.

delete

Deletes an affinity group.

update

Updates the configuration of an affinity group.

info

Displays the affinity group information.

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Specify the number of the volume to be set to an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.

-lun *LUN_number*,...

Specify the LUN number to be allocated to the volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified, use commas (",") to separate LUN numbers.
For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.

If this option is omitted, LUN numbers will be allocated in order, starting from 0.

-affinitygroup *affinitygroup_number*

Specify the affinity group number to be created, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

If this option is omitted, the affinity group numbers that can be created within the target storage device will be allocated automatically.

-name *alias_name*

Specify an alias for the affinity group to be created. This option is required for ETERNUS2000, but can be omitted for ETERNUS4000 and ETERNUS8000. If this option is omitted, an alias will not be set up.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

Displays the created affinity group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group to be deleted, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the update operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group whose configuration is to be changed, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-add

Adds volumes in the affinity group.
When the number for the allocated volume/LUN is specified, this command terminates abnormally.

-delete

Deletes volumes from an affinity group.
The command will terminate abnormally if a volume number or LUN number of a volume that has not been mapped is specified, or if deleting the specified mapping will mean that there are no more mappings.

-volume *volume_number*[,*volume_number*,...]

Specify the volume number of the volume to be added to or deleted from an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.

This option cannot be specified together with the -lun option when deleting volumes from an affinity group. Delete volumes by specifying either this option or the -lun option, not both together.

-lun *LUN_number*[,*LUN_number*,...]

Specify the LUN number to be allocated to a volume or released from a volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified,

use commas (",") to separate LUN numbers.

For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.

If this option is omitted when LUN numbers are being allocated, LUN numbers will be automatically allocated, starting with the smallest free LUN number.

When LUN numbers are being released from volumes, this option cannot be specified together with the -volume option. Release LUN numbers by specifying either this option or the -volume option, but not both together.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group for which detailed information is to be displayed, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

If this option is omitted, a list of affinity groups will be displayed.

-csv

Displays the affinity group information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

- Creating an affnity group and displaying the created affinity group in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr 1.2.3.4 -volume 16,17,18 -lun 0,1,2 -
affinitygroup 16
<<< AffinityGroup ADD >>>
NUMBER
------
0x0010
------
INFO:swsag0001:Command terminated normally.
```

- Creating an affnity group and displaying the created affinity group in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity add -ipaddr 1.2.3.4 -volume 16,17,18 -lun 0,1,2 -
affinitygroup 16 -csv
NUMBER
0x0010
```

- Deleting an affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity delete -ipaddr 1.2.3.4 -affinitygroup 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

- Adding a LUN in the affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity update -ipaddr 1.2.3.4 -affinitygroup 16 -add -volume 19
-lun 3
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Deleting a LUN from the affinity group.

```
# /opt/FJSVssmgr/sbin/storageadm affinity update -ipaddr 1.2.3.4 -affinitygroup 16 -delete -volume
19
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・ Displaying the affinity group lists in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4
<<< AffinityGroup Information >>>
NUMBER NAME
------ -------------
0x0000 AG00
0x0001 AG01
0x0002 AG02
0x0003 AG03
-------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the affinity group lists in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -csv
NUMBER,NAME
0x0000,AG00
0x0001,AG01
0x0002,AG02
0x0003,AG03
```

・ Displaying the affinity group detail information (mapping) in the table format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -affinitygroup 16
<<< AffinityGroup Information >>>
NUMBER NAME            LUN    VOLUME  VOLUME NAME
------ ------------- ------ ------- ----------------------
0x0010 abcd          0x0000 0x0001  sample
                     0x0002 0x0004
----------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the affinity group detail information (mapping) in the CSV format.

```
# /opt/FJSVssmgr/sbin/storageadm affinity info -ipaddr 1.2.3.4 -affinitygroup 16 -csv
NUMBER,NAME,LUN,VOLUME,VOLUME NAME
0x0010,abcd,0x0000,0x0001,sample
0x0010,abcd,0x0002,0x0004,
```

NOTES

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "update" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ The command will terminate abnormally if the -delete option is specified with the "update" operand in such a way that there are no items of mapping information for the affinity group.

・ The command will terminate abnormally if the number for a following volume that cannot be set to an affinity group is specified with the "update" operand.

  - The volumes that do not exist in the storage device

- The volumes other than open volumes

- The LUN concatenated volumes

12.2.4.5 Eco-mode command (storageadm ecomode)

NAME

storageadm ecomode － Operates the eco-mode

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm ecomode on -ipaddr ipaddr
/opt/FJSVssmgr/sbin/storageadm ecomode off -ipaddr ipaddr [-s]
/opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr ipaddr [-csv]
```

DESCRIPTION

This command toggles and displays eco-mode information for ETERNUS disk storage systems registered to this product.

OPERANDS

on

Sets eco-mode to ON.

off

Sets eco-mode to OFF.

info

Displays eco-mode status.

OPTIONS

When on is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

When off is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-s

Continues processing without asking for confirmation.

When info is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-csv

Displays the eco-mode status of the ETERNUS disk storage system in CSV format.

EXAMPLES

・ Setting eco-mode to ON:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode on -ipaddr 1.2.3.4
INFO:swsag0001:Command terminated normally.
```

・ Setting eco-mode to OFF:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode off -ipaddr 1.2.3.4
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ Displaying eco-mode information:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr 1.2.3.4

<<< EcoMode Information>>
STATUS
------
ON
------
INFO:swsag0001:Command terminated normally.
```

・ Displaying eco-mode information in CSV format:

```
# /opt/FJSVssmgr/sbin/storageadm ecomode info -ipaddr 1.2.3.4 -csv
STATUS
ON
```

NOTES

・ If off is specified without -s, then the confirmation message below is displayed:

```
Are you sure? [y/n]:
```

・ If the device eco-mode settings are as follows, the command terminates with an error:

An error occurs if the eco-mode is already on when the processing to switch eco-mode on is executed.

12.2.4.6 Performance monitoring command（storageadm perfctl）

NAME

storageadm perfctl － Performs monitoring operations

SYNOPSIS

```
/opt/FJSVssmgr/sbin/storageadm perfctl start -ipaddr ipaddr [-interval time]
/opt/FJSVssmgr/sbin/storageadm perfctl stop -ipaddr ipaddr
/opt/FJSVssmgr/sbin/storageadm perfctl status -ipaddr ipaddr
```

DESCRIPTION

This command starts and stops performance monitoring for the NR1000F series and displays the performance monitoring status.

OPERANDS

start

Starts performance monitoring.

stop

Stops performance monitoring.

status

Displays the performance monitoring status.

OPTIONS

When start is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-interval *time*

Specify either 10, 30, 60, or 300 (seconds unit) as the performance monitoring interval. If this option is omitted, monitoring is performed at 30 second intervals.

When stop is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

When status is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

EXAMPLES

・ Starting performance monitoring at 60-second intervals.

```
# /opt/FJSVssmgr/sbin/storageadm perfctl start -ipaddr 1.2.3.4 -interval 60
```

・ Stopping performance monitoring.

```
# /opt/FJSVssmgr/sbin/storageadm perfctl stop -ipaddr 1.2.3.4
```

・ Displaying the performance monitoring status.

```
# /opt/FJSVssmgr/sbin/storageadm perfctl status -ipaddr 1.2.3.4

<<< Performance Monitor Status>>
DEVICE_NAME(IP_ADDRESS)          STATUS              INTERVAL[SEC]
-------------------------------- ------------------- --------------
NR1000F(1.2.3.4)                 Monitoring          60
----------------------------------------------------------------

INFO:swsag0001:Command terminated normally.
```

Status description

・ The table below shows the status types and their meanings:

Monitoring	Normal monitoring is in progress.
Stop	Performance monitoring is stopped.
Recovering	Retry is in progress, after communication was interrupted or an attempt failed.
Error	Stopped with an error, after an unsuccessful retry. Collect the required troubleshooting data and then contact the Fujitsu systems engineer (SE). For details, refer to "D.1 Troubleshooting information"

NOTES

- The NR1000F series must be registered in this product.

- If NR1000F series performance is to be monitored when creating new storage in a manually incorporated device, then use the settings below:

  For "product type", select "NR1000F".

  Specify the **-ipaddr** option.

- If -interval is set to a value other than 10, 30, 60, or 300, then the actual interval is set according to the table below (an error will occur if it is set to a negative value or a value greater than or equal to 2147483648):

-interval *time* values	Monitoring interval (in secs)
time = 0	30
0 < *time* <= 10	10
10 < *time* <= 30	30
30 < *time* <= 60	60
60 < *time*	300

12.3 [Windows Version] Administrative Server Commands

This section explains command operations on the Windows administrative server.

12.3.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.3.1.1 Administrator login account creation command (rcxcert)

NAME

rcxcert - creates administrative login account

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVrcxmr\sbin\rcxcert setup
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command sets administrative login account and perform creation of a CLI encryption key.
Only user of OS administrative group can execute this command. This command only can execute when admin server stop.

OPTIONS

None.

USAGE

Execute "rcxcert" command in "$INS_DIR\Manager\opt\FJSVrcxmr\sbin" directory.

This command set the parameter by the following interface.

```
Input a new CLI crypt key [length:4-56]: any key

Are you sure? [y,n,q?] y

Input a new user name [length:1-16]: username

Input a new password [length:1-16]: password

Retype a new password [length:1-16]: password

Are you sure? [y,n,q?] y
```

CLI encryption key

Please enter the CLI encryption key to be used (between 4 and 56 characters). Double-byte characters, single-byte alphanumerical characters, symbols, and strings composed entirely of single or double-byte characters can be used. Notice that CLI encryption is required for ETERNUS SF Storage Cruiser internal use only, and users don't have to remember the key.

Username

Enter the user name of the login account for administrators (between 1 and 16 characters). The name must start with an alphabetic character, and alphanumerical characters (including underscores, "_", periods, ".", and hyphens, "-") can be used.

Password

Enter the password of the login account for administrators (between 1 and 16 characters). The password is a string of alphanumerical characters and symbols, but can not start with "{".

Password confirmation

For password confirmation, enter the password of the administrator again.

EXAMPLES

```
C:\> cd "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVrcxmr\sbin"
C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVrcxmr\sbin> rcxcert setup
```

12.3.1.2   SNMP Trap transmission place IP address change command (sanadm chtraprcvip)

NAME

sanadmsh chtraprcvip - changes SNMP Trap transmission place IP address

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\bin\sanadm chtraprcvip -h
$INS_DIR\Manager\opt\FJSVssmgr\bin\sanadm chtraprcvip -all -oldip xxx.xxx.xxx.xxx [-newip
yyy.yyy.yyy.yyy]
$INS_DIR\Manager\opt\FJSVssmgr\bin\sanadm chtraprcvip DeviceID -oldip xxx.xxx.xxx.xxx [-newip
yyy.yyy.yyy.yyy]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

After the IP address of the administrative server is changed, this command deletes from the devices registered with this software, the old IP address of the administrative server that is the SNMP Trap transmission place address, and then adds the new IP address. Only user of OS administrative group can execute this command.

Although the SNMP Trap transmission place setting for a device may be changed with the Management Software on the device, this software provides this command to facilitate the changing of the transmission place.

OPTIONS

-h

Displays help about the argument format of this command.

-all

Makes the SNMP Trap transmission place settings for all devices managed by this software. Executing the command specified with this argument places device names and execution results in execution order on the standard output. If the administrative server has more than one IP address because, for example, the administrative server is connected to multiple subnets, the correct SNMP Trap transmission place may not be set for a device. After making this setting, therefore, check whether the correct administrative server address is set as the SNMP Trap transmission place address on the device.

DeviceID

Executes SNMP Trap transmission place setting for selected devices. Specify the device type in one of the device recognition methods listed in the table below:

Device type	Device recognition methods (one of which must be specified)
-host -storage -library -switch -hub -bridge	ip:xxx.xxx.xxx.xxx sysname:SysName name of SNMP set in the device nickname:Device management name that is set by this software.

-oldip *xxx.xxx.xxx.xxx*

Specify the old IP address of the administrative server. Delete this IP address from the SNMP transmission place address of managed devices.

-newip *yyy.yyy.yyy.yyy*

Specify the new IP address of the administrative server. Add this IP address to the SNMP transmission place address of managed devices. If this argument is omitted, the IP address of the new administrative server is automatically specified. Fujitsu recommends that the argument be entered giving consideration to administrative servers having multiple IP addresses.

USAGE

Execute the command after changing the IP address of Manager. The command is executed either for all devices managed by this software or for selected devices.

Devices that can be targets of the command are devices for which SNMP Trap transmission settings can be defined automatically from this software.

The monitoring status of every target device must be normal.

EXAMPLES

· Execute SNMP Trap transmission place change processing for all managed devices that can automatically make the SNMP Trap transmission place settings.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\bin\sanadm" chtraprcvip -all -oldip
10.10.10.10 -newip 20.20.20.20
```

· Execute SNMP Trap transmission place change processing for the server node for which sysname is defined in host1.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\bin\sanadm" chtraprcvip -host sysname:host1 -
oldip 10.10.10.10 -newip 20.20.20.20
```

12.3.1.3   SN200 (Brocade), BX600 Fibre Channel switch blades SNMP Trap test (swtraptest)

NAME

swtraptest - tests of SNMP Trap

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\bin\swtraptest fibre-channel-switch-ip-address
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell.

A simulated Fibre Channel switch SNMP Trap (FC Port fault) is created and issued to the administrative server.

For *fibre-channel-switch-ip-address*, specify the IP address of the Fibre Channel switch which is to check the SNMP trap setting by this command.

The Fibre Channel switch must be a device managed by this software.

OPTIONS

None.

EXAMPLES

· Executing this command for a Fibre Channel switch whose IP address is 11.11.11.11

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\bin\swtraptest" 11.11.11.11
```

NOTES

Even the input IP address is not for a FC device, this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.3.1.4 ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 and GR SNMP Trap test (grtraptest)

NAME

grtraptest - tests of SNMP Trap

SYNOPSIS

`$INS_DIR\Manager\opt\FJSVssmgr\bin\grtraptest` *storage-ip-address*

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command checks whether this software can receive an SNMP Trap correctly, display an event, and cooperate with Systemwalker Centric Manager and Shell/Bat.

The administrative server internally generates pseudo SNMP traps (FAN fault) of the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000 and GR device, and issues them to the administrative server itself.

For *storage-ip-address*, specify the IP address of the storage which is to check the SNMP trap setting by this command.

The storage device must be a device managed by this software.

OPTIONS

None.

EXAMPLES

・ Executing the command for a storage device whose IP address is 12.12.12.12.

`"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\bin\grtraptest" 12.12.12.12`

NOTES

Even the input IP address is other than ETERNUS8000,ETERNUS6000, ETERNUS4000,ETERNUS3000, ETERNUS2000, GR series, and this command can be executed.
In this case, it executes as the event of device which IP address is input.

12.3.1.5 Shared SNMP Trap Port Command (mpmsts)

NAME

mpmsts - shares the SNMP Trap port

SYNOPSIS

`$INS_DIR\Manager\opt\FJSVswstt\bin\mpmsts ON|OFF`

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command enables the SNMP Trap port to function properly in systems where both ESC Manager and another Administrative software are operating. When the SNMP Trap monitor service starts, this command does specification that automatically starts Microsoft SNMP Trap Service. Only user of OS administrative group can execute this command.

Whenever Microsoft SNMP Trap Service is started, SNMP trap is received by way of Microsoft SNMP Trap Service.

OPERANDS

ON

Start Microsoft SNMP Trap Service automatically when SNMP Trap monitor service is start.

OFF

Turn OFF the automatic start of Microsoft SNMP Trap Service.

USAGE

Execute the mpmsts command in *management-server-environment-setup-directory*\Manager\opt\FJSVswstt\bin directory.

Please execute this command in the environment with Microsoft SNMP Trap Service, and reboot your system.

EXAMPLES

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVswstt\bin\mpmsts" ON
```

12.3.1.6   Host affinity and zoning operation command (storageadm zone)

NAME

storageadm zone - operates the host affinity and Fibre Channel switch zoning

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm zone add -storage cawwpn,affinitygroup -hba hbawwpn
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm zone delete -storage cawwpn,affinitygroup -hba
hbawwpn
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm zone info [-ipaddr ipaddr[,ipaddr,...]]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command is used to set/delete/display the storage device host affinity and Fibre Channel switch zoning. Only user of OS administrative group can execute this command.

Specify the storage device CA WWPN, affinity group, and WWPN of the set HBA in the command parameter to set/delete the storage device host affinity and Fibre Channel switch zoning. The set host affinity and zoning is also displayed.

The target storage device and Fibre Channel switch must be devices managed by this software.

OPERANDS

add

This sets the host affinity and zoning.

delete

> This deletes the host affinity and zoning.

info

> This displays the host affinity and zoning.

-storage *cawwpn,affinitygroup*

> Specify the storage device CA WWPN and affinity group for which the host affinity is set or deleted.

-hba *hbawwpn*

> Specify the WWPN of the HBA set for host affinity and zoning.

-ipaddr *ipaddr*[*,ipaddr,...*]

> Displays the host affinity information set in the specified IP address, Fibre Channel switch zoning information, or storage device CA.
>
> To display more than one item of storage device information, specify the IP address using a comma (",").
>
> If this omitted, all the storage device and Fibre Channel switch information registered in this software is displayed.

EXAMPLES

- Adding the host affinity and zoning

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" zone add -storage
1111111111111111,3 -hba 2222222222222222
```

- Deleting the host affinity and zoning

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" zone delete -storage
1111111111111111,3 -hba 2222222222222222
```

- Displaying the host affinity and zoning

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" zone info
<<< FC Switch Zone Information >>>
DEVICE_NAME(IP_ADDRESS)        ZONE_NAME       ZONE_WWPN
------------------------------ --------------- ---------------------------------
Switch1(10.10.10.10)           SNM_0001        1111111111111111;2222222222222222
                               SNM_0002        3333333333333333;4444444444444444
--------------------------------------------------------------------------------

<<< FC CA Zone Information >>>
DEVICE_NAME(IP_ADDRESS)        CA_WWPN          AFFINITY_GROUP  HBA_WWPN
------------------------------ --------------- --------------- ----------------
E4000M300(10.10.10.11)         1111111111111111 3              2222222222222222
--------------------------------------------------------------------------------
```

NOTES

- The storage device and Fibre Channel switch for which set/delete/display is performed must have been registered in this software.

  This command cannot be used to register Fibre Channel switches is zoning has not been set. Create a temporary zone and then register the Fibre Channel switch in this software. Refer to "4.2.1.1 Setting" for details on creating temporary zones.

- Please execute this command after confirming the state of the server is below. (When the server where HBA specified for "-hba" option is installed is registered in this software.)

    - The server had to have started when "Add" option was specified.

    - The server had to have stopped when "Delete" option was specified.

- Fibre Channel switch zoning is set for the Fibre Channel switch connected to the specified storage device CA.

- The Fibre Channel switch and storage device must be connected using a Fibre Channel cable. If the Fibre Channel cable is not connected, Fibre Channel switch zoning is not set. Connect the Fibre Channel cable, and then re-execute the command.

- Zone settings (creation of the AffinityGroup) must be configured in the ETERNUS disk array device in advance, using Storage Volume Configuration Navigator or ETERNUSmgr.

- Only the ETERNUS SN200 (except model 250M) and Brocade (except AP7420) Fibre Channel switch and PRIMERGY BX600 switch blades are supported.
For ETERNUS VS900 model 300, only "info" operand is supported. When ETERNUS VS900 model 300 is specified at the "info" operand, the WPN of the virtual initiator of ETERNUS VS900 model 300 is displayed on the HBA_WWPN line of <<< FC CA Zone Information >>>.

- The following conformation message is output when "delete" is specified. To continue, enter 'y'. To cancel, enter 'n'.

```
Are you sure? [y/n]:
```

12.3.1.7   Performance information operation command (storageadm perfdata)

NAME

storageadm perfdata - operates the performance information

SYNOPSIS

$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm perfdata export *outdirname* -ipaddr *ipaddr* [-date *start_time*[-*end_time*]]

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command outputs the performance information of the storage devices and Fibre Channel switches. Only user of OS administrative group can execute this command.

By specifying the IP address of the device that outputs the performance information and the date in the command operand, the storage device and Fibre Channel switch performance information is output in CSV format.

The target storage device and Fibre Channel switch must be devices managed by this software when performance monitoring is either still running or already completed.

The supported devices are as follows.

- ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000

- The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

The details of CSV files are as follows.

The port information of Fibre Channel switch

Items	Explanation
File name	PORT.csv

Header line	- Case of ETERNUS SN200 series
	  Date,PortX - Tx Throughput, PortX - Rx Throughput, PortX - CRC Error, ...
	
	- Case of ETERNUS SN200 MDS series
	  Date,PortX - Tx Throughput, fcX/X - Rx Throughput, fcX/X - CRC Error, ...

Data line	*date,port0s,port0r,port0e, ... ,portNs,portNr,portNe* The following information is output for each field. (After *date*, the information is repeated for the actual number of ports.)

Items	Explanation
	date : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *port0s* : Port0 Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *port0r* : Port0 Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *port0e* : Port0 Number of CRC errors at *date* (Decimal notation. The unit is Count.) *portNs* : PortN Transfer rates of send data at *date* (Decimal notation. The unit is MB/S.) *portNr* : PortN Transfer rates of receive data at *date* (Decimal notation. The unit is MB/S.) *portNe* : PortN Number of CRC errors at *date* (Decimal notation. The unit is Count.)

The CM performance information of storage device

ETERNUS8000 models 700, 900, 1100 and 2100, ETERNUS4000 models 300 and 500, ETERNUS2000

Items	Explanation
File name	CM.csv
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX - Copy Remain, ...
Data line	*date,CM00u,CM00r, ... ,CMNNu,CMNNr* The following information is output for each field. (After *date*, the information is repeated for the actual number of CMs.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *CM00u* : CM0x00:CPU0 (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CM00r* : CM0x00:CPU0 (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.) *CMNNu* : CM0xNN:CPUN (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CMNNr* : CM0xNN:CPUN (*1) CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

*1: The CPU number is not output when the storage device is ETERNUS2000.

ETERNUS8000 models 800, 1200 and 2200, ETERNUS4000 models 400 and 600

Items	Explanation
File name	CM/*nnnn*.csv (*nnnn* indicates the CM number by hexadecimal notation. CM numbers are assigned in ascending order, starting with 0000 for the lowest CM CPU number in the device. CM0x0 CPU0 is 0000, CM0x0 CPU1 is 0001, CM0x1 CPU0 is 0002, CM0x1 CPU1 is 0003, : CM0x7 CPU0 is 000E, CM0x7 CPU1 is 000F.)
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX(ROE) - CPU Use Rate, CM0xXX:CPUX - Copy Remain
Data line	*date,cpu,roe,remain* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *cpu* : CM0xXX:CPUX CPU Load at *date* (Decimal notation. The unit is %.) *roe* : CM0xXX:CPUX ROE Load at *date* (Decimal notation. The unit is %.) *remain* : CM0xXX:CPUX CM Copy remaining amount at *date* (Decimal notation. The unit is GB.)

The LogicalVolume performance information of storage device

Items	Explanation
File name	LogicalVolume/*nnnn*.csv (*nnnn* indicates the LogicalVolume number by hexadecimal notation.)

Items	Explanation
Header line	Date, LogicalVolume0xXXXX - Read IOPS, LogicalVolume0xXXXX - Write IOPS, LogicalVolume0xXXXX - Read Throughput, LogicalVolume0xXXXX - Write Throughput, LogicalVolume0xXXXX - Read Response Time, LogicalVolume0xXXXX - Write Response Time, LogicalVolume0xXXXX - Read Cache Hit Rate, LogicalVolume0xXXXX - Write Cache Hit Rate, LogicalVolume0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The RAIDGroup performance information of storage device

Items	Explanation
File name	RAIDGroup/*nnnn*.csv (*nnnn* indicates the RAIDGroup number by hexadecimal notation.)
Header line	Date, RAIDGroup0x0xXXXX - Read IOPS, RAIDGroup0x0xXXXX - Write IOPS, RAIDGroup0x0xXXXX - Read Throughput, RAIDGroup0x0xXXXX- Write Throughput, RAIDGroup0x0xXXXX - Read Response Time, RAIDGroup0x0xXXXX - Write Response Time, RAIDGroup0x0xXXXX - Read Cache Hit Rate, RAIDGroup0x0xXXXX - Write Cache Hit Rate, RAIDGroup0x0xXXXX - Prefetch Cache Hit Rate,
Data line	*date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date* (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date* (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date* (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date* (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date* (Decimal notation. The unit is %.)

The Disk performance information of storage device

Items	Explanation
File name	Disk/*nnnn*.csv (*nnnn* indicates the DE number by hexadecimal notation.)
Header line	Date, DE0xXX:SlotX - busy time, ...
Data line	*date,Disk0, ... ,DiskN* The following information is output for each field. (After *date*, the information is repeated for the actual number of Disks.) *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *Disk0* : Disk0 Disk busy rate at *date* (Decimal notation. The unit is %.) *DiskN* : DiskN Disk busy rate at *date* (Decimal notation. The unit is %.)

The CA/CM Port performance information of storage device

Items	Explanation
File name	Port/*nnnn*.csv (*nnnn* indicates the CA/CM Port number by hexadecimal notation. CA/CM port numbers are assigned in ascending order, starting with 0000 for the lowest CA/CM port number in the device. CM0x0 CA0x0 Port0 is 0000, CM0x0 CA0x0 Port1 is 0001, : CM0x7 CA0x3 Port2 is 007E, CM0x7 CA0x3 Port3 is 007F.)

Header line	・ Case of CA Port
	
	   Date, CM0xX:CA0xX:PortX - Read IOPS, CM0xX:CA0xX:PortX - Write IOPS, CM0xX:CA0xX:PortX - Read Throughput, CM0xX:CA0xX:PortX - Write Throughput
	
	・ Case of CM Port
	
	   Date, CM0xX:PortX - Read IOPS, CM0xX:PortX - Write IOPS, CM0xX:PortX - Read Throughput, CM0xX:PortX - Write Throughput

Data line	*date,read,write,through-r,through-w* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date* (Decimal notation. The unit is IOPS.) *write* : Write Count at *date* (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date* (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date* (Decimal notation. The unit is MB/S.)

The number of active disks performance information of storage device

Items	Explanation
File name	ACTIVE_DISK.csv
Header line	Date, Total Disks, Active Disks
Data line	*date,total,active* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *total* : Overall number of loaded disk devices at *date* (Decimal notation. The unit is Disk.) *active* : Overall number of active disk devices at *date* (Decimal notation. The unit is Disk.)

Power consumption performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_POWER_CONSUMPTION.csv
Header line	Date, System Power Consumption
Data line	*date*, *power* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *power:* Power used by the device as a whole at *date* (Decimal notation. The unit is W.)

Temperature performance information of storage device (ETERNUS DX60/DX80 only)

Items	Explanation
File name	SYSTEM_TEMPERATURE.csv
Header line	Date, System Temperature

Items	Explanation
Data line	*date*, *temperature* The following information is output for each field. *date* : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) *temperature:* Air intake temperature at device at *date* (Decimal notation. The unit is degrees Centigrade.)

OPERANDS

export

Outputs performance information for the specified date in CSV format.

outdirname

Specify the directory that outputs performance information.
Performance information is output to the *outdirname* directory based on the following configuration.

OPTIONS

-ipaddr *ipaddr*

Specify the IP address of the device that outputs performance information.

The output target device must satisfy the following conditions:

- Storage devices, Fibre Channel switches and Fibre Channel switch blades that output performance information must be registered in this software, and the device must be one of the following performance monitoring targets:

  - ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000

  - The Fibre Channel switches and Fibre Channel switch blades which support the performance monitoring.

For the settings of performance monitoring, refer to "7.2.2 Instruction for performance management".

-date *start_time*[-*end_time*]

Specify the start and end times for the output of performance information in YYYYMMDDhhmm format. The start and end times must be concatenated using a hyphen ("-"), as follows:

```
YYYYMMDDhhmm-YYYYMMDDhhmm
```

If the hyphen ("-") and end time are omitted, the command execution time will be the end time.

If this option is omitted, a time 30 minutes before the command execution time will be the start time, and the command execution time will be the end time.

EXAMPLES

- Output of performance information from 00:00 on 01/01/2008 to 23:59 on 01/01/2008 for a device with IP address 10.101.12.13 to the c:\work directory:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" perfdata export "C:\work" -
ipaddr 10.101.12.13 -date 200801010000-200801012359
```

- Output of performance information from 00:00 on 01/01/2008 to now for a device with IP address 10.101.12.13 to the c:\work directory:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" perfdata export "C:\work" -
ipaddr 10.101.12.13 -date 200801010000
```

NOTES

- The full path of an existing directory must be specified in *outdirname*.

- The time that is specified for the -date option start time must be earlier than the end time. Additionally, the time that is specified for the start and end times must be later than 00:00 on 01/08/2001, and earlier than the command execution time.

12.3.1.8 Disk control command (storageadm spindle)

NAME

storageadm spindle - controls disks

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm spindle start -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm spindle stop -ipaddr ipaddr {-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server} [-sync [-time timeout]] [-s] [-f]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm spindle info -ipaddr ipaddr [{-raid
RAIDGroup_number[,RAIDGroup_number,...] | -server}]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

Starts or stops the storage device RAID disk rotation. Only user of OS administrative group can execute this command.

If a storage device was specified when the status was displayed, the rotation status of the disk that was used to configure RAID is displayed.
If a server was specified, the storage device RAIDGroup number and volume number used by the server are displayed.

By specifying the storage device IP address and RAIDGroup number in the command operand, the rotation of the disk that was used to configure the storage device RAID is started or stopped.

By specifying the server IP address, the rotation of the storage device disk used by the server is started or stopped.

The target storage device and server must be devices managed by this software.

OPERANDS

start

Starts the disk that is used to configure the storage device RAIDGroup.

stop

Stops the disk that is used to configure the storage device RAIDGroup.

info

Displays the storage device RAIDGroup Eco-mode information, or the storage device information used by the server.

OPTIONS

Options that can be specified when the start operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the start target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to start rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

Options that can be specified when the stop operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the stop target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

-server

Specify this option to stop rotation of the storage device disk used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

-sync

When this option is specified, there is no return until processing is complete, or the time specified in the -time option has elapsed.

-time *timeout*

Specify the timeout value (unit: seconds) if the -sync option has been specified. Specify a number from 1 to 86400. If this option is omitted, the timeout value will be 600 seconds.

-s

Processing continues without the output of a confirmation message.

-f

Related RAIDGroup disks are forcibly stopped.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the storage device or server IP address.

-raid *RAIDGroup_number*[,*RAIDGroup_number*,...]

Specify the status display target RAIDGroup number using hexadecimal notation. If more than one RAIDGroup number is specified, separate each number using a comma (",").
Specify this option when the storage device IP address has been specified in the -ipaddr option.

If this option is omitted, the information for all the RAIDGroups in the specified storage device is displayed.

-server

Specify this option when the server IP address is specified to display the storage device RAIDGroup Eco-mode information and volume number used by the server.
Specify this option when the server IP address has been specified in the -ipaddr option.

EXAMPLES

- Starting the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" spindle start -ipaddr
10.10.10.10 -raid 0x0000,0x0001
```

- Stopping the disk that is used to configure the RAIDGroup by specifying the storage device IP address and RAIDGroup number:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" spindle stop -ipaddr
10.10.10.10 -raid 0x0001
```

- Stopping the disk that is used by the server by specifying the server:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" spindle stop -ipaddr
10.10.10.20 -server
```

- Displaying the Eco-mode status of all storage device RAIDGroups:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" spindle info -ipaddr
10.10.10.10
<<< ECO Mode RAID Group Information >>>
RAIDGROUP_NUMBER(NAME)   MODE DISK_STATUS        CONTROL SCHEDULE
----------------------- ---- ------------------ ------- ---------------
0x0000(data1)            ON   Idle               OFF     External
0x0001(data2)            ON   in the boot process ON     01-NAME0001
0x0002                   OFF  Active             -
```

```
0x0003                  -    Active           -
------------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
RAIDGROUP_NUMBER(NAME)	Displays the RAID group number by the hexadecimal number of four digits. When the name is set on the RAID group, its name is displayed by enclosing in ().
MODE	Displays the Eco-mode status that is set on the RAID group. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAID group. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAID group. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
SCHEDULE	Displays the Eco-mode schedule set on RAID group by the following format. The schedule name of External is displayed as "External". number-name The "number" is displayed in decimal number, and "name" is displayed in eight characters or less.

・ Displaying the storage device RAIDGroup number and volume number that are used by the server:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" spindle info -ipaddr
10.10.10.20 -server
<<< ECO Mode RAID GROUP information for Server >>>
IP_ADDRESS      RAID   MODE DISK_STATUS         CONTROL STOP
--------------- ------ ---- ------------------- ------- ----
10.10.10.10     0x0000 ON   Idle                OFF
                0x0001 ON   Active              ON      *
-------------------------------------------------------------

<<< Disk use information on Server >>>
IP_ADDRESS      RAID   VOLUME
--------------- ------ ------------------------------------------------------
10.10.10.10     0x0000 0x0000,0x0001,0x0002,0x0003,0x0004,0x0005,0x0006,0x0007,
                       0x0008,0x0009,0x000A,0x000B,0x000C,0x000D,0x000E,0x000F
                0x0001 0x0010,0x0011,0x0012,0x0013,0x0014,0x0015,0x0016,0x0017,
                       0x0018,0x0019,0x001A,0x001B,0x001C,0x001D,0x001E,0x001F
------------------------------------------------------------------------------
```

The explanation of the information displayed in each field is as follows.

Field title	Explanation
Fields of <<< ECO Mode RAID GROUP information for Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
MODE	Displays the Eco-mode status that is set on the RAIDGroup. "ON" indicates that the Eco-mode is enabled.

Field title	Explanation
	"OFF" indicates that the Eco-mode is disabled. "-" (hyphen) indicates that the Eco-mode cannot be set.
DISK_STATUS	Displays the status of disks that compose the RAIDGroup. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress.
CONTROL	Displays the disk control status set on the RAIDGroup. "ON" indicates that disk starting is requested. "OFF" indicates that disk stopping is requested. "-" (hyphen) indicates uncontrollable.
STOP	Although the stopping the disks used from the specified server is directed, when any disks in this RAIDGroup are used from other server or this RAIDGroup cannot be stopped because of any following states, displays "*". ・ The RAIDGroup for which the system disk is included ・ The RAIDGroup for which it is set in the NAS area ・ The RAIDGroup for which the mainframe volumes, MVV volumes or MVV Concatenation volumes are registered
Fields of <<< Disk use information on Server >>>	
IP_ADDRESS	Displays the IP address of the storage device connected with the specified server.
RAID	Displays the RAIDGroup number by the hexadecimal number of four digits. The RAIDGroup including the volume used from the specified server is displayed.
VOLUME	Displays the volume number by the hexadecimal number of four digits. The volumes used from the specified server are displayed.

NOTES

・ There are RAIDGroups that cannot do the Eco-mode operation. Refer to "Uncontrollable RAID groups" in the "1.3.4 Energy-saving operation for storage device".

・ The RAIDGroup Eco-mode must be ON to operate the RAIDGroup start/stop control. For details on the procedure for setting the RAIDGroup Eco-mode to ON, refer to "6.1.13 How to control the Eco-mode".

・ If disk rotation is started and stopped by specifying the server IP address, do not change the storage device connection.

・ For stopping the disk rotation by specifying the server IP address, if one or more share disks are contained on the stopped disks, the disk rotation cannot be stopped. Check the status of all servers that use their share disks, and judge whether share disks can be stopped or not. If share disks can be stopped, specify the -f option.

・ For stopping the disk rotation by specifying the server IP address, if the disks used from other server are included in the RAIDGroup that stop target disk exists, the disk rotation cannot be stopped. To stop the disk rotation, either specify server IP address for all servers that use the disk of its RAIDGroup, or specify the -f option. When you specify -f option, check the status of all related servers, and judge whether disks can be stopped or not. It is recommended that the server and the RAIDGroup be the compositions of couple 1.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including unused disks, the disk rotation cannot be stopped. Re-execute either specify the -f option or specify the RAIDGroup.

・ For stopping the disk rotation by specifying the server IP address, if the RAIDGroup including the stop target disk is any of "Uncontrollable RAID groups", the disk rotation cannot be stopped.

・ If the volume that belongs to the specified stop target RAIDGroup is concatenated with a different RAIDGroup using the LUN concatenation functionality, the disk is not stopped even if the stop operand is specified. To stop all related RAIDGroup disks, either

specify all of the related RAIDGroups, or specify the -f option. However, if the related RAIDGroup is any of "Uncontrollable RAID groups", the disk control cannot be executed.

・ The following confirmation message is output when the stop operand is specified. To continue, enter "y". To cancel, enter "n". This confirmation message is not output when the -s option is specified.

```
Are you sure? [y/n]:
```

・ The information of storage device that can control disks is displayed on the storage device information used by the server. The information of storage device that cannot control disks is not displayed. When both the disk controllable storage device and the disk uncontrollable storage device are connected with the server, the information of disk controllable storage device is only displayed.

・ The disk does not stop when the RAIDGroup status is as follows:

- Part of the storage device controller module and the module for the disk drive access route contain a fault.

- The disk drive that was used to configure the RAIDGroup is faulty.

- There is AdvancedCopy copy data.

- There is an EC/REC session (including when there is no copy data). The disk does, however, stop when the EC/REC status is Suspend.

- There is a QuickOPC/SnapOPC session (including when there is no copy data).

12.3.1.9 Virtualization switch access path setting command (storageadm virtualzone)

NAME

storageadm virtualzone - Operates on the host affinities and zonings for virtualization switches

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm virtualzone add -storage cawwpn,affinitygroup -ipaddr
ipaddr [-update all] [-f [-s]]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm virtualzone add -hba hbawwpn -vt vtwwpn [-update all]
[-f [-s]]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm virtualzone delete -storage cawwpn,affinitygroup -
ipaddr ipaddr [-s] [-update all]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm virtualzone delete -hba hbawwpn -vt vtwwpn [-s] [-
update all]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command adds or deletes zonings for Fibre Channel switches and host affinities for storage devices associated with virtualization switches (virtual targets and virtual initiators).

・ Adds or deletes zonings between the HBA and a virtualization switch (virtual target)

・ Adds or deletes host affinities and zonings between the CA and a virtualization switch (virtual initiator)

Only user of OS administrative group can execute this command.

The target storage devices and Fibre Channel switches must be devices managed by this software. The only Fibre Channel switch supported is ETERNUS VS900 model 300.

OPERANDS

add

Adds the host affinity and zoning.

delete

Deletes the host affinity and zoning.

OPTIONS

Options that can be specified when the add operand or delete operand is specified

-storage *cawwpn,affinitygroup*

Specify the channel adapter WWPN and the affinity group number of the storage device where the host affinity is to be set up.

Specify the channel adapter WWPN using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 11:11:11:11:11:11:11:11. Specify the affinity group number using either decimal notation or hexadecimal notation. For example, affinity group number 16 can be specified using decimal notation as "-storage 1111111111111111,16" or in hexadecimal notation as "-storage 1111111111111111,0x10".

-ipaddr *ipaddr*

Specify the IP address of the virtualization switch to which the virtual initiator (to be set in host affinities and zonings) belongs.

-hba *hbawwpn*

Specify the WWPN for the HBA to be set in zonings.

Specify the WWPN for the HBA using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

-vt *vtwwpn*

Specify the WWPN for the virtual target to be set in zonings.

Specify the WWPN for the virtual target using 16 digits of hexadecimal notation, optionally separating pairs of digits by a colon (":") for a total of 23 characters in hexadecimal notation. An example using colons to separate digits is 22:22:22:22:22:22:22:22.

Options that can be specified when the add operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are added. The "storageadm zone info" command is better for updating information after multiple settings have been made.

-f

Specify this option to forcibly set up WWPN zoning on a Fibre Channel switch where zoning has not been set up.

When specifying this option, check the security settings for the Fibre Channel switch. Specify this option only when setting up WWPN zoning.

Note that specifying this option will have no effect in the following situation (the command will run in the same way as if the option were omitted):

- When zoning settings have already been made on the target Fibre Channel switch

-s

Processing continues without the output of a confirmation message.
Only when -f option is specified, this option can be specified.

Options that can be specified when the delete operand is specified

-update all

Specify this option to update the information managed by this software after the settings are complete. Only "all" can be specified with the "-update" option. If this option is omitted, the information managed by this product will not be updated. To update information later, execute the "storageadm zone info" command without the "-fast" option.

This option is effective when only a few items are deleted. The "storageadm zone info" command is better for updating information after multiple settings have been deleted.

-s

Processing continues without the output of a confirmation message.

EXAMPLES

- Adding zoning settings between the HBA and a virtualization switch (virtual target)

  ```
  "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" virtualzone add -hba
  1111111111111111 -vt 2222222222222222
  ```

- Deleting zoning settings between the HBA and a virtualization switch (virtual target)

  ```
  "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" virtualzone delete -hba
  1111111111111111 -vt 2222222222222222
  ```

- Adding zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter

  ```
  "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" virtualzone add -storage
  1111111111111111,3 -ipaddr 10.10.10.10
  ```

- Deleting zonings and host affinities between a virtualization switch (virtual initiator) and a channel adapter.

  ```
  "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" virtualzone delete -storage
  1111111111111111,3 -ipaddr 10.10.10.10
  ```

NOTES

- The storage devices and Fibre Channel switches where settings are to be added or deleted must be registered with this software.
  This command cannot make settings for Fibre Channel switches where zoning settings have not been made. To perform zoning for Fibre Channel switches using this command, create provisional zoning before registering the Fibre Channel switches with this software. Refer to "Zoning setting" under "4.2.1.1 Setting" for information about how to create provisional zoning.
  If the -f option is specified, zoning settings can be made forcibly on Fibre Channel switches where zoning settings have not been made.
  However, if provisional zoning is created, or if settings are made forcibly by specifying the -f option, all accesses to zones other than those specified by the -f option will be blocked. For this reason, this action should not be taken while the target Fibre Channel switch environment is operating. Take this action either before operations start immediately after the Fibre Channel switch environment has been installed, or while operations are stopped.

- Fibre Channel switch zoning will be set up on the Fibre Channel switch equipped with the latest firmware in the fabric that contains the specified virtualization switch.

- When the "add" operand is specified, the channel adapter specified by the -storage option and the virtualization switch specified by the -ipaddr option must be connected, otherwise host affinities will not be set up on the storage device, zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the channel adapter and the virtualization switch with a Fibre Channel cable.

- When the "add" operand is specified, the HBA specified by the -hba option and the virtual target specified by the -vt option must be connected, otherwise zoning settings will not be added to the Fibre Channel switch, and the command will terminate abnormally. Execute the command again after connecting the HBA and the virtual target with a Fibre Channel cable.

- Before executing this command, zone settings must be made (an affinity group must be created) on the ETERNUS disk storage system using either Storage Volume Configuration Navigator or ETERNUSmgr.

- This command only supports the ETERNUS VS900 model 300.

- A confirmation message will be output in the situations below. Enter "y" to continue or "n" to cancel. The confirmation message can be suppressed by specifying the -s option.

  - If the -f option is specified with the "add" operand but the -s option is not specified

  - If the -s option is not specified with the "delete" operand

  A confirmation message is as follows.

```
Are you sure? [y/n]:
```

SEE ALSO

Host affinity and zoning operation command (storageadm zone)

12.3.2 Starting and stopping services

This section explains how to start and stop services.

12.3.2.1 Starting and stopping the service

Starting the services

Open [Control Panel] - [Administrative Tools] - [Services], select the service "ETERNUS SF Storage Cruiser Manager" and start it.

Stopping the services

Open [Control Panel] - [Administrative Tools] - [Services], select the service "ETERNUS SF Storage Cruiser Manager" and stop it.

12.3.2.2 Starting and stopping the SNMP Trap monitoring service

Starting the SNMP Trap monitoring service

Open [Control Panel] - [Administrative Tools] - [Services], select the service "Systemwalker MpWksttr" and start it.

Stopping the SNMP Trap monitoring service

Open [Control Panel] - [Administrative Tools] - [Services], select the service "Systemwalker MpWksttr" and stop it.

Checking the SNMP Trap monitoring service

Open [Control Panel] - [Administrative Tools] - [Services], select the service "Systemwalker MpWksttr" and check it by the status of <start> button.

12.3.3 Troubleshooting information collection

This section explains the commands for collecting troubleshooting information of the Manager.

12.3.3.1 Troubleshooting information collection of Manager (managersnap)

NAME

managersnap - Collects the troubleshooting information of Manager

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\managersnap -dir dirname [-all]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

Collect information of the Manager on the administrative servers. Only user of OS administrative group can execute this command.

The managersnap is the command used to collect information on administrative server when a problem occurs.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name that starts from the drive letter for *dirname*.
The maximum length that can be specified for *dirname* is 100 bytes.

The collected information is gathered in the directory that its name starts by "managersnap_". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 40MB
All troubleshooting information	more than "80 + (2 * number of registered device)" MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

・ Collecting the troubleshooting information for initial investigation on D:\temp directory.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\managersnap" -dir D:\temp
```

12.3.4 Commands for storage management

The following sections explain the commands for managing the storage device.

The following table shows the correspondence between types of commands and the storage devices where they can be used. Only OS administrator (root) user can execute these commands. In the following table, "A" indicates "Available" and "N/A" indicates "Not Available".

Command name	ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 ETERNUS DX60/DX80	Other storage devices
storageadm disk	A	N/A

Command name	ETERNUS8000, ETERNUS4000 (except models 80 and 100), ETERNUS2000 ETERNUS DX60/DX80	Other storage devices
storageadm raid	A	N/A
storageadm volume	A	N/A
storageadm affinity	A	N/A
storageadm ecomode	A	N/A

12.3.4.1   Disk management command (storageadm disk)

NAME

storageadm disk - manages disks

SYNOPSIS

`$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm disk info -ipaddr ipaddr [-csv]`

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command displays information of disks in the ETERNUS disk storage system that is registered in this software.

OPERANDS

info

Displays detail information of disks in the ETERNUS disk storage system that is registered in this software.

OPTIONS

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-csv

Displays the disk information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

・ Displaying the disk information in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" disk info -ipaddr
192.168.0.1
<<< Disk Information >>>
NUMBER DE    SLOT USAGE          STATUS    RGNO   SIZE  DISKTYPE MOTOR
------ ---- ---- -------------- --------- ------ ----- -------- ---------------
0      0x00 0    System Disk    Available 0x0002 300GB SAS      Active
1      0x00 1    System Disk    Available 0x0001 300GB SAS      Idle
2      0x00 2    System Disk    Available 0x0002 300GB SAS      In the boot process
3      0x00 3    System Disk    Available 0x0003 300GB SAS      In the stop process
```

```
4      0x00 4    Data Disk     Available 0x0003 300GB SAS     Active
-----------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

· Displaying the disk information in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" disk info -ipaddr
192.168.0.1 -csv
NUMBER,DE,SLOT,USAGE,STATUS,RGNO,SIZE,DISKTYPE,MOTOR
0,0x00,0,System Disk,Available,0x0002,300GB,SAS,Active
1,0x00,1,System Disk,Available,0x0001,300GB,SAS,Idle
2,0x00,2,System Disk,Available,0x0002,300GB,SAS,In the boot process
3,0x00,3,System Disk,Available,0x0003,300GB,SAS,In the stop process
4,0x00,4,Data Disk,Available,0x0003,300GB,SAS,Active
```

12.3.4.2 RAID management command (storageadm raid)

NAME

storageadm raid - manages RAID groups

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm raid add -ipaddr ipaddr -disk
DE_number:slot_number,DE_number:slot_number[,DE_number:slot_number,...] -level RAIDlevel [-name
alias_name] [-cm assigned_CM] [-csv]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm raid delete -ipaddr ipaddr -raidgroup
RAIDGroup_number [-f] [-s]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm raid info -ipaddr ipaddr [-raidgroup
RAIDGroup_number] [-csv]

$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm ecomode -ipaddr ipaddr -raidgroup RAIDGroup_number
 ($INS_DIR means "Program Directory" specified at the Manager installation.)
```

DESCRIPTION

This command is used to create/delete/display a RAID group in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates a RAID group

delete

Deletes a RAID group

info

Displays a RAID group information

ecomode

Sets eco-mode for the RAID group

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-disk *DE_number*:*slot_number*,*DE_number*:*slot_number*[,*DE_number*:*slot_number*,...]

Specify DE numbers and slot numbers for the storage device using either decimal or hexadecimal notation, placing a colon (":") in the middle of each DE number and slot number pair, and using commas (",") to separate pairs. For example, two pairs can be specified as "-disk 1:1, 1:2" in decimal notation or "-disk 0x1:0x1,0x1:0x2" in hexadecimal notation.

Be sure to specify at least two DE number/slot number pairs.

-level *RAIDlevel*

Specify the RAID level by the minuscule as follows.

Characters that can be specified	Created RAID level
raid0	RAID0
raid1	RAID1
raid1+0	RAID1+0
raid5	RAID5
raid6	RAID6

-name *alias_name*

Specify an alias for the RAID group to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'".,/<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-cm *assigned_CM*

Specify the assigned CM number for the RAID group using two digits, as in the following table. If this option is omitted, the assigned CM number will be set up automatically ("auto" will be specified).

Storage device	Assigned CM	Characters to be specified	Remarks
ETERNUS2000 ETERNUS DX60/DX80	CM#0	00	For the first digit, enter the assigned CM number.
	CM#1	10	For the second character, always enter "0".
Other	CM#0 CPU#0	00	For the first digit, enter the assigned CM number.
	CM#0 CPU#1	01	For the second digit, enter the number of the CPU within the CM entered for the first digit.
	CM#1 CPU#0	10	
	CM#1 CPU#1	11	
	:	:	
	CM#7 CPU#0	70	
	CM#7 CPU#1	71	

-csv

Displays the RAID group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number to be deleted, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-s

Processing continues without the output of a confirmation message.

-f

If there are volumes within the RAID group, the volumes will be deleted before the RAID group is deleted. However, the command will terminate with an error without deleting the volumes if any of the following conditions apply to the RAID group:

- The volumes in the RAID group have been mapped

- There are volumes other than open volumes

- There are LUN concatenated volumes

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup *RAIDGroup_number*

Specify the RAID group number for which detailed information is to be displayed, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-csv

Displays the RAID group information in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the ecomode operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-raidgroup [*RAIDGroup_number, ...*]

Specify the RAID group number for which detailed information is to be displayed, using decimal and/or hexadecimal notations.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-on

Set eco-mode to ON for the specified RAID group. The only possible specifications are -off and -on. This option cannot be set if eco-mode cannot be set for any one of the specified RAID groups.

-off

Set eco-mode to OFF for the specified RAID group. The only possible specifications are -off and -on.

-s

Continues processing without asking for confirmation.

EXAMPLES

・ Creating a RAID group and displaying the created RAID group in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid add -ipaddr 1.2.3.4 -
disk 1:10,1:11,1:12,1:13,1:14,1:15 -level raid5
<<< RAID ADD >>>
RGNO
------
0x0000
------
INFO:swsag0001:Command terminated normally.
```

・ Creating a RAID group and displaying the created RAID group in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid add -ipaddr 1.2.3.4 -
disk 1:10,1:11,1:12,1:13,1:14,1:15 -level raid5 -csv
RGNO
0x0000
```

・ Deleting a RAID group.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid delete -ipaddr 1.2.3.4 -
raidgroup 16
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group information in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid info -ipaddr 1.2.3.4
<<< RAID Information >>>
RGNO   NAME USAGE       LEVEL   STATUS    CM       TOTAL_CAPACITY FREE_CAPACITY
------ ---- ----------- ------- --------- -------- -------------- -------------
0x0000      Open,System RAID5   Available CM0CPU0  407775         0
0x0001      Open,SDV    RAID5   Available CM1CPU0  410880         285440
0x0002      Open        RAID1   Available CM0CPU1  136960         345367
------------------------------------------------------------------------------
INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group information in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid info -ipaddr 1.2.3.4 -
csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY
0x0000,,"Open,System",RAID5,Available,CM0CPU0,407775,0
0x0001,,"Open,SDV",RAID5,Available,CM1CPU0,410880,285440
0x0002,,Open,RAID1,Available,CM0CPU1,136960,345367
```

・ Displaying the RAID group detail information in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid info -ipaddr 1.2.3.4 -
raidgroup 0x0000
<<< RAID Information >>>
RGNO   NAME USAGE        LEVEL   STATUS    CM       TOTAL_CAPACITY FREE_CAPACITY
------ ---- ----------- ------- --------- -------- -------------- -------------
0x0000      Open,System RAID5   Available CM0CPU0  407775         0

NO     CONCATENATION NAME       TOTAL_CAPACITY ALLOCATED     STATUS    TYPE
                                               CAPACITY
------ ------------- ---------- -------------- ------------- --------- -------
0x0001 1/3           sample     102400         102400        Available Open
0x0001 2/3           sample     1024           1024          Available Open
Free   -                        2048           2048
0x0004 -                        1536           1536          Available Open
```

```
        --------------------------------------------------------------------------
        INFO:swsag0001:Command terminated normally.
```

・ Displaying the RAID group detail information in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid info -ipaddr 1.2.3.4 -
raidgroup 0x0000 -csv
RGNO,NAME,USAGE,LEVEL,STATUS,CM,TOTAL_CAPACITY,FREE_CAPACITY,NO,CONCATENATION,NAME,TOTAL_CAPACITY
,ALLOCATED_CAPACITY,STATUS,TYPE
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,1/3,sample,
102400,102400,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0001,2/3,sample,1024,1024,Available,Open
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,Free,-,,2048,2048,,
0x0000,"Open,System",RAID5,Available,CM0CPU0,407775,0,0x0004,-,,1536,1536,Available,Open
```

・ RAID group eco-mode set to ON.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid ecomode -ipaddr 1.2.3.4
-raidgroup 0x0000 -on
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

・ RAID group eco-mode set to OFF.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" raid ecomode -ipaddr 1.2.3.4
-raidgroup 0x0000 -off
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

NOTES

・ The following confirmation message will be output if the -s option is not specified with the "delete" operand. Enter "y" to continue or "n" to cancel.
This confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Setting eco-mode for a RAID group with an eco-mode schedule already set results in the following:

   - RAID group eco-mode set to ON -> Eco-mode ON overwrites the RAID group eco-mode schedule.

   - RAID group eco-mode set to OFF -> An error occurs (unless the eco-mode schedule is software-controlled),.

・ If eco-mode operation is not possible for the specified RAID group, then the command terminates with an error.
For details of RAID groups for which eco-mode operatioin is not possible, refer to "1.3.4 Energy-saving operation for storage device" > "Uncontrollable RAID groups".

12.3.4.3 Volume management command (storageadm volume)

NAME

storageadm volume - manages volumes

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm volume add -ipaddr ipaddr -size capacity -raidgroup
RAIDGroup_number [-name alias_name] [-csv]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm volume delete -ipaddr ipaddr -volume
volume_number[,volume_number,...] [-s]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm volume format -ipaddr ipaddr -volume
```

```
volume_number[,volume_number,...] [-s]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm volume info -ipaddr ipaddr [-volume volume_number,...]
[-csv]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm volume nomapping -ipaddr ipaddr [-volume
volume_number,...] [-csv]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command is used to create/delete/format/display volumes in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates a volume.

delete

Deletes volumes.

format

Formats volumes.

info

Displays volume information.

nomapping

Displays the information of volumes that are not mapped to affinity group.

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-size *capacity*

Specify the size of the volume to be created in MB or GB. 1 GB is equivalent to 1024 MB.
For example, 1024 MB is specified as "-size 1024MB" or "-size 1GB".

-raidgroup *RAIDGroup_number*

Specify the RAID group number for which a volume is to be created, using either decimal or hexadecimal notation.
For example, RAID group number 16 can be specified using decimal notation as "-raidgroup 16" or in hexadecimal notation as "-raidgroup 0x10".

-name *alias_name*

Specify an alias for the volume to be created. Aliases can only be set up for ETERNUS2000, ETERNUS DX60/DX80. If this option is omitted, an alias will not be set up. This command will terminate with an error if this option is specified for other storage devices.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

Displays the created volume number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand or format operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Specify the numbers for the volumes to be deleted or formatted, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.

For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the info operand or nomapping operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Enter the number of the volume to be output for which information is to be output, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.

For example, specify volumes 10 and 16 as either "-volume 10, 16" in decimal notation or "-volume 0xa,0x10" in hexadecimal notation.

If this option is omitted, information will be displayed for all target volumes.

-csv

Displays the volume information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

- Creating a volume and displaying the created volume in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume add -ipaddr 1.2.3.4 -
size 1024MB -raidgroup 16
<<< Volume ADD >>>
NUMBER
------
0x0001
------
INFO:swsag0001:Command terminated normally.
```

- Creating a volume and displaying the created volume in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume add -ipaddr 1.2.3.4 -
size 1024MB -raidgroup 16 -csv
NUMBER
0x0001
```

- Deleting a volume.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume delete -ipaddr
1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

- Formatting a volume.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume format -ipaddr
1.2.3.4 -volume 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

- Displaying the volume information in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume info -ipaddr 1.2.3.4
<<< Volume Information >>>
```

```
       NUMBER    NAME      TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO    ENCRYPT
       -------   --------  -------------- ---------  ------ ------------- ------  -------
       Unknown             0              Available F6427G -             0x0001  -
       0x0001            100              Available SDV    -             0x0000  -
       0x0002            425              Available Open   -             0x0002  -
       Unknown           1166             Available MVV(G) -             0x0001  -
       Unknown           2332             Available MVV(G) 2             0x0001  -
       0x0005            150              Available Open   -             0x0002  -
       0x0006            4700             Available Open   3             0x0000,0x0002 -
       ---------------------------------------------------------------------------
       INFO:swsag0001:Command terminated normally.
```

- Displaying the volume information in the CSV format.

```
       "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume info -ipaddr 1.2.3.4 -
       csv
       NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
       Unknown,,0,Available,F6427G,-,0x0001,-
       0x0001,,100,Available,SDV,-,0x0000,-
       0x0002,,425,Available,Open,-,0x0002,-
       Unknown,,1166,Available,MVV(G),-,0x0001,-
       Unknown,,2332,Available,MVV(G),2,0x0001,-
       0x0005,,150,Available,Open,-,0x0002,-
       0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

- Displaying the unused volume information in the table format.

```
       "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume nomapping -ipaddr
       1.2.3.4
       <<< Volume Information >>>
       NUMBER    NAME      TOTAL_CAPACITY STATUS    TYPE   CONCATENATION RGNO    ENCRYPT
       -------   --------  -------------- ---------  ------ ------------- ------  -------
       Unknown             0              Available F6427G -             0x0001  -
       0x0001            100              Available SDV    -             0x0000  -
       0x0002            425              Available Open   -             0x0002  -
       Unknown           1166             Available MVV(G) -             0x0001  -
       Unknown           2332             Available MVV(G) 2             0x0001  -
       0x0005            150              Available Open   -             0x0002  -
       0x0006            4700             Available Open   3             0x0000,0x0002 -
       ---------------------------------------------------------------------------
       INFO:swsag0001:Command terminated normally.
```

- Displaying the unused volume information in the CSV format.

```
       "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" volume nomapping -ipaddr
       1.2.3.4 -csv
       NUMBER,NAME,TOTAL_CAPACITY,STATUS,TYPE,CONCATENATION,RGNO,ENCRYPT
       Unknown,,0,Available,F6427G,-,0x0001,-
       0x0001,,100,Available,SDV,-,0x0000,-
       0x0002,,425,Available,Open,-,0x0002,-
       Unknown,,1166,Available,MVV(G),-,0x0001,-
       Unknown,,2332,Available,MVV(G),2,0x0001,-
       0x0005,,150,Available,Open,-,0x0002,-
       0x0006,,4700,Available,Open,3,"0x0000,0x0002",-
```

NOTES

- Only open volumes can be created.

- The volumes that are created are formatted automatically.

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "format" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ Volumes cannot be deleted by specifying the volume numbers for volumes that are not open volumes.

・ Volumes cannot be deleted by specifying the volume numbers for LUN concatenated volumes.

・ Volumes that have been mapped to an affinity group cannot be deleted.

・ The Thin Provisoning Volume is not able to create. However, it possible to remove.

12.3.4.4 AffinityGroup management command (storageadm affinity)

NAME

storageadm affinity - manages affinity groups

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm affinity add -ipaddr ipaddr -volume
volume_number[,volume_number,...] [-lun LUN_number] [-affinitygroup affinitygroup_number] [-name
alias_name] [-csv]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm affinity delete -ipaddr ipaddr -affinitygroup
affinitygroup_number [-s]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm affinity update -ipaddr ipaddr -affinitygroup
affinitygroup_number {-add -volume volume_number[,volume_number,...] [-lun
LUN_number[,LUN_number,...]] | -delete [-volume volume_number[,volume_number,...] | -lun
LUN_number[,LUN_number,...]]} [-s]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm affinity info -ipaddr ipaddr [-affinitygroup
affinitygroup_number] [-csv]
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command is used to create/delete/modify/display affinity groups in the ETERNUS disk storage system that is registered in this software.

OPERANDS

add

Creates an affnity group.

delete

Deletes an affinity group.

update

Updates the configuration of an affinity group.

info

Displays the affinity group information.

OPTIONS

Options that can be specified when the add operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-volume *volume_number*[,*volume_number*,...]

Specify the number of the volume to be set to an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.

-lun *LUN_number*,...

Specify the LUN number to be allocated to the volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified, use commas (",") to separate LUN numbers.
For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.

If this option is omitted, LUN numbers will be allocated in order, starting from 0.

-affinitygroup *affinitygroup_number*

Specify the affinity group number to be created, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

If this option is omitted, the affinity group numbers that can be created within the target storage device will be allocated automatically.

-name *alias_name*

Specify an alias for the affinity group to be created. This option is required for ETERNUS2000, but can be omitted for ETERNUS4000 and ETERNUS8000. If this option is omitted, an alias will not be set up.

Only alphanumeric characters (a to z, A to Z and 0 to 9) and the following symbols can be used for aliases: !@#$%^&*()-= `_+| ~[]{};:'"./<>?. If the alias contains a space, enclose the entire alias in double quotes (e.g., -name "123 567").

-csv

Displays the created affinity group number in the CSV format. When this option is omitted, it is displayed in the table format.

Options that can be specified when the delete operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group to be deleted, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the update operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group whose configuration is to be changed, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

-add

Adds volumes in the affinity group.
When the number for the allocated volume/LUN is specified, this command terminates abnormally.

-delete

Deletes volumes from an affinity group.
The command will terminate abnormally if a volume number or LUN number of a volume that has not been mapped is specified, or if deleting the specified mapping will mean that there are no more mappings.

-volume *volume_number*[,*volume_number*,...]

Specify the volume number of the volume to be added to or deleted from an affinity group, using either decimal or hexadecimal notation. If multiple volume numbers are specified, use commas (",") to separate volume numbers.
For example, specify volumes 16, 17 and 18 as either "-volume 16,17,18" in decimal notation or "-volume 0x10,0x11,0x12" in hexadecimal notation.

This option cannot be specified together with the -lun option when deleting volumes from an affinity group. Delete volumes by specifying either this option or the -lun option, not both together.

-lun *LUN_number*[,*LUN_number*,...]

Specify the LUN number to be allocated to a volume or released from a volume, using either decimal or hexadecimal notation. The number of LUN numbers specified must be the same as the number of volumes specified using the -volume option, and the LUN numbers must also be listed in the same order as their corresponding volume numbers. If multiple LUN numbers are specified, use commas (",") to separate LUN numbers.
For example, specify LUN numbers 16, 17 and 18 as either "-lun 16,17,18" in decimal notation or "-lun 0x10,0x11,0x12" in hexadecimal notation.

If this option is omitted when LUN numbers are being allocated, LUN numbers will be automatically allocated, starting with the smallest free LUN number.

When LUN numbers are being released from volumes, this option cannot be specified together with the -volume option. Release LUN numbers by specifying either this option or the -volume option, but not both together.

-s

Processing continues without the output of a confirmation message.

Options that can be specified when the info operand is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-affinitygroup *affinitygroup_number*

Specify the number of the affinity group for which detailed information is to be displayed, using either decimal or hexadecimal notation.
For example, specify affinity group number 16 as either "-affinitygroup 16" in decimal or "-affinitygroup 0x10" in hexadecimal.

If this option is omitted, a list of affinity groups will be displayed.

-csv

Displays the affinity group information in the CSV format. When this option is omitted, it is displayed in the table format.

EXAMPLES

- Creating an affnity group and displaying the created affinity group in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity add -ipaddr 1.2.3.4
-volume 16,17,18 -lun 0,1,2 -affinitygroup 16
<<< AffinityGroup ADD >>>
NUMBER
------
0x0010
```

```
------
INFO:swsag0001:Command terminated normally.
```

・Creating an affnity group and displaying the created affinity group in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity add -ipaddr 1.2.3.4
-volume 16,17,18 -lun 0,1,2 -affinitygroup 16 -csv
NUMBER
0x0010
```

・Deleting an affinity group.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity delete -ipaddr
1.2.3.4 -affinitygroup 16
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Adding a LUN in the affinity group.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity update -ipaddr
1.2.3.4 -affinitygroup 16 -add -volume 19 -lun 3
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Deleting a LUN from the affinity group.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity update -ipaddr
1.2.3.4 -affinitygroup 16 -delete -volume 19
Are you sure? [y/n]: y
INFO:swsag0001:Command terminated normally.
```

・Displaying the affinity group lists in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity info -ipaddr
1.2.3.4
<<< AffinityGroup Information >>>
NUMBER NAME
------ -------------
0x0000 AG00
0x0001 AG01
0x0002 AG02
0x0003 AG03
-------------------
INFO:swsag0001:Command terminated normally.
```

・Displaying the affinity group lists in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity info -ipaddr
1.2.3.4 -csv
NUMBER,NAME
0x0000,AG00
0x0001,AG01
0x0002,AG02
0x0003,AG03
```

・Displaying the affinity group detail information (mapping) in the table format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity info -ipaddr
1.2.3.4 -affinitygroup 16
<<< AffinityGroup Information >>>
NUMBER NAME          LUN    VOLUME  VOLUME NAME
------ ------------- ------ ------- ----------------------
0x0010 abcd          0x0000 0x0001  sample
                     0x0002 0x0004
```

```
                    ------------------------------------------------------------
                    INFO:swsag0001:Command terminated normally.
```

・ Displaying the affinity group detail information (mapping) in the CSV format.

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" affinity info -ipaddr
1.2.3.4 -affinitygroup 16 -csv
NUMBER,NAME,LUN,VOLUME,VOLUME NAME
0x0010,abcd,0x0000,0x0001,sample
0x0010,abcd,0x0002,0x0004,
```

NOTES

・ The following confirmation message will be output if the -s option is not specified when either the "delete" operand or the "update" operand is specified. Enter "y" to continue or "n" to cancel.
The confirmation message can be suppressed by specifying the -s option.

```
Are you sure? [y/n]:
```

・ The command will terminate abnormally if the -delete option is specified with the "update" operand in such a way that there are no items of mapping information for the affinity group.

・ The command will terminate abnormally if the number for a following volume that cannot be set to an affinity group is specified with the "update" operand.

  - The volumes that do not exist in the storage device

  - The volumes other than open volumes

  - The LUN concatenated volumes

12.3.4.5 Eco-mode command (storageadm ecomode)

NAME

storageadm ecomode － Operates the eco-mode

SYNOPSIS

$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm ecomode on -ipaddr *ipaddr*

$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm ecomode off -ipaddr *ipaddr* [-s]

$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm storageadm ecomode info -ipaddr *ipaddr* [-csv]

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command toggles and displays eco-mode information for ETERNUS disk storage systems registered to this product.

OPERANDS

on

  Sets eco-mode to ON.

off

  Sets eco-mode to OFF.

info

> Displays eco-mode status.

OPTIONS

When on is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

When off is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-s

> Continues processing without asking for confirmation.

When info is specified

-ipaddr *ipaddr*

> Specify the IP address of the storage device.

-csv

> Displays the eco-mode status of the ETERNUS disk storage system in CSV format.

EXAMPLES

- Setting eco-mode to ON:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" ecomode on -ipaddr 1.2.3.4
INFO:swsag0001:Command terminated normally.
```

- Setting eco-mode to OFF:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" ecomode off -ipaddr 1.2.3.4
Are you sure? [y/n]:y
INFO:swsag0001:Command terminated normally.
```

- Displaying eco-mode information:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" ecomode info -ipaddr 1.2.3.4
<<< EcoMode Information>>
STATUS
------
ON
------
INFO:swsag0001:Command terminated normally.
```

- Displaying eco-mode information in CSV format:

```
"C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" ecomode info -ipaddr 1.2.3.4
-csv
STATUS
ON
```

NOTES

- If off is specified without -s, then the confirmation message below is displayed:

```
Are you sure? [y/n]:
```

・ If the device eco-mode settings are as follows, the command terminates with an error:

An error occurs if the eco-mode is already on when the processing to switch eco-mode on is executed.

12.3.4.6 Performance monitoring command（storageadm perfctl）

NAME

storageadm perfctl － Performs monitoring operations

SYNOPSIS

```
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm perfctl start -ipaddr ipaddr [-interval time]
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm perfctl stop -ipaddr ipaddr
$INS_DIR\Manager\opt\FJSVssmgr\sbin\storageadm perfctl status -ipaddr ipaddr
```

($INS_DIR means "Program Directory" specified at the Manager installation.)

DESCRIPTION

This command starts and stops performance monitoring for the NR1000F series and displays the performance monitoring status.

OPERANDS

start

Starts performance monitoring.

stop

Stops performance monitoring.

status

Displays the performance monitoring status.

OPTIONS

When start is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

-interval *time*

Specify either 10, 30, 60, or 300 (seconds unit) as the performance monitoring interval. If this option is omitted, monitoring is performed at 30 second intervals.

When stop is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

When status is specified

-ipaddr *ipaddr*

Specify the IP address of the storage device.

EXAMPLES

・ Starting performance monitoring at 60-second intervals.

```
# "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" perfctl start -ipaddr
1.2.3.4 -interval 60
```

・ Stopping performance monitoring.

```
# "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" perfctl stop -ipaddr
1.2.3.4
```

・ Displaying the performance monitoring status.

```
# "C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm" perfctl status -ipaddr
1.2.3.4

<<< Performance Monitor Status>>
DEVICE_NAME(IP_ADDRESS)         STATUS              INTERVAL[SEC]
----------------------------- ------------------- ---------------
NR1000F(1.2.3.4)                Monitoring          60
----------------------------------------------------------------

INFO:swsag0001:Command terminated normally.
```

Status description

・ The table below shows the status types and their meanings:

Monitoring	Normal monitoring is in progress.
Stop	Performance monitoring is stopped.
Recovering	Retry is in progress, after communication was interrupted or an attempt failed.
Error	Stopped with an error, after an unsuccessful retry. Collect the required troubleshooting data and then contact the Fujitsu systems engineer (SE). For details, refer to "D.1 Troubleshooting information"

NOTES

・ The NR1000F series must be registered in this product.

・ If NR1000F series performance is to be monitored when creating new storage in a manually incorporated device, then use the settings below:

For "product type", select "NR1000F".

Specify the **-ipaddr** option.

・ If -interval is set to a value other than 10, 30, 60, or 300, then the actual interval is set according to the table below (an error will occur if it is set to a negative value or a value greater than or equal to 2147483648):

-interval *time* values	Monitoring interval (in secs)
$time = 0$	30
$0 < time <= 10$	10
$10 < time <= 30$	30
$30 < time <= 60$	60
$60 < time$	300

12.4 Systemwalker Centric Manager Linkage Setup Commands

12.4.1 Systemwalker Centric Manager window linkage command (mpaplreg)

NAME

mpaplreg - linkages to the Systemwalker Centric Manager client window

SYNOPSIS

```
mpaplreg -a -m application_name -p server_node_name -c command_line
mpaplreg -d -m application_name
mpaplreg -v -m application_name
```

DESCRIPTION

This command adds the operation item selected from the operation menu in the monitoring window of the Systemwalker Centric Manager administrative client to the pop-up menu that is displayed by right-clicking a node on the map. For information about the command, see mpaplreg in the Systemwalker Centric Manager Reference Manual.

Execute this command to linkage ESC monitor window to Systemwalker Centric Manager client window.

OPTIONS

-m

Specify a name for the item added to the menu.

Specify "ESC" for example.

-p

Specify the server node name of the managed node for which you want to add the menu item.

Specify the host name of the node registered in Systemwalker Centric Manager.

-c

Specify the command line entry to be executed when the menu item is selected.

Specify the startup command path of the Client.

-v

Displays a registered menu item.

-d

Deletes a registered menu item.

EXAMPLES

・ Addition to a menu

```
mpaplreg -a -m ESC -p tama -c "\"C:\Program Files\ETERNUS-SSC\Client\bin\rcxclient.exe\""
```

・ Deletion from a menu

```
mpaplreg -d -m ESC
```

・ Confirmation of content of menu registration

```
mpaplreg -v -m ESC
Modification example:
Administrative domain name : melba
```

```
Application name : ESC
Command line : "C:\Program Files\ETERNUS-SSC\Client\bin\client.exe"
Node name : tama
```

NOTES

Note the following about executing the command:

- ・ Perform this operation each time a storage device is added.

Only a user belonging to the administrator group of the administrative client can perform this operation.

12.5 [Solaris OS Version] Agent Commands

This section explains command operations on Solaris OS Agent machines.

12.5.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.5.1.1 User information setting command (defusr)

NAME

defusr - Sets the user information

SYNOPSIS

```
/opt/FJSVssage/bin/defusr -a key-name user-name password
/opt/FJSVssage/bin/defusr -l [key-name]
/opt/FJSVssage/bin/defusr -r key-name user-name password
/opt/FJSVssage/bin/defusr -d key-name
```

DESCRIPTION

This command sets user information necessary for database monitoring. Based on the information set with the defusr command, Agent accesses a database and collects information.

User information specified with the defusr command is used only by Agent to access the database and collect information, and it is not related to the user who has started Agent or the user who has logged in to the administrative client machine.

Only users having administrator authority can execute this command to set or reset user information necessary for database monitoring. Up to 63 letters can be specified individually for the key name, user name, and password of the defusr command. However, Japanese characters (double-byte characters) cannot be specified for the key name, user name, and password of the defusr command.

OPTIONS

-a

Registers user information. Up to 255 sets of user information can be registered. An attempt at registration with an existing key results in an error.

-l

Displays user information. The user name defined for a specified key name is displayed. If no key name is specified, all registered user names are displayed.

-r

Changes user information.

-d

Deletes user information.

key-name*, *user-name*, and *password

Specify the following.

Monitored object	key-name	user-name and password
Oracle	Instance name specified in Oracle statement	User information to access to instance specified by key name

EXAMPLES

· Registering user information

```
# /opt/FJSVssage/bin/defusr -a key1 user pass
```

· Changing user information

```
# /opt/FJSVssage/bin/defusr -r key1 user pass
```

12.5.1.2 Agent information change command (setagtip)

NAME

setagtip - Changes the Agent information

SYNOPSIS

```
/opt/FJSVssage/bin/setagtip [-i ip-address]
```

DESCRIPTION

This command sets Agent information. Only OS administrator (root) user can execute this command.

To change the start IP address of Agent, specify an IP address in the command parameter to specify Agent information.

OPTIONS

No specify

Displays the current setting information.

-i *ip-address*

For *ip-address*, specify the IP address of the server node that can communicate from the administrative server.

Sets the specified IP address as the start IP address of Agent.

EXAMPLES

- Displaying Agent information

    ```
    # /opt/FJSVssage/bin/setagtip
    ```

- Setting the Agent IP address to 10.12.13.14

    ```
    # /opt/FJSVssage/bin/setagtip -i 10.12.13.14
    ```

NOTES

If the host name cannot be resolved from the specified IP address, the messages shown below is displayed. Check for an error in the specified IP address or network definition (hosts, DNS, etc.), and re-execute the command.

```
IP Address = IP address: Host's Name is not found.
```

12.5.1.3 Server node Agent SNMP Trap Test (traptest)

NAME

traptest - Does the test of SNMP Trap

SYNOPSIS

```
/opt/FJSVssagt/bin/traptest [ip-address]
```

DESCRIPTION

This command checks whether SNMP Trap is correctly transmitted to a administrative server from a server node agent, display an event, and check the linkage with Shell/Bat. The Centric Manager linkage is not operated by this command.

If the action on SNMP Trap as a test is supposed to be changed, change SNMP Trap XML definition file (1_3_6_1_4_1_211_4_1_3_21_2_2.xml) for the ESC agent. In SNMP Trap as a test, 1 is used for Specific Trap Type number and the action can be changed by changing the definition of the Specific Trap Type number 1 defined in SNMP Trap XML definition file. For SNMP Trap XML definition file, refer to "C.6 SNMP Trap XML Definition File".

Only in the environment where the host holds two or more IP addresses, a server node's IP (Agent start IP address) address which the ESC manager recognizes is specified to *ip-address*.

OPTIONS

None.

EXAMPLES

- SNMP Trap is transmitted from the server node agent of IP address 11.11.11.11.

    ```
    # /opt/FJSVssagt/bin/traptest 11.11.11.11
    ```

NOTES

If the SNMP Trap destination address is not set to the server node when execute the command, the following results are output.

```
Target Host Nothing
SNMPTrap error
```

If the server node that input in the command is not registered in ESC, please re-execute the command after registering the server node.

Please execute the same action in case where the server node is not registered in ESC after deletion of the server node.

12.5.2 Starting and Stopping Agent

This command sets Starting and Stopping Agent

12.5.2.1   Starting and Stopping Agent

Only OS administrator (root) user can execute following commands.

Starting Agent

Enter the following command to start Agent.

```
# /opt/FJSVssage/bin/sstorageagt
```

Stopping Agent

Enter the following command to stop Agent.

```
# /opt/FJSVssage/bin/pstorageagt
```

12.5.3 Troubleshooting information collection

This section explains the commands for collecting troubleshooting information on agent.

12.5.3.1   Troubleshooting information collection of Agent (agentsnap)

NAME

agentsnap - Collects the troubleshooting information of Agent

SYNOPSIS

```
/opt/FJSVssage/sys/agentsnap [-dir dirname] [-all]
```

DESCRIPTION

Collect information on the agent. Only OS administrator (root) user can execute this command.

Collect information on agent when a problem occurs.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name for *dirname*.
When this option is omitted, the troubleshooting information is stored on /tmp directory.

The collected information is gathered in the file that its name starts by "agentsnap_". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 10MB
All troubleshooting information	more than 30MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

・ Collecting the troubleshooting information for initial investigation.

```
# /opt/FJSVssage/sys/agentsnap
```

12.6 [Windows Version] Agent Commands

This section explains command operations on Windows Agent machines.

12.6.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.6.1.1 User information setting command (defusr)

NAME

defusr - Sets the user information

SYNOPSIS

```
$INS_DIR\Agent\bin\defusr -a key-name user-name password
$INS_DIR\Agent\bin\defusr -l [key-name]
$INS_DIR\Agent\bin\defusr -r key-name user-name password
$INS_DIR\Agent\bin\defusr -d key-name
```

($INS_DIR means "Program Directory" specified at the Agent installation.)

DESCRIPTION

This command sets user information necessary for database monitoring. Based on the information set with the defusr command, Agent accesses a database and collects information. User information specified with the defusr command is used only by Agent to access the database and collect information, but it is not related to the user who has started Agent or the user who has logged in to the Client machine.

Only users having administrator authority can execute this command to set or reset user information necessary for database monitoring. Up to 63 letters can be specified individually for the key name, user name, and password of the defusr command. However, Japanese characters (double-byte characters) cannot be specified for the key name, user name, and password of the defusr command.

OPTIONS

-a

Registers user information. Up to 255 sets of user information can be registered. An attempt at registration with an existing key results in an error.

-l

Displays user information. The user name defined for a specified key name is displayed. If no key name is specified, all registered user names are displayed.

-r

Changes user information.

-d

Deletes user information.

key-name*, *user-name*, and *password

Specify the following.

Monitored object	key-name	user-name and password
Oracle	Instance name specified in Oracle statement	User information to access to instance specified by key name
SQL Server	Arbitrary name (The same name as the key name specified in SQL Server statement)	User information to access to instance specified by SQL Server statement

EXAMPLES

- Registering user information

  ```
  "C:\Program Files\ETERNUS-SSC\Agent\bin\defusr" -a key1 user pass
  ```

- Changing user information

  ```
  "C:\Program Files\ETERNUS-SSC\Agent\bin\defusr" -r key1 user pass
  ```

12.6.1.2 Agent information change command (setagtip)

NAME

setagtip - Changes the Agent information

SYNOPSIS

```
$INS_DIR\Agent\bin\setagtip [-i ip-address]
```

($INS_DIR means "Program Directory" specified at the Agent installation.)

DESCRIPTION

This command sets Agent information. Only user of OS administrative group can execute this command.

To change the start IP address of Agent, specify an IP address in the command parameter for this setting.

OPTIONS

No specify

Displays the current setting information.

-i *ip-address*

For *ip-address*, specify the IP address of the server node that can communicate from the administrative server.

Sets a specified IP address as the start IP address of Agent.

EXAMPLES

・ Displaying Agent information

```
"C:\Program Files\ETERNUS-SSC\Agent\bin\setagtip"
```

・ Setting the Agent IP address to 10.12.13.14

```
"C:\Program Files\ETERNUS-SSC\Agent\bin\setagtip" -i 10.12.13.14
```

NOTES

If the host name cannot be resolved from the specified IP address, the messages shown below is displayed. Check for an error in the specified IP address or network definition (hosts, DNS, etc.), and re-execute the command.

```
IP Address = IP address: Host's Name is not found.
```

12.6.1.3　Server node Agent SNMP Trap Test (traptest)

NAME

traptest - Does the test of SNMP Trap

SYNOPSIS

```
$INS_DIR\Agent\bin\traptest [ip-address]
```

($INS_DIR means "Program Directory" specified at the Agent installation.)

DESCRIPTION

This command checks whether SNMP Trap is correctly transmitted to a administrative server from a server node agent, display an event, and check the linkage with Shell/Bat. The Centric Manager linkage is not operated by this command.

If the action on SNMP Trap as a test is supposed to be changed, change SNMP Trap XML definition file (1_3_6_1_4_1_211_4_1_3_21_2_2.xml) for the ESC agent. In SNMP Trap as a test, 1 is used for Specific Trap Type number and the action can be changed by changing the definition of the Specific Trap Type number 1 defined in SNMP Trap XML definition file. For SNMP Trap XML definition file, refer to "C.6 SNMP Trap XML Definition File".

Only in the environment where the server node holds two or more IP addresses, a server node's IP (Agent start IP address) address which the ESC manager recognizes is specified to *ip-address*.

OPTIONS

None.

・ SNMP Trap is transmitted from the server node agent of IP address 11.11.11.11.

```
"C:\Program Files\ETERNUS-SSC\Agent\bin\traptest" 11.11.11.11
```

NOTES

If the SNMP Trap destination address is not set to the server node when execute the command, the following results are output.

```
Target Host Nothing
SNMPTrap error
```

If the server node that input in the command is not registered in ESC, please re-execute the command after registering the server node.

Please execute the same action in case where the server node is not registered in ESC after deletion of the server node.

12.6.2 Starting and Stopping Services

This section explains how to start and stop services.

12.6.2.1 Starting and Stopping Services

Starting the service

Open [Control Panel] - [Administrative Tools] - [Services], select the service "ETERNUS SF Storage Cruiser Agent" and start it.

Stopping the CIMOM service

Open [Control Panel] - [Administrative Tools] - [Services], select the service "ETERNUS SF Storage Cruiser Agent" and stop it.

12.6.3 Troubleshooting information collection

This section explains the commands for troubleshooting information on Agent.

12.6.3.1 Troubleshooting information collection of Agent (agentsnap)

NAME

agentsnap - Collects the troubleshooting information of Agent

SYNOPSIS

```
$INS_DIR\Agent\sbin\agentsnap -dir dirname [-all]
```

($INS_DIR means "Program Directory" specified at the Agent installation.)

DESCRIPTION

This command collects information of Agent. Only OS administrator (root) user can execute this command.

Collect information when a problem occurs on Agent.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir _dirname_

Corrects the troubleshooting information on _dirname_ directory. Specify the full path name that starts from the drive letter for _dirname_.
The maximum length that can be specified for _dirname_ is 100 bytes.

The collected information is gathered in the directory that its name starts by "agentsnap_". Before executing this command, please confirm that _dirname_ directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 10MB
All troubleshooting information	more than 30MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

・ Collecting the troubleshooting information for initial investigation on D:\temp directory.

```
"C:\Program Files\ETERNUS-SSC\Agent\sbin\agentsnap" -dir D:\temp
```

NOTES

When the operating system is Windows 2000, check whether Windows 2000 Support Tools have been installed before executing the agentsnap command. If Windows 2000 Support Tools have not been installed, take either of the following actions:

・ Install Windows 2000 Support Tools from the Windows 2000 CD.

・ Use regedit.exe to get the registry values for [1] and [2] below. (Note that there is no need to get values for registries that do not exist.)

For [1], get all of the key values indicated.
For [2], get all of the key values indicated, as well as all of the values for subordinate keys.

- Collecting the Initial investigation information

```
HKEY_LOCAL_MACHINE\
    HARDWARE\
        DEVICEMAP\
            Scsi          --- [1]
    SOFTWARE\
        Emulex            --- [1]
        Fujitsu           --- [1]
        SNIA              --- [2]
        Wow6432Node\
            Emulex        --- [1]
            Fujitsu       --- [1]
            SNIA          --- [2]
    SYSTEM\
        CurrentControlSet\
            Services      --- [1]
```

- Collecting the All troubleshooting information

```
HKEY_LOCAL_MACHINE\
    HARDWARE\
        DEVICEMAP\
            Scsi          --- [2]
```

```
SOFTWARE\
    Emulex              --- [2]
    Fujitsu             --- [2]
    SNIA                --- [2]
    Wow6432Node\
        Emulex          --- [2]
        Fujitsu         --- [2]
        SNIA            --- [2]
SYSTEM\
    CurrentControlSet\
        Services\       --- [1]
            elxstor     --- [2]
            lpxnds      --- [2]
            ql2300      --- [2]
            mpio        --- [2]
            F3GLMiDr    --- [2]
            F3GLMpDr    --- [2]
```

12.7 [Linux Version] Agent Commands

This section explains command operations on Linux OS Agent machines.

12.7.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.7.1.1 User information setting command (defusr)

NAME

defusr - Sets the user information

SYNOPSIS

```
/opt/FJSVssage/bin/defusr -a key-name user-name password
/opt/FJSVssage/bin/defusr -l [key-name]
/opt/FJSVssage/bin/defusr -r key-name user-name password
/opt/FJSVssage/bin/defusr -d key-name
```

DESCRIPTION

This command sets user information required for database monitoring. Based on the user information set by the defusr command, Agent accesses the database and collects information.

The user information set by the defusr command is used only by Agent to access the database to collect information and has nothing to do with the Agent start user and the login user of an administrative client.

A user with administrator authority executes this command to set or delete user information required for database monitoring. Each of the key name, user name, and password in the defusr command can be specified using up to 63 characters. Two-byte characters cannot be used.

OPTIONS

-a

Adds user information. Up to 255 pieces of user information can be stored. An attempt to add user information to a key for which user information has already been stored causes an error.

-l

Displays user information. The user name defined for the specified key name is displayed. If the key name is not specified, all user names that have been registered are displayed.

-r

Modifies user information.

-d

Deletes user information.

key-name, _user-name_, and _password_

Specify the following.

Monitoring target	key-name	user-name and password
Oracle	Instance name specified in the Oracle statement	User information needed to access the instance specified for the key name

EXAMPLES

・ Adding user information

```
# /opt/FJSVssage/bin/defusr -a key1 user pass
```

・ Modifying user information

```
# /opt/FJSVssage/bin/defusr -r key1 user pass
```

12.7.1.2 Agent information change command (setagtip)

NAME

setagtip - Changes the Agent information

SYNOPSIS

```
/opt/FJSVssage/bin/setagtip [-i ip-address]
```

DESCRIPTION

This command sets Agent information. Only OS administrator (root) user can execute this command.

To change the start IP address of Agent, specify an IP address in the command parameter to specify Agent information.

OPTIONS

No specify

Displays the current setting information.

-i *ip-address*

> For *ip-address*, specify the IP address of the server node that can communicate from the administrative server.

> Sets the specified IP address as the start IP address of Agent.

EXAMPLES

- Displaying Agent information

  ```
  # /opt/FJSVssage/bin/setagtip
  ```

- Setting the Agent IP address to 10.12.13.14

  ```
  # /opt/FJSVssage/bin/setagtip -i 10.12.13.14
  ```

NOTES

If the host name cannot be resolved from the specified IP address, the messages shown below is displayed. Check for an error in the specified IP address or network definition (hosts, DNS, etc.), and re-execute the command.

```
IP Address = IP address: Host's Name is not found.
```

12.7.1.3 Server node Agent SNMP Trap Test (traptest)

NAME

traptest - Does the test of SNMP Trap

SYNOPSIS

```
/opt/FJSVssagt/bin/traptest [ip-address]
```

DESCRIPTION

This command checks whether SNMP Trap is correctly transmitted to a administrative server from a server node agent, display an event, and check the linkage with Shell/Bat. The Centric Manager linkage is not operated by this command.

If the action on SNMP Trap as a test is supposed to be changed, change SNMP Trap XML definition file (1_3_6_1_4_1_211_4_1_3_21_2_2.xml) for the ESC agent. In SNMP Trap as a test, 1 is used for Specific Trap Type number and the action can be changed by changing the definition of the Specific Trap Type number 1 defined in SNMP Trap XML definition file. For SNMP Trap XML definition file, refer to "C.6 SNMP Trap XML Definition File".

Only in the environment where the host holds two or more IP addresses, a server node's IP (Agent start IP address) address which the ESC manager recognizes is specified to *ip-address*.

OPTIONS

None.

EXAMPLES

- SNMP Trap is transmitted from the server node agent of IP address 11.11.11.11.

  ```
  # /opt/FJSVssagt/bin/traptest 11.11.11.11
  ```

NOTES

If the SNMP Trap destination address is not set to the server node when execute the command, the following results are output.

```
Target Host Nothing
SNMPTrap error
```

If the server node that input in the command is not registered in ESC, please re-execute the command after registering the server node.

Please execute the same action in case where the server node is not registered in ESC after deletion of the server node.

12.7.2 Starting and Stopping Agent

This section explains the commands for starting and stopping agent.

12.7.2.1 Starting and Stopping Agent

Only OS administrator (root) user can execute following commands.

Starting Agent

Enter the following command to start Agent.

```
# /opt/FJSVssage/bin/sstorageagt
```

Stopping Agent

Enter the following command to stop Agent.

```
# /opt/FJSVssage/bin/pstorageagt
```

12.7.3 Troubleshooting information collection

This section explains the commands for troubleshooting information on Agent.

12.7.3.1 Troubleshooting information collection of Agent (agentsnap)

NAME

agentsnap - Collects the troubleshooting information of Agent

SYNOPSIS

```
/opt/FJSVssage/sys/agentsnap [-dir dirname] [-all]
```

DESCRIPTION

This command collects information of Agent. Only OS administrator (root) user can execute this command.

Collect information when a problem occurs on Agent.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name for *dirname*.

When this option is omitted, the troubleshooting information is stored on /tmp directory.

The collected information is gathered in the file that its name starts by "agentsnap_". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 10MB
All troubleshooting information	more than 30MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

- Collecting the troubleshooting information for initial investigation.

```
# /opt/FJSVssage/sys/agentsnap
```

12.8 [HP-UX Version] Agent Commands

This section explains the command operations on HP-UX Agent machines.

12.8.1 Commands for operating environment management

The following sections explain the commands for managing the operating environment.

12.8.1.1 Agent information change command (setagtip)

NAME

setagtip - Changes the Agent information

SYNOPSIS

```
/opt/FJSVssage/bin/setagtip [-i ip-address]
```

DESCRIPTION

This command sets the Agent information. Only OS administrator (root) user can execute this command.

To change the start IP address of Agent, specify an IP address in the command parameter for this setting.

OPTIONS

No specify

Displays the current setting information.

-i *ip-address*

For *ip-address*, specify the IP address of the server node that can communicate from the administrative server.

Sets the specified IP address as the start IP address of Agent.

EXAMPLES

・ Displaying Agent information

```
# /opt/FJSVssage/bin/setagtip
```

・ Setting the Agent IP address to 10.12.13.14.

```
# /opt/FJSVssage/bin/setagtip -i 10.12.13.14
```

NOTES

If the host name cannot be resolved from the specified IP address, the message shown below is displayed. Check for an error in the specified IP address or network definition (hosts, DNS, etc.), and re-execute the command.

```
IP Address = IP address : Host's Name is not found.
```

12.8.1.2 Server node Agent SNMP Trap Test (traptest)

NAME

traptest - Does the test of SNMP Trap

SYNOPSIS

```
/opt/FJSVssagt/bin/traptest [ip-address]
```

DESCRIPTION

This command checks whether SNMP Trap is correctly transmitted to a administrative server from a server node agent, display an event, and check the linkage with Shell/Bat. The Centric Manager linkage is not operated by this command.

If the action on SNMP Trap as a test is supposed to be changed, change SNMP Trap XML definition file (1_3_6_1_4_1_211_4_1_3_21_2_2.xml) for the ESC agent. In SNMP Trap as a test, 1 is used for Specific Trap Type number and the action can be changed by changing the definition of the Specific Trap Type number 1 defined in SNMP Trap XML definition file. For SNMP Trap XML definition file, refer to "C.6 SNMP Trap XML Definition File".

Only in the environment where the host holds two or more IP addresses, a server node's IP (Agent start IP address) address which the ESC manager recognizes is specified to *ip-address*.

OPTIONS

None.

EXAMPLES

· SNMP Trap is transmitted from the server node agent of IP address 11.11.11.11.

```
# /opt/FJSVssagt/bin/traptest 11.11.11.11
```

NOTES

If the SNMP Trap destination address is not set to the server node when execute the command, the following results are output.

```
Target Host Nothing
SNMPTrap error
```

If the server node that input in the command is not registered in ESC, please re-execute the command after registering the server node.

Please execute the same action in case where the server node is not registered in ESC after deletion of the server node.

12.8.2 Starting and Stopping Agent

This section explains the commands for starting and stopping agent.

12.8.2.1 Starting and Stopping Agent

Only OS administrator (root) user can execute following commands.

Starting Agent

Execute the following command to start Agent.

```
# /opt/FJSVssage/bin/sstorageagt
```

Stopping Agent

Execute the following command to stop Agent.

```
# /opt/FJSVssage/bin/pstorageagt
```

12.9 Client Commands

This section explains command operations on Client.

12.9.1 Troubleshooting information collection

This section explains the commands for troubleshooting information on Client.

12.9.1.1 Troubleshooting information collection of Client (clientsnap)

NAME

clientsnap - Collects the troubleshooting information of Client

SYNOPSIS

```
$INS_DIR\Client\sbin\clientsnap -dir dirname [-all]
```

($INS_DIR means "Destination Folder" specified at the Client installation.)

DESCRIPTION

This command collects information of Client. Only user of OS administrative group can execute this command.

Collect information when a problem occurs on Client.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

Corrects the troubleshooting information on *dirname* directory. Specify the full path name that starts from the drive letter for *dirname*.
The maximum length that can be specified for *dirname* is 100 bytes.

The collected information is gathered in the directory that its name starts by "clientsnap_". Before executing this command, please confirm that *dirname* directory has more than 70MB free space.

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

- Collecting the troubleshooting information for initial investigation on D:\temp directory.

```
"C:\Program Files\ETERNUS-SSC\Client\sbin\clientsnap" -dir D:\temp
```

Appendix A Indicating Storage Device Types

A.1 Notational Conventions of Window Elements and Abbreviations

Notational conventions of common window elements used in the resource view, Performance Management window, and, Correlation window are explained below.

A hexadecimal number is indicated with 0x as 0x12fe.

Table A.1 ETERNUS DX60/DX80, ETERNUS2000, ETERNUS3000, ETERNUS4000, ETERNUS6000, ETERNUS8000, and GR elements

Name in this software	Value format	Value	Abbreviation
Disk	Character string	Drive ID ID number of a device enclosure (DE) accommodating a drive and the serial number of the drive in the DE Example: DE0x00:Disk7 (DE (uppercase letters) is followed by a two-digit hexadecimal number. The disk is indicated by a decimal number.)	Drive, PLU, LUNP, LUN_P
RAIDGroup	Hexadecimal number	RAID Group value Example: RAIDGroup0x0000 (uppercase letters followed by a four-digit hexadecimal number)	RLU, LUNR, LUN_R, RANK
LogicalVolume	Hexadecimal number	Disk array internal logical volume number Example: LogicalVolume0x0000 (four-digit hexadecimal number)	OLU, LUNV, LUN_V
AffinityGroup	Decimal number	Affinity group number defined for disk array (zone number) Example: AffinityGroup0 (decimal number)	ZONE (ETERNUS3000,GR)
LUN	Decimal number	Logical volume number that can be seen by a server node Example: LUN0 (decimal number)	LUNH, HLU
CA	Hexadecimal number	CA identification character string Example: CM0x0:CA0x1 For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices" below.	
Port	Character string	Port identification character string Example: CA0x10:Port0 For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices" below.	
DA	Hexadecimal number	DA identification character string	

Name in this software	Value format	Value	Abbreviation
		Example: DA0x10 For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices" below.	
CM	Hexadecimal number	CM identification character string Example: CM0x00 For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices" below.	
IOB	Hexadecimal number	IOB identification character string Example: IOB0x10 For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices" below.	
Router	Decimal number	Front End Router number 0 is the number used for the front of a chassis and 1 is used for the back. Example: Router0	
DE	Hexadecimal number	DE ID number. Example: DE0x00	
Battery/Capacitor	Decimal number	Serial number used in a battery/capacitor	

A.2　Module Element Notations and Mounting Location of Storage Devices

A.2.1　ETERNUS3000 model 50, GR710 module mounting diagram

```
+----------+   +----------+
|  Port0   |   |  Port0   |
+----------+   +----------+
|  CA0x00  |   |  CA0x10  |
+----------+   +----------+
|  CM0x00  |   |  CM0x10  |
+----------+   +----------+
```
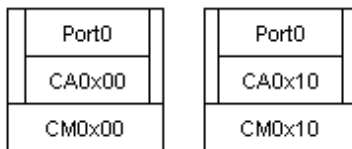
A.2.2 GR720, GR730 module mounting diagram

DA0x11	Port0	DA0x10	Port0
	CA0x11		CA0x10
CM0x10			

DA0x01	Port0	DA0x00	Port0
	CA0x01		CA0x00
CM0x00			

A.2.3 GR740, GR820, GR840 module mounting diagram

Front

Port0	Port0	DA 0x00	Port0	Port0	DA 0x01	Port0	Port0	DA 0x02	Port0	Port0	DA 0x03
CA 0x00	CA 0x01		CA 0x02	CA 0x03		CA 0x04	CA 0x05		CA 0x06	CA 0x07	
IOB0x00			IOB0x01			IOB0x02			IOB0x03		
CM0x00						CM0x01					
Router0											

Back

Port0	Port0	DA 0x10	Port0	Port0	DA 0x11	Port0	Port0	DA 0x12	Port0	Port0	DA 0x13
CA 0x10	CA 0x11		CA 0x12	CA 0x13		CA 0x14	CA 0x15		CA 0x16	CA 0x17	
IOB0x10			IOB0x11			IOB0x12			IOB0x13		
CM0x10						CM0x11					
Router1											

A.2.4 ETERNUS4000 models 80 and 100, ETERNUS3000 models 80 and 100 module mounting diagram

Port0	Port1
CA0x00	
CM0x00	

Port0	Port1
CA0x10	
CM0x10	

A.2.5 ETERNUS3000 models 200, 300, 400, 500, 600 and 700 module mounting diagram

Port0	Port1	Port0	Port1
CA0x00		CA0x01	
CM0x00			

Port0	Port1	Port0	Port1
CA0x10		CA0x11	
CM0x10			

A.2.6 ETERNUS6000 series module mounting diagram

Front

Router 0x11 (3)	CA 0x00	Port0	CA 0x02	Port0	DA 0x00	CM 0x11 (3)	CM 0x01 (1)	CA 0x00	Port0	CA 0x02	Port0	DA 0x00	Router 0x01 (1)
		Port2		Port2					Port2		Port2		
		Port1		Port1					Port1		Port1		
		Port3		Port3					Port3		Port3		
	CA 0x01	Port0	CA 0x03	Port0	DA 0x01			CA 0x01	Port0	CA 0x03	Port0	DA 0x01	
		Port2		Port2					Port2		Port2		
		Port1		Port1					Port1		Port1		
		Port3		Port3					Port3		Port3		

Back

Router 0x00 (0)	CA 0x00	Port0	CA 0x02	Port0	DA 0x00	CM 0x00 (0)	CM 0x10 (2)	CA 0x00	Port0	CA 0x02	Port0	DA 0x00	Router 0x10 (2)
		Port2		Port2					Port2		Port2		
		Port1		Port1					Port1		Port1		
		Port3		Port3					Port3		Port3		
	CA 0x01	Port0	CA 0x03	Port0	DA 0x01			CA 0x01	Port0	CA 0x03	Port0	DA 0x01	
		Port2		Port2					Port2		Port2		
		Port1		Port1					Port1		Port1		
		Port3		Port3					Port3		Port3		

A.2.7 ETERNUS8000 series, ETERNUS4000 series (except models 80 and 100) module mounting diagram

```
                Port0
            Port1
           Port2
          Port3
```

0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
CA0x00				CA0x01				CA0x02				CA0x03				CA0x00				CA0x01				CA0x02				CA0x03			
CM0x00																CM0x01															

0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
CA0x00				CA0x01				CA0x02				CA0x03				CA0x00				CA0x01				CA0x02				CA0x03			
CM0x02																CM0x03															

0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
CA0x00				CA0x01				CA0x02				CA0x03				CA0x00				CA0x01				CA0x02				CA0x03			
CM0x06																CM0x07															
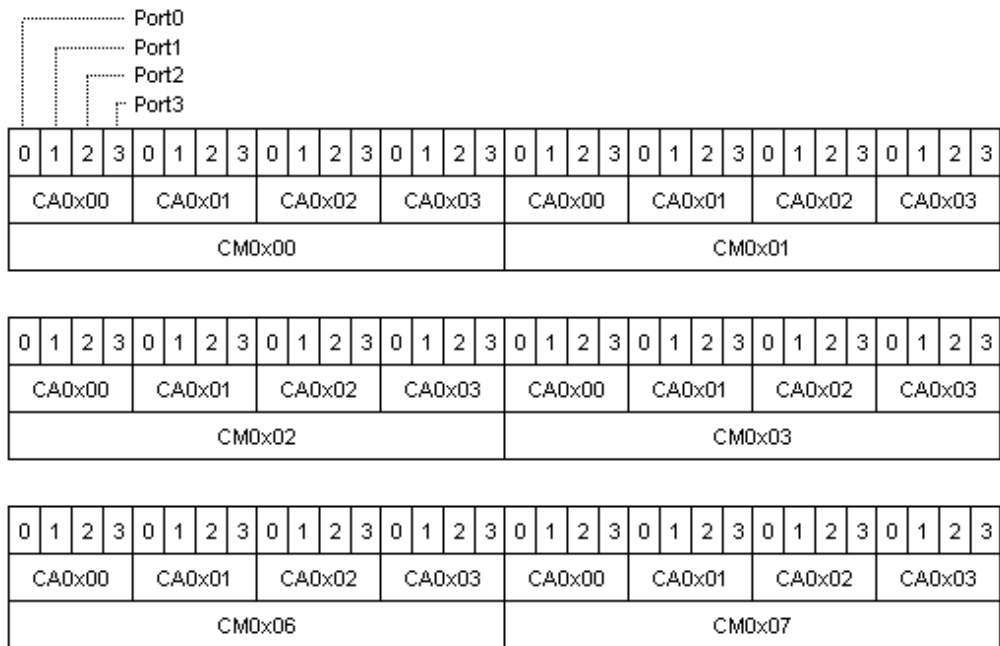
A.2.8 ETERNUS2000 series module mounting diagram

Port0	Port1	Port0	Port1
CM0x00		CM0x01	
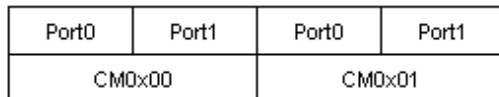
A.2.9 ETERNUS DX60/DX80 series module mounting diagram

Port0	Port1	Port0	Port1
CM0x00		CM0x01	
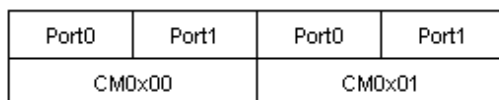
Appendix B Explanation of Menus and Windows

This chapter describes the client's window functions and explains how to use them.

B.1 Configuration of Resource View

The resource view consists of the following six smaller windows:

Menu bar

Resource view functions can be executed from the menu bar.

Menu items are enabled or disabled depending on the selection states of windows and icons.

When [View] - [Change] - [List View] is selected, some operations (such as a device search, device addition, or device deletion) cannot be performed.

Right-clicking in a view or window, excluding the Main view (for category display) and Category view, displays a pop-up menu from which typical commands registered on the menu bar can be selected and executed.

Tree (left side of the screen)

Resources are categorized as servers, storage, or SAN. Server nodes and storage units are stored for base domain and SAN devices are stored for each device type (switch, hub, router, or bridge) under the corresponding tree branch.

Map view (right side of the screen)

Resources are displayed as icons. Physical paths and access paths (for server nodes or storage view) are displayed as lines between the icons.

The contents of the displayed Map view depends on the icon selected in the tree.

List view (lower right side of the screen)

This displays individual items of resource information. The contents of the displayed List view depend on the icon selected in the tree.

The items to be displayed on a list can be specified for all lists. Right-click the item button, and select [Visible] on the pop-up menu.

Moreover, you can sort device information displayed on a list by clicking one of the list items.

A blank is displayed for the following information: device information that cannot be obtained from a physical device and that not yet set for a manually embedded device.

Event log (near the bottom of the screen)

This displays the settings defined from this software for individual resources and an error report (SNMP Trap) sent from a device.

Status bar (bottom of the screen)

This displays an explanation of the indicated status (color) of each resource.

The resource view also consists of the following views and Windows:

Main view

This displays the categories (overall configuration) of the devices being managed.

To display the Site view, select [File] - [Main View] from the menu in a view, or click the main view name in the Tree view.

Category view

This displays base domains (Server Category view and Storage Category view) or SAN device types (SAN Category view).

Domain view

This displays all devices (servers and storage), including related devices, managed by the base domain.

SAN view

This displays all accessible devices among the specified SAN device type.

Server Node view

This displays the storage devices related to the selected server node. This view also allows the user to display the access paths set from the server node, or set or delete access paths.

The relevant items are displayed by double-clicking in tree display or in one of the views the icon for the server node.

Switch view

This displays sources connected to the selected Fibre Channel switch.

To display the Switch view, double-click the target Fibre Channel switch in the tree or its icon in a view.

Hub view

This displays resources connected to the selected hub.

To display the Hub view, double-click the target hub in the tree or its icon in a view.

Router view

This displays resources connected to the selected router (contain Edge).

To display the Router view, double-click the target router in the tree or its icon in a view.

Bridge view

This displays resources connected to the selected bridge.

To display the Bridge view, double-click the target bridge in the tree or its icon in a view.

Storage view

This displays the host associated with a particular storage device and access paths that have been set, and it is used to set, and delete access paths.

To display the Storage view, double-click the target storage in the tree or its icon in a view.

Correlation window

Details about devices are displayed in this window.

To display the Correlation window, select [File] on the menu bar in each view, then [Correlation Window], or select [Correlation Window] from the pop-up menu displayed by right-clicking.

Performance Management Window

This displays the performance of ETERNUS, GR and Fibre Channel switches. Settings such as the start of performance measurement are made in the GUI window.

From the [File] menu in each view, select [Performance Management Window] to display the window, or right-click and select [Performance Management Window] from the pop-up menu.

Manual Configuration Window

This window is used to manually set the device configuration.

From the [File] menu in the SAN view, select [Manual configuration window] to display the window, or select [Manual configuration window] from the pop-up menu.

Thin Provisioning Pool monitor window

This window is used to monitor Thin Provisioning Pool.

From the [File] menu in each view, select [Thin Provisioning Pool monitor Window] to display the window.

B.2 Main View Operations

B.2.1 Explanation of window

The Site view displays the all devices configuration information of the devices managed.
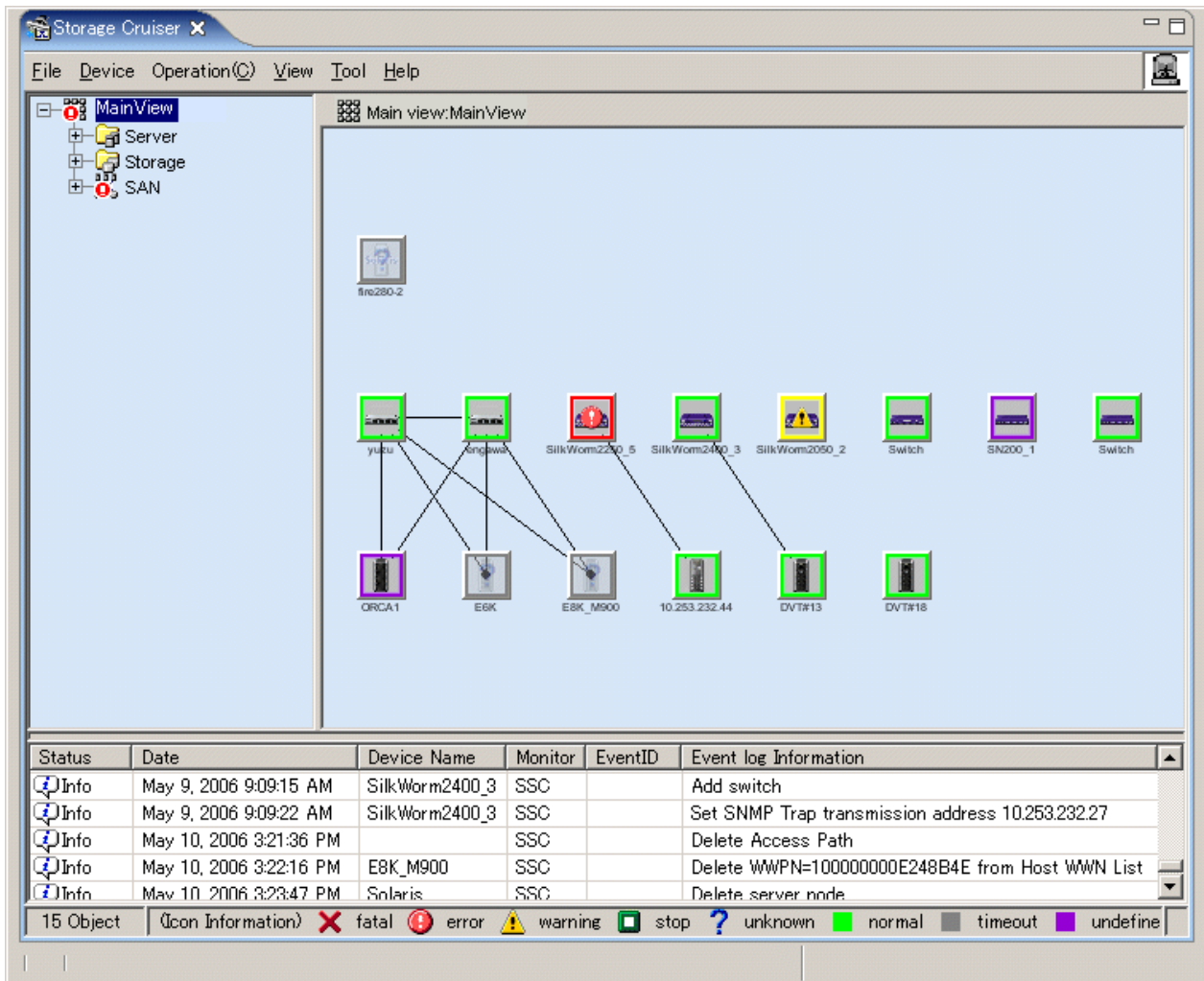
Expanding the tree displays the server, storage, and SAN categories. Expanding the categories displays the server domain, storage domain, and SAN device type.

The following explains the icons in the Tree view and Map view and the List view items.

Icon state

Resource states are indicated with colors and icons. When you select an icon with a mouse click, the icon is displayed in blue, indicating that the icon is being selected.

Icon state	Color	Icon	Description	Action to be taken
normal	Green		The device is operating normally.	None
warning	Yellow	⚠	An error occurred, but the resource remains usable.	Replace the faulty part, and execute recovery processing. -> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
error	Red	🛑	An error occurred for an unspecified cause, and the resource cannot be used.	Replace the faulty part, and execute recovery processing.

Icon state	Color	Icon	Description	Action to be taken
				-> "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"
stop	Green	■	Operation of a resource was stopped, and the resource cannot be used.	None
fatal	Red	✖	A malfunction occurred in the operation of this resource, and the resource cannot be used.	None
unknown	Grey	?	The status cannot be determined.	None
timeout	Gray		The device is registered in this software, but is not recognized by the software. The device properties displayed by the GUI are the values that were retrieved the last time that the device was recognized. However, if the device is a Fibre Channel switch that enters the timeout state, the GUI does not display the Fibre Channel physical line under the Fibre Channel switch. The GUI indicates errors for all access paths using the Fibre Channel switch because this software cannot check the statuses of these paths.	The power supply of the device may be off, Agent may not be operating, or a LAN error may have occurred. When you changed the IP address manually, see also "9.1.2 Changing the operating environment" and perform operations to reflect the changes of the IP address. If the device uses the SNMP protocol for communication, the community name of the device may differ between the target device and admin server. If the community name of the target device has been changed, set the community name by referring to "C.2 sanma.conf Parameter", and reflect the setting file on this software. -> Check the device status, and select [Refresh] from the menu.
undefined	Violet		The device is undefined in this software.	Define the device.

List view items

All devices and their states are displayed in list format.
To display the list view items, select [View] - [Change] - [List View] from the menu.

B.2.2   Menus

This section explains the menus that can be used in the resource view.

File

- ・ Main view or [Ctrl] + [O]

    The Main view is displayed.

- ・ Retrieve Information

    Database information can be retrieved (Only for the menu of Main View, Server View and Storage View. The function cannot be used while a device icon is selected. Information in the Correlation window cannot be retrieved from here.)

- ・ Register

    [Register a server]

    Select this to register a server node.

[Register SAN devices]

Select this to register devices to be managed under control of this software. Valid only when an unregistered device icon is selected.

・ Delete

Delete the specified device and it is excludes from the management by this software. Valid only when a device icon is selected. Thereafter, this software does nothing for the relevant device.

・ Register SAN devices (Only for Base domain view of Storage category)

[Detect device in subnet]

Select this to automatically detect devices in the same subnet as the administrative server. If a supported device is detected, it is displayed as an unregistered device in the Review view. This function is valid only when no device icon is selected. The administrative server internally broadcasts SNMP to the network. Devices in other subnets can also be detected simultaneously. For more information, see "Appendix C Customization". (This function is valid only when no device icon is selected.)

[Detect by IP address]

Select this to detect a device connected to the SAN by specifying its IP. (This function is valid only when no device icon is selected.)

・ Correlation Window

Displays a window that displays the correlation of detail elements in the device.

・ Performance Management Window

Opens the Performance Management window that displays performance data. Multiple Windows can be opened at the same time.

・ Manual Configuration window

Select this to embed a device in the main view.

・ Virtual Storage Window

[View and Create]

Refer and create Virtual Storage.

[Copy]

Copy Virtual Storage.

[Maintenance]

Maintenance virtual storage.

・ Thin Provisioning Pool monitor window

Displays the window that monitors Thin Provisioning Pool. Only one monitoring window can be displayed.

・ Logout

Returns to the login windows after closing the GUI window. The following windows are also closed: Performance Management, Relationship Management, Thin Provisioning Pool monitor, Capacity management. Note that if an icon was moved but its new position has not been saved, it returns to the old position at the next startup.

Device

・ Change Device Management Name

Changes the device names managed in this software. Set a unique name for the devices managed in the administrative server. Device names that have already been registered cannot be specified.

Specify a maximum of 24 characters for the ETERNUS/GR disk array device name.

The name that is set for the ETERNUS/GR disk array device can also be used as the ETERNUS/GR name for SSF/Backup Facility (direct backup).

・ Change account for device management

Re-specify a user name and password for device management of this software. (This function is valid only when the icon of a device requiring a password for management is selected.)

Some devices managed by this software require users to log in to read or set device information.

Before this software obtains and sets information for such a device, the user name and password for logging in to the device as specified during device registration must be entered. Therefore, if the user name and password are changed after device registration, they must be set again for this software.

Enter a new user name and password in the dialog.

・ Performance management

This is used to control the starting and stopping of performance management for a device.

(This function is valid only when the icon of any the following is selected: device of the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 (except model 50), ETERNUS2000, GR720 or later, or Fibre Channel switch.)

For details, see "7.2 Flow of Performance Management".

・ Call management software

This is used to call Management Software from a device icon of this software. For the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, GR series, and Fibre Channel switches, the URL of the Management Software is called.

The devices that have the Management Software function can be set up for call linkage. The call linkage is set up for such a device from its Properties dialog. (This software supports both URL calls and direct command execution.)The telnet can be started from the Management Software by describing it by the following formats:

Example: telnet://connected-server-name (Or, connected-server-IP-address)

Operation

・ Access Path

[Inherit]

Inheritance an access path.

[Connect]

Connect an access path. (Only when HBA or CA is selected)

[Delete]

Delete an access path. (Only when an access path is selected)

・ View Device

[Add]

The Add View Device dialog appears, enabling selection of devices to be added to those displayed in this view. Select the device to be displayed, and move it to "Additional Device" by clicking the <>>Add> button. Clicking the <OK> button displays the view with the icon of the device registered in "Additional Device".

[Clear]

The Remove View Device dialog appears, enabling deletion of an icon from display in this view. (However, a device whose icon is deleted with this function is not deleted from this software.) From "Deletable Device," select the device whose icon is to be deleted, and move it to "Deleted Device" by clicking the <<<Delete> button. The icon of the selected device is deleted from the view when the <OK> button is clicked.

View

- Change

  Provides one of the following view modes to be set for displaying the Map and/or List view:

  [Map View] Select this to display only the Map view and remove the List view.

  [List View] Select this to display only the List view and remove the Map view.

  [Map/List View] Select this to display both the Map and List views concurrently.

- Icon Size

  Used to change the size of device views in the Map view.

  [Normal] Select this to display the views at the normal size.

  [Small] Select this to reduce the display size of the views. This makes it possible to display larger areas.

- Show/Hide

  This is used to select the information to be displayed on the GUI window.

  [Physical Connection] Controls the display of physical lines.

  [Status Bar] Controls the display of the bar explaining the device status icon colors and the revolving light icon provided at the bottom of the screen.

  [Event Log] Controls the display of the event log provided at the bottom of the screen.

  [Overview] Controls the display of the Overview. The Overview function reduces the display of the entire system (all resources) in order to display it in another Overview window. The Overview changes the display size according to the size of the Overview window. The yellow frame in the Overview indicates the area displayed in the current Map view. Moving this frame in the Overview while holding down the left mouse button can change the display range of the Map view.

- Refresh or [F5]

  Obtains and displays the status of devices registered with this software via a LAN.

  The processing time depends on the LAN status and the number of devices. Several tens of seconds may pass after execution until the status is displayed. The processing time thus becomes long especially if the LAN has an unrecognizable device, which causes several internal retries to be made for the device. It is recommended to delete devices not requiring management from this software.

Tool

- Option

  Enables use of the option functions.

  [Re-read Definition File] Loads a definition file. For more information about definition files, see "Appendix C Customization".

  [Maximum number of event acquisition] Sets the number of events to be retrieved. Up to 1,000 events can be displayed. Event log data not displayed on the screen is stored in the file and can be referenced from other applications.

  [System configuration] Sets the operating environment.

  - [Set Device Polling Time]: Used to change the interval at which monitoring is performed to check whether the device status has changed.

  ### Note

  If the specified monitoring time is 10 seconds or less, status monitoring may not be reliable. If the monitoring time has been changed and is set to 10 seconds or less, check whether monitoring is in operation (event log information is updated normally).

- Authentication

  This function can set resource management authority for each administrator.

Help

- Help or [F1]

  Displays the user's guide.

- Message Reference

  Displays the message guide.

- Event Reference

  Displays the event guide.

- Version Information

  Select this to display the administrative client information, user information, the administrative server information, and Java virtual machine information. Selecting the refresh button frees the memory space used by this software.

B.2.3 Event log

Up to 1,000 events that have been logged can be displayed. When the number of events logged exceeds 1,000, logged events are deleted starting with the oldest. For details of events, refer to the "ETERNUS SF Storage Cruiser Event Guide". The number of events to be logged can be defined in the event acquisition number setting dialog box. To display the dialog box, select [Tool] - [Option] - [Maximum number of event acquisition] from the menu. The number of events to be logged is 100 by default.

B.3 Category View Operation

B.3.1 Screen description

A Category view can be displayed by double-clicking the target category icon from the Tree or Main view. This view displays the server domain, storage domain, and SAN device type related to the selected category.

A Category view displayed with the server category selected is referred to as the Server Category view. A Category view displayed with the storage category selected is referred to as the Storage Category view. A Category view displayed with the SAN category selected is referred to as the SAN Category view.

The figure below is an example of the window displayed with the server category selected from the Tree view. Only the managed server domains are displayed in the Map and List views.
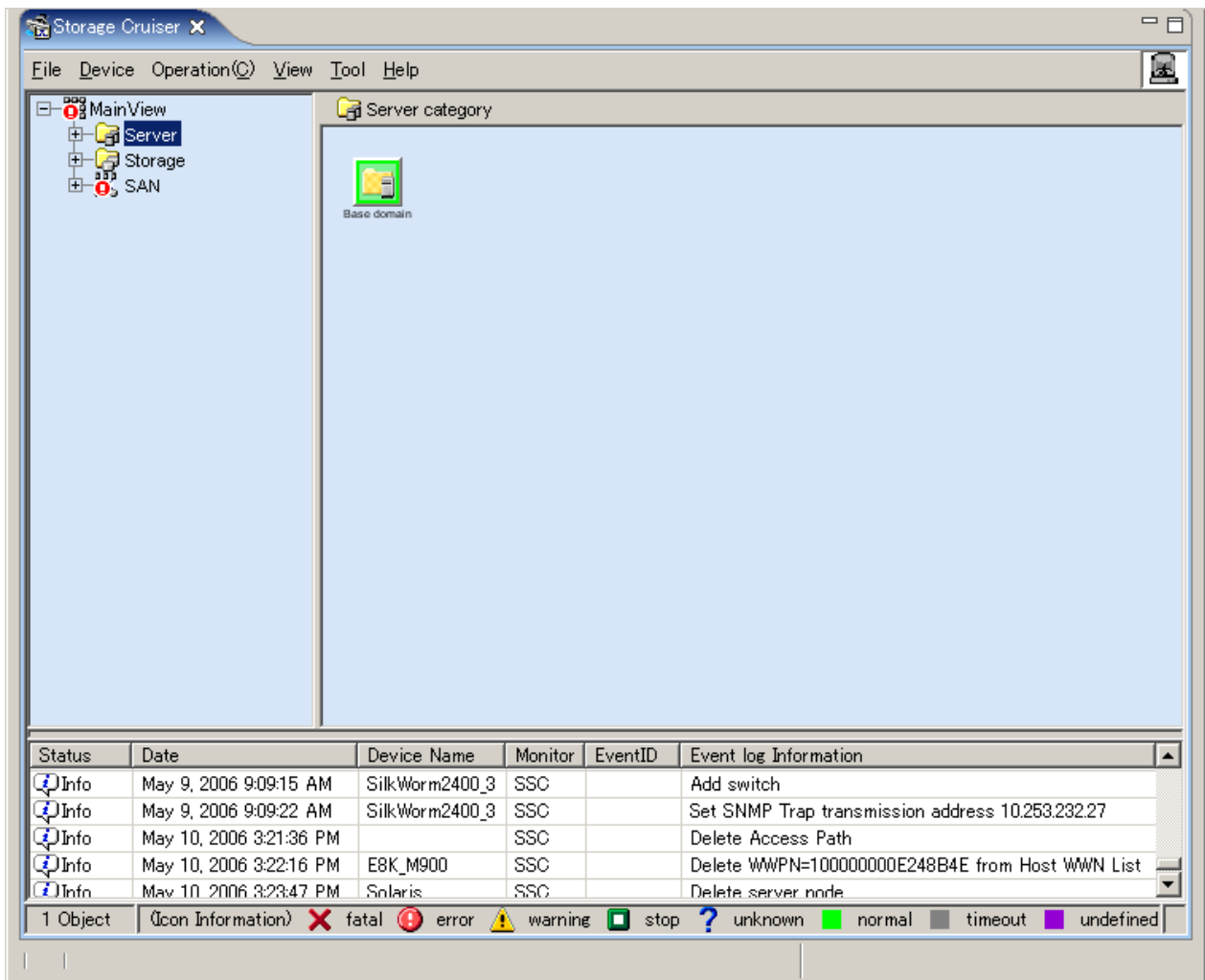
List view items

Domain names and their states are displayed in list format.

B.3.2 Menus

This section explains the menus that can be used on this view. Please refer to "B.2.2 Menus" for the detail information of the menu.

File

- ・ Main view or [Ctrl] + [O]

- ・ Correlation Window

- ・ Performance Management Window

- ・ Manual Configuration window (valid only when the SAN Category view is displayed)

- ・ Logout

B.4　Domain View Operation

B.4.1　Screen description

A Domain view can be displayed by double-clicking the target domain icon from the Tree or Category view. This view displays the device (server or storage) managed by the base domain and all other related devices.

The figure below is an example of the window displayed with the server domain selected from the Tree view. The server managed by the domain and its related devices are all displayed in the Map and List views.
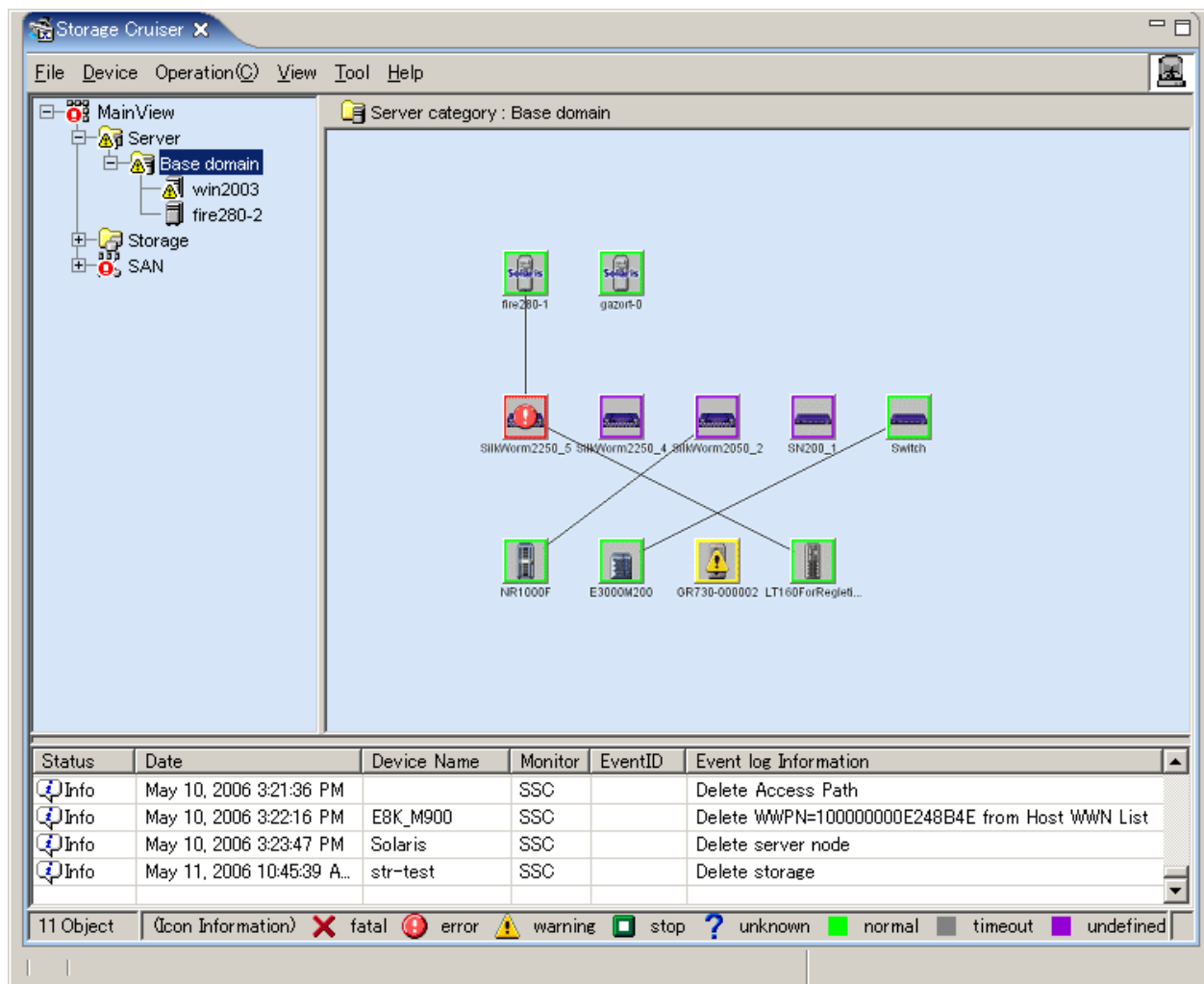
B.4.2　Menus

The available menus are explained below. These commands are also available from the pop-up menu displayed by right-clicking a device. Please refer to "B.2.2 Menus" for the detail information of the menu.

File

- ・ Main view or [Ctrl] + [O]

- ・ Retrieve information

- ・ Register

- ・ Delete

- ・ Detect SAN devices

- ・ Correlation window

- ・ Performance management window

- ・ Property

- ・ Logout

Device

- ・ Change account for device management

- ・ Set Performance management

- ・ Call management software

B.5   SAN View Operation

B.5.1   Screen description

A SAN view can be displayed by double-clicking the target device type icon (Switch, Hub, Router, or Bridge) from the Tree or SAN Category view. This view displays all SAN devices of the selected type.

The figure below is an example of the window displayed with Switch selected from the Tree view. All accessible Fibre Channel switches are displayed in the Map and List views.
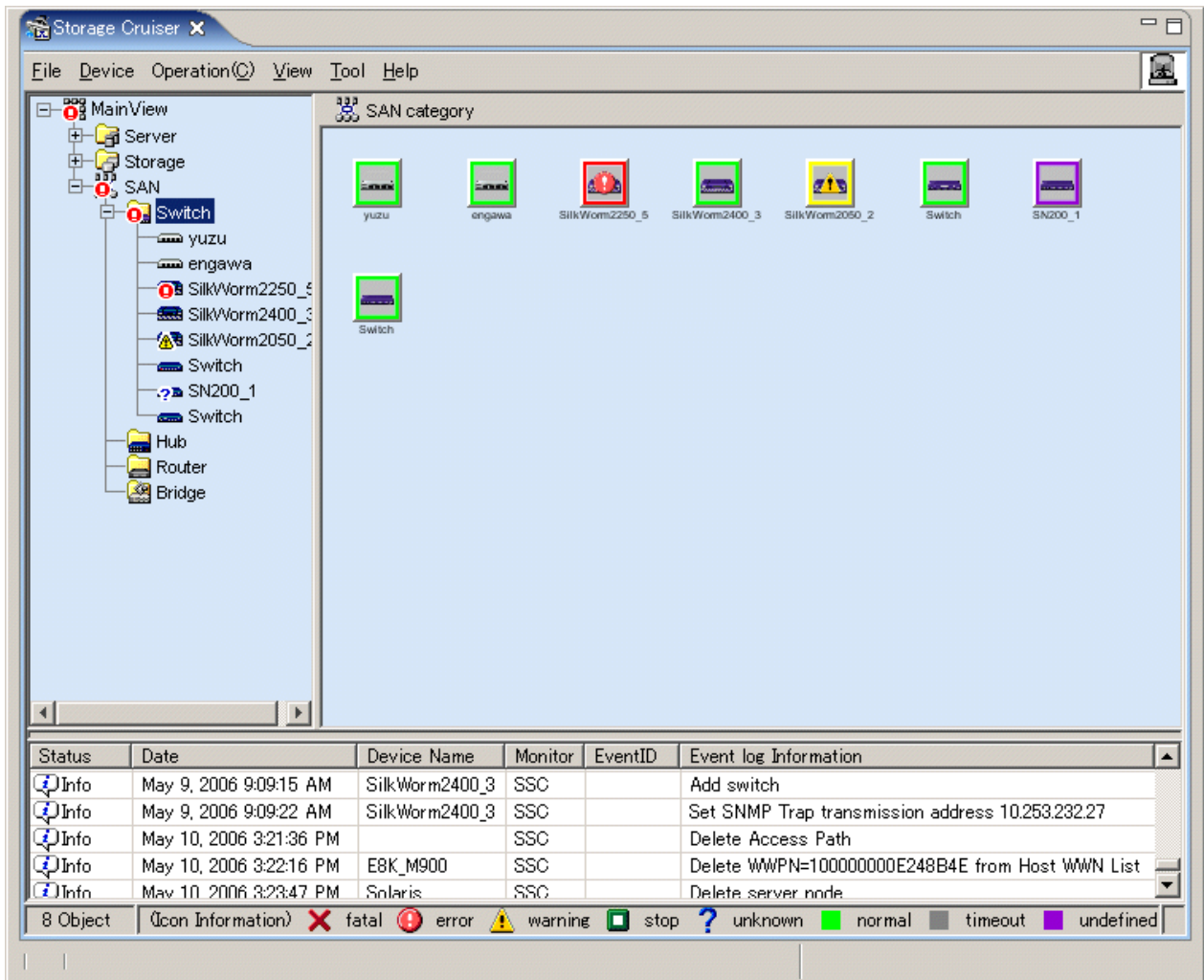
B.5.2 Menus

This section explains the menus that can be used on this view. Please refer to "B.2.2 Menus" for the detail information of the menu.

File

- Main view or [Ctrl] + [O]

- Register

- Delete

- Correlation window

- Performance management window

- Manual Configuration window

- Property

- Logout

Device

- Change account for device management

- Set performance management

- Call management software

B.6   Side View Operations

B.6.1   Screen description

The Side view is displayed by double-clicking a device in the tree or a device icon in a view. This view displays the devices (with Fibre Channel switches and access paths) related to the selected device.

The Side view displayed when a server node, a Fibre Channel switch, storage, a bridge, a hub or a router is selected is called the Server Node view, Switch view, Storage view, Bridge view, Hub view or Router view, respectively.

In the Server Node view, Storage view and Bridge view, access paths can be displayed, set, and deleted. Note that, in the Switch view, Hub view and Router view no operation can be performed for access paths.
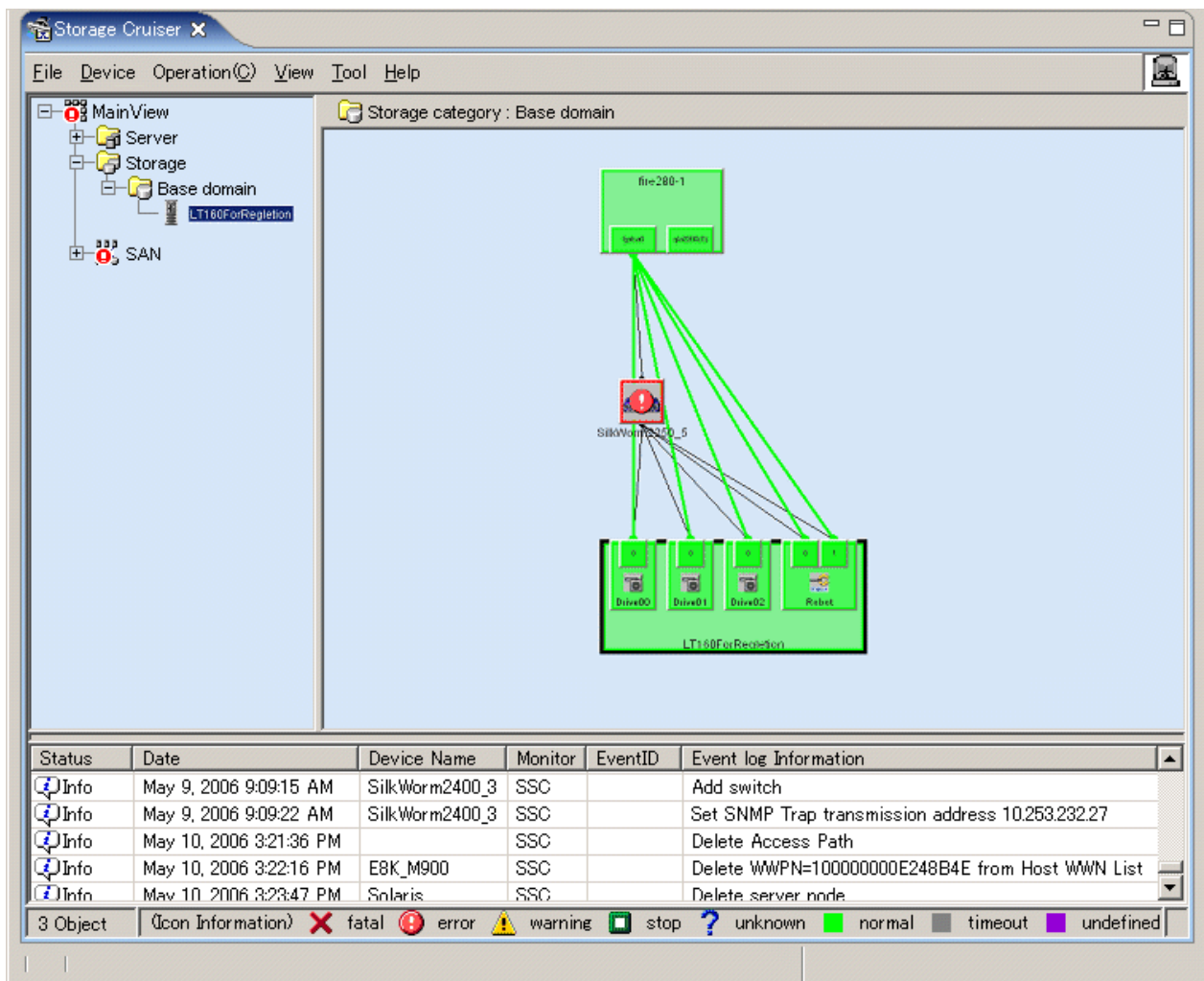
The Side view displays not only shows an access path for FcHba-FcCa but also shows other access paths such as FcHba-FcHba and FcCa-FcCa. The Side view displays only devices (Fibre Channel switches, hubs, and routers) related to the selected device.

Note

In the virtual storage environment, this view does not display devices related logically to respective devices.

Icons

The icon color indicates the resource status.

Color	Status
Green	Operation is normal.
Yellow	A warning was issued.
Red	A system error occurred.
Gray	No response was received (because the LAN failed, device is off, etc.).
Violet	The device is not registered.

If the Fujitsu multipath disk control mechanism or msdsm (the multi path driver that is built into Windows operating system since Windows Server 2008 by the standard) is installed on a server node and a device file is defined, such information is displayed together with icons.

An example of the information displayed is shown below:

Server node OS	Product name of multipath disk control mechanism (version and operation mode)	Example of information display
Solaris OS	Fujitsu Multipath Driver (when setting special file of Solaris OS standard)	c2t17d0-7
	ETERNUS Multipath Driver (when setting mplb special file) GPMPD (1.x), MPLB	mplb0-7
	MPHD	mphd0-7
Windows	ETERNUS Multipath Driver, GRMPD, MPHD, msdsm	Disk0-2
Linux(RHEL)	ETERNUS Multipath Driver, GRMPD	/dev/sda-c

Screen operations

When a resource in a route related to an access path is selected, the associated portions are displayed in light blue.

・ Selection of an access path -> route physical line (However, no intermediate route is displayed if Fibre Channel switches are cascaded.)
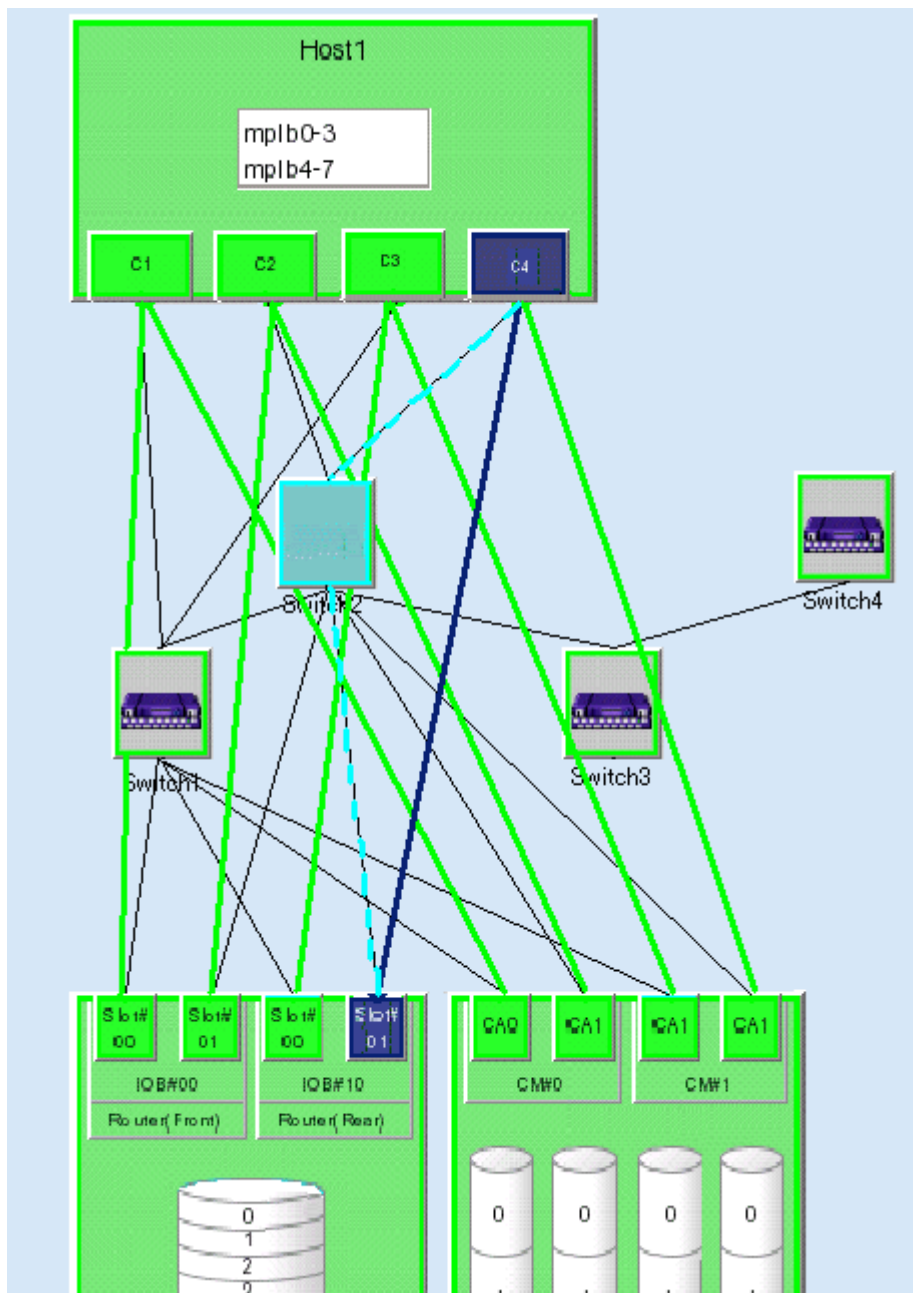
- Selection of an HBA -> target storage area (for ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000, GR series)
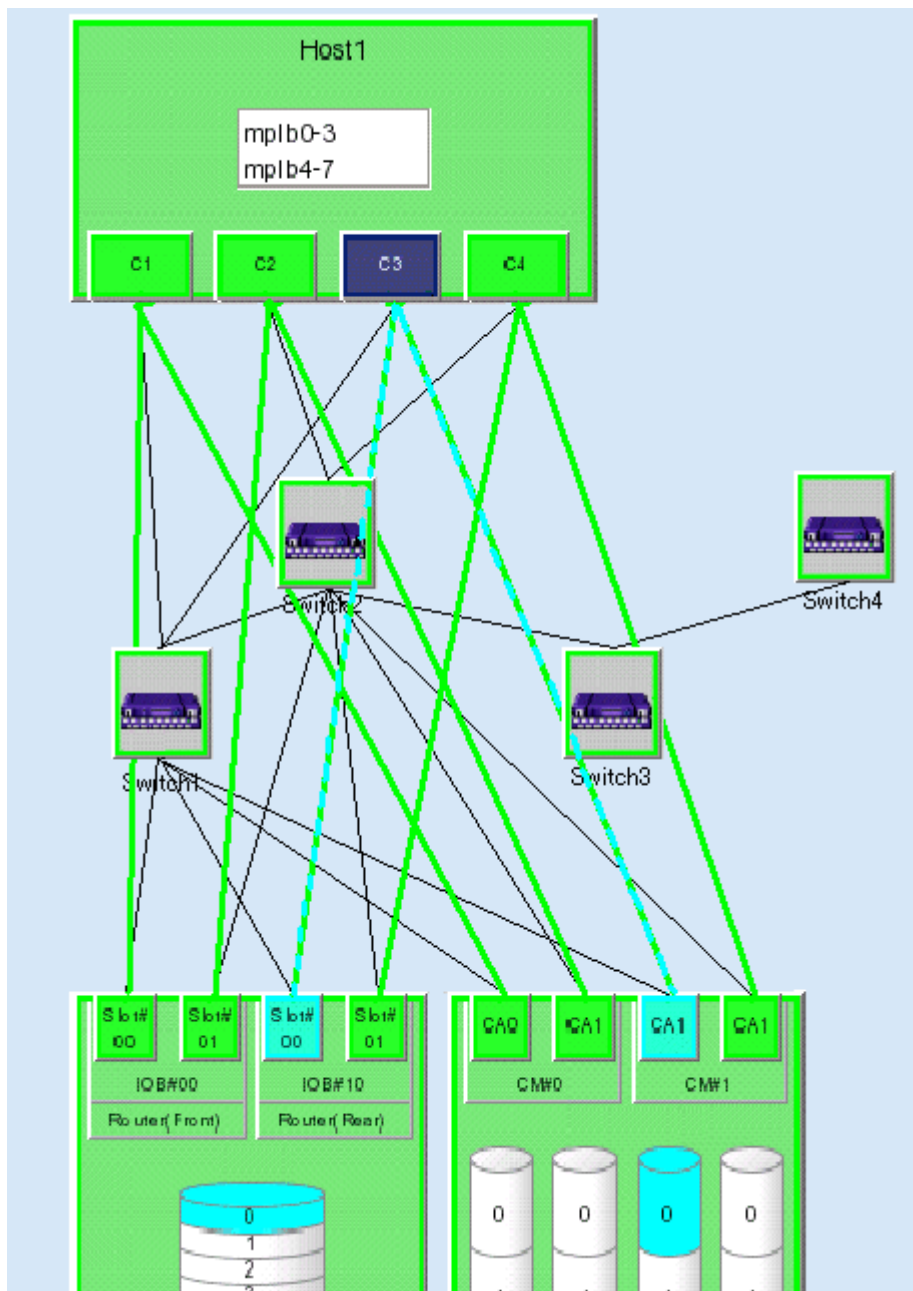
- Selection of the name of a multipath disk control device file on a server node -> associated logical path and associated storage area (In the Linux server node equipped with PG-FCD101/PG-FCD102, the associated logical path and the associated storage area can not be displayed.
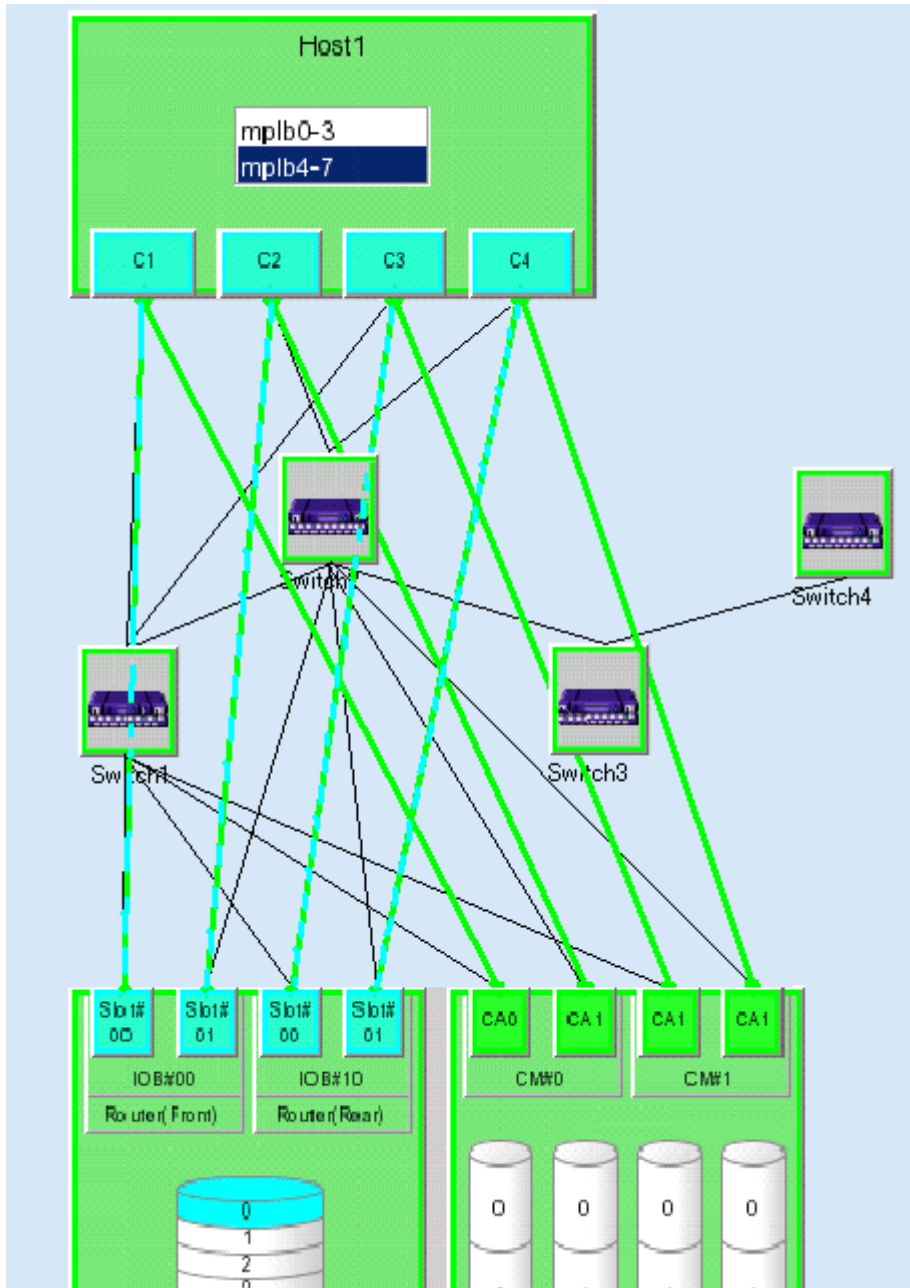
B.6.2 Menus

This section describes the menus that can be used in the Side view. To display multiple commands on a pop-up menu, right-click a device and select an item on the pop-up menu. Any of the commands can be selected for execution. The commands on the menu differ slightly depending on the device selected.

File

- Main view or [Ctrl]+[O]

・ Delete

If an HBA or CA is selected for a device, it is deleted. However, HBAs and CAs of some devices (e.g., ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series or GR series devices, and server nodes with Agent installed) cannot be deleted because this software can fully detect and recognize these HBAs and CAs.

If a device icon is selected, the device is deleted from management of this software. For details, see "Chapter 6 Operation".

・ Correlation Window

・ Performance Management Window

・ Property

・ Logout

Device

・ Call management software

Operation

・ Access Path [only in the Server node view, Storage view, and Bridge view]

For information on how to use this function, see "Chapter 6 Operation".

[Inherit] Select this to inherit an access path.

[Connect] Select this to connect an access path. (This function is valid only when an HBA or CA is selected.)

[Delete] Select this to delete an access path. (This function is valid only when an access path is selected.)

・ View Device

The Side view displays only the devices currently related to the selected device. However, this function can display devices not related to the selected device. The resulting view is used to add access paths to other devices. (This function is valid only when no device icon is selected.)

[Add] The Add View Device dialog appears, enabling selection of devices to be added to those displayed in this view. From "Available Devices" select the device to be displayed, and move it to "Devices to Show" by clicking the <>>Add> button. Clicking the <OK> button displays the view with the icon of the device registered in "Devices to Show".

[Clear] The Remove View Device dialog appears, enabling deletion of an icon from display in this view. (However, a device whose icon is deleted with this function is not deleted from this software.) From "Available Devices" select the device whose icon is to be deleted, and move it to "Devices to Hide" by clicking the <<<Delete> button. The icon of the selected device is deleted from the view when the <OK> button is clicked.

Pop-up menu

・ Change Detail View

[ON] Selecting this enlarges device icons for a more detailed display.

[OFF] Selecting this makes device icons the same size as those in the Map view of the Domain view. However, this function cannot be used for a device that is the center of a view.

・ Blink Beacon

[Start] This LED blinking function is provided for the following devices so that appropriate physical device locations are more easily determined: The blinking time is three minutes.

[Stop] Select this to stop the blinking.

Use of this method for recognizing devices and support of the function are explained below.

Recognized devices	Supported function
Fibre Channel switch	LEDs of all the ports blink in turn.
Fibre Channel hub (Gadzoox)	The power indication LED blinks.
HBA (GP7B8FC1A, GP7B8FC1-G and GP7B8FC1)	The two LEDs (LINK and CHK) of the host bus adapter (HBA) blink at the same time.
HBA (PW008FC2A, PW008FC2-G, PW008FC3 and SE0X7F11F)	The LINK LED of the HBA blinks.
HBA (SE0X7F12F)	The selected host bus adapter (HBA) port LINK LED blinks.

B.7   Resource View Properties

This chapter describes the properties of selecting items for individual devices.

Items common to all device properties

・ Event Information

The contents of setting items for individual devices are displayed. Moreover, the contents are displayed when a SNMP Trap is received. This user's guide refers to such information as "device events". Up to 15 device events are displayed. If there are more than 15 device events, device events are eliminated starting from the oldest event until there are 15 events, which are then displayed.

Note that the same device may have different event contents displayed in "Device Event" compared with those in the event log.

・ Notepad

Administrator information, location information, and note information can be specified as desired. Such information is saved in a database of this software when the <Save Notepad> button is clicked.

・ <Change> button of Management Software

"Call management software" is used from the device menu to specify a method of calling Management Software to run it. For Management Software that can be started from a WEB client, specify a URL beginning with http://. For Management Software operating on the client side, code the execution file name with its full path (e.g., c:\test\test.exe). ETERNUS3000, ETERNUS4000 models 80 and 100, GR devices cannot change Management Software. Moreover, to start telnet from Management Software, describe it as "telnet://connected-server-name (Or, connected-server-IP-address)".

・ VMware server nodes

The following table shows which property explanation should be referred to, depending on which version of VMware is being used:

VMware version	Property explanation to be referenced
VMware Infrastructure 3 Version 3.0	This is handled in the same way as the Linux server nodes. Refer to the Linux explanation of "B.7.1 Server node (host) properties".
VMware Infrastructure 3 Version 3.5 or later VMware ESXi 3.5 or later	When a server is VM host, refer to "B.7.2 Server node (VM host) properties". When a server is VM guest, refer to "B.7.3 Server node (VM guest) properties".

B.7.1   Server node (host) properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Indicates the host name of a server node. If a server node having the same host name is already stored in the manager management

	Name of display item	Value	Description
			database, the host name indicated here may be followed by ". + suffix-number (*1)". If the host name cannot be resolved, the host name is indicated in the "IP-ip-address" format. *1 Suffix numbers are assigned sequentially from 0.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the status of a device. The Domain view displays the either status of the HBA or the multipath, which is faultier. By contrast, the Correlation window displays the statuses that are most faulty among the statuses of all of the elements managed on that window. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal ", "unmonitored", "undefined"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software.
	IP Address	IP address	Indicates the IP address of a device in a LAN.
	Management Software	Any character string	Indicates the start command or URL of Management Software. (It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the version number information of Agent.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup"	Indicates the event notification setting status of Agent.
Server Node Information	OS Type	"Solaris", "WindowsNT", "Windows2000", "Windows2003", "Windows2008", "Linux", "Linux (SUSE)", "Linux(VMware)", "HP-UX", "AIX"	Indicates an OS name. Solaris denotes the Solaris OS. Windows NT denotes WindowsNT, Windows2000 denotes Windows 2000, Windows2003 denotes Windows Server 2003, and Windows2008 denotes WIndows Server 2008. Linux, Linux (SUSE) denotes Linux. Linux(VMware) denotes VMware. HP-UX denotes HP-UX. AIX denotes AIX.
	OS Version	Any character string	Indicates the OS version number. For the Solaris OS versions of Agent, 2.6, 7, 8, 9, and 10 are displayed. For the Windows versions of Agent, 4.0, 5.0, and 5.2 are displayed. For the Linux versions of Agent, the kernel version numbers are displayed. For the HP-UX versions of Agent, the release identifiers are displayed.

	Name of display item	Value	Description
			For the AIX versions of Agent, version numbers are displayed in the "version-number.release-number" format.
	MultiPath Type	"MPLB", "MPHD", "MP"	Indicates the multipath disk control method. "MPLB" denotes the Solaris OS version and Linux(RHEL) version of GRMPD and ETERNUS Multipath Driver, and "MP" denotes the Windows version. No value is displayed when the agent is HP-UX version or AIX version. No value is displayed when the Solaris OS version and HBA are produced by SUN.
	MultiPath Instance Name (LUN)	"mplb1(lun1), mplb2(lun2)", "c2t17d1(lun1), c2t17d2(lun2)", etc. (Solaris OS) "Disk0(lun0), Disk1(lun1)", etc.(Windows) "/dev/sda,/dev/sdb", etc. (Linux)	Indicates the multipath disk control instance name. For the Solaris OS versions of Agent, the LUN numbers corresponding to the instance names defined under multipath disk control are displayed. When two or more numbers are displayed, they are separated by ",". For the Windows versions of Agent, a disk number and LUN number associated with a path is displayed. If two or more numbers are displayed, they are delimited by ",". For the Linux versions of Agent, GRMPD disk device nodes are displayed. If two or more disk device nodes are displayed, they are delimited by ",". No value is displayed when the agent is HP-UX version or AIX version. No value is displayed when the Solaris OS version and HBA are produced by SUN.
	MultiPath Access Path	"c1t1, c2t1, c3t1", etc. (Solaris OS) "p1b0t0, p2b1t0", etc. (Windows) "h1c0t0, h2c1t0", etc. (Linux)	Indicates one of the device path (access path) names used multipath disk control. If two or more names are displayed, they are delimited by ",". No value is displayed when the agent is the HP-UX version or the AIX version. No value is displayed when the Solaris OS version and HBA are produced by SUN. No value is displayed when the agent cannot collect information.

B.7.2   Server node (VM host) properties

This is the explanation for VMware Infrastructure 3 Version 3.5 or higher or VMware ESXi 3.5 or higher. When using VMware Infrastructure 3 Version 3.0, refer to "B.7.1 Server node (host) properties".

	Name of display item	Value	Description
Basic Information	Device Name	VM host name	Indicates the host name of VM host.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the status of a device. It changes by the status of the access path. When the monitoring status is "invalid Password", it is indicated as "warning". When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".

	Name of display item	Value	Description
	Monitoring Status	"normal ", "unmonitored", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the VM host is not running or this software cannot communicate with VM host. "invalid Password" indicates that this software detected the login name change or password change for VM host.
	IP Address	IP address of VM host	Indicates the IP address of VM host.
	Management Software	URL of VI Web Access	Indicates the URL of VI Web Access. (It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	(Empty)	Not displayed.
	Event Notification function setup	"Un-supported"	This software does not support the event notification (Fault management by receiving SNMP Trap). Always indicates "Un-supported".
Server Node Information	OS Type	Product name of VMware	Indicates the product name of VMware.
	OS Version	Version of VMware	Indicates the VMware version number.
	MultiPath Type	(Empty)	Not displayed.
	MultiPath Instance Name (LUN)	(Empty)	Not displayed.
	MultiPath Access Path	(Empty)	Not displayed.
VM Guest Information	VM Guest Name	Virtual machine name, or host name of guest OS	Indicates the virtual machine name of VM guest. When the VMware Tools is running on the guest OS, the host name of guest OS is indicated.
	Monitoring Status	"normal ", "unmonitored", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the VM host is not running or this software cannot communicate with VM host. "invalid Password" indicates that this software detected the login name change or password change for VM host that VM guest belongs.
	VM Guest Status	"normal", "stop", "warning", "error", "unknown"	Indicates the status of a device. [When the VMware Tools is not installed on the guest OS] "normal" indicates that the virtual machine is running. "stop" indicates that the virtual machine is not running. [When the VMware Tools is installed on the guest OS] "normal" indicates that the VMware Tools is running. "stop" indicates that the VMware Tools is not running (including that virtual machine is not running). When the monitoring status is "invalid Password", it is indicated as "warning". When the monitoring status is "unmonitored", it is indicated as "unknown".
	IP Address	IP address of guest OS	Indicates the IP address of guest OS. When the VMware Tools is not running on the guest OS, no information is displayed.

	Name of display item	Value	Description
	OS Type	OS name of guest OS or Product name of VMware	Indicates the OS name of guest OS. When the VMware Tools is not running on the guest OS, the product name of VMware is displayed.

B.7.3　Server node (VM guest) properties

This is the explanation for VMware Infrastructure 3 Version 3.5 or higher or VMware ESXi 3.5 or higher.
When using VMware Infrastructure 3 Version 3.0, the information of VM guest is not displayed.

	Name of display item	Value	Description
Basic Information	Device Name	VM guest name	Indicates the virtual machine name of VM guest. When the VMware Tools is running on the guest OS, the host name of guest OS is indicated.
	Device Status	"normal", "stop", "warning", "error", "unknown"	Indicates the status of a device. [When the VMware Tools is not installed on the guest OS] "normal" indicates that the virtual machine is running. "stop" indicates that the virtual machine is not running. [When the VMware Tools is installed on the guest OS] "normal" indicates that the virtual machine is running. "stop" indicates that the virtual machine is not running (including that virtual machine is not running). When the monitoring status is "invalid Password", it is indicated as "warning". When the monitoring status is "unmonitored", it is indicated as "unknown".
	Monitoring Status	"normal ", "unmonitored", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the VM host is not running or this software cannot communicate with VM host. "invalid Password" indicates that this software detected the login name change or password change for VM host that this VM guest belongs.
	IP Address	IP address of guest OS	Indicates the IP address of guest OS. When the VMware Tools is not running on the guest OS, no information is displayed.
	Management Software	(Empty)	Not displayed. (It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	(Empty)	Not displayed.
	Event Notification function setup	"Un-supported"	This software does not support the event notification (Fault management by receiving SNMP Trap). Always indicates "Un-supported".
Server Node Information	OS Type	OS name of guest OS or Product name of VMware	Indicates the OS name of guest OS. When the VMware Tools is not running on the guest OS, the product name of VMware is displayed.

	Name of display item	Value	Description
	OS Version	Empty or Product version of VMware	When the VMware Tools is running on the guest OS, no information is displayed. When the VMware Tools is not running on the guest OS, the product version of VMware is displayed.
	MultiPath Type	(Empty)	Not displayed.
	MultiPath Instance Name (LUN)	(Empty)	Not displayed.
	MultiPath Access Path	(Empty)	Not displayed.
	VM Host Name	Host name of VM host	Indicates the host name of VM host.

B.7.4   HBA properties

	Name of display item	Value	Description
	WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) set for an HBA.
	WWNN	Eight-byte WWNN	Indicates the WWNN (World Wide Node Name) set for an HBA. When it is unknown, the value is not displayed.
	WWPN before HBA Replacement	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) set for an HBA to be replaced.
Basic Information of Port	Device Status	"normal", "warning", "error", "unknown"	Indicates the status of a device. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown". An agent of the Solaris OS or a Windows server node collects device status information in greater detail than SSC Agent on the same platform. Thus, the device status reported by both agents may not be identical In case that "HBAstatus=off" is defined in Correlation.ini file, the HBA icon displayed will be always "normal". For the detail information of Correlation.ini file, refer to "Appendix C Customization".
	Monitoring Status	"normal", "unmonitored", "undefined", "The access path must be inherited"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that a previously recognized HBA can no longer be recognized. If the HBA is possible still installed, check the HBA itself. If the HBA is not installed and access path inheritance is not planned, delete this HBA icon. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. "The access path must be inherited" indicates that an access path must be inherited because an HBA was replaced.

	Name of display item	Value	Description
	Manufacturer Name	Any character string	Indicates a manufacturer name as follows: "FUJITSU" for the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F, SE0X7F12F. "SUN MICROSYSTEMS, INC". for XSEFC401AF/XSEFC402AF. "QLOGIC" for the SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z. "QLOGIC" for the GP5-FC101, GP5-FC102, PG-FC102, PG-FCD101, PG-FCD102, QLA2100F, QLA2200, QLA2340. "JAYCOR" for the SN10-FC01 and FC64-1063. "EMULEX" is for MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, MC-08FC71, PG-FC105, PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD201, LP7000, LP8000, LP9000, LP9002S, LP9002L, LP9802, LP10000, LP1050, LP1050Ex. "Hewlett-Packard" for the A6795A, A5158A, A6826A, AB378A, AB378B, AB379A, AB379B. "IBM" for the 6228 and 6239. When it is unknown, the value is not displayed.
	Product Name	Any character string	Indicates a product name as follows: "PFCA", "GP7B8FC1", "PW008FC2" or "PW008FC3" are for PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1. "SE0X7F11F" is for SE0X7F11F. "SE0X7F12F" is for SE0X7F12F. "LPe11000-S" is for XSEFC401AF. "LPe11002-S" is for XSEFC402AF. In SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z, the name starts with "375". "QLA2100F" is for GP5-FC101 and QLA2100F. "QLA23xx" or "QLA2340" is for QLA2340 in the Windows version. "QLA2200" is for GP5-FC102, PG-FC102, and QLA2200. "FCAW" is for SN10-FC01 and FC64-1063. "LP7K" and "LP8K" are for LP7000 and LP8000 in the Solaris OS version. "LP7K/8K/9K" are in the Windows version. "LP9K" and "LP9000" are for LP9000/9002S in the Solaris OS version. "LP7K/8K/9K" or "LP9000" is in the Windows version. "LP9K" or "LP9802" are for LP9802 in the Solaris OS version. "LP7K/8K/9K" or "LP9802" is in the Windows version. "LP10K" or "LP10000" are for LP10000 in the Solaris OS version. "LP9K" or "LP9002" are for PG-FC105 is for PG-FC105 and LP9002L in the Solaris OS version. "LP7K/8K/9K" or "LP9002" is in the Windows version. "LP9002" is in the Linux version. "LP7K/8K/9K" or "LP9802" is for PG-FC106 in the Windows version. "LP9802" is for PG-FC106 in the Linux version.

	Name of display item	Value	Description
			"LP7K/8K/9K" or "LP1050" is for PG-FC107, PG-FC201, LP1050, LP1050Ex in the Windows version. "LP1050" is in the Linux version. "LP7K/8K/9K" in the Windows version.
			"QLA23xx" or "QLA2312" is for PG-FCD101,PG-FCD102 in the Windows version. "QLA2312" or "FCI/O-CARD2Gb/s" is in the Linux version.
			"LPe1150-F4" is for PG-FC202.
			"BX600-FC42E" is for PG-FCD201.
			"LP10000" or "2Gb" is for the MC-08FC11, MC08FC71 in the Linux version.
			"LP11000-M4" or "4Gb" is for MC-08FC31.
			"LP11002-M4" or "4Gb" is for MC-08FC41.
			"LPe11000-M4" or "4Gb" is for MC-08FC51.
			"LPe11002-M4" or "4Gb" is for MC-08FC61.
			"A6795A" is for A6795A.
			"A5158A" is for A5158A.
			"A6826A" is for A6826A.
			"AB378A" is for AB378A.
			"AB378-60101" is for AB378B.
			"AB379A" is for AB379A.
			"AB379-60101" is for AB379B.
			"6228" is for 6228.
			"6239" is for 6239.
			When it is unknown, "HBA" is displayed.
	Current FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port that is active.
	Supported FC Classes	"Class1", "Class2", "Class3", "Class4", "Class6", "ClassF"	Indicates the class of Fibre Channel supported.
	Supported FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port supported.
	Driver Version	Driver version	Indicates the driver version. When it is unknown, the value is not displayed.
HBA Port Information	Controller Number	Controller number	Indicates a controller number. Displays only in a Solaris OS environment. The controller number corresponds to X in /dev/rdsk/cXtY. This may not be displayed when /dev/rdsk/cXtY does not exist or the destination is only tape.
	SCSI Port Number	SCSI Port Number	Indicates a SCSI port number. This value is displayed only in a Windows environment. HBA information in a small SCSI port number corresponds to the FC port of FC Pass Thru Blade 1 when the server node is BX600. HBA information in one with

	Name of display item	Value	Description
			a large SCSI port number corresponds to the FC port of FC Pass Thru Blade 2 when the server node is BX600.
			When it is unknown, the value is not displayed.
	SCSI Adapter Number	SCSI Adapter Number	Indicates a SCSI adapter number.
			This value is displayed only in a Linux environment. HBA information in a small SCSI adapter number corresponds to the FC port of FC Pass Thru Blade 1 when the server node is BX600. HBA information in one with a large SCSI adapter number corresponds to the FC port of FC Pass Thru Blade 2 when the server node is BX600.
			When it is unknown, the value is not displayed.
	Physical HBA Number	Any character string	Indicates physical number of an HBA.
			Example for a Solaris OS Sbus card:
			sbus@4,0/fcaw@1,0
			Example for a Solaris OS PCI card (for FUJITSU/EMULEX):
			pci@9,2000/fibre-channel@2
			Example for a Solaris OS PCI card (for SE0X7F12F):
			pci@36,600000/fibre-channel@0,1
			Example for a Solaris OS PCI card (for XSEFC401AF,XSEFC402AF):
			pci@7c0/pci@0/pci@8/SUNW,emlxs@0,1/fp@0,0
			Example for a Solaris OS PCI card (for SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, SG-XPCI2FC-QF2-Z):
			pci@1f,0/pci@5/SUNW,qlc@1,1
			Example for a Solaris OS PCI card (for QLOGIC):
			pci@9,2000/scsi@2
			When it is unknown, the value is not displayed.
			This information is not displayed in a Windows, Linux, HP-UX, or AIX environment.
	Logical HBA Number	Logical number	Indicates an HBA logical number.
			Indicates an HBA device name for the AIX version.
			When it is unknown, the value is displayed with hbaX format.
	Bus Number	Bus Number	Indicates a bus number.
			This value is displayed only in a Windows or Linux environment. When it is unknown, the value is not displayed.
	Affinity Type	"NO_Affinity", "Another_Binding", "WWPN_Binding"	Indicates the type of storage affinity (LUN mapping) set for an HBA.
			NO_Affinity indicates that storage affinity is not set.
			Another_Binding indicates that storage affinity (LUN mapping) is not set or that zoning is set with a Fibre Channel switch or storage. In the Linux server node equipped with PG-FC105 (driver version:V4.20q-1), PG-FC106 (driver version:V4.20q-1) and PG-FCD101, PG-FCD102 even if Binding is setting by WWPN, this status is shown.
			WWPN_Binding indicates that Binding is set for its WWPN.

	Name of display item	Value	Description
	Connection Permission WWPN	Eight-byte WWPN	Indicates the partners' WWPN associated with an access path.
	Connection Permission Target Number	0 to 255	Indicates the value of Target ID (Y in cXtY of a special file in the Solaris OS) associated with an access path. The value is not displayed for XSEFC401AF/XSEFC402AF. The value is not displayed for SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z. When it is unknown, the value is not displayed.
	Connection Permission Affinity Group	Any character string	Indicates the AffinityGroup name on the storage side corresponding to the access path. (ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, and GR only)
	Connection Permission LUN	Any character string	Indicates the LUN set for an access path. The list of LUN set to the access path is displayed. When the physical Drive number can be acquired for Windows, it bundles by () behind the LUN number and displays. When it is unknown, the value is not displayed.
	Current FC Class	"Class1", "Class2", "Class3", "Class4", "Class6", "ClassF", "Class_Unknown"	Indicates the class of Fibre Channel set for an access path. If it is unsure, indicates "Class_Unknown".
	Access Path Status	"Normal", "Config miss match", "Access Path Error"	Indicates the access path status. "Normal" indicates that the access path is in the normal state. "Config miss match" indicates an incorrect or incomplete access path setting. "Access Path Error" indicates that a problem occurred in the middle of an access path or that a path in a multipath configuration is blocked.

B.7.5   Access path properties

Access path properties include HBA access path and port information (see HBA properties), CA access path and port information (see CA properties), and error information.

The error column outlines the causes of conflicts determined as having occurred on the side of this software, for access path conflicts that may occur. The following table shows the information displayed:

Number	Displayed information	Description
0	Nondisplay	No error
1	HBA Storage Affinity that is out of support on this software product is configured. Please inspect Host's configuration.	Storage affinity of the server node that is not supported by this software is configured. Check the configuration definition of the server node.
2	Switch Zoning (a pair of WWPNs, HBA and Storage (or Bridge) FC Port) does not exist.	Switch zoning has not been set for an access path.

Number	Displayed information	Description
3	Configured Storage FC Port's Host Affinity is incorrect. Please inspect Storage FC Port's Host Affinity.	Host affinity of the configured storage is incorrect. Check the host affinity setting of the storage device.
4	There is no connection of HBA and Switch. Please inspect HBA, FC cable, and Switch.	The host bus adapter (HBA) is not connected to the Fibre Channel switch. Check the host bus adapter (HBA), FC cable, and Fibre Channel switch.
5	There is no connection of Storage (or Bridge) FC Port and Switch. Please inspect Storage (or Bridge) FC Port, FC cable, and Switch.	The storage (bridge) FC port is not connected to the Fibre Channel switch. Check the storage (bridge) FC port, FC cable, and Fibre Channel switch.
6	Switches (connected with HBA, and connected with Storage (or Bridge) FC Port) are not cascaded.	The following are not cascaded: Fibre Channel switch connected to the host adapter and Fibre Channel switch whose FC port is connected to storage (bridge).
7	Storage (or Bridge) FC Port is degraded or error status.	The status of the storage (bridge) FC port is abnormal.
8	Host Agent reports Access Path Status is degraded.	Agent on a server node reports that operation of an access path is degraded.
9	A connection of HBA and Switch exists. But, Switch Zoning (a pair of WWPNs, HBA and Storage (or Bridge) Fc Port) is set in another Switch (IP Address of Key Domain ="+'IP address list'+").	The connection between the host bus adapter (HBA) and Fibre Channel switch was established, but the zoning set for an access path of the Fibre Channel switch is also set for another Fibre Channel switch (IP Address of Key Domain list).
10	Storage (or Bridge) FC Port's observe status is not normal.	The registration status of the storage (bridge) FC port is abnormal.
11	There is no connection of FC Port and Switch. Please inspect FC Port, FC cable, and Switch.	The FC port is not connected to the Fibre Channel switch. Check the FC port, FC cable, and Fibre Channel switch.
12	Switches (connected with FC Port) are not cascaded.	The Fibre Channel switches whose FC ports are connected are not cascaded.

B.7.6　Fibre Channel switch properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Identifier used by this software. Each device name is unique in its management. For a Fibre Channel switch, the WWN address of the device is displayed. SNMP SysName is indicated if it is specified for the device. In addition, a management name is indicated if one has been defined from this software.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN.

	Name of display item	Value	Description
			"undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software.
			In the case of "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the Domain view menu.
	Manufacturer Name	Any character string	Indicates a manufacturer's name. "Brocade" is displayed for the ETERNUS SN200 series.
	Product Name	Any character string	Indicates a product name. In ETERNUS SN200 series, this is displayed as "xxxx". (Example: For ETERNUS SN200 model 540, this is "48000")
	IP Address	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the URL address of software that controls devices. (It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version of a device.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.
Switch Information	Domain Name	Any character string	Indicates the domain name set for a device.
	Number of Ports	Number	Indicates the maximum number of ports that a device accommodates.
	Key Domain IP Address	IP address	Indicates the IP address of a Fibre Channel switch device that is the key for a cascade connection.
Zoning Information	Zoning Information	Zoning Information dialog	For information on how to use this dialog, see "6.3.7 To manage Fibre Channel switch that has already set in port zoning".

B.7.7   Fibre Channel switch port properties

	Name of display item	Value	Description
Basic Information	Device Status	"normal", "warning", "error", "unknown"	Indicates the port status.
	Manufacturer Name	Any character string	Indicates a manufacturer's name.
	Product Name	Any character string	Indicates a product name.
	Current FC Port Type	"F", "FL", "E"	Indicates the Fibre Channel topology of ports.
Switch Port Information	WWPN of a Destination Port	Eight-byte WWPN	Indicates the WWPN of the destination port connected to a switch port.

	Name of display item	Value	Description
	WWNN of a Destination Port	Eight-byte WWNN	Indicates the WWNN of the destination port connected to a switch port.
	Information on a Connection Destination	Any character string	Indicates Inquiry information of the destination device connected to a switch port.
	Destination Switch Domain Name	Domain Name	Indicates the domain name of the destination Fibre Channel switch connected to a switch port.
	Destination Switch Port Number	Number	Indicates the port number of the destination Fibre Channel switch connected to a switch port.
	Transfer Rate	Transfer rate	Indicates the port transfer rate.

B.7.8　Hub properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Identifier used by this software. Each device name is unique in its management. For a hub, a special identifier is displayed. SNMP SysName is indicated if it is specified for the device. A management name is indicated if one has been defined from this software.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. For "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the menu.
	Manufacturer Name	Any character string	Indicates a manufacturer's name.
	Product Name	Any character string	Indicates a product name.
	IP Address	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the start command or URL of Management Software. (It can be changed manually with the

	Name of display item	Value	Description
			\<Change\> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version of a device.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.
Hub Information	Number of Ports	Number	Indicates the number of FC ports of a hub.

B.7.9　Hub port properties

	Name of display item	Value	Description
Basic Information of Port	Device Status	"normal", "warning", "error", "unknown"	Indicates the port status.
Hub Port Information	WWPN of a Destination port	Eight-byte WWPN	Indicates the WWPN of the destination port connected to a hub port. Information about the hub is generally not displayed because the destination cannot recognize the hub.
	WWNN of a Destination port	Eight-byte WWNN	Indicates the WWNN of the destination port connected to a hub port. Information about the hub is generally not displayed because the destination cannot recognize the hub.
	Port Number of a Destination Switch	Number	Indicates the port number of the destination Fibre Channel switch connected to a hub port. Information about the hub is generally not displayed because the destination cannot recognize the hub.

B.7.10　Router properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Indicates a router name.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN.
	Manufacturer Name	Any character string	Indicates a manufacturer's name.

	Name of display item	Value	Description
	Product Name	Any character string	Indicates a product name.
	IP Address of Management LAN	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the start command or URL of Management Software. It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version of a device.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.
Router Information	Number of FC Ports	Number	Indicates the number of FC ports of a router.
	Number of WAN Ports	Number	Indicates the number of WAN ports of a router.

B.7.11   FC port properties (router)

	Name of display item	Value	Description
Basic Information of Port	Device Status	"normal", "warning", "error", "unknown"	Indicates the port status.
FC Port Information	WWPN of a Destination port	Eight-byte WWPN	Indicates the WWPN of the destination port connected to an FC port.
	WWNN of a Destination port	Eight-byte WWNN	Indicates the WWNN of the destination port connected to an FC port.
	Destination Switch Port Number	Number	Indicates the port number of the destination Fibre Channel switch connected to an FC port.

B.7.12   Storage properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Identifier used by this software. Each device name is unique in its management. For a storage device, a device name + serial number, WWN, etc., is displayed. SNMP SysName is indicated if it is specified for the device. A management name is indicated if it has been defined from this software.
	Device Status	"normal", "warning",	Indicates the device status.

	Name of display item	Value	Description
		"error", "unknown"	When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the menu.
	Manugacturer Name	Any character string	Indicates a manufacturer's name.
	Product Name	Any character string	Indicates a product name.
	IP Address	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the start command or URL of Management Software. (For devices other than ETERNUS3000, ETERNUS4000 models 80 and 100, GR series devices, it can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.
Storage Information	Storage Type	"Disk", "Tape", "Array", "Robot"	Indicates information on the type of storage device.
	Serial Number	Serial number	Indicates the serial number of a device.
	BOX ID	BOX ID	BOX ID is displayed for ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series and GR series.
	TPP Remaining Capacity Status	"Normal", "Caution", "Warning", "Blank"	TPP remaining capacity status is displayed at using Thin Provisioning Function. "Blank" is displayed, If Thin Provisioning Function is not used.

	Name of display item	Value	Description
Specified AffinityGroup Information	Specified AffinityGroup	Any character string	Indicates the AffinityGroup name of configured storage. (ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series and GR series only)
	LUN in AffinityGroup	Any character string	Indicates LUN in the storage AffinityGroup using a decimal numbers format. (ETERNUS8000 series, ETERNUS6000 series, ETERNUS4000 series, ETERNUS3000 series, ETERNUS2000 series and GR series only)

The "Eco-mode information and set" is displayed for ETERNUS disk storage systems that support to display and control of the Eco-mode . For the storage devices that support the Eco-mode operation, refer to "1.3.4 Energy-saving operation for storage device".

	Name of display item		Value	Description
Eco-mode information and set	Eco-mode information on device	Current Eco-mode setting	"ON", "OFF"	Indicates the current Eco-mode setting status of the storage device. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. In this case, "Eco-mode information on RAID group" is not displayed.
	Eco-mode information on RAID group	RAID group	Any character string	Indicates the RAID group number and name. When the name is not set on the RAID group, the RAID group number is only displayed.
		Eco-mode	"ON", "OFF", "-"	Indicates the Eco-mode status that is set on the RAID group. "ON" indicates that the Eco-mode is enabled. "OFF" indicates that the Eco-mode is disabled. "-" indicates that the Eco-mode cannot be set.
		Status	"Active". "Idle", "In the boot process", "In the stop process", "-"	Indicates the current status of disks that compose the RAID group. "Active" indicates that disks are active. "Idle" indicates that disks are inactive. "In the boot process" indicates that disks start in progress. "In the stop process" indicates that disks stop in progress. "-" indicates that disks are cannot be set Eco-mode (SSD).
		Control	"start request", "stop request"	Indicates the disk control status. "start request" indicates that disk starting is requested. "stop request" indicates that disk stopping is requested.
		Schedule (No-Name)	Any character string (Decimal number)	The Eco-mode schedule set on RAID group is displayed with the "number"-"name" format. (Example) 01-DB01 When the Eco-mode of RAID group can be controlled by this software, the "External" is displayed on the name.

		Name of display item	Value	Description
		Device that permits access	Any character string Eight-byte WWPN	Indicates the device can access to RAID group, or the port information. "Information is not acquired" indicates that the information for displaying is not acquired. If you would like to display, turn on the "The row of the access permission device is displayed" check box, and click the <Refresh> button. When the server node, Fibre Channel switch, and storage device are connected and there are accessed without using security function, no information is displayed. When the storage devices are connected directly, no information is displayed.

B.7.13 Storage FC port (CA) and bridge FC port properties

	Name of display item	Value	Description
Basic Information	WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) set for a CA.
	WWNN	Eight-byte WWNN	Indicates the WWNN (World Wide Node Name) set for a CA.
	Device Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device was previously recognized but currently cannot be recognized. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the menu.
	Supported FC Classes	"Class1", "Class2", "Class3", "Class4", "Class6", "ClassF"	Indicates the classes of Fibre Channel supported by a CA.
	Supported FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port supported by a CA. (The indicated type is incorrect unless the Fibre Channel switch is managed by connecting it to LOOP.)

	Name of display item	Value	Description
	Current FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port for which a CA is active.
	Driver Version	Driver version	Indicates the driver version.
FC Port Information	Group Number	Value	Indicates the group name of the storage side where a channel adapter (CA) is mounted. (ROUTER number for the ETERNUS6000, GR740, GR840 and CM number for the ETERNUS8000, ETERNUS4000, ETERNUS3000, ETERNUS2000, GR710, GR720, GR730)
	CA Exchange Unit Number	Hexadecimal number	Indicates the unit of channel adapter (CA) replacement. Channel adapters having the same value are affected by a host system replacement.
	Port Number	Hexadecimal number	Indicates the port number of a channel adapter (CA).
	Affinity Type	"No_Affinity", "Another_Binding", "GR_PortZone_Binding", "GR_Subsystem_Zone_Binding"	Indicates the type of host affinity (zone function). No_Affinity indicates that an access path is not set. Another_Binding indicates that storage affinity (LUN mapping) is not set or that zoning is set with a Fibre Channel switch or storage. GR_PortZone_Binding indicates that affinity is set for ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 model 50, GR710, GR720, GR730. For ETERNUS3000 model 50, GR710, GR720, GR730, a zone is set for each CA port. GR_Subsystem_Zone_Binding indicates that affinity is set for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 (except model 50), ETERNUS2000 and GR740. For the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 (except model 50), ETERNUS2000 and GR740, a zone is set for the subsystem.

Specified AffinityGroup Information	Specified AffinityGroup	Any character string	Indicates the AffinityGroup name of configured storage.
	LUN in AffinityGroup	Any character string	Indicates the LUN of a storage device with the AffinityGroup name.
Access Path Information	AffinityGroup Name	Any character string	Indicates the AffinityGroup name set for a CA.
	Connection Permission WWPN	Eight-byte WWPN	Indicates the WWPN of the HBA side associated with the above AffinityGroup name. (Host affinity setup)
	Operation Mode	Any character string	Indicates the operation mode set for a CA. (The current value is not entered.)
	Current FC Class	"Class1", "Class2", "Class3",	Indicates the Fibre Channel class set for a CA.

		"Class4", "Class6", "ClassF"	

B.7.14   SCSI port properties

	Name of display item	Value	Description
SCSI Bus Information	Group Number	0, 1	Indicates the group name of the storage side where a channel adapter (SCSI CA) is mounted.
	CA Exchange Unit Number	Hexadecimal number	Indicates the unit of channel adapter (SCSI CA) replacement. Channel adapters having the same value are affected by hot system replacement.
	Port Number	Hexadecimal number	Indicates the port number of a channel adapter (SCSI CA).
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that that the device was previously recognized but currently cannot be recognized. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the menu.
	SCSI ID	Decimal number	Indicates a SCSI ID.
	SCSI LUN	Decimal number	Indicates a SCSI LUN.
	Driver Version	Driver version	Indicates the driver version.

B.7.15   Bridge properties

Bridge information (SCSI-related information) is not displayed for tape encryption devices.

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Identifier used by this software. Each device name is unique in its management. For a bridge, device name + serial number, WWN, etc., is displayed. SNMP SysName is indicated if it is specified for the device. In addition, a management name is indicated if one has been defined from this software.
	Device Status	"normal", "warning",	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".

	Name of display item	Value	Description
		"error", "unknown"	
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the password of the device retained in this software. Select [Device] - [Change Account Information for Device Management] from the Domain view menu.
	Manufacturer Name	Any character string	Indicates a manufacturer's name.
	Product Name	Any character string	Indicates a product name.
	IP Address	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the start command or URL of Management Software. It can be changed manually with the <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.
Bridge (SCSI-related) Information	FCP LUN	Decimal number	Indicates a LUN that is recognized in Fibre Channel of the destination device.
	SCSI Bus Adapter Number	Decimal number	Indicates the SCSI bus adapter number of the destination device.
	SCSI Initiator Number	Decimal number	Indicates the initiator number of the destination device.
	SCSI ID	Decimal number	Indicates the SCSI ID of the destination device.
	SCSI LUN	Decimal number	Indicates the SCSI LUN of the destination device.
	Manufacturer Name	Any character string	Indicates the destination device manufacturer name.
	Product Name	Any character string	Indicates the destination device product name.
	Storage Type	"Disk", "Tape", "Array", "Robot"	Indicates the storage type of the destination device.

B.7.16　Properties of SCSI ports in bridges

	Name of display item	Value	Description
Basic Information	SCSI Bus Adapter Number	Decimal number	Indicates a SCSI bus adapter number.
	SCSI Initiator Number	Decimal number	Indicates an initiator number.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device was previously recognized but currently cannot be recognized. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the device password stored by this software. Select [Device] - [Change Account Information for Device Management] from the menu.
SCSI Device Information	FCP LUN	Decimal number	Indicates the LUN that is recognized in Fibre Channel of the destination device.
	Manufacturer Name	Any character string	Indicates the destination device manufacturer name.
	Product Name	Any character string	Indicates the destination device product name.
	SCSI ID	Decimal number	Indicates the SCSI ID of the destination device.
	SCSI LUN	Decimal number	Indicates the SCSI LUN of the destination device.
	Storage Type	"Array", "Library", "Tape", "Disk", "Robot"	Indicates the storage type of the destination device

B.7.17　Properties of bridge connection SCSI devices

	Name of display item	Value	Description
SCSI Device Information	FCP_LUN of Device	Decimal number	Indicates a LUN that is made accessible in Fibre Channel.
	Device Manufacturer Name	Any character string	Indicates the name of the manufacturer of a device.
	Device Product Name	Any character string	Indicates the product name of a device.
	SCSI ID of Device	Decimal number	Indicates the SCSI ID of a device.
	SCSI LUN of Device	Decimal number	Indicates the SCSI LUN of a device.

	Name of display item	Value	Description
	Storage Type of Device	"Array", "Library", "Tape", "Disk", "Robot"	Indicates the device storage type.

B.7.18　Library properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Identifier used by this software. Each device name is unique in its management. For a library, device name + serial number, WWN, etc., is displayed. SNMP SysName is indicated if it is specified for the device. A management name is indicated if it has been defined from this software.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software.
	Manufacturer Name	Any character string	Indicates a manufacturer's name.
	Product Name	Any character string	Indicates a product name.
	IP Address	IP address	Indicates the IP address of a device.
	Management Software	Any character string	Indicates the start command or URL of Management Software. It can be changed manually with <Change> button. For details, see "B.7 Resource View Properties".)
	Firmware Version	Any character string	Indicates the firmware version.
	Event Notification function setup	"Setting up", "Un-setting up", "Manual setup", "Un-supported"	Indicates the status of SNMP Trap transmission place setting. Nothing is displayed for an unregistered device.

B.7.19   AffinityGroup properties

	Name of display item	Value	Description
Basic Information	Specified LUN	Number	Indicates a LUN (HLU) contained in AffinityGroup (ZONE) of the ETERNUS series and GR series.

B.7.20   UnknownFC port properties

	Name of display item	Value	Description
Basic Information of Port	WWPN	Eight-byte WWPN	Indicates the World Wide Port Name (WWPN) specified for this port.
	WWNN	Eight-byte WWNN	Indicates the World Wide Node Name (WWNN) specified for this port.
	Device Status	"normal", "warning", "error"	Indicates the device status.
	Monitoring Status	"normal", "unmonitored"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device was previously recognized but currently cannot be recognized.
	Manufacturer Name (Extraction from WWN)	Any character string	Manufacturer's information included in WWN is extracted and displayed.
	Device Inquiry	Any character string	Indicates Inquiry information on the device that the switch acquired (manufacturer name and device name). This manufacturer name might be different from manufacturer information extracted from WWN.
	Current FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port for which this port is active.
	Supported FC Classes	"Class1", "Class2", "Class3", "Class4", "Class6", "ClassF"	Indicates the class of Fibre Channel supported by this port.
	Supported FC Port Type	"N", "NL-Private", "NL-Public"	Indicates the type of Fibre Channel port supported by this port. (The indicated value is incorrect unless the Fibre Channel switch is managed by connecting it to LOOP.)
	Driver Version	Driver version	Indicates the driver version.

B.7.21 Controller properties

	Name of display item	Value	Description
Basic Information	Device Name	Any character string	Indicates an identifier used by this software. Each device name is unique in its management.
	Device Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined," the device status is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that the operation of the device in a LAN has been verified, but the device is not registered with this software.
Controller Information	Controller Number	Decimal number	Indicates a controller number.

B.8   Correlation Window Operations

B.8.1   Screen description

To start the Correlation window, select [File]-[Correlation Window] from the resource view menu.

Icons and connection lines

The icon color indicates the resource status as follows:

Color	Status
Green or Transparent	Operation is normal.
Yellow	A warning was issued.
Red	An error occurred.
Gray	No response. (LAN becomes interrupted, power supply of device OFF, etc.)
Violet	An unregistered device.

B.8.2   Menus

This section describes the menus that can be used in the Correlation window. To display multiple commands on a pop-up menu, right-click a device and select an item on the pop-up menu. Any of the commands can be selected for execution.

File

- New creation

  Selecting this clears the data displayed in the Correlation window.

- Open

  Select this to read and display configuration data. The data currently displayed in the Correlation window is cleared.

- Save

  Selecting this overwrites data in the current save file with the data displayed in the current window.

- Save As

  Select this to save the configuration data currently displayed in the Correlation window to a file different from the current save file and assign a new name to this file.

- Save List As CSV

  Selecting this saves the data displayed in lists to the specified file in a CSV format. Because the data is in the CSV format, it can be used with other applications.

- Page Setup

  Select this to set the page format for printing.

- Print

  Select this to print the Correlation window.

- Quit

  Selecting this closes the Correlation window.

View

- Zoom

  [In] Selecting this increases the display magnification.

  [Out] Selecting this reduces the display magnification.

  [Fit] Selecting this automatically adjusts the display magnification according to the window size.

- Layout

  Select this to automatically optimize the layout of devices and elements displayed in the Correlation window. After the layout or display elements are changed manually, this function can be used so that the correlation display is easily understood.

- Orthogonal Line Mode

  Selecting this mode displays connection lines between elements in a device, resulting in an image similar to a circuit diagram. This function is useful for minimizing the display of many elements. If this window mode is selected again, it is invalidated.

- Toolbar

  The frequently used menu items are defined in the toolbar. This toolbar can be set to the display and non-display. Default is a display.

- Status Bar

  Operation information on the window of the Correlation window is displayed in the status bar. This status bar can be set to the display and non-display. Default is set as display.

- List

  The End to End list which listing displays the correlating element can be displayed. This End to End list can be set to the display and non-display. Default is non-display.

・ Overview

Selecting this opens a window that displays all configuration data controlled with the Correlation window. The Overview can display the range of data indicated in the Correlation window. In addition, the mouse can be used to specify the range to be displayed in the Correlation window.

・ Refresh

Selecting this obtains information on all devices displayed in the Correlation window from the devices via a LAN.

The processing time depends on the LAN status, number of devices, and size of the configuration set for devices. It may take approximately several minutes from execution until the information is displayed.

Element

・ Detail

Select this to specify whether the window provides a detailed display of elements in a device.

If [Expand] is selected, a detailed display of elements is provided.
If [Collapse] is selected, no element is displayed and only unit icons are displayed.

・ Table Element

The elements selected with the mouse are integrated and displayed in the form of a table element.

If [ON] is selected, table element is displayed as integrated element icon.
If [OFF] is selected, integrated element icon is displayed as table element.

・ Table Element Magnification

The display magnification of all the table elements displayed in the Correlation window is changed.

・ Action

Selecting [Disk Map] displays disk allocation information of the selected device.

・ Visible

A dialog appears, enabling selection of element display components by type.

Check the check box of an element component to display it. Uncheck the check box of an element component to not display it.

This function is useful if too many elements are displayed, which makes it difficult to differentiate among items in the window, and for eliminating unused elements from the window. Check box selection is disabled in cases where the minimum amount of information, such as an HBA (port) data, is displayed as required; and in such cases, the contents displayed cannot be controlled.

・ Property

Selecting this displays the properties of the selected element.

Help

・ Help

Select this to display "User's Guide" of Correlation window.

・ Message Reference

Select this to display "Message Guide" of Correlation window.

・ Event Reference

Select this to display "Event Guide" of Correlation window.

・ Version Information

Client information, user information, connected server information, and Java virtual machine information are displayed. Moreover, when the Refresh button is selected, the memory that this software uses is opened.

B.9　Correlation Window Properties

This chapter describes the properties displayed from element icons in the Correlation window.

B.9.1　Server node (host) properties

The following table describes properties of elements a server node, as displayed in the window:

The middleware and driver version information that is displayed in the properties is identical to the information output by the version information display command for the middleware and the package version information for the corresponding package. To check the relationship of this version to the product version, refer to documents such as the installation guide for the middleware.

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About the VM server node

The following table shows which property explanation should be referred to, depending on which version of VMware is being used:

VMware version	Property explanation to be referenced
VMware Infrastructure 3 Version 3.0	This is handled in the same way as the Linux server nodes. Refer to the Linux explanation of "Table B.1 Server node properties".
VMware Infrastructure 3 Version 3.5 or later VMware ESXi 3.5 or later	When a server is VM host, refer to "Table B.2 Server node (VM host) properties". When a server is VM guest, refer to "Table B.3 Server node (VM guest) properties"

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Table B.1 Server node properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the host name of a server node as the icon name. If a server node having the same host name is already stored in the manager management database, the host name indicated here may be followed by ". + suffix-number (*1)". If the host name cannot be resolved, the host name is indicated in the "IP-ip-address" format. *1 Suffix numbers are assigned sequentially from 0.
	Status	"normal", "warning", "error", "unknown"	Indicates the device status. The resource view displays the status of whichever of the two, the HBA and multipath, is the more abnormal. The Correlation window displays the status of the devices that are most abnormal out of all elements statuses managed in the server node. When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software.

	Name of display item	Value	Description
			In the case of "invalid Password", change the device password stored by this software. Select [Device] - [Change account for device management] from the resource view menu.
	Vender ID	Any character string	Indicates information which identifies manufacturer's name or manufacturer. When cannot specify manufacturer, the following information is displayed. ・ For the Solaris OS versions of Agent, information collected with the uname -i command is displayed. ・ For the Windows versions of Agent, information collected with WMI collection is displayed. However, for the Linux versions of Agent, for the HP-UX versions of Agent and when no information could be collected, no value is displayed.
	Product ID	Any character string	Indicates information which identifies product's name or product. When cannot specify product, the following information is displayed. ・ For the Solaris OS versions of Agent, information collected with the uname -i command is displayed. ・ For the Windows versions of Agent, information collected with WMI collection is displayed. ・ For the HP-UX versions of Agent, information collected with the uname -i command is displayed. ・ For the AIX version of Agent, information collected with the uname -M command is displayed. However, for the Linux versions of Agent and when no information could be collected, no value is displayed.
	IP Address	IP address	Indicates the IP address of a device in a LAN.
	Management Software	Any character string	Indicates the Management Software set in the resource view.
Server Node Information	OS Type	"Solaris", "WindowsNT", "Windows2000 ", "Windows2003 ", "Windows2008 ", "Linux", "Linux (SUSE)", "Linux(VMwar e)", "HP-UX", "AIX"	Indicates an OS name. Solaris denotes the Solaris OS. Windows NT denotes WindowsNT, Windows2000 denotes Windows 2000, Windows2003 denotes Windows Server 2003, and Windows2008 denotes Windows Server 2008. Linux, Linux (SUSE) denotes Linux. Linux(VMware) denotes VMware. HP-UX denotes HP-UX. AIX denotes AIX.
	OS Version	Any character string	Indicates the OS version number. For the Solaris OS versions of Agent, 2.6, 7, 8, and 9 are displayed. For the Windows versions of Agent, 4.0, 5.0 and 5.2 are displayed. For the Linux versions of Agent, the kernel version numbers are displayed. For the HP-UX versions of Agent, the release identifiers are displayed.

	Name of display item	Value	Description
			For the AIX versions of Agent, version numbers are displayed in the "version-number.release-number" format.
	Agent Version	Any character string	Indicates the internal version number information of Agent. However, if no information could be collected from Agent, no value is displayed.
	Node identifier	Node identifier	Indicates a PRIMECLUSTER node identifier. This information is displayed only in the Solaris OS or Linux(RHEL) PRIMECLUSTER environment. Nothing is displayed if Agent fails to collect information.
Events	-	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
Memo pad	Manager	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Location	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Memo	Any character string	The same information as that of the properties of the Domain and Side views is displayed.

Table B.2 Server node (VM host) properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	VM host name	Indicates the host name of VM host.
	Status	"normal", "warning", "error", "unknown"	Indicates the status of a device. It changes by the status of the access path. When the monitoring status is "invalid Password", it is indicated as "warning". When the monitoring status is "unmonitored" or "undefined", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the VM host is not running or this software cannot communicate with VM host. "invalid Password" indicates that this software detected the login name change or password change for VM host.
	Vender ID	(Empty)	Not displayed.
	Product ID	(Empty)	Not displayed.
	IP Address	IP address of VM host	Indicates the IP address of VM host.
	Management Software	Any character string	Indicates the Management Software set in the resource view.
Server Node Information	OS Type	Product name of VMware	Indicates the product name of VMware.
	OS Version	Version of VMware	Indicates the VMware version number.
	Agent Version	(Empty)	Not displayed.
VM Guest Information	VM Guest Name	Virtual machine name, or host name of guest OS	Indicates the virtual machine name of VM guest. When the VMware Tools is running on the guest OS, the host name of guest OS is indicated.

	Name of display item	Value	Description
Events	-	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
Memo pad	Manager	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Location	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Memo	Any character string	The same information as that of the properties of the Domain and Side views is displayed.

Table B.3 Server node (VM guest) properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	VM guest name	Indicates the virtual machine name of VM guest. When the VMware Tools is running on the guest OS, the host name of guest OS is indicated.
	Status	"normal", "stop", "warning", "error", "unknown"	Indicates the status of a device. [When the VMware Tools is not installed on the guest OS] "normal" indicates that the virtual machine is running. "stop" indicates that the virtual machine is not running. [When the VMware Tools is installed on the guest OS] "normal" indicates that the VMware Tools is running. "stop" indicates that the VMware Tools is not running (including that virtual machine is not running). When the monitoring status is "invalid Password", it is indicated as "warning". When the monitoring status is "unmonitored", it is indicated as "unknown".
	Monitoring Status	"normal", "unmonitored", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the VM host is not running or this software cannot communicate with VM host. "invalid Password" indicates that this software detected the login name change or password change for VM host that this VM guest belongs.
	Vender ID	(Empty)	Not displayed.
	Product ID	(Empty)	Not displayed.
	IP Address	IP address of guest OS	Indicates the IP address of guest OS. When the VMware Tools is not running on the guest OS, no information is displayed.
	Management Software	Any character string	Indicates the Management Software set in the resource view.
Server Node Information	OS Type	OS name of guest OS or Product name of VMware	Indicates the OS name of guest OS. When the VMware Tools is not running on the guest OS, the product name of VMware is displayed.

	Name of display item	Value	Description
	OS Version	Empty or Product version of VMware	When the VMware Tools is running on the guest OS, no information is displayed. When the VMware Tools is not running on the guest OS, the product version of VMware is displayed.
	Agent Version	(Empty)	Not displayed.
	VM Host Name	Host name of VM host	Indicates the host name of VM host.
Events	-	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
Memo pad	Manager	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Location	Any character string	The same information as that of the properties of the Domain and Side views is displayed.
	Memo	Any character string	The same information as that of the properties of the Domain and Side views is displayed.

Table B.4 Application elements properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Displays the name of an application as the icon name
	Status	"normal", "warning"	Displays the application status. "normal" indicates the status that all information associated with the application is available. "warning" indicates the status that information associated with the application such as DBMS (database) system information and raw device information cannot be obtained. In this status the icon name for unavailable information is displayed.
	Status Description	Character string indicating details about the status	Indicates detail information on the status. In the "normal" status, no message is displayed. In the "warning" status, the following message is displayed indicating that the associated information could not be obtained. "A connection point element doesn't exist. (xxxxxx, ...)" xxxx is the icon name for unavailable information.
Application Information	Manager	Any character string	Displays information on the administrator of the application. (It can be changed manually with the <Change> button.)
	Management Software	Any character string	Indicates the start command or URL of Management Software. (It can be changed manually with the <Change> button.)
	Memo	Any character string	Displays memo information. (It can be changed manually with the <Change> button.)

Table B.5 Oracle database properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a database name as an icon name.
	Instance Status	"normal"	Indicates the instance status.
	Status Description	"OPEN"	Indicates the instance status. OPEN is displayed after a startup or alter database open command is executed.
Oracle DB Information	Instance Name	Any character string	Indicates an instance name.
	Instance Start Time	Any character string	Indicates the instance start date and time.
	Version	Any character string	Indicates the leading 64 characters of the Oracle database version number.

Table B.6 Oracle database integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Devices(Oracle)"	Indicates an integration icon name.
DB Information	Name	Any character string	Indicates a database name as an icon name.
	Instance Status	"OK"	Indicates the instance status.
	Status Description	"OPEN"	Indicates the instance status. OPEN is displayed after a startup or alter database open command is executed.
	Instance Name	Any character string	Indicates an instance name.
	Instance Start Time	Any character string	Indicates the instance start date and time.
	Version	Any character string	Indicates the leading 64 characters of the Oracle database version number.

Table B.7 Oracle file type properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Instance Name"_Control", Instance Name"_Data", Instance Name"_Log"	Indicates an instance name and file type as an icon name. Control indicates a control file. Data indicates a data file. Log indicates a log file.

Table B.8 Oracle file type integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS File Types(Oracle)"	Indicates an integration icon name.
Oracle DB File Information	File Types	Instance Name"_Control", Instance Name"_Data", Instance Name"_Log"	Indicates an instance name and file type as an icon name. Control indicates a control file. Data indicates a data file. Log indicates a log file.

Table B.9 Oracle file properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a raw device name, file name or disk group name as an icon name.
	File Status	"normal", "warning"	Indicates the file status.
	Status Description	If the file type is a control file: "CURRENT", "BACKUP", "CREATED", "CLONE", "STANDBY" If the file type is a data file: "ONLINE", "OFFLINE", "SYSTEM", "RECOVER", "SYSOFF" If the file type is a log file: "UNUSED", "CURRENT", "ACTIVE", "CLEARING", "CLEARING_CURRENT", "INACTIVE", "INVALID", "STALE", "DELETED"	Indicates the file status. The detailed statuses are as follows for a control file: CURRENT indicates that the standby database is open after activation or recovery. BACKUP indicates that the database is being recovered with the backup file. CREATED indicates that the database is being recovered with the created file. CLONE indicates the clone database status. STANDBY indicates the standby database status. The detailed statuses are as follows for a data file: ONLINE indicates the online state. OFFLINE indicates the offline state. SYSTEM indicates the system data file status. RECOVER indicates recovery is required. SYSOFF indicates the offline system status. The detailed statuses are as follows for a log file: UNUSED indicates that the REDO log has not yet been written. CURRENT indicates the current REDO log status. ACTIVE indicates the active log status, not the current log status. CLEARING indicates the status of log re-creation. CLEARING_CURRENT indicates the erasure status of the current log. INACTIVE indicates the log status not required for instance recovery.

	Name of display item	Value	Description
			INVALID indicates that the REDO log file cannot be accessed.
			STALE indicates that the contents of the REDO log file are incomplete.
			DELETED indicates that the REDO log file is not being used.
DB File Information	Log Group Number	Decimal number	For a log file, a log group number is displayed.
	Creation Date	File creation date and time	For a control or data file, the file creation date and time are displayed.
	Data Type	Any character string	For a data file, the table area name of the file is displayed.
	File Type	"Control_File", "Data_File", "Log_File"	Indicates the file type. Control_File indicates a control file. Data_File indicates a data file. Log_File indicates a log file.

Table B.10 Oracle file integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Files(Oracle)"	Indicates an integration icon name.
DB File Information	File Name	Any character string	Indicates a raw device name, file name or disk group name as an icon name.
	File Status	"normal", "warning"	Indicates the file status.
	Status Description	If the file type is a control file: "CURRENT", "BACKUP", "CREATED", "CLONE", "STANDBY" If the file type is a data file: "ONLINE", "OFFLINE", "SYSTEM", "RECOVER", "SYSOFF" If the file type is a log file: "UNUSED", "CURRENT", "ACTIVE", "CLEARING", "CLEARING_CURRENT", "INACTIVE", "INVALID",	Indicates the file status. The detailed statuses are as follows for a control file: CURRENT indicates that the standby database is open after activation or recovery. BACKUP indicates that the database is being recovered with the backup file. CREATED indicates that the database is being recovered with the created file. CLONE indicates the clone database status. STANDBY indicates the standby database status. The detailed statuses are as follows for a data file: ONLINE indicates the online state. OFFLINE indicates the offline state. SYSTEM indicates the system data file status. RECOVER indicates recovery is required. SYSOFF indicates the offline system status. The detailed statuses are as follows for a log file: UNUSED indicates that the REDO log has not yet been written.

	Name of display item	Value	Description
		"STALE", "DELETED"	CURRENT indicates the current REDO log status.
			ACTIVE indicates the active log status, not the current log status.
			CLEARING indicates the status of log re-creation.
			CLEARING_CURRENT indicates the erasure status of the current log.
			INACTIVE indicates the log status not required for instance recovery.
			INVALID indicates that the REDO log file cannot be accessed.
			STALE indicates that the contents of the REDO log file are incomplete.
			DELETED indicates that the REDO log file is not being used.
	Log Group Number	Decimal number	For a log file, a log group number is displayed.
	Creation Date	File creation date and time	For a control or data file, the file creation date and time are displayed.
	Data Type	Any character string	For a data file, the table area name of the file is displayed.
	File Type	"Control_File", "Data_File", "Log_File"	Indicates the file type.
			Control_File indicates a control file.
			Data_File indicates a data file.
			Log_File indicates a log file.

Table B.11 Symfoware database properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a database name as an icon name.
			For multi-RDB operations, the database name is displayed in the format of an RDB system name.database name.
DB Information	Create Date	Database definition date and time	Indicates the database definition date and time.
	Create User	Any character string	Indicates the database definer name.
	Version	Any character string	Indicates the Symfoware version number.

Table B.12 Symfoware database integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Devices(Symfo)"	Indicates an integration icon name.
DB Information	Name	Any character string	Indicates a database name.
			For multi-RDB operations, the database name is displayed in the format of an RDB system name.database name.

	Name of display item	Value	Description
	Create Date	Database definition date and time	Indicates the database definition date and time.
	Create User	Any character string	Indicates the database definer name.
	Version	Any character string	Indicates the Symfoware version number.

Table B.13 Symfoware file type properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"RDBDic", "RDBDir", "Log", "system", Log group name"_UserLogGroup", DB name"_DBSpace" For multi-RDB operation, RDB system name":", or RDB system name"". is prefixed to the value.	Indicates the file type as an icon name. RDBDic indicates the RDB dictionary. RDBDir is the RDB directory. Log is the log group management file. system is the system log group. Log group name"_UserLogGroup" is a user log group. DB name"_DBSpace" is a database.

Table B.14 Symfoware file type integration properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS File Types(Symfo)"	Indicates an integration icon name.
DB File Type Information	File Types	"RDBDic", "RDBDir", "Log", "system", Log group name"_UserLogGroup", DB name"_DBSpace" For multi-RDB operation, RDB system name":", or RDB system name"". is prefixed to the value.	Indicates the file type as an icon name. RDBDic indicates the RDB dictionary. RDBDir is the RDB directory. Log is the log group management file. system is the system log group. Log group name"_UserLogGroup" is a user log group. DB name"_DBSpace" is a database.

Table B.15 Symfoware file properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a raw device name or file name as an icon name.
	File Status	"normal", "warning", "Error"	Indicates the file status.
	Status Description	For a dictionary file: "HER", "SOF",	Indicates the detailed status of the file.

		Name of display item	Value	Description
			"CRV", "MRV", "TIH", "IND", "CMD", "FTR", "---" For the RDB Directory file for a user log group: "normal", "inhibit" For a log group management file: "---", "trouble", "trouble(CMD)" For a log management file: "avail", "failure", "failure(CMD)" For a temporary log file: "---", "active", "trouble", "trouble(CMD)" For an archive log file: "using", "full", "empty", "inh", "inh(CMD)", "switch", "icoff" For a database space: "HER", "SOF", "DER", "CRV", "MRV", "TIH", "DIR", "ALD", "CMD", "FMT", "IND", "FTR", "---"	For a dictionary file, the detailed statuses are as follows: HER indicates a hardware failure. SOF indicates a software error. CRV indicates a down recovery error. MRV indicates a media recovery error. TIH indicates a rollback error. IND indicates the in-doubt state (displayed only for load sharing operations). CMD indicates that the RDB command is being executed. FTR indicates the flash treatment blockade state (displayed only for load sharing operations). --- indicates that there is no operation information. For the RDB Directory file for a user log group, the detailed statuses are as follows: normal indicates that the file can be used. inhibit indicates that the file is access-inhibited. For a log group management file, the detailed statuses are as follows: --- indicates the normal state. trouble and trouble(CMD) indicate an abnormal state. For a log management file, the detailed statuses are as follows: avail indicates that the file was created normally. failure and failure(CMD) indicate a destroyed file or an input-output error. For a temporary log file, the detailed statuses are as follows: --- indicates that the file is not used. active indicates that the file is being used (Symfoware/RDB operation in progress) or that recovery is required (Symfoware/RDB operation is stopped). trouble and trouble(CMD) indicate an abnormal state. For an archive log file, the detailed statuses are as follows: using indicates the file is being used. full indicate the file is waiting to be saved. empty indicates that the file is not used. inh and inh(CMD) indicate an abnormal state. switch indicates forcible file switching. icoff indicates that file has been discarded. For a database space, the detailed statuses are as follows: HER indicates a hardware failure. SOF indicates a software error. DER indicates a data error. CRV indicates a down recovery error. MRV indicates a media recovery error. TIH indicates a rollback error. DIR indicates an RDB directory file error. ALD indicates a postscript processing error of the rdbsaloader command. CMD indicates that the RDB command is being executed. FMT indicates that format processing is in progress. IND indicates the in-doubt state (displayed only for load sharing operations). FTR indicates the flash treatment blockade state (displayed only for load sharing operations). --- indicates that there is no operation information.
		Database Space Status	Format: Type of operation information/target containing operation information	Indicates detail information on the database space. The types of operation information are as follows: INH indicates that access is suppressed. NUP indicates that

	Name of display item	Value	Description
		Type of Operation Information: "INH", "NUP", "NRC", "NRW", "---" Target Containing Operation Information: "DBS", "---"	write is suppressed. NRC indicates that there is no recovery. NRW indicates that read and write are suppressed. --- indicates that there is no operation information. Targets containing operation information are as follows: DBS indicates that operation information has been set on the entire database space. --- indicates that there is no operation information.
DB File Information	File Type	"RDB Dictionary", "RDB Directory(user)", "Loggroup Management File", "Log Management File", "Temporary Log Index", "Temporary Log Ai", "Temporary Log Bi", "Archive Log", "DB Space"	Indicates the file type. RDB Dictionary denotes the RDB dictionary. RDB Directory denotes the RDB directory. RDB Directory(user) denotes the RDB directory for a user log group. Loggroup Management File denotes the log group management file. Log Management File denotes the log management file. Temporary Log Index denotes the index area for temporary logs. Temporary Log Ai denotes the Ai temporary log file. Temporary Log Bi denotes the Bi temporary log file. Archive Log denotes an archive log file. DB Space denotes a database.
	Creation Date	Date and time of file creation and re-registration	Indicates the date and time when a temporary log file is created and re-registered. This information is displayed only for the temporary log file.
	Group	Any character string	Indicates a log group name. This information is displayed only for a system log group log management file, system log group RDB directory file, user log group log management file, and user log group RDB directory file.
	Entry	Decimal number	Indicates the number of transaction entries. This information is displayed only for a raw device or a file in which the log index area is defined.
	DataBase Space Name	Any character string	Indicates a database space name. This information is displayed only for a raw device or a file in which a database space is defined.

Table B.16 Symfoware file integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Files(Symfo)"	Indicates an integration icon name.
DB File Information	File name	Any character string	Indicates a raw device name or file name as an icon name.
	Status	"normal", "warning", "error"	Indicates the file status.

	Name of display item	Value	Description
	Status Description	For a dictionary file: "HER", "SOF", "CRV", "MRV", "TIH", "IND", "CMD", "FTR", "---"	Indicates the detailed status of the file. For a dictionary file, the detailed statuses are as follows: HER indicates a hardware failure. SOF indicates a software error. CRV indicates a down recovery error. MRV indicates a media recovery error. TIH indicates a rollback error. IND indicates the in-doubt state (displayed only for load sharing operations). CMD indicates that the RDB command is being executed. FTR indicates the flash treatment blockade state (displayed only for load sharing operations). --- indicates that there is no operation information.
		For the RDB Directory file for a user log group: "normal", "inhibit"	For the RDB Directory file for a user log group, the detailed statuses are as follows: normal indicates that the file can be used. inhibit indicates that the file is access-inhibited.
		For a log group management file: "---", "trouble", "trouble(CMD)"	For a log group management file, the detailed statuses are as follows: --- indicates the normal state. trouble and trouble(CMD) indicate an abnormal state.
		For a log management file: "avail", "failure", "failure(CMD)"	For a log management file, the detailed statuses are as follows: avail indicates that the file was created normally. failure and failure(CMD) indicate a destroyed file or an input-output error.
		For a temporary log file: "---", "active", "trouble", "trouble(CMD)"	For a temporary log file, the detailed statuses are as follows: --- indicates that the file is not used. active indicates that the file is being used (Symfoware/RDB operation in progress) or that recovery is required (Symfoware/RDB operation is stopped). trouble and trouble(CMD) indicate an abnormal state.
		For an archive log file: "using", "full", "empty", "inh", "inh(CMD)", "switch", "icoff"	For an archive log file, the detailed statuses are as follows: using indicates the file is being used. full indicate the file is waiting to be saved. empty indicates that the file is not being used. inh and inh(CMD) indicate an abnormal state. switch indicates forcible file switching. icoff indicates that file has been discarded.
		For a database space: "HER", "SOF", "DER", "CRV", "MRV", "TIH", "DIR", "ALD", "CMD", "FMT", "IND", "FTR", "---"	For a database space, the detailed statuses are as follows: HER indicates a hardware failure. SOF indicates a software error. DER indicates a data error. CRV indicates a down recovery error. MRV indicates a media recovery error. TIH indicates a rollback error. DIR indicates an RDB directory file error. ALD indicates a postscript processing error of the rdbsaloader command. CMD indicates that the RDB command is being executed. FMT indicates that format processing is in progress. IND indicates the in-doubt state (displayed only for load sharing operations). FTR indicates the flash treatment blockade state (displayed only for load sharing

	Name of display item	Value	Description
			operations). --- indicates that there is no operation information.
	Database Space Status	Format: Type of operation information/target containing operation information Type of Operation Information: "INH", "NUP", "NRC", "NRW", "---" Target Containing Operation Information: "DBS", "---"	Indicates detail information on the database space. The types of operation information are as follows: INH indicates that access is suppresed. NUP indicates that write is suppresed. NRC indicates that there is no recovery. NR indicates that read and write is suppresed. --- indicates that there is no operation information. Targets containing operation information are as follows: DBS indicates that operation information has been set on the entire database space. --- indicates that there is no operation information.
	File Type	"RDB Dictionary", "RDB Directory(user)", "Loggroup Management File", "Log Management File", "Temporary Log Index", "Temporary Log Ai", "Temporary Log Bi", "Archive Log", "DB Space"	Indicates the file type. RDB Dictionary denotes the RDB dictionary. RDB Directory denotes the RDB directory. RDB Directory(user) denotes the RDB directory for a user log group. Loggroup Management File denotes the log group management file. Log Management File denotes the log management file. Temporary Log Index denotes the index area for temporary logs. Temporary Log Ai denotes the Ai temporary log file. Temporary Log Bi denotes the Bi temporary log file. Archive Log denotes an archive log file. DB Space denotes a database.
	Creattion Date	Date and time of file creation and re-registration	Indicates the date and time when a temporary log file is created and re-registered. This information is displayed only for the temporary log file.
	Group	Any character string	Indicates a log group name. This information is displayed only for a system log group log management file, system log group RDB directory file, user log group log management file, and user log group RDB directory file.
	Entry	Decimal number	Indicates the number of transaction entries. This information is displayed only for a raw device or a file in which the log index area is defined.
	DataBase Space Name	Any character string	Indicates a database space name. This information is displayed only for a raw device or a file in which a database space is defined.

Table B.17 SQL Server database properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string Adds "instance name:" when an instance name is specified.	Indicates the name of a database.
	Database Status	"normal", "warning"	Indicates the database status.
	Status Description	"OK", "pre recovery", "recovering", "not recovered", "offline"	Indicates the database status. OK indicates that is normal. pre recovery indicates that the recovery processing in progress. recovering indicates that the recovery processing in progress. not recovered indicates that recovery failed. offline indicates that it is offline.
DB Information	Data definition date	Any character string	Indicates the database definition date and time.
	Version	Any character string	Indicates SQL Server version information.

Table B.18 SQLServer database integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Devices(SQL Server)"	Indicates an integration icon name.
DB Information	Name	Any character string Adds "instance name:" when an instance name is specified.	Indicates the name of an integration icon.
	Status	"normal", "warning"	Indicates the database status.
	Status Description	"OK", "pre recovery", "recovering", "not recovered", "offline"	Indicates the database status. OK indicates that is normal. pre recovery indicates that the recovery processing in progress. recovering indicates that the recovery processing in progress. not recovered indicates that recovery failed. offline indicates that it is offline.
	Create Date	Any character string	Indicates the database definition date and time.
	Version	Any character string	Indicates SQL Server version information.

Table B.19 SQLServer file type properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	DB name:file group name Adds "instance name" when an instance name is specified.	Indicates the name of a file group.

Table B.20 SQLServer file type integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS File Types(SQL Server)"	Indicates the name of an integration icon.
DB Filegroup Integration	Filegroup Name	DB name:file group name Adds "instance name" when an instance name is specified.	Indicates the name of a file group.

Table B.21 SQLServer file properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the full path to a file.
	Logical Name	Any character string	Indicates the logical name of a file.
	File Type	"Data File", "Log File"	Indicates the file type. Data File denotes a data file. Log File denotes a log file.

Table B.22 SQLServer file integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"DBMS Files(SQL Server)"	Indicates the name of an integration icon.
DB File Information	File Name	Any character string	Indicates the full path to a file.
	Logical Name	Any character string	Indicates the logical name of a file.
	File Type	"Data File", "Log File"	Indicates the file type. Data File denotes a data file. Log File denotes a log file.

Table B.23 UFS mount point properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type (ufs) and mount point as an icon name.
UFS-File System Information	Device No.	Hexadecimal number	Indicates a device number.

Table B.24 ZFS mount point properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type and mount point as an icon name. It is displayed as follows. ufs (zfs) mount point

Table B.25 ZFS area properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the device name, device slice name, or file name as an icon name.
File System Type	File System ID	Any character string	Indicates the ZFS storage pool name.
	Device Number	Hexadecimal number	Indicates a device number.
	Mount Point	Any character string	Indicates the mount point.

Table B.26 QFS mount point properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type and mount point as an icon name. It is displayed as follows. ufs (QFS/SAM-QFS/SAM-FS) mount point

Table B.27 QFS area properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the number specified for Equipment Ordinal field of the mcf file defined when the QFS is constructed, as an icon name.
File System Type	File System ID	Any character string	Indicates the QFS file system name.
	Device Number	Hexadecimal number	Indicates a device number.
	Mount Point	Any character string	Indicates the mount point.

Table B.28 SafeFILE(/Global) and GFS mount point properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type (sfxfs, sfcfs) and mount type as an icon name.
	Version	Any character string	Indicates the version information of SafeFILE(/Global) and GFS. When it is unknown, the value is not displayed.
	Management Software	Any character string	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: * For the SafeFILE/Global and GFS shared file system * When "Web-Based Admin View" is running on the server node To enable a client to open the menu of the Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-

	Name of display item	Value	Description
			Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions:
			* The administrative client must have Java Plug-in.
			* The URL of the primary administrative server is displayed.

Table B.29 SafeFILE(/Global) and GFS area properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"META", "LOG", "DATA"	Indicates usage of the SafeFILE, SafeFILE/Global, or GFS partition as an icon name. META indicates a metadata area. LOG indicates an update log area. DATA indicates a file data area.
	Version	Any character string	Indicates version information of SafeFILE(/Global) and GFS. When it is unknown, the value is not displayed.
	Management Software	Any character string	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: * For the SafeFILE/Global and GFS shared file system * When "Web-Based Admin View" is running on the server node To enable the administrative client to open the menu of the Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions: * The administrative client must have Java Plug-in. * The URL of the primary administrative server is displayed.
File System Type	Size	Decimal number	Indicates the partition size (in kilobytes). The displayed value is 0 during configuration change processing.
	File System ID	FS identification number or partition ID	Indicates an FS identification number for the SafeFILE/Global and GFS shared file system. Indicates a partition ID for the SafeFILE and GFS local file system.
	Transit	"add"	"add" is displayed only during partition addition processing.
	Device Number	Hexadecimal number	Indicates a device number.
	Mount	Any character string	Indicates the mount point. If no device is currently mounted, ----- is displayed for the SafeFILE/Global and GFS shared file system.

Table B.30 SafeFILE(/Global) and GFS area integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"File System Areas("File System Type (sfxfs,sfcfs) and Mount Point")"	Indicates usage of the SafeFILE(/Global), GFS area integration information as an icon name. File System type(sfxfs,sfcfs) and Mount Point is correlated with integrated SafeFILE(/Global) and GFS area.
File System Type Integration	Area/Usage	"META", "LOG", "DATA"	Indicates usage of the SafeFILE, SafeFILE/Global, or GFS partition as an icon name. META indicates a metadata area. LOG indicates an update log area. DATA indicates a file data area.
	Version	Any character string	Indicates version information of SafeFILE(/Global) and GFS. When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: * For the SafeFILE/Global and GFS shared file system * When "Web-Based Admin View" is running on the server node To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions: * The administrative client must have Java Plug-in. * The URL of the primary administrative server is displayed.
	Size	Decimal number	Indicates the partition size (kilobytes). The displayed value is 0 during configuration change processing.
	File System ID	FS identification number or partition ID	Indicates an FS identification number for the SafeFILE/Global and GFS shared file system. Indicates a partition ID for the SafeFILE and GFS local file system.
	Transit	"add"	"add" is displayed only during partition addition processing.
	Device Number	Hexadecimal number	Indicates a device number.
	Mount	Any character string	Indicates the mount point. If no device is currently mounted, ----- is displayed for the SafeFILE/ Global and GFS shared file system.

Table B.31 Windows file system properties (only applicable to the Windows versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system (fat, fat32, ntfs) and drive letter as an icon name.
File System Information	Volume Serial No.	Hexadecimal number	Indicates a volume serial number.

	Name of display item	Value	Description
	Volume Label Name	Any character string	Indicates a volume label name.
	Disk No.	Any character string	Indicates a disk number (assigned by Windows OS to each LU).

Table B.32 ext2 mount point properties (only available for the Linux versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type (ext2) and mount point as the icon name.
File System Information	Device Number	Hexadecimal number	Indicates a device number.

Table B.33 ext3 mount point properties (only available for the Linux versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the file system type (ext3) and mount point as the icon name.

Table B.34 ext3 area properties (only available for the Linux versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	"META/DATA", "JOURNAL"	Indicates the intended use of the ext3 file system as the icon name. META/DATA denotes the meta data and file data areas. JOURNAL denotes the journal area.
File System Type	Device Number	Hexadecimal number	Indicates a device number.

Table B.35 ext3 area integration information properties (only available for the Linux versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	"File System Areas(file system type (ext3) and mount point)"	Indicates the name of ext3 area integration information as the icon name. Indicates the file system type (ext3) and mount point associated with the integrated ext3 area.
File System Type Integration	Area/Usage	"META/DATA", "JOURNAL"	Indicates the intended use of the ext3 file system area. META/DATA denotes the meta data and file data areas. JOURNAL denotes the journal area.
	Device Number	Hexadecimal number	Indicates a device number.

Table B.36 reiserfs mount point properties (only available for the SUSE Linux Enterprise Server 9 for EM64T version of Agent and the OS is "Linux (SUSE)")

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a file system type (reiserfs) and mount point as an icon name.

Table B.37 reiserfs area properties (only available for the SUSE Linux Enterprise Server 9 for EM64T version of Agent and the OS is "Linux (SUSE)")

	Name of display item	Value	Description
Basic Information	(Icon Name)	"META/DATA", "JOURNAL"	Indicates the intended use of a reiserfs file system area as an icon name. META/DATA denotes a metadata and file data areas. JOURNAL denotes a journal area.
File System Information	Device Number	Hexadecimal number	Indicates a device number.

Table B.38 reiserfs area integration information properties (only available for the SUSE Linux Enterprise Server 9 for EM64T version of Agent and the OS is "Linux (SUSE)")

	Name of display item	Value	Description
Basic Information	(Icon Name)	"File System Areas ("file system type (reiserfs) and mount point")"	Indicates the name of the reiserfs area integration information as an icon name. Indicates the file system type (reiserfs) and mount point associated with an integrated reiserfs area.
File System Area Integration Information	Area Usage	"META/DATA", "JOURNAL"	Indicates the intended use of the reiserfs file system area. META/DATA denotes a metadata and file data areas. JOURNAL denotes a journal area.
	Device Number	Hexadecimal number	Indicates a device number.

Table B.39 SafeDISK(/Global) and GDS volume properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a volume name as an icon name. Asterisk (*) indicates an area that cannot be allocated for a volume or an area that can be allocated for a volume but has not yet been allocated.
	Status	"normal", "warning", "stop", "error"	Indicates the volume status to which the slice status on a local node is added. normal indicates that the volume is active and all of the associated slices are active. warning indicates that the volume is active and part of the associated slices are inactive.

	Name of display item	Value	Description
			stop indicates that the volume is suspended and all of the associated slices are suspended.
			error indicates that the volume cannot be started or is suspended and part of the associated slices are not suspended.
			For 1.2 and lower version numbers of Agent, it indicates the volume status to which the slice status on a local node is not added.
			normal indicates that the volume is active.
			stop indicates that the volume is suspended.
			error indicates that the volume cannot be started.
	Status Description	"exist non active slice", "all slices stopped", "exist non stop slice", "volume cannot be activated due to problem with data"	Indicates the volume status to which the slice status on a local node is added. When the volume status is normal, no information is displayed.
			exist non active slice indicates that the volume is active and part of the associated slices are inactive.
			all slices stopped indicates that the volume is suspended and all of the associated slices are suspended.
			exist non stop slice indicates that the volume is suspended and part of the associated slices are not suspended.
			volume cannot be activated due to problem with data indicates that the volume is suspended and cannot be started due to invalid data.
			For 1.2 and lower version numbers of Agent, it indicates the volume status to which the slice status on a local node is added.
			ACTIVE indicates the volume is operating.
			STOP indicates the volume is stopped.
			INVALID indicates that the volume is stopped and cannot be started because data is invalid.
			FREE indicates that an area has not yet been allocated for the volume.
			PRIVATE is the area used by SafeDISK (/Global) or GDS for control and cannot be assigned as a volume.
	Version	Any character string	Indicates version information of SafeDISK(/Global) and GDS.
			When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View".
			This information is displayed only in the following cases:
			* For the SafeFILE/Global and GFS shared file system
			* When "Web-Based Admin View" is running on the server node
			To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions:
			* The administrative client must have Java Plug-in.
			* The URL of the primary administrative server is displayed.

	Name of display item	Value	Description
Mirror Disk Volume Information-1	Volume Status	"ACTIVE", "STOP", "INVALID", "FREE", "PRIVATE"	Indicates the status of a volume on the local node. ACTIVE indicates that it is active. STOP indicates that it is suspended. INVALID indicates that it is suspended and cannot be started due to invalid data. FREE indicates that it is not assigned as a volume. PRIVATE is the area used by SafeDISK (/Global) or GDS for control and cannot be assigned as a volume. For 1.2 and lower version numbers of Agent, no value is displayed.
	Proxy	"join", "part", "*"	Indicates the proxy volume status. join indicates the linkage status. part indicates the separation status. "*" indicates that SafeDISK Snapshot has not yet been installed or no proxy volume is used.
	Mode	"rw", "ro", "*"	Indicates the access mode attribute value (default access mode). Mode indicates the local node status. rw indicates that both reading and writing are enabled. ro indicates that only reading is enabled. "*" indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.
	CMode	"rw", "ro", "*"	Indicates the current access mode of the active volume. Mode indicates the local node status. rw indicates that both reading and writing are enabled. ro indicates that only reading is enabled. * indicates that the volume has not been started.
	Lock	"on", "off", "*"	Indicates the lock mode. Mode indicates the local node status. on indicates a lock against subsequent starts (suppressed). off indicates no lock against subsequent starts. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated.
	First Block	Decimal number	Indicates the first block (sector) number.
	Last Block	Decimal number	Indicates the last block (sector) number.
	Blocks	Decimal number	Indicates the number of blocks (sectors) as the size.
Mirror Disk Volume Information-2	Skip Mode	"on", "off", "*"	Indicates the resynchronization skip mode. on indicates that the resynchronization skip mode is on. off indicates that the resynchronization skip mode is off. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.

	Name of display item	Value	Description
	Jrm Mode	"on", "off", "*"	Indicates the high-speed resynchronization mode. on indicates the high-speed resynchronization mode is on. off indicates the high-speed resynchronization mode is off. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.
	Disk Class	Any character string	Indicates the name of the class to which a disk belongs.
	Volume Type	"mirror", "stripe", "concat", "switch", "single"	Indicates the type attribute. mirror indicates that the volume belongs to the mirror group. stripe indicates that the volume belongs to the GDS stripe group. concat indicates that the volume belongs to the GDS concatenation group. switch indicates that the volume belongs to a GDS switch group. single indicates that the volume belongs to a single disk.
	Group	Any character string	Indicates that the name of the group to which a volume belongs. The asterisk (*) indicates a single volume.
	Master Volume	Any character string	Indicates the name of the master volume. The asterisk (*) indicates that SafeDISK and GDS Snapshot are not installed or no proxy volume is used.
	Connected Disk	Any character string	Indicates the name of the disk to which a volume belongs. The asterisk (*) indicates a mirror volume.
	Physical Slice	"on", "off", "*"	Indicates the physical slice attribute of a volume. This information is displayed only for GDS. on indicates that the physical slice attribute of the volume is on. off indicates that the physical slice attribute of the volume is off. The asterisk (*) indicates an occupied or unallocated area.
	Slice No.	Decimal number or "*"	Indicates the number of slices that form the volume. This information is displayed only for GDS. * indicates that no physical slices are part of the volume.
Slice Information	Slice	Any character string	Indicates the name of the slice. For 1.2 and lower version numbers of Agent, no value is displayed.
	Slice Status	"ACTIVE", "STOP", "INVALID", "COPY", "TEMP", "TEMP-STOP", "NOUSE"	Indicates the slice status on a local node. ACTIVE indicates that the slice is active. STOP indicates that the slice is suspended. INVALID indicates that the slice is temporarily detached because the data are invalid. COPY indicates that copying is in progress to ensure data. TEMP indicates that the slice is detached from the volume temporarily and running independently. TEMP-STOP indicates that the slice is detached from the volume temporarily and suspended independently.

	Name of display item	Value	Description
			NOUSE indicates that the slice is suspended and no operation is available.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Class	Any character string	Indicates the name of the class to which the slice belongs.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Group	Any character string	Indicates the name of the highest level group to which the slice belongs.
			For a single slice, the asterisk (*) is displayed.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Disk	Any character string	Displays the name of the disk or the lower level group (group to which this slice belongs among groups directly connected to the related highest level group) to which the slice belongs.
			For the highest level group is a stripe group or a concatenation group an asterisk (*) is displayed.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Volume	Any character string	Indicates the name of the volume to which the slice belongs.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Status	"run", "bg", "intr", "wait", "*"	Indicates the copy processing status.
			run indicates that the copy processing is in progress.
			bg indicates that the copy processing is in progress background but access to valid data is available.
			intr indicates that the copy processing is suspended.
			wait indicates that the copy processing is in queue because many copy processes are currently in execution.
			The asterisk (*) indicates that it is not being copied.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Jrm Mode	"on", "off", "*"	Indicates the high-speed resynchronization mode.
			on indicates that the high-speed resynchronization mode is on.
			off indicates that the high-speed resynchronization mode is off.
			The asterisk (*) indicates that it is not a mirror slice temporarily detached from the mirror volume.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Mode	"rw", "ro", "*"	Indicates the access mode.
			rw indicates that both reading and writing are available.
			ro indicates that only reading is available.
			The asterisk (*) indicates that the slice is not a mirror slice temporarily detached from the mirror volume.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Cur Blocks	Decimal number or "*"	Indicates the number of blocks (sectors) already copied.
			When the slice is not being copied or EMC TimeFinder or EMC SRDF is conducting the copy processing, the asterisk (*) is displayed.
			For 1.2 and lower version numbers of Agent, no value is displayed.

	Name of display item	Value	Description
	Copy Blocks	Decimal number or "*"	Indicates the number of blocks (sectors) needed to be copied. When the slice is not being copied, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Delay Time	Decimal number or "*"	Indicates copy delay time. The unit is milliseconds. When the slice is not being copied, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Type	"soft;", "EC", "OPC", "REC", "ROPC", "TF", "SRDF", "*"	Indicates the type of copy function being used to copy data between the master and the proxy. soft indicates that the copy processing is in execution using a copy function (soft copy function) of the GDS sfdsk driver. EC indicates that the EC function is currently being executed in the ETERNUS series or GR series unit. OPC indicates that the OPC function is currently being executed in the ETERNUS series or GR series unit. REC indicates that the REC function is currently being executed in the ETERNUS series or GR series unit. ROPC indicates that the ROPC function is currently being executed in the ETERNUS series or GR series unit. TF indicates that the copy processing is in execution using EMC TimeFinder. SRDF indicates that the copy processing is in execution using EMC SRDF. For 1.2 and lower version numbers of Agent, no value is displayed.
	Source Proxy Volume	Any character string	Indicates the name of the restoring copy source volume. For a slice not composing the copy destination master volume in which copy for restoring in progress, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.

Table B.40 SafeDISK(/Global) and GDS volume integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"Mirror Driver Volumes("Group name")"	Indicates a SafeDISK(Global) and GDS volume integration information name as an icon name. The group name that integrated SafeDISK(Global) and GDS volume belong is shown.
Mirror Disk Volume Information-1	Volume Name	Any character string	Indicates a volume name Asterisk (*) indicates an area that cannot be allocated for a volume or an area that can be allocated for a volume but has not yet been allocated.
	Status	"normal", "warning", "stop", "error"	Indicates the volume status including the slice status on a local node. normal indicates that the volume is active and all of the associated slices are active. warning indicates that the volume is active and some of the associated slices are inactive.

	Name of display item	Value	Description
			stop indicates that the volume is suspended and all of the associated slices are suspended.
			error indicates that the volume cannot be started or is suspended and some of the associated slices are not suspended.
			For 1.2 and lower version numbers of Agent, the value indicates the volume status not including the slice status on a local node.
			normal indicates that the volume is active.
			stop indicates that the volume is suspended.
			error indicates that the volume cannot be started.
	Status Description	"exist non active slice", "all slices stopped", "exist non stop slice", "volume cannot be activated due to problem with data"	Indicates the volume status including the slice status on a current node. When the volume status is normal, no information is displayed.
			exist non active slice indicates that the volume is active and some of the associated slices are inactive.
			all slices stopped indicates that the volume is suspended and all of the associated slices are suspended.
			exist non stop slice indicates that the volume is suspended and some of the associated slices are not suspended.
			volume cannot be activated due to problem with data indicates that the volume is suspended and cannot be started due to invalid data.
			For 1.2 and lower version numbers of Agent, the value indicates the volume status not enjoined by the slice status on a current node.
			ACTIVE indicates the volume is operating.
			STOP indicates the volume is stopped.
			INVALID indicates that the volume is stopped and cannot be started because data is invalid.
			FREE indicates that an area has not yet been allocated for the volume.
			PRIVATE is the area used by SafeDISK (/Global) or GDS for control and cannot be assigned as a volume.
	Version	Any character string	Indicates version information of SafeDISK(/Global) and GDS.
			When version information is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View".
			This information is displayed only in the following cases:
			* For the SafeFILE/Global and GFS shared file system
			* When "Web-Based Admin View" is running on the server node
			To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions:
			* The administrative client must have Java Plug-in.
			* The URL of the primary administrative server is displayed.
	Volume Status	"ACTIVE", "STOP",	Indicates the status of a volume on the local node.

	Name of display item	Value	Description
		"INVALID", "FREE", "PRIVATE"	ACTIVE indicates the volume is operating. STOP indicates the volume is stopped. INVALID indicates that the volume is stopped and cannot be started because data is invalid. FREE indicates that an area has not yet been allocated for the volume. PRIVATE indicates that an area cannot be allocated for the volume because it is used with SafeDISK (/Global) or GDS for control purposes.
	Proxy	"join", "part", "*"	Indicates the proxy volume status. join indicates the linkage status. part indicates the separation status. "*" indicates that SafeDISK Snapshot has not yet been installed or no proxy volume is used.
	Mode	"rw", "ro", "*"	Indicates the access mode attribute value (default access mode). Mode indicates the local node status. rw indicates that both reading and writing are enabled. ro indicates that only reading is enabled. "*" indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.
	CMode	"rw", "ro", "*"	Indicates the current access mode of the active volume. Mode indicates the local node status. rw indicates that both reading and writing are enabled. ro indicates that only reading is enabled. * indicates that the volume has not been started.
	Lock	"on", "off", "*"	Indicates the lock mode. Mode indicates the local node status. on indicates a lock against subsequent starts (suppressed). off indicates no lock against subsequent starts. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated.
	First Block	Decimal number	Indicates the first block (sector) number.
	Last Block	Decimal number	Indicates the last block (sector) number.
	Blocks	Decimal number	Indicates the number of blocks (sectors) as the size.
Mirror Disk Volume Information-2	Volume Name	Any character string	Indicates a volume name Asterisk (*) indicates an area that cannot be allocated for a volume or an area that can be allocated for a volume but has not yet been allocated.
	Skip Mode	"on", "off", "*"	Indicates the resynchronization skip mode. on indicates that the resynchronization skip mode is on. off indicates that the resynchronization skip mode is off. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.

	Name of display item	Value	Description
	Jrm Mode	"on", "off", "*"	Indicates the high-speed resynchronization mode. on indicates the high-speed resynchronization mode is on. off indicates the high-speed resynchronization mode is off. * indicates that an area cannot be allocated for the volume or that an area can be allocated but has not yet been allocated for the volume.
	Disk Class	Any character string	Indicates the name of the class to which a disk belongs.
	Volume Type	"mirror", "stripe", "concat", "switch", "single"	Indicates the type attribute. mirror indicates that the volume belongs to the mirror group. stripe indicates that the volume belongs to the GDS stripe group. concat indicates that the volume belongs to the GDS concatenation group. switch indicates that the volume belongs to a GDS switch group. single indicates that the volume belongs to a single disk.
	Group	Any character string	Indicates that the name of the group to which a volume belongs. Asterisk (*) indicates a single volume.
	Master Volume	Any character string	Indicates the name of the master volume. Asterisk (*) indicates that SafeDISK and GDS Snapshot are not installed or no proxy volume is used.
	Connected Disk	Any character string	Indicates the name of the disk to which a volume belongs. Asterisk (*) indicates a mirror volume.
	Physical Slice	"on", "off", "*"	Indicates the physical slice attribute of a volume. This information is displayed only for GDS. on indicates that the physical slice attribute of the volume is on. off indicates that the physical slice attribute of the volume is off. Asterisk (*) indicates an occupied or unallocated area.
	Slice Number	Decimal number or "*"	Indicates the number of slices that form the volume. This information is displayed only for GDS. * indicates that no physical slices comprise the volume.
Slice Information	Slice	Any character string	Indicates the name of the slice. For 1.2 and lower version numbers of Agent, no value is displayed.
	Slice Status	"ACTIVE", "STOP", "INVALID", "COPY", "TEMP", "TEMP-STOP", "NOUSE"	Indicates the slice status on a local node. ACTIVE indicates that it is active. STOP indicates that it is suspended. INVALID indicates that the slice is temporarily detached for the data are invalid. COPY indicates that copying is in progress to ensure data. TEMP indicates that the slice is detached from the volume temporarily and running by itself. TEMP-STOP indicates that the slice is detached from the volume temporarily and suspended by itself.

	Name of display item	Value	Description
			NOUSE indicates that the slice is suspended and no operation is available.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Class	Any character string	Indicates the name of the class to which the slice belongs.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Group	Any character string	Indicates the name of the highest level group to which the slice belongs.
			For a single slice, the asterisk (*) is displayed.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Disk	Any character string	Displays the name of the disk or the lower level group (group to which this slice belongs among groups directly connected to the related highest level group) to which the slice belongs.
			For the highest level group is a stripe group or a concatenation group the asterisk (*) is displayed.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Volume	Any character string	Indicates the name of the volume to which the slice belongs.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Status	"run", "bg", "intr", "wait", "*"	Indicates the copy processing status.
			run indicates that the copy processing is in progress.
			bg indicates that the copy processing is in progress in background but access to valid data is available.
			intr indicates that the copy processing is suspended.
			wait indicates that the copy processing is in queue because many copy processes are currently in execution.
			The asterisk (*) indicates that it is not being copied.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Jrm Mode	"on", "off", "*"	Indicates the high-speed resynchronization mode.
			on indicates that the high-speed resynchronization mode is on.
			off indicates that the high-speed resynchronization mode is off.
			The asterisk (*) indicates that the slice is not a mirror slice temporarily detached from the mirror volume.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Mode	"rw", "ro", "*"	Indicates the access mode.
			rw indicates that both reading and writing are available.
			ro indicates that only reading is available.
			The asterisk (*) indicates that it is not a mirror slice temporarily detached from the mirror volume.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Cur Blocks	Decimal number or "*"	Indicates the number of blocks (sectors) already copied.
			When the slice is not being copied or EMC TimeFinder or EMC SRDF is conducting the copy processing, the asterisk (*) is displayed.

	Name of display item	Value	Description
			For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Blocks	Decimal number or "*"	Indicates the number of blocks (sectors) needed to be copied. When the slice is not being copied, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Delay Time	Decimal number or "*"	Indicates copy delay time. The unit is milliseconds. When the slice is not being copied, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.
	Copy Type	"soft;", "EC", "OPC", "REC", "ROPC", "TF", "SRDF", "*"	Indicates the type of copy function being used to copy data between the master and the proxy. soft indicates that the copy processing is in execution using a copy function (soft copy function) of the GDS sfdsk driver. EC indicates that the copy processing is in execution using the EC function of GR700 series. OPC indicates that the copy processing is in execution using the OPC function of GR700 series or ETERNUS3000. REC indicates that the copy processing is in execution using the REC function of GR700 series. ROPC indicates that the copy processing is in execution using the ROPC function of GR700 series. TF indicates that the copy processing is in execution using EMC TimeFinder. SRDF indicates that the copy processing is in execution using EMC SRDF. For 1.2 and lower version numbers of Agent, no value is displayed.
	Source Proxy Volume	Any character string	Indicates the name of the restoring copy source volume. For a slice not composing the restoring copy destination master volume, the asterisk (*) is displayed. For 1.2 and lower version numbers of Agent, no value is displayed.

Table B.41 SafeDISK(/Global) and GDS group properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a group name as an icon name.
	Version	Any character string	Indicates version information of SafeDISK(/Global) and GDS. When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: * For the SafeFILE/Global and GFS shared file system * When "Web-Based Admin View" is running on the server node

	Name of display item	Value	Description
			To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions: * The administrative client must have Java Plug-in. * The URL of the primary administrative server is displayed.
Group Information	Blocks	Decimal number	Indicates the group size. The group size indicates the size of the smallest disk among connected disks. The size is the number of blocks (sectors).
	Free Blocks	Decimal number or "*"	Indicates the number of free blocks (sectors) that can be allocated to a new volume. Asterisk (*) indicates a low-level group of GDS.
	Master Group	Any character string	Indicates the name of the master group. Asterisk (*) indicates that SafeDISK Snapshot is not installed or no proxy group is used.
	Spare Count	Decimal number or "*"	Indicates the number of connectable spare disks. Asterisk (*) indicates a stripe or concatenation group of GDS.
	Disk Class	Any character string	Indicates the name of the class to which a disk belongs.
	Disks	List of any character strings	A list of connected disk names is displayed. GDS displays a list of connected disk names and low-order group names.
	Group Type	"mirror", "stripe", "concat", "switch"	Indicates the type attribute. This information is displayed only for GDS. mirror indicates mirror. stripe indicates stripe. concat indicates concatenation. switch indicates switch.
	Stripe Width	Decimal number or "*"	Indicates the stripe width (number of blocks). This information is displayed only for GDS. * indicates that no stripe group is used.

Table B.42 SafeDISK(/Global) and GDS disk properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a disk name as an icon name.
	Status	"normal", "error"	Indicates the disk status enjoined by the error status of the disk on a local node and a common node. normal indicates that the disk is operable and no I/O error has occurred.

	Name of display item	Value	Description
			error indicates that the disk is not operable, or is operable and an I/O error has occurred.
			For 1.2 and lower version numbers of Agent, the disk status not including the error status of the disk on a local node and a common node.
			normal indicates that the disk is operable.
			error indicates that the disk is not operable.
	Status Description	"I/O error has occurred", "not available for work", "available for disk exchanging"	Indicates details about the status of the disk that includes the error status of the disk on a local node and a common node. When the disk status is normal, no information is displayed.
			I/O error has occurred indicates that the disk is operable in GDS and an I/O error has occurred on a local node or a common node.
			not available for work indicates that the disk is not operable.
			available for disk exchanging indicates that the disk is operable and can be swapped.
			For 1.2 and lower version numbers of Agent, the value indicates the disk status not including the error status of the disk on a local node and a common node.
			ENABLE indicates the disk is operable.
			DISABLE indicates the disk is inoperable.
			SWAP indicates the disk is inoperable and replaceable.
	Version	Any character string	Indicates version information of SafeDISK(/Global) and GDS.
			When version information is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View".
			This information is displayed only in the following cases:
			* For the SafeFILE/Global and GFS shared file system
			* When "Web-Based Admin View" is running on the server node
			To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions:
			* The administrative client must have Java Plug-in.
			* The URL of the primary administrative server is displayed.
Disk Information	Blocks	Decimal number	Indicates the disk size.
			The size is the number of blocks (sectors).
	Free Blocks	Decimal number or "*"	Indicates the number of free blocks (sectors) that can be allocated to a new volume.
			* indicates that no single disk is used.
	Group	Any character string	Indicates a connected group name.
			Asterisk (*) indicates that no disk is connected.
	Disk Type	"mirror", "stripe", "concat", "switch",	Indicates the type attribute value.
			mirror indicates that the disk is connected to the mirror group.
			stripe indicates that the disk is connected to the GDS stripe group.

	Name of display item	Value	Description
		"keep", "single", "spare", "undef"	concat indicates that the disk is connected to the GDS concatenation group.
			switch indicates that the disk is connected to a GDS switch group.
			keep indicates a keep disk.
			single indicates a single disk.
			spare indicates a spare disk.
			undef indicates an undefined disk.
	Device Name	Any character string	Indicates a physical disk name.
			The name is displayed in one of the following formats:
			cCtTdD (for an ordinary hard disk under control of Solaris OS)
			mphdI (for an MPHD disk)
			mplbI (for an MPLB disk)
			emcpowerN (for an emcpower disk under control of Splaris)
			sdX (for an ordinary hard disk under control of Linux(RHEL))
			emcpowerP (for an emcpower disk under control of Linux)
			C indicates a controller. T indicates a target ID. D indicates a disk number. I indicates an MPHD instance number or MPLB instance number. N indicates an emcpower device number or device identifier under control of Solaris OS. P is an emcpower device type name under control of Linux. X indicates a device identifier.
	Nodes	List of any character strings	A list of node identifiers connected to a physical disk is displayed.
			Asterisk (*) indicates that SafeCLUSTER and PRIMECLUSTER are not installed.
	Disk Status	"ENABLE", "DISABLE", "SWAP"	Indicates the disk status.
			ENABLE indicates that the disk is operable.
			DISABLE indicates that the disk is not operable.
			SWAP indicates that the disk is not operable and can be swapped.
			For 1.2 and lower version numbers of Agent, no value is displayed.
	IO Status	"0", "1", "*"	Indicates the status with regard to disk errors.
			This information is displayed only for GDS.
			0 indicates that no I/O error has occurred on local and shared nodes.
			1 indicates that an I/O error has occurred on the local or shared node.
			* indicates that the disk is connected to neither the stripe group nor the concatenation group.

Table B.43 SafeDISK(/Global) and GDS class properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the name of a class as the icon name.

	Name of display item	Value	Description
	Version	Any character string	Indicates SafeDISK(/Global) and GDS version information. When version information is unknown, no value is displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: * For the SafeFILE/Global and GFS shared file system * When "Web-Based Admin View" is running on the server node To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions: * The administrative client must have Java Plug-in. * The URL of the primary administrative server is displayed.
Class Information	Class Type	"root", "local", "shared"	Indicates the type attribute value. root denotes the root class. local denotes a local class. shared denotes a common class.
	Scope	Any character string	Displays the node identifier as the scope attribute value. When the class is shared by multiple nodes in a SafeCLUSTER or PRIMECLUSTER system, a list of node identifiers is displayed. When SafeCLUSTER or PRIMECLUSTER is not deployed, the asterisk (*) is displayed.
	Hot Spare	"on", "off"	IIndicates the hot spare mode. on indicates that the hot spare mode is enabled. off indicates that the hot spare mode is disabled.
	Spare	Decimal number	Indicates the number of spare disks not connected to the group.

Table B.44 LVM logical volume properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the name of a logical volume as the icon name.
	LV Status	"normal", "warning", "error"	Indicates the logical volume status. When it is unknown, the value is not displayed.
	Status Description	"available/stale", "available/ syncd", "available", "unavailable"	Indicates details on the logical volume status. available/stale: The logical volume is available but it includes a physical extent that does not exist in the current volume. available/syncd: The logical volume is available and in sync.

	Name of display item	Value	Description
			available: The logical volume is available. A cache for error output and the consistency recovery are both off on the logical volume, and therefore the status cannot be determined between stale and syncd for certain.
			unavailable: The logical volume is unavailable.
	LVM Version	Any character string	Indicates LVM version information.
LV Information	LV Path Name	Any character string	Indicates the block type device and path name of a logical volume within the volume group.
	LV Size(Mbytes)	Any character string	Indicates the logical volume size.
	Current LE	Any character string	Indicates the number of logical extents within the logical volume.
	Allocated PE	Any character string	Indicates the number of physical extents used for the logical volume.
	Used PV	Any character string	Indicates the number of physical volumes used for the logical volume.

Table B.45 LVM logical volume integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"LVM Logical Volumes("volume group name")"	Indicates the name of LVM logical volume integration information as the icon name. "volume group name" indicates the name of the volume and group to which the integrated LVM logical volume belongs.
LV Information-1	LV Name	Any character string	Indicates the logical volume name.
	LV Status	"normal", "warning", "error"	Indicates the logical volume status.
	Status Description	"available/stale", "available/syncd", "available", "unavailable"	Indicates details on the logical volume status. available/stale: The logical volume is available but it includes a physical extent that does not exist in the current volume. available/syncd: The logical volume is available and in sync. available: The logical volume is available. A cache for error output and the consistency recovery are both off on the logical volume, and therefore the status cannot be determined between stale and syncd for certain. unavailable: The logical volume is unavailable.
	LVM Version	Any character string	Indicates LVM version information.
LV Information-2	LV Name	Any character string	Indicates Logical Volume name.
	LV Path Name	Any character string	Indicates the block type device and path name of a logical volume within the volume group.
	LV Size(Mbytes)	Any character string	Indicates the logical volume size.
	Current LE	Any character string	Indicates the number of logical extents within the logical volume.

	Name of display item	Value	Description
	Allocated PE	Any character string	Indicates the number of physical extents used for the logical volume.
	Used PV	Any character string	Indicates the number of physical volumes used for the logical volume.

Table B.46 LVM volume group properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the part after "/" in the volume and group path name as the icon name.
	VG Status	"normal"	Indicates the volume group status.
	Status Description	"available"	Indicates the volume group status.
	LVM Version	Any character string	Indicates LVM version information.
VG Information-1	VG Name	Any character string	Indicates the volume and group path name.
	VG Write Access	"read/write", "read-only"	Indicates the current volume and group access mode.
	VGDA	Decimal number	Indicates the number of volume group descriptor areas within the volume and group.
	PE Size	Decimal number	Indicates the size of each physical extent.
	Total PE	Decimal number	Indicates the total number of physical extents within the volume and group.
	Alloc PE	Decimal number	Indicates the number of physical extents currently assigned to the logical volume.
	Free PE	Decimal number	Indicates the number of physical extents not assigned.
VG Information-2	Max LV	Decimal number	Indicates the number of logical volumes that can be included in the volume and group.
	Cur LV	Decimal number	Indicates the number of logical volumes that currently exist in the volume and group.
	Open LV	Decimal number	Indicates the number of logical volumes and groups currently open in the volume and group.
	Max PV	Decimal number	Indicates the number of physical volumes that can be included in the volume and group.
	Cur PV	Decimal number	Indicates the number of physical volumes that currently exist in the volume and group.
	Act PV	Decimal number	Indicates the number of physical volumes currently active in the volume and group.
	Max PE per PV	Decimal number	Indicates the number of physical extents that can be assigned from physical volumes in the volume and group.
	Total PVG	Decimal number	Indicates the number of physical volumes and groups within the volume and group.

	Name of display item	Value	Description
	Total Spare PVs	Decimal number	Indicates the number of physical volumes specified as spares for this volume and group.
	Total Spare PVs in use	Decimal number	Indicates the total number of spare physical volumes that are active to alternate with failed physical volumes.

Table B.47 LVM physical volume properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the block type device path name of a logical volume within the group as the icon name. Device paths are displayed using legacy DSFs (cCtTdD) in the following situations: - For HP-UX11iv2 or earlier - If only PVLink is being used for path redundancy for physical volumes with HP-UX11iv3 or later Device paths are displayed using persistent DSFs (diskX) in the following situations: - If path redundancy is not used for physical volumes with HP-UX11iv3 or later - If native multi-paths are being used for path redundancy for physical volumes with HP-UX11iv3 or later
	PV Status	"normal", "warning", "error"	Indicates the physical volume status.
	Status Description	"available", "available/data spared", "available/active spare", "available/standby spare", "unavailable", "unavailable/data spared", "unavailable/active spare", "unavailable/standby spare", "a part of path unavailable", "all path unavailable"	Indicates details on the physical volume status. available: The physical volume is available and is not a spare physical volume. available/data spared: The physical volume is available. However, the data reside on a spare physical volume still active. available/active spare: The physical volume is available and is an active spare physical volume. available/standby spare: The physical volume is a spare physical volume and is stand-by against any failure on another physical volume in this volume group. This physical volume can be used simply for obtaining data from a failed physical volume. unavailable: The physical volume is not available and is not a spare physical volume. unavailable/data spared: The physical volume is unavailable. However, the data reside on a spare physical volume still active and can be accessed if the spare physical volume is available. unavailable/active spare: The physical volume is unavailable and is an active spare physical volume, and the data on this physical volume are unavailable. unavailable/standby spare: The physical volume is a stand-by spare physical volume that cannot be used currently for obtaining data from a failed physical volume. a part of path unavailable: Part of paths defined to the relevant physical volume or to an alternative link cannot be used.

	Name of display item	Value	Description
			all path unavailable: All of the paths defined to the relevant physical volume or to an alternative link cannot be used.
	LVM Version	Any character string	Indicates LVM version information.
PV Information	PV Name	Any character string	Indicates the block type device and path name of a physical volume within the group. Device paths are displayed using legacy DSFs (cCtTdD) in the following situations: - For HP-UX11iv2 or earlier - If only PVLink is being used for path redundancy for physical volumes with HP-UX11iv3 or later Device paths are displayed using persistent DSFs (diskX) in the following situations: - If path redundancy is not used for physical volumes with HP-UX11iv3 or later - If native multi-paths are being used for path redundancy for physical volumes with HP-UX11iv3 or later
	PV Name Alternate Link	Any character string	Alternate links to physical volumes are indicated using legacy DSFs (cCtTdD) in the following situation: - For physical volumes that use PVLink Multiple paths to physical volumes are indicated using legacy DSFs (cCtTdD) in the following situation: - For physical volumes that use the native multi-path function in environments where legacy DSFs have not been disabled or deleted. Multiple paths to physical volumes are indicated using logical HBA numbers in the following situation: - For physical volumes that use the native multi-path function in environments where legacy DSFs have been disabled or deleted.
	PVG Name	Any character string	Indicates the name of the physical volume group to which the physical volume indicated by the device name of a physical volume is defined. When the physical volume indicated by the device name of a physical volume does not belong to the physical volume group, no value is displayed.
	Total PE	Decimal number	Indicates the total number of physical extents on the physical volume.
	Free PE	Decimal number	Indicates the number of physical extents on the physical volume that are not assigned.
	Autoswitch	"On", "Off"	Indicates the specification of autoswitch behavior for the physical volume. On: LVM automatically switches the path to the physical volume to an optimum available path. Off: LVM automatically switches the current path to an optimum available path only if it cannot be used.

Table B.48 LVM physical volume integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	"LVM Physical Volumes("volume name")"	Indicates the LVM physical volume integration information name as the icon name.

	Name of display item	Value	Description
			The physical volume name is displayed using legacy DSFs (cCtTdD) in the following situations: - For HP-UX11iv2 or earlier - If only PVLink is being used for path redundancy for physical volumes with HP-UX11iv3 or later
			The physical volume name is displayed using persistent DSFs (diskX) in the following situations: - If path redundancy is not used for physical volumes with HP-UX11iv3 or later - If native multi-paths are being used for path redundancy for physical volumes with HP-UX11iv3 or later
PV Fusion Information	MultiPath Driver Device	Any character string	Indicates the block type device path name of physical volume. Device paths are displayed using legacy DSFs (cCtTdD) in the following situations: - For HP-UX11iv2 or earlier - If only PVLink is being used for path redundancy for physical volumes with HP-UX11iv3 or later Device paths are displayed using persistent DSFs (diskX) in the following situations: - If path redundancy is not used for physical volumes with HP-UX11iv3 or later - If native multi-paths are being used for path redundancy for physical volumes with HP-UX11iv3 or later
	PV Status	"normal", "warning", "error"	Indicates the physical volume status.
	Status Description	"available", "available/data spared", "available/active spare", "available/standby spare", "unavailable", "unavailable/data spared", "unavailable/active spare", "unavailable/standby spare", "a part of path unavailable", "all path unavailable"	Indicates details on the physical volume status. available: The physical volume is available and is not a spare physical volume. available/data spared: The physical volume is available. However, the data reside on a spare physical volume still active. available/active spare: The physical volume is available and is an active spare physical volume. available/standby spare: The physical volume is a spare physical volume and is stand-by against any failure on another physical volume in this volume group. This physical volume can be used simply for obtaining data from a failed physical volume. unavailable: The physical volume is not available and is not a spare physical volume. unavailable/data spared: The physical volume is unavailable. However, the data reside on a spare physical volume still active and can be accessed if the spare physical volume is available. unavailable/active spare: The physical volume is unavailable and is an active spare physical volume, and the data on this physical volume are unavailable. unavailable/standby spare: The physical volume is a stand-by spare physical volume that cannot be used currently for obtaining data from a failed physical volume.

	Name of display item	Value	Description
			a part of path unavailable: Part of paths defined to the relevant physical volume or to an alternative link cannot be used.
			all path unavailable: All of the paths defined to the relevant physical volume or to an alternative link cannot be used.
	LVM Version	Any character string	Indicates LVM version information.
	PV Name	Any character string	Indicates the block type device and path name of a physical volume within the group.
			Device paths are displayed using legacy DSFs (cCtTdD) in the following situations: - For HP-UX11iv2 or earlier - If only PVLink is being used for path redundancy for physical volumes with HP-UX11iv3 or later
			Device paths are displayed using persistent DSFs (diskX) in the following situations: - If path redundancy is not used for physical volumes with HP-UX11iv3 or later - If native multi-paths are being used for path redundancy for physical volumes with HP-UX11iv3 or later
	PVG Name	Any character string	Indicates the name of the physical volume group to which the physical volume indicated by the device name of a physical volume is defined. When the physical volume indicated by the device name of a physical volume does not belong to the physical volume group, no value is displayed.
	Total PE	Decimal number	Indicates the total number of physical extents on the physical volume.
	Free PE	Decimal number	Indicates the number of physical extents on the physical volume that are not assigned.
	Autoswitch	"On", "Off"	Indicates the specification of autoswitch behavior for the physical volume. On: LVM automatically switches the path to the physical volume to an optimum available path. Off: LVM automatically switches the current path to an optimum available path only if it cannot be used.

Table B.49 MultiPath driver slice properties (only applicable to the Solaris OS versions of Agent and the Linux versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a user access device node name as an icon name. In the Solaris OS version, information is displayed in the following format: - MPHD: /dev/FJSVmphd/rdsk/mphdMsS - MPLB,GRMPD 1.x, ETERNUS Multipath Driver (when setting mplb special file): /dev/FJSVmplb/rdsk/mplbMsS - ETERNUS Multipath Driver (when setting special file of Solaris OS standard): /dev/rdsk/cCtTdDsS Indicates the added disk device node with the number to distinguish partition in the Linux(RHEL) version.

	Name of display item	Value	Description
	Driver Version	Driver version	Indicates version information of the multipath driver. When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: - For the SafeFILE/Global and GFS shared file system - When "Web-Based Admin View" is running on the server node To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions: - The administrative client must have Java Plug-in. - The URL of the primary administrative server is displayed.

Table B.50 MultiPath driver device properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	In the Solaris OS version, an icon name indicated by this is the name of the user access device node from which a slice portion was omitted. In the Solaris OS version, information is displayed in the following format: - MPHD: /dev/FJSVmphd/rdsk/mphdM - MPLB,GRMPD 1.x, ETERNUS Multipath Driver (when setting mplb special file): /dev/FJSVmplb/rdsk/mplbM - ETERNUS Multipath Driver (when setting special file of Solaris OS standard): /dev/rdsk/cCtTdD In the Windows version, this indicates a disk number (assigned by WindowsNT or Windows2000 to each LU). In the Linux(RHEL) version, this indicates disk device node. In the AIX version, this indicates block device.
	Status	"normal", "warning"	Displays warning when "warning" is included in the multipath status. When the ETERNUS multipath driver for Windows is used, a warning is displayed when the number of active paths has been reduced. For example, number of paths is reduced from three to two. When the msdsm is used, a warning is displayed when the access path that is not redundant configuration exists. For example, number of paths is one (single path) at the first time, or it is reduced from two to one.
	Driver Version	Driver version	Indicates version information of the multipath driver. However, no value is displayed if the multipath driver is multipath control for WindowsNT/2000. When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that an administrative client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases:

	Name of display item	Value	Description
			- For the SafeFILE/Global and GFS shared file system
			- When "Web-Based Admin View" is running on the server node
			To enable the administrative client to open the menu of Management Software "Web-Based Admin View", the administrative client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the administrative client is subject to the following restrictions:
			- The administrative client must have Java Plug-in.
			- The URL of the primary administrative server is displayed.
MultiPath Device Information	MultiPath Type	"MPHD", "MPLB", "MP", "DPF"	Indicates the multipath disk control method. In the Solaris OS version, the following are displayed: MPHD: "MPHD" MPLB, GRMPD, ETERNUS Multiputh Driver: "MPLB" or "MPHD" In the Windows version, "MP" is displayed. In the Linux(RHEL) version, "MPLB" is displayed. In the AIX version, "DPF" is displayed.
	Number of Path	Decimal number	Indicates the number of paths.

Table B.51 MultiPath Driver Device integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a MultiPath Driver Device integration information name as an icon name. In the Solaris OS version, ranges of an icon name indicated by this is the name of the user access device node from which a slice portion was omitted. In the Windows version, this indicates ranges of disk number (assigned by Windows OS to each LU). In the Linux(RHEL) version, ranges of disk device node is displayed as a name. In the AIX version, range of block device is displayed as a name.
MultiPath Device Fusion Information	MultiPath Driver Device	Any character string	In the Solaris OS version, an icon name indicated by this is the name of the user access device node from which a slice portion was omitted. In the Solaris OS version, information is displayed in the following format: - MPHD: /dev/FJSVmphd/rdsk/mphdM - MPLB,GRMPD 1.x, ETERNUS Multipath Driver (when setting mplb special file): /dev/FJSVmplb/rdsk/mplbM ETERNUS Multipath Driver (when setting special file of Solaris OS standard): /dev/rdsk/cCtTdD In the Windows version, this indicates a disk number (assigned by Windows OS to each LU). In the Linux(RHEL) version, this indicates disk device node. In the AIX version, this indicates block device.
	Status	"nomal", "warning"	Displays warning when "warning" is included in the multipath status.

	Name of display item	Value	Description
			When Windows version GRMPD 2.x is used, a warning is displayed when the number of active paths has been reduced.
	Driver Version	Driver version	Indicates version information of the multipath driver. However, no value is displayed if the multipath driver is multipath control for WindowsNT/2000. When it is unknown, the value is not displayed.
	Management Software	URL	Indicates the URL that a client can use to open the menu of the Management Software "Web-Based Admin View". This information is displayed only in the following cases: - When "Web-Based Admin View" is running on the host - When multipath disk control is MPHD or MPLB To enable the client to open the menu of the Management Software "Web-Based Admin View", the client must satisfy the operating requirements of the "Web-Based Admin View" menu. Moreover, the client is subject to the following restrictions: - The client must have Java Plug-in. - The URL of the primary administrative server is displayed.
	MultiPath Type	"MPHD", "MPLB", "MP", "DPF"	Indicates the multipath disk control method. In the Solaris OS version, the following are displayed: MPHD: "MPHD" MPLB, GRMPD, ETERNUS Multipath Driver: "MPLB" or "MPHD" In the Windows version, "MP" is displayed. In the Linux(RHEL) version, "MPLB" is displayed. In the AIX version, "DPF" is displayed.
	Number of Path	Decimal number	Indicates the number of paths. When Windows version GRMPD 2.x is used, the number of active paths is displayed.

Table B.52 EMC PowerPath slice properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	For Solaris OS version, this indicates a pseudo name with "/dev/rdsk/" attached as an icon name. In Linux version, this indicates a pseudo name with "/dev/" attached as an icon name.

Table B.53 EMC PowerPath device properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	For Solaris OS version, this indicates a pseudo name, whose trailing alphabetic character is omitted, with "/dev/rdsk/" attached, as an icon name.

	Name of display item	Value	Description
			In Linux version, this indicates a pseudo name, whose trailing alphabetic character is omitted, with "/dev/" attached, as an icon name.
			The pseudo name is an identifier used to access a logical device of the storage system.
	Status	"normal", "warning"	Indicates the status of an EMC PowerPath device.
			"normal" indicates that all paths connected to individual devices are active.
			"warning" indicates that a certain path connected to individual paths is disabled.
			For Solaris OS version, "normal" is displayed when the status description of the EMC PowerPath device is "alive," and "warning" is displayed when it is "dead".
			In Linux version, "normal" is displayed when the status description of the EMC PowerPath device is "open," and "warning" is displayed when it is "close".
	Status Description	In Solaris OS version: "alive", "dead" In Linux version: "open", "close"	Indicates actual status information on an EMC PowerPath device.
	Driver Version	Driver version	Indicates EMC PowerPath version information. Nothing is displayed when the version is unknown.
MultiPath Device Information	MultiPath Type	"emcpower"	Indicates the multipath disk control type.
	Number of Paths	Decimal number	Indicates the number of paths.
	Logical device ID	Hexadecimal number or alphanumeric string	Indicates a logical device identifier.

Table B.54 EMC PowerPath device integrated information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the name of EMC PowerPath device integration information as an icon name.
MultiPath Device Fusion Information	MultiPath Driver Device	Any character string	For Solaris OS version, this indicates a pseudo name, whose trailing alphabetic character is omitted, with "/dev/rdsk/" attached, as an icon name.
			In Linux version, this indicates a pseudo name, whose trailing alphabetic character is omitted, with "/dev/" attached, as an icon name.
			The pseudo name is an identifier used to access a logical device of the storage system.

	Name of display item	Value	Description
	Status	"normal", "warning"	Indicates the status of an EMC PowerPath device. "normal" indicates that all paths connected to individual devices are active. "warning" indicates that a certain path connected to individual paths is disabled. In Solaris OS version, "normal" is displayed when the status description of the EMC PowerPath device is "alive" and "warning" is displayed when it is "dead". In Linux version, "normal" is displayed when the status description of the EMC PowerPath device is "open," and "warning" is displayed when it is "close".
	Status Description	In Solaris OS version: "alive", "dead" In Linux version: "open", "close"	Indicates actual status information on an EMC PowerPath device.
	Driver Version	Driver version	Indicates EMC PowerPath version information. Nothing is displayed when the version is unknown.
	MultiPath Type	"emcpower"	Indicates the multipath disk control type.
	Number of Paths	Decimal number	Indicates the number of paths.
	Logical device ID	Hexadecimal number or alphanumeric string	Indicates a logical device identifier.

Table B.55 HDLM slice properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates host device name with "/dev/rdsk" and slice identifier as an icon name.

Table B.56 HDLM device properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates host device name with "/dev/rdsk" and slice identifier as an icon name.
	Status	"normal", "warning"	Indicate the status of HDLM device normal: All path status which connects to each device is online. warning; There is offline path exists. The status will be displayed as "normal" if all the paths connected to HDLM device are "Online". If status other than "Online" exists, it will be displayed as "warning".

	Name of display item	Value	Description
	Status Description	"Online,Offline(E)"	Indicate the status of HDLM device's path.
	Driver Version	Driver version	Indicate the driver version of HDLM device. In case that version is unknown, no value is displayed.
MultiPath Device Fusion information	MultiPath Type	"HDLM"	Indicate the multipath disk's control type.
	Number of Paths	Decimal number	Indicate the path number.

Table B.57 HDLM device integration icon properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates HDLM device integrated information as an icon name.
MultiPath Device Information	MultiPath Driver Device	Any character string	Indicates host device name with "/dev/rdsk" and slice identifier as an icon name.
	Status	"normal", "warning"	Indicate the status of HDLM device normal: All path status which connects to each device is online. warning; There is offline path exists. The status will be displayed as "normal" if all the paths connected to HDLM device are "Online". If status other than "Online" exists, it will be displayed as "warning".
	Status Description	"Online, Offline(E)"	Indicate the status of HDLM device's path.
	Driver Version	Driver version	Indicate the driver version of HDLM device. In case that version is unknown, no value is displayed.
	MultiPath Type	"HDLM"	Indicate the multipath disk's control type.
	Number of Paths	Decimal number	Indicate the path number.

Table B.58 MPxIO slice properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates the device name including the part of slice, as an icon name.

Table B.59 MPxIO device properties

	Name of display item	Value	Description
Basic Information	(icon name)	Any character string	Shows the device name without the slice part as the icon name.
	Status	"normal", "warning"	Indicates the MPxIO device status. Normal: All the paths that connect to each device are running.

	Name of display item	Value	Description
			Warning: Some of the paths that connect to each device are blocked.
			If all the MPxIO device status details are "ONLINE" or "STANDBY", "normal" is displayed, otherwise "Warning" is displayed.
	Status Description	"ONLINE,OFFLINE", for example	Indicates the MPxIO device path status.
MultiPath Device Information	MultiPath Type	"MPxIO"	Indicates the multipath disk control type.
	Number of Paths	Decimal	Indicates the number of paths.

Table B.60 MultiPath driver device / LVM physical volume / EMC Power Path device/HDLM device/MPxIO device

	Name of display item	Value	Description
Basic Information	Source ID	Any character string	Indicates the names of the multipath driver device, LVM physical volume, and EMC PowerPath device and HDLM device/MPxIO device corresponding to the relevant path.
	Path Status	"nomal", "warning"	Displays status information on the multipath driver device, LVM physical volume, and EMC PowerPath device and HDLM device/MPxIO device.
			"Normal" indicates active path.
			"Warning" indicates path in trouble or the path separated from the management of multipath.
			In HP-UX version "normal" indicates the normal status of corresponding LVM physical volume.
			"Warning" indicates other status than the normal state of corresponding LVM physical volume.

Table B.61 Raw device properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a raw device name as an icon name.
			For the Solaris OS versions of Agent, the name is displayed in the following format: /dev/rdsk/cCtTdD.
			C, T, and D indicate the controller, target ID, and disk number, respectively.
			For the Windows versions of Agent, the name is displayed in the format of pPbBtTlL.
			P denotes the SCSI port number, B denotes the SCSI bus number, T denotes the target ID (SCSI-ID), and L denotes the LUN number.
			For the Linux versions of Agent, the name is displayed in a /dev/sdD format.
			D is a character standing for the physical drive.
			For the HP-UX versions of Agent, the name is displayed in a /dev/rdsk/cCtTdD format.
			C shows the card instance number, T shows the target address, and D shows the device number.

	Name of display item	Value	Description
			The Legacy DSF is ignored (removed) on HP-UX 11iv3 or later, no information is displayed.
			For the AIX version of Agent, the name is displayed in a /dev/hdiskB format. B is character standing for the block device number.

Table B.62 Raw device integration information properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a raw device integration information name as an icon name.
			For the Solaris OS versions of Agent, the name is displayed in the following format: /dev/rdsk/cCtTdD-D.
			C, T, and D-D indicate the controller, target ID, and range of disk number, respectively.
			For the Windows versions of Agent, the name is displayed in the format of pPbBtTlL-L.
			P indicates a SCSI port number. B indicates a SCSI bus number. T indicates a target ID (SCSI-ID). L-L indicates range of LUN number.
			For the Linux versions of Agent, the name is displayed in a /dev/sdD format.
			D-D indicates the range of physical devices. For the HP-UX versions of Agent, the name is displayed in a /dev/rdsk/cCtTdD-D format.
			C shows the card instance number, T shows the target address, and D-D shows the range of device.
			The Legacy DSF is ignored (removed) on HP-UX 11iv3 or later, no information is displayed.
			For the AIX version of Agent, the name is displayed in a /dev/hdiskB-B format. B-B indicates the range of the block device number.
RawDevice Fusion Information	Raw Device Name	Any character string	Indicates a raw device name.
			For the Solaris OS versions of Agent, the name is displayed in the following format: /dev/rdsk/cCtTdD.
			C, T, and D indicate the controller, target ID, and disk number, respectively.
			For the Windows versions of Agent, the name is displayed in the format of pPbBtTlL.
			P indicates a SCSI port number. B indicates a SCSI bus number. T indicates a target ID (SCSI-ID). L indicates a LUN number.
			For the Linux versions of Agent, the name is displayed in a /dev/sdD format.
			D indicates the range of physical devices.
			For the HP-UX versions of Agent, the name is displayed in a /dev/rdsk/cCtTdD format.
			C shows the card instance number, T shows the target address, and D shows the range of device.

	Name of display item	Value	Description
			The Legacy DSF is ignored (removed) on HP-UX 11iv3 or later, no information is displayed.
			For the AIX version of Agent, the name is displayed in a /dev/hdiskB format. B is character standing for the block device number.

Table B.63 Raw device slice properties (only applicable to the Solaris OS versions, Linux versions and HP-UX versions of Agent)

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a raw device slice name as an icon name.
			For the Solaris OS versions of Agent, the name is displayed in a /dev/rdsk/cCtTdDsS format.
			C shows the controller, T shows the target ID, D shows the disk number, S shows the slice number.
			For the Linux versions of Agent, the name is displayed in a /dev/sdDP format or a /dev/hdDP format.
			D shows a character standing for the physical drive and P shows the partition on the physical drive.
			For the HP-UX versions of Agent, the name is displayed in a /dev/rdsk/cCtTdDsS format.
			C shows the card instance number, T shows the target address, D shows the device number, and S shows the section number.

Table B.64 HBA port properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a logical number of an HBA as an icon name.
	Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", "unknown" is indicated. An agent of the Solaris OS or a Windows server node collects device status information in greater detail than SSC Agent on the same platform. Thus, the device status reported by both agents may not be identical.
	Status Description	Any character string	Indicates the device status in detail. When it is unknown, the value is not displayed.
	Monitoring Status	Any character string	Indicates the HBA port monitoring status.
	Driver Version	Driver version	Indicates the HBA driver version. When it is unknown, the value is not displayed.
	SNIA HBA API Version	SNIA HBA API Version	Indicates the SNIA HBA API version. When it is unknown, the value is not displayed.

	Name of display item	Value	Description
Port Information-1	Port No.	Decimal number	Indicates a port number.
	WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) set for an HBA.
	WWNN	Eight-byte WWNN	Indicates the WWNN (World Wide Node Name) set for an HBA. When it is unknown, the value is not displayed.
	Supported FC Port Types	List of "N", "NL-Private", "NL-Public", "E", "F", "FL", "B", and "G"	A list of Fibre Channel port types supported by an HBA is displayed. When it is unknown, the value is not displayed.
	Current FC Port Type	"N", "NL-Private", "NL-Public", "E", "F", "FL", "B", "G"	Indicates the type of Fibre Channel port for which an HBA is currently active. When it is unknown, the value is not displayed.
	Supported FC Classes	List of "Class2", "Class3", and "Class2(Enable ACK0)"	A list of Fibre Channel classes supported by an HBA is displayed. When it is unknown, the value is not displayed.
	Current FC Class	"Class2", "Class3", "Class2(Enable ACK0)"	Indicates the FC class in use. When it is unknown, the value is not displayed.
Port Information-2	FC Loop ID Assignment	"Manual", "Automatic (Ascending order)", "Automatic (Descending order)", "Unknown"	Indicates the loop ID setting method of Fibre Channel settings for an FC port. This property is valid only for a loop connection. When it is unknown, "Unknown" is displayed.
	FC Loop ID	Decimal number	Indicates loop ID of the Fibre Channel set to the FC port. This property is invalid excluding the loop connection.
	Transfer Rate	"Automatic", "1Gbit/s", "2Gbit/s", "4Gbit/s", "8Gbit/s", "10Gbit/s", "Unknown"	Indicates the transfer rate set to the FC port. When it is unknown, "Unknown" is displayed. When it is "Automatic", the transfer rate is either of the followings: 10Gbit/s, 8Gbit/s, 4Gbit/s, 2Gbit/s, 1Gbit/s
	Connected WWPN	List of eight-byte WWPN	Indicates the list of WWPN (World Wide Port Name) of the other side node connected with this HBA port. This property is not displayed in the device not supported. In the Linux server node equipped with PG-FC105 (driver version:V4.20q-1), PG-FC106 (driver version:V4.20q-1) and PG-FCD101, PG-FCD102, no value is shown.
Affinity Information	Controller Number	Controller number	Indicates the controller number of HBA. This value is displayed only in a Solaris OS environment. It corresponds to X in /dev/rdsk/cXtY. When /dev/rdsk/cXtY does not exist or the destination is tape, the value is not displayed.
	SCSI Port Number	SCSI port number	Indicates SCSI port number. This property is displayed in the Windows environment.

	Name of display item	Value	Description
			When it is unknown, the value is not displayed.
	SCSI Adapter Number	SCSI Adapter Number	Indicates the SCSI adapter number. This value is displayed only in a Linux environment. When it is unknown, the value is not displayed.
	Card Instance Number	Card Instance Number	Indicates the card instance number. When two or more card instance numbers for the HBA are found, a list of card instance numbers is displayed. This value is displayed only in an HP-UX environment. When it is unknown, the value is not displayed.
	Physical Number	Any character string	Indicates physical number of an HBA. Example for Solaris OS Sbus card: sbus@4,0/fcaw@1,0 The example (For FUJITSU/EMULEX) for the Solaris OS PCI card: pci@9,2000/fibre-channel@2 Example for a Solaris OS PCI card (for SE0X7F12F): pci@36,600000/fibre-channel@0,1 Example for a Solaris OS PCI card (for XSEFC401AF,XSEFC402AF): pci@7c0/pci@0/pci@8/SUNW,emlxs@0,1 Example for a Solaris OS PCI card (for SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z): pci@1f,0/pci@5/SUNW,qlc@1,1 The example (For QLOGIC) for the Solaris OS PCI card: pci@9,2000/scsi@2 When it is unknown, the value is not displayed. This value not displayed in a Windows, Linux, or HP-UX environment.
	Logical HBA Number	Logical HBA number	Indicates logical number of an HBA. Indicates an HBA device name for the AIX version. When it is unknown, the value is displayed with hbaX format.
	Bus Number	Bus number	Indicates a bus number. This value is not displayed in a Solaris OS and HP-UX environment. When it is unknown, the value is not displayed.
	Security Mode	"on", "off"	Indicates the security setting status of a HBA port. When the type of storage affinity (LUN mapping) is WWPN_BINDING, the value is "valid".
	Affinity Type	"NO_AFFINITY", "ANOTHER_BINDING", "WWPN_BINDING"	Indicates the type of storage affinity (LUN mapping) defined on the HBA. NO_AFFINITY indicates that no definition is set. ANOTHER_BINDING indicates that storage affinity (LUN mapping) is not defined or zoning is defined with a Fibre Channel switch or a storage device.

	Name of display item	Value	Description
			WWPN_BINDING indicates that BINDING is defined with a WWPN.
			When it is unknown, the value is not displayed.
	Affinity WWPN	List of Eight-byte WWNN	Indicates the list of WWPN on the storage side corresponding to the access path.
			When it is unknown, the value is not displayed.
	Target ID	List of any character strings	A list of Target ID (Y in cXtY of a special file in the Solaris OS, and T in pPbBtTlL of a Windows raw device, Y in cXtY of a HP-UX raw device) values corresponding to an access path is displayed.
			In AIX version, or when the value of this property is not clear, no value is displayed.
	Server LUN	List of any character strings	Delimited by a comma (,), LUN lists set for an access path are displayed.
			In Windows, each physical drive number that could be obtained is enclosed in () and displayed following the LUN number.
			When the number is unknown, the value is not displayed.

Table B.65 HBA properties

	Name of display item	Value	Description
Basic Information	(Icon Name)	Any character string	Indicates a product name as an icon name as follows:
			"PFCA", "GP7B8FC1", "PW008FC2" or "PW008FC3" for the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1.
			"SE0X7F11F" is for SE0X7F11F.
			"SE0X7F12F" is for SE0X7F12F.
			"LPe11000-S" is for XSEFC401AF.
			"LPe11002-S" is for XSEFC402AF.
			In SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z, the name starts with "375".
			"QLA2100F" for the GP5-FC101 and QLA2100F
			"QLA2200" for the GP5-FC102, PG-FC102, and QLA2200. "QLA23xx" or "QLA2340" for the QLA2340 in the Windows version.
			"FCAW" for the SN10-FC01 and FC64-1063
			"LP7K" and "LP8K" for the LP7000/8000 in the Solaris OS version, and "LP7K/8K/9K" in the Windows version.
			"LP9K" and "LP9000" for the LP9000 and LP9002S in the Solaris OS version, and "LP7K/8K/9K" or "LP9000" in the Windows version.

	Name of display item	Value	Description
			"LP9K" or "LP9802" for the LP9802 in the Solaris OS version. "LP7K/8K/9K" or "LP9802" is in the Windows version.
			"LP10K" or "LP10000" for the LP10000 in the Solaris OS version.
			"LP9K" or "LP9002" for the PG-FC105 and LP9002L in the Solaris OS version, "LP7K/8K/9K" or "LP9002" in the Windows version, and "LP9002" in the Linux version.
			"LP7K/8K/9K" or "LP9802" for the PG-FC106 in the Windows version, and "LP9802" in the Linux version.
			"LP7K/8K/9K" or "LP1050" is for PG-FC107, PG-FC201, LP1050, LP1050Ex in the Windows version. "LP1050" is in the Linux version.
			"QLA23xx" or "QLA2312" for the PG-FCD101, PG-FCD102 in the Windows version, and "QLA2312" or "FCI/O-CARD2Gb/s" in the Linux version.
			"LPe1150-F4" is for PG-FC202.
			"BX600-FC42E" is for PG-FCD201.
			"LP10000" or "2Gb" is for MC-08FC11/MC08FC71.
			"LP11000-M4" or "4Gb" is for MC-08FC31.
			"LP11002-M4" or "4Gb" is for MC-08FC41.
			"LPe11000-M4" or "4Gb" is for MC-08FC51.
			"LPe11002-M4" or "4Gb" is for MC-08FC61.
			"A6795A" for the A6795A.
			"A5158A" for the A5158A.
			"A6826A" is for A6826A.
			"AB378A" is for AB378A.
			"AB378-60101" is for AB378B.
			"AB379A" is for AB379A.
			"AB379-60101" is for AB379B.
			"6228" for the 6228.
			"6239" for the 6239.
			When it is unknown, "HBA" is displayed.
	Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", status becomes "unknown".
	Status Description	Any character string	Indicates the device status in detail. When it is unknown, the value is not displayed.
	Monitoring Status	Any character string	Indicates the HBA monitoring status.
	Driver Version	Driver version	Indicates the HBA driver version. When it is unknown, the value is not displayed.

	Name of display item	Value	Description
	SNIA HBA API Version	SNIA HBA API Version	Indicates the SNIA HBA API version. When it is unknown, the value is not displayed.
Adapter Information	Port Amount	Decimal number	Indicates port number. SE0X7F12F, SG-XPCI2FC-QF2/-Z (Solaris 9 OS only), MC-08FC41, MC-08FC61, A6826A, AB379A, and AB379B are dual port HBAs. In this product, however, there is only one port because two HBAs are used to express a single port.
	Product ID	Any character string	Indicates product name. "PFCA", "GP7B8FC1", "PW008FC2" or "PW008FC3" for the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1. "SE0X7F11F" is for SE0X7F11F. "SE0X7F12F" is for SE0X7F12F. "LPe11000-S" is for XSEFC401AF. "LPe11002-S" is for XSEFC402AF. In SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z, the name starts with "375". "QLA2100F" for the GP5-FC101 and QLA2100F. "QLA2200" for the GP5-FC102, PG-FC102, and QLA2200. "QLA23xx" or "QLA2340" for the QLA2340 in the Windows version. "FCAW" for the SN10-FC01 and FC64-1063 "LP7K" and "LP8K" for the LP7000/8000 in the Solaris OS version, and "LP7K/8K/9K" in the Windows version. "LP9K" and "LP9000" for the LP9000 and LP9002S in the Solaris OS version, and "LP7K/8K/9K" or "LP9000" in the Windows version. "LP9K" or "LP9802" for the LP9802 in the Solaris OS version. "LP7K/8K/9K" or "LP9802" is in the Windows version. "LP10K" or "LP10000" for the LP10000 in the Solaris OS version. "LP9K" or "LP9002" for the PG-FC105 and LP9002L in the Solaris OS version, "LP7K/8K/9K" or "LP9002" in the Windows version, and "LP9002" in the Linux version. "LP7K/8K/9K" or "LP9802" for the PG-FC106 in the Windows version, and "LP9802" in the Linux version. "LP7K/8K/9K" or "LP1050" is for PG-FC107, PG-FC201, LP1050, LP1050Ex in the Windows version. "LP1050" is in the Linux version. "QLA23xx" or "QLA2312" for the PG-FCD101, PG-FCD102 in the Windows version, and "QLA2312" or "FCI/O-CARD2Gb/s" in the Linux version.

	Name of display item	Value	Description
			"LPe1150-F4" is for PG-FC202.
			"BX600-FC42E" is for PG-FCD201.
			"LP10000" or "2Gb" is for MC-08FC11/MC08FC71.
			"LP11000-M4" or "4Gb" is for MC-08FC31.
			"LP11002-M4" or "4Gb" is for MC-08FC41.
			"LPe11000-M4" or "4Gb" is for MC-08FC51.
			"LPe11002-M4" or "4Gb" is for MC-08FC61.
			"A6795A" for the A6795A.
			"A5158A" for the A5158A.
			"A6826A" is for A6826A.
			"AB378A" is for AB378A.
			"AB378-60101" is for AB378B.
			"AB379A" is for AB379A.
			"AB379-60101" is for AB379B.
			"6228" for the 6228.
			"6239" for the 6239.
			When it is unknown, "HBA" is displayed.
	Vender ID	Any character string	Indicates manufacturer name.
			"FUJITSU" for the PW008FC2A, PW008FC2-G, PW008FC3, GP7B8FC1A, GP7B8FC1-G, GP7B8FC1, SE0X7F11F and SE0X7F12F.
			"SUN MICROSYSTEMS, INC". for XSEFC401AF/ XSEFC402AF.
			"QLOGIC" for the SG-XPCI1FC-QF2, SG-XPCI2FC-QF2, SG-XPCI1FC-QL2, and SG-XPCI2FC-QF2-Z.
			"QLOGIC" for the GP5-FC101, GP5-FC102, PG-FC102, PG-FCD101, PG-FCD102, QLA2100F, QLA2200 and QLA2340.
			"JAYCOR" for the SN10-FC01 and FC64-1063.
			"EMULEX" for the MC-08FC11, MC-08FC31, MC-08FC41, MC-08FC51, MC-08FC61, MC-08FC, PG-FC105, PG-FC106, PG-FC107, PG-FC201, PG-FC202, PG-FCD201, LP7000, LP8000, LP9000, LP9002S, LP9002L, LP9802, LP10000, LP1050 and LP1050Ex.
			"Hewlett-Packard" for A6795A, A5158A, A6826A, AB378A, AB378B, AB379A, and AB379B.
			"IBM" for 6228, 6239.
			When it is unknown, the value is not displayed.

B.9.2   Fibre Channel switch properties

See "B.7 Resource View Properties" for details.

B.9.3　Storage properties

B.9.3.1　ETERNUS storage

Table B.66 Storage (device) properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	Any character string	Displays a storage name as an icon name.	
	Status Description	Any character string	Indicates detailed device status.	
	Status	"normal", "warning", "error", "unknown"	Indicates the device status. When the monitoring status is "unmonitored" or "undefined", status becomes "unknown".	
	Monitoring Status	"normal", "unmonitored", "undefined", "invalid Password"	Indicates the level of recognition of a device by this software. "normal" indicates that the device is recognized normally. "unmonitored" indicates that the device is registered with this software but cannot be recognized for operation with a LAN. "undefined" indicates that operation of the device in a LAN has been verified, though the device is not registered with this software. In the event of "invalid Password", change the device password stored by this software. Select [Device] - [Change account for device management] from the resource view menu.	
	Vender ID	Any character string	Indicates a manufacturer's name.	
	Product ID	Any character string	Indicates a product name.	
	IP Address	IP address	Indicates the device IP address in a LAN. If multiple IP addresses are displayed, they are separated by a period ("."). as their delimiter	
	Management Software	Any character string	Indicates the Management Software used. The value is set from the resource view is used.	
Storage Information	Storage Type	"Disk", "Tape", "Array", "Library"	Indicates the storage type.	
	Serial Number	Serial number	Indicates a storage device serial number.	
	Firm Version	Any character string	Indicates the storage device firmware version number.	
	BOX ID	Device ID	Indicates the device ID of storage. (ETERNUS series and GR series only)	
Events	-	Any character string	The same information as that of the properties of the Domain and Side views is displayed.	
Memo pad	Manager	Any character string	The same information as that of the properties of the Domain and Side views is displayed.	

Tab name	Name of display item	Value	Description	Remarks
	Location	Any character string	The same information as that of the properties of the Domain and Side views is displayed.	
	Memo	Any character string	The same information as that of the properties of the Domain and Side views is displayed.	

Table B.67 CA properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	Any character string	Indicates a CA name as an icon name. For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices".	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the status of a channel adapter (CA). When the monitoring status is "unmonitored" or "undefined", status becomes "unknown".	
	Status Description	Any character string	Indicates the CA status in detail.	
	Monitoring Status	Any character string	Indicates the CA monitoring status.	
Adapter Information	CA No.	Decimal number	Indicates a CA number. For the ETERNUS6000 series, the value is the slot number (0-3) in Router. For the GR740, GR820, GR840, the value is the slot number (0 or 1) in IOB. For the ETERNUS8000, ETERNUS4000, ETERNUS3000, GR710, GR720, GR730, the value is the CA slot number in CM.	
	Group No.	0, 1	Indicates the group number (CM number for the ETERNUS8000, ETERNUS4000, ETERNUS3000, GR710, GR720, GR730. Router number for the ETERNUS6000, GR740, GR820, GR840) of the storage side where a CA is mounted.	
	Exchange Unit Name	Any character string	Indicates the unit name for CA replacement unit. Channel adapters with the same name are affected by hot system replacement.	

Table B.68 Port properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	Any character string	Indicates a port identification name as an icon name. (Example: CA0x00:Port0) For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices".	
	Status	"normal", "warning",	Indicates the FC port status.	

Tab name	Name of display item	Value	Description	Remarks
		"error", "fatal", "unknown"	When the monitoring status is "unmonitored" or "undefined", status becomes "unknown".	
	Status Description	Any character string	Indicates the FC port status in detail.	
	Monitoring Status	Any character string	Indicates the FC port monitoring status.	
Port Information-1	Port No.	Decimal number	Indicates the FC port index number within a channel adapter (CA).	
	WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) set for an FC port.	
	WWNN	Eight-byte WWNN	Indicates the WWNN (World Wide Node Name) set for an FC port.	
	Adapter Type	"FCCA", "FCRA(initiator)", "FCRA(target)", "FCRA(Automatic)", "FC-Initiator"	Indicates the FC port type.	
	Supported FC Port Types	"N", "NL-Private", "NL-Public", "E", "F", "FL", "B", "G"	Indicates the Fibre Channel port types supported by an FC port.	
	Current FC Port Type	"N", "NL-Private", "NL-Public", "E", "F", "FL", "B", "G"	Indicates the type of Fibre Channel port for which an FC port is currently active.	
	Supported FC Classes	"Class2", "Class3", "Class2(Enable ACK0)"	Indicates the service class of Fibre Channel supported by an FC port.	
	Current FC Class	"Class2", "Class3", "Class2(Enable ACK0)"	Indicates the Fibre Channel service class set for an FC port.	
Port Information-2	FC Loop ID Assignment	"Manual", "Automatic (Ascending order)", "Automatic (Descending order)"	Indicates the loop ID setup method of Fibre Channel settings for an FC port. This property is valid only for a loop connection.	
	FC Loop ID	Decimal number	Indicates the loop ID of Fibre Channel settings for an FC port. This property is valid only for a loop connection.	

Tab name	Name of display item	Value	Description	Remarks
	Transfer Rate	"Automatic", "1Gbit/s", "2Gbit/s", "4Gbit/s", "8Gbit/s", "Unknown"	Indicates the transfer rate set for an FC port. When it is unknown, "Unknown" is displayed. When it is "Automatic", the transfer rate is either of the followings: 10Gbit/s, 8Gbit/s, 4Gbit/s, 2Gbit/s, 1Gbit/s	
	Connected WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) of a remote node connected to this FC port. This property is not displayed for unsupported devices. In ETERNUS8000, ETERNUS6000, ETERNUS4000 and ETERNUS2000, this property is not indicated.	
Affinity Information	Security Mode	"on", "off"	Indicates the security setting status of an FC port.	
	Authorized WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) of an HBA connected to an access path that is set.	
	AffinityGroup Name	Any character string	Indicates the affinity group name (zone name) of storage assigned to the above Authorized WWPN.	
	Host Response Number	Decimal number	Indicates the host response number assigned to the HBA indicated by the Authorized WWPN. (This item is displayed for a device that supports the host response setting function.) For information about the host response function, refer to the "ETERNUSmgr/GRmgr User's Guide".	
Remote Copy	Destination FCRA WWPN	Eight-byte WWPN	Indicates the WWPN (World Wide Port Name) of the destination FCRA (remote connection adapter) that is route-set with the remote copy function. This tab and "Properties" are displayed only for the FCRA.	

Table B.69 DA properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	Any character string	Indicates a Device Adapter(DA) name as an icon name. For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices". (Example: DA0x10)	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the device adapter (DA) status.	
	Status Description	Any character string	Indicates the DA status in detail.	
Device Adapter Information	DA No.	Decimal number	Indicates a DA number. For the ETERNUS6000, the value is the slot number (0-1) in the router. For the GR740, GR820, GR840, the value is the slot number (generally 2) in IOB.	

Tab name	Name of display item	Value	Description	Remarks
			For ETERNUS4000 models 80 and 100, ETERNUS3000, GR710, GR720, GR730, the value is the DA slot number (0 or 1) in CM.	
	Group No.	Value	Indicates a group number (CM number for the ETERNUS4000 models 80 and 100, ETERNUS3000 series and GR710, GR720, GR730, and Router number for the ETERNUS6000, GR740, GR820, GR840) of the storage side where a DA is mounted.	
	Exchange Unit Name	Any character string	Indicates the unit name for DA exchange. Adapters with the same name are affected by hot system replacement.	
	Controlled DE ID	Hexadecimal number	Indicates the ID number of Device Enclosure (DE) controlled with DA.	

Table B.70 CM properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"CM" + number	Indicates a CM name as an icon name. For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices". (Example: CM0x00) The value is represented in hexadecimal number.	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the device CM (Controller) status.	
	Status Description	Any character string	Indicates the CM status in detail.	
Controller Information	CM No.	Decimal number	Indicates CM number. The number becomes a serial number from 0.	
	Cache Capacity	Memory size(MB)	Indicates cache memory size of CM.	

Table B.71 Router properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"Router" + number	Indicates a router name as an icon name. For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices". (Example: Router0/Router0x00)	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the router status.	
	Status Description	Any character string	Indicates the router status in detail.	

Tab name	Name of display item	Value	Description	Remarks
Router Information	Router No.	Decimal number	Indicates a router number.	

Table B.72 IOB properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"IOB" + number	Indicates an IOB name as an icon name. For details, see "A.2 Module Element Notations and Mounting Location of Storage Devices". (Example: IOB0x00) The number is hexadecimal.	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the IOB status.	
	Status Description	Any character string	Indicates the IOB status in detail.	
IOB Information	IOB No.	Hexadecimal number	Indicates an IOB number.	

Table B.73 LUNMapping properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"LUNMapping"	Indicates a LUNMapping name as an icon name.	For the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS2000, the LUNMapping icon is displayed using ETERNUSmgr. For the ETERNUS3000 model 50, GR710, GR720, GR730, the LUNMapping icon is displayed using ETERNUSmgr, GRmgr addressing mode with zone setting.
Mapping Information	Group Name	Any character string	Indicates an arbitrary name of LUNMapping. When the name has not been set, it is not displayed. For ETERNUS3000 model 50, GR710, GR720, GR730, indicates the zone name set by the zone setting function in the addressing mode of ETERNUSmgr, GRmgr.	

Table B.74 AffinityGroup properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"AffinityGroup" + group name	Indicates an AffinityGroup name as an icon name.	
Affinity Group Information	Group No.	Decimal number	Indicates an AffinityGroup number. The value is a zone number for the ETERNUS4000 models 80 and 100, ETERNUS3000, GR series.	
	Group Name	Any character string	Indicates the affinity group name (zone name).	

Table B.75 LUN properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"LUN" + number	Indicates a LUN name as an icon name. The number is decimal.	

Table B.76 LUN integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic Information	(Icon Name)	"LUN" + number	Indicates the integrated LUN number. The number is decimal.	
	LUN Fusion Information	LUN No.	Number	The list of the integrated LUN numbers. The number is decimal.	
		LUN	"LUN" + number	LUN number. The number is decimal.	
		Logical Volume	"Logical Volume" + number	Indicates a logical volume number which corresponds to mapped LUN. The number is hexadecimal.	
		Capacity	Volume capacity(MB)	Indicates capacity of Logical Volume.	
		Volume Type	"Open Volume", "Main Frame Volume", "MVV", "SDV", "TempOLU", "TempSDV", "SDPV"	Indicates the logical volume type (for opening, main frame, sharing,Snapping Data Volume, TempOLU, TempSDV, SDPV).	
		Encryption	"Encryption", "Non-Encryption"	Indicates the logical volume encryption attribute.	
		RAID Group	"RAID Group" + number	RAID Group number (in hexadecimal format) corresponding to Logical Volume. Blank is displayed if the device has a Thin Provisioning configuration and the RAID group belongs to the Thin Provisioning Pool.	

	Tab name	Name of display item	Value	Description	Remarks
		Thin Provisioning Pool	"TPP" + number	Integrated Thin Provisioning Pool number (in hexadecimal format). Blank is displayed if there is a Thin Provisioning configuration but no Thin Provisioning Pool. A hyphen (-) is displayed if there is not a Thin Provisioning configuration or if the information cannot be acquired.	
Table Element		LUN	"LUN" + number	Indicates integrated LUN number. The number is decimal.	

Table B.77 Logical Volume properties

Tab name	Name of display name	Value	Description	Remarks
Basic Information	(Icon Name)	"Logical Volume" + number	Indicates a logical volume name as an icon name. The number is hexadecimal.	
Logical Volume Fusion Information	Capacity	Volume capacity(MB)	Indicates the capacity of a logical volume.	
	Volume Type	"Open Volume", "Main Frame Volume", "MVV", "SDV", "TempOLU", "TempSDV", "SDPV", "TPV"	Indicates the type of logical volume (for opening, main frame, sharing, Snapping Data Volume, TempOLU, TempSDV, SDPV,TPV).	
	Encryption	"Encryption", "Non-Encryption"	Indicates the logical volume encryption attribute.	

Table B.78 Logical Volume integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic Information	(Icon Name)	"Logical Volume" + number	Indicates an integrated logical volume number. The number is hexadecimal.	
	Logical Volume Fusion Information	Logical Volume No.	Number	Indicates the list of integrated logical volume numbers. The number is hexadecimal.	
		Logical Volume	"Logical Volume" + number	Indicates a logical volume number. The number is hexadecimal.	
		Capacity	Volume capacity(MB)	Indicates capacity of the logical volume.	
		Volume Type	"Open Volume", "Main Frame Volume",	Indicates the logical volume type (for opening, main frame and sharing, Snapping Data Volume, TempOLU, TempSDV, SDPV,TPV).	

	Tab name	Name of display item	Value	Description	Remarks
			"MVV", "SDV", "TempOLU", "TempSDV", "SDPV", "TPV"		
		Encryption	"Encryption", "Non-Encryption"	Indicates the logical volume encryption attribute.	
Table Element		Logical Volume	"Logical Volume" + number	Indicates the list of integrated logical volume numbers. The number is hexadecimal.	

Table B.79 Thin Provisioning volume properties

Tab name	Name of display item	Value	Description	Remarks
Basic information	(Icon name)	"LogicalVolume" + Number	Logical volume name (displayed as the icon name in hexadecimal format).	
Logical volume	Name	Character string	Logical volume name set by the user.	
	Capacity	Volume capacity (MB)	Logical volume capacity.	
	Used Capacity	Capacity used (MB)	Used capacity.	
	Volume Type	"Open volume", "Mainframe volume","MVV", "SDV", "TempOLU","TempSDV", "SDPV", "TPV"	Logical volume type (for open, mainframe, shared, Snap Data Volume, TempOLU, TempSDV, SDPV,TPV)	
	Encryption	"Encryption"、 "Non-Encryption"	Logical volume encryption usage.	
	Notice Status	"Normal", "Caution"	Monitoring status of the logical volume capacity. Possible values: -Normal: Volume free space is less than "Caution threshold value". -Caution: Volume free space is greater than or equal to "Caution threshold value".	
	Notice(Caution)	Threshold value (%)	"Caution threshold value" set for the logical volume.	

Table B.80 Thin Provisioning volume integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic information	(Icon name)	"LogicalVolume" + number	Integrated logical volume number (in hexadecimal format).	
	Thin Provisioning Volume Fusion Information	Logical Volume No.	Number	List of integrated logical volume numbers (in hexadecimal format).	
		Logical Volume	"LogicalVolume" + number	Logical volume number (in hexadecimal format).	

	Tab name	Name of display item	Value	Description	Remarks
		Name	Character string	Logical volume name set by the user.	
		Capacity	Logical volume capacity (MB)	Logical volume capacity.	
		Used Capacity	Capacity used (MB)	Used capacity.	
		VolumeType	"Open volume", "Mainframe volume", "MVV", "SDV", "TempOLU", "TempSDV", "SDPV", "TPV"	Logical volume type (for open, mainframe, shared, Snap Data Volume, TempOLU, TempSDV, SDPV,TPV)	
		Encryption	"Encryption", "Non-Encryption"	Logical volume encryption attribute.	
		Notice Status	"Normal"、 "Warning"	Monitoring status of the logical volume capacity. Possible values: -Normal: Volume free space is less than "Caution threshold value". -Caution: Volume free space is greater than or equal to "Caution threshold value".	
		Notice(Caution)	Threshold value (%)	"Caution threshold value" set for the logical volume.	
Table element		Logical volume	"LogicalVolume" + number	List of integrated logical volume numbers (in hexadecimal format).	

Table B.81 Thin Provisioning Pool properties

Tab name	Name of display item	Value	Description	Remarks
Basic information	(Icon name)	"TPP" + number	Thin Provisioning Pool name (displayed as the icon name in 4-digit hexadecimal format).	
	Device status	"normal", "warning", "error","fatal", "unknown"	Thin Provisioning Pool status.	
	Device details	Character string	Detailed information on Thin Provisioning Pool status.	
Thin Provisioning Pool Information	Name	Character string	Thin Provisioning Pool name set by the user.	
	Capacity	Total capacity (MB)	Thin Provisioning Pool total capacity.	
	Used Capacity	Capacity used (MB)	Capacity allocated to the logical volume.	
	Disks Kind	"Online"、 "Nearline"、 "Unknown"	Attributes of the disks that comprise the Thin Provisioning Pool.	
	Reliability	"High"、 "Medium、 "None"、 "Unknown"	Thin Provisioning Pool reliability.	
	Encryption	"Encryption", "Non-Encryption"	Encryption attribute.	

Tab name	Name of display item	Value	Description	Remarks
	Notice Status	"Normal", "Warning", "Caution"	Monitoring status of the used Thin Provisioning Pool capacity. Possible values: -Normal: Used Thin Provisioning Pool capacity is less than "Caution threshold value". -Caution: Used Thin Provisioning Pool capacity is less than "Warning threshold value" and greater than or equal to "Caution threshold value".	
	Notice(Warning)	Threshold value (%)	"Warning threshold value" set for the Thin Provisioning Pool. This value is a strong warning level indicating the Thin Provisioning Pool capacity already allocated.	
	Notice(Caution)	Threshold value (%)	"Caution threshold value" set for the Thin Provisioning Pool. This value is a weak warning level indicating the Thin Provisioning Pool capacity already allocated.	
Thin Provisioning Volume Information	Logical Volume(Mainframe)	"-"	A hyphen (-) is displayed, since there is no information,	
	Logical Volume(TPV)	Volume number	TPV Volume number.	
	Part	Numeric+"/"+ Numeric	Logical volume integration information. Values are displayed as *<integration_order_number>*/ *<integration_total_number>*. "1/1" is displayed for Thin Provisioning volumes.	
	Capacity	Capacity (MB)	Logical volume capacity.	
	Volume Type	"Open volume", "Mainframe volume", "MVV", "SDV", "TempOLU", "TempSDV", "SDPV"	Logical volume type (for open, mainframe, shared, Snap Data Volume, TempOLU, TempSDV, SDPV).	
	Encryption	"Encryption", "Non-Encryption"	Encryption usage.	

Table B.82 Thin Provisioning Pool integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic information	(Icon name)	"TPP" + number	Integrated Thin Provisioning Pool number (in hexadecimal format).	
	Pool Fusion Information	Thin Provisioning Pool	"TPP" + number	Thin Provisioning Pool number (in hexadecimal format).	
		Status	"normal", "warning", "error", "fatal", "unknown"	Thin Provisioning Pool status.	

	Tab name	Name of display item	Value	Description	Remarks
		Statis Description	Character string	Detailed information on Thin Provisioning Pool status.	
		Name	Character string	Thin Provisioning Pool name set by the user.	
		Capacity	Total capacity (MB)	Thin Provisioning Pool total capacity.	
		Used Capacity	Capacity used (MB)	Capacity allocated to the logical volume.	
		Disks Kind	"Online", "Nearline", "Unknown"	Attributes of the disks that comprise the Thin Provisioning Pool.	
		Reliability	"High", "Medium", "None", "Unknown"	Thin Provisioning Pool reliability.	
		Encryption	"Encryption", "Non-Encryption"	Encryption usage.	
		Notice Status	"Normal", "Warning", "Caution"	Monitoring status of the Thin Provisioning Pool capacity. Possible values: -Normal: Used Thin Provisioning Pool capacity is less than "Caution threshold value". -Caution: Used Thin Provisioning Pool capacity is less than "Warning threshold value" and greater than or equal to "Caution threshold value". -Warning: Used Thin Provisioning Pool capacity is greater than or greater to "Warning threshold value".	
		Notice(Warining)	Threshold value (%)	"Warning threshold value" set for the Thin Provisioning Pool. This value is a strong warning level indicating the Thin Provisioning Pool capacity already allocated.	
		Notice(Caution)	Threshold value (%)	"Caution threshold value" set for the Thin Provisioning Pool. This value is a weak warning level indicating the capacity already allocated.	
Table element		Thin Provisioning Pool	"TPP"+number	List of the integrated Thin Provisioning Pool number (in hexadecimal format).	

Table B.83 RAID Group properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"RAID Group" + number	Indicates a RAID group name as an icon name. The number is hexadecimal.	

Tab name	Name of display item	Value	Description	Remarks
	Status	"normal", "warning", "error", "unknown"	Indicates the RAID group status.	
	Status Description	Any character string	Indicates the RAID group status in detail.	
RAID Group Information	RAID level	"RAID0", "RAID1+0", "RAID1", "RAID3", "RAID5", "RAID5+0", "RAID6"	Indicates the RAID level of a RAID group.	
	Capacity	Total capacity(MB)	Indicates the total volume capacity of a RAID group.	
	Free Capacity	Free capacity(MB)	Indicates the free capacity not assigned to a logical volume in a RAID group.	
	Stripe Size	Decimal number(KB)	Indicates the stripe size of a RAID group.	
	Assigned CM No.	CM number	Indicates the CM number for controlling this RAID group. When there is no information and information are uncertain, "-" (hyphen) is displayed.	
	Assigned CPU No.	CPU number	Indicates the CPU number for controlling this RAID group. When there is no information and information are uncertain, "-" (hyphen) is displayed.	
	Format Progress	"Formatting", "Abnormal End of Formatting", "Reforming", "Abnormal End of Reforming", "-"	Indicates the formatting status, RAID level exchange, and the RAID group capacity expansion status. "-" (hyphen) is displayed if these operations are not performed and when they complete normally.	
	Disk Status	"Active", "Idle", "In the boot process", "In the stop process", ""	Indicates the disk status of the RAID group. When the device cannot be supported or device information cannot be collected, "-" (hyphen) is displayed.	
	D. Hot Spare	"DE" + 0xDE number + ": " + "Disk" + disk number	Information on the dedicated hot spare allocated to the RAID group. Blank is displayed for RAID groups or devices with no dedicated hot spare.	
	Thin Provisioning Pool	"TPP" + number	Thin Provisioning Pool number belonging to the RAID group. Displayed only if the device has a thin provisioning configuration and has a Thin Provisioning Pool.	
Logical Volume Information	RAID Level	"RAID0", "RAID1+0", "RAID1", "RAID3", "RAID5", "RAID5+0", "RAID6"	Indicates the RAID level of a RAID Group.	

Tab name	Name of display item	Value	Description	Remarks
	Capacity	Total capacity(MB)	Indicates the total volume capacity of RAID Group.	
	Free Capacity	Free Capacity(MB)	Indicates the empty capacity not allocated in a logical volume in the RAID Group.	
	Logical Volume	"Logical Volume" + number	Indicates the logical volume number constructed in RAID. The number is hexadecimal.	
	Capacity	Capacity(MB)	Indicates the logical volume capacity.	
	Volume Type	"Open Volume", "Main Frame Volume", "MVV", "SDV", "TempOLU", "TempSDV", "SDPV"	Indicates the logical volume type (for opening, main frame and sharing, Snapping Data Volume, TempOLU, TempSDV, SDPV).	
	Encryption	"Encryption", "Non-Encryption"	Indicates the logical volume encryption attribute.	
	Logical Volume (Mainframe)	"Logical Volume" + number	Indicates the mainframe logical volume number.	
	Logical Volume (Open)	"Logical Volume" + number	Indicates the open logical volume number.	
	Part	Number+"/"+number	Indicates logical volume integration information. The value is shown as integration order number+"/"+integration total number. For example, 1/1 indicates a volume that is not integrated, and 3/8 indicates that the relevant logical volume is composed of eight data areas and the information is for the third area.	

Note: Logical volume information is not displayed if the configuration has thin provisioning volumes.

Table B.84 RAID Group integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic Information	(Icon Name)	"RAID Group" + number	Indicates the integrated RAID group number. The number is in hexadecimal.	
	RAID Group Information	RAIDGroup	"RAID Group" + number	Indicates the RAID group number. The number is in hexadecimal.	
		Status	"normal", "warning", "error", "unknown"	Indicates the RAID group status.	
		Status Description	Any character string	Indicates the RAID group status in detail.	
		RAID level	"RAID0", "RAID1+0", "RAID1", "RAID3",	Indicates the RAID level of a RAID group.	

	Tab name	Name of display item	Value	Description	Remarks
			"RAID5", "RAID5+0", "RAID6"		
		Capacity	Total capacity(MB)	Indicates the total volume capacity of a RAID group.	
		Free Capacity	Free capacity(MB)	Indicates the free capacity not assigned to a logical volume in a RAID group.	
		Stripe Size	Decimal number(KB)	Indicates the stripe size of a RAID group.	
		Assigned CM No.	CM number	Indicates the CM number for controlling this RAID group. When there is no information and information are uncertain, "-" (hyphen) is displayed.	
		Assigned CPU No.	CPU number	Indicates the CPU number for controlling this RAID group. When there is no information and information are uncertain, "-" (hyphen) is displayed.	
		Format Progress	"Formatting", "Abnormal End of Formatting", "Reforming", "Abnormal End of Reforming", "-"	Indicates the formatting status, RAID level exchange, and the RAID group capacity expansion status. "-" (hyphen) is displayed if these operations are not performed and when they complete normally.	
		Disk Status	"Active", "Idle", "In the boot process", "In the stop process", ""	Indicates the disk status of the RAID group. When the device cannot be supported or device information cannot be collected, "-" (hyphen) is displayed.	
		D. Hot Spare	"DE" + 0xDE number + ": " + "Disk" + disk number	Information on the dedicated hot spare allocated to the RAID group. Blank is displayed for RAID groups or devices with no dedicated hot spare.	
Table Element		RAID Group	"RAIDGroup" + number	Indicates the integrated RAIDGroup number list. The number is in hexadecimal.	

Table B.85 Disk Properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"DE" + 0xDE number + ": " + "Disk" + Disk number	The name is displayed in combination with the number of the DE where the disk is mounted and the slot number of the disk in the DE. (Example: DE0x00:Disk8) The DE number is hexadecimal, and the disk slot number is decimal.	
	Device Status	"normal", "warning", "error", "unknown"	Indicates the disk status.	

Tab name	Name of display item	Value	Description	Remarks
	Status Description	Any character string	Indicates the disk status in detail.	
Disk Information	Disk Type	"Data Disk", "Hot Spare Disk", "D. Hot Spare", "Backup Disk", "System Disk"	Indicates the disk assignment type.	
	Disk Spec.	"Fibre Channel Disk", "Nearline FC Disk", "SAS Disk", "Nearline SAS Disk", "Nearline SATA Disk", "SSD"	Indicates the disk type. If unknown, the value is not displayed.	
	Capacity	Capacity(MB)	Indicates the user area capacity of the disk.(*)	
	Motor Status	"Active", "Idle", "In the boot process", "In the stop process", "-"	Indicates the motor status of the disk. When the device cannot be supported or device information cannot be collected, "-" (hyphen) is displayed.	
	Vender ID	Any character string	Indicates the disk manufacturer's name.	
	Product ID	Any character string	Indicates the product name of the disk.	
	Firmware Version	Any character string	Indicates the firmware version number of the disk.	
	Rotational Speed	Number of rotations(RPM)	Indicates the disk rotation speed. This property is invalid if "-" hyphen is displayed.	
	Capacity Type	Decimal number(GB) or Decimal number(TB)	Indicates the disk capacity type.	

(*)NOTE: ETERNUS DX60, DX80, the physical disk capacity is displayed in the all disk. Also, ETERNUS DX60, DX80 Otherwise, the physical disk capacity is displayed in the system disk.

Table B.86 Disk integration icon properties and table element information

	Tab name	Name of display item	Value	Description	Remarks
Integration	Basic Information	(Icon Name)	"DE" + 0xDE number + ": " + "Disk" + Disk number	Indicates the integrated disk name. The name is displayed in combination with the number of the DE where the disk is mounted and the slot number of the disk in the DE. (Example: DE0x00:Disk8) The DE number is hexadecimal, and the disk slot number is decimal.	
	Disk Fusion Information	Disk Fusion Information	"DE" + 0xDE number + ": " + "Disk" + Disk number	Indicates the integrated disk information.	
		Disk	"DE" + 0xDE number + ": " + "Disk" + Disk number	Indicates the integrated disk name. The name is displayed in combination with the number of the DE where the disk is mounted and	

	Tab name	Name of display item	Value	Description	Remarks
				the slot number of the disk in the DE. (Example: DE0x00:Disk8) The DE number is hexadecimal, and the disk slot number is decimal.	
		Device Status	"normal", "warning", "error", "unknown"	Indicates the disk status.	
		Status Description	Any character string	Indicates the disk status in detail.	
		Disk Type	"Data Disk", "Hot Spare Disk", "D. Hot Spare", "Backup Disk", "System Disk"	Indicates the disk assignment type.	
		Disk Spec.	"Fibre Channel Disk", "Nearline FC Disk", "SAS Disk", "Nearline SAS Disk", "Nearline SATA Disk", "SSD"	Indicates the disk type. If unknown, the value is not displayed.	
		Capacity	Capacity(MB)	Indicates the user area capacity of the disk. (*)	
		Motor Status	"Active", "Idle", "In the boot process", "In the stop process", "-"	Indicates the motor status of the disk. When the device cannot be supported or device information cannot be collected, "-" (hyphen) is displayed.	
		Vender ID	Any character string	Indicates the disk manufacturer's name.	
		Product ID	Any character string	Indicates the product name of the disk.	
		Firmware Version	Any character string	Indicates the firmware version number of the disk.	
		Rotational Speed	Number of rotations(RPM)	Indicates the disk rotation speed. This property is invalid, if "-" (hyphen) is displayed.	
		Capacity Type	Decimal number(GB) or Decimal number(TB)	Indicates the disk capacity type.	
Table Element		Disk	"DE" + 0xDE number + ": " + "Disk" + Disk number	Indicates the integrated disk name. The name is displayed in combination with the number of the DE where the disk is mounted and the slot number of the disk in the DE. (Example: DE0x00:Disk8) The DE number is a hexadecimal number, and the disk slot number is a decimal number.	

(*)NOTE: ETERNUS DX60, DX80, the physical disk capacity is displayed in the all disk. Also, ETERNUS DX60, DX80 Otherwise, the physical disk capacity is displayed in the system disk.

Table B.87 DE properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"DE" + number	Indicates a DE (Drive Enclosure) name as an icon name. The number is a hexadecimal number.	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the DE status.	
	Status Description	Any character string	Indicates the DE status in detail.	
Drive Enclosure Information	DE No.	Hexadecimal number	Indicates the DE ID number.	

Table B.88 Battery/Capacitor properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	(Icon Name)	"Battery" + number or "Capacitor" + number	Indicates a battery/capacitor name as an icon name. The number is a decimal number.	
	Status	"normal", "warning", "error", "fatal", "unknown"	Indicates the battery/capacitor status.	
	Status Description	Any character string	Indicates the battery/capacitor status in detail.	
Battery/Capacitor Information	Battery/ Capacitor No.	Decimal number	Indicates the battery/capacitor number. The number is a serial number starting at 0.	
	Exchange Date	Date	Indicates the battery replacement date. An old battery must be replaced with a new one before this date. If information cannot be obtained a value will not be displayed. In the case of Capacitor: A periodical exchange is unnecessary. The value will not be displayed.	

B.9.4   Access path properties

Table B.89 Access Path Properties

Tab name	Name of display item	Value	Description	Remarks
Basic Information	Access Path Status	"normal", "warning", "error"	Indicates the access path status.	

Tab name	Name of display item	Value	Description	Remarks
	Access Path Description	Any character string	Indicates the detailed information about access path status.	
Zoning Information (*1)	Zoning Type	"WWPN_ZONING", "WWPN_ZONING(N)", "PORT_ZONING", "PORT_ZONING(N)"	Indicates the zoning type that is set in the switch.	
	Security Mode	"on", "off"	Indicates the security setting status of a switch.	
Server Node Information (*1)	Affinity Type	"NO_AFFINITY", "ANOTHER_BINDING", "WWPN_BINDING"	Indicates the type of the storage affinity (LUN mapping) defined on the HBA. NO_AFFINITY indicates that no definition is set. ANOTHER_BINDING indicates that storage affinity (LUN mapping) is not defined or zoning is defined with a Fibre Channel switch or a storage device. WWPN_BINDING indicates that BINDING is defined with a WWPN. When it is unknown, the value is not displayed.	
	Security Mode	"on", "off"	Indicates the security setting status of a HBA port. When the type of storage affinity (LUN mapping) is WWPN_BINDING, the value is valid.	
	Target ID	List of any character strings	A list of Target ID(Y in cXtY of a special file in the Solaris OS, and T in pPbBtTlL of a Windows raw device, Y in cXtY of a HP-UX raw device) values corresponding to an access path is displayed. If the value of this property is not clear, no value is displayed.	
	Server LUN	List of any character strings	Delimited by a comma (,), LUN lists set by an access path are displayed. In Windows, each physical drive number that could be obtained is displayed enclosed in parentheses ( ) and following the LUN number. When it is unknown, the value is not displayed.	
	Affinity WWPN	List of Eight-byte WWPN	Indicates the list of WWPN of CA on the storage side corresponding to the access path. When the list is unknown, the value is not displayed.	
Storage Information (*1)	Affinity Type	"NO_AFFINITY", "ANOTHER_BINDING", "GR_PortZone_Binding", "GR_Subsystem_Zone_Binding"	Indicates the type of host affinity (zone function). NO_AFFINITY indicates that an access path is not set. ANOTHER_BINDING indicates that storage affinity (LUN mapping) is not set or that zoning is set with a Fibre Channel switch or storage. GR_PortZone_Binding indicates that affinity is set for ETERNUS3000 model 50, GR710, GR720, GR730.	

Tab name	Name of display item	Value	Description	Remarks
			GR_Subsystem_Zone_Binding indicates that affinity is set for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 (except model 50), ETERNUS2000, GR740.	
	Security Mode	"on", "off"	Indicates the security setting status of FC port.	
	Affinity Group Name	Any character strings	Indicates storage affinity group name (zone name) that is assigned to the following affinity WWPN.	
	Affinity WWPN	Eight-byte WWPN	Indicates HBA WWPN (World Wide Port Name) that is connected by access path setting.	

*1: Zoning information, server node information and storage information can not be set as access path information depending on the configuration of the device in which access path is set. When the access path properties are displayed, the information that does not exist is not displayed.

B.10   Performance Management Window Operations

The Performance Management window provides performance display functions for Fibre Channel switches and the ETERNUS disk array device. Moreover, it provides a threshold monitoring function for the Fibre Channel switch and the ETERNUS disk array.

To display the performance graph of a device or perform the setting of threshold monitoring, the device must be displayed in the tree of the Performance Management window.

To display a device in the tree of the Performance Management window, drag and drop the device icon from the physical resource view. However, the same device cannot be displayed in multiple Performance Management windows.

If a Performance Management window is opened while no other Performance Management windows are being displayed, devices whose performance is being monitored are automatically displayed in the tree.

A device icon in one Performance Management window can be moved into another Performance Management window by using the drag & drop method. At this time, the performance graph is also moved.

The performance graph of the device selected in the tree is displayed in the performance display area of the Performance Management window. If multiple devices are in the tree, graphs displayed in the window can be switched by selecting the target device.

P Point
. . . .

One Performance Management window cannot display the performance graphs of two or more devices at the same time. To display the performance graphs of two or more devices at the same time, display each device in the tree of a separate Performance Management window.
. . . .

For performance monitoring, select [File] - [Performance Management Window] from the menu on the GUI window to execute it. Start threshold monitoring after selecting [Performance Management Window].

B.10.1   Basic description of the Performance Management window

The Performance Management window first appears when [File] - [Performance Management Window] is selected from the menu.

The window has three parts. The menu bar is at the top. The resource tree view is on the left. The performance display area is on the right.

Menu bar

This can be used for operations of the Performance Management window and threshold monitoring.

Tree view

The following items can be displayed in the tree view: Fibre Channel switches, resources of the ETERNUS disk array device, and elements in resources as detailed components.

Note that when the Performance Management window is open and saving device performance information is already specified, devices are automatically displayed as if dragging and dropping the tree.

Performance display area

The performance graphs of the device selected in the tree are displayed. Multiple Performance Graph windows can be opened and displayed in this area.
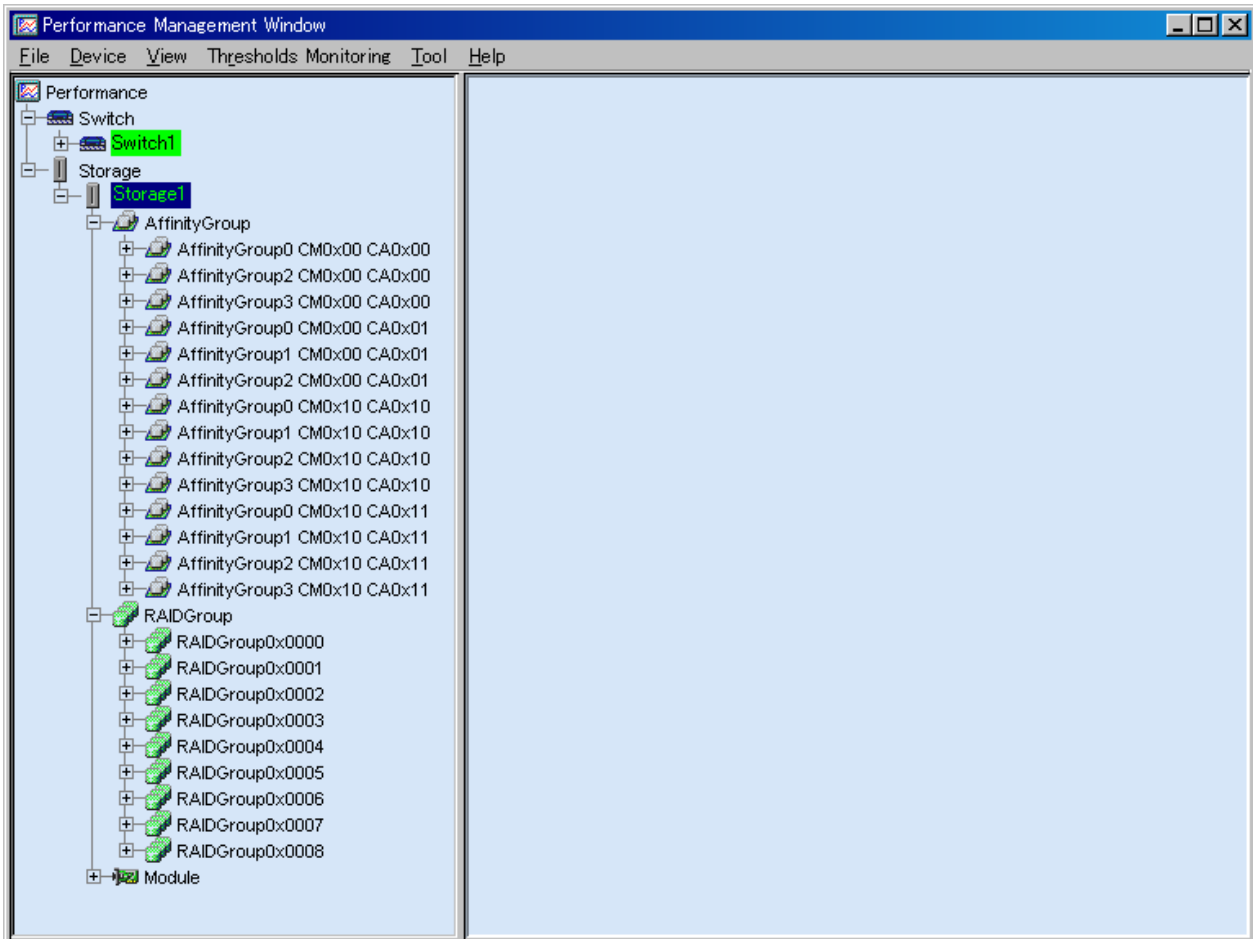
B.10.2   Menus

The menu bar functions are explained below.

File

・ New Window

　Select this to open a new Performance Management window.

・ Print

　Select this to print the view graph displayed in the active Performance Graph window.

・ Save CSV

　Select this to output view graph data displayed in the active Performance Graph window to a file in the CSV format.

Any name can be specified as the file name. The default name is graph00.csv. The file format consists of one header part and multiple data parts.

Header part

The header part explains the output graph. It consists of the following:

```
[@, graph title, graph type, year-month-day-time, device name, graph line explanation]
```

Items	Explanation
graph title	Indicates the graph window title name.
graph type	Indicates the time axis of the selected graph (one hour, one day, or one week).
year-month-day-time	Indicates the start time of the graph. Year-month-day-time is displayed for a one-hour graph. Year-month-day is displayed for one-day graph. Year-month is displayed for one-week graphs.
device name	Indicates a device ID.
graph line explanation	Indicates the names of graph lines in sequence. They are displayed by clicking the <Graph Line> button in a graph.

Data part

This part shows the following: Values of X-axis data containing graph points and corresponding Y-axis data values. This part consists of graph time and graph data.

Items	Explanation
Graph time	Indicates the X-axis time data: Year-month-day-hour-minute-second data for a one-hour graph, year-month-day-hour-minute data for a one-day graph, and year-month-day-hour data for a one-week graph.
Graph data	Each item of Y-axis data in graph time is displayed in order by graph line name. Each unit is the same as the performance graph axis unit.

📖 Example
. . . .

Contents of CSV file - output of a one-hour graph of Logical Volume0x0000 read response:

```
@, E3000 - LUN0 (Logical Volume0x0000) Read Response Time, One Hour, "Mar 24, 2003 3 PM",
00E3000#######E320S20A####FC000022######, LUN0 (Logical Volume0x0000)
"Mar 24, 2003 3:00:01 PM",0.9434189
"Mar 24, 2003 3:00:31 PM",1.0192572
:
"Mar 24, 2003 3:59:01 PM",5.277033
"Mar 24, 2003 3:50:31 PM",10.39139
```

. . . .

- JPEG Archive

  Select this to output the view graph displayed in the active Performance Graph window to a file in the JPEG format. Any name can be specified as the file name. The default name is jpeg00.jpg.

- Close

  Selecting this closes the Performance Management window where the current menu is selected.

- Exit

  Selecting this closes all Performance Management windows.

Device

・ Create Device Configuration File

If the storage device configuration has been changed, click the target device and select this command from the menu to execute it. After this command is executed, a tree is displayed according to the new configuration.

・ Delete Device

When a device is clicked to select it and this command is executed, display of the target device is deleted from the Performance Management window. However, performance monitoring of the device continues. To stop performance monitoring, use the GUI window.

View

・ Cascade

Select this to overlap the graph windows displayed in the performance view area.

・ Tile

Select this to list the graph windows displayed in the performance view area.

・ Close All

Selecting this closes all graph windows for the device selected in the tree.

・ Refresh Graphs of Selected Device

Selecting this updates all graph windows for the device selected in the tree to the latest information.

・ Refresh Graphs of All Devices(F5)

Selecting this updates all graph windows displaying performance management information to the latest information.

Thresholds Monitoring

・ Monitoring Enable/Disable

Selecting this opens a dialog box allowing the user to enable or disable the threshold monitoring function for the device selected in the tree window. When the performance monitoring is stopped for the selected device in the tree, this menu cannot be selected.

・ Monitoring Time Setting

Selecting this opens a dialog box allowing the user to set the threshold monitoring time zone and alarm notification time zone of the threshold monitoring function for the device selected in the tree window. If the threshold monitoring function for the device selected in the tree is being stopped, this menu cannot be selected.

・ Thresholds Setting/Start Monitoring/Stop Monitoring

Selecting this opens a dialog box allowing the user to set detailed information of the threshold monitoring and specify the start and stop of the monitoring for the device selected in the tree window. If the threshold monitoring function for the device selected in the tree is being stopped, this menu cannot be selected.

・ Thresholds Alarm Log

Selecting this opens a dialog box allowing the user to display the alarm log managed by the threshold monitoring function.

・ Alarm Delete Setting

Selecting this opens a dialog box allowing the user to set the period after which the threshold monitoring alarm log data is deleted automatically. If the threshold monitoring function for the device selected in the tree is being stopped, this menu cannot be selected.

Tools

- Options

  - Re-read definition File

    Settings in the performance managements configuration file (perf.conf) are reflected dynamically. For details, refer to "7.7 Definition File".

B.10.3   The tree view

If the ETERNUS disk array device and Fibre Channel switch icons are dropped onto the Performance Management window, the logical configuration tree of the device can be displayed as shown below.
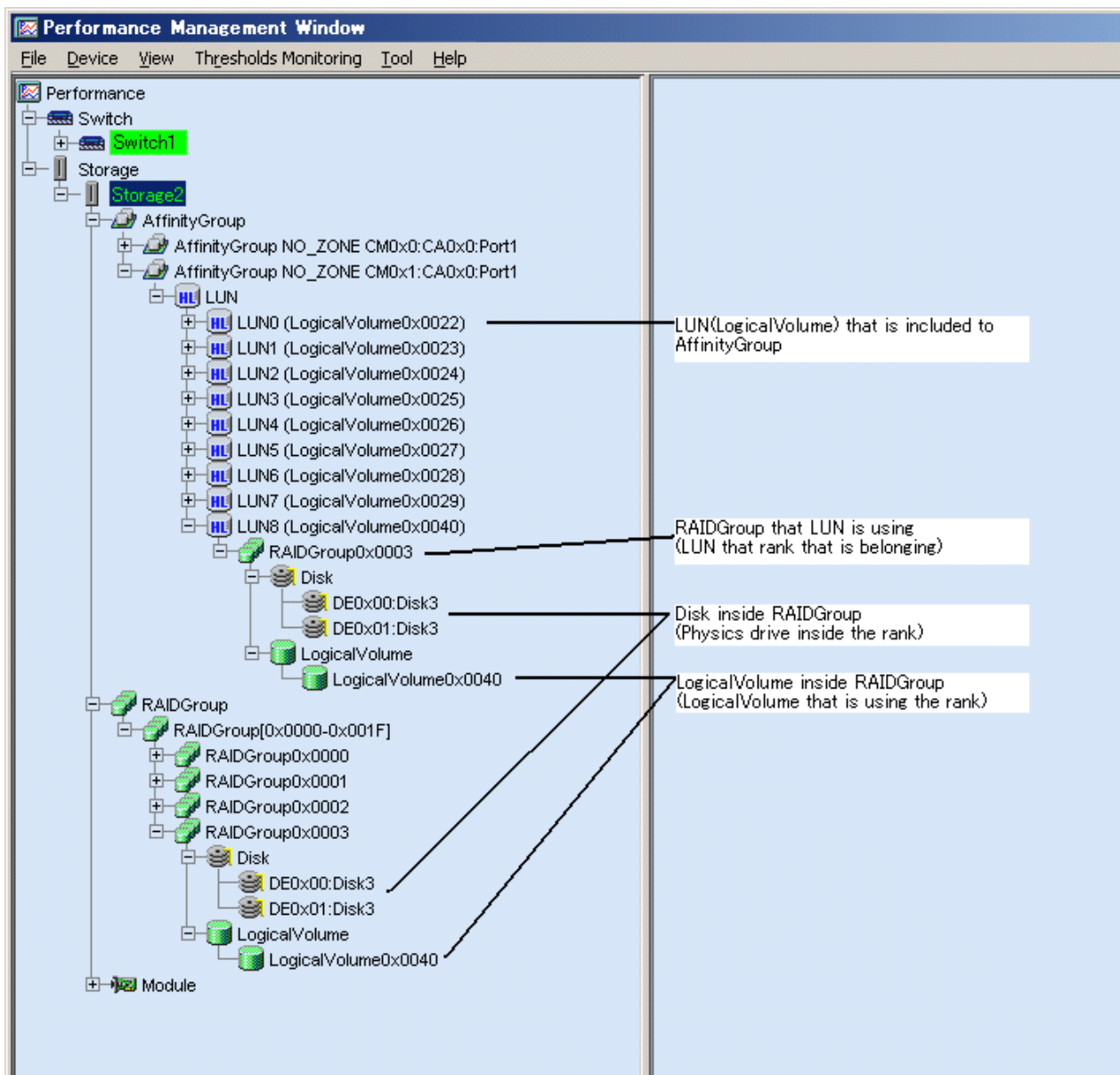
"AffinityGroup" indicates a number of the zone function of the selected storage system.

"LUN" indicates a logical unit number from the point of view of the server node. Since this is allocated with Logical Volume (OLU and LUN_V) that specifies a number unique to a device managed in the device, this is expressed as "LUN X(Logical Volume X)" in the tree.

"RAID Group" located under "LUN" indicates that LUN is included in "RAID Group" (rank). [Disk](=physical drive) under [RAIDGroup] or [RAIDGroup [X- X]] indicates the drive used to configure the rank. [LogicalVolume] under [RAIDGroup] or [RAIDGroup [X- X]] indicates the numbers of other LogicalVolumes that belong to the same RAIDGroup. [RAIDGroup X- X] also has devices that are not shown.

[fc X/Y] and [port Y] are the Fibre Channel switch ports. X is "Slot Number", and Y is "Port Number".

X and Y are hexadecimal numbers that start with "0x". Other numbers are decimal numbers.

Place the mouse cursor on the device name on the tree to display the properties as tool tips.

	Tool tip contents
Device Name	Device Name
	IP address
LUN X	LUN capacity
	Existence of a LUN concatenation function application. If the LUN was created using the LUN concatenation function, "[Concatenation]" is displayed.
	Existence of an encryption target. If there is an encryption target, "[Encryption]" is displayed.
RAIDGroup, RAIDGroup [X -X]	Existence of a LUN concatenation function application. If the LUN was created using the LUN concatenation function, "[Concatenation]" is displayed.
	Existence of an encryption target. If there is an encryption target, "[Encryption]" is displayed.
RAIDGroup X	RAID level
	RAIDGroup capacity
	CM (CPU) name allocated in the RAIDGroup
	Existence of a LUN concatenation function application. If the LUN was created using the LUN concatenation function, "[Concatenation]" is displayed.
	Existence of an encryption target. If there is an encryption target, "[Encryption]" is displayed.
LogicalVolume X	LogicalVolume capacity
	Existence of a LUN concatenation function application. If the LUN was created using the LUN concatenation function, "[Concatenation]" is displayed.
	Existence of an encryption target. If there is an encryption target, "[Encryption]" is displayed.
CM X	CM (CPU) cache memory capacity
Port X, fc X/X	Maximum transfer rate

B.10.4   Method of displaying performance

In the device tree of the Performance Management window, select and right-click an element whose performance you want to display, and then select [Show Performance Graph] on the pop-up menu. Elements for which performance can be displayed are as follows: In the tables, "A" indicates "Available" and "N/A" indicates "Not Available".

・ Fibre Channel switch

Element	Fibre channel switch
Port	A

・ ETERNUS disk storage system

Element	ETERNUS8000, ETERNUS4000 (except models 80 and 100)	ETERNUS6000	ETERNUS4000 models 80 and 100, ETERNUS3000 (except model 50), ETERNUS GR series (ETERNUS GR720 or higher)	ETERNUS DX60/ DX80 ETERNUS2000
LUN LogicalVolume RAIDGroup Disk CM	A	A	A	A
CA	A	A	N/A	N/A
CM Port	N/A	N/A	N/A	A
DA	N/A	A	N/A	N/A
Device name	A	N/A	N/A	A

Multiple elements (whose type must be the same) can also be selected. Click two or more elements while holding down the Ctrl or Shift key, right-click, and then select [Show Performance Graph]. However, when the multiple device names are selected and right-click, the [Show Performance Graph] pop-up menu is not displayed.
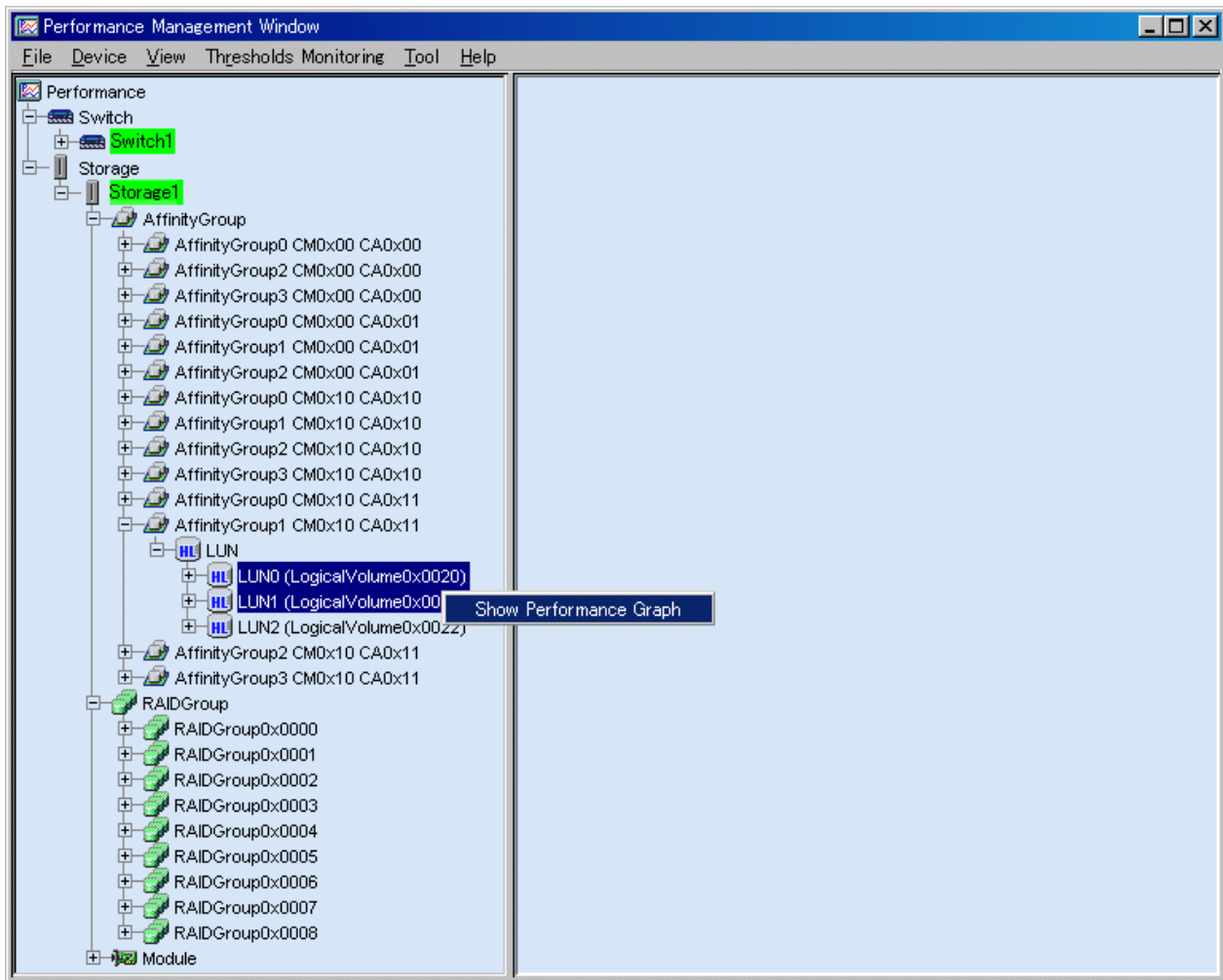
The dialog shown below appears. Enter the performance display parameters.

The dialog contents depend on elements selected. For information on the input method, see "7.2 Flow of Performance Management". Specify the day and time displayed in the center of the graph in "Date Specification". You can specify a period of up to 7 days.

After input is completed, click the <OK> button, and a graph window is displayed on the right.
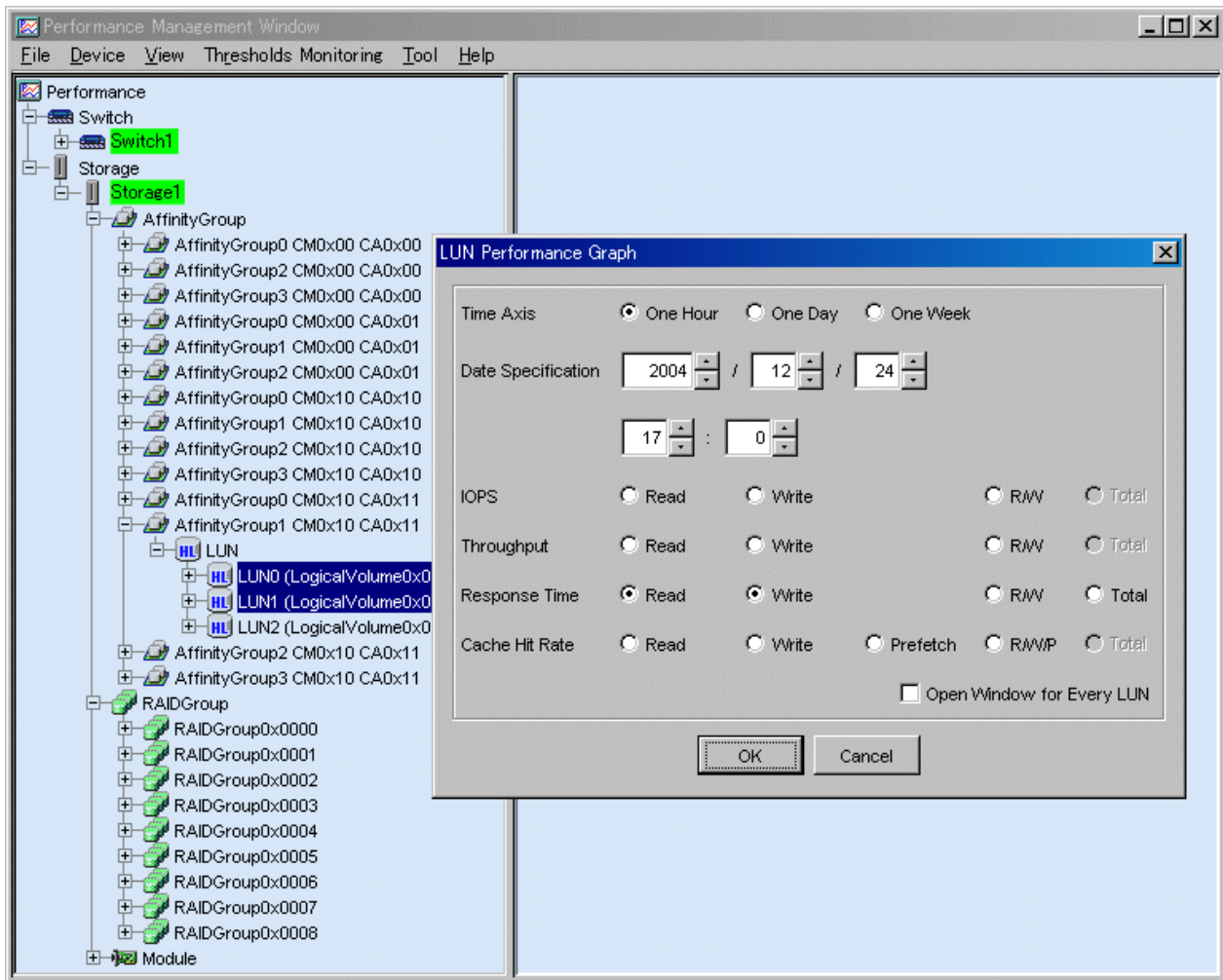
B.10.5 Graph window functions

・ Graph Line button

The example in this figure shows that the dialog was used to set the display of multiple LUNs in the same graph window. In this example, the <Graph Line> button is placed at the upper right so that the names of multiple graph lines can be seen. Clicking this button displays a window that explains the graph line names.
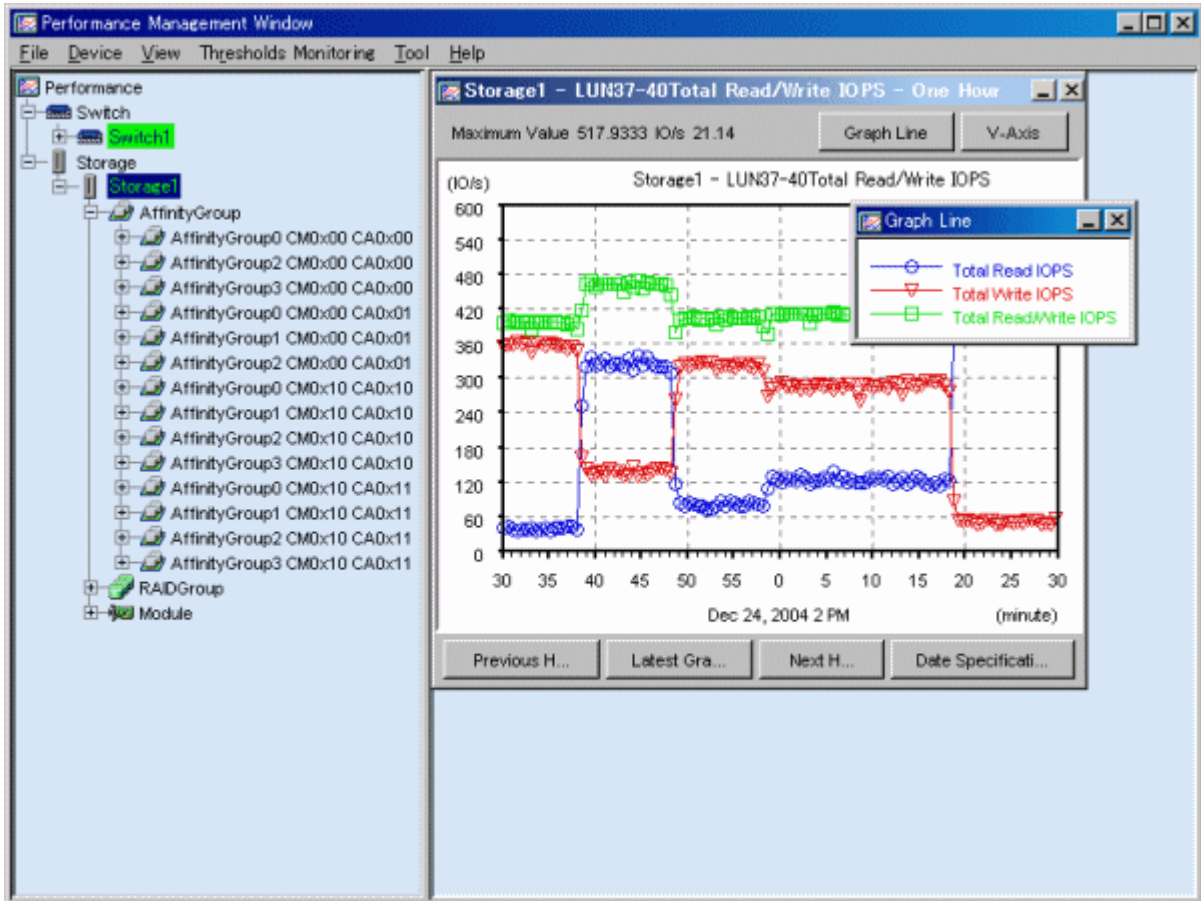
· Set Vertical Axis button

Clicking the <V-Axis> button at the upper right of the screen displays the dialog shown below. In this dialog, the maximum value of the vertical axis of a graph can be specified.

The value can be entered directly. However, clicking the <Adjust to Maximum Value> button automatically calculates and displays the maximum value for a graph. Clicking the <Reset to Default> button sets the maximum value of the standard vertical axis of performance management.
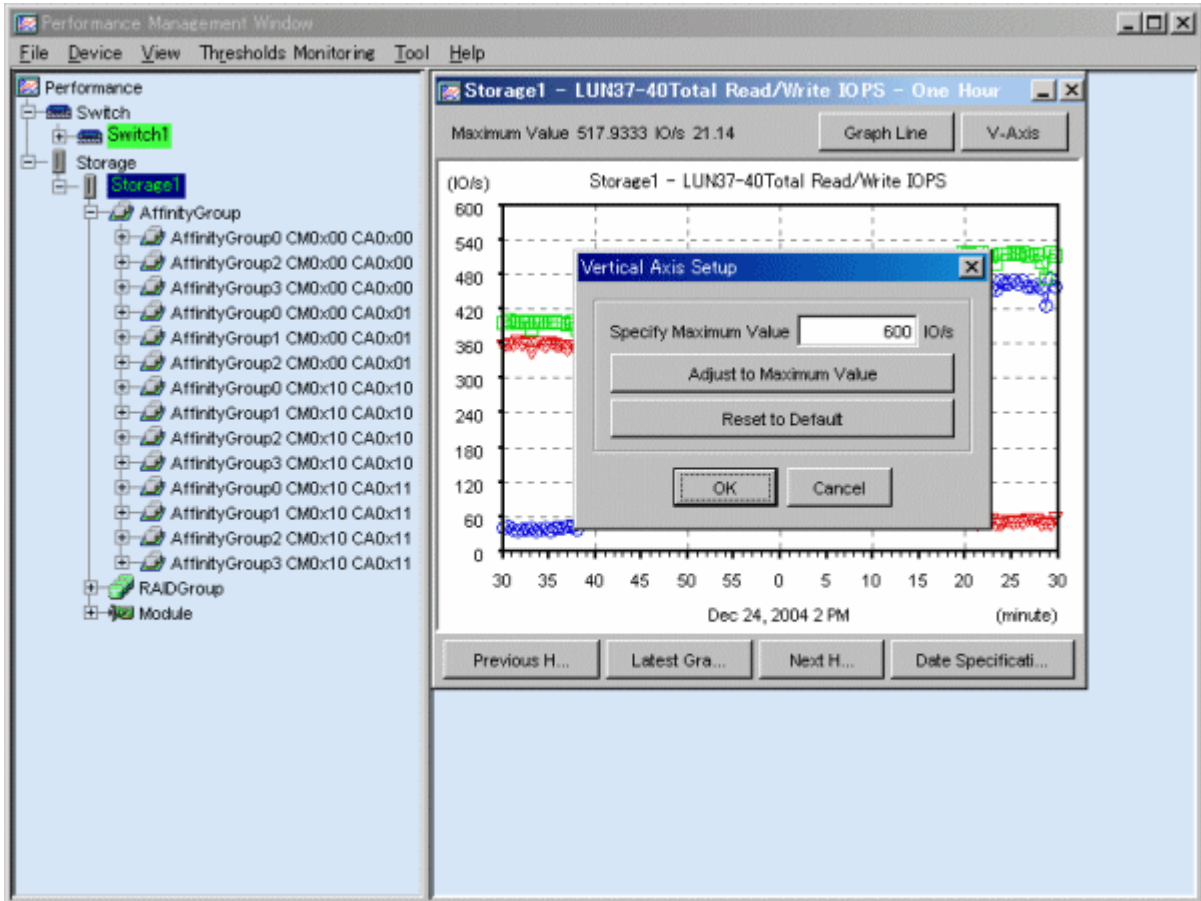
・ Latest Information button

Clicking the <Latest Graph> button in the lower part of the screen displays a graph for the latest date and time.

・ Previous One Week, Previous Day, Previous One Hour, Next One Week, Next Day, and Next One Hour buttons

Clicking the <Previous Week>, <Previous Day>, <Previous Hour>, <Next Week>, <Next Day>, or <Next Hour> buttons in the lower part of the screen reads and displays performance information from stored performance data.

・ Date Specification button

The following dialog is displayed when the <Date Specification> button on the part of the lower right of the screen and an arbitrary date can be specified. The graph is displayed centering on a specified date. You can specify a period of up to 7 days. The range which can be input is different according to the type of the time axis.
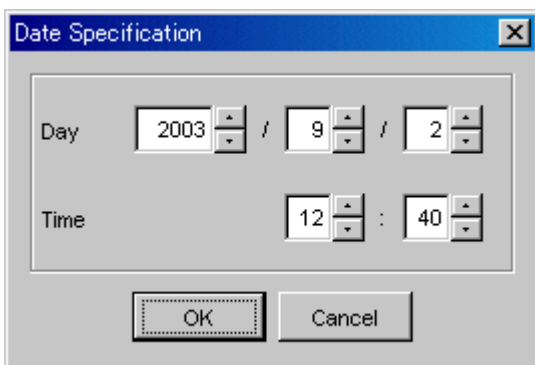
・ Peak button

When one week or one day is indicated in a displayed graph, the <Peak> button in the upper part of the screen can be used to add or delete graph lines in the graph. These graph lines are plotted with only the maximum vertical axis data values of the graph in the respective unit of time. The <Peak> button is displayed in the graph if an item other than R/W, R/W/P, and total had been selected in

the "Performance Graph" dialog. The <Peak> button is not displayed in the performance graph for RAIDGroup and number of active disks, power consumption, and temperature.

- Changing the time axis in a graph window

  Right-clicking in the Performance Graph window as shown below displays a pop-up menu. From this menu, menu items can be selected to display a window with a different time axis. In the menu, one menu item for displaying a graph with a shorter time axis is adjusted according to the mouse position. For example, right clicking at around 22:00 in the graph displays a pop-up menu for displaying a one-hour graph at 22:00 as shown in the figure below.
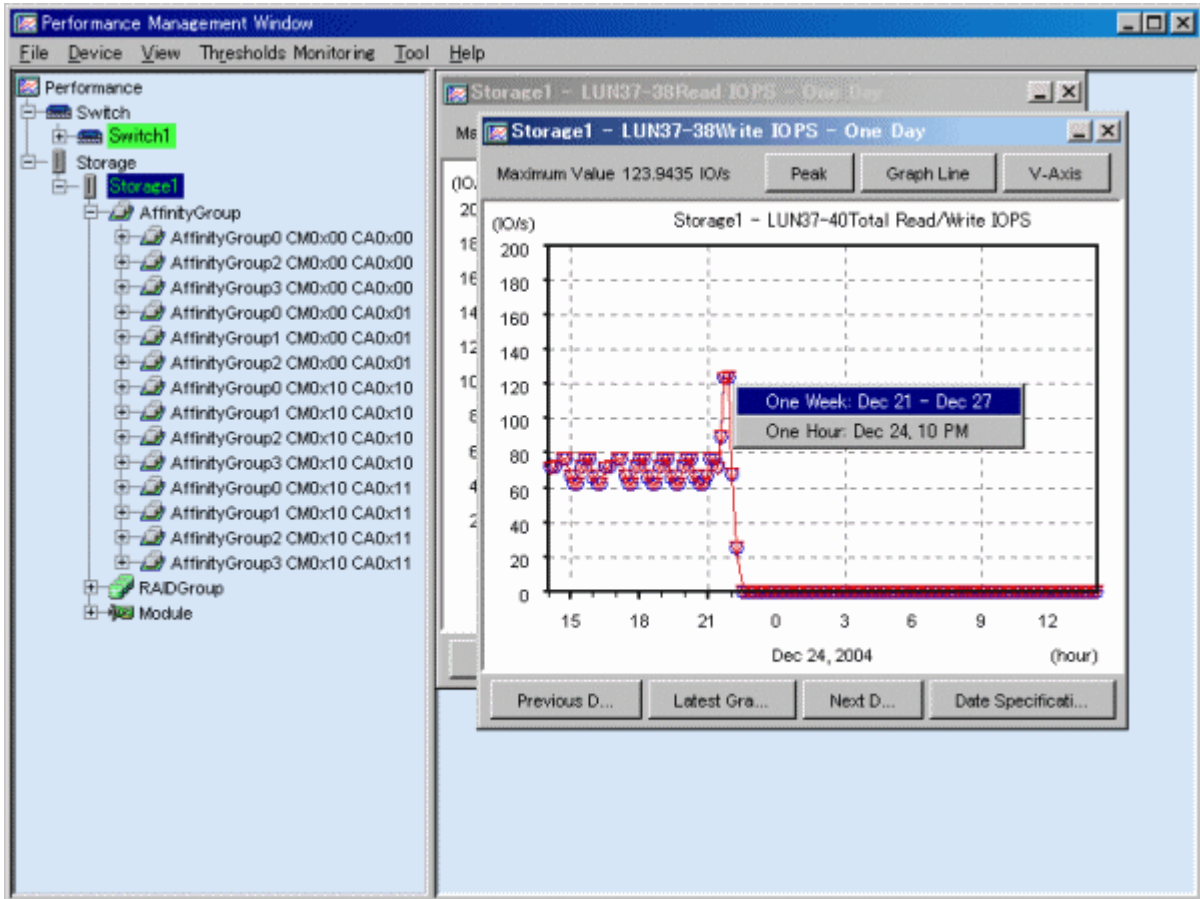
Clicking in the one-hour graph in the Performance Graph window as shown below displays a pop-up menu. From this menu, the following menu items can be selected: item for redisplaying of the window with a different center for the time axis and item for increased magnification of the window display. The center of the time axis is the time adjacent to the mouse position. For example, click at around 14:10 in the graph as shown in the figure below. 14:10 then comes to the center of the graph, and a pop-up menu for displaying a one-hour graph from 13:40 to 14:40 and a pop-up menu for displaying a 20-minute graph from 14:00 to 14:20 are displayed.

Year-month-day-time is displayed in the graph window to indicate the beginning time of the displayed graph.
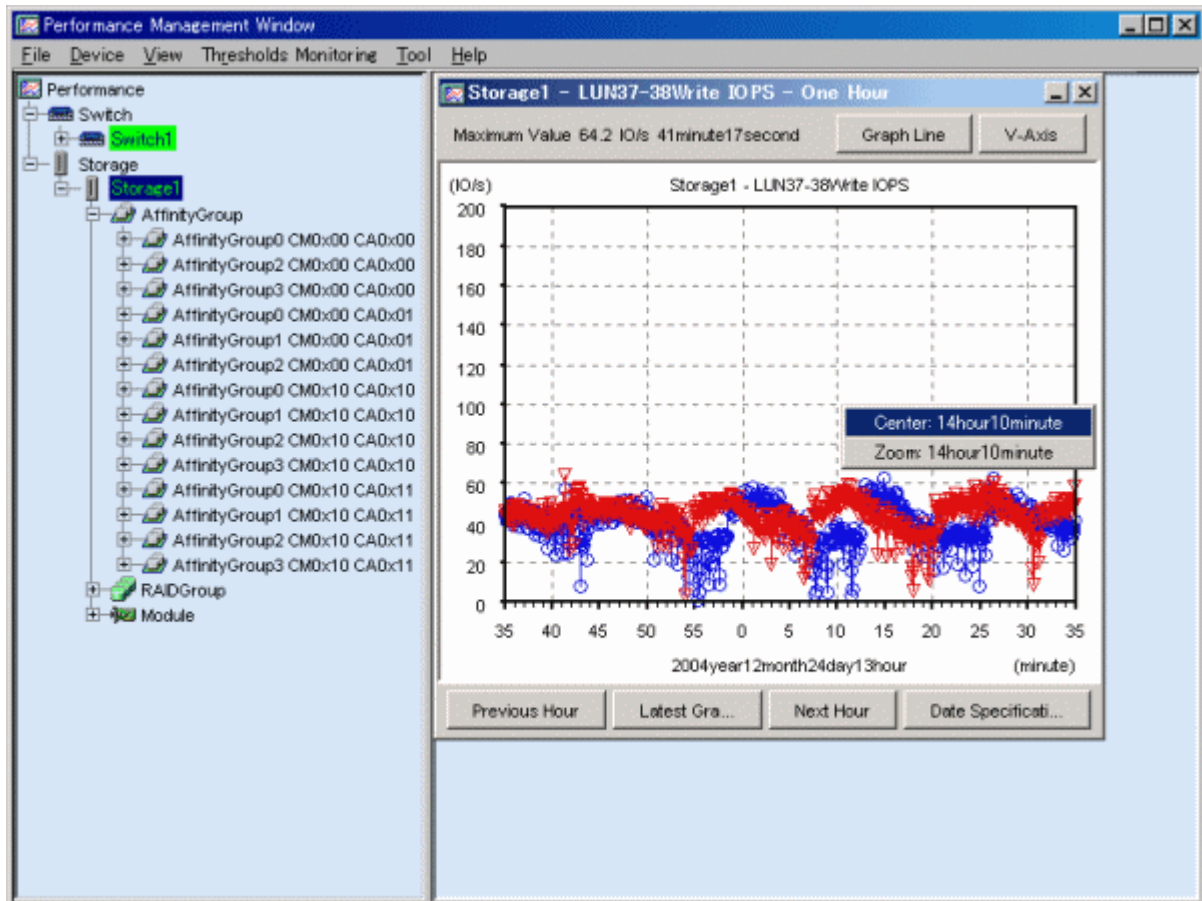
B.10.6 Threshold monitoring dialog functions

This section explains the functions that can be selected from [Thresholds Monitoring], one of the function items on the menu bar in the Performance Management window. However, to enable the functions, a target device must be selected in the tree. Moreover, an instruction for performance monitoring of the device must already have been issued.

・ Monitoring Enable/Disable

Select this to specify whether to enable or disable the threshold monitoring function for the target device. Selecting this item reverses the current state of threshold monitoring. A dialog indicating the reversal of this state appears. In the dialogs shown below as an example, the left one indicates that disabled monitoring is enabled, and the right one indicates that enabled monitoring is disabled.
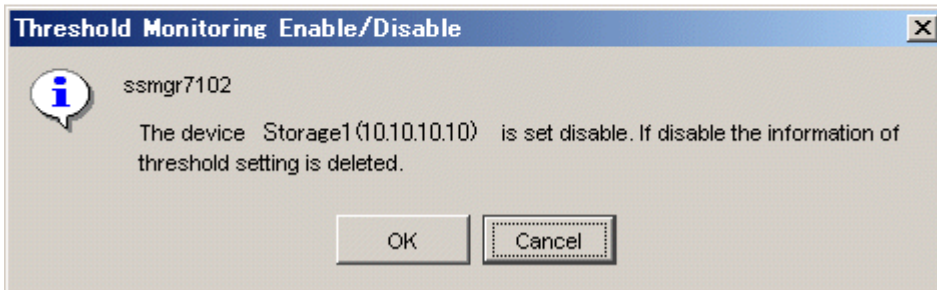
- Monitoring Time Setting

  Selecting this function displays the dialog box shown in the figure below. In this dialog box, the user can specify the threshold monitoring time zone and the alarm event log display time zone for the target device.
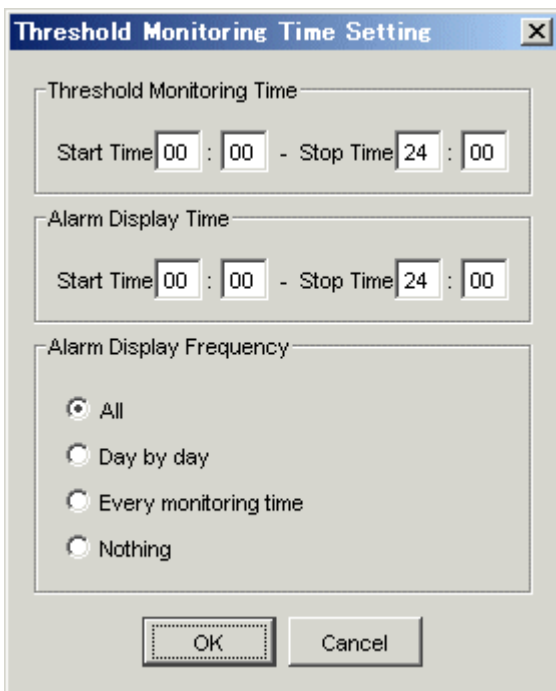
Threshold Monitoring Time	The start time and stop time can be specified. The duration must be within 24 hours.	
Alarm Display Time	The start time and stop time for event log display can further be specified within the threshold monitoring time. The duration must be within 24 hours.	
Alarm Display Frequency	"Alarm Display Frequency" is used to define the method of displaying an event log generated when the threshold conditions are met.	
	All	Specifies that an event log be reported each time an alarm log is generated.
	Day by day	Specifies that an event log be reported only once a day even though many alarm logs are generated in the day.

Every monitoring time	Specifies that an event log be reported per threshold monitoring unit time specified in "Threshold Setting/Start Monitoring/Stop Monitoring" in the figure shown below.
Nothing	Specifies that no event log be reported even though an alarm log is generated. "Threshold Monitoring Alarm Log" can be used to refer to every alarm log.

Note

By default an entire day from 00:00 to 24:00 is set for both the monitoring time and event log display time, and an alarm log is reported to the event log every time it is generated.

If "Day by day," "Every monitoring time," or "Nothing" is specified for "Alarm Display Frequency," event log display for each device is suppressed.

- Thresholds Setting/Start Monitoring/Stop Monitoring

Selecting this displays the dialog shown below. This dialog is used to set the threshold conditions of threshold monitoring for the target device. In the figure below where the <Start> button is clicked, the Logical Volume response time, RAID Group busy rate, and CM busy rate are specified.
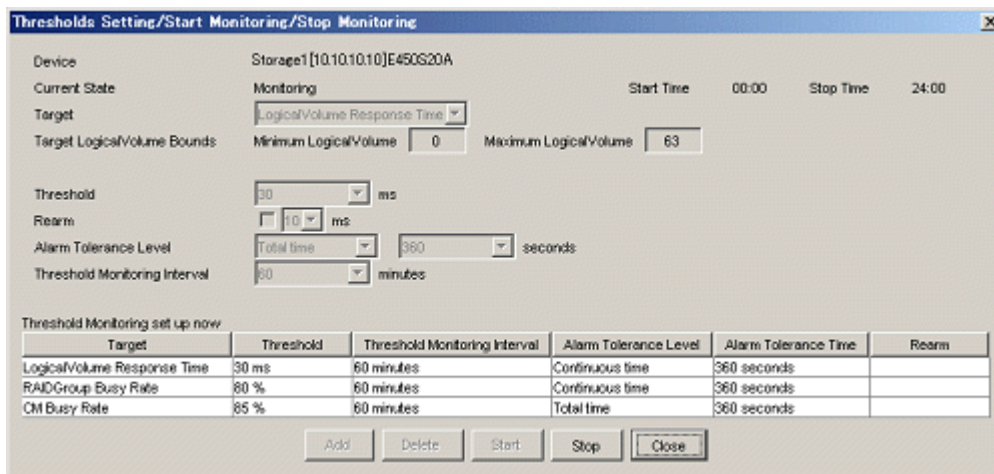
<Add> button	The threshold condition of the threshold monitoring that is selected, and set is displayed and registered in the list. When there is already "Threshold Monitoring Device", it is considered the change instruction, and updates it.
<Delete> button	All the threshold conditions displayed in the list of the threshold monitoring being set are deleted. However, the content which directed the monitoring starting before is not deleted.
<Start> button	The threshold monitoring is started under the threshold condition displayed in the list of the threshold monitoring being set. Moreover, the set threshold condition is kept in this software.
<Stop> button	The threshold monitoring is stopped. The threshold condition correction of the threshold monitoring becomes possible.
<Cancel> or <Close> button	The dialog of "Thresholds Setting/Start Monitoring/Stop Monitoring" closes. However, the content of the input is annulled while inputting the threshold condition of the threshold monitoring.

In this dialog, it has the following function button.

Device	Displays the nickname, IP address, and type of the target device.
Current Status	Displays the monitoring status and the monitoring time zone specified in "Monitoring Time Setting". Monitoring in Progress indicates that the <Start Monitoring> button has been clicked and monitoring is in progress. Monitoring Stop indicates that monitoring is stopped. Monitoring on Standby indicates that monitoring is ready to start but is temporarily stopped because the current time is outside the monitoring time zone.

	LogicalVolume Response Time	Select this item to monitor the average processing time of Read/Write I/O.
Target	RAIDGroup Busy Rate	Select this item to monitor the average busy rate of the drives (disks) making up a RAIDGroup. For a "RAID1+0 (4 + 4) configuration, for example, it monitors the average of eight drives.
	CM busy rate	Select this item to monitor the CM utilization in the device. However, the ROE usage rate is not monitored.
Target LogicalVolume Bounds	Displays the range of target LogicalVolumes specified for performance management. The target LogicalVolumes are subjected to threshold monitoring. No target range needs to be specified for RAIDGroup and CM because the maximum numbers of these units configured for a device are automatically defined as target ranges.	
Threshold	Specify the threshold for the item selected for "Target". This is output as an alarm if the performance value is equal to or exceeds the threshold during threshold monitoring. Each default value can be selected from a list for the item selected in "Target". A value other than the default values can also be specified.	
Rearm	The setting of the Lower Limit is enabled when a value is set in "Total time" in "Alarm Tolerance Level" and the check box is selected. A value can be selected from the list or entered directly. If the lower limit is set and the performance value is equal to or less than this value, "Total time" will be reset and threshold monitoring will start again.	
Alarm Tolerance Level	Total time	Specifies that an alarm log be generated when the total time of events that exceeded the threshold within the threshold monitoring unit time has reached the specified total time.
	Continuous time	Specifies that an alarm log be generated when an event that exceeds the threshold continuously for the specified time within the threshold monitoring interval is detected.
Threshold Monitoring Interval	Specify the unit time during which alarm monitoring is to be performed starting from when the threshold is exceeded.	

The relationships between parameters are shown in the figure below.
The figure shown below assumes the following conditions ("Total time" is selected for "Alarm Tolerance Level").

Threshold Monitoring Time	0:00-23:00		
Alarm Display Time	0:00-14:00	Alarm Display Frequency	All
Target	RAIDGroup Busy Rate	Threshold	80%
Lower Limit	10%		
Alarm Tolerance Level	Total time: 360 seconds		
Threshold Monitoring Interval	60 minutes		
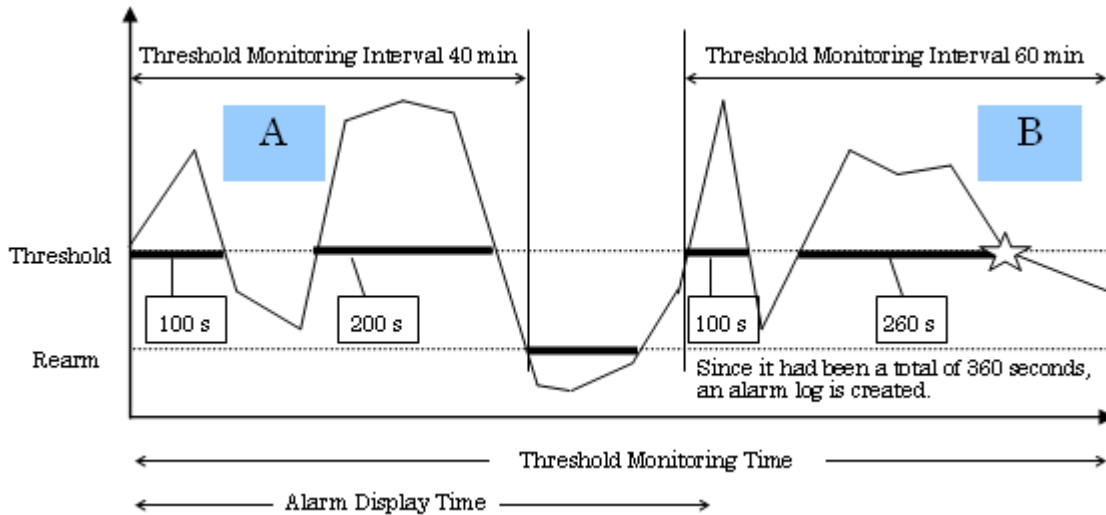
In A, the accumulated time during which the performance value equals or exceeds the threshold value has reached 300 seconds in "Threshold Monitoring Time", but the lower limit is met or exceeded before "Threshold Monitoring Interval 60 minutes" is reached, therefore data will be reset and monitoring will restart.

In B, the accumulated time during which the performance value equals or exceeds the threshold value has reached 360 seconds in "Threshold Monitoring Time", therefore an alarm log is generated. No alarm is reported for event log display because the events occurred outside the time range specified for "Alarm Display Time".

The figure shown below assumes the following conditions ("Continuous time" is selected for "Alarm Tolerance Level").

Threshold Monitoring Time	0:00-23:00		
Alarm Display Time	0:00-23:00	Alarm Display Frequency	All
Target	RAIDGroup Busy Rate	Threshold	80%
Alarm Tolerance Level	Continuous time: 360 seconds		
Threshold Monitoring Interval	60 minutes		
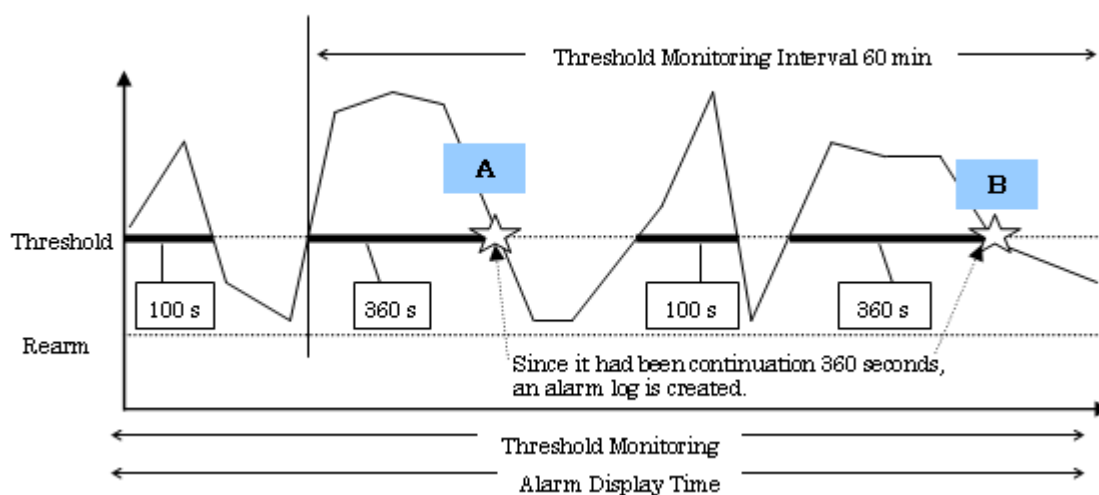
In either A or B, the threshold is exceeded for consecutively 360 seconds within the "Threshold Monitoring Time" and therefore an alarm log is generated in either case. However, because "Every monitoring time" is selected for "Alarm Display Frequency," only alarm A is reported for event log display.

Moreover, the following figure is an example to specify the Port throughput of Fibre Channel switch and click the <Start> button.

Device	Displays the nickname, IP address, and type of the target device.	
Current Status	Displays the monitoring status and the monitoring time zone specified in "Monitoring Time Setting". Monitoring in Progress indicates that the <Start> button has been clicked and monitoring is in progress. Monitoring Stop indicates that monitoring is stopped. Monitoring on Standby indicates that monitoring is ready to start but is temporarily stopped because the current time is outside the monitoring time zone.	
Target	Port Throughput	Select this item to monitor the total throughput of reception and transmission in each port.
Target Port Bounds	All ports implemented by the target switch specified for performance management are subject to threshold monitoring.	
Threshold	Specify the threshold for the item selected for "Target". This is output as an alarm if the performance value is equal to or exceeds the threshold value during threshold monitoring. Each default value can be selected from a list for the item selected in "Target". A value other than the default values can also be specified.	
Rearm	The setting of the lower limit is enabled when a value is set in "Total time" in "Alarm Tolerance Level" and the check box is selected. A value can be selected from the list or entered directly. If the lower limit value is specified, and the performance value becomes equal to or les than this value, threshold monitoring will restart, and "Total Time" will be reset for counting to begin again. The "Total Time" field is reset and recounting will take place every time this occurs.	
Alarm Tolerance Level	Total time	Specifies that an alarm log be generated when the total time of events that exceeded the threshold within the threshold monitoring interval has reached the specified total time.
	Continuous time	Specifies that an alarm log be generated when an event that exceeds the threshold continuously for the specified time within the threshold monitoring interval is detected.
Threshold Monitoring Interval	Specify the unit time during which alarm monitoring is to be performed starting from when the threshold is exceeded.	

For "Threshold" and "Rearm", check the type of the target switch (1 Gbps, 2 Gbps or 4 Gbps). When the switch type is 1 Gbps, specify the utilization (%) against the reference value of 100 MBps. When the switch type is 2 Gbps, specify the utilization (%) against the reference value of 200 MBps. When the switch type is 4 Gbps, specify the utilization (%) against the reference value of 400 MBps. For instance, when 90% is specified for the threshold of a 2 Gbps type switch, the threshold is 180 MBps (total of reception and transmission).

・ Thresholds Alarm log

When selecting this function, the following dialog is displayed. The threshold monitoring alarm log list detected with all the object devices is displayed. The content of the display are "Report ID", "Day", "Time", "Level", "Validation", "Device" and "Title". When the alarm log list has already been displayed, a new alarm log list is not displayed. The contents of the alarm log list which has already displayed is updated to latest information.

"Report ID" indicates the management number allocated in order of detection of alarm log. The maximum is 1000.

"Day" and "Time" indicate the date when an alarm log was created.

"Level" indicates the level of an alarm log. Only Alarm is currently used.

"Validation" indicates the confirmation check box in alarm log details, and indicates that save processing has completed.

"Device" indicates the nickname assigned to the target device when it was registered.

"Title" indicates the title of the event for which an alarm log was created.

This dialog has a menu bar. [Tool] on the menu bar can be used to select the following functions for the alarm log list: [Find], [Sort], [Delete], and [Update to the newest information]. Multiple items can be specified for [Delete]. Similar to other Windows operations, multiple items can be selected with the use of the Ctrl and Shift keys.

From [File] on the menu bar, [Print] and [Selected Rows Print] can be selected as functions for the threshold monitoring alarm log list. [Print] prints the entire threshold monitoring alarm log list that is displayed. When lines on the displayed threshold monitoring alarm log list is selected, [Selected Rows Print] can be used to print only these lines. Similar to other Windows operations, multiple items can be selected with the use of the Ctrl and Shift keys. In print data, the creation date is the date on which the threshold monitoring alarm log list is displayed. However, the date when the threshold monitoring alarm log was displayed again after the threshold monitoring alarm log is deleted is printed as the creation date when [Delete] function is selected.

In the dialog, double-clicking on an alarm log line displays detailed information of the specified report ID, as shown in the next figure. This example shows a report about a RAID Group load error.
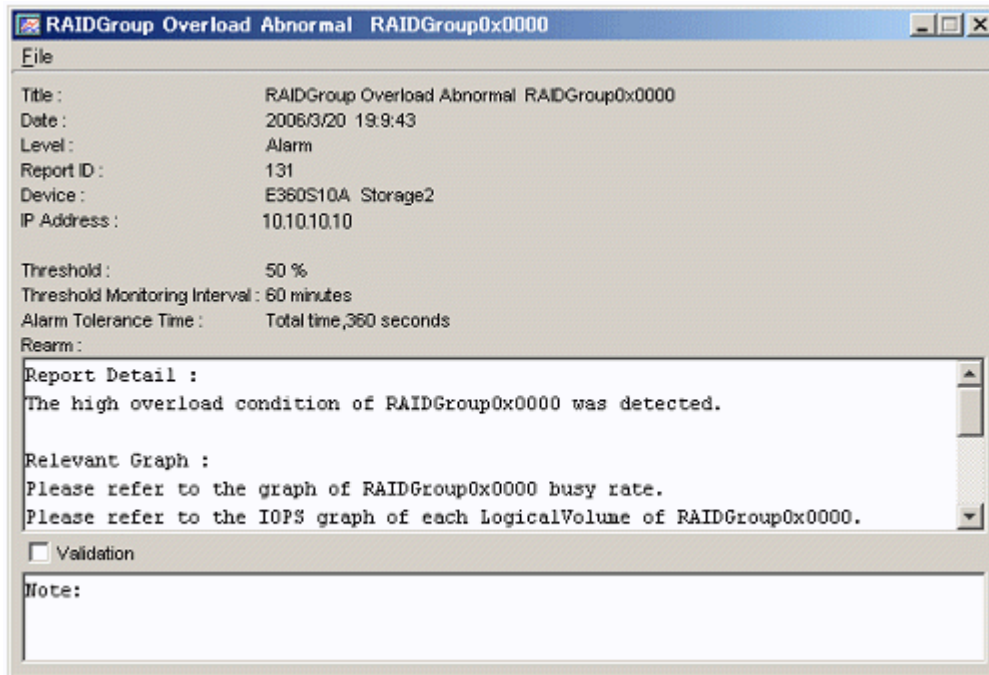
The report has the following items specified for threshold settings: threshold, threshold monitoring interval, alarm tolerance time, rearm, and others. Also, it shows the alarm log creation date and relevant device information.

The confirmation check box can be checked, and a simple memo can be input. Use the memo as comments to explain the confirmation mark used to recognize alarm contents and to provide contact information.
If a check or comments are input, select [File] - [Save] to save the input data.
However, up to 400 characters can be saved in Note.

The displayed report can be printed by clicking [File] - [Print] from the menu bar.
Up to 10 lines of a comment entered on the report can be printed. If the confirmation check box has been checked, OK is printed.

· Alarm Delete Setting

Selecting this function open the dialog shown below. This dialog is used to specify the management retention period for alarm log data created with the threshold monitoring function as Alarm Maintenance Term. Alarm log data whose retention period has expired is automatically deleted according to settings in the dialog. The deletion function is enabled when the start of management or the expiration of this period is detected. Consequently, the data whose retention period has expired is deleted.
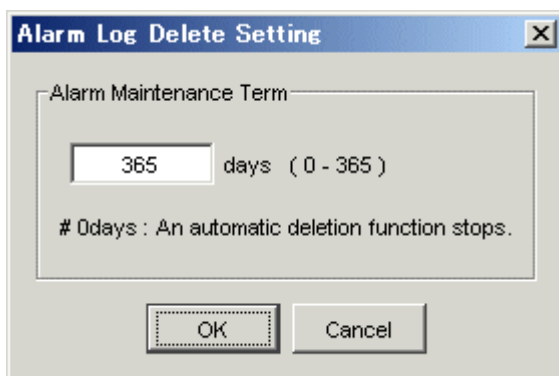
If 0 day is specified, the automatic deletion function does not work.

If the number of alarm logs has reached 1000, the maximum number, within the specified period, the oldest alarm log data is replaced with the newest alarm log data. The maximum number is fixed at 1000.

B.11 Thin Provisioning Pool monitor window operations

The Thin Provisioning Pool monitor window is used to provide the threshold value monitoring function and the capacity monitoring function of disk storage systems where the thin provisioning function has been enabled.

To display the window, select [File] - [Thin Provisioning Pool monitor window] from any of the Resource management window views.

B.11.1 Thin Provisioning Pool monitor window

When [File] - [Thin Provisioning Pool monitor window] is selected from the menu, the Thin Provisioning Pool monitor window is displayed.

The Thin Provisioning Pool monitor window consists of three parts: a menu bar at the top of the window, a tree on the left side, and a table on the right side.

Menu bar

The menu bar is used to execute Thin Provisioning Pool monitor window operations.

Tree

The tree lists the Thin Provisioning Pool that are registered to disk storage systems and disk storage systems where the thin provisioning function is enabled.

Table

The table displays detailed information concerning the item selected in the tree.
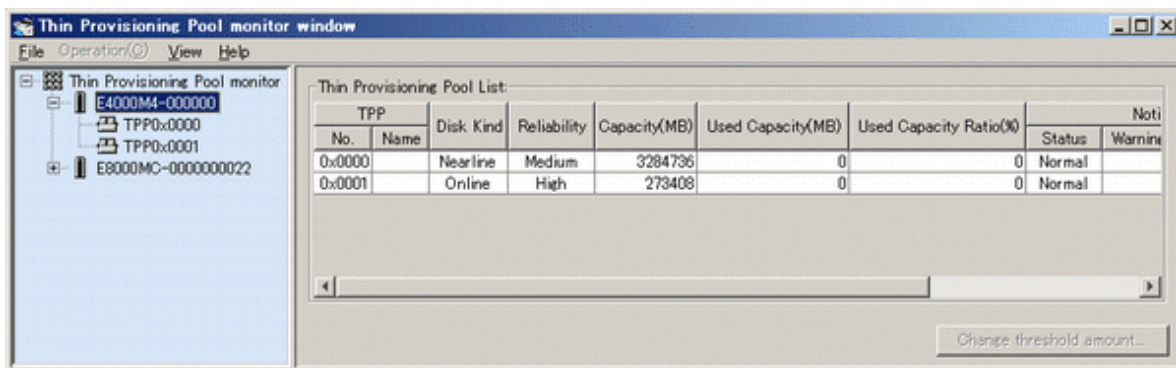
B.11.2 Menu

The menu bar provides the following functions.

File

· End

This closes the Thin Provisioning Pool monitor window. If the Capacity management window is currently displayed, the Capacity management window also closes.

Operations

· Capacity management window

This starts the Capacity management window for the Thin Provisioning Pool.

This menu item will be enabled in case of selecting the Thin Provisioning Pool in the tree, or selecting the Thin Provisioning Pool in the Thin Provisioning Pool table displayed by select device in tree.

- Change threshold amount

  This starts the change notification threshold values dialog to set the threshold values for the Thin Provisioning Pool. Change threshold amount will be enabled when selecting the Thin Provisioning Pool in the Thin Provisioning Pool table that is displayed by selecting device in tree.

View

- Refresh

  This obtains the latest information concerning the thin provisioning function from the disk storage system.

Help

- Help

  Displays the user's guide.

- Message reference

  Displays message explanation texts.

- Event reference

  Displays event explanation texts.

- Version information

  Displays version information. When the refresh button is selected on the displayed window, the memory used by this product is released.

B.11.3   Tree display

The tree view displays a list of the devices where the thin provisioning function is enabled and the Thin Provisioning Pool that are registered to the devices. The following table shows the content displayed in the tree view.

Display item	Description
Thin Provisioning Pool monitor	When this node is selected, a list of the devices where the thin provisioning function is enabled is displayed in the table view.
Device	The devices where the thin provisioning function is enabled are displayed When this node is selected, a list of the Thin Provisioning Pool that are registered to the selected device is displayed in the table view.
TPP	The Thin Provisioning Pool that are registered to devices are displayed separately for each device. The display format is "TPP+Thin Provisioning Pool number". When this node is selected, a list of the logical volumes that are registered to the selected Thin Provisioning Pool is displayed in the table view. While still in the selected state, the Capacity management window can be started by selecting [Operation] - [Capacity management window] from the menu, or by selecting [Capacity management window] from the pop-up menu. The following icons are displayed in accordance with the threshold value monitoring status of the capacity threshold values set for each Thin Provisioning Pool: ⚠: Less than the "Warning threshold value" and greater than the "Caution threshold value" 🔴: Greater than the "Warning threshold value"

B.11.4 Table display

The table displays details of the item selected in the tree. When "Thin Provisioning Pool monitor" is selected, a list of the devices targeted for monitoring is displayed. When a device is selected, a list of the Thin Provisioning Pool registered to the device is displayed. When a Thin Provisioning Pool is selected, a list of the logical volumes registered to the Thin Provisioning Pool is displayed.

。The following table describes the content displayed.

・Device list

Display item	Value	Description
Device Name	Any character string	The identifier used by this product. The name is unique within the managed range. The device name + serial number, the WWN, and so on, are displayed. If an SNMP SysName has been set for the device, that name is displayed. If a management name has been defined from this product, that name is displayed.
IP Address	IP address	Indicates the IP address of the device.

・Thin Provisioning Pool list

Display item name	Tab display item name	Value	Description
TPP	No.	Thin Provisioning Pool number	Indicates the Thin Provisioning Pool number. It is a four-digit hexadecimal number. The following icons are displayed in accordance with the threshold values set for each Thin Provisioning Pool for monitoring when the capacity is running out. ⚠: Less than the "Warning threshold value" and greater than the "Caution threshold value" 🔴: Greater than the "Warning threshold value"
	Name	Any character string	Indicates the Thin Provisioning Pool name that was set by the user.
Disk Kind		"Online", "Nearline", "-"	Indicates the attributes of the disks that comprise the Thin Provisioning Pool.
Reliability		"High", "Medium", "None", "-"	Indicates the degree of reliability of the Thin Provisioning Pool. If information could not be obtained from the device, a hyphen (-) is displayed.
Capacity (MB)		Decimal number	Indicates the total Thin Provisioning Pool capacity in MB units.
Used Capacity (MB)		Decimal number	The physical capacity allocated from the Thin Provisioning Pool to logical volumes is displayed in MB units.
Use Capacity Ratio (%)		Decimal number	Indicates the percentage of the physical capacity allocated to logical volumes, based on the total capacity of the Thin Provisioning Pool.
Notice	Status	"Normal", "Warning", "Caution"	Indicates the threshold value monitoring status of the Thin Provisioning Pool. Normal: The Thin Provisioning Pool capacity used is less than the "Caution threshold value".

Display item name	Tab display item name	Value	Description
			Caution: The Thin Provisioning Pool capacity used is less than the "Warning threshold value" and the same or greater than the "Caution threshold value".
			Warning: The Thin Provisioning Pool capacity used is the same or greater than the "Warning threshold value".
			- (hyphen)：Information could not be obtained due to a device fault or similar.
	Warning (%)	Decimal number	Indicates the "Warning threshold value" set for the Thin Provisioning Pool. This threshold value is a strong warning level indicating the percentage of the capacity of the Thin Provisioning Pool that is already allocated.
	Caution (%)	Decimal number, "-"	Indicates the "Caution threshold value" set for the Thin Provisioning Pool. This threshold value is a weak warning level indicating the percentage of the capacity of the Thin Provisioning Pool that is already allocated.
			If a value is not set, a hyphen (-) is displayed.
Encryption		"Encryption", "Non-Encryption" "-"	Indicates the encryption status of the Thin Provisioning Pool.
			Encryption: Encrypted.
			Non-Encryption: Not encrypted.
			- (hyphen)：Information could not be collected due to a device fault or similar.

・LogicalVolume list

Display item name	Tab display item name	Value	Description
LogicalVolume	No.	LogicalVolume number	Indicates the logical volume number. It is a four-digit hexadecimal number.
			If the unallocated capacity of the volume is the same or greater than the "Caution threshold value" set at the device side, ⚠ is displayed.
	Name	Any character string	Displays the logical volume name set by the user.
Capacity (MB)		Decimal number	Indicates the logical capacity of the logical volume in MB units.
Used Capacity (MB)		Decimal number, "-"	Indicates the physical capacity allocated to the logical volume in MB units.
			If information could not be obtained due to a device fault or similar, a hyphen (-) is displayed.
Notice	Status	"Normal", "Caution", "-"	Indicates the threshold value monitoring status of the logical volume.
			Normal: The volume unallocated capacity is less than the "Caution threshold value".
			Caution: The volume unallocated capacity is the same or greater than the "Caution threshold value".
			- (hyphen)：Information could not be obtained due to a device fault or similar.
	Caution (%)	Decimal number	Indicates the "Caution threshold value" set for the logical volume.

Display item name	Tab display item name	Value	Description
Encryption		"Encryption", "Non-Encryption" "-"	Indicates the encryption status of the logical voume. Encryption: Encrypted. Non-Encryption: Not encrypted. - (hyphen)：Information could not be collected due to a device fault or similar.

B.11.5   Dialog for changing notification threshold values

The following table describes the dialog for changing notification threshold values which sets the threshold values for monitoring when the Thin Provisioning Pool capacity is used up.

Display item	Description
"Warning (%)" input box	Enter a percentage (%) as the "Warning threshold value" for warning notifications that the Thin Provisioning Pool capacity is running out. The value set for the Thin Provisioning Pool is displayed as the initial value. If more than one Thin Provisioning Pool is selected, a blank space is displayed. Enter a value from 5 to 99.
"Caution (%)" input box	Enter a percentage (%) as the "Caution threshold value" for caution notifications that the Thin Provisioning Pool capacity is running out. The value set for the Thin Provisioning Pool is displayed as the initial value. If more than one Thin Provisioning Pool is selected, a blank space is displayed. If a blank space is set, caution notifications are not issued. Enter a value from 5 to 80.
"Both" radio button	Sets the "Warning threshold value" and the "Caution threshold value".
"Warning only" radio button	Sets only the "Warning threshold value".
"Caution only" radio button	Sets only the "Caution threshold value".

B.11.6   Capacity management window

This section describes the Capacity management window that displays graphs of changes in Thin Provisioning Pool capacity.

To display a Capacity management window like the one shown below, select a Thin Provisioning Pool in the Thin Provisioning Pool monitor window, then select [Operation] - [Capacity management window].
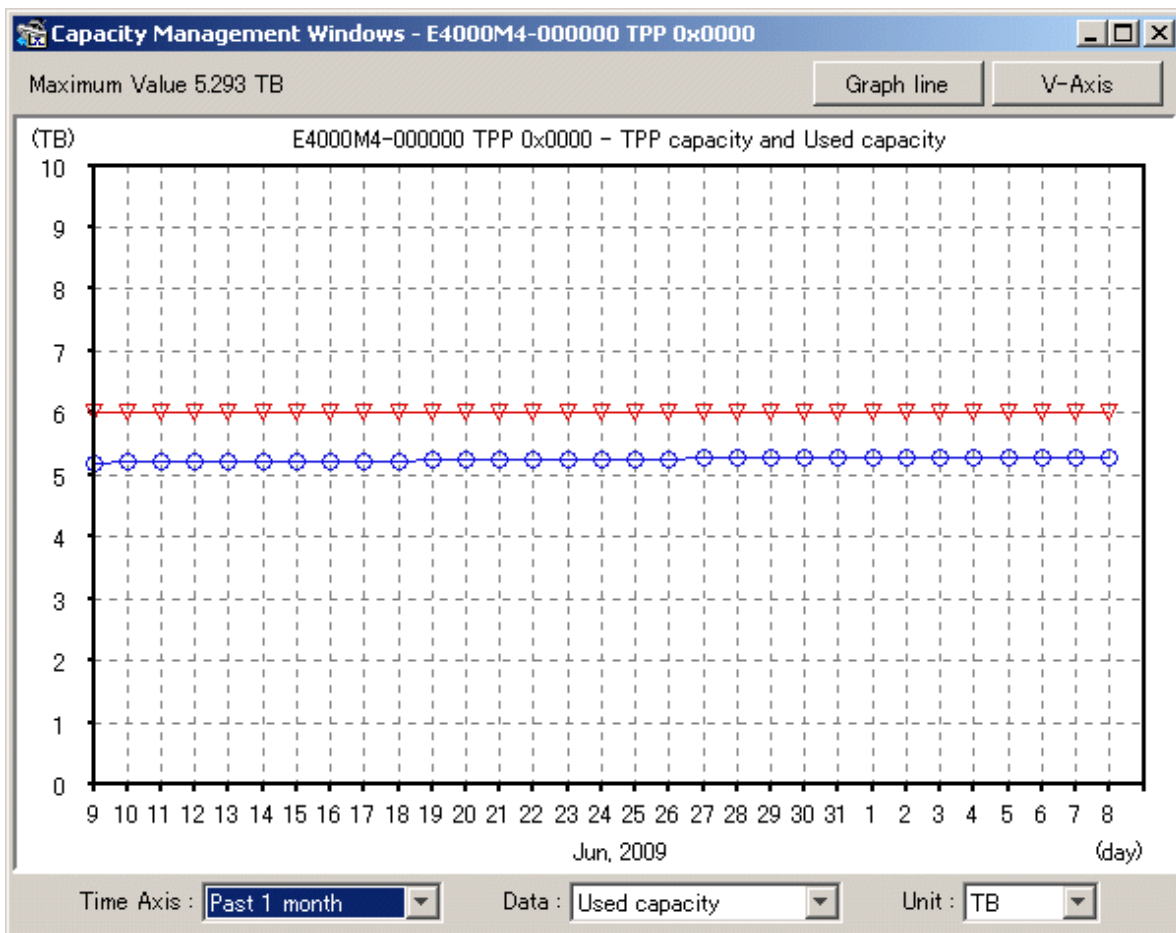
- Types of graph

The following table shows the graphs that are displayed.

Graph	Description
Used capacity of Thin Provisioning Pool	The graph shows the physical capacity allocated from the Thin Provisioning Pool to the logical volume. To display this graph, select it from the Displayed content pull-down menu.
Remaining capacity of Thin Provisioning Pool	The graph shows the physical capacity remaining after subtraction of the "Used capacity of Thin Provisioning Pool" from the Thin Provisioning Pool capacity. To display this graph, select it from the Displayed content pull-down menu.
Capacity of Thin Provisioning Pool	The graph shows the Thin Provisioning Pool capacity. To display this graph, select "TB" from the Unit pull-down menu.

- Time Axis (pull-down menu)

The following table shows the items that can be selected as the display interval.

Selection item	Description
Past 1 month	The graph displays data from within a single past month. Plotting points are in units of one day.
Past N year (N=1,2,···,10)	The graph displays data from within N past years. Plotting points are in units of one month. Items are displayed in the menu for the years as far back as data exists.

- Data (pull-down menu)

The following table shows the items that can be selected as the content to be displayed.

Selection item	Description
Used capacity	The graph data shows the Thin Provisioning Pool capacity used.
Remain capacity	The graph data shows the remaining Thin Provisioning Pool capacity.

・ Unit (pull-down menu)

The following table shows the items that can be selected as the unit.

Selection item	Description
TB	The Thin Provisioning Pool capacity and the item selected from the Displayed content pull-down menu are shown in graphs in TB units. The graph line button can be selected in order to display more than one graph.
%	The Thin Provisioning Pool capacity for the item selected from the Displayed content pull-down menu is shown in graphs as a percentage.

・ Graph Line button

When "TB" is selected from the Unit pull-down menu, the <Graph Line> button at the upper right of the window becomes clickable. Clicking this button displays a window that explains the graph line names.
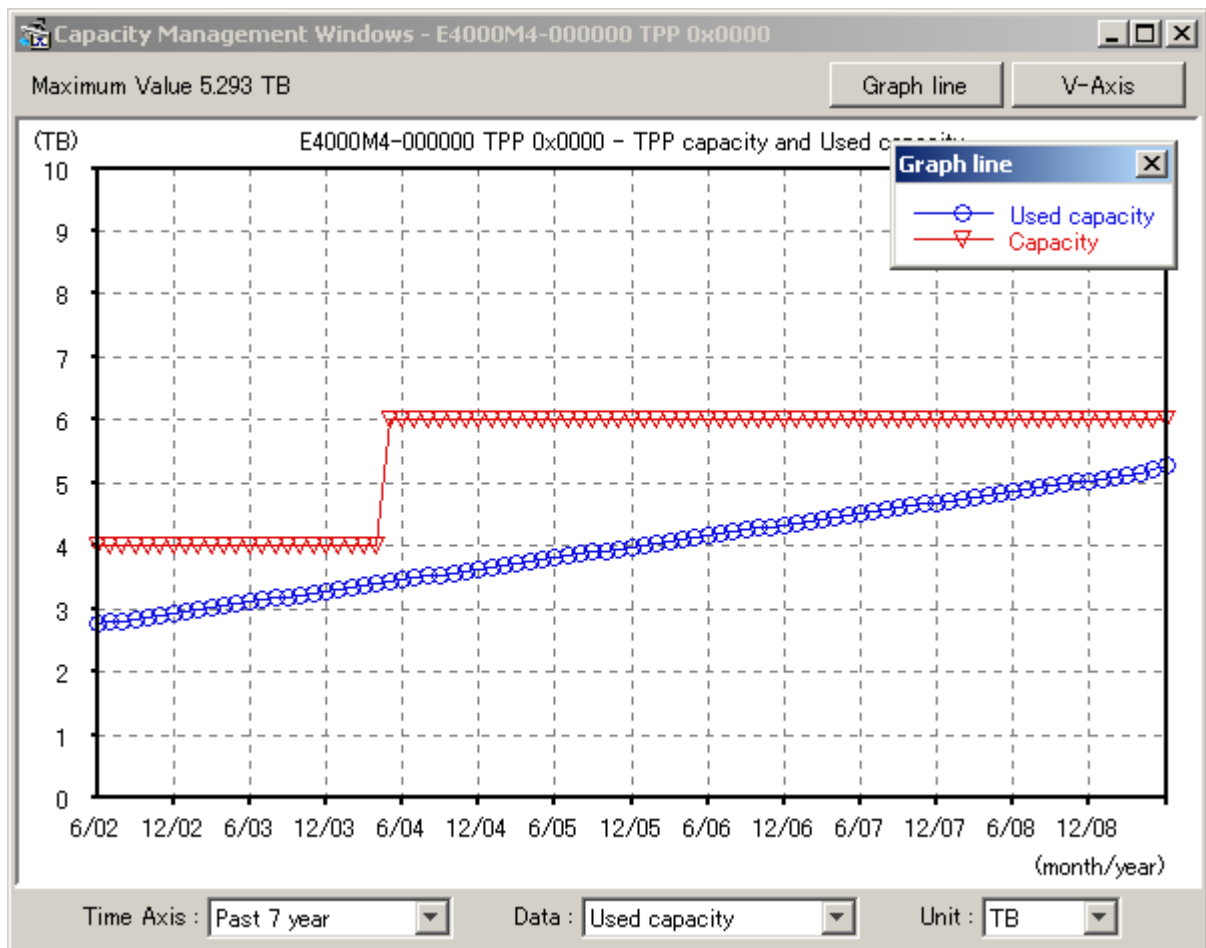
・ Set Vertical Axis button

Clicking the <V-Axis> button at the upper right of the screen displays the dialog shown below. In this dialog, the maximum value of the vertical axis of a graph can be specified. The value can be entered directly. However, clicking the <Adjust to Maximum Value> button automatically calculates and displays the maximum value for a graph. Clicking the <Reset to Default> button sets the maximum value of the standard vertical axis of capacity management.

Vertical Axis Setup

Specify Maximum Value [100] %

Adjust to Maximum Value

Reset to Default

OK   Cancel
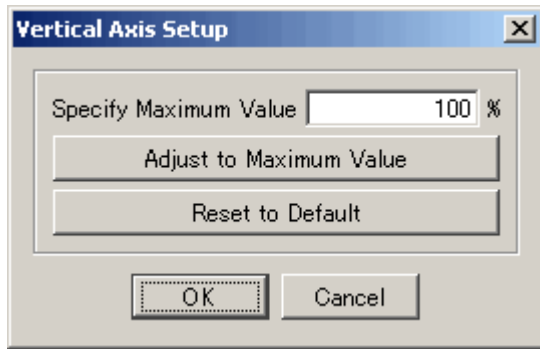
Appendix C Customization

C.1 Overview

This software Manager and Agent control setting can be made by editing the appropriate definition files. Edit the files according to requirements. However, be sure not to edit values of parameters not discussed in this chapter.

sanma.conf (definition file)

This file is saved at the following location as a detailed setting file of the storage management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\sanma.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/sanma.conf

ssmgr.conf (definition file for correlation management)

This file is saved at the following location as a detailed setting file of the storage management for the correlation management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\ssmgr.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/ssmgr.conf

perf.conf (performance management definition file)

This file is saved at the following location as a detailed setting file of the storage management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\perf.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/perf.conf

SNMP Trap XML definition file (fault management definition file)

Creating this file enables detailed definitions of targets of fault monitoring using SNMP Traps and processing for the environment.

Correlation.ini (Agent definition file)

This file is saved at the following location as a detailed setting file of Agent:

Platform of Agent	Location
Windows	$ENV_DIR\Agent\etc\Correlation.ini ($ENV_DIR means "Environment Directory" specified at the Agent installation.)
Solaris OS, Linux, HP-UX	/etc/opt/FJSVssage/Correlation.ini

sstorageagt.conf (Agent environment setting file)

This file is saved at the following location as a detailed setting file of the Agent:

Platform of Agent	Location
Windows	$ENV_DIR\Agent\etc\sstorageagt.conf ($ENV_DIR means "Environment Directory" specified at the Agent installation.)
Solaris OS, Linux	/etc/opt/FJSVssage/sstorageagt.conf

bcm.conf (bridge management definition file)

This file is a detailed setting file used when dealing with a FC-SCSI bridge by storage management:

Since this file is not installed, it is necessary to create it in the following location.

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\bcm.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/bcm.conf

C.2   sanma.conf Parameter

This file is saved at the following location as a detailed setting file of the storage management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\sanma.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/sanma.conf

Reflecting the contents of the setting file

If the setting file is changed, select [Tool] - [Option] - [Re-read Definition File] from the resource view, or reactivate the Manager. This reflects the settings on this software.

Customization

> 📖 **Note**
>
> ....
>
> Note that the memory or the disk capacity may become insufficient when the number of generations or the maximum capacity of each log file is increased. Operation may stop when the memory or the disk capacity becomes insufficient.
>
> Note when changing the number of generations or maximum capacity, secure the memory capacity and the disk capacity.
>
> ....

AUTODISCOVER_SUBNET

Specify the address of a subnet searched during an automatic device search. Use a "," (comma) to define multiple subnets.

```
Example:
AUTODISCOVER_SUBNET="10.12.13.255,133.134.13.255";
```

The administrative server issues SNMP broadcasts for automatic device detection in these subnets, but if the broadcast is limited by network settings, this function is not enabled.

LOGICAL_MANAGER_IP

If the administrative server is cluster system which has physical IPs and logical IP, logical IP address must be specified in this parameter.

```
Example:
LOGICAL_MANAGER_IP="10.12.13.14";
```

When a device is added to devices subject to fault monitoring, the parameter is used for automatically setting the SNMP Trap transmission place for the device. For details, see "5.2.5 SNMP Trap transmission place automatic setting function".

MANAGER_LAN_CARD_IP

Specify this parameter so that Manager recognizes the IP address of a LAN card in the administrative server.

The parameter must be set in order to search for a device during Manager operation where multiple LAN cards are used.

```
Example:
MANAGER_LAN_CARD_IP="10.12.13.14,100.101.102.103";
```

SET_SW_ZONING_ALWAYS

When an access path is set, if the zoning setting for the Fibre Channel switch need not be added because port zoning is set, this software does not generally set zoning for Fibre Channel. Specifying 1 in this parameter sets one-to-one WWPN zoning even in the above case (excluding cases in the No Security state):

```
Example:
SET_SW_ZONING_ALWAYS=1; (Default: 0)
```

DISPLAY_SNMP_STANDARD_EVENT

Specify whether the SNMP Trap common to devices from a device is indicated in the event log. Setting 1 for this parameter indicates the SNMP Trap common to devices. Setting 0 for this parameter does not indicate it. Default is 1 (indicate).

```
Example:
DISPLAY_ SNMP_STANDARD_EVENT = 0;
```

SNMP_COMMUNITY_NAME_FOR_IP

For communication using SNMP between this software and a device, "public"(READ-direction) and "private"(WRITE-direction) are used for the SNMP community name.

For such communication using any name other than "public" and "private", specify its community name in this parameter.

Specify the IP address of the device and the community name used for SNMP communication with the device, delimiting them with a space.

When setting "abc" as the community name used for SNMP communication with IP address 10.11.12.13, set as follows:

```
Example:
SNMP_COMMUNITY_NAME_FOR_IP="10.11.12.13 abc";
```

Wild card definitions in which "*" is used at the end of the IP address is permitted.

```
Example:
SNMP_COMMUNITY_NAME_FOR_IP="10.11.12.* abc";
SNMP_COMMUNITY_NAME_FOR_IP="20.21.*.* def";
SNMP_COMMUNITY_NAME_FOR_IP="30.*.*.* ghi";
```

To define community names for multiple devices, specify the names on as many definition lines as the number of devices.

```
Example:
SNMP_COMMUNITY_NAME_FOR_IP="10.11.12.13 abc";
SNMP_COMMUNITY_NAME_FOR_IP="10.11.14.15 def";
```

If community names must be different in the READ-direction and WRITE-direction of SNMP communication, specify a device IP address, community name used for READ-direction, and community name used for WRITE-direction, delimiting them with a space.

When setting "abc" as the READ-direction community name and "def" as the WRITE-direction community name used for SNMP communication with IP address 10.11.12.13, set as follows:

```
Example:
SNMP_COMMUNITY_NAME_FOR_IP="10.11.12.13 abc def";
```

SNMP_COMMUNITY_NAME_FOR_AUTODISCOVER

Using the SNMP protocol, the Intra-subnet device detection function detects devices. The "public" is used as the community name. To change the community name "public" to a required name, specify the name in this parameter. When specifying this parameter, be sure to specify SNMP_COMMUNITY_NAME_FOR_IP.

When community name is "abc," set as follows:

```
Example:
SNMP_COMMUNITY_NAME_FOR_AUTODISCOVER="abc";
```

In an environment where each device has a unique community name, not all devices can be detected even if the parameter is specified. In this case, specify only SNMP_COMMUNITY_NAME_FOR_IP to search for one device at a time.

LOG_CYCLE

The number of generations of log files (log.* and event.*) of the whole storage management is specified by an arbitrary decimal number. Default is two. It circulates in the second generation (log.0 and log.1 or event.0 and event.1), when 2 is set.

```
Example for circulating in the fifth generation:
LOG_CYCLE = 5;
```

Location of the log file

Platform of Manager	Location
Windows	$TMP_DIR\Manager\var\opt\FJSVssmgr\current ($TMP_DIR means "Work Directory" specified at the Manager installation.)
Solaris OS, Linux	/var/opt/FJSVssmgr/current

LOG_MAX_SIZE

The maximum capacity of the log file (log.* and event.*) of the whole storage management is specified within the range of 0-2147483647 (KB). When 0 is specified, the log is not output. Moreover, when the value is specified outside the range, it becomes a default value. Default capacity is 1024(KB).

```
Example for setting the maximum capacity to 2MB:
LOG_MAX_SIZE = 2048;
```

For location of the log files, refer to LOG_CYCLE.

SNMPTH_LOG_COUNT

The number of generations of log files (snmpth.*) related to SNMP Trap is specified by an arbitrary decimal number.

Default is 2.

It circulates in the second generation (snmpth.0 and snmpth.1), when 2 is set.

```
Example for circulating in the fifth generation:
SNMPTH_LOG_COUNT = 5;
```

For location of the log files, refer to LOG_CYCLE.

SNMPTH_LOG_LIMIT

The maximum capacity of the log file (snmpth.*) related to SNMP Trap is specified within the range of 0-2147483647 (KB).

Default capacity is 1024 (KB).

When 0 is specified, the log is not output. Moreover, when the value is specified outside the range, it becomes a default value.

```
Example for setting the maximum capacity to 2MB:
SNMPTH_LOG_LIMIT = 2048;
```

For location of the log files, refer to LOG_CYCLE.

SILKWORM_ZONING_DELAY_TIMER

The waiting time to command execution of the zoning setting for the ETERNUS SN200 series Fibre Channel switch is specified by unit of milliseconds. Default value is 3000 (3 seconds).

When setting the waiting time to 5 seconds, set as follows:

```
Example:
SILKWORM_ZONING_DELAY_TIMER = 5000;
```

Less than 3000 (3 seconds) cannot be specified. When it was set less than 3000 or when setting is inaccurate, 3000 which is a default is assumed. In addition, this setting is required when the following events are reported from the ETERNUS SN200 series Fibre Channel switch at the time of an access path setup.

```
ZONE-TRANSCOMMIT Transaction Commit failed. Reason code 10 - "Fabric Merging"
ZONE-TRANSCOMMIT Transaction Commit failed. Reason code 2 - "Aca Was Rejected"
```

This event shows the error about the zoning setting command of a Fibre Channel switch. By setting a large value as the waiting time of command execution, the error is avoidable.

FIRMWARE_VERSION_CHECK

Any "Unsupported Firmware Version" message output to the event log indicates that a device with firmware not supported by ETERNUS SF Storage Cruiser has been detected. This message is output at the time of an operation such as "Refresh".

To suppress output of the message, make the following setting:

```
FIRMWARE_VERSION_CHECK = 0;
```

Since new firmware can be supported by applying certain patches to ETERNUS SF Storage Cruiser, be sure to delete this setting after applying the patches.

SILKWORM_SUPPORTED_FIRMWARE_VERSION

In consideration of incompatibility of Fibre Channel switch firmware, if unsupported firmware is detected, all functions including the configuration management functions are restricted. Normally, in such cases, patches need to be applied to ETERNUS SF Storage Cruiser. However, when such firmware has no incompatibility, it can be handled without applying patches.

📄 **Note**

. . . .
Make this setting only for firmware that is confirmed to have no incompatibility.
The procedure for upgrading firmware is described in the firmware upgrade manual.
If it is impossible to confirm that firmware has no incompatibility, contact your Fujitsu CE or SE.
. . . .

For example, to handle the firmware that has no incompatibility and whose version is v12.34.56a, make settings as follows.

First, change each of the three numeric values in firmware version v12.34.56a to a two-digit value in hexadecimal notation. Characters such as the first "v" and the last "a" need not be considered.

```
12 -> 0C
34 -> 22
56 -> 38
```

Then, these three two-digit values are concatenated to produce a six-digit value in hexadecimal notation.

```
0C2238
```

Specify this value as follows:

```
SILKWORM_SUPPORTED_FIRMWARE_VERSION = "0C2238";
```

When specifying multiple versions, delimit them with a comma ",".
To specify both v2.4.1 and v5.0.1, describe them as follows:

```
SILKWORM_SUPPORTED_FIRMWARE_VERSION = "020401,050001";
```

The hyphen "-" can be used to specify a range of version.

To specify versions v4.0.0 to v4.2.2, describe them as shown below. Be sure to describe the smaller version number first.

```
SILKWORM_SUPPORTED_FIRMWARE_VERSION = "040000-040202";
```

Also, the above description methods can be combined.

```
SILKWORM_SUPPORTED_FIRMWARE_VERSION = "020401,040000-040202,050001";
```

C.3   ssmgr.conf Parameter

This file is saved at the following location as a detailed setting file of the storage management for the correlation management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\ssmgr.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/ssmgr.conf

Reflecting the contents of the setting file

If the setting file is changed, select [Tool] - [Option] - [Re-read Definition File] from the resource view, or reactivate the Manager. This reflects the settings on this software.

Customization

📝 **Note**

. . . .

Note that the memory or the disk capacity may become insufficient when the number of generations or the maximum capacity of each log file is increased. Operation may stop when the memory or the disk capacity becomes insufficient.

Note when changing the number of generations or maximum capacity, secure the memory capacity and the disk capacity.

. . . .

LOG_COUNT

The number of generations of log files (common.*) which is common to system to SNMP Trap is specified by an arbitrary decimal number.

Default is 2.

It circulates in the second generation (common.0 and common.1), when 2 is set.

```
Example for circulating in the fifth generation:
LOG_COUNT = 5;
```

Location of the log file

Platform of Manager	Location
Windows	$TMP_DIR\Manager\var\opt\FJSVssmgr\current ($TMP_DIR means "Work Directory" specified at the Manager installation.)
Solaris OS, Linux	/var/opt/FJSVssmgr/current

LOG_LIMIT

The maximum capacity of log file (common.*) which is common to system is specified within the range of 0-2147483647 (KB).

Default capacity is 1024 (KB).

When 0 or a minus value is specified, the log is not output. Moreover, when the value larger than the maximum value is specified, it becomes a default value.

```
Example for setting the maximum capacity to 2MB:
LOG_LIMIT = 2048;
```

For location of the log files, refer to LOG_COUNT.

SES_FILE_MAX_SIZE

The maximum capacity of system event log file (systemevent.csv) is specified within the range of 0-262144 (KB).

Default capacity is 2048 (KB).

When 0 is specified, the log is not output. Moreover, when the value is specified outside the range, it becomes a default value.

```
Example for setting the maximum capacity to 4MB:
SES_FILE_MAX_SIZE = 4096;
```

For location of the log files, refer to LOG_COUNT.

SYSTEMLOG_FACIRITY (Valid only for Solaris OS Manager)

Specify a facility name which has system log output destination information if a facility name is changed from the default ("daemon"). The facility name that is specified here must be defined by /etc/syslog.conf. Users can optionally change the system log output destination according to the specified facility name and the level.

Refer to online manuals of each operating system for syslog.conf definition.

PS_UNUSED_AFFINITYGROUP_WARNING

Specify whether to display an affinity group that is not assigned to the HBA as a warning in a system event. The default value is set to true. If false is set, no message is displayed for the system events.

For information on system event messages, refer to "1.2 Events Related to Storage Device Operation" in the ETERNUS SF Storage Cruiser Event Guide.

C.4   perf.conf Parameter

This file is saved at the following location as a detailed setting file of the storage management:

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\perf.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/perf.conf

Reflecting the contents of the setting file

To reflect the contents of the setting file in this software after a change has been made, either select [Tool] - [Option] - [Re-read Definition File] from the performance management window menu, or restart the Manager.

📘Information
. . . .

- ・ In performance management, the setting file is referenced once every 4 hours so that changes are reflected even if the above procedure has not been performed.

- If the number of days to retain performance data is reduced, data retained that is older than the new number of days will be deleted. If the manager is forced to re-read the definition file, as per the procedure above, processing this change may take a while.

Customization

📄 **Note**

- If the number of days performance data is kept is increased, the application may stop because of insufficient memory or disk space; therefore care must be taken to ensure space is sufficient. In particular, if 0 is set for PERF_DATA_KEEP_DAYS, processing to delete performance information stops, so check the memory or disk space regularly.

- If the number of generations of log files is increased, the application may stop because of insufficient memory or disk space, therefore care must be taken to ensure space is sufficient.

- When the performance management for number of active disks is performed, the dynamic disk capacity must be secured separately. When performing the performance management for number of active disks, ensure that sufficient dynamic disk capacity has been secured.

  For the dynamic disk space, refer to the following section in the ETERNUS SF Storage Cruiser Installation Guide.

    - Solaris OS Manager: "4.1.1.2.6 Dynamic disk space"

    - Linux Manager: "4.2.1.2.6 Dynamic disk space"

    - Windows Manager: "4.3.1.2.5 Dynamic disk space"

- When the performance management for number of active disks is performed, it may not be possible to obtain performance information inside the performance monitoring interval. Change the performance monitoring interval where necessary.

PERF_DATA_KEEP_DAYS

Specify the number of days during which performance management keeps performance data. The data is automatically deleted after the specified number of days elapse.

If 0 is specified, the data is not deleted. However, the number of days does not include the current day.

The default value is seven days and is defined as shown below. Change this value if necessary.

```
PERF_DATA_KEEP_DAYS = 7;
```

LOG_ROTATION

The number of generations of log files (perflog.*) related to performance is specified by an arbitrary decimal number. Default is 2. It circulates in the second generation of perflog.0 and perflog.1 when 2 is set.

```
Example for circulating in the fifth generation:
LOG_ROTATION = 5;
```

Location of the log file

Platform of Manager	Location
Windows	$TMP_DIR\Manager\var\opt\FJSVssmgr\current ($TMP_DIR means "Work Directory" specified at the Manager installation.)
Solaris OS, Linux	/var/opt/FJSVssmgr/current

ENABLED_ECO_MODE

Specify whether or not the number of active disks performance management is to be used. To use the performance management for number of active disks, specify "true". If you do not want to use it, specify "false". The default is "false".

This parameter is not defined in the perf.conf file used for installation. Add the parameter where necessary.

```
Example: When the performance management for the number of active disks is used:
ENABLED_ECO_MODE = true;
```

C.5 Change in the Maximum Memory Used

The maximum memory used can be customized by using the configuration file.

The configuration file is stored in the following directory on the manager side and the client side.

・ Manager

Platform of Manager	Location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\bin\manager.ini ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/bin/manager.ini

・ Client

$INS_DIR\Client\bin\client.ini
($INS_DIR means "Destination Folder" specified at the Client installation.)

Reflecting the contents of the setting file

The customized content is reflected at the next start time after it customizes it.

Customization

Customization is not required for normal operation. If the processing time is very long in a large-scale configuration, customize the maximum memory used. Before starting customization, make sure that sufficient memory is installed in the manager and client machines.

Describe in the configuration file as follows to customize it. (The unit is MB. Up to 9999 can be specified.)

```
Example:
MAXMEMORY=512
```

C.6 SNMP Trap XML Definition File

Use of this file enables customization of the fault monitoring method. Define the file on the Manager and Agent sides.

SNMP Trap XML definition file on the Manager side

The icon statuses, event log and device event messages, and operations using linkage with Systemwalker Centric Manager, linkage with Shell/Bat and linkage with External Script can be defined for SNMP Traps received from individual device (including server node). Customize the contents of this file to change default values of this software on the Manager side according to the operating environment of the storage system used.

Creating this definition file enables a function equivalent to the fault monitoring function for support levels A and B to be implemented for a device of support level I.

The SNMP Trap XML definition file on the Agent side

It defines a fault monitoring method of an Agent server node. Customize its contents to change the monitoring method from default.

Reflecting the contents of the setting file

The setting file on the Manager side is dynamically read into this software and therefore no special reflection method is provided.

The setting file on the Agent side is read into this software statically and therefore the Agent needs to be restarted to reflect the contents of the setting file on this software.

Customization

📋 **Note**

・ If an error is detected in an XML definition file, a message in the format shown below is output to the event log and device log. The fault level of notification is the information level, and the icon status does not change. Linkage with Systemwalker Centric Manager and linkage with Shell/Bat are not used.

```
Message format: "XML parse error (detected trap: (SNMP Trap data character string))"
```

・ Except for some devices, all swsag codes that are reported to Systemwalker Centric Manager are 4821.

・ When customizing SNMP Trap processing, do not edit the definition file in the installation directory but edit the one in the customization directory.

Definition file names and storage location on the Manager side

The SNMP Trap XML definition file is created for each device. It is then stored in the following directory when Manager is installed or upgraded.

Platform of Manager	Location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\lib\snmpth ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/lib/snmpth

When customizing SNMP Trap processing of Manager, copy the SNMP Trap XML definition file in the above directory to the customization directory shown below, and edit the copy of the file.

Platform of Manager	Customization Directory
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\snmpth ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/snmpth

Manager operates as follows.

- When the SNMP Trap XML definition file exists in the customization directory

  Manager operates in accordance with its file.

- When the SNMP Trap XML definition file does not exist in the customization directory

  Manager operates in accordance with the definition file in the installation directory. (default)

In a trap of a device, the file name is enterprise code in which "." is replaced with "_".

Table C.1 Default SNMP Trap XML definition files on a system where this software is implemented with Manager

Device type	File name
ETERNUS SN200 series Fibre Channel switch Brocade PRIMERGY BX600 Fibre Channel switch blade	1_3_6_1_4_1_1588_2_1_1_1.xml
ETERNUS SN200 MDS, Cisco MDS	1_3_6_1_4_1_9_9_117_2.xml 1_3_6_1_4_1_9_9_289_1_3.xml 1_3_6_1_4_1_9_9_302_1_3.xml 1_3_6_1_4_1_9_9_305_1_4_3.xml 1_3_6_1_4_1_9_9_91_2.xml
McDATA	1_3_6_1_4_1_289.xml
ETERNUS3000 model 50	1_3_6_1_4_1_211_4_1_1_126_1_7.xml
ETERNUS3000 model 600	1_3_6_1_4_1_211_4_1_1_126_1_6.xml
ETERNUS3000 models 80 and 100 ETERNUS4000 models 80 and 100	1_3_6_1_4_1_211_4_1_1_126_1_5.xml
ETERNUS3000 models 200 and 400	1_3_6_1_4_1_211_4_1_1_126_1_4.xml
ETERNUS3000 models 300, 500 and 700 ETERNUS VD800 (*3)	1_3_6_1_4_1_211_4_1_1_126_1_8.xml
ETERNUS6000 models 400, 500, 600, 700, 800, 900, 1000 and 1100	1_3_6_1_4_1_211_4_1_1_126_1_10.xml
ETERNUS8000 models 700, 900, 1100 and 2100 ETERNUS4000 models 300 and 500	1_3_6_1_4_1_211_4_1_1_126_1_20.xml
ETERNUS8000 models 800, 1200 and 2200 ETERNUS4000 models 400 and 600	1_3_6_1_4_1_211_4_1_1_126_1_50.xml
ETERNUS2000 models 50, 100 and 200	1_3_6_1_4_1_211_4_1_1_126_1_30.xml
ETERNUS SX300 ETERNUS SX300S	1_3_6_1_4_1_1123_1_205.xml
ETERNUS GR710	1_3_6_1_4_1_211_4_1_1_126_1_3.xml
ETERNUS GR720, GR730	1_3_6_1_4_1_211_4_1_1_126_1_1.xml
ETERNUS GR740, GR820, GR840	1_3_6_1_4_1_211_4_1_1_126_1_2.xml
ETERNUS LT120	1_3_6_1_4_1_11_2_3_9_7_1.xml 1_3_6_1_4_1_11_2_3_9_7_2.xml
ETERNUS LT130	1_3_6_1_4_1_3351_1_3_2_6_1_1.xml 1_3_6_1_4_1_3351_1_3_2_6_1_2.xml 1_3_6_1_4_1_3351_1_3_2_6_1_3.xml 1_3_6_1_4_1_3351_1_3_2_6_1_4.xml 1_3_6_1_4_1_3351_1_3_2_6_1_6.xml 1_3_6_1_4_1_3351_1_3_2_6_1_7.xml 1_3_6_1_4_1_3351_1_3_2_6_1_8.xml 1_3_6_1_4_1_3351_1_3_2_6_1_9.xml 1_3_6_1_4_1_3351_1_3_2_6_1_10.xml 1_3_6_1_4_1_3351_1_3_2_6_1_12.xml
ETERNUS LT160	1_3_6_1_4_1_211_4_1_1_126_3_1.xml
ETERNUS LT200	1_3_6_1_4_1_119_1_83_1_21.xml
ETERNUS LT210, LT220, LT230	1_3_6_1_4_1_119_1_83_1_1.xml 1_3_6_1_4_1_119_1_83_1_2.xml
ETERNUS LT250	1_3_6_1_4_1_211_4_1_1_126_3_5.xml

Device type	File name
ETERNUS LT270	1_3_6_1_4_1_211_4_1_1_126_3_2.xml
Tape encryption device	1_3_6_1_4_1_2021_250_10.xml
Fibre Alliance MIB support device (SN200 model 255V, model 250M, Brocade AP7420)	1_3_6_1_3_94.xml
NR1000	1_3_6_1_4_1_789.xml
Edge	1_3_6_1_4_1_333_2_4_1.xml
Event from performance management	1_3_6_1_4_1_211_4_1_3_21_3.xml
Multipath-related event from Solaris OS Agent or Windows Agent	1_3_6_1_4_1_211_4_1_3_21_2.xml (*1)
Safe/PRIMECLUSTER GDS or GFS series event from Solaris OS Agent	1_3_6_1_4_1_211_4_1_3_21_2_2.xml (*2)
Multipath-related event from Solaris OS Agent	1_3_6_1_4_1_211_4_1_3_21_2_21.xml (*2)
EMC PowerPath event from Solaris OS Agent	1_3_6_1_4_1_211_4_1_3_21_2_22.xml (*2)
Multipath-related event from Windows Agent	1_3_6_1_4_1_211_4_1_3_21_2_5.xml (*2)
MPIO event from Windows Agent	1_3_6_1_4_1_211_4_1_3_21_2_51.xml (*2)
GR multipath driver event from Linux Agent	1_3_6_1_4_1_211_4_1_3_21_2_3.xml (*2)
PRIMECLUSTER GDS or GFS series event from Linux Agent	1_3_6_1_4_1_211_4_1_3_21_2_31.xml (*2)
LVM(PV-Links) event from HP-UX Agent	1_3_6_1_4_1_211_4_1_3_21_2_4.xml (*2)
HBA driver event from HP-UX Agent	1_3_6_1_4_1_211_4_1_3_21_2_41.xml (*2)
Symmetrix	1_3_6_1_4_1_1139_1.xml 1_3_6_1_4_1_1139_3.xml
Crossroads	Not provided but can be created.

*1: This file can be changed only concerning the on/off setting of "linkage with Systemwalker Centric Manager" (only Shell/Bat linkage control can be done and Systemwalker Centric Manager linkage cannot be.) and "external script linkage 1" and "external script linkage 2" in "Operation definition" (the flag attributes) in "Definition contents" of "Definition file format". For "Fault level" and "Message," this file can not be changed.

*2: When this file is updated, the file with the same name on the Agent side must also be updated so that their contents are the same.

*3: Disk array unit for ETERNUS VD800.

For devices excluding the above ones, SNMP Trap processing for each device is enabled by creating XML files according to the enterprise code of the device.

Definition file name and storage location on the Agent side

The XML definition file for customizing the fault monitoring method of an Agent server node is saved at the following location:

Platform of Agent	Location
Windows	$ENV_DIR\Agent\etc\snmpth ($ENV_DIR means "Environment Directory" specified at the Agent installation.)
Solaris OS, Linux, HP-UX	/etc/opt/FJSVssage/snmpth

The file is read and used when Agent starts. Therefore, the restart of Agent is needed to operate according to the modified contents when the file is modified.

The file name is the enterprise code in a trap issued from Agent to Manager and in which "." is replaced with "_".

Table C.2 Default SNMP Trap XML definition files on a system where this software is implemented with Agent

Server node	File name (*1)	Monitoring target
Solaris OS	1_3_6_1_4_1_211_4_1_3_21_2_2.xml	Safe/PRIMECLUSTER GDS, GFS series
	1_3_6_1_4_1_211_4_1_3_21_2_21.xml	ETERNUS/GR multipath driver
	1_3_6_1_4_1_211_4_1_3_21_2_22.xml	EMC PowerPath
	1_3_6_1_4_1_211_4_1_3_21_2_23.xml	HITACHI JP1/HiCommand Dynamic Link Manager
	1_3_6_1_4_1_211_4_1_3_21_2_24.xml	Sun MPxIO
Windows	1_3_6_1_4_1_211_4_1_3_21_2_5.xml	ETERNUS/GR multipath driver
Linux	1_3_6_1_4_1_211_4_1_3_21_2_3.xml	ETERNUS/GR multipath driver
	1_3_6_1_4_1_211_4_1_3_21_2_31.xml	PRIMECLUSTER GDS, GFS series
HP-UX	1_3_6_1_4_1_211_4_1_3_21_2_4.xml	PV-LINK (LVM function)
	1_3_6_1_4_1_211_4_1_3_21_2_41.xml	HBA driver

*1: When this file is updated, the file with the same name on the Manager side must also be updated so that their contents are the same.

Definition file format

Definition contents

Operations are defined by the following items for the Specific Trap Type in the definition file:

Item	Description
Operation definition	Whether to post a status change to a window
	Whether to output a device event
	Whether to output the event log
	Whether to implement linkage with Systemwalker Centric Manager and linkage with Shell/Bat
	Whether to enable external script linkage 1
	Whether to enable external script linkage 2
Fault level	Notification levels of icon status, individual events, and linkage with Systemwalker Centric Manager (Information/Warning/Error)
Message	Message output for event and linkage with Systemwalker Centric Manager

Node hierarchy

The following figure shows the hierarchy of tag nodes:
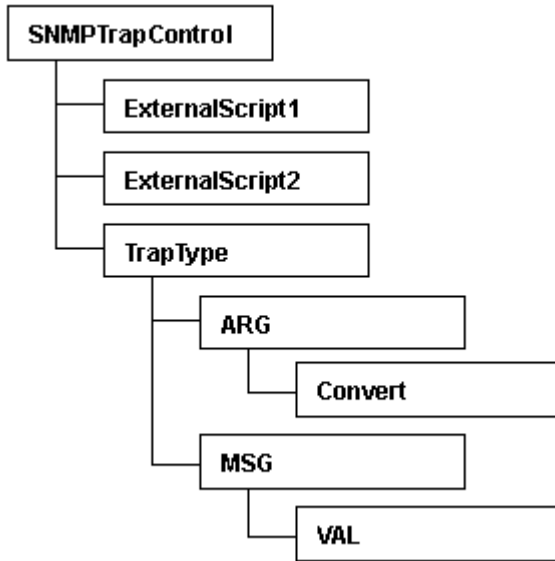
Tags and attributes

SNMPTrapControl tag

Attribute name	Description
name	Device name
ver	Version of this definition file

ExternalScript1, ExternalScript2 tag (option)

This tag defines the script name when using external script linkage. ExternalScript1 indicates external script linkage 1 and ExternalScript2 indicates external script linkage 2. A script defined here is executed when the corresponding linkage bit is set on in the flag attribute of the TrapType tag or the Convert tag.

ExternalScript1 and ExternalScript2 tag must be defined in a line above the TrapType tag definition.

Attribute name	Description
name	Executed script name (using full path name)

TrapType tag

This tag defines trap analysis operations for each Specific Trap Type. Traps of types not defined by the TrapType tag are not analyzed and discarded.

Attribute name	Description
type	"ST" + Specific Trap Type number (decimal)
flag	Control of event, linkage with Systemwalker Centric Manager, and linkage with Script (in 6-bits binary) (*1) The "0" is interpreted as "off", the "1" is "on". **bit5** ... external script linkage2 **bit4** ... external script linkage1 **bit3** ... Linkage with Systemwalker Centric Manager, Linkage with Shell/Bat (*2) **bit2** ... Event log output **bit1** ... Device event output **bit0** ... Status change notification For example, only linkage with Systemwalker Centric Manager is set to on "001000".
level	Fault level "I", "W", or "E"

Attribute name	Description
	Specify levels of events and icon statuses (*3) that are posted to Systemwalker Centric Manager.
	(I: Information / W: Warning / E: Error)
msg	Messages displayed for events and linkage with Systemwalker Centric Manager, sending and linkage with Script.
	The following parameters can be included in messages:
	%d: Decimal number
	%x: Hexadecimal number
	%s: Character string
	As many ARG tags as the number of parameters included in a message must be defined as described in (4) below.
	If any character other than 'd', 'x', and 's' follows %, the % is handled as a character and displayed as is.

*1: If the higher-order bits are 0s, the 0s can be omitted.
(ex.) "001000" can be described as "1000".

*2: Since events of the Agent are not reported to Systemwalker Centric Manager, only Shell/Bat linkage control can be done in the definition file of the Agent.

*3: Since the icon status is also changed by "Refresh to latest information" processing, or the device polling function, it may bring a different result from specification of this definition.

ARG tag

The ARG tag defines correspondence between a parameter specified in the msg attributes of the TrapType tag and a Variable Binding index in trap data. There are as many ARG tags as the number of parameters specified in the msg attributes must be defined.

Attribute name	Description
index	Index number (0 or larger) of a parameter included in the msg attributes of the TrapType tag described in (3).
VBIndex	Index number (0 or larger) of Variable Binding in Trap data

Convert tag (option)

The Convert tag specifies how to express a character string for an INTEGER-type data value of a trap. Definition of this tag is optional. For example, to use Trap data value 0 to indicate the status of OK, specify <Convert val="0" name="OK"/> so that character string "OK" can be displayed instead of "0".

By specifying the flag attribute and level attribute (options), a fault level specified in the level attribute of the TrapType tag can be changed and posted. (If the msg attribute includes multiple ARGs and the flag or level attribute is specified in individual Convert tags, the values specified in the Convert tag of the last ARG are used.)

Attribute name	Description
val	Numeric data value (decimal) of the INTEGER type in a Trap
flag (option)	Control of events, linkage with Systemwalker Centric Manager, and linkage with Script (in 6-bit binary)
	For values, see "TrapType tag".
level (option)	Fault level "I", "W", or "E"
	This tag is given a higher priority than the TrapType tag.
name	Character string corresponding to val

If an undefined value is received, the value is displayed as a numeric value as is.

MSG tag

The MSG tag defines a monitoring keyword for Server Node Agent monitoring. It is valid only for Server Node Agent.

Windows Agent: Monitors with the id, src, and type attributes (ignores the key attribute).

Another Agent: Monitors with the key attribute (ignores the id, src, and type attributes).

Attribute name	Description
key	Monitoring keyword for monitoring (required for a non-Windows Agent)
id	Event ID of the event to be monitored (required for a Window Agent)
src	Source name of the event to be monitored (required for a Windows Agent)
line	When a VAL tag is used (a substring of a monitored event is added to notification information), specify the number of monitored event lines for the line attribute. The line attribute can be omitted for a single line or when a Windows Agent is used.
type	Specify the type of event logs to be monitored. (Valid only for windows Agent) System: Monitor the system log. (Default) Application: Monitor the application log.

To change the monitoring keyword, change this keyword.

A normal expression can be specified to the monitoring keyword.

To add a monitoring keyword for monitoring, add the TrapType tag and later shown below. Be sure not to specify a Specific Trap Type number that is already specified.

VAL tag (option)

The VAL tag is used to define the method of retrieving a character string from the monitored event and adding it to notification information. The VAL tag is valid only for Server Node Agent.

Attribute name	Description
ref	Specify the value to be added to notification information. Specify the value in parentheses () in normal expression.

ID attribute specification by DTD

During SNMP Trap control, the type attribute of the TrapType tag is used as the ID attribute for searches, so DTD must be described as follows in the XML definition file:

```
<!DOCTYPE SNMPTrapControl[
<!ATTLIST TrapType type ID #REQUIRED>
]>
```

Definition file sample

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE SNMPTrapControl
<!ATTLIST TrapType type ID #REQUIRED>
]>
<SNMPTrapControl name="SW3800" ver=1.0">
  <TrapType type="ST1" flag="111111" level="E" msg="Faulty reason: %d">
    <ARG index="0" VBIndex="0">
      <Convert val="0" flag="000110" level="I" name="sw-ok"/>
      <Convert val="1" name="sw-faulty"/>
    </ARG>
  </TrapType>
  <TrapType type="ST2" flag="000111" level="E" msg="%s: is currently in state %d">
    <ARG index="0" VBIndex="4"/>
    <ARG index="1" VBIndex="0">
```

```
            <Convert val="1" name="unknown"/>
            <Convert val="2" name="faulty"/>
            <Convert val="3" name="below-min"/>
            <Convert val="4" flag="000110" level="I" name="nominal"/>
            <Convert val="5" name="above-max"/>
            <Convert val="6" name="absent"/>
        </ARG>
    </TrapType>
</SNMPTrapControl>
```

Example

Method of suppressing forecast monitoring traps of products of the ETERNUS3000 series and GR series:

To suppress events of forecast monitoring traps from products of the ETERNUS3000 series and GR series, change the following items in the XML definition file as shown below:

The flag attribute is changed to "000000" in the TrapType tag for which "ST5" is specified as the type attribute.

```
<TrapType type="ST5" flag="000000" level="W" swsag="4405" msg="%d(0x%x) %d">
```

Example

Method of suppressing ETERNUS SN200 series Fibre Channel switch, Brocade series FC port Online/Offline traps:

To suppress ETERNUS SN200 series Fibre Channel switch, Brocade series FC port Online/Offline traps, change the following locations in the corresponding XML definition file.

The flag attribute is changed to "000000" in val="1" and val="2" of the Convert tag in <ARG index="1" VBIndex="0"> for which "ST3" is specified as the type attribute.

```
<Convert val="1" flag="000000" level="I" swsag="4203" name="Online"/>
<Convert val="2" flag="000000" level="I" swsag="4203" name="Offline"/>
```

C.7   Correlation.ini Parameter

This file is saved at the following location of the Server Node as a detailed setting file of Agent:

Platform of Agent	Location
Windows	$ENV_DIR\Agent\etc\Correlation.ini ($ENV_DIR means "Environment Directory" specified at the Agent installation.)
Solaris OS, Linux, HP-UX	/etc/opt/FJSVssage/Correlation.ini

Reflecting the contents of the setting file

The file is read and used when Agent starts.

To operate according to the contents of the file the restart of Agent is needed.

Customization

PollingTime

Specify a period of time in seconds during which system messages are monitored. The default value is 10.

0 (not monitored) to 3600 (one hour)

```
PollingTime=time
```

Oracle (valid only for the Solaris OS Agent, Windows Agent and Linux Agent)

Specify this parameter for configuration management targeting Oracle. If there are multiple instance names, specify as many parameters as the number of instance names.

- "instance-name" and "oracle-home-absolute-path-name" are always required.

- "host-name" can be omitted. When this parameter is omitted, the server node name specified by the management LAN of Agent is used.

- "listener-port-number" can be omitted. When this parameter is omitted, "1521" is used as "listener-port-number".

- When "host-name" is specified, "listener-port-number" cannot be omitted.

```
Oracle=instance-name;oracle-home-absolute-path-name;host-name;listener-port-number
```

Symfoware (valid only for the Solaris OS Agent, Windows Agent and Linux Agent)

Specify this parameter for configuration management targeting Symfoware. If there are multiple RDB system names, specify as many parameters as the number of system names. This definition statement need not be specified for single RDB operation.

```
Symfoware=RDB-system-name
```

SQLServer (valid only for the Windows Agent)

Specify this parameter for configuration management targeting SQLServer. If there are multiple instance names, specify as many parameters as the number of instance names.

```
SQLServer=instance-name-with-a-name: key-name
```

The instance name with a name must be specified in the following format.

```
computer-name-running Agent\instance-name
```

Specify the key name defined with the defusr command.

Instance type	Authentication method	Instance name with a name	Key name	Notes
Default instance	Windows authentication	Default	Default	(*)
	SQL authentication	Default	:key name	-
Instance with a name	Windows authentication	Instance name with a name	Default	-
	SQL authentication	Instance name with a name	:key name	-

*: This definition can be omitted only when using the default instance. To use both default and named instances, specify ":" only as shown below.
SQLServer=:

MultiPathSlice (valid only for the Solaris OS Agent)

Specify this parameter to collect slice information of unconnected multipaths. The default value is OFF.

```
MultiPathSlice= ON or OFF
```

- ON (Slice information of unconnected multipaths is collected.)

- OFF (Slice information of unconnected multipaths is suppressed.)

HBAStatus(HP-UX Agent does not support this parameter)

Specify this parameter to collect HBA's status. The default value is ON.

```
HBAStatus= ON or OFF
```

- ON (status of HBA is collected.)

- OFF (status of HBA is suppressed.)

To unite states of HBA in the environment where the ESC Agent of Solaris OS and Windows exists together with SSC Agent, turn HBAStatus to OFF.

HBAMask(HP-UX Agent does not support this parameter)

Use this parameter to make HBA port be non-displayed. Specify WWPN(World Wide Port Name) of HBA port non-displayed is specified. If multiple HBA ports are specified, specify as many parameters as the number of HBA ports.

```
HBAMask=WWPN-of-HBA-port
```

The warning/error status is displayed for HBA port when FC cable is not connected with it. To suppress the status of HBA because of unused or similar reason, use this parameter.

If the HBA which has already been displayed is specified, its status becomes "timeout". To remove the HBA icon, refer to "6.1.11 Unregistering CA and HBA (FC adapter) icons".

C.8   sstorageagt.conf Parameter

This file is saved at the following location of the Server Node as a setting file for environment variables, etc., used when Agent is started:

Platform of Agent	Location
Windows	$ENV_DIR\Agent\etc\sstorageagt.conf ($ENV_DIR means "Environment Directory" specified at the Agent installation.)
Solaris OS, Linux	/etc/opt/FJSVssage/sstorageagt.conf

Reflecting the contents of the setting file

The file is read and used when Agent starts.

To operate according to the contents of the file the restart of Agent is needed.

Customization

Definitions for monitoring Symfoware

Definitions of environment variables necessary for configuration management targeting Symfoware are described below.

The variables are defined as shown below during Agent installation. Change path names depending on the Symfoware installation environment.

- For Solaris OS Agent and Linux Agent

```
LD_LIBRARY_PATH=/opt/FSUNrdb2b/lib:/etc/opt/FSUNiconv/lib
export LD_LIBRARY_PATH
LD_LIBRARY_PATH_64=/opt/FSUNrdb2b/lib
export LD_LIBRARY_PATH_64
PATH=/opt/FSUNrdb2b/bin
export PATH
```

- For Windows Agent

  Specific definitions are required since necessary environment variables are defined when Symfoware is installed, it is recommended to verify the necessary environment variables to make sure.

Definitions for monitoring Oracle

Environment definitions necessary for configuration management targeting Oracle are described below.

The environment is defined during Agent installation as shown below. Check the definition of environment variable ORACLE_HOME, and change the path name according to the Oracle installation environment.

- For Solaris OS Agent

```
CLASSPATH=$ORACLE_HOME/jdbc/lib/classes12.zip
export CLASSPATH
```

- For Windows Agent

```
CLASSPATH=$ORACLE_HOME/jdbc/lib/classes12.zip
```

C.9   SANGui.cfg File

The SANGui.cfg file (SANGui_<login-user-name>.cfg in normal operation mode) contains keys used to sort Tree and Map view elements. The table below lists the sort keys with the values that can be set for them.

・ Storage directory of the environment settings file before application

  $INS_DIR\Client\eclipse\plugins\com.fujitsu.systemwalker.rcnr.client_x.x.x\Client\etc\san\gui\SANGui.cfg
  ($INS_DIR means "Destination Folder" specified at the Client installation.)
  (The x.x.x will differ depending on the product version.)

・ Storage directory of the environment settings for the login user for the application

  - Windows Vista

    $SYS_DRIVE:\ETERNUS-SSC\Client\workspace\.metadata\.plugins\com.fujitsu.systemwalker.rcnr.client\etc\san\gui
    \SANGui_<login user name>.cfg
    ($SYS_DRIVE means the drive name where Windows operating system is installed.)

  - All other cases (i.e. not Windows Vista)

    $INS_DIR\Client\workspace\.metadata\.plugins\com.fujitsu.systemwalker.rcnr.client\etc\san\gui\SANGui_<login   user
    name>.cfg
    ($INS_DIR means "Destination Folder" specified at the Client installation.)

Property name	Description	Value that can be set	Remarks
GUI_SORT_KEY_FOR_HOST	Host icon sort setting	"Name" (Default) "IPAddress" "SysName"	(*1)
GUI_SORT_KEY_FOR_SWITCH	Switch icon sort setting	"Name" (Default) "IPAddress" "SysName" "EnterpriseCode"	
GUI_SORT_KEY_FOR_STORAGE	Storage icon sort setting	"SerialNumber" "Name" (Default) "IPAddress" "SysName" "EnterpriseCode"	
GUI_SORT_EKY_FOR_HUB	Hub icon sort setting	"Name" (Default) "IPAddress"	

Property name	Description	Value that can be set	Remarks
		"SysName" "EnterpriseCode"	
GUI_SORT_KEY_FOR_BRIDGE	Bridge icon sort setting	"Name" (Default) "IPAddress" "SysName"	
GUI_SORT_KEY_FOR_LIBRARY	Library icon sort setting	"Name" (Default) "IPAddress" "SysName"	
GUI_SORT_KEY_FOR_HBA	FcHba icon sort setting	"ControllerNumber" (Default) "PhysicalNumber" "LogicalNumber" "WWPN"	
GUI_SORT_KEY_FOR_CA	FcCa icon sort setting	"CaAdapterPortNumber" (Default) "CaDisplayPortNumber" "WWPN"	
GUI_SORT_KEY_FOR_SWPORT	SwPort icon sort setting	None	
GUI_SORT_KEY_FOR_HUBPORT	HubPort icon sort setting	None	
GUI_SORT_KEY_FOR_SCSIPORT	BrScsiPort icon sort setting	"Name" "ScsiPortAddress" (Default)	
GUI_SORT_KEY_FOR_BRDEV	BrDev icon sort setting	None	
GUI_SORT_KEY_FOR_LIBSTORAGE	Library internal Storage icon sort setting	"SerialNumber" "Name" "IPAddress" "SysName" (Default) "EnterpriseCode"	
GUI_SORT_KEY_FOR_SCSI_CA	ScsiCa icon sort setting	None	
GUI_SORT_KEY_FOR_UNKNOWNFCPORT	UnknownFcPort sort setting	None	

*1: A Blade server or Industry Standard Server has its own sort process and therefore the sort keys that have been set do not work. The sort keys that have been set are used only when the sort process of the server's own cannot be normally executed.

C.10   Device Polling Setting File

Editing these setting files can customize the default behavior of the device polling function. Two setting files are provided: one file is for defining the polling function behavior and the other file is for defining event linkage control. These files are descried in XML.

Reflecting the contents of the setting file

Changed contents are automatically reflected at the next polling operation. (Manager checks the file contents every 30 seconds even while polling is stopped.) Note that selecting [Tool] - [Option] - [Re-read Definition File] from the resource view menu does not reflect the contents.

Customization (Polling function behavior setting file)

📝 **Note**

- If an error is detected in an XML file, the event message shown below is output for each polling operation. In this event, the polling function operates with the default settings.

  Message: "[Polling] XML File Format Error(XML file name)"

- Be sure not to delete the file itself even if no items are set. If the file is deleted, re-create the file according to the above sample.

- When customizing the polling function behavior setting file, do not edit the setting file in the installation directory but edit the one in the customization directory.

- Setting file name and storage directory

  The polling function behavior setting file is stored in the following location during Manager installation or upgrading:

Platform of Manager	Location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\lib\devicepolling\DP_config.xml ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/lib/devicepolling/DP_config.xml

  When customizing the polling function behavior, copy the polling function behavior setting file in the above location to the customization location shown below, and edit the copy of the file.

Platform of Manager	Customization Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\devicepolling\DP_config.xml ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/devicepolling/DP_config.xml

  If the polling function behavior setting file exists in the customization location, Manager operates in accordance with the setting file. If not, it operates in accordance with the default setting file in the installation directory.

- Setting file format

  Setting contents

Item	Description
Polling interval	Polling operation interval (including during stoppage)
Device not subject to polling	Specify a device to exclude it from polling.

  Node hierarchy

  The tag node hierarchy is shown below.
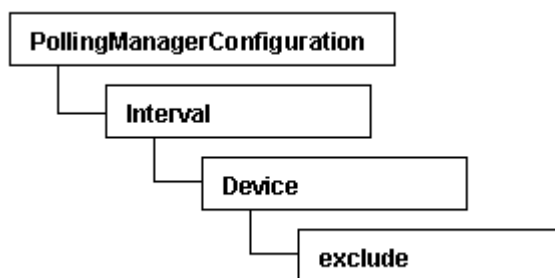
Tags and attributes

Interval tag

Attribute name	Description
value	A polling operation interval is set in seconds (decimal). The minimum interval is 30 seconds. If a value less than 30 is specified, 30 seconds is used for polling. Specifying 0 stops polling.

Device/exclude tag

No attributes can be set in the Device tag. As many exclude tags as required can be set.

exclude tag

Attribute name	Description
address	Specify the IP address of a device to exclude it from polling operations. The address format is "XX.XX.XX.XX".

・ Default value

The default values of the parameters are as follows:

Polling interval: 60 seconds
Device not subject to polling: None

・ Sample setting file

```
<?xml version="1.0" encoding="UTF-8" ?>
<PollingManagerConfiguration>
  <Interval value="60"/>
  <Device>
    <exclude address="10.20.30.40"/>
    <exclude address="10.20.30.50"/>
  </Device>
</PollingManagerConfiguration>
```

Customization (Control Event Linkage setting file)

🛑 Note

・ The portions that can be changed are the name attribute values of the ExternalScript1 and ExternalScript2 tags and the flag attribute value of the Convert tag only. The other portions may not be modified since the changes can possibly cause an abnormal behavior of the polling function.

・ Events involving the server node agent are not posted to Systemwalker Centric Manager. Use the monitoring function of Systemwalker Centric Manager to monitor operating status.

・ Setting file name and storage directory

The setting file is stored in the following directory:

Platform of Manager	Location
Windows	$INS_DIR\Manager\opt\FJSVssmgr\lib\snmpth\1_3_6_1_4_1_211_4_1_3_21_1.xml ($INS_DIR means "Program Directory" specified at the Manager installation.)
Solaris OS, Linux	/opt/FJSVssmgr/lib/snmpth/1_3_6_1_4_1_211_4_1_3_21_1.xml

Setting contents

Item	Description
External script name definition	Define the script name when using external script linkage.
Operation definition	Whether to display a posted status change Whether to output a device event Whether to output the event log Whether to implement linkage with Systemwalker Centric Manager and linkage with Shell/Bat Whether to implement external script linkage 1 Whether to implement external script linkage 2

Setting method

- External Script name definition

When using external script linkage, define the script name in the name attribute of following definition lines (in full path specification).

Item	Definition line
external script linkage 1	<ExternalScript1 name="c:\somedir\script1.bat" />
external script linkage 2	<ExternalScript2 name="c:\somedir\script2.bat" />

- Event linkage behavior definition

In the configuration file, there are following definition lines according to the events. To define Event linkage behavior, set in the flag attribute of each definition line.

Event	Definition line
When the status becomes normal (green)	<Convert val="0" name="" level="I" flag="001111" />
When the status becomes warning (Yellow)	<Convert val="1" name="" level="W" flag="001111" />
When the status becomes error (Red)	<Convert val="2" name="" level="E" flag="001111" />
When the status becomes timeout	<Convert val="3" name="" level="WT" flag="001111" />
When communication has been recovered	<Convert val="10" name="" level="IR" flag="001111" />

Flag Attribute is shown bwlow.

Attribute name	Description
flag	Control of event, linkage with Systemwalker Centric Manager, and linkage with Script (in 6-bits in binary) The "0" is interpreted as "off", the "1" is "on". **bit5** ... External script linkage 2 **bit4** ... External script linkage 1 **bit3** ... Linkage with Systemwalker Centric Manager, Linkage with Shell/Bat **bit2** ... Event log output **bit1** ... Device event output **bit0** ... Status change notification

Attribute name	Description
	For example, only linkage with Systemwalker Centric Manager is set to on "001000".

C.11   RAID Group Integration Mode Definition File

When large-scale configuration for storage devices, such as ETERNUS8000, ETERNUS6000, ETERNUS4000 are displayed on the Correlation window, the Correlation window can look complicated though it depends on the model and the configuration. For that reason RAID Group Integration function is supported as the function to make the screen look simple. By setting the client definition file "groupmode.dat", the RAID Group integration mode (on/off) can be made for this function.

P Point
. . . .
If the large-scale configuration storage, Fujitsu recommends that RAID Group integration mode should be switched on.
. . . .

The client definition file is stored in the following.

・ Correlation management view

$INS_DIR\Client\eclipse\plugins\com.fujitsu.systemwalker.rcnr.client_x.x.x\Client\etc\san\gui\groupmode.dat
($INS_DIR means "Destination Folder" specified at the Client installation.)
(The x.x.x will differ depending on the product version.)

・ When correlation management start

$INS_DIR\Client\etc\san\gui\groupmode.dat
($INS_DIR means "Destination Folder" specified at the Client installation.)

The RAID Group integration mode can be set in "groupmode.dat" file as follows:

How to set	Description
GROUPMODE_ETERNUS=0	Indicates that RAID Group integration mode is put off (default).
GROUPMODE_ETERNUS=1	Indicates that RAID Group integration mode is put on.

C.12   bcm.conf Parameter

This file is a detailed setting file used when dealing with a FC-SCSI bridge by storage management:
Since this file is not installed, it is necessary to create it in the following location.

Platform of Manager	Location
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\bcm.conf ($ENV_DIR means "Environment Directory" specified at the Manager installation.)
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/bcm.conf

Reflecting the contents of the setting file

If the setting file is changed, select [Tool] - [Option] - [Re-read Definition File] from the resource view, or reactivate the Manager. This reflects the settings on this software.

Customization

With the storage management, the type of SCSI device connected to a bridge can be set by using the bcm.conf file. Specify the "Vendor ID", "Product ID", "LUN number", and "device type" of the SCSI device in the bcm.conf file in the text format before connecting it.

The storage management compares information of a SCSI device connected to the bridge with information in bcm.conf.

- ・ Vendor ID

- ・ Product ID

- ・ LUN number

If the information matches, the device type in the bcm.conf is set as the device type of the SCSI device.

Example

Description example of bcm.conf

```
# Start a comment line with "#".
# VenderID,ProductID,LUN,DeviceType(0:Unknown,1:Disk,2:Drive,3:Array,4:Robot)
# Define data in the above sequence.
IBM,03590B11,0,2
IBM,03590B11,1,4
FUJITSU,M8100AA2,0,2
FUJITSU,M8100AA2,1,4
Quantum,DLT4000,1,2
# STK,9730,1,4
IBM,ULT3580-TD1,0,2
```

C.13 Polling Service Setting File

The default operation of the polling service can be customized by editing its XML configuration file.

Reflecting the file

If the file has been changed, then it needs to be reflected in this product. To do that, reactivate the Manager or from the Resource management window select [Tool] - [Option] - [Re-read definition file].

Customization

Note

- ・ Do not delete the file, even if no items are specified.

- ・ To customize the polling service, edit the file in the customization directory (not the one in the installation directory).

File path and name

When the Manager is installed or upgraded, the configuration file is stored in the directory below:

Manager OS	Absolute path name
Windows	$INS_DIR\Manager\opt\FJSVssmgr\lib\polling\pollingService.xml, where $INS_DIR is the "executable directory" specified during Manager installation.
Solaris OS, Linux	/opt/FJSVssmgr/lib/polling/pollingService.xml

To customize the polling service, copy the configuration file in the directory above to the customization directory below, then edit it:

Manager OS	Absolute path name (for customization)
Windows	$ENV_DIR\Manager\etc\opt\FJSVssmgr\current\polling\pollingService.xml, where $ENV_DIR is the "environment directory" specified during Manager installation.
Solaris OS, Linux	/etc/opt/FJSVssmgr/current/polling/pollingService.xml

If there is a configuration file in the customization directory, then the Manager uses it, otherwise it uses the default configuration file in the installation directory.

File format

Contents

Item	Content
Polling interval	Polling operation interval (including stopping).
Polling execution time specification	Polling execution time.

Node hierarchy

The tag node hierarchy for is displayed below:
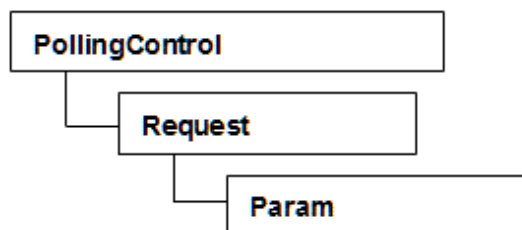
Tags and attribute types

Request tag

The table below lists the request tags. Please note that the "interval" attribute takes precedence over "exectime".

Attribute name	Content	Default
interval	Polling interval in seconds (in decimal format). The minimum value is 30 - specifying shorter values will result in this value being used. The maximum value is 9223372036854775 - specifying larger values will result in this value being used. Please note that values larger than 9223372036854775807 will cause an error. Specifying 0 will cause the polling service to not be executed.	3600
exectime	Polling execution time (in hh:mm:ss format - example: 21:15:00) hh has a valid range of 0 to 23, and mm and ss have a range of 0 to 59.	01:00:00

Param tag

None.

Sample configuration file

```
<?xml version="1.0" encoding="UTF-8" ?>
<PollingControl name="Default" ver="1.0">
  <Request name="WatchAlarm"
className="com.fujitsu.storagesoft.services.polling.method.WatchPoolAlarm" interval="3600">
    <param key="Warning" value="pool status changed: Warning" />
```

```
    <param key="Caution" value="pool status changed: Caution" />
    <param key="Normal" value="pool status changed: Normal" />
  <Request name="WatchCapacity"
className="com.fujitsu.storagesoft.services.polling.method.WatchPoolCapacity"
exectime="01:00:00" />
</PollingControl>
```

📘 Example
....

Modification Method at intervals that observes threshold of Thin Provisioning Pool

Please change the following part when you change the threshold watch interval of Thin Provisioning Pool.

The name attribute changes the interval attribute of the Request tag of "WatchAlarm". It specifies it at the second. Interval attribute is changed to "1800" when changing every 30 minutes.

```
<Request name="WatchAlarm"
className="com.fujitsu.storagesoft.services.polling.method.WatchPoolAlarm" interval="1800">
```
....

📘 Example
....

Modification method at acquisition time of capacity information on Thin Provisioning Pool

Please change the following part when you change acquisition time of capacity information on Thin Provisioning Pool.

The name attribute changes the exectime attribute of the Request tag of "WatchCapacity". The value is time (hh): (mm): It specifies it by second (ss). The exectime attribute is changed to "12:00:00" when changing at 12:00.

```
<Request name="WatchCapacity"
className="com.fujitsu.storagesoft.services.polling.method.WatchPoolCapacity" exectime="12:00:00" />
```
....

Appendix D Troubleshooting

This appendix explains the most common problems that might be encountered during ETERNUS SF Storage Cruiser operation. Further, it explains basic troubleshooting and also provides information on where to find further help.

D.1 Troubleshooting information

If a failure occurs in this software, the following troubleshooting information will be required:

Information for initial investigation

It is the information required for the initial analysis of problems.
The size of data should be small so that it can easily be sent by email.
Collect troubleshooting information immediately when a problem occurs. Sometimes, important information is lost over time.

Information for further investigation

The information for initial investigation can sometimes determine the cause of problems. However, some problems might require further, detailed troubleshooting information. Therefore, in case the cause of a problem cannot be determined from an initial investigation alone, it is required to collect more detailed information.
Collect information for further investigation and submit it to Fujitsu technical staff if requested.

> **Note**
> ....
> - Sometimes, important information is lost over time. Collect troubleshooting information immediately when a problem occurs.
>
> - When using the following to store the collected information, check if there is enough space in the filesystem to ensure system resources are not depleted or any effect is had on system operation.
>
> | Platform | Filesystem which attention is necessary for use |
> |---|---|
> | Windows | filesystem configured in the environment variable TEMP |
> | Solaris OS, Linux, HP-UX | "/", "/var", and "/tmp" |
>
> Also, be careful about space when a different directory is specified with the command option. Ensure there is sufficient space in the directory.
>
> - If troubleshooting information is collected using the managersnap command or agenttsnap command, the information will reach 200KB - 5 MB (the maximum size is 30MB with "-all" option). Also, it is necessary to reserve 5 - 30MB (30 - 80 MB with the "-all" option) for a temporary directory to store the information. The space required varies depending on operating environment, and the data described above is for reference.
> ....

D.2 Information for initial investigation

When a system failure occurs, determine and analyze the cause of the problem as soon as possible.

This section explains information required for initial investigation.

Advantage

The information used for initial problem analysis can be acquired immediately, and is small enough to be sent by email.

D.2.1   Collecting information from the administrative server (Solaris OS)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

P Point

. . . .

In cluster configurations, collect information on both the primary and secondary nodes of the administrative server.

. . . .

1. Make a note of the error code (swsagXXXX), if an error dialog box is displayed.

2. Login to the administrative server with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

3. Execute the managersnap command.

   ```
   # /opt/FJSVssmgr/sbin/managersnap [-dir directory]
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

Information

. . . .

Case of Solaris 10 OS:

Although the following message is output in /var/adm/messages when the managersnap command is executed, it will be not affect command processing and no corrective action needs to be taken.

```
WARNING: The <if>:ip*_forwarding ndd variables are obsolete and may be removed
in a future release of Solaris. Use ifconfig (1M) to manipulate the forwarding
status of an interface.
```

. . . .

D.2.2   Collecting information from the administrative server (Linux)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

P Point

. . . .

In cluster configurations, collect information on both the primary and secondary nodes of the administrative server.

. . . .

1. Make a note of the error code (swsagXXXX), if an error dialog box is displayed.

2. Login to the administrative server with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

3. Execute the managersnap command.

   ```
   # /opt/FJSVssmgr/sbin/managersnap [-dir directory]
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

D.2.3   Collecting information from the administrative server (Windows)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Make a note of the error code (swsagXXXX), if an error dialog box is displayed.

2. Login to the administrative server with OS administrator permissions.

   OS administrator permissions are required to collect the information.

3. Execute the managersnap command. The $INS_DIR means "Program Directory" specified at the Manager installation.

   ```
   C:\> $INS_DIR\Manager\opt\FJSVssmgr\sbin\managersnap -dir directory
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

D.2.4   Collecting information on managed server node (Solaris OS)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command.

   ```
   # /opt/FJSVssage/sys/agentsnap [-dir directory]
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

Information

....

Case of Solaris 10 OS:

Although the following message is output in /var/adm/messages when the agentsnap command is executed, it will be not affect command processing and no corrective action needs to be taken.

```
WARNING: The <if>:ip*_forwarding ndd variables are obsolete and may be removed
in a future release of Solaris. Use ifconfig (1M) to manipulate the forwarding
status of an interface.
```

....

D.2.5   Collecting information on managed server node (Windows)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions.

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command. The $INS_DIR means "Program Directory" specified at the Agent installation.

   ```
   C:\> $INS_DIR\Agent\sbin\agentsnap -dir directory
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

3. Collect event log of Windows by Event Viewer which is a standard application of Windows.

   Run "Event Viewer", select [Action] - [Save Log File As], and save the following event log files.

   - System files

   - Application files

Note

....

When using Windows 2000:

Check whether Windows 2000 Support Tools have been installed before executing the agentsnap command. If Windows 2000 Support Tools have not been installed, take either of the following actions:

・ Install Windows 2000 Support Tools from the Windows 2000 CD.

・ Use regedit.exe to get the registry values for [1] and [2] below. (Note that there is no need to get values for registries that do not exist.)

For [1], get all of the key values indicated.
For [2], get all of the key values indicated, as well as all of the values for subordinate keys.

```
HKEY_LOCAL_MACHINE\
    HARDWARE\
        DEVICEMAP\
            Scsi          --- [1]
    SOFTWARE\
        Emulex            --- [1]
        Fujitsu           --- [1]
        SNIA              --- [2]
        Wow6432Node\
            Emulex        --- [1]
            Fujitsu       --- [1]
            SNIA          --- [2]
    SYSTEM\
        CurrentControlSet\
            Services      --- [1]
```

D.2.6 Collecting information on managed server node (Linux)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command.

   ```
   # /opt/FJSVssage/sys/agentsnap [-dir directory]
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

D.2.7 Collecting information on managed server node (HP-UX)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

Collect information directly by cp command.

1. Collect system log files.

   Collect all files from the directory below.

   - /var/adm/syslog/syslog.log

   - /var/adm/syslog/OLDsyslog.log (If exists)

2. Collect trace log files.

   Collect all files from /var/opt/FJSVssage directory. (including sub-directories)

3. Collecting setting files.

   Collect all files from /etc/opt/FJSVssage directory. (including sub-directories)

4. Collect core file, if it exists on the root directory "/".

D.2.8　Collect information about the client environment

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions.

   OS administrator permissions are required to collect the information.

2. Execute the clientsnap command. The $INS_DIR means "Destination Folder" specified at the Client installation.

   ```
   C:\> $INS_DIR\client\sbin\clientsnap -dir directory
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

3. Collect a screen shot of the window at the time the trouble occurred.

   Perform the following on the client that troubleshooting information is being collected for.
   Press the Print Screen key, and then save the copy in a file format (e.g. bitmap file) after pasting the image on the clipboard with the edit tool.

4. Collect the system version.

   Using the same method as step 2, obtain a hard copy of the OS, version level, and service pack.
   Select "My Computer" and then select [Properties] from the pop-up menu. Display the window of [General], and then take hard copies of each of the tabs.

D.3　Information for further investigation

If it is not possible to determine the cause of the problem in the initial investigation, further detailed information may be needed.

This section explains how to collect required information to resolve the problem.

Data feature

As there is various information required in order to determine the cause of the problem, the size of the data will be greater than that used for the initial investigation.

D.3.1　Collecting information from the administrative server (Solaris OS)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

📘 Point
. . . .

In cluster configurations, collect information on both the primary and secondary nodes of the administrative server.
. . . .

1. Login to the administrative server with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the fjsnap command or managersnap command.

   Usually, please use the fjsnap command. If fjsnap command cannot be executed for some reason, use the managersnap command.

   - fjsnap command

     ```
     # /opt/FJSVsnap/bin/fjsnap -a output
     ```

     Replace the variable *output* with the name of the output medium or specific file name to save the collected information.

- managersnap command

```
# /opt/FJSVssmgr/sbin/managersnap [-dir directory] -all
```

It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

📖Information
....

Case of Solaris 10 OS:

Although the following message is output in /var/adm/messages when the managersnap command is executed, it will be not affect command processing and no corrective action needs to be taken.

```
WARNING: The <if>:ip*_forwarding ndd variables are obsolete and may be removed
in a future release of Solaris. Use ifconfig (1M) to manipulate the forwarding
status of an interface.
```
....

D.3.2   Collecting information from the administrative server (Linux)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

📘 Point
....
In cluster configurations, collect information on both the primary and secondary nodes of the administrative server.
....

1. Login to the administrative server with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the fjsnap command and managersnap command.

   Please execute both commands. If the fjsnap command cannot be executed for some reason, use only the managersnap command.

   - fjsnap command

   ```
   # /opt/FJSVsnap/bin/fjsnap -a output
   ```

   Replace the variable *output* with the name of the output medium or specific file name to save the collected information.

   - managersnap command

   ```
   # /opt/FJSVssmgr/sbin/managersnap [-dir directory] -all
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

D.3.3   Collecting information from the administrative server (Windows)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the administrative server with OS administrator permissions.

   OS administrator permissions are required to collect the information.

2. Execute the managersnap command. The $INS_DIR means "Program Directory" specified at the Manager installation.

   ```
   C:\> $INS_DIR\Manager\opt\FJSVssmgr\sbin\managersnap -dir directory -all
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

D.3.4 Collecting information on managed server node (Solaris OS)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command.

   ```
   # /opt/FJSVssage/sys/agentsnap [-dir directory] -all
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

D.3.5 Collecting information on managed server node (Windows)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions.

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command. The $INS_DIR means "Program Directory" specified at the Agent installation.

   ```
   C:\> $INS_DIR\Agent\sbin\agentsnap -dir directory -all
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

Note

When using Windows 2000:

Check whether Windows 2000 Support Tools have been installed before executing the agentsnap command. If Windows 2000 Support Tools have not been installed, take either of the following actions:

- Install Windows 2000 Support Tools from the Windows 2000 CD.

- Use regedit.exe to get the registry values for [1] and [2] below. (Note that there is no need to get values for registries that do not exist.)

  For [1], get all of the key values indicated.
  For [2], get all of the key values indicated, as well as all of the values for subordinate keys.

```
HKEY_LOCAL_MACHINE\
    HARDWARE\
        DEVICEMAP\
            Scsi          --- [2]
    SOFTWARE\
        Emulex            --- [2]
        Fujitsu           --- [2]
        SNIA              --- [2]
        Wow6432Node\
            Emulex        --- [2]
            Fujitsu       --- [2]
            SNIA          --- [2]
    SYSTEM\
        CurrentControlSet\
            Services\     --- [1]
                elxstor   --- [2]
                lpxnds    --- [2]
                ql2300    --- [2]
                mpio      --- [2]
```

```
                    F3GLMiDr  --- [2]
                    F3GLMpDr  --- [2]
```

D.3.6　Collecting information on managed server node (Linux)

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions (root).

   OS administrator permissions are required to collect the information.

2. Execute the agentsnap command.

   ```
   # /opt/FJSVssage/sys/agentsnap [-dir directory] -all
   ```

   It is possible to change a directory to save the information by specifying -dir option. If the option is omitted, information will be saved in /tmp.

D.3.7　Collecting information on managed server node (HP-UX)

Collect the information which is required by Fujitsu technical staff, and submit the file to them.

D.3.8　Collect information about the client environment

The method for collecting information is as follows. Submit the information to the Fujitsu technical staff.

1. Login to the server node with OS administrator permissions.

   OS administrator permissions are required to collect the information.

2. Execute the clientsnap command. The $INS_DIR means "Destination Folder" specified at the Client installation.

   ```
   C:\> $INS_DIR\client\sbin\clientsnap -dir directory -all
   ```

   Specify the directory to save the information with -dir option (The -dir option cannot be omitted).

D.4　Configuration management functionality

The actions to be taken for problems related to configuration management functionality are shown below.

D.4.1　No detection of device is possible

Phenomenon

Message swsag0018 ("The selected IP device cannot be found.") is displayed and the device cannot be registered.

Action

- ・ If the server node cannot be detected

   - Check that the device power supply is on, and that there are no problems on the LAN. If the Network load is high, clear it and then re-execute.

- Check that the Agent is running.

- User the Agent information change command (setagtip) to check the Agent start IP address. For details about the Agent information change command (setagtip), refer to the following:

    - Solaris OS version: "12.5.1.2 Agent information change command (setagtip)"

    - Windows version: "12.6.1.2 Agent information change command (setagtip)"

    - Linux version: "12.7.1.2 Agent information change command (setagtip)"

    - HP-UX version: "12.8.1.1 Agent information change command (setagtip)"

- If the server node cannot be booted from SAN, confirm whether to do be done the port license of ETERNUS SN200 series Fibre Channel switch in activation.

- When you detect the server node for which Agent is installed, do not use VMware ESX option in the "Register a server" dialog.

- When you detect the server node for which the operating system is VMware Infrastructure 3 Version 3.5 (or later) or VMware ESXi 3.5 (or later), confirm the followings.

    - Enter a user name and password by using VMware ESX option in the "Register a server" dialog.

    - Check that entered user name and password are correct.

    - When the version of VMware is earlier than version 3.5, install an Agent on the host operating system and register server by using the same method as before.

    - Do not specify the Virtual Center.

- ・ If the Fibre Channel switch cannot be detected

  - Check that the device power supply is on, and that there are no problems on the LAN. If the network load is high, clear the traffic and then re-execute.

  - Refer to the following for the Fibre Channel switch:

    - ETERNUS SN200 (Brocade SilkWorm) series Fibre Channel switches, PRIMERGY BX600 Fibre Channel switchblades, ETERNUS VS900 model 300 Virtualization switch: "4.2.1.3 Problem-handling (FAQ)"

    - ETERNUS VS900 model 200 virtualization switch: "4.2.6.3 Problem-handling (FAQ)"

    - ETERNUS SN200 MDS (Cisco MDS) Fibre Channel switches: "4.2.4.2 Problem-handling (FAQ)"

    - McDATA Fibre Channel switches: "4.2.5.2 Problem-handling (FAQ)"

- ・ If the disk array device cannot be detected

  - Check that the device power supply is on, and that there are no problems on the LAN. If the Network load is high, clear it and then re-execute.

  - Refer to "4.3.1.2 Problem-handling (FAQ)" in "Chapter 4 Environment Configuration".

D.4.2   The Fibre Channel card (HBA) is not displayed

Phenomenon

The server node Fibre Channel card (HBA) is not displayed.

Action

- ・ Check that the hardware and the driver are running correctly.

- ・ Check that the Fibre Channel card (HBA) is a supported target.

- ・ Check that the SNIA HBA API library can be set correctly. For details about the settings method, check the OS in "4.1 Server Node (Host)".

・ If zoning information has not been set in the Fibre Channel switch, the Fibre Channel card (HBA) may not be displayed. Create the zoning information in the Fibre Channel switch, and then check the Fibre Channel card display.

D.4.3 Device is not possible to communicate

Phenomenon

The device cannot communicate or a timeout occurs.

Action

・ Check that the device power supply is on, and that there are no problems on the LAN.

・ Refer to "9.1.2 Changing the operating environment" before modifying the IP address.

・ For communication devices that use the SNMP protocol, such as Fibre Channel switches and storage devices, the community names of the target device and administrative server may not match. To modify the community name of the target device, refer to "C.2 sanma.conf Parameter", to set the community name, and then reflect the settings in the settings file.

・ In server nodes, check that the Agent is running.

・ To modify the host name after the server node device has been registered, follow the procedures in "9.1.2.4 Changing the name of a server node (host)".

・ Check that there are no problems with the communication mode settings in the network environment. If one communication mode is set to "Auto Negotiation" while the other is set to "Full Duplex" communications may be slow, this needs to be corrected.

D.4.4 The access path displays an ERROR (red)

Phenomenon

The access path displays an ERROR (red)

Action

・ Check that the device power supply is on, and that there are no problems on the LAN.

・ For details about Fibre Channel switch problems, refer to "4.2.1.3 Problem-handling (FAQ)".

・ Check the "Access path error" in "6.3.2.4 Access path status display".

D.4.5 The device displays a WARNING (yellow) or an ERROR (red)

Phenomenon

The device displays a WARNING (yellow) or an ERROR (red)

Action

・ Server node

    - Check whether an access path error or multi path error has occurred.

    - Check whether the HBA is faulty.

    - The server node also displays a WARNING (yellow) if access path inheritance is required.

    - Refer to "8.1 Windows Displayed in the Event of a Fault and Troubleshooting".

- Fibre Channel switch

  If the Fibre Channel switch cannot be detected, refer to the following for the Fibre Channel switch:

    - ETERNUS SN200 (Brocade SilkWorm) series Fibre Channel switches, PRIMERGY BX600 Fibre Channel switchblades, ETERNUS VS900 model 300 Virtualization switch: "4.2.1.3 Problem-handling (FAQ)"

    - ETERNUS VS900 model 200 virtualization switch: "4.2.6.3 Problem-handling (FAQ)"

    - ETERNUS SN200 MDS (Cisco MDS) Fibre Channel switches: "4.2.4.2 Problem-handling (FAQ)"

    - McDATA Fibre Channel switches: "4.2.5.2 Problem-handling (FAQ)"

    - Common: "8.1 Windows Displayed in the Event of a Fault and Troubleshooting"

- Disk array devices

    - During the removal of the parts that configure the device, depending on the timing, a device error is detected and the device may display an ERROR (red). From the menu, select [View] and then [Refresh], or press the [F5] key to update the information.

    - In all other cases, refer to "8.1 Windows Displayed in the Event of a Fault and Troubleshooting".

- Devices that are edited in the manual configuration window

  The state for devices that are edited in the manual configuration window is not recovered automatically. After the device is recovered, return the state for the device manually. There are following two methods to return the state for the device manually.

    - Right-click the device icon in the Resource View, select [Property] from the pop-up menu. Click <Change> button of "Device Status", select "normal" in the list of "Change Device Status" dialog.

    - Right-click the device icon in the manual configuration window, select [Change Device Information] from the pop-up menu, select "normal" in the "Device Status" list.

D.4.6   Managing cascaded Fibre Channel switches (SN200)

Phenomenon

Managing cascaded Fibre Channel switches (SN200)

Action

To manage cascaded Fibre Channel switches (SN200), register all cascaded switches in this software. If all of the switches are not registered, the SAN environment cannot be managed correctly. For example, Fibre Channel switch information cannot be displayed correctly.

For details about dealing with problems that occur when all cascaded switches are registered correctly, refer to "4.3.1.2 Problem-handling (FAQ)".

D.4.7   Access path setting has failed

Phenomenon

The access path setting has failed.

Action

- If an error occurs in the monitoring state for a single (or multiple) device from the server node, HBA, storage, CA, bridge, or switch, take the following action:

    - If the monitoring state is "timeiout"

      Refer to "D.4.3 Device is not possible to communicate".

- If the monitoring state is "undefined"

  Register the unit (device) using the physical resource management screen.

- If the monitoring state is "invalid Password" (storage, CA, bridge, or switch)

  Modify the device password that is maintained in the software. Use [Change account for device management] in the document view [Device] menu.

- If the monitoring state is "The access path must be inherited" (HBA)

  Refer to "8.3.1 HBA state is "The access path must be inherited" after the HBA on the server node is replaced".

D.4.8 Using the storage migration function

Phenomenon

One of the following types of trouble occurs while using the storage migration function:

- ・ The "Monitoring Status" of the CA port in the storage device is "timeout".

- ・ The CA port of the storage device is not displayed.

- ・ The Fibre Channel card (HBA) of the server node is not displayed.

- ・ The access path is not displayed.

- ・ The access path is displayed incorrectly.

- ・ The physical line is not displayed.

- ・ The physical line is displayed incorrectly.

- ・ The "Same WWPN already exists" message is displayed in the event log.

- ・ The dialog box of "swsag0255" message is displayed.

Action

Do not perform operations with this software while using the storage migration function, because of the device information may not display correctly. If the device information does not display correctly, take the following action:

1. Delete the storage device that is using the storage migration function.

2. Clear the storage migration function settings.

3. Register the storage device that was deleted in step 1 again.

4. After the storage device has been registered again, re-configure the access path settings if the access path is "Config miss match".

D.4.9 The"Register SAN devices"dialog is not displayed. The dialog where nothing is displayed is displayed.

Phenomenon

When [File] - [Register] - [Register SAN devices] of the menu is executed, The"Register SAN devices"dialog is not displayed. The dialog where nothing is displayed is displayed.

Action

Please shut the screen with close button in the upper right of a dialog concerned, and execute the "Register SAN devices" operation again.

D.4.10 No detection of device in the subnet is possible

Phenomenon

Message swsag0255 ("More than one HBA/Storage FC Port has a same WWPN. ") is displayed and the device in the subnet cannot be registered.

Action

- Turn back WWPN to before it changes, when the WWPN of Storage FC Port is changed by using the storage migration function.

- Please correspond either as follows when IP address on the Slave CM side is set with ETERNUS

  - Please execute "Detect device in subnet" again after invalidating IP address on the Slave CM side.

  - Please put into the state that the communication between the administrative server and Slave CM cannot be done, and execute "Detect device in subnet" again.

  - Do not perform "Detect device in subnet", please detect devices by "Detect by IP address".

- When a Softek Storage Cruiser Agent is installed in a Windows server, check the configuration file (wwpn.dat) of the agent. WWPN of other devices may be set.

D.5   Performance management functionality

The actions to be taken for problems related to performance management functionality are shown below.

D.5.1   Cannot register devices in the performance management window (swsag0609)

Phenomenon

When the device icon is moved to the performance management window from the resource management screen using the Drag & Drop method and the message swsag0609 ("Uncompleted to register the device %IP ADDRESS% ") is displayed.

Action

The message swsag0609 will appear if the configuration file for the target device cannot be found or read. Follow the procedure below to create the configuration file.

1. Select the target device name in the performance management window tree.

2. Execute [Device] - [Create Device Configuration File] form the performance management window menu bar.

📝 **Note**

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If the creation of the configuration information file fails, check the state of the device or network according to the following procedure.

- All supported storage models

  - Using the ping command, perform a communication check to make sure that the device can be recognized from the operation control server.

  - Log into ETERNUSmgr, and set the administrative server IP address in "Setting"(Main Menu) - "Set IP Address(Others)".

- ETERNUS DX60/DX80, ETERNUS2000, ETERNUS4000 (except models 80 and 100), ETERNUS6000, ETERNUS8000

  - If you have logged into ETERNUSmgr, log out.

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D.5.2 Performance monitoring does not recover from the recovery state

Phenomenon

Performance monitoring does not recover from the recovery state.

Note: "recovery state" means that the P mark at the top right of the device icon in the resource management screen is yellow.

Action

Take one of the following actions:

- ETERNUS DX60/DX80, ETERNUS2000, ETERNUS4000 (except models 80 and 100), ETERNUS6000, ETERNUS8000
  If you have logged into ETERNUSmgr, log out.

- If the network is too busy (is experiencing very high traffic levels) and the administrative server is on a different subnet than the device being monitored, it may not be possible to obtain performance monitoring information within the interval that has been set. Change the performance monitoring interval accordingly.

D.5.3 Cannot display the performance graph (after the device configuration is modified)

Phenomenon

The device configuration information is modified using [Device] - [Create Configuration Device File] from the performance management window menu bar, but the performance information for a LUN that has been added or has had its configuration modified cannot be displayed.

Action

Performance information cannot be displayed because the performance monitoring process cannot read or access the new configuration information.

Update the new device configuration information for performance monitoring by following the procedures in "7.2.11 Updating configuration information".

Information

From the point at which the device configuration is modified until the new device configuration is updated in performance monitoring processing using the above procedure, performance information will be obtained and saved using the previous device configuration information.

D.5.4 Cannot display the performance graph

Phenomenon

Performance information for the date and time on which performance monitoring was performed cannot be displayed as a graph.

Action

Take one of the following actions:

・ Performance information for the date and time specified for the graph may have been deleted if the period set to save information has passed.
Refer to "C.4 perf.conf Parameter", and check the period for saving performance information.

・ Performance monitoring for a single device may have been executed from more than one administrative server at the same time. Softek Storage Cruiser and ETERNUS SF Storage Cruiser/Systemwalker Resource Coordinator administrative servers are also target administrative servers.
Check whether performance monitoring for a single device was executed from more than one administrative server at the same time.

D.6   Linkage with other software

D.6.1   Cannot display performance information in Systemwalker Service Quality Coordinator

Phenomenon

Performance monitoring information in Systemwalker Service Quality Coordinator is not displaying, even though monitoring has been started from the resource management screen.

Action

If performance management information is displaying in the performance management window, check Systemwalker Service Quality Coordinator settings. If not, follow the procedures in "D.5 Performance management functionality".

D.6.2   Cannot wake up Web browser for calling management software

Phenomenon

On the client GUI of this software, the Web browser for calling management software cannot be waked up.

Action

The Web browser (default Web browser) may not be set up correctly. Set the default Web browser.

Set up Internet Explorer as the default Web browser

Set up the default Web browser by using one of following methods.

- Setting from Internet Explorer

1. Start Internet Explorer, and select [Tools] - [Internet Options] - [Programs] tab.

2. Check "the Internet Explorer should check to see whether it is the default browser" check box, and click <Apply> button and <OK> button.

3. When Internet Explorer is re-started and a message (question whether you are prompted to make it the default browser or not) is displayed, click <Yes> button.

- Setting from the menu

1. Select [Control Panel] - [Add or Remove Programs] (or [Add/Remove Programs]) - [Set Program Access and Defaults].
If the "Set Program Access and Defaults" exists in the menu displayed by clicking <Start> button, select it.

2. Select [Custom], and click an arrow on the right side.
Select Internet Explorer in the "Choose a default Web browser ", and click <OK> button.

Set up other browser as the default Web browser

Set up by referring manuals for its browser.

D.7　Installation and uninstallation

D.7.1　[Windows Version] Cannot uninstall ETERNUS SF Storage Cruiser

Phenomenon

While uninstalling [Windows Version] ETERNUS SF Storage Cruiser (manager or client or agent) using with <Add or Remove Programs> dialog, it is not uninstalled with error dialog that displays "Error reading setup initialization file"

Action

Insert the ETERNUS SF Storage Cruiser program CD-ROM, execute setup.exe that was used to install.

D.8　Troubles of the Eco-mode operation

D.8.1　Cannot execute the all Eco-mode operations

Phenomenon

On the Client window, the all Eco-mode operations cannot be executed.

Action

It is necessary to log in as a privileged administrator to execute the Eco-mode operation. If you are logging in the Client window by the non-privileged administrator, log in as a privileged administrator.

D.8.2　Cannot change the Eco-mode of the RAID group

Phenomenon

On the Client window, the Eco-mode of the RAID group cannot be changed.

Action

- When the Eco-mode of the storage device is OFF, the Eco-mode of the RAID group cannot be changed. Re-execute the operation after executing " Procedure to set the storage device Eco-mode to ON" in the "6.1.13 How to control the Eco-mode".

- For the RAID groups that are described in "Uncontrollable RAID groups" in the "1.3.4 Energy-saving operation for storage device", the Eco-mode operation cannot be done. Check the composition of the RAID group.

D.8.3　Cannot request to start or stop the disk drive rotation

Phenomenon

- ・ On the Client window, the <Start of disk...> button or <Stop of disk...> button cannot be clicked.

- ・ On the Client window, the target RAID group is not displayed in the "Start of disk" dialog or "Stop of disk" dialog.

- ・ On the Client window or storageadm spindle command, the request to start or stop the disk drive rotation cannot be accepted.

Action

- ・ When any message is output by the operation, refer to its message explanation in the "ETERNUS SF Storage Cruiser Message Guide" and solve the problem.
  When using the storageadm spindle command, refer to the notes of its command in addition to above. The reference point is as follows.

  - Solaris OS version : "NOTES" in the "12.1.1.7 Disk control command (storageadm spindle)"

  - Linux version: "NOTES" in the "12.2.1.7 Disk control command (storageadm spindle)"

  - Windows version: "NOTES" in the "12.3.1.8 Disk control command (storageadm spindle)"

- ・ When the <Start of disk...> button or <Stop of disk...> button cannot be clicked on the Client window, the RAID groups that can be start or stop the disk drive rotation may not exist. When the RAID group including the target disk drive is not displayed in the "Start of disk" dialog or "Stop of disk" dialog on the Client window, the Eco-mode of its RAID group may be OFF. In both cases, please confirm the Eco-mode of the target RAID group. If its Eco-mode is OFF, re-execute the operation after executing "Procedure to set the RAIDGroup Eco-mode to ON" in the "6.1.13 How to control the Eco-mode".

D.8.4   Cannot start the disk drive rotation

Phenomenon

On the Client window or storageadm spindle command, the disk drive rotation cannot be started even if the "start request" is executed.

Action

- ・ When any message is output by the operation, refer to its message explanation in the "ETERNUS SF Storage Cruiser Message Guide" and solve the problem.
  When using the storageadm spindle command, refer to the notes of its command in addition to above. The reference point is as follows.

  - Solaris OS version : "NOTES" in the "12.1.1.7 Disk control command (storageadm spindle)"

  - Linux version: "NOTES" in the "12.2.1.7 Disk control command (storageadm spindle)"

  - Windows version: "NOTES" in the "12.3.1.8 Disk control command (storageadm spindle)"

D.8.5   Cannot stop the disk drive rotation

Phenomenon

On the Client window or storageadm spindle command, the disk drive rotation cannot be stopped even if the "stop request" is executed.

Action

- ・ When any message is output by the operation, refer to its message explanation in the "ETERNUS SF Storage Cruiser Message Guide" and solve the problem.
  When using the storageadm spindle command, refer to the notes of its command in addition to above. The reference point is as follows.

  - Solaris OS version : "NOTES" in the "12.1.1.7 Disk control command (storageadm spindle)"

- Linux version: "NOTES" in the "12.2.1.7 Disk control command (storageadm spindle)"

- Windows version: "NOTES" in the "12.3.1.8 Disk control command (storageadm spindle)"

・ The disk drive does not stop when the target RAID group status is as follows. Check the RAID group status.

- Part of the storage device controller module and the module for the disk drive access route contain a fault.

- The disk drive that was used to configure the RAID group is faulty.

- There is AdvancedCopy copy data.

- There is an EC/REC session (including when there is no copy data). The disk does, however, stop when the EC/REC status is Suspend.

- There is a QuickOPC/SnapOPC session (including when there is no copy data).

・ If the volume that belongs to the specified stop target RAID group is concatenated with a different RAID group using the LUN concatenation functionality, the disk is not stopped. To stop all related RAID group disks, execute the any one of the following methods. However, if the related RAID group is any of "Uncontrollable RAID groups", the disk control cannot be executed.

- Specify all of the related RAID groups

- Specify the -f option (The only storagadm spindle command can use this method)

・ Even if the target RAID group meets the conditions for the RAID group stopping, time more than a certain period is needed until the disk drive stops actually as described in the "Stopping disk drives". Please reconfirm the state after it passes for a while.

D.8.6 Disk drive status has not been changed from "Active" to "Idle"

Phenomenon

On the Client window, the "Status" field has not been changed from "Active" to "Idle" in the RAID group that the "Control" field is "stop request".

Action

The ETERNUS disk storage system may judge that the RAID group is used with high frequency because its RAID group has been accessed periodically. In this case, the ETERNUS disk storage system does not stop its disk drive rotation. Check the using state of the RAID group.

For the above control mechanism of the ETERNUS disk storage system, refer to "Continuous disk drive rotation" in the "1.3.4 Energy-saving operation for storage device".

Appendix E Mail client function program with the Windows Version of Manager (stxsmail)

The explanation described as follows is how to use mail client function program (henceforth "stxsmail") which sends event inftion with bat linkage of the Windows version manager.

Stxsmail is a program which achieves the mail client function in Windows.

Information
. . . .

For Solaris OS or Linux, SMTP server is used on the server where the SSC administrative server is running.
. . . .

See
. . . .

For details, see "6.4 Event Display and Linkage".
. . . .

E.1 stxsmail Operating Requirements

stxsmail has the following operating requirements.

Items	Requirements
OS	Windows 2000 Server Windows 2000 Advanced Server Windows Server 2003, Standard Edition Windows Server 2003, Enterprise Edition Windows Server 2008 Standard without Hyper-V (x86) Windows Server 2008 Enterprise without Hyper-V (x86) Windows Server 2008 Datacenter without Hyper-V (x86)
Memory	OS operating requirements must be satisfied.
HDD	OS operating requirements must be satisfied.
Network	TCP/IP protocol must be installed, and communication with external SMTP servers must be enabled.
Mail server	The mail server which can be used is UNIX system server equipped with sendmail which supports the SMTP protocol or Windows Server which supports the SMTP protocol.

E.2 Command Format

The format of the stxsmail command is described.

SYNOPSIS

```
stxsmail [-v] [-l LogFile] [-p PortNo] [-t Timeout] MailServer MailFile
```

OPTIONS

-v

This sets Verbose (redundant) mode.

Specifying this option outputs different types of information to standard output during stxsmail execution.

The option is mainly used for debugging, such as to find the cause of a failure.

-l LogFile

Specify a log file name.

If this option is specified, the execution status of this program is recorded in the specified log file.

The option is mainly used for debugging, such as to find the cause of a failure.

The information recorded in the log file is the same as the information output to standard output by specifying -v option.

-p PortNo

Specify an SMTP port number.

Generally, the SMTP port number is set to 25, but if the SMTP port number of a destination mail server is not 25, specify the SMTP port number of the mail server.

-t Timeout

Specify a timeout value for communication with the mail server. Specify a time in seconds in a range of 1 to 65535.

The default value of this option is 60 seconds.

Specify this option only if required.

MailServer

Specify the server node name (FQDN) or IP address of the mail server.

This parameter cannot be omitted.

MailFile

Specify a mail file to be sent.

This parameter cannot be omitted.

E.3   Mail File Format

Mail files handled by stxsmail must satisfy the following requirements:

- ・ The files are text files.
- ・ Each line ends (EOL) with CRLF(\r\n).
- ・ Similar to the end of a line, each file ends (EOF) with CRLF(\r\n).
- ・ The mail header contains at least one "From:" and one "To:".

A sample mail file is shown below.

The mail file contains a mail header and text, which are separated by one blank line.

General mail header items can be specified in the mail header.

The basic mail header items are described below.

Item	Description
From	Specify a sender mail address.
To	Specify a destination mail address.
Cc	Specify a CC destination mail address.
Bcc	Specify a BCC destination mail address.
Subject	Describe the title of the mail.

Be sure to confirm that "From" and "To" are correctly specified in the mail header.

If "From" or "To" is omitted, stxsmail posts an error and terminates.

The other mail header items can be omitted.

Specify mail addresses for "From", "To", "Cc", and "Bcc" only as follows:

```
Example:
From: mgr@foo.bar.com
```

Be sure not to include a non-mail address. See the following examples:

```
Example 1:
From: < mgr @foo.bar.com>

Example 2:
From: "Administrator" < mgr @foo.bar.com>

Example 3:
From: manager (mgr @foo.bar.com)
```

Multiple mail addresses can be specified on one line for "To", "Cc", and "Bcc" as follows:

```
Example:
Cc: admin@foo.bar.com, root@foo.bar.com
```

A mail address can be specified over multiple lines for "To", "Cc", and "Bcc" as follows:

```
Example:
Cc: admin@foo.bar.com
Cc: root@foo.bar.com
```

A total of 16 mail addresses can be specified for "To", "Cc", and "Bcc".

General mail headers not described above can be specified, however, stxsmail does not guarantee operating results. Mail header items not described above are sent by stxsmail as is to the mail server.

E.4   Errors and Responses

stxsmail posts messages depending on the execution results.

The messages and appropriate responses are described below.

Usage: stxsmail [-v] [-l <LogFile>] [-p <PortNo>] [-t <Timeout>] <MailServer> <MailFile>
-v : Verbose mode
-l <LogFile> : Log file name
-p <PortNo> : SMTP port number (default=25)
-t <Timeout> : Timeout value (default=60sec)
<MailServer> : Mail server (IP address or host name)
<MailFile> : Mail file (must be contains MAIL-HEADERS)

Explanation

stxsmail was started incorrectly. (Parameters are missing, invalid options are specified, or invalid values are specified for options.)

Response

Check the operations for stxsmail, and specify correct options and parameters.

Cannot send a mail - Error on WSACleanup()... Maybe WINSOCK is not available or illegal.

Explanation

Initialization of WinSock failed. (An error occurred in the WSACleanup function.)

Response

Confirm that WinSock can be used on the system. (WinSock can generally be used, so if this error occurs, the OS must be reinstalled.)

Cannot send a mail - Error on WSAStartup()... Maybe WINSOCK is not available or illegal.

Explanation

Initialization of WinSock failed. (An error occurred in the WSAStartup function.)

Response

Confirm that WinSock can be used on the system. (WinSock can generally be used, so if this error occurs, the OS must be reinstalled.)

Cannot send a mail - Error on socket()... Maybe WINSOCK is not available or illegal.

Explanation

Creating a WinSock socket failed. (An error occurred in the socket function.)

Response

Confirm that WinSock can be used on the system. (WinSock can generally be used, so if this error occurs, the OS must be reinstalled.)

Cannot send a mail - Error on gethostbyname()... Maybe missing DNS or name server not respond.

Explanation

The server node name specified for <MailServer> could not be converted to an IP address.

Response

Check the network environment to determine whether the server node name can be correctly converted to an IP address (make sure that DNS settings are correct).

Cannot send a mail - Error on connect()... Maybe host unreachable.

Explanation

Connection to the mail server failed.

Response

Check whether the mail server specified in <MailServer> is functioning normally.

Cannot send a mail - Error on send()... Maybe communication error occoured on mail server.

Explanation

Data sending to the mail server failed.

Response

Check whether the mail server specified in <MailServer> is functioning normally. If it is, then check whether the mail server supports the standard protocol, SMTP.

Cannot send a mail - Error on recv()... Maybe communication error occoured on mail server.

Explanation

Data receiving from the mail server failed.

Response

Check whether the mail server specified in <MailServer> is functioning normally. If it is, then check whether the mail server supports the standard protocol, SMTP.

Cannot send a mail - SMTP protocol error... Protocol violation on mail server.

Explanation

Mail sending failed.

Response

Check whether the mail server specified in <MailServer> supports the standard protocol, SMTP.

Cannot send a mail - SMTP server not respond.

Explanation

The mail server sends no response.

Response

Check whether the mail server specified in <MailServer> is functioning normally. If it is, then check whether the mail server supports the standard protocol, SMTP.

Cannot send a mail - No "From" header.

Explanation

No "From:" header item was found in the mail file.

Response

Specify the "From:" mail header item correctly in the mail file.

Cannot send a mail - No "To" header.

Explanation

No "To:" mail header item was found in the mail file.

Response

Specify the "To:" mail header item correctly in the mail file.

Cannot send a mail - Not found mail file.

Explanation

The specified mail file was not found.

Response

Check for the mail file specified in <MailFile>.

Cannot send a mail - Timeout detected.

Explanation

The mail server sends no response.

Response

Check whether the mail server specified in <MailServer> is functioning normally. If it is, then check whether the mail server supports the standard protocol, SMTP.

E.5 Restrictions

Note the following points about using stxsmail:

- Up to 16 mail addresses can be specified for mail destinations (To, Cc, Bcc).

- Only mail addresses can be specified for each mail address item. (Aliases and other such names cannot be specified.)

- The maximum size of a mail file including EOF is 65536 bytes.

- The maximum length of one line including EOL in a mail file is 4096 bytes.

- A mail file must be consisting of plain text with 7-bit ASCII characters. Accordingly, Japanese or other languages cannot be written in a mail file.

- The mail server which can be used is Windows2000 Server which supports the SMTP protocol of UNIX system server equipped with sendmail or supports the SMTP service equipped standard appending.

- Authentication technologies such as SMTP authentication of mail server (SMTP AUTH) and SMTP before POP are not supported.

- stxsmail does not check the validity of mail headers.

Appendix F How to check product version

This appendix describes how to check version of installed ETERNUS SF Storage Cruiser

🅿 Point

・ ETERNUS SF Storage Cruiser can be operated even if a different version of the agent and manager. Therefore, ETERNUS SF Storage Cruiser to determine the exact use of the environment, you must determine the version of each component..

・ How to check version is different for each platform. ETERNUS SF Storage Cruiser check from the platform of the system components are installed, please read how to determine the appropriate platform.

F.1 To check the product version in Windows operationg system

Check the product version according to the procedure shown below.

1. Logon to Windows operating system, ETERNUS SF Storage Cruiser component is installed.

2. Open the window that can add or remove programs.

   The name of window that can add or remove programs and the method to open its window are as follows.

OS	Name of window	Method to open window
Windows 2000	Add/Remove Programs	[Start] - [Settings] - [Control Panel] - [Add/Remove Programs]
Windows Vista	Programs and Features	[Start] - [Control Panel] - [Programs and Features]
Windows XP Windows Server 2003	Add or Remove Programs	・ When "Start menu" is used: [Start] - [Control Panel] - [Add or Remove Programs] ・ When "Classic Start menu" is used: [Start] - [Settings] - [Control Panel] - [Add or Remove Programs]
Windows Server 2008	Programs and Features	・ When "Start menu" is used: [Start] - [Control Panel] - [Programs and Features] ・ When "Classic Start menu" is used: [Start] - [Settings] - [Control Panel] - [Programs and Features]

The following is "Add or Remove Programs" window.
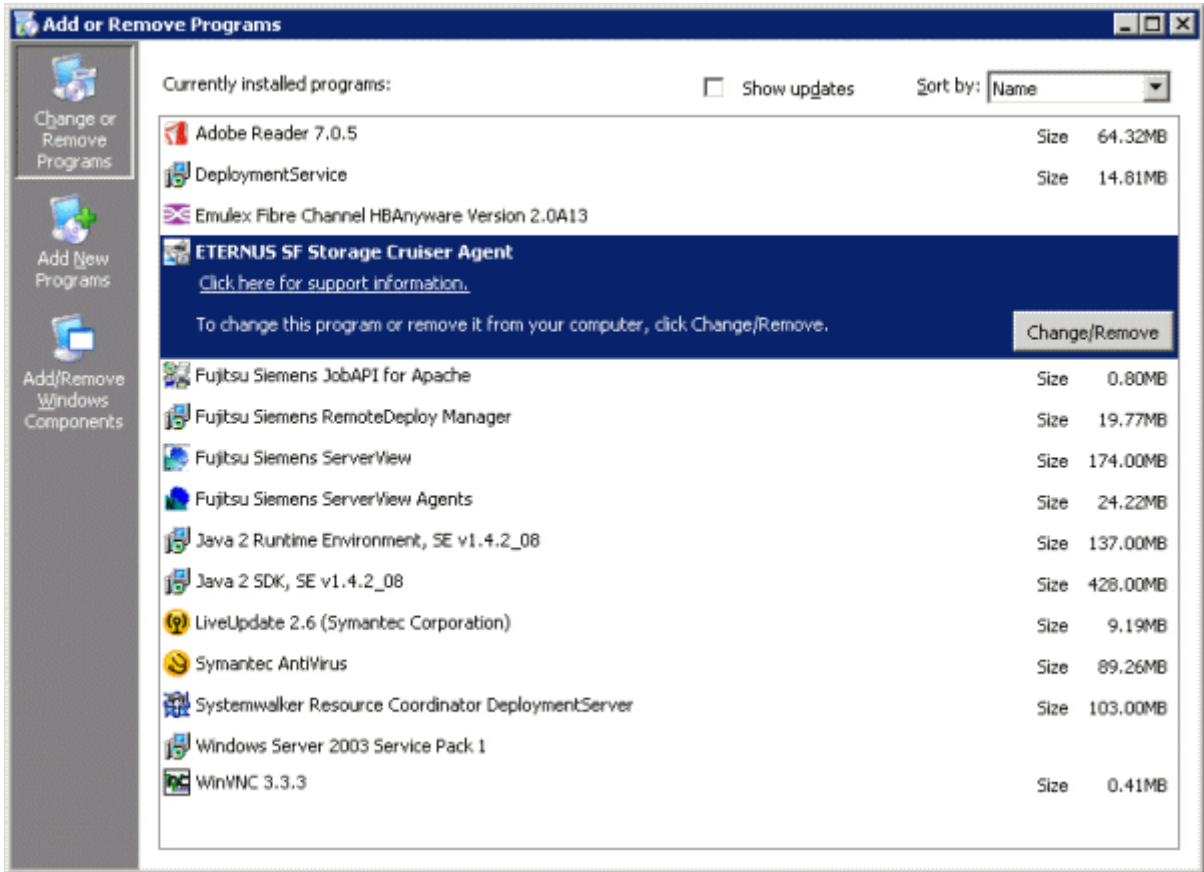
3. Select ETERNUS SF Storage Cruiser component on "Add or Remove Programs" window.
   The following is ETERNUS SF Storage Cruiser component and program name.

Component name	Program name
Manager	ETERNUS SF Storage Cruiser Manager
Client	ETERNUS SF Storage Cruiser Client
Agent	ETERNUS SF Storage Cruiser Agent

4. click "Click here for support information." in step 3.
   following dialog will appears.
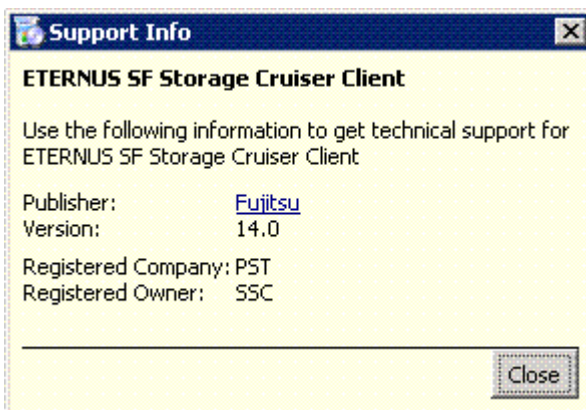
5. Check the version information in " Support information" dialog.
   If the above dialog, the client (ETERNUS SF Storage Cruiser Client) version is 14.0

F.2　To check the product version in Solaris OS

Check the product version according to the procedure shown below.

1. Logon to Solaris OS, ETERNUS SF Storage Cruiser component is installed.
   root (superuser) privileges are not required.

2. Perform the check version according to the command shown below.

   - To check Manager version

     ```
     # pkginfo -l FJSVssmge
     ```

   - To check agent version

     ```
     # pkginfo -l FJSVssage
     ```

3. pkginfo command output that results from, VERSION verify information.
   ETERNUS SF Storage Cruiser VERSION component information, 14.xy format (x and y are numbers) will be output. Of these, 14. x is part of the specified components and versions.

   ## Example

   If the output of pkginfo, the Manager (ETERNUS SF Storage Cruiser Manager) version is 14.0

   ```
   # pkginfo -l FJSVssmge
      PKGINST:  FJSVssmge
         NAME:  FUJITSU Storage System Management for ETERNUS SF
     CATEGORY:  application
         ARCH:  sparc
      VERSION:  14.0.0
      BASEDIR:  /opt
       VENDOR:  FUJITSU LIMITED
         DESC:  FUJITSU Storage System Management for ETERNUS SF
       PSTAMP:  lager20090423173108
     INSTDATE:  6Œ2 02 2009 14:19
       STATUS:  completely installed
        FILES:          3 installed pathnames
                        2 directories
                        1 blocks used (approx)
   ```

F.3　To check the product version in Linux or VMware

Check the product version according to the procedure shown below.

1. Logon to Linux or VMware, ETERNUS SF Storage Cruiser component is installed.
   root (superuser) privileges are not required.

2. Perform the check version according to the command shown below.

   - To check Manager version

     ```
     # rpm -qi FJSVssmge
     ```

   - To check agent version

     ```
     # rpm -qi FJSVssage
     ```

3. rpm command output that results from, VERSION verify information.
   ETERNUS SF Storage Cruiser VERSION component information, 14.xy format (x and y are numbers) will be output. Of these, 14. x is part of the specified components and versions.

📘Information
• •
Depending on your version of the product, Version 14.0.0_40I32 may be output and so on. However, if you please 14.x version is part of the decision.
• •

📝Example
• •
If the output of rpm, the Manager (ETERNUS SF Storage Cruiser Manager) version is 14.0

```
# rpm -qi FJSVssmge
Name        : FJSVssmge               Relocations: (not relocatable)
Version     : 14.0.0                      Vendor: FUJISTU LIMITED
Release     : 1                       Build Date: Fri Apr 24 08:39:35 2009
Install Date: Tue Jun  2 23:00:33 2009    Build Host: redhat5
Group       : Applications/Utilities  Source RPM: FJSVssmge-14.0.0-1.src.rpm
Size        : 98                         License: Copyright FUJITSU LIMITED 2007-2009
Signature   : (none)
Packager    : FUJISTU LIMITED
URL         : http://www.fujitsu.com/
Summary     : FUJITSU Storage System Management for ETERNUS SF
Description :
FUJITSU Storage System Management for ETERNUS SF
```
• •

F.4   To check the product version in HP-UX

Check the product version according to the procedure shown below.

In addition, HP-UX running on ETERNUS SF Storage Cruiser is the only component of the agent and explained to the agent.

1. Logon to Linux of VMware, ETERNUS SF Storage Cruiser component is installed.
   root (superuser) privileges are not required.

2. Perform the check version according to the command shown below.

   ```
   # /usr/sbin/swlist | grep FJSVssage
   ```

3. The result of command execution, output is as follows.

   ```
   # /usr/sbin/swlist | grep FJSVssage
     FJSVssage        13.3.0       ETERNUS SF Storage Cruiser Agent
   #
   ```

Version information is output in the second column. Please specify the version in the table below.

OS Type	The second column string (n is any number)	Agent version
HP-UX 11.0 HP-UX 11i	13.0.n	Latest(Note)
HP-UX 11i v2	13.0.n	13.1
	13.2.n	13.2
	13.3.n	13.3

Note: This is the latest version. Please determine the version of the manager and the same version.

Appendix G Version Upgrade Tool

This appendix describes the tool used to upgrade ETERNUS SF Storage Cruiser.

📘 Point

・ "Version Upgrade" refers to migration from ETERNUS SF Storage Cruiser 13 (13 to 13.4) to ETERNUS SF Storage Cruiser 14 (14.0 onwards).

・ To perform the version upgrade, back up the old versions of the files, then restore them in the new environment. Use the special-purpose tool to backup and restore the device management information.

G.1 Provided files

The version upgrade tool is stored under the following directory on the ETERNUS SF Storage Cruiser 14.0 Manager/Agent (Windows)" CD-ROM:

```
CD-ROM drive\manager\escvup directory
+ escvup.exe
```

The self-extraction program escvup.exe extracts the following files and folders when executed under Windows:

```
escvup directory
+ unxvup.tar (tool for Solaris OS and Linux)
+ winvup.exe (tool for Windows)
```

Copy the tool to the work directory of the server being upgraded (ESC Manager installation directory), and delete it once the version upgrade is complete.

G.2 Solaris OS and Linux

Preparation

In this section, we assume the work directory to be /var/tmp/escvup.

1. Copy unxvup.tar to the work directory (for details on this file, refer to "G.1 Provided files").

2. Move to the work directory and expand unxvup.tar.

```
# cd /var/tmp/escvup
# tar xvf unxvup.tar
```

The files below will be expanded in the work directory:

- cimbackup.sh - The backup command

- cimrestore.sh - The restore command

- dbkit.jar - Java archive invoked by cimbackup.sh and cimrestore.sh

The backup and restore commands should be issued in the work directory, and require root permission for execution.

Backing up device management information

Execute cimbackup.sh, specifying the backup location.

```
# ./cimbackup.sh <backup_location>
```

The message below is displayed upon successful execution:

```
INFO: cimbackup has been completed.
```

The table below lists the possible error messages:

Error	Message
Backup location was not specified	`Usage: cimbackup.sh save-directory`
ESC Manager is currently operating	`WARNING: Unable to backup, while the ETERNUS SF Storage Cruiser Manager is running.`
ESC Manager is not installed	`WARNING: The old ETERNUS SF Storage Cruiser Manager is not installed.`
Files targeted for backup already exist at the specified backup location	`WARNING: The backup files are found in <directory>.`
Directory does not exist at the specified backup location	`ERROR: The specified directory <directory> is not found.`
File copying failed	`ERROR: Unable to copy <file> to <directory>.`
Files targeted for backup do not exist	`ERROR: Unable to find <file>.`
Directory creation failed	`ERROR: Unable to create the directory <directory>.`
Backup failed	`ERROR: cimbackup has been failed.`

Restoring device management information

Execute cimrestore.sh, specifying the backup location.

```
# ./cimrestore.sh <backup_location>
```

The message below is displayed upon successful execution:

```
INFO: cimrestore has been completed.
```

The table below lists the possible error messages:

Error	Message
Backup location was not specified	`Usage: cimerstore.sh save-directory`
ESC Manager is currently operating	`WARNING: Unable to restore, while the ETERNUS SF Storage Cruiser Manager is running.`
ESC Manager is not installed	`WARNING: The ETERNUS SF Storage Cruiser Manager is not installed.`
Backed up files could not be found in the specified backup location	`ERROR: The backup files are not found in <directory>.`
Database conversion failed	`ERROR: Unable to convert the Repository <directory>.`
Database initialization failed	`ERROR: Unable to initialize the Repository <directory>.`
Database reconstruction failed	`ERROR: Unable to reconstruct the Repository <directory>.`
Restoration failed	`ERROR: cimrestore has been failed.`

G.3 Windows

Preparation

In this section, we assume the work directory to be D:/tmp/escvup.

1. Copy winvup.exe to the work directory (for details on this file, refer to "G.1 Provided files").

2. Move to the work directory and execute winvup.exe from the work directory.

   The files below will be expanded in the work directory:

- cimbackup.bat - The backup command

- cimrestore.bat - The restore command

- dbkit.jar - Java archive invoked by cimbackup.bat and cimrestore.bat

- sscreg.exe - Executable invoked by cimbackup.bat and cimrestore.bat

3. Activate command prompt and move to the work directory.

```
C:\Document and Settings\Administrator> D:
D:\> cd D:\tmp\escvup
D:\tmp\escvup>
```

The backup and restore commands should be issued in the work folder, by a user with Administrator privileges.

Backing up device management information

Execute cimbackup.bat, specifying the backup location.

```
D:\tmp\escvup> cimbackup.bat <backup_location>
```

The message below is displayed upon successful execution:

```
INFO: cimbackup has been completed.
```

The table below lists the possible error messages:

Error	Message
Backup location was not specified	`Usage: cimbackup.bat save-directory`
If ESC Manager is currently operating	`WARNING: Unable to backup, while the ETERNUS SF Storage Cruiser Manager is running.`
ESC Manager is not installed	`WARNING: The old ETERNUS SF Storage Cruiser Manager is not installed.`
The files targeted for backup already exist at the specified backup location	`WARNING: The backup files are found in <directory>.`
The directory does not exist at the specified backup location	`ERROR: The specified directory <directory> is not found.`
File copying failed	`ERROR: Unable to copy <file> to <directory>.`
Files targeted for backup do not exist	`ERROR: Unable to find <file>.`
Directory creation failed	`ERROR: Unable to create the directory <directory>.`
Backup failed	`ERROR: cimbackup has been failed.`

Restoring device management information

Execute cimrestore.bat, specifying the backup location.

```
D:\tmp\escvup>  cimrestore.bat <backup_location>
```

The message below is displayed upon successful execution:

```
INFO: cimrestore has been completed.
```

The table below lists the possible error messages:

Error	Message
Backup location was not specified	`Usage: cimrestore.bat save-directory`
ESC Manager is currently operating	`WARNING: Unable to restore, while the ETERNUS SF Storage Cruiser Manager is running.`

Error	Message
ESC Manager is not installed	WARNING: The ETERNUS SF Storage Cruiser Manager is not installed.
Backed up files cannot be found in the specified backup location	ERROR: The backup files are not found in *\<directory\>*.
Database conversion failed	ERROR: Unable to convert the Repository *\<directory\>*.
Database initialization failed	ERROR: Unable to initialize the Repository *\<directory\>*.
Database reconstruction failed	ERROR: Unable to reconstruct the Repository *\<directory\>*.
Restoration failed	ERROR: cimrestore has been failed.

Glossary

Access path

Logical path for accessing storage from a server node. It is constructed by defining the host, Fibre Channel switch, storage, binding, and zoning settings.

Administrative client

Client terminal that is operated by administrators and displays the GUI window. Here, the server node that installed the Client.

Administrative server

Server unit that the manager is installed. It collects and sets information on devices that has to do with storage system connected to LAN.

AffinityGroup

AffinityGroup or zone defined for ETERNUS disk array units or GR series

It is the unit in which logical volumes in storage are grouped. This function makes it easy to define a set of volumes on a server nodet.

Agent

Agent installed on a server node for managing Fibre Channel HBAs and multipath control software. It reads Fibre Channel HBA information, edits configuration information files such as sd.conf/fcaw.conf/pfca.conf, diagnoses access paths, and monitors for faults and posts fault information involving multipath disk control according to access path setting commands from this software product on the server node.

Binding

Server node HBA function. This function defines the correspondence between information of storage Fibre Channel ports (connection destinations) and special server node files. A storage area that allows precise access from a server node can be defined.

Built-in bridge

Bridge device convert SCSI to FC. The FC interface of the library device of LT120 and LT130 is managed as a built-in bridge according to the library device type in this software product.

CA (Channel Adapter)

Adapter card mounted on the storage side and used as an interface with server node HBAs and Fibre Channel switches.

Cascade connection function

Function connecting Fibre Channel switches physically, using fibre cable. This function automatically enables the Fibre Channel switches to communicate with one another, thereby enabling access through the Fibre Channel switches by the name server function.

Client

Client connects with the Manager and functions as GUI (screen control part). One manager can connect two or more clients simultaneously.

COS

Fibre Channel service classes. Classes 2 and 3 are currently general classes. The classes differ in whether confirmation of frame distribution must be given.

DSM (Device-Specific Module)

Driver that controls the multipath by using MPIO.

Element

Part of a device shown in detail in the Correlation window. The entire device is called a unit.

ETERNUS manager, ETERNUSmgr

ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, and ETERNUS2000 storage management software.

ETERNUS Multipath Driver

Multipath disk control driver for ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, and ETERNUS2000. This is a successor to the GRMPD driver.

ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000

Fujitsu's series of highly reliable disk storage systems providing excellent performance.

ESC agent

Agent of ETERNUS SF Storage Cruiser, which is a storage resource management software.

Fabric

Topology where the Fibre Channel interface is used. In this topology, concurrent communication can be executed among multiple nodes, using Fibre Channel switches.

fabric

A network of Fibre Channels that is formed by Fibre Channel switches in a cascading connection. A fabric can also consist of a single Fibre Channel switch that is not in a cascading connection.

FC-AL (Fibre Channel Arbitrated Loop)

Topology where the Fibre Channel interface is used. In this topology, concurrent communication can be executed among multiple nodes, using Fibre Channel hubs. Currently, the topology is mostly used for one-to-one connections. NL and L ports are used.

Fibre Channel

Interface for serial data transfer. This interface features high-speed transfers and long-distance transmission with a server node.

Fibre Channel hub

Dedicated hub for Fibre Channel. Operating in the FC-AL topology, the hub operates in a mode in which Fibre Channel node devices are connected in a loop.

Fibre Channel switch

Switch using Fibre Channel. This switch enables concurrent communication with multiple Fibre Channel nodes. Operating in the Fabric topology, the switch is higher performance and reliable than the Fibre Channel hub.

FL port

Fabric (Fibre Channel switch) port connected to an NL port.

F port

Fabric (Fibre Channel switch) port connected to an N port.

GBIC

Abbreviation of GigaBit Interface Converter. It is used as a module of a Fibre Channel port, such as a Fibre Channel switch or HBA.

GDS

Fujitsu's software for improving data integrity by mirroring disk devices.

GFS

Robust multivolume file system providing increased data availability. Fujitsu's file system is fully compatible with UFS that is a standard API of UNIX.

GR manager, GRmgr

Storage management software of ETERNUS3000 series GR710, GR720, GR730, GR740.

GR series

Generic name for a series of highly reliable Fujitsu disk array devices (GR720, GR730, GR740, GR820, GR840) providing excellent performance.

GRMPD

Multipath disk control driver for the ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000 and GR series. It is an extended version of the MPLB driver. The instance name is MPLB.

Guest OS

An operating system running on virtual machines.

Hard disk driver (HDDV)

Hard disk driver software of a server node.

This software controls disk array devices, serving as the sd driver. In the Solaris OS, an optimal recovery environment can be set up for a GR series connected in the Solaris OS.

HBA (Host Bus Adapter)

Adapter card used as an interface with storage port and Fibre Channel switch CAs mounted in a server node

HDDV

See "Hard disk driver (HDDV)".

Host affinity

Definition for associating an HBA in a server node set for a CA port on the storage side with an accessible area within storage. This function assigns a logical volume in a storage device presented to a host (HBA), and serves as a security function inside a storage device.

In the ETERNUS6000 disk array devices, GR710, GR720, GR730, and GR740, ETERNUSmgr/GRmgr can be used to define the correspondence between zones and WWPNs of server nodes that can access individual zones. This software product sets such definitions automatically by using the access path setting function.

Host affinity in the F649x, Spectris, or Platinum series is set from the CE maintenance tool FST.

Host OS

The operating system where the virtualization software that executes virtual machines runs.

JNI

Name of a Fibre Channel HBA vendor.

Legacy DSF

One of the formats for device special files used by the HP-UX operating system. The "Legacy" indicates that this is the format for device special files that were used with versions of HP-UX prior to HP-UX 11iv3, as opposed to "persistent DSF", which is the format that was introduced with HP-UX 11iv3.
Format for legacy DSFs: /dev/[r]dsk/cXtYdZ[sN]

LUN (Logical Unit Number)

Logical unit defined under a channel adapter in a storage device.

LUN mapping

Function that maps Logical Volume numbers managed in ETERNUS8000, ETERNUS6000, ETERNUS4000, ETERNUS3000, ETERNUS2000, GR710, GR720, GR730, and GR740 storage devices to the number for the CA port (the Volume number:LUN number that is displayed in the host).

Manager

Central management part of this software product, which has a database for fault management.

MPHD

See "Multipath disk control".

MPIO (Multi Path I/O)

The multipath disk control mechanism on the Windows operating system. This is supported from Windows Server 2003. The actual control is performed by a driver known as the "DSM" driver, which is provided by storage vendors.

MPLB

See "Multipath disk control load balance option".

msdsm

It is standard DSM on the Windows operating system. This is supported from Windows Server 2008.

Multipath disk control

Failover driver software performing multipath disk control. This software sets multiple physical access paths for each logical path to avoid to stop access to a disk array device clue to a fault occurring in one of the physical access paths.

Multipath disk control load balance option

Driver software performing multipath disks control for a server node. In addition to the failover function of multipath disk control, load balancing (path load distribution) and the multipath function (for two to eight paths) are provided by this software; it is highly reliable, providing excellent operability and improved performance, and it is suitable for servers operating in a SAN.

Native multipath function

A control mechanism for multipath disks for the HP-UX operating system. The native multipath function was introduced with HP-UX 11iv3.

NL-private port

Ports in the FC-AL topology where ports are not connected with Fibre Channel switches.

NL-public port

Ports in the FC-AL topology where ports are connected with Fibre Channel switches.

N port

Ports used in the Fabric topology (Fibre Channel switch environment) or the point-to-point connection with Fibre Channel environment.

Persistent DSF

One of the formats for device special files used by the HP-UX operating system. This format was introduced with HP-UX 11iv3. Format for persistent DSFs: /dev/[r]disk/diskX[_pY]

PID binding

One method of storage affinity (binding) of a server node HBA. The correspondence between PIDs of storage Fibre Channel ports, which are connection destinations, and special server node files can be defined.

Point-to-point

Topology where the Fibre Channel interface is used. It is the topology for one-to-one connections of N ports. Currently, FC-AL one-to-one connections are mainly used.

Port zoning

Zoning of accessible areas for a Fibre Channel switch. An access path is set by specifying the port number of the Fibre Channel switch from the server node HBA connected to a port and storage CA.

Prefetch

Function for reading disk array in advance. This function is effective for improving performance.

PV-LINK

A control mechanism for multipath disks that is provided by the Logical Volume Manager (LVM) for the HP-UX operating system. PV-LINK was introduced with HP-UX 10.0.

ROE

An abbreviation for "RAID Offload Engine", which is responsible for encryption processing and parity generation processing for RAID5 and RAID6.

SafeDISK

Fujitsu's software for improving data durability by mirroring disk devices.

SafeFILE

Robust multivolume file system providing increased data availability. Fujitsu's file system is fully compatible with UFS and the standard API of UNIX.

SAN (Storage Area Network)

Abbreviation of Storage Area Network. This network is used for server node-storage connection. In a broad sense, it refers to implementation of storage centralization and data sharing among hosts of different types, and it includes implementation of integrated management of storage.

Server node

Server unit that the Agent is installed. It controls the information on platform software such as HBA and Multipath control driver etc. on the server unit using storage and communicates with the Manager.

SMIS storage

Storage device compliant with the SMIS standard

SMIS, SMI-S (Storage Management Initiative Specification)

Interface standard for SAN management advocated by SNIA (Storage Networking Industry Association)

Storage

Secondary storage devices that is stored in a case. It is sometimes called simply "storage".

Storage affinity (LUN mapping/binding)

Definitions set in a server node HBA. These are definitions of the correspondence between storage CAs and paths on the server node side to be allocated to the storage CA. The Fibre Channel adapter (HBA) has this function.

In the Solaris OS, as many storage devices can be related to Solaris OS special files in a SAN as required by defining the correspondence between storage CA WWPNs and special file tX (target) in Fibre Channel HBA setting files, such as sd.conf, fcaw.conf, fjpfca.conf, lpfc.conf, and lpfs.conf.

Manager automatically defines the setting files when an access path is set.

SynfinityCLUSTER/PRIMECLUSTER

Software offered by Fujitsu for construction of clusters with products of PRIMEPOWER, the GP7000F family, and the GP7000S family.

Thin Provisioning

Function for virtualizing and allocating storage resources, thus enabling reduction of the storage physical capacity.

Thin Provisioning Pool, TPP

Physical disk pool created by the Thin Provisioning function.

TID, Target ID

ID set for each SCSI bus port.

In systems using SCSI or FC-AL, this ID is generally set for each device. In an environment of Solaris OS Fabric connection, its value can be defined using software from the OS. (WWPN binding)

Unit

Generic name of the entire device. For greater detail, parts in a unit are called elements.

UnknownFC port

Information created by this software product according to information about WWPNs, excluding WWPNs of storage HBAs and server node CAs, where the WWPNs are used for connections to Fibre Channel switch ports. Devices in a SAN environment not managed by this software product can be identified. The information is manually embedded for individual HBAs and CAs.

Virtual machine

A virtual computer that is created by virtualization software.

VM guest

Refers to either a virtual machine or a guest OS.

VM host

Refers to either the virtualization software that executes virtual machines or the computer where the virtualization software runs.

WWNN (World Wide Node Name)

Common name set for a Fibre Channel port of a node. The node definition varies depending on the manufacturer. A device is defined in some cases, and an adapter is defined in others. WWNN is also called node WWN.

WWNN binding

One method of storage affinity (binding) of a server node HBA. The correspondence between WWNNs of storage Fibre Channel ports (connection destinations) and special server node files can be defined.

WWNN zoning

Zoning of accessible areas for a Fibre Channel switch. An access path is set by specifying the WWNN of a server node HBA and WWNN of a storage CA. This setting disables access through the Fibre Channel switch to every Fibre Channel port whose WWNN is not defined.

WWPN (World Wide Port Name)

Unique name set for each Fibre Channel port (HBA, CA, Fibre Channel switch port, etc.). It is a IEEE MAC global address. A WWPN is used as an ID during Fibre Channel port login because no two Fibre Channel ports have the same WWPN. It is also called port WWN.

WWPN binding

One method of storage affinity (binding) of a server node HBA. The correspondence between WWPNs of storage Fibre Channel ports (connection destinations) and special server node files can be defined.

WWPN zoning

Zoning of accessible areas for a Fibre Channel switch. An access path is set by specifying the WWPN of a server node HBA and WWPN of a storage CA. This setting disables access through the Fibre Channel switch to every Fibre Channel port whose WWPN is not defined. In access path settings of this software product, access paths of Fibre Channel switches are controlled with WWPN zoning.

Zone function

For the ETERNUS3000 series and GR series, management is enabled in units of zones, each including multiple logical units in individual storage systems. A zone can be defined so that multiple server node HBAs can access it. This is called the host affinity function.

Zoning function

Fibre Channel ports connected to a Fibre Channel switch are grouped into zones. Access within individuals zones is restricted to implement security in Fibre Channel. There are several zoning types, including WWPN zoning, WWNN zoning, and port zoning.

Zoning setting

Setting on the device side for implementing the zoning function.

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