

FUJITSU Storage ETERNUS SF Express V16.2

Operation Guide

Windows/Linux

B1FW-6005-03ENZO(01)
March 2015

Preface

Purpose

This manual gives an overview of FUJITSU Storage ETERNUS SF Express.

FUJITSU Storage ETERNUS SF Express is part of the following products:

- FUJITSU Storage ETERNUS SF Express (hereafter abbreviated as "Express")
- FUJITSU Storage ETERNUS SF Storage Cruiser (hereafter abbreviated as "Storage Cruiser")
- FUJITSU Storage ETERNUS SF AdvancedCopy Manager (hereafter abbreviated as "AdvancedCopy Manager")

Express is the software that enables you to easily install and operate a storage system.

Intended Reader

This manual is intended for users who are considering installing Express or who want an overall understanding of the product.

Readers will gain an understanding of the Express functions from this manual.

Organization

This manual is composed as follows:

Chapter 1 Overview

This chapter gives an overview of Express.

Chapter 2 Flow to Operation

This chapter explains the workflow from installing to operating a storage system.

Chapter 3 Configuration

This chapter explains how to configure the operating environment of a storage system using Express.

Chapter 4 Operation

This chapter explains how to operate a storage system using Express.

Chapter 5 Maintenance

This chapter explains the maintenance of Express.

Appendix A Advanced Copy Function

This appendix explains Advanced Copy function.

Appendix B Command References

This appendix explains commands.

Notation

The names, abbreviations, and symbols shown below are used in this manual.

Operating Systems

Formal Name	Abbreviation	
Microsoft(R) Windows Server(R) 2003, Standard Edition	Windows Server 2003	Windows
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 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		

Formal Name	Abbreviation	
Microsoft(R) Windows Server(R) 2008 Standard (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM) (32-bit)(64-bit)	Windows Server 2008	
Microsoft(R) Windows Server(R) 2008 R2 Foundation Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	Windows Server 2008 R2	
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter	Windows Server 2012	
Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	Windows Server 2012 R2	
Windows Vista(R) Home Basic Windows Vista(R) Home Premium Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate	Windows Vista	
Windows(R) 7 Home Basic Windows(R) 7 Home Premium Windows(R) 7 Professional Windows(R) 7 Enterprise Windows(R) 7 Ultimate	Windows 7	
Windows(R) 8 Windows(R) 8 Pro	Windows 8	
Windows(R) 8.1 Windows(R) 8.1 Pro	Windows 8.1	
Solaris(TM) 9 Operating System	Solaris 9	Solaris or Solaris OS
Oracle Solaris 10	Solaris 10	
Oracle Solaris 11	Solaris 11	
Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	RHEL5	Linux
Red Hat(R) Enterprise Linux(R) 6 (for x86) Red Hat(R) Enterprise Linux(R) 6 (for Intel64)	RHEL6	
Red Hat(R) Enterprise Linux(R) 7 (for Intel64)	RHEL7	
SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T	SUSE Linux Enterprise Server 11	
HP-UX 11i v1 HP-UX 11i v2 HP-UX 11i v3	HP-UX	
AIX(R) V6.1 AIX(R) V7.1	AIX	
VMware vSphere(R) 4	VMware vSphere 4	VMware

Formal Name	Abbreviation	
VMware vSphere(R) 5	VMware vSphere 5	
VMware vSphere(R) 6	VMware vSphere 6	

Oracle Solaris might be described as Solaris, Solaris Operating System, or Solaris OS.

FUJITSU Storage ETERNUS

Formal Name	Abbreviation
FUJITSU Storage ETERNUS DX60 FUJITSU Storage ETERNUS DX80 FUJITSU Storage ETERNUS DX90	ETERNUS Disk storage system
FUJITSU Storage ETERNUS DX60 S2 FUJITSU Storage ETERNUS DX80 S2 FUJITSU Storage ETERNUS DX90 S2	
FUJITSU Storage ETERNUS DX60 S3 FUJITSU Storage ETERNUS DX100 S3 FUJITSU Storage ETERNUS DX200 S3	
FUJITSU Storage ETERNUS DX200F	-

Each individual device name in this document is listed with "FUJITSU Storage" omitted from it.

Software Products

Formal Name	Abbreviation
Windows(R) Internet Explorer(R)	Internet Explorer
Mozilla(R) Firefox(R)	Firefox
Trend Micro Storage Security for FUJITSU Storage ETERNUS DX100 S3	Trend Micro Storage Security for FUJITSU Storage ETERNUS DX S3 series or TMSS for ETERNUS DX S3 series
Trend Micro Storage Security for FUJITSU Storage ETERNUS DX200 S3	

Manuals

Formal Name	Abbreviation
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Quick Reference	ETERNUS SF Quick Reference
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Release Notes	ETERNUS SF Release Notes
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Installation and Setup Guide	ETERNUS SF Installation and Setup Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Migration Guide	ETERNUS SF Migration Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Web Console Guide	ETERNUS SF Web Console Guide
FUJITSU Storage ETERNUS SF Storage Cruiser / AdvancedCopy Manager Cluster Environment Setup Guide	ETERNUS SF Cluster Environment Setup Guide
FUJITSU Storage ETERNUS SF Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes	ETERNUS SF Operation Guide for VMware vSphere Virtual Volumes
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Messages	ETERNUS SF Messages

Formal Name	Abbreviation
FUJITSU Storage ETERNUS SF Express / Storage Cruiser Event Guide	ETERNUS SF Event Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Glossary	ETERNUS SF Glossary

Besides the above-mentioned, each individual manual name in this document is listed with "FUJITSU Storage" omitted from it.

Others

- ETERNUS SF Web Console is abbreviated as "Web Console".
- Quality of Service is abbreviated as "QoS".
- In this document, unless there is a special explanatory note, ETERNUS Disk storage system includes ETERNUS DX200F All Flash Arrays.
However, the following functions are not supported in ETERNUS DX200F All Flash Arrays:
 - Energy saving operation for storage device
 - NAS operation for storage device
 - Automated Storage Tiering operation at multiple tiers (two or more)

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Shipment Date and Revision History

Shipment Date	Revision	Document Part Number	
		PDF	HTML
December 2013	1	B1FW-6005-01ENZ0(00)	B1FW-6005-01ENZ2(00)
March 2014	1.1	B1FW-6005-01ENZ0(01)	B1FW-6005-01ENZ2(01)

Shipment Date	Revision	Document Part Number	
		PDF	HTML
May 2014	1.2	B1FW-6005-01ENZ0(02)	B1FW-6005-01ENZ2(02)
June 2014	2	B1FW-6005-02ENZ0(00)	B1FW-6005-02ENZ2(00)
July 2014	2.1	B1FW-6005-02ENZ0(01)	B1FW-6005-02ENZ2(01)
January 2015	3	B1FW-6005-03ENZ0(00)	B1FW-6005-03ENZ2(00)
March 2015	3.1	B1FW-6005-03ENZ0(01)	B1FW-6005-03ENZ2(01)

Notes

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Update History

Content of Update	Updated Section	Revision
Notes when creating a NAS interface are added.	4.6.3.2	1.1
Notes when setting up an authentication server are added.	4.6.3.3	
The access method by CIFS protocol is changed.	4.6.4	
The information related to ETERNUS DX200F is described.	"Others" in Preface, 4.1.7, 4.1.8, 4.2.1.1, 4.6, 4.6.1.3	1.2
Modified screen names in the ETERNUS GUI	3.1	2
Added Wizard startup method description	3.6	
Added Notes for ETERNUS Disk storage systems	4.1.1	
Notes are added and changed.	4.1.4, 4.1.5, 4.1.7	
Added DX200F information	4.2.1, A.4	
Updated the Web Console graphics	4.3.1	
Function is added to the NAS management.	4.6	
Removed SymfoWARE description	5.1.3.1, 5.1.3.2	
Port numbers used in Express is deleted.	5.1.3.1, 5.2.3.1	
Updated the Eco mode description	A.4	
Note is added.	4.6	
The number of NAS volumes and NAS backup volumes creatable on one ETERNUS Disk storage system is changed.	4.6.1.2.1	
Note is added when data inconsistency is found in a snapshot.	4.6.1.3.1, 4.6.4.12	
Point is added to "NAS Environment Quota Management".	4.6.1.4.1	
Point is added to "Events Notified by Quota Management".	4.6.1.4.2	
Note is added to "Registration of User/Group".	4.6.2.2	

Content of Update	Updated Section	Revision
Note when using quota management function and snapshot function is added.	4.6.2.4, 4.6.3.1, 4.6.4.10, 4.6.4.15	
"NAS Volume Number to Which to Create Shared Folder" is added. Method for specifying time to collect snapshots is added.	4.6.3.1	
Suffix of volume name is changed. The limit to the number of volume name characters is deleted.	4.6.3.1, 4.6.4.9	
Mode number is added. Point is added to "Port Bonding". Note is added to "NAS Interface (Network)". Note is added to "VLAN ID".	4.6.3.2	
Point is added to "Removing Authentication Server".	4.6.4.21	
Antivirus server is added.	"Software Products" in Preface	3
Information related to the ETERNUS DX200F is modified or added.	"Others" in Preface, 1.2, 1.3, 3.1, 4.2.1.1, 4.4, 4.4.6, A.2.1, A.2.2, A.3.1	
The information related to ETERNUS DX60 S3 is described.	"Organization" in Preface, 1.3, 3.1, 4.2.1.1, A.4	
The error in writing of "Copy Command via LAN" was corrected about ETERNUS DX90 in the table of "System Configuration Using Advanced Copy Function".	1.3	
Performance management is added to NAS volume and NAS system.	4.2.1.1, 4.2.2.5, 4.6.1.1.2, 4.6.4.18, B.1	
Antivirus countermeasures are added to the NAS environment.	4.6.1.1.2, 4.6.1.5, 4.6.1.6, 4.6.2.4, 4.6.4.18, 4.6.4.19, 4.6.4.20, 4.6.4.24	
"Copy Table Size Settings" is added.	4.6.2.5	
The SMB encryption of the data access and the enumeration based on the access permission setting is added.	4.6.3.1, 4.6.4.2	
"Access Using NFS Protocol" is changed.	4.6.4.1	
Note on the "Deleting Shared Folder" is added.	4.6.4.24	
The term "VMware Virtual Volumes" is changed to "VMware vSphere Virtual Volumes" according to the terms used by VMware, Inc.	Throughout this manual	3.1
Information related to VMware vSphere(R) 6 is added.	"Notation" in Preface	

Manual Organization and Reading Suggestions

Manual Organization

The following table describes the Manual organization of Express, Storage Cruiser and AdvancedCopy Manager.

When to Read	Related Manuals (Abbreviated)	Related Products (*1)			Explanation
		EXP	SC	ACM	
Before installation	Quick Reference	Yes	Yes	Yes	This manual is common for all products.
	Release Notes	Yes	Yes	Yes	This manual is common for all products.
	Overview	-	-	Yes	This manual is unique for the product.
During installation	Installation and Setup Guide	Yes	Yes	Yes	This manual is common for all products.
	Cluster Environment Setup Guide	-	Yes	Yes	This manual is common for Storage Cruiser and AdvancedCopy Manager.
	Migration Guide	Yes	Yes	Yes	This manual is common for all products.
During operation	Operation Guide	Yes	Yes	Yes	This manual is unique for each product. The following manuals are available: <ul style="list-style-type: none"> - Express Operation Guide - Storage Cruiser Operation Guide - Storage Cruiser Operation Guide for Optimization Function - AdvancedCopy Manager Operation Guide (for Windows) - AdvancedCopy Manager Operation Guide (for Solaris) - AdvancedCopy Manager Operation Guide (for Linux) - AdvancedCopy Manager Operation Guide (for HP-UX) - AdvancedCopy Manager Operation Guide (for AIX) - AdvancedCopy Manager Operation Guide for Copy Control Module - Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes
	Web Console Guide	Yes	Yes	Yes	This manual is common for all products.
Anytime	Event Guide	Yes	Yes	-	This manual is common for Express and Storage Cruiser.
	Messages	Yes	Yes	Yes	This manual is common for all products.
	Glossary	Yes	Yes	Yes	This manual is common for all products.

*1: "EXP" indicates Express, "SC" indicates Storage Cruiser and "ACM" indicates AdvancedCopy Manager.

How to Read Manuals

Please use the following table to find the most useful information in the Express, Storage Cruiser and AdvancedCopy Manager manuals to answer your inquiry.

Purpose	Manual	Main Contents	How to Read
Acquiring a product overview and basic operation knowledge	Quick Reference	<ul style="list-style-type: none"> - Product overview - Installation decision 	Please read if you want to acquire a fundamental knowledge of the product and its operation in order to decide to install it or not.

Purpose	Manual	Main Contents	How to Read
		<ul style="list-style-type: none"> - Overview of the necessary tasks from installation to first use 	
	AdvancedCopy Manager Overview	<ul style="list-style-type: none"> - Main functions - Linkable applications - Procedure overview for Advanced Copy of ETERNUS Disk storage system 	
Confirming the updated contents	Release Notes	<ul style="list-style-type: none"> - New function overview - Incompatibilities with previous version - Fixed bugs 	Please read if you want to know the updated contents from a previous version and if you perform the upgrade.
Deciding if a version upgrade is required	Migration Guide	<ul style="list-style-type: none"> - Notes and cautions about version upgrade - Version upgrade procedure 	Please read if you want to upgrade from a previous version.
Installing and correctly operating the product	Installation and Setup Guide	<ul style="list-style-type: none"> - Operating environment - Installation procedure - Setup procedure - Uninstallation procedure 	Please read if you want to install and setup the product.
Setting up operating environment depending on purpose	Cluster Environment Setup Guide	<ul style="list-style-type: none"> - Supported cluster software - Installation procedure for a clustered system - Setup procedure for a clustered system - Uninstallation procedure for a clustered system 	Please read if you want to install and setup the product on a clustered system.
Administration and operation of the installed system	Express Operation Guide	<ul style="list-style-type: none"> - Starting and stopping the software - Device monitoring - Data copy inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance 	Please read if you want to start or shutdown the system, monitor the operation status, do backup/restore operations, etc.
	Storage Cruiser Operation Guide	<ul style="list-style-type: none"> - Starting and stopping the software - Device monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	

Purpose	Manual	Main Contents	How to Read
	Storage Cruiser Operation Guide for Optimization Function	<ul style="list-style-type: none"> - Operating environment construction - Operating status monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	
	AdvancedCopy Manager Operation Guide (for Windows)	<ul style="list-style-type: none"> - Starting and stopping the software 	
	AdvancedCopy Manager Operation Guide (for Solaris)	<ul style="list-style-type: none"> - Data backup/restore inside the storage system 	
	AdvancedCopy Manager Operation Guide (for Linux)	<ul style="list-style-type: none"> - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	
	AdvancedCopy Manager Operation Guide (for HP-UX)		
	AdvancedCopy Manager Operation Guide (for AIX)		
	AdvancedCopy Manager Operation Guide for Copy Control Module		
	Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes	<ul style="list-style-type: none"> - Operating environment construction - Virtual machine operation using a virtual volume - Backup/restore of the virtual machine - Necessary tasks after an architectural modification of the system as well as product maintenance 	
	Web Console Guide	<ul style="list-style-type: none"> - Operating environment - Screen layout description 	Please read if you want to understand the ETERNUS SF Web Console.
Dealing with messages issued by the software	Messages	<ul style="list-style-type: none"> - Messages and their explanations - Parameter (variable information) description - System action - Countermeasures 	Please read if you want a practical way of investigating and dealing with messages issued by the software.
Dealing with events issued by the software	Event Guide	<ul style="list-style-type: none"> - Phenomenon of event - Countermeasures 	Please read if you need to find a practical way of investigating and dealing with events.
Researching the meaning of	Glossary	<ul style="list-style-type: none"> - Product specific terminology explanation 	Please read if you want to learn the meaning of

Purpose	Manual	Main Contents	How to Read
specific terms related to the products and other important terms		<ul style="list-style-type: none"> - Explanation of important terminology appearing in the manual - Synonyms and related terms - Proper form of abbreviated terms 	important terms, product specific terms or abbreviations used in the manuals.

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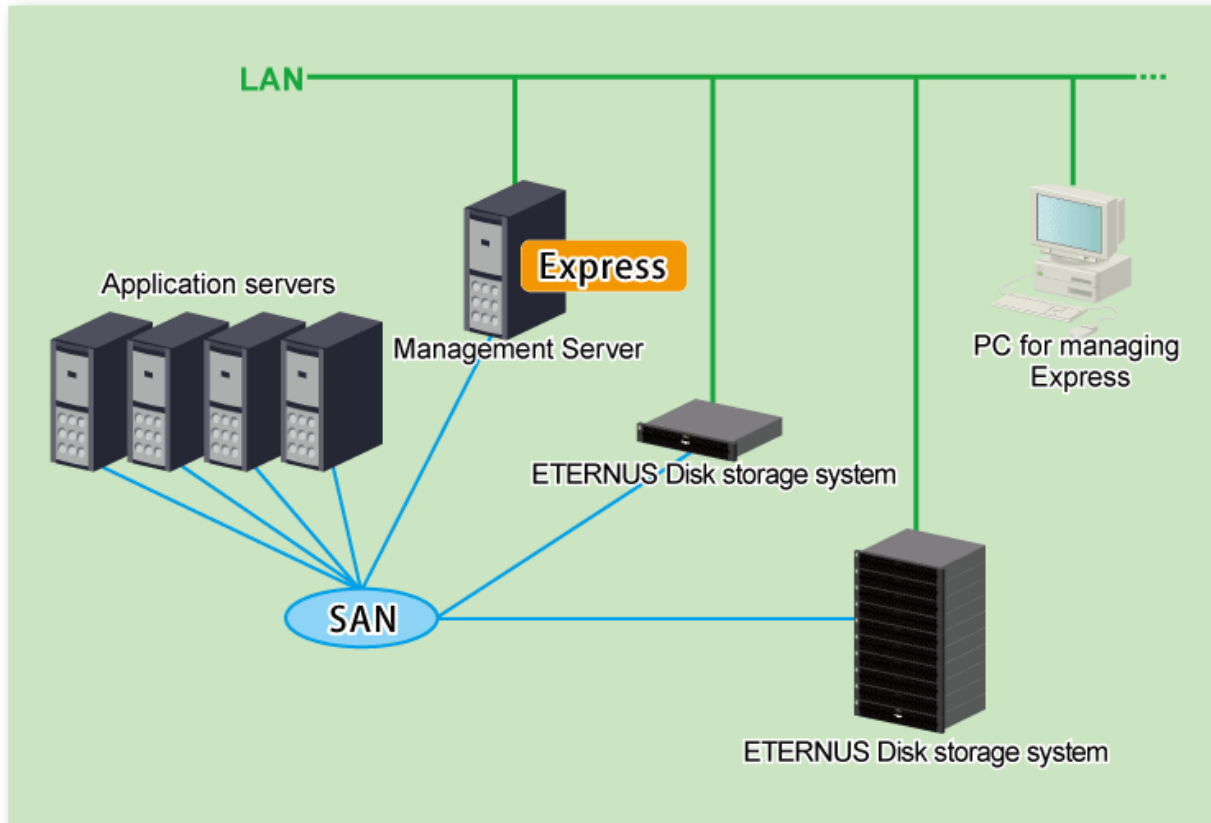
Chapter 1 Overview

This chapter gives an overview of Express.

1.1 Overview of Storage System

A storage system refers to the overall configuration of a system including servers that perform daily transactions and storage that holds data.

Figure 1.1 Overview Image of Storage System



1.2 Function Overview of Express

Express is designed to make management of ETERNUS Disk storage system easier than by using the GUI. Express makes storage management less difficult thanks to the following functions:

Easy Configuration and Expansion

This software can be easily configured with the configuration wizard.

Even without prior experience of ETERNUS Disk storage systems configuration and setup, volume creation in ETERNUS Disk storage system can be done with a wizard. ETERNUS Disk storage systems and volumes can also be added later with only a few clicks in the wizard.

Express provides the following wizard.

- Storage configuration wizard
- Volume allocation wizard
- Advanced Copy configuration wizard

Easy Operation

What to do, how to do it: operation target and method can be selected directly on the screen in ETERNUS SF Web Console. Therefore, operation procedures are no longer difficult to understand.

ETERNUS SF Web Console allows Express operation directly from a Web browser.
In this manual, ETERNUS SF Web Console will be referred hereafter as "Web Console".

As several ETERNUS Disk storage systems can be managed, monitored and operated in the same Web Console, it is not necessary anymore to physically go to the various managed systems locations, switch between browser windows, etc.

With Express, Web Console operation can be performed without having to end the current tasks on the computer.

Easy Troubleshooting

When a problem occurs, the user can determine the cause and scope of the problem before calling to report it.
Easy to understand messages makes it possible to understand the cause of a problem without prior expert storage knowledge.
Advice on how to handle the problem can be displayed by clicking on the message.

Data Copy

Express can execute snapshot copy (SnapOPC+) of the Advanced Copy function of the ETERNUS Disk storage system. The maximum number of copy sessions that can be executed with the device is as follows:

Device Name	Maximum Number of Copy Sessions
ETERNUS DX60/DX60 S2/DX80/DX80 S2/DX90/DX90 S2	8
ETERNUS DX100 S3	1024
ETERNUS DX200 S3 ETERNUS DX200F	2048

Operations can be performed from the Web Console or the Command Line Interface (CLI). The operations through the Web Console are simple. The CLI allows integration in a script, use of the OS scheduler for preset copy tasks, etc. in a customizable manner.

Performance Management

The use of the Web Console makes it possible to display in a graph the 24-hour performance information of ETERNUS Disk storage system.

In addition, the command line operation makes it possible to output 1-hour or 24-hour performance information of ETERNUS Disk storage system into a CSV file.

1.3 System Configuration

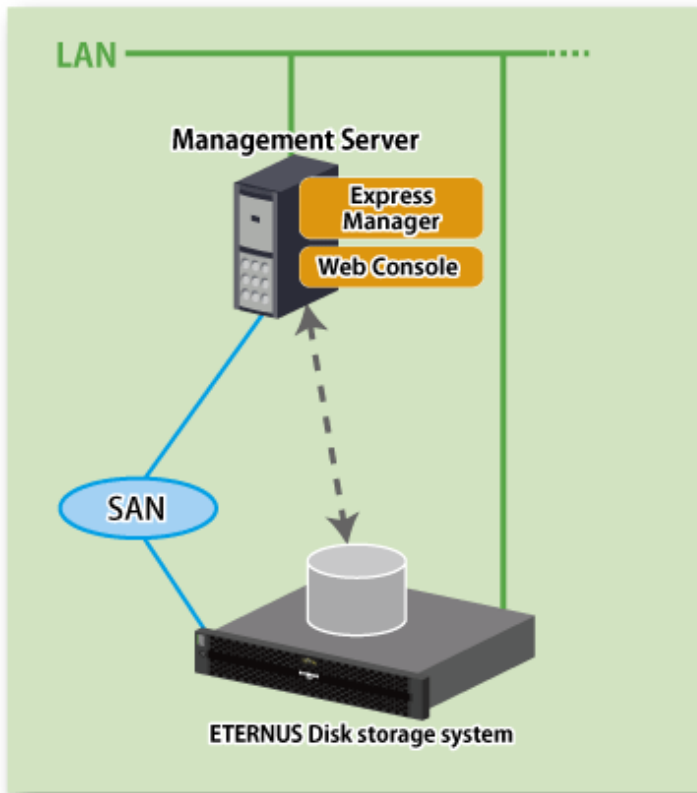
Express can manage one or more storage devices.

Express can operate in various system configurations such as the ones described in this section. Since using Express in the IPv6 environment is not supported, use it in the IPv4 environment.

Basic System Configuration

In this configuration, Express's manager and Web Console are operated on the same server.

Figure 1.2 Example of Basic System Configuration



The Express's manager and Web Console can be operated on different servers. In this environment, Web Console accesses to the Express's manager over the network (HTTPS connection).

System Configuration Using Advanced Copy Function

In Express, the Management Server sends a command to ETERNUS Disk storage system to perform an Advanced Copy function. There are two available methods for sending the copy command:

- Sending a command to ETERNUS Disk storage system to perform an Advanced Copy function from the server over the SAN (hereafter referred to as "Copy command via SAN")
- Sending a command to ETERNUS Disk storage system to perform an Advanced Copy function from the server over the LAN (hereafter referred to as "Copy command via LAN")

The following table describes the requirements for the two copy methods, via SAN or via LAN, for each type of system:

Device Name	Copy Command via SAN		Copy Command via LAN	
	Operation	Firmware Version	Operation	Firmware Version
ETERNUS DX60 ETERNUS DX80	A	All versions	N/A	-
ETERNUS DX90	A	All versions	A (*1)	V10L61 or later
ETERNUS DX60 S2	A	All versions	N/A	-
ETERNUS DX80 S2 ETERNUS DX90 S2	A	All versions	A	All versions
ETERNUS DX60 S3 ETERNUS DX100 S3 ETERNUS DX200 S3	A	All versions	A	All versions

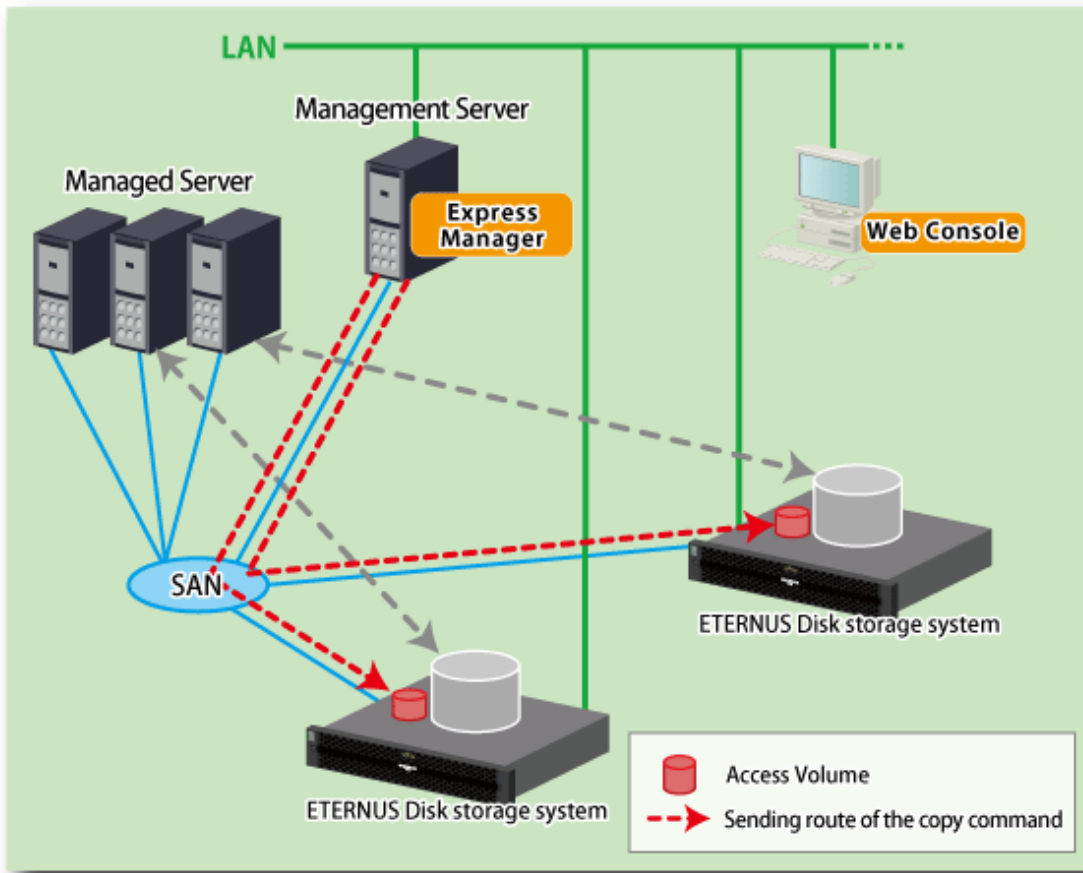
Device Name	Copy Command via SAN		Copy Command via LAN	
	Operation	Firmware Version	Operation	Firmware Version
ETERNUS DX200F	A	All versions	A	All versions

(A=Available, N/A=Not Available)

*1: The acarrray add command (ETERNUS Disk storage system registration command) cannot be executed with the -lan option added.

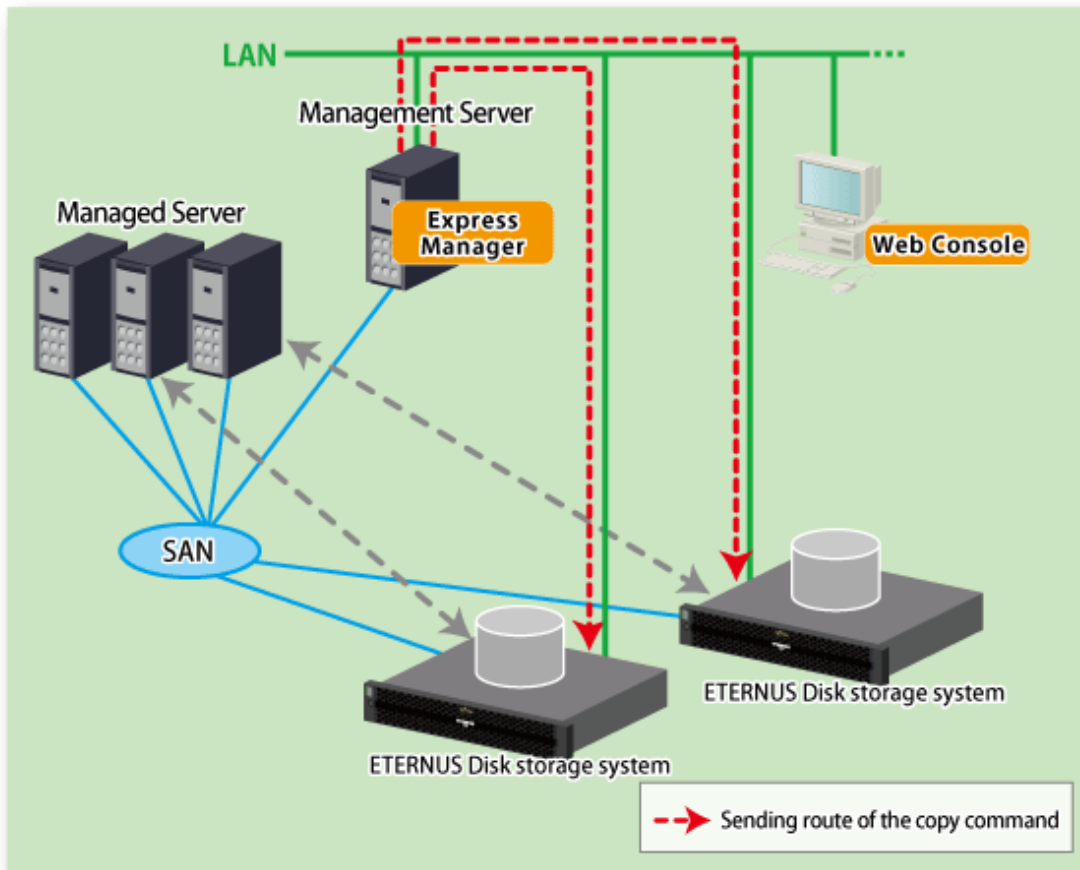
When using the Copy command via SAN method, a logical volume that can be accessed from the Management Server is needed in ETERNUS Disk storage system. In this manual, this logical volume is called "access volume". One logical volume of ETERNUS Disk storage system must be assigned to Management Server as the access volume.

Figure 1.3 Example of System Configuration Using Copy Command via SAN



When using the Copy command via LAN method, no access volume is needed.

Figure 1.4 Example of System Configuration Using Copy Command via LAN



Chapter 2 Flow to Operation

This chapter describes the required information before installation.

2.1 Flow from Installation to Operation

The "[Figure 2.1 Flow from Installing to Operating Storage System](#)" shows a flow from installation of a storage system to its operation in Express.

This manual explains the environment configuration, operation and maintenance of Express.

Refer to the following manual for installation and setting up Express.

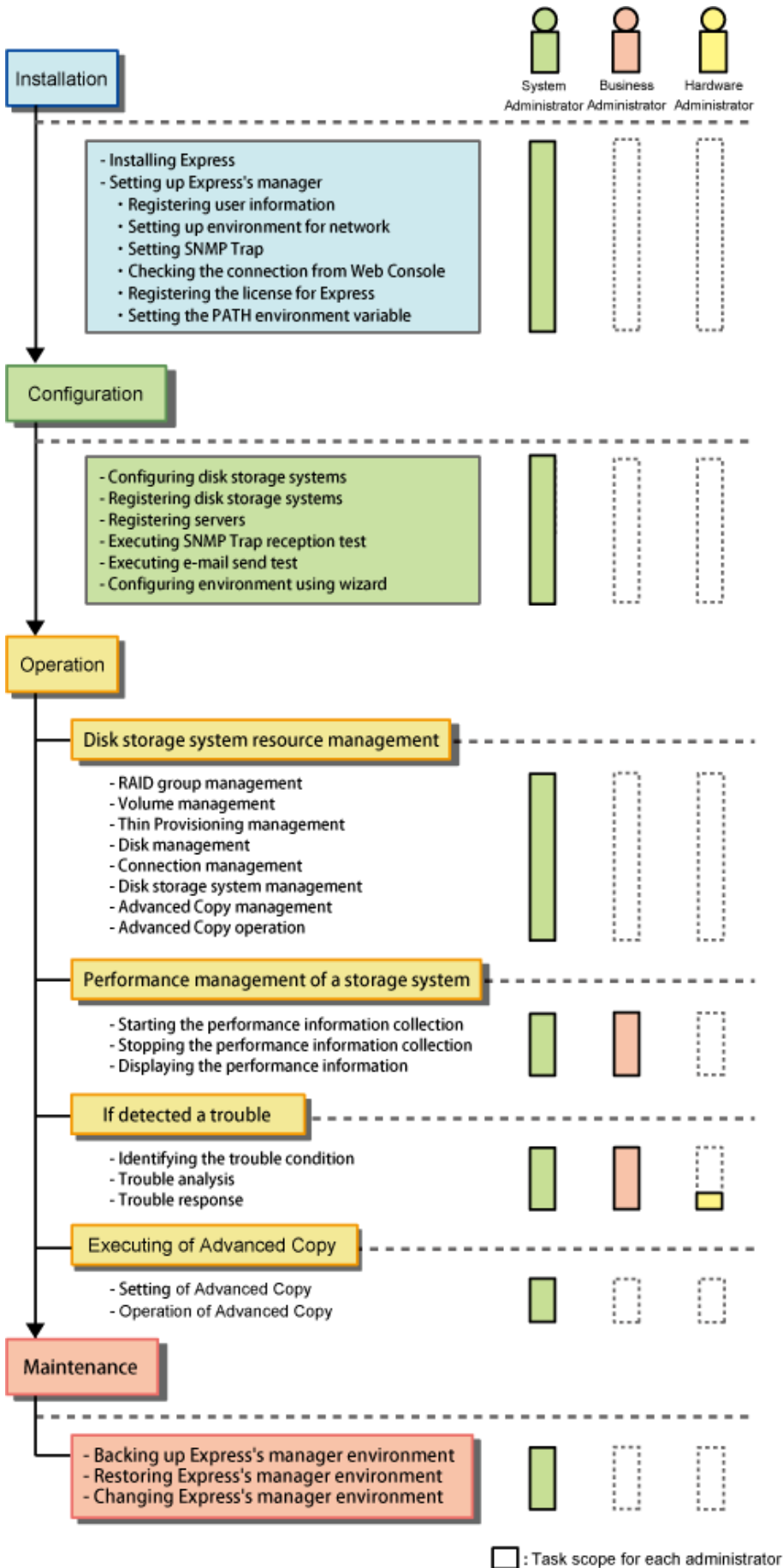
For Installation of Express:

ETERNUS SF Installation and Setup Guide

For Upgrading from Previous Version to Latest Version:

ETERNUS SF Migration Guide

Figure 2.1 Flow from Installing to Operating Storage System



Express defines the role of each administrator for installing and operating a storage system as follows.

Table 2.1 Roles of Administrators

Administrator	Task
System administrator	Manages design through operation of storage systems. Handles all the tasks required to operate storage systems.
Business administrator	Manages business operations performed on servers. Performs backup and restore of business data and handles failures affecting managed business operations.
Hardware administrator	Manages storage system hardware. Handles hardware failures.

 **Information**

Administrator to Be Registered and Required Privileges:

To use Express, it is necessary to register Administrator user information on the server on which to install Express. System administrator must be registered. Register Business administrator and Hardware administrator as required. Refer to "Registering User Account for Using Express" in the *ETERNUS SF Installation and Setup Guide* for privileges given to each administrator.

Chapter 3 Configuration

This chapter describes the configuration procedures of storage system operating environment by using Express.

3.1 Setup Required in Advance

In order to manage ETERNUS Disk storage system using Express, it is necessary to configure ETERNUS Disk storage system in advance.

Please set up the following item by using the ETERNUS Web GUI.

Refer to the ETERNUS Web GUI manuals for more information.

- Check the IP address of the Management Server.
When the Management Server exists in a different subnet from where ETERNUS Disk storage system belongs, make sure that the IP address of the Management Server is registered in "Access permission list for outside of the subnet" on "Setup environment for network" screen. If it is not registered, register it.
- On the following screens of the ETERNUS Web GUI, enable the SNMP function of MNT port:

Target Device	Screen Name
ETERNUS DX60 S3/DX100 S3/DX200 S3 ETERNUS DX200F	Setup SNMP Agent User
Other than that above	Setup SNMP Agent

- Check the ETERNUS Disk storage system name displayed in the **Name** column on the "Modify Storage System Name" screen.
When using Advanced Copy functions, specify 16 or less alphanumeric characters for ETERNUS Disk storage system name.
- When you connect iSCSI, specify "Enable" the use of iSNS server in the target port.

For ETERNUS DX80 S2/DX90 S2, DX60 S3/DX100 S3/DX200 S3, ETERNUS DX200F, in addition to the above, execute the following settings:

- Create a new SSH server key.
Create an SSH server key on the following screens of the ETERNUS Web GUI. The number of bits for SSH server key is optional.

Target Device	Screen Name
ETERNUS DX60 S3/DX100 S3/DX200 S3 ETERNUS DX200F	Setup SSH Server Key
Other than that above	Create SSH Server Key

- Create a Software Role Account with the account information in the ETERNUS Web GUI "Setup User Account" screen.
Use this account information during the remaining of the procedure.
- If a SNMP community name is not already set for ETERNUS Disk storage system, create the SNMP community name in the "Setup SNMP Community" screen in the ETERNUS Web GUI.



Note

Make sure to logout from the ETERNUS Web GUI if the setting up is completed.

3.2 Checking Connection from Web Console

From the next section on, the described tasks are supposed to be performed from the Web Console.

Launch the Web Console and login, and then check that the initial screen is displayed.



See

Refer to the *ETERNUS SF Web Console Guide* for the version level of the supported web browsers and methods for launching and logging into the Web Console.

3.3 Registering Disk Storage Systems

In order to manage disk storage systems, first of all it is necessary to register disk storage systems to be managed.

Disk storage systems can be registered by using the Web Console.

Refer to "Register ETERNUS Disk Storage System" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

3.4 Registering Servers

In order to assign volume to a server using Express, it is necessary to register the target server in advance.

Using the Web Console, register a server to be managed by Express.

Refer to "Register Server" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

Then, add HBA to the registered server.

Refer to "Add HBA" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.



Point

Registration of a server and the addition of HBA can be performed using the Storage configuration wizard. Refer to "[3.6 Environment Configuration Using Wizard](#)" for details about the Storage configuration wizard.

3.5 Event Notification Test

Express performs the fault monitoring by processing events that are asynchronously reported by SNMP Trap from ETERNUS Disk storage system. Therefore, check that the SNMP Trap settings are correctly done.

By sending E-mail to the destination address configured in advance when an abnormality occurs in the device, it is possible to notify its abnormality to the system administrator and business administrator immediately.

This section describes the procedure for SNMP Trap reception test and E-mail send test.

3.5.1 Procedure for SNMP Trap Reception Test

Check that the Management Server can receive SNMP Trap.

Perform the following procedure to execute a SNMP Trap reception test.

1. Launch the ETERNUS Web GUI.
2. On the ETERNUS Web GUI, check that SNMP Trap destination from ETERNUS Disk storage systems is an IP address of the Management Server.
SNMP Trap destination is automatically specified when ETERNUS Disk storage system is registered. Also, it can be manually specified on the ETERNUS Web GUI.
3. On the ETERNUS Web GUI, send the SNMP Trap.
Refer to the ETERNUS Web GUI manuals for more information.
4. On the Web Console, check that the message has been displayed in the event log.
SNMP Trap Test has been completed successfully if the message including the character string of "SNMP Trap Test" is displayed in the body of the message.

If the message has not been displayed, check the SNMP community name and SNMP Trap destination in the ETERNUS Disk storage system settings. In addition, check that the network settings (e.g. firewall setting) is correct. Then, send the SNMP Trap on the ETERNUS Web GUI again.

3.5.2 Procedure for E-mail Send Test

Check whether E-mail can be received at the specified E-mail address or SMTP server IP address.

Using the Web Console, check that the E-mail destination address is set up and then send test E-mail.

Refer to "Send Test E-mail" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.



Note

If an event notification E-mail destination address has been set, a test E-mail is sent to the E-mail destination address whether or not an event notification E-mail has been set to send.

The test E-mail is sent only to the business administrator and system administrator.

3.6 Environment Configuration Using Wizard

Even without prior experience of ETERNUS Disk storage systems configuration and setup, the volume created in ETERNUS Disk storage system can be assigned to the server with a wizard.

Express provides the following wizards:

Storage Configuration Wizard

This wizard can register new server and assign volumes created in ETERNUS Disk storage system to new server. In addition, volumes to be assigned can be created in this wizard.

From "Main" of the Global Navigation tab or on the Action pane for "Storage", execute Configure Storage under Wizard.

Volume Allocation Wizard

This wizard can assign volumes created in ETERNUS Disk storage system to the registered server.

On "Main" of the Global Navigation tab or on the Action pane for "Storage", execute Assign Volume under Wizard.

Advanced Copy Configuration Wizard

This wizard can configure the copy table size and Snap Data Pool policy required for Advanced Copy operation.

Select ETERNUS Disk storage system from "Storage" of the Global Navigation tab and select "AdvancedCopy" on the Category pane. Then, on the Action pane for "Configuration" on the Category pane for AdvancedCopy, execute AdvancedCopy under Wizard.

Wizard Name	Flow of Operation
Storage configuration wizard	<ol style="list-style-type: none"> 1. Register the server and add HBA 2. Select ETERNUS Disk storage system to connect with the server 3. Create RAID group (optional) 4. Create volume (optional) 5. Assign volume to the server <ol style="list-style-type: none"> 5-1. Register host 5-2. Create Affinity group 5-3. Add Host Affinity
Volume allocation wizard	<ol style="list-style-type: none"> 1. Select the server 2. Select HBA and port 3. Assign volume to the server

Wizard Name	Flow of Operation
	3-1. Register host 3-2. Create Affinity group 3-3. Add Host Affinity
Advanced Copy configuration wizard	1. Configure the copy table size 2. Configure Snap Data Pool policy (optional)

Without using these wizards, each operation can be executed. Refer to "[4.1 Resource Management](#)" for the executable operations.

Chapter 4 Operation

This chapter describes the procedure to operate the disk storage system using Express.

4.1 Resource Management

Various functions can be used on the Web Console to the disk storage system registered into Express.



See

Refer to the *ETERNUS SF Web Console Guide* for details on the operation procedures using the Web Console.

4.1.1 Operations for ETERNUS Disk Storage System

Express can execute operations related to ETERNUS Disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display ETERNUS Disk storage system
- Delete ETERNUS Disk storage system
- Change ETERNUS Disk storage system information
- Set and change the information of the account that can access ETERNUS Disk storage system
- Change the storage system name for ETERNUS Disk storage system
- Change the Box ID for ETERNUS Disk storage system
- Configure ETERNUS Disk storage system
- Assign ETERNUS Disk storage system volumes to a server
- Reload ETERNUS Disk storage system configuration information



Note

In the following cases, since the ETERNUS Disk storage system has been modified beyond management of Express manager, the configuration information must be reloaded:

- An error event or warning event has been received
- The ETERNUS Disk storage system has recovered from a problem
- Performance is managed and monitored status is not up-to-date
- Management Server or Express manager has stopped its functions before operations specified from the Web Console are completed
- When the ETERNUS Disk storage system is being managed by multiple Express managers
- ETERNUS Disk storage system is operated by another manager (not Express)
- If the ETERNUS Disk storage system was upgraded with new hardware option e.g. Unified Kit
- The firmware of the ETERNUS storage system was updated

4.1.2 Operations Related to Server

Express can execute operations related to servers.

Using the Web Console, select the server, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the server
- Delete the server
- Change the server information
- Reload the server configuration information
- Add the HBA
- Delete the HBA

4.1.3 Operations Related to RAID Group

Express can execute operations related to RAID groups in the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the RAID group
- Display the RAID group details
- Create and delete the RAID group
- Configure the RAID group Eco-mode



Note

When the RAID group corresponds to either following conditions, the disk drive cannot be stopped from the Web Console. Stop the disk drive by the storageadm spindle stop command:

- The volume whose volume type is WSV exists in the target RAID group.
- The volumes in the target RAID group are concatenated with other RAID groups by the LUN Concatenation.

Refer to "Command References" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the storageadm spindle stop command.

4.1.4 Operations Related to Volume

Express can execute operations related to volumes in the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the volume
- Create and delete the volume
- Forcible delete the volume
- Format the volume
- Expand the Thin Provisioning Volume capacity
- Start and stop the Thin Provisioning Volume restriping



Note

- The number of maximum volumes that can be made with this product at a time is 128. Make them by dividing into two or more times when you make volumes that exceed 128.

- On the Web Console, the following operations cannot be performed:
 - Delete the reservation of Snap Data Pool Volume.
 - Create, delete and format volumes of LUN concatenation.
 - Create, delete and format Wide Striping Volume.

The above operations can be performed using the ETERNUS Web GUI.

4.1.5 Operations Related to Thin Provisioning

Express can execute operations related to Thin Provisioning in the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the Thin Provisioning Pool
- Display the Thin Provisioning Pool status
- Create and delete the Thin Provisioning Pool
- Change the Thin Provisioning Pool threshold value
- Display the Thin Provisioning Pool capacity graph
- Expand the Thin Provisioning Pool capacity
- Format the Thin Provisioning Pool



Note

If the firmware version number of the following device is less than V10L20, a total capacity of Thin Provisioning pool exceeding 2TB cannot properly be displayed. When using a Thin Provisioning pool exceeding 2TB, the firmware version number must be V10L20 or later:

- ETERNUS DX80 S2/DX90 S2

4.1.6 Operations Related to Component Information for Storage Device

Express can execute operations related to component information for the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the entire device information
- Display the Controller Enclosure information
- Display the Drive Enclosure Information
- Display the port information
- Display the disk information
- Register the Global Hot Spare disk
- Register the Dedicated Hot Spare disk
- Release the Hot Spare disk

4.1.7 Operations Related to Connectivity for Storage Device

Express can execute operations related to connectivity for the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the storage port list
- Display the FC port information, iSCSI port information, SAS port information and FCoE port information
- Change the FC port settings, iSCSI port settings and SAS port settings
- Display the number of hosts for port type
- Add the FC host, iSCSI host and SAS host
- Display the Affinity/LUN group list
- Create, delete and change the affinity/LUN group
- Display the Host Affinity list
- Create and delete the Host Affinity



Note

- For ETERNUS DX200F, SAS port configuration cannot be changed and SAS host cannot be added.
- On the Web Console, the transfer rate of iSCSI-RA port cannot be changed. Change the transfer rate on the ETERNUS Web GUI.
- Multiple VLAN functions of iSCSI port are not supported. On the Web Console, a basic IP address (#0) can be set and viewed. However, expanded virtual IP addresses (#1 through #15) cannot be set and viewed. Set and view the configuration information for expanded virtual IP addresses on the ETERNUS Web GUI.

4.1.8 Operations for System Management

Express can execute operations related to the disk storage system management.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Display the license
- Register and delete the license
- Display the Eco-mode
- Configure the Eco-mode
- Enable and disable the encryption mode



Note

Eco-mode is not configurable for ETERNUS DX200F.

4.1.9 Operations Related to Advanced Copy

Express can execute operations related to the Advanced Copy for the disk storage system.

Using the Web Console, select the disk storage system, and then select the process on the **Action** pane.

The executable operations are as follows.

- Configure the copy table size for Advanced Copy
- Configure the connection type for ETERNUS Disk storage system

- Display the copy group
- Create and delete the copy group
- Display the copy pair
- Create, add and delete the copy pair
- Perform the Advanced Copy
- Display the copy session
- Display the Snap Data Pool information
- Change the Snap Data Pool policy

4.2 Performance Management

4.2.1 Overview

This software supports performance management for ETERNUS Disk storage systems. The performance management enables users to get details about the operation and load statuses of devices.

Additionally, by knowing the number of active disks, it is possible to verify the Eco-mode status of the ETERNUS Disk storage system.



Note

- Do not execute performance monitoring for one ETERNUS Disk storage system from more than one server (*) at the same time.
*: Any of Management Servers of ETERNUS SF Express, Softek Storage Cruiser, ETERNUS SF Storage Cruiser and Systemwalker Resource Coordinator.
- The performance management always starts up when the Management 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 the Web Console is started or not. To stop performance information collection, execute performance management stop processing.

4.2.1.1 Performance Information Types

The following information can be managed:

	Performance Information	Unit
Logical Volume	Read/Write count	IOPS
RAID Group	Read/Write data transfer rate	MB/s
	Read/Write response time	msec
	Read/Pre-fetch/Write cache hit rate	%
NAS Volume (*1)	Read/Write throughput	MB/s
Disk drive	Disk busy rate	%
CM	Load (CPU usage) rate	%
	Copy remaining amount	GB
NAS System (*1)	CPU usage rate	%
	Number of CIFS/NFS processes	ops/s
CM Port	Read/Write count	IOPS
	Read/Write data transfer rate	MB/s

	Performance Information	Unit
Device	Number of active disks	Disk
	Power consumption	W
	Temperature	C

*1: Performance information can be displayed only if the following conditions are satisfied:

- NAS Option is applied to the storage device.
- The firmware version is V10L21-0000 or later.

Note

- If there is a difference between the internal clocks of the Management Server and the target device, a time lag may occur in the performance graph.
To prevent this phenomenon, it is recommended to setup NTP to stay in sync with the Management Server and the target device.
- If restarting a target device during performance management, the device may fail to acquire the correct performance information after the restart.
We recommend to stop the performance management before restarting a target device.
- Support for Logical Volume and RAID Group performance information varies according to the volume type and the ETERNUS Disk storage system model. However, we cannot guarantee the values for the RAID Group performance information including SDV.

Storage Devices	Logical Volume, RAID Group		
	Standard Volume	Thin Provisioning Volume, Thin Provisioning Pool	Snap Data Volume, Snap Data Pool Volume
ETERNUS DX60 ETERNUS DX80 ETERNUS DX90	A	N/A	N/A
ETERNUS DX60 S2	A	N/A	N/A
ETERNUS DX80 S2 ETERNUS DX90 S2	A	A	N/A
ETERNUS DX60 S3 ETERNUS DX100 S3 ETERNUS DX200 S3	A	A	N/A
ETERNUS DX200F	A	A	N/A

(A=supported, N/A=not supported)

- Performance information of SAS ports and NAS ports, which are ETERNUS Disk storage system host interfaces, is not supported.
- Performance management cannot be done for ETERNUS Disk storage systems which do not have Logical Volume (LUN).
- RDB performance information cannot be displayed in environments that use the REC Disk Buffered Consistency function.

4.2.1.2 Performance Graph Window Types

It is possible to display the following graph.

One-day Graph window

Based on the mean values for 10-minute periods, a line graph for a one-day period is displayed.

Information

- Following performance values are displayed as they are obtained from the device (not their mean values).
 - CM Copy remaining amount
 - Number of active disks
 - Power consumption
 - Temperature
- 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 might not be displayed at every monitoring interval of 60 minutes depending on the LAN traffic condition or network environment, for example, the Management Server and target device of the performance monitoring exist in the different subnets.

4.2.2 Flow of Performance Management

When a user gives an instruction for performance management of a target device using the Web Console, the performance management unit for this product saves the device performance data for each device, and stores them as performance data to the Management Server. This performance data is displayed on a graph.

4.2.2.1 Checking Disk Space on Management Server

To conduct performance management, sufficient disk space is required on the Management Server for performance data storage. Make sure that sufficient disk space is ensured referring to the *ETERNUS SF Installation and Setup Guide*.

4.2.2.2 Instruction for Performance Management

When performing performance management, configure and start the performance management by using the Web Console.

Enter the range of target Logical Volume (LUN_V) that is obtained for performance information in the Web Console. Specifying the range of Logical Volume (LUN_V) reduces the effects on the disk area stored performance data and the loads resulting from obtaining performance information.

Refer to "Start/Change Settings of/Stop Performance Monitoring" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

Information

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.

At this time, after instructing it to start the performance management, the monitoring range which is displayed on the Web Console is not the value specified at the start time but the value converted to units of 64.

When starting performance management, "Monitoring" is displayed on the "Performance Monitoring Status".

Refer to "Display Performance Monitoring Status" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

The following table shows the value of "Performance Monitoring Status", the corresponding status, and the appropriate actions.

Value of "Performance Monitoring Status"	Status	Appropriate Action
Monitoring	Performance is being monitored. (Normal)	The action is no required.

Value of "Performance Monitoring Status"	Status	Appropriate Action
Recovering	Performance monitoring is being recovered (e.g. device time-out).	The Express's manager cannot communicate with a disk storage system. Check the network status and the disk storage status. Log off, when ETERNUS Web GUI is in a login state.
Error	Performance monitoring error (e.g. device time-out, writing to the performance information file failed.)	The Express's manager cannot communicate with a disk storage system. Check the network status and the disk storage system status. Log off, when ETERNUS Web GUI is in a login state. In addition, check the write permission to the file and the capacity of the file system. Then, stop performance monitoring and restart it.
Stop	Performance monitoring has stopped. (Normal)	The action is no required.

However, the value of "Performance Monitoring Status" may differ in present value. Reload the setting for ETERNUS Disk storage system and make sure the system is up-to-date.

Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.2.2.3 Setting Monitoring Intervals

The performance information is acquired from ETERNUS Disk storage system at 60 second (fixed) intervals.



Information

In LAN traffic or cross-subnet (where there is a gateway between the performance monitoring target device and the Management 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.

Since the performance management unit is started as a daemon of the Management Server, the unit continues obtaining performance information while the Management Server is active, without starting the Web Console.

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.

4.2.2.4 Displaying Performance Information of Selected Device

Confirm by displaying the graph using the Web Console. In addition, the performance information can be output to the CSV format file by using the `storageadm perfdata` command.

Refer to "Display Performance Information Graph" and "Export Performance Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures for Web Console.

4.2.2.5 Displaying Storage Performance Information

4.2.2.5.1 Displaying Logical Volume and RAID Group Performance Information

Select the number of Logical Volume or RAID Group whose performance information you want to display in graph.



Note

The ETERNUS Disk storage system performance information for SDVs is not supported. The value for the performance information about the RAID Group containing a SDV also cannot be guaranteed.

4.2.2.5.2 Displaying Disk (Physical Drive) Performance Information

Select the number of the disk whose performance information you want to display in graph.

4.2.2.5.3 Displaying CM Performance Information

Select the CM or CM CPU whose performance information you want to display in graph.

4.2.2.5.4 Displaying CM Port Performance Information

Select the CM Port from a list of ports whose performance information you want to display in graph.

4.2.2.5.5 Displaying Number of Active Disks, Power Consumption, and Temperature Performance Information

Select the performance information you want to display in graph.

4.2.2.5.6 Displaying Performance Information of NAS Volume and NAS System

Select the performance information you want to display and display the graph.



Note

If the ETERNUS Disk storage system does not support NAS functionality, performance information of NAS volumes and NAS systems is not displayed. Even if NAS functionality is supported, it is necessary to update to supported firmware (V10L21-0000 or later) and perform "[Required Setup Configuration](#)" in advance. In order to display performance information, after performing pre-configuration, it is necessary to update configuration information and restart performance monitoring.

4.2.2.6 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 Affinity Group number and Logical Volume number of the ETERNUS Disk storage system defined in the target access path.
3. Using performance management, display and check the target Logical Volume performance values.
4. If a response of the Logical Volume 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 Logical Volumes, and check for a heavy load on RAID Group. If there is a heavy load, move the appropriate Logical Volume to another RAID Group, or take other appropriate action.

4.2.2.7 Instruction for Stopping Performance Management

Execute performance management processing on the Web Console.

Refer to "Start/Change Settings of/Stop Performance Monitoring" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.2.2.8 Updating Configuration Information

Device configuration information is independently maintained in the performance management.

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 that has executed performance management has been changed.

1. Record the performance monitoring settings contents (if performance monitoring is used)
<Recorded settings contents>
 - Performance monitoring targets (Minimum LUN_V, Maximum LUN_V)
2. Stop performance monitoring (if performance monitoring is used)
Refer to "[4.2.2.7 Instruction for Stopping Performance Management](#)".
3. Change the configuration for a device that has executed performance management.
4. Start performance monitoring based on the settings contents recorded in step 1. (if performance monitoring is used).
Make sure to set it to create configuration information.
Refer to "[4.2.2.2 Instruction for Performance Management](#)".



Note

.....

If the configuration for a device that has executed performance management has been changed, the configuration information before the change is used for performance management. Performance information cannot be guaranteed prior to the configuration information update.

.....

4.3 Detecting Trouble

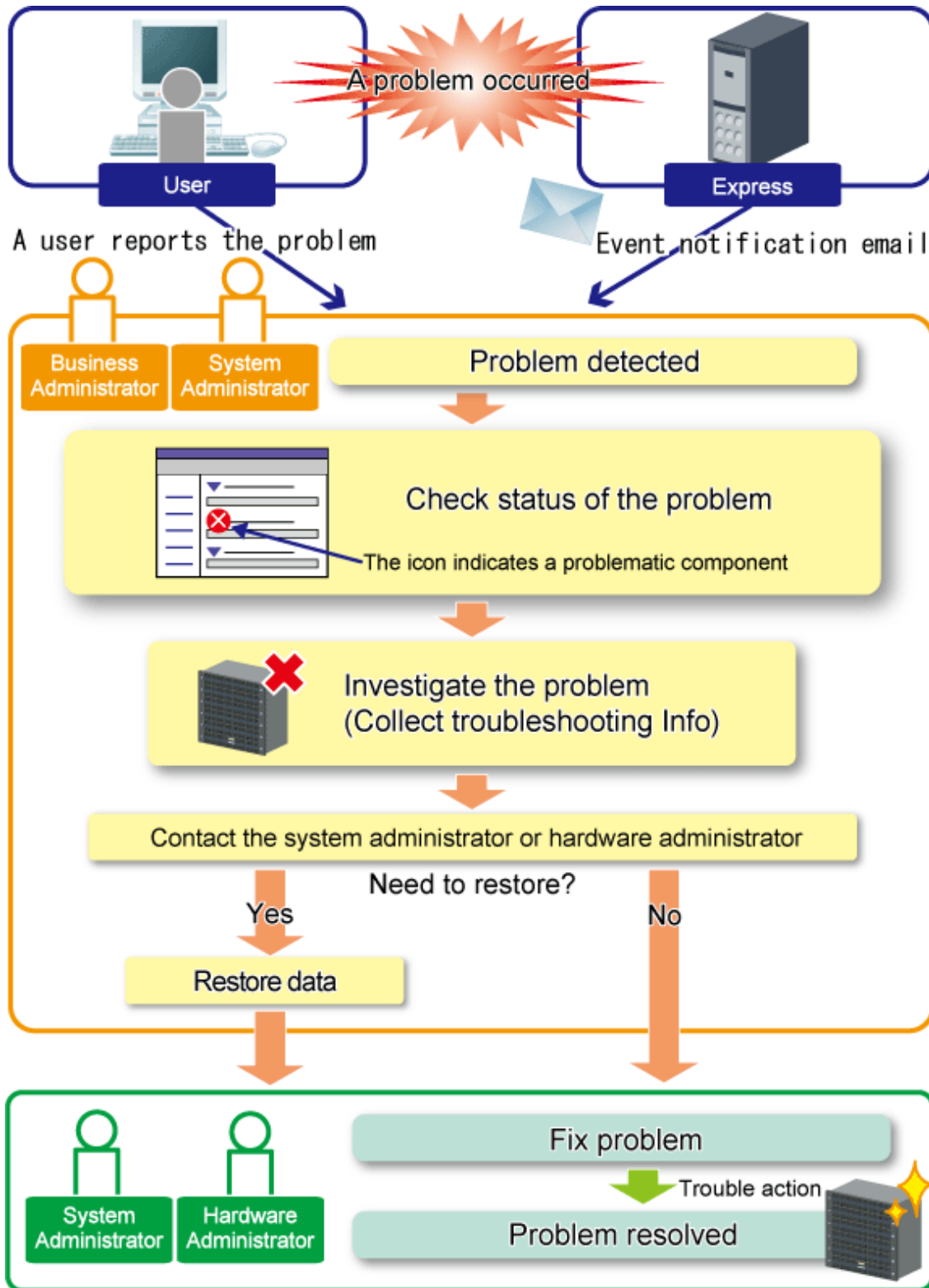
The following is a description of the procedure to be taken if trouble should occur during Disk storage system operations.

Trouble occurrence is detected in the following way.

- An E-mail of error or warning level trouble occurrence is sent from Express.
- Trouble occurrence reported from a user.

The following is a flow from trouble detection to its response.

Figure 4.1 Flow from Trouble Detection to Its Response

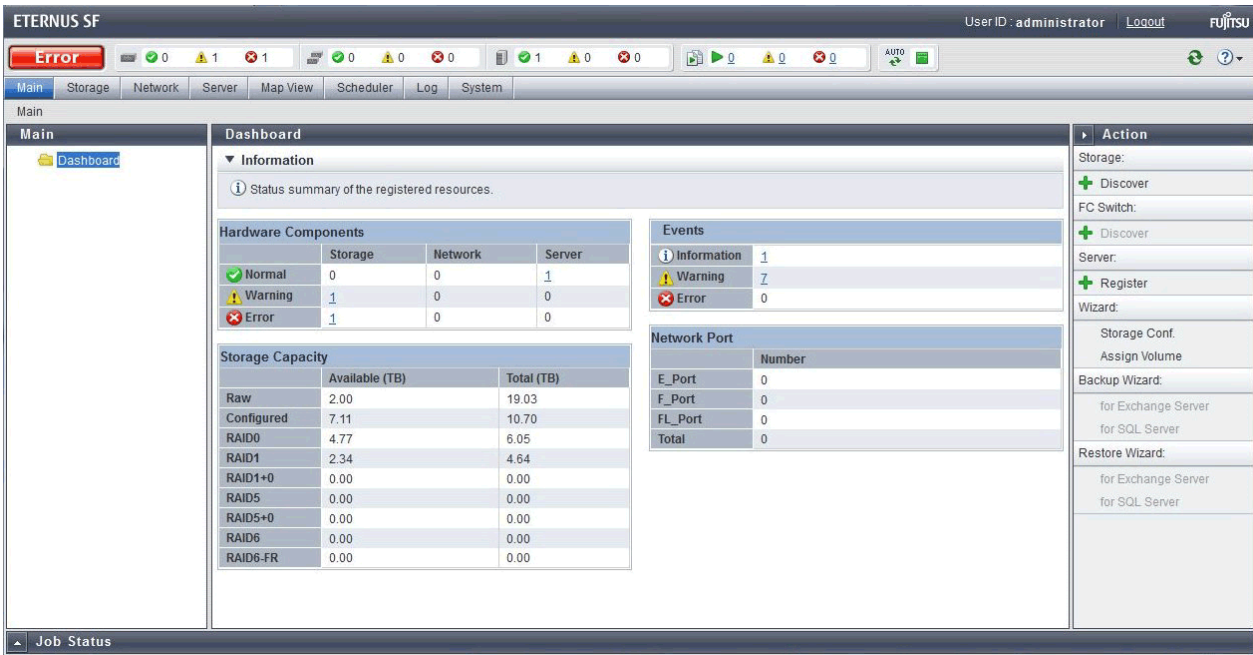


4.3.1 Identifying Trouble Condition

The Web Console can identify the trouble condition.

Since the Web Console displays the status of each device with icons or messages, it is easy to identify the trouble condition.

Figure 4.2 Web Console



If trouble is occurring, check the following item.

- Dashboard

This is the initial screen when you login to the Web Console.

It is possible to check the status of components in the device to be managed and the state of event log immediately.

When trouble occurs, number of trouble-occurred devices or events is counted up in the field which "Error (❌)" or "Warning (⚠️)" icon is displayed.

If the value in the field is counted up, it is highly possible that business operations are affected. Therefore, identify the cause of the trouble to determine how to correct it.

By clicking the value in the field, the management screen is displayed. It is possible to check the detailed status in the management screen.

- Event log

When trouble occurs in the disk storage system, the Management Server receives an event notification by SNMP Trap.

The notified event can be verified in the event log.

Refer to "Display Events" in the *ETERNUS SF Web Console Guide* for details on displaying the event log.



Note

If an Error or Warning level event is reported, update the corresponding storage system element status manually.

When the status of the storage system is recovered, also update the corresponding storage system element status manually.

The global status of the system containing the element is updated automatically.

Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.



Point

In the following cases, the status icon is updated.

- When there is a higher error event notification from the disk storage system.
- When the configuration information is reloaded using the Web Console.

4.3.2 Collecting Troubleshooting Information

There are other methods to analyze the effects of the trouble besides "4.3.1 Identifying Trouble Condition". Use those methods as required.

In addition, for hardware troubles, contact the hardware administrator when needed.

- Trouble information collection

The trouble information can be collect using either the [esfsnap](#) command or Web Console.

Refer to "Collecting Troubleshooting Information" in the *ETERNUS SF Web Console Guide* for using the Web Console.

- Displaying operation history

The Web Console operation (contents, execution status and results) history can be displayed.

Refer to "Display Operation History" in the *ETERNUS SF Web Console Guide* for details.

- Displaying login/logout history

The Web Console user login and logout history can be displayed.

Refer to "Display Login/Logout History" in the *ETERNUS SF Web Console Guide* for details.

4.3.3 Trouble Response

After identifying the trouble condition as shown in "4.3.1 Identifying Trouble Condition" or "Collecting the Troubleshooting Information", contact a system administrator or a hardware administrator, referring to the message and trouble information.

After resolving the trouble, reload the configuration information to update information. Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.4 Executing Advanced Copy

This section describes the procedures for executing Advanced Copy.

Express can execute snapshot copy (SnapOPC+). The maximum number of copy sessions that can be executed with the device is as follows:

Device Name	Maximum Number of Copy Sessions
ETERNUS DX60/DX60 S2/DX80/DX80 S2/DX90/DX90 S2	8
ETERNUS DX100 S3	1024
ETERNUS DX200 S3 ETERNUS DX200F	2048

4.4.1 Connection Type Settings

Set up the type of the connection with ETERNUS Disk storage system used by Copy command via SAN or Copy command via LAN.



Refer to "System Configuration" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details about Copy command via SAN and Copy command via LAN.

There are two connection types.

Connection Type	Explanation
Access through volumes	If this type is selected the copy command is issued through the SAN interface.
Access through network	If this type of selected the copy command is issued though the LAN interface.

Refer to "Configure Connection Type for ETERNUS Disk Storage System" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.4.2 Access Volume Settings

In Express, the Management Server sends a command to ETERNUS Disk storage system to perform an Advanced Copy function. When using the Copy command via SAN method, a logical volume that can be accessed from the Management Server is needed in ETERNUS Disk storage system. In this manual, this logical volume is called "access volume".

One logical volume of ETERNUS Disk storage system must be assigned to Management Server as the access volume.



.....
When registering ETERNUS Disk storage system to be used the Copy command via LAN method, no access volume is needed.
.....

For Windows

Perform the following procedure to set an access volume on the Management Server:

1. Allocate the logical volume from ETERNUS Disk storage system that is to be used as the access volume.
The allocated volume is recognized as a disk.
2. Initialize the disk as MBR disk format (DOS format) or GPT disk format.
3. Create a partition and assign the drive letter.

For Linux

Perform the following procedure to set an access volume on the Management Server:

1. Allocate the logical volume from ETERNUS Disk storage system that is to be used as the access volume.
The allocated volume is recognized as a disk.
2. Initialize the disk as MBR disk format (DOS format) or GPT disk format.

4.4.3 Copy Table Size Settings

Configure the copy table size and resolution required to use Advanced Copy. It is necessary to calculate the value of these parameters on the basis of the copy capacity and the number of sessions (volumes) that will be performed simultaneously. Refer to the ETERNUS Disk storage system manuals for about the calculation method.

- Copy table size

Set the size of the copy table assigned in ETERNUS Disk storage system. The copy table is the dedicated memory area required to manage Advanced Copy.

- Resolution

Set the resolution of the copy table (data size represented each bit). Specify the value as small as possible.

Refer to "Configure Copy Table Size for Advanced Copy" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.4.4 Creating Copy Group

Create copy groups. A copy group is a group of copy pairs, consisting of a copy source logical volume and a copy destination logical volume.

When creating copy groups, specify which type of Advanced Copy and which ETERNUS Disk storage system to use.

Refer to "Create/Display/Delete Copy Group" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.4.5 Creating Copy Pair

Before executing Advanced Copy, create a pair consisting of a copy source volume and a copy destination volume.

Refer to "Create Copy Pair" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

4.4.6 Executing Snapshot Copy

This is a copy method to execute ETERNUS Disk storage system SnapOPC+.

SnapOPC+ uses the Copy-On-Write method to create a pre-update copy source volume.

Refer to "Perform Advanced Copy" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

SnapOPC+ can save pre-update data on the copy source volume on a per snap generation (unit of volume replication) basis.

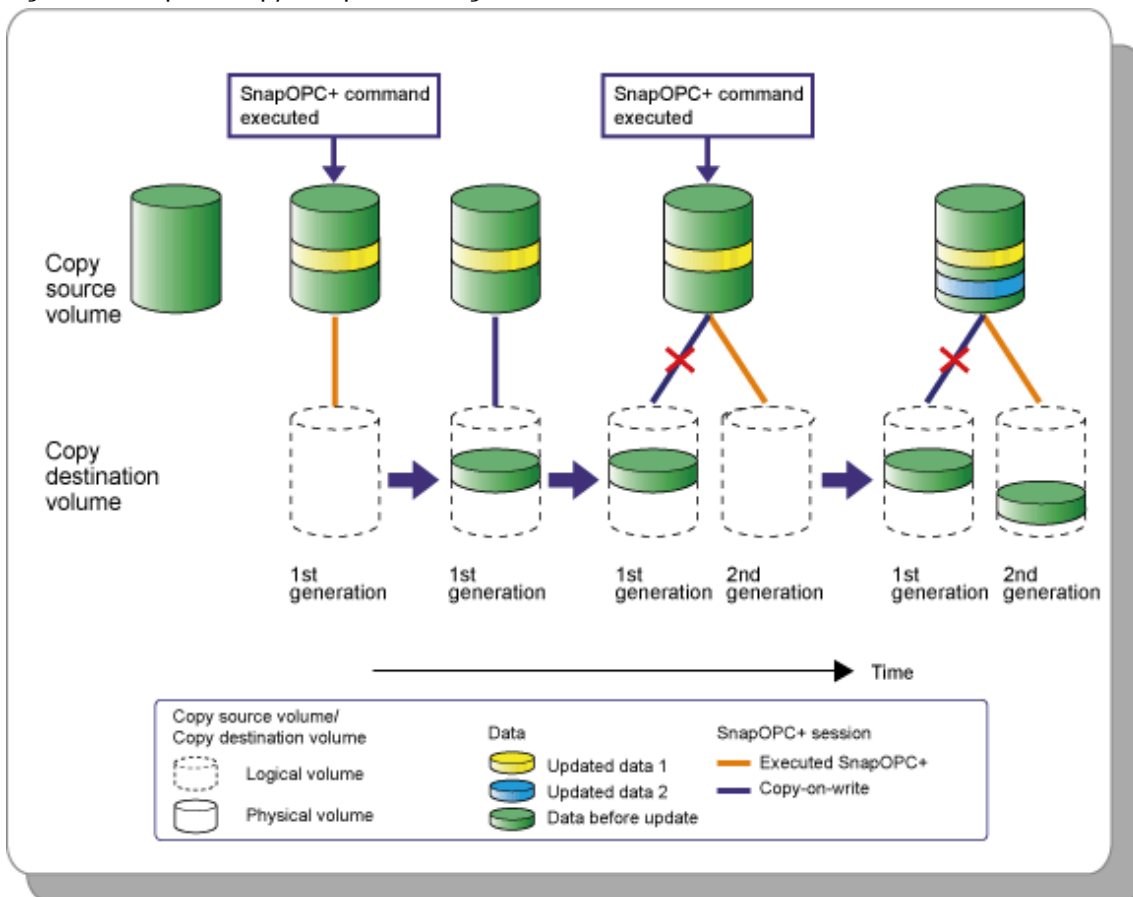
SnapOPC+ is designed in view of its mechanism and features to be used as backups for recovery from software failures such as an operational error or a software error.

If a copy source volume becomes inaccessible due to any hardware failure, SnapOPC+ session(s) fail making it impossible to read the data on the copy destination volume.

The snapshot copy (SnapOPC+) is effectively available for:

- Backups of temporary files used for cascade copy to alternate media such as tape.
- Backups of file servers and other data less frequently updated.

Figure 4.3 Snapshot Copy (SnapOPC+) Diagram



Note

ETERNUS DX80 S2/DX90 S2, DX100 S3/DX200 S3, ETERNUS DX200F requires one or more Snap Data Pool Volumes.

4.4.7 Checking Copy Status

This section describes how to check the status of Advanced Copy.

Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

Note

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If the copy status is "???" or "Unknown", an access volume may be wrong. Check the access volume with "acarray detail (ETERNUS Disk Storage System Detail Information Display Command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module*.

If the access volume is wrong, refer to "[4.4.2 Access Volume Settings](#)" to set a correct access volume.
.....

4.4.8 Command Line Operation

This section describes how to execute Advanced Copy functions with command line interface.

See

.....
Refer to "Command References" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details on the commands.
.....

Registering ETERNUS Disk Storage System

Execute the acarray add command to register an ETERNUS Disk storage system.

Set up the type of the connection with ETERNUS Disk storage system at the same time.

Note

.....
For ETERNUS Disk storage system name specified with the -a option of the acarray add command, specify an ETERNUS Disk storage system name registered to Express.

If a different name is registered, Advance Copy using the Web Console is not available.
.....

Creating Copy Groups

Execute the acgroup create command to create a copy group.

Adding Copy Pairs

Execute the acpair add command to add a copy pair to a copy group.

Executing Copy

Execute the copy start command provided for snapshot copy (SnapOPC+) to initiate the copy operation.

Note

.....
If the copy status or SID is "???" or "Unknown", an access volume may be wrong. Check the access volume with "acarray detail" command.
If the access volume is wrong, refer to "[4.4.2 Access Volume Settings](#)" to set a correct access volume.
.....

4.5 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 the changes in capacity used for the Thin Provisioning Pool graphically.

4.5.1 Threshold Monitoring

This function monitors the threshold values for the Thin Provisioning Pool capacity used.

Threshold Values and Threshold Monitoring Status

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. 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 used.

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

Set the threshold values by using the Web Console.

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 displays an SNMP Trap in the event log, which notifies the change in Thin Provisioning Pool status at the disk storage system.

- Refreshing

After checking the displayed event, perform [Reload Conf.] on the applicable storage system.

- Checking the status of the Thin Provisioning Pool

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. Refer to "Polling Service Setting File" in the *ETERNUS SF Storage Cruiser Operation Guide* for details.

.....



Information

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Even if capacity reaches "Caution threshold value" which is set for each LogicalVolume, SNMP Trap will not be sent. "Caution threshold value" for LogicalVolume is a threshold value for unallocated capacity of LogicalVolume which is at the disk storage system.

.....

4.5.2 Capacity Management

This function displays the Thin Provisioning Pool Capacity and its changes in the capacity used graphically to grasp the changes in the capacity used for the Thin Provisioning Pool.

This enables users to grasp the period to expand the size of the physical disk for the Thin Provisioning Pool, or to review the threshold setting according to the situation.

Information

The information of the Thin Provisioning Capacity and its capacity used is displaying in graph. The information is obtained everyday at 1:00:00.

You can change the time to obtain the information by using a polling service setting file. Refer to "Polling Service Setting File" in the *ETERNUS SF Storage Cruiser Operation Guide* for details.

4.5.2.1 Capacity Graph Window Types

It is possible to display the following graph.

One-month Graph window

The line graph displays data for the past 31 days from the present day.
The plot points are displayed on a daily basis.

4.6 NAS Management

This product will manage ETERNUS Disk storage system models that are multi-protocol storage with a block access interface (SAN) and a file access interface (NAS). With the Web Console, various features for operation of the ETERNUS Disk storage system NAS file system can be utilized.

This section explains the following items necessary in order to perform NAS operation of the ETERNUS Disk storage system with this product.

- [Overview of Functions](#)
- [Required Setup Configuration](#)
- [Installation Steps](#)
- [Operation Method](#)

Note

- This function cannot be used for ETERNUS DX200F.
 - Refer to the ETERNUS Disk storage system manuals for notes of NAS operation.
-

4.6.1 Overview of Functions

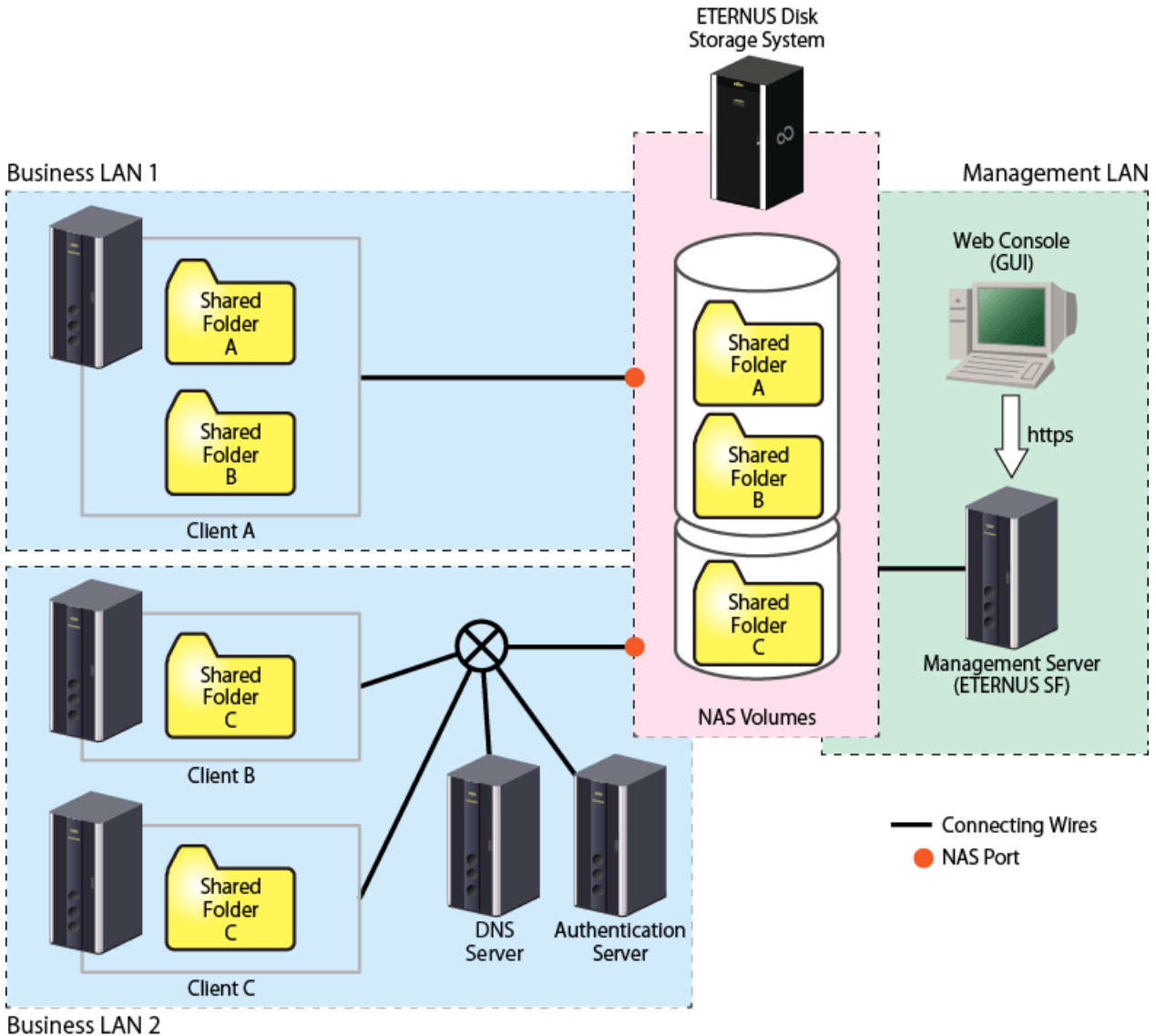
4.6.1.1 About NAS Management

NAS management of the ETERNUS Disk storage system will be explained.

4.6.1.1.1 Basic System Configuration

Basic system configurations required when operating NAS of the ETERNUS Disk storage system will be explained.

Figure 4.4 Basic System Configuration Diagram



Configuration of NAS is performed from the Management Server.

Connect the Management Server and the ETERNUS Disk storage system with a management LAN. Access to the Management Server is performed from either the Management Server or the Web Console of a terminal within a network capable of HTTPS communication with the Management Server.

The NAS feature of the ETERNUS Disk storage system is accessed by a client through one or more business LANs. It is recommended that a business LAN include a DNS Server for name resolution and an Authentication Server for authenticating NAS accesses into the NAS file system.

Point

When an authentication system is not used for the NAS file system, it is unnecessary to setup an authentication server on the system. If an authentication system is not implemented then the NAS file system can be accessed from any clients connected to the business LAN. It is strongly recommended that an authentication server is properly configured and implemented.

4.6.1.1.2 Support Features

In order to perform NAS operation of the ETERNUS Disk storage system, this product is provided with the following features:

- [Easy Installation of NAS File System Using Wizard](#)

- [Display of Configuration Information and Fault Monitoring](#)
- [Block Level Capacity Monitoring](#)
- [Performance Management](#)
- [Backup/Restoration of NAS Volume](#)
- [Automatic Collection of NAS Volume Snapshot](#)
- [Quantity Consumed Upper Limit Management and Monitoring by User/Group \(Quota Management\)](#)
- [NAS Environment Antivirus](#)

Easy Installation of NAS File System Using Wizard

The "creating of a shared folder" and the "creating of a NAS interface" which are necessary when installing a NAS file system can be configured easily by using a wizard.

Display of Configuration Information and Fault Monitoring

The configuration information resources being used for ETERNUS Disk Storage system NAS can be confirmed with the Web Console. In addition, when a failure occurs, the details of the failure will be displayed in the event log of the Web Console.

Block Level Capacity Monitoring

Capacity monitoring of NAS file system in ETERNUS Disk storage system is implemented at a level similar to that for block volumes.

Performance Management

This enables performance monitoring of resources with the ETERNUS Disk storage system below.

- NAS volume
- NAS system



Information

- The performance monitoring and threshold monitoring functions cannot be used for NAS port.
- The threshold monitoring function cannot be used for NAS volume and NAS system.

Backup/Restoration of NAS Volume

Backup and restoration of a NAS volume utilizes QuickOPC and a NAS backup volume. The use of the NAS backup volume provides protection against loss or corruption of the active NAS volume. In addition, the NAS backup volume can be accessed Read-Only for file level recovery.

Automatic Collection of NAS Volume Snapshot

This is a function that follows the specified schedule and automatically collects snapshots. The capture of the NAS volume snapshot is achieved using SnapOPC+. The NAS volume snapshot for the specified generation can be stored, and files and folders from the snapshot can be recovered without administrators.

Quantity Consumed Upper Limit Management and Monitoring by User/Group (Quota Management)

This is a function for managing the upper limit of the quantity consumed by user or group. This prevents in advance the depletion of total resources due to large disk volume consumption by certain users or groups.

NAS Environment Antivirus

By registering the antivirus server provided by the antivirus security vendors, checking of access to files under the shared folder, detection of viruses and measures are performed automatically. This prevents data in the NAS environment being infected by viruses/illegal programs.

4.6.1.1.3 Configuration Items of NAS File System

Configure the following with the Web Console in order to perform NAS operation of the ETERNUS Disk storage system.

- [Shared Folder](#)

- [NAS Interface](#)
- [NAS File System Environment](#)

Shared Folder

The shared folder refers to a folder made public on the network as a NAS file system. With this product, by creating a shared folder and setting access controls, it is possible to capture a backup and snapshot.

When creating a shared folder from the Web Console, the following resources are also created simultaneously.

Resources	Explanation
NAS volume	A volume where the shared folder will be created. Multiple shared folders can be configured to a single NAS volume.
NAS backup volume	A volume for backup of the NAS volume. When configuring NAS backup is done by a new NAS backup volume, one is created for each NAS volume. Configuring NAS backup volume is optional.
NAS snapshot volume	This is a volume for the NAS volume snapshot. When using NAS snapshot, one is created for each generation. Configuring NAS snapshot is optional.
NAS system volume	System volumes are used to control NAS volumes. They are created when a new NAS volume is created. It is created in the same Thin Provisioning Pool as NAS volume.
Copy group	Copy group used to back up NAS volume. This is created only when a NAS backup volume is configured.
Copy pair	A copy pair of a NAS volume and a NAS backup volume. This is created only when a NAS backup volume is configured.

The shared folder that is created with this product can be accessed using the following protocols. As it is possible to use the following protocols simultaneously, it is possible to access a single shared folder from both UNIX and Windows clients.

- CIFS
This protocol is a developed version of SMB which is used in Windows file sharing.
- NFS
This protocol is a protocol used between UNIX based OSs.

NAS Interface

A NAS interface refers to the definition information of a network interface that manages, over a business LAN, a public IP address for access to the shared folder and information of the port to which this IP address is assigned. When using the VLAN function, it is possible to configure multiple IP addresses for one port.

Information

There is no relation between the shared folder and the NAS interface. It is possible to reference the same shared folder from any NAS interface.

The NAS interface maybe assigned to a single port or 2 ports. The type of connections that can be configured are as follows:

- Active-Active connection
A method where 2 ports are used, and an IP address is configured to each. Both ports are enabled, and it is possible to access the shared folder from either port. In addition, 2 IP addresses can be publicized for clients, and it is possible to distribute the bandwidth load. In the event that one port is down, as the IP address configuration can be passed on to the other port automatically, operation with the same IP address can be continued even after recovering from the down time.

Information

During the time one port is down, operation is limited to a single port. It is not possible to distribute the bandwidth load across 2 ports.

- Active-Standby connection

A method where 2 ports are used, and a single IP address is configured. Of the 2, only one port will be enabled (Active port), and the other port will be disabled (Standby port). When the Active port is down, the IP address configuration can be passed on to the Standby port which is automatically enabled, making it possible to continue operation with the same IP address even after recovering from the down time.

- Single connection

A method where 1 port is used, and a single IP address is configured. When the port goes down, it will not be possible to access the shared folder.

Information

In order to continue business when a port is down, it is recommended to configure either Active-Active or Active-Standby connection for redundancy.

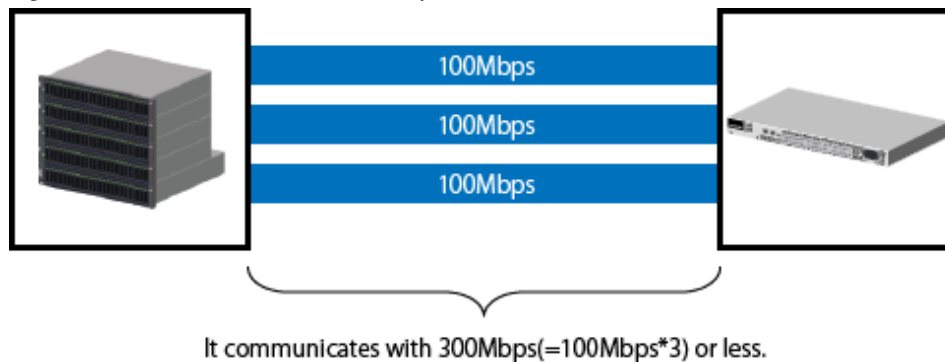
Further, with the aim of increasing communication speed and becoming more fault-resilient, multiple physical ports can be bundled and handled as one logical port. Further, a NAS interface can be allocated for that logical port (bonding port). The method of determining communication ports of bonding port is to select an operating mode and hash policy.

- Increase Communication Speed

Networks are bundled to increase communication speed.

"Figure 4.5 Increase Communication Speed" is when three 100Mbps networks are bundled to communicate at maximum of 300Mbps.

Figure 4.5 Increase Communication Speed

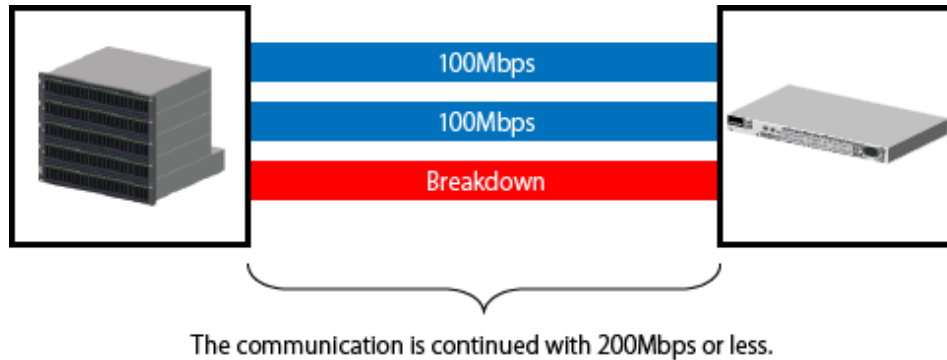


- Improved Fault-Resilience

When a communication fault occurs in any one of the bundled networks, the remaining networks can continue communication.

"Figure 4.6 Improved Fault-Resilience" is when one of 3 networks has a fault so the remaining 2 networks continue at a maximum speed of 200Mbps.

Figure 4.6 Improved Fault-Resilience



NAS File System Environment

- NAS server name

NAS server name is a unique name set within the ETERNUS Disk storage system.

By registering the NAS server name set within the ETERNUS Disk storage system and the DNS server, it is possible to set the NAS server name and access the CIFS protocol shared folder.

- DNS server

Sets the DNS server to use when operating NAS.

- Authentication System

With this product, as access to the shared folder is controlled, an authentication system using a domain controller is provided. The domain controller centrally manages the account information of individual clients on the network, and conducts authentication in relation to each of these clients or permits access.

In case an authentication server goes down, it is possible to register a maximum of 3 authentication servers for each authentication method.

The authentication methods supported by this product are as follows:

- Kerberos Authentication Method with Active Directory

Kerberos is a network authentication protocol designed to provide strong authentication for client/server applications. A password received from a client is authenticated, and a ticket is issued. By utilizing the ticket, the client that has been authenticated is able to utilize the network service.

When accessing the shared folder with a CIFS protocol, and when managing access to directories and files, in order to perform authentication and access control using this authentication method, register an Active Directory domain controller.

- Authentication Method using LDAP

LDAP is a protocol for accessing the directory service. With the directory service, it is possible to easily use features such as the search function by centrally managing the account information of network equipment and clients.

When accessing the shared folder with the NFS protocol, and when performing access management to directories and files, in order to perform authentication and access control using this authentication method, register an LDAP server.

4.6.1.2 Backup of NAS Environment

An overview of backup of the NAS environment in the ETERNUS Disk storage system will be explained.

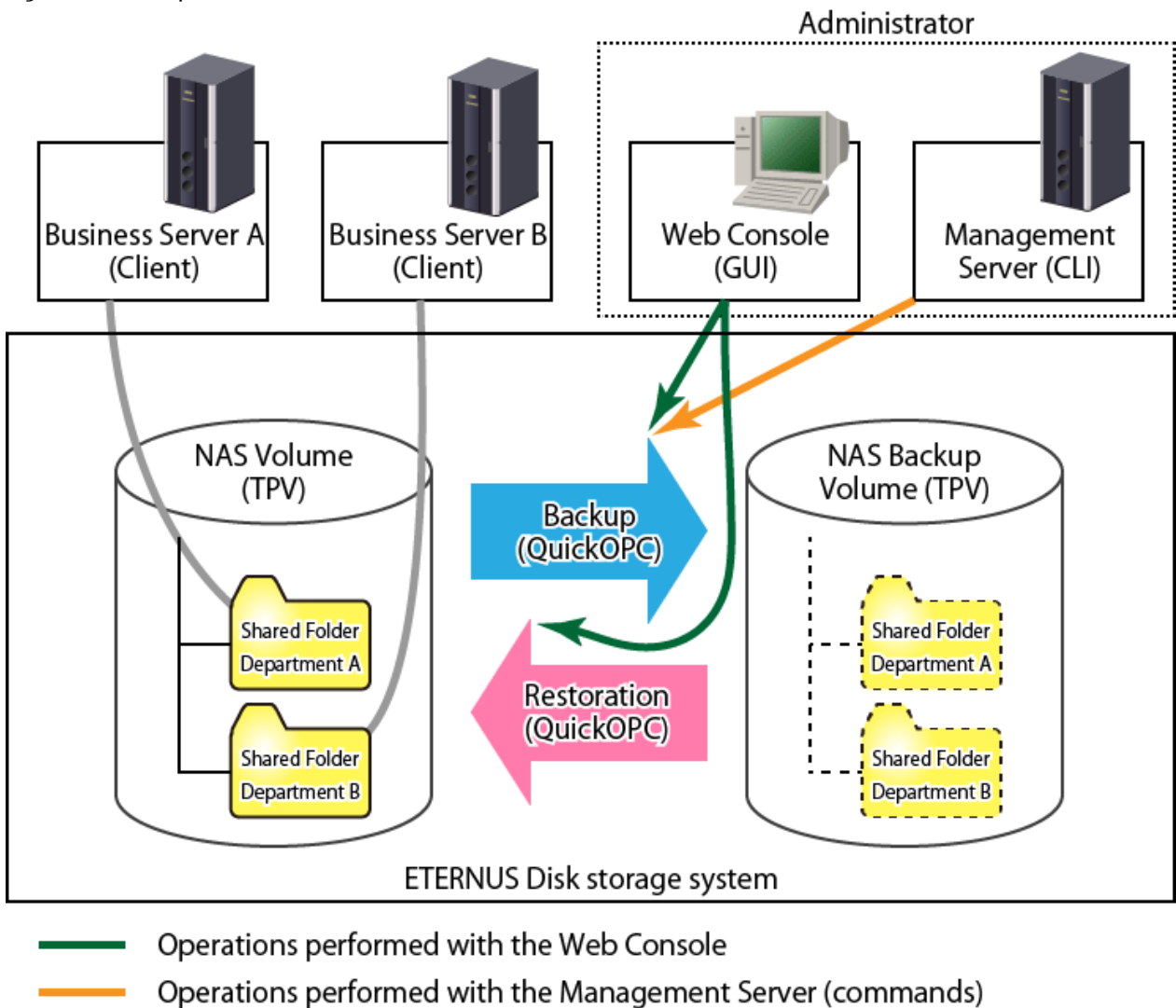


Refer to "Backup of NAS Environment" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the backup operation for NAS environment.

4.6.1.2.1 Backup/Restoration of NAS Volume

It is possible to back up the entire NAS volume configured with the Web Console to a NAS backup volume. In addition, it is possible to restore the entire NAS volume from the NAS backup volume.

Figure 4.7 Backup/Restoration of NAS Volume



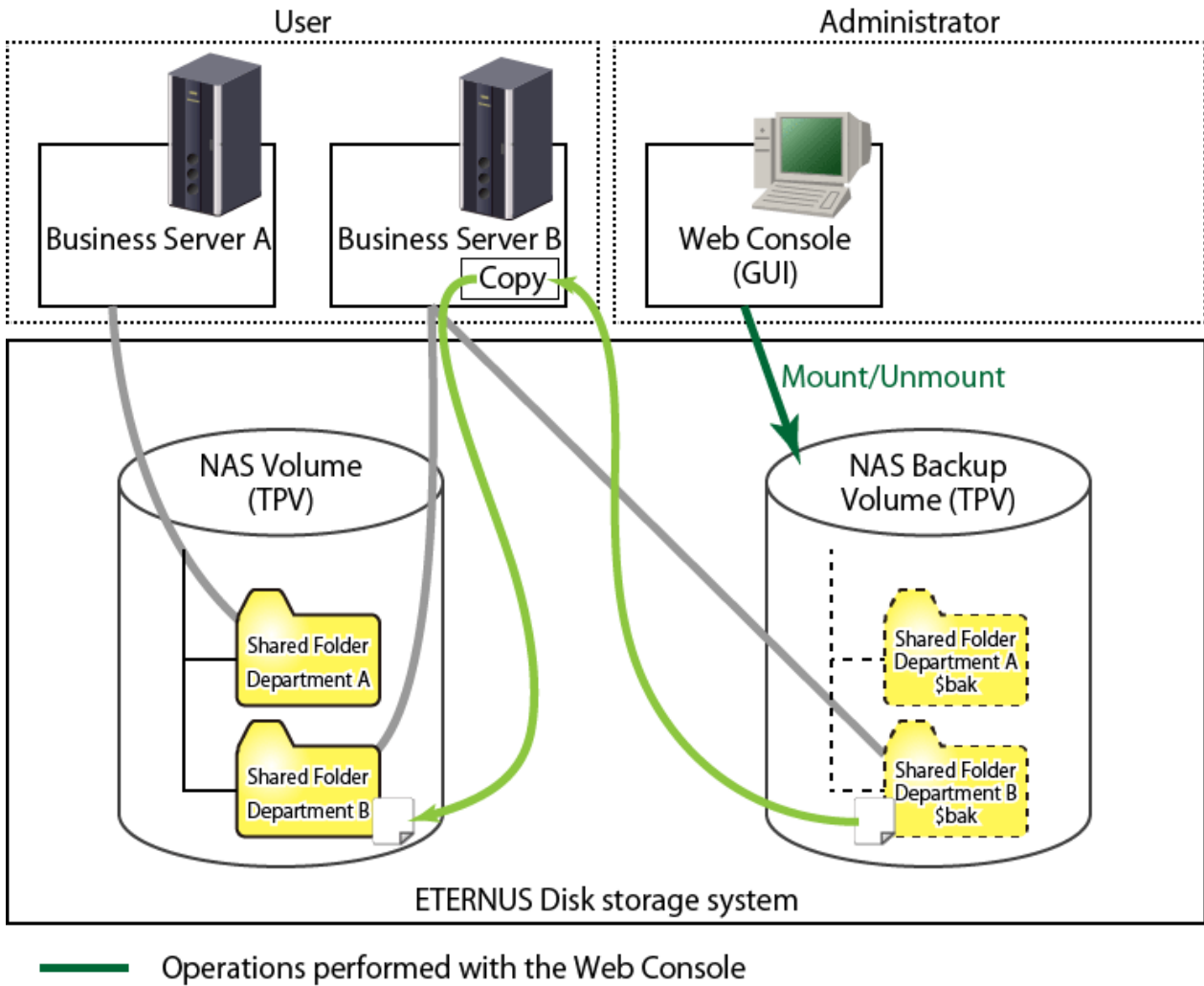
Information

- Backup of the NAS volume can either be executed with the Web Console, or be executed with commands from the Management Server. Restoration of the NAS volume can only be executed with the Web Console.
- When recovering individual files from the NAS backup volume, mount the NAS backup volume and manually copy the files.
- The number of NAS volumes and NAS backup volumes creatable on one ETERNUS Disk storage system varies with the device model and its firmware version. Refer to the ETERNUS Disk storage system manuals for details.

4.6.1.2.2 Mounting/Unmounting NAS Backup Volume

The NAS backup volume that is the backup destination of the NAS volume can be mounted onto the NAS environment as Read-Only. By mounting the NAS backup volume, users can recover files themselves. In addition, a mounted NAS backup volume can be unmounted when recovery has been completed.

Figure 4.8 Mounting/Unmounting the NAS Backup Volume



Information

- Mounting and unmounting of the NAS backup volume can be done from the Web Console.
- While the NAS backup volume is mounted, it is not possible to backup or restore the NAS volume.
- The name of the shared folder on the NAS backup volume after being mounted is the name of the shared folder at the time of backup + "\$bak". Furthermore, the name of the shared folder of the NAS backup volume will not be displayed on the Web Console.

4.6.1.3 NAS Environment Snapshot

This section provides an outline of the NAS environment snapshot function for the ETERNUS Disk storage system.

4.6.1.3.1 NAS Snapshot

With the NAS snapshot, the snapshot can be captured regularly at the desired timing and that snapshot can be referenced from the client. The NAS volume snapshot is achieved using SnapOPC+. This is provided for the purposes of NAS volume generation management and to be able to recover files and folders deleted due to operating errors.

The NAS snapshot feature can be used by configuring the snapshot from the Web Console.

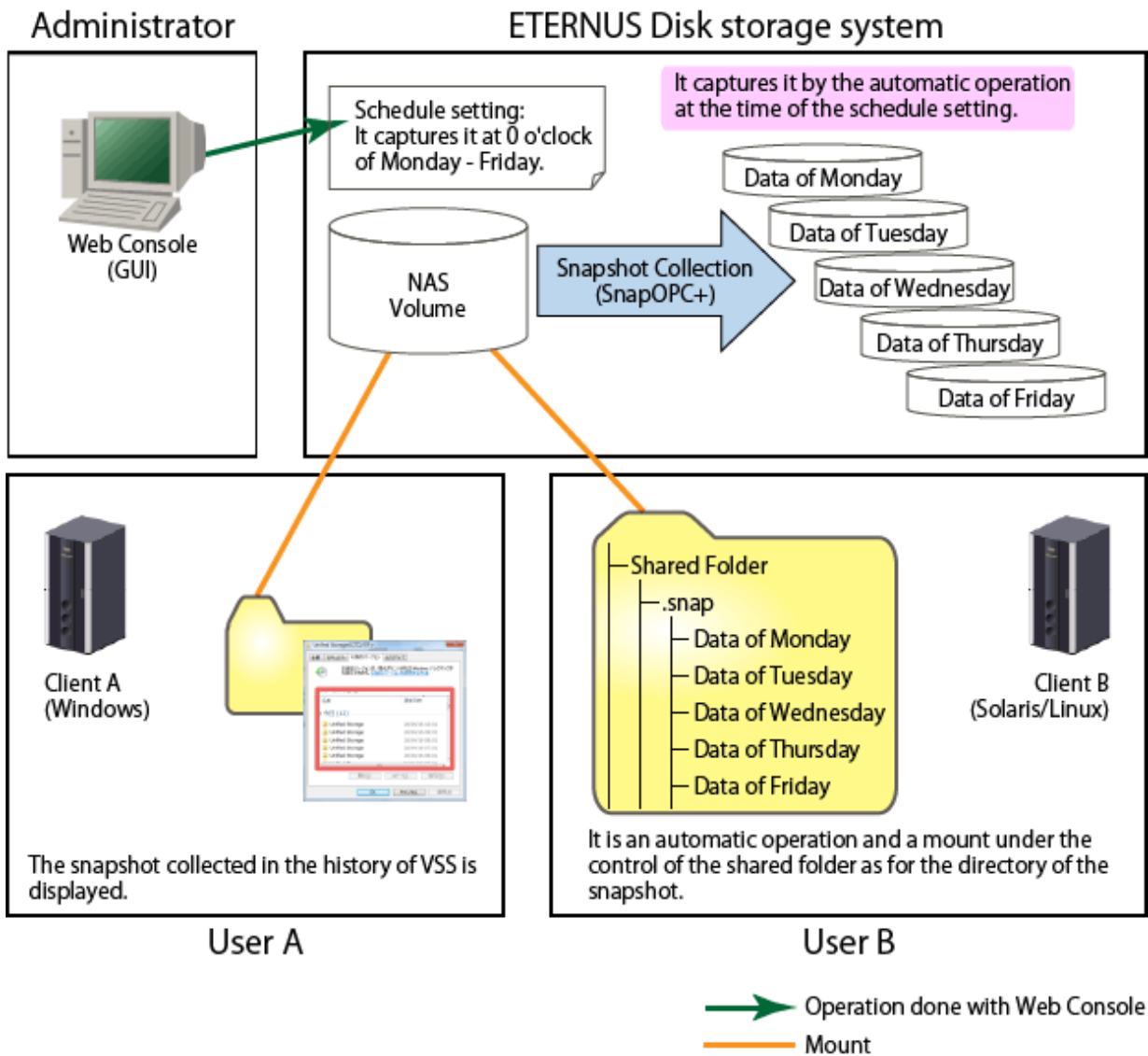
The following items are configured.

- Snapshot generation number
Set the number of snapshot generations for the you want to own.

The number of configurable generations differs depending on the device model and firmware. See the manual accompanying the ETERNUS Disk storage system.

- Schedule configuration
Sets the schedule for capturing the snapshots. A snapshot is taken on the day set every week or the hour set every day.

Figure 4.9 Outline of NAS Snapshot



Note

If a snapshot is collected while accessing a volume from an application, a snapshot at a point in time at which half-done data was written to the volume could be created. In this case, the data consistency in the snapshot is not ensured, so that the operation of the file in the snapshot is made impossible or the file content becomes incomplete.

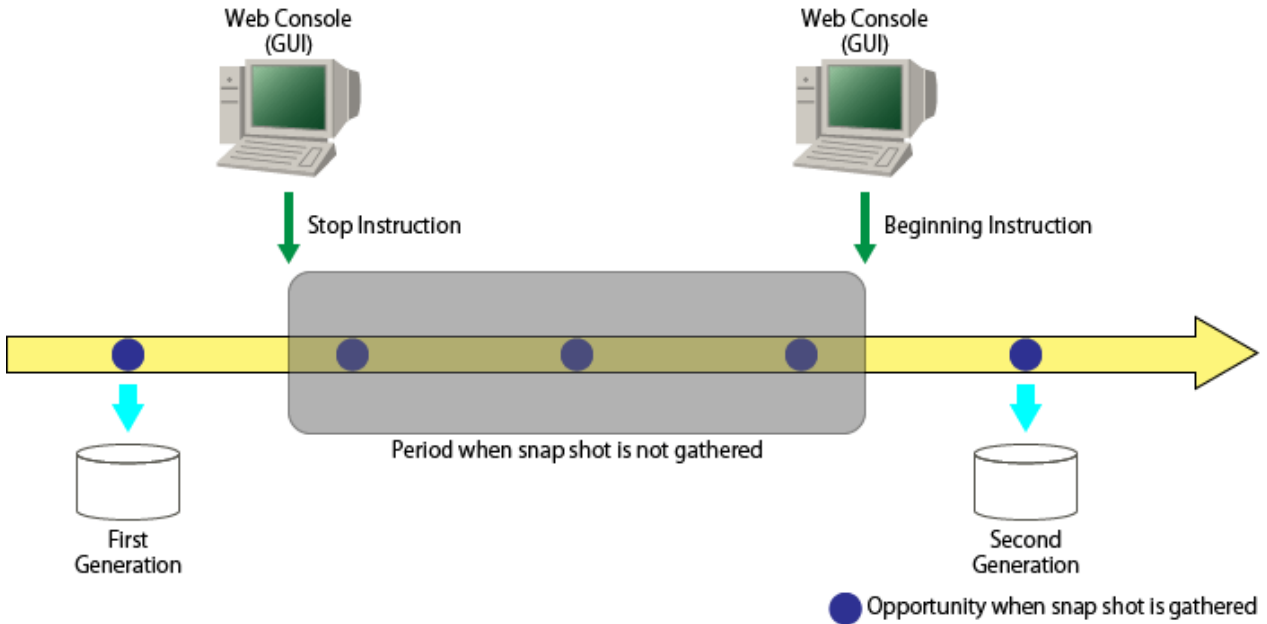
Generally, to collect a snapshot whose data is consistent, the application accessing a volume must be stopped beforehand.

Configure a schedule for snapshot collection and the number of generations in a snapshot so that correct data can be traced back through generations when data inconsistency is found in the snapshot.

4.6.1.3.2 Snapshot Capture Stop/Start

Where the NAS volume is temporarily not updated due to device maintenance period or long break, overwriting of past snapshots can be prevented by stopping the snapshot capture. When restarting the snapshot capture, execute snapshot capture start. Snapshot capture can be restarted carrying on with the snapshot before stopping.

Figure 4.10 Snapshot Capture Stop/Start



4.6.1.4 About NAS Environment Quota Management

This section provides an outline of NAS environment quota management for the ETERNUS Disk storage system.

4.6.1.4.1 NAS Environment Quota Management

With quota management, the amount of usable resources can be limited. This prevents in advance the depletion of total resources due to certain users wasting disk capacity.

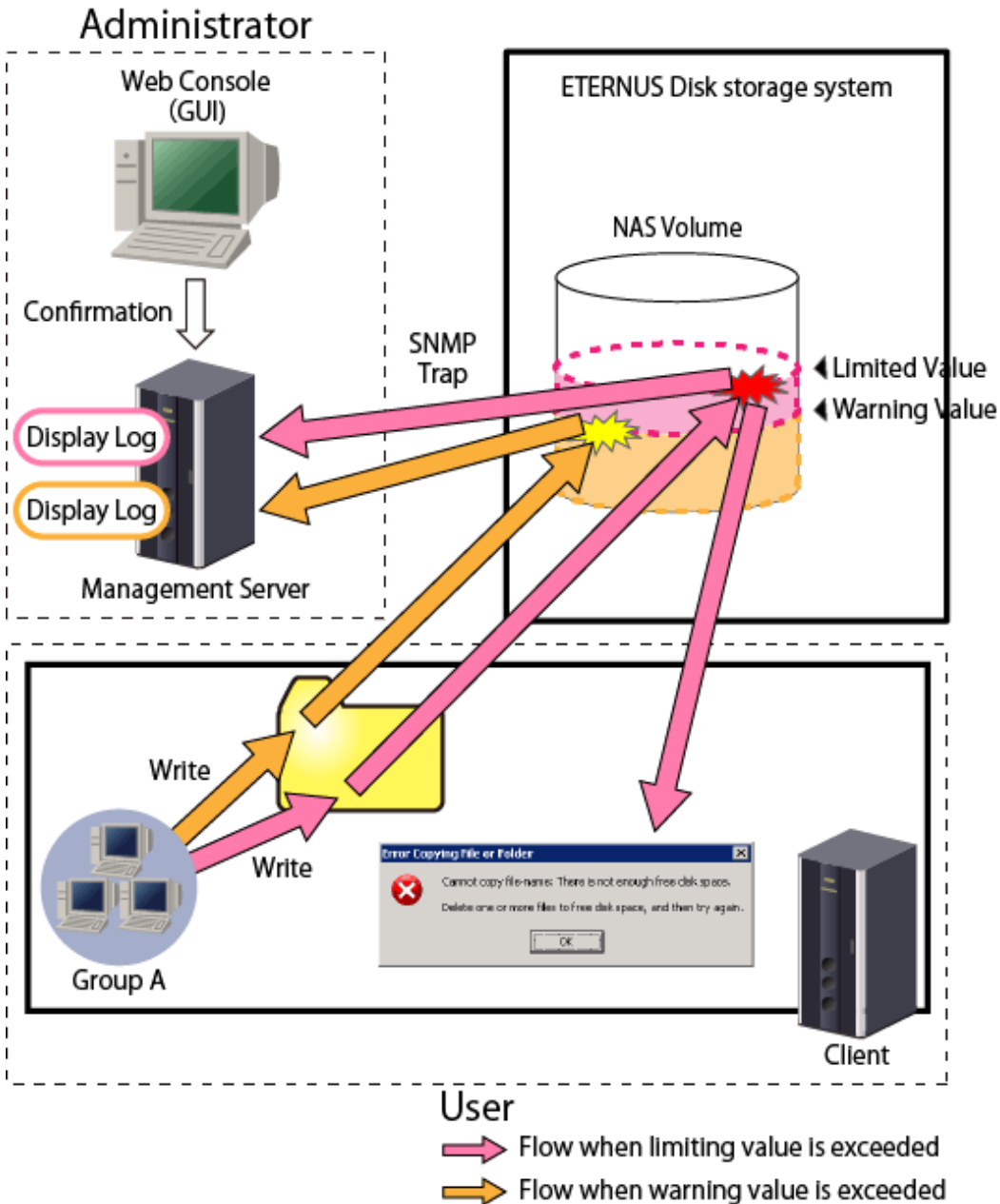
Restrictions on the disk usable volume and number of files for the user who is the owner of the shared folder and groups can be set using the following 2 values.

- Limit value
This is the upper limit value actually used. When updating data that exceeds the limit value, there will be an error for the update.
- Warning value
This is the value for providing pre-notification before reaching the limit value. When updating data that has exceeded the warning value, an SNMP Trap and event shall be notified to the operation management server.

Point

- Even if a disk is used with a limit value exceeded, it may not cause any error. In this case, it is used up to disk use amount limitation value +2GB in the maximum.
- When a NAS volume to which quota is set is backed up, its quota setting information is backed up at the same time. For this reason, when it is restored, its quota setting information backed up is applied.

Figure 4.11 Quota Management Outline



Information

- Sets a quota for the users and groups registered on the authentication server set in "4.6.3.3 NAS File System Environment Settings".
- By setting the transmission of an event notification E-mail, a notification by E-mail can be made when the quota management limits value or warning value are exceeded.

4.6.1.4.2 Events Notified by Quota Management

With quota management, an SNMP Trap is notified by the operation management server in the following cases.

- Error occurred when data update or file creation was attempted with the limit value reached (Limit value exceeded)
- Warning value exceeded (predicted)
- Returned below warning value

The notified event can be confirmed on the quota management log screen on the Web Console. Logs are stored for 30 days.

 See

Refer to "Display Quota Information" in the *ETERNUS SF Web Console Guide* for the procedure to display the Quota Management Log screen.

 Point

- Events are categorized by type; warning value exceeded, limit value exceeded, warning value removed, and notified every 10 minutes.
- The limit value exceeded event is notified when an error occurred because data update or file creation was attempted with a limit value reached.

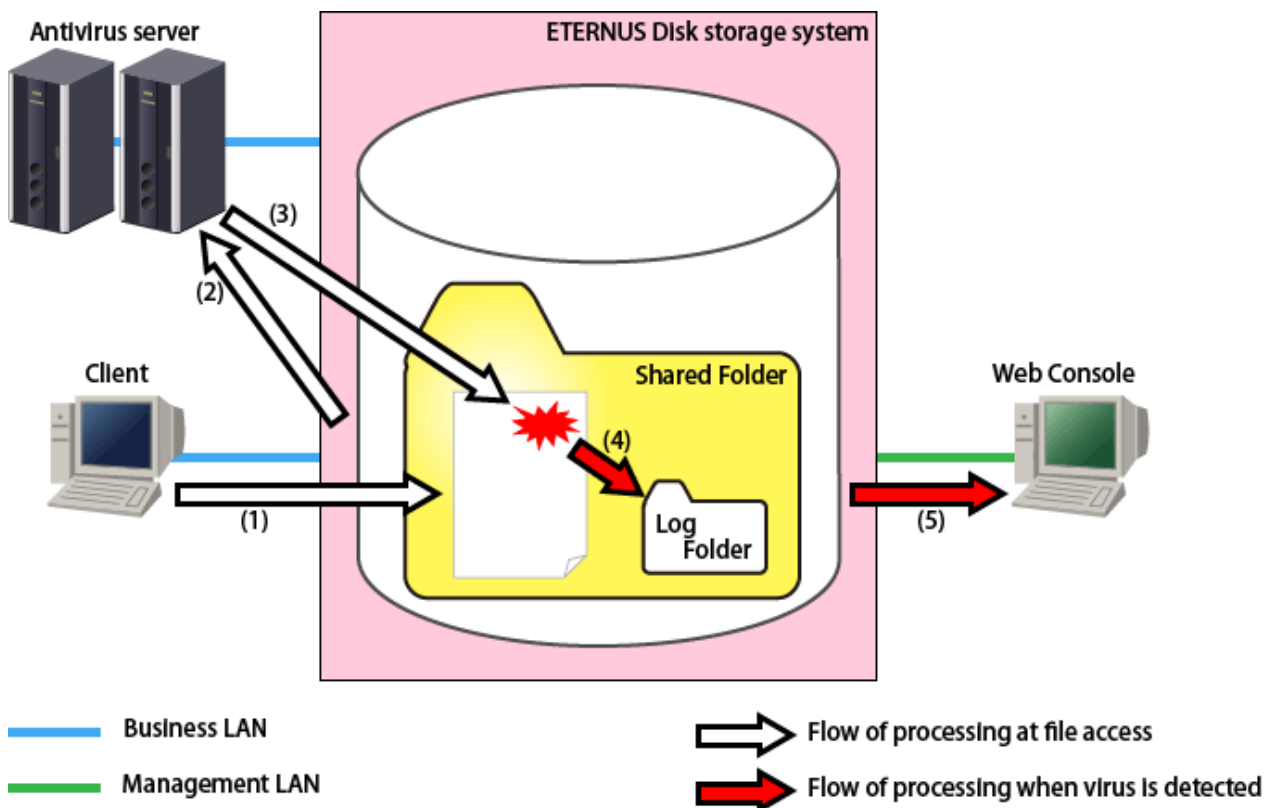
4.6.1.5 About Antivirus for NAS Environment

This section provides an outline of the antivirus for the NAS environment on an ETERNUS Disk storage system.

4.6.1.5.1 Antivirus for NAS Environment

The antivirus function is linked to the antivirus server provided by the antivirus security vendor, and prevents data in the NAS environment being infected by viruses/illegal programs.

When the file is accessed from the client, the registered antivirus server checks the accessed file.



1. The client accesses files in the shared folder on the ETERNUS Disk storage system.
2. The ETERNUS Disk storage system instructs the antivirus server to perform a virus check on the accessed files.
3. The antivirus server checks the accessed files.

4. When it discovers a virus/illegal program, it outputs a detection log to the log folder.
5. When it discovers a virus/illegal program, the results of the detection are notified to the Web Console.

Point

- The antivirus function only applies to shared folders using the CIFS protocol.
- The NAS interface must be configured with the ETERNUS Disk storage system so that two CMs in the ETERNUS Disk storage system can communicate to the antivirus server.
- We recommend establishing multiple antivirus servers. If the ETERNUS Disk storage system cannot communicate with the antivirus server, the client will not be able to access files in the NAS environment.
Refer to the ETERNUS Disk storage system manuals for the number of the antivirus server that can be registered in the ETERNUS Disk storage system.
- Prepare an antivirus server activation code for each ETERNUS Disk storage system.
- The antivirus function is available for shared folders that have writing authority.
The shared folders that have no writing authority are not scanned.

If the antivirus server detects a virus it will deal with it automatically.

Please check the action taken by the antivirus server according to the following procedures:

1. Access the shared folder and check the logs are output to the following folder.

```
\\nasInterfaceIpAddress\sharedFolderName\.evscan\log
```

The log file names are as follows:

- Latest logs

```
viruslog_YYYY_MM.txt
```

YYYY: year, MM: month(1~12)

- Past logs

```
viruslog_YYYY_MM_partN.txt
```

YYYY: year, MM: month(1~12), N: control No.(decimal starting from 1)

See

Refer to the message output to the log for details of the log. Refer to the ETERNUS Disk storage system manuals for the action.

2. Check the action taken by the antivirus server from the content of the log.

If you want to check the detected content in detail, provide the log and relevant file to the vendor for confirmation.

Files quarantined by the antivirus server are in the following folder.

```
\\nasInterfaceIpAddress\sharedFolderName\.evscan\quarantine
```

Point

When the capacity of the log output destination is not sufficient, an SNMP Trap will be sent. When notified, perform the following to secure capacity.

- Extend the NAS volume.
- Delete unnecessary past logs and files in the .evscan\quarantine folder.

- When quota management is set, raise the limit value.

Logs in the .evscan\log folder are stored for 90 days.

4.6.1.5.2 Event Notified by Antivirus

As an antivirus, in the following cases an SNMP Trap will be notified to the Management Server.

- A virus is detected
- Pattern files that exceed 2 days are not updated.
- Scan engine is not up to date
- Pattern files/scan engine have been updated
- Unable to communicate with antivirus server
- Communication recovered with antivirus server
- The activation code expiry date is in the next 30 days.
- The activation code expiry date has expired.

Notified events can be confirmed on the Web Console antivirus log screen. Logs are stored for 90 days.



See

Refer to "Display Antivirus Information" in the *ETERNUS SF Web Console Guide* for the procedure to display the Antivirus Log screen.

4.6.1.6 Operating Environment

The functions of the NAS option of the ETERNUS Disk storage system can be used with the following environments.

Table 4.1 Operating Environment

Object	Environment
Platform	Platforms on which the ETERNUS SF Manager can be operated.
Required licenses (software)	<ul style="list-style-type: none"> - ETERNUS SF Express (*1) - ETERNUS SF AdvancedCopy Manager Local Copy License (*2)
ETERNUS Disk storage system	ETERNUS DX100 S3/DX200 S3
Required options (hardware)	NAS Option
Authentication methods (*3)	[When accessing with the CIFS protocol] Active Directory [When accessing with the NFS protocol] LDAP
Antivirus server	Trend Micro Storage Security for FUJITSU Storage ETERNUS DX S3 series

*1: Required to construct the NAS file system.

*2: Required to back up the NAS volumes.

*3: Required when performing access control using an authentication server for the NAS file system. When no authentication server is configured, all access will be permitted.

4.6.2 Required Setup Configuration

Requirements for installing ETERNUS Disk storage system NAS management will be explained.

Table 4.2 Prior Configurations

Subject of Configuration	Configuration Details
ETERNUS Disk storage system	- Application of NAS Option

Subject of Configuration	Configuration Details
	- Preparing ETERNUS for Registration to This Product
Authentication server	- Registration of User/Group - Creating Redundant Authentication Servers
DNS server	- NAS Server Name Registration
Antivirus Server	- Preparing Antivirus Server
Management Server	- Device Registration - License Registration - Creating Thin Provisioning Pool - Configuration of Connection Type of Advanced Copy - Creating RAID Groups - SDP Capacity Expansion - Copy Table Size Settings

4.6.2.1 ETERNUS Disk Storage System Configuration

ETERNUS Disk storage system configuration will be explained.

The items to be configured are as follows:

- [Application of NAS Option](#)
- [Preparing ETERNUS for Registration to This Product](#)

Application of NAS Option

To apply the ETERNUS Disk storage system NAS option, refer to the ETERNUS Disk storage system manuals.

Skip this work if the NAS option has already been applied to the target ETERNUS Disk storage system.

Preparing ETERNUS for Registration to This Product

Prepare the ETERNUS Disk storage system to be registered to this product. Refer to "[3.1 Setup Required in Advance](#)" for details of the configuration.

Skip this work if the target ETERNUS Disk storage system has already been registered to this product.

4.6.2.2 Authentication Server Setup

Required configuration for the authentication server will be explained.

The items to be configured are as follows:

- [Registration of User/Group](#)
- [Creating Redundant Authentication Servers](#)

Registration of User/Group

On the domain controller or LDAP server, register the users and groups that have access to the shared folders. Refer to the LDAP or domain controller manuals for information on how to perform the registration.

Note

When using both protocols of CIFS and NFS, ensure uniqueness of user/group information between Active Directory authentication server and LDAP authentication server.

Mapping Windows security identifier (SID) and UNIX server's user ID (UID)/group ID (GID) can secure the uniqueness of user/group information.

When mapping user/group information, set the UID/GID of an LDAP authentication server based on the user ID/group ID of an Active Directory authentication server.

When registering a user/group on the LDAP authentication server, register as UID/GID the number that has 10,000,000 added to the end part of SID of the user/group registered on the Active Directory authentication server (e.g.: when the value of SID is S-1-5-21-xxxx-yyyy-zzzz-nnnn, nnnn is the end part).

Creating Redundant Authentication Servers

In this product, redundant authentication servers can be registered up to 3 units. Refer to the LDAP or domain controller manuals for information on how to create redundant configuration.

4.6.2.3 Prior Configuration of DNS Server

This section describes the pre-configuration of the DNS server.

The items to be configured are as follows:

- [NAS Server Name Registration](#)

NAS Server Name Registration

When the NAS server name is specified when accessing the shared folder, the NAS server can be registered on the DNS server using any name set uniquely in the ETERNUS Disk storage system.

Refer to the manual accompanying the DNS server for the registration method.

4.6.2.4 Pre-configuration of Antivirus Server

This section describes the pre-configuration of the antivirus server.

The items to be configured are as follows:

- [Preparing Antivirus Server](#)

Preparing Antivirus Server

Prepare the antivirus server. Refer to the manuals of the respective vendors for details.

Vendor Name	Prior Configuration
Trend Micro, Inc.	Install Trend Micro Storage Security for FUJITSU Storage ETERNUS DX S3 series. Refer to the Trend Micro Storage Security for FUJITSU Storage ETERNUS DX S3 series manuals for details.

4.6.2.5 Prior Configuration of Operation Management Server

This section explains the prior setting of this product when installed in operation management servers.

The details to be configured are as follows:

- [Device Registration](#)
- [License Registration](#)
- [Creating Thin Provisioning Pool](#)
- [Configuration of Connection Type of Advanced Copy](#)
- [Creating RAID Groups](#)
- [SDP Capacity Expansion](#)
- [Copy Table Size Settings](#)

Device Registration

Register the ETERNUS Disk storage system to be managed with this product. Refer to "[3.3 Registering Disk Storage Systems](#)" for information on how to register the device.

When a target ETERNUS Disk storage system has already been registered to this product, and when application of the addition of the NAS option has been performed with "4.6.2.1 ETERNUS Disk Storage System Configuration", perform the **Reload Conf.** operation for the ETERNUS Disk storage system.

 **Note**

When using the snapshot function or quota management function, enable SNMP Trap Setup when you register devices. If SNMP Trap Setup is not enabled, snapshot collection result and an alarm output when a quota threshold is exceeded are not notified.

 **See**

Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for information on how to perform the **Reload Conf.** operation.

License Registration

Register the ETERNUS Disk storage system NAS license, and any other required license that is not already registered.

Refer to required licenses (software) of the "4.6.1.6 Operating Environment" for required and optional licenses.

Skip this work if the license of the object has already been registered in this product.

 **See**

Refer to "Register License" in the *ETERNUS SF Web Console Guide* for information on how to register the license.

Creating Thin Provisioning Pool

A Thin Provisioning Pool in which the NAS volume is created will be created.

Skip this work if the Thin Provisioning Pool for the NAS volume has already been made.

 **See**

Refer to "Create Thin Provisioning Pool" in the *ETERNUS SF Web Console Guide* for information on how to create a Thin Provisioning Pool.

 **Information**

For increased reliability, it is recommended to create the primary NAS volume and the backup NAS volume in separate Thin Provisioning Pools. When performing NAS volume backup, create two Thin Provisioning Pools; one for the primary NAS volume and one for the backup NAS volume.

Configuration of Connection Type of Advanced Copy

Configure the access connection type for Advanced Copy in order to define the NAS volume backup.

Skip this work if the backup is not being used for NAS environment or if the connection has been configured already.

 **See**

Refer to "Configure Connection Type for ETERNUS Disk Storage System" in the *ETERNUS SF Web Console Guide* for information on how to perform the configuration.

Information

For the configuration of the connection type, select "Access through volumes" or "Access through network".

Creating RAID Groups

When using the NAS snapshot, a NAS snapshot volume is created on the RAID group. The capacity is calculated according to the following formula, and is required as free space within the RAID group.

```
RAID group free space = Total capacity of NAS volume for NAS snapshot * snapshot generation numbers * 0.001
```

Skip this work if not creating a NAS snapshot or if a NAS snapshot volume on the RAID group has already been created.

Note

As shown below, if the RAID group where the NAS snapshot volume is created is shared, it may not be possible to set the maximum number of snapshot generations.

- Where creating SDPV with "SDP Capacity Expansion"
- Where creating a NAS snapshot volume for other NAS volumes
- When creating volumes for SAN

See

For the RAID group creation procedure, Refer to "Create RAID Group" in the *ETERNUS SF Web Console Guide*.

SDP Capacity Expansion

SDP capacity may need to be expanded in order to use the NAS snapshot.

Skip this work when not using NAS snapshot.

The physical capacity allocated for the snapshot captured with NAS snapshot is provided by creating an SDPV. Create so that the total SDPV capacity becomes the capacity estimated below.

```
SDP additional capacity = total value for updated volume (*1) of NAS volumes for each generation
```

*1: NAS volume content that is changed between the time of one snapshot and the next snapshot.

When it is difficult to estimate size of the changed content, we recommend adding the following capacity. This is only a recommended value, so it should be modified according to the operational state.

```
SDP additional capacity = Total capacity of NAS volumes for NAS snapshot * a number between 0.3 and 0.5
```

Point

SDPV and SDP are shared with SAN AdvancedCopy.

For this reason, when using SAN AdvancedCopy and NAS snapshot on the ETERNUS Disk storage system simultaneously, prepare SDP capacity that is the total estimated volume for SAN and NAS.

See

Refer to "Create Volume" in the *ETERNUS SF Web Console Guide* for the SDPV creation procedure.

Copy Table Size Settings

In order to use NAS snapshot, configure the copy table size and resolution.



- Values that can be configured for the copy table size and resolution differ depending on the model of the storage device. Refer to the ETERNUS Disk storage system manuals for information on the specification of the copy table size.
- Refer to "Configure Copy Table Size for Advanced Copy" in the *ETERNUS SF Web Console Guide* for the copy table size configuration procedure. However, if an AdvancedCopy Manager license is not purchased, this cannot be configured from the Web Console. Configure from the ETERNUS Web GUI.

4.6.3 Installation Steps

The installation steps for performing ETERNUS Disk storage system NAS operation is explained.

Installation is implemented in the following order.

Order	Installation Item	Title of Sections Listed in Web Console Guide	Optional/Required (*1)
1	Creating Shared Folder	Create Shared Folder	Required
2	Creating NAS Interface	Create NAS Interface	Required
3	NAS File System Environment Settings	Configure DNS Server	Optional
		Configure Authentication Server	Optional

*1: Tasks that must be performed in order to operate the NAS file system are "Required", while tasks that may be omitted are "Optional".



If an authentication system is not implemented then the NAS file system can be accessed from any clients connected to the business LAN. It is strongly recommended that an authentication server is properly configured and implemented.

4.6.3.1 Creating Shared Folder

Create a shared folder in order to configure the folder of the access destination of the NAS file system.

Configure the following for the shared folder:

Table 4.3 Create Shared Folder

Subject of Configuration	Configuration Details
Shared Folder	<ul style="list-style-type: none">- Shared Folder Name- Protocol- Oplocks Setting- Data Access SMB Encryption- Enumeration Based on Access Permission Settings- Destination Volume to Which to Create Shared Folder- NAS Volume Capacity to Which to Create Shared Folder- NAS Volume Number to Which to Create Shared Folder

Subject of Configuration	Configuration Details
NAS Backup	- NAS Backup Volume
NAS Snapshot	- Number of Snapshot Generations - Schedule Configuration
Access settings	- Access Configurations of Shared Folder - Host Access Configurations of Shared Folder

Shared Folder

Shared Folder Name

The name of the shared folder.

Protocol

The protocol to be used by the shared folder.

It is possible to select CIFS, NFS, or both of these protocols.

Oplocks Setting

This is the configuration of the Oplocks function that prevents concurrent file access.

It is possible to configure this only when using the CIFS protocol.

When the Oplocks function is enabled, although improvement of access performance from the client can be expected, it will become impossible to use the Alternate Data Stream. In addition, when selecting both protocols of CIFS and NFS, it is recommended that the Oplocks function is not enabled.

Data Access SMB Encryption

Settings that are for the SMB encryption function.

The settings can be configured only when using the CIFS protocol.

When the SMB encryption function is enabled, the communications between the client and the ETERNUS Disk storage system will be encrypted. In order to use this function, the client must support SMB 3.0.



Note

When data access encryption is enabled, clients that do not support SMB 3.0 cannot access the shared folder.

Enumeration Based on Access Permission Settings

This is the Access Based Enumeration (ABE) function settings.

The settings can be configured only when using the CIFS protocol.

When the ABE function is enabled, folders and files that cannot be referenced by users accessing the shared folder are not displayed.

Destination Volume to Which to Create Shared Folder

This is the volume where the shared folder is to be created.

When no NAS volumes are already defined, a new NAS volume will be created.

When NAS volumes are already defined, one of them may be selected, or a new NAS volume may be created.

NAS Volume Capacity to Which to Create Shared Folder

This is the capacity of the NAS volume.

This is only to be specified when creating a new NAS volume.

Information

For NAS volume, a system area of 300GB is reserved. For this reason, the area available as a file system is the value after subtracting the system area from the area specified for the NAS volume.

e.g.: If a NAS volume of 3TB is created, the user area is 2.7TB and the system area is 0.3TB.

NAS Volume Number to Which to Create Shared Folder

This is a NAS volume number.

Specify this number when execute the inter-box backup of NAS volumes.

The NAS volume number must be the same at ETERNUS Disk storage systems as backup source and backup destination respectively.

NAS Backup

This is set for the purpose of backing up the NAS volume data.

NAS Backup Volume

When there is no NAS backup volume, create a new NAS backup volume. Where there is a NAS backup volume, you can choose to either create a new NAS backup volume or use an existing NAS backup volume.

The NAS backup volume is created with the following details.

Volume Name	<i>nasVolumeName\$bak_N (*1)</i>
Capacity	Same as the source NAS volume.
Volume Type	Same as the source NAS volume.
Thin Provisioning Pool of the Creation Destination	User Selection

*1: "N" is a sequential number from 0. The number of digits varies.

When a NAS backup volume is created, the following copy group and copy pair will be automatically created.

- Copy group

The copy group is a group of copy pairs. A copy pair is comprised of a source NAS volume and a destination NAS backup volume.

Copy Group Name	<i>NAS_QuickOPC_nasVolumeName_N (*1,*2)</i>
Copy Group Type	QuickOPC

*1: "N" is a sequential number from 0. The number of digits varies.

*2: Characters other than those listed below in *nasVolumeName* are replaced with hash (#):

One-byte alphanumeric character, minus (-), underscore (_), hash (#), period (.), plus (+)

- Copy pair

The copy pair is a definition of a source NAS volume and a destination NAS backup volume. A copy pair is defined within a copy group.

In addition, it is also possible to configure NAS backup individually. Refer to "[4.6.4.9 Configuring NAS Backup](#)" for this procedure.

Point

- For increased reliability, it is recommended to create Thin Provisioning Pools of the creation destination for the NAS backup volume and the NAS volume in separate Thin Provisioning Pools.

- When configuring NAS backup or backing up the NAS volume, an ETERNUS SF AdvancedCopy Manager Local Copy License is required.

NAS Snapshot

Sets the number of generations that the NAS snapshot has and the snapshot capture schedule. This can be configured only when setting a new NAS snapshot. When using an existing NAS snapshot, the existing setting is used. This cannot be modified.

Number of Snapshot Generations

Sets the number of snapshot generations owned.

However, the number of configurable generations differs according to the device model and firmware version number. Refer to the NAS snapshot specification described in the manual accompanying the ETERNUS Disk storage system.

Schedule Configuration

Sets the snapshot capture schedule. The following items are set.

Item	Explanation
Cycle	Selects the cycle for capturing snapshots. Daily: Snapshots captured every day at selected "Time". Weekly: Snapshots captured on the selected "Day" and "Time" of every week.
Day	Selects the days to capture the snapshot. This cannot be selected when Daily is selected for the [Cycle]. Check the check box of the days you wish to capture the snapshot.
Time	Selects the time to capture the snapshot. Check the check box of the time you wish to capture the snapshot. When an interval of capturing a snapshot is selected, the selected interval time is automatically checked from the start point of zero time.

When configuring a new NAS snapshot, the NAS snapshot volume for the collected snapshot backup is automatically created. The NAS snapshot volume is created with the following content.

Volume Name	<i>nasVolumeName\$snap_N(*1)</i>
Capacity	Same as the NAS volume of the backup source
Volume Type	SDV
RAID Group Created	User Selection

*1: "N" is a sequential number from 0. The number of digits varies.

Point

- The snapshot is collected based on the time set for the ETERNUS Disk storage system.
- When a new NAS snapshot is configured, it automatically goes into start state.

Note

When using the snapshot function, enable SNMP Trap Setup. If SNMP Trap Setup is not enabled, snapshot collection result is not notified. Refer to "Change ETERNUS Disk Storage System Information" in the *ETERNUS SF Web Console Guide* for the procedure to change SNMP Trap Setup via the Web Console.

Access settings

Access Configurations of Shared Folder

The owner and group that will issue access rights in relation to the shared folder will be configured. For the owner and group, configure a user or group on the authentication server configured with "[4.6.3.3 NAS File System Environment Settings](#)". When root

is configured as the owner and group that has the access rights of the shared folder, it will be possible to access the shared folder from all clients on the business LAN.

 **Point**

- Set root to the owner and the group when making first time of the shared folder or the authentication server is a unsetting. Refer to "[4.6.4.2 Changing Shared Folder](#)" for the modification procedure when the access authority is given to a specific owner and the group after the authentication server is set.
- In order to perform detailed access control such as specifying Read-Only to individual users other than the owner, directly configure this in relation to the authentication server.

Host Access Configurations of Shared Folder

Configure host access, permitted and denials, to the shared folder. When a host to permit is not specified, access from all hosts will be permitted. Furthermore, it is possible to configure hosts to deny only when CIFS is specified for the protocol.

In addition, the following will be automatically configured when creating the shared folder.

- [Writing Authority of Shared Folder](#)
- [Shared Status of Shared Folder](#)

Writing Authority of Shared Folder

The state of whether writing to the shared folder is enabled or disabled will be displayed. The client can only write into a shared folder for which writing authority is enabled, or folders and files subordinate to such a shared folder.

When the shared folder is created, writing will be enabled by default.

Refer to "[4.6.4.2 Changing Shared Folder](#)" for information on how to change write authority.

Shared Status of Shared Folder

The state of whether the sharing of the shared folder is active (Online) or inactive (Offline) will be displayed. For a folder where sharing has been made active, the client will be able to access files via the NAS interface.

When the shared folder is created, sharing will be in an active state by default.

Refer to "[4.6.4.7 Activating Sharing](#)" or "[4.6.4.8 Stopping Sharing](#)" for information on how to change the shared status.

Shared folders can be created up to 256 folders per device.

 **See**

Refer to "Create Shared Folder" in the *ETERNUS SF Web Console Guide* for information on how to create using the Web Console.

4.6.3.2 Creating NAS Interface

Create a NAS Interface in order to configure a public IP address and a port to access the shared folder.

The following can be configured with this function:

Subject of Configuration	Configuration Details
NAS Interface (Port)	<ul style="list-style-type: none"> - RIP Setting Enable/Disable - Port for Access - Connection Access Method

Subject of Configuration	Configuration Details
	- Port Bonding
NAS Interface (network)	- IP Address for Access - VLAN ID

NAS Interface (Port)

RIP Setting Enable/Disable

Configure whether to enable/disable RIP configuration.

When the RIP setting is enabled, its own routing table will be automatically generated based on the routing table broadcast from the router connected to the port, and the access route set in the NAS interface can be automatically selected.

When the RIP setting is disabled, there will be dynamic generation of the routing table.

Point

- When the RIP configuration is enabled, in order to dynamically create the routing table of the NAS interface, enable the RIP configuration of the router that is connected.
- When the RIP setting is disabled, the NAS interface cannot select its own access route. Set the routing table manually using the ETERNUS Disk storage system command.

Port for Access

Configure the Allocation port and the Redundant port of the NAS interface. The shared folder will be accessed via the port configured as the Allocation port.

When the Allocation port is down, the shared folder can be accessed via the port configured as the Redundant port. It is also possible to use a single port operation format where a Redundant port is not configured.

Point

- By setting the VLAN ID, 1 port can be allocated to multiple NAS interfaces.
- The following ports cannot be selected for the Allocation port:
 - Member ports of bonding port
- The following port cannot be selected for Redundant port:
 - Port of same CM as assignment Allocation port
 - Redundant port of other port
 - Member port of bonding port
- When a Redundant port is not configured, it will not be possible to access the shared folder when the Allocation port goes down. For this reason, it is recommended that a Redundant port be configured.

Connection Access Method

Configure the Allocation port and Redundant port for the shared folder access connection method.

The method for configuration of the connection type is as follows:

Connection Settings	Configuration Method
Single connection	Specify only an Allocation port, and create a NAS interface.
Active-Standby connection	Specify an Allocation port and a Redundant port, and create a NAS interface.

Connection Settings	Configuration Method
Active-Active connection	<p>There are the two following configuration methods.</p> <ul style="list-style-type: none"> - Method 1 <ul style="list-style-type: none"> 1. Create a NAS interface of an Active-Standby connection. 2. Again, create a NAS interface. During this, specify the "Redundant port of the NAS interface" created in step 1 as the port. - Method 2 <ul style="list-style-type: none"> 1. Create a NAS interface of a Single connection. 2. Again, create a NAS interface. During this, specify the "port of the NAS interface" created in step 1 as the Redundant port.

Port Bonding

The Allocation ports and the Redundant ports for the NAS interface can be set as operating mode of member port and bonding port.

Point

- The following ports cannot be selected for bonding ports.
 - Port of CM different from the master port
 - Port to which a NAS interface has already been assigned
 - Duplicated port

The operating mode that will be the method of determining the communication ports from the bonding ports can be selected from the following.

Mode	Name	Explanation
0	Load distribution (round robin)	Performs load distribution using round robin.
1	Active backup	Communicates on one port, and when communication is not possible, switches over to other ports. This does not perform load distribution.
2	Load distribution (EXCLUSIVE OR)	Performs load distribution based on EXCLUSIVE OR of recipient/ sender
4	IEEE802.3ad	Performs load distribution following the IEEE802.3ad standard. As it communicates with the switch using Link Aggregation Control Protocol, an 802.3ad-compatible switch is required.
5	Load distribution (link speed[only transmit])	Transmit performs load distribution in line with Link speed. Receive is only performed on one port.
6	Load distribution (link speed[transmit and receive])	Send performs load distribution in line with Link speed. Receive appropriately allocates communicate ports to each communication partner.

Further, when the operating mode is "load distribution (EXCLUSIVE OR)" or "IEEE802.3ad", has policy is set as the method of determining the port.

Name	Explanation
MAC Address	This is determined using an EXCLUSIVE OR of the sender and recipient MAC addresses.
MAC Address and IP Address	This is determined using an EXCLUSIVE OR of the sender and recipient MAC addresses and IP addresses.
IP Address and Port Number	This is determined using an EXCLUSIVE OR of the sender and recipient IP addresses and port numbers.

Point

- Specify "1" for Restriction on the number of detached ports of the switch. The number "1" is set by default. The Restriction on the number of detached ports indicates the allowable number of ports disconnected from members making up a bonding port. When the number of detached ports is less than the restriction number, the bonding port is disabled. For example, if number "1" is specified for the Restriction on the number of detached ports and 4 ports make up a bonding port, when all the 4 ports become unavailable, the bonding port is disabled. When all the ports are recovered, the bonding port gets enabled.
- The function required for LAN switch varies depending on the operating mode of bonding port. Refer to the ETERNUS Disk storage system manuals for the function required for switch by operating mode.

NAS Interface (network)

IP Address for Access

Sets the IP address used for the NAS interface.

VLAN ID

Sets the tag VLAN ID configured for the NAS interface.

By setting the VLAN ID for the NAS interface, the NAS interface can be additionally allocated for ports that other NAS interfaces have allocated.

Note

- When multiple NAS interface are assigned to the same port using the VLAN ID, the NAS interface must all be in different subnets.
- Port VLAN is not supported for connection between ETERNUS Disk storage system and switch.

See

Refer to "Create NAS Interface" in the *ETERNUS SF Web Console Guide* for information on settings using the Web Console.

Note

- When the same subnet is assigned to the same CM, the behavior will be to communicate using only a specific port.
- Where the network is allocated in an Active-Active connection form, it is necessary to set the same network address between CM.
- To create a NAS interface, allocate a new NAS interface to NAS ports and then restart the service to access the shared folder by the CIFS protocol. Before the restart process is completed, the shared folder is not accessible from the existing NAS interface by the CIFS protocol. Wait a few moments to access it again.

- If Spanning Tree Protocol (STP) is implemented into the LAN switch for connecting to NAS ports, when the STP function is enabled, access to the shared folders may fail.
Take the following steps to disable the STP function:
 - When the STP function is not required for network configuration:
Disable the STP function of the LAN switch.
 - When the STP function is required for network configuration:
At only the NAS port connected part of the connection ports of the LAN switch, disable the STP function or configure Port-Fast.
 - When using the antivirus function, create a NAS interface for each port with two CMs.

4.6.3.3 NAS File System Environment Settings

Configures the NAS file system environment settings

DNS Server

The ETERNUS Disk storage system NAS file system sets the DNS Server for performing name resolution.

A primary DNS Server and secondary DNS Server can be registered.

Information

When Active Directory authentication Servers on which the DNS feature is enabled are registered in the ETERNUS Disk storage system, name resolution is performed using the DNS feature on the Active Directory authentication server. In this case, the DNS Server information can be displayed on the Web Console.

Authentication Server

Perform configuration of the authentication server to perform client access control to the NAS file system.

Depending on the type of protocol for access, specify the following for the authentication method:

Active Directory

Specify this when accessing the NAS file system using the CIFS protocol.

LDAP

Specify this when accessing the NAS file system using the NFS protocol.

Note

- The authentication methods that can be operated differ with each protocol. For this reason, when the shared folder is accessed with an authentication method that is not supported, the authentication system will not operate.
- In the operation using Active Directory, it is required to synchronize the time between the ETERNUS Disk storage system and the Active Directory installed authentication server. It is recommended to automatically correct the time by Network Time Protocol (NTP).

It is possible to register a maximum of 3 authentication servers for each authentication method.

See

Refer to "Configure Authentication Server" in the *ETERNUS SF Web Console Guide* for information on settings using the Web Console.

Set the access authority to the owner and the group if necessary for the shared folder made by "4.6.3.1 Creating Shared Folder" after setting the authentication server.

4.6.4 Operation Method

The operation method for performing ETERNUS Disk storage system NAS operations with this product will be explained.

The functions that can be executed during operation are as follows:

- [Access to Shared Folder](#)
- [Changing Shared Folder](#)
- [Changing NAS Interface](#)
- [Changing NAS Server Name](#)
- [Changing DNS Server](#)
- [Changing Authentication Server](#)
- [Activating Sharing](#)
- [Stopping Sharing](#)
- [Configuring NAS Backup](#)
- [Setting/Changing/Disabling NAS Snapshot](#)
- [Snapshot Reference](#)
- [Restoring from Snapshot](#)
- [Start Snapshot Capture](#)
- [Stop Snapshot Capture](#)
- [Adding Quota Settings](#)
- [Changing Quota Settings](#)
- [Deleting Quota Settings](#)
- [Antivirus Server Settings](#)
- [Enabling Antivirus Function](#)
- [Disabling Antivirus Function](#)
- [Performance Management for NAS Volume and NAS System](#)
- [Capacity Management of Thin Provisioning Pool](#)
- [Expansion of NAS File System](#)
- [Deleting of NAS Environment](#)

4.6.4.1 Access to Shared Folder

The access method to the shared folder is the following:

- [Access Using CIFS Protocol](#)
- [Access Using NFS Protocol](#)

Access Using CIFS Protocol

The shared folder is accessible by the Windows file sharing or network drive mapping.

Enter the following to the address bar or to the network drive mapping window:

`\\nasInterfaceIpAddress\sharedFolderName`

When authenticating by Active Directory, the operation method varies depending on the presence of setup of an authentication server.

- If Active Directory is configured as an authentication server:
Enter the user name and password registered to Active Directory.
When connecting from the client participating in Active Directory, authentication is not needed.
- If an authentication server is not set up:
Enter the user name and password described in the ETERNUS Disk storage system manuals.

Information

Entering the IP address for NAS interface in the address bar can view sharable folders.

Access Using NFS Protocol

The shared folder is accessible by performing the NFS mount from a UNIX server using the following procedure:

When authenticating through LDAP, there is no difference in operation method with the presence of setup of an authentication server. Make the UNIX server participate in the LDAP domain to perform the NFS mount.

1. Check the NFS export path for the shared folder.
The **NFS Export Path** displayed in the **Basic** tab of the Detail Shared Folder screen is the shared folder path.
Refer to "Display Shared Folder" in the *ETERNUS SF Web Console Guide* for the procedure to display the **Basic** tab of the Detail Shared Folder screen.
2. Log in to the UNIX server with administrator privileges.
3. Execute the mount command to mount the shared folder.
When executing the mount command, specify the following:

For Solaris

```
mount -F nfs nasInterfaceIpAddress:nfsExportPath mountDestinationDir
```

For Linux

```
mount -t nfs nasInterfaceIpAddress:nfsExportPath mountDestinationDir
```

Information

- Executing the showmount command on the UNIX server can view NFS mountable shared folders.

```
showmount -e nasInterfaceIpAddress
```

- The format for the *nfsExportPath* is as follows:

```
/mnt/nas/nvnasVolumeNumber/data/sharedFolderName
```

After NFS mounted, logging in to the UNIX server as the user registered to LDAP can access the shared folder with the owner/group permissions set to the shared folder.

When not authenticating through LDAP, logging in to the UNIX server can access the shared folder.

4.6.4.2 Changing Shared Folder

The values of the shared folder will be changed. The values that can be changed are as follows:

- Oplocks Configuration (when the protocol is CIFS or both CIFS and NFS)
- Data Access SMB Encryption (when the protocol is CIFS or both CIFS and NFS)
- Enumeration Based on Access Permission Settings (when the protocol is CIFS or both CIFS and NFS)

- Owner/Group of Shared Folder
- Writing Authority
- Hosts Permitted Access
- Hosts Denied Access (when the protocol is CIFS or both CIFS and NFS)

Note

- When the configuration of a shared folder is changed, sharing will temporarily be suspended and it will not be possible to access the shared folder. When the changes to the shared folder are complete, sharing will be automatically resumed.
- When data access encryption is enabled, clients that do not support SMB 3.0 cannot access the shared folder.

See

Refer to "Change Shared Folder" in the *ETERNUS SF Web Console Guide* for information on how to make changes to the shared folder using the Web Console.

4.6.4.3 Changing NAS Interface

The values of the NAS interface will be changed.

The values that can be changed are as follows:

- IP Address
- RIP Setting
- Port
- Redundant port
- Member ports of bonding port
- Operating mode of bonding port

Information

- Only when a new port is set to the NAS interface to which the port is not set, the setting of the port can be changed.
- The following ports cannot be selected as the port:
 - Member ports of bonding port
- The following ports cannot be selected for Redundant ports:
 - Port of same CM as assignment Allocation port
 - Redundant port of other port
 - Member ports of bonding port
- The following ports cannot be selected as member ports of bonding port:
 - Port of CM different from the master port
 - Port to which a NAS interface has already been assigned
 - Duplicated port
 - Master ports of bonding port
- It is not possible to delete all member ports and disable port bonding.

- The NAS interface IP addresses allocated for the ports on which redundancy has been set cannot be changed.
- With ETERNUS SF, the same operating mode and hash policy are set for the ports and Redundant ports. When a different operating mode is set for the Redundant ports using the ETERNUS Disk storage system CLI etc, the Redundant port side operating mode shall be set to the same setting as the port side operating mode when an ETERNUS SF NAS interface operation takes place.



See

Refer to "Change NAS Interface" in the *ETERNUS SF Web Console Guide* for information on how to change NAS interface using the Web Console.



Note

When changing the settings of the Redundant port, access to the shared folder using the CIFS protocol shall become temporarily impossible.

4.6.4.4 Changing NAS Server Name

Changes the name of the NAS Server. It is also possible to return it to the same setting as when the ETERNUS Disk storage system was shipped.



See

Refer to "Change NAS Server Name" in the *ETERNUS SF Web Console Guide* for the procedure for configuring from the Web Console.



Note

When the Active Directory authentication Server is configured, delete the Active Directory authentication server before changing the name of the NAS Server. Refer to "[Deleting Authentication Server](#)" for how to delete the authentication server. Re-register the Active Directory Server, as well, after changing the NAS Server name.

4.6.4.5 Changing DNS Server

Change the DNS Server settings. The change procedure and values that can be changed are the same as when configuring the DNS Server. Refer to "[DNS Server](#)".

4.6.4.6 Changing Authentication Server

The values of the authentication server will be changed.

The steps for making changes and the values that can be changed are the same as those when configuring the authentication server. Refer to "[4.6.3.3 NAS File System Environment Settings](#)".



Point

When changing the domain administrator name of the authentication server, it is necessary to re-enter the password of the domain administrator. When changing items other than the domain administrator name, the password of the domain administrator is not required.

4.6.4.7 Activating Sharing

The sharing status of the shared folder will be activated.

When sharing is activated, it will be possible to access the shared folder via the NAS interface.



Refer to "Change NAS Interface" in the *ETERNUS SF Web Console Guide* for information on how to change NAS interface using the Web Console.

4.6.4.8 Stopping Sharing

The sharing status of the shared folder will be stopped.

When sharing is stopped, it will not be possible to access the shared folder.



Refer to "Start/Stop Sharing" in the *ETERNUS SF Web Console Guide* for information on the procedure using the Web Console.

4.6.4.9 Configuring NAS Backup

Configures the backup of NAS volume data.

For the NAS backup configuration, apart from creating a NAS backup volume, a copy group and copy pair will be configured.

If NAS backup is not set up, this function is enabled to create a NAS volume backup system.

Configure the following for the NAS backup volume:

- [NAS Backup Volume](#)
- [Copy Group](#)
- [Copy Pair](#)

NAS Backup Volume

This is the volume for backup of the data of the NAS volume.

When there is no NAS backup volume, create a new NAS backup volume. Where there is a NAS backup volume, you can choose to either create a new NAS backup volume or use an existing NAS backup volume.

The NAS backup volume is created with the following details.

Volume Name	<i>nasVolumeName\$bak_N(*1)</i>
Capacity	Same as the source NAS volume
Volume Type	Same as the source NAS volume
Thin Provisioning Pool of the Creation Destination	User Selection

*1: "*N*" is a sequential number from 0. The number of digits varies.



For increased reliability, it is recommended to create Thin Provisioning Pools of the creation destination for the NAS backup volume and the NAS volume in separate Thin Provisioning Pools.

Copy Group

This is a group for defining copy pairs of a NAS volume and a NAS backup volume.

If no copy group definition for backup exists, a copy group is automatically created with the following settings:

Copy Group Name	NAS_QuickOPC_nasVolumeName_ <i>N</i> (*1,*2)
Copy Group Type	QuickOPC

*1: "*N*" is a sequential number from 0. The number of digits varies.

*2: Characters other than those listed below in nasVolumeName are replaced with hash (#):
One-byte alphanumeric character, minus (-), underscore (_), hash (#), period (.), plus (+)

Copy Pair

This is a copy pair of a source NAS volume and backup NAS volume.

It is created when creating a copy group.



See

Refer to "Set NAS Backup" in the *ETERNUS SF Web Console Guide* for information on how to configure steps using the Web Console.



Point

- When it is possible to execute this function from the Web Console, the NAS backup configuration is not setup or is incomplete. When constructing a backup system of the NAS volume, implement this task.
- When configuring NAS backup or backing up the NAS volume, an ETERNUS SF AdvancedCopy Manager Local Copy License is required.

4.6.4.10 Setting/Changing/Disabling NAS Snapshot

Configures the NAS snapshot settings. Disabling NAS snapshot also uses this operation. The values that can be set are as follows:

- Whether NAS snapshot is used
- Number of snapshot generations
- Schedule configuration (cycle, day, time)
- RAID group on which NAS snapshot volume created (can only be set when newly set)



Note

- When disabling the NAS snapshot settings, the snapshots already captured are discarded. The NAS snapshot volumes are also deleted.
- When using the snapshot function, enable SNMP Trap Setup. If SNMP Trap Setup is not enabled, snapshot collection result is not notified. Refer to "Change ETERNUS Disk Storage System Information" in the *ETERNUS SF Web Console Guide* for the procedure to change SNMP Trap Setup via the Web Console.



Point

- When a new NAS snapshot is set, a NAS snapshot volume is automatically created on the specified RAID group.
- The snapshot is collected based on the time set for the ETERNUS Disk storage system.
- The RAID group on which the NAS snapshot volume is created cannot be modified while the NAS snapshot is in use. Reconfigure after disabling the NAS snapshot settings.
- When a new NAS snapshot is configured, it automatically goes into start state.



See

Refer to "Set/Change/Release NAS Snapshot" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.11 Snapshot Reference

The captured snapshot is referenced from the client in the following way.

- Where the client server is the Windows environment
The captured snapshot can be referenced as the "previous version" using the Windows OS VSS feature.
- Where the client server is the Linux/Solaris environment
The data in the shared folder when a snapshot was captured from ".snap" under the shared folder mounted on the client can be referenced. Each snapshot is in a directory named below:

Directory Name	@GMT- <i>yyyy.mm.dd-hh.mm.00</i> (<i>yyyy.mm.dd-hh.mm</i> is the time that a snapshot was captured (Greenwich Mean Time). The second is rounded down.)
----------------	--



Point

Users can access the ".snap" directory. However, since ".snap" is a virtual directory, it is not displayed. The following is the example of a directory content displayed by the ls command:

```
[root@esf nas]# ls -a
. .. dir1 dir2 nas.txt
[root@esf nas]# ls .snap
@GMT-2014. 06. 11-08. 00. 00 @GMT-2014. 06. 11-09. 00. 00 @GMT-2014. 06. 11-10. 00. 00
```

4.6.4.12 Restoring from Snapshot

It is possible to restore files and folders that have been modified/deleted due to operator error using the captured snapshot. The restore procedure is as follows:

- Where the client server is the Windows environment
The snapshot to be restored can be specified and executed from "Restoring a previous version" using the Windows OS VSS feature.
- Where the client server is the Linux/Solaris environment
There are directories for each snapshot in the ".snap" directory under the shared folder. Copy the files or directories you want to restore to the shared folder from the snapshots using the OS function.



Note

When data inconsistency is found in a snapshot, trace back the data through generations.

4.6.4.13 Start Snapshot Capture

Starts snapshot capture.



See

Refer to "Start/Stop Snapshot Collection" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.14 Stop Snapshot Capture

Stops snapshot capture.



See

Refer to "Start/Stop Snapshot Collection" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.15 Adding Quota Settings

Sets limits on the quantity consumed of disk/number of files for users/groups.

The following values are set:

- NAS volume
- Restricted users/groups
- Quantity consumed of disk (warning values, limit values)
- Number of files (warning values, limit values)



Point

Quotas can be set for users and groups that are registered on the authentication server.



See

Refer to "Add Quota Setting" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.



Note

- The users/groups that can be added with one quota configuration are as follows:
 - Total number of user name characters within 2048
 - Total number of group name characters within 2048

When exceeding the above described number of characters when configuring, please add quota configurations by dividing into multiple instances.

- When using the quota management function, enable SNMP Trap Setup. If SNMP Trap Setup is not enabled, an alarm is not notified when a quota threshold is exceeded. Refer to "Change ETERNUS Disk Storage System Information" in the *ETERNUS SF Web Console Guide* for the procedure to change SNMP Trap Setup via the Web Console.

4.6.4.16 Changing Quota Settings

Changes the quantity consumed of disk/file number limits for users/groups. The values that can be changed are as follows:

- Quantity consumed of disk (warning values, limit values)
- Number of files (warning values, limit values)



See

Refer to "Change Quota Setting" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.17 Deleting Quota Settings

Disables the quantity consumed of disk/file number limits for users/groups.

After deleting, the quantity consumed of disk/file number limits for users/groups are "unlimited".



Refer to "Delete Quota Setting" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.18 Antivirus Server Settings

Configures the antivirus server/activation code.



- The NAS interface must be configured with the ETERNUS Disk storage system so that two CMs in the ETERNUS Disk storage system can communicate to the antivirus server.
- We recommend registering multiple antivirus servers on the ETERNUS SF system. If the ETERNUS Disk storage system cannot communicate with the antivirus server, the client will not be able to access files in the NAS environment.
- Prepare an activation code for each ETERNUS Disk storage system.
- When configuring a new antivirus server, the antivirus function will be automatically enabled.
- When deleting all of the registered antivirus servers or disabling the registered activation codes, the antivirus function will be automatically disabled.



Refer to "Add/Change/Delete Antivirus Server" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.19 Enabling Antivirus Function

Enables the antivirus function.

If the antivirus function is enabled, virus detection and handling will be automatically executed on the files in the NAS environment.



Refer to "Enable/Disable Antivirus Function" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.20 Disabling Antivirus Function

Disables the antivirus function

If the antivirus function is disabled, execution of virus detection and handling of files in the NAS environment will be automatically stopped.



When the antivirus function is enabled and communication is impossible with any of the antivirus servers registered on the ETERNUS Disk storage system, the files residing in the NAS environment are not accessible from the client.

In this case, disabling the antivirus function makes it possible to access the files residing in the NAS environment from the client. However, disabling the antivirus function increases security risk. Therefore, enable the antivirus function after recovery from communication trouble.



See

Refer to "Enable/Disable Antivirus Function" in the *ETERNUS SF Web Console Guide* for the procedure for setting via the Web Console.

4.6.4.21 Performance Management for NAS Volume and NAS System

The performance of NAS volume and NAS system can be managed.

Refer to "[4.2 Performance Management](#)" for details.



See

Refer to "Operations for Performance Management of Storage Device" in the *ETERNUS SF Web Console Guide* for information on the procedure using the Web Console.



Information

- The performance monitoring and threshold monitoring functions cannot be used for NAS port.
- The threshold monitoring function cannot be used for NAS volume and NAS system.

4.6.4.22 Capacity Management of Thin Provisioning Pool

Capacity management for the Thin Provisioning Pool in which the NAS volume is created is implemented.

Refer to "[4.5 Thin Provisioning Management](#)" for details.



See

Refer to "Operations for Thin Provisioning" in the *ETERNUS SF Web Console Guide* for information on the procedure using the Web Console.

4.6.4.23 Expansion of NAS File System

Expansion of the NAS file system will be implemented.

- [Expansion of NAS Volume](#)
This is performed when there is a possibility that total free space on the NAS volume on which the NAS file system has been created may be insufficient.
- [Expansion of Thin Provisioning Pool](#)
This is implemented when there is a possibility that the used capacity of the Thin Provisioning Pool in which the NAS volume is created will exceed the total capacity.

Expansion of NAS Volume

NAS volume expansion is performed using the following procedure:

1. Confirms the total free capacity for the NAS volume.
Confirms the total free capacity of the NAS volume from the Web Console.
Expand the NAS volume capacity based on the size of the free capacity.



See

Refer to "Display Shared Folder" in the *ETERNUS SF Web Console Guide* for the procedure for displaying the total free capacity of the NAS volume from the Web Console.

2. Disables NAS backup settings.

When NAS backup has already been set for the NAS volume to be expanded, this releases the NAS backup settings. Delete the following resources in the description order and disable the NAS backup settings.

- a. Copy pair
- b. Copy group
- c. NAS backup volume



See

Refer to the following for how to delete resources:

- a. For deleting copy pairs, "[Deleting Copy Pair](#)"
- b. For deleting copy groups, "[Deleting Copy Group](#)"
- c. For deleting of the NAS backup volume, "[Deleting Volume for NAS](#)"

3. Disable NAS snapshot settings.

When NAS snapshot has already been set for the NAS volume to be expanded, this disables the NAS snapshot settings.



See

Refer to "[4.6.4.10 Setting/Changing/Disabling NAS Snapshot](#)" for how to delete NAS snapshot settings.

4. Expands NAS volume capacity.

Expands the NAS volume capacity using a new provisioning volume capacity extension function from the Web Console.



See

Refer to "Expand Capacity of Thin Provisioning Volume" in the *ETERNUS SF Web Console Guide* for the procedure for expanding capacity via the Web Console.



Note

- The NAS volume cannot be expanded in the following cases.
 - Where there is a copy session on the NAS volume
 - A NAS snapshot is configured on the NAS volume
- NAS backup volume and NAS system volume cannot be expanded
- When NAS backup or NAS snapshot operation is continued after expansion of the NAS volume, reconfigure after expansion.

Expansion of Thin Provisioning Pool

Expansion of the Thin Provisioning Pool in which the NAS volume is created is implemented with the following steps.

1. Confirm the capacity of the Thin Provisioning Pool.
Confirm the capacity of the Thin Provisioning Pool in which the NAS volume is created.

Refer to "4.6.4.22 Capacity Management of Thin Provisioning Pool".

Depending on the size of the available capacity of the Thin Provisioning Pool, perform the expansion of the capacity of the Thin Provisioning Pool with the following steps.

2. Expand the capacity of the Thin Provisioning Pool.
Perform the expansion of the capacity of the Thin Provisioning Pool from the Web Console.



See

Refer to the "Expand Capacity of/Format/Change Threshold Value of/Delete Thin Provisioning Pool" in the *ETERNUS SF Web Console Guide* to expand capacity.

A disk that is not being used is necessary to expand the capacity of the Thin Provisioning Pool. Add more disks as needed before performing the extension of the capacity.

Refer to the manual included with the ETERNUS Disk storage system for information on how to add disks.

4.6.4.24 Deleting of NAS Environment

The steps for deleting the NAS environment will be explained.

The deletion is performed with the following steps.

Table 4.4 Dismantling of NAS Environment

Order	Item	Title of Sections Listed in Web Console Guide
1	Disable NAS Snapshot	Set/Change/Release NAS Snapshot
2	Deleting Authentication Server	Configure Authentication Server
3	Deleting DNS Server	Configure DNS Server
4	Deleting Antivirus Server	Add/Change/Delete Antivirus Server
5	Deleting NAS Interface	Delete NAS Interface
6	Deleting Copy Pair	Add/Display/Delete Copy Pair
7	Deleting Copy Group	Create/Display/Delete Copy Group
8	Deleting Shared Folder	Delete Shared Folder
9	Deleting Volume for NAS	Delete Volume



Note

When these steps are implemented, the NAS environment is deleted. All the data that had been stored on the NAS volume and the NAS backup volume will be deleted. Do not implement this step except when deleting the NAS environment.

Disable NAS Snapshot

Disables the settings for NAS snapshot.

When dismantling the NAS environment, disable the NAS snapshot settings for all of the NAS volumes. When disabling the NAS snapshot settings individually, specify the target NAS volume and delete.



Note

When disabling the NAS snapshot settings, the snapshots already captured are discarded. The NAS snapshot volumes are also deleted.

Deleting Authentication Server

The authentication server is deleted from the configuration.

Delete domain information and all authentication server information when you dismantle the NAS environment.



Refer to "Configure Authentication Server" in the *ETERNUS SF Web Console Guide* for the procedure with the Web Console.



After deleting the authentication server, quota cannot be added, changed or deleted.

When a NAS volume targeted for quota management is deleted, the quota setting is also deleted.

Deleting DNS Server

Deletes the DNS Server.

When dismantling the NAS environment, delete all the information from the primary server and secondary server.



Refer to "Configure DNS Server" in the *ETERNUS SF Web Console Guide* for the delete procedure.

Deleting Antivirus Server

The setting of the antivirus server is deleted.

When dismantling the NAS environment, delete the activation codes and all antivirus servers.



Refer to "Add/Change/Delete Antivirus Server" in the *ETERNUS SF Web Console Guide* for information on how to delete.

Deleting NAS Interface

The NAS interface will be deleted.

When deleting the NAS environment, be sure to delete all NAS interfaces. In order to delete a specific NAS interface, specify the chosen NAS interface and execute the deletion.



Refer to "Delete NAS Interface" in the *ETERNUS SF Web Console Guide* for information on how to delete.



When the following two conditions are met, the redundancy of ports is removed:

- All NAS interfaces are deleted from Allocation ports.
- A Redundant port is set to an Allocation port.

Deleting Copy Pair

The copy pair for NAS defined with the NAS volume and the NAS backup volume will be deleted.



See

Refer to "Add/Display/Delete Copy Pair" in the *ETERNUS SF Web Console Guide* for information on how to delete.



Information

Even when all shared folders have been deleted, the copy pair automatically created for the NAS will not be deleted. When deleting the NAS backup configuration, delete the copy pair from the Web Console.

Deleting Copy Group

The copy group for NAS will be deleted.



See

Refer to "Create/Display/Delete Copy Group" in the *ETERNUS SF Web Console Guide* for information on how to delete.



Information

Even when all shared folders have been deleted, the copy group automatically created for the NAS will not be deleted. When deleting the NAS backup configuration, delete the copy group from the Web Console.

Deleting Shared Folder

The shared folder will be deleted.

When deleting the NAS environment, be sure to delete all shared folders. In order to delete a specific shared folder, specify a shared folder of choice and execute the deletion.



See

Refer to "Delete Shared Folder" in the *ETERNUS SF Web Console Guide* for information on how to delete.



Note

- Delete the files and the folders in the shared folders beforehand.
When the files or the folders are existed in the shared folder, it will be an error of the deletion the shared folders.
- The shared folder at the time of being accessed from the client might not be able to be deleted.
Delete this after stopping access to the shared folder.

Deleting Volume for NAS

The volume for NAS will be deleted.



See

Refer to "Delete Volume" in the *ETERNUS SF Web Console Guide* for information on how to delete.



Information

Even when all shared folders have been deleted, the volume for NAS will not be deleted. In order to delete the NAS volume, delete the NAS volume from the Web Console.



Point

In the following cases, the volume for NAS cannot be deleted from the Web Console.

- When a shared folder is present on the NAS volume
- When the NAS backup volume is mounted
- When the volume is a NAS system volume

Delete the NAS system volume from the ETERNUS Disk storage system. Refer to the ETERNUS Disk storage system manuals for the deletion procedure.

4.7 Model Upgrade for ETERNUS Disk Storage System

When applying Model upgrade options for ETERNUS Disk storage system, ETERNUS SF Manager cannot manage the corresponding ETERNUS Disk storage system since the device information of it is changed.

Reload configuration information and delete the license registered with ETERNUS Disk storage system. Then, re-register the license with ETERNUS Disk storage system.

Refer to "Operation on Model Upgrade for ETERNUS Disk Storage System" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

When you use the performance management function, update configuration information of the performance management function in reference to "[4.2.2.8 Updating Configuration Information](#)".

Chapter 5 Maintenance

This chapter describes the maintenance of Express's manager.

5.1 Maintenance of Express's Manager Environment (Windows)

5.1.1 Backing Up Express's Manager Environment (Windows)

It is required to back up the Express's manager environment to recover from failure on the Management Server. Perform the following procedure to back up the Express's manager environment. All operations are performed on the Management Server.



Notation in Procedure:

Directory Name	Explanation
\$BAK_DIR	This is a backup destination directory.
\$INS_DIR	This is the "Program Directory" specified at the ETERNUS SF Manager installation.
\$ENV_DIR	This is the "Environment Directory" specified at the ETERNUS SF Manager installation.
\$TMP_DIR	This is the "Work Directory" specified at the ETERNUS SF Manager installation.

1. Stop the ETERNUS SF Express Tomcat service.
Open Service Control Manager to stop the following service.
 - ETERNUS SF Express Tomcat Service

2. Create a backup data.
Using Explorer, create the following backup directories:
 - \$BAK_DIR\Common

Execute the following command to create a backup data. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*. The file name of the created backup data is *fileName*.

```
$INS_DIR\Common\sys\postgres\bin\pg_dump -U esfpostgres -C --attribute-inserts -p portNumber -f $BAK_DIR\Common\fileName esfdb
```

The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

3. Execute the following batch to stop the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Stop_ESFservice.bat
```



When the batch is executed, the message that ETERNUS SF Manager Tomcat Service has been already stopped is displayed many times. Please ignore because there is no problem.

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. If there is no subdirectory or file, you don't need to backup.

Using Explorer, create the following backup directory.

- \$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current
- \$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perfconf
- \$BAK_DIR\ESC\Manager\var\opt\FJSVssmgr\current\perf

Copy the subdirectories and files in the following source directory to the backup destination directory.

Copy Source File	Copy Destination Directory
\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perf.conf	\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current

Copy the subdirectories and files in the following source directory to the backup destination directory.

Copy Source Directory	Copy Destination Directory
\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perfconf	\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perfconf
\$TMP_DIR\ESC\Manager\var\opt\FJSVssmgr\current\perf	\$BAK_DIR\ESC\Manager\var\opt\FJSVssmgr\current\perf

5. Back up customizable files.

It is unnecessary to back up the files or directories which are not existed.

Using Explorer, create the following backup directory.

- \$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current
- \$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\eventmail

Copy the following backup source file to the backup destination directory.

Copy Source File	Copy Destination Directory
\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\sanma.conf	\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current

Copy the subdirectories and files in the following source directory to the backup destination directory.

Copy Source Directory	Copy Destination Directory
\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\eventmail	\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\eventmail

6. Back up the polling service setting file.

This step can be skipped if you are not customizing the polling service setting file.

If customizing the polling service setting file pollingService.xml, follow the step below to back it up.

Create the following backup directory in Explorer or a similar program.

- \$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\polling

Using Explorer or a similar program, copy the following file to its backup location.

Copy Source File	Copy Destination Directory
\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\polling\pollingService.xml	\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\polling

7. Back up the files associated with definition of copy group and copy pair.

This step is required only when using Advanced Copy function.

Using Explorer, create the following backup directories.

- \$BAK_DIR\CCM\etc
- \$BAK_DIR\CCM\etc\db
- \$BAK_DIR\CCM\etc\db\cg
- \$BAK_DIR\CCM\etc\prop
- \$BAK_DIR\CCM\var\micc\database

Copy the following backup source files to the backup destination directory.

Copy Source File	Copy Destination Directory
\$ENV_DIR\CCM\etc\db\eternus.xml	\$BAK_DIR\CCM\etc\db
\$TMP_DIR\CCM\var\micc\database\DeviceRegList.xml	\$BAK_DIR\CCM\var\micc\database

If the following source files exist, copy them to the backup destination directory.

Copy Source File	Copy Destination Directory
\$ENV_DIR\CCM\etc\prop\user.properties	\$BAK_DIR\CCM\etc\prop
\$ENV_DIR\CCM\etc\stxc.alias	\$BAK_DIR\CCM\etc
\$ENV_DIR\CCM\etc\stxc_ext.alias	
\$ENV_DIR\CCM\etc\stxcvolinf	

Copy the subdirectories and files in the following backup source directory to the backup destination directory.

Copy Source Directory	Copy Destination Directory
\$ENV_DIR\CCM\etc\db\cg	\$BAK_DIR\CCM\etc\db\cg

8. Back up the license management database.

Using Explorer, create the following backup directory:

- \$BAK_DIR\LM

Execute the following command. The file specified with *fileName* will be created as a backup file.

```
$INS_DIR\LM\bin\esflm backup $BAK_DIR\LM\fileName
```

9. Execute the following batch to start the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Start_ESFservice.bat
```

5.1.2 Restoring Express's Manager Environment (Windows)

If any failure occurs in the Management Server, perform the following procedure to restore Express's manager environment. All operations are performed on the Management Server.

Information

Notation in Procedure:

Directory Name	Explanation
\$BAK_DIR	This is a backup destination directory.
\$INS_DIR	This is the "Program Directory" specified at the ETERNUS SF Manager installation.

Directory Name	Explanation
\$ENV_DIR	This is the "Environment Directory" specified at the ETERNUS SF Manager installation.
\$TMP_DIR	This is the "Work Directory" specified at the ETERNUS SF Manager installation.

1. Reconfigure the Express's manager.

Install the ETERNUS SF Manager, and set up it as the Express's manager. Refer to "Installation of ETERNUS SF Manager" and "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for details on how to install and setup.

2. Stop the ETERNUS SF Express Tomcat service.

Open Service Control Manager to stop the following service.

- ETERNUS SF Express Tomcat Service

3. Restore a backup data.

Execute the following command. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*.

```
$INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p portNumber postgres
```

The prompt is displayed, and waiting for input. Input the following strings in order.

```
master01!
drop database esfdb;
\q
```

Execute the following command to restore the backup data. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*. The *fileName* is the file name specified when the backup data was created.

```
$INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p portNumber -f $BAK_DIR\Common\fileName
postgres
```

The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

4. Execute the following batch to stop the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Stop_ESFservice.bat
```



Note

When the batch is executed, the message that ETERNUS SF Manager Tomcat Service has been already stopped is displayed many times. Please ignore because there is no problem.

5. Restore files that are related to the performance management function.

If you are not using the performance management function or the files related to the performance management function are not backed up, this step is unnecessary.

If you are upgrading from a previous version, restore only the files which were backed up in the previous version.

Using Explorer, delete files and subdirectories under following restore destination directory.

However, do not delete the restore destination directory itself. If the restore destination directory does not exist, create it.

- \$TMP_DIR\ESCManager\var\opt\FJSVssmgr\current\perf

Copy the following source file to the destination directory.

Copy Source File	Copy Destination Directory
\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perf.conf	\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current

Copy the subdirectories and files in the following source directory to the destination directory.

Copy Source Directory	Copy Destination Directory
\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perfconf	\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\perfconf
\$BAK_DIR\ESC\Manager\var\opt\FJSVssmgr\current\perf	\$TMP_DIR\ESC\Manager\var\opt\FJSVssmgr\current\perf

6. Restore customizable files.

Restore only the files and directories which were backed up.

If you are upgrading from a previous version, restore only the files which were backed up in the previous version.

Copy the following files to the destination directory.

Copy Source File	Copy Destination Directory
\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\sanma.conf	\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current

Copy the subdirectories and files in the following source directory to the destination directory.

Copy Source Directory	Copy Destination Directory
\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\eventmail	\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\eventmail

7. Restore the polling service setting file.

This restoration is unnecessary for the files which have not been backed up.

Using Explorer or a similar program, copy the polling service setting file from its backup location.

Copy Source File	Copy Destination Directory
\$BAK_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\polling\pollingService.xml	\$ENV_DIR\ESC\Manager\etc\opt\FJSVssmgr\current\polling

8. Restore the files associated with definition of copy group and copy pair.

This step is required only when using Advanced Copy function.

If you are upgrading from a previous version, restore only the files which were backed up in the previous version.

Using Explorer, delete files under the following restore destination directory.

- \$ENV_DIR\CCM\etc\db\cg

In addition, if the following files exist, delete them.

- \$ENV_DIR\CCM\etc\prop\user.properties
- \$ENV_DIR\CCM\etc\stxc.alias
- \$ENV_DIR\CCM\etc\stxc_ext.alias
- \$ENV_DIR\CCM\etc\stxcvolinf

Copy the following source files to the destination directory.

Copy Source File	Copy Destination Directory
\$BAK_DIR\CCM\etc\db\eternus.xml	\$ENV_DIR\CCM\etc\db
\$BAK_DIR\CCM\var\micc\database\DeviceRegList.xml	\$TMP_DIR\CCM\var\micc\database

If the following source files exist, copy them to the destination directory.

Copy Source File	Copy Destination Directory
\$BAK_DIR\CCM\etc\prop\user.properties	\$ENV_DIR\CCM\etc\prop
\$BAK_DIR\CCM\etc\stxc.alias	\$ENV_DIR\CCM\etc
\$BAK_DIR\CCM\etc\stxc_ext.alias	
\$BAK_DIR\CCM\etc\stxcvolinf	

Copy the subdirectories and files in the following source directory to the destination directory.

Copy Source Directory	Copy Destination Directory
\$BAK_DIR\CCM\etc\db\cg	\$ENV_DIR\CCM\etc\db\cg

- Restore the license management database.

If the license management database is not backed up (in case of upgrading from a previous version), this step is unnecessary. Execute the following command. The *fileName* is the file name specified when the backup data was created.

```
$INS_DIR\LM\bin\esflm restore $BAK_DIR\LM\fileName
```

- Execute the following batch to start the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Start_ESFservice.bat
```

5.1.3 Changing Express's Manager Environment (Windows)

This section describes the following procedure.

- How to change the port numbers used in Express or Web Console
- How to change the IP address of the Management Server

5.1.3.1 Changing Port Numbers (Windows)

Changing Port Numbers Used in Express

This section describes how to change port number that is used by Express.

The port numbers are defined in the operating system's services file. The ports shown in the following table are used by Express. The default values for the port numbers are shown. If you have changed the value for these port numbers, please read the numbers to replace after the change in this section.

Port Number	Service Name	Protocol	Note
9855	esfmanagerweb	tcp	Port number used for the Web Console
1226	stgxfws	tcp	Port number used for configuration management and polling monitoring
24916	sscruiserm	tcp	Port numbers used inside Express



Notation in Procedure:

- \$INS_DIR: "Program Directory" specified at the ETERNUS SF Manager installation
- \$ENV_DIR: "Environment Directory" specified at the ETERNUS SF Manager installation

Perform the following procedure to change the port numbers used by Express.

1. Open the file "%SystemRoot%\system32\drivers\etc\services" with a notepad.
2. Pick out the entry of a service name to be changed to change its entry port number.
A port number can be entered between 1024 and 65535. However, a port number from 5001 to 32768 is recommended.

```
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
stgxfws 1226/tcp
esfmanagerweb 9855/tcp
sscruiserm 24916/tcp
```

3. Save the "%SystemRoot%\system32\drivers\etc\services" file and close it.
4. Edit httpd.conf file if the port number used by Web Console is changed.
 1. Open the "\$INS_DIR\Common\sys\apache\conf\httpd.conf" file with text editor.
 2. Replace the port number (9855) in red letters with the other port number listed immediately after the Listen directive.

```
Listen 9855
```

3. Save the "\$INS_DIR\Common\sys\apache\conf\httpd.conf" file and close it.
5. Restart services.
 1. Execute the following batch on the Management Server to stop the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Stop_ESFservice.bat
```

2. Execute the following batch on the Management Server to start the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Start_ESFservice.bat
```

6. Create a server information change instruction file on the Management Server, then execute the stgxfwcmmodsrv command with the -f option specified to change the port numbers.

[Example] In the case that name of the server information change instruction file is "c:\acm\modfile".

```
$INS_DIR\ACM\bin\stgxfwcmmodsrv -f c:\acm\modfile
```

7. Restart the Management Server.



See

Refer to "stgxfwcmmodsrv (Server Information Change Command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* corresponding to the operating system of the Management Server for information on the stgxfwcmmodsrv command and the server information change instruction file.

Changing Port Numbers Used in Web Console

The Web Console uses the following ports internally.

Port Number	Protocol	Note
28005	tcp	Port numbers used inside Web Console
28009	tcp	
28443	tcp	

Port Number	Protocol	Note
15432	tcp	

If the above port numbers are used by other applications, the Web Console cannot start. In this case, change the port numbers according to the following steps.

1. Execute the following batch on the Management Server to stop the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Stop_ESFservice.bat
```

2. Open the following files with text editor.

- \$INS_DIR\Common\sys\tomcat\conf\server.xml
- \$INS_DIR\Common\sys\apache\conf\httpd.conf
- \$ENV_DIR\Common\etc\db\data\postgresql.conf
- \$INS_DIR\Common\sys\tomcat\webapps\esf\WEB-INF\config\database.yml
- \$INS_DIR\ESCManager\opt\FJSSmgr\etc\properties\escs_event.properties

3. Change the default port numbers (28005, 28009, 28443 and 15432) to other numbers.

- server.xml

Change the port number of the Server tag.

```
<Server port="28005" shutdown="SHUTDOWN">
```

Change the port number listed in the port of the Connector tag and redirectPort.

```
<Connector port="28009" address="127.0.0.1"
enableLookups="false" redirectPort="28443" protocol="AJP/1.3" />
```

- httpd.conf

Change the port numbers of the ProxyPass and ProxyPassReverse directive.

```
ProxyPass / ajp://localhost:28009/ timeout=900
ProxyPassReverse / ajp://localhost:28009/
```

- postgresql.conf

Change the port number of the port directive.

```
port = 15432 # (change requires restart)
```

- database.yml

Change the port number of the port directive to the same number as described in postgresql.conf.

```
port = 15432
```

4. Save and close these files.

5. Execute the following batch on the Management Server to start the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Start_ESFservice.bat
```

5.1.3.2 Changing IP Address (Windows)

The following is the procedure to change the IP address of Management Server.

Information

Notation in Procedure:

- \$INS_DIR: "Program Directory" specified at the ETERNUS SF Manager installation

Perform the following procedure to change the IP address of Management Server.

1. Execute the following batch file on the Management Server to stop the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Stop_ESFservice.bat
```

2. Change the IP address of the Management Server.

3. Execute the following batch file on the Management Server to start the ETERNUS SF Manager services.

```
$INS_DIR\Common\bin\Start_ESFservice.bat
```

4. Create a server information change instruction file on the Management Server, then execute the stgxfwcmmodsrv command with the -f option specified to change the IP addresses.

[Example] In the case that name of the server information change instruction file is "c:\acm\modfile".

```
$INS_DIR\ACM\bin\stgxfwcmmodsrv -f c:\acm\modfile
```

5. If the IP address of the Management Server is specified for SNMP Trap destination, change the specified IP address using the ETERNUS Web GUI.
Refer to the ETERNUS Web GUI manuals for more information.
6. Restart the Management Server.
7. Launch the Web Console and connect to Express's manager running on the Management Server whose IP address has been changed.

See

Refer to "stgxfwcmmodsrv (Server Information Change Command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* corresponding to the operating system of the Management Server for information on the stgxfwcmmodsrv command and the server information change instruction file.

5.2 Maintenance of Express's Manager Environment (Linux)

5.2.1 Backing Up Express's Manager Environment (Linux)

It is required to back up the Express's manager environment to recover from failure on the Management Server. Perform the following procedure to back up the Express's manager environment. All operations are performed on the Management Server.

Information

Notation in Procedure:

Directory Name	Explanation
\$BAK_DIR	This is a backup destination directory.

1. Stop the ETERNUS SF Manager Web service.

Execute the following shell script to stop the service.

```
/opt/FJSVesfcm/bin/stop-webservice.sh
```

2. Create a backup data.

Create the following backup directories:

```
mkdir -p $BAK_DIR/Common
```

Execute the following command to create a backup data. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*. The file name of the created backup data is *fileName*.

```
/opt/FJSVesfcm/postgres/bin/pg_dump -U esfpostgres -C --attribute-inserts -p portNumber -f $BAK_DIR/Common/fileName esfdb
```

The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

3. Execute the following shell script to stop the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/stopesf.sh
```



When the batch is executed, the message that ETERNUS SF Manager Web Service has been already stopped is displayed many times. Please ignore because there is no problem.

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 following backup directory.

```
mkdir -p $BAK_DIR/etc/opt/FJSVssmgr/current
mkdir -p $BAK_DIR/etc/opt/FJSVssmgr/current/perfconf
mkdir -p $BAK_DIR/var/opt/FJSVssmgr/current/perf
```

Copy the subdirectories and files to the backup destination directory.

```
cp -p /etc/opt/FJSVssmgr/current/perf.conf $BAK_DIR/etc/opt/FJSVssmgr/current/
cp -p /etc/opt/FJSVssmgr/current/perfconf/* $BAK_DIR/etc/opt/FJSVssmgr/current/perfconf/
cp -Rp /var/opt/FJSVssmgr/current/perf/* $BAK_DIR/var/opt/FJSVssmgr/current/perf/
```

5. Back up customizable files.

It is unnecessary to back up the files or directories which are not existed.

Create the following backup directory.

```
mkdir -p $BAK_DIR/etc/opt/FJSVssmgr/current
mkdir -p $BAK_DIR/etc/opt/FJSVssmgr/current/eventmail
```

Copy the subdirectories and files to the backup destination directory.

```
cp -p /etc/opt/FJSVssmgr/current/sanma.conf $BAK_DIR/etc/opt/FJSVssmgr/current/
cp -Rp /etc/opt/FJSVssmgr/current/eventmail/* $BAK_DIR/etc/opt/FJSVssmgr/current/eventmail/
```

6. Back up the polling service setting file.

This step can be skipped if you are not customizing the polling service setting file.

If you have customized the polling service setting file *pollingService.xml*, back up this file using the step shown below:

Create the directory for the backup data.

```
# mkdir -p $BAK_DIR/etc/opt/FJSVssmgr/current/polling
```

Copy the file to the backup location.

```
# cp -p /etc/opt/FJSVssmgr/current/polling/pollingService.xml $BAK_DIR/etc/opt/FJSVssmgr/  
current/polling/
```

7. Back up the files associated with definition of copy group and copy pair.

This step is required only when using Advanced Copy function.

Create the following backup directories.

```
mkdir -p $BAK_DIR/CCM/etc  
mkdir -p $BAK_DIR/CCM/etc/db  
mkdir -p $BAK_DIR/CCM/etc/db/cg  
mkdir -p $BAK_DIR/CCM/etc/prop  
mkdir -p $BAK_DIR/CCM/var/micc/database
```

Copy the subdirectories and files to the backup destination directory.

It is unnecessary to back up the files which are not existed.

```
cp -p /etc/opt/FJSVccm/db/eternus.xml $BAK_DIR/CCM/etc/db  
cp -p /var/opt/FJSVccm/micc/database/DeviceRegList.xml $BAK_DIR/CCM/var/micc/database  
cp -p /etc/opt/FJSVccm/prop/user.properties $BAK_DIR/CCM/etc/prop  
cp -p /etc/opt/FJSVccm/acc/etc/stxc.alias $BAK_DIR/CCM/etc  
cp -p /etc/opt/FJSVccm/acc/etc/stxc_ext.alias $BAK_DIR/CCM/etc  
cp -p /etc/opt/FJSVccm/acc/etc/stxcvolinf $BAK_DIR/CCM/etc  
cp -Rp /etc/opt/FJSVccm/db/cg/* $BAK_DIR/CCM/etc/db/cg
```

8. Back up the license management database.

Create the following backup directory:

```
mkdir -p $BAK_DIR/LM
```

Execute the following command. The file specified with *fileName* will be created as a backup file.

```
/opt/FJSVesflm/bin/esflm backup $BAK_DIR/LM/fileName
```

9. Execute the following shell script to start the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/startesf.sh
```

5.2.2 Restoring Express's Manager Environment (Linux)

If any failure occurs in the Management Server, perform the following procedure to restore Management Server environment. All operations are performed on the Management Server.

Information

Notation in Procedure:

Directory Name	Explanation
\$BAK_DIR	This is a backup destination directory.

1. Reconfigure the Express's manager.

Install the ETERNUS SF Manager, and set up it as the Express's manager. Refer to "Installation of ETERNUS SF Manager" and "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for details on how to install and setup.

2. Stop the ETERNUS SF Manager Web service.

Execute the following shell script to stop the service.


```
/opt/FJSVesfcm/bin/stop-webservice.sh
```

3. Restore a backup data.

Execute the following command. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*.

```
/opt/FJSVesfcm/postgres/bin/psql -U esfpostgres -p portNumber postgres
```

The prompt is displayed, and waiting for input. Input the following strings in order.

```
master01!  
drop database esfdb;  
/q
```

Execute the following command to restore the backup data. Specify 15432 to *portNumber* by default. If you have changed the port number, specify that port number to *portNumber*. The *fileName* is the file name specified when the backup data was created.

```
/opt/FJSVesfcm/postgres/bin/psql -U esfpostgres -p portNumber -f $BAK_DIR/Common/fileName  
postgres
```

The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

4. Execute the following shell script to stop the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/stopesf.sh
```



When the batch is executed, the message that ETERNUS SF Manager Web Service has been already stopped is displayed many times. Please ignore because there is no problem.

5. Restore files that are related to the performance management function.

If you are not using the performance management function or the files related to the performance management function are not backed up, this step is unnecessary.

Delete files and subdirectories under following restore destination directory.

However, do not delete the restore destination directory itself. If the restore destination directory does not exist, create it.

```
rm -f /etc/opt/FJSVssmgr/current/perf.conf  
rm -rf /etc/opt/FJSVssmgr/current/perfconf/*  
rm -rf /var/opt/FJSVssmgr/current/perf/*
```

Copy the subdirectories and files from the destination directory.

```
cp -p $BAK_DIR/etc/opt/FJSVssmgr/current/perf.conf /etc/opt/FJSVssmgr/current/  
cp -p $BAK_DIR/etc/opt/FJSVssmgr/current/perfconf/* /etc/opt/FJSVssmgr/current/perfconf/  
cp -Rp $BAK_DIR/var/opt/FJSVssmgr/current/perf/* /var/opt/FJSVssmgr/current/perf/
```

6. Restore customizable files.

Restore only the files and directories which were backed up.

Delete files and subdirectories under following restore destination directory.

However, do not delete the restore destination directory itself. If the restore destination directory does not exist, create it.

```
rm -f /etc/opt/FJSVssmgr/current/sanma.conf  
rm -rf /etc/opt/FJSVssmgr/current/eventmail/*
```

Copy the subdirectories and files from the destination directory.

```
cp -p $BAK_DIR/etc/opt/FJSVssmgr/current/sanma.conf /etc/opt/FJSVssmgr/current/  
cp -Rp $BAK_DIR/etc/opt/FJSVssmgr/current/eventmail/* /etc/opt/FJSVssmgr/current/eventmail/
```

7. Restore the polling service setting file.

This restoration is unnecessary for the files which have not been backed up.

Copy the file from the backup location.

```
# cp -p $BAK_DIR/etc/opt/FJSVssmgr/current/polling/*.xml /etc/opt/FJSVssmgr/current/polling/
```

8. Restore the files associated with definition of copy group and copy pair.

This step is required only when using Advanced Copy function.

Delete files under the following restore destination directory.

```
rm -rf /etc/opt/FJSVccm/db/cg/*  
rm -f /etc/opt/FJSVccm/prop/user.properties  
rm -f /etc/opt/FJSVccm/acc/etc/stxc.alias  
rm -f /etc/opt/FJSVccm/acc/etc/stxc_ext.alias  
rm -f /etc/opt/FJSVccm/acc/etc/stxcvolinf
```

Copy the subdirectories and files from the destination directory.

It is unnecessary to restore the files which are not existed.

```
cp -p $BAK_DIR/CCM/etc/db/eternus.xml /etc/opt/FJSVccm/db  
cp -p $BAK_DIR/CCM/var/micc/database/DeviceRegList.xml /var/opt/FJSVccm/micc/database  
cp -p $BAK_DIR/CCM/etc/prop/user.properties /etc/opt/FJSVccm/prop  
cp -p $BAK_DIR/CCM/etc/stxc.alias /etc/opt/FJSVccm/acc/etc  
cp -p $BAK_DIR/CCM/etc/stxc_ext.alias /etc/opt/FJSVccm/acc/etc  
cp -p $BAK_DIR/CCM/etc/stxcvolinf /etc/opt/FJSVccm/acc/etc  
cp -Rp $BAK_DIR/CCM/etc/db/cg/* /etc/opt/FJSVccm/db/cg
```

9. Restore the license management database.

Execute the following command. The *fileName* is the file name specified when the backup data was created.

```
/opt/FJSVccm/bin/esflm restore $BAK_DIR/LM/<file_name>
```

10. Execute the following shell script to start the ETERNUS SF Manager services.

```
/opt/FJSVccm/bin/startesf.sh
```

5.2.3 Changing Express's Manager Environment (Linux)

This section describes the following procedure.

- How to change the port numbers used in Express or Web Console
- How to change the IP address of the Management Server

5.2.3.1 Changing Port Numbers (Linux)

Changing Port Numbers Used in Express

This section describes how to change port number that is used by Express.

The port numbers are defined in the operating system's services file. The ports shown in the following table are used by Express. The default values for the port numbers are shown. If you have changed the value for these port numbers, please read the numbers to replace after the change in this section.

Port Number	Service Name	Protocol	Note
9855	esfmanagerweb	tcp	Port number used for the Web Console
1226	stgxfws	tcp	Port number used for configuration management and polling monitoring
24916	sscruiserm	tcp	Port numbers used inside Express

Perform the following procedure to change the port numbers used by Express.

1. Open the file "/etc/services" with a notepad.
2. Pick out the entry of a service name to be changed to change its entry port number.
A port number can be entered between 1024 and 65535. However, a port number from 5001 to 32768 is recommended.

```
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
stgxfws 1226/tcp
esfmanagerweb 9855/tcp
sscruiserm 24916/tcp
```

3. Save the "/etc/services" file and close it.
4. Edit httpd.conf file if the port number used by Web Console is changed.
 1. Open the "/etc/opt/FJSVesfcm/conf/apache/httpd.conf" file with text editor.
 2. Change the port number listed immediately after the Listen directive.

```
Listen 0.0.0.0:9855
```

3. Save the "/etc/opt/FJSVesfcm/conf/apache/httpd.conf" file and close it.
5. Restart services.
 1. Execute the following shell script on the Management Server to stop the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/stopesf.sh
```

2. Execute the following shell script on the Management Server to start the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/startesf.sh
```

6. Create a server information change instruction file on the Management Server, then execute the stgxfwcmmodsrv command with the -f option specified to change the port numbers.

[Example] In the case that name of the server information change instruction file is "/acm/modfile".

```
/opt/FJSVswstf/bin/stgxfwcmmodsrv -f /acm/modfile
```

7. Restart the Management Server.



Refer to "stgxfwcmmodsrv (Server Information Change Command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* corresponding to the operating system of the Management Server for information on the stgxfwcmmodsrv command and the server information change instruction file.

Changing Port Numbers Used in Web Console

The Web Console uses the following ports internally.

Port Number	Protocol	Note
28005	tcp	Port numbers used inside Web Console

Port Number	Protocol	Note
28009	tcp	
28443	tcp	
15432	tcp	

If the above port numbers are used by other applications, the Web Console cannot start. In this case, change the port numbers according to the following steps.

1. Execute the following shell script on the Management Server to stop the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/stopesf.sh
```

2. Open the following files with text editor.

- /etc/opt/FJSVesfcm/conf/tomcat/server.xml
- /etc/opt/FJSVesfcm/conf/apache/httpd.conf
- /var/opt/FJSVesfcm/db/data/postgresql.conf
- /opt/FJSVesfcm/tomcat/webapps/esf/WEB-INF/config/database.yml
- /opt/FJSvsmgr/etc/properties/esccs_event.properties

3. Change the default port numbers (28005, 28009, 28443 and 15432) to other numbers.

- server.xml

Change the port number of the Server tag.

```
<Server port="28005" shutdown="SHUTDOWN">
```

Change the port number listed in the port of the Connector tag and redirectPort.

```
<Connector port="28009" address="127.0.0.1"
enableLookups="false" redirectPort="28443" protocol="AJP/1.3" />
```

- httpd.conf

Change the port numbers of the ProxyPass and ProxyPassReverse directive.

```
ProxyPass / ajp://localhost:28009/ timeout=900
ProxyPassReverse / ajp://127.0.0.1:28009/
```

- postgresql.conf

Change the port number of the port directive.

```
port = 15432
```

- database.yml

Change the port number of the port directive to the same number as described in postgresql.conf.

```
port = 15432
```

4. Save and close these files.

5. Execute the following shell script on the Management Server to start the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/startesf.sh
```

5.2.3.2 Changing IP Address (Linux)

The following is the procedure to change the IP address of Management Server.

1. Execute the following batch file on the Management Server to stop the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/stopesf.sh
```

2. Change the IP address of the Management Server.

3. Execute the following shell script on the Management Server to start the ETERNUS SF Manager services.

```
/opt/FJSVesfcm/bin/startesf.sh
```

4. Create a server information change instruction file on the Management Server, then execute the stgxfwcmmodsrv command with the -f option specified to change the IP addresses.

[Example] In the case that name of the server information change instruction file is "c:/acm/modfile".

```
/opt/FJSVswstf/bin/stgxcwcmmodsrv -f /acm/modfile
```

5. If the IP address of the Management Server is specified for SNMP Trap destination, change the specified IP address using the ETERNUS Web GUI. Refer to the ETERNUS Web GUI manuals for more information.
6. Restart the Management Server.
7. Launch the Web Console and connect to Express's manager running on the Management Server whose IP address has been changed.



See

Refer to "stgxfwcmmodsrv (Server Information Change Command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* corresponding to the operating system of the Management Server for information on the stgxfwcmmodsrv command and the server information change instruction file.

5.3 Action Required When Management Server Functionality Is Stopped

If processing stops in Express's manager or the Management Server before an operation started in the Web Console is complete, the operation result may not be reflected properly in the Express's manager.

In this case, reload the device information to reflect in Express's manager.

Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

5.4 Caution about Disk Storage System Managed in Several Express's Managers

If the same Disk storage system is managed in several Express's managers, the result of an operation initiated in a Web Console connected to an Express's manager will not be reflected in the other Express's manager.

In this case, reload the device information on other Express's manager, and reflect it in other Express's manager.

Refer to "Reload ETERNUS Disk Storage System Configuration Information" in the *ETERNUS SF Web Console Guide* for details on the operation procedures.

5.5 Caution about Operating Disk Storage System Outside Express's Manager

If an operation has been initiated directly in the ETERNUS Disk storage system by the ETERNUS Web GUI, the operation result will not be reflected in Express's manager.

To reflect the operation result in Express's manager, follow the same procedure as in "5.4 Caution about Disk Storage System Managed in Several Express's Managers".

Appendix A Advanced Copy Function

This appendix explains the Advanced Copy function of ETERNUS Disk storage system.



See

Refer to "Command References" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details on the commands used in Express.

A.1 Overview of Advanced Copy Function

A.1.1 What Is Advanced Copy Function?

Advanced Copy functions allow ETERNUS Disk storage system to carry out high-speed copying operations itself, with no need to draw on server CPU resources. With Advanced Copy functions, at any point in time a business data volume can be copied to a separate copy volume, quickly and within ETERNUS Disk storage system. Once the copy is complete, the copy volume can be separated from the business volume ensuring no further updates to the business volume are applied to the copy volume. This allows the copy volume data to be backed up to a tape device, as a point in time copy of the business data, while normal operations continue.

Advanced Copy Methods

Two types of Advanced Copy methods are supported:

One snapshot copy method (SnapOPC+) and three clone copy methods (EC, OPC and QuickOPC).

Of these types Express supports only the snapshot copy method.

- Snapshot creates a virtual point in time image of the original data.
- Clone make a full (physical) copy of the original data.

SnapOPC+

A function that creates a copy of the data prior to it being updated (Copy-on-Write).

As requires less copy volume capacity compared with clone, SnapOPC+ is ideal for copy operations for systems with relatively few updates such as file servers.

EC (Equivalent Copy)

A function that maintains a synchronized copy of a business data volume on a copy volume (Mirroring method).

The business volume and copy volume are synchronized but can be separated at any required time (mirror suspend). The copy volume can then be backed up to a tape device while business operations continue on the business volume.

Suspend/Resume functions can be used to re-establish the mirror by copying only updated data since the mirror was suspended.

OPC (One Point Copy)

A function that creates a copy of the business data volume at any point in time (Background Copy).

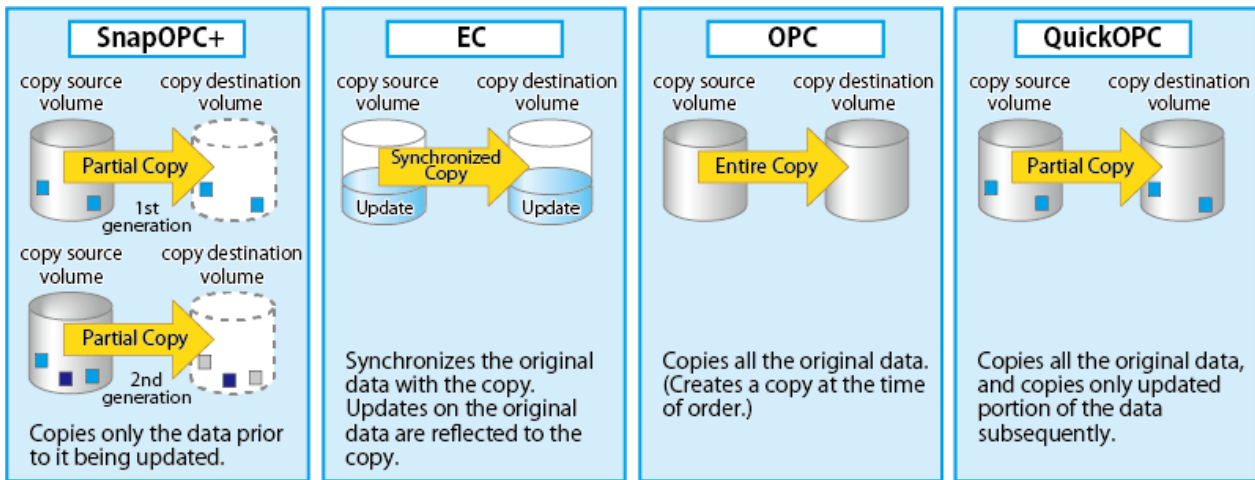
Data on the business volume is copied logically to a copy volume, quickly, as and when required.

The copy volume can be used for backup operation, to a tape device, without waiting for physical copy completion, while business operations can continue on the business volume.

QuickOPC

A function that creates a copy of all the business data volume and subsequently only copies updated data (Background Copy).

This suits large database operation where backup times must be reduced.



These copy methods all provide access to the data as it exists at a specific point in time, but there are different features, advantages and disadvantages to each method as detailed below:

Function Name	Copy Type			
	Snapshot Copy	Clone Copy		
	SnapOPC+	EC	OPC	QuickOPC
Copy method	Copy-on-write method	Mirror breaking method	Background copy method	Background copy method
Timing of actual copy load	-	Before "mirror breaking"	After the copy command is issued	After the copy command is issued
Effect on access to the copy source while copy is running	Yes	None	Minor	Minor
Effect on access to the copy source after copy has "finished"	Yes	None	Slight during background copy	Slight during background copy
Lifetime of copy session	Until session is stopped	Until the Equivalent state is stopped	Until background copy is completed	Until session is stopped and copy is completed
Size of copy destination area	Sufficient for changed areas (Snapshot)	Same as the copy source (Clone)	Same as the copy source (Clone)	Same as the copy source (Clone)
Copy action during restore	Copy back only the already copied data For ETERNUS DX60/ DX60 S2/DX80/DX90, restore operation is not available (use OS tools to copy whole files instead)	- Copy back all the data by OPC - EC Reverse (Suspend -> Reverse -> Resume) only copies updated areas	- If OPC is active, copy back only the already copied data (Restore OPC) - If OPC is completed, copy back all of the copied data	Copy back only the already copied data
Best used for...	- Temporary backup area for backup to tape - Backup to disk for file server and	- Backup to disk - Creation of testing data	- Backup to disk - Creation of testing data	- Backup to disk - Creation of testing data

Function Name	Copy Type			
	Snapshot Copy	Clone Copy		
	SnapOPC+	EC	OPC	QuickOPC
	other low modification rate data (generational management is available)		- Restoring from backup disk	- Recovery from physical disk failure when data modification rate is low



Note

These are generic observations based on the mechanisms involved. Actual effect on servers will depend on the specifics of the usage environment.

A.2 Configuration of Advanced Copy Function

A.2.1 Common Configuration in All Copy Methods

Copy Table Size Settings

Specify the following table size parameters for Advanced Copy. These parameters should be determined based on aggregate copy capacity and number of active sessions (volumes), and then set them using the Web Console, ETERNUS Web GUI, or ETERNUS CLI.

- Copy table size

The copy table size is memory area reserved for meta-data required for Advanced Copy management. Please allocate the this table size in advance.

- Resolution

Resolution represents the amount of data represented by each bit in the copy table. The following table shows the possible values depending on the model:

Device Name	Specifiable Magnification
ETERNUS DX60/DX60 S2 ETERNUS DX80/DX80 S2 ETERNUS DX90/DX90 S2	1(default), 2, 4, 8, 16
ETERNUS DX100 S3/DX200 S3 ETERNUS DX200F	1(default), 2, 4, 8, 16, 32, 64

The default setting of 1 results in minimal internal overhead. Please use the default value unless larger value is required due to the copy capacity.

A.2.2 Configuration of Snapshot Copy

Creating Copy Destination Volumes

When creating copy destination volumes for snapshot copy, note the following:

- The type of a copy destination volume must be SDV.
OPEN, SDPV, standard or TPV cannot be used as a copy destination for snapshot copy.
- The size of a copy destination volume must be the same as that of copy source volume (the original volume).
- When creating an SDV, set the appropriate capacity.

Refer to "Create Volume" in the *ETERNUS SF Web Console Guide* for procedures about creating a copy destination volume.

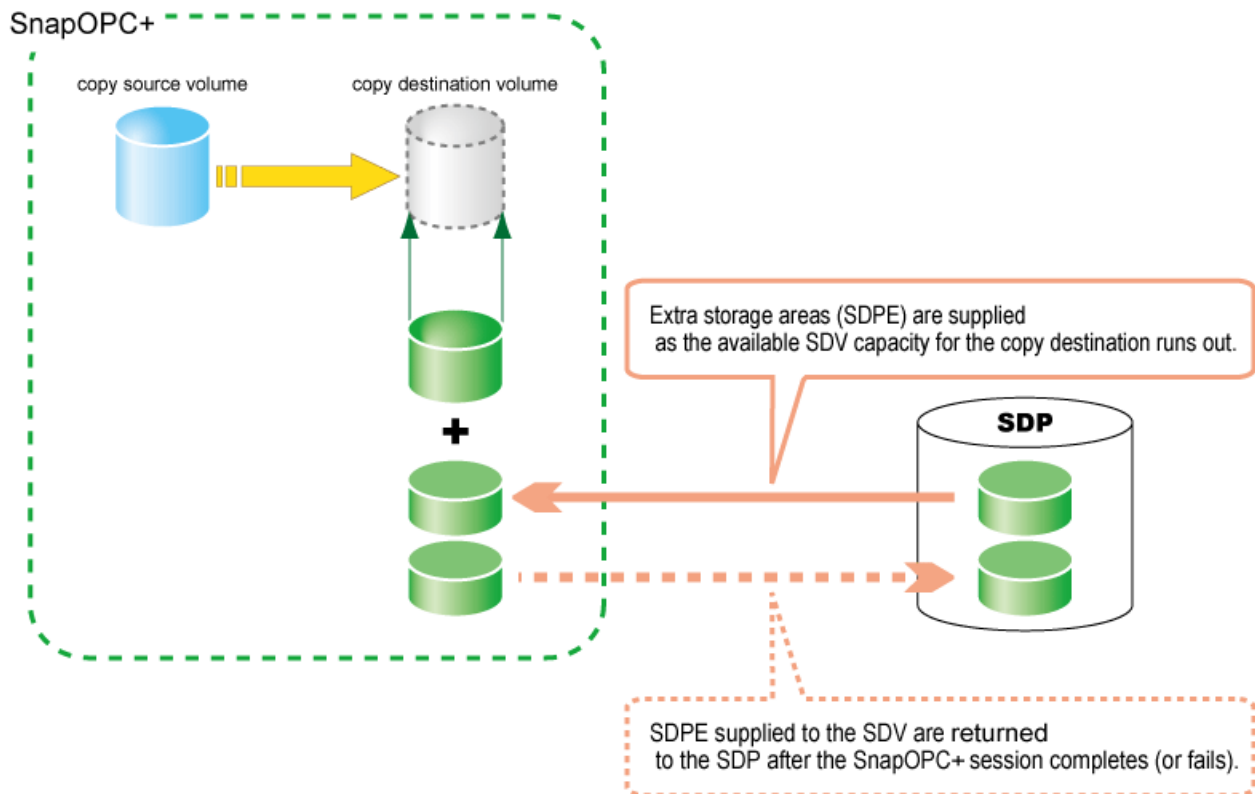
Creating Snap Data Pool (SDP)

Snap Data Pool (SDP) is used for SnapOPC+.

By registering standby storage areas in the SDP, it is possible to supply extra storage areas (SDPE: Snap Data Pool Elements) from the SDP whenever the amount of updates exceeds the capacity of the copy destination SDV, allowing the copy session to continue without failing. For ETERNUS DX80 S2/DX90 S2, DX100 S3/DX200 S3, ETERNUS DX200F, one or more than SDPVs are required.

- If storage area capacity runs short in an SDV, extra storage area (SDPE) is automatically supplied from the SDP.
- Once the copy session is completed, all extra storage area (SDPE) supplied to the SDV is returned to the SDP. (The SDPE is also returned to the SDP if the copy session fails.)

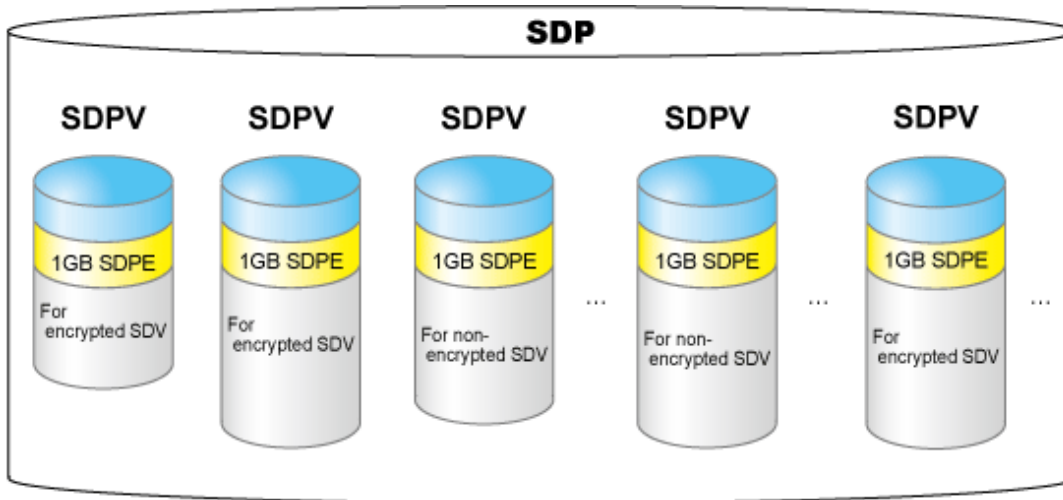
Figure A.1 SDP Concept



When creating copy destination volumes for snapshot, note the following:

- One SDP can be created per ETERNUS Disk storage system.
- SDP becomes available upon creating a dedicated SDPV. After creation, the SDPV is automatically allocated to the SDP.
- If the SDV is encrypted, make sure the SDPV is also encrypted.
- If the ETERNUS Disk storage system contains both encrypted and non-encrypted SDVs, then both encrypted and non-encrypted SDPVs will be needed.
- Estimate the update amounts expected for each copy source volume, then decide the SDV and SDP capacities. If estimation is difficult, try setting up the SDV and SDP with a total capacity of 50% of that of the copy source (note that this is just a rule-of-thumb value and that different operating configurations will require different SDP capacities).

Figure A.2 Construction of SDP



A.3 Snapshot Copy (SnapOPC+)

A.3.1 How SnapOPC+ Eorks

Figure A.3 State Transition for (Normal) SnapOPC+

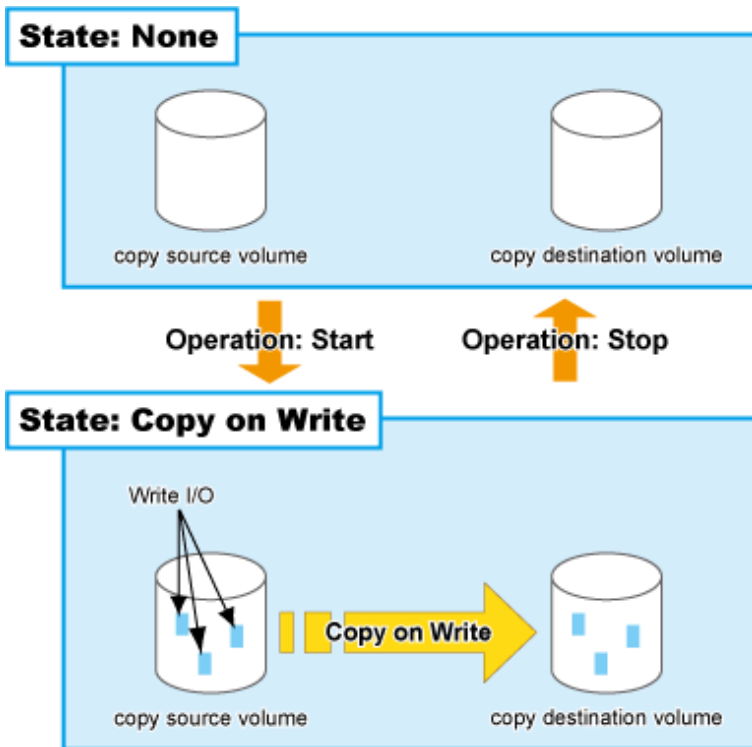


Figure A.4 State Transition Diagram for Dummy SnapOPC+

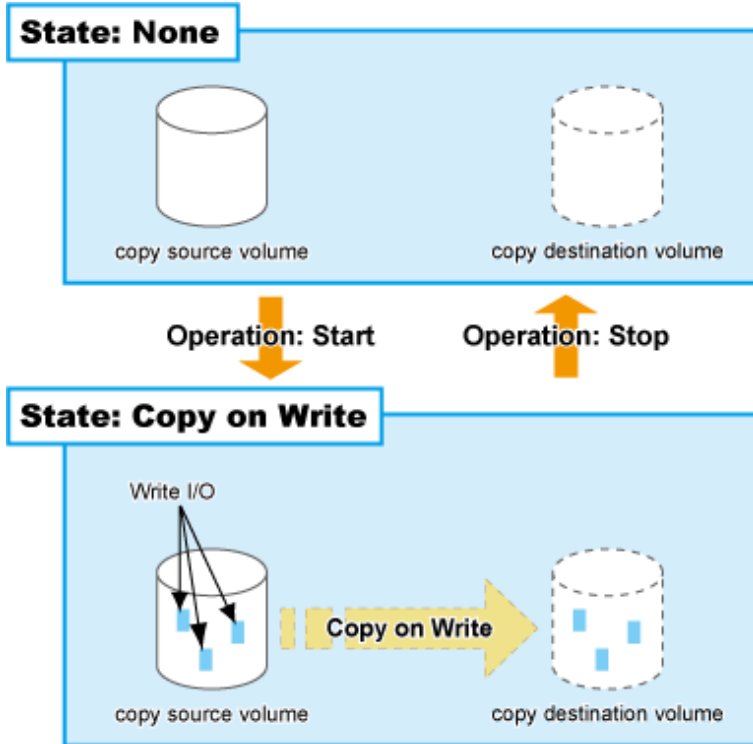


Table A.1 Relationship Between Session Operation and Express Function

Session Operation	Express Function
Start normal SnapOPC+	acsnap start
Start dummy SnapOPC+	acsnap start -estimate
Stop	acsnap cancel

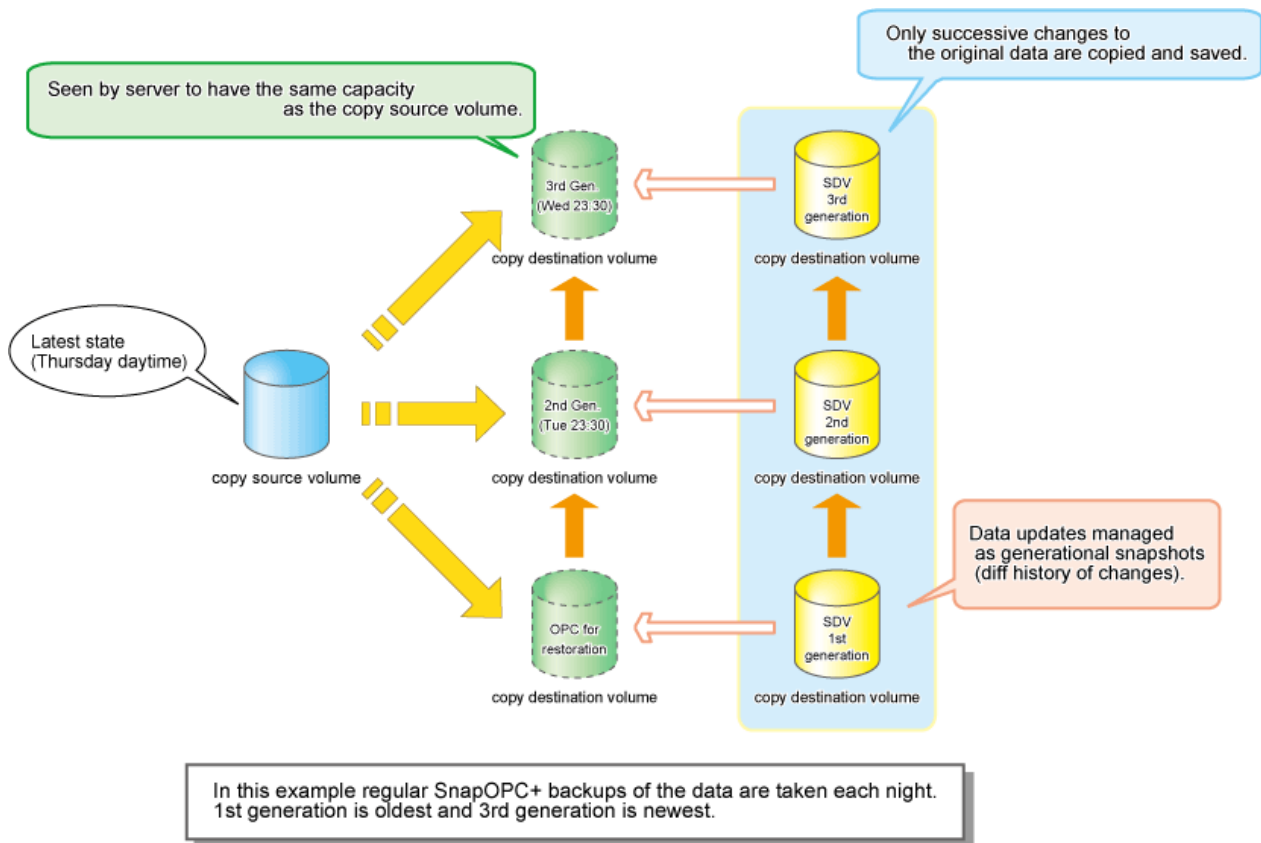
Start

When the SnapOPC+ session is started, the copy-on-write process is started. The maximum number of copy sessions that can be executed with Express is as follows.

Device Name	Maximum Number of Copy Sessions
ETERNUS DX60/DX60 S2/DX80/DX80 S2/DX90/DX90 S2	8
ETERNUS DX100 S3	1024
ETERNUS DX200 S3 ETERNUS DX200F	2048

When a write I/O is issued to the source volume, the copy-on-write process copies the old-data to the copy destination before writing the new data to the source volume. By doing so the copy-on-write process maintains the Point in Time image. This process is an internal background system in the ETERNUS Disk storage system and it is transparent to the host server. The copy destination area becomes accessible after SnapOPC+ session has been started.

- Unlike the Clone methods (OPC, Quick OPC and EC) the physical capacity for the destination need to be large enough to contain updated areas. So the size requirement is typically small.
- When the target volume is being read it needs to reference the original source volume to obtain the unmodified data. This dependence to the source volume means that SnapOPC+ is not suited for persistent or long-term data retention or as a backup data for recovery in case of physical loss of source media.



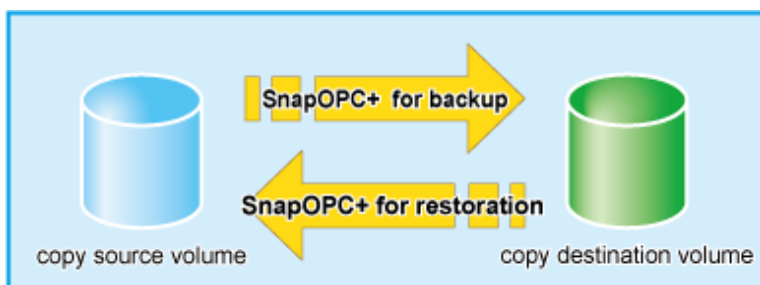
Stop

When the SnapOPC+ session is stopped, the copy-on-write process terminates and all the data saved in the SDV is lost.

If there are older SnapOPC+ sessions than the SnapOPC+ session to stop, it cannot be stopped. Such a SnapOPC+ session can be stopped by using the force option. However, the Stop operation with the force option stops not only the specified SnapOPC+ session but also all the older SnapOPC+ sessions.

A.3.2 Restore

Restoration requires the SnapOPC+ copy destination be mounted by the OS and the target data restored using normal file copying.



Note

Restoration by the SnapOPC+ cannot be performed for ETERNUS DX60/DX60 S2/DX80//DX90. For the restoration, mount the copy destination volume and copy each file on the operating system.

A.3.3 SDV Operations

Table A.2 Relationship Between SDV Operation and Express Function

SDV Operation	Express Function
Monitoring SDV capacity	acsdv stat
Initialize SDV	acsdv init

Monitoring SDV Capacity

If an SDP is not used, the SDV should be monitored on a periodic basis to ensure that adequate remaining capacity leeway is maintained.

Initializing SDV

- Even if no copy sessions are running, programs may write data to SDV. If SDV capacity becomes large, the "Initialize SDV" operation should be performed with ETERNUS Web GUI or ETERNUS CLI.
- When copy session is running, space for SDV or SDP used by the copy session is decreased. In this case, amount of maintaining data may be decreased.

Note that when a Snap Data Volume is initialized, any existing data on it will become inaccessible, so this data should be backed up beforehand, using OS commands.

A.3.4 SDP operation

Table A.3 Relationship Between SDP Operation and Express Function

SDP Operation	Express Function
Monitoring SDP capacity	acsdv poolstat

Monitoring SDP Capacity

If an SDP is used, the SDP should be monitored on a periodic basis to ensure that adequate remaining capacity leeway is maintained.

If the allocatable SDP capacity runs short, this is indicated by e-mail/SNMP Trap notification.

A.4 Eco-mode

Eco Mode based on MAID (Massive Arrays of Idle Disks) can be configured for ETERNUS Disk storage systems.

Performing either of the following controls during a period of time of not accessing disk drives can reduce power consumption, leading to the reduction of loads on environments.

- a. Spindle rotation control of disk drives
- b. Power control of disk drives

The above "b" is recommended. It can reduce power consumption more effectively than the above "a".

The devices that support "b" are shown in ["Table A.4 Devices That Support Power Control of Disk Drives"](#).

Table A.4 Devices That Support Power Control of Disk Drives

Device Name	Firmware Version
ETERNUS DX60 S3	All versions
ETERNUS DX100 S3/DX200 S3	V10L20 or later

Express can monitor the Disk storage systems where the Eco-mode has been enabled.

A.5 Note on Backup and Restore by Express

Express performs backup and restoration regardless of the state of the server to be backed up. Therefore, make sure that both copy source and destination volumes are inaccessible in order to ensure consistency of backup data. For absolute assurance of data consistency, we highly recommend to stop the target server before executing backups and restorations. If the server cannot be suspended, dismount a target volume using the OS function to prevent data within a file cache from being reflected and inhibit access to the target volume.

Appendix B Command References

This appendix explains the commands that are used with Express.

All the command path names listed here are described as those installed in the default installation directory.

Information

How to Use Other Commands:

Express provides other commands besides those described in this manual.

Refer to "Command References" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details.

B.1 storageadm perfdata (Performance Information Management Command)

NAME

storageadm perfdata - Manages performance information

SYNOPSIS

For Windows

```
$INS_DIR\ESC\Manager\opt\FJSVssmgr\sbin\storageadm perfdata export outDirName -ipaddr ipAddr [-recent 24]
```

(\$INS_DIR means "Program Directory" specified at the ETERNUS SF Manager installation.)

For Linux

```
/opt/FJSVssmgr/sbin/storageadm perfdata export outDirName -ipaddr ipAddr [-recent 24]
```

DESCRIPTION

This command outputs one-hour or 24-hour performance information for disk storage system before the command is executed.

By specifying the IP address of a disk storage system whose performance information is output and the time in the command operand, the disk storage system performance information is output in CSV format.

A target disk storage system must be managed by Express and performance monitoring is either still running or already completed.

The details of CSV files are as follows.

Table B.1 CM Performance Information for Disk Storage System

Items	Explanation
File name	CM.csv
Header line	Date, CM0xXX - CPU Use Rate, CM0xXX - Copy Remain, ...
Data line	<p><i>date</i>, <i>CM00u</i>, <i>CM00r</i>, ... , <i>CMNNu</i>, <i>CMNNr</i></p> <p>The following information is output for each field. (After <i>date</i>, the information is repeated for the actual number of CMs.)</p> <p><i>date</i>: Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format)</p> <p><i>CM00u</i>: CM0x00 CPU Load at <i>date</i> (Decimal notation. The unit is %.)</p> <p><i>CM00r</i>: CM0x00 CM Copy remaining amount at <i>date</i>. (Decimal notation. The unit is GB.)</p> <p><i>CMNNu</i>: CM0xNN CPU Load at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>CMNNr</i>: CM0xNN CM Copy remaining amount at <i>date</i>. (Decimal notation. The unit is GB.)</p>

Table B.2 Logical Volume Performance Information for Disk Storage System

Items	Explanation
File name	LogicalVolume/ <i>nnnn</i> .csv (<i>nnnn</i> indicates the Logical Volume 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, LogicalVolume0xXXXX- Read Cache Hit Rate(Extreme Cache), LogicalVolume0xXXXX- Read Cache Hit Rate(DRAM + Extreme Cache), LogicalVolume0xXXXX- Read QoS Delay Time, LogicalVolume0xXXXX- Write QoS Delay Time
Data line	<p><i>date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch, hit-r-extreme-cache, hit-r-dram-extreme-cache, delay-r-qos, delay-w-qos</i></p> <p>The following information is output for each field.</p> <p><i>date</i>: Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format)</p> <p><i>read</i>: Read Count at <i>date</i>. (Decimal notation. The unit is IOPS.)</p> <p><i>write</i>: Write Count at <i>date</i>. (Decimal notation. The unit is IOPS.)</p> <p><i>through-r</i>: Read data transfer rate at <i>date</i>. (Decimal notation. The unit is MB/s.)</p> <p><i>through-w</i>: Write data transfer rate at <i>date</i> (Decimal notation. The unit is MB/s.)</p> <p><i>resp-r</i>: Read Response Time at <i>date</i>. (Decimal notation. The unit is msec.)</p> <p><i>resp-w</i>: Write Response Time at <i>date</i>. (Decimal notation. The unit is msec.)</p> <p><i>hit-r</i>: Read Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>hit-w</i>: Write Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>fetch</i>: Read Pre-fetch Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>hit-r-extreme-cache</i>: Read Cache Hit Rate at <i>date</i>. (Extreme Cache) (Decimal notation. The unit is %.) (*1, *2)</p> <p><i>hit-r-dram-extreme-cache</i>: Read Cache Hit Rate at <i>date</i>. (DRAM + Extreme Cache) (Decimal notation. The unit is %.) (*1, *2)</p> <p><i>delay-r-qos</i>: Read QoS Delay Time at <i>date</i>. (Decimal notation. The unit is msec.) (*3)</p> <p><i>delay-w-qos</i>: Write QoS Delay Time at <i>date</i>. (Decimal notation. The unit is msec.) (*3)</p>

*1: For a device that does not support Extreme Cache performance information, a value will not be output and instead a series of commas will be output.

```
Example: For a device that does not support Extreme Cache performance information
...,hit-r-extreme-cache,hit-r-dram-extreme-cache
.....
```

*2: When this function is disabled for a device that supports Extreme Cache performance information, "0" will be output.

```
Example: For a device that supports Extreme Cache performance information (function disabled)
...,hit-r-extreme-cache,hit-r-dram-extreme-cache
...,0,0
```

*3: For a device that does not support Host-LU QoS performance information (QoS Delay Time), a value will not be output and instead a series of commas will be output.

```
Example: For a device that does not support Host-LU QoS performance information
...,delay-r-qos,delay-w-qos
.....
```


Table B.3 RAID Group Performance Information for Disk Storage System

Items	Explanation
File name	RAIDGroup/ <i>nnnn</i> .csv (<i>nnnn</i> indicates the RAID Group number by hexadecimal notation.)
Header line	Date, RAIDGroup0x <i>XXXX</i> - Read IOPS, RAIDGroup0x <i>XXXX</i> - Write IOPS, RAIDGroup0x <i>XXXX</i> - Read Throughput, RAIDGroup0x <i>XXXX</i> - Write Throughput, RAIDGroup0x <i>XXXX</i> - Read Response Time, RAIDGroup0x <i>XXXX</i> - Write Response Time, RAIDGroup0x <i>XXXX</i> - Read Cache Hit Rate, RAIDGroup0x <i>XXXX</i> - Write Cache Hit Rate, RAIDGroup0x <i>XXXX</i> - Prefetch Cache Hit Rate, RAIDGroup0x <i>XXXX</i> - Read Cache Hit Rate(Extreme Cache), RAIDGroup0x <i>XXXX</i> - Read Cache Hit Rate(DRAM + Extreme Cache), RAIDGroup0x <i>XXXX</i> - Read QoS Delay Time, RAIDGroup0x <i>XXXX</i> - Write QoS Delay Time
Data line	<p><i>date,read,write,through-r,through-w,resp-r,resp-w,hit-r,hit-w,fetch, hit-r-extreme-cache, hit-r-dram-extreme-cache, delay-r-qos, delay-w-qos</i></p> <p>The following information is output for each field.</p> <p><i>date</i>: Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format)</p> <p><i>read</i>: Read Count at <i>date</i>. (Decimal notation. The unit is IOPS.)</p> <p><i>write</i>: Write Count at <i>date</i>. (Decimal notation. The unit is IOPS.)</p> <p><i>through-r</i>: Read data transfer rate at <i>date</i>. (Decimal notation. The unit is MB/s.)</p> <p><i>through-w</i>: Write data transfer rate at <i>date</i>. (Decimal notation. The unit is MB/s.)</p> <p><i>resp-r</i>: Read Response Time at <i>date</i>. (Decimal notation. The unit is msec.)</p> <p><i>resp-w</i>: Write Response Time at <i>date</i>. (Decimal notation. The unit is msec.)</p> <p><i>hit-r</i>: Read Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>hit-w</i>: Write Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>fetch</i>: Read Pre-fetch Cache Hit Rate at <i>date</i>. (Decimal notation. The unit is %.)</p> <p><i>hit-r-extreme-cache</i>: Read Cache Hit Rate at <i>date</i>. (Extreme Cache) (Decimal notation. The unit is %.) (*1, *2)</p> <p><i>hit-r-dram-extreme-cache</i>: Read Cache Hit Rate at <i>date</i>. (DRAM + Extreme Cache) (Decimal notation. The unit is %.) (*1, *2)</p> <p><i>delay-r-qos</i>: Read QoS Delay Time at <i>date</i>. (Decimal notation. The unit is msec.) (*3)</p> <p><i>delay-w-qos</i>: Write QoS Delay Time at <i>date</i>. (Decimal notation. The unit is msec.) (*3)</p>

*1: For a device that does not support Extreme Cache performance information, a value will not be output and instead a series of commas will be output.

```
Example: For a device that does not support Extreme Cache performance information
...,hit-r-extreme-cache,hit-r-dram-extreme-cache
.....
```

*2: When this function is disabled for a device that supports Extreme Cache performance information, "0" will be output.

```
Example: For a device that supports Extreme Cache performance information (function disabled)
...,hit-r-extreme-cache,hit-r-dram-extreme-cache
...,0,0
```

*3: For a device that does not support Host-LU QoS performance information (QoS Delay Time), a value will not be output and instead a series of commas will be output.

```
Example: For a device that does not support Host-LU QoS performance information
...,delay-r-qos,delay-w-qos
.....
```

Table B.4 Disk Performance Information for Disk Storage System

Items	Explanation
File name	Disk/ <i>nnnn</i> .csv (<i>nnnn</i> indicates the DE number by hexadecimal notation.)
Header line	Date, DE0xXX:DiskX - busy time, ...
Data line	<i>date</i> , <i>Disk0</i> , ... , <i>DiskN</i> The following information is output for each field. (After <i>date</i> , the information is repeated for the actual number of Disks.) <i>date</i> : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) <i>Disk0</i> : Disk0 Disk busy rate at <i>date</i> . (Decimal notation. The unit is %.) <i>DiskN</i> : DiskN Disk busy rate at <i>date</i> . (Decimal notation. The unit is %.)

Table B.5 CA/CM Port Performance Information for Disk Storage System

Items	Explanation
File name	Port/ <i>nnnn</i> .csv (<i>nnnn</i> 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	<i>date</i> , <i>read</i> , <i>write</i> , <i>through-r</i> , <i>through-w</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) <i>read</i> : Read Count at <i>date</i> . (Decimal notation. The unit is IOPS.) <i>write</i> : Write Count at <i>date</i> . (Decimal notation. The unit is IOPS.) <i>through-r</i> : Read data transfer rate at <i>date</i> . (Decimal notation. The unit is MB/s.) <i>through-w</i> : Write data transfer rate at <i>date</i> . (Decimal notation. The unit is MB/s.)

Table B.6 Performance Information for Disk Storage System Active Disks

Items	Explanation
File name	ACTIVE_DISK.csv
Header line	Date, Total Disks, Active Disks
Data line	<i>date</i> , <i>total</i> , <i>active</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) <i>total</i> : Overall number of loaded disk devices at <i>date</i> . (Decimal notation. The unit is Disk.) <i>active</i> : Overall number of active disk devices at <i>date</i> . (Decimal notation. The unit is Disk.)

Table B.7 Power Consumption Performance Information for Disk Storage System

Items	Explanation
File name	SYSTEM_POWER_CONSUMPTION.csv
Header line	Date, System Power Consumption
Data line	<i>date, power</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) <i>power</i> : Power used by the device as a whole at <i>date</i> . (Decimal notation. The unit is W.)

Table B.8 Temperature Performance Information for Disk Storage System

Items	Explanation
File name	SYSTEM_TEMPERATURE.csv
Header line	Date, System Temperature
Data line	<i>date, temperature</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) <i>temperature</i> : Air intake temperature at device at <i>date</i> . (Decimal notation. The unit is degrees Centigrade.)

Table B.9 Storage Device NAS System Performance Information

Items	Explanation
File name	NAS/System/ <i>nnnn</i> .csv (<i>nnnn</i> indicates the CM number by hexadecimal notation.)
Header line	Date, CM0xXX - CPU Use Rate, CM0xXX - CIFS Operations, CM0xXX - NFS Operations
Data line	<i>date, CMuse, CMcifs, CMnfs</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) <i>CMuse</i> : CPU usage rate within the CM at <i>date</i> (Decimal notation. The unit is %.) <i>CMcifs</i> : Number of CIFS processes within CM at <i>date</i> (Decimal notation. The unit is ops/s.) <i>CMnfs</i> : Number of NFS processes within CM at <i>date</i> (Decimal notation. The unit is ops/s.)

Table B.10 Storage Device NAS Volume Performance Information

Items	Explanation
File name	NAS/LogicalVolume/ <i>nnnn</i> .csv (<i>nnnn</i> indicates the LogicalVolume number by hexadecimal notation.)
Header line	Date, LogicalVolume0xXXXX - Read Throughput, LogicalVolume0xXXXX - Write Throughput
Data line	<i>date, through-r, through-w</i> The following information is output for each field. <i>date</i> : Performance Information Acquisition Time (YYYY/MM/DD hh:mm:ss format) <i>through-r</i> : Read data transfer rate at <i>date</i> (Decimal notation. The unit is MB/s.) <i>through-w</i> : Write data transfer rate at <i>date</i> (Decimal notation. The unit is MB/s.)

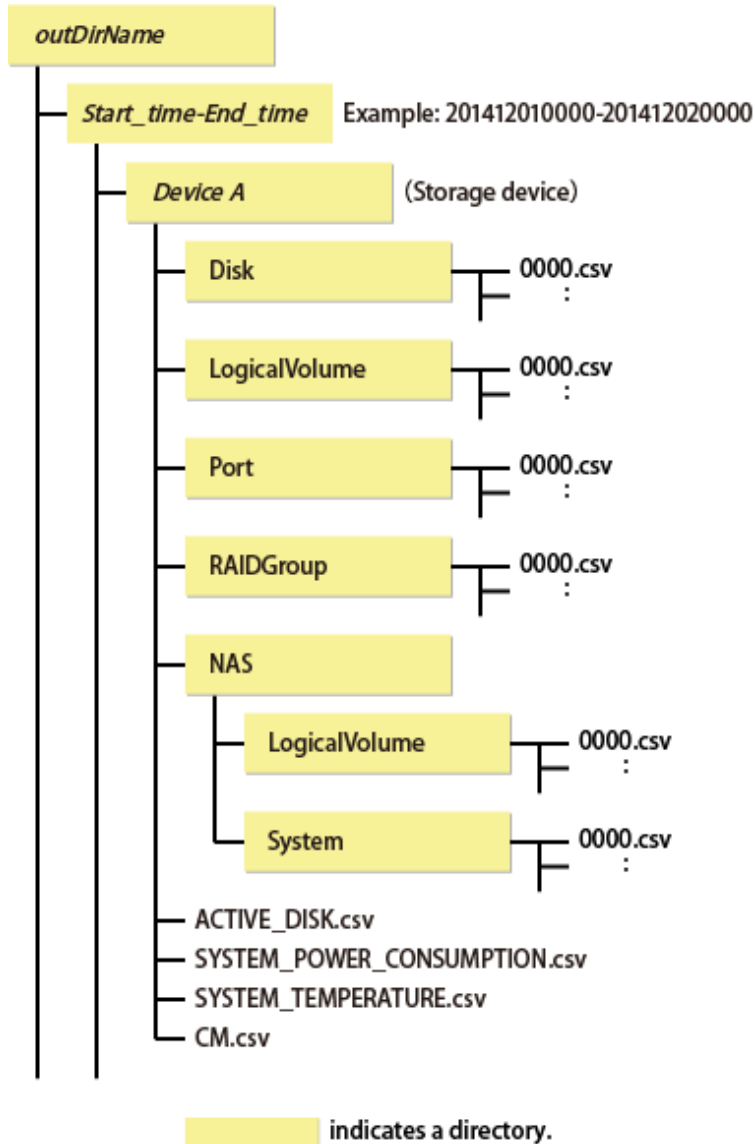
OPERANDS

export

Outputs performance information for the specified time in CSV format.

outDirName

Specify the directory that outputs performance information.
Performance information is output to the *outDirName* directory based on the following configuration.



The following free space (unit: MB) is required for this directory.

```
((0.1 + 0.4 * installed DEs + 0.1 * installed CM ports + 0.2 * (LUs + RAID groups)) * 1440) + (0.2 + 0.6 * installed DEs + 0.2 * installed CM ports + 0.4 * (LUs + RAID groups)) / 1024
```

OPTIONS

-ipaddr *ipAddr*

This option specifies the IP address of the device that outputs performance information.

The output target device must satisfy the following conditions:

- Storage devices output performance information must be registered in this software.

Refer to "Performance management" for the settings of performance monitoring.

-recent 24

This option collects the latest 24-hour performance data.

If this option is skipped, the latest 1-hour performance data is collected.

EXAMPLES

For Windows

Output of performance information for a device with IP address 10.12.13.14 to the c:\work directory:

```
> C:\ETERNUS_SF\ESC\Manager\opt\FJSVssmgr\sbin\storageadm perfdata export "C:\work" -ipaddr 10.12.13.14
```

For Linux

Output of performance information for a device with IP address 10.12.13.14 to the /tmp directory:

```
# /opt/FJSVssmgr/sbin/storageadm perfdata export /tmp -ipaddr 10.12.13.14
```

NOTES

The full path of an existing directory must be specified in *outDirName*.

B.2 esfsnap (Express's Manager Troubleshooting Information Collection Command)

NAME

esfsnap - Collects the troubleshooting information of the Express's manager

SYNOPSIS

For Windows

```
$INS_DIR\Common\bin\esfsnap -dir dirName [-all]
```

(\$INS_DIR means "Program Directory" specified at the ETERNUS SF Manager installation.)

For Linux

```
/opt/FJSVesfcm/bin/esfsnap -dir dirName [-all]
```

DESCRIPTION

This command collects the troubleshooting information of the Express's manager on the Management Server when a problem occurs. Only user of OS administrative group can execute this command.

Please send the collected data to Fujitsu Technical Support.

OPTIONS

-dir *dirName*

For Windows

Specify a directory where the troubleshooting data is stored. It is necessary to specify the full path name that begins with a drive letter for *dirName*.

The maximum length that can be specified for *dirName* is 70 bytes.

The collected troubleshooting data are stored in the directory which its name begins with "esfsnap_". Before executing this command, please check 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

For Linux

Specify a directory where the troubleshooting data is stored. It is necessary to specify the full path name for *dirName*.

The collected troubleshooting data are created as the file which its name begins with "esfsnap_". Before executing this command, please check 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 data on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

For Windows

Collecting the troubleshooting data for initial investigation on D:\temp directory.

```
> C:\ETERNUS_SF\Common\bin\esfsnap -dir D:\temp
```

For Linux

Collecting the troubleshooting data for initial investigation on /tmp directory.

```
# /opt/FJSVesfcm/bin/esfsnap -dir /tmp
```

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