FUJITSU Storage
ETERNUS SF
Express V16.0/ Storage Cruiser V16.0/ AdvancedCopy Manager V16.0

Quick Reference

Preface

Purpose

This manual describes the pre-installation requirements, installation procedure, configuration procedure, as well as the first use of the following three products of the FUJITSU Storage ETERNUS SF:

- FUJITSU Storage ETERNUS SF Express (hereafter referred to as "Express")

- FUJITSU Storage ETERNUS SF Storage Cruiser (hereafter referred to as "Storage Cruiser")

- FUJITSU Storage ETERNUS SF AdvancedCopy Manager (hereafter referred to as "AdvancedCopy Manager")

Intended Readers

This manual is intended for people planning installation or installing the above products for the first time. A basic knowledge of clustered systems and server virtualization is advised to fully understand this manual.

In the case of upgrade from a previous version to the latest version, refer to the *ETERNUS SF Migration Guide*.

Organization

This manual is composed as follows:

Part 1 Express

Part 2 Storage Cruiser

Part 3 AdvancedCopy Manager

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 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	Windows Server 2003	Windows
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	

Formal Name	Abbreviation	
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) AS (v.4 for x86) Red Hat(R) Enterprise Linux(R) AS (v.4 for EM64T)	RHEL-AS4	Linux
Red Hat(R) Enterprise Linux(R) ES (v.4 for x86) Red Hat(R) Enterprise Linux(R) ES (v.4 for EM64T)	RHEL-ES4	
Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	RHEL5	
Red Hat(R) Enterprise Linux(R) 6 (for x86) Red Hat(R) Enterprise Linux(R) 6 (for Intel64)	RHEL6	
SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T	SUSE Linux Enterprise Server 11	
HP-UX 11i HP-UX 11i v2 HP-UX 11i v3	HP-UX	
AIX(R) V6.1 AIX(R) V7.1	AIX	
VMware vSphere(R) 4 Essentials Kit VMware vSphere(R) 4 Essentials Plus Kit VMware vSphere(R) 4 Standard Edition(TM) VMware vSphere(R) 4 Standard Plus Data Recovery VMware vSphere(R) 4 Advanced Edition(TM) VMware vSphere(R) 4 Enterprise Edition(TM) VMware vSphere(R) 4 Enterprise Plus Edition(TM)	VMware vSphere 4	VMware
VMware vSphere(R) 5 Essentials Kit VMware vSphere(R) 5 Essentials Plus Kit VMware vSphere(R) 5 Standard Edition(TM) VMware vSphere(R) 5 Standard Plus Data Recovery VMware vSphere(R) 5 Enterprise Edition(TM) VMware vSphere(R) 5 Enterprise Plus Edition(TM)	VMware vSphere 5	

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

FUJITSU Storage ETERNUS

Formal Name	Abbreviation		
FUJITSU Storage ETERNUS DX60/DX60 S2 FUJITSU Storage ETERNUS DX80/DX80 S2 FUJITSU Storage ETERNUS DX90/DX90 S2	-		ETERNUS Disk storage system
FUJITSU Storage ETERNUS DX100 S3 FUJITSU Storage ETERNUS DX200 S3			
FUJITSU Storage ETERNUS DX410 FUJITSU Storage ETERNUS DX440	ETERNUS DX400 series	ETERNUS DX400/ DX400 S2 series	
FUJITSU Storage ETERNUS DX410 S2 FUJITSU Storage ETERNUS DX440 S2	ETERNUS DX400 S2 series		
FUJITSU Storage ETERNUS DX500 S3 FUJITSU Storage ETERNUS DX600 S3	-		
FUJITSU Storage ETERNUS DX8100 FUJITSU Storage ETERNUS DX8400 FUJITSU Storage ETERNUS DX8700	ETERNUS DX8000 series	ETERNUS DX8000/ DX8000 S2 series	
FUJITSU Storage ETERNUS DX8100 S2 FUJITSU Storage ETERNUS DX8700 S2	ETERNUS DX8000 S2 series		
FUJITSU Storage ETERNUS LT20/LT20 S2 FUJITSU Storage ETERNUS LT40/LT40 S2 FUJITSU Storage ETERNUS LT60/LT60 S2 FUJITSU Storage ETERNUS LT200 FUJITSU Storage ETERNUS LT210 FUJITSU Storage ETERNUS LT220 FUJITSU Storage ETERNUS LT230 FUJITSU Storage ETERNUS LT250 FUJITSU Storage ETERNUS LT270/LT270 S2	ETERNUS Tape library		
FUJITSU Storage ETERNUS DX200F	-		
FUJITSU Storage ETERNUS Multipath Driver	ETERNUS Multipath Driver		

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

Software Products

Formal Name	Abbreviation
Microsoft(R) Internet Explorer(R)	Internet Explorer
Mozilla(R) Firefox(R)	Firefox
Microsoft(R) Cluster Service	MSCS
Microsoft(R) Windows Server(R) Failover Clustering	WSFC
Microsoft(R) Exchange Server	Exchange Server
Microsoft(R) SQL Server(R)	SQL Server
VMware(R) ESX(R)	VMware ESX
VMware(R) ESXi(TM)	VMware ESXi
VMware(R) vCenter(TM) Server	VMware vCenter Server or vCenter Server
FUJITSU Software PRIMECLUSTER Global Disk Services	GDS
FUJITSU Software PRIMECLUSTER Global File Services	GFS
FUJITSU Software Symfoware Server Enterprise Extended Edition FUJITSU Software Symfoware Server Enterprise Edition	Symfoware

Manuals

Formal Name	Abbreviation
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Quick Reference	ETERNUS SF Quick Reference
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Release Notes	ETERNUS SF Release Notes
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Installation and Setup Guide	ETERNUS SF Installation and Setup Guide
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Migration Guide	ETERNUS SF Migration Guide
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Web Console Guide	ETERNUS SF Web Console Guide
FUJITSU Storage ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Cluster Environment Setup Guide	ETERNUS SF Cluster Environment Setup Guide
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Messages	ETERNUS SF Messages
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser Event Guide	ETERNUS SF Event Guide
FUJITSU Storage ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF 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".

- In this document, unless there is a special explanatory note, ETERNUS DX200 S3 indicates ETERNUS DX200 S3 and ETERNUS DX200F. In addition, ETERNUS Disk storage system includes ETERNUS DX200F All Flash Arrays.
  However, the following functions are not supported in ETERNUS DX200F:

    - 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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Notes

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Update History

Content of Update	Updated Section	Revision
The information related to ETERNUS DX200F was described.	"Others" in Preface	1.1

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.

When to Read	Related Manuals (Abbreviated)	Related Products (*1)			Explanation
		EXP	SC	ACM	
During operation	Operation Guide	Yes	Yes	Yes	This manual is unique for each product. The following manuals are available: - 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
	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	- Product overview - Installation decision - Overview of the necessary tasks from installation to first use	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.
	AdvancedCopy Manager Overview	- Main functions - Linkable applications - Procedure overview for Advanced Copy of ETERNUS Disk storage system	
Confirming the updated contents	Release Notes	- 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.

Purpose	Manual	Main Contents	How to Read
Deciding if a version upgrade is required	Migration Guide	- 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 Setting up operating environment depending on purpose	Installation and Setup Guide	- Operating environment - Installation procedure - Setup procedure - Uninstallation procedure	Please read if you want to install and setup the product.
	Cluster Environment Setup Guide	- 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	- 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	- Starting and stopping the software - Device monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
	Storage Cruiser Operation Guide for Optimization Function	- 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) AdvancedCopy Manager Operation Guide (for Solaris)	- Starting and stopping the software - Data backup/restore inside the storage system	

Purpose	Manual	Main Contents	How to Read
	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	- Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
	Web Console Guide	- 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	- 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	- Phenomenon of event - Countermeasures	Please read if you need to find a practical way of investigating and dealing with events.
Researching the meaning of specific terms related to the products and other important terms	Glossary	- Product specific terminology explanation - Explanation of important terminology appearing in the manual - Synonyms and related terms - Proper form of abbreviated terms	Please read if you want to learn the meaning of important terms, product specific terms or abbreviations used in the manuals.

Contents

Part 1   Express

Chapter 1 Overview of Express

This chapter is an overview of Express.

1.1 Function Overview

Express makes storage management less difficult thanks to the following functions:

- Easy configuration and expansion

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

- Easy operation

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

  The Web Console allows Express operation directly from a Web browser.

- 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.

Furthermore, Express provides access to the Advanced Copy function of ETERNUS Disk storage system. The Advanced Copy function allows high speed copy of a business volume at anytime.

See
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Refer to "Overview" in the *ETERNUS SF Express Operation Guide* for information on the functions provided by Express.
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1.2 Product Structure

Express is made of the following program.

Table 1.1 Express Software Components and Supported OS

No.	Program Name	Function Overview	Supported Operating Systems (A=Available, N/A=Not Available)				
			Windows	Solaris	Linux	HP-UX	AIX
1	ETERNUS SF Manager	Manages the storage system	A	N/A	A	N/A	N/A

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After installation of ETERNUS SF Manager, if ETERNUS SF Manager is set up as the Express's manager, it is possible to use Express. Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the version level of the supported operating systems.
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In this manual, the server where ETERNUS SF Manager is installed is referred as the "Management Server", and a server managed by the Management Server is referred as "Managed Server".

1.3 Supported Hardware

The following hardware can be managed with Express:

Table 1.2 Supported Hardware

Type	Device Name
Storage device	ETERNUS DX60/DX60 S2 ETERNUS DX80/DX80 S2 ETERNUS DX90/DX90 S2 ETERNUS DX100 S3/DX200 S3

1.4 Operating Environment Models

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 Manager and Web Console are operated on the same server.

Figure 1.1 Example of Basic System Configuration
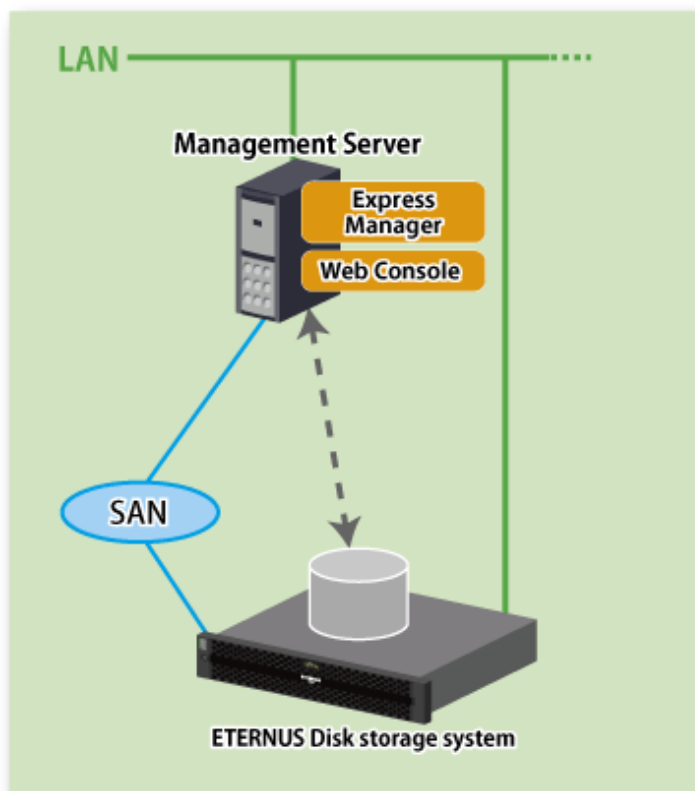
Express Manager and Web Console can be operated on different servers. In this environment, Web Console accesses Express Manager over the network (HTTPS connection).

System Configuration Using the 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/DX60 S2/DX80/DX90	A	All versions	N/A	-
ETERNUS DX80 S2/DX90 S2 ETERNUS DX100 S3/DX200 S3	A	All versions	A	All versions

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

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 1.2 Example of System Configuration Using Copy Command via SAN
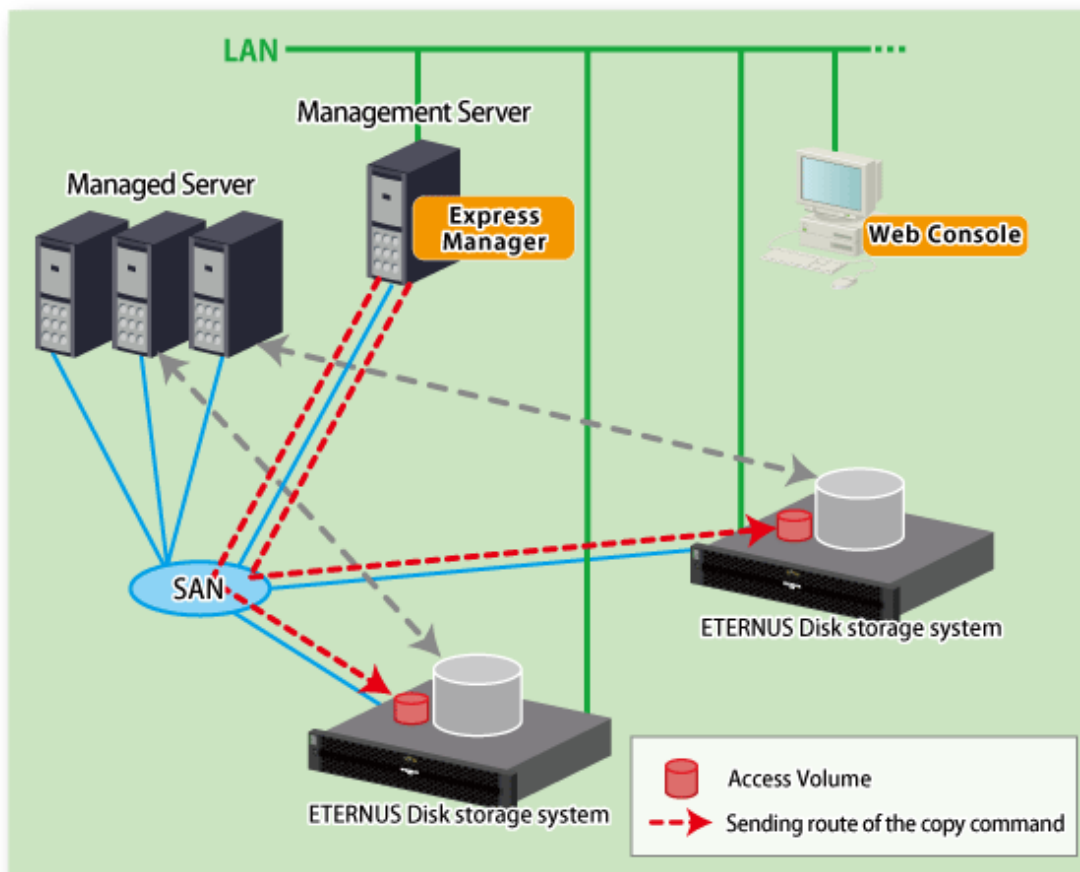
When using the Copy command via LAN method, no access volume is needed.

Figure 1.3 Example of System Configuration Using Copy Command via LAN
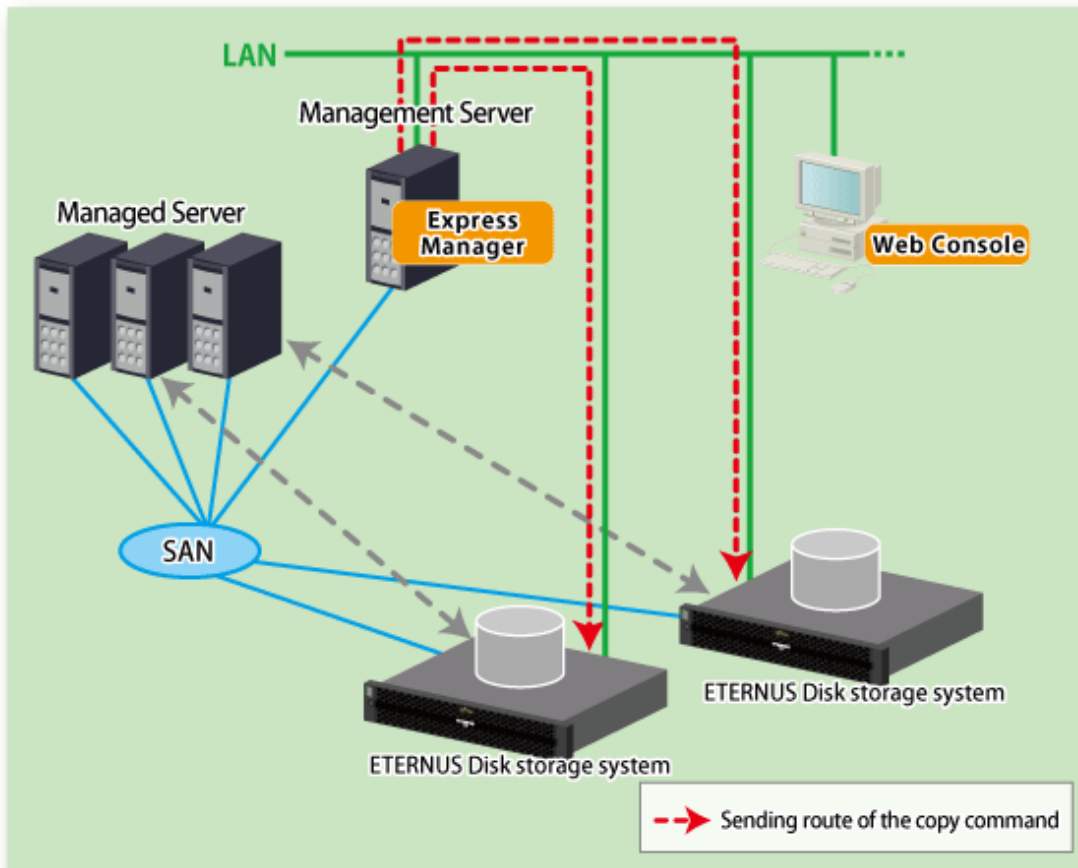
NAS Management of ETERNUS Disk Storage System

ETERNUS SF allows you to use diverse functions to manage the NAS file systems of the ETERNUS Disk storage system connected to the Management Server by Management LAN.
Express provides management functions for NAS environment.

Perform NAS environment management from the Management Server or Web Console.

Refer to the *ETERNUS SF Express Operation Guide* for the overview of management functions for NAS environment and its operational procedure.

Chapter 2 System Design Before Express Installation

This chapter explains the system design required before Express installation.

Before reading this chapter, check the cautions and limitations mentioned in the software guide.

2.1 Choosing Management Server

Express's manager has to process requests from the Web Console as well as various events and data acquisition coming from the managed hardware. To avoid interferences from other software or insufficient physical resources and ensure smooth operations, it is recommended to install Express on its own dedicated server.

If a dedicated server cannot be secured, the Management Server should be chosen according to the following requirements:

Impact on Business Applications

On a server running business applications (hereafter described as "business server"), Express's manager operations will likely have an impact on other applications performance. If the candidate server is a mission critical server running financial, distribution or public utilities applications, the decision to install Express's manager must be evaluated with extra caution.

Impact on Other Guest OS (for Virtual Server Environment)

In a virtual server environment, the physical server resources (CPU, memory, and network) are shared by multiple guest OS. Therefore, the operations of a guest OS have an impact on the other guest OS performance. Before installing Express's manager on a guest OS, usage of physical resources and role of other guest OS must be evaluated carefully.

Incompatible Software

Express's manager cannot run on the same server concurrently to certain other software (hereafter described as "incompatible software"). A server with no incompatible software must be selected.

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Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the incompatible software.
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2.2 Collecting Information Required for Installation

When Express is installed, the following information items are required:

Items	Required Information
License	- Software license to use Express
Server	- Server name - Server IP address - Type of connection between the server and the storage systems - HBA host ID
Storage device	- IP address of storage device - User name and password for storage device - SNMP community name
Volume	- Volume name - Volume capacity - Volume type - Number of volumes to create

Items	Required Information
RAID Group	- RAID group name - RAID level - CM number - Number of disks in the RAID group
Advanced Copy function	- Copy table size - Proportion
E-mail	- Destination E-mail addresses - Source E-mail address - IP address and port number of the SMTP server
Host interface	- Host interface type - iSCSI name and IP address of the corresponding port - Use of Host affinity or not

 See
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Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the license.
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Chapter 3 Express Installation and Setup

This chapter explains the installation and setup procedures of Express.

In case of update from a previous version to the latest version, refer to the *ETERNUS SF Migration Guide*.

3.1 Overview of Installation Procedure

The ETERNUS SF Manager must be installed to use Express.
The overview of the installation procedure of ETERNUS SF Manager is shown below.

1. Check if the target server satisfies the hardware and software requirements for the ETERNUS SF Manager installation.

   Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the ETERNUS SF Manager.

   Refer to "Installation of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

3.2 Setup Overview

The overview of the procedure for setting up the ETERNUS SF Manager as the Express Manager is shown below.
Refer to "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure.

1. Create and register a user account that will be using Express.

   The possible operations by the user are dependent on the level of permission the user account is given. The following table describes the differences:

ESF Admin Role	OS Administrator Privilege	
	Yes	No
Yes	Operations are possible from the Web Console and the command line.	Operations are possible only from the Web Console.
No	Operations are possible only from the command line.	Operations are neither possible from the Web Console nor from the command line.

   ### 🅿 Point
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   - On systems using Single Sign-on, a created user account should be registered in the corresponding account authentication system so that the user can login to the Management Server.
     For example, on the Windows environment, if the Management Server belongs to an Active Directory domain, the user must be added to the Active Directory domain.

   - Commands can be executed only by users with OS administrator privileges or users belonging to the OS administrators group.
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2. Set up the firewall.

   The firewall must be set up so that the remote PC where the Web Console will be used can connect to the Management Server.

3. Launch the Web Console, and then check that the user registered by step 1 can login to the Management Server from the Web Console.

   Refer to "Supported Web Browsers" in the *ETERNUS SF Web Console Guide* for the version level of the supported web browsers.

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From the "Chapter 4 Configuration of Express Operating Environment" chapter on, the described tasks are supposed to be performed from the Web Console. Before proceeding, it is therefore important to check that Express can actually be operated from the Web Console.

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Chapter 4 Configuration of Express Operating Environment

This chapter explains how to configure the Express operating environment.

4.1 Configuring the Network Environment

If a firewall is installed between the Management Server and the Managed Server, or between the Management Server and the Managed device, the network environment must be setup so that the SNMP Traps emitted by the Managed device or the Managed Server can be sent to the Management Server.

Refer to the following section in the *ETERNUS SF Installation and Setup Guide* for information on the procedures.
"Setup of ETERNUS SF Manager" -> "Setup of Express's manager" -> "Configuring the network environment"

4.2 Setting the Storage System

The following procedure is required to set up the storage devices managed with Express:

1. Set the following properties for the storage devices to manage and then register them in Express.

   - IP address of the Management Server

   - Enable the SNMP function of MNT port

   - Created SSH server key (for ETERNUS DX80 S2/DX90 S2/DX100 S3/DX200 S3 only)

   - Created Software Role Account (for ETERNUS DX80 S2/DX90 S2/DX100 S3/DX200 S3 only)

   - SNMP community name (for ETERNUS DX80 S2/DX90 S2/DX100 S3/DX200 S3 only)

   Refer to "Registering disk storage systems" in the *ETERNUS SF Express Operation Guide* for information on the procedure.

2. Register the Managed Servers used for ETERNUS Disk storage system in Express.

   Refer to "Registering servers" in the *ETERNUS SF Express Operation Guide* for information on the procedure.

3. Create RAID groups in ETERNUS Disk storage system managed by Express.

   Refer to "Create RAID Group" in the *ETERNUS SF Web Console Guide* for information on the procedure.

4. Create volumes in ETERNUS Disk storage system.

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

5. Assign volumes in ETERNUS Disk storage system to Managed Servers.

   Refer to "Volume allocation wizard" of "Environment configuration using wizard" in the *ETERNUS SF Express Operation Guide* for information on the procedure.

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Steps from 2 to 5 of the above procedure are supported by a wizard in Express to make them easier. Refer to "Storage configuration wizard" in "Environment configuration using wizard" in the *ETERNUS SF Express Operation Guide* for information on the wizard.
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4.3 Checking the SNMP Trap Reception

The purpose of the SNMP Trap test is to check that events generated by the storage devices are properly displayed in Express's manager.

Refer to "Event notification test" in the *ETERNUS SF Express Operation Guide* for information on the procedure.

If the system is operated in a state where events cannot be displayed, problems will not be detected or detected too late and create a possibility that the system will not work properly. It is therefore important to check that the events generated by the storage devices are properly displayed.

4.4 Configuring the Advanced Copy

If you use the Advanced Copy function of ETERNUS Disk storage system, the environment has to be configured accordingly.

For ETERNUS Disk Storage System Using the Copy Command via SAN

1. Access volume settings

2. Connection method settings

3. Advanced Copy settings

For ETERNUS Disk Storage System Using the Copy Command via LAN

1. Connection method settings

2. Advanced Copy settings

For the ETERNUS Disk storage system using the Copy command via LAN, access volume settings are not needed.

When using the Copy command via SAN method for the ETERNUS Disk storage system, an access volume setting is needed. However, when using the Copy command via LAN method, an access volume setting is not needed.

- Refer to "Access volume settings" in the *ETERNUS SF Express Operation Guide* for information on the access volume settings.

- Refer to "Connection type settings" in the *ETERNUS SF Express Operation Guide* for information on the connection method settings.

- Refer to "Copy table size settings" in the *ETERNUS SF Express Operation Guide* for information on the Advanced Copy settings.

4.5 Backing Up the Setup Information

The Express's manager setting information should be backed up to prevent its loss in case of a failure of the Management Server.

Refer to the following sections in the *ETERNUS SF Express Operation Guide* for information on the procedure.

- For Windows environment

  "Backing up Express's manager environment (Windows)"

- For Linux environment

  "Backing up Express's manager environment (Linux)"

Chapter 5 Start Express Operation

This chapter explains how to start the Express operation.

5.1 Monitoring and Managing Storage Systems

This explains how to verify the operation and load status for storage systems.

5.1.1 Performance Monitoring

Performance monitoring of ETERNUS Disk storage system is possible with Express.

Performance monitoring can be performed by selecting a storage device previously registered in "4.2 Setting the Storage System" in the Web Console.

Refer to "Performance management" in the *ETERNUS SF Express Operation Guide* for information on the procedures.

5.1.2 Storage Capacity Virtualization Operation by Using Thin Provisioning

For ETERNUS DX80 S2/DX90 S2/DX100 S3/DX200 S3, storage capacity virtualization operation can be done by using the Thin Provisioning function.

There are two methods to start the Thin Provisioning operation for ETERNUS Disk storage system:

- By registering ETERNUS Disk storage systems where Thin Provisioning is enabled

- By updating the system information on the Web Console after the Thin Provisioning is enabled on an already registered ETERNUS Disk storage system

Refer to "Thin Provisioning management" in the *ETERNUS SF Express Operation Guide* for information on the procedures.

5.2 Backing Up the Data of Business Volumes

This explains how to backup the data of business volumes using the Advanced Copy function of ETERNUS Disk storage systems.

5.2.1 Executing the Advanced Copy

The data of business volumes on the ETERNUS Disk storage systems can be backed up with the Advanced Copy function.

Refer to "Executing Advanced Copy" in the *ETERNUS SF Express Operation Guide* for information on the procedures.

5.2.2 Checking the Copy Status and Cancelling the Operation

When Advanced Copy is running, it is possible to check the copy progress status or cancel the copy operation from the Web Console or via a command.

Refer to "Executing Advanced Copy" in the *ETERNUS SF Express Operation Guide* for information on the procedures.

Part 2   Storage Cruiser

Chapter 6 Overview of Storage Cruiser

This chapter is an overview of Storage Cruiser.

6.1 Function Overview

Storage Cruiser, so as to support the stable operation of the storage system environment, provides the following functions:

- Configuration management

  This displays the physical connection status between devices onto the ETERNUS SF Web Console.
  This is convenient for obtaining a grasp on the access points for each device's parts (for example, the Fibre Channel switch ports).

  The Web Console allows Storage Cruiser operation directly from a Web browser.

- Correlation management

  This automatically acquires from within the storage device's disks configuration information for physical paths, related server file systems, and multipath, and correlates this information, displaying it to the Web Console.
  The configuration elements are correlated and displayed on one screen, so it is convenient for obtaining a grasp of the entire configuration.

- Fault management

  This function reads faults having occurred with the device and displays the relevant information in an easy-to-understand format to the Web Console.
  It supports early identification of the faulty part and its range of impact, as well as early recovery from the fault.

- Performance management

  This function displays the performance information (for management) for the Fibre Channel switch and ETERNUS Disk storage system to the Web Console in the form of a graph.
  Through continuous collection of information, it is easy to obtain a grasp of such things as the operation status and load status from the past.

  If a threshold value for performance information is set up on Storage Cruiser, an alarm will be issued when a performance value error has been detected.
  This function is useful for identifying the location and cause of bottlenecks and removing the source of the problem so that the storage system can be operated under an optimal environment.

See
....
Refer to "Overview" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the functions provided by Storage Cruiser.
....

Storage Cruiser visualizes the ETERNUS Disk storage system's power consumption and implements a reduction to power consumption for storage operation. Also, during operation of thin provisioning, Storage Cruiser supports virtual storage operation through monitoring capacity.

6.2 Product Structure

Storage Cruiser is made of the following program.

Table 6.1 Storage Cruiser Software Components and Supported OS

No.	Program Name	Function Overview	Supported Operating Systems (A=Available, N/A=Not Available)				
			Windows	Solaris	Linux	HP-UX	AIX
1	ETERNUS SF Manager	Manages the storage system	A	A	A	N/A	N/A
2	Storage Cruiser's agent	Monitors the Managed Server	A	A	A	A	A

In this manual, the server where ETERNUS SF Manager is installed is referred as the "Management Server", and a server managed by the Management Server is referred as "Managed Server".

P **Point**
....
After installation of ETERNUS SF Manager, if ETERNUS SF Manager is set up as the Storage Cruiser's manager, it is possible to use Storage Cruiser.
Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the version level of the supported operating systems.
....

6.3 Supported Hardware and Middleware

The following hardware and middleware can be managed with Storage Cruiser:

Hardware

Table 6.2 Supported Hardware

Type	Typical Devices
Storage device	ETERNUS DX series NetApp FAS Series
Tape library	ETERNUS LT series
Fibre Channel switch	ETERNUS SN200 series Brocade Fibre Channel switch
Converged Switch	PRIMERGY BX Ethernet Fabric Switch
Others	VMware vSphere 4 or later

See
....
Refer to "Supported devices" in the *ETERNUS SF Installation and Setup Guide* for information on the hardware can be managed.
....

Middleware

- File system

- Multi path driver

See
....
Depending on the OS and version being used, the type of middleware and their contents that can be managed will vary.
Refer to "Server Node Middleware that can be Managed" in the *ETERNUS SF Storage Cruiser Operation Guide* for details.
....

6.4 Operating Environment Models

Storage Cruiser can manage multiple storage devices, tape libraries, Fibre Channel switches and servers.
Also, in addition to physical environments, Storage Cruiser is also compatible with server virtualized environments.

Also, it is possible to manage the Managed Server regardless of whether or not the Storage Cruiser's agent has been installed.

It is possible to operate Storage Cruiser with a system environment as depicted below.

Figure 6.1 Storage Cruiser Operating Environment
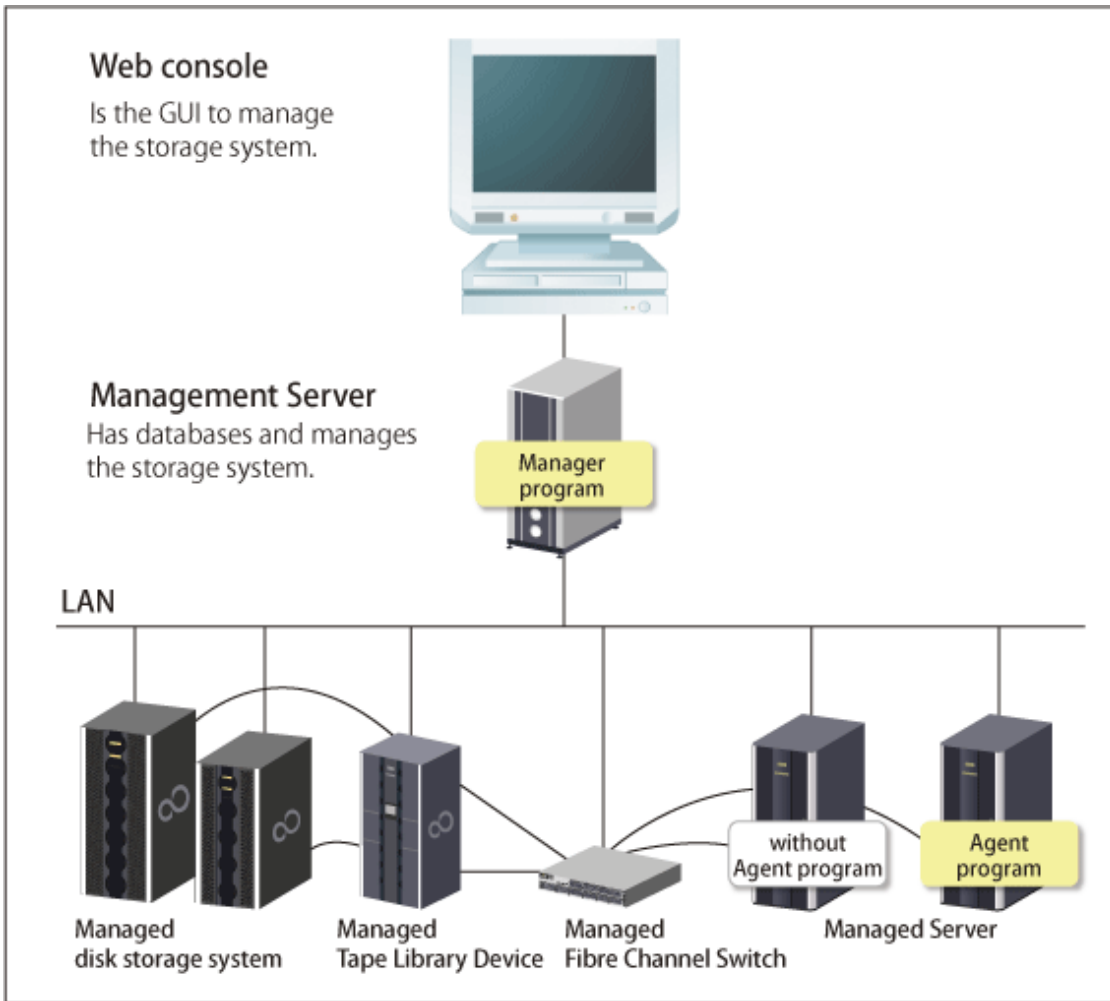
See
. . . .
Refer to "7.2 Selecting the Agent Installation" for information on the Storage Cruiser's agent installation, and choose accordingly.
. . . .

NAS Management of ETERNUS Disk Storage System

ETERNUS SF allows you to use diverse functions to manage the NAS file systems of the ETERNUS Disk storage system connected to the Management Server by Management LAN.
Storage Cruiser provides management functions for NAS environment.

Perform NAS environment management from the Management Server or Web Console.

Refer to the *ETERNUS SF Storage Cruiser Operation Guide* for the overview of management functions for NAS environment and its operational procedure.

Installation to Clustered System

- Installation of the Storage Cruiser's manager

  To increase the availability of the Storage Cruiser's manager, make the system redundant by installing the Storage Cruiser's manager to the clustered system.
  Also, note that this product does not support configurations of managing a single operating system with multiple Storage Cruiser's managers (multiple Management Servers environment).

- Installation of the Storage Cruiser's agent

  This product monitors the status of each node of which the clustered system is comprised. If installing the Storage Cruiser's agent to a clustered system, install to all nodes of which the clustered system is comprised.
  If performing device registration for each node of which the clustered system is comprised, for the node's IP address, designate the physical IP address allocated to each node, not the clustered system's logical IP address.

See
....
Refer to the *ETERNUS SF Cluster Environment Setup Guide* for the Installation procedures to a clustered system.
....

Chapter 7 System Design Before Storage Cruiser Installation

This chapter explains the system design required before the Storage Cruiser installation.

Before reading this chapter, check the cautions and limitations mentioned in the software guide.

7.1 Choosing Management Server

Storage Cruiser's manager has to process requests from the Web Console as well as various events and data acquisition coming from the managed hardware. To avoid interferences from other software or insufficient physical resources and ensure smooth operations, it is recommended to install Storage Cruiser's manager on its own dedicated server.

If a dedicated server cannot be secured, the Management Server should be chosen according to the following requirements:

Impact on Business Applications

On a server running business applications (hereafter described as "business server"), Storage Cruiser's manager operations will likely have an impact on other applications performance. If the candidate server is a mission critical server running financial, distribution or public utilities applications, the decision to install Storage Cruiser's manager must be evaluated with extra caution.

Impact on Other Guest OS (for Virtual Server Environment)

In a virtual server environment, the physical server resources (CPU, memory, and network) are shared by multiple guest OS. Therefore, the operations of a guest OS have an impact on the other guest OS performance. Before installing Storage Cruiser's manager on a guest OS, usage of physical resources and role of other guest OS must be evaluated carefully.

Incompatible Software

Storage Cruiser's manager cannot run on the same server concurrently to certain other software (hereafter described as "incompatible software"). A server with no incompatible software must be selected.

See
. . . .
Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the incompatible software.
. . . .

7.2 Selecting the Agent Installation

Storage Cruiser provides the following two types for server monitoring models.

- Monitoring without the Storage Cruiser's agent installed

- Monitoring with the Storage Cruiser's agent installed

Please refer to the following selection criteria and choose the monitoring condition accordingly.

Monitoring Model	Selection Criteria
Monitoring without agent installed (agent-less monitoring)	- If the OS installed to the Managed Server is not supported by the Storage Cruiser's agent. - The HBA built into the Managed Server is not supported by the Storage Cruiser's agent. - If the Storage Cruiser's agent cannot be installed on the Managed Server. For example, if installation of applications is not permitted on the Managed Server outside a restricted set of applications, or if an incompatible software application is already installed on the server. - If you want to reduce the maintenance tasks on the Managed Server. For example, if you want to avoid having to apply patches on the software. - If using Storage Cruiser under the VMware vSphere 4 or later environment.

Monitoring Model	Selection Criteria
	Since direct connections are made with VMware ESX or VMware ESXi, and the VM host and VM guest information is displayed, installation of the Storage Cruiser's agent is not necessary.
Monitoring with agent installed (agent-used monitoring)	- If you want to use some of the functions available when the Storage Cruiser's agent is installed. Access path settings, status monitoring, and fault monitoring, etc.

 See
. . . .

- Refer to "Support levels" in the *ETERNUS SF Storage Cruiser Operation Guide* for the difference in functions between agent-less monitoring and agent-used monitoring.

- Refer to "Operating environment of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide* for information on the incompatible software for the Storage Cruiser's agent.

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7.3 Collecting Information Required for Installation

When Storage Cruiser is installed, the following information items are required:

Required Information	Server Necessary for Information Collection
Information for installation destination server - OS type and version level - IP address - Cluster configuration information	- Server to which ETERNUS SF Manager is to be installed - Server to which Storage Cruiser's agent is to be installed
Disk space needed for installation	- Server to which ETERNUS SF Manager is to be installed - Server to which Storage Cruiser's agent is to be installed
Port numbers availability for operation	- Server to which ETERNUS SF Manager is to be installed - Server to which Storage Cruiser's agent is to be installed
Disk space of the database needed for operation	- Server to which ETERNUS SF Manager is to be installed
Whether or not performance management is being done	- Server to which ETERNUS SF Manager is to be installed
Required disk space and memory needed for operation	- Server to which ETERNUS SF Manager is to be installed - Server to which Storage Cruiser's agent is to be installed
Software license for the use of Storage Cruiser	Not information necessary for individual server units Please prepare the license for the device to be managed.

 See
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Refer to the following sections in the *ETERNUS SF Installation and Setup Guide* for the information required for installation.

- "Operating environment of ETERNUS SF Manager"

- "Operating environment of Storage Cruiser's agent"

- "License Management"

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Chapter 8 Storage Cruiser Installation and Setup

This chapter explains the installation and setup procedures of Storage Cruiser.

In the case of upgrade from a previous version to the latest version, refer to the *ETERNUS SF Migration Guide*.

8.1 Installation of ETERNUS SF Manager

The ETERNUS SF Manager must be installed to use Storage Cruiser.
The overview of the installation procedure of ETERNUS SF Manager is shown below.

1. Check if the target server satisfies the hardware and software requirements for the ETERNUS SF Manager installation.

   Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the ETERNUS SF Manager.

   Refer to "Installation of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

See
. . . .
Refer to the *ETERNUS SF Cluster Environment Setup Guide* for the installation procedures to a clustered system.
. . . .

8.2 Setup of ETERNUS SF Manager

The overview of the procedure for setting up the ETERNUS SF Manager as the Storage Cruiser's manager is shown below.
Refer to "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure.

1. Create and register a user account that will be using Storage Cruiser.

   The possible operations by the user are dependent on the level of permission the user account is given. The following table describes the differences:

ESF Admin Role	OS Administrator Privilege	
	Yes	No
Yes	Operations are possible from the Web Console and the command line.	Operations are possible only from the Web Console.
No	Operations are possible only from the command line.	Operations are neither possible from the Web Console nor from the command line.

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   - On systems using Single Sign-on, a created user account should be registered in the corresponding account authentication system so that the user can login to the Management Server.
   For example, on the Windows environment, if the Management Server belongs to an Active Directory domain, the user must be added to the Active Directory domain.

   - Commands can be executed only by users with OS administrator privileges or users belonging to the OS administrators group.
. . . .

2. Set up the firewall.

   The firewall must be set up so that the remote PC where the Web Console will be used can connect to the Management Server.

3. Launch the Web Console, and then check that the user registered by step 1 can login to the Management Server from the Web Console.

   Refer to "Supported Web Browsers" in the *ETERNUS SF Web Console Guide* for the version level of the supported web browsers.

   ### 🅿 Point
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   From the "Chapter 9 Configuration of Storage Cruiser Operating Environment" chapter on, the described tasks are supposed to be performed from the Web Console. Before proceeding, it is therefore important to check that Storage Cruiser can actually be operated from the Web Console.
   ....

4. A Storage Cruiser license must be registered for each of the ETERNUS Disk storage systems managed in Storage Cruiser.

   ### 🅿 Point
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   There are two ways of registering a license, from the Web Console or from the command line.
   However, use the command line interface to register a license in this time.

   License registration from the Web Console is possible only for ETERNUS Disk storage systems already managed in Storage Cruiser. Registration for the ETERNUS Disk storage systems not yet managed in Storage Cruiser is possible from the command line.

   Registration from the Web Console becomes possible after "9.2 Registering Device".
   ....

   Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the license and registering procedure.

8.3 Installation of Storage Cruiser's Agent

The overview of the installation procedure of Storage Cruiser's agent is shown below.

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It is not necessary to install the Storage Cruiser's agent under the VMware vSphere 4 or later environment.
....

1. Check if the target server satisfies the hardware and software requirements for the Storage Cruiser's agent installation.

   Refer to "Operating environment of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the Storage Cruiser's agent.

   Refer to "Installation of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

8.4 Setup of Storage Cruiser's Agent

For the setup of the Storage Cruiser's agent, it is necessary to set up such things as the port numbers to be used and the SNIA HBA API library.

The items and procedures necessary for setup vary according to OS. Refer to the part detailing one's OS in "Setup of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide*.

Chapter 9 Configuration of Storage Cruiser Operating Environment

This chapter explains how to configure the Storage Cruiser operating environment.

9.1 Setting Up to Manage Devices

Perform the necessary setup for the devices to be monitored/managed by Storage Cruiser.

Servers

So that Storage Cruiser can manage the HBA built into the Managed Server to which the Storage Cruiser's agent has been installed, install the SNIA HBA API library that HBA vendor distributes.

Refer to the *SNIA HBA API Library Installation Guide* at the following URL for the installation method for the HBA API library.

```
http://www.fujitsu.com/global/services/computing/storage/eternus/documentation/
```

Fibre Channel Switches

So that Storage Cruiser can manage the Fibre Channel switch device, first, perform setup to the Fibre Channel switch.

Refer to "Fibre Channel Switch" in "Environment Configuration" in the *ETERNUS SF Storage Cruiser Operation Guide* for items and procedures pertaining to setup.

ETERNUS Disk Storage Systems

So that Storage Cruiser can manage the ETERNUS Disk storage system, first, perform setup to ETERNUS Disk storage system.

Refer to "Disk Array" in "Environment Configuration" in the *ETERNUS SF Storage Cruiser Operation Guide* for items and procedures pertaining to setup.

Network Attached Storages

So that Storage Cruiser can manage the NetApp FAS Series, first, perform setup to NetApp FAS Series.

Refer to "NetApp FAS Series and V-Series Network Disk Storage system" in "Environment Configuration" in the *ETERNUS SF Storage Cruiser Operation Guide* for items and procedures pertaining to setup.

Tape Libraries

So that Storage Cruiser can manage the tape library device, first, perform setup to the tape library.

Refer to "Tape Library Devices" in "Environment Configuration" in the *ETERNUS SF Storage Cruiser Operation Guide* for items and procedures pertaining to setup.

9.2 Registering Device

For the managing of devices with Storage Cruiser, register the managed devices to Storage Cruiser.

Refer to "Registering device" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedure.

9.3 Registering License

If the ETERNUS Disk storage system just registered in Storage Cruiser does not have a Storage Cruiser license, register the Storage Cruiser license for it.

The license registration can be performed either from the Web Console or from the command line.

Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the license and registering procedure.
∙∙

9.4 Checking the SNMP Trap Reception

The purpose of the SNMP Trap test is to check that events generated by the storage devices are properly displayed in Storage Cruiser.

Refer to the following sections in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedures:

- "swtraptest (SNMP Trap test for Fibre Channel switch)"

- "grtraptest (SNMP Trap test for ETERNUS Disk storage system)"

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If the system is operated in a state where events cannot be displayed, problems will not be detected or detected too late and create a possibility that the system will not work properly. It is therefore important to check that the events generated by the storage devices are properly displayed.
∙∙

9.5 Backing Up the Setup Information

The Storage Cruiser's manager setting information should be backed up to prevent its loss in case of a failure of the Management Server.

Refer to "Backup of Manager" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedures.

Chapter 10 Start Storage Cruiser Operation

This chapter explains how to start the Storage Cruiser operation.

10.1 Performance Monitoring

Performance monitoring of the Fibre Channel switch and ETERNUS Disk storage system is possible with Storage Cruiser. Performance monitoring can be performed by selecting a storage device previously registered in "9.2 Registering Device".

Refer to "Performance Management" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedure.

10.2 Energy-saving Operation for Storage Device by Using Eco-mode

Storage Cruiser can achieve the energy-saving operation by using the Eco-mode function of ETERNUS Disk storage system.

For Eco-mode, there is "storage device Eco-mode" and "RAID Group Eco-mode". One can set each Eco-mode ON or OFF separately, so it is possible to achieve a meticulously energy-saving operation.

Refer to "How to control the Eco-mode" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedure.

10.3 Storage Capacity Virtualization Operation by Using Thin Provisioning

Storage Cruiser can achieve the storage capacity virtualization operation by using the Thin Provisioning function of ETERNUS Disk storage system.

There are two methods to start the Thin Provisioning operation for the ETERNUS Disk storage systems:

- By registering ETERNUS Disk storage systems where Thin Provisioning is enabled

- By updating the system information on the Web Console after the Thin Provisioning is enabled on an already registered ETERNUS Disk storage system

Refer to "Thin Provisioning management" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the procedures.

Part 3   AdvancedCopy Manager

Chapter 11 Overview of AdvancedCopy Manager

This chapter is an overview of AdvancedCopy Manager.

11.1 Function Overview

AdvancedCopy Manager is the storage management software for using the Advanced Copy functions of the ETERNUS Disk Storage System.
The Advanced Copy function allows copying the data from a business volume to another volume at a given time in a very short duration.

AdvancedCopy Manager provides the following functions with the purpose of performing high-speed and high-reliability backup/replication operations.

- Advanced Copy functions

    - Snapshot high-speed copy

    - Synchronous high-speed copy

- Backup management functions

- Replication management functions

- Backup functions using the AdvancedCopy Manager Copy Control Module (hereafter referred to as "AdvancedCopy Manager CCM")

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AdvancedCopy Manager provides a function called "Web Console" in order to manage AdvancedCopy Manager operating environment from a Web browser.
Refer to the *ETERNUS SF Web Console Guide* for information on the operating environment and screens of the Web Console.

. . . .

See

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Refer to "Overview of AdvancedCopy Manager" in the *ETERNUS SF AdvancedCopy Manager Overview* for information on the main functions provided by AdvancedCopy Manager.

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11.2 Product Structure

AdvancedCopy Manager is made of the following program.

Table 11.1 AdvancedCopy Manager Software Components and Supported OS

No.	Program Name	Function Overview	Supported Operating Systems (A=Available, N/A=Not Available)				
			Windows	Solaris	Linux	HP-UX	AIX
1	ETERNUS SF Manager	Data management of storage systems with Agent-based operation model	A	A	A	N/A	N/A
2	AdvancedCopy Manager's agent	Management of backup and replication	A	A	A	A	A
3	AdvancedCopy Manager CCM	Data Management of storage systems with Agent-less operation model	A	A	A	N/A	N/A

In this manual, the server where ETERNUS SF Manager is installed is described as the "Management Server", while the server where the AdvancedCopy Manager Control Module is described as the "CCM Server". Also, the server managed by the Management Server or CCM Server is described as "Managed Server".

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After installation of ETERNUS SF Manager, if ETERNUS SF Manager is set up as the AdvancedCopy Manager's manager, it is possible to use AdvancedCopy Manager.
Refer to "Operating Environment" in the *ETERNUS SF Installation and Setup Guide* for information on the version level of the supported operating systems.
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11.3 Supported Hardware and Middleware

The following hardware and middleware can be managed with AdvancedCopy Manager:

11.3.1 Supported Disk Storage Systems

The disk storage systems supported by AdvancedCopy Manager are as follows.

Table 11.2 Supported Disk Storage Systems

Disk Storage System Name
ETERNUS DX series

11.3.2 Supported Devices

AdvancedCopy Manager can manage devices by disk partitions (slices) or by Logical Units (disks).

See
. . . .
Refer to "Managing a Device on AdvancedCopy Manager" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for details.
. . . .

11.3.3 Linkable Applications

AdvancedCopy Manager can be linked up with the applications listed below.

Table 11.3 Linkable Applications

Application Name	Linkable Function (A=Available, N/A=Not Available)	
	Backup / Restore	Replication
Oracle	A	A
SQL Server	A	A
Exchange Server	N/A	A
Symfoware	A	A (*1)
DB2	A	A
Hyper-V	N/A	A

*1: Windows environment only

11.4 Operating Environment Models

AdvancedCopy Manager can manage several ETERNUS Disk storage systems.
Moreover, AdvancedCopy Manager also supports virtual server environments in addition to physical environments.

The operating environment model of AdvancedCopy Manager is described below.

Figure 11.1 AdvancedCopy Manager Operating Environment Models
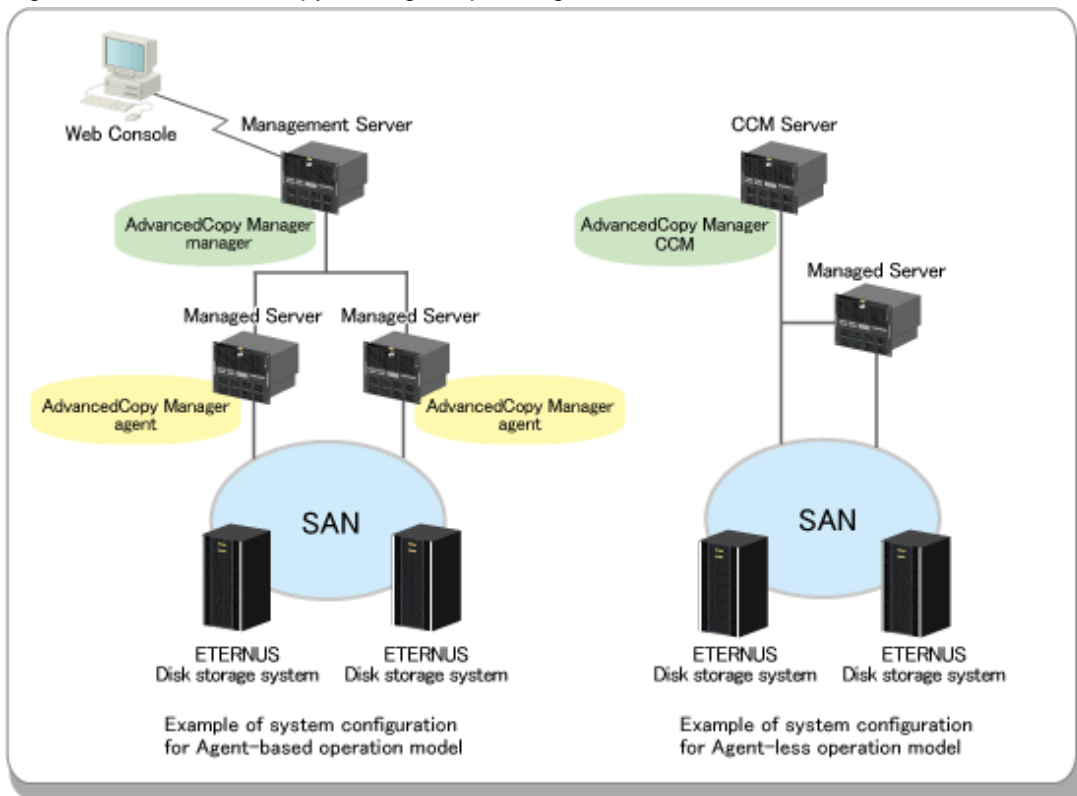
Refer to "12.1 Choice of Operating Model" about whether perform the installation of AdvancedCopy Manager's agent or not.

NAS Management of ETERNUS Disk Storage System

ETERNUS SF allows you to use diverse functions to manage the NAS file systems of the ETERNUS Disk storage system connected to the Management Server by Management LAN.
AdvancedCopy Manager provides backup functions for NAS environment.

Perform NAS environment configuration, management and backup from the Management Server or Web Console.

Refer to "NAS Management" in the *ETERNUS SF Express Operation Guide* or *ETERNUS SF Storage Cruiser Operation Guide* for the overview of NAS environment configuration/management and its operational procedure.

Refer to "Backup of NAS environment" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for the overview of NAS environment backup and its operational procedure.

Installation to Clustered System

To increase the availability of AdvancedCopy Manager, manager or agent of AdvancedCopy Manager can be installed on a clustered system for redundancy.

- AdvancedCopy Manager's manager installation

A system cannot be managed by more than one AdvancedCopy Manager's managers.

- AdvancedCopy Manager's agent installation

Register the logical node names (unique names in a cluster configuration) of the clustered system as Managed Servers. When the cluster real node names are registered as Managed Servers, the clustered system cannot be correctly managed.

 See

Refer to the *ETERNUS SF Cluster Environment Setup Guide* for information on the installation on a clustered system.

Chapter 12 System Design Before AdvancedCopy Manager Installation

This chapter explains the system design required before the AdvancedCopy Manager installation.

Before reading this chapter, check the cautions and limitations mentioned in the software guide.

12.1 Choice of Operating Model

With AdvancedCopy Manager, the following 2 operating modes are available:

Agent-Based Operating Model

This operating model requires the installation of ETERNUS SF Manager and the AdvancedCopy Manager's agent.
Use of this operating model requires that the installed ETERNUS SF Manager be set up as the AdvancedCopy Manager's manager.

Application data copy is possible on a server where a business application is installed (hereafter "business server"). As a function to trigger scripts before and after the copy operation is provided, scripts can be customized to conform to the administration policies and allow flexible and optimized operations.

Agent-Less Operating Model

This operating model requires the installation of AdvancedCopy Manager CCM.

There is no need to install either ETERNUS SF Manager or AdvancedCopy Manager's agent, therefore the time to get ready to start is shorter compared to Agent-based operating model. Moreover, as all the operations can be done directly on the server where the CCM has been installed, there are no requirements about the OS environment of the business server.

Unlike the copy operation with an agent, the copy is done per disk rather than per partition or slice. For this reason, the copy destination resource must be larger. Also, as copy is done without relation to the application running on the business server, the operator must ensure the integrity of the copied data. (for example, by performing the copy when the data is inactive).

Decide which operating model to use by considering the following criteria.

Operating Model	Choice Criteria
Agent-based	- If you want to use functions available when the AdvancedCopy Manager's agent is installed. For example, if you want to use advanced copy operations such as multiple generation backup/restore functions, interaction with a DBMS on a business server, volume shadow copy service (VSS Volume Shadow Copy Service function), etc.
Agent-less	- If there are many business servers and you want to reduce the cost of installation and start operation as soon as possible. - If the OS on the business server is not supported by the AdvancedCopy Manager's manager or the AdvancedCopy Manager's agent. - If the AdvancedCopy Manager's agent cannot be installed on the business server. For example, if installation of applications is not permitted on the business server outside a restricted set of applications, or if an incompatible software application is already installed on the server. - If you want to reduce the maintenance tasks on the business server. For example, if you want to avoid having to apply patches on the software.

🔆 Note

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It is possible to have operating models with Agent-based and Agent-less at the same time, but when operated in parallel, the copy data of both operating models must not have common areas.
If the copy data of both operating models have common areas, there is a possibility of data loss when copy operations use the mutual areas.

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Refer to the following sections of the *ETERNUS SF Installation and Setup Guide* for details about incompatible software with AdvancedCopy Manager.

- Agent-based operating model:

   "Operating environment of ETERNUS SF Manager" and "Operating environment of AdvancedCopy Manager's agent"

- Agent-less operating model:

   "Operating environment of AdvancedCopy Manager CCM"

···

12.2 System Design for Agent-Based Operating Model

This section explains the required tasks to perform before the installation and configuration of Agent-based operating model.

12.2.1 Selecting Function to Use

With Agent-based operating model, the following two functions are available:

- Backup and restore function

   This function allows maintaining multiple generations of the copied data.
   Unlike the data copied with the replication function, the data copied with backup cannot be used outside this function.

   By setting a backup policy, the backup can be performed according to that policy.
   This function creates multiple generations of the copied data. When performing a restoration, any one of the backup generations can be chosen and restored.

   However, this function does not support data copy to a different ETERNUS Disk storage system. To copy data over to a different ETERNUS Disk storage system, use the replication function.

- Replication function

   This function allows using the copy data differently from a backup (for example, using the copied data in a business application, etc). Copy to a different ETERNUS Disk storage system, including a remote location, is possible.

   A replication data source and destination areas are defined as a pair, and data are copied inside this pair. As multi-generation data management is not supported by the replication function, several pairs must be defined for one data source and multiple data destinations.

Please refer to the following selection criteria and decide the function to use.

Function	Choice Criteria
Backup and restore function	- If you need to keep multiple generations of the data copied in AdvancedCopy Manager.
Replication function	- If you want to use the copied data outside a backup dataset.
	- If you want to copy between volumes that are connected to different servers
	- If you want to copy between volumes that are residing on different ETERNUS Disk storage systems.
	- If you want to backup data from Microsoft Exchange Server. The backup and restore function does not support copying data from Microsoft Exchange Server.
	- If you want to backup data from a Hyper-V Guest OS. The backup and restore function does not support copying data from Hyper-V Guest OS.

12.2.2 Choosing Management Server

AdvancedCopy Manager's manager has to process requests from the Web Console as well as various events and data acquisition coming from the managed hardware. To avoid interferences from other software or insufficient physical resources and ensure smooth operations, it is recommended to install AdvancedCopy Manager's manager on its own dedicated server.

If a dedicated server cannot be secured, the Management Server should be chosen according to the following requirements:

Impact on Business Applications

On a server running business applications (hereafter described as "business server"), AdvancedCopy Manager's manager operations will likely have an impact on other applications performance. If the candidate server is a mission critical server running financial, distribution or public utilities applications, the decision to install AdvancedCopy Manager's manager must be evaluated with extra caution.

Impact on Other Guest OS (for Virtual Server Environment)

In a virtual server environment, the physical server resources (CPU, memory, and network) are shared by multiple guest OS. Therefore, the operations of a guest OS have an impact on the other guest OS performance. Before installing AdvancedCopy Manager's manager on a guest OS, usage of physical resources and role of other guest OS must be evaluated carefully.

Incompatible Software

AdvancedCopy Manager's manager cannot run on the same server concurrently to certain other software (hereafter described as "incompatible software"). A server with no incompatible software must be selected.

See

Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the incompatible software.

12.2.3 Collecting Information Required for Installation

When AdvancedCopy Manager is installed, the following information items are required:

Required Information	Server Necessary for Information Collection
Information for installation destination server - OS type and version level - IP address - Cluster configuration information	- Server to which ETERNUS SF Manager is to be installed - Server to which AdvancedCopy Manager's agent is to be installed
Disk space needed for installation	- Server to which ETERNUS SF Manager is to be installed - Server to which AdvancedCopy Manager's agent is to be installed
Port numbers availability for operation	- Server to which ETERNUS SF Manager is to be installed - Server to which AdvancedCopy Manager's agent is to be installed
Disk space of the database needed for operation	- Server to which ETERNUS SF Manager is to be installed
Required disk space and memory needed for operation	- Server to which ETERNUS SF Manager is to be installed - Server to which AdvancedCopy Manager's agent is to be installed
Software license for the use of AdvancedCopy Manager	The AdvancedCopy Manager software licenses are based on the ETERNUS Disk storage system to be managed. Please prepare the license(s) for each of the ETERNUS Disk storage systems to be managed. Each ETERNUS Disk storage system to be managed may have a local and/or remote copy license.

12.3 System Design for Agent-Less Operating Model

This section explains the required tasks to perform before the installation and configuration of Agent-less operating model.

12.3.1 Choosing CCM Server

AdvancedCopy Manager CCM has to process requests from the Web Console as well as various events and data acquisition coming from the managed hardware. To avoid interferences from other software or insufficient physical resources and ensure smooth operations, it is recommended to install AdvancedCopy Manager CCM on its own dedicated server.

If a dedicated server cannot be secured, the server should be chosen according to the following requirements:

Impact on Business Applications

On a server running business applications (hereafter described as "business server"), AdvancedCopy Manager CCM operations will likely have an impact on other applications performance. If the candidate server is a mission critical server running financial, distribution or public utilities applications, the decision to install AdvancedCopy Manager CCM must be evaluated with extra caution.

Impact on Other Guest OS (for Virtual Server Environment)

In a virtual server environment, the physical server resources (CPU, memory, and network) are shared by multiple guest OS. Therefore, the operations of a guest OS have an impact on the other guest OS performance. Before installing AdvancedCopy Manager CCM on a guest OS, usage of physical resources and role of other guest OS must be evaluated carefully.

Incompatible Software

AdvancedCopy Manager CCM cannot run on the same server concurrently to certain other software (hereafter described as "incompatible software"). A server with no incompatible software must be selected.

12.3.2 Selecting Program to Install

AdvancedCopy Manager CCM can be installed using 2 methods.

  - [Method 1] Install the ETERNUS SF Manager program and use the AdvancedCopy Manager CCM included in the ETERNUS SF Manager program

  - [Method 2] Install and use the AdvancedCopy Manager CCM program only

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With the method 1, in addition to the Command Line Interface, AdvancedCopy Manager CCM can be operated from the Web Console. However, it has the following demerits:

  - The required disk space for installation is larger than method 2.

  - There are more incompatible software applications than method 2.

- Symfoware verification is necessary (only if Symfoware is installed on the server)

- An estimate of the database size is required.

Select the program to install after considering these issues.

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12.3.3 Selecting Advanced Copy Control Method

In AdvancedCopy Manager CCM, the CM 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")

With AdvancedCopy Manager CCM, the ETERNUS Disk storage systems listed below can use Copy command via SAN and via LAN.

Table 12.1 ETERNUS Disk Storage Systems That Can Be Operated by Copy Command via SAN or via LAN

Device Name	Copy Command via SAN		Copy Command via LAN	
	Operation	Firmware Version	Operation	Firmware Version
ETERNUS DX60/DX60 S2/DX80	A	All versions	N/A	-
ETERNUS DX90	A	All versions	A (*1)	V10L61 or later
ETERNUS DX80 S2/DX90 S2	A	All versions	A	All versions
ETERNUS DX100 S3/DX200 S3	A	All versions	A	All versions
ETERNUS DX400 series	A	All versions	A (*1)	V20L71 or later
ETERNUS DX400 S2 series	A	All versions	A	All versions
ETERNUS DX500 S3/DX600 S3	A	All versions	A	All versions
ETERNUS DX8000 series	A	All versions	A (*1)	V20L71 or later
ETERNUS DX8000 S2 series	A	All versions	A	All versions

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

*1: The acarray 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 CCM 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 CCM Server as the access volume.

Figure 12.1 Example of System Configuration Using Copy Command via SAN
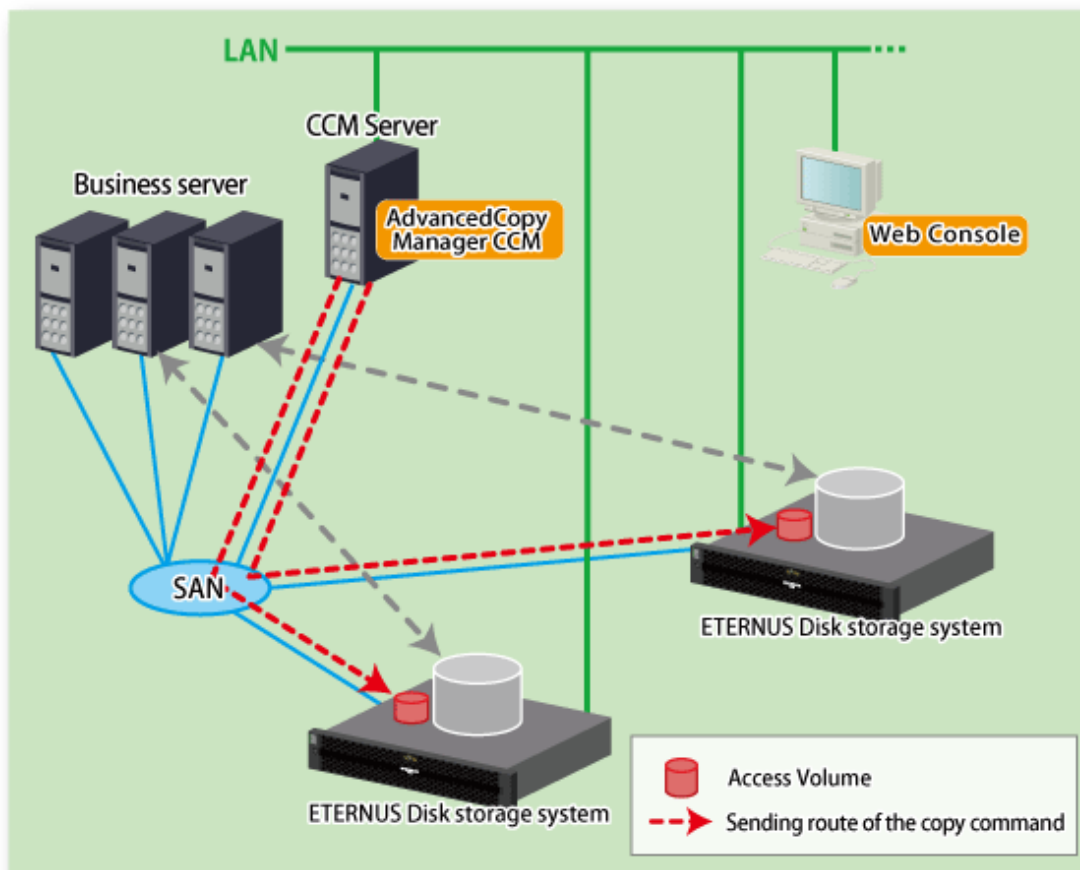
When using the Copy command via LAN method, no access volume is needed.

Figure 12.2 Example of System Configuration Using Copy Command via LAN
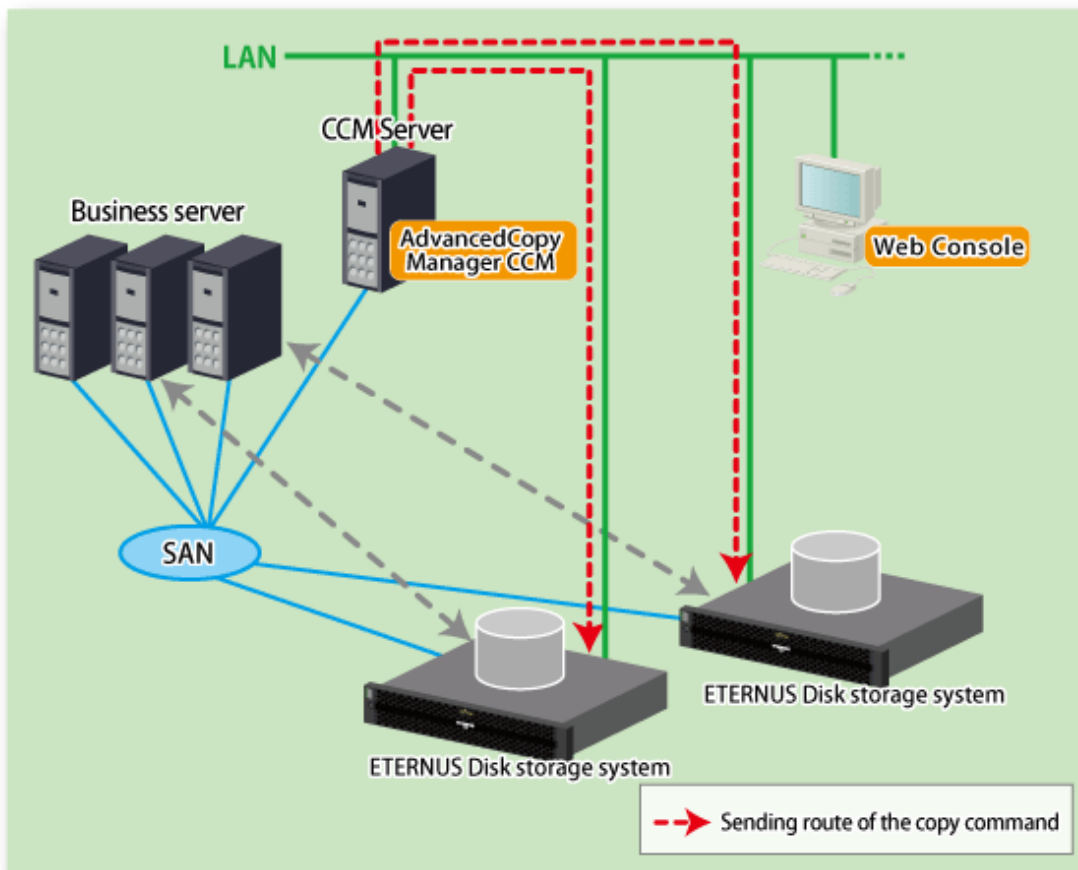
Information

Among the ETERNUS Disk storage systems described in "Table 12.1 ETERNUS Disk Storage Systems That Can Be Operated by Copy Command via SAN or via LAN", some models do not support the Copy command via LAN. In case of a system environment where not all managed ETERNUS Disk storage systems support the Copy command via LAN, it is recommended to use only the Copy command via SAN.

12.3.4 Collecting Information Required for Installation

When AdvancedCopy Manager CCM is installed, the following information items are required:

Required Information	Necessary for Information Collection	
	Using AdvancedCopy Manager CCM Included in ETERNUS SF Manager	Using AdvancedCopy Manager CCM to Be Install Individually
Information for installation destination server - OS type and version level - IP address - Cluster configuration information	Necessary	Necessary
Disk space needed for installation	Necessary	Necessary
Port numbers availability for operation	Necessary (*1)	No necessary

Required Information	Necessary for Information Collection	
	Using AdvancedCopy Manager CCM Included in ETERNUS SF Manager	Using AdvancedCopy Manager CCM to Be Install Individually
Disk space of the database needed for operation	Necessary (*1)	No necessary
Required disk space and memory needed for operation	Necessary	Necessary
Software license for the use of AdvancedCopy Manager (*2)	Necessary	Necessary

*1: This information is required for ETERNUS SF Manager.
*2: Please prepare the license for the ETERNUS Disk storage system to be managed.

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Refer to the following sections in the *ETERNUS SF Installation and Setup Guide* for the information required for installation.

- If using AdvancedCopy Manager CCM included in ETERNUS SF Manager:

    - "Operating environment of ETERNUS SF Manager"

    - "License Management"

- If using AdvancedCopy Manager CCM to be installed individually:

    - "Operating environment of AdvancedCopy Manager CCM"

    - "License Management"
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Chapter 13 Installation and Setup of Agent-Based Operation Model

This chapter explains the installation and setup procedures of Agent-based operation model.

In case of update from a previous version to the latest version, refer to the *ETERNUS SF Migration Guide*.

13.1 Installation of ETERNUS SF Manager

The ETERNUS SF Manager must be installed to use AdvancedCopy Manager's manager functions.
The overview of the installation procedure of ETERNUS SF Manager is shown below.

1. Check if the target server satisfies the hardware and software requirements for the ETERNUS SF Manager installation.

    Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the ETERNUS SF Manager.

    Refer to "Installation of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

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Refer to the *ETERNUS SF Cluster Environment Setup Guide* for the procedures of the Installation to a clustered system.
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13.2 Setup of ETERNUS SF Manager

The overview of the procedure for setting up the ETERNUS SF Manager as the AdvancedCopy Manager's manager is shown below.
Refer to "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure.

1. Create and register a user account that will be using AdvancedCopy Manager.

    The possible operations by the user are dependent on the level of permission the user account is given. The following table describes the differences:

ESF Admin Role	OS Administrator Privilege	
	Yes	No
Yes	Operations are possible from the Web Console and the command line.	Operations are possible only from the Web Console.
No	Operations are possible only from the command line.	Operations are neither possible from the Web Console nor from the command line.

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- On systems using Single Sign-on, a created user account should be registered in the corresponding account authentication system so that the user can login to the Management Server.
  For example, on the Windows environment, if the Management Server belongs to an Active Directory domain, the user must be added to the Active Directory domain.

- The commands of AdvancedCopy Manager can be executed only by the following users.

    - For Windows environment

    Local users belonging to the Administrators group or domain users belonging to the Domain Admins group

-   For Solaris or Linux environment

    Users who have OS administrator privilege (root user)
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2. Set up the firewall.

    The firewall must be set up so that the remote PC where the Web Console will be used can connect to the Management Server.

3. Launch the Web Console, and then check that the user registered by step 1 can login to the Management Server from the Web Console.

    Refer to "Supported Web Browsers" in the *ETERNUS SF Web Console Guide* for the version level of the supported web browsers.

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From the "Chapter 14 Configuration of Agent-Based Operation Model Environment" chapter on, the described tasks are supposed to be performed from the Web Console. Before proceeding, it is therefore important to check that AdvancedCopy Manager can actually be operated from the Web Console.
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4. Register the AdvancedCopy Manager licenses with the license management commands for all the ETERNUS Disk storage systems managed by AdvancedCopy Manager.

    Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the licenses and registering procedure.

13.3 Installation of AdvancedCopy Manager's Agent

The overview of the installation procedure of AdvancedCopy Manager's agent is shown below.

1. Check if the target server satisfies the hardware and software requirements for the AdvancedCopy Manager's agent installation.

    Refer to "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the AdvancedCopy Manager's agent.

    Refer to "Installation of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

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Refer to the *ETERNUS SF Cluster Environment Setup Guide* for the procedures of the Installation to a clustered system.
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13.4 Setup of AdvancedCopy Manager's Agent

To setup the AdvancedCopy Manager's agent, services and hardware configuration is required.
The items and procedures necessary for setup vary according to OS.

Refer to the part detailing one's OS in "Setup of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*.

Chapter 14 Configuration of Agent-Based Operation Model Environment

This chapter explains how to configure the Agent-based operation model environment.

14.1 Configuration of Environment Using Backup/Restore Function

This section describes the procedure for configuring the operating environment for backup and restore function.

1. Managed Server registration

   Register each Managed Server on the Management Server.

   Refer to "Registering a Managed Server" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

2. Device information collection

   Collect the information about the devices connected to the Managed Server.

   Refer to "Fetching device information on a Managed Server" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

3. Backup server environment configuration

   Decide and configure on which server the backup operations will be performed.

   Refer to "Configuring the environment for a backup operation server" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

4. Volume type settings

   Set the type for volumes to be managed by AdvancedCopy Manager from among volumes fetched in step 2.
   Choose one of the following types for each volume:

   - Transaction volume

     This is a volume to be backed up (copy data source).

   - Backup volume

     This is a volume that will keep the backed up data (copy data destination).

   Refer to "Setting the operation type for a device" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

5. Backup policy settings

   Set the backup policy for each of the transaction volumes set up in step 4.

   - Preservation generations

   - Interval days

   Refer to "Setting a backup policy" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

6. Pre-processing and post-processing scripts customization

   If the specific pre-processing and post-processing is needed, customize the pre-processing and post-processing scripts for backup.

   Refer to "Pre-processing and Post-processing of Backup and Restoration" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

14.2 Configuration of Environment Using Replication Function

This section describes the procedure for configuring the operating environment for replication function.

1. Managed Server registration

    Register each Managed Server on the Management Server.

    Refer to "Registering a Managed Server" in "Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

2. Device information collection

    Collect the information about the devices connected to the Managed Server.

    Refer to "Fetching device information on a Managed Server" in "Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

3. Settings of volumes for replication

    Set the copy source and destination volumes used with the replication operation.

    Refer to "Configuring the source volume and replica volume" in "Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

4. Pre-processing and post-processing scripts customization

    If in one of the following 2 situations, customize the pre-processing and post-processing scripts for replication:

    - Specific processing needs to be added before or after replication.

    - The standard processing before or after the replication needs to be modified.

    Refer to "Pre-processing and Post-processing of Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system of the Managed Server for information on the procedure.

14.3 Backing Up the Setup Information

AdvancedCopy Manager setting information should be backed up to prevent its loss in case of a failure of the Management Server.

Refer to "Maintenance of Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the procedure.

Chapter 15 Start the Operation of Agent-Based Operation Model

This chapter explains how to start the operation of the Agent-based operation model.

15.1 Starting the Operation Using Backup/Restore Function

This section explains how to do data backup using the backup and restore function.

15.1.1 Executing the Backup

Perform a backup of the business data in the transaction volume by executing an Advanced Copy.

The backup volume is automatically selected.
However, it is possible to configure the relation between source volumes and destination volumes by using the "device map file".

Refer to the following sections under the chapter "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the procedure.

- "Performing snapshot high-speed backup"

- "Performing synchronized high-speed backup"

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Refer to "Preparing a device map file" under the chapter "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the device map file.
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15.1.2 Checking the Copy Status and Cancelling the Operation

When Advanced Copy is running, it is possible to check the copy progress status or cancel the copy operation.

Refer to "Managing a backup history" in "Backup Operation" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the procedure.

15.2 Starting the Operation Using Replication Function

This section explains how to copy data using the replication function.

15.2.1 Executing the Replication

Copy from a source volume to a destination volume is possible by executing an Advanced Copy.
A data copy created with the replication function can also be used as a backup.

Refer to the following sections under the chapter "Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the procedure.

- "Executing snapshot replication"

- "Executing synchronized replication"

15.2.2 Checking the Copy Status and Cancelling the Operation

When Advanced Copy is running, it is possible to check the copy progress status or cancel the copy operation.

Refer to the following sections under the chapter "Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the using operating system for information on the procedure.

- "Executing snapshot replication"

- "Executing synchronized replication"

- "Stopping the Operation"

Chapter 16 Installation and Setup of Agent-Less Operation Model

This chapter explains the installation and setup procedures of Agent-less operation model.

In case of update from a previous version to the latest version, refer to the *ETERNUS SF Migration Guide*.

16.1 Installation of AdvancedCopy Manager CCM

There are two possible methods to install AdvancedCopy Manager CCM, as mentioned in "12.3.2 Selecting Program to Install".

When Using AdvancedCopy Manager CCM Included in ETERNUS SF Manager

Install the ETERNUS SF Manager.
The overview of the installation procedure of ETERNUS SF Manager is shown below.

1. Check if the target server satisfies the hardware and software requirements for the ETERNUS SF Manager installation.

   Refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the ETERNUS SF Manager.

   Refer to "Installation of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

When Using AdvancedCopy Manager CCM to Be Installed Individually

Install the ETERNUS SF Manager.
The overview of the installation procedure of ETERNUS SF Manager is shown below.

1. Check if the target server satisfies the hardware and software requirements for the AdvancedCopy Manager CCM installation.

   Refer to "Operating environment of AdvancedCopy Manager CCM" in the *ETERNUS SF Installation and Setup Guide* for information on each condition.

2. Install the AdvancedCopy Manager CCM.

   Refer to "Installation of AdvancedCopy Manager CCM" in the *ETERNUS SF Installation and Setup Guide* for information on the installation procedure.

16.2 Setup of AdvancedCopy Manager CCM

The overview of the procedure for setting up the AdvancedCopy Manager CCM is shown below.

When Using AdvancedCopy Manager CCM Included in ETERNUS SF Manager

The overview of the procedure for setting up the ETERNUS Manager as the AdvancedCopy Manager CCM is shown below.
Refer to "Setup of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure.

1. Create and register a user account that will be using AdvancedCopy Manager CCM.

   The possible operations by the user are dependent on the level of permission the user account is given. The following table describes the differences:

ESF Admin Role	OS Administrator Privilege	
	Yes	No
Yes	Operations are possible from the Web Console and the command line.	Operations are possible only from the Web Console.
No	Operations are possible only from the command line.	Operations are neither possible from the Web Console nor from the command line.

- On systems using Single Sign-on, a created user account should be registered in the corresponding account authentication system so that the user can login to the Management Server (also used as CCM Server).
  For example, on the Windows environment, if the Management Server belongs to an Active Directory domain, the user must be added to the Active Directory domain.

- The commands of AdvancedCopy Manager CCM can be executed only by the following users.

  - For Windows environment

    Local users belonging to the Administrators group or domain users belonging to the Domain Admins group

  - For Solaris or Linux environment

    Users who have OS administrator privilege (root user)

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2. Set up the firewall.

   The firewall must be set up so that the remote PC where the Web Console will be used can connect to the Management Server.

3. Launch the Web Console, and then check that the user registered by step 1 can login to the Management Server from the Web Console.

   Refer to "Supported Web Browsers" in the *ETERNUS SF Web Console Guide* for the version level of the supported web browsers.

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From the "Chapter 14 Configuration of Agent-Based Operation Model Environment" chapter on, the described tasks are supposed to be performed from the Web Console. Before proceeding, it is therefore important to check that AdvancedCopy Manager can actually be operated from the Web Console.

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4. Register the AdvancedCopy Manager licenses with the license management commands for all the ETERNUS Disk storage systems managed by AdvancedCopy Manager CCM.

   Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the licenses and registering procedure.

When using AdvancedCopy Manager CCM to Be Installed Individually

The overview of the procedure for setting up AdvancedCopy Manager CCM is shown below.
Refer to "Setup of AdvancedCopy Manager CCM" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure.

1. Create and register a user account that will execute AdvancedCopy Manager CCM commands.

   The AdvancedCopy Manager CCM commands can be executed only by users with Administrator permissions or users belonging to the Administrators group. Take this requirement into account when creating and registering a user.

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On systems using Single Sign-on, a created user account should be registered in the corresponding account authentication system so that the user can login to the CCM Server.
For example, if the CCM Server belongs to an Active Directory domain, the user must be added to the Active Directory domain.

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2. Register the AdvancedCopy Manager licenses with the license management commands for all the ETERNUS Disk storage systems managed by AdvancedCopy Manager CCM.

   Refer to "License Management" in the *ETERNUS SF Installation and Setup Guide* for information on the licenses and registering procedure.

Information

When the AdvancedCopy Manager CCM program is installed, AdvancedCopy Manager CCM functions cannot be operated from the Web Console. Therefore, registration of a user for operating the Web Console or firewall settings is not required.

Chapter 17 Configuration of Agent-Less Operation Model Environment

This chapter explains how to configure the Agent-less operation model environment.

17.1 Access Volume Settings

When sending a command to ETERNUS Disk storage system to perform an Advanced Copy function from the CCM Server by using Copy command via SAN, this setting must be performed on each ETERNUS Disk storage system.

When using the Copy command via SAN, a logical volume that can be accessed by the CCM Server must be defined in the ETERNUS Disk storage system, according to "Figure 12.1 Example of System Configuration Using Copy Command via SAN". In this manual, this logical volume is called "access volume". One logical volume of ETERNUS Disk storage system must be assigned to CCM Server as the access volume.

Refer to "Access Volume Settings" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

17.2 Storage Device Registration

The ETERNUS Disk storage system where Advanced Copy operations will be performed with AdvancedCopy Manager CCM must be registered in AdvancedCopy Manager CCM with the following information.

- Name of ETERNUS Disk storage system

- IP address of ETERNUS Disk storage system

- User name and password of users who access the ETERNUS Disk storage system

- Access Volume set in "17.1 Access Volume Settings" (only for using Copy command via SAN)

Refer to "Registering ETERNUS Disk storage system" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

17.3 Copy Group Creation

Create copy groups.

The combination of the copy source and destination logical volume is called "copy pair". Several copy pairs can be grouped into what is called "copy group".

When creating a copy group, ETERNUS Disk storage system to be used and the type of Advanced Copy must be set.

Refer to "Creating copy groups" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

17.4 Copy Pair Creation

The copy pairs must be registered in a copy group.
To register a copy pair, the following information is required.

- Name of the copy source ETERNUS Disk storage system

- Logical volume number of the copy source volume

- Name of the copy destination ETERNUS Disk storage system

- Logical volume number of the copy destination volume

Refer to "Adding copy pairs" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

17.5 Backing Up the Setup Information

AdvancedCopy Manager CCM setting information should be backed up to prevent its loss in case of a failure of the CCM Server.

Refer to "Backing up environment settings files" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

Chapter 18 Start the Operation of Agent-Less Operation Model

This chapter explains how to start the operation of the Agent-less operation model.

18.1 Executing the Backup

Perform a backup of the data in the business volume by executing an Advanced Copy.

Refer to "Executing Advanced Copy" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.

18.2 Checking the Copy Status and Cancelling the Operation

When Advanced Copy is running, it is possible to check the copy progress status or cancel the copy operation.

Refer to "Executing Advanced Copy" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the procedure.