ETERNUS SF Express V14.1

User's Guide

Windows

Preface

Purpose

This manual gives an overview of the ETERNUS SF Express (hereafter referred to as Express).

This manual describes the Express product features.

Reader

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

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

Organization

This manual consists of the following chapters:

Chapter 1 **Overview**

This chapter gives an overview of the Express.

Chapter 2 **Required Environment**

This chapter explains the environment required by a storage system including Express.

Chapter 3 **Flow from Introduction to Operation**

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

Chapter 4 **Express Managed Information**

This chapter explains the information managed by Express.

Chapter 5 **Introducing**

This chapter explains the steps to install a storage system using Express.

Chapter 6 **Operation**

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

Chapter 7 **Maintenance**

This chapter explains the maintenance of Express Manager.

Appendix A **Advanced Copy Function**

This appendix explains Advanced Copy function.

Appendix B **Installing and uninstalling Express**

This appendix explains installing and uninstalling Express.

Appendix C **Commands**

This appendix explains commands.

Appendix D **Messages**

This appendix explains the messages output from Express.

Appendix E **Detail Error Messages of ETERNUS**

This appendix explains the details of error messages for ETERNUS.

Appendix F **Events**

This appendix explains the events output from Express.

Notation

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

Product abbreviations

The following table shows how product names are abbreviated in this manual:

Abbreviation	Formal name
ETERNUS Disk storage system	ETERNUS DX60 ETERNUS DX80 ETERNUS DX90
FibreCAT SX Disk storage system	FibreCAT SX60 FibreCAT SX80 FibreCAT SX80 iSCSI FibreCAT SX88 FibreCAT SX100
Windows Server 2008	Microsoft(R) Windows Server(R) 2008 Standard(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter(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 without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Standard(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Enterprise(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Datacenter(64-bit)
Windows	Microsoft(R) Windows Server(R) 2008 Standard(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter(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 without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Standard(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Enterprise(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Datacenter(64-bit)
Windows XP	Microsoft(R) Windows(R) XP Home Edition Microsoft(R) Windows(R) XP Professional
Windows Vista	Windows Vista(R) Home Basic Windows Vista(R) Home Premium Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate
Windows 7	Windows(R) 7 Home Basic Windows(R) 7 Professional Windows(R) 7 Ultimate

Command Prompt

Command prompt is shown as ">" and the command format is described as follows.

```
> Command name
```

The command path is omitted. If the product is installed the standard directory, add C:\Program Files (x86)\ETERNUS SF\Express\Manager\bin\ to the command if necessary.

The following path is used for the above command.

C:\Program Files (x86)\ETERNUS SF\Express\Manager\bin\Command name

Symbols

Notations in the following formats are used to indicate matters that must be noted and reference information:

Note

This is important information which must be read and carefully noted.

Point

This is information which is useful to know.

See

This describes related reference items and where they are located.

Information

This is reference information related to using the product.

Example

This is an example that is useful as a reference.

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Shipment date and revision history

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Contents

Chapter 1 Overview

This chapter gives an overview of the Express.

1.1 Overview of a storage system

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

Figure 1.1 Overview image of a storage system
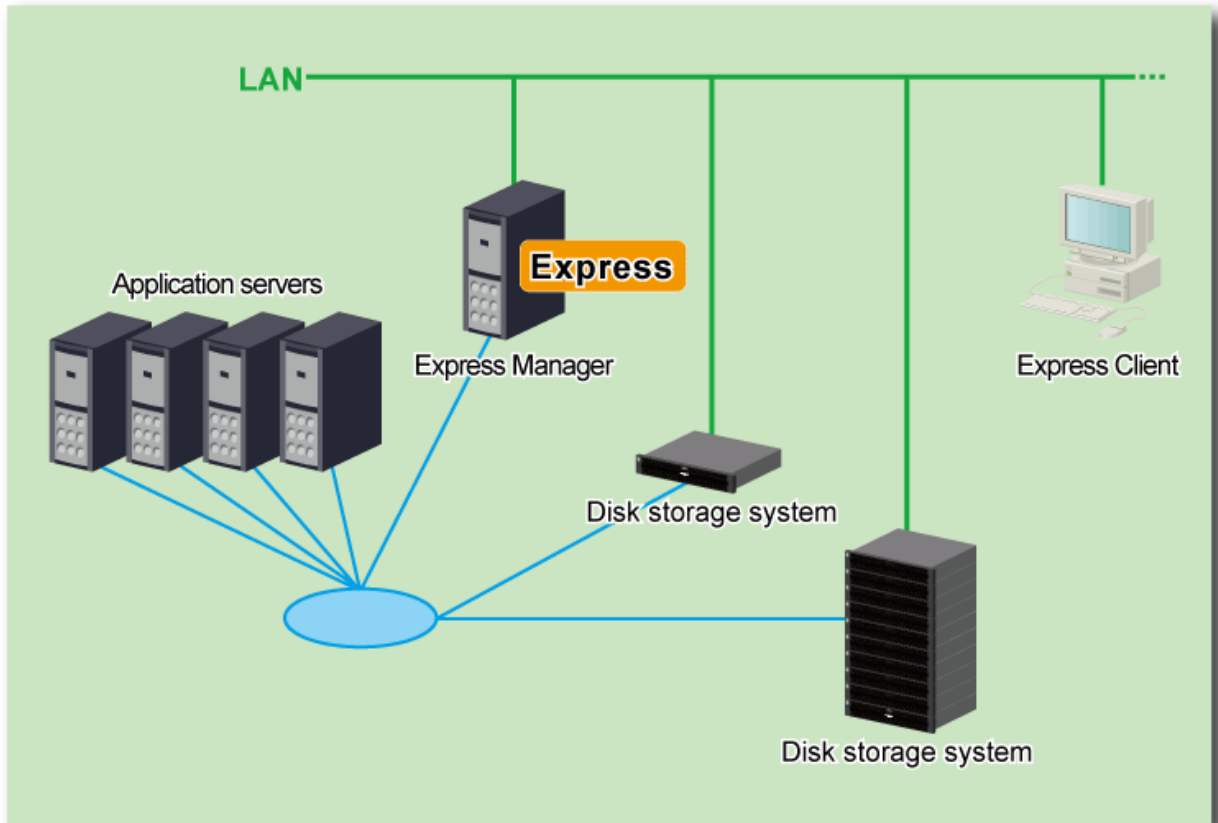
1.2 Overview of Express

This product is an additional software which can be operated with the GUI to use ETERNUS Disk storage system and FibreCAT SX Disk storage system easily.

1.2.1 Overview of Express
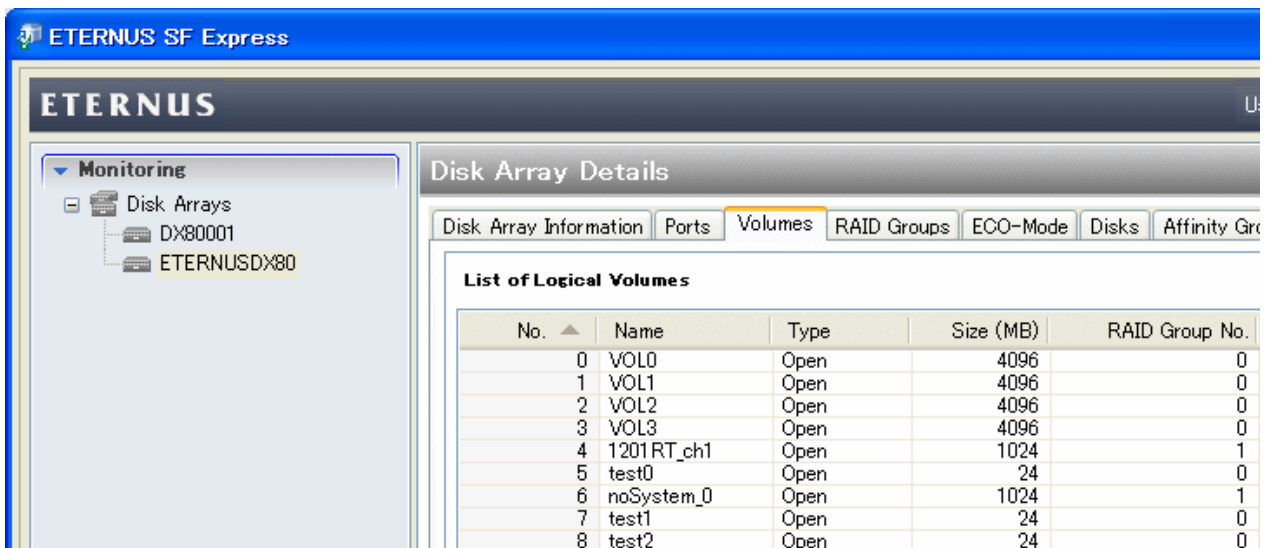
Express is an easy to use software addition to ETERNUS Disk storage system, in order to facilitate management of ETERNUS based storage as well as leverage ETERNUS functionality like Snapshots, Cloning or Remote copies.

Multiple storage management

Multiple ETERNUS Disk storage systems can be managed and monitored with one console. In addition, FibreCAT SX Disk storage system can be monitored.

Health and status overview
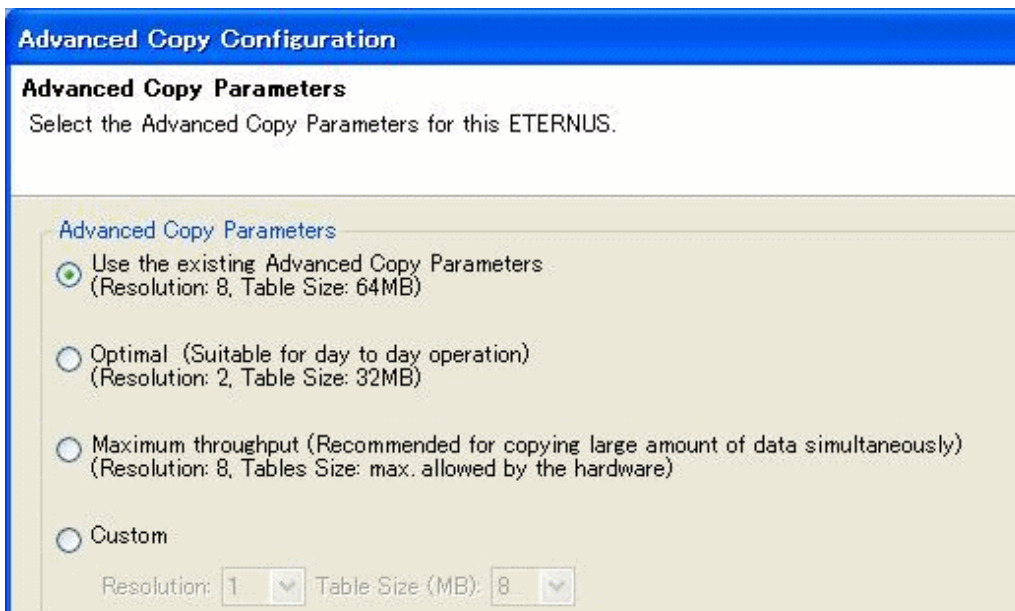
The internal configurations of Disk storage systems, such as volumes and RAID groups are displayed in a list, so that they can easily be checked. Besides, the integrated management of multiple storage systems makes it easy to notice any error occurrence even if you do not pay attention to each individual storage system.

Copy setting wizard

Hardware settings that should be performed before using Advanced Copy functions provided by ETERNUS Disk storage system can easily be done using a wizard.

Advanced Copy

For Snapshots, Clones and Remote copies that are the Advanced Copy functions provided by ETERNUS Disk storage system, you can set copy parameters and copy executions on the GUI window with ease.

Also, using the command line interface for Express enables a series of copy operations, so that the above functions are available for purposes of making scripts to work together with other programs and executing copy periodically using an OS scheduler.
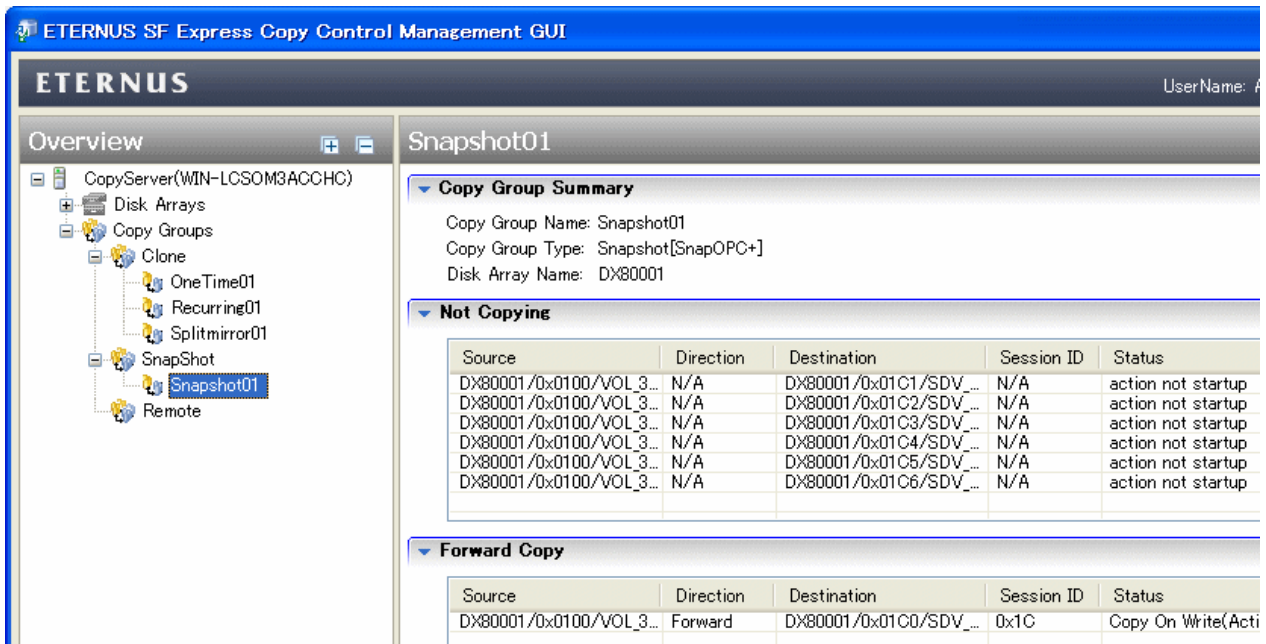
Types of Advanced Copy are as follows.

- Clone(One Time)[OPC]

- Clone(Recurring)[Quick OPC]

- Clone(Split mirror)[EC]

- Snapshot[SnapOPC+]

- Remote Advanced Copy

  - Synchronous mode

  - Consistency mode

  - Stack mode

Performance management

The command line operations allow 1 hour ETERNUS hardware performance information to be output into a CSV file.

1.2.2　Configuration of Express

The Express is comprised of the following components.

Figure 1.2 Configuration of Express
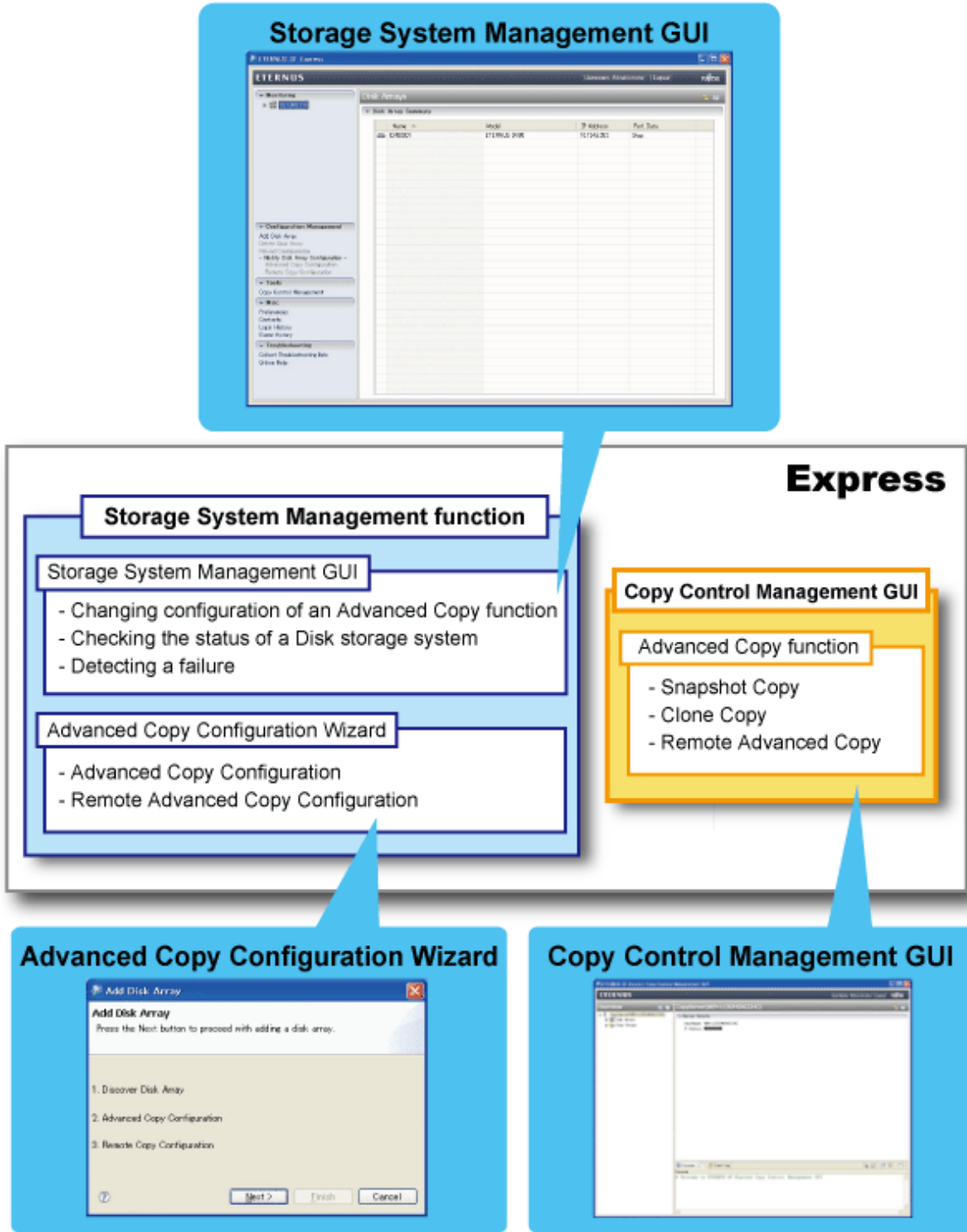
Storage System Management GUI

The following is the overview of the Storage System Management GUI window.
Use this as a reference when using the Storage System Management GUI.

Figure 1.3 Storage System Management GUI window
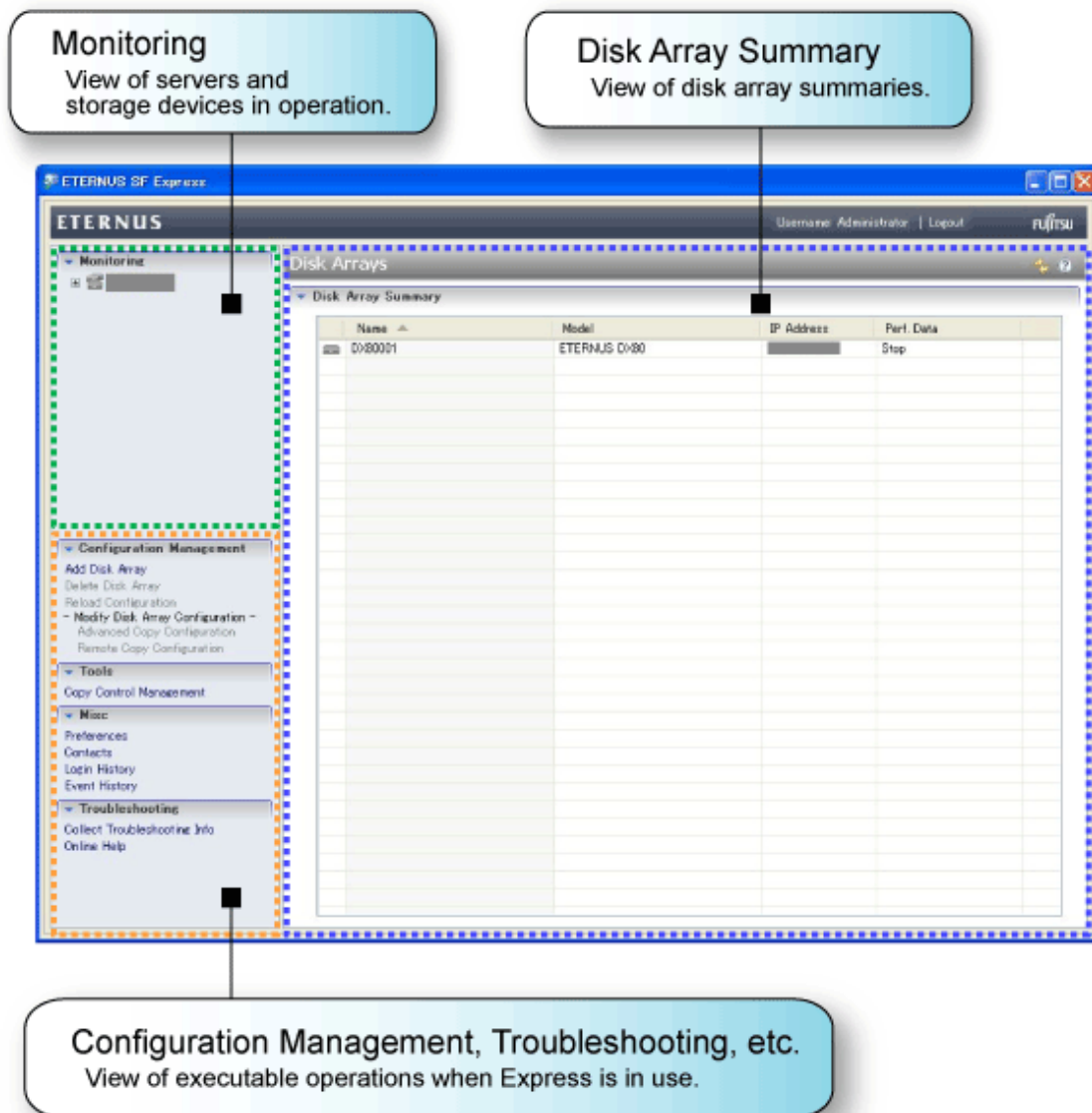
Copy Control Management GUI

The following is the overview of the Copy Control Management GUI window.
Use this as a reference when using the Copy Control Management GUI.

Figure 1.4 Copy Control Management GUI window
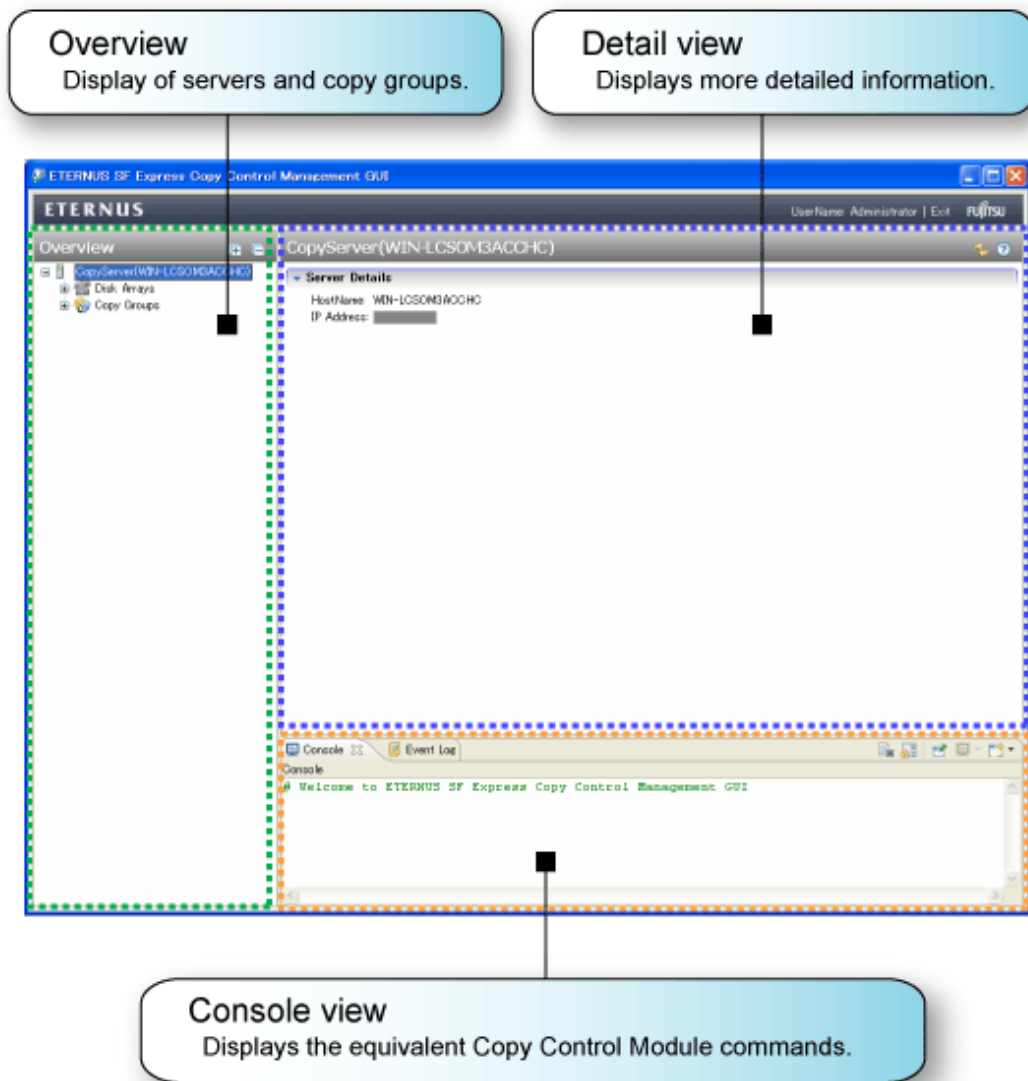
Note

Express can execute the processing of a maximum of 8 Snapshot type copy pairs concurrently. If you execute the processing of 9 or more Snapshot type copy pairs concurrently or if you execute Clone type copy or Remote type copy, you need the licenses of their respective types.

Chapter 2 Required Environment

This chapter describes the environments required for a storage system including Express.

When you use the Advanced Copy function (except Snapshot[SnapOPC+] within 8 sessions), you need to get equivalent Advanced Copy License key in advance.

2.1 Hardware conditions

A storage system including Express requires the following hardware.

Table 2.1 Storage hardware conditions

Series name	Model name
ETERNUS DX	DX60
	DX80
	DX90
FibreCAT SX	SX60
	SX80
	SX80 iSCSI
	SX88
	SX100

 Note

For FibreCAT SX Disk storage system, only monitoring is supported.

Table 2.2 Server hardware conditions

Series name
PRIMERGY

 Note

PRIMERGY FT model is unsupported.

Table 2.3 Capacities required for servers on which to install Express

Type of Express	Memory requirement (Unit : MB)	Disk space requirement (Unit : MB)	Remarks
Express Manager	128	1792 + (A)	A: Repository
Express Client	256	200	

Repository

Additionally, when performance management is being performed, based on the type of target (the ETERNUS DX60/DX80/DX90), the number of logical units involved, and the number of DE (Disk Enclosure), the required capacity given below becomes necessary.

```
(2) * (240 + (1.2 + 0.3 * number of DEs + 0.3 * (number of secured LUs + number of secured
RAIDGroups[*1])) * (86400 / 60) + (95 * number of DEs) + (50 * (number of secured LUs + number of
secured RAIDGroups[*1]))) / 1024 + 3 * (Number of days to collect + 12) * (10.6 + 0.07 * (86400 /
performance monitoring interval (seconds) 60)) / 1024

[*1] The "number of secured RAIDGroups" is the number of RAIDGroups created from the secured Lus.
```

📋 Example

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When securing the performance information of 512LUs in an ETERNUS DX80, (2 * (240 + (1.2 + 0.3 * 2 + 0.3 * (512 + 64)) * (86400 /
60) + (95 * 2) + (50 * (512 + 64))) / 1024) + (3 * 2 * (10.6 + 0.07 * (86400 / 60)) / 1024) = 548.8051MB is required.

••

Additionally, when performance information is output using the performance information operation command, the following disk space
is required, depending on the number of LUs of the ETERNUS DX60/DX80/DX90, number of DEs, number of ports that is used to collect
performance information.
Each element number of installed DEs, installed CM Ports, LUs, RAIDGroups is the number mounted in the device when the command
is executed.

```
Number of days to output 1/24 * (((0.1 + 0.4 * number of installed DEs + 0.1 * number of installed CM
Ports + 0.2 * (number of LUs + number of RAIDGroups)) * (86400 / performance monitoring interval
(seconds) 60)) + (0.2 + 0.6 * number of installed DEs + 0.2 * number of installed CM Ports + 0.4 *
(number of LUs + number of RAIDGroups))) / 1024
```

📑 See

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Refer to "C.3 storageadm perfdata (Performance information operation command)".

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Figure 2.1 Schematic view showing hardware conditions
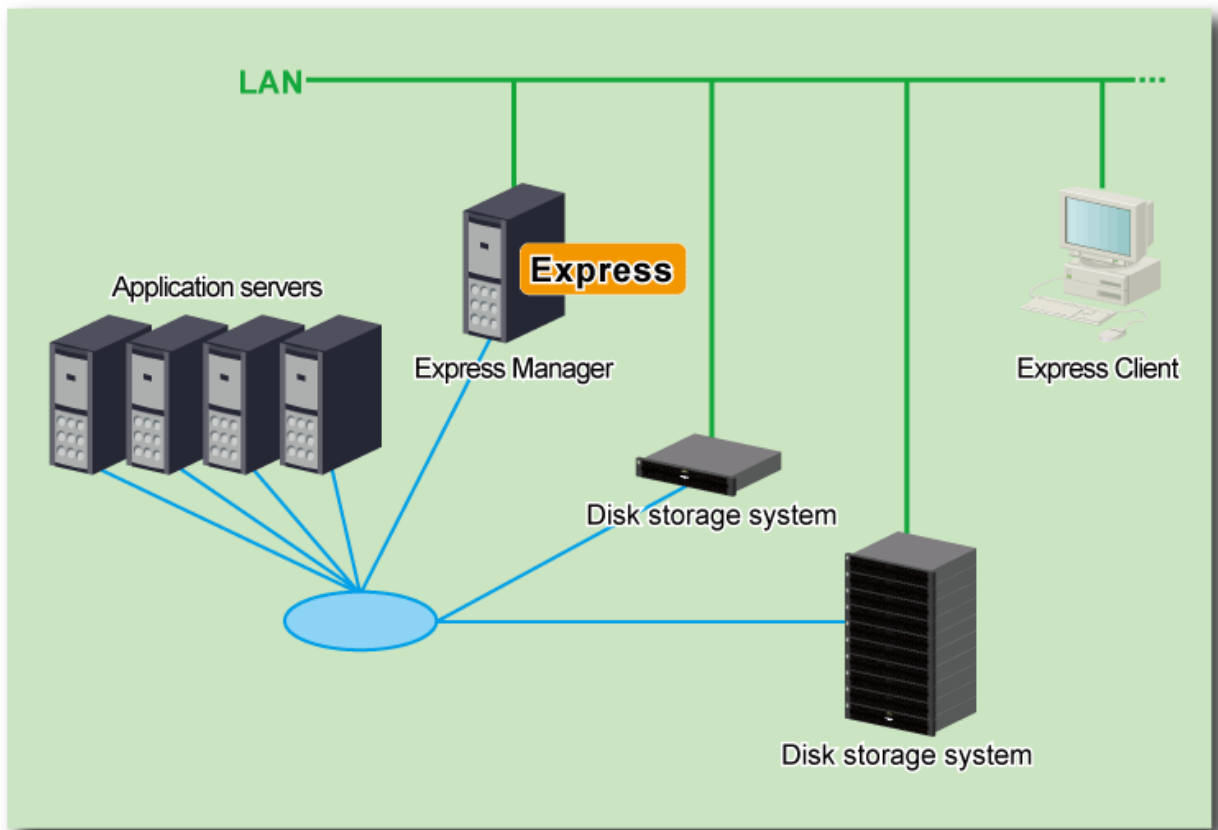
P Point

・ Number of management for Disk storage systems

Express is recommended to manage less than 10 Disk storage systems.

・ Connecting servers and a Disk storage systems

- FC-AL

- Fabric

- iSCSI

- SAS

2.2 Software conditions

Software conditions required for Express and software unavailable with Express are as follows.

Software conditions required for Express

Table 2.4 Manager software conditions

OS	Comment
Microsoft(R) Windows Server(R) 2008 Standard(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter(32-bit)(64-bit)	(64 bit) supports only 32 bit compatibility mode (WOW64).

OS	Comment
Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM)(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 without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Standard(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Enterprise(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Datacenter(64-bit)	Server Core installation option is unsupported. Guest OS in Hyper-V(TM) environment is unsupported.

Table 2.5 Client software conditions

OS	Comment
Microsoft(R) Windows(R) XP Home Edition Microsoft(R) Windows(R) XP Professional Windows Vista(R) Home Basic Windows Vista(R) Home Premium Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate Windows(R) 7 Home Basic Windows(R) 7 Professional Windows(R) 7 Ultimate	
Microsoft(R) Windows Server(R) 2008 Standard(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter(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 without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM)(32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Standard(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Enterprise(64-bit) Microsoft(R) Windows Server(R) 2008 R2 Datacenter(64-bit)	(64 bit) supports only 32 bit compatibility mode (WOW64). Server Core installation option is unsupported.

Exclusive software

This software cannot coexist with the following software.

・ ETERNUS SF Storage Cruiser

・ Systemwalker Centric Manager (manager function only)

🕉 **Note**
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・ When following software is installed, ETERNUS SF Express Advanced Copy function can not be used. In this case, you can only use Copy Control Module of ETERNUS SF AdvancedCopy Manager.

  - ETERNUS SF AdvancedCopy Manager (Copy Control Module) 14.0 or older

・ When ETERNUS SF AdvancedCopy Manager (Copy Control Module) 14.1 has been installed, both ETERNUS SF Express Advanced Copy function and AdvancedCopy Manager CCM can be used.
. . . .

Chapter 3 Flow from Introduction to Operation

This chapter describes the flow from introduction of a storage system to its operation.

Figure 3.1 Flow from installing to operating a storage system
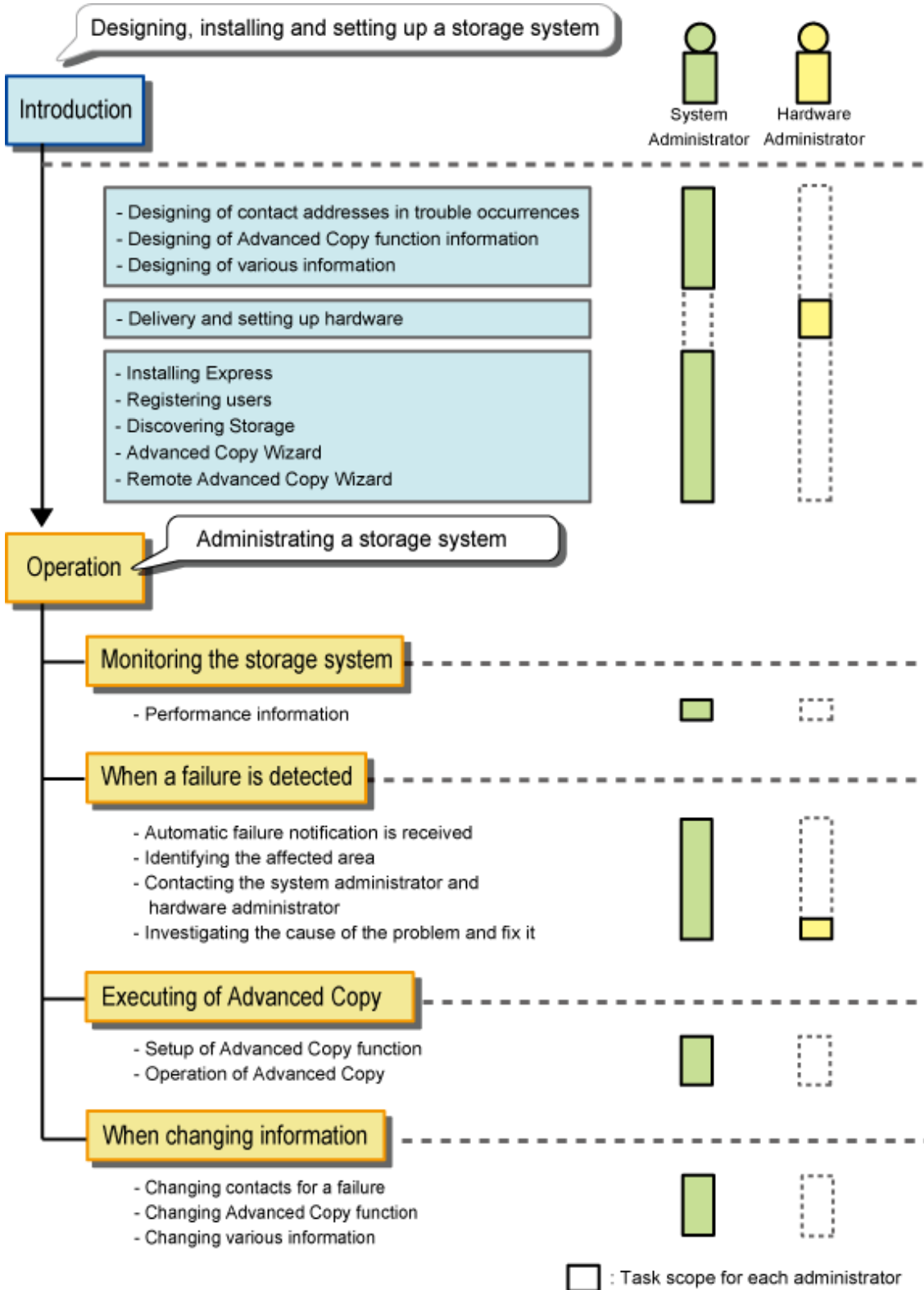
Express defines the role of each administrator for installing and administering a storage system.

Table 3.1 Roles of administrators

Administrator	Tasks
System Administrator	The system administrator is in charge of tasks from designing to operating the storage system. All the tasks required to operate the storage system are handled by this person.
Hardware Administrator	The hardware administrator is in charge of the storage system hardware. Hardware failures are handled by this person.

P Point
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Required privileges for administrators

To use Express, it is necessary to register a system administrator on a server on which you will install Express.

Refer to "5.2 Registering users" on the privileges granted to users to be registered.
· ·

Chapter 4 Express Managed Information

This chapter describes the information managed by Express to introduce and operate a storage system.

The following is the information managed by Express.

Table 4.1 List of information managed by Express

Information managed by Express	Item	Storage system introduction	Storage system In use
"4.1 Contact addresses in trouble occurrences"	Name	B	B
	Phone number	B	B
	Mail address	B	B
	Automatic notification of trouble occurrence	B	B
"4.2 Advanced Copy function information"	Disk storage system Name	A	B
	Disk storage system Model Name	A	C
	Disk storage system IP Address	A	B
	Advanced Copy Configurations	A	B
	Remote Advanced Copy Configurations	B	B
"4.3 Various information"	Number of days events kept	B	B
	Number of days login/logout kept	B	B
	Interval in Minutes	B	B
	SMTP server	B	B
	SMTP Port	B	B
	Mail Sender	B	B

A : Required items

B : Additionable/changeable items

C : Unchangeable items

4.1 Contact addresses in trouble occurrences

Express manages administrators and their contact addresses to reach if any trouble should occur in a storage system.

P Point
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Administrators and their contact addresses are to be optionally determined when Express is introduced or used.
If you receive a notification email of trouble occurrence or if you send the information collected according to the "How to collect trouble information" by email, decide administrators and their contact addresses.
....

Express manages the following contact addresses on a per administrator basis.
For the role of each administrator, see the "Chapter 3 Flow from Introduction to Operation".

Table 4.2 Contact information in trouble occurrences

Item	Description
Name	Name of an administrator. If you manage the storage system under a number of names, set up the name of a representative.

Item	Description
Phone number	Phone number of an administrator.
Mail address	Mail address via which to receive a notification email of trouble occurrence.
Automatic notification of trouble occurrence	The trouble of the storage system is notified to Express Manager by SNMP Trap. If error or warning level trouble should occur while the storage system is operated, select whether or not to send a notification email of trouble occurrence. You can select a system administrator. If a notification email of trouble occurrence is received under a number of names, set up a mailing list for those email addresses.

Note

....
When notifying a hardware administrator of trouble occurrence, the notification should be made from a system administrator.
....

4.2 Advanced Copy function information

Express manages the following information on the storage (Disk storage system).

Table 4.3 Advanced Copy function information

Item	Description
Disk storage system Name	Disk storage system name.
Disk storage system Model Name	Disk storage system model name.
Disk storage system IP Address	The IP address of the Disk storage system.
Advanced Copy Configurations	The Advanced Copy configurations information is shown as follows: ・ Advanced Copy License registration status ・ Copy table size ・ Bitmap ratio ・ Total amount for Snap Data Pool ・ Number of Snap Data Volumes
Remote Advanced Copy Configurations	The Remote Advanced Copy configurations information is shown as follows: ・ Remote Advanced Copy License registration status ・ Connectivity ・ Line speed ・ Compression ratio ・ REC buffer

Note

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・ The other parameters described above are set by ETERNUS Web GUI.

・ Disk storage system Name should be an alphanumeric character within 16 characters, when you use Advanced Copies.
....

📖Information
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For Advanced Copy function, refer to "Appendix A Advanced Copy Function".
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4.3 Various information

Express manages the following information besides that described in the "4.1 Contact addresses in trouble occurrences" through the "Appendix A Advanced Copy Function".

Table 4.4 Various information

Item		Description
History	Number of days events kept	Number of days event history is kept.
	Number of days login/logout kept	Number of days login/logout history is kept.
Screen refresh	Interval in Minutes	Screen refresh interval for the Storage System Management GUI. This can be specified in minute. To refresh screen manually, select the "Refresh" icon in the pane title bar in the Storage System Management GUI. "Screen refresh" is to acquire information from Express manager and to display the information in Storage System Management GUI. (Neither the configuration information nor the state are acquired from the device.) The acquisition of the configuration information and the state is executed by "6.5 Reload construct configuration".
Email	SMTP server	SMTP server name used when receiving a notification email of trouble occurrence. When not receiving a notification email of trouble occurrence or when not sending the information collected according to the "How to collect trouble information" by email, you do not have to set it up.
	SMTP Port	The port number of the SMTP server to send event notification email.
	Mail Sender	The sender email address for event notification email. The email address set here is used as an email sender.

Chapter 5 Introducing

This chapter describes the procedure to introduce a Disk storage system using Express.

5.1 Installing Express

This section explains the installation of Express.

5.1.1 Installing Express Manager program

Install the Express manager program to use a management server.

Refer to "B.1.1 Installation of Express Manager" for the installation method.

Note

If the Express manager server has multiple IP Addresses
Refer to "6.6 Express manager server with multiple IP Addresses" for the setting procedure.

5.1.2 Installing Express Client program

Install the Express client program to use a windows PC or server.

Refer to "B.1.2 Installation of Express Client" for the installation method.

5.2 Registering users

Register Express users before using a Disk storage system.
Refer to the table below to create a system administrator's user account on the Express manager installed server.

Table 5.1 Privileges required for the administrator's user account

Administrator	Privileges
System administrator	A user with the Administrator privileges registered on the OS of Express manager installed server.

The user information registered in this step is used when starting the Storage System Management GUI. The login history can be checked using the [Login History] under [Misc] menu of the Storage System Management GUI.

Note

A user with privileges described in the "Table 5.1 Privileges required for the administrator's user account" can use Express.
Create user accounts only for the users who will use Express to prevent unexpected users from using it.

Information

Refer to the "Chapter 3 Flow from Introduction to Operation" for the roles of the system administrator.

5.3 Configuring the Network Environment

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

Check the network environment, access authorization and communication mode settings between the Express Manager server and the Disk storage system. Make sure that one communication mode is not set to "Auto Negotiation" while the other is set to "Full (full duplex)"

Refer to the manual of the Disk storage system and check the network environment settings.

If the network environment configurations are insufficient, set them with ETERNUS Web GUI or FibreCAT SX WBI (web-browser interface).

When a firewall is placed, set the following port numbers to be able to pass the firewall.

Table 5.2 Settings for a firewall between the Express Manager server and the ETERNUS Disk storage system

Port Number	Protocol	Communication Start Direction
23	tcp	From Express Manager server to ETERNUS Disk storage system.
161	udp	From Express Manager server to ETERNUS Disk storage system.
162	udp	From ETERNUS Disk storage system to Express Manager server.
1999	tcp	From Express Manager server to ETERNUS Disk storage system.

Note

The telnet protocol port and the ETERNUS maintenance protocol port should be open in the firewall setting on the ETERNUS Disk storage system.

Table 5.3 Settings for a firewall between the Express Manager server and the FibreCAT SX Disk storage system

Port Number	Protocol	Communication Start Direction
161	udp	From Express Manager server to FibreCAT SX Disk storage systems.
162	udp	From FibreCAT SX Disk storage systems to Express Manager server.

Table 5.4 Settings for a firewall between the Express Manager server and the Express Client PC or server

Default Port Number	Protocol	Communication Start Direction
9853	tcp	From Express Client PC or server to Express Manager server.
9854	tcp	From Express Client PC or server to Express Manager server.

Note

When firewall of OS is made effective.

The Express doesn't use Microsoft SNMP Trap Service to receive the SNMP Trap.

Therefore, SNMP Trap cannot be received by making "SNMP Trap Service (UDP in)" effective in "Inbound Rules" of "Windows Firewall with Advanced Security".

Please add Inbound Rule of the following content by using "New Inbound Rule Wizard".

Item	Set value
Rule type	port
Protocol	UDP

Item	Set value
Port	Local 162
Action	Allow the connection

5.4 Discovering Storage

A system administrator will follow the steps below to discovery a storage device using the Storage System Management GUI.

1. Execute the following preparations to discover the storage system for the Express.

    - For ETERNUS Disk storage system

       Please set by ETERNUS Web GUI following item, refer to the ETERNUS Web GUI manuals for more information.

       - Confirm IP address of the server that operates Express manager is included in allowed IP list of MNT port on "Setup Network Environment Screen".

       - Make the SNMP function of MNT port effective at "Setup SNMP Agent (Basic Interface) Screen".

       - Please confirm storage system name displayed in "Name" column on "Modify Storage System Name Screen". Specify it in the alphanumeric character within 16 characters when you use Advanced Copy.

    - For FibreCAT SX Disk storage system

       Please set by FibreCAT SX WBI according to the following procedures, refer to FibreCAT SX Series Administrator's Guide for more information.

       - Make the SNMP function effective at "Services Security" page.

2. Login to the server using a user with Administrator privilege.

3. Start the Storage System Management GUI.
    Refer to "6.1 Starting the Storage System Management GUI" to start the Storage System Management GUI.
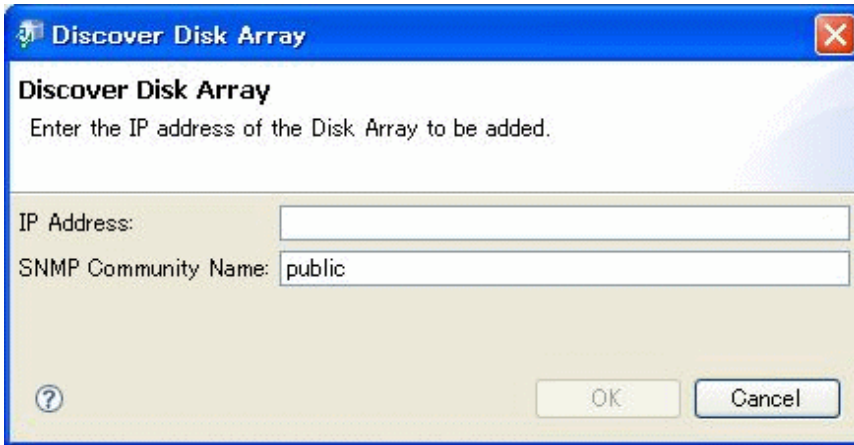
4. Select [Add Disk Array] and specify an IP address, Administrator ID and password for Disk storage system.
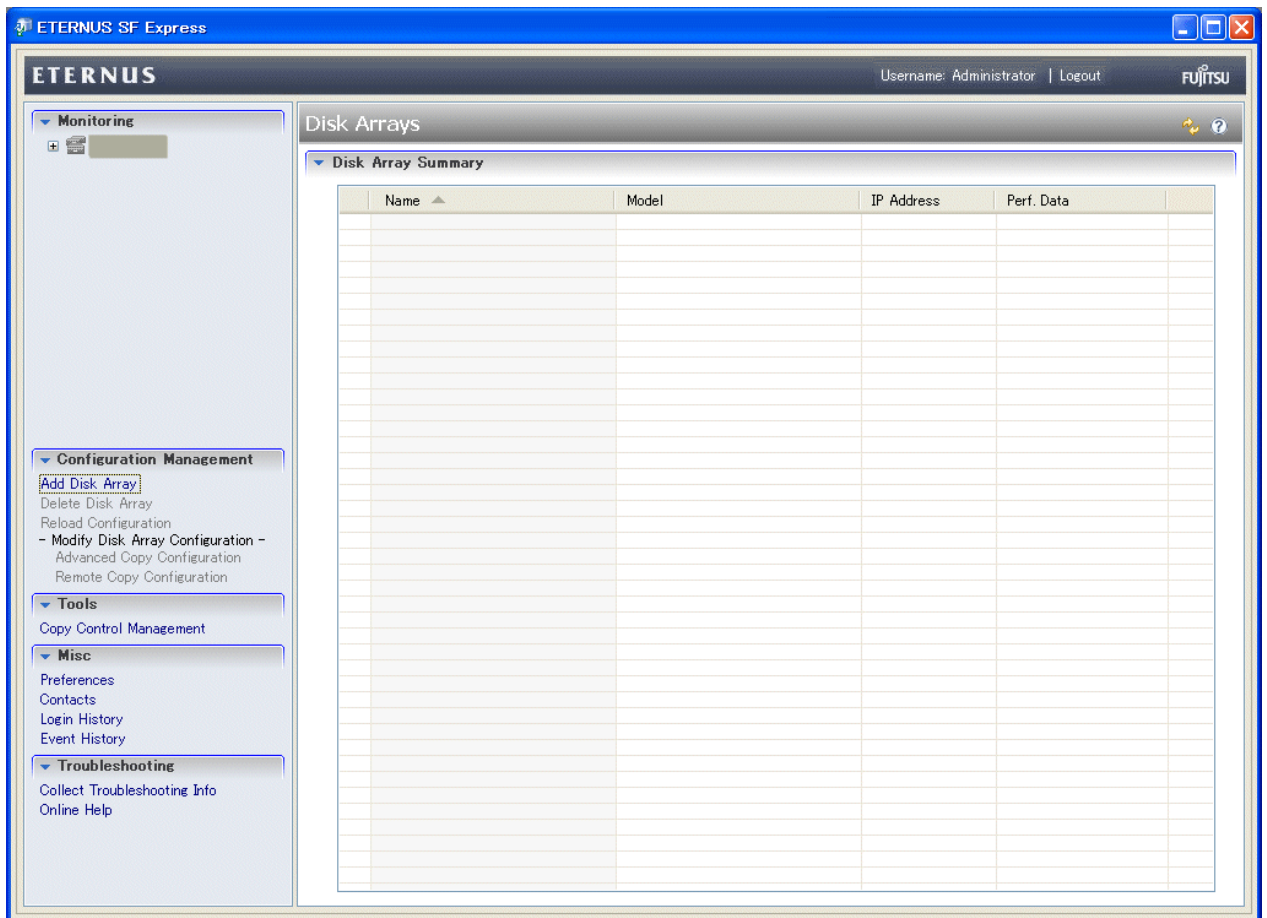
5. Click the [Next] button.
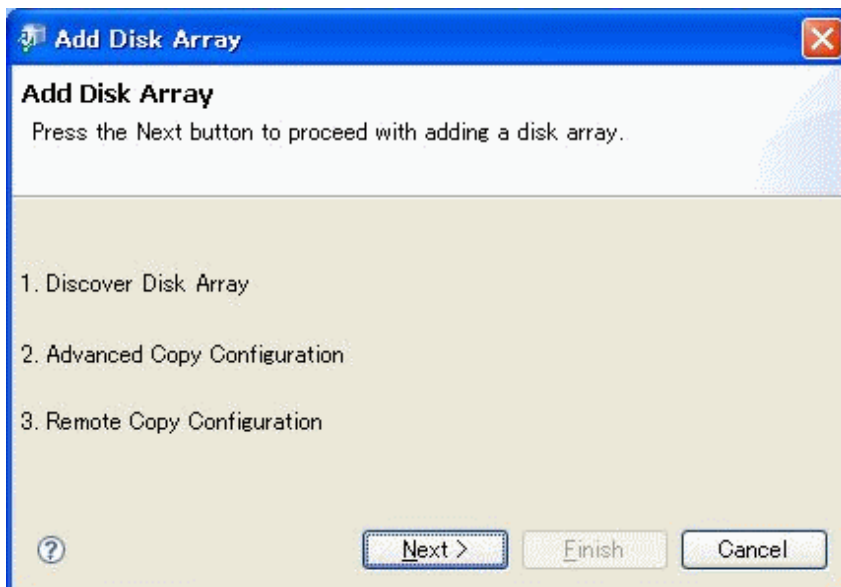
6. Specify an IP address and a Name of SNMP community.

![Note icon] **Note**

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When the ETERNUS Disk storage system that IP address is set to 2 CMs respectively is added by "Add Disk Array", it is necessary to specify "Master IP" in the wizard.

. . . .

7. Specify Administrator ID and password for the ETERNUS Disk storage system if you use it.

8. Display current configuration information.
   After check these parameter are correct, next step is Advanced Copy Configuration Wizard. If this Disk storage system is not target, retry to add other Disk storage system or cancel this work.

9. Set up an Advanced Copy function.

   - For Advanced Copy function

     Follow the procedures described in "5.5 Advanced Copy Configuration Wizard".

   - For Remote Advanced Copy function

     Follow the procedures described in "5.6 Remote Advanced Copy Configuration Wizard".

![Note icon] **Note**

. . . .

・ Execute the discovery of each controller module for FibreCAT SX Disk storage system with 2 controller modules.

・ To delete the storage device which has registered in Express Client, select the device on the screen, and click [Delete Disk Array]. If the device uses Advanced Copy function, you must not delete storage device which has registered in Express Client.

. . . .

5.5 Advanced Copy Configuration Wizard

A system administrator will follow the steps below to set up an Advanced Copy function using the Advanced Copy Configuration Wizard.

Please click [Advanced Copy Configuration] in [Configuration Management] of Storage System Management GUI. Advanced Copy Configuration Wizard starts.
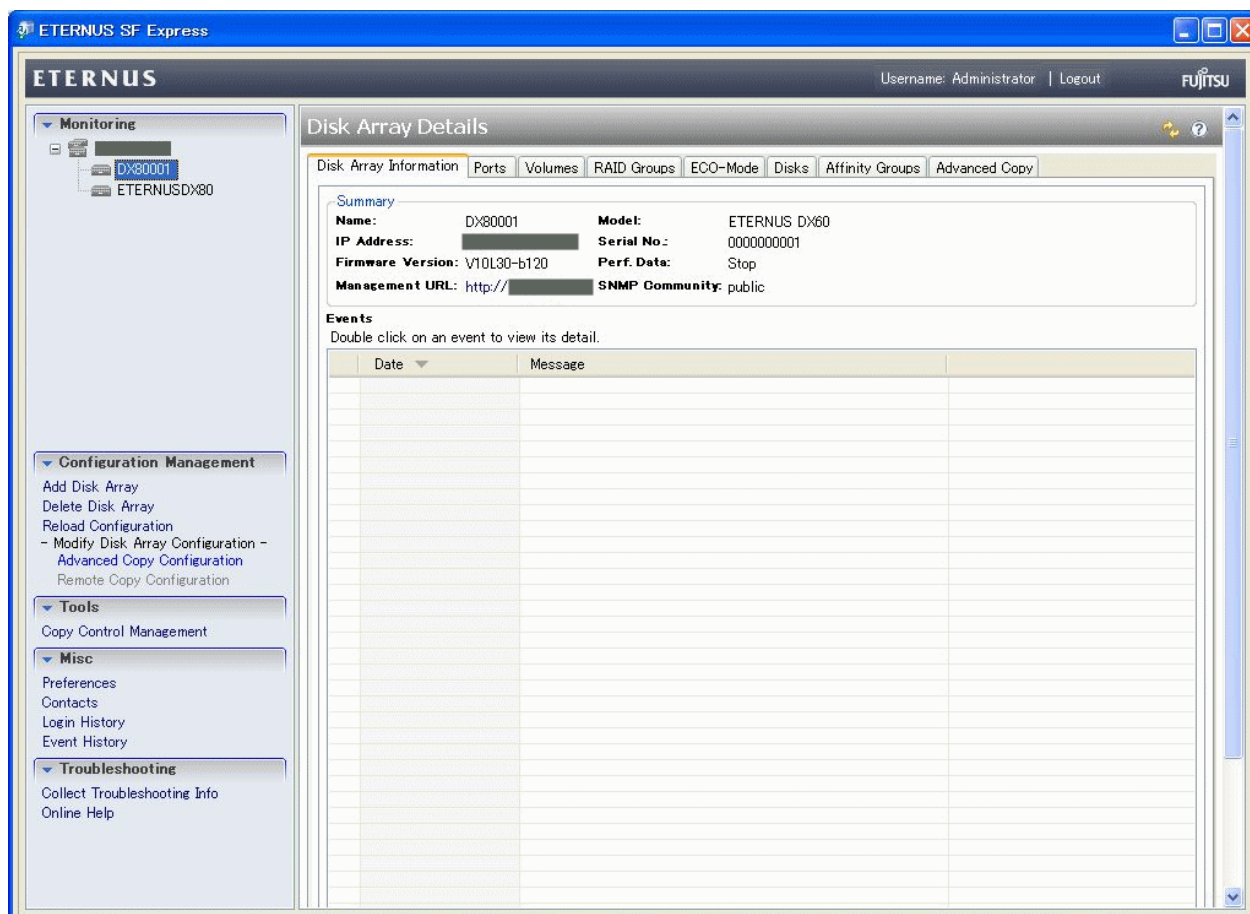
1. Input Advanced Copy License
   Displays Advanced Copy license status. If the Advanced Copy license is not registered, input the license key.

   ## Point

   To utilize Advanced Copy functions or Remote Advanced Copy functions, the corresponding Advanced Copy licenses are required.
   However, up to 8 SnapOPC+ sessions can be run by Express without license.

2. Advanced Copy Parameters
   Tunes the parameters that relates to Advanced Copy.

3. SDPV setting
   A list of the current Snap Data Pool and Snap Data Pool Volume is displayed, and then creates Snap Data Pool Volume.
   To remove SDPV, please use ETERNUS Web GUI.

Item	Description
SDPV Name	The number of characters in the SDPV Name must be 16 or less including numeric values generated by "Count". The "Count" parameter generates consecutive number values that are included at the end of the SDPV

Item	Description
	Name. The SDPV name must be unique and not contain spaces.
Size (GB)	An integer number must be input for the size of SDPV.
Count	The total number of volumes must be 128 or less including SDPV to be added and existing volumes in the RAID Group. An integer number must be input for the size of SDPV.

Note
. . . .

It is recommended to provide at least one SDPV for every CM of ETERNUS Disk storage system.

In addition, if there is any encrypted open volume, it is required to provide an encrypted SDPV separately from a normal SDPV.

. . . .

5.6 Remote Advanced Copy Configuration Wizard

A system administrator will follow the steps below to set up a Remote Advanced Copy using the Remote Advanced Copy Configuration Wizard.

Please click [Remote Copy Configuration] in [Configuration Management] of Storage System Management GUI. Remote Advanced Copy Configuration Wizard starts.

Note
. . . .

・ In Remote Advanced Copy Configuration, values for not shown parameters are what ETERNUS Disk storage system currently has.

  If necessary, please confirm or modify them by ETERNUS Web GUI.

・ When you change FC-CA to FC-RA, already set parameters are changed to default values.

  Connection is changed to FC-AL.
  Transfer rate is changed to Auto Negotiation.

・ When you modify REC route, the modification creates new REC route.

  If necessary, please use ETERNUS Web GUI to remove previous used REC route.

・ If you need to remove REC buffer, please use ETERNUS Web GUI.

・ If you detect the two devices for which the REC route and Remote Copy license have already been set up, you can finish settings by reloading the device information after having registered both devices.

. . . .
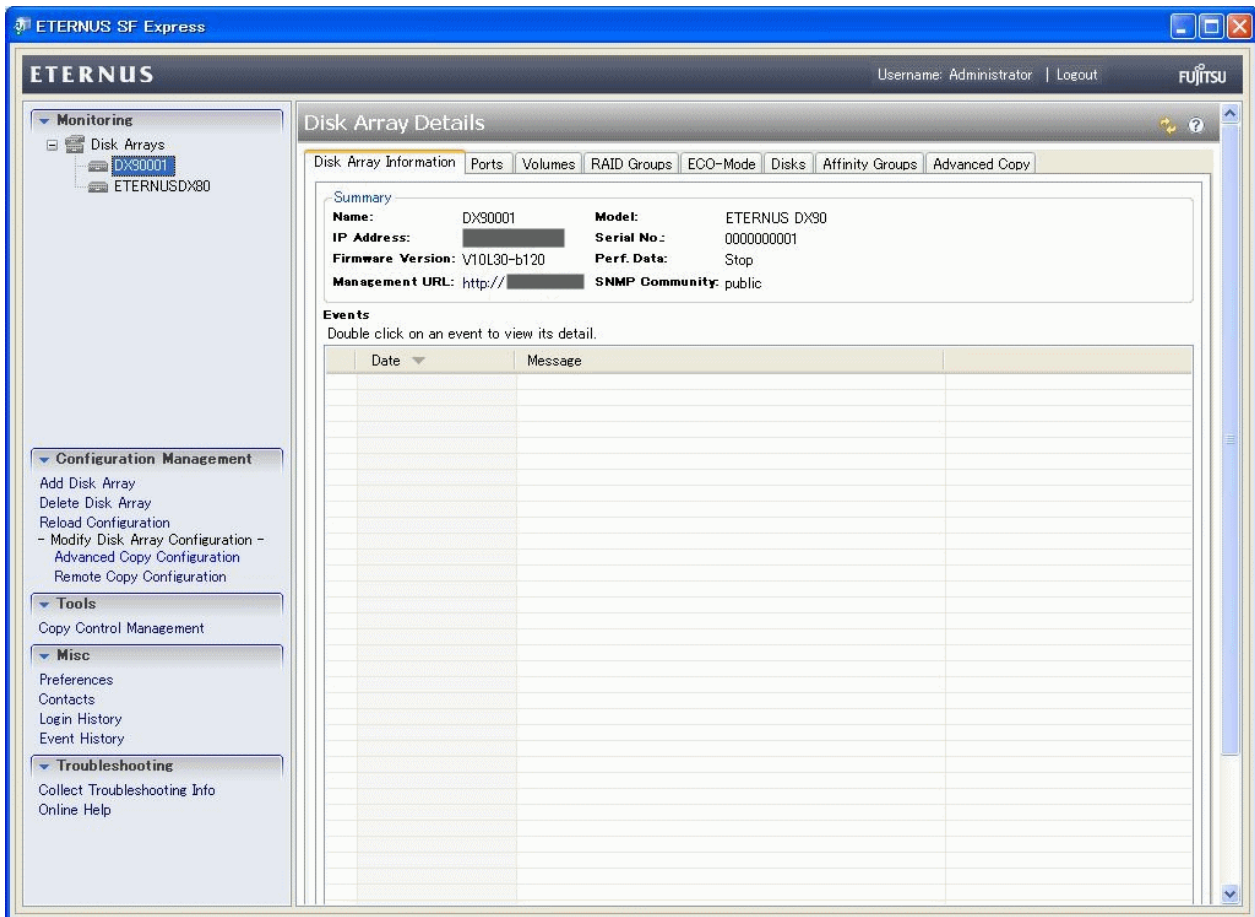
1. Display a list of pairs that are already configured for Remote Advanced Copy

2. Select the primary storage
   List all the registered Disk storage systems and let the system administrator to choose the primary storage.

3. Select a secondary storage
   The system administrator user may select another Disk storage system for the secondary storage except the one chosen as the primary storage.

4. Remote Advanced Copy route settings
   Displays a list of Disk storage system ports available for Remote Advanced Copy.
   Set the secondary path.

5. Connection instruction
   Instruction is given for connecting between remote adapter ports and wait for completion.

6. Configure REC buffer
   Enter buffer setting parameter for REC Consistency mode.

   If the Consistency mode is not used, this parameter is not needed to set.

   REC buffer is set for both ETERNUS Disk storage systems of REC pair.

5.7 Various Settings

This section describes how to specify various information on Express.

5.7.1 Various information

Click [Preferences] in [Misc] menu to specify various information.
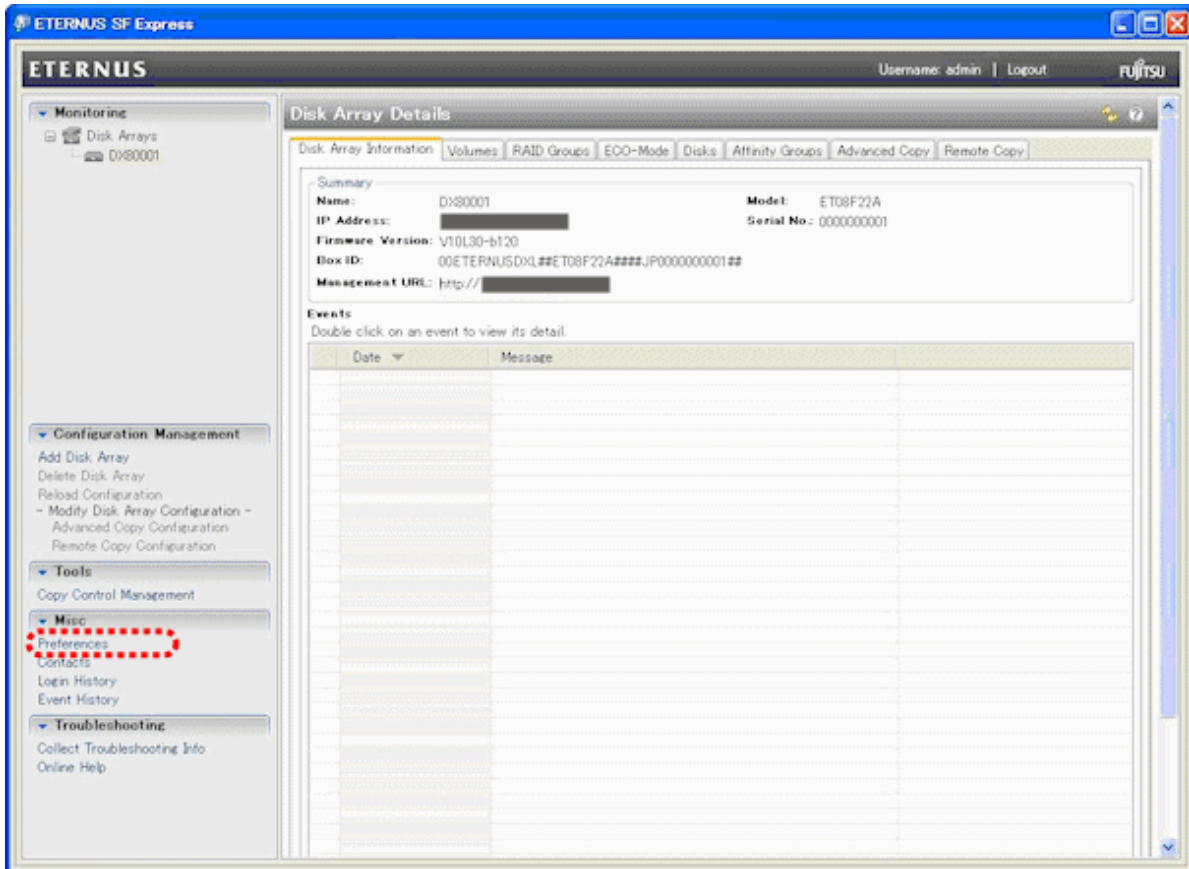
Click the [General] tab to specify the following information.

・ Number of days events kept:

Specify the number of days to retain event log.
A range of specifiable values (effective range) is from 0 to 365.
If a value above 365 is input, use its upper 2 figures as an input value.

・ Number of days login/logout history kept:

Specify the number of days to retain login/logout history.
A range of specifiable values (effective range) is from 0 to 365.
If a value above 365 is input, use its upper 2 figures as an input value.

・ Interval in Minutes

Specify the screen refresh time interval in minutes. If 0 (zero) is specified, the screen is not refreshed automatically.
A range of specifiable values (effective range) is from 0 to 1440.
If a value above 1440 is input, use its upper 3 figures as an input value.
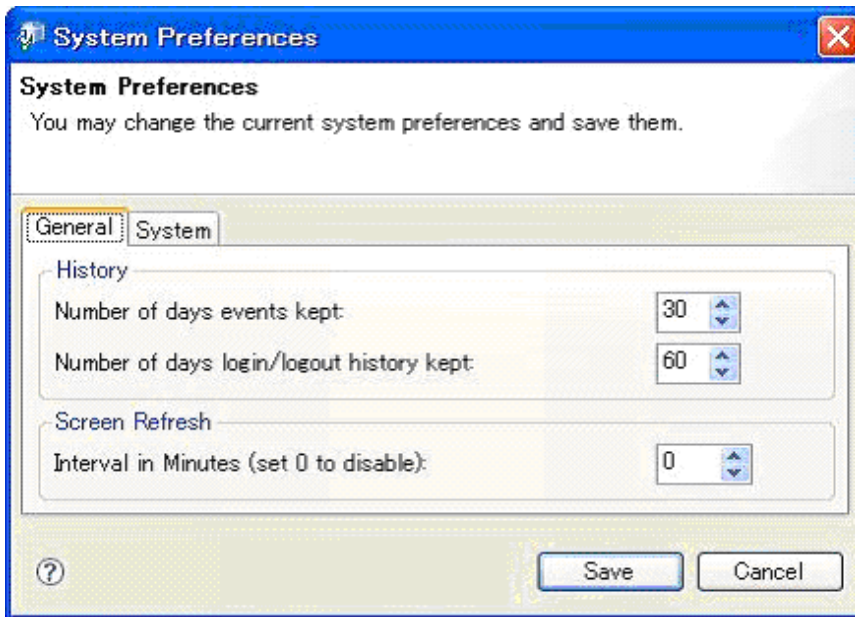
Click the [System] tab to specify the following information.

　・ SMTP Server:

　・ Mail Sender:

　　Specify a mail address to be set in the mail sender header.

　・ SMTP Port:

　　Specify a SMTP port number.
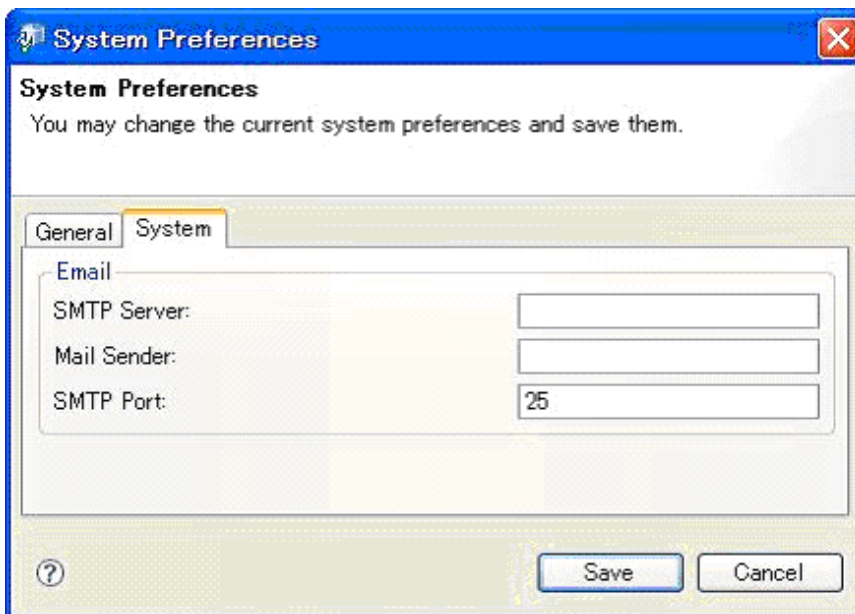
5.7.2　Setting up contact information

Click [Contacts] in [Misc] menu to set up contact information.
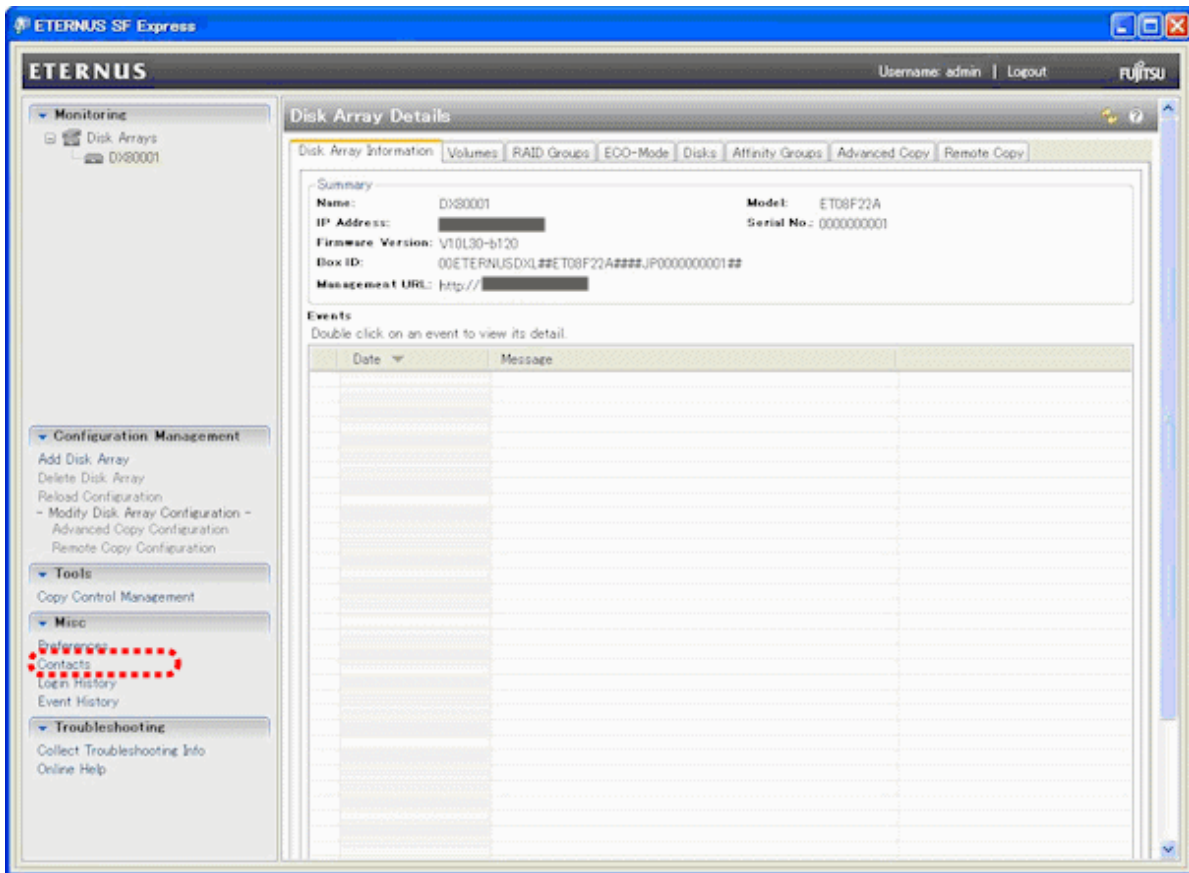
Set up information for system administrator and hardware administrator.
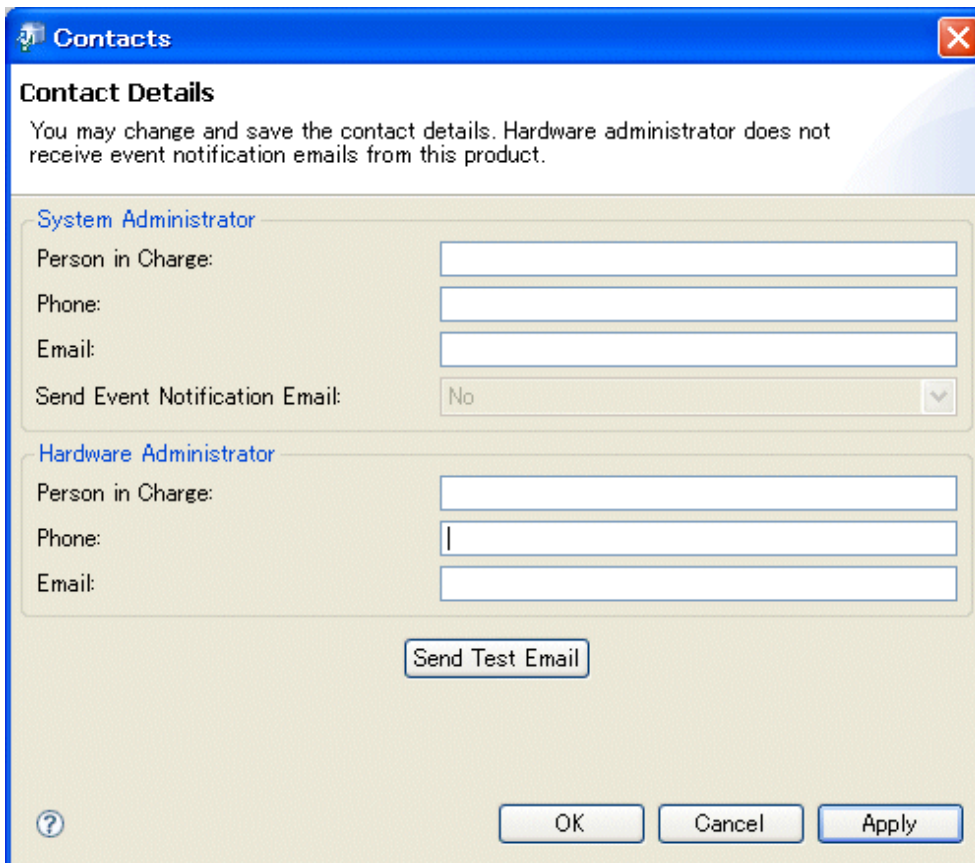
5.8 Test

This section describes procedure of testing SNMP Trap reception and email sending.

5.8.1 Procedure of testing SNMP Trap reception

The test of the SNMP Trap reception is executed according to the following procedures.

Confirm SNMP Trap from storage system is displayed in Storage System Management GUI.

・ For ETERNUS Disk storage system

SNMP Trap sending destination is automatically set.
Click the [Send] button in the "Perform SNMP Trap Test" screen of ETERNUS Web GUI.

Refer to the ETERNUS Web GUI manuals for more information.

・ For FibreCAT SX Disk storage system

SNMP Trap sending destination is not automatically set.
Please set by FibreCAT SX WBI according to the following procedures, refer to FibreCAT SX Series Administrator's Guide for more information.

1. Make SNMP Trap notification enable at "notification summary" page.

2. Set IP address of the server that operates Express Manager and make SNMP Trap enable at "SNMP configuration" page.

3. Click the [Send Test Trap] button at "SNMP configuration" page.

5.8.2 Procedure of email sending test

Follow this procedure if the even notification email has been set.

Ensure that the test email is received using the email address that has been set.

Refer to "6.7 When sending a test mail" to test if the test email can be received using the email address that has been set.

Chapter 6 Operation

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

6.1 Starting the Storage System Management GUI

This section describes the procedure to start the Storage System Management GUI.

 Note

Since the ETERNUS Web GUI and the ETERNUS CLI has a higher authority over modification functions than the Storage System Management GUI, if you use them at the same time, the Storage System Management GUI may end abnormally.

For example, while a configuration is being changed with the ETERNUS Web GUI, you cannot execute "6.5 Reload construct configuration" with the Storage System Management GUI.

Therefore, when you use the Storage System Management GUI, do not use the ETERNUS Web GUI and the ETERNUS CLI.

1. Make sure whether the Computer Browser service is started. (Only when the computer is joined to a Windows domain)

   If the computer is joined to the Windows domain, it is required that the Computer Browser service has been started in order to use the Storage System Management GUI.

   For this reason, make sure that the [Status] of the Computer Browser service is [Started] by clicking on [Control Panel] > [Administrative Tools] > [Services].

    Point

   The Computer Browser service on Windows Server 2008 is stopped by default.

2. Start the Storage System Management GUI.

   - In the case of a user account with administrator authority whose OS is Windows Server 2008 and whose user name is not Administrator:

     [Start] > [All Programs] > [ETERNUS SF Express] > [Express], and right-click the [Express] to display [Run as Administrator].

   - In cases other than above:

     [Start] > [Programs] > [ETERNUS SF Express] > [Express].

3. Login.

   Enter your user ID and password to log into the Storage System Management GUI.

   In each environment, the following user IDs can be specified.

   - Local server: Local user

   - Domain member server: Local user and Domain user

   - Domain controller server (PDC/BDC): Domain user

    Note

   When the domain user is specified, it is specified with "Domain-name\user-name" format.

6.2 Performance Monitoring

This software supports performance management functionality for Disk storage systems. This functionality enables users to get details about the operation and load statuses of devices. However, this software does not support performance management functionality in relation to the ETERNUS Disk storage system SDV or FibreCAT SX Disk storage system.

When a user gives an instruction for performance management of a target device from a Storage System Management GUI window, the performance management unit issues SNMP get periodically through a LAN to devices to obtain performance information, and it saves the information as performance data on the Express manager server. This software can output performance information up to 1 hour before by the storageadm perfdata (Performance information operation command) and manages the device.

To conduct performance monitoring, sufficient disk space is required on the administrative server for performance data storage. Make sure that sufficient disk space is ensured referring to "2.1 Hardware conditions".

Note

・ Do not execute performance monitoring for a single device from more than one administrative server(*) at the same time.

  * The Express manager servers, the ETERNUS SF Storage Cruiser administrative servers, or the Systemwalker Resource Coordinator administrative servers.

・ The performance management functionality always starts up when the Express manager server starts up. For devices in which performance management settings have been configured, performance information collection starts in the background. Accordingly, performance information is collected regardless of whether Storage System Management GUI window display. To stop performance information collection, execute performance management stop processing.

6.2.1 Starting collection of Performance information

When you click [Start Performance] in Storage System Management GUI window, an instruction to obtain performance information is issued to the performance management unit, and the performance management unit obtains performance information of the device through the LAN and saves it as performance data. Since the performance management unit is started as a daemon of the Express manager server, the unit continues obtaining performance information while the Express manager server is active, even if no Storage System Management GUI window is displayed.

The logical configuration of the storage device is recognized, and the obtaining of performance information starts. At the start of obtaining performance information of the selected storage system, an amount of time (tens of seconds to several minutes) is spent to obtain the logical configuration before any performance information is actually obtained.

When performance monitoring starts, "Monitoring" is displayed in "Perf.Data" row as a state of the performance monitoring.

The table below lists value of "Perf.Data" row and their corresponding statuses and actions to be taken. The color may differ from that of the current status. Click [Reload Configuration] button on the Storage System Management GUI window to check the latest status.

Value of "Perf.Data" row	Status	Appropriate action
Monitoring	Performance is being monitored. (Normal)	Performance is being monitored.
Recovering	Performance monitoring is being recovered (e.g. device time-out).	The Express manager server cannot communicate with a device. Check the network status and device status. Log off, when ETERNUS Web GUI is in a login state.
Error	Performance monitoring is being error (e.g. device time-out, writing to the performance information file failed.)	The Express manager server cannot communicate with a device. Check the network status and device status. Log off, when ETERNUS Web GUI is in a login state. Check the write permission to the file and the capacity of the file system. Then, click [Stop Performance] in Storage System Management GUI window.
Stop	Performance monitoring has stopped. (Normal)	Performance monitoring has stopped.
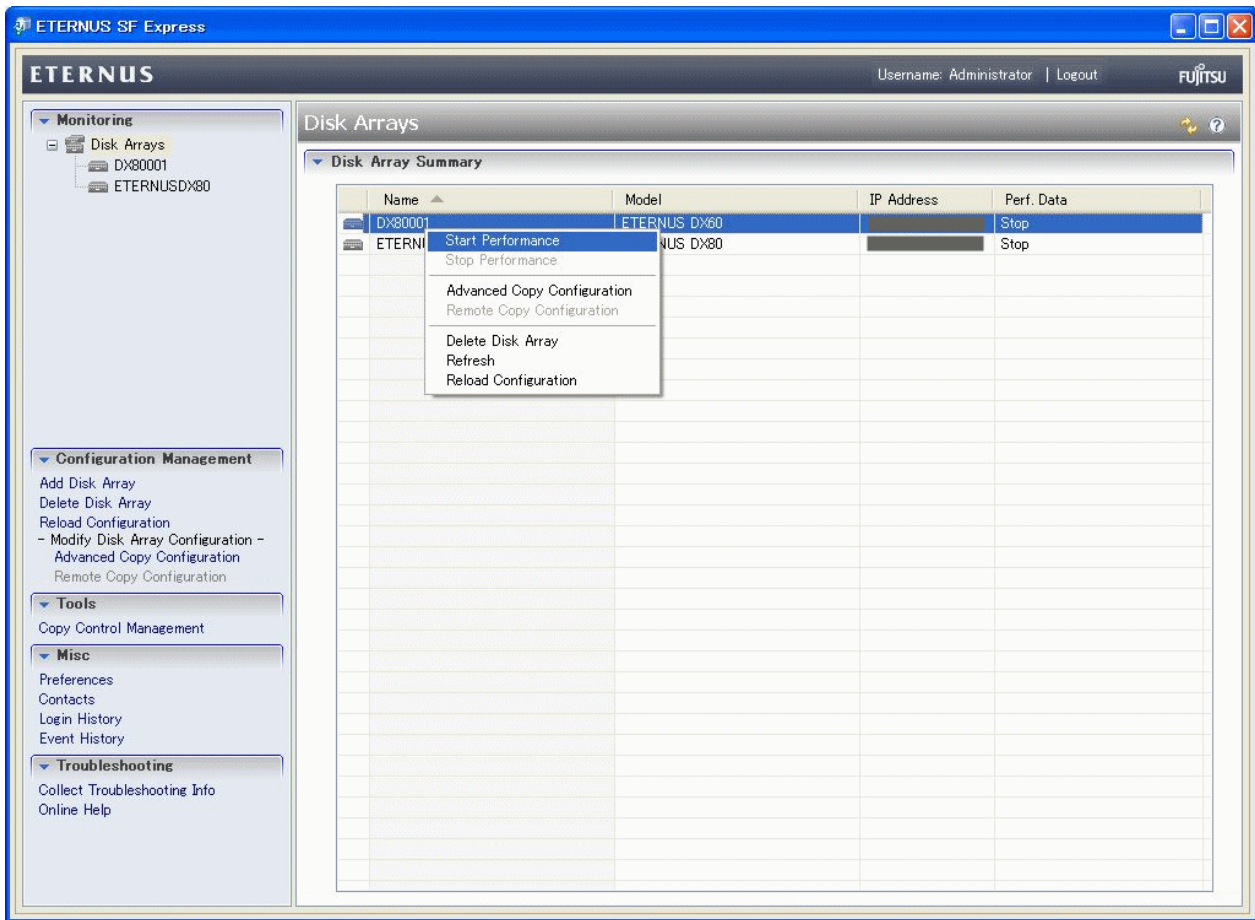
6.2.2 Stopping collection of Performance information

Click [Stop Performance] to stop collection of Performance information.
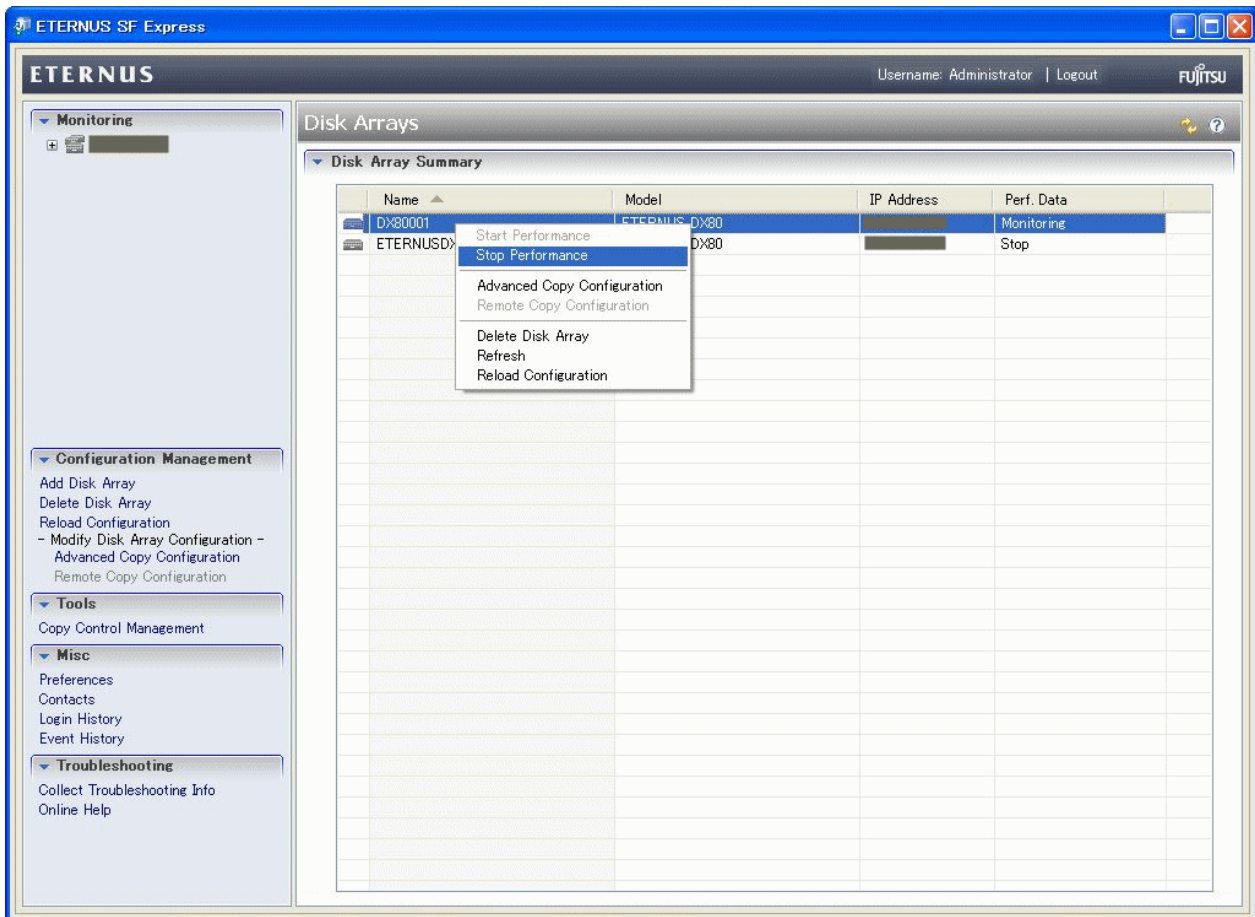
6.2.3   Showing the Performance information

The performance information can be output to the CSV format file by using the storageadm perfdata (Performance information operation command).

The following information can be managed.

	Performance information (Unit)
LUN Logical Volume RAID Group	Read/Write count (IOPS)
	Read/Write data transfer rate (MB/S)
	Read/Write response time (msec)
	Read/Pre-fetch/Write cache hit rate (%)
Disk drive	Disk busy rate (%)
CM	Load (CPU usage) rate (%)
	Copy remaining amount (GB)

	Performance information (Unit)
CM Port	Read/Write count (IOPS)
	Read/Write data transfer rate (MB/S)
Device	Number of active disks (Disk)
	Power consumption (W)
	Temperature (C)

🛈 **Note**

. . . .

Performance information about the ETERNUS Disk storage system SDV is not supported, and performance information values for RAID Group cannot be guaranteed.

. . . .

6.3 When having detected any trouble

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

Any trouble occurrence is detected in the following way.

・ An email of error or warning level trouble occurrence is sent from Express.

・ Trouble occurrence is notified by a user.

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

Figure 6.1 Flow from trouble detection to its response

A problem occurred

User
A user reports the problem

Express
Event notification email

System Administrator

Problem detected

Check status of the problem

The icon indicates a problematic component

Investigate the problem
(Collect troubleshooting Info)

Contact the hardware administrator

Need to restore?

Yes

No

Restore data

System Administrator   Hardware Administrator

Fix problem

Problem resolved
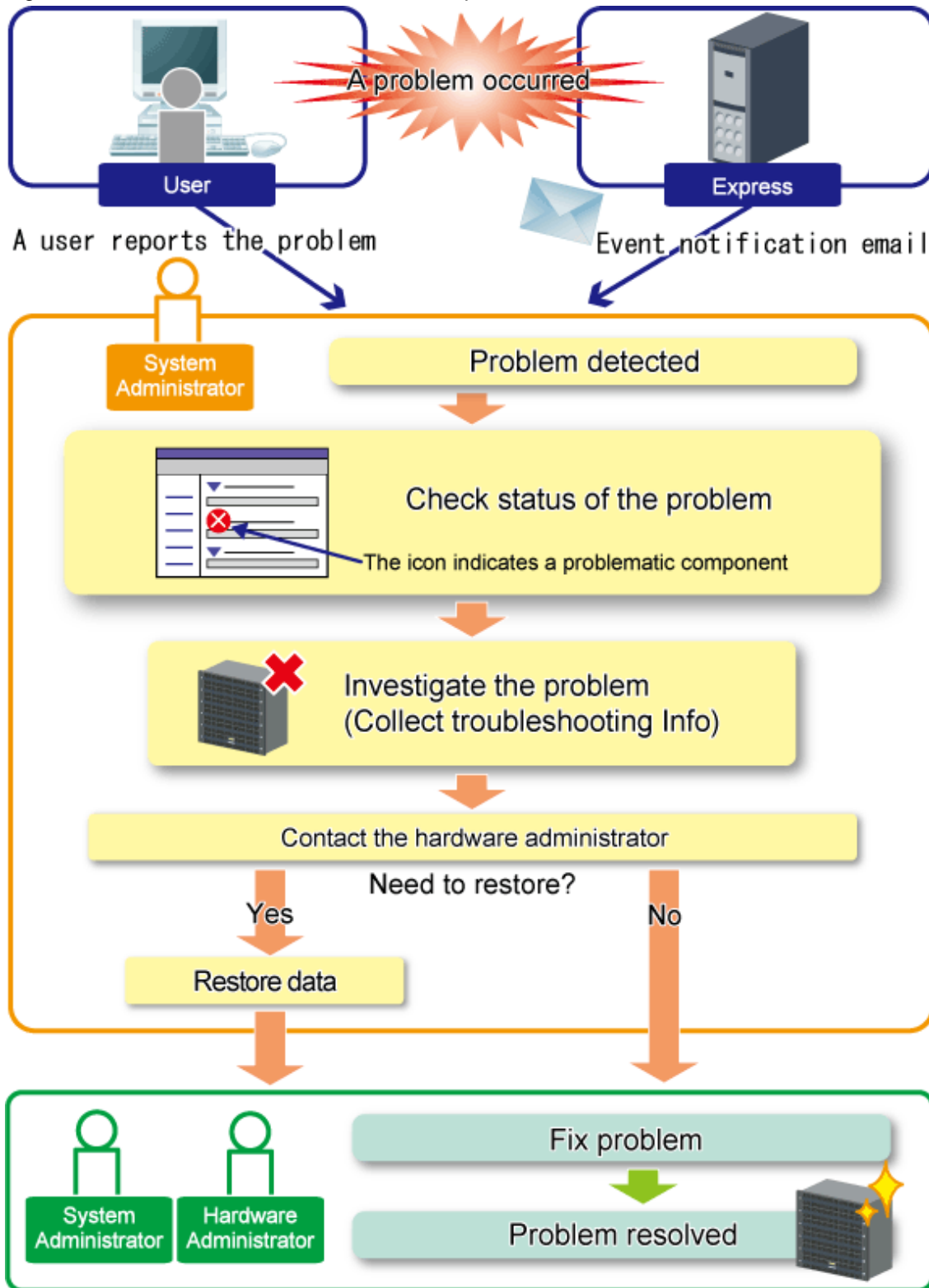
6.3.1   Identifying the trouble condition

If any trouble should occur, start the Storage System Management GUI. Since the Storage System Management GUI displays the status of each device with icons or messages, it is easy to identify the trouble condition.

In addition, via the Storage System Management GUI you can identify the status of the storage system.

Figure 6.2 Storage System Management GUI in trouble occurrences
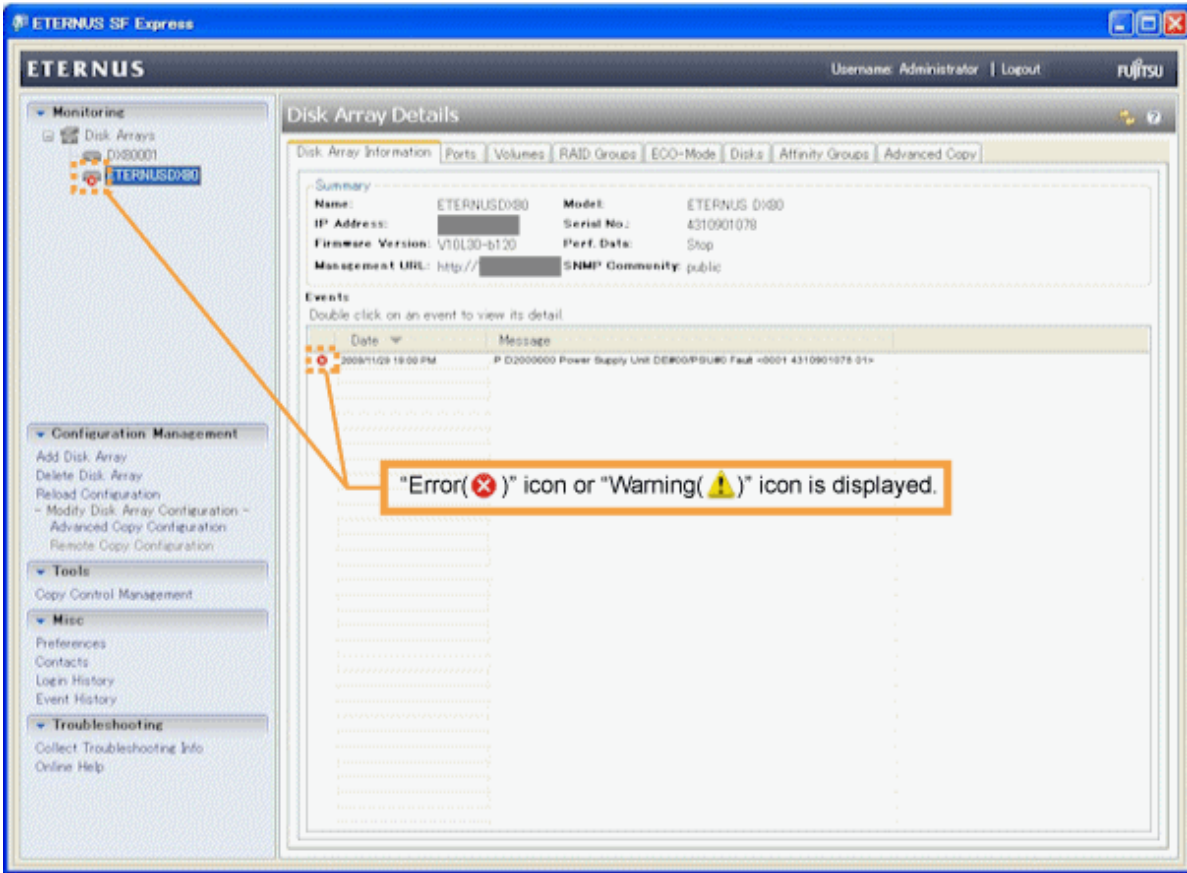
If any trouble is occurring, check the following points.

・ Icon

"Error(❌)" or "Warning(⚠)" icon is displayed at the trouble-occurring area.

If these icons are displayed, it is highly possible that business operations are affected. Therefore, identify the contents of the trouble to take responses.

・ Message

A message of trouble occurrence is displayed at "Event" along with an icon.

🅿 Point
. . . .
In the following cases, the state icon of the storage system displayed in the [Monitoring] menu is renewed.

・ When there is an event notification more than the warning level from the storage system.

・ When you execute "6.5 Reload construct configuration" with Storage System Management GUI.
. . . .

6.3.2 Trouble analysis

There are other methods to analyze the effects of the trouble besides "6.3.1 Identifying the trouble condition". Use those methods as required.
In addition, for hardware troubles, contact the hardware administrator when needed.

- Trouble information collection

  This is used when collecting detailed information about the trouble, which can be collected via the Storage System Management GUI.

  For trouble information collection, refer to "How to collect trouble information".

- Display of configuration information details

  You can check every server operation and disk configuration information managed in storage in a list.

  Selecting the Storage System Management GUI will display configuration information details.

How to collect trouble information

1. Select [Collect Troubleshooting Info] from the [Troubleshooting] menu in the Storage System Management GUI.

2. Select the required item to click the [OK] button.

   Figure 6.3 Collect Troubleshooting Information
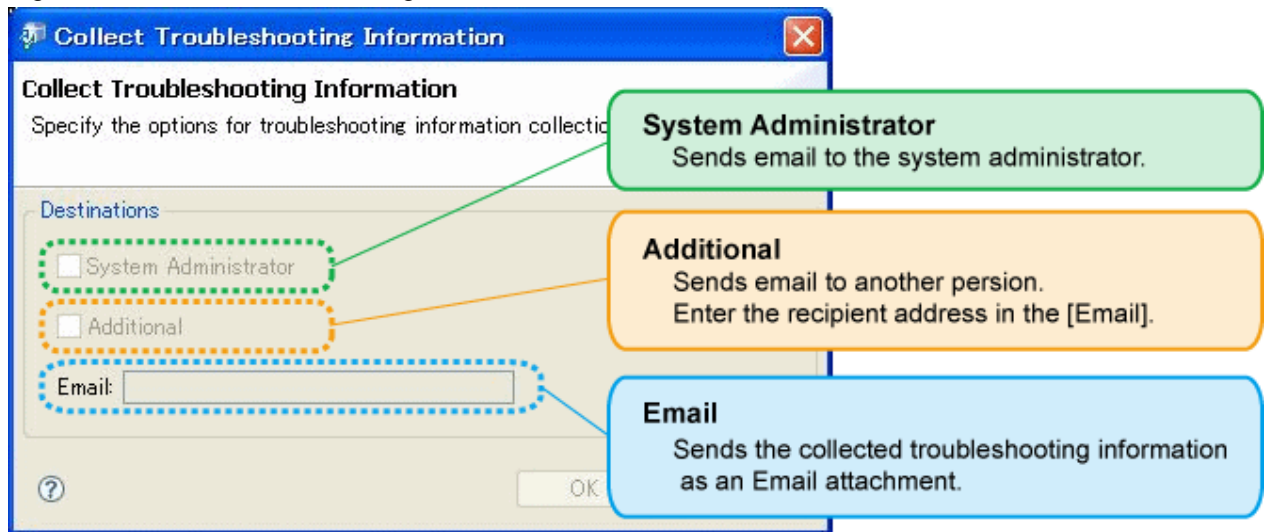
Checking / changing the email address set up for the system administrator

When you check and/or change the contact address set up for the system administrator, refer to the "6.8 When changing the contact addresses in trouble occurrences".

6.3.3　Trouble response

After identifying the trouble condition as shown in the "6.3.1 Identifying the trouble condition" or by "6.3.2 Trouble analysis", contact a system administrator or a hardware administrator, referring to the message and trouble information.

After resolving the trouble, reload the configuration as shown in "6.5 Reload construct configuration" to acquire information again up to date.

[Refresh] button on the Storage System Management GUI only acquires information on the Express manager server, and doesn't update information on the manager.

Latest information is displayed by select [Refresh] button about [Events] information in [Disk Array Information] tab.

Reload the configuration as shown in the above-mentioned when you want to display latest information about other information.

Contact to the hardware administrator

If a message output in a trouble occurrence says "Contact the hardware administrator", the system administrator contact to the hardware administrator.

6.4 Executing Advanced Copy

This section explains the procedures for executing Advanced Copies.

When you use Advanced Copy function, to assure data consistency, please confirm that there isn't any access to business volume.

However, for more assure consistency, stop the server connected to the business volume is recommended.

When you can't stop the business server, unmount the business volume by the server's OS command and reflect the data from the file cash and stop the access to file cash.

The command of unmount, refer to each OS's manual.

📚 See

Refer to "Appendix A Advanced Copy Function" for details of Advanced Copy.

6.4.1 Setup

This section explains how to set up Advanced Copy function for execution.

The setup procedure is shown below.
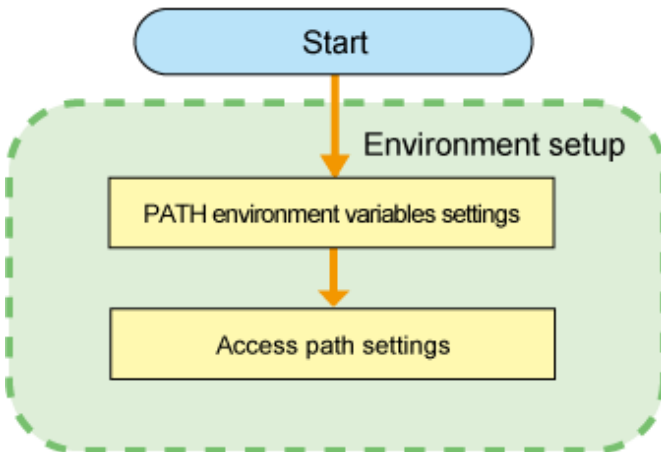
6.4.1.1 PATH environment variables settings

When using Express Advanced Copy commands, it is recommended to add a bin directory of Express Advanced Copy Control Module to path environmental variables.
For example, the procedure for Windows Server 2008 R2 is shown below.

  1. [Start] > Right-click on [Computer] and select [Properties].

  2. Left clink on [Advanced system settings].

3. Select the [Advanced] tab of system properties, and click the [Environment Variables] button.

4. Add the values below to the PATH variables.

```
<Express Manager program directory>\AdvancedCopy Manager Copy Control Module\bin
```

Information

....
The default directory name of Express Manager program is "C:\Program Files (x86)\ETERNUS SF".
....

Point

....
- Use a semi-colon to separate multiple directories.

- When the Advanced Copy function executes it only with Copy Control Management GUI, this setting is unnecessary.
....

6.4.1.2 Access Path Settings

With Express Manager, there must be a logical path between the Express Manager server and the ETERNUS Disk storage system. This logical path is referred to as an "access path". To create an access path, the ETERNUS Disk storage system must have a logical volume for control purposes.

Allocate one logical volume within the ETERNUS Disk storage system to the Express Manager server for access path use.

The settings procedure for the access path is explained below.

1. Allocate to the server the ETERNUS logical volume to be set up as the access path.

   The allocated logical volume is recognized as a disk.

2. Initialize the disk in MBR (DOS) or GPT disk format.

3. Create a partition, and allocate a drive letter.

Note

....
Deletion procedure for "Active Partition Flag" is as follows.

```
C:\Windows\system32>diskpart
DISKPART> select disk 2
DISKPART> list part
DISKPART> select part 0
DISKPART> inactive
```
....

6.4.2 Executing Clone type Advanced Copy

The Clone type Advanced Copy includes the following three types.

・ Clone(One Time)[OPC]

   Execute OPC (One Point Copy) of the ETERNUS Disk storage system.

   All the volume contents at the point of time that Advanced Copy was executed are copied onto its copy destination volume.

   When the OPC command is invoked, ETERNUS creates a point in time snapshot of the source volume and then immediately returns a notification to the operator that the backup is complete, before any physical copying has even occurred. This allows for access to

be returned to the transaction or source volume with little or no interruption while the copy is performed as a background process at the hardware level in the ETERNUS.

Clone(One Time)[OPC] is highly effective for the following applications:

- Generation backups where near continuous uptime is critical such as internet business applications

- Clone(One Time)[OPC] is the primary method for restoration from a backup volume irrespective of the backup copy method thus minimizing resultant downtime

- Where minimizing server I/O load is critical to overall business application performance.

The following diagram represents the process used in a Clone(One Time)[OPC].

Figure 6.4 Clone(One Time)[OPC]
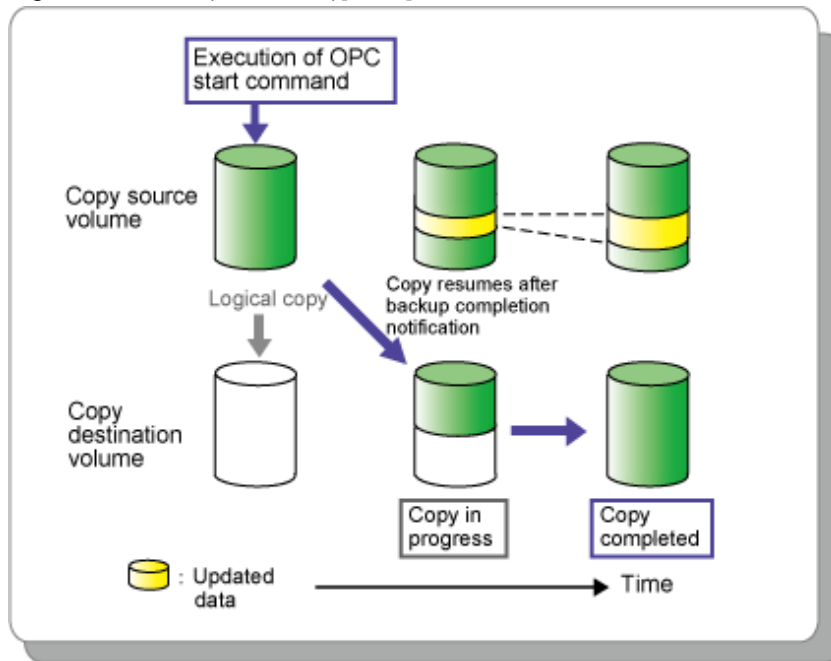
- Clone(Recurring)[Quick OPC]

Execute QuickOPC of the ETERNUS Disk storage system.

When the QuickOPC command is invoked, it will determine if an initial copy exists, then will copy only updated blocks of data that have been tracked since the initial copy was created to the backup volume for that specific QuickOPC session.

If QuickOPC detects that an initial copy does not exist, it will create the initial copy using OPC. The differential copy method used in QuickOPC significantly reduces the time required for physical data copying in order to create a Point in Time snapshot whilst minimizing the I/O load on the storage system host server.

Clone(Recurring)[Quick OPC] is highly effective where:

- Backup to disk where uptime is critical

- Creation of frequent restore points or generation backups

The following diagram represents the differential copy process used in a Clone(Recurring)[QuickOPC] Copy after an initial copy has been created.

Figure 6.5 Clone(Recurring)[Quick OPC]
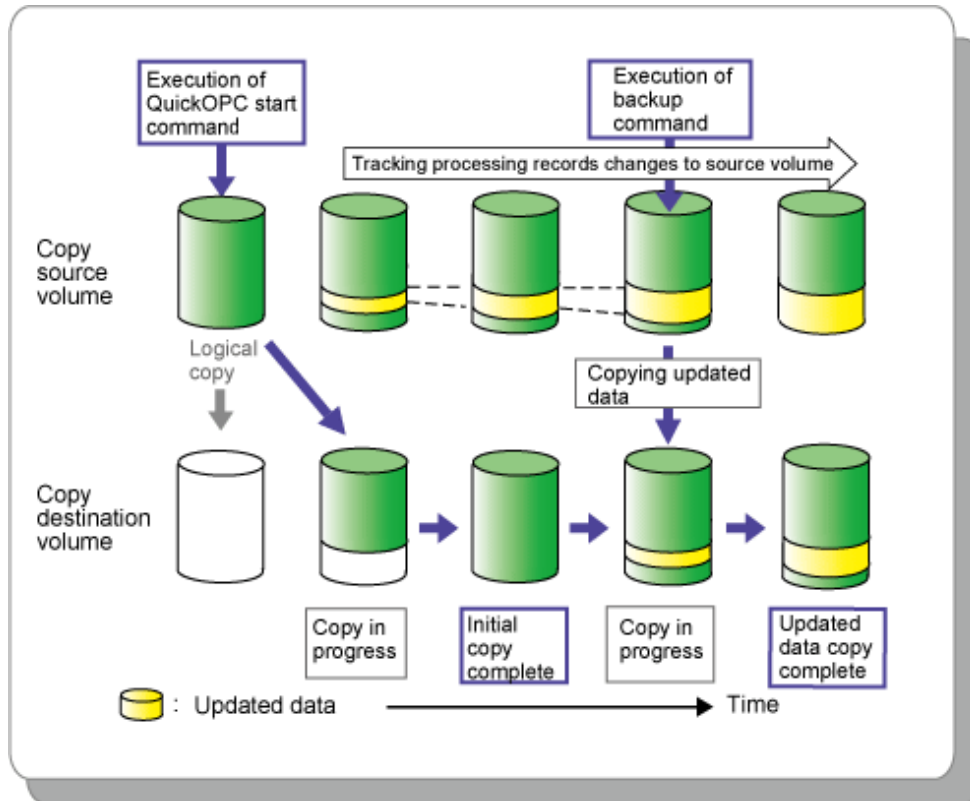
- Clone(Split mirror)[EC]

  Execute EC (Equivalent Copy) of the ETERNUS Disk storage system.

  The Equivalent Copy feature invokes a process of synchronization between source and destination volumes to create a synchronized copy of the source volume. The purpose of the synchronization is to reach and maintain a state of equivalence with the source volume in order to create a temporary copy or archival backup.

  The source volume remains available and accessible as there is no need to stop or suspend access to the source volume while the copy is built using the synchronization process.

  When a state of equivalence with the source volume has been attained, the destination volume continues to be maintained as an image of the source volume.

  At any subsequent point while the source volume and the destination copy are in this state of equivalence, the destination copy can be split from the source, thus creating a backup with history or a replica copy as at that point in time.

  Clone(Split mirror)[EC] is highly effective for:

  - Making backups much more quickly than with conventional backup processes, because backup data can be collected in parallel with ordinary transactions.

  - Reducing processing time and costs by means of distributed processing using copy data.

Figure 6.6 Clone(Split mirror)[EC]
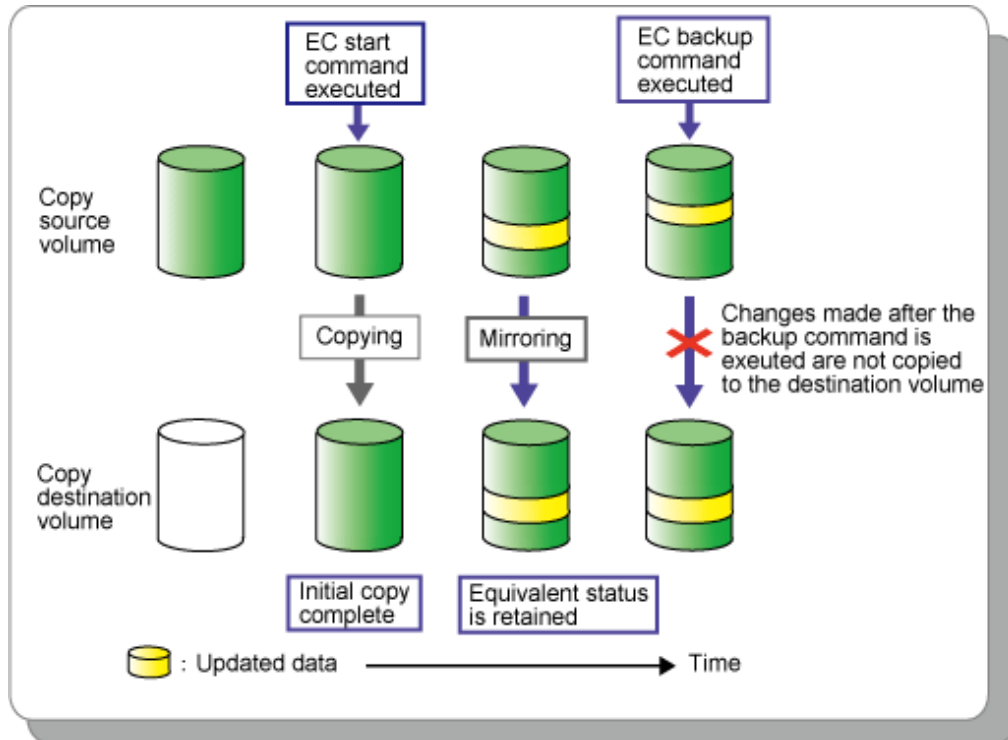
Take the following procedure to execute Clone type Advanced Copy.
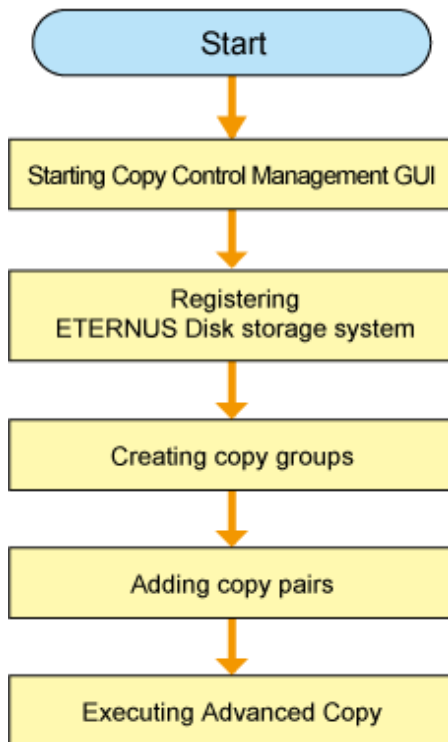
6.4.2.1 Starting Copy Control Management GUI

Start the Copy Control Management GUI from Express Clinet.

Click [Copy Control Management] in [Tools] to launch Copy Control Management GUI.
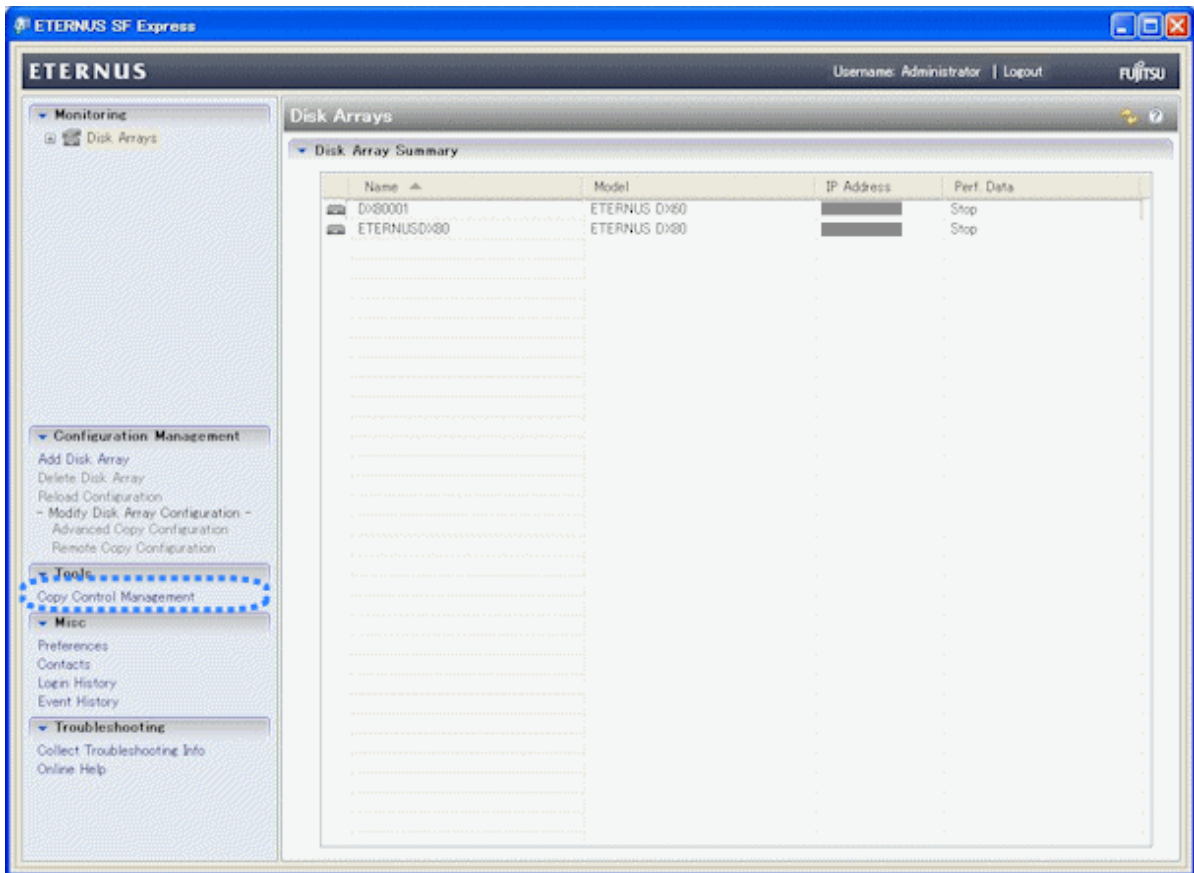
6.4.2.2   Registering ETERNUS Disk storage system

Register an ETERNUS Disk storage system with Express Manager as the devices to be used for copies.

1. Click [Add disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
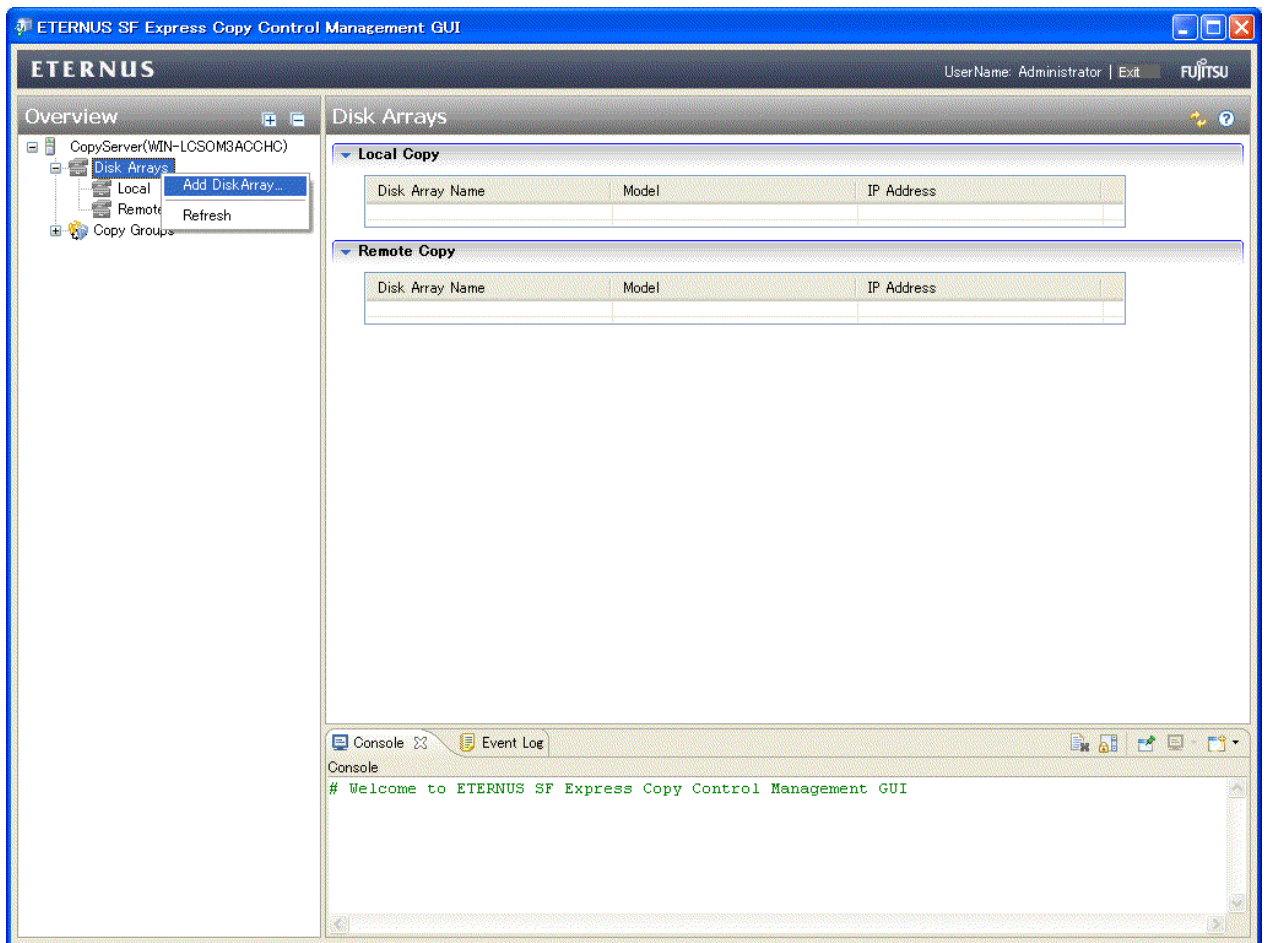
The [Add Disk Array] menu is shown.

2. Specify the following information.

   - Storage Location

   - Array Name

   - IP Address

   - User Name

   - Password

   - Access Path
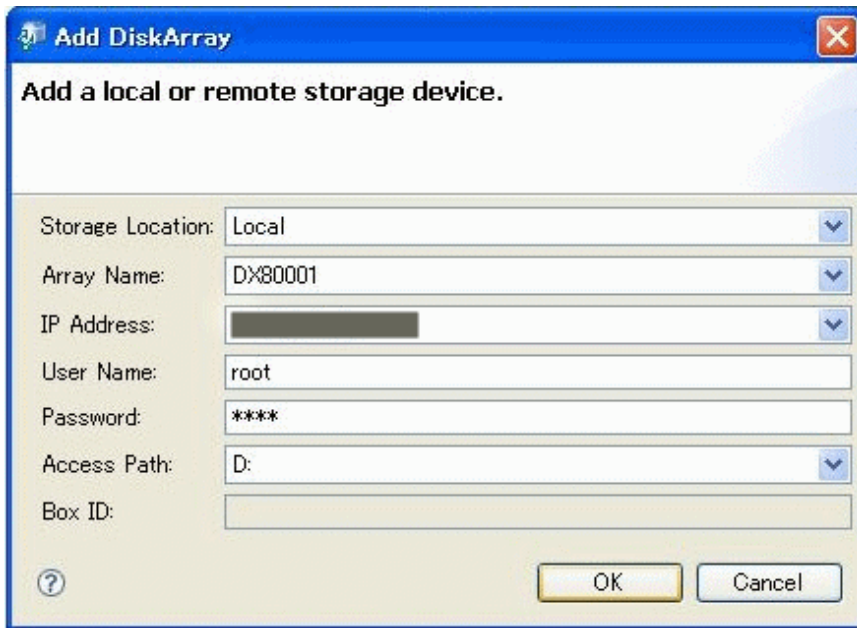
6.4.2.3 Creating copy groups

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

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

1. Click [Create] in [Copy Groups] to create a copy group.
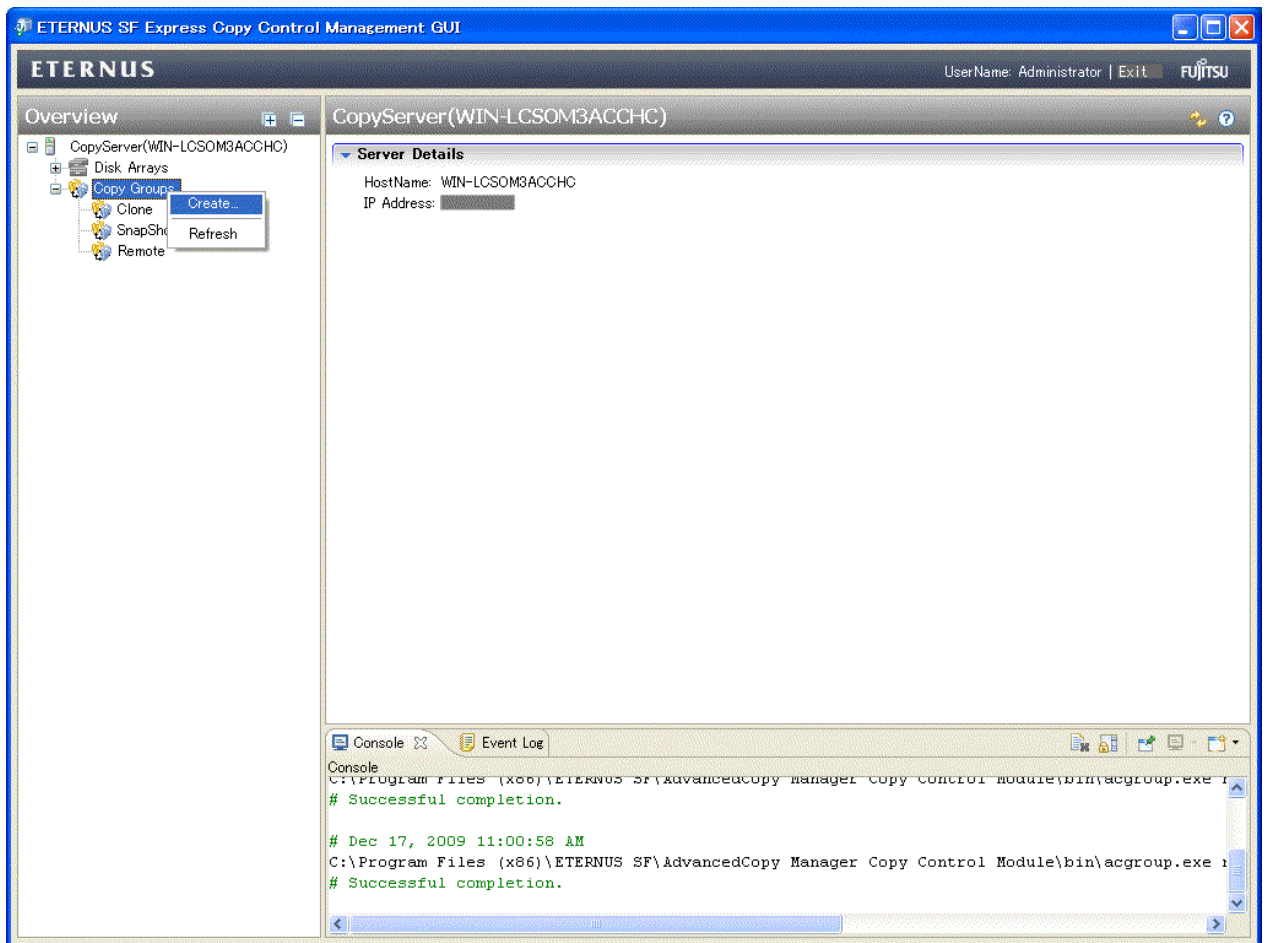
The [Create] menu is shown.

2. Specify the following information.

    -   Group Name

    -   Copy Type

    -   Disk Array (for Local copy)

....

Group Name must be up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.

....

6.4.2.4　Adding copy pairs

Add copy pairs to the copy group that have been created.

Copy pairs are strings that define copy source and destination logical volumes.

1. Click [Add pairs] in the Copy Group to add copy pairs.
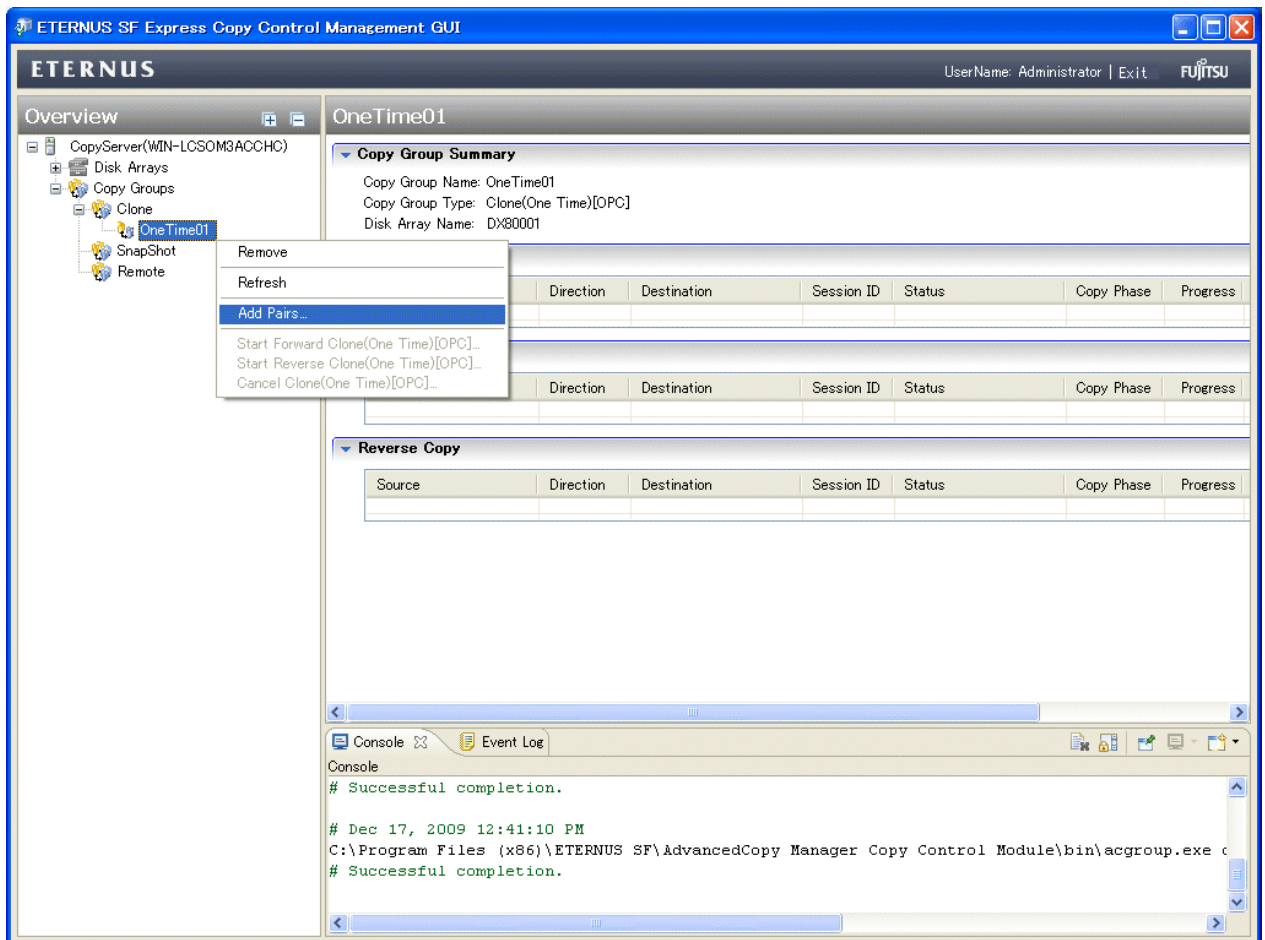
The [Add Copy Pair] menu is shown.

2. Select the following information.

   - Copy Source Volume

   - Copy Destination Volume

6.4.2.5   Executing Advanced Copy

6.4.2.5.1   Clone(One Time)[OPC] type

Execute Clone(One Time)[OPC] type Advanced Copy.

Click [Start Forward Clone(One Time)[OPC]] in the Copy Group to start Clone (One Time) [OPC]. However, if you want to reverse the copied data, click [Start Reverse Clone(One Time)[OPC]].
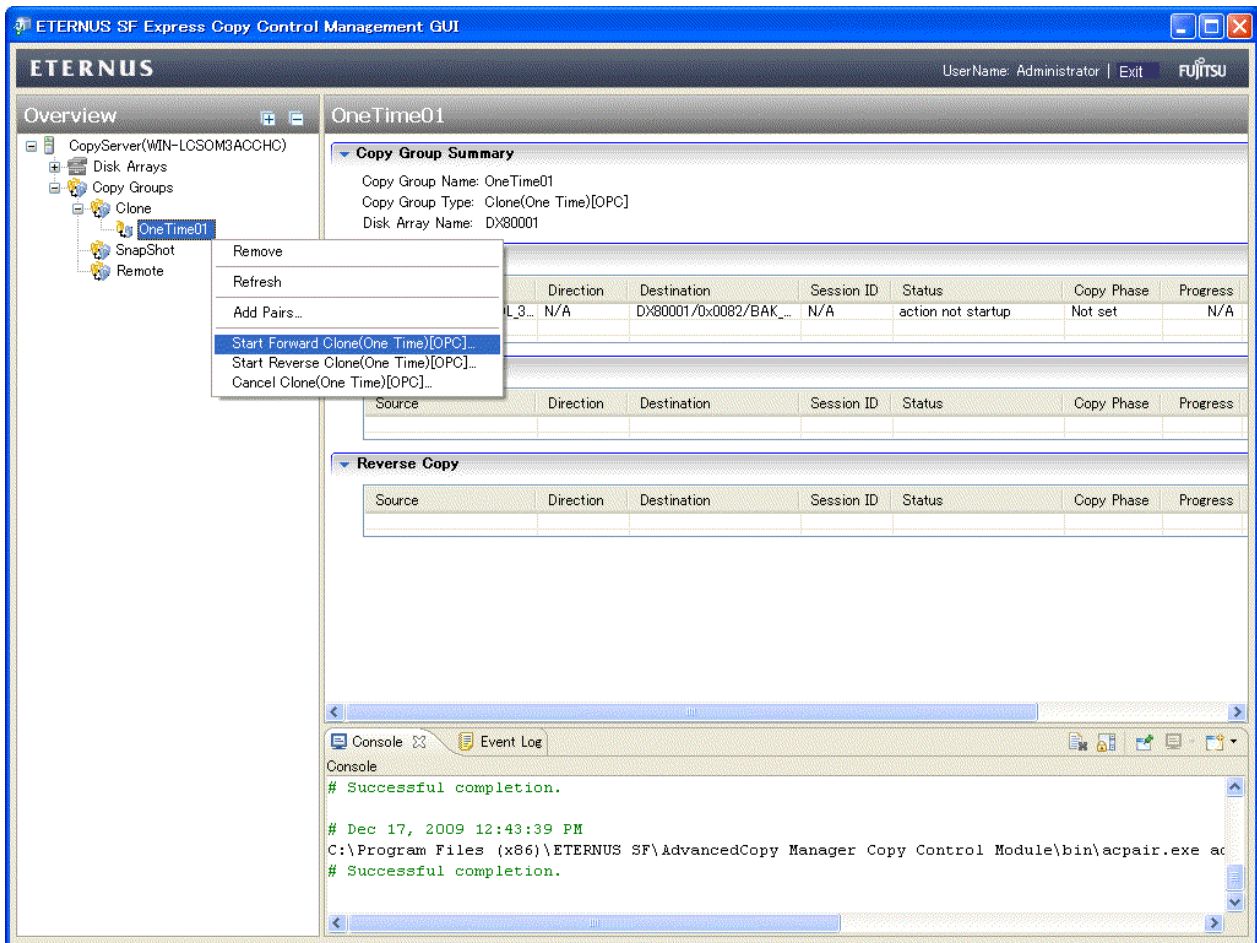
6.4.2.5.2 Clone(Recurring)[QuickOPC] type

Execute Clone(Recurring)[QuickOPC] type Advanced Copy.

The Clone(Recurring)[QuickOPC] type operating procedure is as follows.
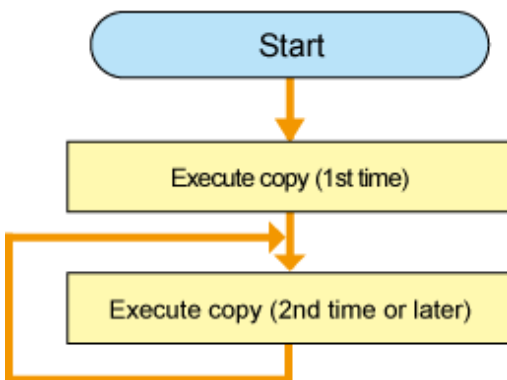
1. Execute copy (1st time).

    1. Click [Start Forward Clone(Recurring)[QuickOPC]] in the Copy Group to start Clone (Recurring) [QuickOPC]. However, if you want to reverse the copied data, click [Start Reverse Clone(Recurring)[QuickOPC]].
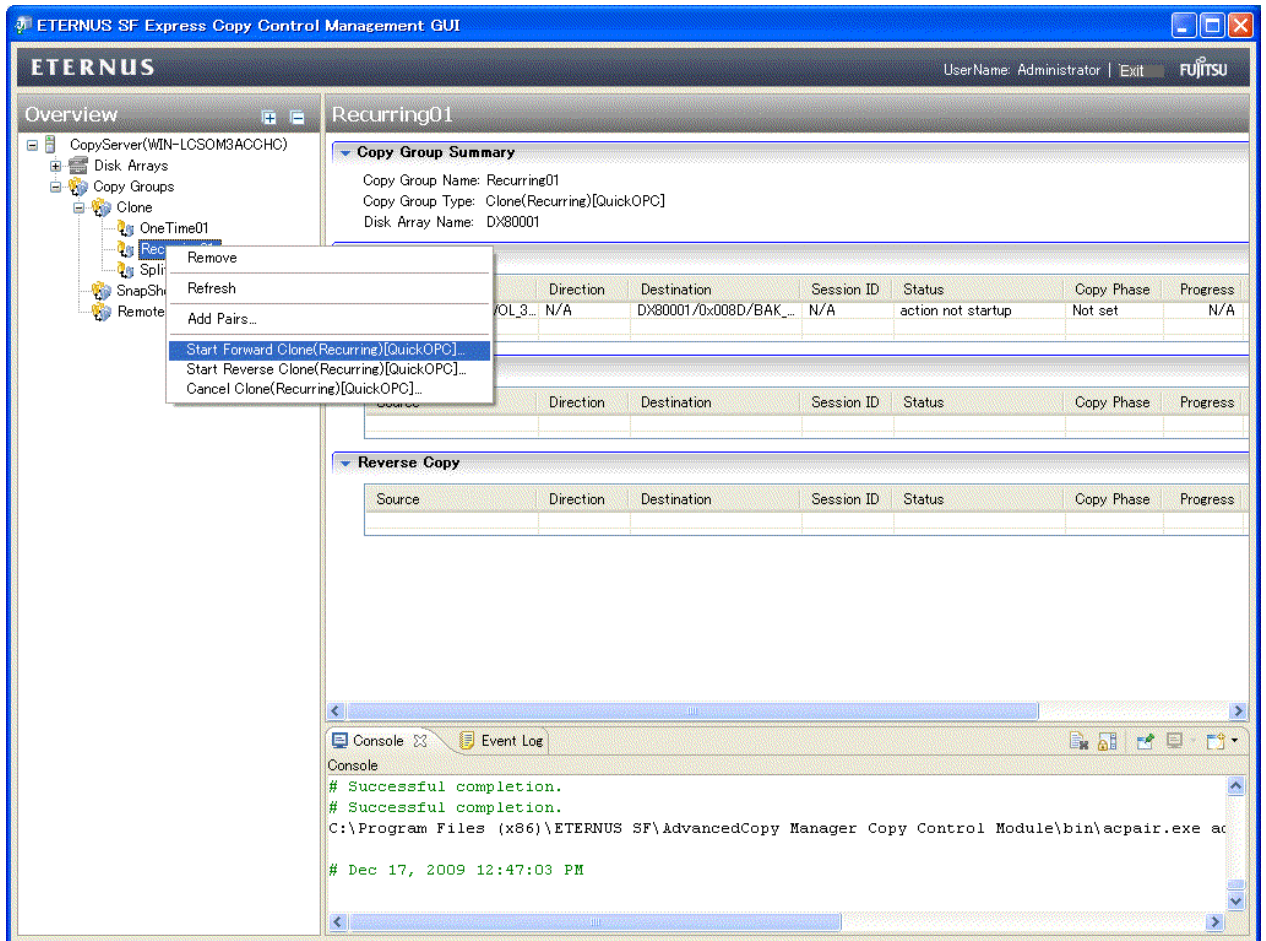
    2. The [Start Forward Clone(Recurring)[QuickOPC]] menu is shown.
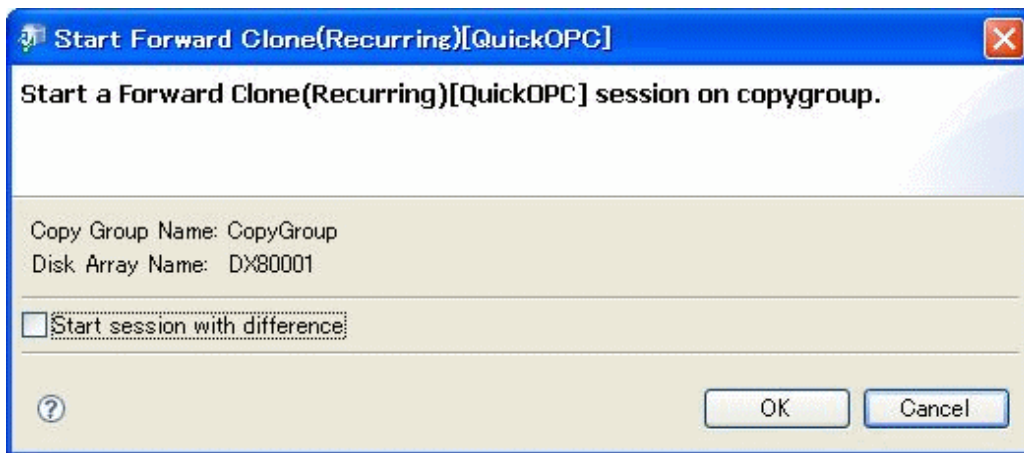
Point
....
This time does not check the [Start session with difference].
....

2. Execute copy (2nd time or later).

1. Click [Start Forward Clone(Recurring)[QuickOPC]] in the Copy Group to start Clone(Recurring) [QuickOPC].
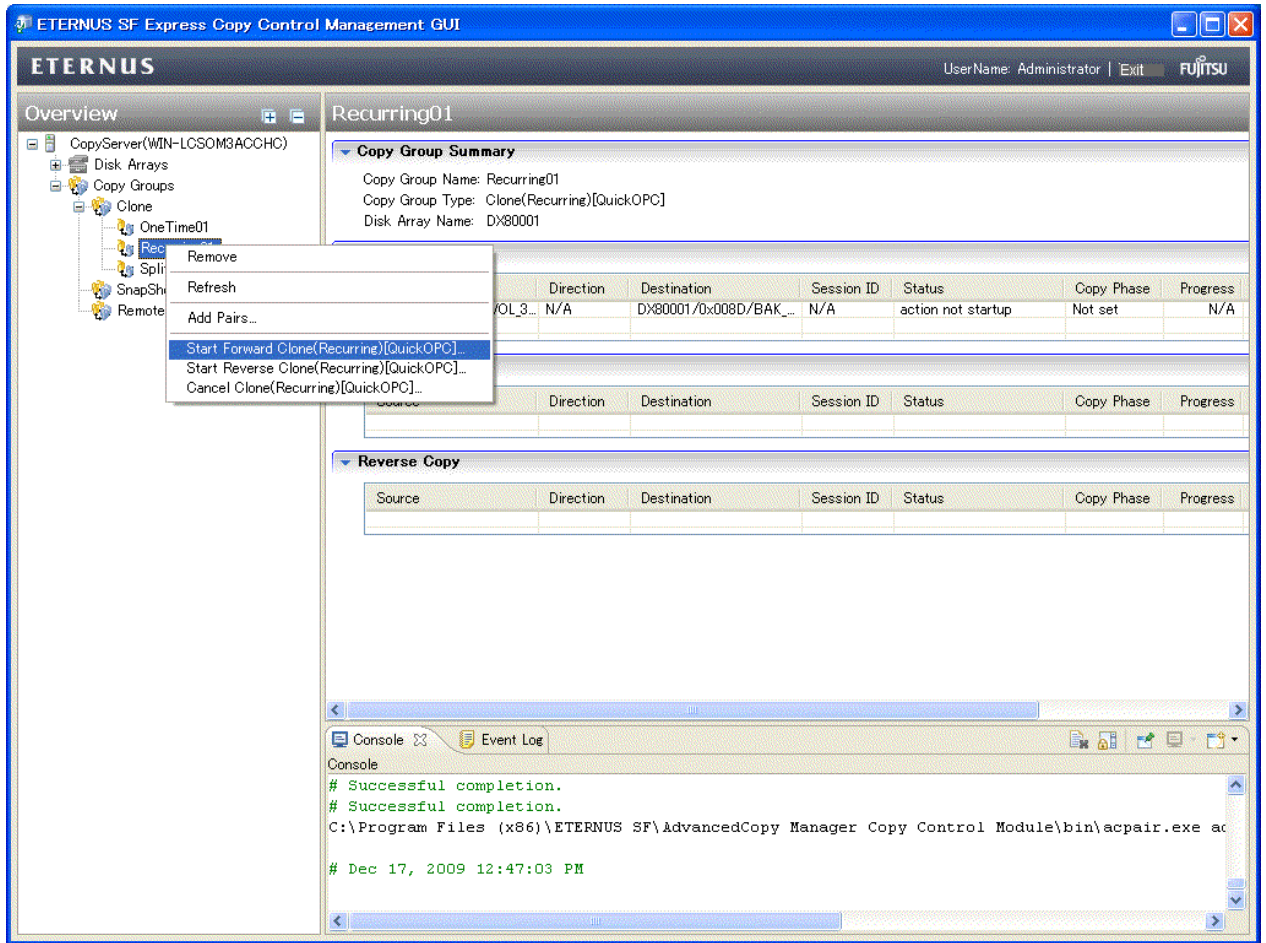
2. The [Start Forward Clone(Recurring)[QuickOPC]] menu is shown.
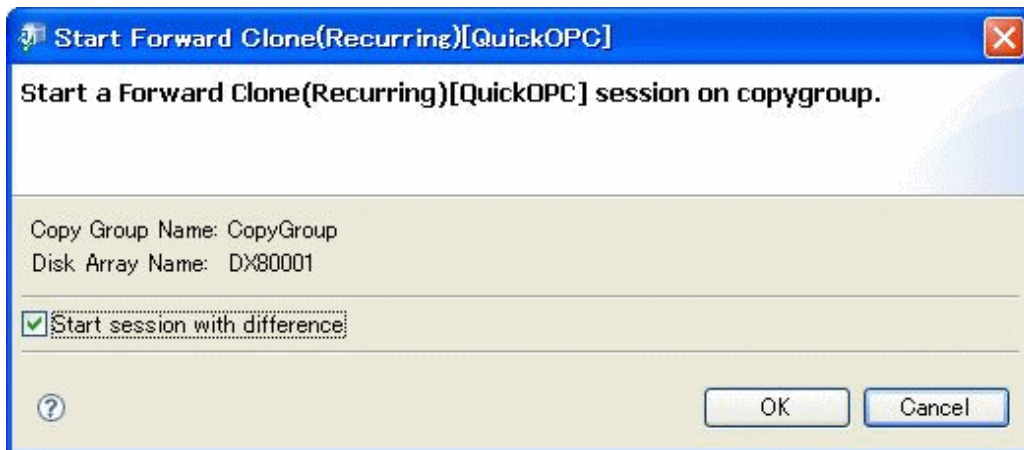
Point
....
A system administrator should check the [Start session with difference].
....

6.4.2.5.3 Clone(Split mirror)[EC] type

Execute Clone (Split mirror) [EC] type Advanced Copy.

The Clone (Split mirror) [EC] type operating procedure is as follows.
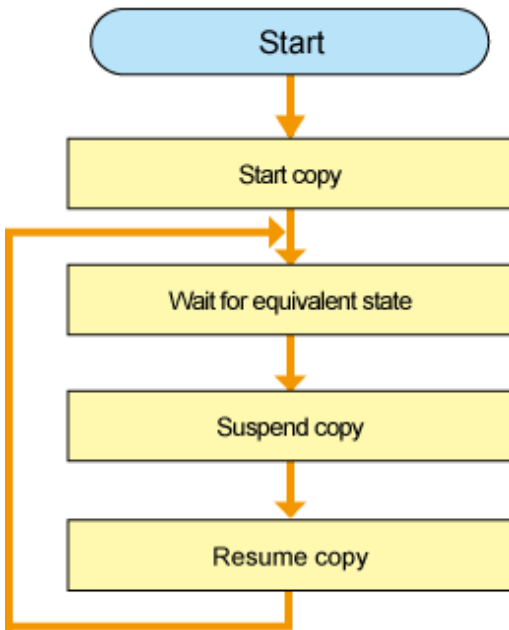
1. Start copy

   Click [Start Forward Clone(Split mirror) [EC]] in the Copy Group to start Clone (Split mirror) [EC]. However, if you want to reverse the copied data, click [Start Reverse Clone(Split mirror)[EC]].
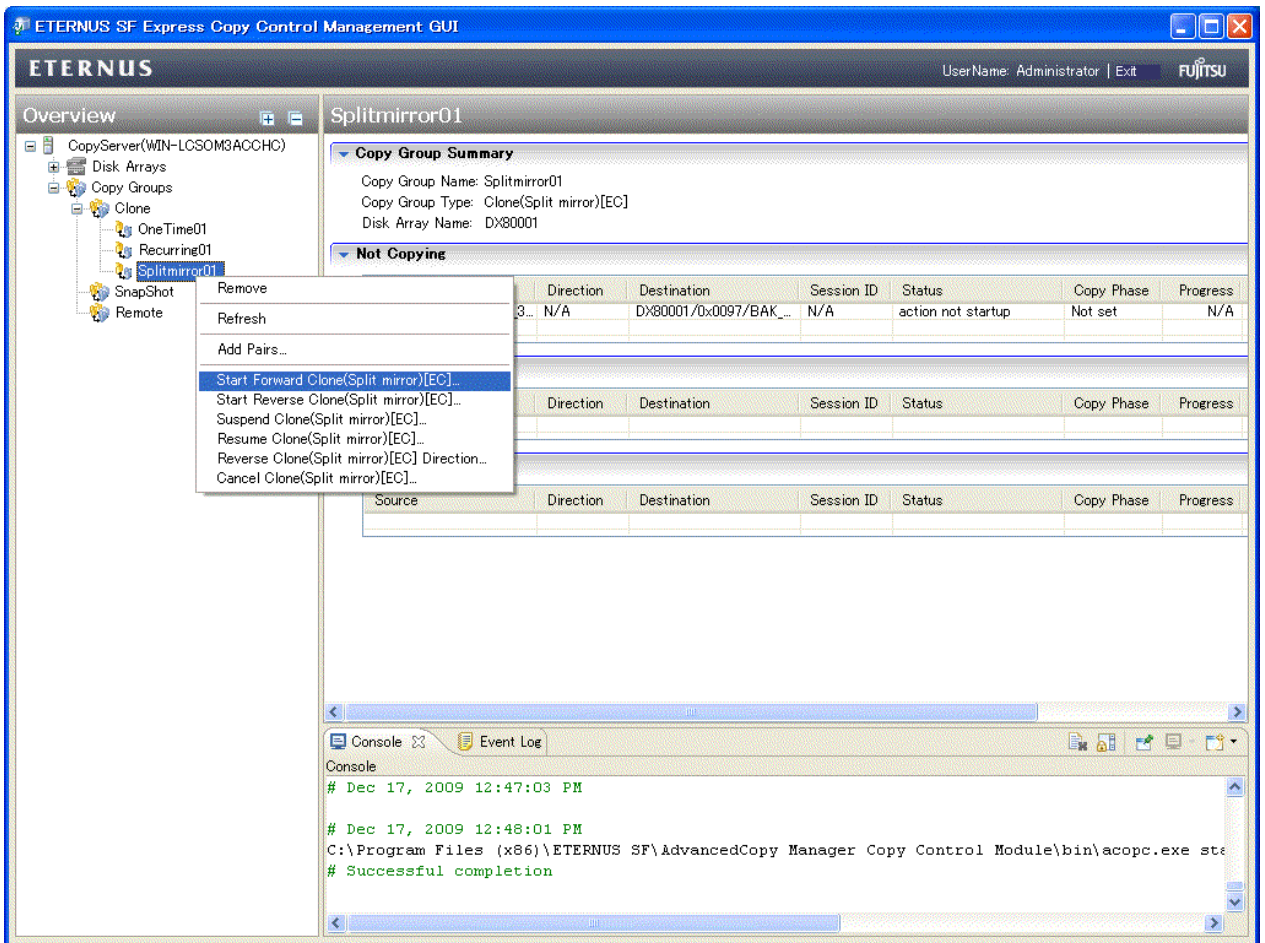
2. Wait for equivalent state

Wait until [Copy Phase] is changed to "Paired" from "Copying".
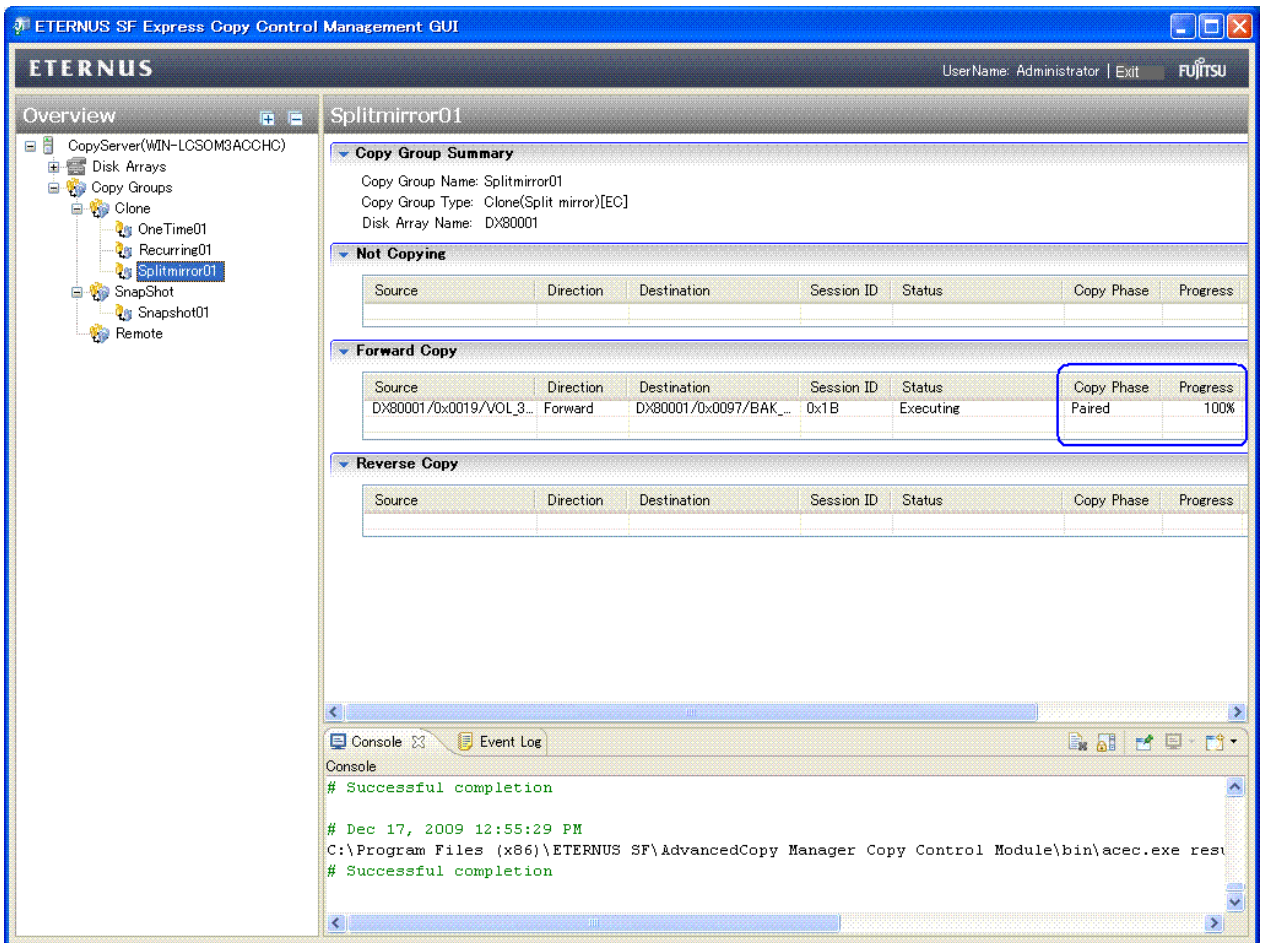
3. Suspend copy

   Click [Suspend Clone(Split mirror)[EC]] in the Copy Group to suspend the clone copy.
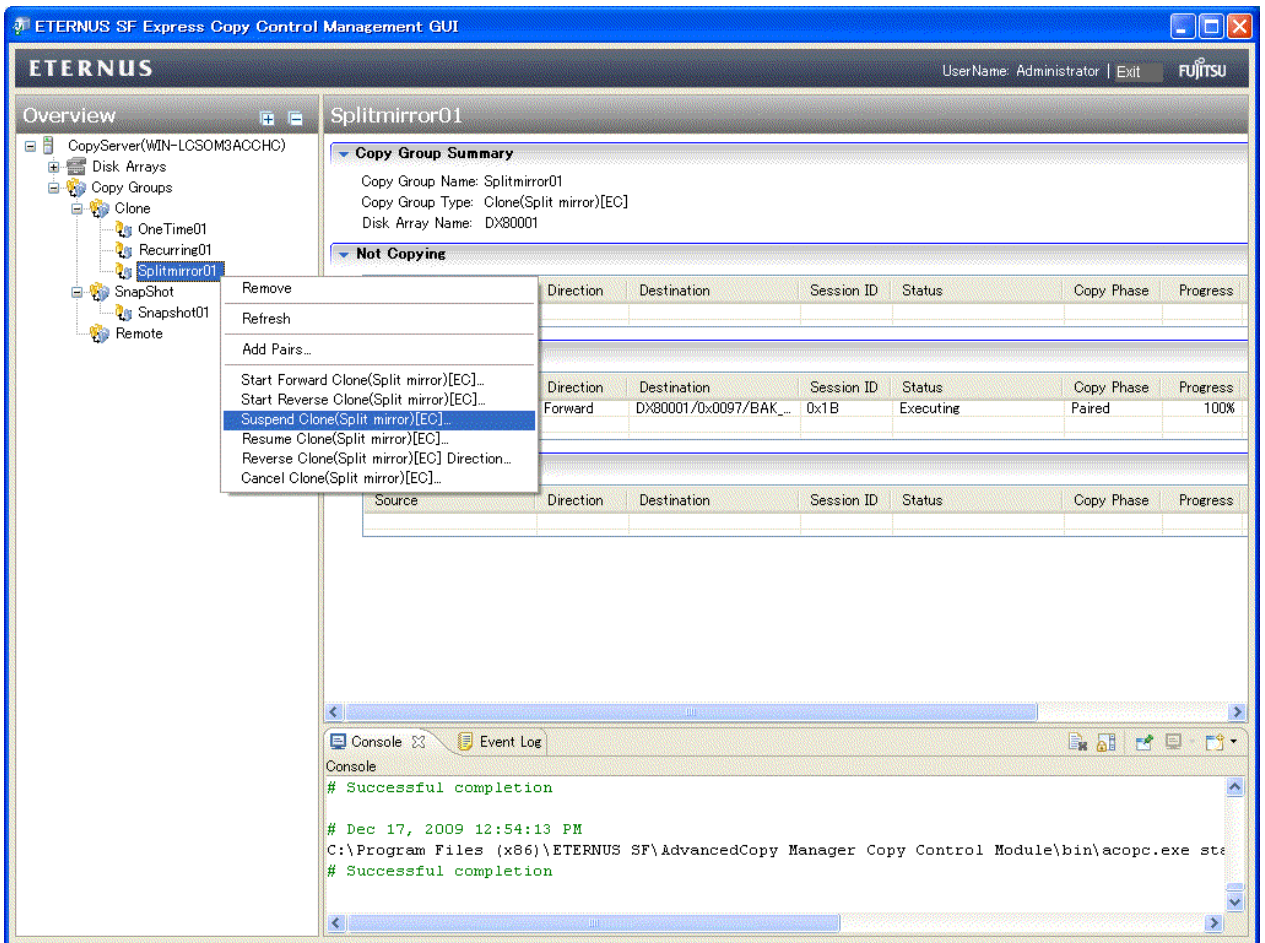
4. Resume copy

Click [Resume Clone(Split mirror)[EC]] in the Copy Group to resume the clone copy.

Then repeat the procedures 2 to 4.
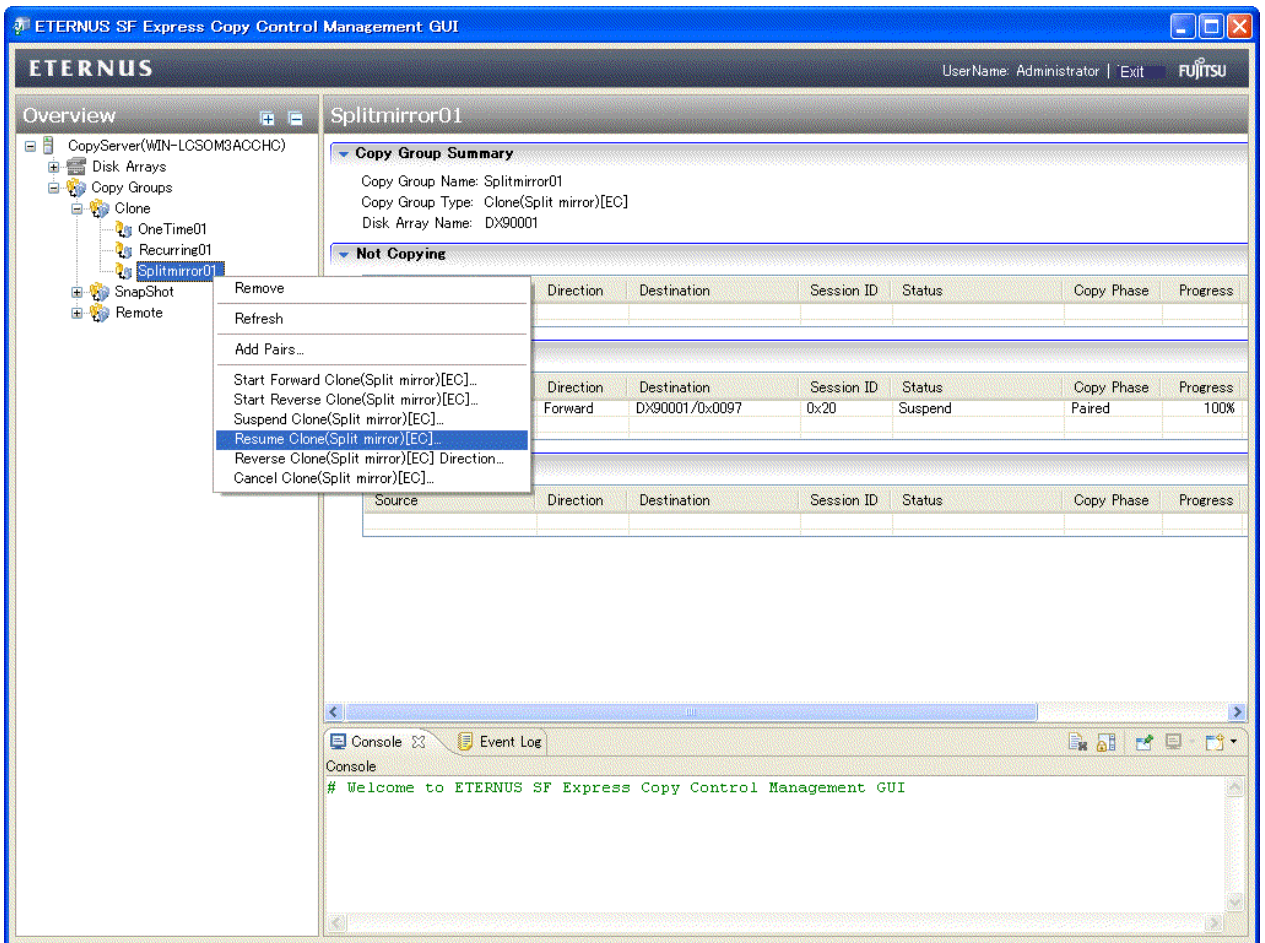
6.4.3 Executing Snapshot type Advanced Copy

Execute SnapOPC+ of the ETERNUS Disk storage system.

SnapOPC+ uses the Copy-On-Write method to create a copy of the source volume in the state before any updates were made.

SnapOPC+ can save the copy source volume data in the state before any updates are made snap generation.

Due to the mechanism and features of SnapOPC+, it is designed to be efficiently used as a backup to recover from software failures (such as operator mistakes and software ends abnormal). If a copy source volume becomes inaccessible due to a hardware fault, then the relevant copy session error - as a result, the data on the copy destination volume cannot be read correctly. In order to be prepared for such fatal hardware faults. We recommends that, in conjunction with SnapOPC+, OPC/QuickOPC/EC/REC should be used to make a complete copy of data.

SnapOPC+ is typically used for:

・ Temporary source for a cascade copy to alternate media such as tape.

・ Backup to disk for file servers and other data with a low modification rates.

Figure 6.7 Snapshot type Advanced Copy
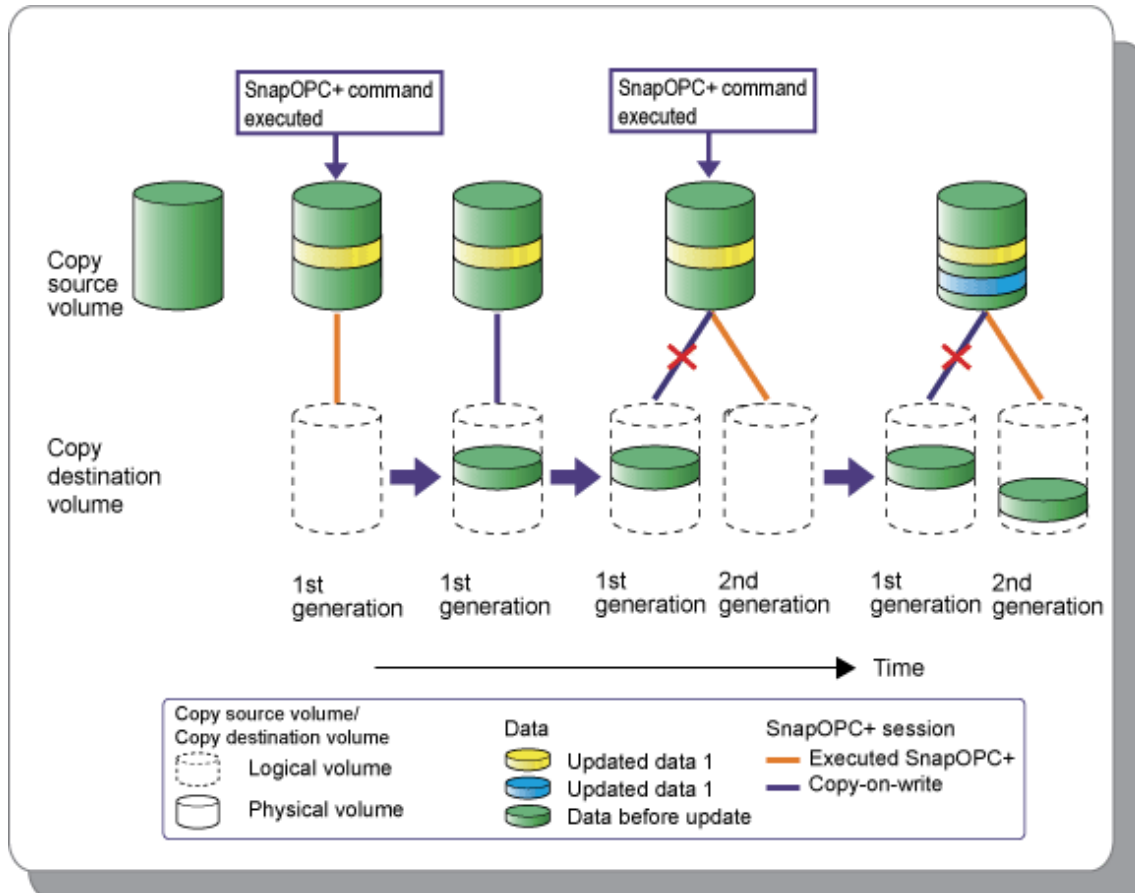
Take the following procedure to execute Snapshot type Advanced Copy.
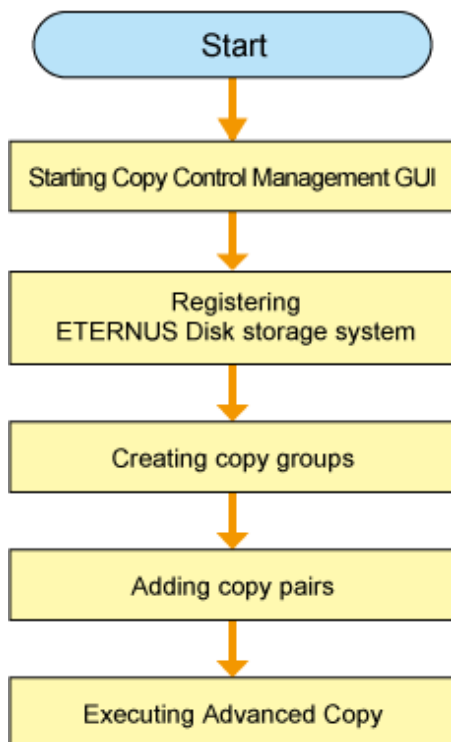
6.4.3.1   Starting Copy Control Management GUI

Start the Copy Control Management GUI from Express Client.

Click [Copy Control Management] in [Tools] to launch Copy Control Management GUI.
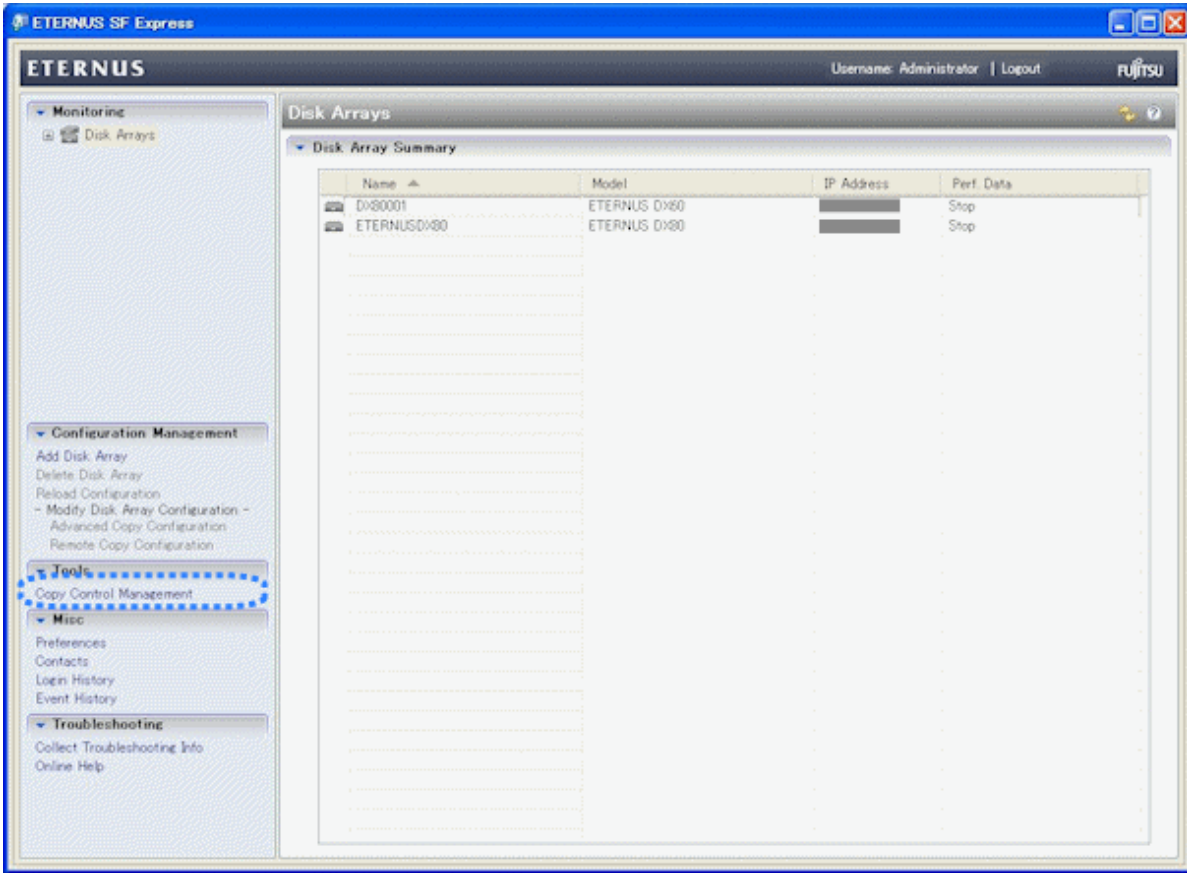
6.4.3.2   Registering ETERNUS Disk storage system

Register an ETERNUS Disk storage system with Express Manager as the devices to be used for copies.

1. Click [Add disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
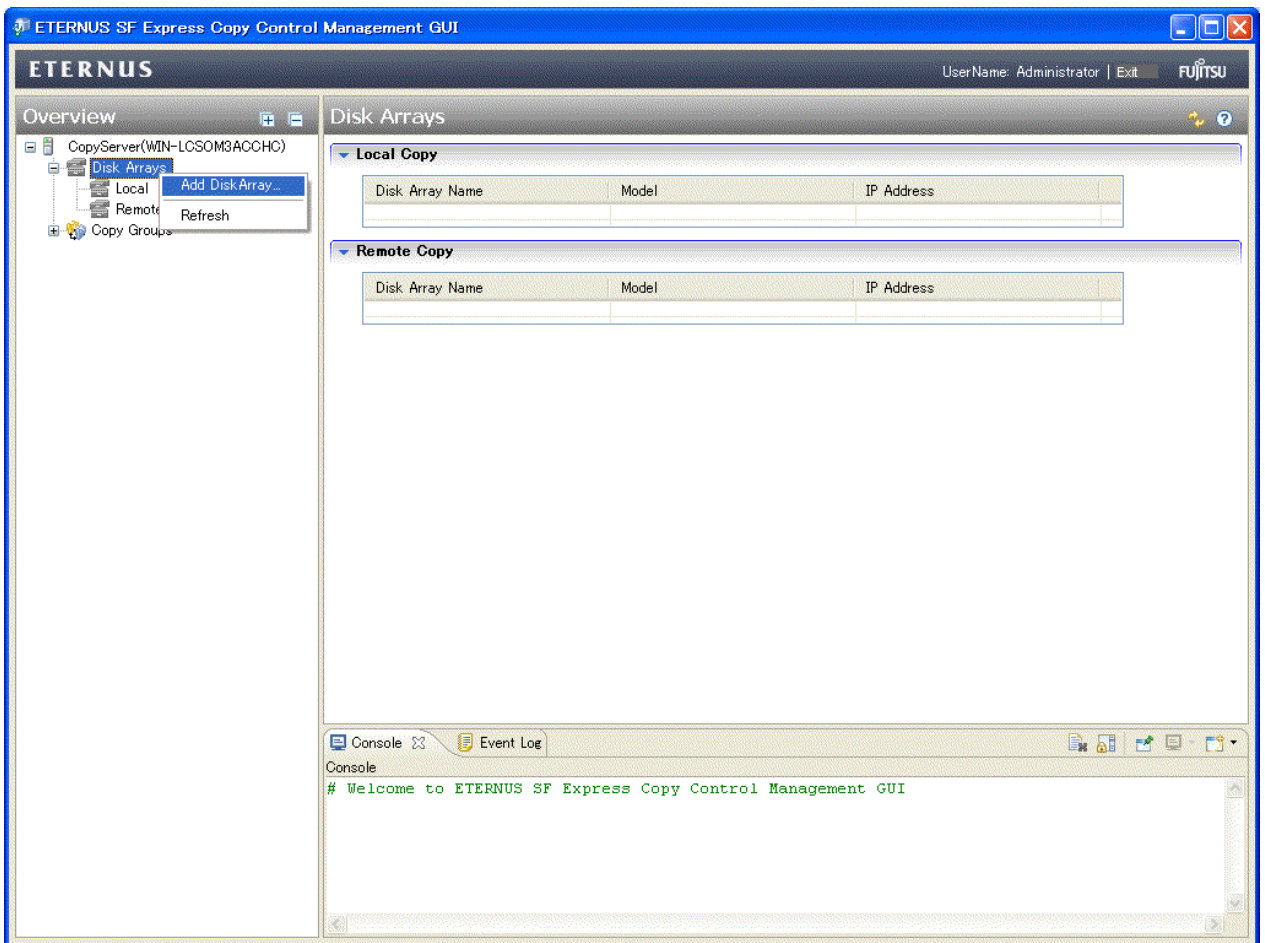
The [Add Disk Array] menu is shown.

2. Specify the following information.

    - Storage Location

    - Array Name

    - IP Address

    - User Name

    - Password

    - Access Path
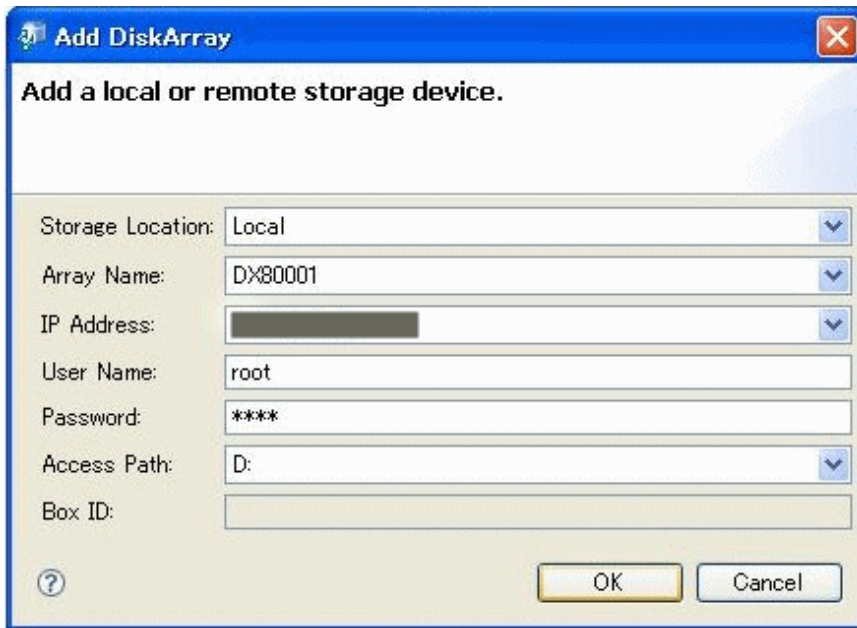
6.4.3.3 Creating copy groups

A copy group is a group of copy pairs, consisting of a copy source logical volume and a copy destination logical volume.
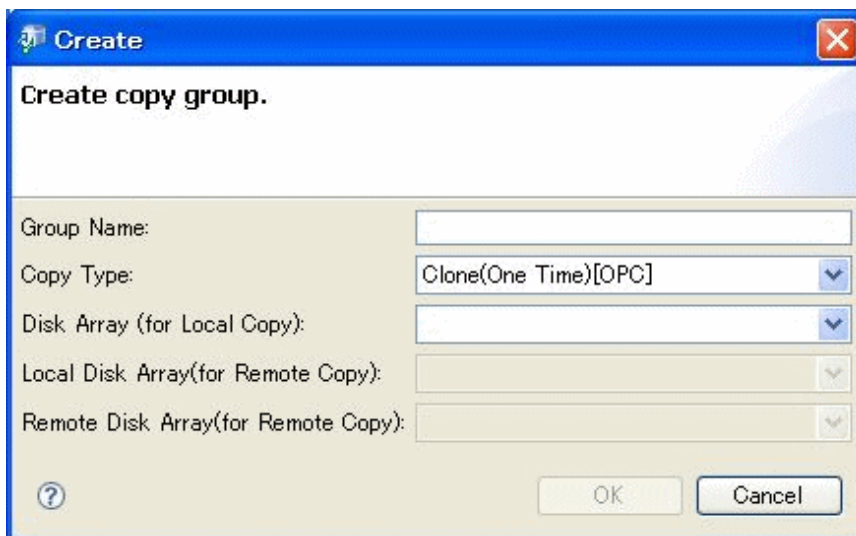
When creating copy groups, specify which type of Advanced Copy and which ETERNUS Disk storage system to use.

1. Click [Create] in [Copy Groups] to create a copy group.

The [Create] menu is shown.

2. Specify the following information.

   - Group Name

   - Copy Type

   - Disk Array (for Local copy)

P Point

. . . .
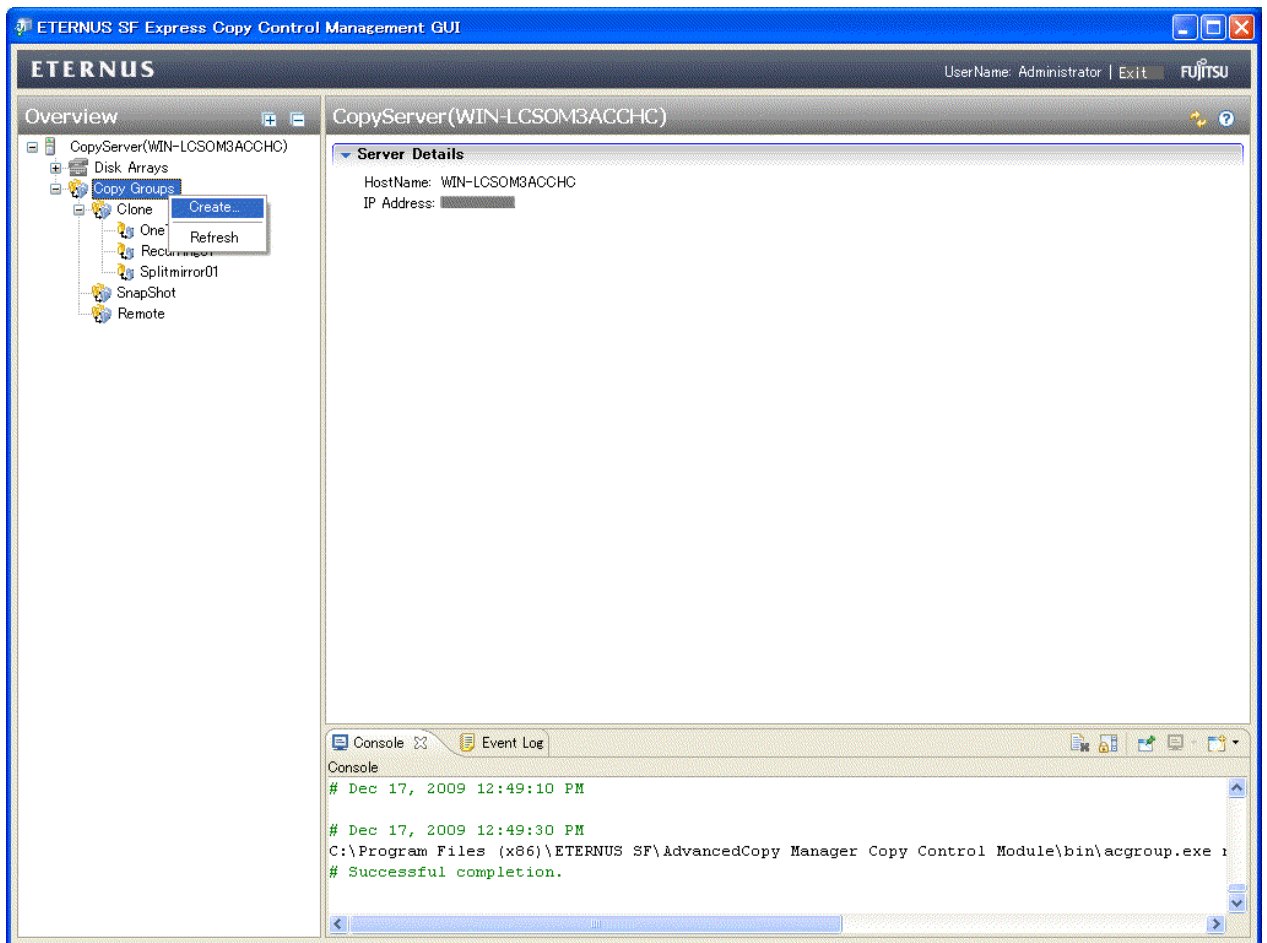
Group Name must be up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.

. . . .

6.4.3.4 Adding copy pairs

Add copy pairs to the copy groups that have been created.

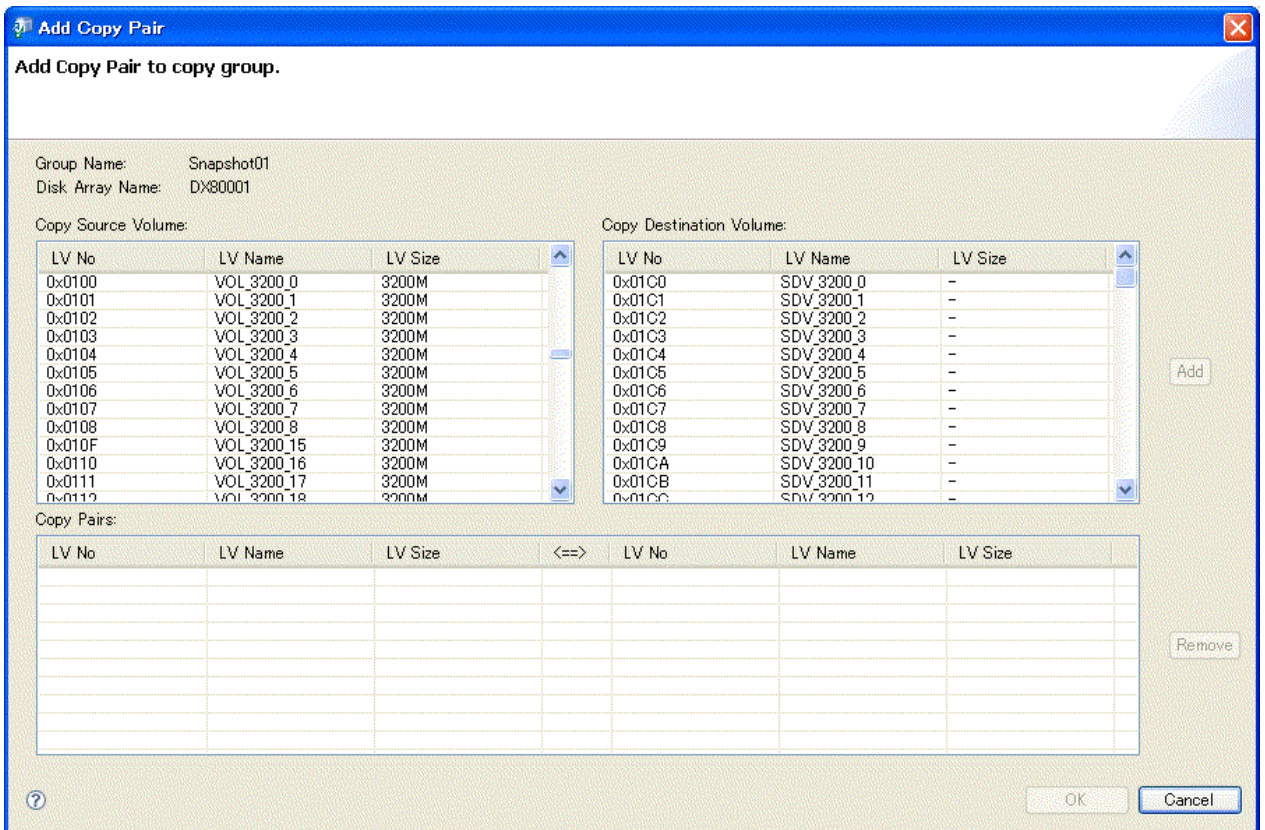Copy pairs are strings that define copy source and destination logical volumes.

1. Click [Add pairs] in the Copy Group to add copy pairs.
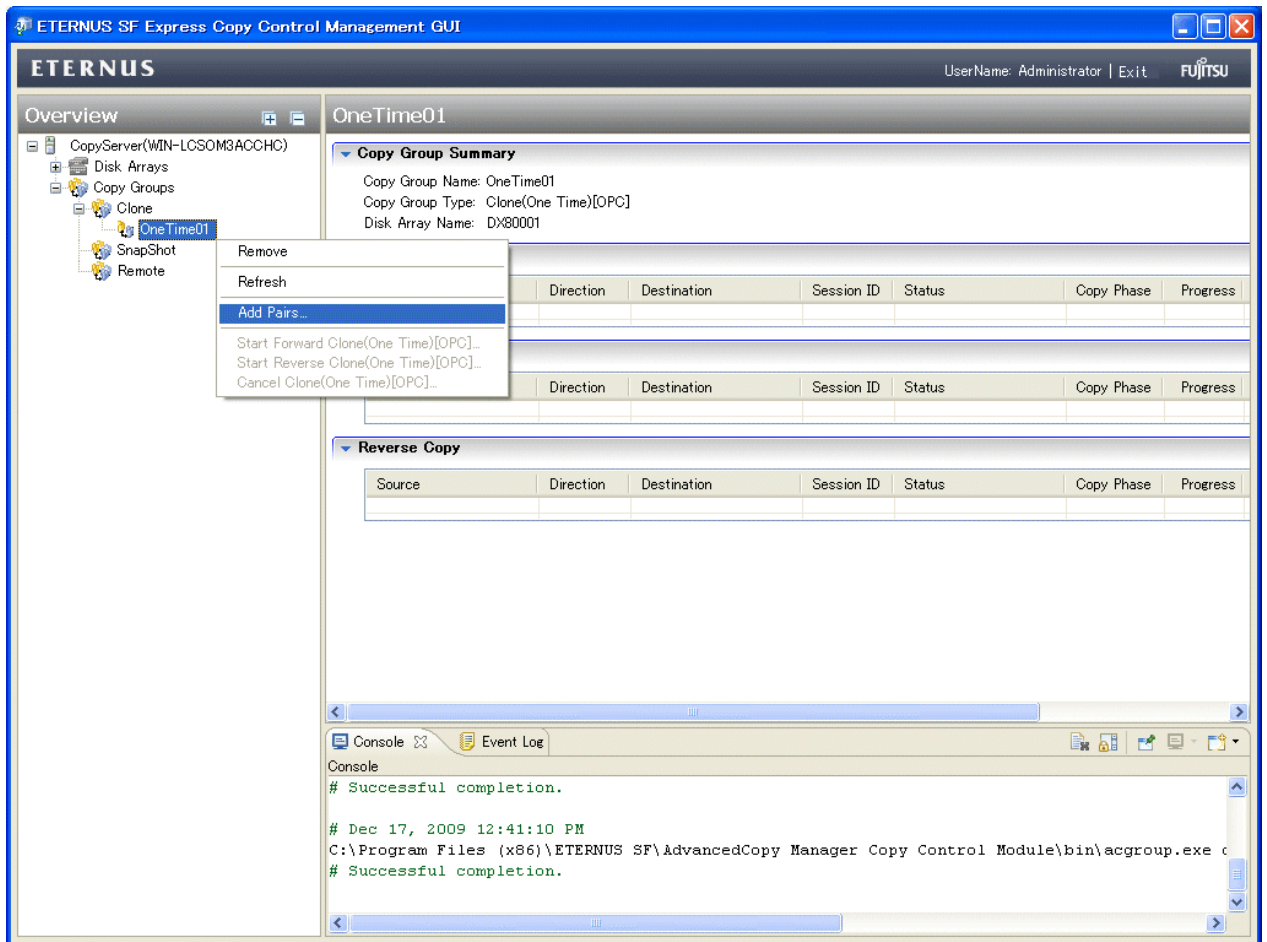
The [Add Copy Pair] menu is shown.

2. Select the following information.

 - Copy Source Volume

 - Copy Destination Volume

6.4.3.5 Executing Advanced Copy
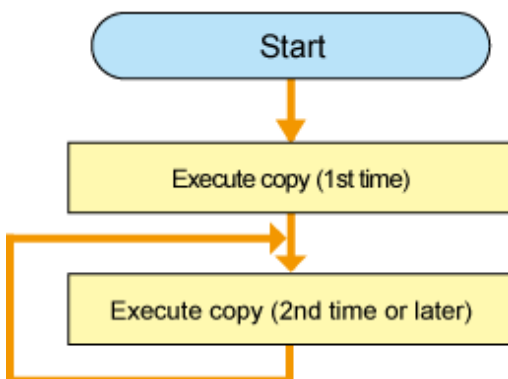
1. Execute copy (1st time)

   Click [Start Forward Snapshot[SnapOPC+]] in the Copy Group to start Snapshot[SnapOPC+].

2. Execute copy (2nd time or later)

Click [Start Forward Snapshot[SnapOPC+]] again, when you want to create the next generation.
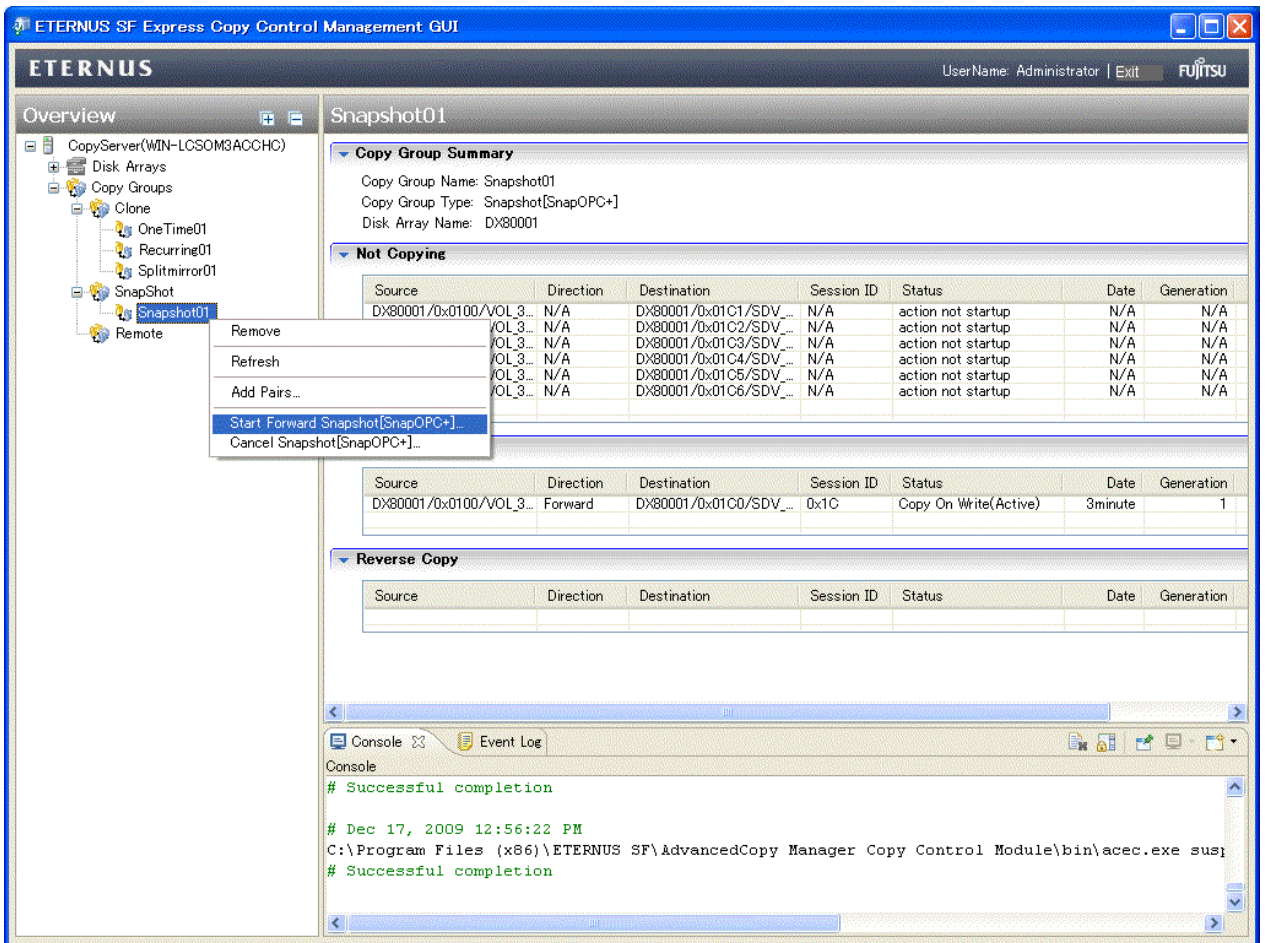
The copy for second generation is started, and the first generation is changed [Status] to "Copy On Write(Inactive)" from "Copy On Write(Active)".

![Note]

Note

You cannot select a first-generation copy pair group to start Snapshot copy.

6.4.4 Executing Remote Advanced Copy (HA system configuration)

This section describes Remote Advanced Copy in the High Availability system configuration.

Execute remote copy between two ETERNUS DX90s at the same site. Even if any failure should occur in one ETERNUS DX90, the other ETERNUS DX90 can continue business operation.

Figure 6.8 HA system configuration diagram
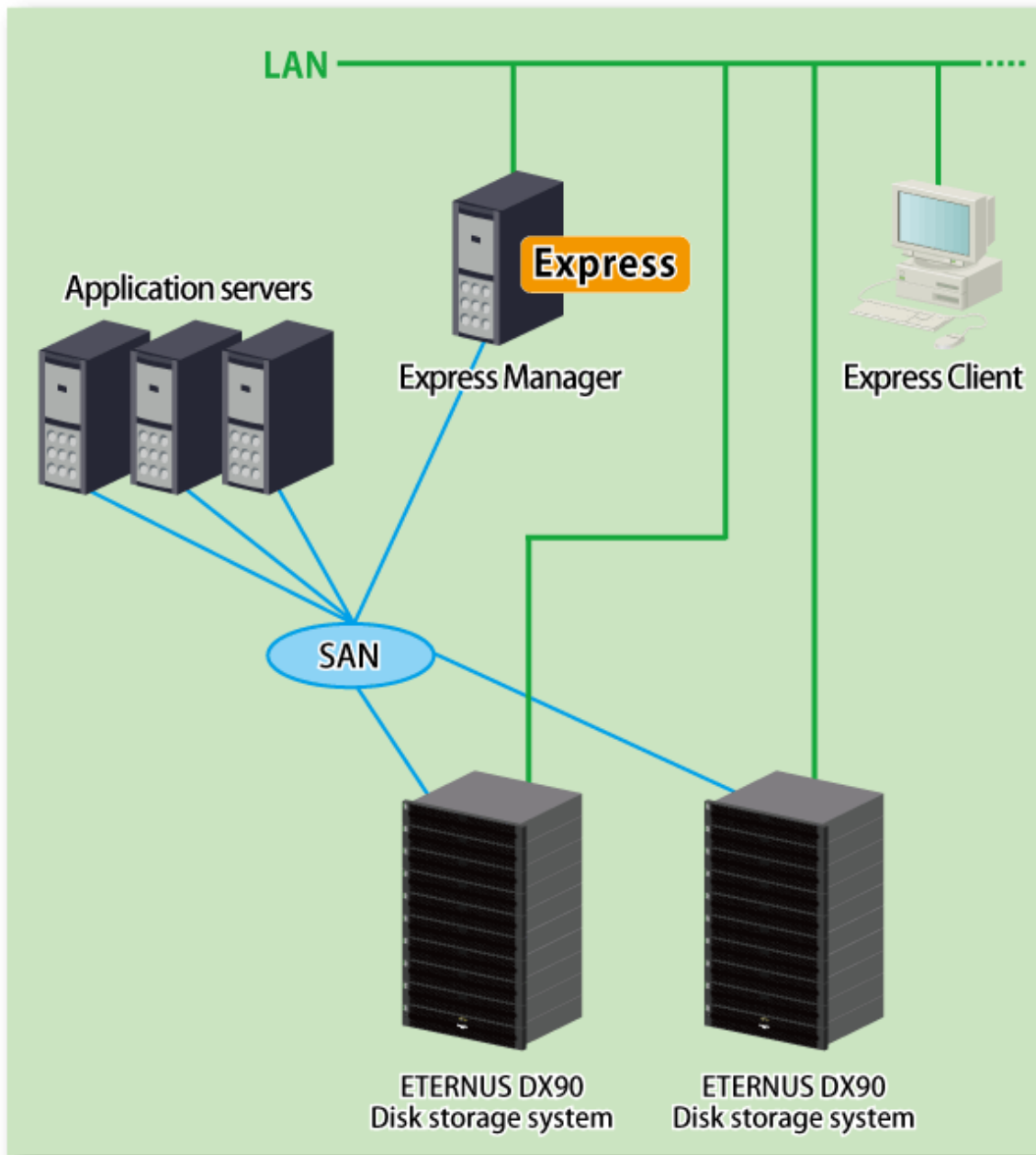
Take the following procedures to execute Remote Advanced Copy.
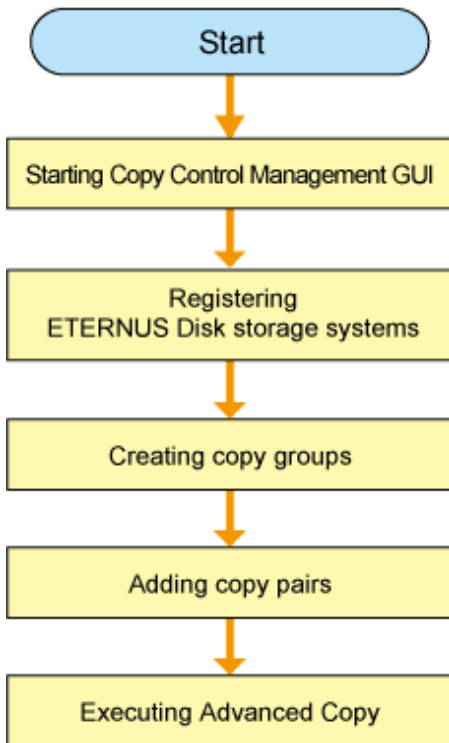
6.4.4.1 Starting Copy Control Management GUI

Start the Copy Control Management GUI from Express Clinet.

Click [Copy Control Management] in [Tools] to launch Copy Control Management GUI.
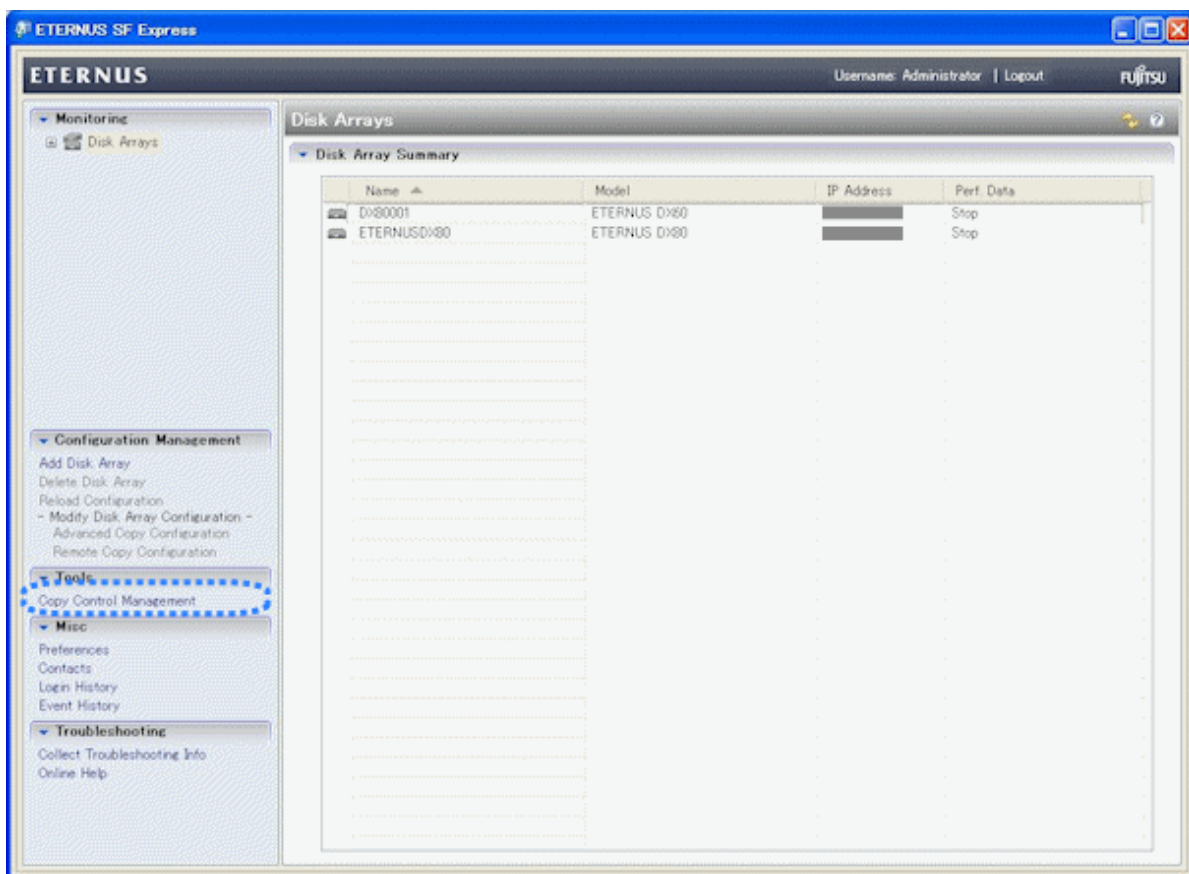
6.4.4.2　Registering ETERNUS Disk storage systems

Register ETERNUS Disk storage systems with Express Manager as the devices to be used for copies.

1. Register an ETERNUS Disk storage system

   1. Click [Add disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
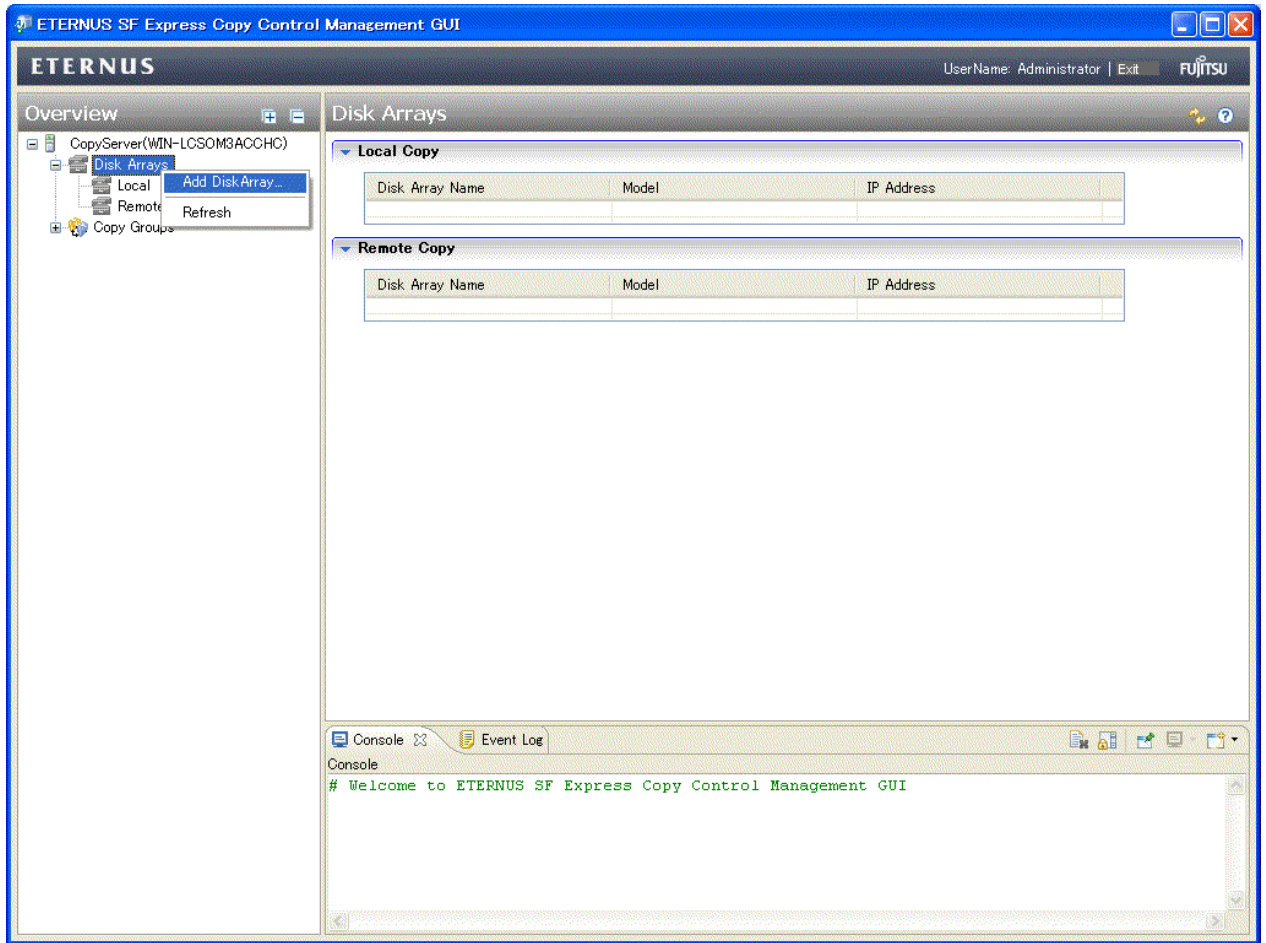
   The [Add Disk Array] menu is shown.

   2. Specify the following information.

      - Storage Location

      - Array Name

      - IP Address

      - User Name

      - Password

      - Access Path
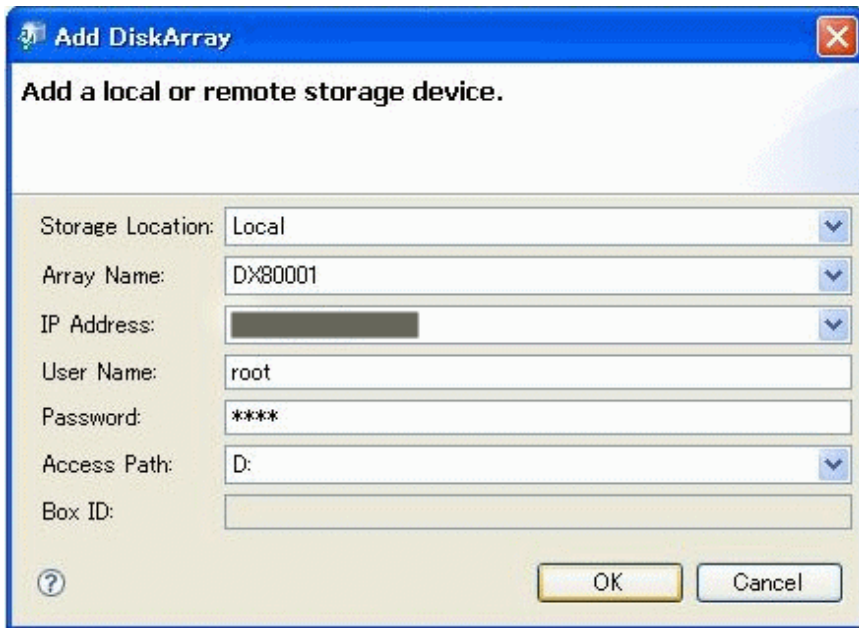
2. Register another ETERNUS Disk storage system

    1. Click [Add Disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
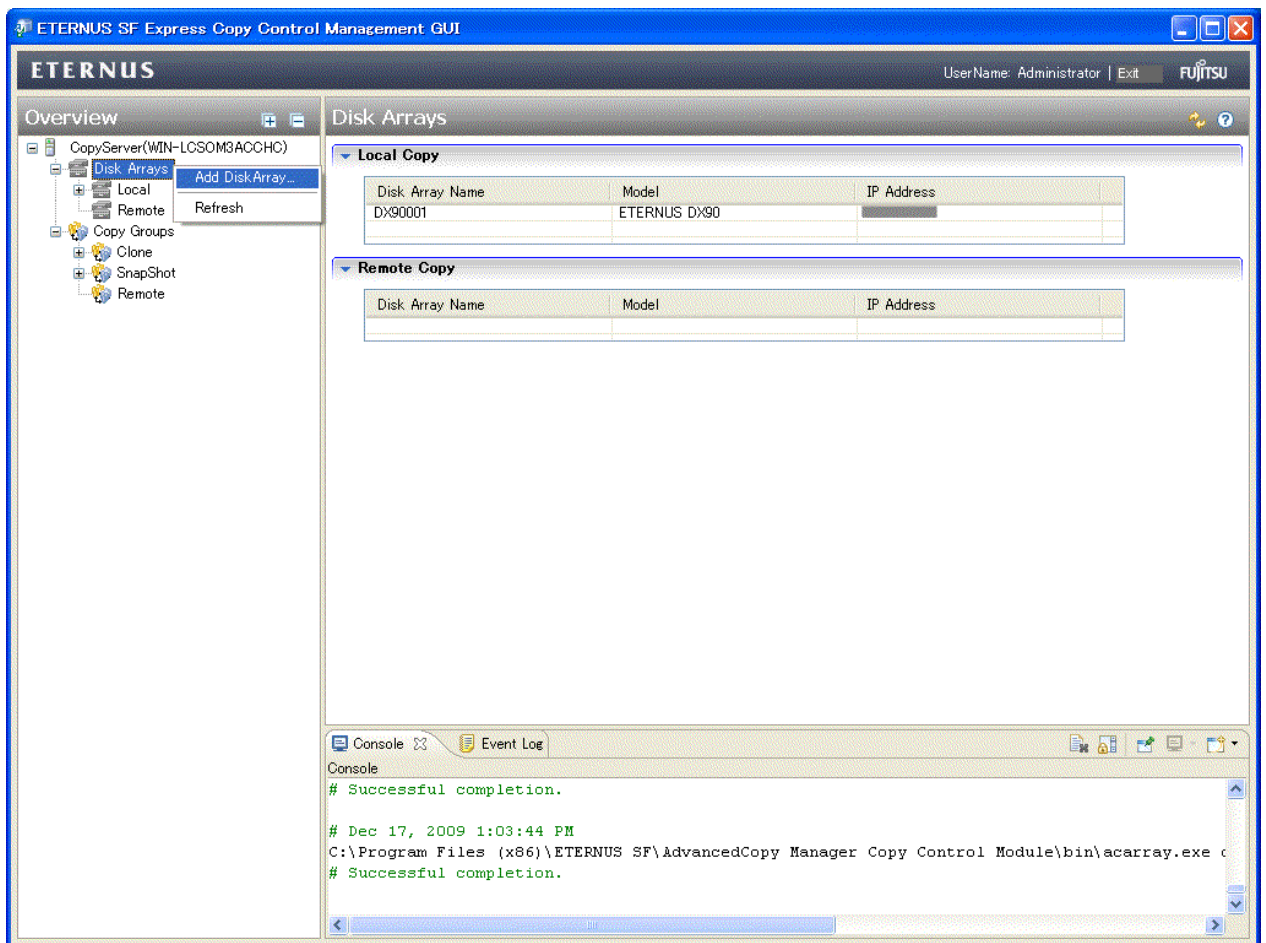
    The [Add Disk Array] menu is shown.

    2. Specify the following information.

      - Storage Location

- Array Name

- IP Address

- User Name

- Password

- Access Path
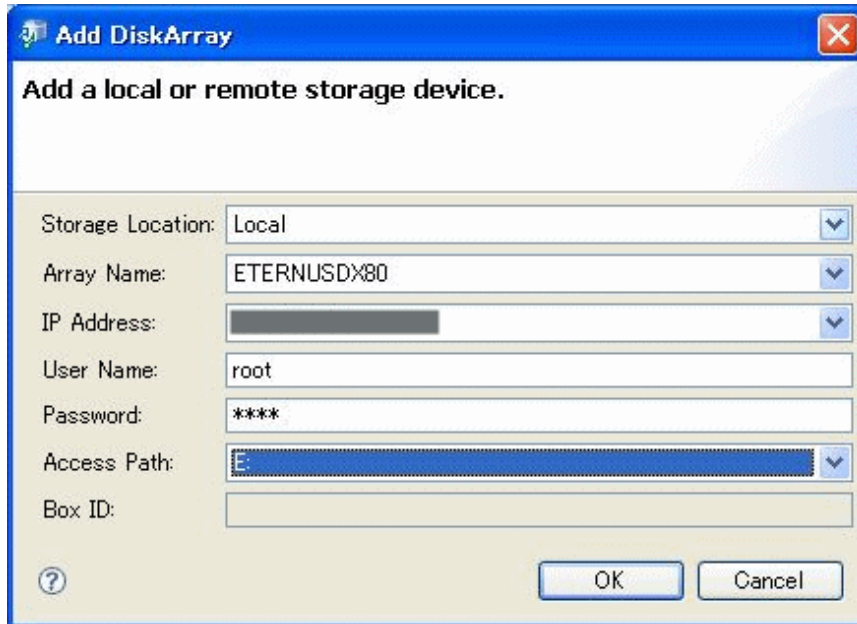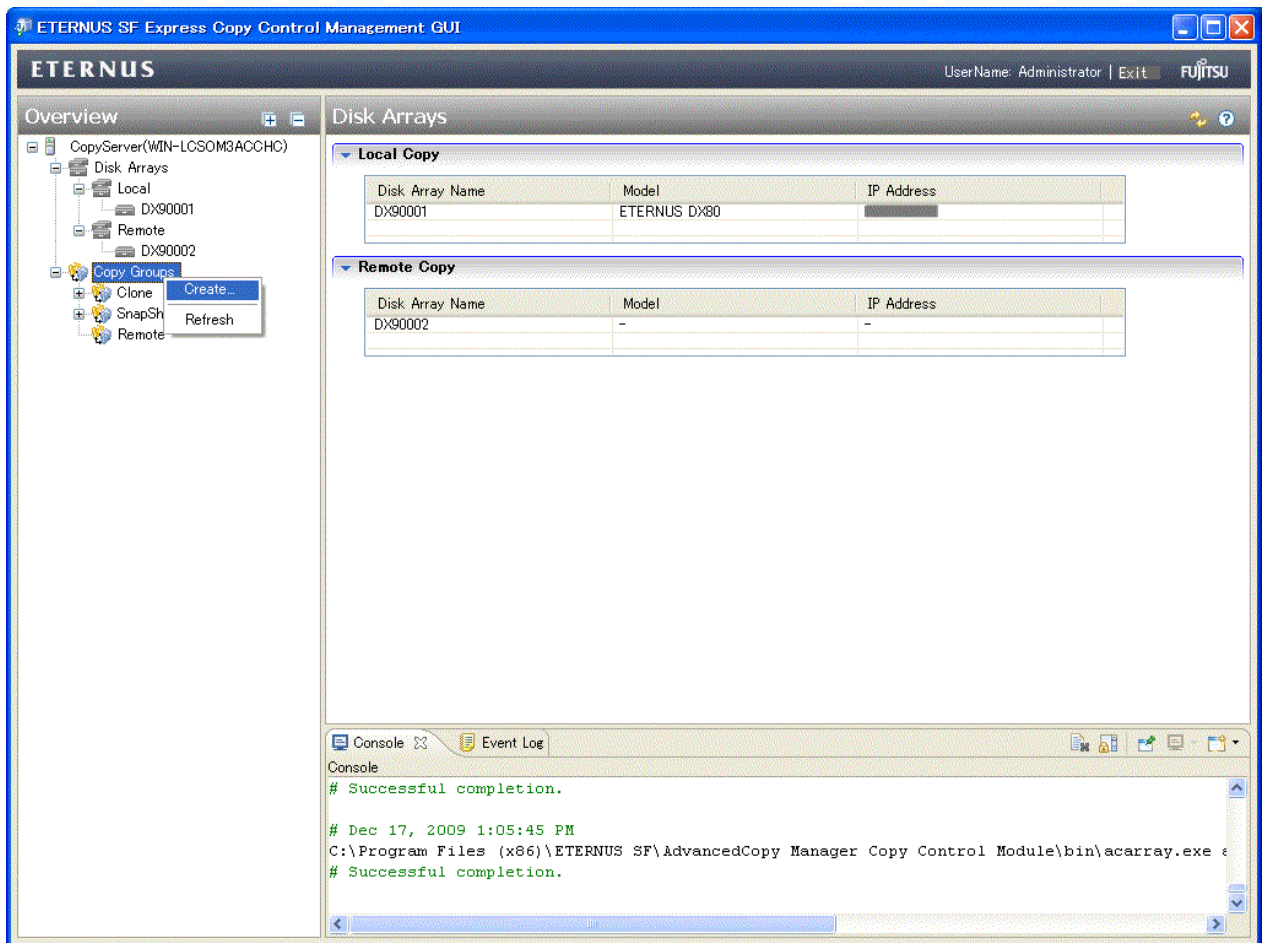
6.4.4.3 Creating copy groups

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

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

1. Click [Create] in the Copy Group to create a Copy Group.

The [Create] menu is shown.

2. Specify the following information.

　　　- Group Name

　　　- Copy Type

　　　- Local Disk Array(for Remote Copy)

　　　- Remote Disk Array(for Remote Copy)

Point

. . . .

Group Name must be up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.

. . . .

6.4.4.4   Adding copy pairs

Add copy pairs to the copy groups that have been created.

Copy pairs are strings that define copy source and destination logical volumes.

1. Click [Add Pairs] in the Copy Group to add Copy Pairs.
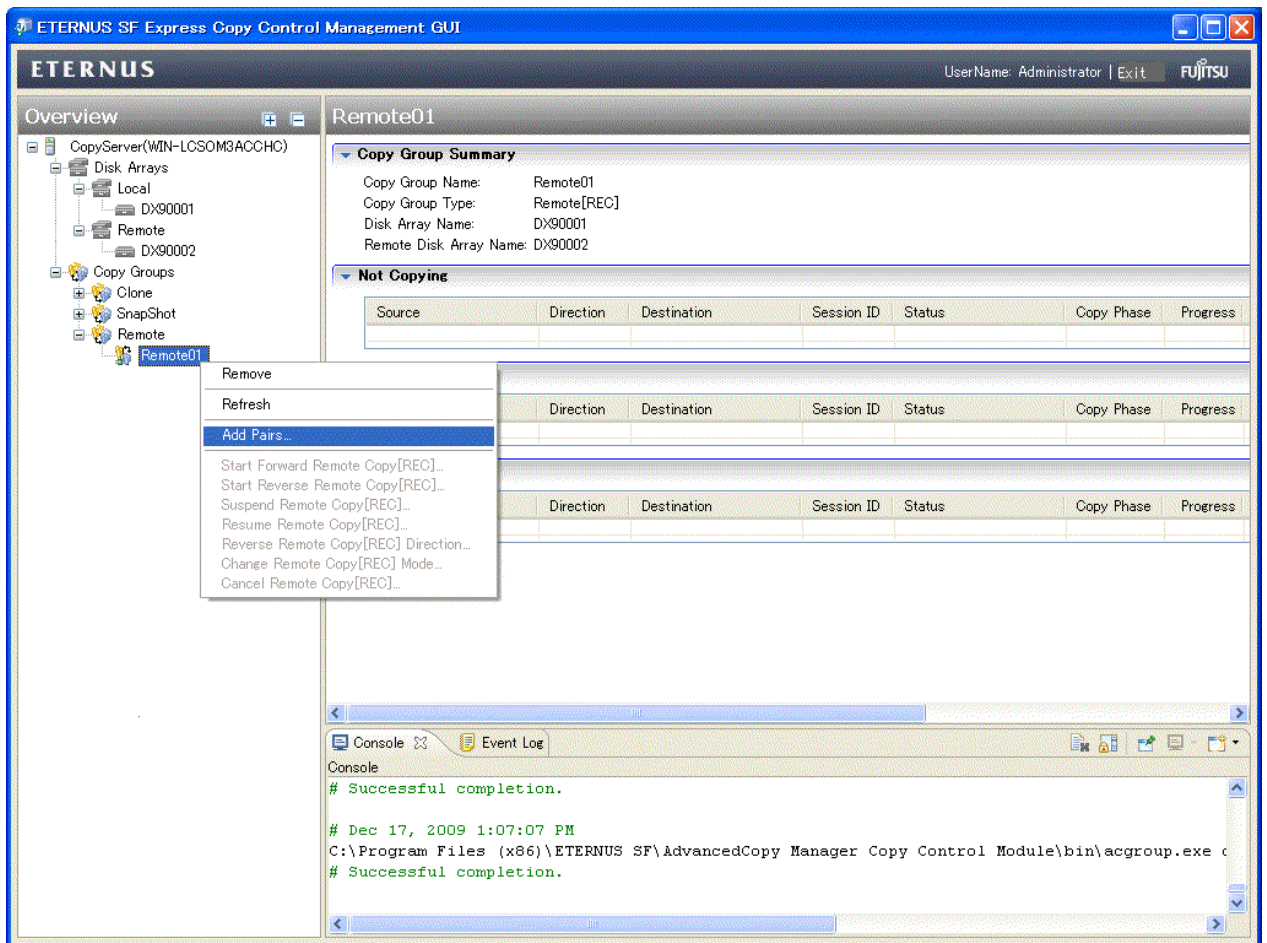
The [Add Copy Pair] menu is shown.

2. Specify the following information.

   - Copy Source Array

   - Copy Source Volume

   - Copy Destination Array

   - Copy Destination Volume

6.4.4.5 Executing Advanced Copy

Execute Clone (Remote) type Advanced Copy.

The Clone (Remote) type operating procedure is as follows.

1. Start copy

   Click [Start Forward Remote Copy[REC]] in the copy group to start Remote Advanced Copy. However, if you want to reverse the copied data, click [Start Reverse Remote Copy[REC]].

Specify the Remote Advanced Copy operating modes.

- Transfer mode

- Recovery mode

- Split mode

2. Wait for equivalent state

   Wait until [Progress] is changed to "100%".

3. Suspend copy

   Click [Suspend Remote Copy[REC]] in the Copy Group to suspend the copy.

4. Resume copy

   Click [Resume Remote Copy[REC]] in the Copy Group to resume the copy.

   Then repeat the procedures 2 to 4.

6.4.5 Executing Remote Advanced Copy (DR system configuration)

This section describes Extended Remote Advanced Copy in a disaster recovery solution system configuration.

Against disasters, execute remote copy between ETERNUS DX90 at active site and ETERNUS DX90 at standby site. If a disaster should occur, switch to the one at standby site and you can continue the system operation.

Figure 6.9 Disaster recovery solution system configuration diagram
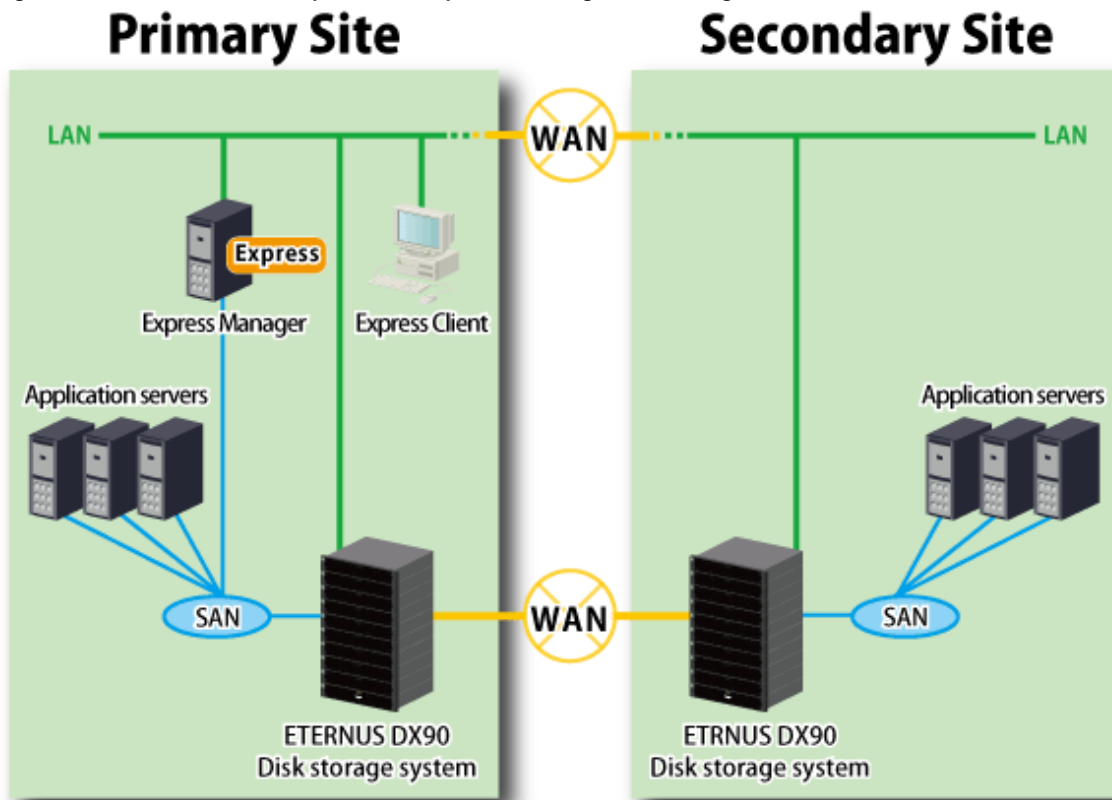
Take the following procedures to execute Remote Advanced Copy.
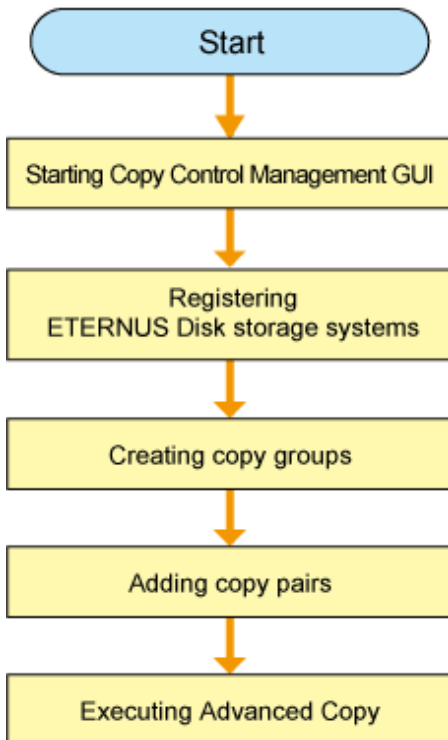
6.4.5.1   Starting Copy Control Management GUI

Start the Copy Control Management GUI from Express Clinet.

Click [Copy Control Management] in [Tools] to launch Copy Control Management GUI.
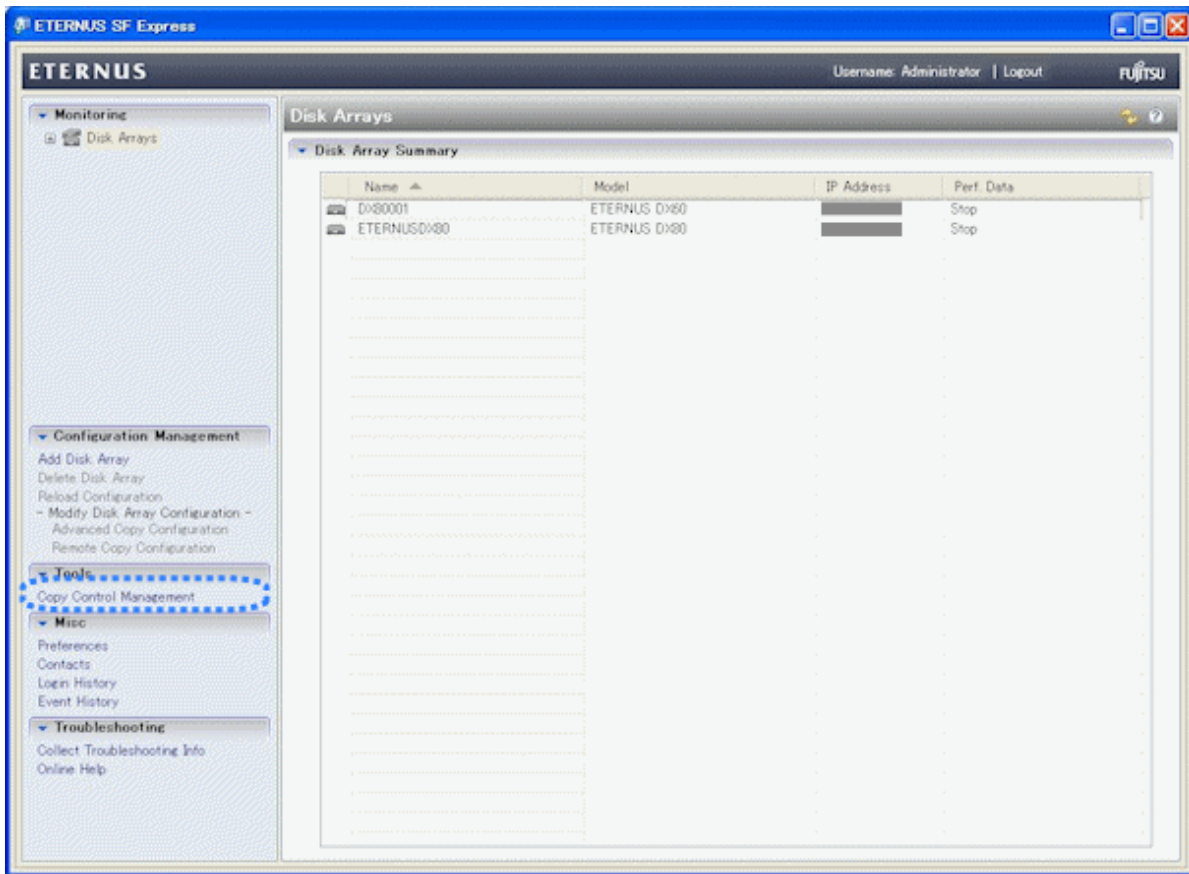
6.4.5.2   Registering ETERNUS Disk storage systems

Register ETERNUS Disk storage systems with Express Manager as the devices to be used for copies.

1. Register an ETERNUS Disk storage system in the local site

    1. Click [Add Disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
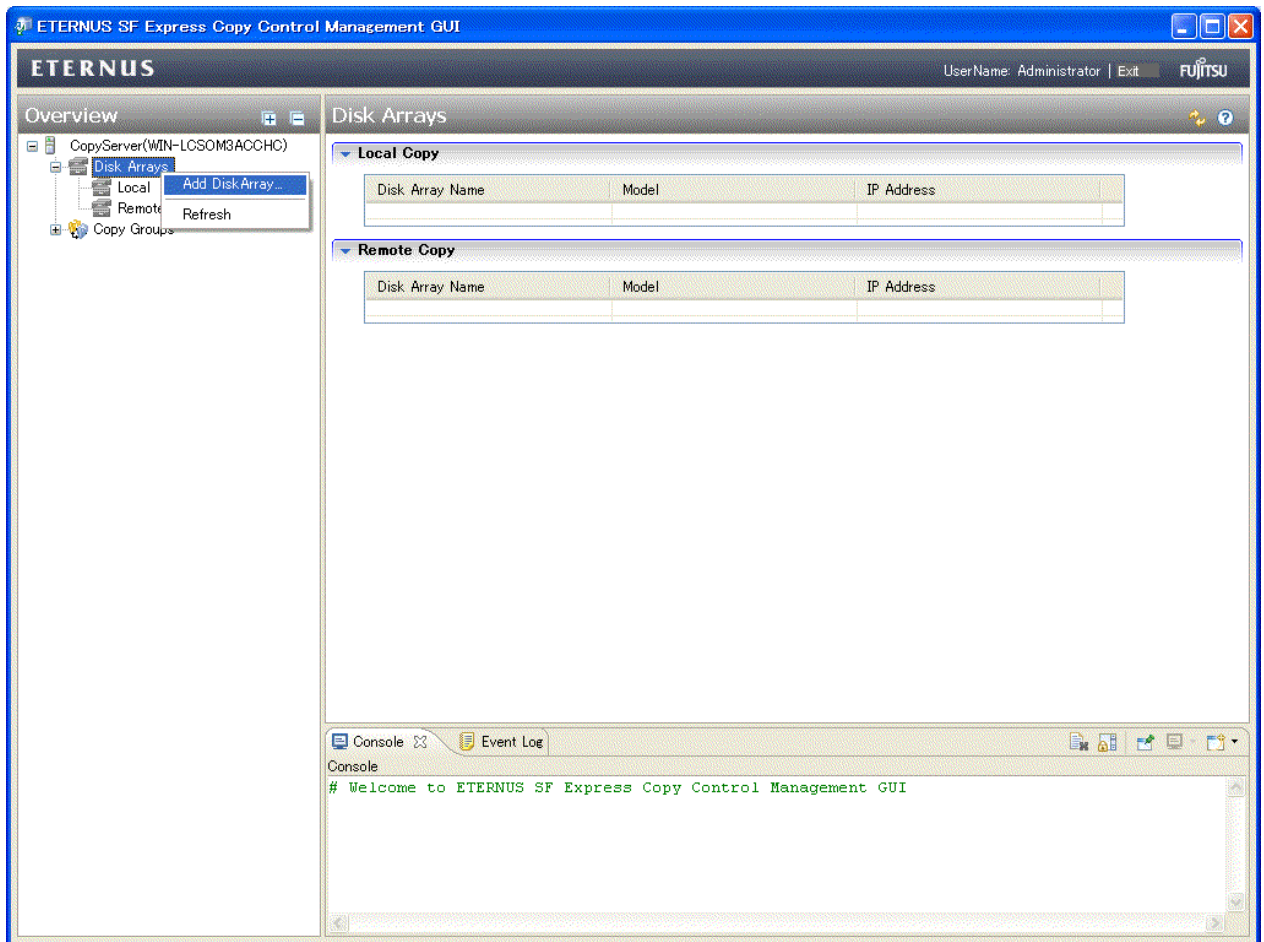
    The [Add Disk Array] menu is shown.

    2. Specify the following information.

        - Storage Location

        - Array Name

        - IP Address

   - User Name

        - Password

        - Access Path

2. Register an ETERNUS Disk storage system in the remote site

   1. Click [Add Disk Array] in [Disk Arrays] to register an ETERNUS Disk storage system.
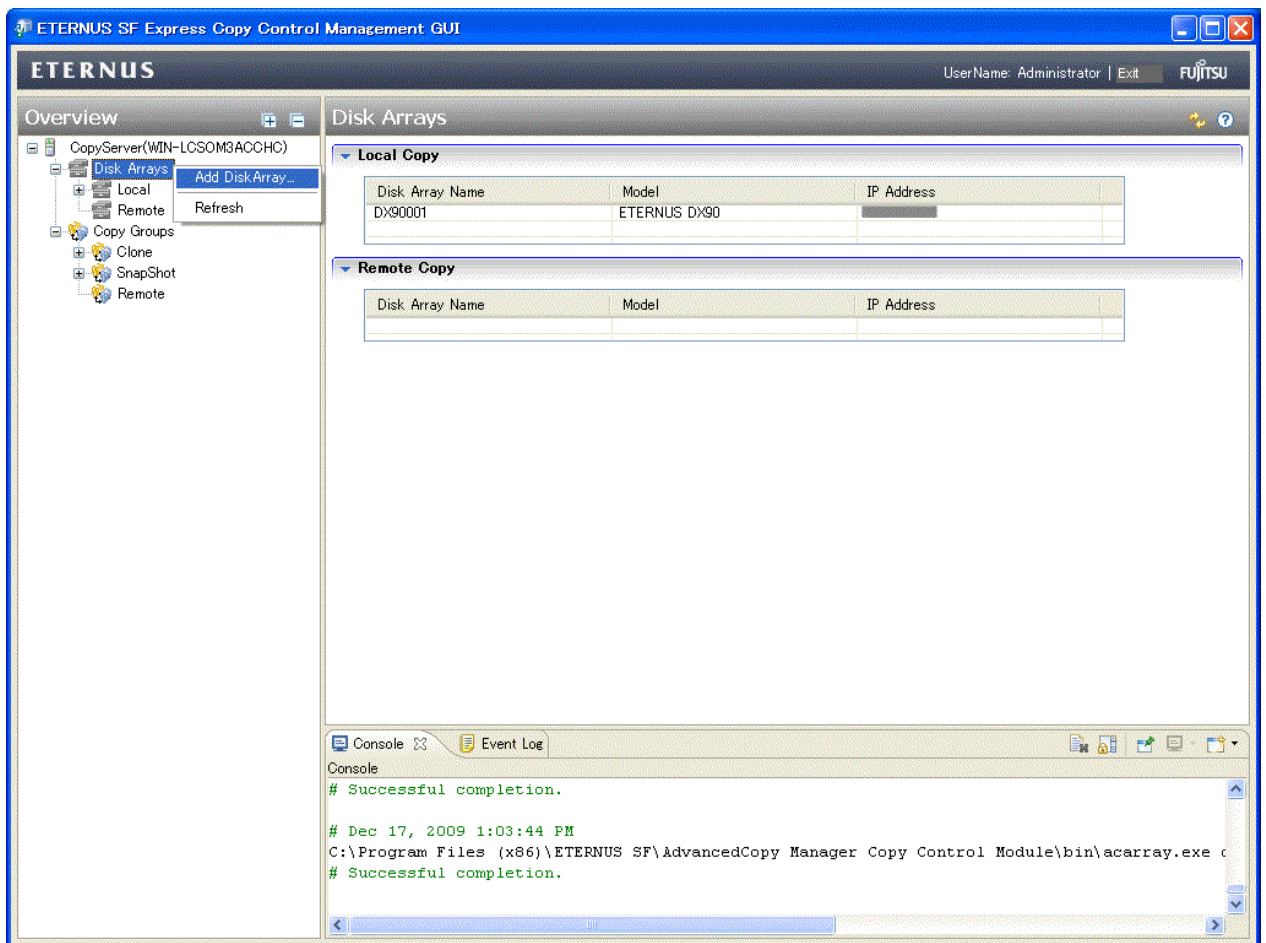
   The [Add Disk Array] menu is shown.

   2. Specify the following information.

     - Storage Location

- Array Name

- Box ID

    You can get the Box ID in remote site by ETERNUS Web GUI.

![P] **Point**

・・

Array Name must be up to 16 alphanumeric characters.

・・

6.4.5.3 Creating copy groups

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

When creating copy groups, specify which type of Advanced Copy and which ETERNUS Disk storage system to use.
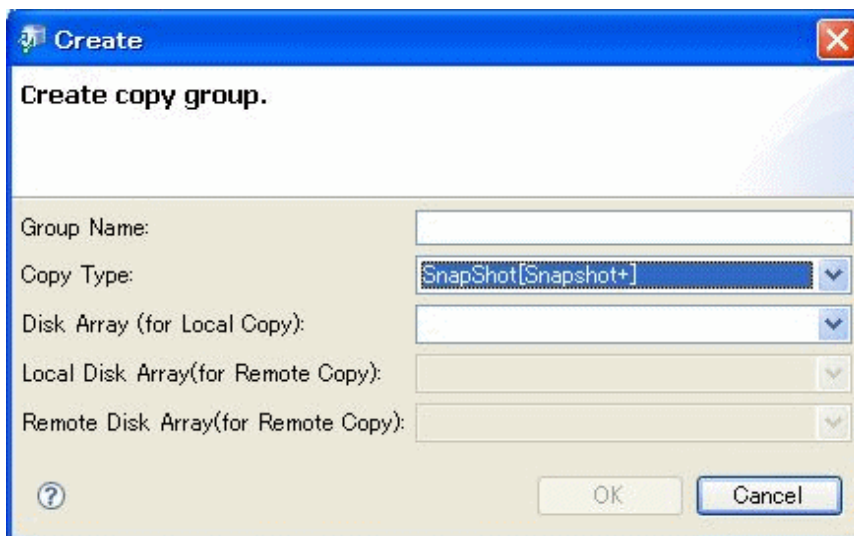
1. Click [Create] in the Copy Group to create a Copy Group.

The [Create] menu is shown.

2. Specify the following information.

   - Group Name

    - Copy Type

    - Local Disk Array(for Remote Copy)

    - Remote Disk Array(for Remote Copy)

![P] **Point**

. . . .

Group Name must be up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.

. . . .

6.4.5.4 Adding copy pairs

Add copy pairs to the copy groups that have been created.

Copy pairs are strings that define copy source and destination logical volumes.
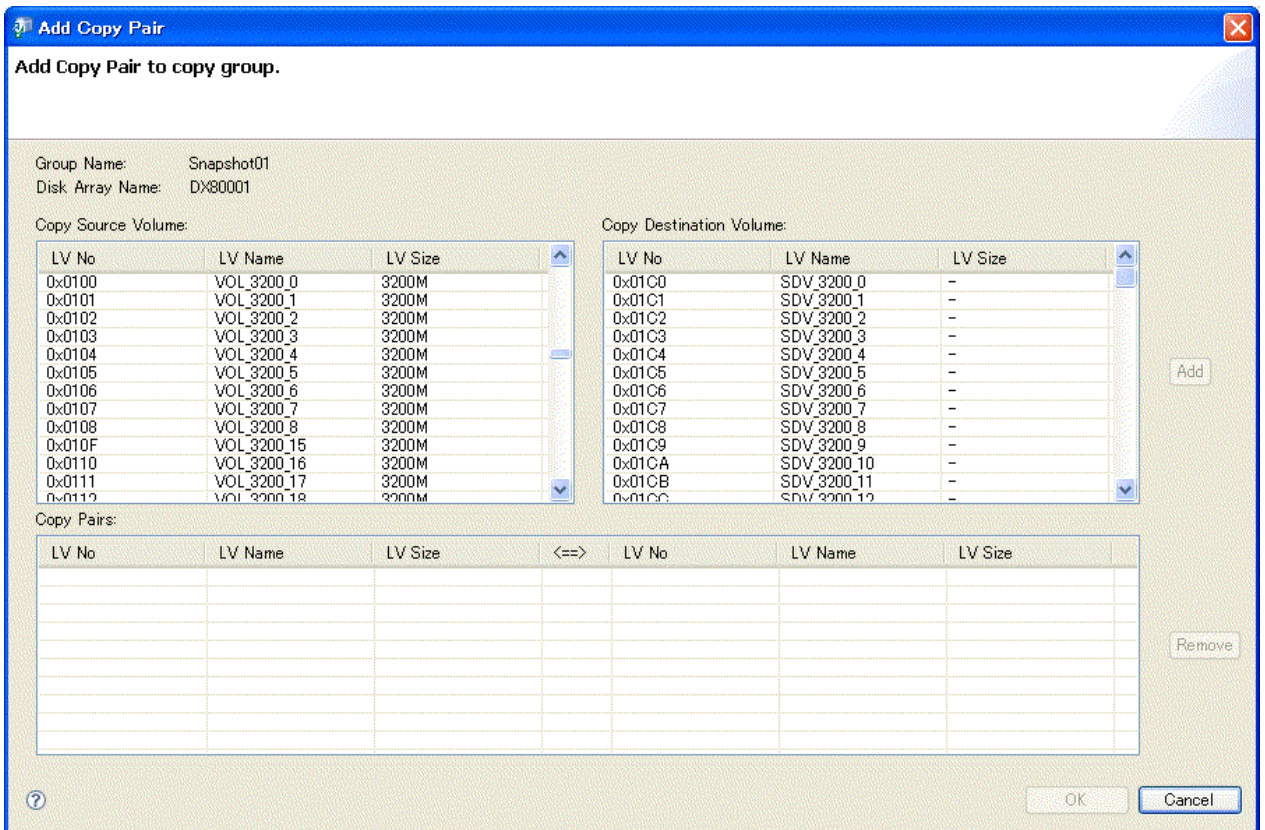
1. Click [Add Pairs] in the Copy Group to add Copy Pairs.
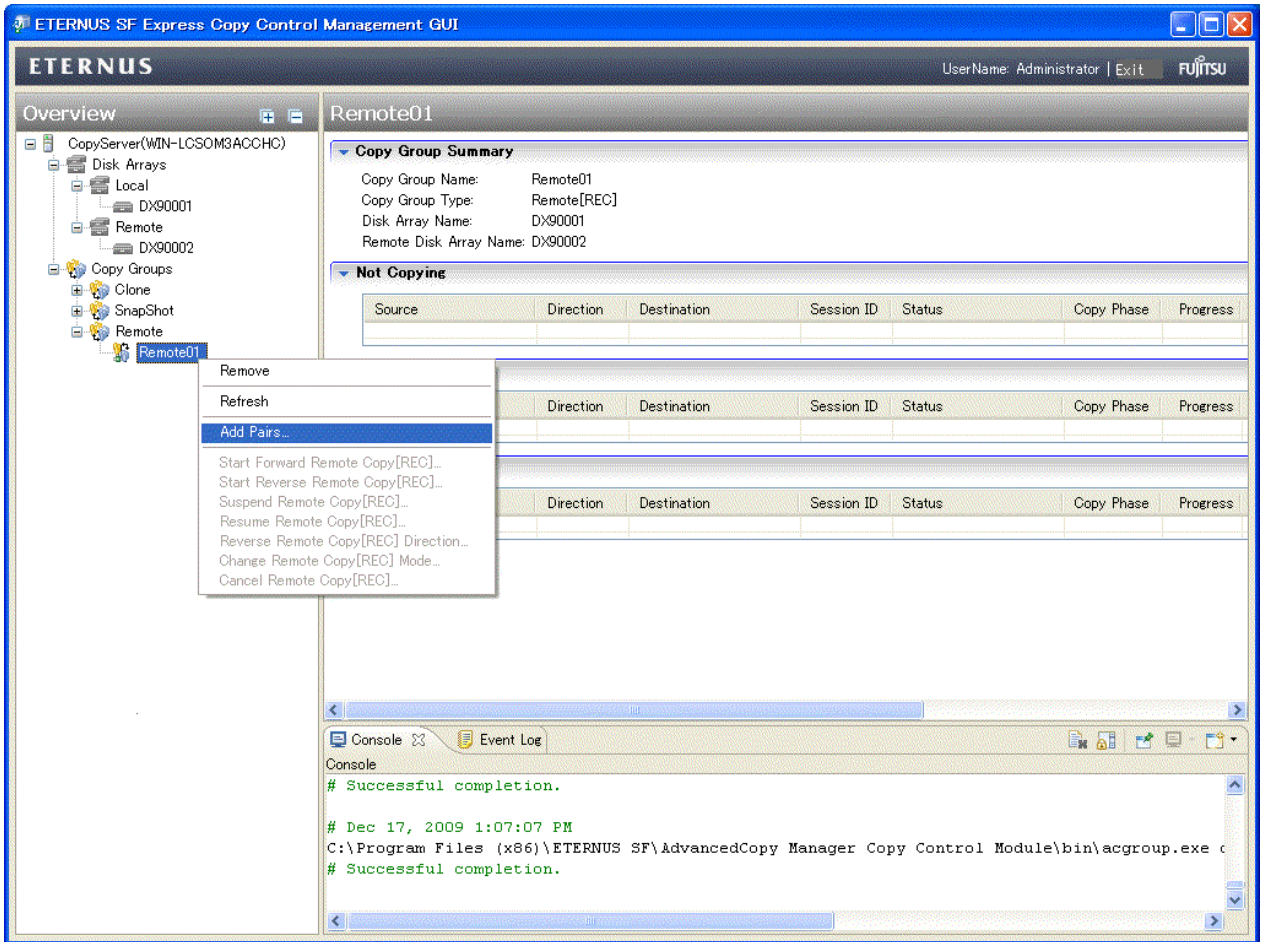
The [Add Copy Pair] menu is shown.

2. Select the volume of the ETERNUS Disk storage system in the local site, and specify the volume of the ETERNUS Disk storage system in the remote site.

6.4.5.5 Executing Advanced Copy

Execute Clone (Remote) type Advanced Copy.

The Clone (Remote) type operating procedure is as follows.

1. Start copy

   Click [Start Forward Remote Copy[REC]] in the copy group to start Remote Advanced Copy. However, if you want to reverse the copied data, click [Start Reverse Remote Copy[REC]].

   Specify the Remote Advanced Copy operating modes.

   - Transfer mode

   - Recovery mode

   - Split mode

2. Wait for equivalent state

   Wait until [Progress] is changed to "100%".

3. Suspend copy

   Click [Suspend Remote Copy[REC]] in the Copy Group to suspend the copy.

4. Resume copy

   Click [Resume Remote Copy[REC]] in the Copy Group to resume the copy.

   Then repeat the procedures 2 to 4.

6.5 Reload construct configuration

This section explains when reloading the configuration created by ETERNUS Web GUI.

📌 **Note**

. . . .
Only a system administrator may change the configuration.
. . . .

Select the [Reload Configuration] button.
Reloads the configuration created by ETERNUS Web GUI and applies it.

[Refresh] button on the Storage System Management GUI only acquires information on the Express manager server, and doesn't update information on the manager.

Latest information is displayed by select [Refresh] button about [Events] information in [Disk Array Information] tab.

Reload the configuration as shown in the above-mentioned when you want to display latest information about other information.

6.6 Express manager server with multiple IP Addresses

If the Express manager server has multiple IP Addresses, specify one IP Address to communicate with Express clients.

Perform the following procedures to specify the IP address.

1. Open the file shown below :

   [Install directory]\Express\Manager\etc\express_manager.ini

2. Specify the IP address as a parameter of "express.rmi.manager.ipaddress" option.

   📑 Example

   ・・
   express.rmi.manager.ipaddress=10.12.13.14
   ・・

3. Restart "esfexpressmgr" and "esfexpressccm" services.

6.7 When sending a test mail

Make sure whether or not a test mail can be received at the email address set up or under the SMTP server name.
Take the following procedure to send a test mail.

1. Select [Contacts] to check the destination email address.

2. Make sure that the test mail can be received at the email address set up.

6.8 When changing the contact addresses in trouble occurrences

Change the contact addresses of administrators and email addresses at which to receive a notification email of trouble occurrence from [Contacts] in the Storage System Management GUI.

In addition, after having changed the email addresses at which to receive a notification email of trouble occurrence, refer to the "6.7 When sending a test mail" to check whether the test mail can be received at the email addresses set up.

6.9 Changing Advanced Copy function

This section explains the procedure for how to change an Advanced Copy function and a Remote Advanced Copy function.

6.9.1 Advanced Copy function

Follow the procedure below to reload configuration.

1. Select the [Advanced Copy Configuration] button and the Advanced Copy Configuration Wizard will be displayed.

2. Set again the Advanced Copy function along the wizard.

📘 See

・・
Refer to "5.5 Advanced Copy Configuration Wizard" on the details of an Advanced Copy function.
・・

6.9.2 Remote Advanced Copy function

Follow the procedure below to reload configuration.

1. Select the [Remote Advanced Copy Configuration] button and the Remote Advanced Copy Configuration Wizard will be displayed.

2. Set again the Remote Advanced Copy function along the wizard.

 See
. . . . - 94 - . . . .
Refer to "5.6 Remote Advanced Copy Configuration Wizard" on the details of a Remote Advanced Copy function.
. . . .

6.10 Changing Express various information

This section explains the procedure for how to change Express various information.

Select the [Preferences] in the [Misc] menu.
Reloads the Express various information changed by Storage System Management GUI.

 Point
. . . .
When changing the SMTP server name

After having changed the SMTP server name, refer to the "6.7 When sending a test mail" to make sure whether the test mail can be received using the SMTP server name set up.
. . . .

 See
. . . .
For details of various information, refer to "4.3 Various information".
. . . .

Chapter 7 Maintenance

This chapter describes the maintenance of Express Manager.

7.1 Backing up Express Manager environment

It is required to save Express Manager environment against failures in a server on which Express Manager is running. Take the following procedure to save its environment. All operations are performed on the relevant server on which Express Manager is running.

Information

About description in the procedure

・ $BAK_DIR means the backup destination directory.

・ $INS_DIR means a directory in which Express Manager is installed.

1. Stop the services.

   Open Service Control Manager to stop the following three services.

   - ETERNUS SF Express Manager

   - ETERNUS SF Express Manager for CCM GUI Service

   - ETERNUS SF Storage Cruiser Manager

2. Back up various settings information.

   Using Explorer, create the following backup directory:

   - $BAK_DIR\Express\Manager\etc

   - $BAK_DIR\Express\Manager\etc\db

   Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$INS_DIR\Express\Manager\etc\db	$BAK_DIR\Express\Manager\etc\db

   Using Explorer, copy the following file to the backup location.

Source file	Destination directory
$INS_DIR\Express\Manager\etc\express_manager.ini	$BAK_DIR\Express\Manager\etc

3. Back up device management information.

   Using Explorer, create the following backup directory:

   - $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom

   Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom\logr	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom

4. Back up essential files.

   If there are no subdirectories or files, backup is unnecessary.

   Using Explorer, create the following backup directories:

- $BAK_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0

- $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\ac

- $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db

- $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr

- $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current

- $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose

Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$INS_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0	$BAK_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\ac	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\ac
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose

Using Explorer, copy the following file to the backup location.

Source file	Destination directory
$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\systemevent.csv	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current

5. Back up files that are related to the performance management function.

   If you are not using the performance management function, this step is unnecessary.

   Using Explorer, create the following backup directories:

   - $BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\perf

   Using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$INS_DIR\Storage Cruise \Manager\var\opt\FJSVssmgr\current\perf	$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\perf

6. If Advanced Copy function is used, save files about definition of copy group and copy pair.

   Using Explorer, create the following backup directory:

   - $BAK_DIR\AdvancedCopy Manager Copy Control Module\etc\db

   - $BAK_DIR\AdvancedCopy Manager Copy Control Module\etc\db\cg

   - $BAK_DIR\AdvancedCopy Manager Copy Control Module\var\micc\database

   Using Explorer, copy the file to the backup location.

Source file	Destination directory
$INS_DIR\AdvancedCopy Manager Copy Control Module\etc\db\eternus.xml	$BAK_DIR\AdvancedCopy Manager Copy Control Module\etc\db
$INS_DIR\AdvancedCopy Manager Copy Control Module\var\micc\database\DeviceRegList.xml	$BAK_DIR\AdvancedCopy Manager Copy Control Module\Manager\var\micc\database

Using Explorer, copy all files in the source directory to the backup location.

Source directory	Destination directory
$INS_DIR\AdvancedCopy Manager Copy Control Module \etc\db\cg	$BAK_DIR\AdvancedCopy Manager Copy Control Module \Manager\etc\db\cg

7. Restart the services

   Open Service Control Manager to start the following three services.

   - ETERNUS SF Express Manager

   - ETERNUS SF Express Manager for CCM GUI Service

   - ETERNUS SF Storage Cruiser Manager

7.2 Recovering Express Manager environment

If any failure occurs in a server on which Express Manager is running, take the following procedure to restore Express Manager. All operations are performed on the relevant server on which Express Manager is running.

Information

About description in the procedure

- $BAK_DIR means the backup destination directory.

- $INS_DIR means a directory in which ETERNUS Express Manager is installed.

1. Install Express Manager.

   Refer to the section "5.1.1 Installing Express Manager program" to reinstall Express Manager.

2. Stop the services.

   Open Service Control Manager to stop the following three services.

   - ETERNUS SF Express Manager

   - ETERNUS SF Express Manager for CCM GUI Service

   - ETERNUS SF Storage Cruiser Manager

3. Restore various settings information.

   Using Explorer, create the following directory, if these directories do not exist.

   - $INS_DIR\Express\Manager\etc

   - $INS_DIR\Express\Manager\etc\db

   By using Explorer, copy the subdirectories and files in the following directories to the backup location.

Source directory	Destination directory
$BAK_DIR\Express\Manager\etc\db	$INS_DIR\Express\Manager\etc\db

   By using Explorer, copy the following file from the backup location.

Source file	Destination directory
$BAK_DIR\Express\Manager\etc\express_manager.ini	$INS_DIR\Express\Manager\etc

4. Restore the device management information.

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom\logr

By using Explorer, copy the subdirectories and files from the backup location.

Source directory	Destination directory
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom\logr	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\opencimom\logr

5. Restore essential files.

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $INS_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0

- $INS_DIR\Storage Cruise \Manager\var\opt\FJSVtrccb\2.0\ac

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose

By using Explorer, delete the following file.

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\systemevent.csv

If there are no subdirectories or files, restore is unnecessary.

By using Explorer, copy the subdirectories and files from the backup location.

Source directory	Destination directory
$BAK_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0	$INS_DIR\Storage Cruise\Manager\etc\opt\FJSVtrccb\2.0
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\ac	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\ac
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\db
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVtrccb\2.0\sr
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\vsccompose

By using Explorer, copy the following file from the backup location.

Source file	Destination directory
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\systemevent.csv	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current

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

If you are not using the performance management function, this step is unnecessary.

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr\current\perf

By using Explorer, copy the subdirectories and files in the following directories from the backup location.

Source directory	Destination directory
$BAK_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr \current\perf	$INS_DIR\Storage Cruise\Manager\var\opt\FJSVssmgr \current\perf

7. If Advanced Copy function is used, restore files about definition of copy group and copy pair.

By using Explorer, delete the subdirectories and files in the restore destination directories shown below.

Do not delete the restore destination directories themselves. If these directories do not exist, create them.

- $INS_DIR\AdvancedCopy Manager Copy Control Module\etc\db

- $INS_DIR\AdvancedCopy Manager Copy Control Module\etc\db\cg

- $INS_DIR\AdvancedCopy Manager Copy Control Module\micc\databaseetc\db

Using Explorer, copy the file from the backup location.

Source file	Destination directory
$BAK_DIR\AdvancedCopy Manager Copy Control Module \etc\db\eternus.xml	$INS_DIR\AdvancedCopy Manager Copy Control Module \etc\db
$BAK_DIR\AdvancedCopy Manager Copy Control Module \var\micc\database\DeviceRegList.xml	$INS_DIR\AdvancedCopy Manager Copy Control Module \var\micc\database

Using Explorer, copy all files from the backup location.

Source directory	Destination directory
$BAK_DIR\AdvancedCopy Manager Copy Control Module\etc \db\cg	$INS_DIR\AdvancedCopy Manager Copy Control Module \etc\db\cg

8. Restart the Manager.

Open Service Control Manager to start the following three services.

- ETERNUS SF Express Manager

- ETERNUS SF Express Manager for CCM GUI Service

- ETERNUS SF Storage Cruiser Manager

7.3 Changing Express Manager environment

7.3.1 Changing port numbers

Express uses the following four port numbers.

service name	port number	protocol	Note
esfexpressmgr	9853	tcp	Express manager service for Express client
esfexpressccm	9854	tcp	Express manager service for Copy Control Management GUI
sscruisera	4917	tcp	Express manager service(Internal use)
nfport	23456	tcp	Express manager service(Internal use)

Those port numbers are defined in the services file of the system.

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

1. Open the file "%SystemRoot%\system32\drivers\etc\services" with a notepad.

2. Pick out the entry of a service name to be changed to change its entry port number.

```
# <service name>  <port number>/<protocol>  [aliases...]  [#<comment>]
#
esfexpressmgr  9853/tcp
esfexpressccm  9854/tcp
nfport         23456/tcp
sscruisera     4917/tcp
```

3. Save the file "%SystemRoot%\system32\drivers\etc\services" to close.

4. Reboot the server that is running Express Manager.

7.3.2 Changing the IP address

The following is the procedure to change the IP address for the server that is running Express Manager.

1. Change the IP address for the server that is running Express Manager.

2. Stop the services.

   Open Service Control Manager to stop the following 3 services.

   - ETERNUS SF Express Manager

   - ETERNUS SF Express Manager for CCM GUI Service

   - ETERNUS SF Storage Cruiser Manager

3. If the management server has two network interfaces or more, change the IP address which used by communication between the management server and an Express client referring to "6.6 Express manager server with multiple IP Addresses".

4. If the notification destination of SNMP Trap set for a storage system is specified by an IP address, change the IP address.

5. Reboot the server.

6. Start Express Manager to connect to the changed server IP address.

P Point
. . . .

When the server which is running Express Manager has its IP address changed, the device which specifies the IP address as a destination of SNMP Trap needs to change to that IP address.

・ For ETERNUS Disk storage system

  Change the destination of SNMP Trap setting by ETERNUS Web GUI.
  The destination of SNMP Trap is displayed in "Setup SNMP Agent (Trap) Screen".
  Delete the pre-change IP address and specify the post-change IP address and community name.
  Click the [Add New Destination] button, and the new destination is added.

・ For FibreCAT SX Disk storage system

  Change the destination of SNMP Trap setting by FibreCAT SX WBI.
  The destination of SNMP Trap is displayed in "SNMP configuration" page.
  Delete the pre-change IP address and specify the post-change IP address.
. . . .

7.4 Changing the Storage System

7.4.1 Configuration change

If the configuration of the storage system has been changed such as logical volume deletion and addition or host affinity deletion, addition and change, take the procedure shown in the section "6.5 Reload construct configuration".

7.4.2 Changing the storage system name

When changing a storage system name, take the following procedure.

1. Start the Storage System Management GUI.

2. If Advanced Copy function is used on the storage system whose name is to be changed, start the Copy Control Management GUI. Delete the storage system via the Copy Control Management GUI.

Note

You must not perform any operation such as deletion of a copy group or a copy pair with respect to copy groups and copy pairs.

3. Delete a storage system whose name is to be changed via the Storage System Management GUI.

4. Add the storage system whose name was changed via the Storage System Management GUI. For more information, refer to the section "5.4 Discovering Storage".

5. If you perform copy operation on the storage system, add the system name via the Copy Control Management GUI. For more information, refer to the section "6.4 Executing Advanced Copy".

Point

Refresh behavior is required for re-registered systems or copy groups.

7.4.3 Changing the IP address

The following is the procedure to change the IP address for storage system.

1. Start the Storage System Management GUI.

2. If Advanced Copy function is used on the storage system whose IP address is to be changed, start the Copy Control Management GUI. Delete the storage system via the Copy Control Management GUI.

Note

You must not perform any operation such as deletion of a copy group or a copy pair with respect to copy groups and copy pairs.

3. Delete the storage system whose name is to be changed via the Storage System Management GUI.

4. Add the storage system whose IP address was changed via the Storage System Management GUI.
   For more information, refer to the section "5.4 Discovering Storage".

5. If you perform copy operation on the storage system, add its name via the Copy Control Management GUI.
   For more information, refer to the section "6.4 Executing Advanced Copy".

P Point
....
Refresh behavior is required for re-registered systems or copy groups.
....

7.4.4 Changing the SNMP community name

When changing SNMP community name of the storage system, follow the procedure below to reload configuration.

1. Select the [Delete Disk Array] to delete the configuration.

2. Select the [Add Disk Array] to discover the storage system as shown in "5.4 Discovering Storage".

7.4.5 Changing the User Name or Password

The following is the procedure to change the User Name or Password to access a storage system.
If Advanced Copy functions are not used, this procedure is not needed.

1. Start the Storage System Management GUI.

2. Start the Copy Control Management GUI.
   Delete the storage system via the Copy Control Management GUI.

Note
....
You must not perform any operation such as deletion of a copy group or a copy pair with respect to copy groups and copy pairs.
....

3. Add the storage system with the new User Name and Password via the Copy Control Management GUI.

   For more information, refer to the "6.4 Executing Advanced Copy".

Appendix A Advanced Copy Function

This appendix explains the Advanced Copy function.

A.1   Introduction

A.1.1   What is an Advanced Copy?

The Advanced Copy functions allow the Disk storage system to carry out high-speed copying operations itself, with no need to draw on server CPU resources. With Advanced Copy functions, at any point in time a business data volume can be copied to a separate copy volume, quickly and within the Disk storage system. Once the copy is complete, the copy volume can be separated from the business volume ensuring no further updates to the business volume are applied to the copy volume. This allows the copy volume data to be backed up to a tape device, as a point in time copy of the business data, while normal operations continue.

Advanced Copy methods

Advanced Copy functions provide three clone functions (EC, OPC, QuickOPC) and one snapshot function (SnapOPC+).

・ Clone is a full (real) copy of the original data.

・ Snapshot is a virtual copy of the original data.

EC (Equivalent Copy)

A function that always creates a synchronized copy of a business data volume on a copy volume (Mirroring method).

The business volume and copy volume are synchronized but can be separated at any required time (mirror suspend). The copy volume can then be backed up to a tape device while business operations continue on the business volume.

Suspend/Resume functions can be used to re-establish the mirror by copying only updated data since the mirror was suspended.

OPC (One Point Copy)

A function that creates a copy of the business data volume at any point in time (Background Copy).

Data on the business volume is copied logically to a copy volume, quickly, as and when required.

The copy volume can be used for backup operation, to a tape device, without waiting for physical copy completion, while business operations can continue on the business volume.

QuickOPC

A function that creates a copy of all the business data volume and subsequently only copies updated data (Background Copy). This suits large database operation where backup times must be reduced.

SnapOPC+

A function that creates a copy of the data prior to it being updated (Copy-on-Write).

As requires less copy volume capacity compared with clone, SnapOPC+ is ideal for copy operations for systems with relatively few updates such as file servers.
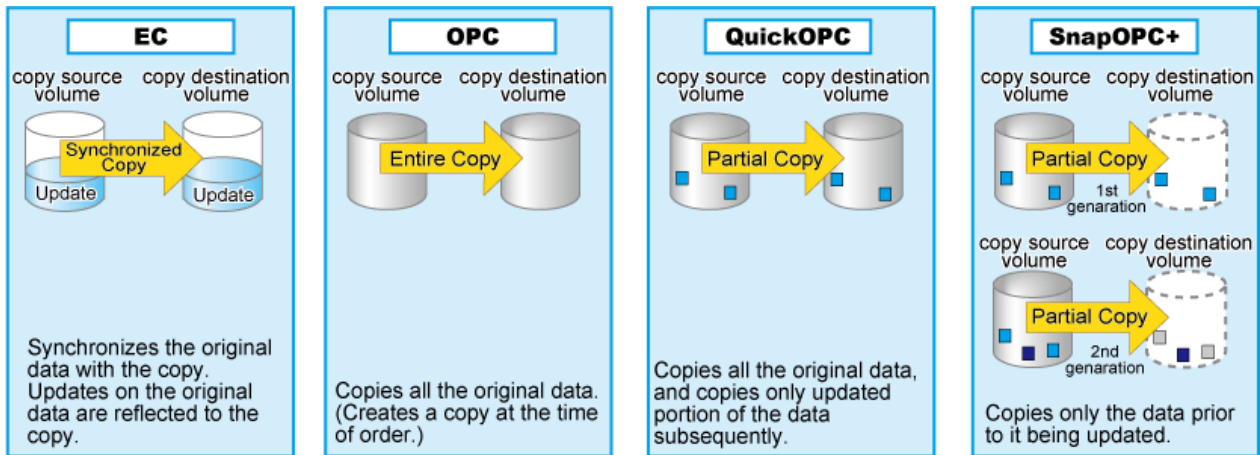
These copy methods all copy the data as it exists at a specific point in time, but there are different features, advantages and disadvantages to each method as detailed below:

Copy type	Clone			Snapshot
Function name	EC	OPC	QuickOPC	SnapOPC+
Copy method	Mirror breaking method	Background copy method	Background copy method	Copy-on-write method
Timing of actual copy load	Before "mirror breaking"	After the copy command is issued	After the copy command is issued	-
Effect on access to the copy source while copy is running	N/A	Minor	Minor	Yes
Effect on access to the copy source after copy has "finished"	N/A	Slight during background copy	Slight during background copy	Yes
Lifetime of copy session	Until the Equivalent state is stopped	Until background copy is completed	Until session is stopped and copy is completed	Until session is stopped
Size of copy destination area	Same as the copy source (Clone)	Same as the copy source (Clone)	Same as the copy source (Clone)	Sufficient for changed areas (Snapshot)
Copy action during restore	・Copy back all the data by OPC ・EC Reverse (Suspend Reverse Resume) only copies updated areas	If OPC is active, copy back only the already copied data	Copy back only the already copied data	Restore operation is not available (use OS tools to copy whole files instead)
Best used for...	・Backup to disk ・Creation of testing data	・Backup to disk ・Creation of testing data ・Restoring from backup disk	・Backup to disk ・Creation of testing data ・Recovery from physical disk failure when data	・Temporary backup area for backup to tape ・Backup to disk for file server and other low modification rate data

Copy type	Clone			Snapshot
Function name	EC	OPC	QuickOPC	SnapOPC+
			modification rate is low	(generational management is available)

Note

These are generic observations based on the mechanisms involved. Actual effect on servers will depend on the specifics of the usage environment.

A.1.2 What is a Remote Advanced Copy?

Remote Advanced Copy provides a server-less remote mirroring function which ensures fast recovery when the primary site Disk storage system becomes unusable because of a disaster, such as fire, earthquake or malicious damage.

Remote Advanced Copy methods

Remote Advanced Copy

By using Fibre Channel interfaces, Remote Advanced Copy can provide lower cost remote site support up to a maximum distance of 10km between a primary storage device and a secondary device.

Figure A.1 Remote Advanced Copy connection
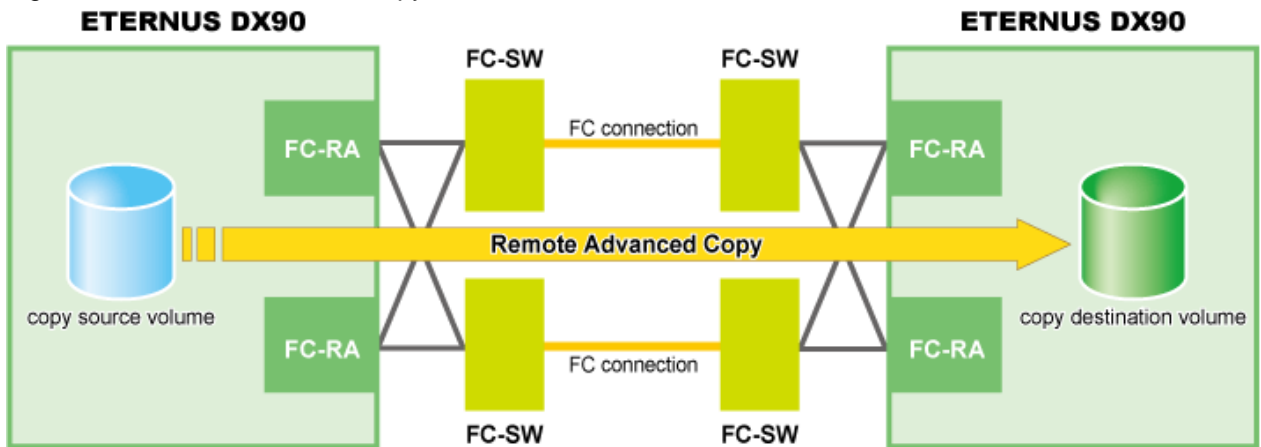
Extended Remote Advanced Copy

Extended Remote Advanced Copy uses a combination of a Fibre Channel switch and WAN converter to support very long distances over WAN. Replicated data can be located at a remote site hundreds of kilometers away from the primary site. This provides high security for the protection of critical data from both man-made and natural disasters.

Figure A.2 Extended Remote Advanced Copy connection (via FC-RA)
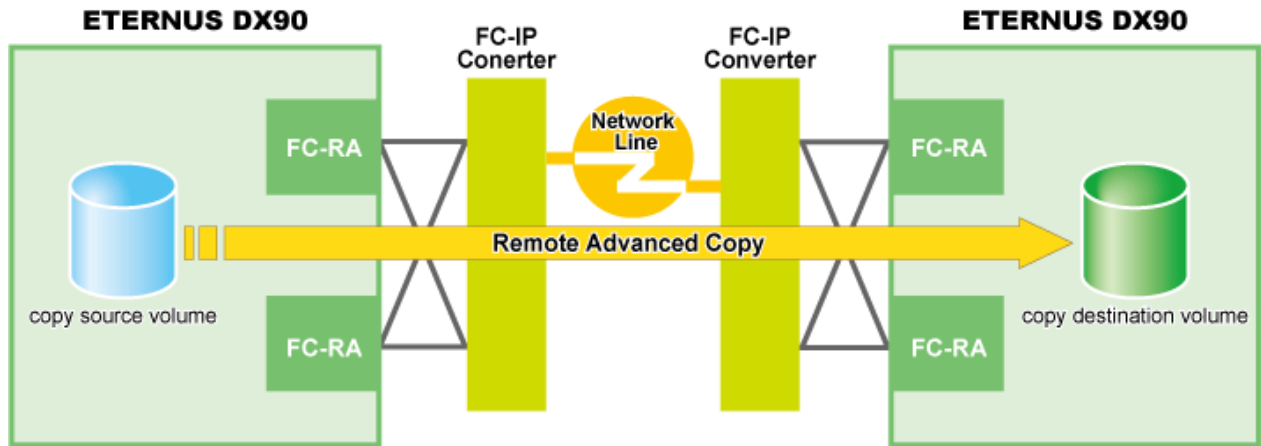
A.1.3 Technical terms

Sessions

For Advanced Copy, each copying action is called a "session". Different copy source areas, copy destination areas and copy types can be specified for each session.

A.1.4 Advanced Copy license

To utilize Advanced Copy functions or Remote Advanced Copy functions, the corresponding Advanced Copy licenses are required. However, up to 8 SnapOPC+ sessions can be run by Express without license.

A.2 Configuration

A.2.1 Configuration common in all copy methods

License registration

Register Advanced Copy license keys with Advanced Copy Wizard or Remote Advanced Copy Wizard of Express. Specifically, in REC case, license keys for 2 Disk storage systems need to be registered.

Parameter setting

To use (Remote) Advanced Copy, resolution and table size need to be set. These parameters can be set by ETERNUS Web GUI/ETERNUS CLI or Express.

- Resolution is the value that determines the amount of data each bit in the copy bitmap represents. The allowed resolution settings of "1 (standard)", "2", "4", "8", and "16" respectively give 8KB, 16KB, 32KB, 64KB, and 128KB regions of data per bitmap bit. The same value is used in the ETERNUS Disk storage system. The smallest possible resolution value should be set, to reduce the internal process overhead.

- Table size is the dedicated memory area required for Advanced Copy management. The table size and resolution settings are determined by the copy capacity and the number of sessions (volumes) that will be run simultaneously.

A.2.2 Configuration for clone

Creating copy destination volumes

When creating copy destination volumes for clone, note the following:

- The type of a copy destination volume must be OPEN. SDV (Snap Data Volume) or SDPV (Snap Data Pool Volume) can not be used as a copy destination volume for clone.

- The size of a copy destination volume must be the same as that of copy source volume (the original volume).

- To create OPEN volume, use ETERNUS Web GUI/ETERNUS CLI because Express does not offer the feature to create OPEN volumes.

A.2.3 Configuration for snapshot

Creating copy destination volumes

When creating copy destination volumes for snapshot, note the following:

- The type of a copy destination volume must be SDV. OPEN or SDPV can not be used as a copy destination for snapshot.

- The size of a copy destination volume must be the same as that of copy source volume (the original volume).

- When creating an SDV, set the appropriate capacity.

Creating Snap Data Pool (SDP)

Snap Data Pool (SDP) is used for SnapOPC+.

By registering standby storage areas in the SDP, it is possible to supply extra storage areas (SDPE: Snap Data Pool Elements) from the SDP whenever the amount of updates exceeds the capacity of the copy destination SDV, allowing the copy session to continue without failing.

- If storage area capacity runs short in an SDV, extra storage area (SDPE) is automatically supplied from the SDP.

- Once the copy session is completed, all extra storage area (SDPE) supplied to the SDV is returned to the SDP. (The SDPE is also returned to the SDP if the copy session fails.)

Figure A.3 SDP concept
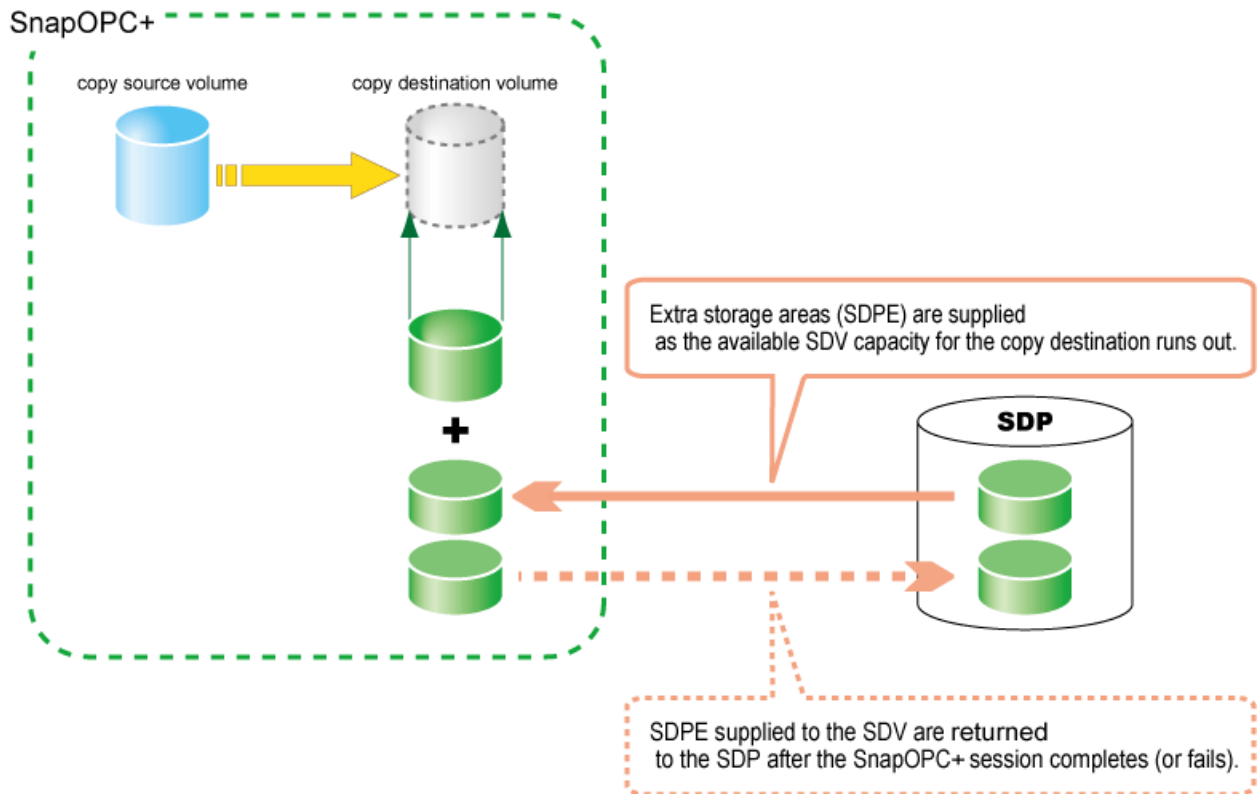
When creating copy destination volumes for snapshot, note the following:

- One SDP can be created per ETERNUS Disk storage system.

- SDP becomes available upon creating a dedicated SDPV. After creation, the SDPV is automatically allocated to the SDP.

- If the SDV is encrypted, make sure the SDPV is also encrypted.

- If the ETERNUS Disk storage system contains both encrypted and non-encrypted SDVs, then both encrypted and non-encrypted SDPVs will be needed.

- Estimate the update amounts expected for each copy source volume, then decide the SDV and SDP capacities. If estimation is difficult, try setting up the SDV and SDP with a total capacity of 50% of that of the copy source (note that this is just a rule-of-thumb value and that different operating configurations will require different SDP capacities).

Figure A.4 Construction of SDP
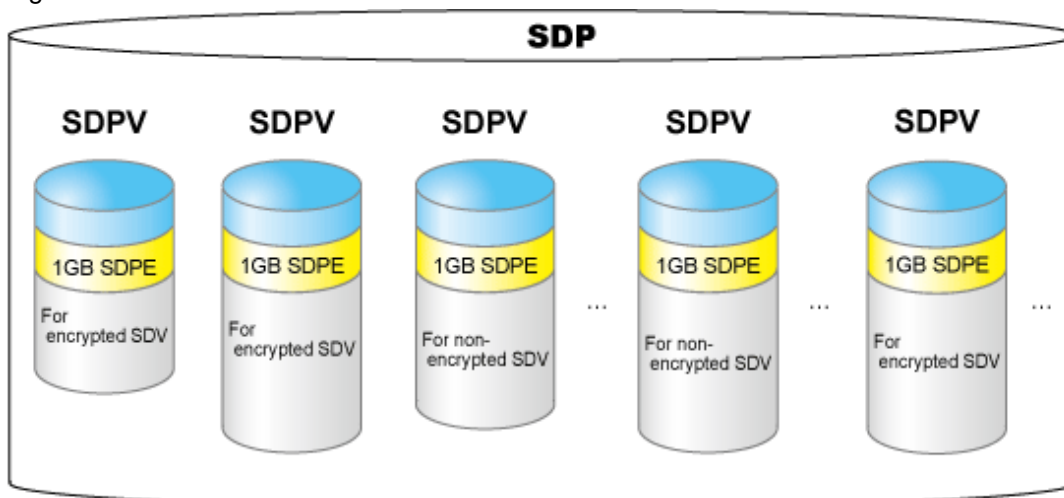
A.2.4 Configuration for remote copy

Creating copy destination volumes

When creating copy destination volumes for remote copy, note the following:

- ・ The type of a copy destination volume must be OPEN. SDV or SDPV can not be used as a copy destination volume for remote copy.

- ・ The size of a copy destination volume must be the same as that of copy source volume (the original volume).

- ・ To create OPEN volume, use ETERNUS Web GUI/ETERNUS CLI because Express does not offer the feature to create OPEN volumes.

Setting of FC-RA ports

FC-RA (Fibre Channel Remote Adapter) ports are required for REC. Change any FC-CA port to an FC-RA port.

Setting of FC-RA paths

Create a data transmission path by combination of FC-RA ports. This setting is required for all storage systems that perform REC.

Setting of REC buffers

When using the Consistency mode, REC buffers are used. Up to four REC buffers can be set in the ETERNUS DX90. Set the REC buffer size for both data transmission and reception units. You can use a single buffer for unidirectional data transfer only. Therefore, if you use the bidirectional data transfer, you must also set the buffer for reverse directional data transfer.

A.3 Clone (EC)

A.3.1 How to work

Figure A.5 State transition diagram
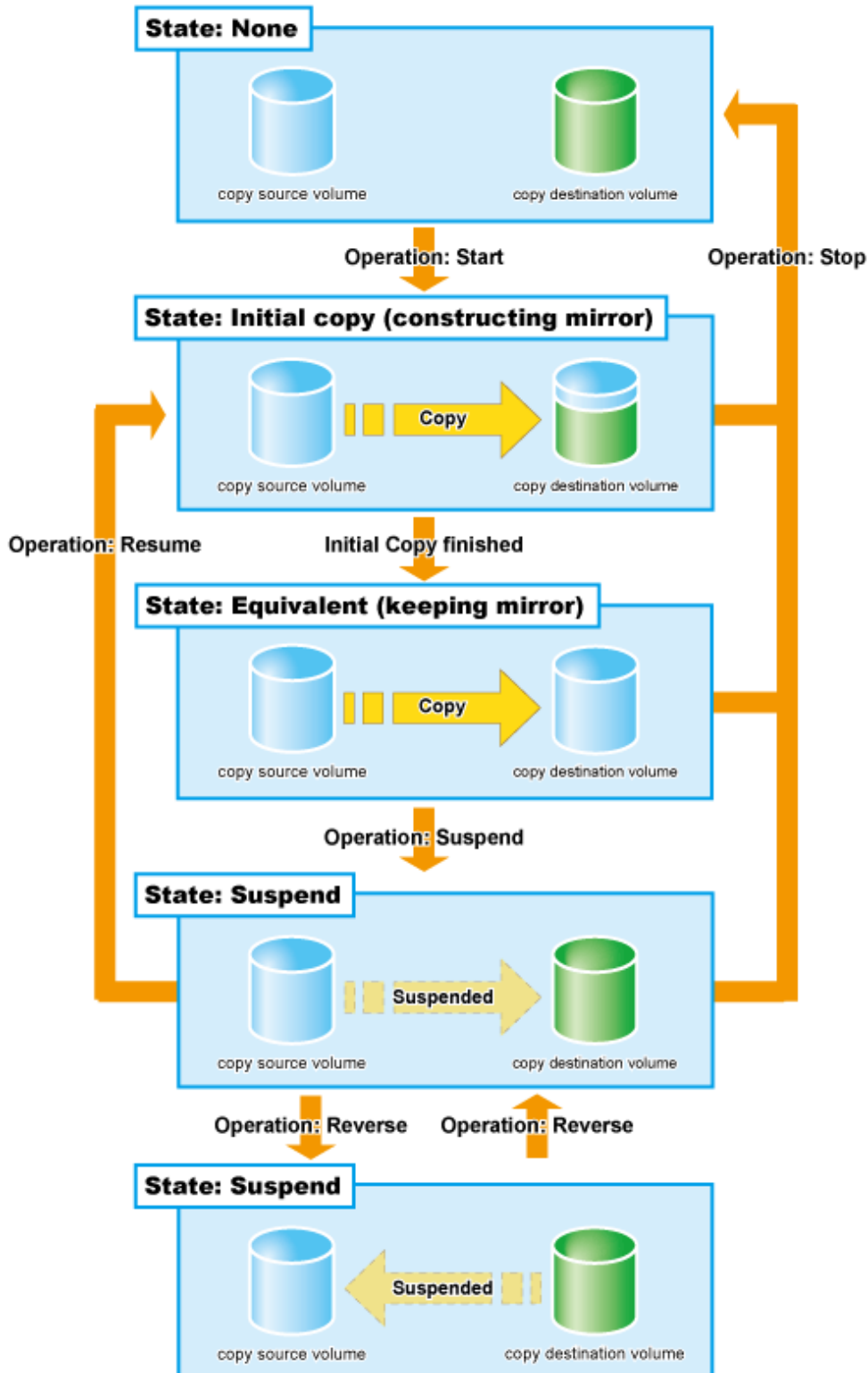
Table A.1 Relationship between session operation and Express function

Session operation	Express function
Start	acec start
Suspend	acec suspend
Resume	acec resume
Reverse	acec reverse
Stop	acec cancel

Start

When the EC session is started, the whole area of data specified by the source parameters is copied.

- If data copying has been completed for a given area and a write operation is applied to that area, the write data is also transferred to the destination area.

- After all data in the specified area has been copied over, the data in source and destination areas will be kept in almost the same state by the EC function. This is called the Equivalent state. In the Equivalent state, if source data is changed, the same data is transferred to the destination area to maintain the Equivalent state.

- Until the EC session reaches to the Equivalent state, copy destination volume are neither readable nor writable. If EC session is in the Equivalent state, copy destination volume are not writable but readable.

Suspend

When the EC session is suspended, both the copy source volume and the copy destination volume are accessible as independent volumes (copy destination volume becomes readable and writable). The Suspend operation can only be executed when the EC session is in the Equivalent state.

Unlike the Stop operation, changes to the source and destination volumes continue to be recorded while the Suspend state applies.

Resume

When the EC session is resumed, data is copied over from the source to the destination so as to catch up on all the changes that were made after the Suspend operation was performed and recover the Equivalent state. As the amount of data that thus needs to be transferred is much less than would be required if the whole source area were to be recopied, the time required to recover the Equivalent state is also greatly reduced.

If the source is changed under the Suspend state (when copying is temporarily interrupted by the Suspend operation), the changes are sent to the destination after the Resume operation is performed (when the copy is restarted). However, any changes made at the destination while under the Suspend state will be rolled-back (overwritten from the source data). Consequently, any and all changes made to the destination during the Suspend state are discarded and lost following the Resume operation.

Concurrent Suspend

Multiple EC sessions can be suspended using the Concurrent Suspend operation. This allows consistent copies of multi-volume data-objects, such as databases, to be easily acquired.

Copy source volume
A B C

Copy destination volume
A B C

All sessions are suspended simultaneously
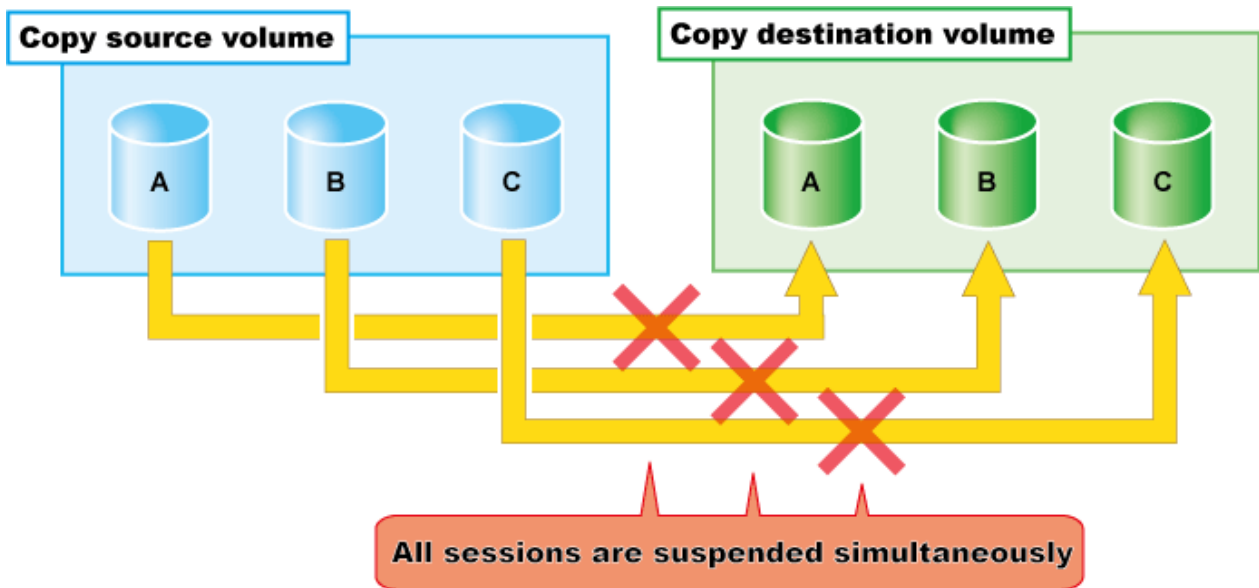
Reverse

When the EC session is reversed, the copy direction is reversed. The Reverse operation can only be executed when the EC session data is in the Suspend state.

Stop

When the EC session is stopped, it terminates. If the EC session in one of the following statuses is stopped, the copy destination volume should not be used because the mirroring is incomplete.

- Initial copy state

- Error suspend state

If the EC session in one of the following statuses is stopped, the copy destination volume can be used because the mirroring has been complete.

- Equivalent state

- Suspend state

A.3.2   Restoration

Restoration can be performed by the Reverse function of EC or by OPC.

Restoration by reversing EC

The Reverse operation of EC allows high-speed restoration of the pre-update data saved in the secondary destination back to the updated areas of the primary volume. (The Suspended copy session is reversed and then resumed.)
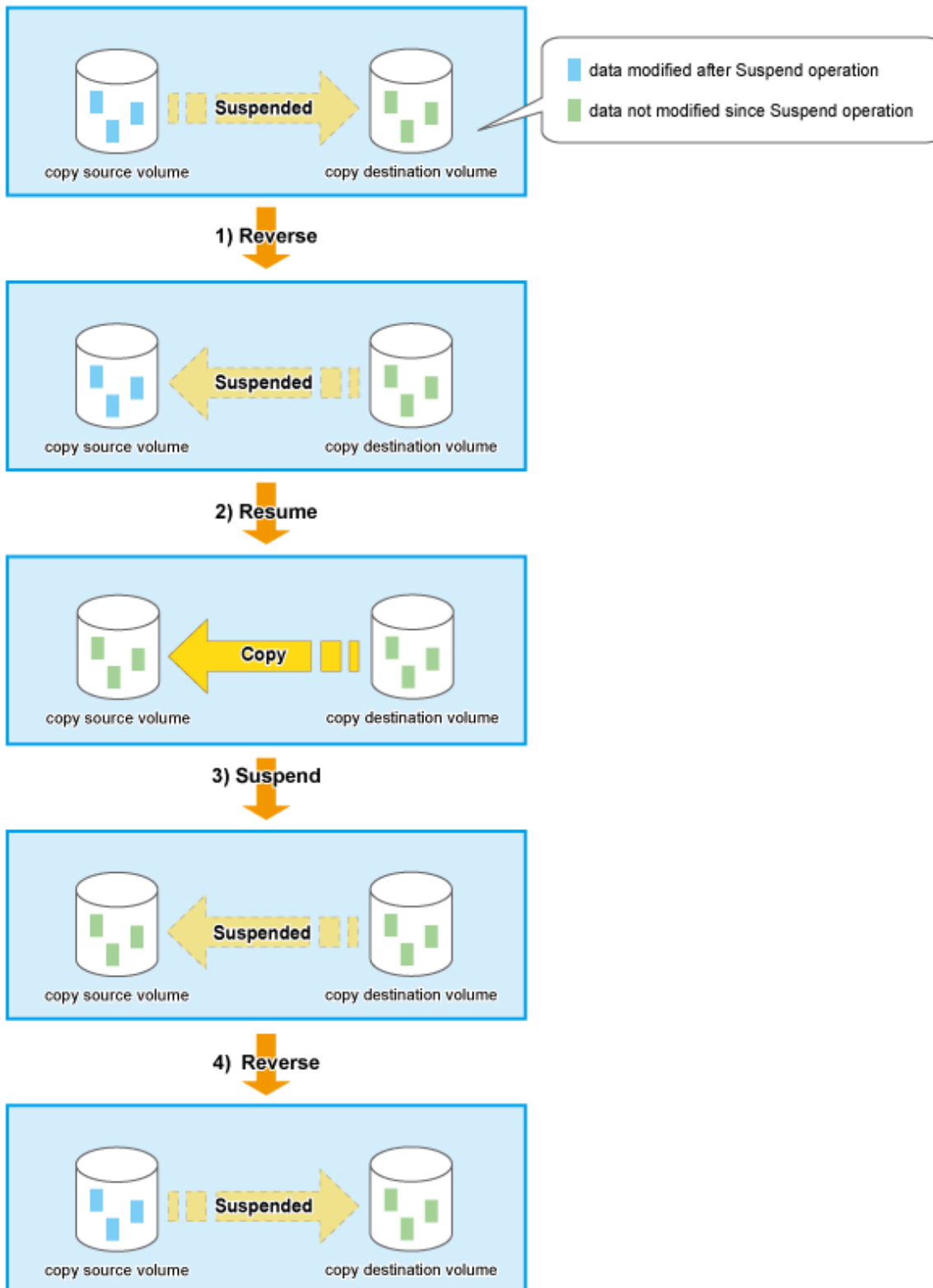
Restoration by OPC

To perform restoration by OPC, start the OPC session in the reverse direction after stopping the EC session. The method using OPC has no advantage over the method using the EC reverse function in that a full copy is required. However, it has the benefit that the original volume can be used immediately after the logical copy has completed.
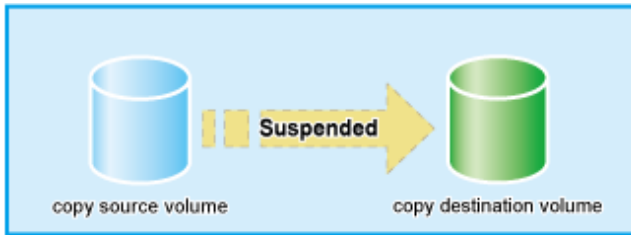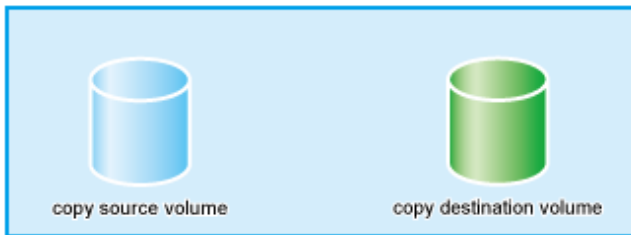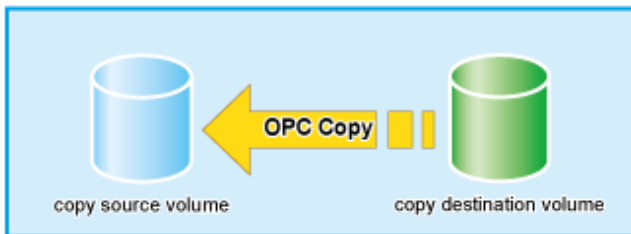
A.4   Clone (OPC)

A.4.1   How to work

Figure A.6 State transition diagram
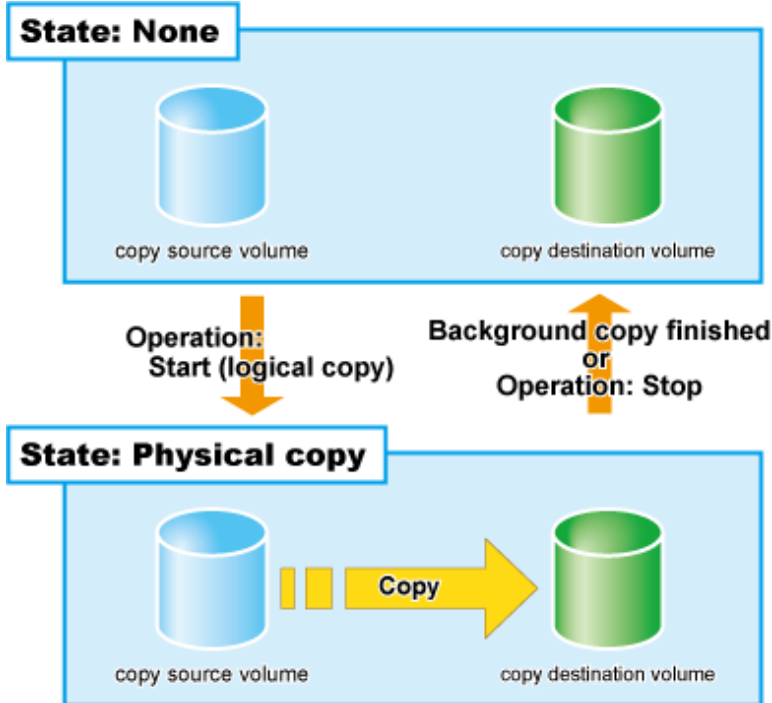
Table A.2 Relationship between OPC operation and Express function

Session operation	Express function
Start	acopc start
Stop	acopc cancel

Start

When the OPC session is started, the logical copy completes immediately and returns a "copied" response before any actual (physical) copying occurs. The actual physical copy process starts after the logical copy has finished. This is an internal ETERNUS Disk storage system background process that is not visible to the server. After the logical copy has completed, the copy destination area becomes accessible. When the physical copy has completed, the session automatically terminates.

Stop

When the OPC session is stopped, it terminates. The copy destination volume can not be used because the physical copy is incomplete.

A.4.2   Restoration

Restoration can be done by executing OPC in the reverse direction. Especially, restoration with a background physical copy is possible.
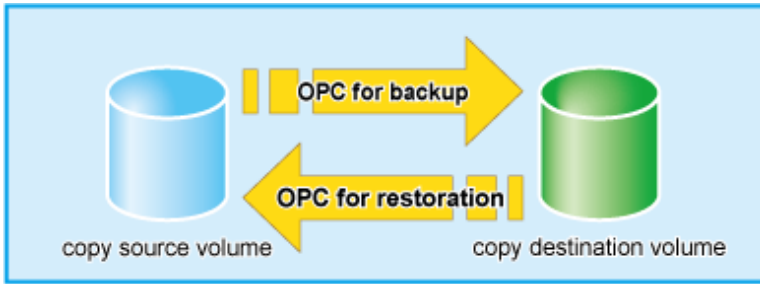
A.5 Clone (QuickOPC)

A.5.1 How to work

Figure A.7 State transition diagram
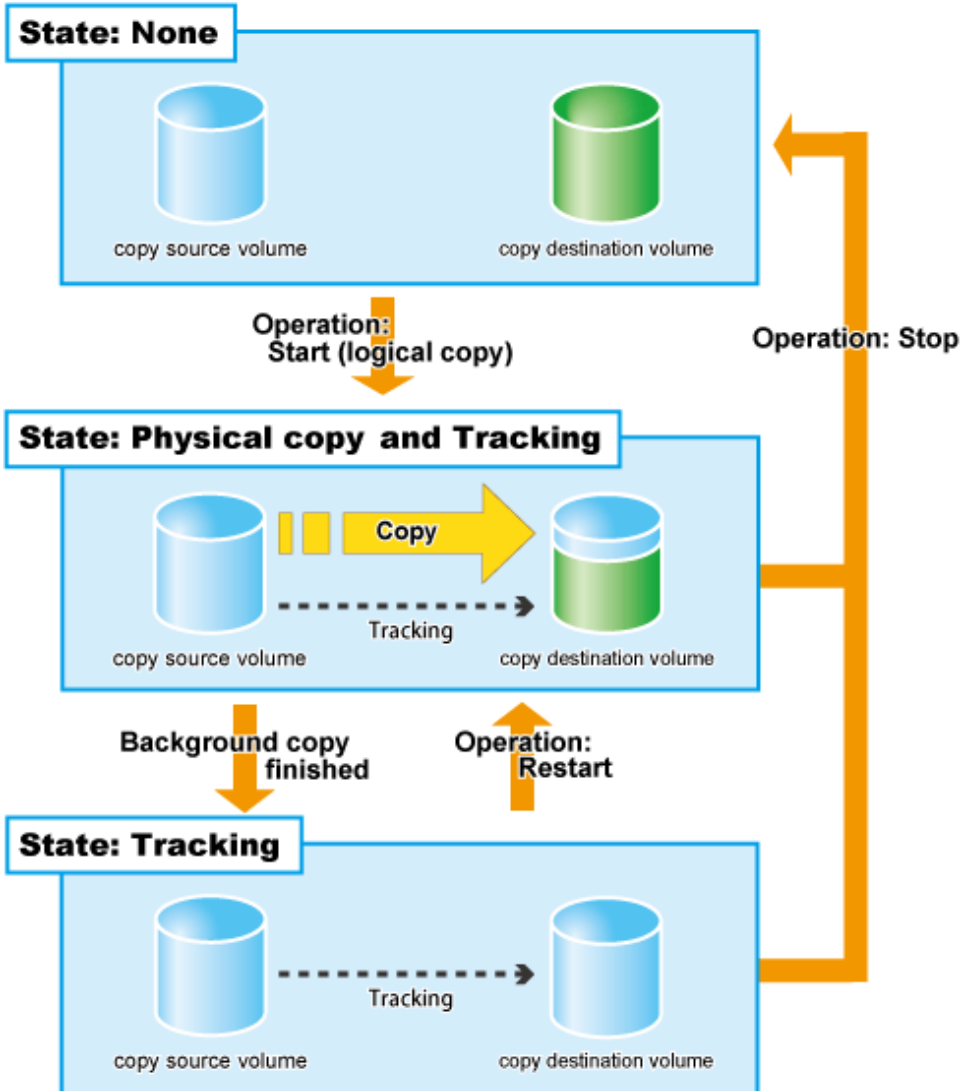
Table A.3 Relationship between QuickOPC operation and Express function

Session operation	Express function
Start	acopc start

Session operation	Express function
Restart	acopc start -diff
Stop	acopc cancel

Start

When the QuickOPC session is started, the logical copy completes immediately and returns a "copied" response before any actual (physical) copying occurs. The actual physical copy process and tracking process start after the logical copy has finished (the tracking process keeps track of data which is modified for copy source and copy destination volumes after the logical copy). These two processes are internal ETERNUS Disk storage system background processes that are not visible to the server. After the logical copy has completed, the copy destination area becomes accessible. Even if the physical copy has finished, the session remains because the tracking process is still active.

Restart

When the QuickOPC session is restarted, then instead of the initial full copy, only the data areas recorded by the tracking process are copied over from the source to the destination.

While less data needs to be copied, this copy is similar to the initial copy in that a logical copy step precedes the actual physical copy, and the copy destination becomes read/write accessible as soon as the logical copy has completed. The tracking process also starts recording subsequent updates again at this stage.
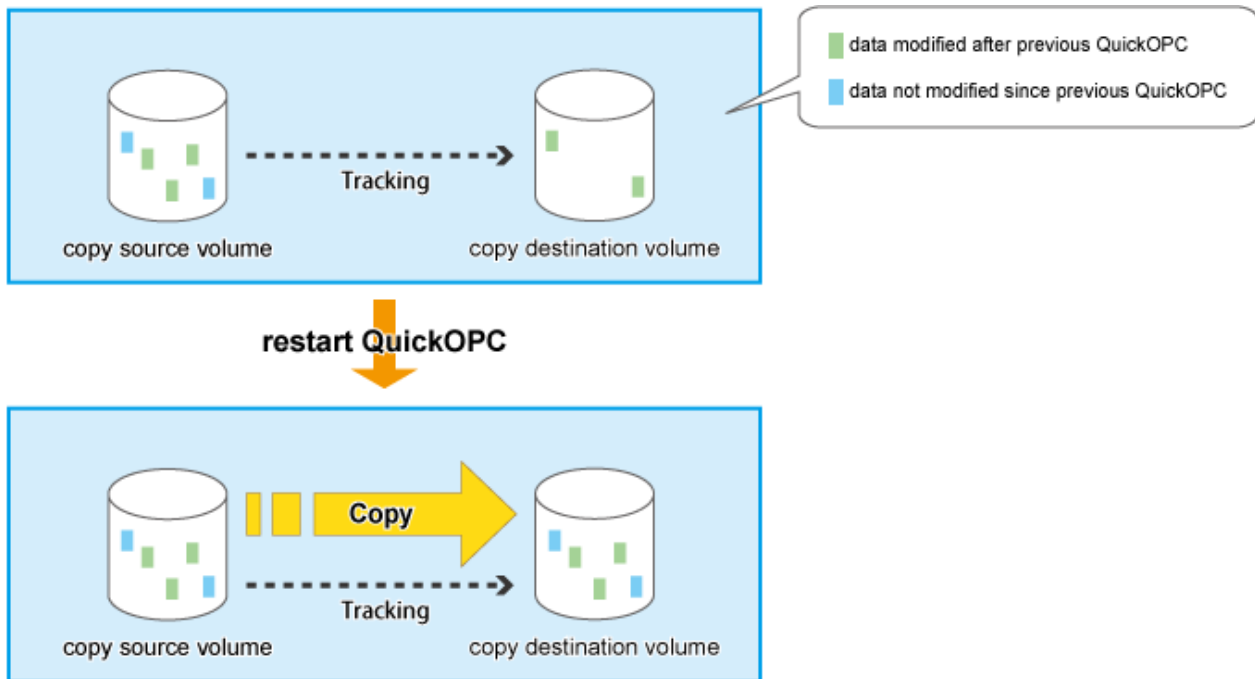
If the source is changed after the previous logical copy, the changes are sent to the destination after the Restart operation is performed (when the copy is restarted). However, any changes made at the destination after the previous logical copy will be rolled-back (overwritten from the source data). Consequently, any and all changes made to the destination after the previous logical copy are discarded and lost following the Restart operation.

Stop

When the QuickOPC session is stopped, it terminates. If the QuickOPC session which is in the Physical copy and Tracking state is stopped, the copy destination volume can not be used because the physical copy is incomplete. If the QuickOPC session in the Tracking state is stopped, the copy destination volume can be used because the physical copy has completed.

A.5.2 Restoration

Restoration can be done by executing OPC in the reverse direction.

Especially, restoration with a background physical copy is possible.
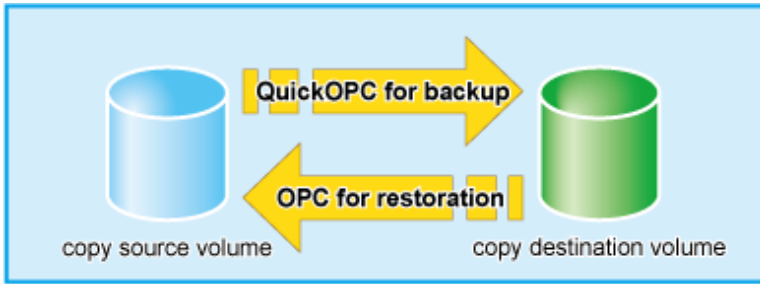
Although a restoration is executed with OPC, only the data that has been updated since the previous QuickOPC is copied. Therefore, in copy using QuickOPC, not only a physical backup but also restoration is completed in a short period of time.
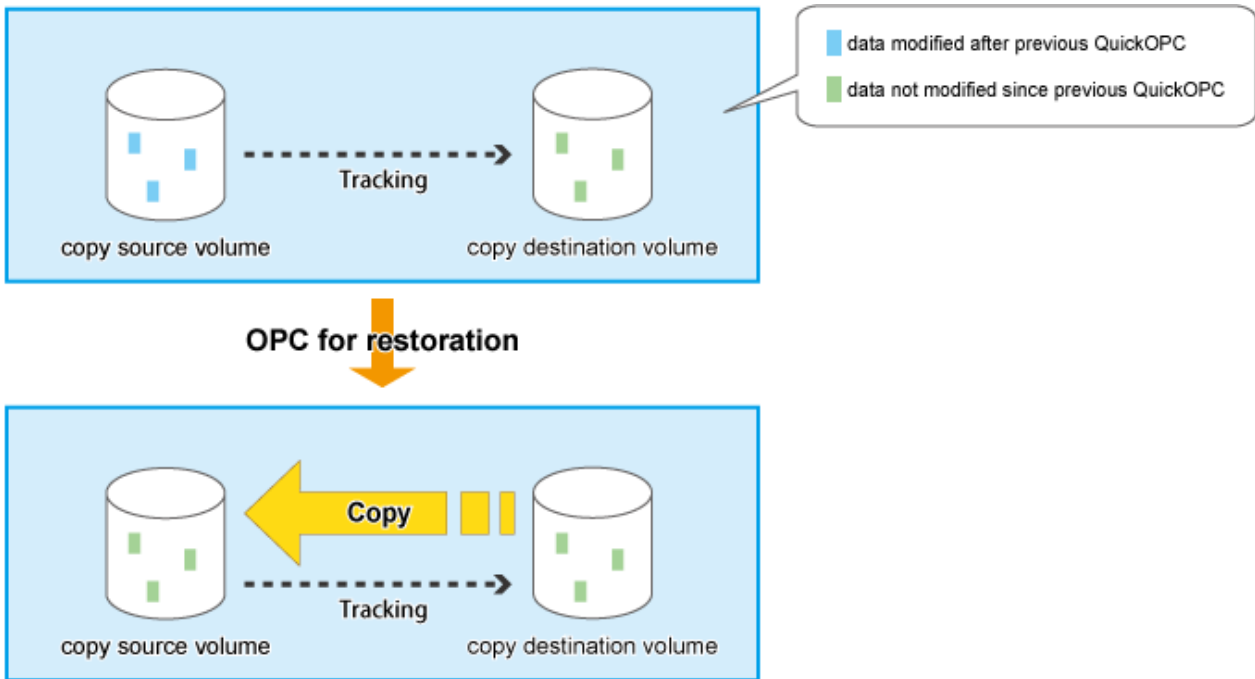
By performing OPC for restoration, any changes made at the primary volume after the previous logical copy will be rolled-back (overwritten from the secondary volume data). Consequently, any and all changes made to the primary volume after the previous logical copy are discarded and lost following OPC for restoration.

A.6   Snapshot (SnapOPC+)

A.6.1   How to work

Figure A.8 State transition for (normal) SnapOPC+
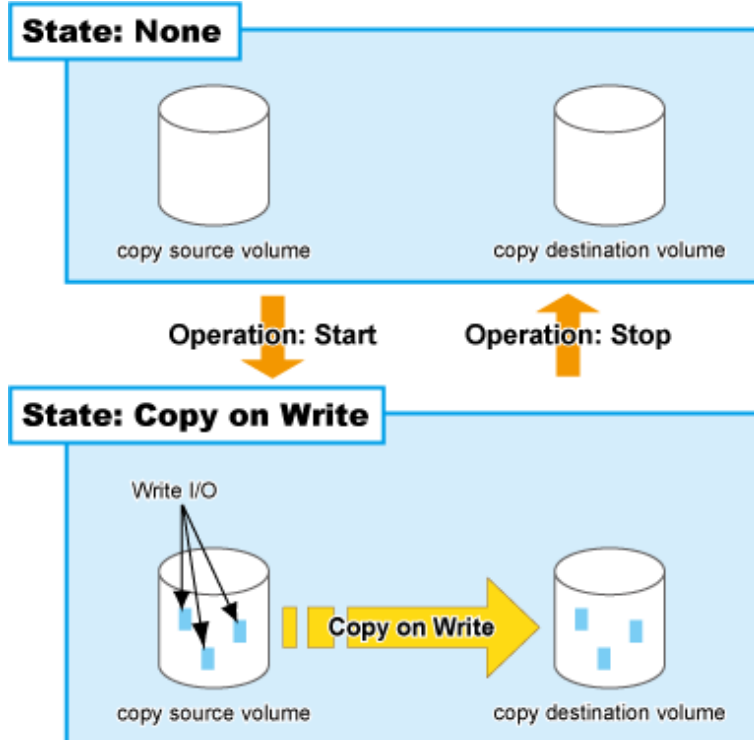
Figure A.9 State transition diagram for dummy SnapOPC+
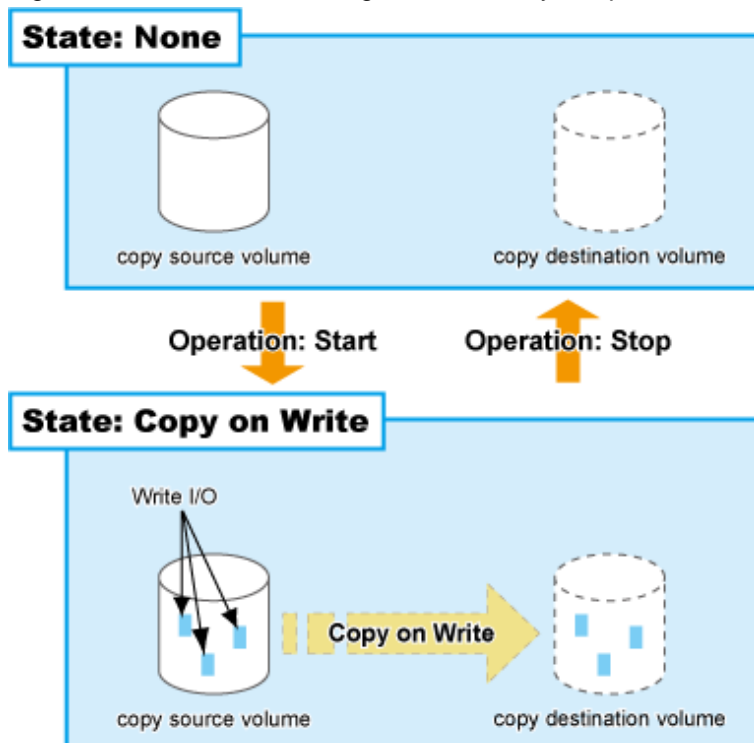
Table A.4 Relationship between session operation and Express function

Session operation	Express function
Start normal SnapOPC+	acsnap start
Start dummy SnapOPC+	acsnap start -estimate
Stop	acsnap cancel

Start

When the SnapOPC+ session is started, the copy-on-write process starts. When a write I/O is requested from the server, the copy-on-write process copies the old data to the copy destination before writing the new data to the copy source. This process is an internal ETERNUS Disk storage system background process that are not visible to the server. After the SnapOPC+ session has been started, the copy destination area becomes accessible.

- Unlike Clone (OPC, QuickOPC, EC), as the physical copy destination only needs to be large enough to contain updated areas, size requirements are usually small.

- While the referencing of unmodified areas of the SnapOPC+ "copy" directly from the original data on the copy source volume reduces the copy load, this dependence on the copy source volume means that SnapOPC+ is not suited to persistent or long-term data backup/ recovery use.

- Up to 8 SnapOPC+ sessions per one copy source can be set. Since multiple SnapOPC+ sessions for one copy source are managed in generations, multiple copy operation can be performed with less disk capacity.
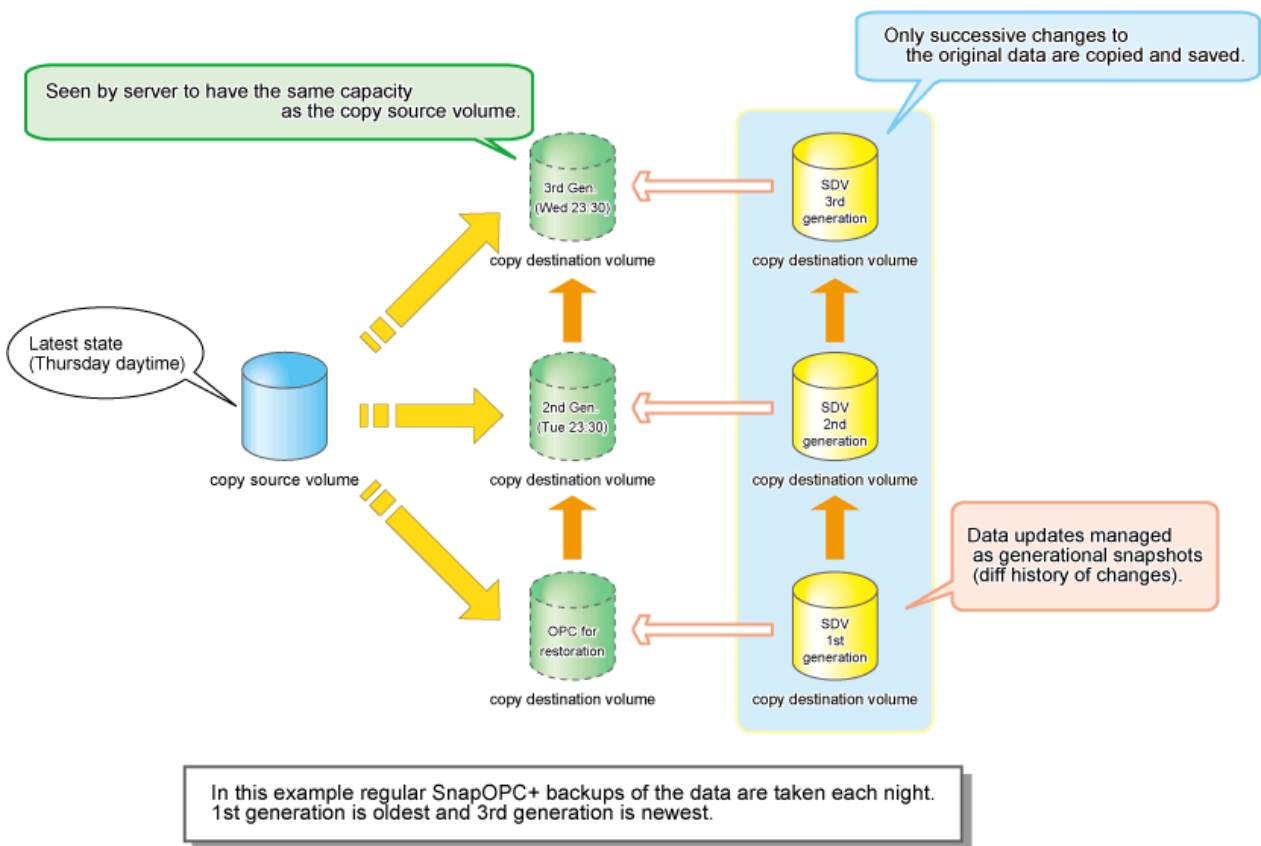
Stop

When the SnapOPC+ session is stopped, the copy-on-write process terminates and all the data saved in SDV are lost.

If there are older SnapOPC+ sessions than the SnapOPC+ session to stop, it cannot be stopped. Such a SnapOPC+ session can be stopped by using the force option. However, the Stop operation with the force option stops not only the specified SnapOPC+ session but also all the older SnapOPC+ sessions.

A.6.2 Restoration

Restoration requires the SnapOPC+ copy destination be mounted by the OS and the target data restored using normal file copying.

Note

Restoration by the reverse OPC cannot be performed for ETERNUS DX60/DX80/DX90.

A.6.3 SDV operations

Table A.5 Relationship between SDV operation and Express function

SDV operation	Express function
Monitoring SDV capacity	acsdv stat
Initialize SDV	acsdv init

Monitoring SDV capacity

If an SDP is not used, the SDV should be monitored on a periodic basis to ensure that adequate remaining capacity leeway is maintained.

Initialize SDV

- Even if no copy sessions are running, some operational problems can cause large volumes of writes to occur, reducing the SDV or SDP capacity available to the copy session when it is set. In these cases, the "Initialize SDV" operation should be performed.

- Note that when a Snap Data Volume is initialized, any existing data on it will become inaccessible, so this data should be backed up beforehand, using OS commands.

A.6.4 SDP operations

Table A.6 Relationship between SDP operation and Express function

SDP operation	Express function
Monitoring SDP capacity	acsdv poolstat

Monitoring SDP capacity

If an SDP is used, the SDP should be monitored on a periodic basis to ensure that adequate remaining capacity leeway is maintained.

If the allocatable SDP capacity runs short, this is indicated by e-mail/SNMP Trap notification.

A.7 Remote Advanced Copy (REC)

Remote Equivalent Copy (REC) is used for both Remote Advanced Copy and Extended Remote Advanced Copy.

Whereas EC is an internal cabinet copy function, REC is the equivalent copy function for use between cabinets.

A.7.1　How to work

Figure A.10 Session state and state transition
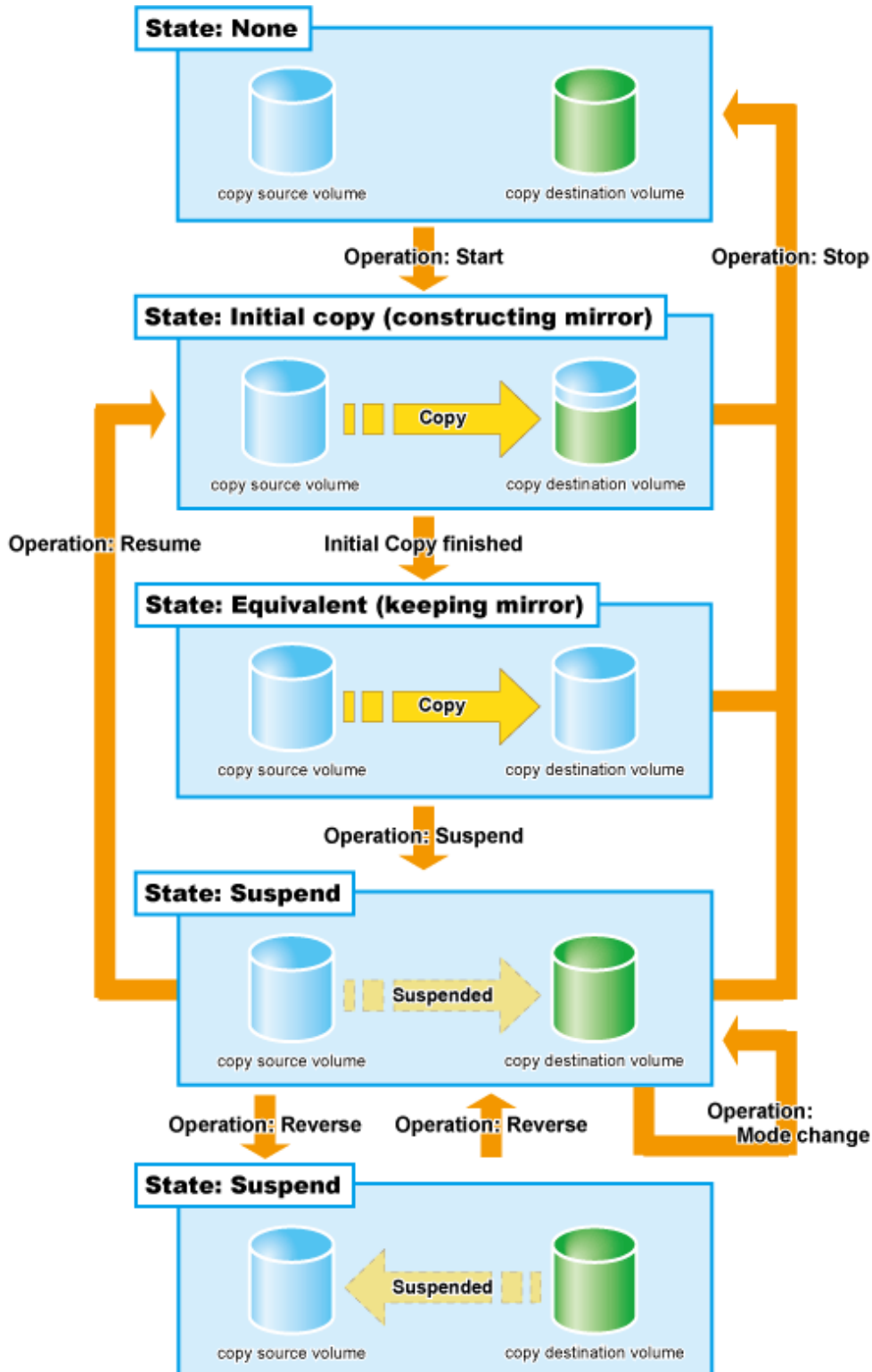
Table A.7 Relationship between session operation and Express function

Session operation	Express function
Start	acec start
Suspend	acec suspend

Session operation	Express function
Resume	acec resume
Reverse	acec reverse
Mode change	acec change
Stop	acec cancel

Start

When the REC session is started, the whole area of data specified by the source parameters is copied.

- ・ If data copying has been completed for a given area and a write operation is applied to that area, the write data is also transferred to the destination area.

- ・ After all data in the specified area has been copied over, the data in source and destination areas will be kept in almost the same state by the REC function. This is called the Equivalent state. In the Equivalent state, if source data is changed, the same data is transferred to the destination area to maintain the Equivalent state.

- ・ Until the REC session reaches to the Equivalent state, copy destination volume are neither readable nor writable. If REC session is in the Equivalent state, copy destination volume are not writable but readable.

Unlike EC, the following operation modes need to be specified at the start of REC sessions.

Transmission mode

This mode is concerned with data transmission of REC.

Transmission Mode	Description
Synchronous mode	The REC Synchronous mode guarantees that the copy process is fully complete on both sides of the REC before any update process response is returned to the server. Since the update and copy processes are performed at the same time, the copy process order will naturally be the same as the update process order. However, the concomitant REC transfer processes will always cause the update responses to be slower than a native update alone. Especially, when the Remote Advanced Copy is used in a long-distance WAN connection, the transmission via the WAN is delayed and the data transmission process is also delayed, which can greatly affect the performance.
Consistency mode (Asynchronous)	The sequential transfer of data to destination ETERNUS Disk storage systems is guaranteed in all REC sessions where the Consistency mode has been set. A checkpoint is set at a certain interval (every few seconds) and pending data is copied over during this interval. Synchronous data can be maintained at a certain level. To guarantee the order property, a special REC buffer must be assigned in the cache memory. Before starting the copy session, an REC buffer must be setup in each ETERNUS Disk storage system (both source and destination) to contain pending changes. You cannot simultaneously use a given REC buffer for both transmission and reception. However, the REC buffers can be switched from transmission to reception and back. As the response to the updating process by the server is executed asynchronously with the copy process, delays are minimized. If many data updates are requested, the write-completed response to the server is delayed and the copy process is executed at the higher priority. However, if too many requested changes are pending, the copy processes can cause the server response to become excessively slow, so the copy session is temporarily Halted. After a certain period of time, a prescribed error recovery process is started. In the Consistency mode, the Stop and Suspend sequence is different depending on whether or not Concurrent Suspend is used.
Stack mode (Asynchronous)	In the Stack mode, source-side data updates are responded to immediately. The copy process is executed asynchronously so that it does not affect the response to the server. The copy source area for each copy session is regularly patrolled for updates. However, when multiple writes have occurred in the same location, only the current data at the time of the next patrol check needs to be sent to the copy destination, helping to minimize the amount of transfer data.

Transmission Mode	Description
	Therefore, this mode allows data copying with no effect on server performance even if the data transfer line bandwidth is limited. The following sequence of Stop and Suspend commands must be executed to guarantee that the potentially large amounts of data that may remain in the buffer are copied to the destination.
Through mode (Asynchronous)	Use of this mode is not recommended. The Through mode is still provided for compatibility with legacy systems. However, you should understand how data is copied in the Through mode since it may be useful if the Consistency mode and the Stack mode are stopped for certain reasons. As the response to source-side data updates is executed asynchronously with the copy process, delays are minimized. When data is updated, the copy process is queued. However, the queue has limited length and if the number of queued processes exceeds the limit, the response to the server is delayed and the copy process is executed at the higher priority. Since the queue length is relatively short, the Equivalent state suspend process will always complete within a specified time. Since the data update and transfer processes are executed using the same block size, transmission performance is not high. When writing sequential data in particular, execution of the update and transfer processes is mutually exclusively, so deteriorating performance is a common result. When deciding whether to use this mode, consideration should be given to the fact that processing takes longer to complete than for Stack mode.

Split mode

This mode is concerned with how REC sessions behave when the line paths are disconnected by a disaster or line error.

Split Mode	Description
Automatic Split	If the communication has failed due to certain reasons during REC execution, the REC session is disconnected automatically so that data can be updated at the source location.
Manual Split	If the communication has failed due to certain reasons during REC execution, the operator is asked whether or not to disconnect the REC session or not in the Manual Split mode. Though the Manual Split mode does reduce availability somewhat, it also helps keep the copy source data and copy destination data better synchronized, resulting in much lower data losses in the event of a disaster. If data copying has failed due to the disconnection of all paths or other reasons, the server becomes unable to update the data in this mode. Therefore, applications that require the data be updated by the server cannot continue if all REC paths become disconnected, or the backup center or backup ETERNUS Disk storage system fails.

Recovery mode

This mode is concerned with how REC sessions are recovered after the line that was disconnected by the transmission error has recovered.

Recovery Mode	Description
Automatic Recovery	REC sessions are automatically resumed as soon as the line that was disconnected by the transmission error has recovered.
Manual Recovery	REC sessions must be manually resumed after the line that was disconnected by the transmission error has recovered.

Suspend

When the REC session is suspended, both the copy source volume and the copy destination volume are accessible as independent volumes (copy destination volume becomes readable and writable). The Suspend operation can only be executed when the REC session is in the Equivalent state.

Unlike the Stop operation, changes to the source and destination volumes continue to be recorded while the Suspend state applies.

The procedure to suspend the REC session varies depending on REC Transmission mode.

Synchronous mode

In this case, the procedure is the same as that of EC.

Figure A.11 Suspend and resume work flow for REC session in Synchronous mode
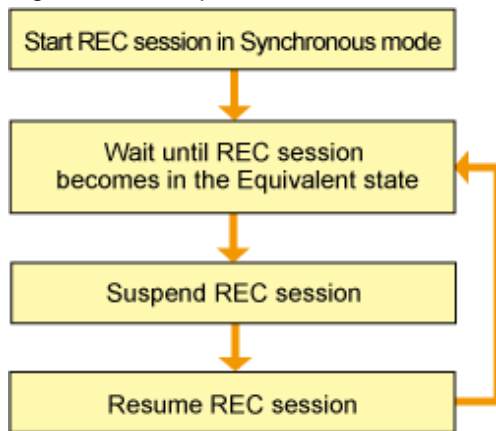
Stack mode or Consistency mode

In order to suspend the REC session in these modes, the Transmission mode must be changed to through mode. However, the Transmission mode is not required to be changed if the REC session in Consistency mode is suspended by Concurrent Suspend.

Figure A.12 Suspend and resume work flow for REC session in Stack or Consistency mode
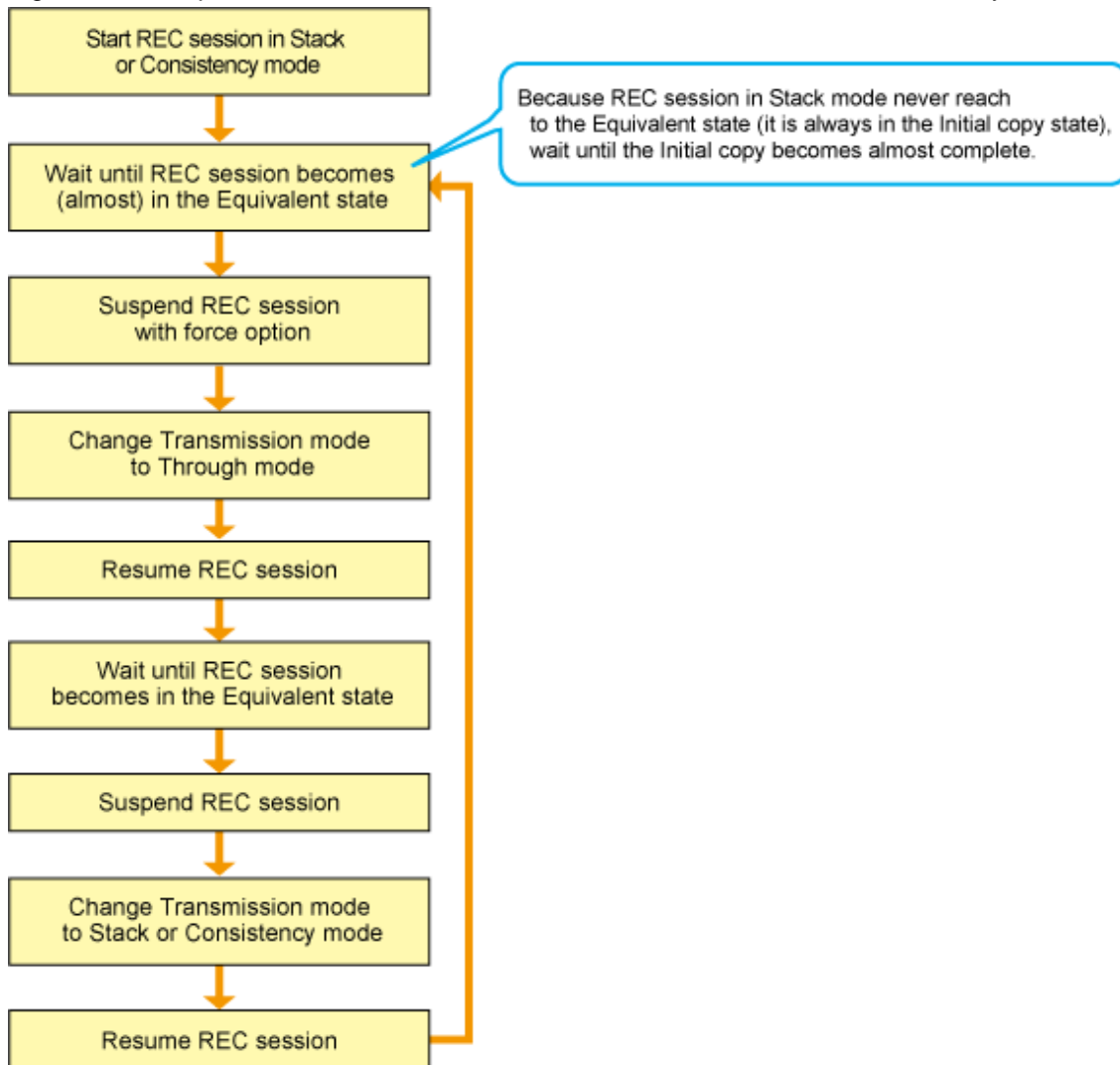
Concurrent Suspend

As EC, multiple REC sessions can be suspended using the Concurrent Suspend operation. This allows consistent copies of multi-volume data-objects, such as databases, to be easily acquired.
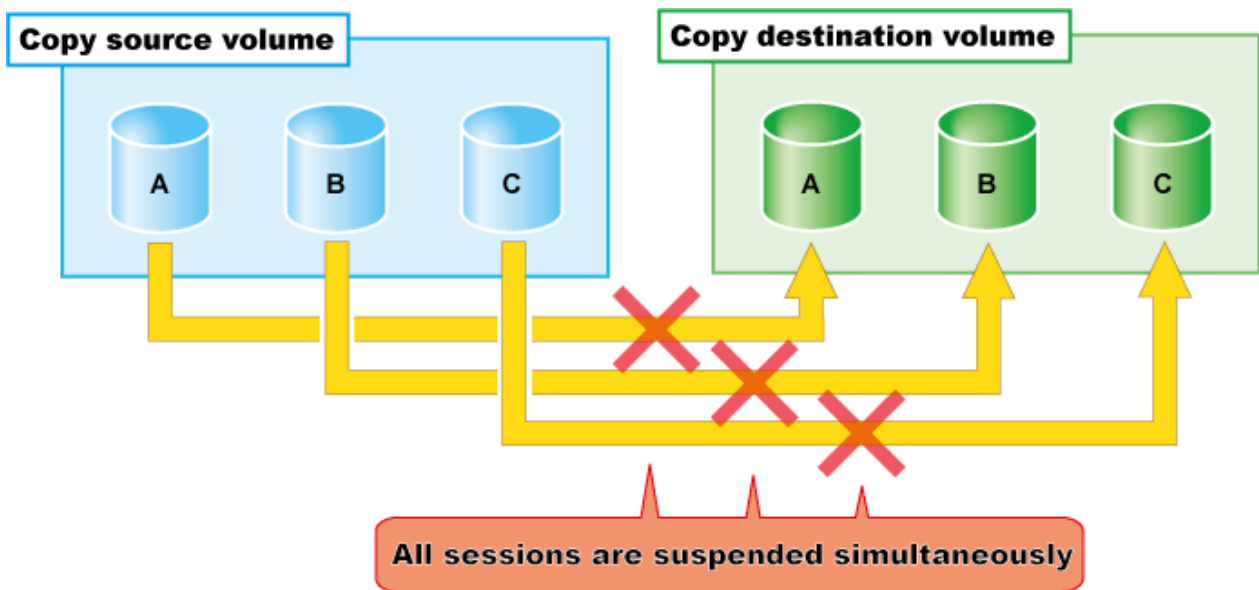
The Concurrent Suspend operation can be performed if the Transmission mode is Synchronous mode or Consistency mode.

Figure A.13 Concurrent Suspend and resume work flow for REC session in Synchronous or Consistency mode
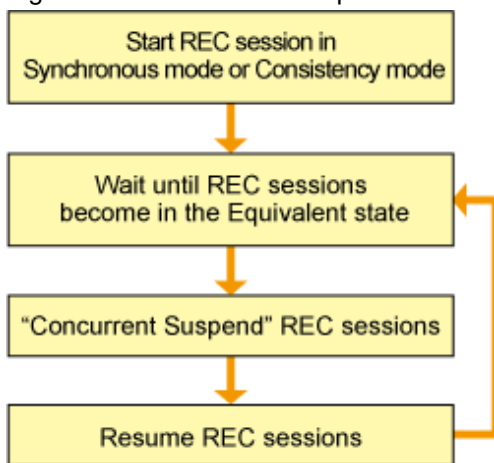
Resume

When the REC session is resumed, data is copied over from the source to the destination so as to catch up on all the changes that were made after the Suspend operation was performed and recover the Equivalent state. As the amount of data that thus needs to be transferred is much less than would be required if the whole source area were to be recopied, the time required to recover the Equivalent state is also greatly reduced.

If the source is changed under the Suspend state (when copying is temporarily interrupted by the Suspend operation), the changes are sent to the destination after the Resume operation is performed (when the copy is restarted). However, any changes made at the destination while under the Suspend state will be rolled-back (overwritten from the source data). Consequently, any and all changes made to the destination during the Suspend state are discarded and lost following the Resume operation.

The operation modes of REC are not changed by the Resume operation.

Reverse

When the REC session is reversed, the copy direction is reversed. The Reverse operation can only be executed when the REC session data is in the Suspend state.

Mode change

When the REC session is in the Suspend state, the operation modes can be changed by the "Mode Change" operation.

Stop

When the REC session is stopped, it terminates. If the REC session in one of the following statuses is stopped, the copy destination volume should not be used because the mirroring is incomplete.

・ Initial copy state

・ Error suspend state

・ Halt state which occurred when the REC session was in the Initial copy state

If the REC session in one of the following statuses is stopped, the copy destination volume can be used because the mirroring has been complete.

・ Equivalent state

・ Suspend state

・ Halt state which occurred when the REC session was in the Equivalent state

A.7.2   Transfer buffer operations

Table A.8 Relationship between session operation and Express function

Session operation	Express function
Change buffer role	acrecbuff set
Monitoring buffer usage	acrecbuff stat

Change buffer role

The Set operation can change the use of REC transfer buffer from SEND to RECV and vice versa.

Monitoring buffer usage

The transfer buffer usage can be checked using the "Monitoring buffer" operation. Monitor buffer usage regularly while REC sessions in Consistency mode are running. A "Rate" of 100% means the transfer buffer is in high-load state.

A.7.3   Restoration

Restoration can be performed by the Reverse function of REC.

The procedure for restoration is the same as EC.

A.8   Combinations of Advanced Copy

A.8.1   Multiple copy

Multiple copy is a method that copies the same copy source area to multiple copy destinations.

Multiple copy destinations may be specified to obtain more than one copy of the original data at a time. This allows copies of the same data for different purposes, such as backup and testing.

Figure A.14 Multiple copy

Disk storage system   Disk storage system

copy source volume

copy destination volume

A

copy destination volume   B

copy destination volume

C

copy destination volume
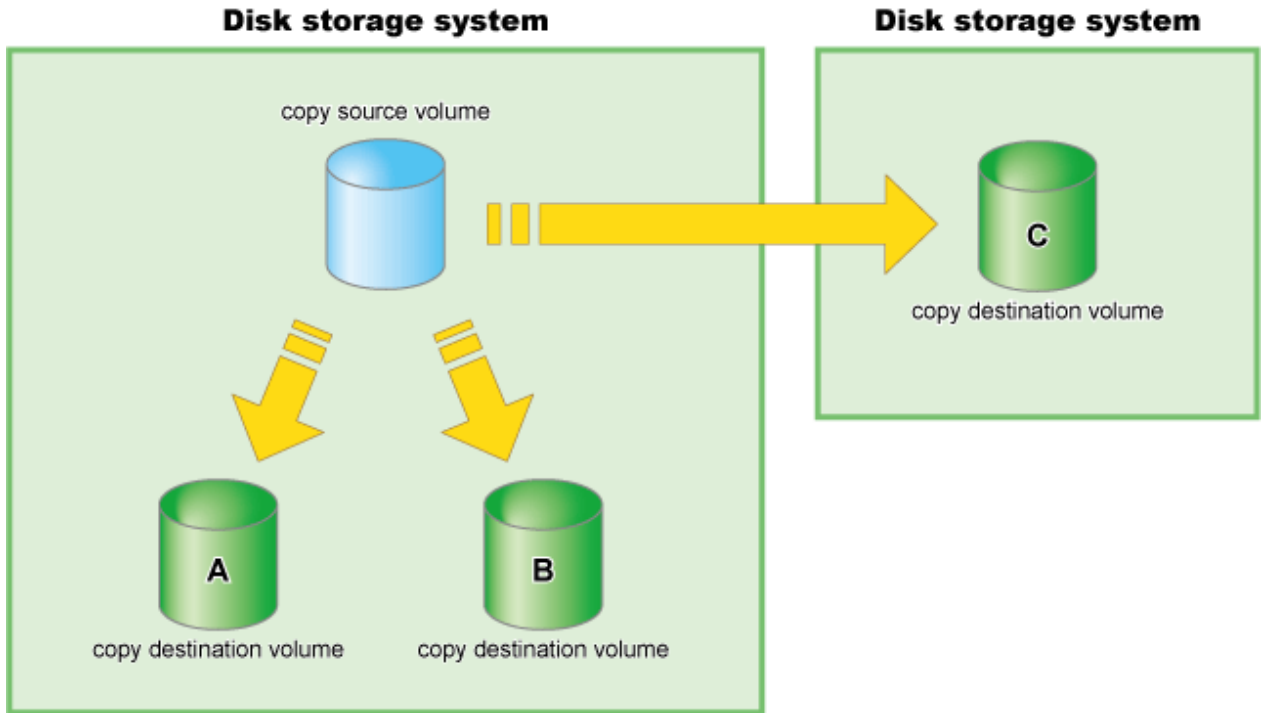
💁 **Note**

Following copy type combination selection rules when using multiple copy.

- For multiple copy with EC only, REC only, or both EC and REC, the start and end points of all copy sessions must be the same.

- For remote copy, REC (Consistency mode) cannot be used for multiple copy destination volumes in the same copy destination device.

A.8.2   Cascade copy

Cascade copy is a method that adds copy sessions end-to-end, with an existing copy destination volume becoming the copy source for a new copy session, or vice versa.

Figure A.15 Cascade copy

copy source volume 1   copy destination volume 1 = copy source volume 2   copy destination volume 2

A.9   ECO mode

The ETERNUS Disk storage system offers the eco-mode (power-saving) function based on the MAID (Massive Array of Idle Disks) technology. The spindle rotation of the disk drive can be turned on and off by using this function.

Express offers the eco support tools to control whether spindle rotation of the disk drive is on or off.

Used in combination with the copy operations of Express, the eco support tools allow the spindle rotation the disk drive to be turned off when it is not used for a long period, thus reducing the power consumption of the ETERNUS Disk storage system.

A.10   Note on Backup and Restore by Express

Express performs backup and restoration regardless of the state of the server to be backed up. Therefore, make sure that both copy source and destination volumes are inaccessible in order to ensure consistency of backup data. For absolute assurance of data consistency, we highly recommend to stop the target server before executing backups and restorations. If the server can not be suspended, dismount a target volume using the OS function to prevent data within a file cache from being reflected and inhibit access to the target volume.

A.11   Trouble shooting

The following figure shows the flow of troubleshooting tasks if a hardware or similar fault occurs.

Figure A.16 Troubleshooting flow
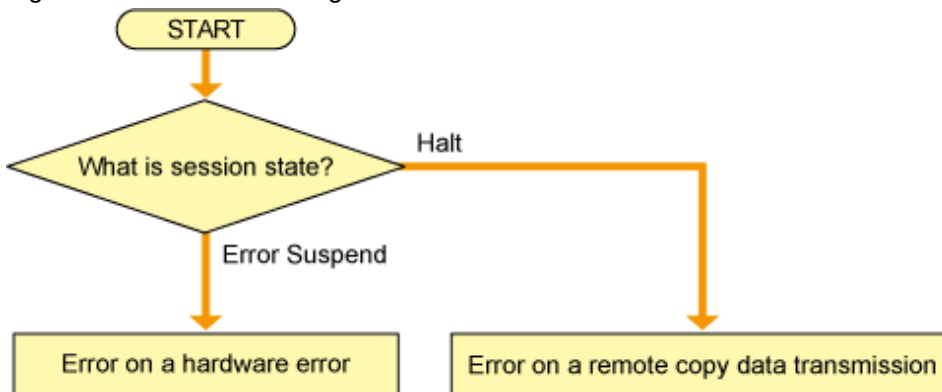
Error on a hardware error

When a hardware error occurs in a source or destination volume, perform the repair work on the error according to the following procedures.

1. Use copy management software (e.g. Express) to stop the session in which the error occurred. If the session cannot be stopped by using copy management software, use ETERNUS Web GUI to stop it.

2. Iron out the hardware error.

3. If required, for copy management software, redefine copy source and destination volumes.

4. Re-start the session in which the error occurred.

Error on a remote copy data transmission

If the Recovery mode of the REC session is Manual Recover mode, the session need to be recovered manually after the transmission error has recovered. The procedure to do this is as follows.

1. Suspend the REC session with force option to change the halt status to the Suspend state.

2. Resume the REC sessions.

Appendix B Installing and uninstalling Express

This appendix explains the installing and uninstalling of the Express.

B.1　Installation

This section explains the installation of the Express.

B.1.1　Installation of Express Manager

This chapter explains the installation of the Manager program of Express.

A flowchart outlining the installation process for the Manager program is shown below:
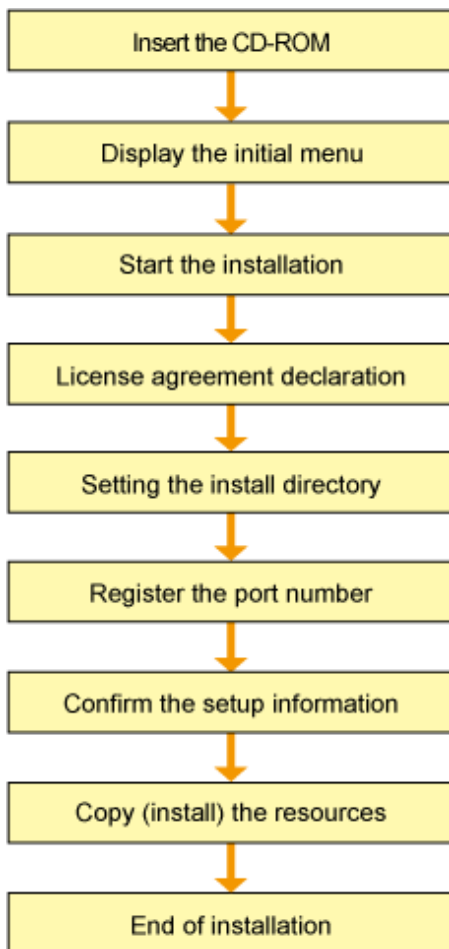
Install Manager program, using the following procedure:

1. Login to the system.
   Login as the user who has the Administrator's authority on the system where Express will be installed.

2. Insert the Express CD-ROM into the drive and an initial window will be displayed. Click [Install ETERNUS SF Express Manager].

Point

When any version of ETERNUS SF AdvancedCopy Manager Copy Control Module 14.0 or earlier is already being installed, the following screen will appear.
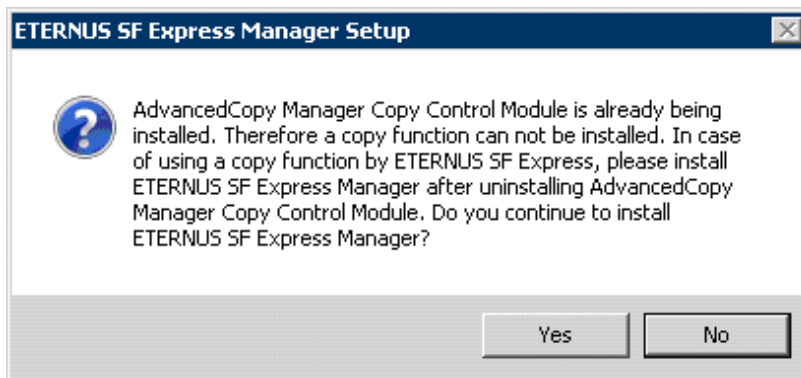
When [Yes] button is clicked, installation is continued. In this case, the Advanced Copy functions of Express are not available.

When [No] button is clicked, installation is stopped. When using the Advanced Copy functions of Express, uninstall ETERNUS SF AdvancedCopy Manager Copy Control Module and then reinstall Express.

3. At the following window, check the displayed contents, and then click the [Next] button.
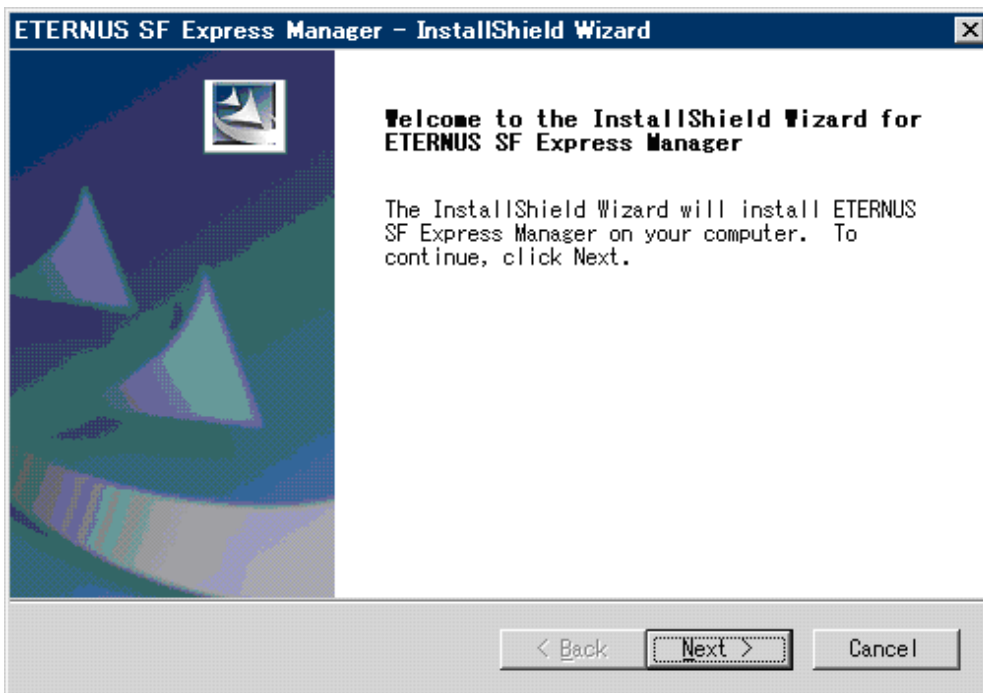
4. Accept the license usage terms and conditions displayed on the [License Agreement] window.

   Check the displayed contents, and then click the [Yes] button.
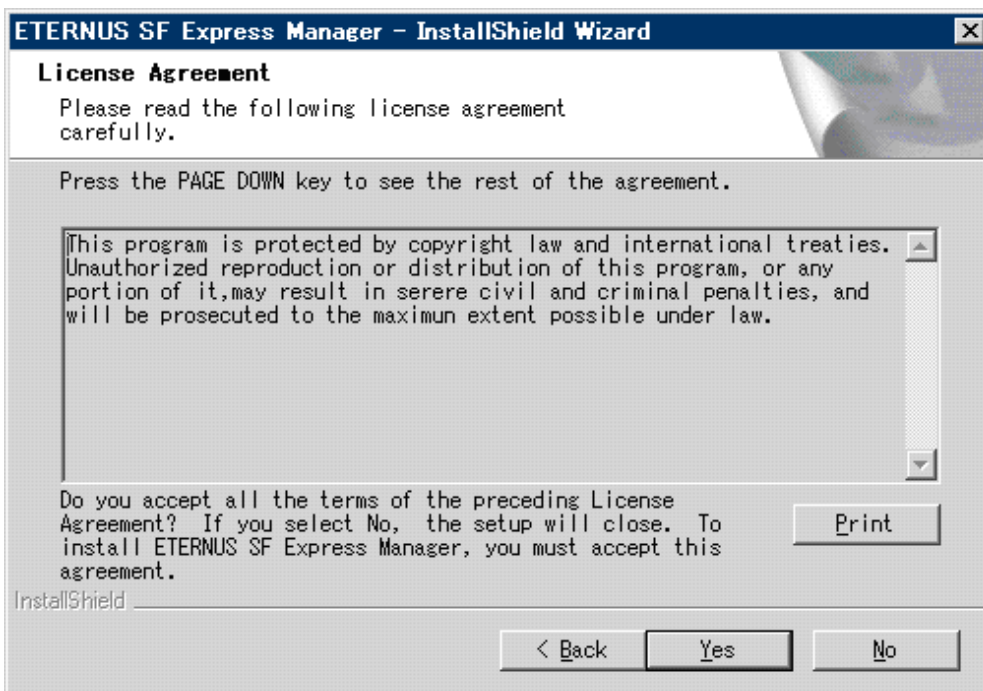
5. Specify the installation directory.

   If this product is to be installed in directories other than those displayed (default directories), click the [Change] button to select the desired directories. After all the proper directories have been selected, click the [Next] button.
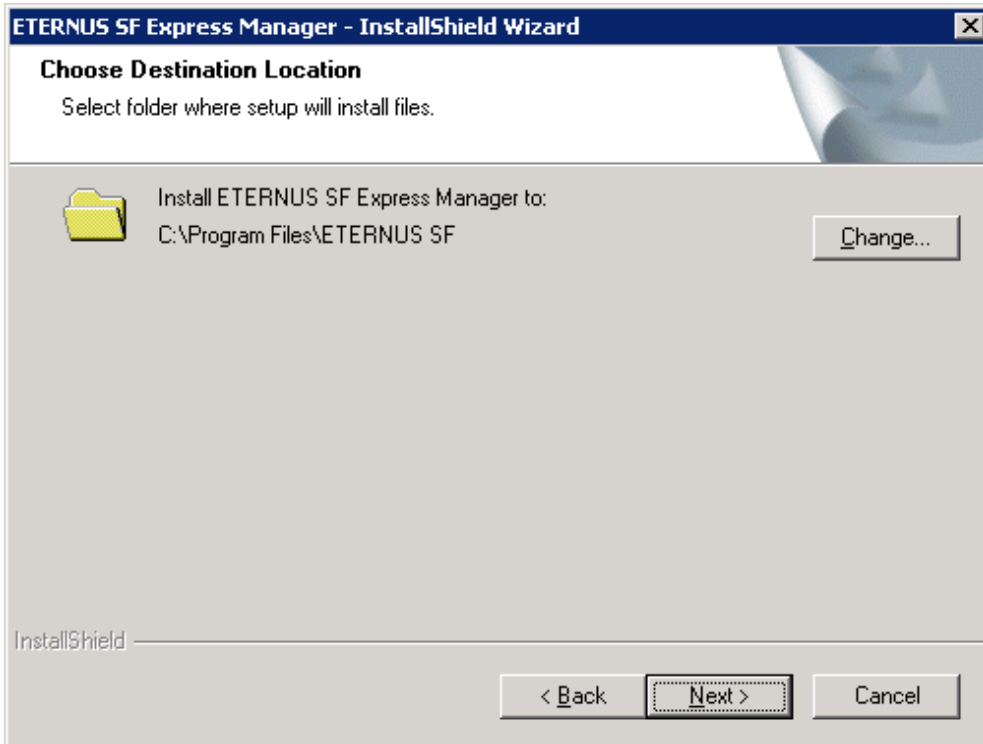
6. Specify the port number to be allocated for the service in the [The registration of the port number] window.

Normally, default port numbers are set in [The registration of the port number] window.
If the other service uses one of the same port numbers, change the relevant port number of either service to be unique.
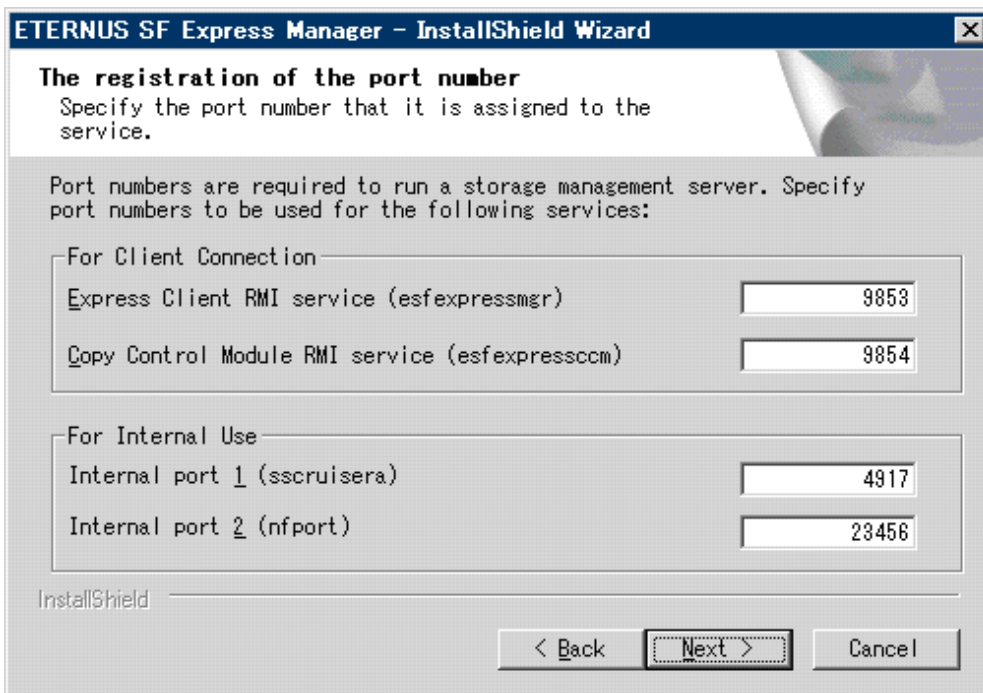
Table B.1 List of port numbers

Service Name	Port number	Note
esfexpressmgr	9853	Express manager service for Express client.
esfexpressccm	9854	Express manager service for Copy Control Management GUI.

Service Name	Port number	Note
sscruisera	4917	Internal use. It does not need to open this port on the firewall.
nfport	23456	Internal use. It does not need to open this port on the firewall.

Information

Please confirm the current service file that the port number described above is vacant.

The services file is located in %SystemRoot%\system32\drivers\etc directory. The %SystemRoot% is the directory where the Windows operating system is installed.

OS	Full path name of services file (default)
Windows Server 2008	C:\Windows\system32\drivers\etc\services

7. Confirm the settings on the [Start Copying Files] window.

   If the information specified is correct, click the [Next] button, or to correct or modify any settings click the [Back] button.
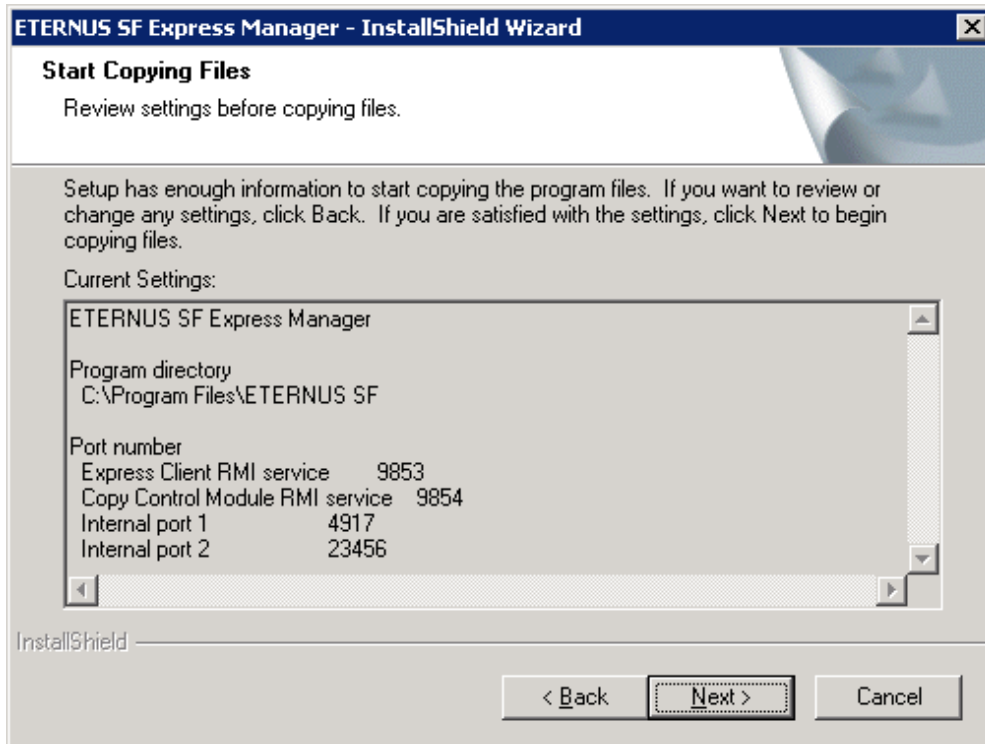
8. Start the copying.

   The file transfer in progress can be viewed on the [Setup Status] window.
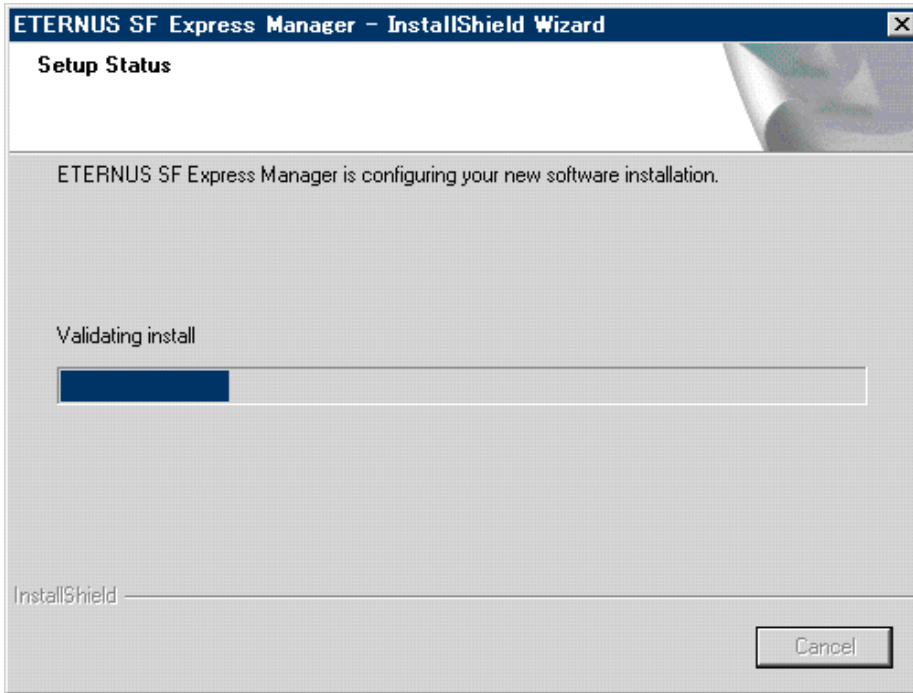
9. Update of the system configuration.

   Wait for the update completion of the system configuration.
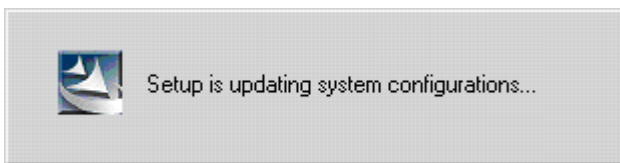
10. Finish the Installer.

    Click the [Finish] button to end the install process, and reboot the computer.
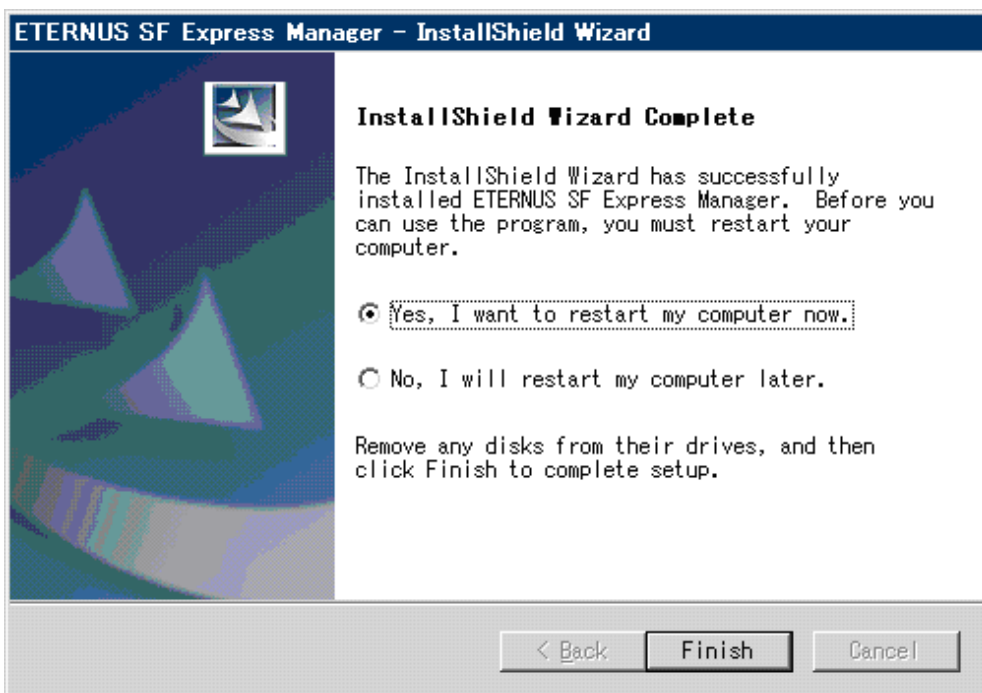
B.1.2 Installation of Express Client

This chapter explains the installation of the Client program of Express.

A flowchart outlining the installation process for the Client program is shown below:

```
┌─────────────────────────────────┐
│      Insert the CD-ROM          │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│    Display the initial menu     │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│      Start the installation     │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│  License agreement declaration  │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│ Eclipse license agreement declaration │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│   Setting the install directory │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│   Confirm the setup information │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│    Copy (install) the resources │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│       Create the shortcut       │
└─────────────────────────────────┘
                ↓
┌─────────────────────────────────┐
│      End of installation        │
└─────────────────────────────────┘
```
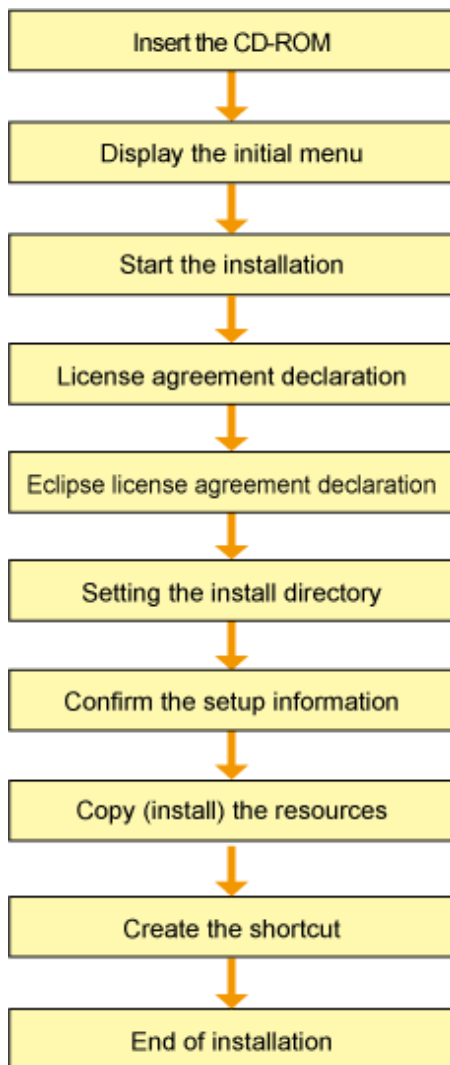
Install Client program, using the following procedure:

1. Login to the system.
   Logon as the user who has the Administrator's authority on the system where Express will be installed.

2. Insert the Express CD-ROM into the drive and an initial window will be displayed. Click [Install ETERNUS SF Express Client].

3. At the following window, check the displayed contents, and then click the [Next] button.
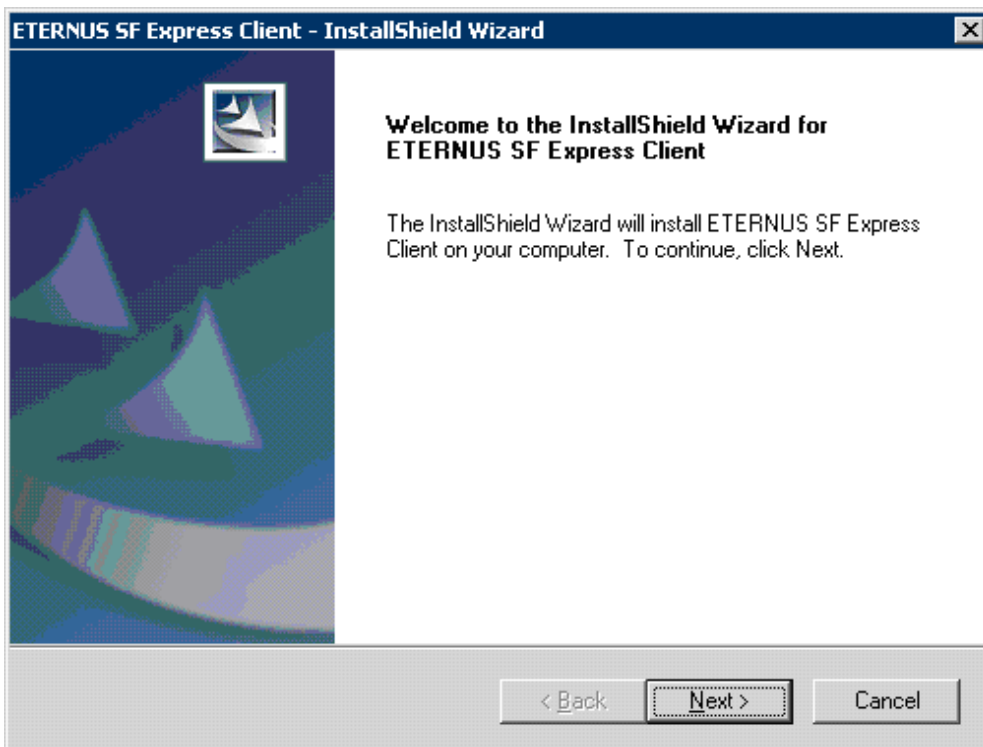
4. Accept the license usage terms and conditions displayed on the [License Agreement] window.

Check the displayed contents, and then click the [Yes] button.
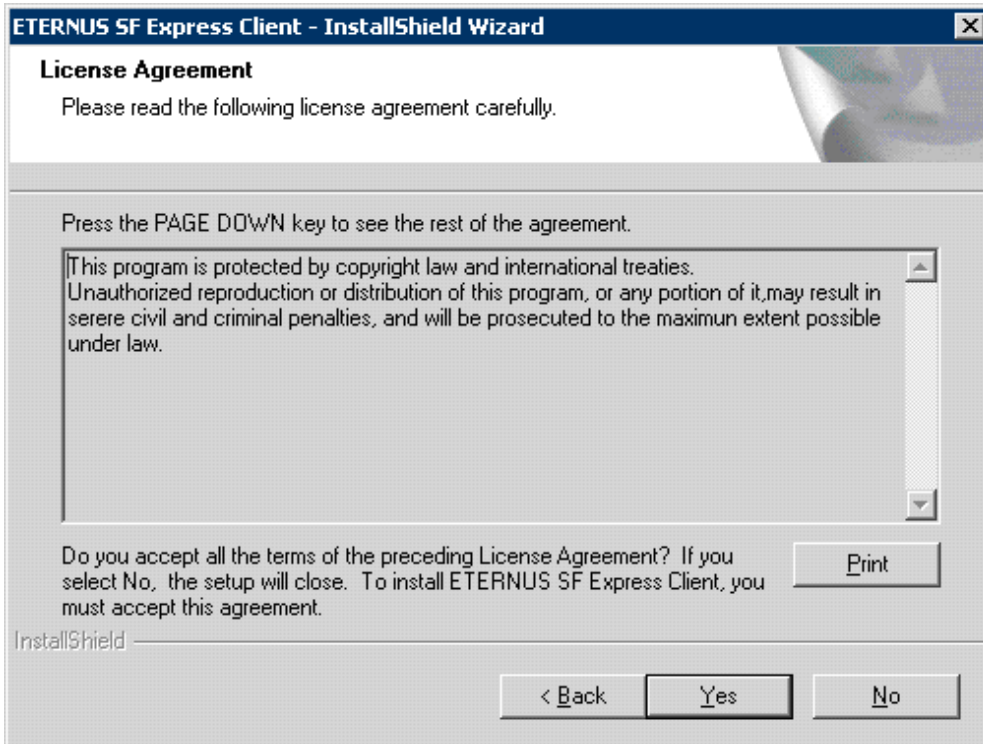
5. Accept the license of Eclipse usage terms and conditions displayed on the [Eclipse License Agreement] window.

   Check the displayed contents, and then click the [Yes] button.
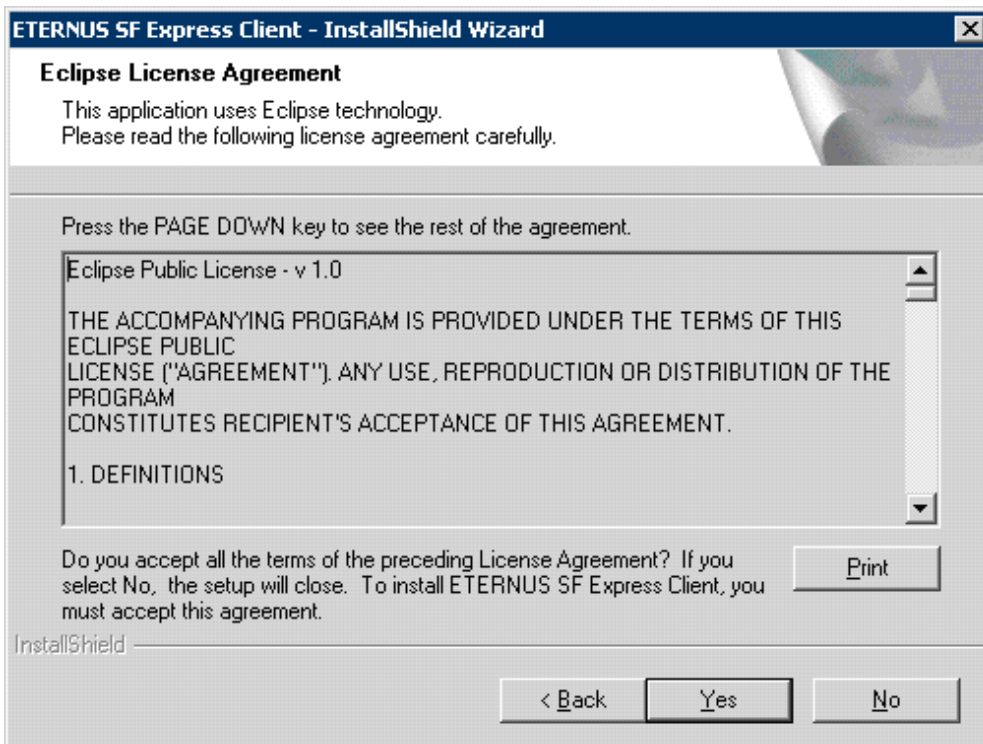
6. Specify the installation directory.

   If this product is to be installed in directories other than those displayed (default directories), click the [Change] button to select the desired directories. After all the proper directories have been selected, click the [Next] button.
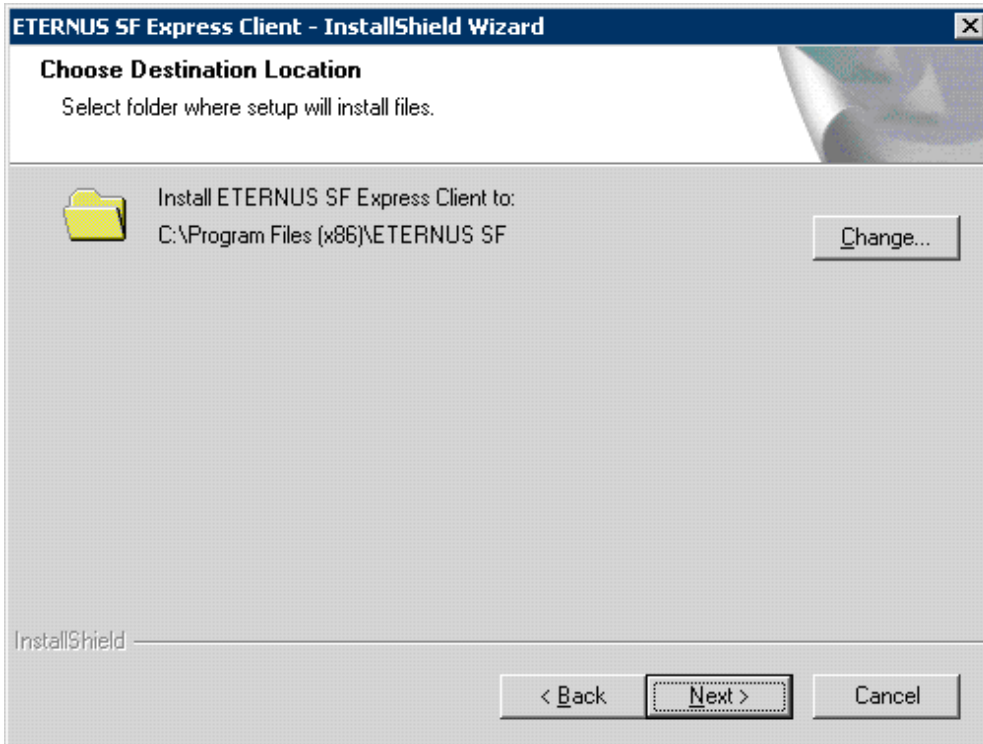
7. Confirm the settings on the [Start Copying Files] window.

   If the information specified is correct, click the [Next] button, or to correct or modify any settings click the [Back] button.
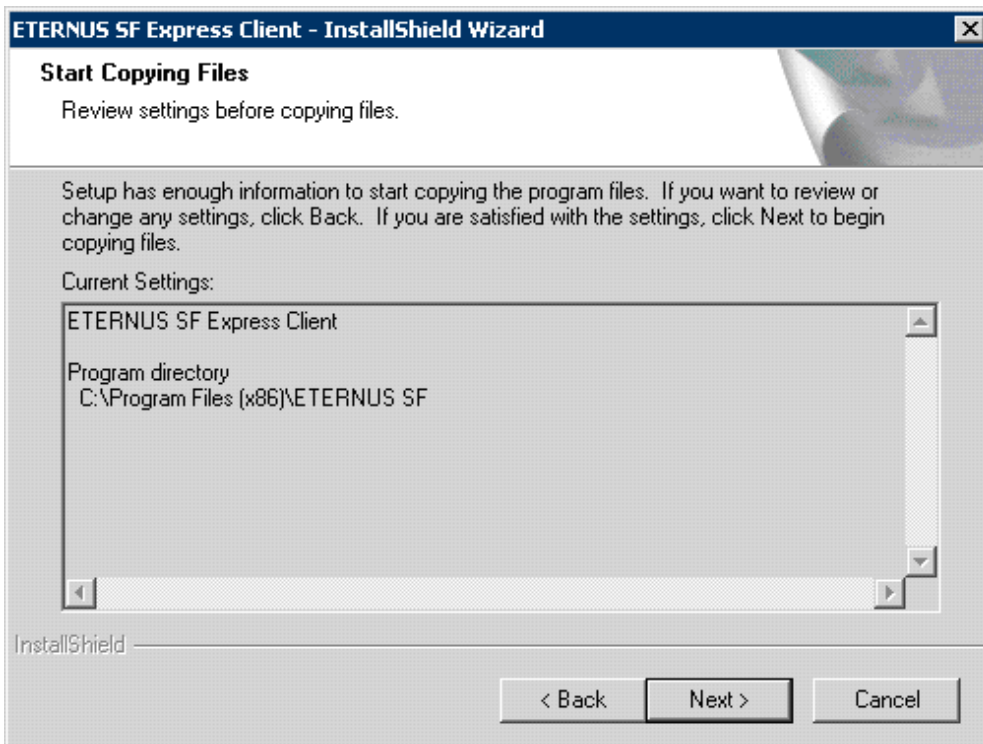
8. Start the copying.

   The file transfer in progress can be viewed on the [Setup Status] window.
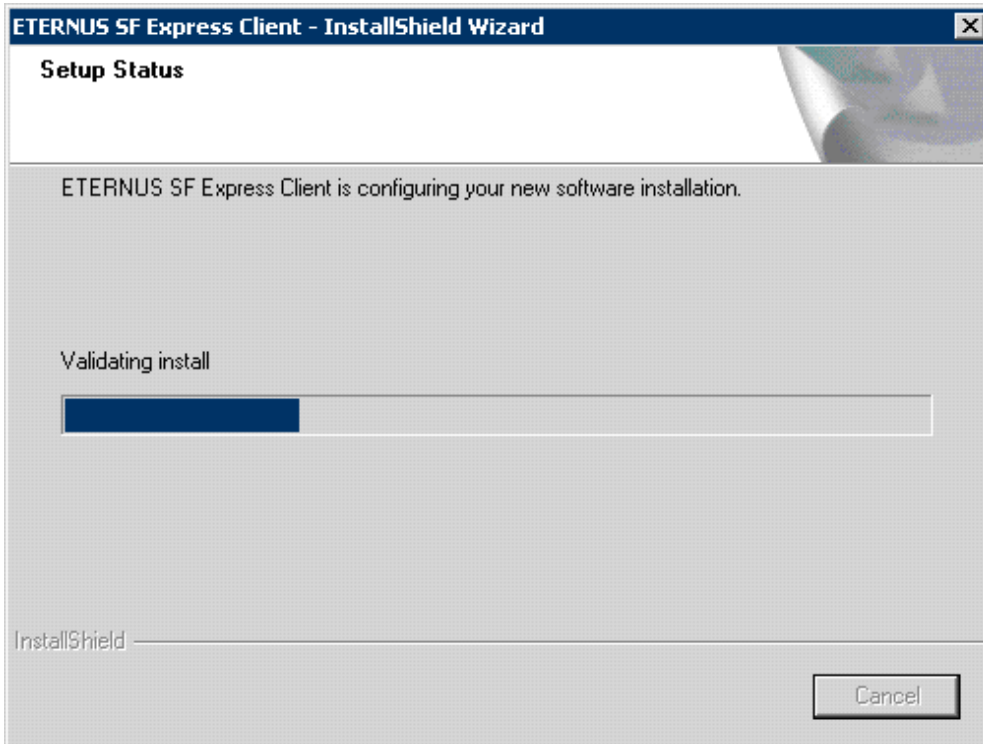
9. Create the shortcut.

When [Yes] button is clicked, installer is create the shortcut on the desk top.
When [No] button is clicked, installer is not create the shortcut.
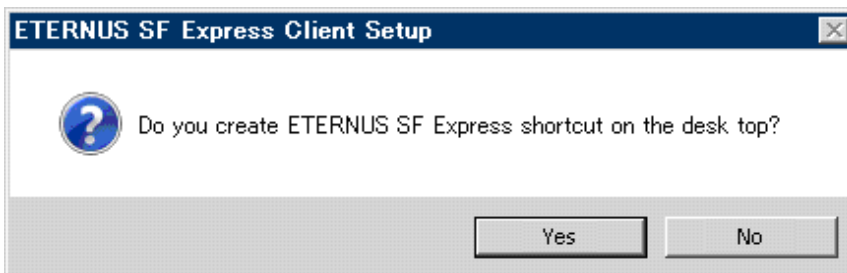
10. Finish the Installer.

When the installation is completed, the following confirmation window will be displayed.
Click the [Finish] button to end the install process.
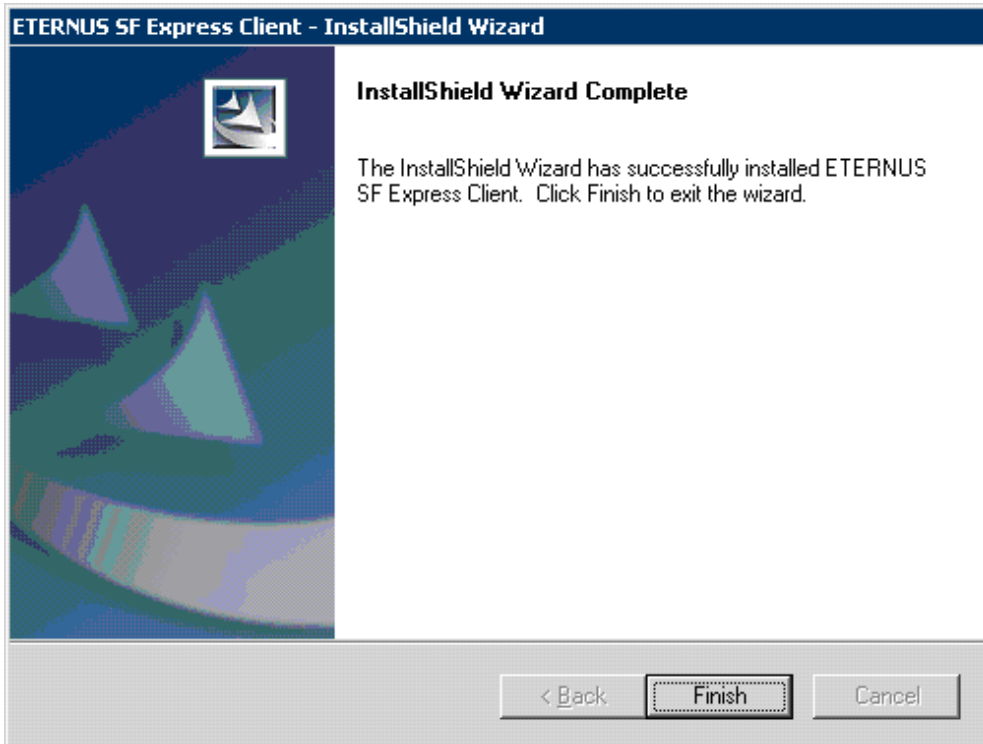
B.2 Uninstallation

This section explains the uninstallation of the Express.

B.2.1 UnInstallation of Express Manager

This chapter explains the uninstallation of the Manager program of Express.

🕝 **Note**

. . . .

After uninstalling, all contents of the "<Express Manager program directory>\Express\Manager" folder in the install directory are removed. (The default directory name of Express Manager program is "C:\Program Files (x86)\ETERNUS SF".)

Do not put your own files under the folder.

If necessary, backup Express Manager environment as shown in "7.1 Backing up Express Manager environment" before uninstall.

. . . .

1. Login to the system.
   Login as the user who has the Administrator's authority on the system where Express will be uninstalled.

2. Open the window that can add or remove programs, and delete the "ETERNUS SF Express Manager" program.

   The name of window that can add or remove programs and the method to open its window are as follows.

OS	Name of window	Method to open window
Windows Server 2008	Programs and Features	・ When "Start menu" is used: [Start] > [Control Panel] > [Programs and Features] ・ When "Classic Start menu" is used: [Start] > [Settings] > [Control Panel] > [Programs and Features]

3. The following confirmation window will be displayed, click the [Yes] button.

4. Delete of the system configuration.

   Wait for the delete completion of the system configuration.
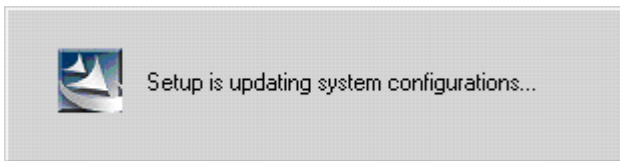
5. Start the uninstall.
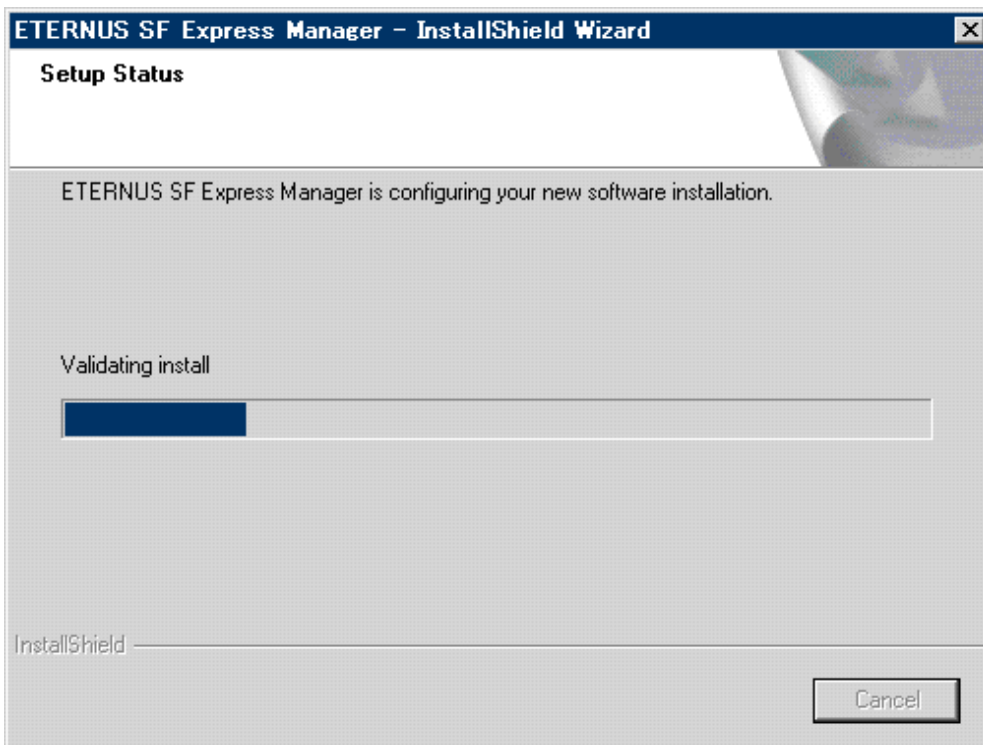
   The file transfer in progress can be viewed on the [Setup Status] window.

6. When the uninstallation is completed, the following confirmation window will be displayed. Click the [Finish] button, and reboot the computer.
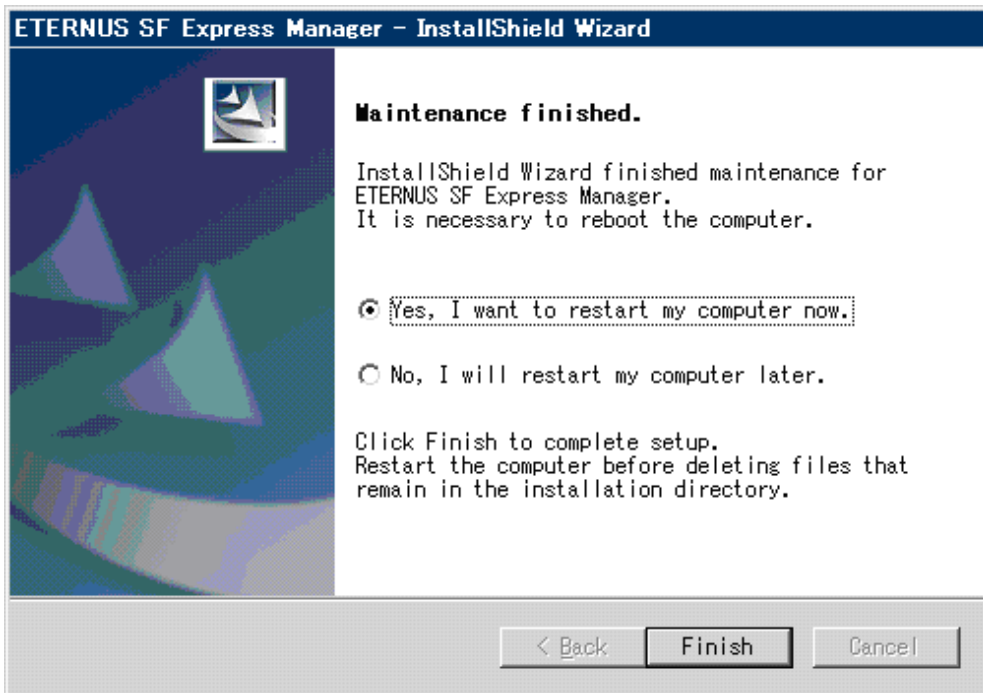
7. Even if uninstall is carried out, the package directory may not be removed. If the directory remains, remove as required.

🔲 **Note**

. . . .

If the licenses for ETERNUS SF products have been registered, these licenses will remain on the management server even after having uninstalled Express Manager.

If you do not use ETERNUS SF products (do not use their licenses) on the same server in the future, please uninstall "ETERNUS SF License Manager" from "Programs and Features".

. . . .

B.2.2   UnInstallation of Express Client

This chapter explains the uninstallation of the Client program of Express.

1. Login to the system.
   Login as the user who has the Administrator's authority on the system where Express will be uninstalled.

2. Open the window that can add or remove programs, and delete the "ETERNUS SF Express Client" program.

   The name of window that can add or remove programs and the method to open its window are as follows.

OS	Name of window	Method to open window
Windows 7	Uninstall a program	[Start] > [Control Panel] > [Uninstall a program]
Windows Vista	Programs and Features	[Start] > [Control Panel] > [Programs and Features]
Windows XP	Add or Remove Programs	・ When "Start menu" is used: 　[Start] > [Control Panel] > [Add or Remove Programs] ・ When "Classic Start menu" is used: 　[Start] > [Settings] > [Control Panel] > [Add or Remove Programs]

OS	Name of window	Method to open window
Windows Server 2008	Programs and Features	・ When "Start menu" is used: [Start] > [Control Panel] > [Programs and Features] ・ When "Classic Start menu" is used: [Start] > [Settings] > [Control Panel] > [Programs and Features]

3. The following confirmation window will be displayed, click the [Yes] button.

4. Start the uninstall.

The file transfer in progress can be viewed on the [Setup Status] window.
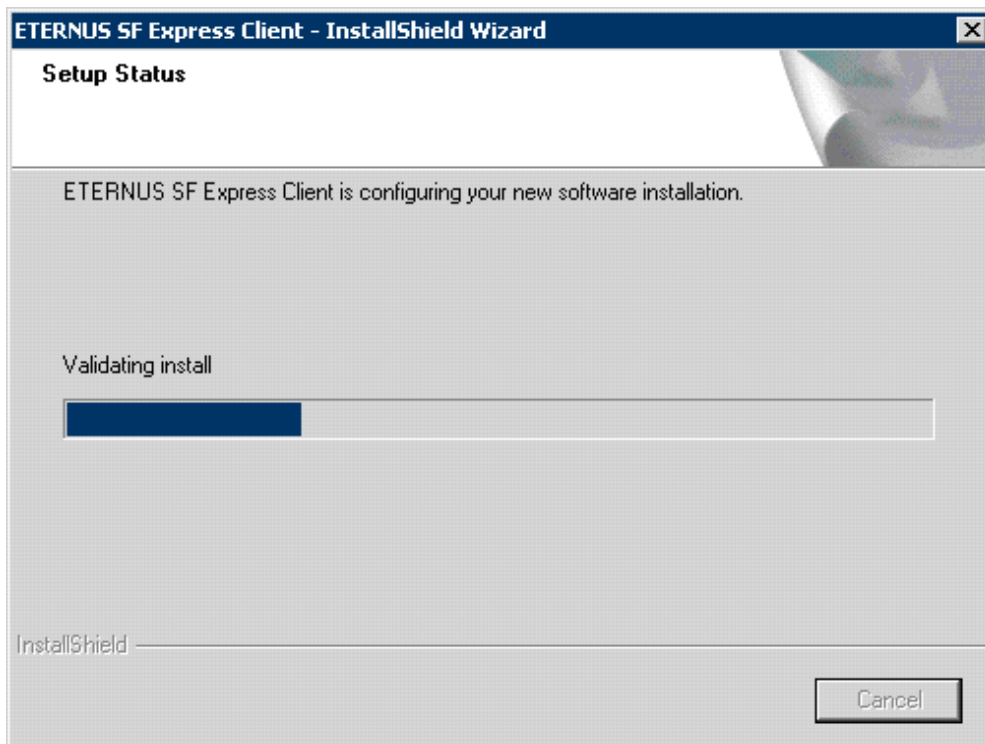
5. When the uninstallation is completed, the following confirmation window will be displayed. Click the [Finish] button.
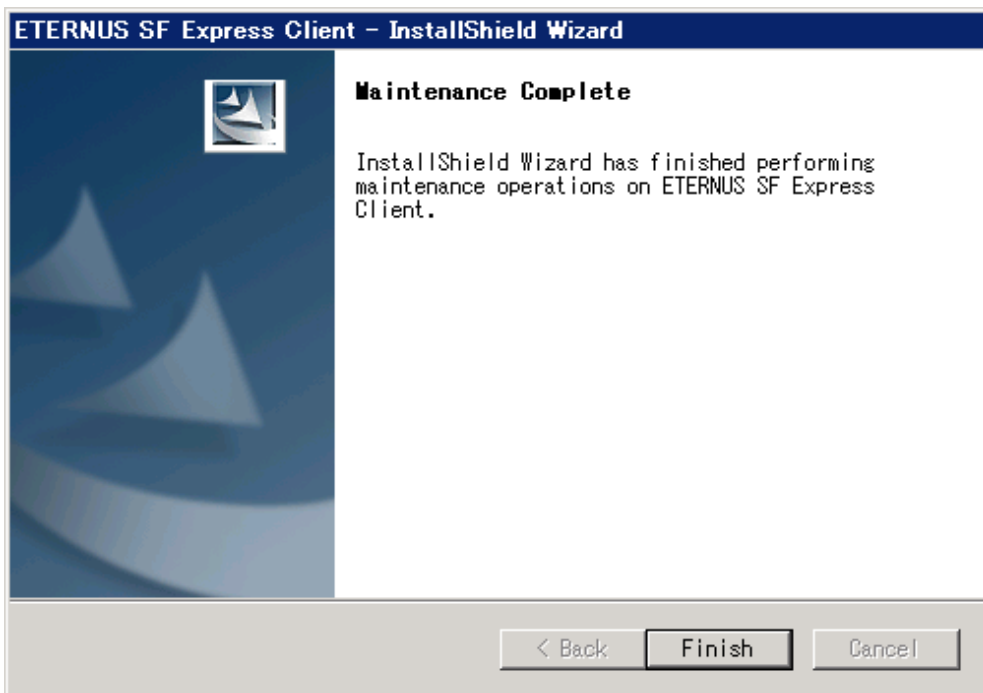
6. Even if uninstall is carried out, the package directory may not be removed. If the directory remains, remove as required.

Appendix C Commands

This appendix explains the various commands that are used with Express.

C.1   Commands for Advanced Copy function

This section explains the commands for Advanced Copy function.

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If using commands, refer to "6.4.1.1 PATH environment variables settings".

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The Advanced Copy commands can be classified as follows.

Environment definition commands

Table C.1 List of commands for controlling ETERNUS Disk storage systems

Function	Command	Explanation
C.1.1 acarray add (ETERNUS Disk storage system registration command)	acarray add	Registers ETERNUS Disk storage systems.
C.1.2 acarray change (Command for changing ETERNUS names and access paths for ETERNUS Disk storage systems)	acarray change	Changes the access paths and ETERNUS names for ETERNUS Disk storage systems.
C.1.3 acarray list (Command for displaying information about ETERNUS Disk storage systems)	acarray list	Displays information about ETERNUS Disk storage systems.
C.1.4 acarray detail (Command for displaying detailed information about ETERNUS Disk storage systems)	acarray detail	Displays detailed information about ETERNUS Disk storage systems.
C.1.5 acarray remove (Command for deleting registration information for ETERNUS Disk storage systems)	acarray remove	Removes registration information about ETERNUS Disk storage systems.

Table C.2 List of commands for displaying information relating to ETERNUS Disk storage systems

Function	Command	Explanation
C.1.6 acinq lv (Command for displaying information about logical volumes)	acinq lv	Displays information about logical volumes.
C.1.7 acinq lunmap (Command for displaying LUN Mapping information)	acinq lunmap	Displays LUN mapping information.
C.1.8 acinq ag (Command for displaying a list of affinity groups)	acinq ag	Displays affinity groups for ETERNUS Disk storage systems.
C.1.9 acinq hag (Command for displaying a list of host affinity groups)	acinq hag	Displays host affinity groups for ETERNUS Disk storage systems.

Table C.3 List of commands for control REC transfer buffer

Function	Command	Explanation
C.1.10 acrecbuff set (Setting REC transfer buffers)	acrecbuff set	Setting REC transfer buffers.
C.1.11 acrecbuff stat (Displaying REC transfer buffer status)	acrecbuff stat	Displaying REC transfer buffer status.

Table C.4 List of commands for setting up copy groups

Function	Command	Explanation
C.1.12 acgroup create (Copy group creation command)	acgroup create	Creates a copy group.
C.1.13 acgroup list (Copy group display command)	acgroup list	Displays the copy groups that have been set up.
C.1.14 acgroup detail (Command for displaying detailed information about copy groups)	acgroup detail	Displays the copy pairs that have been set up in copy groups.
C.1.15 acgroup remove (Copy group deletion command)	acgroup remove	Removes copy groups.
C.1.16 acpair add (Copy pair addition command)	acpair add	Adds copy pairs to copy groups.
C.1.17 acpair remove (Copy pair deletion command)	acpair remove	Removes copy pairs from copy groups.

Operation commands

Table C.5 List of commands for Advanced Copy

Function	Command	Explanation
C.1.18 acopc start (Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy start command)	acopc start	Starts Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy.
C.1.19 acopc query (Status display command for Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy)	acopc query	Displays the status of Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy.
C.1.20 acopc cancel (Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy stop command)	acopc cancel	Stops Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy.
C.1.21 acsnap start (Snapshot type Advanced Copy start command)	acsnap start	Starts snapshot type Advanced Copy.
C.1.22 acsnap query (Status display command for snapshot type Advanced Copy)	acsnap query	Displays the status of snapshot type Advanced Copy.
C.1.23 acsnap cancel (Snapshot type Advanced Copy stop command)	acsnap cancel	Stops snapshot type Advanced Copy.
C.1.24 acec start (Clone(EC) type or Remote Advanced Copy start command)	acec start	Start of Clone(EC) type Advanced Copy or Remote Advanced Copy.
C.1.25 acec query (Status display command for Clone(EC) type or Remote Advanced Copy)	acec query	Displays the status of Clone(EC) type Advanced Copy or Remote Advanced Copy.
C.1.26 acec suspend (Clone(EC) type or Remote Advanced Copy temporary suspension command)	acec suspend	Temporarily suspends Clone(EC) type Advanced Copy or Remote Advanced Copy.
C.1.27 acec resume (Clone(EC) type or Remote Advanced Copy restart command)	acec resume	Restarts temporarily interrupted Clone(EC) type Advanced Copy or Remote Advanced Copy.
C.1.28 acec reverse (Clone(EC) type or Remote Advanced Copy reverse command)	acec reverse	Reverses the direction of Clone(EC) type Advanced Copy or Remote Advanced Copy.
C.1.29 acec change (Remote Advanced Copy mode change command)	acec change	Changes the mode of Remote Advanced Copy.
C.1.30 acec cancel (Clone(EC) type or Remote Advanced Copy stop command)	acec cancel	Stops Clone(EC) type Advanced Copy or Remote Advanced Copy.

Utility commands

Table C.6 List of commands for Snap data volume and Snap data pool

Function	Command	Explanation
C.1.31 acsdv init (Initialize snap data volume command)	acsdv init	Initializes snap data volumes.
C.1.32 acsdv stat (Display snap data volume status command)	acsdv stat	Displays the status of a snap data volume.
C.1.33 acsdv poolstat (Display snap data pool status command)	acsdv poolstat	Displays the status of a snap data pool.

Table C.7 List of utility commands

Function	Command	Explanation
C.1.34 acutil devs (Logical volume information display command)	acutil devs	Displays information about logical volumes on Windows servers.
C.1.35 acgetvolinfo (Displaying logical volume information)	acgetvolinfo	Displays logical volume information.
C.1.36 acutil refresh (Partition table refresh command)	acutil refresh	Refreshes the partition table for the disk.

Troubleshooting data collection commands

Table C.8 List of troubleshooting data collection commands

Function	Command	Explanation
C.1.37 acmcapture (troubleshooting data collection command)	acmcapture	Collects data for use in investigating faults.

C.1.1　acarray add (ETERNUS Disk storage system registration command)

NAME

acarray add - Registration of ETERNUS Disk storage systems.

SYNOPSIS

・ For ETERNUS Disk storage system in the local site

```
acarray add -a DISKARRAY-NAME -ip DISKARRAY-IP -user USER -password PASSWORD -path ACCESSPATH [-xml]
```

・ For ETERNUS Disk storage system in a remote site

```
acarray add -a DISKARRAY-NAME -boxid BOX-ID -remote [-xml]
```

DESCRIPTION

This command registers ETERNUS Disk storage systems. Please make sure to specify the "add" subcommand.

An error will occur when an attempt is made to register an ETERNUS Disk storage system with the same IP address as an ETERNUS Disk storage system that has already been registered.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS names that are used by Express.

Specify it in the alphanumeric character within 16 characters.

-ip *DISKARRAY-IP*

This option specifies the IP address of the ETERNUS Disk storage system.

An error will occur when an attempt is made to register an ETERNUS Disk storage system with the same IP address as an ETERNUS Disk storage system that has already been registered.

-user *USER*

This option specifies a user name with Administrator privileges for ETERNUS Web GUI. Specify the user name using a string that is between 4 and 16 characters long.

Refer to the ETERNUS Web GUI manuals for more information about ETERNUS Web GUI.

-password *PASSWORD*

This option specifies the password for the user with Administrator privileges for ETERNUS Web GUI.

Refer to the ETERNUS Web GUI manuals for more information about ETERNUS Web GUI.

-path *ACCESSPATH*

This option specifies the access path in the logical volume within the ETERNUS Disk storage system that was specified with the "-a" option.

Specify the drive letter.
Example: X:

-box-id *BOX-ID*

This option specifies the BOX-ID of the ETERNUS Disk storage system.
An error will occur when an attempt is made to register an ETERNUS Disk storage system with the same BOX-ID as an ETERNUS Disk storage system that has already been registered.

Refer to the ETERNUS Web GUI manuals for more information.

-remote

This option specifies when registering the ETERNUS Disk storage system which is in a remote site.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acarray add -a DX80 -ip 10.12.13.14 -user root -password root -path X:
Successful completion.
```

C.1.2   acarray change (Command for changing ETERNUS names and access paths for ETERNUS Disk storage systems)

NAME

acarray change - Change of ETERNUS names and access paths.

SYNOPSIS

・ For ETERNUS Disk storage system in the local site

```
acarray change -a DISKARRAY-NAME {-path ACCESSPATH | -new NEW-DISKARRAY-NAME} [-xml]
```

・ For ETERNUS Disk storage system in a remote site

```
acarray change -a DISKARRAY-NAME -new NEW-DISKARRAY-NAME -remote [-xml]
```

DESCRIPTION

This command changes the ETERNUS names and access paths for ETERNUS Disk storage systems. Please make sure to specify the "change" subcommand.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the existing ETERNUS name for which the ETERNUS name or access path is to be changed.

-path *ACCESSPATH*

This option specifies the new access path to be set in the ETERNUS Disk storage system.

Specify the drive letter.
Example: Y:

-new *NEW-DISKARRAY-NAME*

This option specifies the new ETERNUS name to be set for the ETERNUS Disk storage system.

-remote

This option specifies when changing the ETERNUS Disk storage system which is in a remote site.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acarray change -a DX80 -p path Y:
Successful completion.
```

C.1.3   acarray list (Command for displaying information about ETERNUS Disk storage systems)

NAME

acarray list - Display of information on the ETERNUS Disk storage system.

SYNOPSIS

```
acarray list [-remote] [-xml]
```

DESCRIPTION

This command displays a list of the ETERNUS Disk storage systems that have been registered, together with information about each ETERNUS Disk storage system. Please make sure to specify the "list" subcommand.

OPTIONS

-remote

This option specifies when referring the ETERNUS Disk storage system which is in a remote site.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ Displaying ETERNUS Disk storage systems which are in a local site:

```
C:\>acarray list

Name  BOX-ID                                 IP Address
----- -------------------------------------- -----------
DX80  00ETERNUSDXL##ET08E21A####LN4310901078## 10.12.13.14
DX80B 00ETERNUSDXL##ET08F22A####JP0000000001## 10.12.13.15
```

The following table shows the meanings of the information displayed.

Title	Explanation
Name	Displays the ETERNUS name.
BOX-ID	Displays the BOX ID for the ETERNUS Disk storage system.
IP Address	Displays the IP address for the ETERNUS Disk storage system.

・ Displaying ETERNUS Disk storage systems which are in a remote site:

```
C:\>acarray list -remote

Name  BOX-ID
----- --------------------------------------
DX80  00ETERNUSDXL##ET08E21A####LN4310901078##
DX80B 00ETERNUSDXL##ET08F22A####JP0000000001##
```

The following table shows the meanings of the information displayed.

Title	Explanation
Name	Displays the ETERNUS name.
BOX-ID	Displays the BOX ID for the ETERNUS Disk storage system.

C.1.4　acarray detail (Command for displaying detailed information about ETERNUS Disk storage systems)

NAME

acarray detail - Display of detailed information on the ETERNUS Disk storage system.

SYNOPSIS

```
acarray detail -a DISKARRAY-NAME [-xml]
```

DESCRIPTION

This command displays a list of the ETERNUS Disk storage systems that have been registered, together with detailed information about each ETERNUS Disk storage system. Please make sure to specify the "detail" subcommand.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Displaying an ETERNUS Disk storage system which is in a local site:

```
C:\>acarray detail -a DX80

Disk Array Name : DX80
BOX-ID          : 00ETERNUSDXL##ET08E21A####LN4310901078##
IP Address      : 10.12.13.14
Admin User      : root
Access Path      : X:
```

The following table shows the meanings of the information displayed.

Title	Explanation
Disk Array Name	Displays the ETERNUS name.
BOX-ID	Displays the BOX ID for the ETERNUS Disk storage system.
IP Address	Displays the IP address for the ETERNUS Disk storage system. (NOTE)
Admin User	Displays the name of the user with Administrator privileges for ETERNUS Web GUI. (NOTE)
Access Path	Displays the access path set up for the ETERNUS Disk storage system. (NOTE)

NOTE: If the specified ETERNUS Disk storage system exists on a remote site, a hyphen (-) is displayed.

C.1.5   acarray remove (Command for deleting registration information for ETERNUS Disk storage systems)

NAME

acarray remove - Deletion of registered information of the ETERNUS Disk storage system.

SYNOPSIS

```
acarray remove -a DISKARRAY-NAME [-xml]
```

DESCRIPTION

This command deletes registration information for ETERNUS Disk storage systems. Please make sure to specify the "remove" subcommand.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acarray remove -a DX80
Successful completion.
```

C.1.6 acinq lv (Command for displaying information about logical volumes)

NAME

acinq lv - Display of information on logical volumes.

SYNOPSIS

```
acinq lv -a DISKARRAY-NAME [-free] [-xml]
```

DESCRIPTION

This command displays a list of the logical volumes for ETERNUS Disk storage systems, together with information about each logical volume. Please make sure to specify the "lv" subcommand.

This information can be displayed for the following types of logical volumes:

・ Open

・ SDV

・ Thin Provisioning Volume

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-free

Displays list of logical volumes that meet the following requirements.

- Not registered with an affinity group.

- Not used by LUN Mapping settings if the affinity function is disabled.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- [When you specify the option -free]

```
C:\>acinq lv -a DX80 -free

LV No   LV Name LV Size LV Type RG No Encrypt
------  ------- ------- ------- ----- -------
0x0023  vol35   1024M Open        5 -
```

- [When you do not specify the option -free]

```
C:\>acinq lv -a DX80

LV No   LV Name LV Size LV Type RG No Encrypt
------  ------- ------- ------- ----- -------
0x0010  vol16    1024M Open        4 -
0x0011  vol17    1024M Open        4 -
0x0012  vol18    1024M Open        4 -
0x0013  vol19    1024M Open        2 -
0x0014  vol20    1024M Open        2 -
0x0023  vol35    1024M Open        5 -
```

The following table shows the meanings of the information displayed.

Title	Explanation
LV No	Displays the logical volume number in hexadecimal.
LV Name	Displays the alias for the logical volume (0 to 16 characters). (Only be displayed when used with an ETERNUS Disk storage system that supports logical volume alias name.)
LV Size	Displays the size of the logical volume in Megabytes.
LV Type	Displays the logical volume type. ・ Open: This refers to an "Open Volume", which means a normal volume that can be used with open systems. ・ SDV: This refers to a "Snap Data Volume", which means a volume that can be used as the copy destination for SnapOPC/SnapOPC+. The volume of this type cannot be used as the copy destination for OPC/QuickOPC/EC/REC. ・ TPV: This refers to a "Thin Provisioning Volume", which means a virtual volume that can be used with open systems.
RG No	Displays the RAID group number. The hyphen (-) is displayed, when "TPV" is displayed in "LV Type" field.
Encrypt	Displays the encryption status of the logical volume. ・ -: Indicates an unencrypted volume. ・ Yes: Indicates an encrypted volume.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.7 acinq lunmap (Command for displaying LUN Mapping information)

NAME

acinq lunmap - Display of LUN Mapping information.

SYNOPSIS

```
acinq lunmap -a DISKARRAY-NAME -agno AFFINITY-GROUP-NO [-xml]
```

DESCRIPTION

This command displays LUN Mapping information for affinity groups. Please make sure to specify the "lunmap" subcommand.

This command cannot be used with the connected affinity group.

OPTIONS

-a *DISKARRAY-NAME*

    This option specifies the ETERNUS name.

-agno *AFFINITY-GROUP-NO*

    This option specifies an affinity group number.

-xml

    This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acinq lunmap -a DX80 -agno 0x004

LUN    LV No  LV Name
------ ------ -------
0x0000 0x0003 vol03
0x0001 0x0004 vol04
0x0002 0x0005 vol05
```

The following table shows the meanings of the information displayed.

Title	Explanation
LUN	Displays the logical unit number in hexadecimal.
LV No	Displays the logical volume number in hexadecimal.
LV Name	Displays the alias for the logical volume (0 to 16 characters).
	(Displayed only when used with an ETERNUS that supports logical volume alias name.)

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.8 acinq ag (Command for displaying a list of affinity groups)

NAME

acinq ag - Display of list of affinity groups.

SYNOPSIS

```
acinq ag -a DISKARRAY-NAME [-xml]
```

DESCRIPTION

This command displays a list of affinity groups for ETERNUS Disk storage systems. Please make sure to specify the "ag" subcommand.

"Affinity groups" are management information on ETERNUS Disk storage systems that indicate the relationship between logical unit numbers (LUN), which can be recognized by the host, and logical volume numbers, which are managed within ETERNUS Disk storage systems.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acinq ag -a DX80

AG No AG Name
----- -------
0x000 win_78
0x001 x86_76
```

The following table shows the meanings of the information displayed.

Title	Explanation
AG No	Displays the affinity group number in hexadecimal.
AG Name	Displays the affinity group name.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.9   acinq hag (Command for displaying a list of host affinity groups)

NAME

acinq hag - Display of list of host affinity groups.

SYNOPSIS

```
acinq hag -a DISKARRAY-NAME [-xml]
```

DESCRIPTION

This command displays host affinity groups for ETERNUS Disk storage systems. Please make sure to specify the "hag" subcommand.

"Host affinity groups" are management information on ETERNUS Disk storage systems that indicate the relationship between the world wide name (WWN) for the host and its affinity groups. Disks that connect to the host can be specified as host affinity groups.

OPTIONS

-a *DISKARRAY-NAME*

   This option specifies the ETERNUS name.

-xml

   This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acinq hag -a DX80

Host Name Port Type Address          AG No AG Name
--------- --------- ---------------- ----- -------
win_78_1  FC         1000006069107A5A 0x002 win_78
win_78_2  FC         100000AC340DA34F 0x003 win_78
x86_76    FC         10000045AA2C45GG 0x004 x86_76
```

The following table shows the meanings of the information displayed.

Title	Explanation
Host Name	Displays the host name or alias name. The host name is displayed for the FC-CA or the Serial Attached SCSI. The alias name is displayed for the iSCSI.
Port Type	Displays the data transfer method. FC: fibre channel connection iSCSI: iSCSI connection SAS: Serial Attached SCSI connection
Address	Displays the WWN for the connection destination. The WWN is displayed for the FC-CA. The iSCSI address is displayed for the iSCSI. The SAS address is displayed for the Serial Attached SCSI.
AG No	Displays the affinity group number in hexadecimal.
AG Name	Displays the affinity group name.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.10 acrecbuff set (Setting REC transfer buffers)

NAME

acrecbuff set - Sets up REC transfer buffers.

SYNOPSIS

```
acrecbuff set -a DISKARRAY-NAME -id BUFFER-ID -use {SEND|RECV} [-xml]
```

DESCRIPTION

The settings for transfer buffers used in an ETERNUS Disk storage system are changed.

To execute this command, it is required that the REC transfer buffers have been already set.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-id *BUFFER-ID*

This option specifies a transfer buffer ID.

-use {SEND|RECV}

This option specifies the application of the transfer buffer.

- SEND : For sending

- RECV : For receiving

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acrecbuff set -a DX90 -id 1 -use SEND
Successful completion
```

NOTES

・ Set up buffers while no session exists in asynchronous Consistency mode, which is in ACTIVE or ERROR SUSPEND status.

・ It takes tens of seconds to change buffer settings. Since transfer buffers are not available while their settings are changed, do not execute REC operations.

・ This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.11 acrecbuff stat (Displaying REC transfer buffer status)

NAME

acrcsbuff stat - Displays REC transfer buffer information.

SYNOPSIS

acrecbuff stat -a *DISKARRAY-NAME* [-xml]

DESCRIPTION

The information for transfer buffers used in an ETERNUS Disk storage system is displayed.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acrecbuff stat -a DX90
ID  Use   Rate RemoteBoxID
--- ---- ---- ----------------------------------------
1   SEND  12% 00ETERNUSDXL##ET09E24AG###NP4310901018##
2   RECV   0% 00ETERNUSDXL##ET09E24AG###NP4310901018##
```

The following table shows the meanings of the information displayed.

Title	Description
ID	Displays a transfer buffer ID.
Use	Displays the transfer buffer attribute (application). ・ SEND: for sending ・ RECV: for receiving
Rate	Displays the transfer buffer usage as a percentage. When the REC transfer buffer is not available, "----" is displayed. ・ For sending: Displays the transfer buffer usage as a percentage. Even if REC in asynchronous Consistency mode is not executed, the usage does not become 0 %. ・ For receiving: "0 %" is displayed at all times.
RemoteBoxID	Displays the BOX ID for the ETERNUS Disk storage system.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.12   acgroup create (Copy group creation command)

NAME

acgroup create - Creation of copy groups.

SYNOPSIS

```
acgroup create -g COPY-GROUP -type { OPC | QuickOPC | SnapOPCP | EC | REC } -a DISKARRAY-NAME [-remote
REMOTE-DISKARRAY-NAME] [-xml]
```

DESCRIPTION

This command creates a copy group. Please make sure to specify the "create" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

The copy group name is an alias for the copy group that can be used with Express.

Specify copy group names using up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.

An error will occur when an attempt is made to create a copy group with the same name as a copy group that has already been registered.

-type { OPC | QuickOPC | SnapOPCP | EC | REC }

This option specifies the type of copy used within the copy group.

Specify one of the following copy types:

  - OPC

  - QuickOPC

  - SnapOPCP

  - EC

  - REC

-a *DISKARRAY-NAME*

This option specifies the ETERNUS name.

For REC, the access path of the ETERNUS Disk storage system specified here is used.

-remote *REMOTE-DISKARRAY-NAME*

For REC, the ETERNUS name besides the specified ETERNUS Disk storage system is specified by the -a option.

The access path of the ETERNUS Disk storage system specified by the -a option is used, instead of the access path of the ETERNUS Disk storage system specified here.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acgroup create -g group01 -type OPC -a DX80
Successful completion.
```

C.1.13   acgroup list (Copy group display command)

NAME

acgroup list - Display of copy groups.

SYNOPSIS

```
acgroup list [-xml]
```

DESCRIPTION

This command displays a list of copy groups. Please make sure to specify the "list" subcommand.

OPTIONS

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acgroup list

CG Name
-------
Group01
Group02
```

The following table shows the meaning of the information displayed.

Title	Explanation
CG Name	Displays the copy group name.

C.1.14 acgroup detail (Command for displaying detailed information about copy groups)

NAME

acgroup detail - Detailed display of copy groups.

SYNOPSIS

```
acgroup detail -g COPY-GROUP [-xml]
```

DESCRIPTION

This command displays the copy pairs that have been set up in copy groups. Please make sure to specify the "detail" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ For OPC, QuickOPC, SnapOPCP and EC

```
C:\>acgroup detail -g group01

Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Pair
-------------------
DX80/0x1:DX80/0x6
DX80/0x2:DX80/0x7
DX80/0x3:DX80/0x8
```

The displayed content is shown next.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the copy type set in the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Pair	Displays the copy pair that was set up.

・ For REC

```
C:\>acgroup detail -g group01

Copy Group Name        : group01
Copy Group Type        : REC
Disk Array Name        : DX90P (00ETERNUSDXL##ET09E24AG###NP4310901018##)
Remote Disk Array Name : DX90S (00ETERNUSDXL##ET09E24AG###NP4310901019##)

Pair
-------------------
DX90P/0x1:DX90S/0x1
DX90P/0x2:DX90S/0x2
DX90P/0x3:DX90S/0x3
```

The following table shows the meanings of the information displayed.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the copy type set in the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-remote" option of the acgroup create (Copy group creation command).
Pair	Displays the copy pairs that have been set up.

C.1.15 acgroup remove (Copy group deletion command)

NAME

acgroup remove - Deletion of copy groups.

SYNOPSIS

```
acgroup remove -g COPY-GROUP [-xml]
```

DESCRIPTION

This command removes copy groups. Please make sure to specify the "remove" subcommand.

OPTIONS

-g *COPY-GROUP*

    This option specifies the copy group name.

-xml

    This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acgroup remove -g group01
Successful completion.
```

NOTES

・ Even if a copy group contains a pair, it is deleted.

・ Regardless of the Advanced Copy status of the pair, the copy group is deleted. Therefore, check the Advanced Copy status and then delete the copy group. If you delete it accidentally, stop the Advanced Copy of the pair registered in the group on ETERNUS Web GUI or create the same copy group once again to add it and then stop the Advanced Copy.

C.1.16 acpair add (Copy pair addition command)

NAME

acpair add - Addition of copy pairs.

SYNOPSIS

```
acpair add -g COPY-GROUP -p PAIR [-xml]
```

DESCRIPTION

This command adds copy pairs to copy groups. Please make sure to specify the "add" subcommand.

OPTIONS

-g *COPY-GROUP*

    This option specifies the copy group name.

-p *PAIR*

This option specifies the copy pair to be added.
The following example shows the format for specifying copy pairs.

DX80/0x1:DX80/0x6

(1) (2) (3) (4)

- (1) ETERNUS name for the copy source

- (2) Logical volume number for the copy source

- (3) ETERNUS name for the copy destination

- (4) Logical volume number for the copy destination

P Point
....

If it starts with "0x", it is a hexadecimal number.
....

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acpair add -g group01 -p DX80/0x1:DX80/0x6
Successful completion.
```

NOTES

- Make sure that the logical volumes specified for the copy source and the copy destination are of the same size.

- If the copy type is OPC, QuickOPC or EC

  - Specify the ETERNUS name that was specified with the -a option for acgroup create (Copy group creation command).

  - When specifying a pair of ETERNUS Disk storage systems, specify the same ETERNUS Disk storage systems as those specified with the -a option when creating the copy group.

- If the copy type is SnapOPCP

  - For a pair of ETERNUS Disk storage systems to be specified, specify the same ETERNUS Disk storage systems as those specified with the -a option when creating the copy group.

  - If the number of copy destination volumes for the copy source volume of a specified pair exceeds the maximum number of sessions of Snapshot type Advanced Copy copies, this command ends abnormally.

  - If the copy destination for the specified pair is not SDV, this command ends abnormally.

- If the copy type is REC

  - Specify the ETERNUS name that was specified with either the -a or the -remote option for acgroup create (Copy group creation command).

  - Specify different ETERNUS names for the copy source and the copy destination.

- The copy source ETERNUS name and the copy destination ETERNUS name for the copy pair being added must be the same as the copy source ETERNUS name and copy destination ETERNUS name for any copy pairs that have already been added to the copy group.

- When specifying a pair of ETERNUS Disk storage systems, specify the same ETERNUS Disk storage systems as those specified with the -a or -remote option when creating the copy group.

- For the paired ETERNUS names, specify different names for copy source and copy destination.

  e.g.:

  - OK: DX90P/0x50:DX90S/0x51

  - NG: DX90P/0x50:DX90P/0x51

- The copy source and destination ETERNUS names for a specified pair should be the same as those for already added pair.
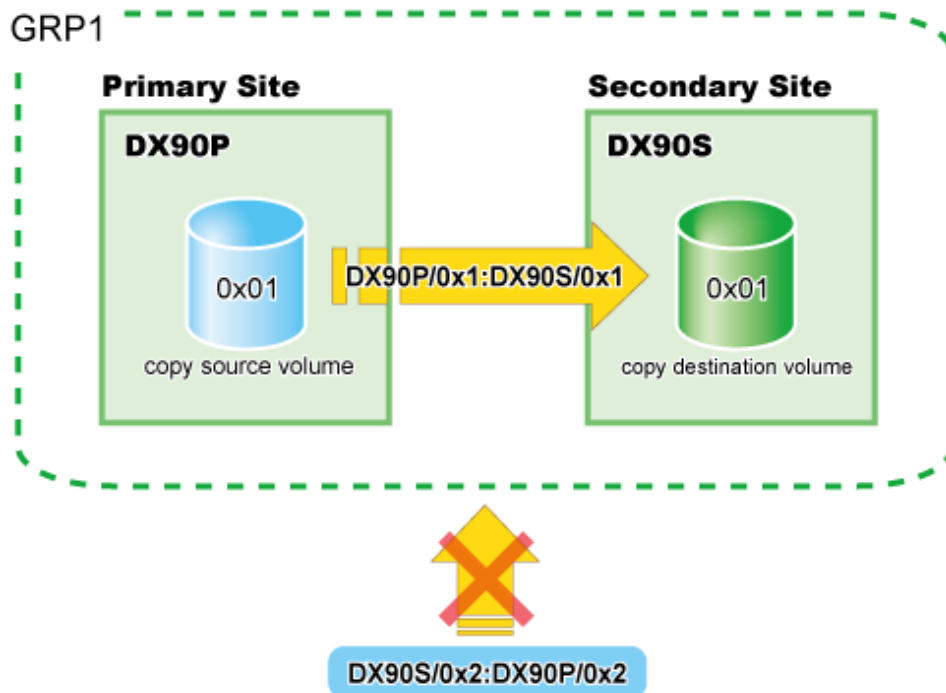
- If any pair in the same string exists in the group, it cannot be newly added.

  Specify the same-size logical volumes for a pair you want to specify.

  If you specify any logical volumes of different sizes and perform copy operation, it leads to the following results.

  1. In the case of a copy-source logical volume size being larger than a copy-destination logical volume, when copy operation is executed, it will end abnormally.

  2. In the case of a copy-source logical volume size being smaller than a copy-destination logical volume size, the copy will be the size of the copy-source logical volume.

C.1.17   acpair remove (Copy pair deletion command)

NAME

acpair remove - Deletion of copy pairs.

SYNOPSIS

```
acpair remove -g COPY-GROUP -p PAIR [-xml]
```

DESCRIPTION

This command deletes copy pairs from copy groups. Please make sure to specify the "remove" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies the copy pair to be deleted.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acpair remove -g group01 -p DX80/0x1:DX80/0x6
Successful completion.
```

NOTES

Since pairs are deleted regardless of their Advanced Copy statuses, check the Advanced Copy status and then delete them. If you delete a pair accidentally, stop the Advanced Copy of the pair registered on ETERNUS Web GUI or add the same pair once again and then stop the Advanced Copy.

C.1.18   acopc start (Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy start command)

NAME

acopc start - Start of Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy.

SYNOPSIS

・ [For OPC copy groups]

```
acopc start -g COPY-GROUP [-p PAIR] [-r] [-xml]
```

・ [For QuickOPC copy groups]

```
acopc start -g COPY-GROUP [-p PAIR] [-diff|-r] [-xml]
```

DESCRIPTION

This command performs a Clone type Advanced Copy (either a full copy or a differential copy), for the specified copy group or copy pair.
Please make sure to specify the "start" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-diff

This option starts a differential copy.

If the -diff option is not specified, a full copy is started.

-r

This option performs a copy in the reverse direction to the direction that has been specified.

If the copy type is QuickOPC, an OPC will be executed.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acopc start -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
# From:BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To   :BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=6/
Adr_high=0/Adr_low=0

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
# From:BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To   :BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=7/
Adr_high=0/Adr_low=0

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
# From:BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=3/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To   :BoxID=303045343030304d3332323232323234534353305332304123232234b4434303330363339303030342323/Olu=8/
Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

NOTES

If the copy type of a copy group is EC, REC or SnapOPCP, this command ends abnormally.

C.1.19 acopc query (Status display command for Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy)

NAME

acopc query - Status display of Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy.

SYNOPSIS

```
acopc query -g COPY-GROUP [-p PAIR] [-r] [-progress] [-xml]
```

DESCRIPTION

This command performs a Clone type Advanced Copy (either a full copy or a differential copy), for the specified copy group or copy pair.
Please make sure to specify the "query" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-r

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-progress

Displays the progress of copy processes.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ For OPC

- When the -progress option is not specified:

```
C:\>acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Source      <=> Target     SID  OPC Status       Copy Phase Copied Block
---------   --- ---------  ---- --------------- ---------- ------------
DX80/0x1   ==> DX80/0x3 0x21  "OPC Executing" "Copying"            0
DX80/0x2   ==> DX80/0x4 0x22  "OPC Executing" "Copying"      1048576
```

- When the -progress option is not specified: (Windows version only)

```
C:\>acopc query -g Group01 -progress

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Source    <=> Target    Progress Copied Block Total Block
--------  --- --------  -------- ------------ -----------
DX80/0x1 ==> DX80/0x3      0%            0     1048576
DX80/0x2 ==> DX80/0x4     45%      1048576     2330168
```

- For QuickOPC

  - When the -progress option is not specified:

    ```
    C:\>acopc query -g Group01

    Copy Group Name : Group01
    Copy Group Type : QuickOPC
    Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

    Source     <=> Target     SID  OPC Status      Copy Phase Copied Block
    ---------  --- ---------  ---- --------------- ---------- ------------
    DX80/0x1   ==> DX80/0x3  0x21  "OPC Executing" "Tracking"     1048576
    DX80/0x2   ==> DX80/0x4  0x22  "OPC Executing" "Tracking"     1048576
    ```

  - When the -progress option is not specified:

    ```
    C:\>acopc query -g Group01 -progress

    Copy Group Name : Group01
    Copy Group Type : QuickOPC
    Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

    Source   <=> Target   Progress Copied Block Total Block
    -------- --- -------- -------- ------------ -----------
    DX80/0x1 ==> DX80/0x3     0%            0     1048576
    DX80/0x2 ==> DX80/0x4    45%       471859     1048576
    ```

The following table shows the meanings of the information displayed.

Table C.9 When the -progress option is not specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ・ N/A: No copying is performed. ・ ==>: Copying from the source to the target. ・ <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID	Displays the session ID for the copy source.
OPC Status	Displays the execution status of the OPC. ・ OPC Starting: The OPC is starting up. ・ OPC Executing: The OPC is executing. ・ OPC action not startup: The specified session does not exist. ・ OPC Error Suspend: An error has occurred, preventing the copy process from continuing.
Copy Phase	Displays the current phase. ・ Copying: Copy processing is executing. ・ Tracking: Copy processing has completed, and tracking is in progress. ・ Copying/Tracking: Both copy processing and tracking are in progress.

Title	Explanation
	・ Not set: Copy processing has not been performed.
Copied Block	Displays the number of blocks that have been copied.

Table C.10 When the -progress option is specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ・ N/A: No copying is performed. ・ ==>: Copying from the source to the target ・ <==: Copying from the target to the source
Target	Displays the logical volume for the copy destination.
Progress	Displays the progress of copy processes as a percentage. The "N/A" is displayed when the copy process is not executed.
Copied Block	Displays the number of blocks that have been copied. The "N/A" is displayed when the copy process is not executed.
Total Block	Displays the number of total blocks.

NOTES

- Information such as Copy direction data and SID data may display as "???".

  It is possible that the access path is incorrect. Therefore, check it using the acarray detail (Command for displaying detailed information about ETERNUS Disk storage systems).

  For details on how to correctly set the access path, refer to "6.4.1.2 Access Path Settings".

- If the copy type of a copy group is EC, REC or SnapOPCP, this command ends abnormally.

C.1.20 acopc cancel (Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy stop command)

NAME

acopc cancel - Stops of Clone(OPC) type type Advanced Copy or Clone(QuickOPC) type Advanced Copy.

SYNOPSIS

- [For OPC copy groups]

  ```
  acopc cancel -g COPY-GROUP [-p PAIR] [-r] [-xml]
  ```

- [For QuickOPC copy groups]

  ```
  acopc cancel -g COPY-GROUP [-p PAIR] [-r] [-force] [-xml]
  ```

DESCRIPTION

This command stops the Clone(OPC) Advanced Copy or Clone(QuickOPC) Advanced Copy for the specified copy group or copy pair. Please make sure to specify the "cancel" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-r

This option stops copying in the direction opposite to the specified one.

-force

This option stops physical copying and tracking.

If this option is not specified, only tracking is stopped. The physical copying currently being executed continues.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acopc cancel -g group01
DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

C.1.21   acsnap start (Snapshot type Advanced Copy start command)

NAME

acsnap start - Starts snapshot type Advanced Copy.

SYNOPSIS

```
acsnap start -g COPY-GROUP [-p PAIR | -v VOLUME-NAME] [-r] [-xml]

[When starting the estimation of the amount of snap data volume updates:]
acsnap start -estimate -v VOLUME-NAME [-xml]
```

DESCRIPTION

Snapshot type copy is executed onto a specified copy group or pair.

It is also possible to start to estimate the number of updated blocks generated for the copy source volume.

1. If the -p option is not specified, a copy destination is automatically selected and Snapshot type copy is started.

   If all copy destination volumes are generation-managed, the oldest snap generation is cancelled and selected as a copy destination.

2. If the -p option is specified, Snapshot type copy is started onto a specified copy destination.

   If a past snap generation (excluding the oldest snap generation) is specified as a copy destination, this command ends abnormally.

3. If the -v option is specified, a copy destination for the specified copy source is automatically selected.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.
Only when the copy group type is as follows, a copy group is specifiable.

   - SnapOPCP

-p *PAIR*

This option specifies a copy pair.

-r

This option performs a copy in the reverse direction to the direction that has been specified.

The latest snap generation is selected as a copy source when the copy pair is not specified.

-v *VOLUME-NAME*

Specify a logical volume when selecting a copy destination automatically.

Also when starting to estimate the amount of snap data volume updates, specify a copy-source logical volume.

The following is an example of a format to specify a logical volume.
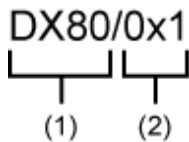
   - (1) ETERNUS name

   - (2) Logical volume number

-estimate

This option starts the estimation of amount of snap data volume updates.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsnap start -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>
```

```
DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

  Succeeded : 3
  Failed    : 0


[When starting to estimate the amount of snap data volume updates:]
C:\>acsnap start -estimate -v DX80/0x1
Successful completion
```

NOTES

・ When the copy type of a copy group is OPC, QuickOPC, EC or REC, this command ends abnormally.

・ This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.22   acsnap query (Status display command for snapshot type Advanced Copy)

NAME

acsnap query - Displays the status of snapshot type Advanced Copy.

SYNOPSIS

```
acsnap query -g COPY-GROUP [-p PAIR] [-r] [-xml]

[When referring the estimation of the amount of snap data volume updates:]
acsnap query -estimate -v VOLUME-NAME [-xml]
```

DESCRIPTION

Snapshot type copy statuses of a specified copy group or pair are displayed.

It is also possible to refer to the estimation of the amount of snap data volume updates for the copy-source volume.

OPTIONS

-g COPY-GROUP

This option specifies the copy group name.
Only when the type of a copy group is as follows, the copy group is specifiable.

   - SnapOPCP

-p PAIR

This option specifies a copy pair.

-r

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-estimate

Estimates the amount of snap data volume updates.

-v VOLUME-NAME

When referring to the estimation of the amount of snap data volume updates, specify a copy-source logical volume.
The following is an example of a format to specify a logical volume.

- (1) ETERNUS name

- (2) Logical volume number

-xml
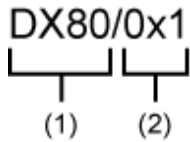
This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsnap query -g Group01


Copy Group Name : Group01
Copy Group Type : SnapOPCP
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)


Source     <=> Target    SID  Snap Status              Gen Date     Copied Block
---------  --- --------- ----  ------------------------ --- -------- ------------
DX80/0x1   ==> DX80/0x5  0x23  "Copy On Write(Active)"   3  10minute     1048576
DX80/0x1   ==> DX80/0x4  0x22  "Copy On Write(Inactive)" 2  3hour        1048576
DX80/0x1   ==> DX80/0x3  0x21  "Copy On Write(Inactive)" 1  1day         1048576
```

The following table shows the meanings of the information displayed.

Title	Explanation
Source	Displays a copy-source logical volume.
<=>	Displays a copy direction. The following information is displayed. ・ N/A: No copy process is executed. ・ ==>: Copy process from source to target. ・ <==: Copy process from target to source.
Target	Displays a copy-destination logical volume.
SID	Displays a copy source session ID.
Snap Status	Displays Snapshot type executed status. Snap execution statuses are as follows. * If the -r option is specified, no information is displayed here. ・ Snap action not startup: No specified session exists. ・ Copy On Write(Active): Snapshot type is in process. (Latest snap generation). ・ Copy On Write(Inactive): Snapshot type is in process. (Past snap generations). ・ Snap Error Suspend: Error that cannot continue copy process occurred.
OPC Status	Displays OPC executed status. OPC execution statuses are as follows. * If the -r option is not specified, no information is displayed here. ・ OPC action not startup: No specified session exists. ・ OPC Starting: OPC is being started. (OPC logical copy is in boot process.)

Title	Explanation
	・ OPC Executing: OPC is in process. (OPC logical copy completed, physical copy being in process.) ・ OPC Error Suspend: Error that cannot continue copy process occurred.
Copy Phase	Displays the current phase. * If the -r option is not specified, no information is displayed here. ・ No set: No copy process is executed. ・ Copying: Copy is in process.
Date	Displays the elapsed time of Snapshot type copy execution. * If the -r option is specified, no information is displayed here. The output format is as follows. ・ N/A: No copy process is executed. ・ Less than 1H: Displayed on a per minute basis. ・ Less than 24H: Displayed on a per hour basis. ・ 24H or more: Displayed on a per day basis. * If below one minute, it is displayed as "0minute".
Gen	Displays snap generation numbers. * If the -r option is specified, no information is displayed here. For snap generation numbers, 1 is the oldest and as the number is larger, it shows more new generations. * If no copy process is executed, it is displayed as "N/A".
Copied Block	Displays the number of copied blocks. * If no copy process is executed, it is displayed as "N/A".

[When referring the amount of snap data volume updates:]

```
C:\>acsnap query -estimate -v DX80/0x1
Update
------
   10M
```

The following table shows the meanings of the information displayed.

Title	Explanation
Update	Displays the amount of snap data volume updates in MB.

NOTES

・ Information such as Copy direction data and SID data may display as "???". It is possible that the copy-source logical volume size and copy-destination logical volume size are different or the access path is incorrect.
Check the size of their logical volumes. If it is different, register the copy pair that the copy-source logical volume size and copy-destination logical volume size are same.
And, check the access path using the acarray detail (Command for displaying detailed information about ETERNUS storage systems) .
For details on how to correctly set the access path, refer to "6.4.1.2 Access Path Settings".

・ If the copy group type is OPC, QuickOPC, EC or REC, this command ends abnormally.

・ This command is not available for ETERNUS Disk storage systems registered as a remote device.

・ Copy-source logical volumes and snap generation numbers are sorted to be displayed. (However, a pair that has no session is displayed at the bottom of the sort column.)

C.1.23   acsnap cancel (Snapshot type Advanced Copy stop command)

NAME

acsnap cancel - Stops snapshot type Advanced Copy.

SYNOPSIS

```
acsnap cancel -g COPY-GROUP [-p PAIR | -v VOLUME-NAME] [-r | -force] [-xml]

[When cancelling the estimation of the amount of snap data volume updates:]
acsnap cancel -estimate -v VOLUME-NAME [-xml]
```

DESCRIPTION

Snapshot type copy for a specified copy group or pair is cancelled.

It is also possible to cancel the estimation of the number of updated blocks generated for the copy-source volume.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.
Only when the type of a copy group is as follows, the copy group is specifiable.

- SnapOPCP

-p *PAIR*

This option specifies a copy pair.

- If neither a pair nor the -force option is specified, the copy process of the oldest snap generation is cancelled.

- If a pair is not specified but the -force option is specified, the copy process of the latest snap generation is cancelled.

When the acsnap start command was executed by specifying both -r option and -p option, it is necessary to specify this option to cancel the SnapOPC+ copy.

-v *VOLUME-NAME*

The copy process of a specified logical volume is cancelled.

- If the -force option is not specified, the copy process of the oldest snap generation is cancelled.

- If the -force option is specified, the copy process of the latest snap generation is cancelled.

- If the -r option is specified, the restore process of the latest snap generation is cancelled.

Also, when cancelling the estimation of the amount of snap data volume updates, specify a copy-source logical volume.

The following is an example of a format to specify a logical volume.

- (1) ETERNUS name

- (2) Logical volume number

-r

This option stops copying in the reverse direction to the direction that has been specified.

-force

>   This option forcibly stops the session.

>   Cancelling Snapshot type process forcibly stops all the snap generations of a pair specified to stop and earlier snap operations.

>   If no pair is specified, Snapshot type process is forcibly cancelled for the latest snap generation, so that all snap generations are stopped.

>   This option is specifiable even if there is only one snap generation.

-estimate

>   Estimates the amount of snap data volume updates.

-xml

>   This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsnap cancel -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

  Succeeded : 3
  Failed    : 0

[When cancelling the estimation of the amount of snap data volume updates:]
C:\>acsnap cancel -v DX80/0x1
Successful completion
```

NOTES

・ If the copy type of a copy group is OPC, QuickOPC, EC or REC, this command ends abnormally.

・ This command is not available for ETERNUS Disk storage systems registered as a remote device.

・ When specifying a pair of the past snap generations (excluding the oldest snap generation) with the -p option, specify the -force option.

・ If the -p option and the -r option are specified for the START Snapshot type COPY command (acsnap start (Snapshot type Advanced Copy start command)), specify only the -p option for this command.

C.1.24   acec start (Clone(EC) type or Remote Advanced Copy start command)

NAME

acec start - Start of Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

・ [When the copy type set in the copy group is EC]

```
acec start -g COPY-GROUP [-p PAIR] [-r] [-xml]
```

・ [When the copy type set in the copy group is REC]

```
acec start -g COPY-GROUP [-p PAIR] [-r] [-transfer {sync[-split {auto|manual}]|through|consist|
stack}] [-recovery {auto|manual}] [-skip] [-xml]
```

DESCRIPTION

This command performs a Clone type Advanced Copy (either a full copy or a differential copy), for the specified copy group or copy pair.
Please make sure to specify the "start" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-r

This option performs a copy in the reverse direction to the direction that has been specified.

-transfer {sync [-split {auto|manual}]|through|consist|stack}

This option specifies the transfer mode. (Only for REC)
The default mode is "stack".

- sync: Synchronous mode

  This option specifies the split mode when sync was specified with the "-transfer" option. (Only for REC)

  -split

  The default mode is "auto".

  - auto: Automatic Split

  - manual: Manual Split

- through: Through mode

- consist: Consistency mode

- stack: Stack mode

-recovery

This option specifies the recovery mode. (Only for REC)
The default mode is "auto".

- auto: Automatic Recovery

- manual: Manual Recovery

 See
・・
Refer to "Recovery mode" for details of each mode.
・・

-skip

This option specifies when the synchronous process is suspended by using the initial copy skip function.
This option can be specified when the synchronous high-speed copy for intra-box is started.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acec start -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To  :BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=6/
Adr_high=0/Adr_low=0

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To  :BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=7/
Adr_high=0/Adr_low=0

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=3/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To  :BoxID=303045343030304d33232323232323453435305332304123232323234b4434303330363339303030342323/Olu=8/
Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

C.1.25   acec query (Status display command for Clone(EC) type or Remote Advanced Copy)

NAME

acec query - Displays the status of Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

```
acec query -g COPY-GROUP [-p PAIR] [-progress] [-r] [-xml]
```

DESCRIPTION

This command displays the status of the Clone(EC) type Advanced Copy or Remote Advanced Copy for the specified copy group or copy pair.
Please make sure to specify the "query" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-progress

Displays the progress of copy processes.

-r

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ For EC

- When the -progress option is not specified:

```
C:\>acec query -g ECGroup

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Source   <=> Target   SID  EC Status               Copy Phase Copied Block
-------- --- -------- ---- ----------------------- ---------- ------------
DX80/0x1 N/A DX80/0x3 N/A  "EC action not startup" "Not set"             0
DX80/0x2 ==> DX80/0x4 0x41 "EC Executing"          "Copying"       1048576
```

The following table shows the meanings of the information displayed.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified the "-a" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ・ N/A: No copying is performed. ・ ==>: Copying from the source to the target. ・ <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID	Displays the session ID.
EC Status	Displays the execution status of the EC. ・ EC Starting: The EC is starting up.

Title	Explanation
	・ EC Executing: The EC is executing.
	・ EC Suspend: The EC is suspended.
	・ EC action not startup: The specified session does not exist.
	・ EC Error Suspend: An error has occurred, preventing the copy process from continuing.
Copy Phase	Displays the current phase.
	・ Copying: Copy processing is executing.
	・ Paired: The copy is in an equivalency maintenance state.
	・ Not set: Either the specified session does not exist, or the copy process is not running.
Copied Block	Displays the number of blocks that have been copied.

- When the -progress option is specified:

```
C:\>acec query -g ECGroup -progress

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Source   <=> Target    Progress Copied Block Total Block
-------- --- --------  -------- ------------ -----------
DX80/0x1 N/A DX80/0x3    N/A           N/A          N/A
DX80/0x2 ==> DX80/0x4    45%        471859      1048576
```

The following table shows the meanings of the information displayed.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified the "-a" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction.
	・ N/A: No copying is performed.
	・ ==>: Copying from the source to the target.
	・ <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
Progress	Displays the progress of copy processes as a percentage. The "N/A" is displayed when the copy process is not executed.
Copied Block	Displays the number of blocks that have been copied. The "N/A" is displayed when the copy process is not executed.
Total Block	Displays the number of total blocks.

・ For REC

- When the -progress option is not specified:

```
C:\>acec query -g RECGroup
```

```
Copy Group Name        : RECGroup
Copy Group Type        : REC
Disk Array Name        : DX90P (00ETERNUSDXL##ET09E24AG###NP4310901018##)
Remote Disk Array Name : DX90S (00ETERNUSDXL##ET09E24AG###NP4310901019##)


Source    <=> Target   SID(RSID)  EC Status               Copy Phase Copied Block Rcv  Split
Xfer
--------- --- --------- ---------- ---------------------- ---------- ------------ ---- -----
-------
DX90P/0x1 N/A DX90S/0x6 N/A        "EC action not startup" "Not set"            0 ---- ----
----
DX90P/0x2 ==> DX90S/0x7 0x4A(0x11) "EC Executing"          "Copying"            0 auto ----
through
DX90P/0x3 ==> DX90S/0x8 0x4C(0x13) "EC Suspend"            "Paired"       1048576 auto ----
through
```

The following table shows the meanings of the information displayed.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-remote" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ・ N/A: No copying is performed. ・ ==>: Copying from the source to the target. ・ <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID(RSID)	Displays the Session ID of the ETERNUS Disk storage system (i.e. the Disk Array Name) and the Session ID of the Remote ETERNUS Disk storage system (i.e. the Remote Disk Array Name).
EC Status	Displays the execution status of the EC. ・ EC Starting: The EC is starting up. ・ EC Executing: The EC is executing. ・ EC Suspend: The EC is suspended ・ EC action not startup: The specified session does not exist. ・ EC Error Suspend: An error has occurred, preventing the copy process from continuing. ・ EC Hardware Suspend: The EC has paused because of a hardware error, such as a problem with the path between hardware devices.
Copy Phase	Displays the current phase. ・ Copying: Copy processing is executing. ・ Paired: The copy is in an equivalency maintenance state. ・ Not set: Either the specified session does not exist, or the copy process is not running.

Title	Explanation
Copied Block	Displays the number of blocks that have been copied.
Rcv	Displays the recovery mode for REC copies. ・ auto: Indicates that the recovery mode is "Automatic". ・ manual: Indicates that the recovery mode is "Manual". ・ ----: Indicates that a REC copy is not being performed.
Split	Displays the split mode for REC copies. ・ auto: Indicates that the split mode is "Automatic". ・ manual: Indicates that the split mode is "Manual". ・ ----: Indicates that either a REC copy is not being performed or that the mode is not synchronous mode.
Xfer	Displays the transfer mode for REC copies. ・ sync: Indicates that the transfer mode is "synchronous". ・ through: Indicates that the transfer mode is "through". ・ consist: Indicates that the transfer mode is "consistency". ・ stack: Indicates that the transfer mode is "stack". ・ ----: a REC copy is not being performed.

- When the -progress option is specified:

```
C:\>acec query -g RECGroup -progress

Copy Group Name        : RECGroup
Copy Group Type        : REC
Disk Array Name        : DX90P (00ETERNUSDXL##ET09E24AG###NP4310901018##)
Remote Disk Array Name : DX90S (00ETERNUSDXL##ET09E24AG###NP4310901019##)

Source     <=> Target    Progress Copied Block Total Block
---------- --- --------- -------- ------------ -----------
DX90P/0x1 N/A DX90S/0x6     N/A          N/A          N/A
DX90P/0x2 ==> DX90S/0x7     45%       471859      1048576
DX90P/0x3 ==> DX90S/0x8    100%      1048576      1048576
```

The following table shows the meanings of the information displayed.

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-a" option of the acgroup create (Copy group creation command).
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-remote" option of the acgroup create (Copy group creation command).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ・ N/A: No copying is performed ・ ==>: Copying from the source to the target ・ <==: Copying from the target to the source

Title	Explanation
Target	Displays the logical volume for the copy destination.
Progress	Displays the progress of copy processes as a percentage. The "N/A" is displayed when the copy process is not executed.
Copied Block	Displays the number of blocks that have been copied. The "N/A" is displayed when the copy process is not executed.
Total Block	Displays the number of total blocks.

NOTES

- Information such as Copy direction data and SID data may display as "???".

  It is possible that the access path is incorrect. Therefore, check it using the acarray detail (Command for displaying detailed information about ETERNUS Disk storage systems).

  For details on how to correctly set the access path, refer to "6.4.1.2 Access Path Settings".

- If the copy type of a copy group is OPC, QuickOPC or SnapOPCP, the command ends abnormally.

C.1.26   acec suspend (Clone(EC) type or Remote Advanced Copy temporary suspension command)

NAME

acec suspend - Temporarily suspends Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

- [For EC copy groups]

  ```
  acec suspend -g COPY-GROUP [-p PAIR | -concur] [-r] [-xml]
  ```

- [For REC copy groups]

  ```
  acec suspend -g COPY-GROUP [-p PAIR] [-r] [-force] [-xml]
  ```

  ```
  acec suspend -g COPY-GROUP -concur [-r] [-xml]
  ```

DESCRIPTION

This command temporarily suspends the Clone(EC) type Advanced Copy or Remote Advanced Copy for the specified copy group or copy pair.

Please make sure to specify the "suspend" subcommand.

OPTIONS

-g *COPY-GROUP*

  This option specifies the copy group.

-p *PAIR*

  This option specifies a copy pair.

-r

  This option temporarily suspends copying in the direction opposite to the specified one.

-force

  This option forcibly and temporarily suspends the REC session.

-concur

This option suspends synchronous high-speed copy using the Concurrent suspension function.
When the copy type of the copy group is REC, this option can be specified only if the transfer mode is not Stack mode and an ETERNUS Disk storage system that set the access path is copy-source box.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ Suspending synchronous high-speed copy (no using the Concurrent suspension function)

```
C:\>acec suspend -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

  Succeeded : 3
  Failed    : 0
```

・ Suspending synchronous high-speed copy using the Concurrent suspension function

```
C:\>acec suspend -g group01 -concur
Successful completion.
```

NOTES

・ The following message may be displayed when this command is executed by specifying -concur option for the REC copy group.

```
ccm5004 Operation failed. function=stxcec.SUSPEND.concur, message=STXC1002 ERROR Invalid
logical volume name. Volume name=(0xa@00ETERNUSDXL##ET09E24AG###NP4310901018##).
```

Check that an ETERNUS Disk storage system of the copy source is not registered as a remote device, if the above message is displayed. When an ETERNUS Disk storage system of the copy source is not registered as a remote device, execute the command again after the re-registration the ETERNUS Disk storage system of the copy source.

・ If the copy type of a copy group is OPC, QuickOPC or SnapOPCP, this command ends abnormally.

C.1.27　acec resume (Clone(EC) type or Remote Advanced Copy restart command)

NAME

acec resume - Restarts temporarily interrupted Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

・ [For EC copy groups]

```
acec resume -g COPY-GROUP [-p PAIR] [-r] [-xml]
```

・ [For REC copy groups]

```
acec resume -g COPY-GROUP [-p PAIR] [-r] [-remain] [-xml]
```

DESCRIPTION

This command restarts the Clone(EC) Advanced Copy or Remote Advanced Copy for the specified copy group or copy pair.
Please make sure to specify the "resume" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

-p *PAIR*

This option specifies a copy pair.

-r

This option restarts copying in the reverse direction to the direction that has been specified.

-remain

This option restarts the synchronous high-speed copy for the copy group or copy pair that suspended by using the initial copy skip function.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acec resume -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

  Succeeded : 3
  Failed    : 0
```

C.1.28   acec reverse (Clone(EC) type or Remote Advanced Copy reverse command)

NAME

acec reverse - Reverses the direction of Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

```
acec reverse -g COPY-GROUP [-p PAIR] [-r] [-xml]
```

DESCRIPTION

This command reverses the direction of the Clone(EC) Advanced Copy or Remote Advanced Copy for the specified copy group or copy pair.
Please make sure to specify the "reverse" subcommand.

OPTIONS

-g *COPY-GROUP*

This option specifies the copy group name.

Only the following types of copy set in the copy group can be specified:

- EC

- REC

-p *PAIR*

This option specifies a copy pair.

-r

This option reverses the copying in the reverse direction to the direction that has been specified, so that the copy direction becomes the direction that has been specified.

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acec reverse -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

C.1.29   acec change (Remote Advanced Copy mode change command)

NAME

acec change - Changes the mode of Remote Advanced Copy.

SYNOPSIS

```
acec change -g COPY-GROUP [-p PAIR] [-r] [-transfer {sync[-split {auto|manual}]|through|consist|
stack}] [-recovery {auto|manual}] [-xml]
```

DESCRIPTION

This command changes the mode of the Remote Advanced Copy for the specified copy group or copy pair.

This command is only enabled when the copy type that was set in the copy group is REC.

Please make sure to specify the "change" subcommand.

OPTIONS

-g *COPY-GROUP*

 This option specifies the copy group.

-p *PAIR*

 This option specifies a copy pair.

-r

 Changes the mode for copying in the reverse direction.

-transfer {sync [-split {auto|manual}]|through|consist|stack}

 This option specifies the transfer mode.

   - sync: Synchronous mode

     This option specifies the split mode when sync was specified with the "-transfer" option.

     -split

       - auto: Automatic Split

       - manual: Manual Split

   - through: Through mode

   - consist: Consistency mode

   - stack: Stack mode

-recovery

 This option specifies the recovery mode.

   - auto: Automatic Recovery

   - manual: Manual Recovery

See

Refer to "Recovery mode" for details of each mode.

-xml

 This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acec change -g group01 -transfer sync

DX90P/0x1:DX90S/0x1
# DATE : 2008/06/24 16:28:00 - << EC Change >>

DX90P/0x2:DX90S/0x2
# DATE : 2008/06/24 16:28:00 - << EC Change >>

DX90P/0x3:DX90S/0x3
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

C.1.30 acec cancel (Clone(EC) type or Remote Advanced Copy stop command)

NAME

acec cancel - Stops Clone(EC) type Advanced Copy or Remote Advanced Copy.

SYNOPSIS

```
acec cancel -g COPY-GROUP [-p PAIR] [-r] [-force] [-xml]
```

DESCRIPTION

This command stops the Clone(EC) Advanced Copy or Remote Advanced Copy for the specified copy group or copy pair.
Please make sure to specify the "cancel" subcommand.

OPTIONS

-g *COPY-GROUP*

   This option specifies the copy group name.

-p *PAIR*

   This option specifies a copy pair.

-r

   This option stops copying in the reverse direction to the direction that has been specified.

-force

   This option forcibly stops the session.

-xml

   This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acec cancel -g group01

DX80/0x1:DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

DX80/0x2:DX80/0x7
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

DX80/0x3:DX80/0x8
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

C.1.31   acsdv init (Initialize snap data volume command)

NAME

acsdv init - Initializes snap data volumes.

SYNOPSIS

```
acsdv init -v VOLUME-NAME [-xml]
```

DESCRIPTION

A snap data volume is initialized.

Initialize snap data volumes when Snapshot type processes are suspended.

OPTIONS

-v *VOLUME-NAME*

Specify a logical volume.

The following is an example of a format to specify a logical volume.

- (1) ETERNUS name

- (2) Logical volume number

-xml

This option specifies when displaying the result of the command execution by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsdv init -v DX80/0x1
Successful completion
```

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.32   acsdv stat (Display snap data volume status command)

NAME

acsdv stat - Displays the status of a snap data volume.

SYNOPSIS

```
acsdv stat -v VOLUME-NAME [-xml]
```

DESCRIPTION

The status of a snap data volume is displayed.

OPTIONS

-v *VOLUME-NAME*

Specify a logical volume.

The following is an example of a format to specify a logical volume.

   - (1) ETERNUS name

   - (2) Logical volume number

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsdv stat -v DX80/0x1

Rate Logical Physical Used Copy Host Pool
---- ------- -------- ---- ---- ---- ----
  0% 8388608 1048576    0    0    0    0
```

The following table shows the meanings of the information displayed.

Title	Explanation
Rate	Displays the usage of a snap data volume as a percentage.
Logical	Displays the logical capacity of a snap data volume in blocks.
Physical	Displays the physical capacity of a snap data volume in blocks.

Title	Explanation
Used	Displays the capacity of a snap data volume used area in blocks. Displays the sum capacity of copy usage and host usage.
Copy	Displays the copy usage out of snap data volume used capacity in blocks.
Host	Displays the host usage out of snap data volume used capacity in blocks.
Pool	Displays the usage of a snap data pool allocated to a snap data volume in blocks.

・ Copy usage: Usage of updates performed during Snapshot type execution.

・ Host usage: Usage of snap data volume updates performed when Snapshot type is not executed.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.33　acsdv poolstat (Display snap data pool status command)

NAME

acsdv poolstat - Displays the status of a snap data pool.

SYNOPSIS

acsdv poolstat -a *DISKARRAY-NAME* [-xml]

DESCRIPTION

The status of a snap data pool is displayed.

OPTIONS

-a *DISKARRAY-NAME*

This option specifies the ETERNUS names that are used by Express.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acsdv poolstat -a DX80
Pool-Type Rate Total     Used      Copy  Host     Free
--------- ---- -------- -------- ----- ------- --------
Normal     10% 20971520  2097152     0 2097152 18874368
Encrypted   0% 20971520        0     0       0 20971520
```

The following table shows the meanings of the information displayed.

Title	Explanation
Pool-Type	Displays the type of a snap data pool. ・ Normal: Normal (unencrypted) ・ Encrypted: Encrypted

Title	Explanation
Rate	Displays the usage of a snap data pool as a percentage.
Total	Displays the total capacity of a snap data pool in blocks.
Used	Displays the capacity of a snap data pool used area in blocks. Displays the sum capacity of copy usage and host usage.
Copy	Displays the copy usage out of snap data pool used capacity in blocks.
Host	Displays the host usage out of snap data pool used capacity in blocks.
Free	Displays the capacity of snap data pool unused area in blocks.

- Copy usage: Usage of updates performed during Snapshot type execution.

- Host usage: Usage of snap data volume updates performed when Snapshot type is not executed.

NOTES

This command is not available for ETERNUS Disk storage systems registered as a remote device.

C.1.34   acutil devs (Logical volume information display command)

NAME

acutil devs - Display of Windows information on logical volume.

SYNOPSIS

```
acutil devs
```

DESCRIPTION

This command displays information about the logical volumes on ETERNUS Disk storage systems for Windows servers.
Please make sure to specify the "devs" subcommand.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acutil devs

Device          BOX-ID                                   LV No Size
-------------- --------------------------------------- ----- -------
PhysicalDrive4 00ETERNUSDXL##ET08E21A####LN4310901078##  0x61  1048576
PhysicalDrive5 00ETERNUSDXL##ET08E21A####LN4310901078##  0x62  1048576
PhysicalDrive6 00ETERNUSDXL##ET08E21A####LN4310901078##  0x63  1048576
```

The following table shows the meanings of the information displayed.

Title	Explanation
Device	Displays the name of the physical device using the following format: "PhysicalDrive [disk number]". This is the same value as the "Disk #" displayed in the [Disk Management] window displayed by selecting [Administrative Tools], [Computer Management] and then [Disk Management] from the [Start] menu.
BOX-ID	Displays the BOX ID for the ETERNUS Disk storage system.
LV No	Displays the logical volume number in hexadecimal.

Title	Explanation
Size	Displays the size (in blocks) of the logical volume in decimal.

C.1.35   acgetvolinfo (Displaying logical volume information)

NAME

acgetvolinfo - Displays logical volume information.

SYNOPSIS

```
acgetvolinfo DEVICE-NAME
```

DESCRIPTION

Check the logical volume information for ETERNUS Disk storage system.

OPERANDS

DEVICE-NAME

Specify the drive letter.

Example: X:

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acgetvolinfo.bat X:
BOX-ID,LV No,Address,Size
00ETERNUSDXL##ET08E21A####LN4310901078##,0x040,0x0,0x800000
```

The following table shows the meanings of the information displayed.

Title	Explanation
BOX-ID	Displays the BOX ID for the ETERNUS Disk storage system.
LV No	Displays the logical volume number in hexadecimal.
Address	Extent start position (per block) is displayed in hexadecimal.
Size	Extent size (number of blocks) is output in hexadecimal.

C.1.36   acutil refresh (Partition table refresh command)

NAME

acutil refresh - Refreshing of partition tables.

SYNOPSIS

```
acutil refresh -d DEVICE-NAME
```

DESCRIPTION

This command refreshes the partition table to update partition information for the specified disk. Please make sure to specify the "refresh" subcommand.

OPTIONS

-d *DEVICE-NAME*

Displays the name of the physical device using the following format: "PhysicalDrive [disk number]".
This is the same value as the "Disk #" displayed in the [Disk Management] window displayed by selecting [Administrative Tools], [Computer Management] and then [Disk Management]from the [Start] menu.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>acutil refresh -d PhysicalDrive2
Successful completion.
```

C.1.37   acmcapture (troubleshooting data collection command)

NAME

acmcapture - Collection of Express troubleshooting data.

SYNOPSIS

```
<Express program directory>\AdvancedCopy Manager Copy Control Module\bin\acmcapture.bat dirname
```

DESCRIPTION

This command collects Express troubleshooting data. Data is collected for all Express components installed on the server where this command is executed.

[Format of the filename or directory name for the troubleshooting data]

The collected data is stored in a directory with the "acmcapture_HOSTNAME_YYYYMMDD_ttmmss" format under the directory specified for "dirname".

The name of the host where the command is executed is used for HOSTNAME. If characters other than alphanumerics and hyphens are used in the host name, then "NOHOSTNAME" is used as the host name. Values are truncated to 15 characters.

・ For YYYYMMDD, YYYY is the year, MM is the month, and DD is the day.

・ For ttmmss, tt is the hour, mm is minutes, and ss is seconds.

OPERANDS

dirname

Directory where the troubleshooting data is stored.

Specify a directory with plenty free space - 500MB or more is recommended. Regard 500MB as a rough guide, since the size of the troubleshooting data will vary depending on the system environment and conditions. If there is not enough free space, then this command will terminate abnormally without collecting troubleshooting data.

Specify an existing directory, otherwise this command will terminate abnormally without collecting troubleshooting data.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

Collect data to the C:\temp directory.

```
C:\>acmcapture.bat C:\temp
Executing........................................
Completed.
OUTPUT=C:\temp\acmcapture_srv01_20090323_094614
```

NOTES

Execute this command when other Express commands are in the stopped state. Data collection may not be performed correctly if other Express commands are running.

C.2   XML format output for Advanced Copy function

This section explains the XML format output for Advanced Copy function.

C.2.1   List of commands support the XML format output function

The following commands support the XML format output function.

Table C.11 Command that support the XML format output function

Command name	Command type	
	Display type	Execution type
acarray add	-	YES
acarray change	-	YES
acarray list	YES	-
acarray detail	YES	-
acarray remove	-	YES
acinq lv	YES	-
acinq lunmap	YES	-
acinq ag	YES	-
acinq hag	YES	-
acgroup create	-	YES
acgroup list	YES	-
acgroup detail	YES	-
acgroup remove	-	YES
acpair add	-	YES
acpair remove	-	YES
acopc start	-	YES
acopc query	YES	-

Command name	Command type	
	Display type	Execution type
acopc cancel	-	YES
acsnap start	-	YES
acsnap query	YES	-
acsnap cancel	-	YES
acsdv init	-	YES
acsdv stat	YES	-
acsdv poolstat	YES	-
acec start	-	YES
acec query	YES	-
acec suspend	-	YES
acec resume	-	YES
acec reverse	-	YES
acec change	-	YES
acec cancel	-	YES
acrecbuff set	-	YES
acrecbuff stat	YES	-
acutil devs	YES	-
acutil refresh	-	YES

 See

....

The XML format between display type command and execution type command is different. Refer to "XML format of display type command" or "XML format of execution type command" for the each XML format.

....

C.2.2   XML format

XML format of display type command

The XML format of display type command is follows:

- ・ List part only

- ・ Table part only

- ・ List part and table part

The display example for each XML format shows the followings.

Display example of list part only

- Without -xml option

```
C:\>acarray detail -a DX80

Disk Array Name : DX80
BOX-ID          : 00ETERNUSDXL##ET08E21A####LN4310901078##
IP Address      : 10.12.13.14
```

```
    Admin User     : root
    Access Path    : X:
```

・ With -xml option

```
C:\>acarray detail -a DX80 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <List>
    <Data id="Disk Array Name">DX80</Data>
    <Data id="BOX-ID">00ETERNUSDXL##ET08E21A####LN4310901078##</Data>
    <Data id="IP Address">10.12.13.14</Data>
    <Data id="Admin User">root</Data>
    <Data id="Access Path">X:</Data>
  </List>
</Response>
```

Display example of table part only

- Without -xml option

```
C:\>acarray list


Name  BOX-ID                                   IP Address
----- ---------------------------------------- -----------
DX80  00ETERNUSDXL##ET08E21A####LN4310901078## 10.12.13.14
DX80B 00ETERNUSDXL##ET08F22A####JP0000000001## 10.12.13.15
```

- With -xml option

```
C:\>acarray list -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <Table>
    <Row>
      <Data id="Name">DX80</Data>
      <Data id="BOX-ID">00ETERNUSDXL##ET08E21A####LN4310901078##</Data>
      <Data id="IP Address">10.12.13.14</Data>
    </Row>
    <Row>
      <Data id="Name">DX80B</Data>
      <Data id="BOX-ID">00ETERNUSDXL##ET08F22A####JP0000000001##</Data>
      <Data id="IP Address">10.12.13.15</Data>
    </Row>
  </Table>
</Response>
```

Display example of list part and table part

- Without -xml option

```
C:\>acec query -g ECGroup

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)

Source   <=> Target   SID  EC Status               Copy Phase Copied Block
-------- --- -------- ---- ----------------------- ---------- ------------
DX80/0x1 N/A DX80/0x3 N/A  "EC action not startup" "Not set"           N/A
DX80/0x2 ==> DX80/0x4 0x41 "EC Executing"          "Copying"       1048576
```

- With -xml option

```
C:\>acec query -g ECGroup -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <List>
    <Data id="Copy Group Name">ECGroup</Data>
    <Data id="Copy Group Type">EC</Data>
    <Data id="Disk Array Name">DX80 (00ETERNUSDXL##ET08E21A####LN4310901078##)</Data>
  </List>
  <Table>
    <Row>
      <Data id="Source">DX80/0x1</Data>
      <Data id="&lt;=&gt;">N/A</Data>
      <Data id="Target">DX80/0x3</Data>
      <Data id="SID">N/A</Data>
      <Data id="EC Status">"EC action not startup"</Data>
      <Data id="Copy Phase">"Not set"</Data>
      <Data id="Copied Block">N/A</Data>
    </Row>
    <Row>
      <Data id="Source">DX80/0x2</Data>
      <Data id="&lt;=&gt;">==&gt;</Data>
      <Data id="Target">DX80/0x4</Data>
      <Data id="SID">0x41</Data>
      <Data id="EC Status">"EC Executing"</Data>
      <Data id="Copy Phase">"Copying"</Data>
      <Data id="Copied Block">1048576</Data>
    </Row>
  </Table>
</Response>
```

Information

. . . .

If the error occurs when the command is executed (e.g. parameter error), the command outputs the error information like as follows.

Without -xml option

```
C:\>acarray detail -a DX80
ccm8003 Could not open the file. file=C:\Program Files\AdvancedCopy Manager Copy Control Module\etc
\db\eternus.xml.lck
```

With -xml option

```
C:\>acarray detail -a DX80 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>8</ReturnCode>
  <Message>ccm8003 Could not open the file. file=C:\Program Files\AdvancedCopy Manager Copy Control
Module\etc\db\eternus.xml.lck</Message>
</Response>
```

. . . .

XML format of execution type command

The XML format of execution type command is follows:

・ Execution result message only

・ Execution result including the detail information

The display example for each XML format shows the followings.

Display example of execution result message only

- Without -xml option

```
C:\>acgroup create -g group01 -type OPC -a DX80
Successful completion.
```

- With -xml option

```
C:\>acgroup create -g group01 -type OPC -a DX80 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>0</ReturnCode>
  <Message>Successful completion.</Message>
</Response>
```

Display example of execution result including the detail information

- Without -xml option

```
C:\>acec start -g ECGroup

DX80/0x1: DX80/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3332323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To  :BoxID=303045343030304d3332323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0

DX80/0x2:DX80/0x7
ccm5004 Operation failed. function=STXCopyEC.START, message=invalid BoxID.

  Succeeded : 1
  Failed    : 1
```

- With -xml option

```
C:\>acec start -g ECGroup -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>6</ReturnCode>
  <Message></Message>
  <ResultList>
    <Result>
      <Object>DX80/0x1:DX80/0x6</Object>
      <Status>Succeeded</Status>
      <Message></Message>
      <Detail>DATE : 2008/06/24 16:28:00 - &lt;&lt; EC Started &gt;&gt; &#13;
From:BoxID=303045343030304d3332323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0&#13;
To  :BoxID=303045343030304d3332323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0</Detail>
    </Result>
    <Result>
      <Object>DX80/0x2:DX80/0x7</Object>
      <Status>Failed</Status>
      <Message>ccm5004 Operation failed. function=STXCopyEC.START, message=invalid BoxID.</
Message>
      <Detail></Detail>
    </Result>
  </ResultList>
</Response>
```

📖Information

....

If the error occurs when the command is executed (e.g. parameter error), the command outputs the error information like as follows.

Without -xml option

```
C:\>acec start -g
ccm1001 Input parameter is illegal.

Usage:
        acec start -g COPY-GROUP(EC) [-p PAIR] [-r] [-xml]
        acec start -g COPY-GROUP(REC) [-p PAIR] [-r]
                [-transfer {sync [-split {auto|manual}]|through|consist|stack}]
                [-recovery {auto|manual}]
                [-skip]
                [-xml]
```

With -xml option

```
C:\>acec start -g -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response>
  <ReturnCode>1</ReturnCode>
  <Message>ccm1001 Input parameter is illegal.</Message>
</Response>
```

....

C.3 storageadm perfdata (Performance information operation command)

This section explains the command for managing the operating environment.

NAME

storageadm perfdata - operates the performance information.

SYNOPSIS

$INS_DIR\Express\Manager\bin\storageadm perfdata export *outdirname* -ipaddr *ipaddr*

($INS_DIR means "Program Directory" specified at the Express Manager installation.)

DESCRIPTION

This command outputs the performance information of the storage devices up to 1 hour before command input. Only user of OS administrative group can execute this command.

By specifying the IP address of the device that outputs the performance information and the date in the command operand, the storage device performance information is output in CSV format.

The target storage device must be devices managed by this software when performance monitoring is either still running or already completed.

The details of CSV files are as follows.

Table C.12 The CM performance information of storage device

Items	Explanation
File name	CM.csv
Header line	Date, CM0xXX:CPUX - CPU Use Rate, CM0xXX:CPUX - Copy Remain, ...

Items	Explanation
Data line	*date*,*CM00u*,*CM00r*, ... ,*CMNNu*,*CMNNr* The following information is output for each field. (After *date*, the information is repeated for the actual number of CMs.) *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *CM00u* : CM0x00:CPU0 (*1) CPU Load at *date* (Decimal notation. The unit is %.) *CM00r* : CM0x00:CPU0 (*1) CM Copy remaining amount at *date*. (Decimal notation. The unit is GB.) *CMNNu* : CM0xNN:CPUN (*1) CPU Load at *date*. (Decimal notation. The unit is %.) *CMNNr* : CM0xNN:CPUN (*1) CM Copy remaining amount at *date*. (Decimal notation. The unit is GB.)

Table C.13 The LogicalVolume performance information of storage device

Items	Explanation
File name	LogicalVolume/*nnnn*.csv (*nnnn* indicates the LogicalVolume number by hexadecimal notation.)
Header line	Date, LogicalVolume0xXXXX - Read IOPS, LogicalVolume0xXXXX - Write IOPS, LogicalVolume0xXXXX - Read Throughput, LogicalVolume0xXXXX - Write Throughput, LogicalVolume0xXXXX - Read Response Time, LogicalVolume0xXXXX - Write Response Time, LogicalVolume0xXXXX - Read Cache Hit Rate, LogicalVolume0xXXXX - Write Cache Hit Rate, LogicalVolume0xXXXX - Prefetch Cache Hit Rate.
Data line	*date*,*read*,*write*,*through-r*,*through-w*,*resp-r*,*resp-w*,*hit-r*,*hit-w*,*fetch* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date*. (Decimal notation. The unit is IOPS.) *write* : Write Count at *date*. (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date*. (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date*. (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date*. (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date*. (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date*. (Decimal notation. The unit is %.) *hit-w* : Write Cache Hit Rate at *date*. (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date*. (Decimal notation. The unit is %.)

Table C.14 The RAID Group performance information of storage device

Items	Explanation
File name	RAID Group/*nnnn*.csv (*nnnn* indicates the RAID Group number by hexadecimal notation.)
Header line	Date, RAID Group0x0XXXX - Read IOPS, RAID Group0x0XXXX - Write IOPS, RAID Group0x0XXXX - Read Throughput, RAID Group0x0XXXX- Write Throughput, RAID Group0x0XXXX - Read Response Time, RAID Group0x0XXXX - Write Response Time, RAID Group0x0XXXX - Read Cache Hit Rate, RAID Group0x0XXXX - Write Cache Hit Rate, RAID Group0x0XXXX - Prefetch Cache Hit Rate.
Data line	*date*,*read*,*write*,*through-r*,*through-w*,*resp-r*,*resp-w*,*hit-r*,*hit-w*,*fetch* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date*. (Decimal notation. The unit is IOPS.) *write* : Write Count at *date*. (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date*. (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date*. (Decimal notation. The unit is MB/S.) *resp-r* : Read Response Time at *date*. (Decimal notation. The unit is msec.) *resp-w* : Write Response Time at *date*. (Decimal notation. The unit is msec.) *hit-r* : Read Cache Hit Rate at *date*. (Decimal notation. The unit is %.)

Items	Explanation
	hit-w : Write Cache Hit Rate at *date*. (Decimal notation. The unit is %.) *fetch* : Read Pre-fetch Cache Hit Rate at *date*. (Decimal notation. The unit is %.)

Table C.15 The Disk performance information of storage device

Items	Explanation
File name	Disk/*nnnn*.csv (*nnnn* indicates the DE number by hexadecimal notation.)
Header line	Date, DE0xXX:SlotX - busy time, ...
Data line	*date*,*Disk0*, ... ,*DiskN* The following information is output for each field. (After *date*, the information is repeated for the actual number of Disks.) *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *Disk0* : Disk0 Disk busy rate at *date*. (Decimal notation. The unit is %.) *DiskN* : DiskN Disk busy rate at *date*. (Decimal notation. The unit is %.)

Table C.16 The CA/CM Port performance information of storage device

Items	Explanation
File name	Port/*nnnn*.csv (*nnnn* indicates the CA/CM Port number by hexadecimal notation. CA/CM port numbers are assigned in ascending order, starting with 0000 for the lowest CA/CM port number in the device. CM0x0 CA0x0 Port0 is 0000, CM0x0 CA0x0 Port1 is 0001, : CM0x7 CA0x3 Port2 is 007E, CM0x7 CA0x3 Port3 is 007F.)

Header line	・ Case of CA Port
	
	  Date, CM0xX:CA0xX:PortX - Read IOPS, CM0xX:CA0xX:PortX - Write IOPS, CM0xX:CA0xX:PortX - Read Throughput, CM0xX:CA0xX:PortX - Write Throughput
	
	・ Case of CM Port
	
	  Date, CM0xX:PortX - Read IOPS, CM0xX:PortX - Write IOPS, CM0xX:PortX - Read Throughput, CM0xX:PortX - Write Throughput

Data line	*date*,*read*,*write*,*through-r*,*through-w* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *read* : Read Count at *date*. (Decimal notation. The unit is IOPS.) *write* : Write Count at *date*. (Decimal notation. The unit is IOPS.) *through-r* : Read data transfer rate at *date*. (Decimal notation. The unit is MB/S.) *through-w* : Write data transfer rate at *date*. (Decimal notation. The unit is MB/S.)

Table C.17 The number of active disks performance information of storage device

Items	Explanation
File name	ACTIVE_DISK.csv
Header line	Date, Total Disks, Active Disks
Data line	*date*,*total*,*active* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *total* : Overall number of loaded disk devices at *date*. (Decimal notation. The unit is Disk.) *active* : Overall number of active disk devices at *date*. (Decimal notation. The unit is Disk.)

Table C.18 Power consumption performance information of storage device

Items	Explanation
File name	SYSTEM_POWER_CONSUMPTION.csv
Header line	Date, System Power Consumption
Data line	*date*, *power* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *power:* Power used by the device as a whole at *date*. (Decimal notation. The unit is W.)

Table C.19 Temperature performance information of storage device

Items	Explanation
File name	SYSTEM_TEMPERATURE.csv
Header line	Date, System Temperature
Data line	*date*, *temperature* The following information is output for each field. *date* : Performance Information Acquisition Time. (YYYY/MM/DD hh:mm:ss format) *temperature:* Air intake temperature at device at *date*. (Decimal notation. The unit is degrees Centigrade.)

OPERANDS

export

Outputs performance information for the specified date in CSV format.

outdirname

Specify the directory that outputs performance information.
Performance information is output to the *outdirname* directory based on the following configuration.
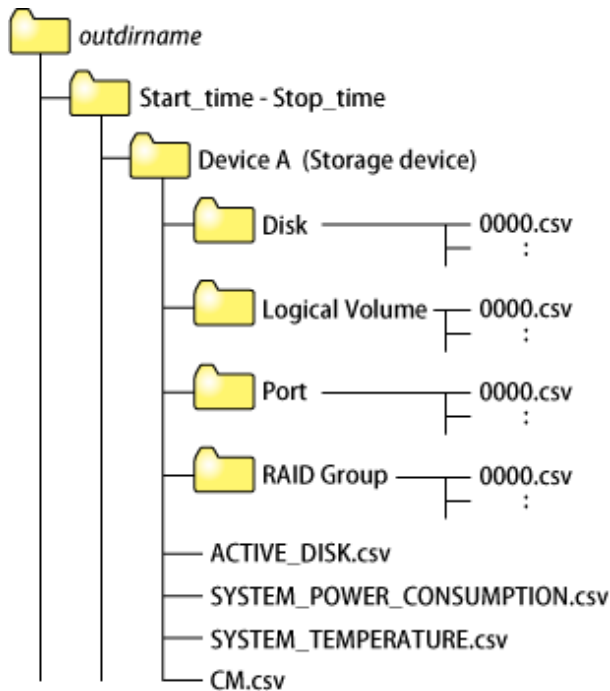
OPTIONS

-ipaddr *ipaddr*

> Specify the IP address of the device that outputs performance information.
>
> The output target device must satisfy the following conditions:
>
> > - Storage devices output performance information must be registered in this software.
>
> For the settings of performance monitoring, refer to "Instruction for performance management".

EXAMPLES

Output of performance information for a device with IP address 10.12.13.14 to the c:\work directory:

```
"C:\Program Files (x86)\ETERNUS SF\Express\Manager\bin\storageadm" perfdata export "C:\work" -ipaddr
10.12.13.14
```

NOTES

The full path of an existing directory must be specified in *outdirname*.

C.4   express_managersnap (Troubleshooting information collection of Manager)

This section explains the commands for collecting troubleshooting information of the Manager.

NAME

express_managersnap - Collects the troubleshooting information of Manager.

SYNOPSIS

```
$INS_DIR\Express\Manager\bin\express_managersnap -dir dirname [-all]
```

($INS_DIR means "Program Directory" specified at the Express Manager installation.)

DESCRIPTION

Collect information of the Manager on the management server. Only user of OS administrative group can execute this command.

The express_managersnap is the command used to collect information on management server when a problem occurs.

Submit the information to Fujitsu technical staff.

OPTIONS

-dir *dirname*

> Corrects the troubleshooting information on *dirname* directory. Specify the full path name that starts from the drive letter for *dirname*.
> The maximum length that can be specified for *dirname* is 100 bytes.
>
> The collected information is gathered in the directory that its name "EX*yyyymmddhhmm*.zip". Before executing this command, please confirm that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 1MB

Collected information	Required free space
All troubleshooting information	more than 15 MB

-all

Collects all troubleshooting information on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXAMPLES

Collecting the troubleshooting information for initial investigation on D:\temp directory.

```
"C:\Program Files (x86)\ETERNUS SF\Express\Manager\bin\express_managersnap" -dir D:\temp
```

Appendix D Messages

This appendix explains the messages output from Express.

D.1   Message Format

Messages consist of a message ID and message text.

Each message is explained according to the sections described in the following table.

Table D.1 Message format

Item	Description
Message text	Shows how the message is displayed.
Description	Explains the reason why the message is displayed, or the conditions under which the message is displayed.
Parameters	Explains the meanings of parameters if included in the messages.
System action	Explains what action the system takes when the message is displayed.
Administrator response	This section explains the actions that the administrator should take in response to the message.

D.2   Message output from Manager

esfmgr00001

Internal error has occurred.

Description

Internal error has occurred in the Manager processing.

System action

The processing is terminated.

Administrator response

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

If the Storage System Management GUI can not be started, collect this message and troubleshooting information as shown in express_managersnap (Troubleshooting information collection of Manager).

esfmgr00101

TCP Port registration for the service ({0}) is not found.

Description

TCP Port registration for the service is failed.

Parameters

{0} : Name of the service

System action

The processing is terminated.

Administrator response

Take the following procedure to check the port registration.

1. Open the file shown below by text editor.

   [Windows System Folder]\drivers\etc\services

2. Check whether there is expected TCP port in the file. If there is not the Port in the file, add the port.

Collect this message and troubleshooting information as shown in express_managersnap (Troubleshooting information collection of Manager) and contact a Fujitsu SE, if the problem persists.

---

esfmgr01001

User name or password of the management server is invalid.

Description

The user name or password to log in the manager is invalid.

System action

The processing is terminated.

Administrator response

Input the valid the user name and password.

Collect this message and troubleshooting information as shown in express_managersnap (Troubleshooting information collection of Manager) and contact a Fujitsu SE, if the problem persists.

---

esfmgr01002

The specified user does not belong to the administrators group.

Description

The specified user does not belong to the administrators group.

System action

The processing is terminated.

Administrator response

Input the user name and password for the user in the administrators group.

Collect this message and troubleshooting information as shown in express_managersnap (Troubleshooting information collection of Manager) and contact a Fujitsu SE, if the problem persists.

---

esfmgr10001

Failed to communicate with the disk array ({0}).

Description

Failed to communicate with the Disk storage system.

Parameters

{0} : IP address of the Disk storage system.

System action

The processing is terminated.

Administrator response

An error may have occurred on the communication destination Disk storage system or network. Check the connection between the server that the Manager is installed and the Disk storage system.

esfmgr10002

Specified disk array ({*0*}) is already registered on this software.

Description

The specified Disk storage system has already been registered in this software.

Parameters

{0} : Specified IP address

System action

The processing is terminated.

Administrator response

To reload the configuration of the registered Disk storage system, select the [Reload configuration].

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10003

Specified disk array ({*0*}) is already registered with a different IP address ({*1*}) on this software.

Description

The specified Disk storage system is already registered with a different IP address.

Parameters

- {0} : Specified IP address
- {1} : IP address of the registered Disk storage system

System action

The processing is terminated.

Administrator response

Check the followings.

- If the Disk storage system's IP address has been changed, register the Disk storage system again as shown in "Chapter 6 Operation".
- Although the Disk storage system has multiple IP addresses, registration for the Disk storage system is required with only one IP address. When you want to change the Disk storage system's IP address, register the Disk storage system again as shown in "Chapter 6 Operation".

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10004

As specified IP address ({*0*}) or SNMP community name ({*1*}) is incorrect, the disk array could not be detected.

Description

The Disk storage system was not able to be detected because specified IP address or SNMP Community Name is not the one of the Disk storage system.

Parameters

- ・ {0} : Specified IP address
- ・ {1} : Specified SNMP community name

System action

The processing is terminated.

Administrator response

Check the following procedure.

- ・ Make sure correct SNMP Community Name and IP address are inputted.
- ・ Check the Disk storage system's power supply and connection state.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10005

As specified IP address ({*0*}) is not an IP address ({*1*}) for master CM, the disk array could not be detected.

Description

Because it was not the IP address of master CM, specified IP address was not able to detect the Disk storage system.

Parameters

- ・ {0} : Specified IP address
- ・ {1} : The IP address for master CM

System action

The processing is terminated.

Administrator response

There is a possibility that the IP address of slave CM has been specified. Make sure IP address of master CM is input.

esfmgr10006

Specified device ({*0*}) is not supported by this software.

Description

The specified device is not supported by this software.

Parameters

{0} : Indicates the specified IP address

System action

The processing is terminated.

Administrator response

Specify the IP address of the device to be supported.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10021

Failed to delete the disk array ({*0*}).

Description

The deletion of the Disk storage system was failed.

Parameters

{0} : Specified Disk storage system name

System action

The processing is terminated.

Administrator response

Select [Delete Disk Array] to retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10101

The one different from the registered disk array ({*0*}) was detected.

Description

Detected Disk storage system is different from the registered Disk storage system.

Parameters

{0} : Registered IP address

System action

The processing is terminated.

Administrator response

There is a possibility that the Disk storage system's IP address has been changed.

Select [Delete Disk Array] to delete the Disk storage system and add it.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10901

Failed to configure disk array({*0*}) or obtain its information. Detail message={*1*}

Description

An error occurred in configuring Disk storage system or obtain its information.

Parameter

- {0} : Specified Disk storage system name
- {1} : Detail message

System action

The processing is terminated.

Administrator response

Check the following procedure.

1. Confirm the message number (the part of E**** of "Error: E****") of detail message.

2. According to the message number of detail message perform the following:

   - "Error: E0060 Resource locked."

     Check the other user is not processing the Disk storage system setting with other tools when detail message is "Error: E0060 Resource locked".
     Wait for a while to retry.

   - Other than "Error: E0060 Resource locked."

     Refer to the "Error Messages" of "ETERNUS DX60/DX80/DX90 Command Line Interface (CLI) User's Guide" and check "Message Countermeasure for the error" corresponding to above-mentioned message number.
     Wait for a while to retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10902

As Telnet communication failed, the disk array with specified IP address({*0*}) could not be detected.

Description

The Disk storage system was not able to be detected because of the Telnet communication failure.

Parameters

{0} : Specified IP address

System action

The processing is terminated.

Administrator response

Check the following procedure.

- Check the Disk storage system's power supply and connection state.

- Make sure that the telnet communication of the Disk storage system is enabled.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10903

Specified user name or password of the disk array is different.

Description

Specified user name or password of the Disk storage system is different.

System action

The processing is terminated.

Administrator response

Check the user name and password and retry with correct user name and password.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10904

Failed to register license. There is a possibility that specified license key is invalid.

Description

Failed to register license.

System action

The processing is terminated.

Administrator response

Check the license key and input valid license key.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr10999

Loading disk array configuration is in process. Wait for a while to retry.

Description

Loading Disk storage system configuration is in process. Wait for a while to retry.

System action

The processing is terminated.

Administrator response

Wait for a while, and retry.

When "Add Disk Array" is executed after forced termination of the client, this message might be output only once.
Please execute it again.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr12000

Failed to start the performance monitor.

Description

Failed to start the performance monitor.

System action

The processing is terminated.

Administrator response

Check the device status and network, then try again.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr12001

Failed to stop the performance monitor.

Description

Failed to stop the performance monitor.

System action

The processing is terminated.

Administrator response

Check the device status and network, then try again.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr12002

Failed to obtain the status of performance monitor.

Description

Failed to obtain the status of performance monitor.

System action

The processing is terminated.

Administrator response

Check the device status and network, then try again.

Collect this message and troubleshooting information and contact a Fujitsu SE.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr12003

Network error occurred in monitoring performance.

Description

Network error occurred in monitoring performance.

System action

The processing is terminated.

Usually, even if an error occurs in monitoring performance, the processing retries.

Administrator response

Check the device or network.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr12004

Unable to access a file of performance monitor.

Description

Unable to access a file of performance monitor.

System action

The processing is terminated.

Administrator response

Check whether the file system is not write-protection or check whether there is enough free space in the file system.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

---

esfmgr12005

Internal error has occurred at performance monitor.

Description

Internal error has occurred at performance monitor.

System action

The processing is terminated.

Administrator response

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

---

esfmgr12006

The LogicalVolume does not exist.

Description

The logical volume does not exist.
The performance monitoring to the Disk storage system where logical volume is not defined is able not to be executed.

System action

The processing is terminated.

Administrator response

Please execute it again after defining logical volume in the Disk storage system.

---

esfmgr12007

Unable to login a device.

Description

This message indicates that an attempt was made to login to the target device to set performance monitoring for the device or to read the configuration information but failed because another user has already logged into the device.

System action

The processing is terminated.

Administrator response

Log out the process that logged into the target device and then re-execute the processing.

esfmgr30001

Failed to communicate with the disk array ({*0*}).

Description

Failed to communicate with the Disk storage system.

Parameters

{0} : Specified IP address

System action

The processing is terminated.

Administrator response

Check the network status between the management server and the Disk storage system and retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr30002

Required service has not been started.

Description

Required service has not been started.

System action

The processing is terminated.

Administrator response

Restart the management server, and retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr60000

Email sending failed.

Description

Administrators could not receive event notification emails.

System action

The processing is terminated.

Administrator response

Check email address in Contacts, Details and SMTP server settings.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr60001

Internal Error (File I/O Error) occurred during collect troubleshooting information.

Description

Internal Error (File I/O Error) occurred during collect troubleshooting information.

System action

The processing is terminated.

Administrator response

Confirm that there is no access to the installation folder, and retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

esfmgr60002

Collect troubleshooting information is still running.

Description

Collect troubleshooting information is still running.

System action

The processing is terminated.

Administrator response

Wait for a while, and retry.

Collect this message and troubleshooting information and contact a Fujitsu SE, if the problem persists.

Start the Storage System Management GUI, and then select [Collect Troubleshooting Info] from [Troubleshooting] to collect the troubleshooting information.

D.3 Message output from CLI

This section explains the messages output from CLI.

D.3.1 Messages for "storageadm perfdata" command

esfcmd67101

storageadm.exe:not privileged

Description

The command was executed without OS administrator authority.

Administrator response

Execute using OS administrator authority.

ssmgr7010

The Performance Monitoring is not set. Please confirm the Performance Monitoring setting.

Description

The Performance Monitoring is not set.

System action

Interrupts the processing.

Administrator response

Set the Performance Monitoring, and then re-execute.

---

swsag0001

Command terminated normally.

Description

The command was executed successfully.

System action

The command is completed normally.

Administrator response

None.

---

swsag0172

Internal Program Error occurred. [*DETAIL*]

Description

An internal error was detected in the program.

Parameters

DETAIL: Detailed information for the error.

System action

Interrupts the processing.

Administrator response

Collect the data needed for troubleshooting as explained in the section "6.3 When having detected any trouble", then contact your Fujitsu systems engineer (SE).

---

swsag0345

Unexpected error has occurred.

Description

An unexpected exception occurred.

System action

Interrupts the processing.

Administrator response

Collect the data needed for troubleshooting as explained in the section "6.3 When having detected any trouble", then contact your Fujitsu systems engineer (SE).

---

swsag0491

syntax error. detail=[*DETAIL*]

Description

The command syntax is invalid. "usage" is displayed.

Parameters

DETAIL: One of the following is displayed:

・ If the command was not specified:

command is not specified.

・ If the specified command [value] is invalid:

command[value] is invalid.

・ If the specified parameter is invalid:

parameter is invalid.

・ If the specified option [value] is invalid:

option[value] is invalid.

・ If the format of the option [value] or the value of the option [value] is invalid:

[value] is invalid value or format.

System action

The system displays "usage" and interrupts the processing.

Administrator response

The system administrator reviews the command syntax and then re-executes the operation.

D.3.2   Messages for "express_managersnap" command

esfcmd67100

express_managersnap:[*OBJ*]:failed to create file or directory

Description

The specified file or directory cannot be created.

Parameters

OBJ: The specified file or directory

Administrator response

Check the following, remove the cause of the problem, and execute the command again.

・ Check the directory permission.

・ Check that there is enough disk area available.

esfcmd67101

express_managersnap:not privileged

Description

The command was executed without OS administrator authority.

Administrator response

Execute using OS administrator authority.

esfcmd67102

express_managersnap:[*OPTION*]:illegal option

Description

The option is invalid, usage is displayed.

Parameters

OPTION: The specified option

Administrator response

Check the command then execute it again.

esfcmd67126

express_managersnap:[*OBJ*]:No such directory

Description

The directory specified was not found.

Parameters

OBJ: The specified file or directory

Administrator response

Specify the correct directory.

esfcmd67129

express_managersnap:syntax error

Description

A command syntax error has occurred. Usage is displayed.

Administrator response

Check the command then execute it again.

esfcmd67130

express_managersnap:[*OPTION*]:option requires an argument

Description

An argument was not specified for the option. Usage is displayed.

Parameters

OPTION: Required option

Administrator response

Check the command then execute it again.

esfcmd67131

express_managersnap:[*OPTION*]: argument too long

Description

The option argument specified is too long.

Parameters

OPTION: Required option

Administrator response

Correct the attribute of the option then execute the command again.

---

esfcmd67162

express_managersnap:[*OPTION*]:is required

Description

The option argument must be specified.

Parameters

OPTION: Required option

Administrator response

Correct the option parameter, and then re-execute the command.

---

esfcmd67820

express_managersnap:[*COMMAND*] process is still running.

Description

The process command is running.

Parameters

COMMAND: The command in running

Administrator response

After the process finishes, re-execute the command.

D.4   Message output from Copy Control Module

This section explains the messages output from Copy Control Module.

D.4.1   Message Explanations

ccm1001

Input parameter is illegal.

Description

An invalid argument has been specified.

System action

Interrupts the processing.

Administrator response

Check the valid values for the argument, and then execute the command again.

---

ccm1002

An invalid option is specified. option=[*OPTION*]

Description

An invalid option has been specified.

Parameters

OPTION: The specified option

System action

Interrupts the processing.

Administrator response

Check the valid values for the option, and then execute the command again.

ccm1003

An invalid parameter is specified. option=[*OPTION*], parameter=[*PARAM*]

Description

An invalid parameter has been specified.

Parameters

・ OPTION: The specified option

・ PARAM: The specified parameter

System action

Interrupts the processing.

Administrator response

Check the valid values for the parameter, and then execute the command again.

ccm1004

An invalid option is specified. copy group=[*GROUP*], copy type=[*TYPE*], option=[*OPTION*]

Description

An invalid option has been specified for a copy group.

Parameters

・ GROUP: Copy group

・ TYPE: Copy type

・ OPTION: The specified option

System action

Interrupts the processing.

Administrator response

Check the valid values for the copy type, and then execute the command again.

ccm2001

This program requires administrative privileges of the operation system.

Description

This command can only be executed with Administrator privileges.

System action

Interrupts the processing.

Administrator response

Execute the command as a user with Administrator privileges.

---

ccm2002

The license is not registered.

Description

The license has not been registered yet.

System response

Interrupts the processing.

Administrator response

Register the license, and then execute the command again.

---

ccm3001

The disk array already exists. disk array=[*DISKARRAY*]

Description

Information for the specified ETERNUS Disk storage system has already been registered.

Parameters

DISKARRAY: ETERNUS name or ETERNUS Disk storage system IP address

System action

Interrupts the processing.

Administrator response

Use acarray list (Command for displaying information about ETERNUS Disk storage systems) to check whether the specified ETERNUS name is correct.

---

ccm3002

The copy group already exists. copy group=[*GROUP*]

Description

The copy group has already been registered.

Parameters

GROUP: Copy group name

System action

Interrupts the processing.

Administrator response

Execute the command again, specifying a copy group name that has not been registered yet.

---

ccm3003

The pair already exists. copy group=[*GROUP*], pair=[*PAIR*]

Description

The copy pair has already been registered.

Parameters

- GROUP: Copy group name

- PAIR: Copy pair name

System action

Interrupts the processing.

Administrator response

Execute the command again, specifying a copy pair name that has not been registered yet.

ccm3004

An invalid pair is specified. pair=[*PAIR*], detail=[*DETAIL*]

Description

An invalid copy pair has been specified.

Parameters

- PAIR: Copy pair name

- DETAIL: Detailed information about the cause of the error

  The DETAIL is will be one of the following strings:

Strings indicated in DETAIL	Cause of error
invalid format	The format of the copy pair is incorrect.
invalid disk array	The specified ETERNUS Disk storage systems have not been set up for the copy group.
same disk array	The same ETERNUS Disk storage systems have been specified for both the copy source and the copy destination.
invalid copy direction	The copy direction is not the same as the other copy pairs that have already been added to the copy group.
invalid Snap Data Volume	The copy-destination logical volume of the specified copy pair is not Snap Data Volume.
old disk array info	The ETERNUS Disk storage system was not re-registered when the version up was done.

System action

Interrupts the processing.

Administrator response

The action required depends on the DETAIL string, as described below:

Strings indicated in DETAIL	Appropriate action
invalid format	Execute the command again, specifying a correct format for the copy pair.
invalid disk array	Execute the command again, specifying the ETERNUS Disk storage systems that has been set up for the copy group.
same disk array	Execute the command again, specifying different ETERNUS Disk storage systems for the copy source and the copy destination.
invalid copy direction	Execute the command again, using the same copy direction as for the other copy pairs that have already been added to the copy group.

Strings indicated in DETAIL	Appropriate action
invalid Snap Data Volume	Execute the command again, specifying the Snap Data Volume for the copy-destination logical volume.
old disk array info	Execute the command again, after the re-registration of ETERNUS Disk storage system.

ccm3005

An invalid volume is specified. volume=[*VOLUME*], detail=[*DETAIL*]

Description

An invalid logical volume has been specified.

Parameters

- ・ VOLUME: Logical volume name

- ・ DETAIL: Detailed information about the cause of the error

   The DETAIL is will be one of the following strings:

Strings indicated in DETAIL	Cause of error
invalid format	The format of the logical volume is incorrect.

System action

Interrupts the processing.

Administrator response

The action required depends on the DETAIL string, as described below:

Strings indicated in DETAIL	Appropriate action
invalid format	Confirm the format of logical volume. And then execute the command again, specifying a correct format.

ccm3006

The number of generation is exceeded the registerable number. Maximum Number of Generation=[*NUMBER*]

Description

The number of generations registerable to a copy group is exceeded.

Parameters

NUMBER: Maximum number of generation that can be registered

System action

Interrupts the processing.

Administrator response

Check whether the number of copy pairs that have the same copy-source logical volume is exceeded the maximum number or not.

ccm3007

The REC buffer could not be found. ID=[*ID*]

Description

The specified buffer ID does not exist.

Parameters

ID: ID of the REC transfer buffer

System action

Interrupts the processing.

Administrator response

Execute the command again, specifying the correct ID.

---

ccm3008

An invalid access path is specified. access path=[*PATH*], detail=[*DETAIL*]

Description

An invalid access path has been specified.

Parameters

- ・ PATH: Access path
- ・ DETAIL: Detailed information about the cause of the error

    The DETAIL is will be one of the following strings:

Strings indicated in DETAIL	Cause of error
invalid access path	The access path is incorrect.

System action

Interrupts the processing.

Administrator response

The action required depends on the DETAIL string, as described below:

Strings indicated in DETAIL	Appropriate action
invalid access path	Execute the command again, specifying the access path of the specifying ETERNUS Disk storage systems.

---

ccm4001

The disk array does not exist. disk array=[*DISKARRAY*]

Description

There is no information for the specified ETERNUS Disk storage system.

Parameters

DISKARRAY: ETERNUS name

System action

Interrupts the processing.

Administrator response

Use acarray list (Command for displaying information about ETERNUS Disk storage systems) to check whether the specified ETERNUS name is correct.

---

ccm4002

The disk array does not exist. disk array=[*BOXID*]

Description

There is no information for the specified ETERNUS Disk storage system.

Parameters

BOXID: The box ID of ETERNUS Disk storage systems

System action

Interrupts the processing.

Administrator response

The information for the ETERNUS Disk storage system specified by the BOXID has been deleted.

Register the same box ID information for the specified ETERNUS Disk storage system again, and then execute the command again.

ccm4003

The copy group is not found. copy group=[*GROUP*]

Description

The specified copy group has not been set up.

Parameters

GROUP: Copy group name

System action

Interrupts the processing.

Administrator response

Use acgroup list (Copy group display command) to check whether the specified copy group name is correct.

ccm4004

The pair is not found. copy group=[*GROUP*]

Description

The copy pair has not been set up for the specified copy group.

Parameters

GROUP: Copy group name

System action

Interrupts the processing.

Administrator response

Set up the copy pair for the specified copy group, and then execute the command again.

ccm4005

The pair is not found. copy group=[*GROUP*], pair=[*PAIR*]

Description

The specified copy pair has not been set up for the copy group.

Parameters

・ GROUP: Copy group name

・ PAIR: Copy pair name

System action

Interrupts the processing.

Administrator response

Set up the specified copy pair for the copy group, and then execute the command again.

---

ccm4006

The logical volume is not found. logical volume=[*VOLUME*]

Description

The specified logical volume does not exist.

Parameters

VOLUME: Logical volume name

System action

Interrupts the processing.

Administrator response

Execute the command again, specifying an existing logical volume.

---

ccm4007

An invalid copy group is specified. copy group=[*GROUP*], copy type=[*TYPE*]

Description

The operation that the user is trying to execute cannot be performed on the specified copy group.

Parameters

・ GROUP : The specified copy group

・ TYPE : The copy type set in the copy group

System action

Interrupts the processing.

Administrator response

Check the copy type that has been set up for the specified copy group.

---

ccm4008

The logical volume is not found. copy group=[*GROUP*], logical volume=[*VOLUME*]

Description

There is no logical volume.

Parameters

・ GROUP: The specified copy group

・ VOLUME: Logical volume name

System action

Interrupts the processing.

Administrator response

Execute the command again, specifying an existing copy source logical volume in the specified copy group.

ccm4009

Remote ETERNUS Disk storage system cannot be specified. disk array=[*DISKARRAY*]

Description

The remote ETERNUS Disk storage systems cannot be specified.

Parameters

DISKARRAY: The name of ETERNUS Disk storage systems

System action

Interrupts the processing.

Administrator response

Confirm the specified ETERNUS Disk storage system is not a remote ETERNUS Disk storage system.

Use acarray list (Command for displaying information about ETERNUS Disk storage systems) with the remote option to check whether the specified ETERNUS name is correct.

ccm5001

Operation aborted. The configuration file is in use.

Description

Processing was interrupted because a CCM configuration file was being updated by one of the commands listed below:

- acarray add
- acarray change
- acarray remove
- acgroup create
- acgroup remove
- acpair add
- acpair remove

System action

Interrupts the processing.

Administrator response

Wait for the conflicting command to finish, and then execute the command again.

ccm5002

Operation failed. function=[*FUNC*], message=[*MSG*]

Description

The process has failed.

Parameters

FUNC: Process name
MSG: Message

System action

Interrupts the processing.

Administrator response

Take the appropriate action according to the error message.

---

ccm5003

Operation failed. function=[*FUNC*], message=[*MSG*]

Description

The process has failed.

Parameters

FUNC: Process name
MSG: Message

System action

Interrupts the processing.

Administrator response

Take the appropriate action indicated by the "D.4.2 Detailed Messages" displayed in the *MSG* section.

---

ccm5004

Operation failed. function=[*FUNC*], message=[*MSG*]

Description

The process has failed.

Parameters

FUNC: Process name
MSG: Message

System action

Interrupts the processing.

Administrator response

Take the appropriate action indicated by the "D.4.2 Detailed Messages" displayed in the *MSG* section.

If a message not listed in "D.4.2 Detailed Messages" is displayed, then please refer to "Appendix E Detail Error Messages of ETERNUS".

---

ccm5005

An invalid mount point is specified. mount point=[*MNTP*]

Description

An invalid mount point or drive letter has been specified.

Parameters

MNTP: The mount point or drive letter

System action

Interrupts the processing.

Administrator response

Check the mount point or drive letter, and then execute the command again. For details on how to check mount points and drive letters, refer to acgetvolinfo (Displaying logical volume information).

---

ccm5006

An invalid device is specified. device=[*DEVICE*]

Description

An invalid device has been specified.

Parameters

DEVICE: Device

System action

Interrupts the processing.

Administrator response

Devices must be specified using the following format: "PhysicalDrive [*device number*]". Execute the command again, specifying a valid format for the device.

---

ccm8001

A general system function failed. function=[*FUNC*], error=[*ERROR*]

Description

The execution of a system function has failed.

Parameters

FUNC: System function
ERROR: Error content

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

---

ccm8002

Could not open the registry. registry key=[*KEY*]

Description

Opening a registry has failed.

Parameters

KEY: Name of the registry key

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8003

Could not open the file. file=[*FILE*]

Description

Opening a file has failed.

Parameters

FILE: File name

System action

Interrupts the processing.

Administrator response

Check the status of the file system.

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8004

Could not write the file. file=[*FILE*]

Description

Writing to a file has failed.

Parameters

FILE: File name

System action

Interrupts the processing.

Administrator response

Check the status of the file system.

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8005

Could not delete the file. file=[*FILE*]

Description

Deleting a file has failed.

Parameters

FILE: File name

System action

Interrupts the processing.

Administrator response

Check the status of the file system.

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8006

Could not start Java VM.

Description

Starting the Java VM has failed.

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8007

A memory allocation failed.

Description

Allocating a memory area has failed.

System action

Interrupts the processing.

Administrator response

Check the memory usage status.

- ・ If there is not enough memory, then increase it.
- ・ Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8008

Could not read the file. file=[*FILE*]

Description

Reading a file has failed.

Parameters

FILE: File name

System action

Interrupts the processing.

Administrator response

Check the status of the file system.

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm8009

License Manager is not installed.

Description

The License Manager has not been installed.

System response

Interrupts the processing.

Administrator response

Install the License Manager and register the license. And then execute the command again.

ccm9001

The configuration file has an invalid format. file=[*FILE*]

Description

The content of the configuration file is invalid.

Parameters

FILE: File name

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm9002

An error occurred in accessing the Java property file. property=[*PROPERTY*]

Description

A Java property could not be looked up.

Parameters

PROPERTY: Property name

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

ccm9003

An unexpected error occurred.

Description

A system error has occurred.

System action

Interrupts the processing.

Administrator response

Refer to acmcapture (troubleshooting data collection command) to collect the data necessary for troubleshooting by acmcapture command, and then contact a Fujitsu SE

D.4.2 Detailed Messages

no such session.

Description

There is no session for the specified copy pair.

System action

Interrupts the processing.

Administrator response

Operations cannot be executed on copy pairs for which there is no copy session.

Check the session status using either acopc query (Status display command for Clone(OPC) type Advanced Copy or Clone(QuickOPC) type Advanced Copy) or acec query (Status display command for Clone(EC) type or Remote Advanced Copy).

invalid logical volume name.

Description

Either the access path specified at ETERNUS Disk storage system registration time or the device name specified using a command is invalid.

System action

Interrupts the processing.

Administrator response

Check that the specified device name is correct.

Or, check the drive letter or device name specified in the access path.

STXC0100 ERROR Specified command parameter is incorrect. Parameter=(*PARAM*)

Description

The specified parameter is not correct.

Parameters

PARAM: Parameter

Administrator response

Correct the parameter and try again.
If "No parameter" is displayed in *PARAM*, specify a parameter for the command and try again.

STXC1000 ERROR Insufficient Snap Data Pool. Required capacity=(*CAPACITY*).

Description

Snap Data Pool area is insufficient and command cannot be executed.

Parameters

CAPACITY: Capacity

Administrator response

Secure free Snap Data Pool capacity that is larger than the capacity notified by the message and try again.

STXC1002 ERROR Invalid logical volume name. Volume name=(*VOLNAME*).

Description

The specified logical volume name is not valid.

Parameters

VOLNAME: Logical volume name

Administrator response

Check the logical volume name specified by the parameter and try again.

STXC1003 ERROR Logical volume is already defined in another copy operation.

Description

The specified logical volume has already been defined as the copy source or copy destination for another copy session.

Administrator response

Review the specification for the logical volume of the copy source or copy destination and try again.

STXC1004 ERROR Maximum session reached.

Description

Copying cannot start because the number of sessions simultaneously operatable on the ETERNUS Disk storage system has already reached maximum.

Administrator response

Check the sessions, delete the unneeded ones among them, and try again.

STXC1005 ERROR Another copy has already started.

Description

For the specified logical volume, a copy operation of another type is already running.

Administrator response

Review the specification for the logical volume name.

STXC1006 ERROR Target volume is already defined in another copy operation.

Description

The specified copy destination logical volume has already been defined as the copy destination for another copy session.

Administrator response

Review the specification for the copy destination logical volume name.

STXC1007 ERROR Logical volume is already reserved.

Description

The logical volume has already been reserved by another user.

Administrator response

Wait for a few seconds and try again.

STXC1009 ERROR Logical volume is busy.

Description

The logical volume is being used by another user.

Administrator response

Wait for a few seconds and try again.

STXC1010 ERROR Specified option is invalid.

Description

The specified option is invalid.

Administrator response

Correct the processing option setting and try again.

STXC1011 ERROR Invalid parameter. Parameter=(*PARAM*).

Description

The parameter is incorrect.

Parameters

PARAM: Parameter

Administrator response

The parameter value is incorrect. Correct the parameter and try again.

STXC1013 ERROR Target volume size mismatch.

Description

Copying cannot execute because the size of the copy destination logical volume is inappropriate.

Administrator response

For the copy destination, specify a logical volume that is equal in size to the copy source logical volume.

STXC1014 ERROR Target volume overlap source volume.

Description

Copy destination logical volume and copy source logical volume area are overlapped.

Administrator response

Change the copy destination or copy source logical volume setting.

STXC1016 ERROR The group file of the form not permitted was specified.

Description

Operation cannot be performed because the specified format of the group file is not permitted.

Administrator response

One of the cases indicated below can be assumed. Re-specify the group file, and try again.

- A group file which describes copy pairs may have been specified in a logical volume operation.
- A group file which describes logical volumes may have been specified in a copy pair operation.

STXC1017 ERROR The option that cannot be used for copy session is specified.

Description

An option that cannot be operate a copy session is specified.

Administrator response

One of the cases indicated below can be assumed. Re-specify the option.

- The transfer mode specified at the copy operation start is not the same as the transfer mode specified at copy restart (recovery).

STXC1100 ERROR Session does not exist.

Description

No session exists between the specified logical volumes.

Administrator response

Check that the logical volume specification is correct and try again.

STXC1102 ERROR Invalid Snap Data Volume.

Description

The specification for Snap Data Volume is invalid.

Administrator response

One of the cases indicated below can be assumed. Review the specification for the logical volume and try again.

- The copy destination logical volume specified when starting SnapOPC+ copying is not Snap Data Volume.

- The copy source logical volume specified when starting SnapOPC+ copying is Snap Data Volume.

- Either the copy source logical volume name specified when starting EC/OPC/QuickOPC copying or the copy destination volume is Snap Data Volume.

STXC1104 ERROR Operation sequence error.

Description

The current status cannot execute the specified operation.

Administrator response

Check the copy status for any of the following cases:

- Suspend was executed for the session that is not in equivalence status.

- Stop was executed for the session in Error Suspend status or Halt status.

- Initialization was executed for the Snap Data Volume for which a SnapOPC+ session was running.

- Start of SnapOPC+ was executed for the Snap Data Volume being initialized.

- Suspend was executed for the session in Suspend status.

- Copy stop, copy resume, or copy direction reversal was executed for the session that is not in Suspend status.

STXC1106 ERROR Insufficient memory.

Description

Memory shortage occurred.

Administrator response

Execute the following and try again.

- Shut down unnecessary programs.

STXC1107 ERROR Alias is not defined.

Description

The ETERNUS Disk storage system alias that is specified as the copy source or copy destination has not been defined.

Administrator response

Check that the ETERNUS Disk storage system alias has been registered. If the alias is not registered, register the routing information and try again.

STXC1108 ERROR The specification of physical information is incorrect.

Description

The specified physical information is incorrect.

Administrator response

One of the cases indicated below can be assumed. Correct the physical information description.

- A start location or copy size that exceeds 2TB was specified for a copy operation to an ETERNUS Disk storage system which does not support copy operations over 2TB.

- Other than "0" is specified for the start location, but "0" is specified for the copy size.

- A size that is larger than actual capacity is specified for the copy size.

STXC1109 ERROR ETERNUS cannot be recognized.

Description

The ETERNUS Disk storage system specified by alias name cannot be recognized.

Administrator response

One of the cases indicated below can be assumed. Correct the physical information description.

- Disk information was reconfigured after the routing information was set.

  In this case, retry after setting the routing information.

- Connection path between ETERNUS Disk storage systems is not established (for REC).

STXC1200 ERROR Unexpected error.

Description

An unexpected error occurred.

Administrator response

Collect the data needed for troubleshooting as explained in the section "6.3 When having detected any trouble", then contact your Fujitsu systems engineer (SE).

STXC1201 ERROR Internal inconsistency.

Description

Internal inconsistency occurred.

Administrator response

Collect the data needed for troubleshooting as explained in the section "6.3 When having detected any trouble", then contact your Fujitsu systems engineer (SE).

STXC1202 ERROR Unsupported function.

Description

An unsupported function was called.

Administrator response

Check the version of the ETERNUS Disk storage system firmware.

STXC1203 ERROR The operation is not permitted.

Description

User does not posses required root privilege to perform copy operation.

Administrator response

Perform copy operations with root privilege.

STXC1204 ERROR SCSI error detected. Error=(*ERROR*).

Description

An error was detected through the SCSI command.

Parameters

ERROR: Error information

Administrator response

Check the connection status of the device and try again. If this error persists, contact Fujitsu technical staff (CE).

STXC1208 ERROR Specified logical volume is not ETERNUS.

Description

The specified logical volume is not an ETERNUS Disk storage system.

Administrator response

Specify an ETERNUS Disk storage system logical volume and try again.

STXC1209 ERROR Insufficient resource in ETERNUS.

Description

Not executable due to ETERNUS Disk storage system resource shortage.

Administrator response

Take any of the following measures:

- Check/set the Advanced Copy option license.
- Check/set the device resources for such errors as "Table size not set" and "Table size not enough".

STXC1212 ERROR Disk drive off by the ECO mode.

Description

The disk drive is stopped due to the Eco-mode.

Administrator response

Try again when the disk drive is activated.

STXC1213 ERROR Invalid file system.

Description

The file system is invalid.

Administrator response

The file system is unsupported. Check the file configuration and try again.

STXC1214 ERROR Preconditions for copy operation are not satisfied.

Description

The preconditions for the copy operation are not satisfied.

Administrator response

Check for the following causes, and check the copy status.

- Tried to start SnapOPC+ session for a copy pair for which a SnapOPC+ session already exists.

- Tried to restore SnapOPC+ session that does not exist for the copy pair.

- Tried to suspend EC session for a copy pair for which no EC exists.

- Tried to suspend EC session without waiting.

- A group configuration that cannot be simultaneously operated is specified.

- Retried to suspend a copy session without resolving the error.

STXC1220 ERROR Change mode operation failed because of communication error. Cause=(*DETAIL*).

Description

Communication or ETERNUS Disk storage system error occurs and changing session mode failed.

Parameters

DETAIL: Detailed information

Administrator response

- When DETAIL is "NOT_CHANGED"
  Check the device connection status and try again.

- When DETAIL is "CROSS"
  Check the device connection status and try again. If this error occurs again, contact Fujitsu technical engineer (CE).

STXC1222 ERROR ETERNUS unit inconsistency.

Description

The copy source and copy destination ETERNUS Disk storage systems setting do not match and remote copy cannot be executed.

Administrator response

Check that the bitmap ratio of the ETERNUS Disk storage system advanced copy table size for the copy source and copy destination are not the same.

STXC1223 ERROR The copy operation with ETERNUS is incorrect.

Description

The copy operation with ETERNUS Disk storage system is not correct.

Administrator response

Take any of the following measures:

- Check ETERNUS Disk storage system firmware version between cabinets.
  Contact Fujitsu system engineer (SE) when ETERNUS Disk storage system firmware version cannot be confirmed.

- Check whether the size of the copy source volume and the copy destination volume is the same.

- Check the server connects it with the ETERNUS Disk storage system of the copy source volume at the suspend processing by the Concurrent suspend mode operation. Moreover, check the route guidance information setting is executed to the ETERNUS Disk storage system of the copy source volume.

STXC1224 ERROR Communication error occurred.

Description

Communication error occurred between the ETERNUS Disk storage systems and remote copy operation cannot be performed.

Administrator response

Check the device connection status and try again.

STXC1225 ERROR MPHD environment is incorrect.

Description

The multipath driver environment is incorrect.

Administrator response

Correct the multipath driver settings.

STXC1226 ERROR GDS environment is incorrect.

Description

The GDS environment is incorrect.

Administrator response

Correct the GDS environment settings.

STXC1250 ERROR Specified LUN_V Number is invalid.

Description

The specified LUN_V number is incorrect.

Administrator response

One of the cases indicated below can be assumed. Check the parameter settings and the status of the ETERNUS Disk storage system, and try again.

- ・ A LUN_V number that does not exist or cannot be accessed is specified.

- ・ Tried to start copy between an encrypted volume and non-encrypted volume.

- ・ Specify the volume which contains bad sector.

STXC1252 ERROR Operation is not supported.

Description

Operation cannot be performed as operation is not supported.

Administrator response

One of the cases indicated below can be assumed. Correct the parameter settings, and try again.

- ・ Tried to execute a copy operation of a size that exceeds 2TB. (For Linux)

STXC1300 ERROR Time out detected.

Description

Timeout was detected while Suspend was being executed.

Administrator response

Try executing the command again.
Or, correct any mistakes with the timeout monitoring frequency and interval specified in the parameters.

STXC1301 WARNING The operation was accepted.

Description

The copy operation was accepted, but the process is not completed.

Administrator response

Check the copy status to confirm whether the copy operation is completed.

If this message appears when the copy operation is suspended, correct any mistakes with the timeout monitoring frequency and interval specified in the parameters.

STXC1400 ERROR File open error. File name=(*FILE*). Cause=(*CAUSE*).

Description

Failed to open the file.

Parameters

FILE: File name
CAUSE: Cause code

Administrator response

Check file status by referring to the cause code and the file name sent by the message.

STXC1401 ERROR The file name of ACCC can not be acquired. Cause=(*CAUSE*).

Description

Files required for operation of ACCC cannot be obtained.

Parameters

CAUSE: Cause code

Administrator response

The ACCC operating environment may be corrupted. Check that the following files exist in the sub directory (etc) of the install directory.

- stxc.ini

- trcdef.ini

- stxcvolinf (for Solaris/Linux)

- stxc.alias (for Solaris/Linux)

STXC1402 ERROR ACCC parameter name is not defined. Parameter=(*PARAM*).

Description

Invalid parameter name is set in the ACCC predefinition file.

Parameters

PARAM: Parameter name

Administrator response

Correct the ACCC predefinition file and try again.

STXC1403 ERROR ACCC parameter value is not allowed. Parameter=(*PARAM*).

Description

Invalid parameter value is set in the ACCC predefinition file.

Parameters

PARAM: Parameter name

Administrator response

Correct the ACCC predefinition file and try again.

STXC1404 ERROR ACCC parameter value is out of range. Parameter=(*PARAM*).

Description

A parameter value that is out of the range is set in the ACCC predefinition file.

Parameters

PARAM: Parameter name

Administrator response

Specify a parameter value in the ACCC predefinition file that is within the definable range.

STXC1405 ERROR The combination of ACCC parameters is incorrect.

Description

The parameter combination defined in the ACCC predefinition file is incorrect.

Administrator response

Correct the ACCC predefinition file and try again.

STXC1406 ERROR Waiting time cannot be set.

Description

The monitoring time for suspendable status cannot be set.

Administrator response

The following may have occurred. Check and correct parameters or the predefinition file.

- Accumulated monitoring interval and monitoring count values exceed their respective permissible values.

- The monitoring count is specified but the monitoring interval is not set (or set to 0).

STXC1407 ERROR ACCC parameter is not defined. Parameter=(*PARAM*).

Description

Parameters necessary for ACCC operation are not set in the ACCC predefinition file.

Parameters

PARAM: Parameter name

Administrator response

Set the parameters displayed in the message in the ACCC predefinition file.

STXC1409 ERROR ACCC (*PARAM*) parameter is already defined.

Description

Defined parameter has been defined twice in the ACCC predefinition file.

Parameters

PARAM: Parameter name

Administrator response

Correct the ACCC predefinition file and try again.

STXC1410 ERROR Alias number reached the maximum.

Description

The ETERNUS Disk storage system alias reached the maximum number that can be managed by ACCC and routing information cannot be set.

Administrator response

Check alias definition status and if there are unnecessary alias names, delete them.

STXC1411 ERROR Alias is already defined.

Description

The ETERNUS Disk storage system alias has already been registered.

Administrator response

Specify another alias and try again.

STXC1412 ERROR Alias identifier does not exist.

Description

An ETERNUS Disk storage system alias with the specified ID does not exist.

Administrator response

Check the alias definition status and ID, and try again.

STXC1500 ERROR Error occurred recognition of ETERNUS management file. Cause=(*CAUSE*).

Description

The ETERNUS Disk storage system management file cannot be obtained.

Parameters

CAUSE: Cause code

Administrator response

The following may be causes. Take an action based on the CAUSE (cause code).

- When the CAUSE is -1 or -2:
  MICC is not installed or registry is rewritten.

- When the CAUSE is -3:
  The file used for setting ETERNUS Disk storage system registration information is corrupted or deleted.

STXC1600 ERROR ETERNUS is not registered on ETERNUS management file.

Description

The ETERNUS Disk storage system has not been registered in the management file.

Administrator response

Register the ETERNUS Disk storage system and try again.

STXC1700 ERROR Alias management file access error. Cause=(*CAUSE*).

Description

An error occurred when the ETERNUS Disk storage system alias management file was accessed.

Parameters

CAUSE: Cause code

Administrator response

The following may be causes. Take an action based on the CAUSE (cause code).

- ・ Registry key acquisition, reference

- ・ File read/write

- ・ File cannot be created

STXC1801 ERROR Group_file does not exist.

Description

The group file does not exist.

Administrator response

Check the group file name specified in the parameter, and try again.

STXC1802 ERROR Syntax error was detected in Group File.line=(*LINE*).

Description

There is a syntax error in the group file description.

Parameters

LINE: Line number of the line in which the syntax error was detected

Administrator response

Check the contents of the group file specified in the parameter, and try again.

STXC1803 ERROR There is no volume name in Copy Group File.

Description

The copy information is not registered in the group file.

Administrator response

Check the contents of the group file specified in the parameter, and try again.

STXC1804 ERROR Error occurred with copy operation described in group file. *VOLINFO*. Error message=(*MSG*).

Description

An error occurred with the copy operation described in the group file.

Parameters

- ・ VOLINFO: Name of the logical volume in which the error occurred.
  "Source=(copy source logical volume name).Target=(copy destination logical volume name)" is for copy pairs.
  "Volume=(Logical volume name)" is for logical volumes.

- ・ MSG: Message text

Administrator response

Deal with the error according to the MSG.

STXC1805 ERROR The number of the copy pairs or logical volumes described in the group file exceeds the maximum number.

Description

The copy operation cannot be performed, as the number of copy pairs or logical volumes described in the group file exceeds the maximum number possible.

Administrator response

Take any of the following measures:

- ・ Divide the group
- ・ Change the max_grouping_ses parameter value in the predefinition file.

STXS1027

The specified parameter is invalid. [parameter name=[*NAME*], parameter value=[*VALUE*]]

Description

An incorrect affinity group number has been specified.

Parameters

- ・ NAME: Parameter name
- ・ VALUE: Parameter value

System action

Interrupts the processing.

Administrator response

Use acinq ag (Command for displaying a list of affinity groups) to check the specified affinity group number.

STXS2001

The specified user name and password have not been registered in the device. [user=[*USER*]]

Description

The user name and password have not been registered on the ETERNUS Disk storage system.

Parameters

USER: User name

System action

Interrupts the processing.

Administrator response

Check whether the user name and password are correct.

STXS2002

The specified user does not have privileges greater than that of an administrator. [user=[*USER*]]

Description

The user does not have Administrator privileges.

Parameters

USER: User name

System action

Interrupts the processing.

Administrator response

Use ETERNUS Web GUI to check the user privileges.

STXS2008

The registered user and password are not registered in the current device. [IP address=[*IPADDR*], user=[*USER*]]

Description

The user name and password have not been registered on the ETERNUS Disk storage system.

Parameters

- ・ IPADDR: IP address
- ・ USER: User name

System action

Interrupts the processing.

Administrator response

The ETERNUS Web GUI user account has either been changed or deleted.

Change the registration information for the ETERNUS Disk storage system by referring to "6.5 Reload construct configuration".

STXS2009

The operation cannot be performed with the user privileges when registering the device. [IP address=[*IPADDR*], user=[*USER*]]

Description

The user does not have Administrator privileges.

Parameters

- ・ IPADDR: IP address
- ・ USER: User name

System action

Interrupts the processing.

Administrator response

The user account privileges for ETERNUS Web GUI have been changed.

Use ETERNUS Web GUI to check the user privileges.

STXS4002

The device is not supported. [IP address=[*IPADDR*], model=[*MODEL*], type=[*TYPE*]]

Description

The specified ETERNUS Disk storage system is not supported.

Parameters

- ・ IPADDR: IP address
- ・ MODEL: ETERNUS Disk storage systems model
- ・ TYPE: ETERNUS Disk storage systems type

System action

Interrupts the processing.

Administrator response

Check that the ETERNUS Disk storage system meets the "2.1 Hardware conditions".

STXS4046

The specified affinity group has not been registered. [affinity group number=[*GROUP*]]

Description

The specified affinity group has not been registered.

Parameters

GROUP: Affinity group number

System action

Interrupts the processing.

Administrator response

Use acinq ag (Command for displaying a list of affinity groups) to check the specified affinity group number.

STXS4047

The specified affinity group has been concatenated. [affinity group number=[*GROUP*]]

Description

A concatenated affinity group has been specified.

Parameters

GROUP: Affinity group number

System action

Interrupts the processing.

Administrator response

Concatenated affinity groups cannot be specified.

STXS7004

Failed to communicate with the device. [IP address=[*IPADDR*]]

Description

Communications with the ETERNUS Disk storage system have failed.

Parameters

IPADDR: IP address

System action

Interrupts the processing.

Administrator response

It is not possible to communicate with the ETERNUS Disk storage system.

Refer to "5.3 Configuring the Network Environment" to check the status of the network, and then execute the command again.

D.5 Error Messages on Troubleshooting Data Collection Command

This section explains the error messages output when the troubleshooting data collection command is executed.

Table D.2 Error Messages on Troubleshooting Data Collection Command

Item number	Error Message	Explanation	Action
1	An invalid argument was specified.	An invalid argument was specified.	Check the specification method of the argument specified in the option. Specify the correct argument and re-execute.
2	The specified directory does not exist.	The specified directory does not exist.	Specify an existing directory and re-execute.
3	The operation was interrupted.	The operation was interrupted for one of the following reasons: 1. A user without permission executed the command. 2. There is insufficient disk space (capacity).	1. Check the permissions of the user who executed the command and re-execute. 2. Secure sufficient disk space (capacity), then re-execute.

Appendix E Detail Error Messages of ETERNUS

This appendix describes the detailed error messages output by the ETERNUS Disk storage system, which were inserted into the messages.

If an error message not shown in this table appears, a hardware failure may have occurred. In such an event, contact your Fujitsu customer engineer (CE).

Table E.1 Detail Error Messages of ETERNUS

No.	Error message	Explanation	Corrective action
1	invalid logical volume name.	The specified copy source or destination device is not found.	Check that the slice information exists on the copy source or destination device.
2	invalid extent number.	An internal conflict occurred. (The number of extents is invalid (STXGetVolmuInfo))	Ask a Fujitsu systems engineer (SE) to collect the data necessary for troubleshooting. (**NOTE**)
3	invalid source BoxID.	An internal conflict occurred. (The copy source box identifier was invalid.)	
4	invalid destination BoxID.	An internal conflict occurred. (The copy destination box identifier was invalid.)	
5	invalid source OLU.	The specified copy source or destination device is not found.	Check the partition information for the copy source device.
6	invalid destination OLU.	The specified copy source or destination device is not found.	Check the partition information for the copy destination device.
7	invalid extent.	The copy source or destination device does not exist.	Check the slice information on the copy source or destination device.
8	invalid source extent size.	An internal conflict occurred. (Not entire volume copy but copy size is 0.)	Ask a Fujitsu systems engineer (SE) to collect the data necessary for troubleshooting. (**NOTE**)
9	invalid copy interval.	The specified copy interval is invalid.	
10	invalid option flag.	An internal conflict occurred. (The operation specification flag is invalid.)	
11	invalid MPHD environment.	An MPHD path name was specified for the logical volume name when MPHD was not installed.	Check whether MPHD is installed.
12	invalid SynfinityDISK environment.	SynfinityDISK resource is not supported.	Specify a resource other than SynfinityDISK.
13	invalid GDHD environment.	A GDHD path name was specified for the logical volume name when GDHD was not installed.	Check whether GDHD is installed.
14	memory allocation error.	Dynamic memory allocation failed.	Allocate sufficient memory or a swap area, or terminate any other programs that are being executed.
15	not STX.	The copy source or destination device does not exist.	Check the slice information on the copy source or destination device.
16	SCSI command busy.	One of the following events occurred. ・ The specified OPC/EC copy source or target device is already being used for another OPC/EC copy target or source. ・ The specified OPC/EC copy target device is already being used for another OPC/EC copy target.	Take the applicable action as follows: ・ Ensure that the OPC/EC copy source or target device is not used for another copy source or target. ・ Ensure that the OPC/EC copy source is not used for another copy source.

No.	Error message	Explanation	Corrective action
		・ The maximum number of OPC/EC that can run concurrently in the disk array has already been reached. ・ BUSY was detected in the SCSI path. ・ The copy that is not managed by AdvancedCopy Manager is done. ・ The upper limit for the number that can operate simultaneously for each LUN has already been reached.	・ Wait until the OPC/EC of the device specified by the backup execution status display command ends, and then re-execute processing. ・ Wait for about five seconds and then re-execute processing. ・ Confirm the status of the copy by using ETERNUS Web GUI. For other cases, contact a Fujitsu customer engineer (CE).
17	SCSI command conflict.	A SCSI error (a command conflict) was detected.	Check the device connection status and then retry.
18	SCSI queue full.	A SCSI error (queue full) was detected.	If this fails to solve the problem, contact a Fujitsu customer engineer (CE).
19	Not support.	The specified copy function is not supported.	Contact a Fujitsu customer engineer (CE).
20	hardware error requiring CE-CALL.	A SCSI error (CheckCondition) was detected.	Check the device connection status and then retry.
21	SCSI condition met.	A SCSI error (Condition met) was detected.	If this fails to solve the problem, contact a Fujitsu customer engineer (CE).
22	unexpected SCSI error.	A SCSI error (abnormal status) was detected.	
23	invalid OLU.	The specified copy source or destination device is invalid because: ・ The same device is specified for the copy source or copy destination in "Copy all volumes". ・ The specified device cannot be used. ・ Consistency mode was specified for the RAID consolidation volume. ・ A non-existent OLU was specified when the volume status was displayed.	Check the device that is the copy source or the device partition information of the copy destination, and retry the function. If this fails to solve the problem, collect the data necessary for troubleshooting, and then contact a Fujitsu systems engineer (SE). (**NOTE**)
24	invalid BoxID.	The specified remote cabinet identifier is invalid.	Check the connection conditions between cabinets, and retry.
25	invalid role.	The specified Remote Advanced Copy direction is invalid.	If this fails to solve the problem, then contact a Fujitsu customer engineer (CE).
26	setup is inadequate	The copy settings are not sufficient for normal operation. One of the following events occurred: ・ The license has not been set with the Advanced Copy option. ・ There are not enough device resources (e.g., "table size not set", "table size not enough", "REC buffer size not set").	Contact a Fujitsu customer engineer (CE) and systems engineer (SE).
27	bit map resolution disagree.	The bitmap resolution between cabinets is inconsistent.	

No.	Error message	Explanation	Corrective action
28	communication interrupted.	An error occurred in communication between cases.	Check the connection state between the cabinets, and retry processing. If this fails to solve the problem, contact a Fujitsu customer engineer (CE).
29	another partner is not supported.	The version of firmware of one cabinet is not supported.	Contact a Fujitsu customer engineer (CE).
30	the session mode was not changed.	An attempt to switch the session mode has failed. (But the original status remains as is.)	Check the connection status between cabinets and then retry.
31	the session mode crosses.	An attempt to switch the session mode has failed. (Information between cabinets is inconsistent.)	If this fails to solve the problem, contact a Fujitsu customer engineer (CE) and systems engineer (SE).
32	the operation of SnapOPC was failed.	One of the following has occurred: ・ An error has occurred accessing a Snap Data volume. ・ Reverse copy was implemented when there was not a SnapOPC session.	Take one of the following actions: ・ Check the partition information for the copy destination disk, and then rerun the command. ・ Check the SnapOPC session status, and then rerun the command. If this fails to solve the problem, contact a Fujitsu customer engineer (CE) and systems engineer (SE).
33	the operation of REC buffer was failed.	An attempt to either display information or change the settings for the REC transfer buffer has failed.	Check the settings status of the REC transfer buffer and then rerun the command. If this fails to solve the problem, contact a Fujitsu customer engineer (CE) and systems engineer (SE).
34	the operation of concurrent suspend was failed.	A concurrent suspension operation has failed. (But the original status remains as is.)	Check the status of all sessions, and then rerun the command. For HP-UX and AIX editions, check that the copy destination volume is the same size or larger than the copy source volume. If this fails to solve the problem, contact a Fujitsu systems engineer (SE).
35	invalid Snap Data volume.	A Snap Data volume specification error has been detected. ・ SnapOPC/SnapOPC+ has been specified but the copy destination is not a Snap Data volume. ・ SnapOPC/SnapOPC+ has been specified but the copy source is a Snap Data volume. ・ OPC/ROPC/QuickOPC or EC/REC was specified but either the copy source or the copy destination is a Snap Data volume. A volume other than a Snap Data volume was specified for Snap Data volume initialization.	Check the partition information for the copy source or copy destination device, and then rerun the command. If this fails to solve the problem, contact a Fujitsu customer engineer (CE) and systems engineer (SE).

No.	Error message	Explanation	Corrective action
36	out of sequence.	One of the following occurred: ・ The status does not allow execution of this command. ・ Invalid status or invalid phase detected for the SCSI access. ・ Replication cancellation was executed to a SnapOPC+ generation other than the oldest generation.	Take one of the following actions: ・ Check the processing status, and then try again. ・ Check the session status, and then try again. ・ Check the Snap generation number, and then try again. If this fails to solve the problem, contact a Fujitsu systems engineer (SE).

NOTE:

Refer to the following, collect the data necessary for troubleshooting.
acmcapture (troubleshooting data collection command)

Appendix F Events

This appendix explains the events output from Express.

See
....

Please refer to the hardware manual for meanings and corrective actions of events reported from the device.
....

F.1　Event Format

Each event is explained according to the sections described in the following table.

Table F.1 Event format

Item	Description
Event text	Shows how the event is displayed.
Description	Explains the reason why the event is displayed, or the conditions under which the event is displayed.
Parameters	Explains the meanings of parameters if included in the events.
Administrator response	This section explains the actions that the administrator should take in response to the message.

F.2　Events related to event notification email

This section explains the events related to event notification email.

Sending Email has failed. (E-mail address : [*TOADDRESS*] SMTP server : [*SMTPSERVER*] Detail code : [*DETAILCODE*])

Description

This is warning message.

Event notification emails sending failure.
Administrators cannot receive event notification emails.

Parameters

・ TOADDRESS: Destination of email address

・ SMTPSERVER: Name of SMTP server

・ DETAILCODE: Detail code number

Administrator response

Contact the system administrator.
Check email addresses in [Contacts] and SMTP server settings in [Preferences].

F.3　Events related to Disk storage system configuration change

This section explains the events related to Disk storage system configuration change.

[*KEYNAME*] has been removed.

Description

This is Information message.

Disk storage system configuration change (deletion from Disk storage system).

Parameters

KEYNAME: Configuration information key name.

- ・ Disk Array Information

- ・ Port - CM#Port#

- ・ Disk - No.#

- ・ Volume - No.#

- ・ Raid Group - No.#

- ・ Affinity Group - No.#

- ・ Affinity Group - No.# , Volume No.#

- ・ Host Affinity - Port CM#Port#, Host Name [hostname], Affinity Group No.#

- ・ LunMapping - Port CM#Port# , Volume No.#

- ・ Advanced Copy Configuration

- ・ Remote Path - Remote Array: [Disk storage system Name(IP address)]

- ・ RECBuffer - Partition No.#

Point

When the type is the FibreCAT SX Disk storage system, only "Disk Array Information" is displayed.

Administrator response

None.

The value of [*VALUENAME*] of [*KEYNAME*] has been changed from [*ORIGINALVALUE*] unit to [*CURRENTVALUE*] [*UNIT*].

Description

This is Information message.

Disk storage system configuration change (changing value of Disk storage system).

Parameters

- ・ VALUENAME: Name of value.

- ・ KEYNAME: Configuration information key name.

    - Disk Array Information

    - Port - CM#Port#

    - Disk - No.#

    - Volume - No.#

    - Raid Group - No.#

    - Affinity Group - No.#

- Affinity Group - No.# , Volume No.#

- Host Affinity - Port CM#Port#, Host Name [hostname], Affinity Group No.#

- LunMapping - Port CM#Port# , Volume No.#

- Advanced Copy Configuration

- Remote Path - Remote Array: [Disk storage system Name(IP address)]

- RECBuffer - Partition No.#

P Point

....

When the type is the FibreCAT SX Disk storage system, only "Disk Array Information" is displayed.

....

・ ORIGINALVALUE: Value before it changes.

・ CURRENTVALUE: Present value.

・ UNIT: Unit of changed information. (Example (MB))
  When the unit is unnecessary, it is not displayed.

Administrator response

None.

[*KEYNAME*] has been added.

Description

This is Information message.

Disk storage system configuration change (addition to Disk storage system).

Parameters

KEYNAME: Configuration information key name.

・ Disk Array Information

・ Port - CM#Port#

・ Disk - No.#

・ Volume - No.#

・ Raid Group - No.#

・ Affinity Group - No.#

・ Affinity Group - No.# , Volume No.#

・ Host Affinity - Port CM#Port#, Host Name [hostname], Affinity Group No.#

・ LunMapping - Port CM#Port# , Volume No.#

・ Advanced Copy Configuration

・ Remote Path - Remote Array: [Disk storage system Name(IP address)]

・ RECBuffer - Partition No.#

P Point

....

When the type is the FibreCAT SX Disk storage system, only "Disk Array Information" is displayed.

....

Administrator response

None.

F.4　Events related to changing the IP address

This section explains the events related to changing the IP address for the server that is running Express Manager.

IP address of the operation management server was changed from [*OLD-IP ADDRESS*] to [*NEW-IP ADDRESS*]. Set new destination of SNMP Trap to storage devices.

Description

This is warning message.

Change the IP address for the server that is running Express Manager.

Parameters

- ・ OLD-IP ADDRESS: Old IP address.

- ・ NEW-IP ADDRESS: New IP address.

Administrator response

Please correct the SNMP Trap destination to a new IP address.

- ・ For ETERNUS Disk storage system

    Please correct it by ETERNUS Web GUI.

- ・ For FibreCAT SX Disk storage system

    Please correct it by FibreCAT SX WBI.

F.5　Events related to performance monitoring

This section explains the events related to performance monitoring.

Performance data collecting failure.

Description

This is error message.

Failure in performance data collection.

Administrator response

Please confirm the device and the LAN state with the IP address shown in the event message.

Performance date re-collecting start.

Description

This is Information message.

Start of performance data re-collection.

Administrator response

None.

Performance date re-collecting success.

Description

This is Information message.

Success in performance data re-collection.

Administrator response

None.

F.6   Event related to device polling function

This section explains the events related to device polling function.

When the device polling function of Express detects the change of the device state, display it in the event as follows.

Connection Timeout.

Description

This is warning message.

The state has been changed to connection timeout.

Administrator response

Please confirm whether the LAN between Manager and the device is operating normally.
Please confirm whether the state of each device is proper and whether, processes of network communication such as SNMP are operating normally.
If the community name of a device that uses SNMP for communication is changed, change SNMP community name by referring to "7.4.4 Changing the SNMP community name".

Glossary

Access Path

Path required by a server to access disks in a Disk storage system.

Advanced Copy function

A hardware copy function of ETERNUS Disk storage systems. This is a generic name of EC and OPC.

CCM (Copy Control Module)

A tool that enables backup using the Advanced Copy function of the ETERNUS Disk storage system.

Copy Control Management GUI

A GUI that it manages Copy Control Module.

EC

This is an abbreviation for Equivalent Copy. It is one of the copy functions of the hardware devices in the ETERNUS Disk storage systems. This function maintains the mirror state between the disks in a hardware device. When detach control is executed from software, a copy of such a disk is created.

ETERNUS Disk storage system

Disk array refers to a device that contains multiple hard disks to use it as large capacity storage. It is sometimes referred as "RAID" as the RAID technology which improves the reliability and performance of the device is used. ETERNUS is the product name for Fujitsu's high-reliability and performance disk arrays.

ETERNUS Multipath Driver

The multipath driver for the ETERNUS DX60/DX80/DX90 which is the successor for ETERNUS Multipath driver. By setting a single logical path out of multiple physical access paths, the driver ensures the access to a Disk storage system is alive even when one of the access paths is failed.

ETERNUS Web GUI

Software product for monitoring and displaying the status of the ETERNUS DX60/DX80/DX90 machine and for setup and maintenance.

FC (Fibre Channel)

One of the interfaces for serial transfer. The features of FC include high-speed and long distance transfer to a server.

Logical copy

The logical copy allows a backup or restoration request to be logically completed before completing the actual copy.

OPC

This is an abbreviation of the term "one point copy" which is a hardware function of ETERNUS Disk storage systems. This function executes disk copy at high speeds at the hardware level. When software issues a copy request, a physical copy operation is performed by the hardware. However, the emulation function makes it look like the copy is completed at the software level.

Physical copy

Actual copy processing performed in an ETERNUS Disk storage system after logical copy is completed.

A server is not aware of the physical copy as it is performed background.

Quick OPC

This is a copy method generally used to copy only the data that is updated after a physical copy of all data by OPC is completed.

It is a suitable copy method for Disk to Disk backup.

Differential OPC is an old name for QuickOPC.

RAID (Redundant Arrays of Inexpensive (Independent) Disks)

A technology that secures performance and fault-tolerance by distributing data to multiple hard disks.

RAID level

The RAID level (RAID0-RAID6) is classified according to how data is allocated to disks or how redundancy is configured.

REC

Abbreviation for "Remote Equivalent Copy". REC uses a hardware function of ETERNUS Disk storage systems to achieve EC (Equivalent Copy) between different cabinets.

Redundancy

Redundancy is implemented for fault tolerance or improving reliability by adding stand-by devices in addition to the normal configuration.

Session

Unit of copying execution that is performed by the Advanced Copy function.

SMTP (Simple Mail Transfer Protocol) Server

A server which sends email.

SDV (Snap Data Volume)

This is a volume for storing the copy used as the SnapOPC+ destination. It is necessary to define a Snap Data Volume in advance of SnapOPC+ being invoked.

SnapOPC+

This method copies only the pre-update status of the data parts that are to be updated, and saves the data in snap generation units (a copy-on-write copy method). This method can be used for efficient data copying since it reduces the data size at the copy destination and data can be saved in snap generation units. This copy method is suited to backing up file servers.

Storage

Storage refers to external storage devices such as a disk array device or a tape device including ETERNUS Disk storage system, F649x series and Spectris/Platinum.

Storage system

A storage system refers to the overall configuration including servers performs daily transactions and storage units which stores the data.

Storage System Management GUI

A GUI that is used for setting up a storage system, checking status, backup, restoration and changing configuration.

Suspend/Resume function

This function sets Suspend or Resume for the EC equivalency maintenance status. The synchronous backup operation can be made faster because the function can create a differential copy from the Suspend state.

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