FUJITSU

ETERNUS SF
AdvancedCopy Manager 13.4

Operator's Guide for Copy Control Module

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Preface

Purpose

This manual explains how to use the ETERNUS SF AdvancedCopy Manager Copy Control Module (known hereafter as the "AdvancedCopy Manager CCM") to deliver advanced copy functions in environments where Agents for ETERNUS SF AdvancedCopy Manager have not been installed.
This manual is for the Windows/Solaris/Linux.

Intended Readers

This manual is intended for system administrators who perform storage management using AdvancedCopy Manager CCM.

Organization

This manual consists of the following chapters and appendixes:

Chapter 1 Overview of AdvancedCopy Manager CCM
This chapter provides an overview of AdvancedCopy Manager CCM.

Chapter 2 Setup
This chapter explains how to install and set up AdvancedCopy Manager CCM.

Chapter 3 Operation
This chapter explains how to operate AdvancedCopy Manager CCM.

Chapter 4 Uninstallation
This chapter explains how to uninstall AdvancedCopy Manager CCM.

Appendix A Commands
This appendix explains the various commands required for using AdvancedCopy Manager CCM.

Appendix B Messages for AdvancedCopy Manager CCM
This appendix explains the messages that are output when AdvancedCopy Manager CCM is used.

Appendix C Troubleshooting
This appendix explains how to collect data when problems occur.

Related Manuals

This ETERNUS SF AdvancedCopy Manager manual is included in the following series of manuals:

- ETERNUS SF AdvancedCopy Manager Overview
  Provides an overview of ETERNUS SF AdvancedCopy Manager.
- ETERNUS SF AdvancedCopy Manager Installation Guide
  Describes the installation procedure.
- ETERNUS SF AdvancedCopy Manager Operator's Guide
  Describes the operating procedures.
- ETERNUS SF AdvancedCopy Manager GUI User's Guide
  Describes the operating procedures for the GUI client.
- ETERNUS SF AdvancedCopy Manager Message Guide
  Explains the messages output by ETERNUS SF AdvancedCopy Manager and the associated troubleshooting.
- ETERNUS SF AdvancedCopy Manager Operator's Guide for Cluster Environment
  Describes the installation and customization procedures in a cluster environment.
- ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option
  Describes the operating procedures for tape backup.
- ETERNUS SF AdvancedCopy Manager Operation Guide - Copy Control Module Edition (this document)

Describes how to deliver advanced copy functions by using the ETERNUS SF AdvancedCopy Manager Copy Control Module.

Users are recommended to read the ETERNUS SF AdvancedCopy Manager Overview first to gain an understanding of the general concepts of this software before reading the other manuals as necessary.

Conventions

- Microsoft(R) Windows(R) 2000 Professional, Microsoft(R) Windows(R) 2000 Server, and Microsoft(R) Windows(R) 2000 Advanced Server are abbreviated as Windows 2000.
- Microsoft(R) Windows Server(R) 2003, Standard Edition, Microsoft(R) Windows Server(R) 2003, Enterprise Edition, Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems are abbreviated as Windows Server 2003.
- Microsoft(R) Windows Server(R) 2008 Standard, Microsoft(R) Windows Server(R) 2008 Enterprise, Microsoft(R) Windows Server(R) 2008 Datacenter, and Microsoft(R) Windows Server(R) 2008 for Itanium-Based Systems are abbreviated as Windows Server 2008.
- Microsoft(R) Windows(R) XP Professional and Microsoft(R) Windows(R) XP Home Edition are abbreviated as Windows XP.
- Microsoft(R) Windows Vista(R) Home Basic, Microsoft(R) Windows Vista(R) Home Premium, Microsoft(R) Windows Vista(R) Business, Microsoft(R) Windows Vista(R) Enterprise, and Microsoft(R) Windows Vista(R) Ultimate are abbreviated as Windows Vista.
- "Solaris(TM) Operating System" is abbreviated as "Solaris".
- "ETERNUS SF AdvancedCopy Manager" is abbreviated as "AdvancedCopy Manager".
- Manager of ETERNUS SF AdvancedCopy Manager is abbreviated as Manager of AdvancedCopy Manager.
- Agent of ETERNUS SF AdvancedCopy Manager is abbreviated as Agent of AdvancedCopy Manager.
- ETERNUS2000, ETERNUS3000, ETERNUS4000, ETERNUS6000, ETERNUS8000, and ETERNUS GR series are referred to as Fujitsu ETERNUS Storage Systems.

Trademarks

Table of Contents

Chapter 1 Overview of AdvancedCopy Manager CCM

This chapter presents an overview of AdvancedCopy Manager CCM.

1.1 What is AdvancedCopy Manager?

AdvancedCopy Manager is a product that uses the following functions to deliver storage management for open systems:

- High-speed backup
- High-speed replication

AdvancedCopy Manager uses the advanced copy function of ETERNUS storage systems to deliver these functions.

Refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for more information.

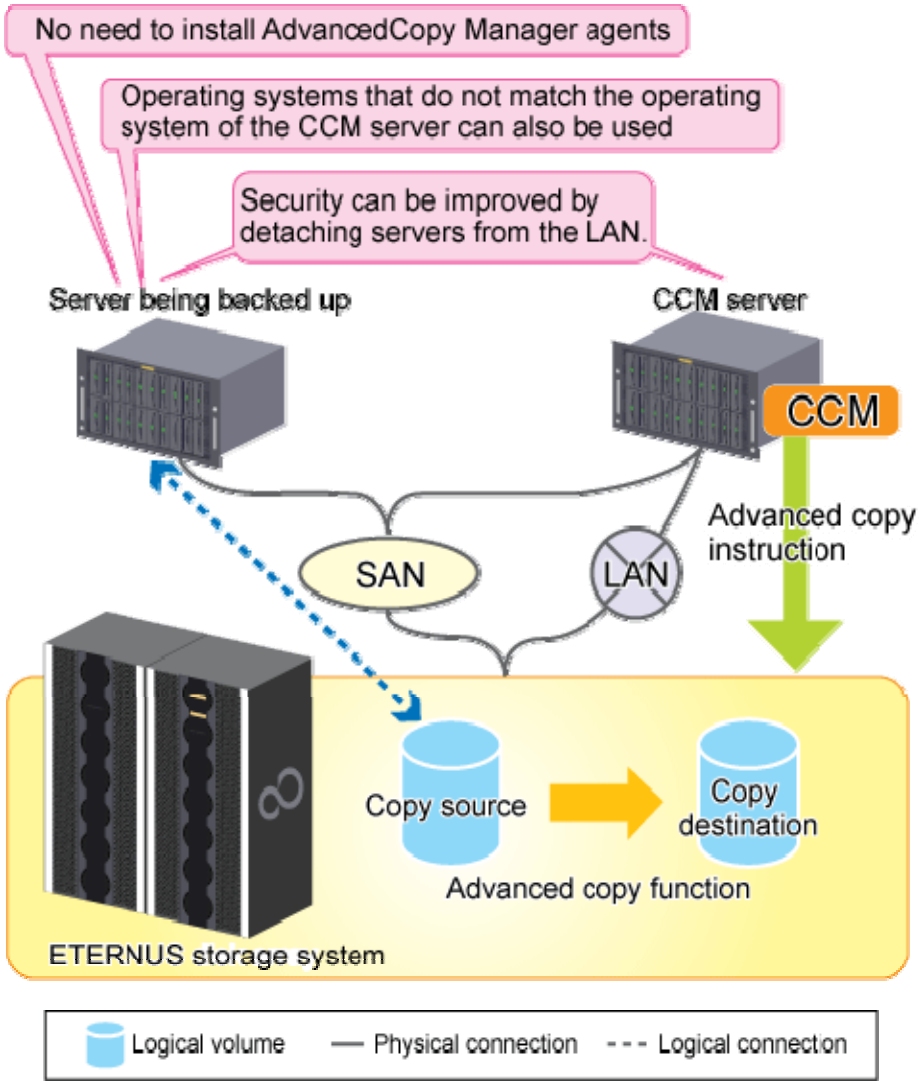
1.2 What is AdvancedCopy Manager CCM?

AdvancedCopy Manager CCM is a backup tool that uses the advanced copy function of ETERNUS storage systems without installing an AdvancedCopy Manager Agent on the server that is backed up (hereafter called the "backup source server").

Using AdvancedCopy Manager CCM has the following advantages:

- There is no need to install an AdvancedCopy Manager Agent on the server that is backed up.
  - Backups can be performed independently of the operating system of the server that is backed up.
  - Operational work becomes more efficient, because there is no need to spend time installing AdvancedCopy Manager Agents on each of the servers to be backed up.
- Security can be improved by isolating the LAN connected to the server to be backed up and the LAN connected to the server where AdvancedCopy Manager CCM is installed (hereafter called the "CCM server").

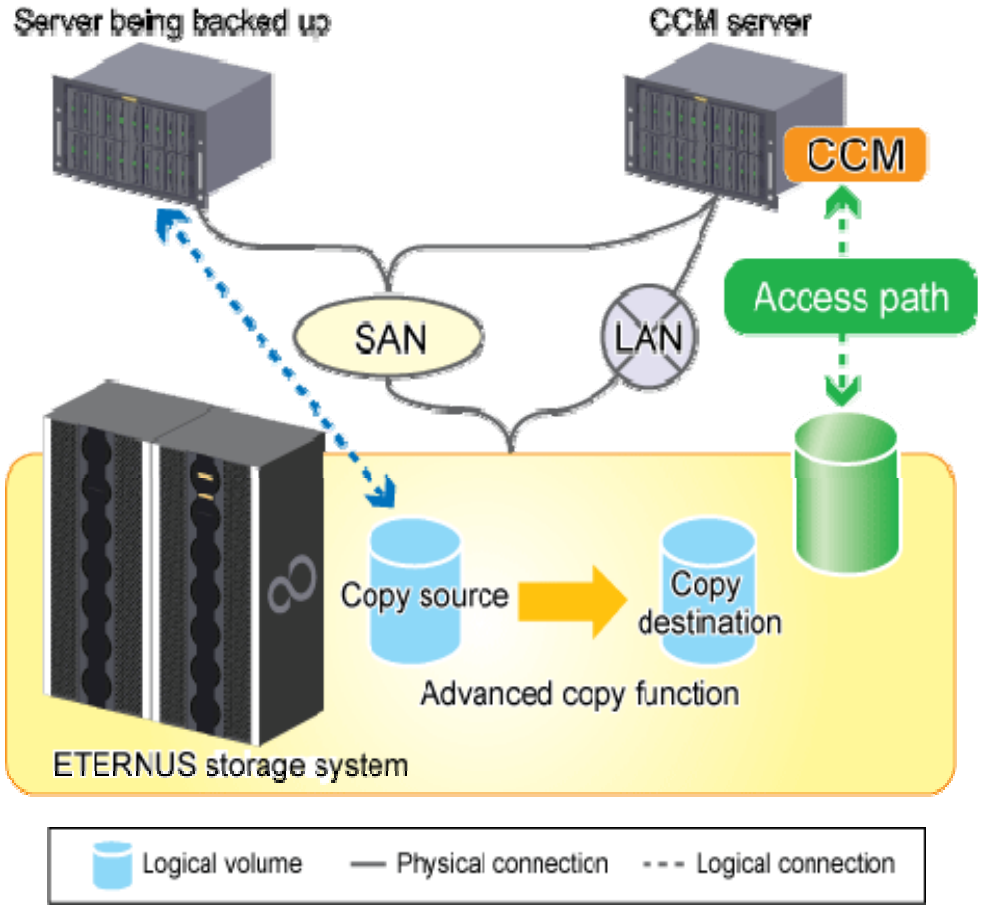
Overview of AdvancedCopy Manager CCM



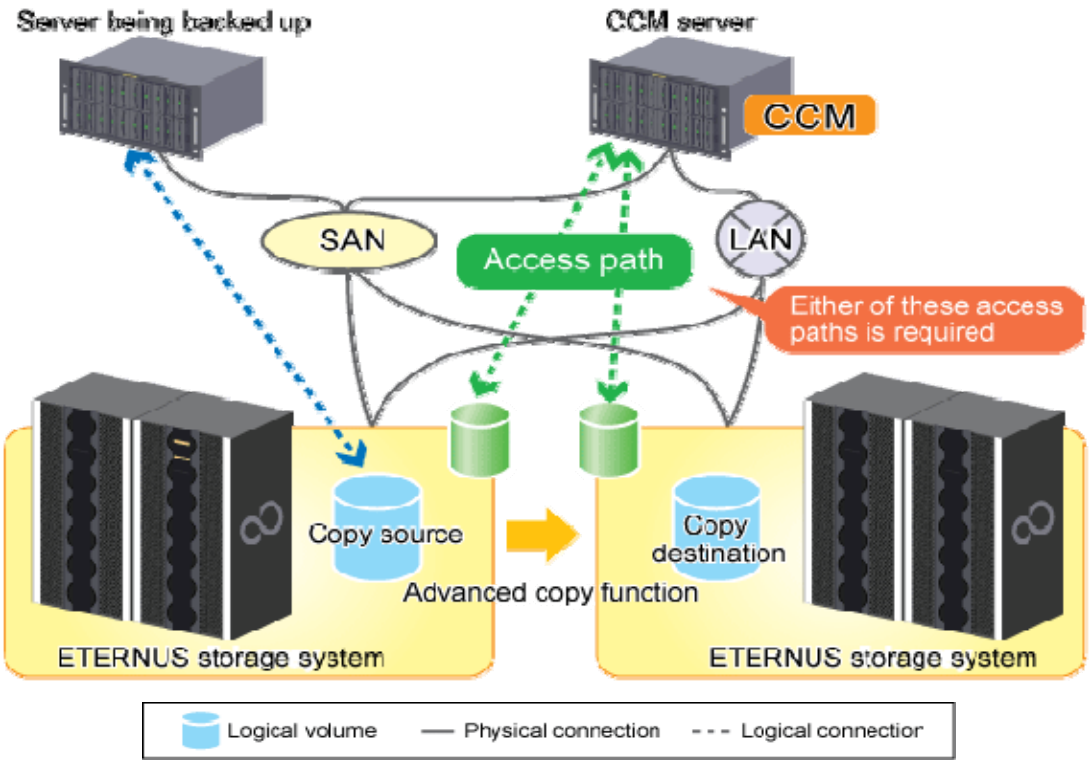
1.3 System Configuration

This section explains the system configuration for AdvancedCopy Manager CCM.
With AdvancedCopy Manager CCM, there must be a logical path between the CCM server and the ETERNUS storage system so that the CCM server can issue advanced copy instructions to the ETERNUS storage system. This logical path is referred to as an access path. To create an access path, the ETERNUS storage system must have a logical volume for control purposes. Connect one of the logical volumes on the ETERNUS storage system to be backed up to the CCM server as an access path.
To execute REC using AdvancedCopy Manager CCM, there must be an access path on either the copy source or the copy destination.

Sample configuration where OPC, QuickOPC or EC is executed using AdvancedCopy Manager CCM



Sample configuration where REC is executed using AdvancedCopy Manager CCM



1.4 Operating Environment

This section explains the operating environment for AdvancedCopy Manager CCM.

1.4.1 Hardware requirements

This section describes the hardware requirements when using AdvancedCopy Manager CCM.

1.4.1.1 ETERNUS Storage System

One of the following ETERNUS storage systems is required to use AdvancedCopy Manager CCM.

Hardware requirements for ETERNUS Storage System

Series	Model	Corresponding firmware version
ETERNUS2000	Model 100/200	V10L50 or later
ETERNUS4000	Model 300/500	V11L50 or later
	Model 400/600	All versions
ETERNUS8000	Model 700/900/1100/2100	V11L50 or later
	Model 800/1200/2200	All versions

1.4.1.2 CCM Server

The available disk capacity and memory required to use AdvancedCopy Manager CCM are listed below.

Hardware requirements for CCM Server

Operating system	Available disk capacity	Memory
Windows	200MB or greater	512MB or greater
Solaris	200MB or greater	512MB or greater
Linux	200MB or greater	512MB or greater

1.4.2 Software requirements

This section describes the software requirements for the server used by AdvancedCopy Manager CCM.

Operating system for the CCM server

Check that the CCM server has one of the following system environments.

Software requirements for the CCM server

Operating system	Operating system level
Windows	Microsoft(R) Windows Server(R) 2003, Standard Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003, Standard x64 Edition Microsoft(R) Windows Server(R) 2003, Standard x64 Edition SP2 Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems SP2 Microsoft(R) Windows Server(R) 2008 Standard(x86,x64) (Note 1) Microsoft(R) Windows Server(R) 2008 Enterprise(x86,x64) (Note 1) Microsoft(R) Windows Server(R) 2008 Datacenter(x86,x64) (Note 1) Microsoft(R) Windows Server(R) 2008 for Itanium-Based Systems
Solaris	Solaris 10 operating system The following functionality is not supported: ● Containers(Zones)
Linux	Red Hat Enterprise Linux 5 (for x86) Red Hat Enterprise Linux 5 (for Intel64) (Note 2) Red Hat Enterprise Linux 5 (for Intel Itanium)

Note 1: The Hyper-V(TM) function of Windows Server 2008 is not supported.
Note 2: Operation in 32-bit compatible mode

It is recommended that the copy destination logical volume should not be connected to any server, for the following reasons:

- To prevent copies between different operating systems
- Operating system behavior cannot be guaranteed if there is another logical volume with the same management information in the same ETERNUS storage system

However, if the copy destination logical volume is connected to the CCM server in order to back up the data to tape, the CCM server and the server being backed up must both have the same operating system.

1.4.3 Supported functions

AdvancedCopy Manager CCM supports the following advanced copy functions.
Note that copies are executed for each separate logical volume of the ETERNUS storage system.

Advanced copy functions supported by AdvancedCopy Manager CCM

Advanced copy function			Supported by AdvancedCopy Manager?	Supported by AdvancedCopy Manager CCM?
Snapshot type high-speed copies	OPC		Y	Y
	QuickOPC		Y	Y
	SnapOPC		Y	N
	SnapOPC+		Y	N
Synchronous high-speed copies	EC	Reversing the copy direction	Y	Y
	REC	Reversing the copy direction	Y	Y
		Initial copy skip function	Y	N
		Concurrent suspension function	Y	N
		Displaying or changing information about the REC transfer buffer	Y	N

Y: Supported
N: Not supported

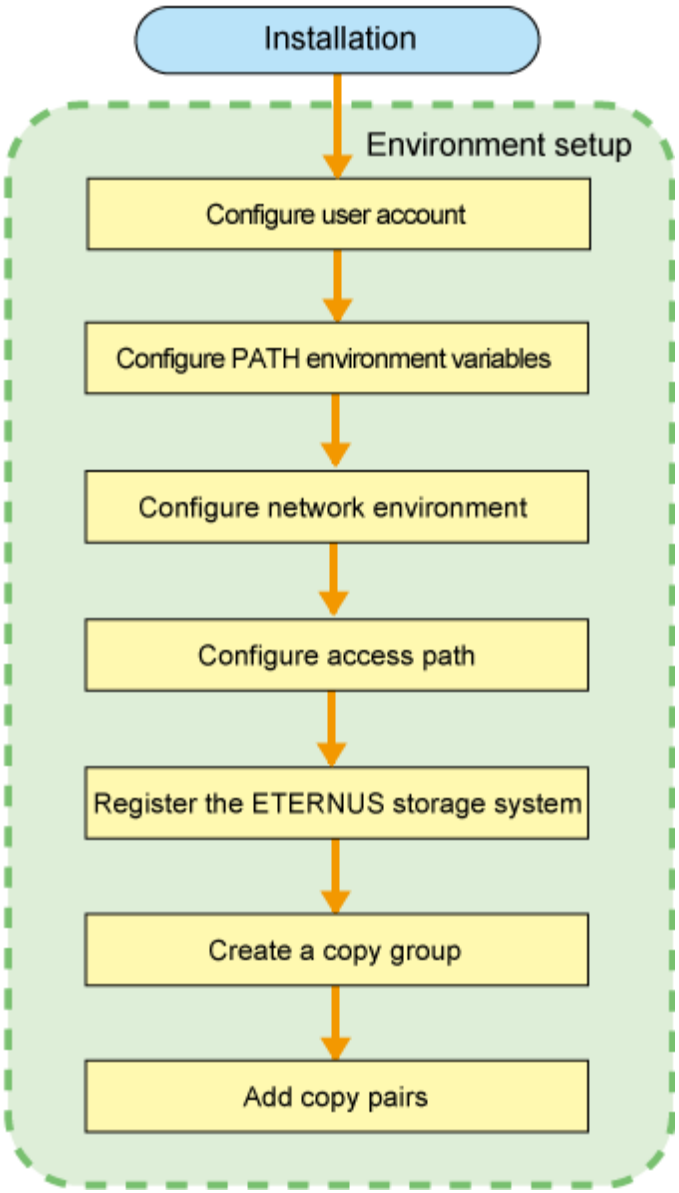
- When using AdvancedCopy Manager and AdvancedCopy Manager CCM together, make sure that the different logical volumes do not interact with each other.
- Cluster systems are not supported in AdvancedCopy Manager CCM.

Chapter 2 Setup

This chapter explains how to set up AdvancedCopy Manager CCM.

The setup procedure is shown below.

Setup procedure



2.1 Installation

This section explains the procedure for installing AdvancedCopy Manager CCM.
Install AdvancedCopy Manager CCM on the server (the CCM Server) that will issue backup/restore (advanced copy) instructions.

2.1.1 Installation on the Windows environment

Use the following procedure to install AdvancedCopy Manager CCM.

1. Log in to the system where AdvancedCopy Manager CCM is to be installed.
   Log in as a user that has Administrator privileges on the terminal where AdvancedCopy Manager CCM is to be installed.

2. Insert the AdvancedCopy Manager CCM CD in the CD drive.

3. Execute the installation program (setup.exe) from the appropriate directory for the operating system being used.
   - For Windows Server 2003

     ```
     <CD drive>:\windows\setup.exe
     ```

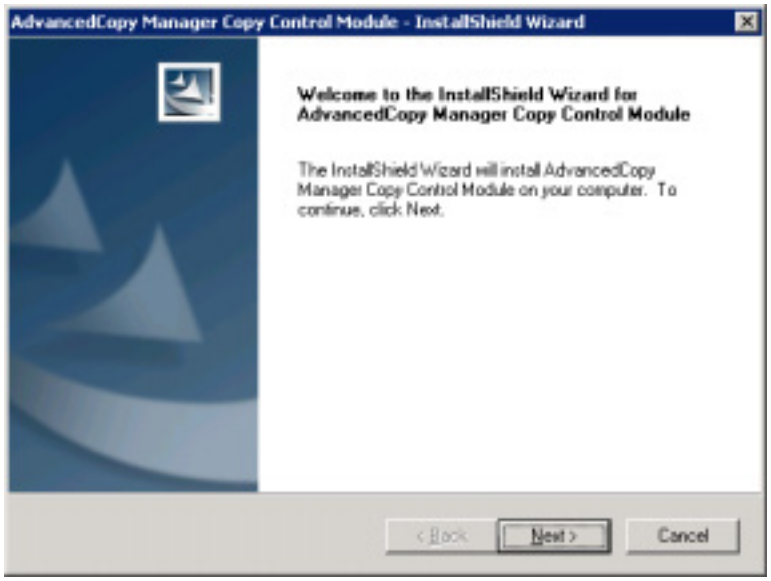
   - For Windows Server 2008 Standard, Enterprise and Datacenter

     ```
     <CD drive >:\windows_x86\setup.exe
     ```

   - For Windows Server 2008 Itanium-Based Systems

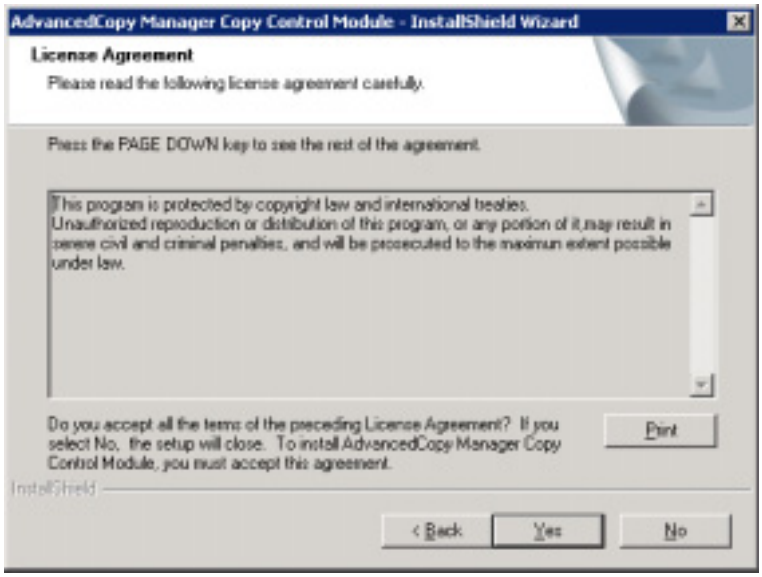
     ```
     <CD drive >:\windows_ia64\setup.exe
     ```

4. The following window will be displayed.
   Check the information displayed, and then click the [Next] button.

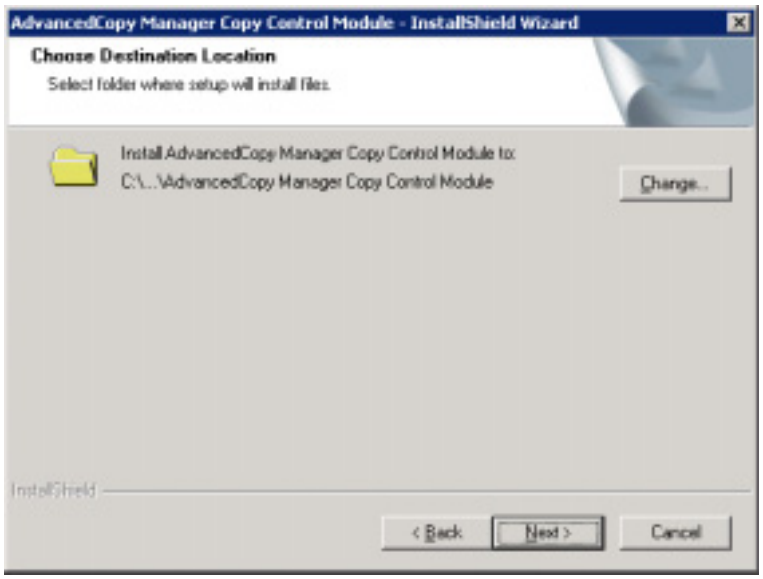


5. Agree to the license agreement in the [License Agreement] window.

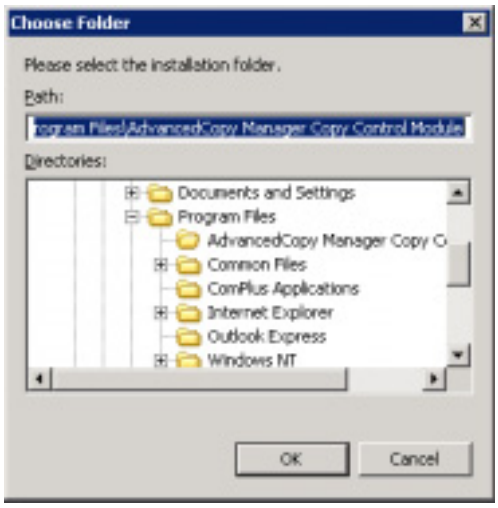
Check the information displayed, and then click the [Yes] button.



6. Specify the installation directory for AdvancedCopy Manager CCM in the [Select Installation Directory] window.
   To install AdvancedCopy Manager CCM in a directory other than the directory displayed by default, click the [Change] button and change the installation directory.

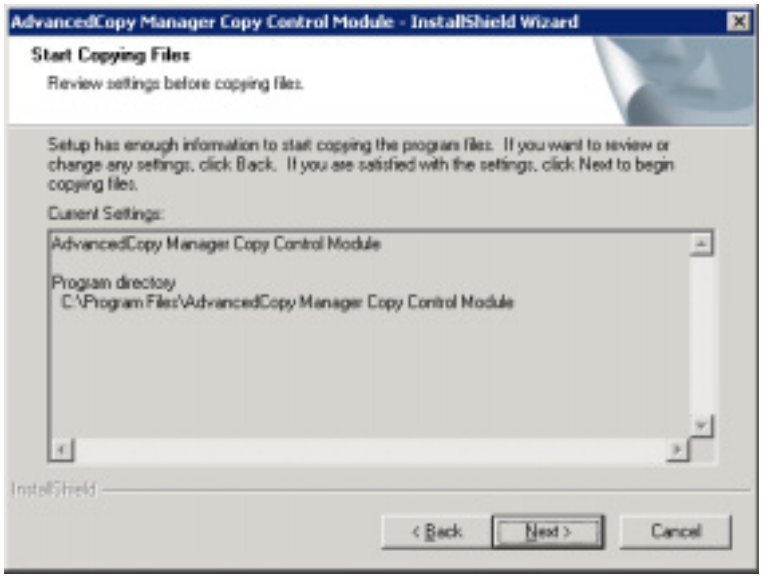


If the [Change] button is clicked, the following window will be displayed.
Select the directory where AdvancedCopy Manager CCM is to be installed, and then click the [OK] button.

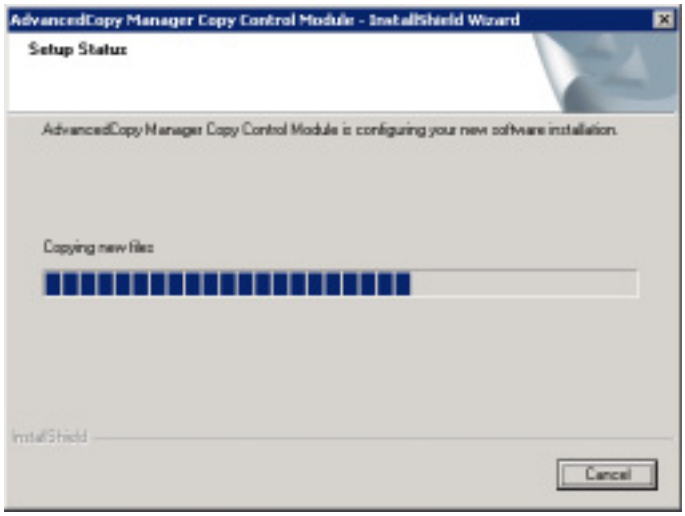


After all directories have been specified, click the [Next] button in the [Select Installation Directory] window.

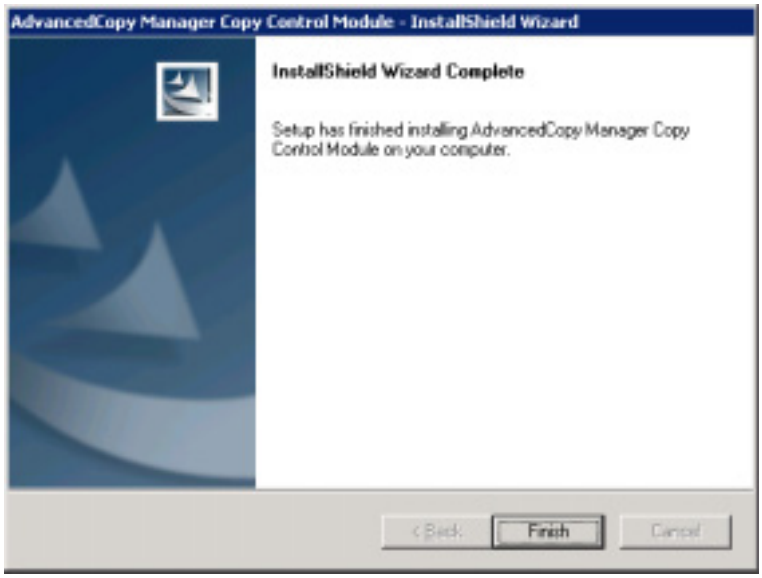
7. Check the information displayed in the [Start copying files] window, and then click the [Next] button.
To change the settings, click the [Back] button.



The installation of AdvancedCopy Manager CCM begins.



8. The installation of AdvancedCopy Manager CCM is complete when the following window is displayed.
   Click the [Finish] button to close the installer.



2.1.2 Installation on the Solaris environment

Use the following procedure to install AdvancedCopy Manager CCM.

1. Log in as a root user.

2. Insert the AdvancedCopy Manager CCM CD in the CD drive and mount the CD-ROM.

```
# mount -F hsfs -o ro /dev/dsk/c0t4d0s0 mount destination of CD
```

Note: The device name of the CD-ROM device differs depending on the device.

3. Start the installation.

```
# pkgadd -d <CD-ROM mount point>/solaris/pkg/FJSVccm.pkg FJSVccm
```

The command will display the default installation directory and a message asking if you want to change the installation settings.

```
ETERNUS SF AdvancedCopy Copy Control Module
(sparc) 13.4
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THIS PACKAGE CONTAINS UNPUBLISHED PROPRIETARY SOURCE CODE OF FUJITSU.

The copyright notice above does not evidence any
actual or intended publication of such source code.

Default installation settings for this setup are as follows:
               Program install directory         : /opt
               Fixed configuration directory     : /etc/opt
               Modifying configuration directory : /var/opt

Do you want to change the installation settings? (default: n) [y,n,?,q]
```

Note 1 - Program install directory (installation directory of the package)
/opt is set as the default.
Note 2 - Fixed configuration directory (installation directory of file for environment settings)
/etc/opt is set as the default.
Note 3 - Modifying configuration directory (installation directory of the file to be modified. For example: log file, temporary file)
/var/opt is set as the default.

- If not modifying, enter "n", or hit the return key to continue.

```
Do you want to change the installation settings? (default: n) [y,n,?,q] n
```

- If modifying, enter "y", and then specify the installation directory to be modified.

```
Do you want to change the installation settings? (default: n) [y,n,?,q] y

Please specify install directory: (default: /opt) [?,q] /acm/opt

Please specify fixed configuration directory: (default: /etc/opt) [?,q]
/acm/etc/opt

Please specify variable configuration directory: (default: /var/opt) [?,q]
/acm/var/opt

Installation settings for this setup are as follows:
              Program install directory         : /acm/opt
              Fixed configuration directory     : /acm/etc/opt
              Modifying configuration directory : /acm/var/opt

Do you want to change the installation settings? (default: n) [y,n,?,q]
```

A message asking for confirmation will be displayed. To accept, enter "n", or hit the return key to continue. To make another modification, enter "y".

4. A message to confirm continuation of installation is displayed. Enter "y".

```
This package contains scripts which will be executed with super-user permission during
the process of installing this package.

Do you want to continue with the installation of <FJSVccm> [y,n,?] y
```

5. When installation completes, the message below is displayed.

```
<Installation of <FJSVccm> was successful.
```

6. Unmount the CD-ROM using the command below, then press the CD tray's Eject button.

```
# umount mount point of CD-ROM
```

2.1.3 Installation on the Linux environment

Use the following procedure to install AdvancedCopy Manager CCM.

1. Log in as a root user.

2. Insert the AdvancedCopy Manager CCM CD in the CD drive and mount the CD-ROM.
   The example below mounts the CD to /dev/cdrom(set in /etc/fstab as the cd media default mount).

```
# mount /dev/cdrom
```

3. Start the installation
   [For 5 for x86, 5 for Intel64 system environment]

```
# rpm -ivh <CD-ROM mount point>/linux50/rpm/FJSVccm-13.4-1.i386.rpm
Preparing...                ########################################### [100%]
   1:FJSVccm                ########################################### [100%]
```

   [For 5 for Intel Itanium system environment]

```
# rpm -ivh <CD-ROM mount point>/linux50-pq/rpm/FJSVccm-13.4-1.ia64.rpm
Preparing...                ########################################### [100%]
   1:FJSVccm                ########################################### [100%]
```

   If changing the installation directory, use the -relocate option to specify the directory set as the default, and the installation directory you wish to change. The default installation directories are displayed below:

   - Package installation directory
     /opt is set as the default.
   - Installation directory of file for environment settings
     /etc/opt is set as the default.
   - Installation directory of the file to be modified (for example: log file, temporary file)
     /var/opt is set as the default.

   Below is an execution example of changing the installation directory.

```
# rpm -ivh <CD-ROM mount point>/linux50/rpm/FJSVccm-13.4-1.i386.rpm --relocate
/opt=/acm/opt --relocate /etc/opt=/acm/etc/opt --relocate /var/opt=/acm/var/opt
Preparing...                ########################################### [100%]
   1:FJSVccm                ########################################### [100%]
```

4. Unmount and eject the CD-ROM using the commands below.

```
# umount /dev/cdrom
# eject cdrom
```

2.2 Environment Settings

This section explains the environment settings for using AdvancedCopy Manager CCM.
Make these settings on all CCM servers.

2.2.1 Configuring User Accounts

This section explains the user accounts that are required when using AdvancedCopy Manager CCM.

2.2.1.1 Windows Server 2003

When using AdvancedCopy Manager CCM in Windows Server 2003, operate as a user with Administrator permissions or a user in the Administrators group.

2.2.1.2 Windows Server 2008

In Windows Server 2008, a User Account Control function (hereafter called "UAC") has been added to enhance security.
Cases where UAC is enabled and disabled are explained below.

- When UAC is enabled
  When any user other than the built-in Administrator account (including accounts in the Administrator group) executes a process or program that requires administrator permissions, the "Permissions granted/authorized dialog" is displayed. Permissions granted or authorized must be confirmed.
- When UAC is disabled
  Processes or programs that require administrator permissions must be executed by either the built-in Administrator account or a user account in the Administrators group.

The operating conditions are shown below.

Relationship between account and UAC

	UAC: Enabled	UAC: Disabled
Built-in Administrator account	A	A
User account in the Administrator group	B	A
Standard user account	B	C

A: Runs without displaying the permissions granted dialog.
B: Displays the permissions granted dialog, and runs if permissions are approved.
C: Does not run, because Administrator permissions cannot be obtained.

If you do not wish to perform the dialog process using the administrator permissions dialog, and the conditions marked as "B" in the table above apply (for example, in batch processing), the program must be executed using administrator permissions with one of the following methods:

- In the Command Prompt, use the runas command to execute the program as a user with administrator permissions or the permissions required to operate AdvancedCopy Manager. A password must be entered after this.

[Batch file (test.bat) execution example]

```
runas /noprofile /user:mymachine\acmuser "cmd.exe /k test.bat"
```

- In the Task Scheduler, specify "Execute with top level privileges" to operate the program.
- From the [Start] menu, select [All Programs]-[Accessories] and right-click on [Command Prompt]. Specify "Run as Administrator" to run the Command Prompt. Execute the program from the Command Prompt.

2.2.1.3 Solaris/Linux user accounts

Execution of AdvancedCopy Manager CCM is only possible for root users. Operate as a root user.

2.2.2 PATH environment variables settings

If using AdvancedCopy Manager CCM commands, add the AdvancedCopy Manager CCM bin directory to the PATH environment variables.

[For Windows]

1. Right-click [Start]-[My Computer] and select [Properties].
2. Select the [Detailed Settings] tab of system properties, and click the [Environment variables] button.
3. Add the values below to the PATH variables.

```
<AdvancedCopy Manager CCM program directory>\bin
```

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

[For Solaris/Linux]

If using Bourne shell, add the value to the PATH variables as shown below.

```
# PATH=$PATH:/opt/FJSVccm/bin
# export PATH
```

Note: Use a colon to separate multiple directories.

2.2.3 Configuring the Network Environment

Configure the network environment to perform communications between the CCM Server and the ETERNUS storage system.
Refer to the ETERNUSmgr manual and check the network environment settings.
If the network environment configuration are insufficient, set them with ETERNUSmgr.

If setting up a firewall between the CCM server and the ETERNUS storage system, in addition to the ETERNUSmgr network environment configuration, use the following settings in the firewall.

Settings for a firewall between the CCM server and the ETERNUS storage system

Port Number	1999
Protocol	tcp
Communication Start Direction	From CCM server to ETERNUS storage system

2.2.4 Access Path Settings

With AdvancedCopy Manager CCM, there must be a logical path between the CCM server and the ETERNUS storage system so that the former can issue advanced copy instructions to the latter. This logical path is referred to as an "access path". To create an access path, the ETERNUS storage system must have a logical volume for control purposes.
Allocate one logical volume within the ETERNUS storage system to the CCM server for access path use.

The settings procedure for the access path is explained below.
[For Windows]

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.

[For Solaris]

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 as a disk with EFI label or VTOC label.

[For Linux]

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.

2.2.5 Registering ETERNUS storage systems

Register ETERNUS storage systems with AdvancedCopy Manager CCM as the devices to be used for copies.
Use the "ETERNUS storage system registration command (acarray add)" to register the ETERNUS storage system.
The following ETERNUS storage system information is required for registration.

- ETERNUS storage system name (hereafter called "ETERNUS name")
  Future operations can be executed with the ETERNUS name.
  In the case of REC, both copy source and copy destination ETERNUS names are required.
- ETERNUS storage system IP address
- ETERNUSmgr user name with Administrator permissions and password
- Access path set in the logical volume within the ETERNUS storage system.

Note for REC

Both ETERNUS storage systems of the copy source and the copy destination must be registered.
Perform the following procedure on the CCM server.

1) Registration of the ETERNUS storage systems that have an access path.
   Specify the existing drive letter or device name in the access path.
2) Registration of the ETERNUS storage systems that do NOT have an access path to the CCM server
   Specify any drive letter or device name in the access path. Even if the specified drive letter or device name does not actually exist, an error will not be caused, so the one specified need not already exist.
3) Creating copy groups
   Specify the ETERNUS name of 1) in the "-a" option.
   Specify the ETERNUS name of 2) in the "-remote" option.

Execution examples are shown below.

[For Windows]
Register the ETERNUS storage system.

```
C:\>acarray add -a E4000 -ip 10.124.6.251 -path c: -user root -password root
Successful completion.
```

To check whether the ETERNUS storage system has been registered, use the command for displaying information about ETERNUS storage systems (acarray list).

```
C:\>acarray list

Name  BOX-ID                                    IP Address
----- ----------------------------------------- ------------
E4000 00E4000M3#####E450S20A####KD4030639004## 10.124.6.251
```

[For Solaris]
Register the ETERNUS storage system.

```
# acarray add -a E4000 -ip 10.124.6.251 -path /dev/rdsk/c4t0d10s2 -user root -password
root
Successful completion.
```

To check whether the ETERNUS storage system has been registered, use the command for displaying information about ETERNUS storage systems (acarray list).

```
# acarray list

Name  BOX-ID                                    IP Address
----- ----------------------------------------- ------------
E4000 00E4000M3#####E450S20A####KD4030639004## 10.124.6.251
```

[For Linux]
Register the ETERNUS storage system.

```
# acarray add -a E4000 -ip 10.124.6.251 -path /dev/sdo -user root -password root
Successful completion.
```

To check whether the ETERNUS storage system has been registered, use the command for displaying information about ETERNUS storage systems (acarray list).

```
# acarray list

Name  BOX-ID                                    IP Address
----- ----------------------------------------- ------------
E4000 00E4000M3#####E450S20A####KD4030639004## 10.124.6.251
```

2.2.6 Creating copy groups

Create copy groups.
A copy group is a group of copy pairs, consisting of a copy source logical volume and a copy destination logical volume.
When creating copy groups, specify which type of advanced copy and which ETERNUS storage system to use.
Refer to "Copy group creation command (acgroup create)" for more information.

[For Windows]

```
C:\> acgroup create -g GRP1 -type OPC -a E4000
Successful completion.
```

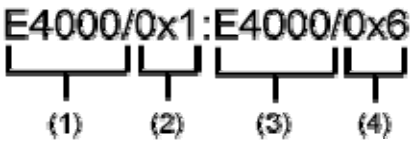
[For Solaris/Linux]

```
# acgroup create -g GRP1 -type OPC -a E4000
Successful completion.
```

2.2.7 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.

Copy pair format



(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

Use the following procedure to add copy pairs.

1. Check the logical volume numbers for the copy source and destination that will be added as a copy pair.
   - Checking the logical volume number of the copy source
     If using the AdvancedCopy Manager CCM function to check the correspondence between the OS device name and the Logical Volume Number, execute the following, depending on the server.
     [For Windows]
     1- Install the AdvancedCopy Manager CCM.
     2- Execute the "Logical volume information display command [Windows] (acutil devs)" to check the correspondence between the OS device name and the Logical Volume Number.
     [For Solaris/Linux/HP-UX/AIX]
     1- Check the operating OS.
     For the operating OS, refer to the "Logical volume information display command [UNIX] (acgetvolinfo)".
     2- Execute the "Logical volume information display command [UNIX] (acgetvolinfo)" to check the correspondence between the OS device name and the Logical Volume Number.
   - Checking the logical volume number of the copy destination
     Operation that is not connected to the server is recommended for the logical volume of the copy destination.
     Specify the "-free" option in the "Logical volume information display command(acinq lv)" with the CCM server to check a logical volume number that is not connected to the server.

2. Add the copy pair to a copy group using the "Copy pair addition command (acpair add)".

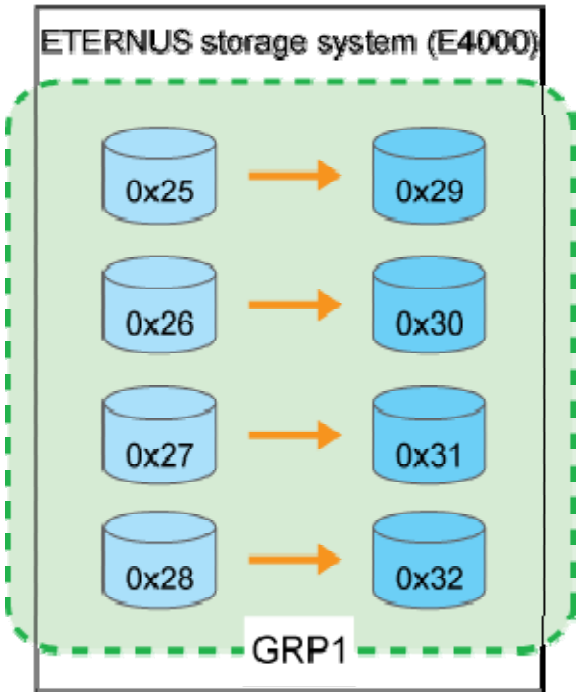
[For Windows]

```
C:\>acpair add -g GRP1 -p E4000/0x25:E4000/0x29
Successful completion.
C:\>acpair add -g GRP1 -p E4000/0x26:E4000/0x30
Successful completion.
C:\>acpair add -g GRP1 -p E4000/0x27:E4000/0x31
Successful completion.
C:\>acpair add -g GRP1 -p E4000/0x28:E4000/0x32
Successful completion.
```

[For Solaris/Linux]

```
# acpair add -g GRP1 -p E4000/0x25:E4000/0x29
Successful completion.

# acpair add -g GRP1 -p E4000/0x26:E4000/0x30
Successful completion.

# acpair add -g GRP1 -p E4000/0x27:E4000/0x31
Successful completion.

# acpair add -g GRP1 -p E4000/0x28:E4000/0x32
Successful completion.
```

Adding copy pairs



3. Check the logical volume numbers of the copy pairs that have been added.

Display information about the ETERNUS storage system using the command for displaying detailed information about copy groups (acgroup detail), and check that the copy pairs have been added using the specified logical volume numbers.

[For Windows]

```
C:\>acgroup detail -g GRP1

Copy Group Name : GRP1
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Pair
--------------------
E4000/0x25:E4000/0x29
E4000/0x26:E4000/0x30
E4000/0x27:E4000/0x31
E4000/0x28:E4000/0x32
```

[For Solaris/Linux]

```
# acgroup detail -g GRP1

Copy Group Name : GRP1
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Pair
--------------------
E4000/0x25:E4000/0x29
E4000/0x26:E4000/0x30
E4000/0x27:E4000/0x31
E4000/0x28:E4000/0x32
```

Chapter 3 Operation

This chapter explains the procedures required to operate AdvancedCopy Manager CCM.

AdvancedCopy Manager CCM performs backups and restorations regardless of the state of the server to be backed up.
Make sure that the server to be backed up has stopped before executing backups and restorations.

If using commands, perform "Configure PATH environment variables".

3.1 Executing Advanced Copies

This section explains the procedures for executing advanced copies using AdvancedCopy Manager CCM.
Refer to "Advanced Copies" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for more information about each type of copy.

3.1.1 Executing snapshot type high-speed copies

3.1.1.1 Backing up and restoring via OPC

This section explains, using Windows examples, how to execute snapshot-type high-speed copies. The procedures for Solaris and Linux are the same.

3.1.1.2 Backing up

Use the snapshot type high-speed copy start command (acopc start) to execute backups via OPC.
[Execution example]

```
C:\>acopc. start -g OpcGroup

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 00:00:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339303034
2323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339303034
2323/Olu=3/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 00:00:02 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339303034
2323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339303034
2323/Olu=4/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

The execution status of the backup can be checked using the status display command for snapshot type high-speed copies (acopc query).

[Execution example]

```
C:\>acopc query -g OpcGroup

Copy Group Name : OpcGroup
Copy Group Type: OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  OPC Status      Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 ==> E4000/0x3 0x21 "OPC Executing" "Copying"          6912
E4000/0x2 ==> E4000/0x4 0x22 "OPC Executing" "Copying"          5760
```

Restoring

Restore the backup data via OPC.

Execute an OPC in the reverse direction (from the copy destination volume to the copy source volume) by specifying the -r option with the snapshot type high-speed copy start command (acopc start).

[Execution example]

```
C:\>acopc start -g OpcGroup -r
E4000/0x1:E4000/0x3
# DATE : 2008/06/25 12:00:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 12:00:02 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=4/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

The execution status of the restoration can be checked by specifying the -r option with the status display command for snapshot type high-speed copies (acopc query).

[Execution example]

```
C:\>acopc query -g OpcGroup -r

Copy Group Name : OpcGroup
Copy Group Type: OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  OPC Status      Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 <== E4000/0x3 0x42 "OPC Executing" "Copying"          9408
E4000/0x2 <== E4000/0x4 0x43 "OPC Executing" "Copying"          3728
```

3.1.1.3 Backing up and restoring via QuickOPC

Backing up

Use the snapshot type high-speed copy start command (acopc start) to execute backups via QuickOPC.

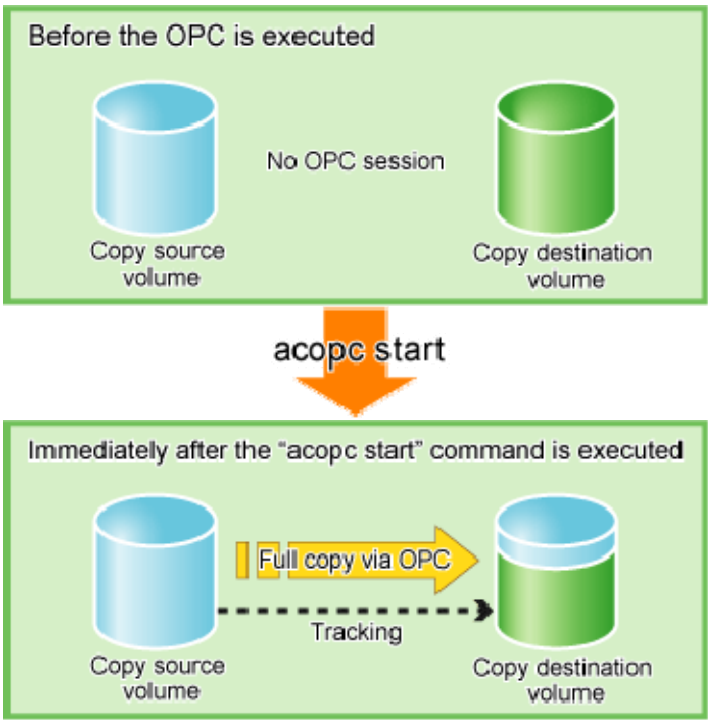
For the first QuickOPC, execute the snapshot type high-speed copy start command (acopc start) without specifying the -diff option.

[Execution example]

```
C:\>acopc start -g QuickOpcGroup

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 00:00:00 - << Differential OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3//Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 00:00:02 - << Differential OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=4/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

Executing the first QuickOPC starts a tracking process as well as an OPC from the copy source volume to the copy destination volume.

What happens when the "acopc start" command is executed (for the first time)



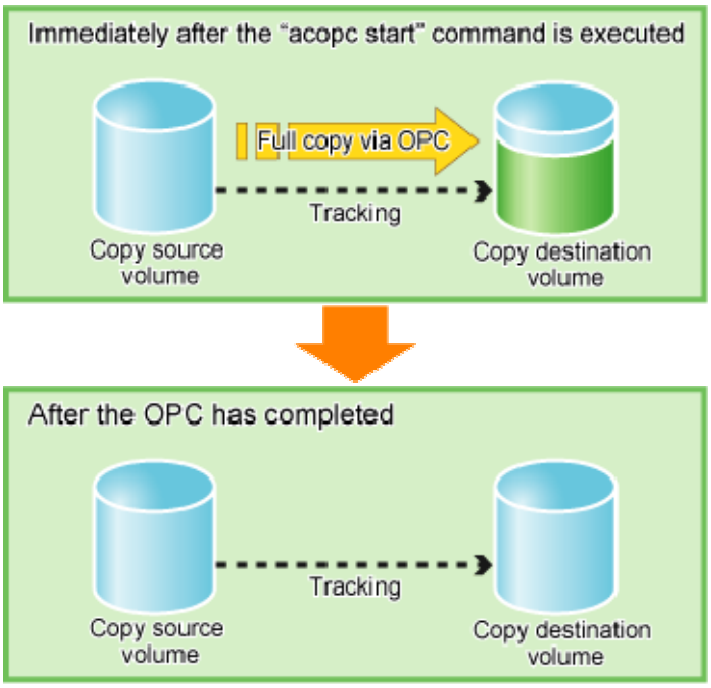
The execution status of the backup can be checked using the status display command for snapshot type high-speed copies (acopc query) in the same way as for backups via OPC.

[Execution example]

```
C:\>acec query -g QuickOpcGroup

Copy Group Name : QuickOpcGroup
Copy Group Type: QuickOPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  OPC Status      Copy Phase          Copied Block
--------- --- --------- ---- --------------- ------------------ ------------
E4000/0x1 ==> E4000/0x3 0x21 "OPC Executing" "Copying/Tracking"         6912
E4000/0x2 ==> E4000/0x4 0x22 "OPC Executing" "Copying/Tracking"         5760
```

When the OPC finishes, only the tracking process will still be running.

What happens when the snapshot processing finishes



The tracking status can be checked using the status display command for snapshot type high-speed copies (acopc query).

[Execution example]

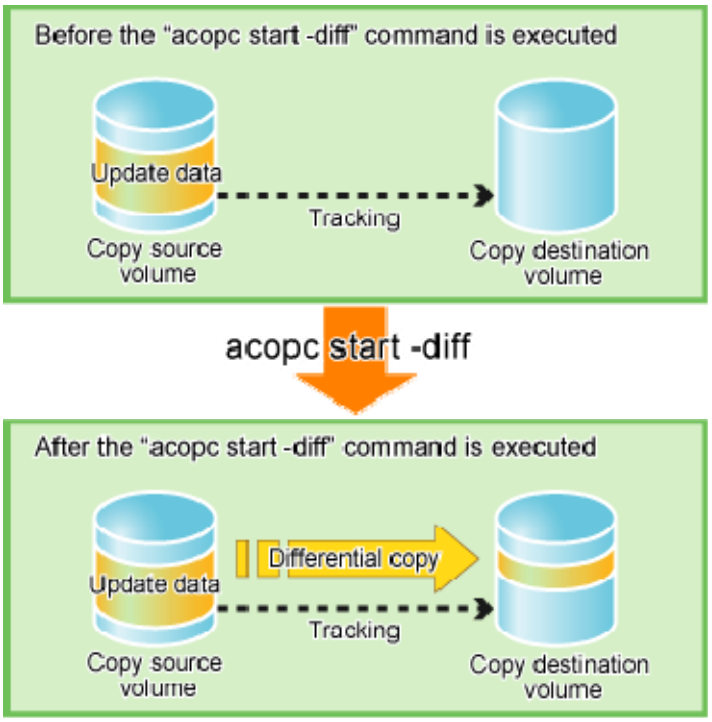
```
C:\>acec query -g QuickOpcGroup

Copy Group Name : QuickOpcGroup
Copy Group Type: QuickOPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  OPC Status      Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 ==> E4000/0x3 0x21 "OPC Executing" "Tracking"       1048576
E4000/0x2 ==> E4000/0x4 0x22 "OPC Executing" "Tracking"       1048576
```

If the snapshot type high-speed copy start command (acopc start) is executed with the -diff option specified while the tracking processing is running, only the differential data updated since the last OPC will be copied, which means that copies take less time to complete.

[Execution example]

```
C:\>acopc start -g QuickOpcGroup -diff

E4000/0x1:E4000/0x3
# DATE : 2008/06/26 00:00:00 - << Differential OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/26 00:00:02 - << Differential OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=4/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

What happens when the "acopc start" command is executed (for the second or subsequent time)



Restoring

Restore the backup data via QuickOPC.

Execute a QuickOPC in the reverse direction (from the copy destination volume to the copy source volume) by specifying the -r option with the snapshot type high-speed copy start command (acopc start).

[Execution example]

```
C:\>acopc start -g QuickOpcGroup -r

E4000/0x1:E4000/0x3
# DATE : 2008/06/26 12:00:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/26 12:0002 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=4/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

The execution status of the restoration can be checked by specifying the -r option with the status display command for snapshot type high-speed copies (acopc query).

[Execution example]

```
C:\>acopc query -g QuickOpcGroup -r

Copy Group Name : QuickOpcGroup
Copy Group Type: QuickOPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  OPC Status      Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 <== E4000/0x3 0x42 "OPC Executing" "Copying"        974848
E4000/0x2 <== E4000/0x4 0x43 "OPC Executing" "Copying"        786432
```

With backup and restoration operations that use QuickOPC, not all data on the logical volume, but only differential data that has been updated since the last OPC completed is copied. This means that both backups and restorations take less time to complete.

3.1.2 Executing synchronous high-speed copies

This section explains, using Windows examples, how to execute synchronous high-speed copies. Solaris and Linux are the same.

3.1.2.1 Backing up and restoring via EC

Backing up

Use the following procedure to execute backups via EC.

1. Use the synchronous high-speed copy start command (acec start) to start an EC.
   [Execution example]

```
C:\>acec start -g EcGroup
E4000/0x1:E4000/0x3
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/24 07:00:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=4/Adr_high=0/Adr_low=0
```

2. Check the execution status of the EC using the status display command for synchronous high-speed copies (acec query).
   Check that all of the ECs in the copy group are in an equivalency maintenance state.
   [Execution example]

```
C:\>acec query -g EcGroup

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  EC Status       Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 ==> E4000/0x3 0x1  "EC Executing"  "Paired"        1048576
E4000/0x2 ==> E4000/0x4 0x2  "EC Executing"  "Paired"        1048576
```

3. Use the synchronous high-speed copy temporary suspension command (acec suspend) to temporarily suspend ECs.
   The backup process is now complete.

[Execution example]

```
C:\>acec suspend -g EcGroup

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4. If backup data is no longer required, use the synchronous high-speed copy restart command (acec resume) to restart ECs in preparation for the next backup.
[Execution example]

```
C:\>acec resume -g EcGroup
E4000/0x1:E4000/0x3
# DATE : 2008/06/25 07:00:00 - << EC Resumed >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 07:00:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

Restoring

Execute restoration via EC using the following procedures.

1. Starting an EC in the reverse direction (i.e., from the copy destination volume to the copy source volume).

The EC start method differs depending on whether there is an EC session already.

- If there is an EC session between the copy source volume and the copy destination volume:
  1) Reverse the EC direction using the synchronous high-speed copy reverse command (acec reverse).
  [Execution example]

```
C:\>acec reverse -g EcGroup

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 12:00:00 - << EC Change >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 12:00:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

2) Restart the EC by specifying the "-r" option with the synchronous high-speed copy restart command (acec resume).

[Execution example]

```
C:¥>acec resume -g EcGroup -r

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 12:01:00 - << EC Resumed >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 12:01:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

- If there is no EC session between the copy source volume and the copy destination volume:

1) Start an EC from the copy destination volume to the copy source volume by specifying the -r option with the synchronous high-speed copy start command (acec start).

[Execution example]

```
C:\>acec start -g EcGroup -r

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434
303330633393030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434
303330633393030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434
303330633393030342323/Olu=4/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434
303330633393030342323/Olu=2/Adr_high=0/Adr_low=0
```

2) Check the execution status of the EC using the status display command for synchronous high-speed copies (acec query).
[Execution example]

```
C:\>acec query -g EcGroup -r

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source    <=> Target    SID  EC Status       Copy Phase Copied Block
--------- --- --------- ---- --------------- ---------- ------------
E4000/0x1 <== E4000/0x3 0x1  "EC Executing" "Paired"        1048576
E4000/0x2 <== E4000/0x4 0x2  "EC Executing" "Paired"        1048576
```

3) Temporarily suspend the EC by specifying the "-r" option with the synchronous high-speed copy temporary suspension command (acec suspend).
The restoration process is now complete.
[Execution example]

```
C:\>acec suspend -g EcGroup -r

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4) Reverse the EC by specifying the "-r" option with the synchronous high-speed copy reverse command (acec reverse) in preparation for the next backup.
[Execution example]

```
C:\>acec reverse -g EcGroup -r

E4000/0x1:E4000/0x3
# DATE : 2008/06/25 15:10:00 - << EC Change >>

E4000/0x2:E4000/0x4
# DATE : 2008/06/25 15:10:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

3.1.2.2 Backing up and restoring via REC

The procedure for executing backups and restorations via REC depends on which transfer mode is being used.

- If the transfer mode is synchronous mode:
  - "Backing up (in synchronous mode)"
  - "Restoring (in synchronous mode)"
- If the transfer mode is stack mode or consistency mode
  - "Backing up (in stack mode or consistency mode)"
  - "Restoring (in stack mode or consistency mode)"

Refer to "Transfer mode" for more information about these transfer modes.

Backing up (in synchronous mode)

Use the following procedure to take a backup via REC in synchronous mode.

1. Use the synchronous high-speed copy start command (acec start) to start a REC from the copy source volume to the copy destination volume.
   Specify the "-transfer sync" option to transfer data in synchronous mode.
   [Execution example]

```
C:\>acec start -g RecGroup -transfer sync

E4000/0x1:E8000/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232346b4434303330
3633393030342323/Olu=1//Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232346b4f34303730
3633393030332323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/24 07:00:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232346b4434303330
3633393030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232346b4f34303730
3633393030332323/Olu=2/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

2. Use the status display command for synchronous high-speed copies (acec query) to check that all of the RECs in the copy group are in an equivalency maintenance state.
[Execution example]

```
C:\>acec query -g RecGroup

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name  : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source     <=> Target     SID(RSID)   EC Status       Copy Phase Copied Block Rcv
Split Xfer
---------- --- ---------- ----------- --------------- ---------- ------------ ----
----- ----
E4000/0x1 ==> E8000/0x1 0x49(0x10) "EC Executing"   "Paired"       1048576 auto
auto  sync
E4000/0x2 ==> E8000/0x2 0x4A(0x11) "EC Executing"   "Paired"       1048576 auto
auto  sync
```

3. Temporarily suspend the REC using the synchronous high-speed copy temporary suspension command (acec suspend).
The backup process is now complete.
[Execution example]

```
C:\>acec suspend -g RecGroup

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4. If backup data is no longer required, restart the REC using the synchronous high-speed copy restart command (acec resume) in preparation for the next backup.
[Execution example]

```
C:\>acec resume -g RecGroup

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 07:00:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 07:00:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

Backing up (in stack mode or consistency mode)

Use the following procedure to take a backup via REC in stack mode or consistency mode.

1. Use the synchronous high-speed copy start command (acec start) to start a REC from the copy source volume to the copy destination volume.
   - To copy in stack mode
     Confirm that the number of blocks that has been copied is equal to the number of whole blocks.
     [Execution example]

```
C:\>acec start -g RecGroup -transfer stack

E4000/0x1:E8000/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434
3033303633393030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232 34b4f34
3037303633393030332323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/24 00:07:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434
3033303633393030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232 34b4f34
3037303633393030332323/Olu=2/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

   - To copy in consistency mode

Confirm that the copy phase is equivalency maintenance state.
[Execution example]

```
C:\>acec start -g RecGroup -transfer consist

E4000/0x1:E8000/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434
303330363339303034232 3/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232 34b4f34
303730363339303033232 3/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/24 07:00:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434
303330363339303034232 3/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045383030304d39232323232345383930533230412323232 34b4f34
303730363339303033232 3/Olu=2/Adr_high=0/Adr_low=0

  Succeeded : 2
  Failed    : 0
```

2. Use the status display command for synchronous high-speed copies (acec query) to check the status of all of the RECs in the copy group.
   — [In the case of stack mode]
   Check that the copied block count and the entire block count are the same.
   [Execution example]

```
C:\>acec query -g RecGroup

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- -----
E4000/0x1 ==> E8000/0x1 0x49(0x10) "EC Executing" "Copying"
1048576 auto ----  stack
E4000/0x2 ==> E8000/0x2 0x4A(0x11) "EC Executing" "Copying"
1048576 auto ----  stack
```

   — [In the case of consistency mode]
   Check that the copy phases are in an equivalency maintenance state.

[Execution example]

```
C:\>acec query -g RecGroup

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- -------
E4000/0x1 ==> E8000/0x1 0x49(0x10) "EC Executing" "Paired"
1048576 auto ----  consist
E4000/0x2 ==> E8000/0x2 0x4A(0x11) "EC Executing" "Paired"
1048576 auto ----  consist
```

3. Forcibly and temporarily suspend the REC by specifying the "-force" option with the synchronous high-speed copy temporary suspension command (acec suspend).
[Execution example]

```
C:\>acec suspend -g RecGroup -force

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4. Use the synchronous high-speed copy mode change command (acec change) to change the REC transfer mode to "through".
[Execution example]

```
C:\>acec change -g RecGroup -transfer through

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 00:01:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 00:01:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

5. Use the synchronous high-speed copy restart command (acec resume) to restart RECs.
[Execution example]

```
C:\>acec resume -g RecGroup

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 00:02:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 00:02:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

6. Use the status display command for synchronous high-speed copies (acec query) to check that all of the RECs in the copy group are in an equivalency maintenance state.
[Execution example]

```
C:\>acec query -g RecGroup

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status       Copy Phase Copied Block Rcv
Split Xfer
--------- --- --------- ---------- -------------- ---------- ------------ ----
----- -------
E4000/0x1 ==> E8000/0x1 0x49(0x10) "EC Executing" "Paired"         1048576 auto
----  through
E4000/0x2 ==> E8000/0x2 0x4A(0x11) "EC Executing" "Paired"         1048576 auto
----  through
```

7. Temporarily suspend the REC using the synchronous high-speed copy temporary suspension command (acec suspend).
The backup process is now complete.
[Execution example]

```
C:\>acec suspend -g RecGroup

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 00:10:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 00:10:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

8. If backup data is no longer required, use the synchronous high-speed copy mode change command (acec change) to change the transfer mode back to the original mode (either stack mode or consistency mode) in preparation for the next backup.
   — [To change to stack mode]

[Execution example]

```
C:\>acec change -g RecGroup -transfer stack

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 07:00:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 07:00:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

— [To change to consistency mode]

[Execution example]

```
C:\>acec change -g RecGroup -transfer consist

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 07:00:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 07:00:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

9. Restart the REC using the synchronous high-speed copy restart command (acec resume).

```
C:\>acec resume -g RecGroup

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 07:01:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 07:01:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

Restoring (in synchronous mode)

Execute restoration via REC using the following procedures.

1. Starting an REC in the reverse direction (i.e., from the copy destination volume to the copy source volume).
   The EC start method differs depending on whether there is an REC session already.

● If there is an REC session between the copy source volume and the copy destination volume:

1) Reverse the REC copy direction using the synchronous high-speed copy reverse command (acec reverse).
   [Execution example]

```
C:\>acec reverse -g RecGroup
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:00:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

2) Restart the REC by specifying the -r option with the synchronous high-speed copy restart command (acec resume).
   [Execution example]

```
C:\>acec resume -g RecGroup -r
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:01:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

- If there is no REC session between the copy source volume and the copy destination volume:

  1) Start an REC from the copy destination volume to the copy source volume by specifying the -r option with the synchronous high-speed copy start command (acec start).

  [Execution example]

```
C:\>acec start -g RecGroup -r -transfer sync

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34
3037303633393030332323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434
3033303633393030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34
3037303633393030332323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_lo
w=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434
3033303633393030342323/Olu=2/Adr_high=0/Adr_low=0
```

  2) Check the status of all of the RECs in the copy group using the status display command for synchronous high-speed copies (acec query).

  [Execution example]

```
C:¥>acec query -g RecGroup -r

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- ----
E4000/0x1 <== E8000/0x1 0x49(0x10) "EC Executing" "Copying"
1048576 auto ----  sync
E4000/0x2 <== E8000/0x2 0x4A(0x11) "EC Executing" "Copying"
1048576 auto ----  sync
```

3) Temporarily suspend the REC by specifying the "-r" option with the synchronous high-speed copy temporary suspension command (acec suspend).
The restoration process is now complete.
[Execution example]

```
C:\>acec suspend -g RecGroup -r
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4) Reverse the REC copy direction by specifying the -r option with the synchronous high-speed copy reverse command (acec reverse) in preparation for the next backup.
[Execution example]

```
C:\>acec reverse -g RecGroup -r
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:10:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:10:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

Restoring (in stack mode or consistency mode)

Execute restoration via REC using the following procedures.

1. Starting an REC in the reverse direction (i.e., from the copy destination volume to the copy source volume.
   The EC start method differs depending on whether there is an REC session already.

● If there is an REC session between the copy source volume and the copy destination volume:

1) Check the transfer mode of the REC using the status display command for synchronous high-speed copies (acec query).
   If necessary, use the synchronous high-speed copy mode change command (acec change) as required to change to another transfer mode (stack mode or consistency mode).
   In the case of stack mode
   [Execution example]

```
C:\>acec change -g RecGroup -transfer stack

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:01:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:01:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

   In the case of consistency mode
   [Execution example]

```
C:\>acec change -g RecGroup -transfer consist

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:01:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:01:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

2) Reverse the REC direction using the synchronous high-speed copy reverse command (acec reverse).
   [Execution example]

```
C:\>acec reverse -g RecGroup"
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:00:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

3) Restart the REC by specifying the -r option with the synchronous high-speed copy restart command (acec resume).

[Execution example]

```
C:\>acec resume -g RecGroup -r"
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:02:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:02:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

- If there is no REC session between the copy source volume and the copy destination volume:

  1) Start a REC from the copy destination volume to the copy source volume by specifying the -r option with the synchronous high-speed copy start command (acec start).

  [In the case of stack mode]

  [Execution example]

```
C:\>acec start -g RecGroup -r -transfer stack

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730
3633393030332323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330
3633393030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730
3633393030332323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330
3633393030342323/Olu=2/Adr_high=0/Adr_low=0
```

  In the case of consistency mode

  [Execution example]

```
C:\>acec start -g RecGroup -r -transfer consist

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730
3633393030332323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330
3633393030342323/Olu=1/Adr_high=0/Adr_low=0

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730
3633393030332323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330
3633393030342323/Olu=2/Adr_high=0/Adr_low=0
```

2) Check the status of all of the RECs in the copy group by specifying the "-r" option using the status display command for synchronous high-speed copies (acec query).

In the case of stack mode

Check that the copied block count and the entire block count are the same.

[Execution example]

```
C:\>acec query -g RecGroup -r

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- -----
E4000/0x1 <== E8000/0x1 0x49(0x10) "EC Executing" "Copying"
1048576 auto ----  stack
E4000/0x2 <== E8000/0x2 0x4A(0x11) "EC Executing" "Copying"
1048576 auto ----  stack
```

In the case of consistency mode

Check that the copy phases are in an equivalency maintenance state.

[Execution example]

```
C:\>acec query -g RecGroup -r

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- -------
E4000/0x1 <== E8000/0x1 0x49(0x10) "EC Executing" "Paired"
1048576 auto ----  consist
E4000/0x2 <== E8000/0x2 0x4A(0x11) "EC Executing" "Paired"
1048576 auto ----  consist
```

3) Forcibly and temporarily suspend the REC by specifying the "-force" option with the synchronous high-speed copy temporary suspension command (acec suspend).
[Execution example]

```
C:\>acec suspend -g RecGroup -r -force

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

4) Use the synchronous high-speed copy mode change command (acec change) to change the REC transfer mode to "through".
[Execution example]

```
C:\>acec change -g RecGroup -r -transfer through
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:01:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:01:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

5) Restart the REC by specifying the "-r" option with the synchronous high-speed copy restart command (acec resume).
[Execution example]

```
C:\>acec resume -g RecGroup -r
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:02:00 - << EC Resumed >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:02:02 - << EC Resumed >>

  Succeeded : 2
  Failed    : 0
```

6) Specify the "-r" option with the status display command for synchronous high-speed copies (acec query) to check that all of the RECs in the copy group are in an equivalency maintenance state.
[Execution example]

```
C:\>acec query -g RecGroup -r

Copy Group Name         : RecGroup
Copy Group Type         : REC
Disk Array Name         : E4000
(00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name : E8000
(00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status      Copy Phase Copied
Block Rcv  Split Xfer
--------- --- --------- ---------- -------------- ----------
------------ ---- ----- ----
E4000/0x1 <== E8000/0x1 0x49(0x10) "EC Executing" "Paired"
1048576 auto ----  through
E4000/0x2 <== E8000/0x2 0x4A(0x11) "EC Executing" "Paired"
1048576 auto ----  through
```

7) Temporarily suspend the REC by specifying the "-r" option with the synchronous high-speed copy temporary suspend command (acec suspend).
The restoration process is now complete.
[Execution example]

```
C:\>acec suspend -g RecGroup -r
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:10:00 - << EC Suspended >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:10:02 - << EC Suspended >>

  Succeeded : 2
  Failed    : 0
```

8) Specify the "-r" option with the synchronous high-speed copy mode change command (acec change) to change the transfer mode back to the original mode (either stack mode or consistency mode) in preparation for the next backup.
In the case of stack mode
[Execution example]

```
C:\>acec change -g RecGroup -r -transfer stack
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:20:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:20:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

In the case of consistency mode
[Execution example]

```
 C:\>acec change -g RecGroup -r -transfer consist
E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:20:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:20:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

9) Reverse the REC copy direction by specifying the "-r" option with the synchronous high-speed copy reverse command (acec reverse).
[Execution example]

```
C:\>acec reverse -g RecGroup -r

E4000/0x1:E8000/0x1
# DATE : 2008/06/25 15:21:00 - << EC Change >>

E4000/0x2:E8000/0x2
# DATE : 2008/06/25 15:21:02 - << EC Change >>

  Succeeded : 2
  Failed    : 0
```

REC operating modes

This section explains the REC operating modes.
There are three types of operating modes for copies that use the REC function, as listed below. One of the following operating modes can be specified to match the operation.

- Transfer mode
- Recovery mode
- Split mode

Transfer mode

This mode relates to the method that the REC uses to transfer data.

Types of transfer modes

Transfer method	Transfer mode	Explanation
Synchronous transfer method	Synchronous	In this mode, responses to write requests from the server do not return as "complete" until data has been written to the copy source volume and copied to the destination volume. Synchronizing data copies with writes to the copy source guarantees the integrity of the data on both the copy source volume and the copy destination volume when the copy completes. This mode is suitable to RECs within sites with short delay times, because it has a large impact on the performance of write accesses from the server.
Asynchronous transfer	Stack	This mode has only a small impact on the time taken to respond to the server because it only records the position of the block that has been

Transfer method	Transfer mode	Explanation
methods		updated before returning "complete" to the server. The data for this block is transferred using an independent transfer engine. Copies can be executed even when there is only limited bandwidth, but in this case the amount of data that has not been transferred may build up.
	Consistency	This mode guarantees the sequence of transfers between copy sessions for the copy destination ETERNUS storage system, and is suitable for operations, such as on databases, that perform mirroring using copies that consist of multiple areas. This mode uses part of cache memory for transfer buffers. Data is transferred to the copy destination by first "storing" a block of data to be copied in a transmission transfer buffer and then using a reception transfer buffer to "expand" the data that has been transferred.
	Through	This mode is for transferring data that has not been transferred when copies in stack mode or consistency mode are stopped or suspended.

Recovery mode

Recovery mode is an operating mode for performing recovery following REC communication errors. The following operating modes can be selected.

Types of recovery mode

Recovery mode	Explanation
Automatic Recovery	In this mode, REC sessions recover automatically when the line that was disconnected due to a communications error is connected again.
Manual Recovery	In this mode, REC sessions must be recovered manually even if the line that was disconnected due to a communications error is connected again.

Split mode

Split mode is an operating mode used when the line path is disconnected due to a line error or disaster, in situations where an REC in synchronous mode is in an equivalency maintenance state. The following operating modes can be selected.

Types of split mode

Split mode	Explanation
Automatic Split	In this mode, if a communication error occurs for some reason while the REC is executing, the REC session will be automatically disconnected and update processing to the copy source will continue.
Manual Split	In this mode, if a communication error occurs for some reason while the REC is executing, the operator will be asked to choose whether to disconnect the REC session. This results in reduced availability, but it also minimizes data losses when disasters occur, because there is no discrepancy between the data on the copy source and the data on the copy destination.

3.2 Backing Up to Tape

Back up the logical volume data of the copy destination to the tape device connected to the CCM server.
This section explains how to create data for the logical volume of the copy destination.
For information on backing to tape, refer to the manual of the backup software and tape device to be used.
Use the following procedure to back up to tape.

[For Windows]

1. Delete any information on the copy destination disk
   Use the diskpart command that comes with Windows to delete all information from the disk that will be the copy destination.
   [Execution example]

```
C:\Documents and Settings\Administrator>diskpart

Microsoft DiskPart Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MS610-B

DISKPART> select disk 14

Disk 14 is now the selected disk.

DISKPART> clean

DiskPart succeeded in cleaning the disk.

DISKPART> exit

DiskPart is terminating...
```

2. Execute the advanced copy
   Refer to "Executing advanced copies" for more information about the execution procedure.
3. Refresh the partition table
   Refresh the partition table by executing the partition table refresh command (acutil refresh) on the CCM server.
   [Execution example]

```
C:\>acutil refresh -d PhygicalDisk14
Successful completion.
```

4. Back up to tape
   Use backup software to back up to tape data that was created in the copy destination volume.

[For Solaris]

1. Unmount the partition on the copy destination disk
   [Execution example]

```
# umount /dev/dsk/c0t1d0s1
```

2. Execute the advanced copy
   For details on the execution procedure, refer to "Executing advanced copies".
3. Mount the partition on the copy destination disk
   [Execution example

```
# mount /dev/dsk/c0t0d0s1 /mnt/backup
```

4. Back up to tape
   Use backup software to back up to tape the data created in the copy destination volume.

[For Linux]

1. Unmount the partition on the copy destination disk
   [Execution example]

```
# umount /dev/sda1
```

2. Execute the advanced copy
   For details on the execution procedure, refer to "Executing advanced copies".
3. Refresh the partition table
   Use the sfdisk or partprobe command to refresh the copy destination disk partition table.
   [Execution example]

```
# sfdisk -R /dev/sda
```

4. Mount the partition on the copy destination disk
   Mount partitions on the copy destination disk.
   [Execution example]

```
# mount /dev/sda1 /mnt/backup
```

5. Back up to tape
   Use backup software to back up to tape data that was created in the copy destination volume.

For details on backup procedures using the AdvancedCopy Manager tape backup function, refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup".

3.3 How to Back Up the Environment Settings Files

With AdvancedCopy Manager CCM, definition files must be backed up and restored manually.
Stop AdvancedCopy Manager CCM processing before backing up or restoring these files.

3.3.1 Backing up environment settings files

This section explains how to back up environment settings files.
Copy the following files to a temporary directory.
[For Windows]

<AdvancedCopy Manager CCM installation directory>etc\db\eternus.xml
All of the files in <AdvancedCopy Manager CCM installation directory>\etc\db\cg\
<AdvancedCopy Manager CCM installation directory >\etc\micc\Stxs.properties
<AdvancedCopy Manager CCM installation directory >\etc\micc\Stxs_env.properties
<AdvancedCopy Manager CCM installation directory >\var\micc\database\DeviceRegList.xml

This completes the backup for environment settings files.

[For Solaris/Linux]

/etc/opt/FJSVccm/db/eternus.xml
All of the files inunder /etc/opt/FJSVccm/db/cg/
/etc/opt/FJSVccm/micc/Stxs.properties
/etc/opt/FJSVccm/micc/Stxs_env.properties
/etc/opt/FJSVccm/micc/database/DeviceRegList.xml

This completes the backup for environment settings files.

3.3.2 Restoring environment settings files

This section explains how to restore the environment settings files that were backed up in "Backing up environment settings files".

1. Delete the following files.
   [For Windows]

All of the files in <AdvancedCopy Manager CCM installation directory>\etc\db\cg\

   [For Solaris/Linux]

All the files inAll the files under /etc/opt/FJSVccm/db/cg/

2. Copy the files that were backed up in "Backing up environment settings files" to the following directory:
   [For Windows]

<AdvancedCopy Manager CCM installation directory >\etc\db\eternus.xml
All of the files in <AdvancedCopy Manager CCM installation directory>\etc\db\cg\
<AdvancedCopy Manager CCM installation directory >\etc\micc\Stxs.properties
<AdvancedCopy Manager CCM installation directory >\etc\micc\Stxs_env.properties
<AdvancedCopy Manager CCM installation directory >\var\micc\database\DeviceRegList.xml

   This completes the restoration of environment settings files.

[For Solaris/Linux]

/etc/opt/FJSVccm/db/eternus.xml
All the files inAll the files under /etc/opt/FJSVccm/db/cg/
/etc/opt/FJSVccm/micc/Stxs.properties
/etc/opt/FJSVccm/micc/Stxs_env.properties
/etc/opt/FJSVccm/micc/database/DeviceRegList.xml

This completes the backup for environment settings files.

3.4 Changing the Configuration

This section explains the procedures for changing the configuration of AdvancedCopy Manager CCM.

3.4.1 Registering additional ETERNUS disk arrays

Register additional information for ETERNUS disk arrays with AdvancedCopy Manager CCM.

Register ETERNUS storage systems by following the procedure in "Registering ETERNUS storage systems".

3.4.2 Changing the registration information for ETERNUS storage systems

This section explains how to change the registration information for ETERNUS storage systems that have been set up with AdvancedCopy Manager CCM.
The registration information for ETERNUS storage systems includes the following items:

- ETERNUS name
- Access path
- BOX ID
- IP address
- User
- Password

Changing ETERNUS names or access paths

Change ETERNUS names or access paths by referring to "Command for changing ETERNUS names and access paths for ETERNUS storage systems (acarray change)".

Changing information other than ETERNUS names or access paths

Use the following procedure to change information other than ETERNUS names or access paths.

1. Delete the registration information
   Delete the registration information for the ETERNUS storage system.
   Refer to "Deleting registration information for ETERNUS storage systems" for more information.
2. Reregister the ETERNUS storage system
   Register the ETERNUS storage system (whose registration information was deleted) again using the new information.
   Register ETERNUS storage systems by following the procedure in "Registering ETERNUS storage systems".

3.4.3 Deleting registration information for ETERNUS storage systems

This section explains how to delete registration information for ETERNUS storage systems that have been set up with AdvancedCopy Manager CCM.
Use the following procedure to delete registration information for ETERNUS storage systems:

1. Delete copy groups
   Delete all of the copy groups that have been set up for the ETERNUS storage system for which registration information is to be deleted.
   Delete the copy groups by referring to "Deleting copy groups".

2. Delete the registration information for the ETERNUS storage system
   Delete the registration information for the ETERNUS storage system that has been set up with AdvancedCopy Manager CCM.
   Refer to "Command for deleting registration information for ETERNUS storage systems (acarray remove)" for more information.

3.4.4 Adding copy groups

This section explains how to add copy groups to AdvancedCopy Manager CCM.

The procedure for adding extra copy groups is the same as for "Creating copy groups".

3.4.5 Changing copy group configurations

The configurations of copy groups can be changed by adding or deleting copy pairs to or from AdvancedCopy Manager CCM.
Use the following procedures to change the configuration of copy groups.

Adding copy pairs

Add copy pairs to the ETERNUS disk array that has been set up with AdvancedCopy Manager CCM.
Add copy groups by referring to "Adding copy pairs".

Deleting copy pairs

Delete the copy pairs for the ETERNUS storage system that has been set up with AdvancedCopy Manager CCM.
Use the following procedure to delete copy pairs:

1. Stop advanced copies
   Use one of the following commands (depending on the type of advanced copy) to stop all of the advanced copies that are executing for the copy pairs to be deleted.
   - "Snapshot type high-speed copy stop command (acopc cancel)"
   - "Synchronous high-speed copy stop command (acec cancel)"
2. Check the status of copy pairs
   Use one of the following commands (depending on the type of advanced copy) to check that all of the advanced copies that are executing for the copy pairs to be deleted have stopped.
   - "Status display command for snapshot type high-speed copies (acopc query)"
   - "Status display command for synchronous high-speed copies (acec query)"

3. Delete copy pairs

   Delete the copy pairs.

   Refer to "Copy pair deletion command (acpair remove)" for more information.

If copy pairs have been deleted by mistake

If a copy pair has been deleted by mistake, take one the following actions:

- Use ETERNUSmgr to stop the advanced copy for the copy pair.
- Add the same copy pair again, and then stop the advanced copy.

3.4.6 Deleting copy groups

This section explains how to delete copy groups that have been set up with AdvancedCopy Manager CCM.

Note that all copy pairs in the copy group will be deleted together with the copy group.

Use the following procedure to delete copy groups:

1. Stop advanced copies

   Use one of the following commands (depending on the type of advanced copy) to stop all of the advanced copies that are executing for the copy group to be deleted.

   - "Snapshot type high-speed copy stop command (acopc cancel)"
   - "Synchronous high-speed copy stop command (acec cancel)"

2. Check the status of the copy group

   Use one of the following commands (depending on the type of advanced copy) to check that all of the advanced copies that are executing for the copy group to be deleted have stopped.

   - "Status display command for snapshot type high-speed copies (acopc query)"
   - "Status display command for synchronous high-speed copies (acec query)"

3. Delete the copy group

   Delete the copy group from AdvancedCopy Manager CCM.

   Refer to "Copy group deletion command (acgroup remove)" for more information.

If copy groups have been deleted by mistake

If a copy group has been deleted by mistake, take one the following actions:

- Use ETERNUSmgr to stop the advanced copies that have been registered with the copy group that was deleted.
- Create another group and add the same copy pairs, then stop the advanced copies.

Chapter 4 Uninstallation

This chapter explains how to uninstall AdvancedCopy Manager CCM.

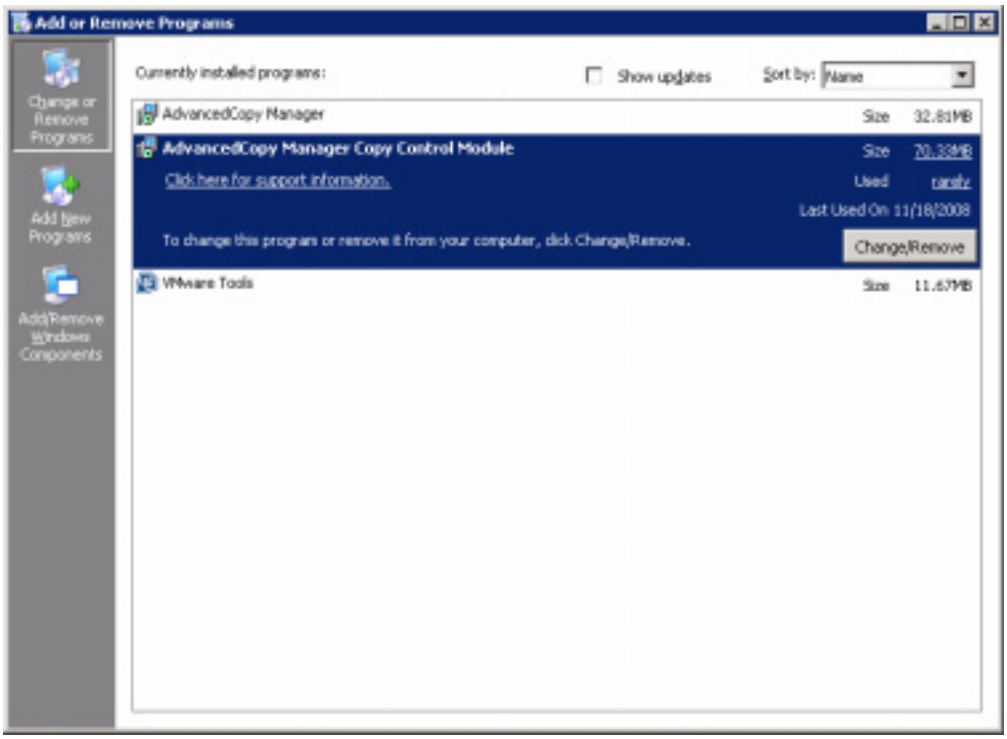
4.1 Uninstall from the Windows Environment

Use the following procedure to uninstall AdvancedCopy Manager CCM.

1. Log in the system where AdvancedCopy Manager CCM is to be uninstalled.
   Log in as a user that has Administrator privileges on the terminal where AdvancedCopy Manager CCM is to be uninstalled.

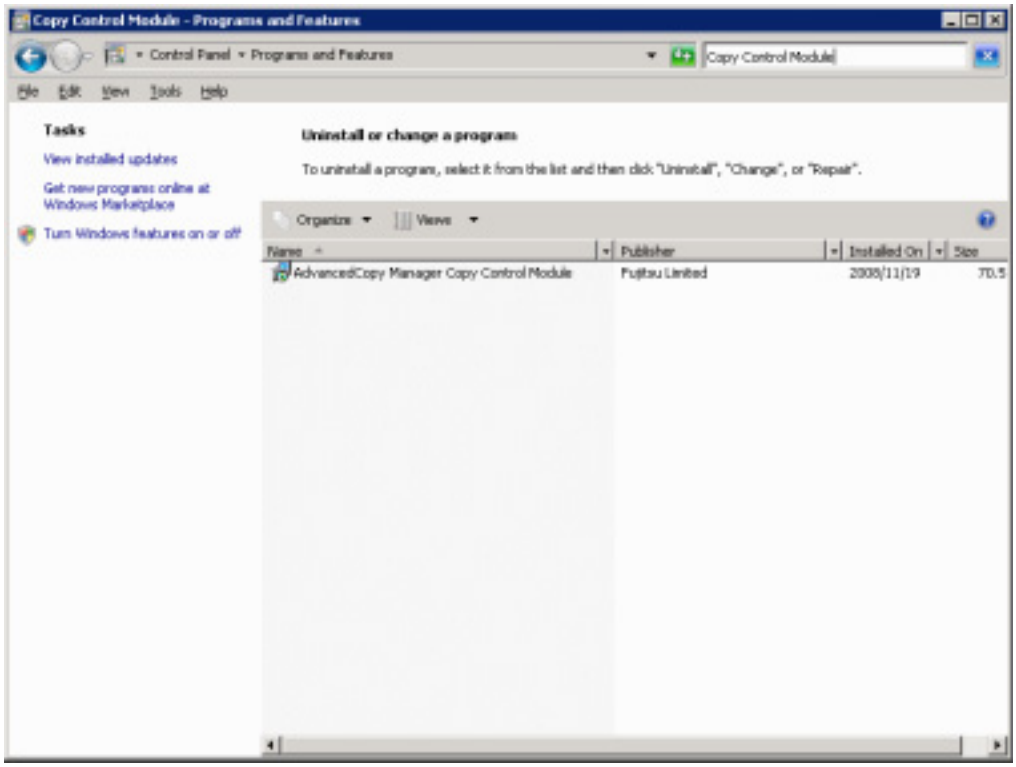
2. Stop all advanced copies
   Use one of the following commands (depending on the type of advanced copy) to stop all of the advanced copies that are executing.
   - "Snapshot type high-speed copy stop command (acopc cancel)"
   - "Synchronous high-speed copy stop command (acec cancel)"

3. Remove AdvancedCopy Manager from the list of programs by following the procedure appropriate to the operating system being used.
   - For Windows Server 2003
     Double-click on the [Add or Remove Programs] icon in the Control Panel to display the following kind of window.
     Select [AdvancedCopy Manager Copy Control Module], and then click the [Change/Remove] button.

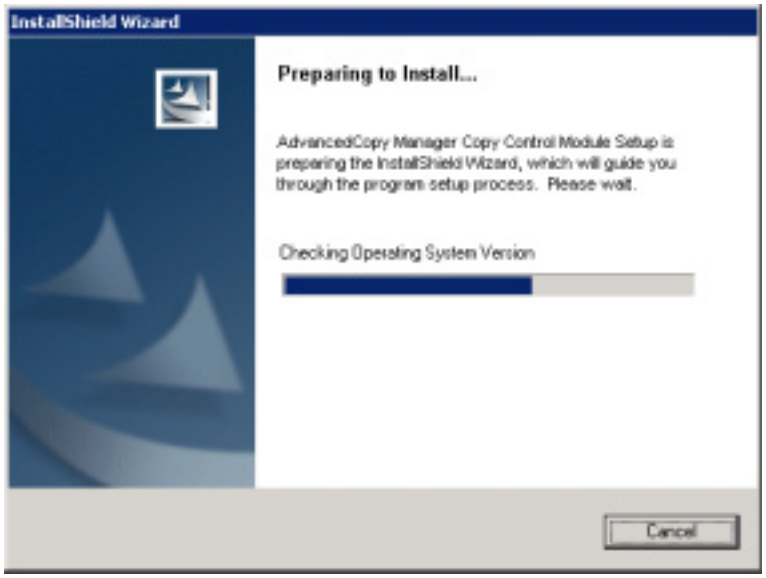


   - For Windows Server 2008

Double-click on the [Programs and Features] icon in the Control Panel to display the following kind of window.
Select [AdvancedCopy Manager Copy Control Module], and then click the [Uninstall] button.

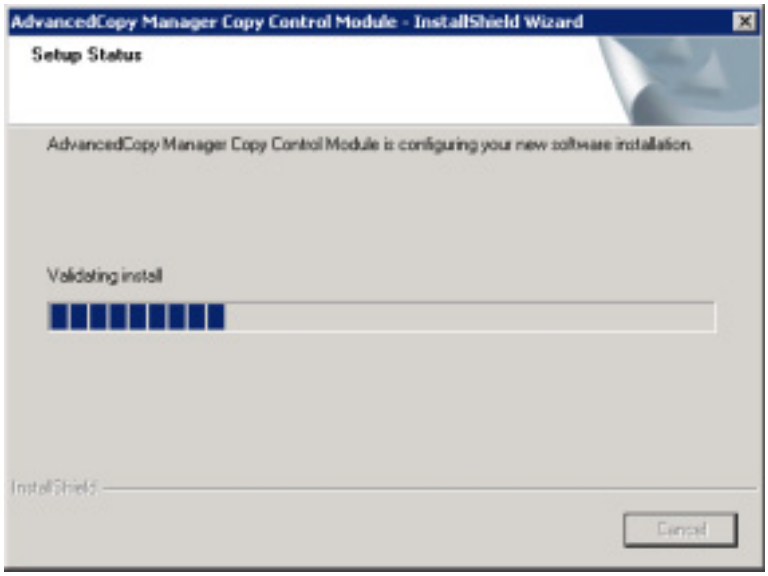


The following window will be displayed.

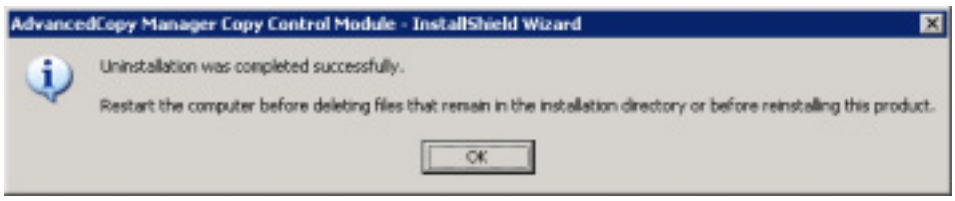


4. Click the [Yes] button in the following confirmation window.

The uninstallation process for AdvancedCopy Manager CCM now starts.



5. The uninstall of AdvancedCopy Manager CCM is complete when the following window is displayed.
   Click the [Finish] button to close the uninstaller.



   Even if uninstall is carried out, the package directory may not be removed. If the directory remains, delete as required.

4.2 Uninstall from the Solaris Environment

Use the following procedure to uninstall AdvancedCopy Manager CCM.

1. Uninstall work of AdvancedCopy Manager CCM must be carried out as a superuser. If a general user, use the su command to switch to superuser.

```
$ su
```

2. Stop advanced copies
   Use one of the commands below (depending on the type of advanced copy) to stop all executing advanced copies.
   - "Snapshot type high-speed copy stop command (acopc cancel)"
   - "Synchronous high-speed copy stop command (acec cancel)"

3. Uninstall the AdvancedCopy Manager CCM package.

```
# pkgrm FJSVccm
```

   Even if uninstall is carried out, the package directory may not be removed. If the directory remains, remove as required.

4.3 Uninstall from the Linux Environment

Use the following procedure to uninstall AdvancedCopy Manager CCM.

1. Uninstall work of AdvancedCopy Manager CCM must be carried out as a superuser. If a general user, use the su command to switch to superuser.

```
$ su
```

2. Stop advanced copies

   Use one of the commands below (depending on the type of advanced copy) to stop all executing advanced copies.

   - "Snapshot type high-speed copy stop command (acopc cancel)"
   - "Synchronous high-speed copy stop command (acec cancel)"

3. Uninstall the AdvancedCopy Manager CCM package.

```
# rpm -e FJSVccm
```

   Even if uninstall is carried out, the package directory may not be removed. If the directory remains, remove as required.

Appendix A Commands

This appendix explains the various commands that are used with AdvancedCopy Manager CCM.
For details on user accounts that can use commands, refer to "Configuring User Accounts".

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

A.1 Command List

The commands can be classified as follows.

Environment definition commands

List of commands for controlling ETERNUS storage systems

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

List of commands for displaying information relating to ETERNUS storage systems

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

List of commands for setting up copy groups

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

Operation commands

List of commands for controlling snapshot type high-speed copies

Function	Command	Explanation
Snapshot type high-speed copy start command (acopc start)	acopc start	Starts snapshot type high-speed copies.
Status display command for snapshot type high-speed copies (acopc query)	acopc query	Displays the status of snapshot type high-speed copies.
Snapshot type high-speed copy stop command (acopc cancel)	acopc cancel	Stops snapshot type high-speed copies.

List of commands for controlling synchronous high-speed copies

Function	Command	Explanation
Synchronous high-speed copy start command (acec start)	acec start	Starts synchronous high-speed copies.
Status display command for synchronous high-speed copies (acec query)	acec query	Displays the status of synchronous high-speed copies.
Synchronous high-speed copy temporary suspension command (acec suspend)	acec suspend	Temporarily suspends synchronous high-speed copies.
Synchronous high-speed copy restart command (acec resume)	acec resume	Restarts temporarily interrupted synchronous high-speed copies.
Synchronous high-speed copy reverse command (acec reverse)	acec reverse	Reverses the direction of synchronous high-speed copies.
Synchronous high-speed copy mode change command (acec change)	acec change	Changes the mode of synchronous high-speed copies (for REC only).
Synchronous high-speed copy stop command (acec cancel)	acec cancel	Stops synchronous high-speed copies.

Utility commands

List of utility commands

Function	Command	Explanation
Command for displaying information about logical volumes [Windows] (acutil devs)	acutil devs	Displays information about logical volumes on Windows servers.
Command for displaying information about logical volumes [UNIX] (acgetvolinfo)	acgetvolinfo	Displays information about logical volumes on UNIX servers.
Partition table refresh command [Windows] (acutil refresh)	acutil refresh	Refreshes the partition table for the disk.

A.2 Control Commands for ETERNUS storage systems

This section explains the commands for ETERNUS storage systems.

A.2.1 ETERNUS storage system registration command (acarray add)

This command registers ETERNUS storage systems.

a. Syntax

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

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS names that are used by AdvancedCopy Manager CCM. Specify it in the alphanumeric character within 16 characters.
-ip	DISKARRAY-IP	This option specifies the IP address of the ETERNUS storage system.
-user	USER	This option specifies a user name with Administrator privileges for ETERNUSmgr. Specify the user name using a string that is between 4 and 16 characters long.
-password	PASSWORD	This option specifies the password for the user with Administrator privileges for ETERNUSmgr.
-path	ACCESSPATH	This option specifies the access path in the logical volume within the ETERNUS storage system that was specified with the "-a" option. [For Windows] Specify the drive letter. Example: X: [For Solaris] Specify the raw device name. Example: /dev/rdsk/c4t0d10s2 [For Linux] Specify the device name. Example: /dev/sdo

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

Refer to the ETERNUSmgr manuals for more information about ETERNUSmgr.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acarray add -a E4000 -ip 10.124.6.251 -user root -password root -path X:
Successful completion.
```

[For Solaris]

```
# acarray add -a E4000 -ip 10.124.6.251 -user root -password root -path
/dev/rdsk/c4t0d10s2
Successful completion.
```

[For Linux]

```
# acarray add -a E4000 -ip 10.124.6.251 -user root -password root -path /dev/sdo
Successful completion.
```

A.2.2 Command for changing ETERNUS names and access paths for ETERNUS storage systems (acarray change)

This command changes the ETERNUS names and access paths for ETERNUS storage systems.

a. Syntax

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

b. Option description

Option	Operand	Explanation
-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 storage system. [For Windows] Specify the drive letter. Example: Y: [For Solaris] Specify the raw device name. Example: /dev/rdsk/c4t0d10s2 [For Linux] Specify the device name. Example: /dev/sdo
-new	NEW-DISKARRAY-NAME	This option specifies the new ETERNUS name to be set for the ETERNUS storage system.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acarray change -a E4000 -p path Y:
Successful completion.
```

[For Solaris]

```
# acarray change -a E4000 -path /dev/rdsk/c4t0d10s2
Successful completion.
```

[For Linux]

```
# acarray change -a E4000 -path /dev/sdo
Successful completion.
```

A.2.3 Command for displaying information about ETERNUS storage systems (acarray list)

This command displays a list of the ETERNUS storage systems that have been registered, together with information about each ETERNUS storage system.

a. Syntax

```
acarray list
```

b. Termination status
=0: Normal termination
>0: Abnormal termination

c. Execution example
[For Windows]

```
acarray list

Name  BOX-ID                                    IP Address
----- ----------------------------------------- ------------
E4000 00E4000M3#####E450S20A####KD4030639004## 10.124.6.251
E8000 00E8000M9#####E890S20A####K04070639003## 10.124.6.241
```

[For Solaris/Linux]

```
# acarray list

Name  BOX-ID                                    IP Address
----- ----------------------------------------- ------------
E4000 00E4000M3#####E450S20A####KD4030639004## 10.124.6.251
E8000 00E8000M9#####E890S20A####K04070639003## 10.124.6.241
```

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 storage system.
IP Address	Displays the IP address for the ETERNUS storage system.

A.2.4 Command for displaying detailed information about ETERNUS storage systems (acarray detail)

This command displays a list of the ETERNUS storage systems that have been registered, together with detailed information about each ETERNUS storage system.

a. Syntax

```
acarray detail -a DISKARRAY-NAME
```

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acarray detail -a E4000

Disk Array Name : E4000
BOX-ID          : 00E4000M3#####E450S20A####KD4030639004##
IP Address      : 10.124.6.251
Admin User      : root
Access Path     : X:
```

[For Solaris]

```
# acarray detail -a E4000

Disk Array Name : E4000
BOX-ID          : 00E4000M3#####E450S20A####KD4030639004##
IP Address      : 10.124.6.251
Admin User      : root
Access Path     : /dev/rdsk/c4t0d10s2
```

[For Linux]

```
# acarray detail -a E4000

Disk Array Name : E4000
BOX-ID          : 00E4000M3#####E450S20A####KD4030639004##
IP Address      : 10.124.6.251
Admin User      : root
Access Path     : /dev/sdo
```

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 storage system.
IP Address	Displays the IP address for the ETERNUS storage system.
Admin User	Displays the name of the user with Administrator privileges for ETERNUSmgr.

Title	Explanation
Access Path	Displays the access path set up for the ETERNUS storage system.

A.2.5 Command for deleting registration information for ETERNUS storage systems (acarray remove)

This command deletes registration information for ETERNUS storage systems.

a. Syntax

```
acarray remove -a DISKARRAY-NAME
```

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acarray remove -a E4000
Successful completion.
```

[For Solaris/Linux]

```
# acarray remove -a E4000
Successful completion.
```

A.3 Commands for Displaying Information Related to ETERNUS storage systems

This section explains the commands for displaying information related to ETERNUS storage systems.

A.3.1 Command for displaying information about logical volumes (acinq lv)

This command displays a list of the logical volumes for ETERNUS storage systems, together with information about each logical volume. This information can be displayed for the following types of logical volumes:

- Open
- SDV

a. Syntax

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

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.
-free	-	Displays list of logical volumes that meet the following requirements. ● The logical volume type is Open. ● Not registered with an affinity group ● Not used by LUN Mapping settings if the affinity function is disabled Note that if the -free option is not specified then only logical volumes with a type of Open or SDV will be listed.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

[When you specify the option -free]

```
C:\>acinq lv -a E4000 -free

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

[When you do not specify the option -free]

```
C:\>acinq lv -a E4000

LV No  LV Name LV Size LV Type RG No Encrypt
------ ------- ------- ------- ----- -------
0x0010           1024M Open        4 -
0x0011           1024M Open        4 -
0x0012           1024M Open        4 -
0x0013           1024M Open        2 -
0x0014           1024M Open        2 -
0x0023           1024M Open        5 -
```

[For Solaris/Linux]

[When you specify the option -free]

```
# acinq lv -a E4000 -free

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

[When you do not specify the option -free]

```
# acinq lv -a E4000

LV No  LV Name LV Size LV Type RG No Encrypt
------ ------- ------- ------- ----- -------
0x0010           1024M Open        4 -
0x0011           1024M Open        4 -
0x0012           1024M Open        4 -
0x0013           1024M Open        2 -
0x0014           1024M Open        2 -
0x0023           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. (only for the ETERNUS2000)
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 is specified as the copy destination for SnapOPC/SnapOPC+.
RG No	Displays the RAID group number.
Encrypt	Displays the encryption status of the logical volume. ● -: Indicates an unencrypted volume.

Title	Explanation
	● Yes: Indicates an encrypted volume.

A.3.2 Command for displaying LUN Mapping information (acinq lunmap)

This command displays LUN Mapping information for affinity groups.
This command cannot be used with the connected affinity group.

a. Syntax

```
acinq lunmap -a DISKARRAY-NAME -agno AFFINITY-GROUP-NO
```

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.
-agno	AFFINITY-GROUP-NO	This option specifies an affinity group number.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
C:\>acinq lunmap -a E4000 -agno 0x004

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

[For Solaris/Linux]

```
# acinq lunmap -a E4000 -agno 0x004

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

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 (only for the ETERNUS 2000).

A.3.3 Command for displaying a list of affinity groups (acinq ag)

This command displays a list of affinity groups for ETERNUS storage systems.
"Affinity groups" are management information on ETERNUS 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 storage systems.

a. Syntax

```
acinq ag -a DISKARRAY-NAME
```

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
C:\>acinq ag -a E4000

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

[For Solaris]

```
# acinq ag -a E4000

AG No AG Name
----- -------
0x000 sol_78
0x001 sol_76
```

[For Linux]

```
# acinq ag -a E4000

AG No AG Name
----- -------
0x000 lin_78
0x001 lin_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.

A.3.4 Command for displaying a list of host affinity groups (acinq hag)

This command displays host affinity groups for ETERNUS storage systems.
"Host affinity groups" are management information on ETERNUS 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.

a. Syntax

```
acinq hag -a DISKARRAY-NAME
```

b. Option description

Option	Operand	Explanation
-a	DISKARRAY-NAME	This option specifies the ETERNUS name.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
C:\>acinq hag -a E4000

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

[For Solaris]

```
# acinq hag -a E4000

Host Name Port Type Address          AG No AG Name
--------- --------- ---------------- ----- -------
          FC        1000006069107A5A 0x002 sol_78
          FC        100000AC340DA34F 0x003 sol_78
          FC        10000045AA2C45GG 0x004 sol_76
```

[For Linux]

```
# acinq hag -a E4000

Host Name Port Type Address          AG No AG Name
--------- --------- ---------------- ----- -------
          FC        1000006069107A5A 0x002 lin_78
          FC        100000AC340DA34F 0x003 lin_78
          FC        10000045AA2C45GG 0x004 lin_76
```

The following table shows the meanings of the information displayed.

Title	Explanation
Host Name	Displays the host name (only for the ETERNUS 2000).
Port Type	Displays the data transfer method. In AdvancedCopy Manager CCM, only fiber channel connection (FC) is displayed.
Address	Displays the WWN for the connection destination
AG No	Displays the affinity group number in hexadecimal.
AG Name	Displays the affinity group name.

A.4 Commands for Setting Up Copy Groups

This section explains the commands relating to copy groups and copy pairs.

A.4.1 Copy group creation command (acgroup create)

This command creates a copy group.

a. Syntax

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

b. Option description

Option	Operand	Explanation
-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 AdvancedCopy Manager CCM. Specify copy group names using up to 64 alphanumeric characters, hyphens (-), underscores (_), hashes (#) or periods (.). The first character must be an alphanumeric character.
-type	● OPC ● QuickOPC ● EC ● REC	This option specifies the type of copy used within the copy group. Specify one of the following copy types: ● OPC ● QuickOPC ● EC ● REC
-a	DISKARRAY-NAME	This option specifies the ETERNUS name. For REC, the access path of the ETERNUS storage system specified here is used.
-remote	REMOTE-DISKARRAY-NAME	For REC, the ETERNUS name besides the specified ETERNUS storage system is specified by the -a option. The access path of the ETERNUS storage system specified by the -a option is used, instead of the access path of the ETERNUS storage system specified here.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acgroup create -g group01 -type OPC -a E4000
Successful completion.
```

[For Solaris/Linux]

```
# acgroup create -g group01 -type OPC -a E4000
Successful completion.
```

A.4.2 Copy group display command (acgroup list)

This command displays a list of copy groups.

a. Syntax

```
acgroup list
```

b. Termination status
=0: Normal termination
>0: Abnormal termination

c. Execution example
[For Windows]

```
C:\>acgroup list

CG Name
-------
Group01
Group02
```

[For Solaris/Linux]

```
# 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.

A.4.3 Command for displaying detailed information about copy groups (acgroup detail)

This command displays the copy pairs that have been set up in copy groups.

a. Syntax

```
acgroup detail -g COPY-GROUP
```

b. Option description

Option	Operand	Explanation
-g	COPY-GROUP	This option specifies the copy group name.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

For OPC, QuickOPC and EC

[For Windows]

```
C:\>acgroup detail -g group01

Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Pair
--------------------
E4000/0x1:E4000/0x6
E4000/0x2:E4000/0x7
E4000/0x3:E4000/0x8
```

[For Solaris/Linux]

```
# acgroup detail -g group01

Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Pair
--------------------
E4000/0x1:E4000/0x6
E4000/0x2:E4000/0x7
E4000/0x3:E4000/0x8
```

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 "Copy group creation command (acgroup create)".
Pair	Displays the copy pair that was set up.

For REC

[For Windows]

```
C:\>acgroup detail -g group01

Copy Group Name         : group01
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name  : E8000 (00E8000M9#####E890S20A####K04070639003##)

Pair
-------------------
E4000/0x1:E8000/0x1
E4000/0x2:E8000/0x2
E4000/0x3:E8000/0x3
```

[For Solaris/Linux]

```
# acgroup detail -g group01

Copy Group Name         : group01
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name  : E8000 (00E8000M9#####E890S20A####K04070639003##)

Pair
-------------------
E4000/0x1:E8000/0x1
E4000/0x2:E8000/0x2
E4000/0x3:E8000/0x3
```

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 "Copy group creation command (acgroup create)".
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-remote" option of the "Copy group creation command (acgroup create)".
Pair	Displays the copy pairs that have been set up.

A.4.4 Copy group deletion command (acgroup remove)

This command removes copy groups.

a. Syntax

```
acgroup remove -g COPY-GROUP
```

b. Option description

Option	Operand	Explanation
-g	COPY-GROUP	This option specifies the copy group name.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acgroup remove -g group01
Successful completion.
```

[For Solaris/Linux]

```
# acgroup remove -g group01
Successful completion.
```

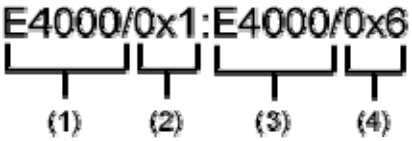
A.4.5 Copy pair addition command(acpair add)

This command adds copy pairs to copy groups.

a. Syntax

```
acpair add -g COPY-GROUP -p PAIR
```

b. Option description

Option	Operand	Explanation
-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.  (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

Note

— 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 of the copy group creation command (acgroup create).

— If the copy type is REC

Specify the ETERNUS name that was specified with either the -a option or the -remote option of the copy group creation command (acgroup create).

- 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.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
acpair add -g group01 -p E4000/0x1:E4000/0x6
Successful completion.
```

[For Solaris/Linux]

```
# acpair add -g group01 -p E4000/0x1:E4000/0x6
Successful completion.
```

A.4.6 Copy pair deletion command (acpair remove)

This command deletes copy pairs from copy groups.

a. Syntax

```
acpair remove -g COPY-GROUP -p PAIR
```

b. Option description

Option	Operand	Explanation
-g	COPY-GROUP	This option specifies the copy group name.
-p	PAIR	This option specifies the copy pair to be deleted.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
C:\acpair remove -g group01 -p E4000/0x1:E4000/0x6
Successful completion.
```

[For Solaris/Linux]

```
# acpair remove -g group01 -p E4000/0x1:E4000/0x6
Successful completion.
```

A.5 Control Commands for Snapshot Type High-speed Copies

This section explains the commands for snapshot type high-speed copies.

A.5.1 Snapshot type high-speed copy start command (acopc start)

This command physically performs a snapshot type high-speed copy for the specified copy group or copy pair.

a. Syntax

[For OPC copy groups]

```
acopc start -g COPY-GROUP [-p PAIR] [-r]
```

[For QuickOPC copy groups]

```
acopc start -g COPY-GROUP [-p PAIR] [-diff|-r]
```

b. Option description

Option	Operand	Explanation
-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 physical copy will start. (only for QuickOPC)
-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.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acopc start -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=6/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=7/Adr_high=0/Adr_low=0

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=8/Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acopc start -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=6/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=7/Adr_high=0/Adr_low=0

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323232 34b4434303330363339
3030342323/Olu=8/Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

A.5.2 Status display command for snapshot type high-speed copies (acopc query)

This command displays the status of the snapshot type high-speed copy for the specified copy group or copy pair.

a. Syntax

```
acopc query -g COPY-GROUP [-p PAIR] [-r]
```

b. Option description

Option	Operand	Explanation
-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.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

For OPC

[For Windows]

```
C:\>acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source  <=> Target  SID  OPC Status      Copy Phase Copied Block
------- --- ------- ---- --------------- ---------- -------------
E4000/1 ==> E4000/3 0x21 "OPC Executing" "Copying"              0
E4000/2 ==> E4000/4 0x22 "OPC Executing" "Copying"        1048576
```

[For Solaris/Linux]

```
# acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source  <=> Target  SID  OPC Status      Copy Phase Copied Block
------- --- ------- ---- --------------- ---------- -------------
E4000/1 ==> E4000/3 0x21 "OPC Executing" "Copying"              0
E4000/2 ==> E4000/4 0x22 "OPC Executing" "Copying"        1048576
```

For QuickOPC

[For Windows]

```
C:\>acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source  <=> Target  SID  OPC Status      Copy Phase Copied Block
------- --- ------- ---- --------------- ---------- ------------
E4000/1 ==> E4000/3 0x21 "OPC Executing" "Tracking"      1048576
E4000/2 ==> E4000/4 0x22 "OPC Executing" "Tracking"      1048576
```

[For Solaris/Linux]

```
# acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : E4000 (00E4000M3#####E450S20A####KD4030639004##)

Source  <=> Target  SID  OPC Status      Copy Phase Copied Block
------- --- ------- ---- --------------- ---------- ------------
E4000/1 ==> E4000/3 0x21 "OPC Executing" "Tracking"      1048576
E4000/2 ==> E4000/4 0x22 "OPC Executing" "Tracking"      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 the ETERNUS name that was specified with the "-a" option of the "Copy group creation command (acgroup create)".
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ● N/A: No copies are being 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. ● No set: Copy processing has not been performed.

Title	Explanation
Copied Block	Displays the number of blocks that have been copied.

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 "Command for displaying detailed information about ETERNUS storage systems (acarray detail)".
For details on how to correctly set the access path, refer to "Access Path Settings".

A.5.3 Snapshot type high-speed copy stop command (acopc cancel)

This command stops the snapshot type high-speed copy for the specified copy group or copy pair.

a. Syntax

[For OPC copy groups]

```
acopc cancel -g COPY-GROUP [-p PAIR] [-r]
```

[For QuickOPC copy groups]

```
acopc cancel -g COPY-GROUP [-p PAIR] [-r] [-force]
```

b. Option description

Option	Operand	Explanation
-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.
-force	-	This option forcibly stops QuickOPC (only for QuickOPC)

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acopc cancel -g group01
E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acopc cancel -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

A.6 Control Commands for Synchronous High-Speed Copies

This section explains the commands for synchronous high-speed copies.

A.6.1 Synchronous high-speed copy start command (acec start)

This command starts synchronous processing for the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

[When the copy type set in the copy group is EC.]

```
acec start -g COPY-GROUP [-p PAIR] [-r]
```

[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}]
```

b. Option description

Option	Operand	Explanation
-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 ● through ● consist ● stack	This option specifies the transfer mode. (Only for REC) The default mode is "stack". ● sync: Synchronous mode ● through: Through mode ● consist: Consistency mode ● stack: Stack mode
-split	● auto ● manual	This option specifies the split mode when sync was specified with the "-transfer" option (Only for REC) The default mode is "auto". ● auto: Automatic Split ● manual: Manual Split
-recovery	● auto ● manual	This option specifies the recovery mode. (Only for REC) The default mode is "auto". ● auto: Automatic Recovery ● manual: Manual Recovery

See

Refer to "Operation mode of REC" for details on each mode.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acec start -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=6/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=7/Adr_high=0/Adr_low=0

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=8/Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec start -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=6/Adr_high=0/Adr_low=0

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=7/Adr_high=0/Adr_low=0

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To  :BoxID=303045343030304d33232323232345343530533230412323234b4434303330363339
3030342323/Olu=8/Adr_high=0/Adr_low=0

  Succeeded : 3
  Failed    : 0
```

A.6.2 Status display command for synchronous high-speed copies (acec query)

This command displays the status of the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

```
acec query -g COPY-GROUP [-p PAIR] [-r]
```

b. Option description

Option	Operand	Explanation
-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.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

For EC

[For Windows]

```
C:\>acec query -g ECGroup

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID  EC Status               Copy Phase Copied Block
--------- --- --------- ---- ----------------------- ---------- ------------
E8000/0x1 N/A E8000/0x3 N/A  "EC action not startup" "Not set"             0
E8000/0x2 ==> E8000/0x4 0x41 "EC Executing"          "Copying"       1048576
```

[For Solaris/Linux]

```
# acec query -g ECGroup

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID  EC Status               Copy Phase Copied Block
--------- --- --------- ---- ----------------------- ---------- ------------
E8000/0x1 N/A E8000/0x3 N/A  "EC action not startup" "Not set"             0
E8000/0x2 ==> E8000/0x4 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 the "-a" option of the "Copy group creation command (acgroup create)".
Remote Disk Array Name	Displays the Box ID with -remote as the alias of the specified ETERNUS storage system (alias).
Source	Displays the logical volume for the copy source.
<=>	Displays the copy direction. ● N/A: No copies are being 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. ● 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. ● No 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.

For REC

[For Windows]

```
C:\>acec query -g RECGroup

Copy Group Name         : RECGroup
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name  : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status              Copy Phase Copied Block
Rcv  Split Xfer
--------- --- --------- ---------- ---------------------- ---------- ------------
---- ----- -------
E4000/0x1 N/A E8000/0x6 N/A        "EC action not startup" "Not set"            0
---- ----  ----
E4000/0x2 ==> E8000/0x7 0x4A(0x11) "EC Executing"         "Copying"            0
auto ----  through
E4000/0x3 ==> E8000/0x8 0x4C(0x13) "EC Suspend"           "Paired"       1048576
auto ----  through
```

[For Solaris/Linux]

```
# acec query -g RECGroup

Copy Group Name         : RECGroup
Copy Group Type         : REC
Disk Array Name         : E4000 (00E4000M3#####E450S20A####KD4030639004##)
Remote Disk Array Name  : E8000 (00E8000M9#####E890S20A####K04070639003##)

Source    <=> Target    SID(RSID)  EC Status              Copy Phase Copied Block
Rcv  Split Xfer
--------- --- --------- ---------- ---------------------- ---------- ------------
---- ----- -------
E4000/0x1 N/A E8000/0x6 N/A        "EC action not startup" "Not set"            0
---- ----  ----
E4000/0x2 ==> E8000/0x7 0x4A(0x11) "EC Executing"         "Copying"            0
auto ----  through
E4000/0x3 ==> E8000/0x8 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 ""Copy group creation command (acgroup create)".
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the "-remote" option of the ""Copy group creation command (acgroup create)".
Source	Displays the logical volume for the copy source.

Title	Explanation
<=>	Displays the copy direction. ● N/A: No copies are being 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 storage system (i.e. the Disk Array Name) and the Session ID of the Remote ETERNUS 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.
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.

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 "Command for displaying detailed information about ETERNUS storage systems (acarray detail)".
For details on how to correctly set the access path, refer to "Access Path Settings".

A.6.3 Synchronous high-speed copy temporary suspension command (acec suspend)

This command temporarily suspends the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

[For EC copy groups]

```
acec suspend -g COPY-GROUP [-p PAIR] [-r]
```

[For REC copy groups]

```
acec suspend -g COPY-GROUP [-p PAIR] [-r] [-force]
```

b. Option description

Option	Operand	Explanation
-g	COPY-GROUP	This option specifies the copy group.
-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.
-force	-	This option forcibly and temporarily suspends the REC session.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acec suspend -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec suspend -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

  Succeeded : 3
  Failed    : 0
```

A.6.4 Synchronous high-speed copy restart command (acec resume)

This command restarts the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

```
acec resume -g COPY-GROUP [-p PAIR] [-r]
```

b. Option description

Option	Operand	Explanation
-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.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acec resume -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec resume -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

  Succeeded : 3
  Failed    : 0
```

A.6.5 Synchronous high-speed copy reverse command (acec reverse)

This command reverses the direction of the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

```
acec reverse -g COPY-GROUP [-p PAIR] [-r]
```

b. Option description

Option	Operand	Explanation
-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	-	Specify this option to copy in the reverse direction.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example
[For Windows]

```
C:\>acec reverse -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec reverse -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

A.6.6 Synchronous high-speed copy mode change command (acec change)

This command changes the mode of the synchronous high-speed 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.

a. Syntax

```
acec change -g COPY-GROUP [-p PAIR] [-r]
[-transfer {sync[-split {auto|manual}]|through|consist|stack}]
[-recovery {auto|manual}]
```

b. Option description

Option	Operand	Explanation
-g	COPY-GROUP	This option specifies the copy group.
-p	PAIR	This option specifies a copy pair.
-r	-	Changes the mode for copies in the reverse direction.
-transfer	● sync ● through ● consist ● stack	This option specifies the transfer mode. ● sync: Synchronous mode ● through: Through mode ● consist: Consistency mode ● stack: Stack mode
-split	● auto ● manual	This option specifies the split mode when sync was specified with the "-transfer" option ● auto: Automatic Split ● manual: Manual Split
-recovery	● auto ● manual	This option specifies the recovery mode. ● auto: Automatic Recovery ● manual: Manual Recovery


See

Refer to "Backing up and restoring via REC" for details of each mode.

c. Termination status
=0: Normal termination
>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acec change -g group01 -transfer sync

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec change -g group01 -transfer sync


E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

  Succeeded : 3
  Failed    : 0
```

A.6.7 Synchronous high-speed copy stop command (acec cancel)

This command stops the synchronous high-speed copy for the specified copy group or copy pair.

a. Syntax

```
acec cancel -g COPY-GROUP [-p PAIR] [-r] [-force]
```

b. Option description

Option	Operand	Explanation
-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.
-force	-	This option forcibly stops the session.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Windows]

```
C:\>acec cancel -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

[For Solaris/Linux]

```
# acec cancel -g group01

E4000/0x1:E4000/0x6
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

E4000/0x2:E4000/0x7
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

E4000/0x3:E4000/0x8
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

  Succeeded : 3
  Failed    : 0
```

A.7 Server Utility Commands

This section explains the utility commands that are used on each server.

A.7.1 Logical volume information display command [Windows] (acutil devs)

This command displays information about the logical volumes on ETERNUS storage systems for Windows servers.

a. Syntax

```
acutil devs
```

b. Termination status
=0: Normal termination
>0: Abnormal termination

c. Execution example

```
C:\>acutil devs

Device         BOX-ID                                    LV No Size
-------------- ----------------------------------------- ----- -------
PhysicalDrive4 00E8000M9#####E890S20A####K04070639003## 0x61  1048576
PhysicalDrive5 00E8000M9#####E890S20A####K04070639003## 0x62  1048576
PhysicalDrive6 00E8000M9#####E890S20A####K04070639003## 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?" in the AdvancedCopy Manager block device name and 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 storage system.
LV No	Displays the logical volume number in hexadecimal.
Size	Displays the size (in blocks) of the logical volume in decimal.

A.7.2 Logical volume information display command [UNIX] (acgetvolinfo)

This command displays information about the logical volumes on ETERNUS storage systems for UNIX servers.
This command is used on the backup source server.
This command can be used with the following operating systems:

- Solaris 10 Operating System
- Red Hat Enterprise Linux 5 (for x86)
- Red Hat Enterprise Linux 5 (for Intel64)
- Red Hat Enterprise Linux 5 (for Intel Itanium)
- AIX 5L V5.3
- HP-UX 11i v3

As a result of a backup source server OS error, the command installation procedure varies between installing and using AdvancedCopy Manager CCM, or copying and using a utility file supported by the OS. Refer to the points below regarding installation.

Install commands using the installation procedure supported by the backup source server OS.

[For Solaris/Linux]
Install and use AdvancedCopy Manager CCM on the backup source server. Or, copy the utility file supported by the OS from the CCM server where AdvancedCopy Manager CCM is installed to the backup source server, and then use it.

[For HP-UX/AIX]
Copy the utility file supported by the OS from the CCM server where AdvancedCopy Manager CCM is installed to the backup source server, and then use it.

If installing AdvancedCopy Manager CCM on the backup source server and using it, refer to "Installation".
If copying the utility file to the backup source server and then using it, copy using the procedures below.

1. Copy the utility file to an arbitrary location on the backup source server.
   The utility file can be found in the following directory on the CCM server.
   [For Windows]

Operating system	Utility file
Solaris 10 Operating system	<AdvancedCopy Manager CCM program directory>\tools\server_utility_solaris.tar
Red Hat Enterprise Linux 5 (for x86) Red Hat Enterprise Linux 5 (for Intel64)	<AdvancedCopy Manager CCM program directory>\tools\server_utility_rhel5x86.tar
Red Hat Enterprise Linux 5 (for Intel Itanium)	<AdvancedCopy Manager CCM program directory>\tools\server_utility_rhel5ia64.tar
AIX 5L V5.3	<AdvancedCopy Manager CCM program directory>\tools\server_utility_aix.tar
HP-UX 11i v3	<AdvancedCopy Manager CCM program directory>\tools\server_utility_hp-ux.tar

[For Solaris/Linux]

Operating system	Utility file
Solaris 10 Operating system	/opt/FJSVccm/tools/server_utility_solaris.tar
Red Hat Enterprise Linux 5 (for x86) Red Hat Enterprise Linux 5 (for Intel64)	/opt/FJSVccm/tools/server_utility_rhel5x86.tar
Red Hat Enterprise Linux 5 (for Intel Itanium)	/opt/FJSVccm/tools/server_utility_rhel5ia64.tar
AIX 5L V5.3	/opt/FJSVccm/tools/server_utility_aix.tar
HP-UX 11i v3	/opt/FJSVccm/tools/server_utility_hp-ux.tar

2. Decompress the utility file, and then change the active directory.

```
# cd <Directory where the file was copied>
# tar xvf <Utility file>
# cd ./server_utility/bin
```

Install and use AdvancedCopy Manager CCM on the backup source server.

[For Solaris/Linux]

a. Syntax

```
acgetvolinfo DEVICE-NAME
```

b. Operand description

Operand	Explanation
DEVICE-NAME	Specifies the device name. [For Solaris] Specifies the RAW device name. Example: /dev/rdsk/c4t0d10s2 [For Linux] Specifies the device name. Example: /dev/sdo

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

[For Solaris]

```
# acgetvolinfo /dev/rdsk/c4t0d10s2
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x041,0x0,0x800000
```

[For Linux]

```
# acgetvolinfo /dev/sdo
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x042,0x0,0x800000
```

The following table shows the meanings of the information displayed.

Title	Explanation
BOX-ID	Displays the box ID for the ETERNUS storage system.
LV No	Displays the logical volume numbers for the ETERNUS storage system in hexadecimal.
Address	Displays the extent start position (in blocks) in hexadecimal.
Size	Displays the extent size (in blocks) in hexadecimal.

Copy utility file to the backup source server and use

[For Solaris/Linux/HP-UX/AIX]

a. Syntax

```
acgetvolinfo DEVICE-NAME
```

b. Operand description

Operand	Explanation
DEVICE-NAME	Specifies the device name. [For Solaris] Specifies the RAW device name. Example: /dev/rdsk/c4t0d10s2 [For Linux] Specifies the device name. Example: /dev/sdo [For HP-UX] Specifies the RAW device name. Example: /dev/rdsk/c1t0d20 [For AIX] Specifies the physical device name. Example: /dev/hdisk10

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. [Execution example]

[For Solaris]

```
# ./acgetvolinfo /dev/rdsk/c4t0d10s2
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x041,0x0,0x800000
```

[For Linux]

```
# ./acgetvolinfo /dev/sdo
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x042,0x0,0x800000
```

[For HP-UX]

```
# ./acgetvolinfo /dev/rdsk/c1t0d20
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x043,0x0,0x800000
```

[For AIX]

```
# ./acgetvolinfo /dev/hdisk10
BOX-ID,LV No,Address,Size
00E4000M3#####E450S20A####KD4030639004##,0x044,0x0,0x800000
```

The following table shows the meanings of the information displayed.

Title	Explanation
BOX-ID	Displays the box ID for the ETERNUS storage system.
LV No	Displays the logical volume numbers for the ETERNUS storage system in hexadecimal.
Address	Displays the extent start position (in blocks) in hexadecimal.
Size	Displays the extent size (in blocks) in hexadecimal.

See

For details on messages output by this command, refer to "Detailed Messages".
For details on messages not listed in that section, refer "ETERNUS SF AdvancedCopy Manager Message Guide", section "Detailed Error Messages of GR Series".

Operating system	Utility file
Solaris 10 Operating System	<AdvancedCopy Manager CCM program directory>\tools\server_utility_solaris.tar
Red Hat Enterprise Linux 5 (for x86) Red Hat Enterprise Linux 5 (for Intel64)	<AdvancedCopy Manager CCM program directory>\tools\server_utility_rhel5x86.tar
Red Hat Enterprise Linux 5 (for Intel Itanium)	<AdvancedCopy Manager CCM program directory>\tools\server_utility_rhel5ia64.tar
AIX 5L V5.3	<AdvancedCopy Manager CCM program directory>\tools\server_utility_aix.tar
HP-UX 11i v3	<AdvancedCopy Manager CCM program directory>\tools\server_utility_hp-ux.tar

1. Decompress the utility file, and then change the active directory.

```
# cd <Directory where the file was copied>
# tar xvf <Utility file>
# cd ./server_utility/bin
```

2. Execute the command.
   Execute this command with the device name specified.

A.7.3 Partition table refresh command [Windows](acutil refresh)

This command refreshes the partition table to update partition information for the specified disk. Only Windows is supported.

a. Syntax

```
acutil refresh -d DEVICE-NAME
```

b. Option description

Option	Operand	Explanation
-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?" in the AdvancedCopy Manager block device name and the "Disk #" displayed in the [Disk Management] window displayed by selecting [Administrative Tools], [Computer Management] and then [Disk Management]from the [Start] menu.

c. Termination status

=0: Normal termination

>0: Abnormal termination

d. Execution example

```
C:\>acutil refresh -d PhysicalDrive2
Successful completion.
```

Appendix B Messages for AdvancedCopy Manager CCM

This appendix explains the messages that are issued by AdvancedCopy Manager CCM and its commands.

B.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.

Format of message explanations

Section	Content
Message text	This section shows the message that is output.
Description	This section explains the reason why the message is output or the situations where the message is output.
Parameters	This section explains the meanings of the parameters in the message text.
System response	This section explains the processing that the system performs when the message is output.
System administrator response	This section explains the actions that the system administrator should take in response to the message.

B.2 Message Explanations

ccm1001

Input parameter is illegal.

Description

An invalid argument has been specified.

System response

Interrupts the processing.

System 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 response

Interrupts the processing.

System administrator response

Check the valid values for the option, and then execute the command again.

ccm1003

An invalid parameter is specified. option=[OPTION], parameter=[PARAMETER]

Description

An invalid parameter has been specified.

Parameters

OPTION: The specified option

PARAMETER: The specified parameter

System response

Interrupts the processing.

System administrator response

Check the valid values for the parameter, and then execute the command again.

ccm1004

An invalid option is specified. copy group=[COPYGROUP], copy type=[COPYTYPE], option=[OPTION]

Description

An invalid option has been specified for a copy group.

Parameters

COPYGROUP: Copy group

COPYTYPE: Copy type

OPTION: The option that was specified

System response

Interrupts the processing.

System 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 response

Interrupts the processing.

System administrator response

Execute the command as a user with Administrator privileges.

ccm3001

The disk array already exists. disk array=[DISKARRAY]

Description

Information for the specified ETERNUS storage system has already been registered.

Parameters

DISKARRAY: ETERNUS name or ETERNUS storage system IP address

System response

Interrupts the processing.

System administrator response

Execute the command again, specifying a ETERNUS name or ETERNUS storage IP address that has not been registered yet.

ccm3002

The copy group already exists. copy group=[COPYGROUP]

Description

The copy group has already been registered.

Parameters

COPYGROUP: Copy group name

System response

Interrupts the processing.

System administrator response

Execute the command again, specifying a copy group name that has not been registered yet.

ccm3003

The pair already exists. copy group=[COPYGROUP], pair=[PAIR]

Description

The copy pair has already been registered.

Parameters

COPYGROUP: Copy group name

PAIR: Copy pair name

System response

Interrupts the processing.

System 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
  This will be one of the following strings:
  - "invalid format"
  - "invalid disk array"

  The following strings appear only when the copy type specified for the copy group is "REC":
  - "same disk array"
  - "invalid copy direction"

System response

Interrupts the processing.

System administrator response

The action required depends on the DETAIL string, as described below:

- "invalid format"
  The format of the copy pair is incorrect.
  Execute the command again, specifying a correct format for the copy pair.
- "invalid disk array"
  The specified ETERNUS storage system has not been set up for the copy group.
  Execute the command again, specifying an ETERNUS storage system that has been set up for the copy group.
- "same disk array"
  The same ETERNUS storage system has been specified for both the copy source and the copy destination.
  Execute the command again, specifying different ETERNUS storage systems for 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.
  Execute the command again, using the same copy direction as for the other copy pairs that have already been added to the copy group.

ccm4001

The disk array does not exist. disk array=[DISKARRAY]

Description

There is no information for the specified ETERNUS storage system.

Parameters

DISKARRAY: ETERNUS name

System response

Interrupts the processing.

System administrator response

Use the command for displaying information about ETERNUS storage systems (acarray list) to check whether the specified ETERNUS name is correct.

ccm4002

The disk array does not exist. disk array=[BOX-ID]

Description

There is no information for the specified ETERNUS storage system.

Parameters

BOX-ID: The box ID for the ETERNUS storage system

System response

Interrupts the processing.

System administrator response

The information for the ETERNUS storage system specified by the BOX-ID has been deleted. Register the same box ID information for the specified ETERNUS storage system again, and then execute the command again.

ccm4003

The copy group is not found. copy group=[COPYGROUP]

Description

The specified copy group has not been set up.

Parameters

COPYGROUP: Copy group name

System response

Interrupts the processing.

System administrator response

Use the copy group display command (acgroup list) to check whether the specified copy group name is correct.

ccm4004

The pair is not found. copy group=[COPYGROUP]

Description

The copy pair has not been set up for the specified copy group.

Parameters

COPYGROUP: Copy group name

System response

Interrupts the processing.

System 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=[COPYGROUP], pair=[PAIR]

Description

The specified copy pair has not been set up for the copy group.

Parameters

COPYGROUP: Copy group name

PAIR: Copy pair name

System response

Interrupts the processing.

System 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=[LOGICAL-VOLUME]

Description

The specified logical volume does not exist.

Parameters

LOGICAL-VOLUME: Logical volume

System response

Interrupts the processing.

System administrator response

Execute the command again, specifying an existing logical volume.

ccm4007

An invalid copy group is specified. copy group=[COPYGROUP], copy type=[COPYTYPE]

Description

The operation that the user is trying to execute cannot be performed on the specified copy group.

Parameters

COPYGROUP: The specified copy group
COPYTYPE: The copy type set in the copy group

System response

Interrupts the processing.

System administrator response

Check the copy type that has been set up for the specified copy group.

ccm5001

Operation aborted. The configuration file is in use.

Description

Processing was interrupted because an AdvancedCopy Manager 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 response

Interrupts the processing.

System administrator response

Wait for the conflicting command to finish, and the execute the command again.

ccm5002

Operation failed. function=[FUNCTION], message=[MESSAGE]

Description

The process has failed.

Parameters

FUNCTION: Process name

MESSAGE: Message

System response

Interrupts the processing.

System administrator response

Take the appropriate action according to the error message.

ccm5003

Operation failed. function=[FUNCTION], message=[MESSAGE]

Description

The process has failed.

Parameters

FUNCTION: Process name

MESSAGE: Message

System response

Interrupts the processing.

System administrator response

Take the appropriate action indicated by the "Detailed Messages" section displayed in the MESSAGE section.

ccm5004

Operation failed. function=[FUNCTION], message=[MESSAGE]

Description

The process has failed.

Parameters

FUNCTION: Process name

MESSAGE: Message

System response

Interrupts the processing.

System administrator response

Take the appropriate action indicated by the "Detailed Messages" section displayed in the MESSAGE section.

If a message not listed in "Detailed Messages" is displayed, then please refer to "Detailed Error Messages for the GR Series" in the "ETERNUS SF AdvancedCopy Manager Message Guide".

ccm5005

An invalid mount point is specified. mount point=[MOUNTPOINT]

Description

An invalid mount point or drive letter has been specified.

Parameters

MOUNTPOINT: The mount point or drive letter

System response

Interrupts the processing.

System 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 "Logical volume information display command [UNIX] (acgetvolinfo)"

ccm5006

An invalid device is specified. device=[DEVICE]

Description

An invalid device has been specified.

Parameters

DEVICE: Device

System response

Interrupts the processing.

System 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=[FUNCTION], error=[ERROR]

Description

The execution of a system function has failed.

Parameters

FUNCTION: System function
ERROR: Error content

System response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Check the status of the file system.
If the file system is normal, then gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Check the status of the file system.
If the file system is normal, then gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Check the status of the file system.
If the file system is normal, then gather the information needed to resolve the problem as described in "How to Collect Data", and then contact a Fujitsu SE.

ccm8006

Could not start Java VM.

Description

Starting the Java VM has failed.

System response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", and then contact a Fujitsu SE.

ccm8007

A memory allocation failed.

Description

Allocating a memory area has failed.

System response

Interrupts the processing.

System administrator response

Check the memory usage status.

- If there is not enough memory, then increase it.
- If there is enough memory, then gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Check the status of the file system.

If the file system is normal, then gather the information needed to resolve the problem as described in "How to Collect Data", and then contact a Fujitsu SE.

ccm9001

The configuration file has an invalid format. file=[FILE]

Description

The content of the configuration file is invalid.

Parameters

FILE: File name

System response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", 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 response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", and then contact a Fujitsu SE.

ccm9003

An unexpected error occurred.

Description

A system error has occurred.

System response

Interrupts the processing.

System administrator response

Gather the information needed to resolve the problem as described in "How to Collect Data", and then contact a Fujitsu SE.

B.2.1 Detailed Messages

no such session.

Description

There is no session for the specified copy pair.

System response

Interrupts the processing.

System administrator response

Operations cannot be executed on copy pairs for which there is no copy session.
Check the session status using either the status display command for snapshot type high-speed copies (acopc query) or the status display command for synchronous high-speed copies (acec query).

invalid logical volume name.

Description

Either the access path specified at ETERNUS storage system registration time or the device name specified using a command is invalid.

System response

Interrupts the processing.

System administrator response

Check that the specified device name is correct.
Or, check the drive letter or device name specified in the access path.

STXS1027

The specified parameter is invalid. [parameter name=[PARAMETER NAME], parameter value=[PARAMETER VALUE]]

Description

An incorrect affinity group number has been specified.

Parameters

PARAMETER NAME: Parameter name
PARAMETER VALUE: Parameter value

System response

Interrupts the processing.

System administrator response

Use the command for displaying a list of affinity groups (acinq ag) 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 storage system.

Parameters

USER: User name

System response

Interrupts the processing.

System 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 response

Interrupts the processing.

System administrator response

Use ETERNUSmgr to check the user privileges.

STXS2008

The registered user and password are not registered in the current device. [IP address=[IP ADDRESS], user=[USER]]

Description

The user name and password have not been registered on the ETERNUS storage system.

Parameters

IP ADDRESS: IP address

USER: User name

System response

Interrupts the processing.

System administrator response

The ETERNUSmgr user account has either been changed or deleted.

Change the registration information for the ETERNUS storage system by referring to "Changing the Configuration".

STXS2009

The operation cannot be performed with the user privileges when registering the device. [IP address=[IP ADDRESS], user=[USER]]

Description

The user does not have Administrator privileges.

Parameters

IP ADDRESS: IP address
USER: User name

System response

Interrupts the processing.

System administrator response

The user account privileges for ETERNUSmgr have been changed.
Use ETERNUSmgr to check the user privileges.

STXS4002

The device is not supported. [IP address=[IP ADDRESS], model=[MODEL], type=[TYPE]]

Description

The specified ETERNUS storage system is not supported.

Parameters

IP ADDRESS: IP address
MODEL: ETERNUS storage system model
TYPE: ETERNUS storage system type

System response

Interrupts the processing.

System administrator response

Check that the ETERNUS storage system meets the "Hardware requirements".

STXS4046

The specified affinity group has not been registered. [affinity group number=[AFFINITY GROUP NUMBER]]

Description

The specified affinity group has not been registered.

Parameters

AFFINITY GROUP NUMBER: Affinity group number

System response

Interrupts the processing.

System administrator response

Use the command for displaying a list of affinity groups (acinq ag) to check the specified affinity group number.

STXS4047

The specified affinity group has been concatenated. [affinity group number=[AFFINITY GROUP NUMBER]]

Description

A concatenated affinity group has been specified.

Parameters

AFFINITY GROUP NUMBER: Affinity group number

System response

Interrupts the processing.

System administrator response

Concatenated affinity groups cannot be specified.

STXS7004

Failed to communicate with the device. [IP address=[IP ADDRESS]]

Description

Communications with the ETERNUS storage system have failed.

Parameters

IP ADDRESS: IP address

System response

Interrupts the processing.

System administrator response

It is not possible to communicate with the ETERNUS storage system.
Refer to "Port number settings" to check the status of the network, and then execute the command again.

Appendix C Troubleshooting

This appendix explains how to resolve problems that may occur with AdvancedCopy Manager CCM.

C.1 How to Collect Data

Collect the following information when problems occur, and then contact a Fujitsu SE.

[For Windows]

File information collected when problems occur

Type	Files
Log files	The files in the "var" subdirectory of the AdvancedCopy Manager CCM installation directory
Definition files	● The files in the "etc" subdirectory of the AdvancedCopy Manager CCM installation directory ● The files in the "sys" subdirectory of the AdvancedCopy Manager CCM installation directory ● The files in the "micc\sys" subdirectory of the AdvancedCopy Manager CCM installation directory

[For Solaris/Linux]

File information collected when problems occur

Type	Files
Log files	The files in the /var/opt/FJSVccm subdirectory.
Definition files	● The files in the /etc/opt/FJSVccm subdirectory. ● The files in the /opt/FJSVccm/micc subdirectory.

C.2 Resolving Hardware Error

If, as a result of a hardware error, the advanced copy cannot continue, the ETERNUS storage system will automatically suspend it.
If a problem occurs, check the copy status and error code, and take action.

- Procedure for checking copy status
  Use either the status display command for snapshot type high-speed copies (acopc query) or the status display command for synchronous high-speed copies (acec query).
  If the copy is suspended, then its status will be changed to one of the following:
  - OPC Error Suspend
  - EC Error Suspend
  - EC Hardware suspend
- Procedure for checking error code
  Use ETERNUSmgr to check error codes:
  1) In the ETERNUSmgr [Status display] menu, click [Advanced copy status display].
  2) In [Session status], click the [Number of active sessions] link for the relevant copy type.
  3) Refer to the value of the [Error Code] column for the relevant copy process.

This section explains how to resolve problems.

Causes and Action in response to Hardware Error

Advanced copy status	Error code	Cause / Action
OPC Error Suspend	0xBA	[Cause] QuickOPC has not finished physical copy, and a bad sector occurred in the logical volume of the copy source during tracking processing. [Action] 1. Use the Snapshot type high-speed copy stop command (acopc cancel) to cancel the copy. If it cannot be cancelled using commands, then use ETERNUSmgr. 2. The bad sector area is recovered by overwriting it. Select an appropriate recovery method from the methods below, according to the usage status of the copy source volume. — Recovery method 1 If the area can be recovered from the parent software (for example, the file system or DBMS), then recover it. — Recovery method 2 Use a dedicated tool (for example, UNIX dd command) to perform write in the case of an unused area. For example, if the bad sector area has not yet been used, or if it is a temporary area. — Recovery method 3 Copy in the reverse direction, and recover data from the logical volume of the copy destination (it is also possible to perform recovery from the copy source volume of the copy process where the bad sector occurred).

Advanced copy status	Error code	Cause / Action
	Other than 0xBA	[Cause] An error other than 0xBA occurred. For error details, confirm with a Fujitsu SE. [Action] 1. Use the Snapshot type high-speed copy stop command (acopc cancel) to cancel the copy. If it cannot be cancelled using commands, then use ETERNUSmgr. 2. Use the Copy pair deletion command (acpair remove) to remove the copy pair. 3. Use the Copy pair addition command (acpair add) to add a new copy pair.
	0xBA	[Cause] EC/REC is in suspend status (copy establishment status) and a bad sector has occurred in the logical volume of the copy source. [Action] 1. Use the Synchronous high-speed copy stop command (acec cancel) to cancel the copy. If it cannot be cancelled using commands, then use ETERNUSmgr. 2. The bad sector area is recovered by overwriting it. Select an appropriate recovery method from the methods below, according to the usage status of the copy source volume. — Recovery method 1 If the area can be recovered from the parent software (for example, the file system or DBMS), then recover it. — Recovery method 2 Use a dedicated tool (for example, UNIX dd command) to perform write in the case of an unused area. For example, if the bad sector area has not yet been used, or if it is a temporary area. — Recovery method 3 Copy in the reverse direction, and recover data from the logical volume of the copy destination (it is also possible to perform recovery from the copy source volume of the copy process where the bad sector occurred).
	Other than 0xBA	[Cause] An error other than 0xBA occurred. For error details, confirm with a Fujitsu SE. [Action] 1. Use the Synchronous high-speed copy stop command (acec cancel) to cancel the copy. If it cannot be cancelled using commands, then use ETERNUSmgr. 2. Use the Copy pair deletion command (acpair remove) to remove the copy pair. 3. Use the Copy pair addition command (acpair add) to add a new copy pair.

Advanced copy status	Error code	Cause / Action
EC Hardware suspend	---	[Cause] An all path halt occurred. [Action] The REC resume procedure varies according to the REC Recovery mode. ● [In Automatic Recovery mode] 1) Remove the cause of the all path halt. 2) The ETERNUS storage system automatically resumes REC. ● [In Manual Recovery mode] 1) Remove the cause of the all path halt. 2) Forcibly and temporarily suspend the REC by specifying the "-force" option with the synchronous high-speed copy temporary suspension command (acec suspend). 3) Resume the REC using the synchronous high-speed copy restart command (acec resume).

Glossary

The special terms used in this manual are explained below.

Access path

Path required by a server to access disks in an ETERNUS storage system

Active site

The ACM backup environment that is normally active

Advanced copy function

Hardware-based copy function of ETERNUS storage systems. This is a generic name of EC and OPC.

AdvancedCopy Manager agent

Generic term referring to the daemons and applications used for backup or replication.

AdvancedCopy Manager client

Generic term referring to the GUI Client that operate in a storage management client.

AdvancedCopy Manager database

Generic term referring to management information such as registry, repository and management files for AdvancedCopy Manager.

AdvancedCopy Manager manager

Generic term referring to AdvancedCopy Manager-related services and applications existing in a Storage Management Server.

AdvancedCopy Manager tape agent

Generic term referring to the applications used for tape backup

AdvancedCopy Manager tape manager

Generic term referring to the Tape Server daemons and applications related to AdvancedCopy Manager in the Tape Server

Affinity Group

Management information on the ETERNUS storage system that shows the association between the Logical Unit Number (LUN) that can be recognized by the host, and the Logical Volume Number managed within the ETERNUS storage system.

Authentication management files

Generic term for the file where authentication management saves information on users and usage.
There are two or more types and it is kept for every Storage Server with a repository.

Backup history

Backup data that is managed by backup management, and other backup related information

Backup management files

Generic term for files used during backup operations containing management information such as volume and server details. These files are stored in each Storage server and can be backed up by the resource backup command.

Backup management screen

GUI Client screen for backup management.

Backup server operation

The type of operation that uses a dedicated backup server that copies the copies destination volume to a tape device. The server is only connected to the copy destination volumes.

Backup synchronous processing

The process of synchronizing the contents of a transaction volume and a backup volume in preparation for synchronous backup operations.

CA (Channel adapter)

The adapter card used as an interface with server HBA/switch found in a Storage Server.

Cascade Copy

Group two or more concurrent copy processes by assuming the copy destination of one to be a copy origin of another.
Refer to the SA/SE handbook of the ETERNUS Series for the requirement of the cascade copy.

CCM Server

The server where the Copy Control Module is installed.

CM (Controller module)

The controller that manages devices within ETERNUS. The CM to be used as the access route (the CM in charge) is set separately for each RAID group in order to achieve load balancing.

Copy Control Module (CCM)

A tool that enables backup using the Advanced Copy function of the ETERNUS storage system. One advantage is that it can be used without installing the AdvancedCopy Manager Agent on the backup source server (the transaction server).

COS

The service class of the fibre channel. Classes 2 and 3 are general now, and the difference between classes 2 and 3 is that only class 2 requires the acceptance confirmation for frame notice assignment.

Day management backup

Backup operation that manages backups according to a specified number of preservation days. This backup operation is available only for backing up data to tape.

Device map file

File that describes both the relationship between transaction volumes and backup volumes for backup management, and the relationship between copy source volumes and copy destination volumes for replication management

Differential OPC

This is a previously used term for QuickOPC. Refer to the paragraph on QuickOPC for an explanation.

Disaster Recovery site

An environment prepared at a different location to be used for data recovery after a disaster.

EC

This is an abbreviation for Equivalent Copy. It is one of the copy functions of the hardware devices in the ETERNUS 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.

Equivalency maintenance state

A state in which the EC function maintains the contents of a transaction volume and backup volume in precise equivalence.

ETERNUS

Brand name for Fujitsu's storage systems

AdvancedCopy Manager provides high-speed backup and replication functions by linking with the following devices:

- ETERNUS disk array
  (ETERNUS2000/ETERNUS3000/ETERNUS4000/ETERNUS6000/ETERNUS8000/ETERNUS GR series)
- ETERNUS NR1000F series network disk array
- ETERNUS tape library (ETERNUS LT series)

ETERNUS GR series

Generic name for Fujitsu's disk array devices (GR720/730/740/820/840).

ETERNUS VSS Hardware Provider

The ETERNUS VSS Hardware Provider (hereafter called "VSSHP") is software that provides the ETERNUS storage system service, based on the interface provided with the Microsoft Volume Shadow Copy Service (hereafter called "VSS").

In AdvancedCopy Manager, during backup of the Exchange database, the VSSHP function may be used to perform backup.

For details on VSSHP, refer to the "ETERNUS VSS Hardware Provider software manual".

ETERNUSmgr (ETERNUS Manager)

Software product for monitoring and displaying the status of the ETERNUS2000/ETERNUS3000/ETERNUS4000/ETERNUS6000/ETERNUS8000 machine and for setup and maintenance

Fabric

Topology using the fibre channel interface. A fibre channel switch is used and two or more communications between nodes can be performed simultaneously.

FC-AL (Fibre Channel Arbitrated Loop)

Topology using the fibre channel interface. A fibre channel that now allows the connection between two or more nodes using a hub. This topology is mostly used for 1 to 1 connectivity between devices. A port that is connected to the fibre channel is either an NL port or an L port.

Fibre channel

One of the interfaces used to perform serial transfer of data. High-speed forwarding of data and the long distance transmission with the server are features of this transfer type.

Fibre channel hub

This is a hub that is only used for fibre channel networks. It is a device that connects two or more fibre channel node devices in a loop. It operates with the FC-AL topology.

Fibre channel switch

This is a switch used only on fibre channel networks. Its primary function is to facilitate communication between two or more fibre channel nodes at the same time. It exceeds a fibre channel hub in performance and reliability and operates with the fabric topology.

File unit backup

Direct specification that performs backup to tape of only the specified data in a directory or file on a disk that is mounted on the backup target server

File unit backup agent

Software that performs backups on a file basis.

Starts the TSM client and specifies file unit backup or restore to a tape

FL port

The port of the fabric topology (fibre channel switch) connected to the NL port.

F port

The port of the fabric topology (fibre channel switch) connected to the N port.

Framework

Generic name referring to applications such as communication services and configuration management that form the foundation of the AdvancedCopy Manager product suite.

GDS Snapshot

Abbreviation of PRIMECLUSTER GDS Snapshot, which is an optional product of PRIMECLUSTER GDS (hereinafter referred to as GDS). With this product, you can create a snapshot of a GDS logical volume (ie, a replica at a certain time). AdvancedCopy Manager supports the backup and replication operations of logical volumes in linkage with GDS Snapshot.

Generation management backup

Backup operation that performs management with the specified number of preservation generations

Generation overflow

This is the situation that arises when the number of backups specified as backup generations have already been used. If the next backup is performed, the backup volume having the oldest backup history is deleted from the generation management. This is called generation overflow. The actual number of backup generations is specified by the backup policy configuration command.

GR Manager, GRmgr

Storage management software of GR720/730/740.

Hard disk driver

Hard disk driver software of a host server. Controls a disk array unit instead of the sd driver. This driver must be installed to perform multipath control.

HBA (Host bus adapter)

The adapter card used as an interface with the storage port/switch CA carried in a server.

HDDV

See "Hard disk driver."

Inter-server replication

Replication in which the source and destination are volumes connected to different servers

Host Affinity Group

Management information on the ETERNUS storage system that shows the association between the World Wide Name of the host and the Affinity Group.

Load share

One of the operation modes of a cluster system. It enables systems that are structured from multiple active nodes to be handled logically as one database.

Logical node

Name of a logical server in a cluster system

LUN

Abbreviation for Logical Unit Number. The logical unit is defined under a channel adapter on a storage unit.

LUN Mapping

Assigns and sets up a LUN which shows a Logical unit LUN (Logical Unit Number) defined as the channel adapter subordinate in GR720/GR730/GR740 storage equipment from the HOST side, and real LUN (mapping). Therefore, HOST to LUN0 and visible Logical unit can be set up with real Logical unit LUNxx.

MPHD

See "Multipath disk control."

MPLB

See "Multipath disk control, load balance option."

Multipath disk control

Driver software that performs multipath disk control of the host server.
Failover driver software that merges two physical access paths into one logical path to avoid stopping access to a disk array unit because of the failure of one physical access path.

Multi path disk control, load balance option

Driver software that performs multipath disk control of the host server. This driver has both load balance (path load distribution) and multipath (two to eight paths) functionality in addition to the multipath disk control failover function. It is superior in terms of reliability, operability, and performance and is the most suitable driver software for a SAN operation server.

NAS backup

The TSM backup function that uses the NDMP functions of the NAS device to back up the data on a NAS device without sending the data via a network

NAS device

The network disk array device of the ETERNUS NR1000F series

NAS directory

A directory created under a NAS volume

NAS volume

A disk volume on a NAS device.
Disk volumes are defined under /vol, and take the form /vol/vol0, /vol/vol1, and so on.

NDMP

NDMP (Network Data Management Protocol) is a communications protocol that manages data on an NAS device.

NL-Private port

The port of the FC-AL topology which has not made a fibre channel switch connection.

NL-Public port

The port of the FC-AL topology which is making a fibre channel switch connection.

N port

The port used by Fabric topology (switch environment) or Point-to-Point in a fibre channel.

OPC

This is an abbreviation of the term “one point copy” which is a hardware function of ETERNUS 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.

Ordinary transaction volume

Volume to be backed up and not provided with a database space.

Point-to-point

Topology using the fibre channel interface. Although it is the topology of 1 to 1 connection of an N port, the main part of the present 1 to 1 connection is the 1 to 1 connection of FC-AL.

Pre-processing or post-processing

Scripted processing that is executed immediately before or after advanced copying at the time of backup or replication. The pre-processing and post-processing scripts are called as part of the command processing of backup or replication management.

PRIMECLUSTER

Software product for cluster configuration

PRIMECLUSTER GDS

Software product that improves data integrity by mirroring disk units

PRIMECLUSTER GFS

Software product that creates a multivolume file system that offers robustness and improves data availability. This file system is completely compatible with UFS, which is the standard API of UNIX.

QuickOPC

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.

REC

Abbreviation for “Remote Equivalent Copy”. REC uses a hardware function of ETERNUS storage systems to achieve EC (Equivalent Copy) between different cabinets.

Registry

AdvancedCopy Manager environment definition file.

Replication management files

Generic term referring to the files where replication management saves the usage information. There are two or more kinds. It is kept for every Storage Server with a data repository.

Repository

The repository contains all management and operational information required by AdvancedCopy Manager and its domain.
It is comprised of data contained in a management database hosted in a Storage Management Server.
The information on the device to be managed, and information on backup and replication management, etc. are all stored in a repository.
This repository is created at the time of installation of AdvancedCopy Manager.

RMI daemon

The RMI server to an AdvancedCopy Manager client.

ROPC

Abbreviation of “Remote One Point Copy”. ROPC uses a hardware function of ETERNUS storage systems to achieve OPC between different cabinets.

SafeFILE

Software product that creates a multivolume file system that offers robustness and improves data availability. SafeFILE extends the UNIX file system (UFS) and improves availability and performance.

SAN (storage area network)

Abbreviation for “Storage Area Network”. It is a server storage network. Broadly speaking, this also refers to the implementation of centralized storage, data sharing among different servers, and integrated storage management.

SDX object

Virtual resource managed by PRIMECLUSTER GDS or SynfinityDISK. It is a general term for classes, groups, disks, volumes, and slices. An SDX object is sometimes called an "object."

Session

Unit of copying execution that is performed by the advanced copy function

Snap Data Disk

This is a disk for storing the copy used as the SnapOPC destination. It is necessary to define a Snap Data Disk in advance of SnapOPC being invoked.

SnapOPC

A copy method used when updating data. This method copies the pre-update status of the data parts that are to be updated, and matches the original non-updated parts to preserve the pre-update status (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.
This copy method is suited to backing up file servers.

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.

Snap shot type high-speed backup

Backup using the one point copy (OPC) function of ETERNUS storage systems.

Storage

A generic name of external storage devices such as disk array devices and tape units. These devices include ETERNUS storage systems, F649x series and Spectris/Platinum.

Storage management client

This term refers to a client machine that the AdvancedCopy Manager GUI Client is operated.

Storage Management Server

Server in which AdvancedCopy Manager's Manager exists.

Storage Server

Server in which AdvancedCopy Manager's Agent exists.

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.

Suspend specification

The act of specifying the -suspend option in the backup execution command (swstbackup) to back up using the Suspend/Resume function

Synchronous backup

This involves using the Equivalent Copy (EC) function of the disk array GR series to perform backup.

Tape library unit

A device that holds a large number of magnetic tapes and uses the controller in the device to automatically replace magnetic tapes in order to gain access to the tapes. It includes ETERNUS LT270 and ETERNUS LT230.

Tape Server

Backup Tape Server for processing requests regarding tape backup operations

TOC

The backup data table of contents provided from a NAS device in parallel with NAS backup operations. TSM uses the obtained TOC to restore data when executing NAS disk unit restore or NAS file unit restore.

TSM

The abbreviation of file backup management product "Tivoli Storage Manager". Tape servers deliver a backup management function by calling TSM internally.

TSM client GUI

Starts the TSM client and issues file unit backup and restore instructions to a tape.
Commands and a GUI are provided for the TSM client, and processing instructions can be issued from the GUI interface.

TSM Web backup/archive client

A TSM processing interface that enables use of a Web browser to connect from an operations terminal to a TSM client.
This enables backup and restore instructions to be issued from an operations terminal to a tape.

Volume Shadow Copy Service

The Volume Shadow Copy Service is a function that provides a communications foundation for backup software, server applications and storage hardware. It is installed as standard with Windows Server 2003.

VSS

Refer to "Volume Shadow Copy Service".

VSSHP

Refer to "ETERNUS VSS Hardware Provider".