

FUJITSU Storage ETERNUS SF AdvancedCopy Manager V16.9

Operation Guide for Copy Control Module

Windows/Solaris/Linux

B1FW-6015-10ENZO(02)
February 2023

Preface

Purpose of This Manual

This manual describes the how to deliver Advanced Copy functions in environments where AdvancedCopy Manager's agents have not been installed, by using AdvancedCopy Manager Copy Control Module of FUJITSU Storage ETERNUS SF AdvancedCopy Manager (hereafter abbreviated as "AdvancedCopy Manager").

Intended Readers

This manual is intended for system administrators who perform storage management using AdvancedCopy Manager Copy Control Module or Express.

Structure of This Manual

The structure of this manual is as follows.

[Chapter 1 Overview of AdvancedCopy Manager CCM](#)

This chapter provides an overview of AdvancedCopy Manager Copy Control Module.

[Chapter 2 Setup](#)

This chapter explains how to install and set up AdvancedCopy Manager Copy Control Module.

[Chapter 3 Operation](#)

This chapter explains how to operate AdvancedCopy Manager Copy Control Module.

[Chapter 4 Command References](#)

This chapter explains the various commands required for using AdvancedCopy Manager Copy Control Module.

[Chapter 5 Troubleshooting](#)

This chapter explains how to collect data when problems occur.

[Chapter 6 Notes on Operations](#)

This chapter explains notes on operations of AdvancedCopy Manager Copy Control Module.

[Appendix A Preliminary Checks of Advanced Copy Status](#)

This appendix explains the preliminary checks of Advanced Copy status.

[Appendix B Backup and Restoration of ZFS File Systems](#)

This appendix explains backup and restoration of ZFS file systems.

[Appendix C XML Format Output Function](#)

This appendix explains the XML format output function.

[Appendix D Operation in Oracle VM Server for SPARC](#)

This appendix explains Oracle VM Server for SPARC in the operation using AdvancedCopy Manager Copy Control Module.

[Appendix E VMware Virtual Machine Automatic Backup/Restore \(Script\)](#)

This appendix explains auto backup/restore of virtual machines in a VMware environment.

[Appendix F Inter-box Backup/Restore of NAS Volumes](#)

This appendix explains Inter-box backup/restore of NAS volumes.

Conventions

This manual abides by the conventions listed in "Conventions" in the *FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Documentation Road Map*.

Export Controls

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

Trademarks

- Microsoft, Windows, Windows Server, Internet Explorer, and Microsoft Edge are registered trademarks of Microsoft Corporation in the United States and other countries.
- UNIX is a registered trademark of The Open Group in the United States and other countries.
- Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.
- Linux is a registered trademark of Linus Torvalds.
- Red Hat and RPM are registered trademarks of Red Hat, Inc. in the U.S. and other countries.
- Novell is a registered trademark of Novell Inc., and SUSE and the SUSE logo is a trademark, of SUSE LLC, in the United States and other countries.
- HP-UX is a registered trademark of Hewlett-Packard Company in the United States and other countries.
- AIX is a trademark or a registered trademark of International Business Machines Corporation in the United States and other countries.
- VMware, VMware logo, Virtual SMP, and vMotion are the registered trademarks or trademarks of VMware, Inc. in the United States and other countries.
- All other trademarks and product names are the property of their respective owners.

Revision History

Date of Publication	Revision	Document Part Number	
		PDF	HTML
February 2023	10.2	B1FW-6015-10ENZ0(02)	B1FW-6015-10ENZ2(02)
May 2022	10.1	B1FW-6015-10ENZ0(01)	B1FW-6015-10ENZ2(01)
August 2021	10	B1FW-6015-10ENZ0(00)	B1FW-6015-10ENZ2(00)
October 2020	9.2	B1FW-6015-09ENZ0(02)	B1FW-6015-09ENZ2(02)
July 2020	9.1	B1FW-6015-09ENZ0(01)	B1FW-6015-09ENZ2(01)
November 2019	9	B1FW-6015-09ENZ0(00)	B1FW-6015-09ENZ2(00)
April 2019	8.1	B1FW-6015-08ENZ0(01)	B1FW-6015-08ENZ2(01)
December 2018	8	B1FW-6015-08ENZ0(00)	B1FW-6015-08ENZ2(00)
December 2017	7	B1FW-6015-07ENZ0(00)	B1FW-6015-07ENZ2(00)
June 2017	6.1	B1FW-6015-06ENZ0(01)	B1FW-6015-06ENZ2(01)
May 2017	6	B1FW-6015-06ENZ0(00)	B1FW-6015-06ENZ2(00)
October 2016	5	B1FW-6015-05ENZ0(00)	B1FW-6015-05ENZ2(00)
June 2016	4.2	B1FW-6015-04ENZ0(02)	B1FW-6015-04ENZ2(02)
December 2015	4.1	B1FW-6015-04ENZ0(01)	B1FW-6015-04ENZ2(01)
October 2015	4	B1FW-6015-04ENZ0(00)	B1FW-6015-04ENZ2(00)
July 2015	3.2	B1FW-6015-03ENZ0(02)	B1FW-6015-03ENZ2(02)
March 2015	3.1	B1FW-6015-03ENZ0(01)	B1FW-6015-03ENZ2(01)
January 2015	3	B1FW-6015-03ENZ0(00)	B1FW-6015-03ENZ2(00)

Date of Publication	Revision	Document Part Number	
		PDF	HTML
July 2014	2.1	B1FW-6015-02ENZ0(01)	B1FW-6015-02ENZ2(01)
June 2014	2	B1FW-6015-02ENZ0(00)	B1FW-6015-02ENZ2(00)
May 2014	1.3	B1FW-6015-01ENZ0(03)	B1FW-6015-01ENZ2(03)
April 2014	1.2	B1FW-6015-01ENZ0(02)	B1FW-6015-01ENZ2(02)
March 2014	1.1	B1FW-6015-01ENZ0(01)	B1FW-6015-01ENZ2(01)
December 2013	1	B1FW-6015-01ENZ0(00)	B1FW-6015-01ENZ2(00)

Notes

- No part of this manual may be reproduced without permission.
- This manual is subject to change without advance notice.

Copyright Notice

Copyright 2013-2023 FUJITSU LIMITED

Update History

Content of Update	Updated Section	Revision
Information related to the following device has been added. - ETERNUS DX S5 series	3.2.2.8	10.2
Information related to the following software has been added. - VMware vSphere 8 - VMware vSphere PowerCLI 12.7	E.5	
Information related to the following software has been added. - Microsoft Windows Server 2022	General	10.1
Microsoft Windows Server 2019 is added in the table "Supported OS".	E.5	
Information related to the following software has been deleted. - Red Hat Enterprise Linux 6 (for x86)	General	10
The article about the basic system configuration has been deleted from this manual and it has been moved to the <i>Overview</i> .	1.1	
Unnecessary description has been deleted from [Point].		
The manual to refer the details of copy has been changed.	3.2	
In [Point], the explanation has been modified.	3.2.1.4	
A new section has been added.	6.8	9.2
Information related to the following software has been added. - VMware vSphere 7 - VMware vSphere PowerCLI 11.5	E.5	9.1
Information related to the following software has been added. - Microsoft Windows Server 2019	General	9

Content of Update	Updated Section	Revision
<ul style="list-style-type: none"> - Red Hat Enterprise Linux 8 (for Intel64) - SUSE Linux Enterprise Server 15 for AMD64 & Intel64 <p>Information related to the following devices and software has been deleted.</p> <ul style="list-style-type: none"> - ETERNUS DX60, DX400 series, DX8000 series - Microsoft Windows Server 2008 R2 - Microsoft Windows Server 2008 - Red Hat Enterprise Linux 5 (for x86) - Red Hat Enterprise Linux 5 (for Intel64) - AIX V6.1 - VMware vSphere 5 		
The description for Conventions has been changed so that the <i>FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Documentation Road Map</i> is referenced.	"Conventions" in Preface	
The "Manual Organization and Reading Suggestions" section has been deleted from Preface.	Preface	
In [Point], information has been modified.	2.4	
The explanation about stopping the SnapOPC+ has been added.	2.6, 3.2.1.6, 3.4.4.2, 3.6.7, 3.6.8, 4.6.4 - 4.6.6, 6.1.3, Appendix A	
In [Note], information has been added and modified.	3.10.2.2, 3.10.2.3, F.1.1	
Information related to Microsoft Windows Server 2019 has been added.	"Notation" and "Others" in Preface, 6.7	8.1
The explanation has been added in "DESCRIPTION".	4.9.1 - 4.9.3	
Information related to the ETERNUS DX8900 S4 has been added.	"Notation" in Preface	8
The description of "DESCRIPTION" has been modified.	4.6.4	
The explanation for the -p option and the -v option has been modified.	4.6.6	
Information related to Microsoft Windows Server 2016 has been added.	E.5, E.6	
VMware vSphere 6.7 has been added in the supported operating environments.	E.5	
Information related to Solaris 9 has been deleted.	"Notation" in Preface, 4.10.2	7
Information related to the ETERNUS DX500 S4/DX600 S4 has been added.	"Notation" in Preface	
Information related to the ETERNUS AF250 S2/AF650 S2 has been added.	"Notation" in Preface, 1.3, 3.2.1.6, 3.2.2.8	
The explanation about the system configuration required for using AdvancedCopy Manager Copy Control Module has been modified.	1.2, 1.3	
[Point] has been added.	3.2.2.5	
The description of step 2 has been modified.	3.4.1	
In [Point], information has been added and modified.	3.4.1	
The command execution example when the option argument is the LU to Partition format or the Partition to LU format has been modified.	3.4.1, 3.4.4.1, 3.4.4.2	

Content of Update	Updated Section	Revision	
[Note] has been added.	3.10.3.1		
In the table of EXAMPLES, information related to the External RAID Group has been added in the [RG No] item.	4.2.1		
The explanation for the -p option has been added.	4.5.5, 4.5.6, 4.6.1 - 4.6.6, 4.7.1 - 4.7.7		
The explanation for the -v option has been added.	4.6.5, 4.6.6, 4.9.2		
The explanation for the -s option and the -t option has been added.	4.9.2, 4.9.3		
The step 3-i has been added.	E.9		
VMware vSphere 6.5 has been added in the supported operating environments. In addition, the explanation has been modified.	E.2, E.5, E.6, E.7.2, E.7.5, E.8, E.9, E.10.1 - E.10.3	6.1	
Information related to Microsoft Windows Server 2016 has been added.	"Notation" and "Others" in Preface	6	
Information related to Windows Vista has been deleted.	"Notation" in Preface		
Information related to SUSE Linux Enterprise Server 11 has been deleted and information related to SUSE Linux Enterprise Server 12 for AMD64 & Intel64 has been added.	"Notation" in Preface, 4.10.2, E.6		
Information related to the ETERNUS DX60 S4/DX100 S4/DX200 S4 has been added.	"Notation" in Preface, 1.3, 3.2.1.6, 3.2.2.8		
In [Point], information has been added and modified.	1.3		
A new section has been added.	3.4.3		
The description has been modified to the procedure using Partition to LU.	3.4.4.2		
In NOTES, information indicating that the copy source TFOV and the copy destination TFOV must belong to the same TFO group has been added.	4.5.5		
Information related to HP-UX 11i v1/v2 has been deleted.	"Notation" in Preface		
Information related to VMware vSphere 4 has been deleted.	"Notation" in Preface		
Information related to the ETERNUS DX80/DX90 has been deleted.	"Notation" in Preface, 1.3, 3.2.2.8, 4.6.2, 4.6.5, 4.7.2, 4.9.1, 6.3, 6.5, 6.6		
Information related to the ETERNUS AF250/AF650 has been added.	"Notation" and "Others" in Preface, 1.3, 3.2.1.6, 3.2.2.8	5	
[Point] has been added.	3.2.1.5		
The explanation of SnapOPC+ has been modified.	4.5.5, 4.6.4 - 4.6.6, 5.2, 6.1, E.2, E.6		
Information has been added in the "DESCRIPTION".	4.10.1 - 4.10.4		
Information in the "NOTES" has been deleted.	4.10.1 - 4.10.4		
The error code "0x1E" and "0x2E" have been added to the error code of "Snap Error Suspend" in the "Table 5.1 Causes and Action in Response to Hardware Error".	5.2		
[Note] has been added.	3.10.1.2, 3.10.2.2		4.2
In [Note], information has been added.	3.10.1.3, 3.10.2.3, F.1.1		
In [Information], the explanation has been modified.	3.10.3.1		
The explanation in "Access Using CIFS Protocol" has been modified.	3.10.4		

Content of Update	Updated Section	Revision	
The operation procedure has been modified.	3.10.6, F.2.3		
VMware vSphere 6 has been added in the supported operating environments.	E.5		
The explanation for the backup of the NAS environment has been modified.	3.10.3.1	4.1	
The explanation for the NAS snapshot has been modified.	3.10.8		
The explanation for the inter-box backup of NAS volumes has been modified.	F.1.1, F.3.1		
Information related to Microsoft Windows Server 2003 has been deleted.	"Notation" in Preface, 4.10.2, E.6	4	
Information related to Windows 10 has been added.	"Notation" in Preface		
The explanation for the backup of the NAS environment has been modified.	3.10.1.3, 3.10.1.4, 3.10.3.1, 3.10.5, 4.8.1		
The explanation related to "Deleting NAS Backup Settings" has been added.	3.10.1.5		
Information related to NAS restore has been added.	3.10.2, 4.8.2		
Information related to the inter-box backup/restore of NAS volumes has been modified or added.	Appendix F		
Information related to the ETERNUS DX8700 S3/DX8900 S3 has been added.	"Notation" in Preface, 3.2.2.8		3.2
The term "VMware Virtual Volumes" has been changed to "VMware vSphere Virtual Volumes" according to the terms used by VMware, Inc.	Throughout this manual	3.1	
Information related to VMware vSphere(R) 6 has been added.	"Notation" in Preface		
The explanation related to applying Model upgrade options has been modified.	3.6.9		
Description of "NOTES" has been added.	4.9.1		
Information related to the ETERNUS DX200F has been modified or added.	"Others" in Preface, 1.3, 3.2.1.6, 3.2.2.8		
Information related to the ETERNUS DX60 S3 has been added.	"Notation" in Preface, 1.3, 3.2.1.6, 3.6.9		
The explanation related to Storage Cluster Continuous copy function has been added.	1.2, 1.4, 3.11, 3.12, 4.5.1, 4.5.3, 5.2, 5.3		
The Red Hat Enterprise Linux 7 (for Intel64) has been added as support OS.	1.5.1, 4.10.2, E.5	3	
The explanation when REC was used has been deleted.	2.4, 4.1.1, 5.3		
The explanation related to WVOL has been added.	4.9.1, 4.9.2		
"Display Example of List Part and Table Part" has been added.	C.2.1		
The explanation of the backup/restore using the VMware script has been added or modified.	E.1.1, E.1.2, E.2, E.3, E.5, E.6, E.7.3, E.7.5, E.7.6, E.9, E.11.2		
Execute backup/restore while taking NAS snapshot has been changed.	3.10.8		2.1
Inter-box backup/restore of NAS volumes has been changed.	Appendix F		
Note on the number of Concurrent OPCs executed at the same time has been changed.	3.2.1.7		2
Inter-box backup/restore of NAS volumes has been added as Appendix F.	3.10.5, Appendix F		
Advanced Copy operation using volumes for storage cluster has been added.	3.11, 4.1.1, 4.1.2, 4.3.1, 5.3		
Note has been added to the "acarray add" command.	4.1.1		
The usage example of the "esfsnap" command has been changed.	4.12.1		

Content of Update	Updated Section	Revision
Corrective action has been changed.	5.3	
The entire view of backup/restore in VMware virtual environment has been added.	E.1	
The point of using multiple ETERNUS Disk storage systems has been added.	E.3	
Design of server configuration and notes for constructing virtual machines have been modified.	E.5	
Preparation for executing scripts has been modified.	E.6	
Output message has been added.	E.10.2	
Information related to the ETERNUS DX200F has been added.	"Others" in Preface	1.3
Added the point of using multiple ETERNUS Disk storage systems.	E.3	1.2
Modified the preparation for executing scripts.	E.5	
Referential description as to setup of shared folder within NAS backup volume has been added.	3.10.1.2, 3.10.2.2, 3.10.3.1	1.1
The access method by CIFS protocol has been changed.	3.10.4	

Contents

Chapter 1 Overview of AdvancedCopy Manager CCM.....	1
1.1 System Configuration.....	1
1.2 Supported Functions.....	3
1.3 Use of IPv6 Address.....	4
1.3.1 Software Requirement.....	4
1.3.2 Supported Devices.....	4
1.3.3 IPv6 Address Notation.....	5
Chapter 2 Setup.....	6
2.1 Creating User Account.....	6
2.2 Access Volume Settings.....	6
2.3 Registering Advanced Copy License.....	6
2.4 Registering ETERNUS Disk Storage System.....	7
2.5 Creating Copy Groups.....	10
2.6 Setting the Required Number of Free Volumes (Only When SnapOPC+ Is Used).....	10
2.6.1 Automatic Management of Snap Generations.....	10
2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+.....	16
2.6.3 Setting the Required Number of Free Volumes.....	16
2.7 Adding Copy Pairs.....	17
2.8 Setting Copy Volume Protection.....	19
2.8.1 Copy Volume Protection Unit.....	20
2.8.2 Advanced Copy of Protected Volumes.....	20
2.8.3 Volume Protection Function for Logical Volumes Not Performed.....	20
Chapter 3 Operation.....	22
3.1 Operating Advanced Copy.....	22
3.1.1 System Configuration.....	22
3.1.2 Notes about Number of Sessions with ETERNUS Disk Storage System.....	25
3.2 Executing Advanced Copy.....	25
3.2.1 Executing Snapshot Type High-speed Copy.....	25
3.2.1.1 Backup via OPC.....	25
3.2.1.2 Restore on OPC Backup Environment.....	27
3.2.1.3 Backup via QuickOPC.....	29
3.2.1.4 Restore on QuickOPC Backup Environment.....	33
3.2.1.5 Backup via SnapOPC+.....	35
3.2.1.6 Stopping SnapOPC+.....	37
3.2.1.7 Restore on SnapOPC+ Backup Environment.....	38
3.2.1.8 Using Concurrent OPC Function on OPC/QuickOPC/SnapOPC+.....	40
3.2.2 Executing Synchronous High-speed Copy.....	40
3.2.2.1 Backup via EC.....	40
3.2.2.2 Restore on EC Backup Environment.....	43
3.2.2.3 Backup via REC.....	46
3.2.2.4 Restore on REC Backup Environment.....	53
3.2.2.5 REC Operating Modes.....	61
3.2.2.6 Backup via REC Using Initial Copy Skip.....	63
3.2.2.7 Restore on REC Backup Environment Using Initial Copy Skip.....	64
3.2.2.8 Using Concurrent Suspend Function on EC/REC.....	64
3.2.2.9 Using Destination Access Permission Function on EC/REC.....	65
3.3 Managing copy sessions.....	65
3.3.1 Displaying copy session information.....	66
3.3.2 Forcibly Stopping Copy Sessions.....	66
3.3.3 Forcibly Suspending REC Sessions.....	67

3.4 Backing Up to Tape.....	68
3.4.1 LU to Partition.....	68
3.4.2 Backup to Tape.....	74
3.4.2.1 Overview of Backup.....	74
3.4.2.2 Backup Procedure.....	74
3.4.3 Partition to LU.....	77
3.4.4 Restoring from Tape.....	78
3.4.4.1 Restoring Using Backup Volume.....	79
3.4.4.2 Restoring Using New Volume.....	79
3.5 How to Back Up Environment Settings Files.....	82
3.5.1 Backing Up Environment Settings Files.....	82
3.5.2 Restoring Environment Settings Files.....	84
3.6 Changing Configuration.....	86
3.6.1 Registering Additional ETERNUS Disk Storage System.....	87
3.6.2 Changing Registered Information for ETERNUS Disk Storage System.....	87
3.6.3 Deleting Registered Information for ETERNUS Disk Storage System.....	88
3.6.4 Adding Copy Groups.....	88
3.6.5 Changing Copy Group Configurations.....	88
3.6.6 Deleting Copy Groups.....	89
3.6.7 Changing the Required Number of Free Volumes.....	89
3.6.8 Changing Timeout Value for Concurrent Suspend Function.....	89
3.6.9 Adding User Accounts.....	90
3.6.10 Model Upgrade for ETERNUS Disk Storage System.....	90
3.7 Changing Cluster Environment.....	91
3.7.1 Start Cluster Operation.....	91
3.7.2 Stop Cluster Operation.....	91
3.8 How to Back Up License Management Database.....	92
3.8.1 Backing Up License Management Database.....	92
3.8.2 Restoring License Management Database.....	92
3.9 How to Back Up ETERNUS SF Manager Database.....	92
3.10 Backup of NAS Environment.....	93
3.10.1 Backup / Restoration with Web Console.....	93
3.10.1.1 Preparing for Execution of Backup.....	93
3.10.1.2 How to Execute Backup.....	93
3.10.1.3 How to Execute Restoration.....	93
3.10.1.4 Suspending / Confirming Status of Backup / Restoration.....	94
3.10.1.5 Deleting NAS Backup Settings.....	95
3.10.2 Backup/Restore with Commands.....	95
3.10.2.1 Preparing for Execution of Backup/Restore Commands.....	95
3.10.2.2 How to Execute Backup Commands.....	96
3.10.2.3 How to Execute Restore Commands.....	96
3.10.2.4 Confirming Copy Status of Backup/Restore and Stopping Backup.....	97
3.10.3 Mounting / Unmounting Backup Destination.....	98
3.10.3.1 Mounting / Unmounting Procedures.....	98
3.10.4 How to Access Backup Destination Volume.....	99
3.10.5 Concerning Secondary Backup of NAS Volume and Use of Data on Different Storage Devices.....	100
3.10.6 Recovery Procedure When NAS Volume or NAS Backup Volume Fails.....	101
3.10.6.1 Data Recovery Procedure of NAS Volume.....	101
3.10.6.2 Data Recovery Procedure of NAS Backup Volume.....	102
3.10.7 Important Points concerning Backup of NAS Environment.....	103
3.10.8 Important Points When Using NAS Snapshot.....	103
3.11 Operations of Advanced Copy Using TFOV.....	103
3.11.1 Backup.....	105

3.11.1.1 Preparing for Execution of Backup.....	106
3.11.1.2 Execution of Backup.....	106
3.11.2 Restore.....	106
3.11.2.1 When Backing Up with Intra-box Copy (OPC/QuickOPC/SnapOPC+/EC).....	106
3.11.2.2 When Backing Up with Inter-box Copy (REC).....	106
3.11.3 Cascade Copies with TFOV.....	107
3.11.4 Recovery from Hardware Failure.....	108
3.12 Storage Cluster Continuous Copy Function.....	111
3.12.1 System Configuration.....	112
3.12.2 Operating Conditions.....	113
3.12.3 Supported Functions.....	113
3.12.4 Setup.....	114
3.12.5 Operating Advanced Copy.....	115
3.12.6 Executing Advanced Copy.....	115
3.12.7 Backing up/Restore to Tape Devices.....	116
3.12.8 Backup and restoration of ZFS file systems.....	116
3.12.9 Operation in Oracle VM Server for SPARC.....	116
3.12.10 Operation during Maintenance.....	116
3.12.10.1 Recovery from Hardware Failure.....	119
3.12.11 When Recovering Storage Cluster Continuous Copy Function.....	123
3.12.12 When Changing Configurations/Settings.....	125
3.12.12.1 Deleting Storage Cluster Environment.....	125
3.12.12.2 When Changing Storage Cluster Target Volume.....	125
3.12.13 Cascade Copies.....	125
Chapter 4 Command References.....	128
4.1 Control Commands for ETERNUS Disk Storage System.....	128
4.1.1 acarrray add (ETERNUS Disk Storage System Registration Command).....	128
4.1.2 acarrray change (ETERNUS Name and Access Volume for ETERNUS Disk Storage System Change Command).....	130
4.1.3 acarrray list (ETERNUS Disk Storage System Information Display Command).....	131
4.1.4 acarrray detail (ETERNUS Disk Storage System Detail Information Display Command).....	133
4.1.5 acarrray pathscan (Access Volume Automatic Setting Command).....	134
4.1.6 acarrray remove (ETERNUS Disk Storage System Registration Information Deletion Command).....	135
4.2 Commands for Displaying Information Related to ETERNUS Disk Storage System.....	136
4.2.1 acinq lv (Logical volume information display command).....	136
4.2.2 acinq lunmap (LUN Mapping Information Display Command).....	138
4.2.3 acinq ag (Affinity Group List Display Command).....	139
4.2.4 acinq hostag (Host Affinity Group List Display Command).....	140
4.3 Logical Volume Control Commands.....	141
4.3.1 acinhibit set (Volume Protection Settings Command).....	141
4.3.2 acinhibit unset (Volume Protection Settings Release Command).....	142
4.4 Commands for REC Transfer Buffers.....	143
4.4.1 acrecbuf set (REC Transfer Buffer Setting Command).....	143
4.4.2 acrecbuf stat (REC Transfer Buffer Status Display Command).....	144
4.5 Commands for Setting Up Copy Groups.....	145
4.5.1 acgroup create (Copy Group Creation Command).....	145
4.5.2 acgroup list (Copy Group Display Command).....	147
4.5.3 acgroup detail (Copy Group Detail Information Display Command).....	148
4.5.4 acgroup remove (Copy Group Deletion Command).....	150
4.5.5 acpair add (Copy Pair Addition Command).....	151
4.5.6 acpair remove (Copy Pair Deletion Command).....	153
4.6 Control Commands for Snapshot Type High-speed Copying.....	153
4.6.1 acopc start (OPC/QuickOPC Copy Start Command).....	153
4.6.2 acopc query (OPC/QuickOPC Copy Status Display Command).....	156

4.6.3 acopc cancel (OPC/QuickOPC Copy Stop Command)	165
4.6.4 acsnap start (SnapOPC+ Copy Start Command)	167
4.6.5 acsnap query (SnapOPC+ Copy Status Display Command)	169
4.6.6 acsnap cancel (SnapOPC+ Copy Stop Command)	174
4.7 Control Commands for Synchronous High-speed Copying	177
4.7.1 acec start (Synchronous High-speed Copy Start Command)	177
4.7.2 acec query (Synchronous High-speed Copy Status Display Command)	179
4.7.3 acec suspend (Synchronous High-speed Copy Temporary Suspension Command)	198
4.7.4 acec resume (Synchronous High-speed Copy Restart Command)	201
4.7.5 acec reverse (Synchronous High-speed Copy Reverse Command)	202
4.7.6 acec change (Synchronous High-speed Copy Mode Change Command)	204
4.7.7 acec cancel (Synchronous High-speed Copy Stop Command)	205
4.8 Commands for NAS Volume	207
4.8.1 acnas backup (NAS volume backup command)	207
4.8.2 acnas restore (NAS volume restore command)	208
4.9 Copy Session Management Commands	209
4.9.1 accopy query (Copy Session Information Display Command)	209
4.9.2 accopy fcancel (Copy Session Forcible Stop Command)	214
4.9.3 accopy fsuspend (REC Session Forcible Suspend Command)	217
4.10 Server Utility Commands	220
4.10.1 acutil devs (Logical Volume Information Display Command)	220
4.10.2 acgetvolinfo (Logical Volume Information Display Command)	221
4.10.3 acutil refresh (Partition Table Refresh Command) [Windows only]	225
4.10.4 acutil fsflush (File System Flush Command) [Windows only]	226
4.10.5 acsdv init (Snap Data Volume Initialization Command)	227
4.10.6 acsdv stat (Snap Data Volume Status Display Command)	227
4.10.7 acsdv poolstat (Snap Data Pool Status Display Command)	229
4.11 Maintenance Command	230
4.11.1 acservice stop (Management Service Stop Command)	230
4.12 Troubleshooting Data Collection Command	230
4.12.1 esfsnap (CCM Server Troubleshooting Data Collection Command)	230
Chapter 5 Troubleshooting	233
5.1 Collecting Troubleshooting Information	233
5.2 Resolving Hardware Error	233
5.3 Resolving for Displaying "???" in Advanced Copy Status	237
Chapter 6 Notes on Operations	239
6.1 Notes on SnapOPC+ Operation	239
6.1.1 SnapOPC+ Copy Destination Volume	239
6.1.2 Monitor Usage of Copy Destination Volume	240
6.1.3 Stopping SnapOPC+	241
6.2 Notes about Cluster Operation	241
6.3 Notes on Combining Cascade Copy and Concurrent OPC in Operation	241
6.4 Notes about Changing Disk Configuration	242
6.5 Use in Combination with ODX (Offloaded Data Transfer)	242
6.6 Use in Combination with XCOPY (Extended Copy)	243
6.7 Notes on Operating AdvancedCopy Manager CCM on Microsoft Windows Server 2019 or Later	244
6.8 Executing the Command That Displays the Advanced Copy Status	244
Appendix A Preliminary Checks of Advanced Copy Status	245
Appendix B Backup and Restoration of ZFS File Systems	250
Appendix C XML Format Output Function	251

C.1 Commands That Support XML Format Output.....	251
C.2 XML Format.....	252
C.2.1 XML Format of Display Type Command.....	252
C.2.2 XML format of Execution Type Command.....	255
Appendix D Operation in Oracle VM Server for SPARC.....	259
Appendix E VMware Virtual Machine Automatic Backup/Restore (Script).....	260
E.1 Backup / Restoration in VMware Virtual Environment.....	260
E.1.1 Virtual Machine with RDM Data Area.....	260
E.1.2 Virtual Machine with VMFS Data Area.....	261
E.2 VMware Script Overview.....	261
E.3 System Area and Data Area Configuration Supported by VMware Script.....	263
E.4 VMware Script Configuration.....	264
E.5 Operating Conditions.....	266
E.6 Operation Design.....	266
E.7 Preparations for Executing VMware Scripts.....	269
E.7.1 Execution Policy Settings for PowerShell Script.....	269
E.7.2 Unzip Script.....	270
E.7.3 Configure Initial Settings for VMware Script Operating Environment.....	270
E.7.4 Prepare Backup Volume and Restore Volume.....	271
E.7.5 Configure Environment for AdvancedCopy Manager CCM.....	271
E.7.6 LU.ini File Setting.....	274
E.8 Virtual Machine Backup.....	274
E.9 Virtual Machine Restoration.....	275
E.10 VMware Script References.....	276
E.10.1 Init.ps1 (Initial Processing Script).....	276
E.10.2 VMBackup.ps1 (Backup Script).....	277
E.10.3 VMRestore.ps1 (Restore Script).....	278
E.11 Log Format and Messages.....	279
E.11.1 Log Format.....	279
E.11.2 List of Messages.....	279
Appendix F Inter-box Backup/Restore of NAS Volumes.....	284
F.1 Overview.....	284
F.1.1 About Prior Work.....	284
F.1.2 Overview of Data Protection Operation.....	285
F.1.3 Overview of Standby Operation.....	286
F.2 Details of Data Protection Operation.....	287
F.2.1 Creation of Environment.....	288
F.2.2 Backup Procedures.....	289
F.2.3 Restoration Procedures.....	290
F.2.4 Deleting Data Protection Operation Definition.....	292
F.3 Details of Standby Operation.....	293
F.3.1 Environment Creation.....	294
F.3.2 Operation Procedure.....	296
F.3.3 Deleting Standby Operation Definition.....	296
F.4 Automation of Operation.....	297
F.4.1 Sample Script of Data Protection Operation.....	298
F.4.2 Sample Script of Standby Operation.....	300
F.4.3 Message Output by Sample Script.....	302
F.4.4 Sample Script in Each Processing Phase.....	308

Chapter 1 Overview of AdvancedCopy Manager CCM

AdvancedCopy Manager CCM is a backup tool that uses the Advanced Copy function of ETERNUS Disk storage system without installing an AdvancedCopy Manager's agent on the business server.

Using AdvancedCopy Manager CCM has the following advantages:

- Backups can be performed independently of the operating system of the business server.
- Operational work becomes more efficient, because there is no need to spend time installing AdvancedCopy Manager's agents on each of the business servers.

1.1 System Configuration

For information on the basic system configuration required for using AdvancedCopy Manager CCM, refer to "Agent-less Operating Model" in "Overview of AdvancedCopy Manager" in the *Overview*.

System Configuration Using Both Copy Command via SAN and via LAN

With an inter-box copy, a configuration that can use both the Copy command via SAN and the Copy command via LAN is available.

Figure 1.1 Sample Configuration When Copy Command via SAN Is Used for Copy Source Device and Copy Command via LAN Is Used for Copy Destination Device

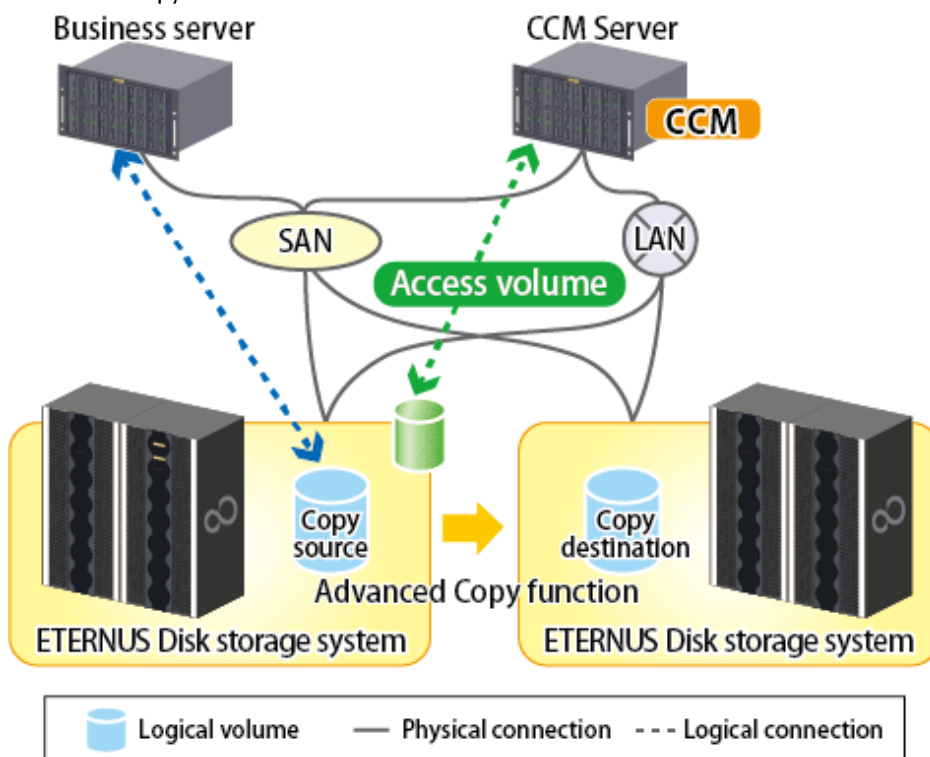


Figure 1.2 Sample Configuration When Copy Command via LAN Is Used for Copy Source Device and Copy Command via SAN Is Used for Copy Destination Device

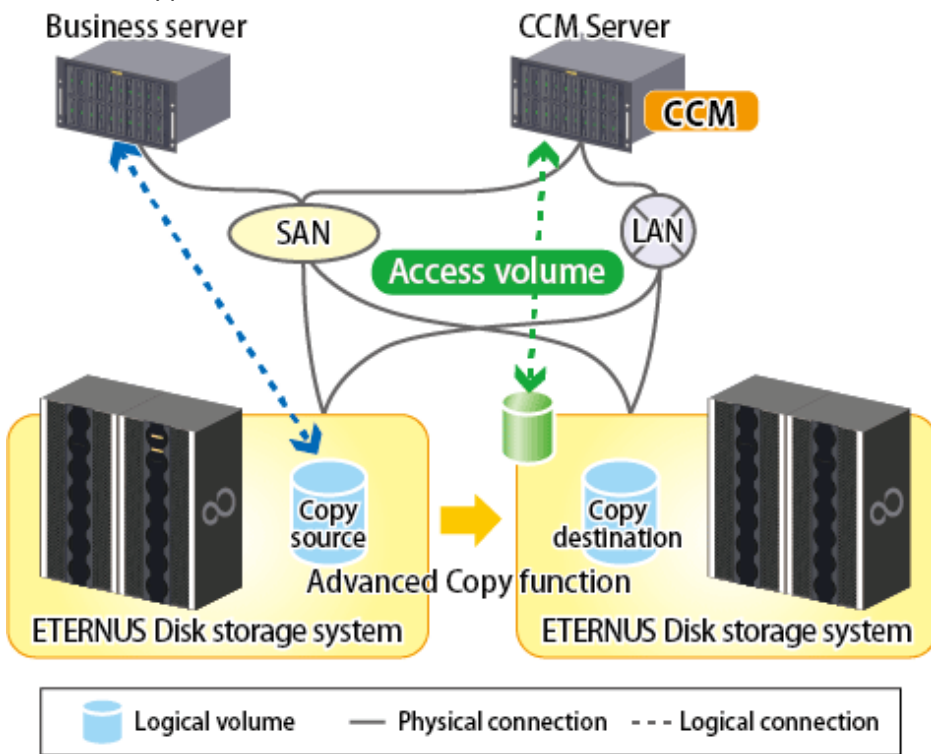
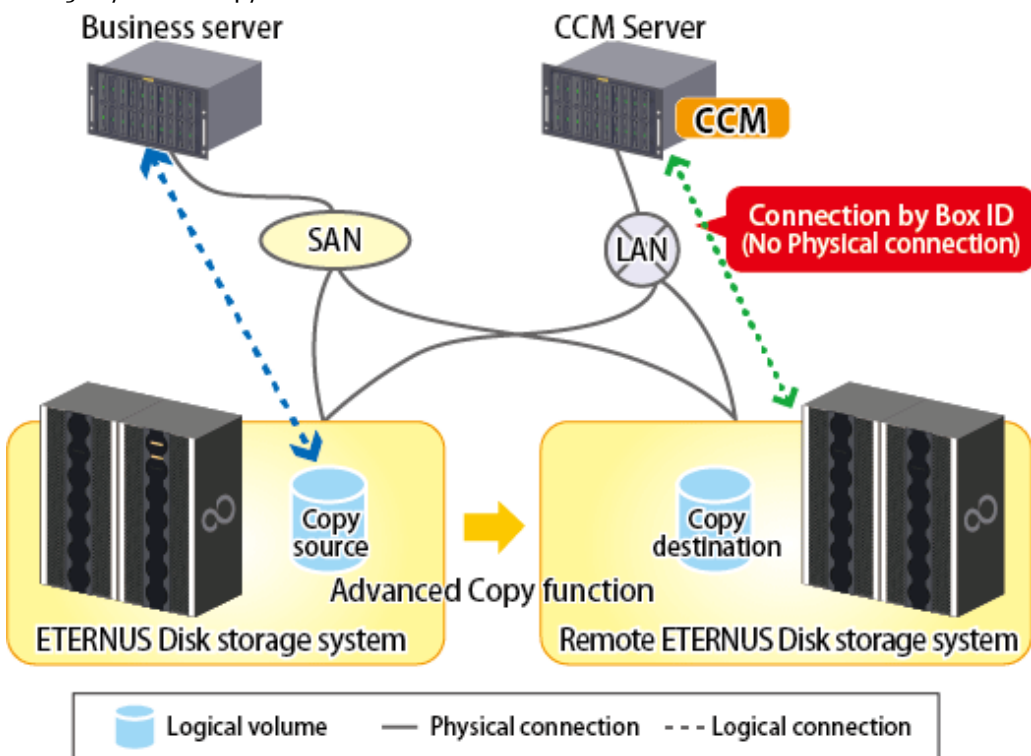


Figure 1.3 Sample Configuration When Copy Command via LAN Is Used for Copy Source Device and Remote ETERNUS Disk Storage System Is Copy Destination Device



P Point

- It is recommended to not connect the copy destination logical volume to any server.

- If performing REC using the Copy command via LAN function, it is necessary that both ETERNUS Disk storage systems are able to be operated by Copy command via LAN.
- If the Copy command via LAN communicates with ETERNUS Disk storage system using SSH, the processing time increases compared with the Copy command via SAN. Moreover, it may take a few minutes to execute Advanced Copy functions by using Copy command via LAN depending on the number of copy pairs to which AdvancedCopy Manager CCM executes at a time.
- If a copy is specified for copy groups with two or more copy pairs in an operating environment using the Copy command via LAN, regardless of the copy specification method (command, Web Console), the total processing time in relation to that copy group can be shortened by specifying a copy in units of copy groups rather than specifying a copy for the number of copy pairs in the copy unit. It is recommended that you operate in units of copy groups when operating two or more copy pairs with the Copy command via LAN.

1.2 Supported Functions

AdvancedCopy Manager CCM supports the following Advanced Copy functions. Note that Advanced Copy is executed for each separate logical volume of ETERNUS Disk storage system.

Table 1.1 Advanced Copy Functions Supported by AdvancedCopy Manager CCM

Advanced Copy Function		AdvancedCopy Manager	AdvancedCopy Manager CCM	
Snapshot type high-speed copies	OPC	A	A	
	QuickOPC	A	A	
	SnapOPC	A	N/A	
	SnapOPC+	A	A	
Synchronous high-speed copies	EC	Reversing the copy direction	A	A
		Concurrent suspend function	A	A
	REC	Reversing the copy direction	A	A
		Initial copy skip function	A	A
		Concurrent suspend function	A	A
		Displaying or changing information about the REC transfer buffer	A	A

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



Note

If using AdvancedCopy Manager and AdvancedCopy Manager CCM together, make sure that they control different logical volumes and that the logical volumes do not interact.



See

AdvancedCopy Manager CCM can be operated on the cluster environment. Refer to the *Cluster Environment Setup Guide* for more information.

The following functions are supported in the Storage Cluster environment. Select the appropriate one according to your purpose.

- Advanced Copy to a volume (hereafter called "non-TFOV") which is not a target of the Storage Cluster function from a TFOV
- Advanced Copy from a TFOV to a TFOV by using the Storage Cluster Continuous Copy function

Advanced Copy Function		From TFOV to non-TFOV	From TFOV to TFOV
Snapshot type high-speed copies	OPC	A	A
	QuickOPC	A	A
	SnapOPC	N/A	N/A
	SnapOPC+	A	N/A
Synchronous high-speed copies	EC	A	A
	REC	A	N/A

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

Point

- When performing an inter-box copy from a TFOV to a non-TFOV, restore of a TFOV is not possible if the TFO status is "Standby" due to a failover or a failback. The Storage Cluster Continuous Copy function can continue Advanced Copy or restore even if a failover or failback occur. For this reason, we recommend using the Storage Cluster Continuous Copy function. Use Advanced Copy from a TFOV to a non-TFOV for a temporary backup, etc.
- When performing an inter-box copy, use REC from a TFOV to a non-TFOV.

See

- For how to perform Advanced Copy from a TFOV to a non-TFOV, refer to "[3.11 Operations of Advanced Copy Using TFOV](#)".
- For how to perform Advanced Copy from a TFOV to a TFOV by using the Storage Cluster Continuous Copy function, refer to "[3.12 Storage Cluster Continuous Copy Function](#)".

1.3 Use of IPv6 Address

1.3.1 Software Requirement

The following are basic software requirements that support the use of IPv6 addresses in AdvancedCopy Manager CCM:

- Microsoft Windows Server 2012 or later
- Solaris 11 (11/11 or later)
- Solaris 10
- Red Hat Enterprise Linux 8 (for Intel64)
- Red Hat Enterprise Linux 7 (for Intel64)
- Red Hat Enterprise Linux 6 (for Intel64)

Point

Refer to "Operating Environment of AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for basic software requirements for AdvancedCopy Manager CCM.

1.3.2 Supported Devices

The use of IPv6 address is supported for the following device:

- ETERNUS Disk storage system

1.3.3 IPv6 Address Notation

Notation of IP Address to Be Input in AdvancedCopy Manager CCM

In AdvancedCopy Manager CCM, IPv6 address can be input in both full notation and abbreviated notation. However, no entry is allowed in the following format:

- IPv4-mapped address
- IPv4-compatible address
- Format in which an interface number or name is added as "%" to the end of the address
(for example: fe80::1234%fx0)

Display of IP Address in AdvancedCopy Manager CCM

In AdvancedCopy Manager CCM, IPv6 address is displayed with reference to RFC5952. Therefore, the notation of an input IP address may be different from that of an IP address displayed by command output or on Web Console.

Chapter 2 Setup

This chapter explains the environment settings for using AdvancedCopy Manager CCM. Make all of settings on the CCM Server.

2.1 Creating User Account

It is necessary to create user accounts that are required for using AdvancedCopy Manager CCM. Refer to "Creating User Account for Using AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for details how to create.

2.2 Access Volume Settings

When using the Copy command via SAN method, a logical volume that can be accessed from the CCM Server is needed in ETERNUS Disk storage system. One logical volume with any size of ETERNUS Disk storage system must be assigned to CCM Server as the access volume.

The settings procedure for the access volume is explained below:

- For specifying the access volume manually when ETERNUS Disk storage system is registered
 - For Windows environments
 1. Allocate a logical volume to be set up as the access volume to the CCM Server.
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 environments
 1. Allocate a logical volume to be set up as the access volume to the CCM Server.
The allocated logical volume is recognized as a disk.
 2. Initialize the disk as a disk with EFI label or VTOC label.
 - For Linux environments
 1. Allocate a logical volume to be set up as the access volume to the CCM Server.
The allocated logical volume is recognized as a disk.
 2. Initialize the disk in MBR (DOS) or GPT disk format.



Note

The allocated logical volume as the access volume must not be included in the backup target for Advanced Copy.

- For specifying the access volume automatically when ETERNUS Disk storage system is registered

Allocate a logical volume to be set up as the access volume to the CCM Server.
The allocated logical volume is recognized as a disk.

After specifying the access volume automatically, check that the specified access volume is not included in the backup target for Advanced Copy. If the access volume is included in the backup target for Advanced Copy, change the access volume by executing the `acarray change` command.

2.3 Registering Advanced Copy License

To execute the Advanced Copy function of ETERNUS Disk storage system, it is necessary to register the Advanced Copy license to the license management function.

Refer to "Registration of License" in the *Installation and Setup Guide* and register the Advanced Copy license.

2.4 Registering ETERNUS Disk Storage System

Register ETERNUS Disk storage system with AdvancedCopy Manager CCM as a device to be used for copies. Execute the [acarray add](#) command to register ETERNUS Disk storage system.

The following ETERNUS Disk storage system information is required for registration.

- ETERNUS Disk 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.

When using Web Console, specify a device name of ETERNUS Disk storage system as ETERNUS name.

- ETERNUS Disk storage system IP address
- ETERNUS Disk storage system user name and password

Specify the user name and password with the following privileges.

Storage Device Type	Privileges
ETERNUS Disk storage system which can operate by using Copy command via LAN	Software role of ETERNUS Disk storage system
ETERNUS Disk storage system which cannot operate by using Copy command via LAN	Administrator authorization of ETERNUS Disk storage system

- Access volume set according to "[2.2 Access Volume Settings](#)" (This setup can be omitted)

When registering the ETERNUS Disk storage system which is operated by Copy command via SAN, an access volume specification can be omitted. However, it is necessary to specify an access volume in a clustered system. Refer to "[6.2 Notes about Cluster Operation](#)" for more information.

When registering the ETERNUS Disk storage system which is operated by Copy command via LAN, it is unnecessary to specify an access volume.

Information

For registering ETERNUS Disk storage system operated by Copy command via SAN and omitting access volume setup, volumes in ETERNUS Disk storage system are searched in the following order. Finding a valid access volume may take a few minutes.

- For Windows environments

The order of "PhysicalDrive [disk number]" displayed in Disk Management.

The disk number is the same value as the "disk?" in the AdvancedCopy Manager block device name and the "Disk #" displayed by clicking the **Start** menu > **Management Tool** > **Computer Management** > **Disk Management**.

- For Solaris environments

1. ETERNUS multipath device (/dev/FJSMplb/rdisk/*)
2. OS standard device (/dev/rdisk/*), Solaris standard multipath (MPxIO) device (/dev/rdisk/*)
3. VxVM (/dev/vx/rdmp/*)

- For Linux environments

1. Multipath device generated by device mapper facility (/dev/mapper/*)
2. OS standard device (/dev/sd*)
3. by-id format for udev (/dev/disk/by-id/*)
4. by-path format for udev (/dev/disk/by-path/*)

When using Copy command via LAN, AdvancedCopy Manager CCM uses the following port number. Make sure that this port is not being used by another service.

Port Number	Protocol	Explanation
32002	tcp	This is the port number which is used internally by AdvancedCopy Manager CCM.

For the remote ETERNUS Disk storage system, AdvancedCopy Manager CCM registers it without authentication. The following ETERNUS Disk storage system information is required for registration.

- ETERNUS name
- Box ID

Point

Note for REC:

Both the copy source and the copy destination ETERNUS Disk storage systems must be registered. Make sure that the REC path is set before registering ETERNUS Disk storage system on the CCM Server.

Perform the following procedure on the CCM Server.

1. Register the one of ETERNUS Disk storage system.

This ETERNUS Disk storage system must be accessible by either SAN or LAN.

- When the ETERNUS Disk storage system has an access volume:

Register the ETERNUS Disk storage system that has the access volume set by "[2.2 Access Volume Settings](#)".

Execute the `acarray add` command with the `-san` option. When both ETERNUS Disk storage systems have an access volume, register either one.

Specify the existing drive letter or device name for the access volume.

- When the ETERNUS Disk storage system does not have an access volume:

Execute the `acarray add` command with the `-lan` option.

2. Register another ETERNUS Disk storage system.

Register the ETERNUS Disk storage system not registered in step 1. If there are more than two ETERNUS Disk storage systems in the REC configuration, repeat step 2 for the additional ETERNUS Disk storage systems.

- When the ETERNUS Disk storage system has an access volume:

Specify the existing drive letter or device name for the access volume.

- When the ETERNUS Disk storage system does not have an access volume:

Register using either of the following methods.

- Registering the LAN as connection route (This is recommended) :

Execute the `acarray add` command with the `-lan` option.

The information of Copy command and volume list can be referred.

- Registering the ETERNUS Disk storage system without authentication:

Execute the `acarray add` command with the `-boxid` option.

3. Refer to "[2.5 Creating Copy Groups](#)" to create copy groups.

Specify the ETERNUS name of step 1 in the `-a` option.

Specify the ETERNUS name of step 2 in the `-remote` option.

Note

ETERNUS Disk storage systems for which the following redundant registration is done are not available:

- Device registered to be used for copy control function via SAN or copy control function via LAN is registered as a remote ETERNUS Disk storage system.

- Device registered as a remote ETERNUS Disk storage system is registered to be used for copy control function via SAN or copy control function via LAN.

Execution examples are shown below.

Register ETERNUS Disk storage system.

- In the case of Copy command via SAN

[Execution example]

```
> acarray add -a ET001 -ip 192.0.2.10 -path c: -user **** -password **** -san
Successful completion.
```

- In the case of Copy command via LAN

[Execution example]

```
> acarray add -a ET001 -ip 192.0.2.10 -user **** -password **** -lan
Successful completion.
```

To check whether ETERNUS Disk storage system has been registered, execute the [acarray list](#) command.

[Execution example]

```
> acarray list
Name   BOX-ID                                     IP Address
-----
ET001  00ETERNUSDXM##ET44S20A####HK000104##### 192.0.2.10
```

To check the connection route to the registered ETERNUS Disk storage system, execute the [acarray detail](#) command with the `-route` option.

- In the case of Copy command via SAN

[Execution example]

```
> acarray detail -a ET001 -route
Disk Array Name      : ET001
BOX-ID               : 00ETERNUSDXM##ET44S20A####HK000104#####
IP Address           : 192.0.2.10
Admin User           : ****
Access Volume        : c:
Access Route         : san
```

- In the case of Copy command via LAN

[Execution example]

```
> acarray detail -a ET001 -route
Disk Array Name      : ET001
BOX-ID               : 00ETERNUSDXM##ET44S20A####HK000104#####
IP Address           : 192.0.2.10
Admin User           : ****
Access Volume        : -
Access Route         : lan
```

To register the remote ETERNUS Disk storage system which does not have network connection, execute the [acarray add](#) command with the `-boxid` option.

[Execution example]

```
> acarrray add -a ET001 -boxid 00ETERNUSDXM##ET44S20A####HK000104##### -remote
Successful completion.
```

To check whether ETERNUS Disk storage system has been registered, execute the [acarrray list](#) command.

[Execution example]

```
> acarrray list -remote

Name  BOX-ID
-----
ET001 00ETERNUSDXM##ET44S20A####HK000104#####
ET002 00ETERNUSDXH##ET87S20A####NC4110699004##
```

2.5 Creating Copy Groups

Execute the [acgroup create](#) command to create copy groups. A copy group is a group of copy pairs, consisting of a copy source logical volume and a copy destination logical volume.

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

[Execution example]

```
> acgroup create -g GRP1 -type OPC -a ET001
Successful completion.
```

2.6 Setting the Required Number of Free Volumes (Only When SnapOPC+ Is Used)

When a storage device whose firmware version is V11L10-2000 or later is used, backup operations are available where snap generations are managed by deleting a specific snap generation other than the oldest among the multiple snap generations created with SnapOPC+. Note that when SnapOPC+ is used in a backup operation environment that meets all the following conditions, the required number of free volumes must be configured as described in this section.

- When the copy source volume of SnapOPC+ is in a storage device whose firmware version is V11L10-2000 or later
- When multiple copy groups are created for the above copy source volume
- When management of the snap generation for the copy source volume is performed automatically with the [acsnap start](#) command

When multiple copy groups are defined for one copy source volume and a backup operation is performed with SnapOPC+, the generation number of the oldest snap generation may not be "1" in the target copy groups.

For example, when two copy groups (copy group A and copy group B) are defined with five copy pairs, if five snap generations are created for copy group A and after that five snap generations are created for copy group B, the generation number of the oldest snap generation for copy group B is "6".

The [acsnap start](#) command attempts to delete the oldest snap generation for the specified copy group and to retrieve the latest snap generation. When the [acsnap start](#) command is executed on a copy group where the generation number of the oldest snap generation is not "1", the data of the deletion target snap generation is migrated to the snap generation prior to it, so the snap generation deletion process may take some time. If the snap generation deletion process is not completed and a free volume does not exist in the copy group, the [acsnap start](#) command terminates with an error because the latest snap generation cannot be retrieved.

Even if the snap generation deletion process is not completed, the latest snap generation can be retrieved if one or more free volumes exist in the copy group. To retrieve the latest snap generation even if the snap generation deletion process is not completed, at least one free volume is required in the copy group. This can be set with "setting the required number of free volumes".

Refer to the example in "[2.6.1 utomatic Management of Snap Generations](#)" and set the required number of free volumes, as necessary.

2.6.1 utomatic Management of Snap Generations

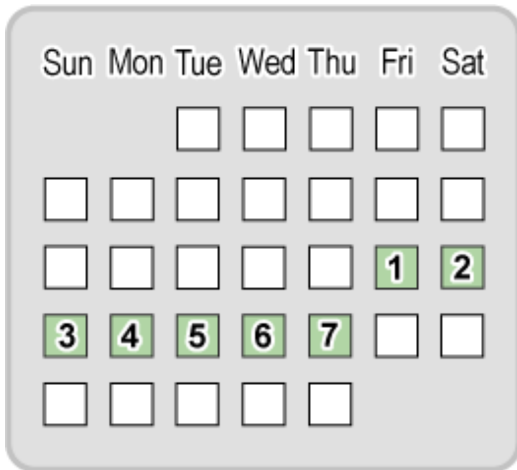
This section describes how to manage snap generations automatically, using the following two examples.

- Management of Seven Generations with Daily Backup
- Management of One Generation with Monthly Backup and Seven Generations with Daily Backup

P Point

The method of generation management varies depending on the value set for the required number of free volumes. Refer to "2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+" for details.

Management of Seven Generations with Daily Backup



N Snap generation
(N: Snap generation number)

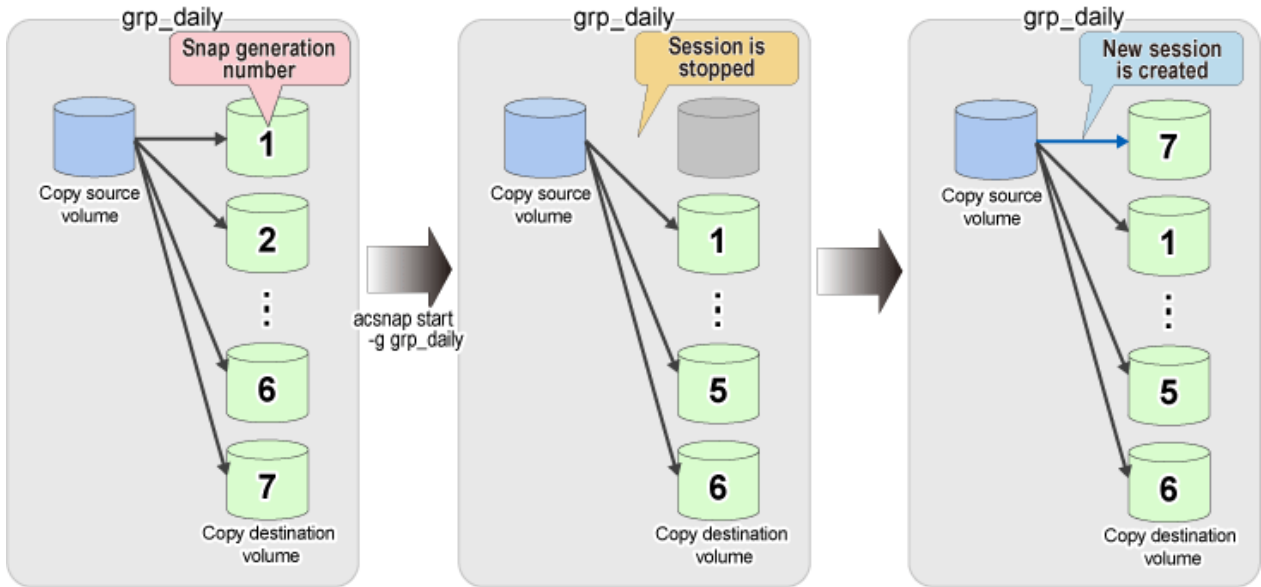
To manage seven generations of daily backups, create seven copy pairs for a single copy group. In this case, the required number of free volumes does not need to be set.

Snap generations can be managed automatically when the `acsnap start` command is executed by specifying a copy group. For information on how to perform a backup, refer to "3.2.1.5 Backup via SnapOPC+".

The following is an overview and example of a command execution when the name of the copy group is "grp_daily".

Frequency of Execution	Command Execution Example	Overview of Command Executions
Once a day	<code>acsnap start -g grp_daily</code>	<ul style="list-style-type: none"> - Until seventh time The latest snap generation is retrieved for copy pairs without a no SnapOPC+ session. - Eighth time and after Because each copy pair in the copy group already has a SnapOPC+ session, the oldest snap generation is deleted. After that, the latest snap generation is retrieved for the copy pair used by the deleted snap generation. Refer to "Figure 2.1 Processing of "acsnap start" Command for "grp_daily" Copy Group".

Figure 2.1 Processing of "acsnap start" Command for "grp_daily" Copy Group



When the `acsnap start` command is executed, the snap generation numbers are moved up by one when the SnapOPC+ session of the oldest snap generation in the copy group is stopped (in the example above, the numbers from "2" to "7" in the left figure are moved up to "1" to "6" in the center figure). After that, a new SnapOPC+ session is set for the volume whose SnapOPC+ session was stopped and the latest snap generation number is allocated to that volume (in the example above, "7" in the right figure).

Management of One Generation with Monthly Backup and Seven Generations with Daily Backup



Information

In the above figure, snap generation number "1" is retrieved from the monthly backup and snap generation number "2" to "8" are retrieved from the daily backup.

To manage one generation of monthly backups and seven generations of daily backups, two copy groups are required. Create a copy pair in the copy group for the monthly backup. For this copy group, settings for the required number of free volumes are not necessary. Create eight copy pairs in the copy group for the daily backup. For this copy group, settings for the required number of free volumes are necessary.

When the name of the copy group for monthly backup is "grp_monthly" and the name of the copy group for daily backup is "grp_daily", the required number of free volumes and copy pairs are as follows.

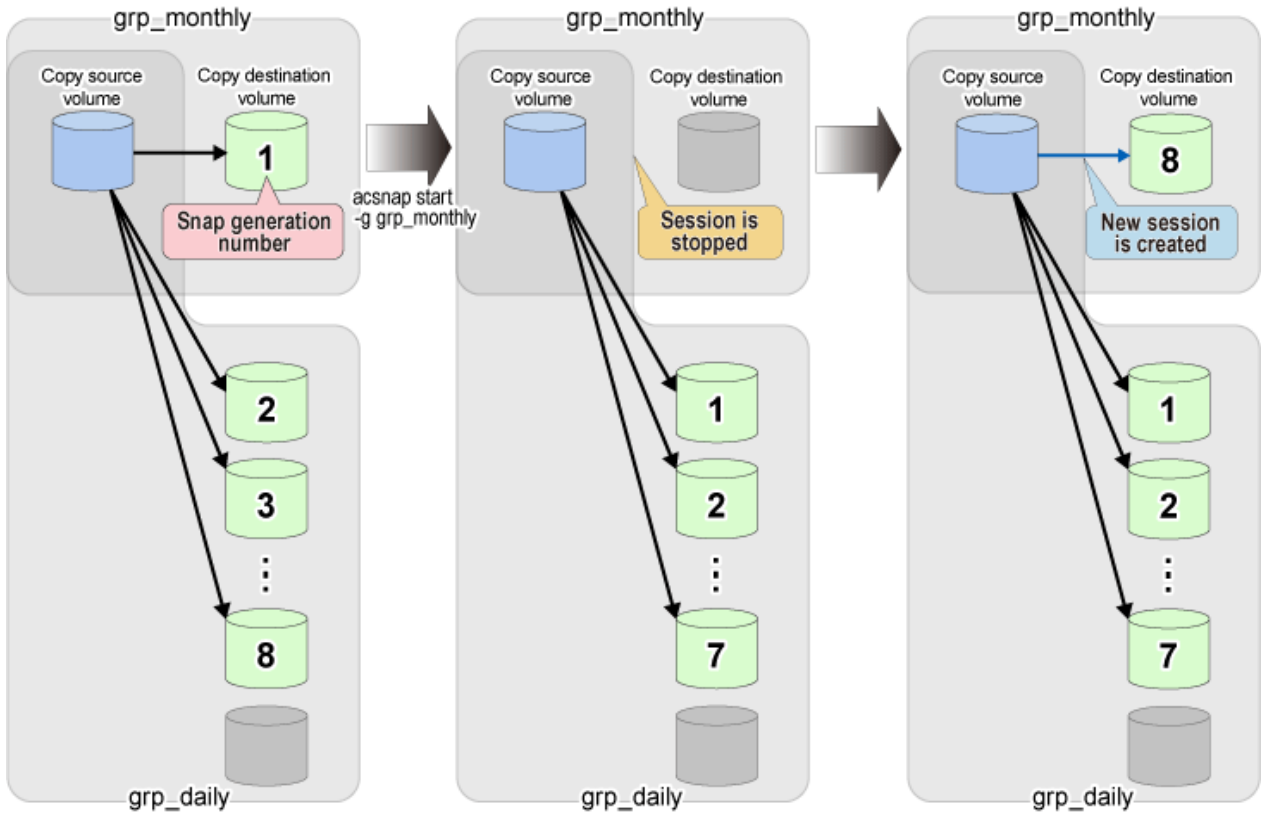
Purpose of the Copy Group	Required Number of Free Volumes	Required Number of Copy Pairs
Monthly backup	0 (setting not necessary)	1
Daily backup	1	8 (= 7 + Required number of free volumes)

Snap generations can be managed automatically by executing the [acsnap start](#) command for each copy group as described below. For information on how to perform a backup, refer to "[3.2.1.5 Backup via SnapOPC+](#)".

The following is an overview and example of a command execution when the name of the copy group for the monthly backup is "grp_monthly" and the name of the copy group for the daily backup is "grp_daily".

Frequency of Execution	Command Execution Example	Overview of Command Executions
Once a month	<code>acsnap start -g grp_monthly</code>	<ul style="list-style-type: none"> - First time The latest snap generation is retrieved for copy pairs without a SnapOPC+ session. - Second time and after The snap generations that have already been retrieved are deleted, and the latest snap generation is retrieved for the same copy pairs. Refer to "Figure 2.2 Processing of "acsnap start" Command for "grp_monthly" Copy Group" for details.
Once a day	<code>acsnap start -g grp_daily</code>	<ul style="list-style-type: none"> - Until seventh time The latest snap generation is retrieved for copy pairs without a no SnapOPC+ session. - Eighth time and after While the oldest snap generation in copy group "grp_daily" is being deleted asynchronously, the latest snap generation is retrieved for the copy pairs without a SnapOPC+ session. Refer to "Figure 2.3 Processing of "acsnap start" Command for "grp_daily" Copy Group".

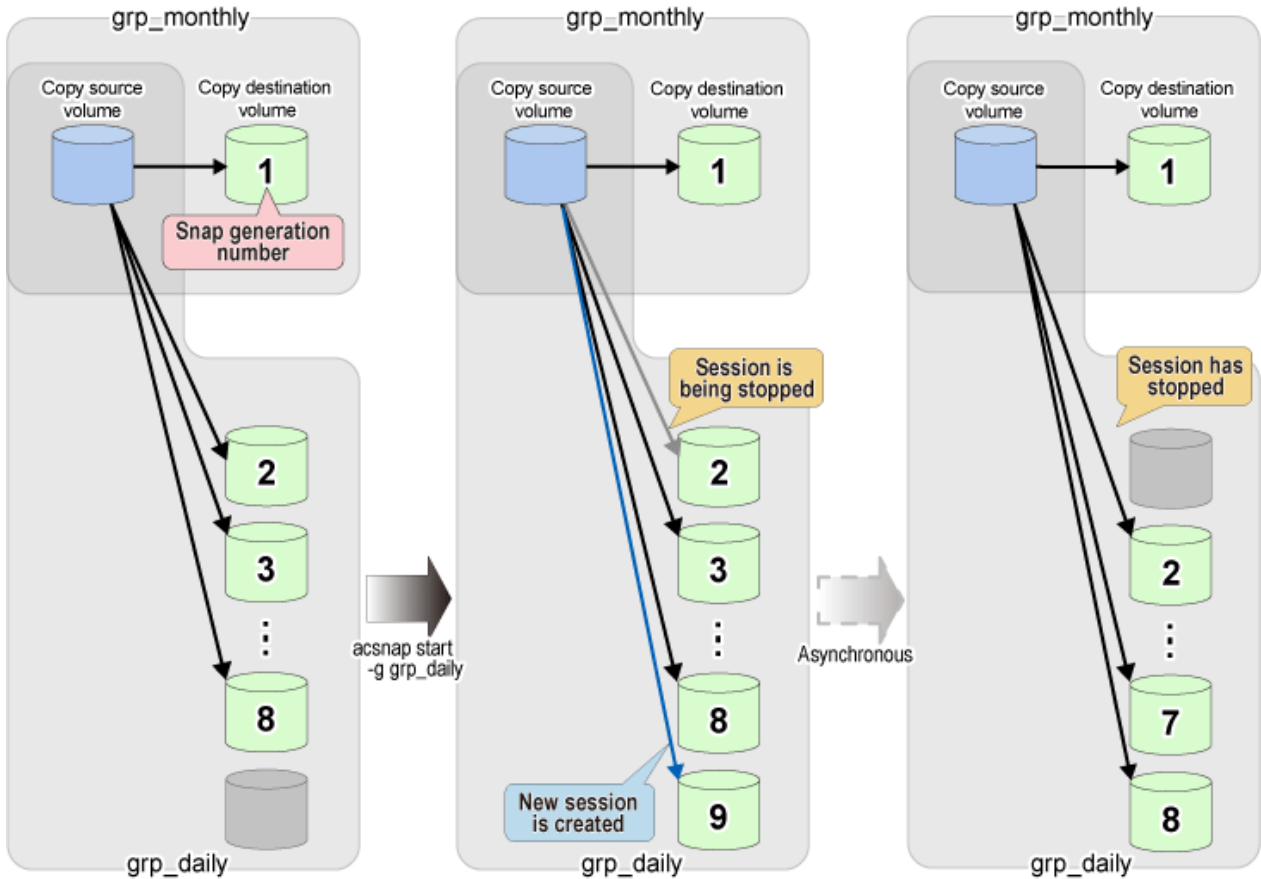
Figure 2.2 Processing of "acsnap start" Command for "grp_monthly" Copy Group



When the `acsnap start` command is executed for copy group "grp_monthly", the snap generation numbers for "grp_daily" are moved up by one when the SnapOPC+ session for copy group "grp_monthly" is stopped. (In the example above, the numbers from "2" to "8" in the left figure are moved up to "1" to "7" in the center figure.)

After that, a new SnapOPC+ session is set for the free volume of the copy group "grp_monthly" and the latest snap generation is allocated to that volume. (In the example above, "8" in the right figure.)

Figure 2.3 Processing of "acsnap start" Command for "grp_daily" Copy Group



When the `acsnap start` command is executed for copy group "grp_daily", the SnapOPC+ session of the oldest snap generation (in the example above, "2" in the left figure) is stopped in copy group "grp_daily". However, because this snap generation is not the oldest one in the copy source volume, deletion of the SnapOPC+ session may take time. Since a new snap generation cannot be retrieved for a copy pair which already has a SnapOPC+ session, SnapOPC+ is started in a free volume prepared in the settings for the required number of free volumes (in the example above, the volume for which a generation number is not allocated). A new SnapOPC+ session is started while the old SnapOPC+ session is being deleted, so there temporarily is eight generations (in the example above, "2" to "9" in the center figure).

A SnapOPC+ session in the process of being deleted is deleted automatically as time passes. When the SnapOPC+ session is deleted, the snap generation numbers for the copy group "grp_daily" are moved up by one (in the example above, the numbers from "3" to "9" in the center figure are moved up to "2" to "8" in the right figure). The volume of the copy pair used by the stopped SnapOPC+ session is used as a free volume when the next snap generation is retrieved.

Point

- When generation management is performed for multiple copy groups in one copy source volume, the oldest snap generation in the copy group targeted for processing may not be the oldest snap generation in the copy source volume. When a snap generation other than the oldest in the copy source volume is deleted, the SnapOPC+ session that is being deleted may remain for some time after the command is returned.
- The next snap generation cannot be retrieved for copy pairs of SnapOPC+ sessions whose stoppage process is yet to be completed. To delete a snap generation other than the oldest, configure one or more volumes for the required number of free volumes to make sure that at least one free volume is always available.
- If stoppage of a SnapOPC+ session may not be completed in time to retrieve the next backup due to the following requirements, set the appropriate required number of free volumes.
 - Backups are performed frequently (time between backups is short)

- Backups are retrieved irregularly

2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+

The copy pair used to start SnapOPC+ is selected based on the following logic.

- When the set value for the required number of free volumes is "0", or the required number of free volumes is not set

- When there is a copy pair without a SnapOPC+ session

A copy pair without a SnapOPC+ session is selected, and SnapOPC+ starts.

- When all copy pairs already have a SnapOPC+ session

The copy pair with the oldest snap generation in the copy group targeted for processing is selected, and the SnapOPC+ session of that copy pair is stopped. After the SnapOPC+ session has been stopped, SnapOPC+ is started for that copy pair.

However, if the selected copy pair is not the oldest snap generation (snap generation number is other than "1") in the copy source volume, the [acsnap start](#) command terminates with an error.

- When the set value for the required number of free volumes is one or more

The selected copy pair varies depending on the number of free volumes (total number of copy pairs without a SnapOPC+ session and copy pairs with a SnapOPC+ session being stopped) and the required number of free volumes. However, if the number of copy pairs without a SnapOPC+ session is zero, the [acsnap start](#) command terminates with an error.

- When the number of free volumes is greater than the required number of free volumes

A copy pair without a SnapOPC+ session is selected, and SnapOPC+ starts.

- When the number of free volumes and the required number of free volumes are equal

Excluding the copy pairs with a SnapOPC+ session being stopped, the oldest snap generation in the copy group is selected and the stoppage process is started for the SnapOPC+ session of that copy pair. After that the copy pair without a SnapOPC+ session is selected, and SnapOPC+ starts.

However, if a copy pair whose SnapOPC+ session can be stopped does not exist in the copy group, the command terminates with an error. Additionally, if the deletion target snap generation is not the oldest snap generation (snap generation number is other than "1") in the copy source volume, the SnapOPC+ session being stopped may remain for a while after the command is responded.

- When the number of free volumes is less than the required number of free volumes

The number of free volumes is insufficient, so the [acsnap start](#) command terminates with an error.

2.6.3 Setting the Required Number of Free Volumes

Define the required number of free volumes for each copy group in the setting file (user.properties).

File Name for Setting

The required number of free volumes must be defined in the following files.

- In the case of non-cluster operation

OS	File Name
Windows	\$INS_DIR\etc\prop\user.properties
Solaris Linux	/etc/opt/FJSVccm/prop/user.properties

\$INS_DIR means "Program Directory" specified at the AdvancedCopy Manager CCM installation.

- In the case of cluster operation

OS	File Name
Windows	\$SHARE_DL:\$SHARE_TOP\etc\prop\user.properties

OS	File Name
Solaris Linux	\$SHARE_MNT/etc/opt/FJSVccm/user.properties

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

If the above files do not exist, they must be created.

How to Set the Required Number of Free Volumes

In the above files, define the copy group name and the required number of free volumes.

Item Name	Explanation
<code>acsnap.freePair.copyGroupName</code>	<p>The name of the copy group is defined in the <code>copyGroupName</code> section. Define the copy group names displayed with the <code>acgroup list</code> command using the correct uppercase and lowercase letters.</p> <p>Specify the required number of free volumes for the copy group with a value of 0 or more.</p> <p>Copy groups for which this item is not defined and copy groups for which an invalid value is set are considered to be a value of 0.</p>



Example

The following is an example of defining the required number of free volumes for copy group "grp1" as "1" and the required number of free volumes for copy group "grp2" as "2" in the "user.properties" file.

```
acsnap.freePair.grp1=1
acsnap.freePair.grp2=2
```



See

For an overview of snap generation processing when the `acsnap start` command is executed with the required number of free volumes set, refer to "2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+".

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.

Figure 2.4 Copy Pair Format

ET01/0x1:ET01/0x6

(1) (2) (3) (4)

- (1) ETERNUS name for the copy source
- (2) Logical volume number for the copy source (*1)
- (3) ETERNUS name for the copy destination
- (4) Logical volume number for the copy destination (*1)

*1: Specify the hexadecimal starting with "0x" (ex, "0x1" or "0x0001")

Use the following procedure to add copy pairs.

1. Check the logical volume numbers for the copy source and destination that are 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.

1. Check the operating OS.

Refer to "[4.10.2 acgetvolinfo \(Logical Volume Information Display Command\)](#)" for the operating OS.

2. Execute the `acgetvolinfo` command to check the correspondence between the OS device name and the logical volume number.

- Checking the logical volume number of the copy destination

It is recommended to not connect the copy destination logical volume to any server.

Execute the `acinq lv` command with the `-free` option on the CCM Server to check a logical volume number that is not connected to the server.



Note

When including a logical volume of a remote ETERNUS Disk storage system in a copy pair, confirm the logical volume number of the object using ETERNUS Web GUI.

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

Execution example for making the copy group "GRP1" shown in "[Figure 2.5 Adding Copy Pairs](#)" is as follows.

[Execution example]

```
> acpair add -g GRP1 -p ET001/0x25:ET001/0x29
Successful completion.

> acpair add -g GRP1 -p ET001/0x26:ET001/0x30
Successful completion.

> acpair add -g GRP1 -p ET001/0x27:ET001/0x31
Successful completion.

> acpair add -g GRP1 -p ET001/0x28:ET001/0x32
Successful completion.
```

In the case when the copy type is SnapOPCP (SnapOPC+), the execution example for making the copy group "GRP2" shown in "[Figure 2.5 Adding Copy Pairs](#)" is as follows.

[Execution example]

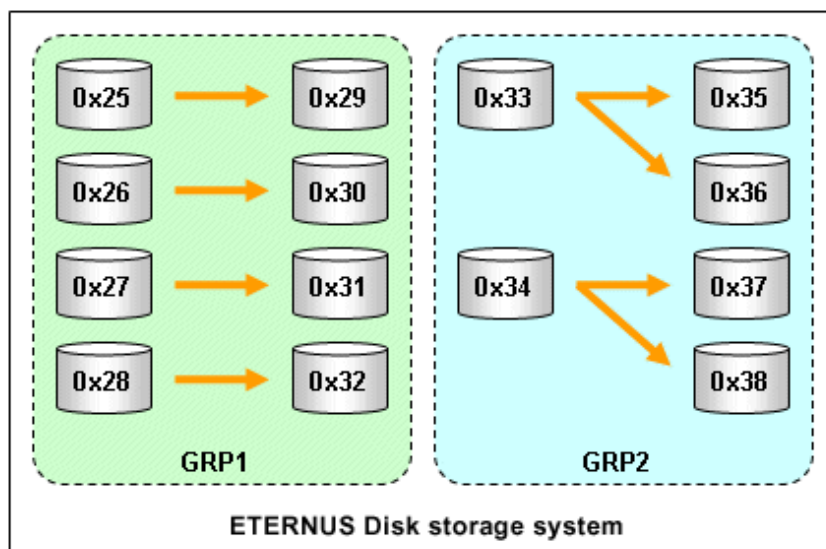
```
> acpair add -g GRP2 -p ET001/0x33:ET001/0x35
Successful completion.

> acpair add -g GRP2 -p ET001/0x33:ET001/0x36
Successful completion.

> acpair add -g GRP2 -p ET001/0x34:ET001/0x37
Successful completion.

> acpair add -g GRP2 -p ET001/0x34:ET001/0x38
Successful completion.
```

Figure 2.5 Adding Copy Pairs



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

Execute the `acgroup detail` command to display information about ETERNUS Disk storage system, and check that the copy pairs have been added using the specified logical volume numbers.

[Execution example]

```
> acgroup detail -g GRP1

Copy Group Name : GRP1
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Pair
-----
ET001/0x25:ET001/0x29
ET001/0x26:ET001/0x30
ET001/0x27:ET001/0x31
ET001/0x28:ET001/0x32
```

2.8 Setting Copy Volume Protection

Volume protection can be set for transaction volumes in order to prevent volumes being discarded accidentally via operator error.

The copy volume protection function performs tasks at ETERNUS Disk storage system to protect logical volumes from all Advanced Copy functions.

Use the `acinhibit set` command to set the volume protection settings. Use the `acinhibit unset` command to release the volume protection settings.

The `acinq lv` command can be used to check the copy volume protection status:

Note

ETERNUS Disk storage system must support the copy volume protection function in order to use it.

The following logical volumes do not support this function.

- Logical volume in the remote ETERNUS Disk storage system
- An REC session destination logical volume

The purpose of this function is to prevent copy operation errors. It does not prevent file write or other disk access.

2.8.1 Copy Volume Protection Unit

Copy volumes can be protected in logical volume units. The following types of logical volumes can be protected.

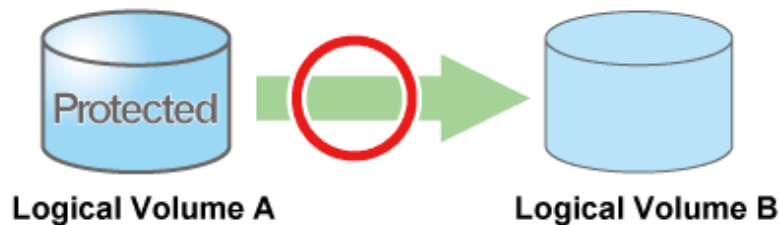
- Open Volume (Open)
- Flexible Tier Volume (FTV)
- Thin Provisioning volume
- Wide Striping Volume (WSV)

Individual partitions or slices cannot be selected for protection.

2.8.2 Advanced Copy of Protected Volumes

This section describes Advanced Copy operations for protected logical volumes.

- The volume-protected logical volume A can be set as the copy source (backup source).



- The volume-protected logical volume B cannot be set as the copy destination (backup destination).



If the copy destination logical volume is protected, an error is output when Advanced Copy is executed.

[Execution example]

```
> acopc start -g group01

ET001/0x1:ET001/0x6
ccm5007 The target logical volume is write protected. target logical volume=ET001/0x6

Succeeded : 0
Failed    : 1
```

Depending on the volume protection status, the [acopc start](#) command, [acsnap start](#) command, [acec start](#) command, and [acec resume](#) command output errors.

2.8.3 Volume Protection Function for Logical Volumes Not Performed

Volume protection can be set for logical volumes to prevent incorrect operation even if AdvancedCopy Manager CCM does not perform copy operations for them.

Logical volumes for which volume protection has been set can be added to a copy group as a copy destination. Note that an error does not occur if a copy pair is added to a copy group.

Chapter 3 Operation

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

Point

- AdvancedCopy Manager CCM performs backups and restorations regardless of the status of the business server. Make sure that the business server has stopped before executing backups and restorations.
If file server or other operations prevent unmounting of the copy source logical volume, it is possible to also perform backups and restorations executing the `acutil fsflush` command.
- If a copy destination logical volume is connected to Linux server or Windows server, execute the following commands to recognize the data of the copy destination volume to OS after the copy is executed.

- For Windows environments

```
acutil refresh -d deviceName
```

deviceName: Physical device name of the copy destination volume (PhysicalDrive[disk number])

- For Linux environments

```
sfdisk -R deviceName
```

deviceName: Device name of the copy destination volume (/dev/sd*)

- The environment variable PATH need to be set to use AdvancedCopy Manager CCM commands. Refer to "Setting Environment Variable PATH" in "Setup of AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for information on how to set it.

3.1 Operating Advanced Copy

AdvancedCopy Manager CCM provides both Copy command via SAN and Copy command via LAN as the data copy methods within ETERNUS Disk storage system.

3.1.1 System Configuration

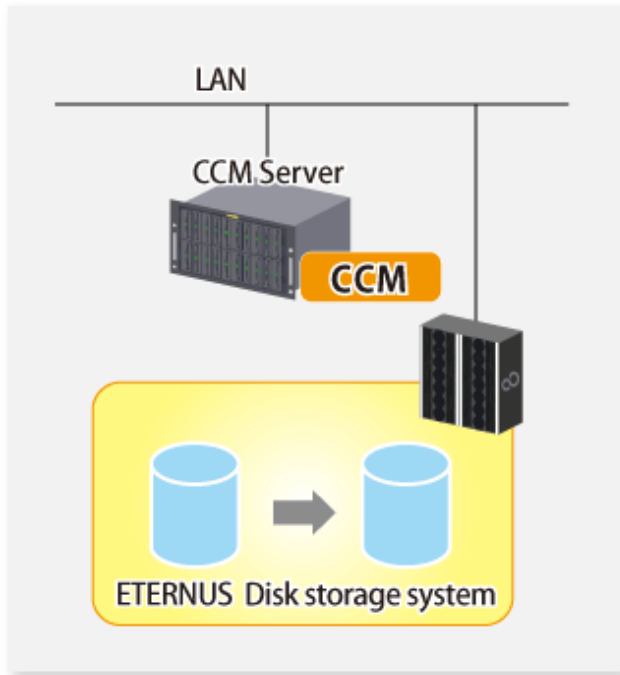
Connection Mode

The AdvancedCopy Manager CCM supports the following modes as the connection mode between the CCM Server and ETERNUS Disk storage system.

Select the connection mode during registration of ETERNUS Disk storage system executing the `acarray add` command.

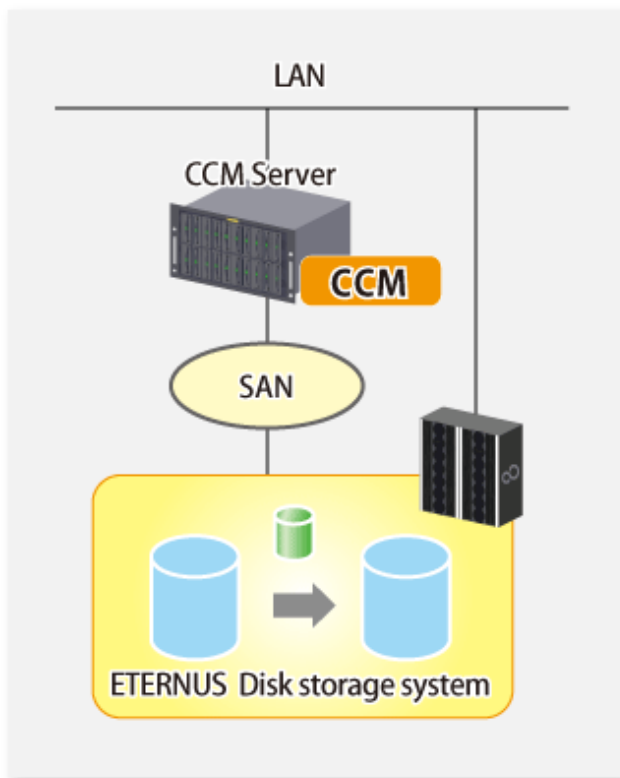
LAN Connection Environment

This mode connects the CCM Server and ETERNUS Disk storage system by LAN only.
All requests from the CCM Server to ETERNUS Disk storage system are issued via LAN.



SAN/LAN Mixed Environment

This mode connects the CCM Server and ETERNUS Disk storage system by SAN and LAN. Requests from the CCM Server are issued via the transmission paths set up with the `acarrray add` command. For a SAN/LAN mixed environment, it is recommended that connection via SAN be setup.



Authentication Method

The Copy command via LAN provides security through login authentication and encryption through ssh. Login authentication is performed with the username and password set to ETERNUS Disk storage system.

Transmission Method

This indicates the method of transmission for the Copy command via SAN and the Copy command via LAN.

Figure 3.1 Copy Command via SAN

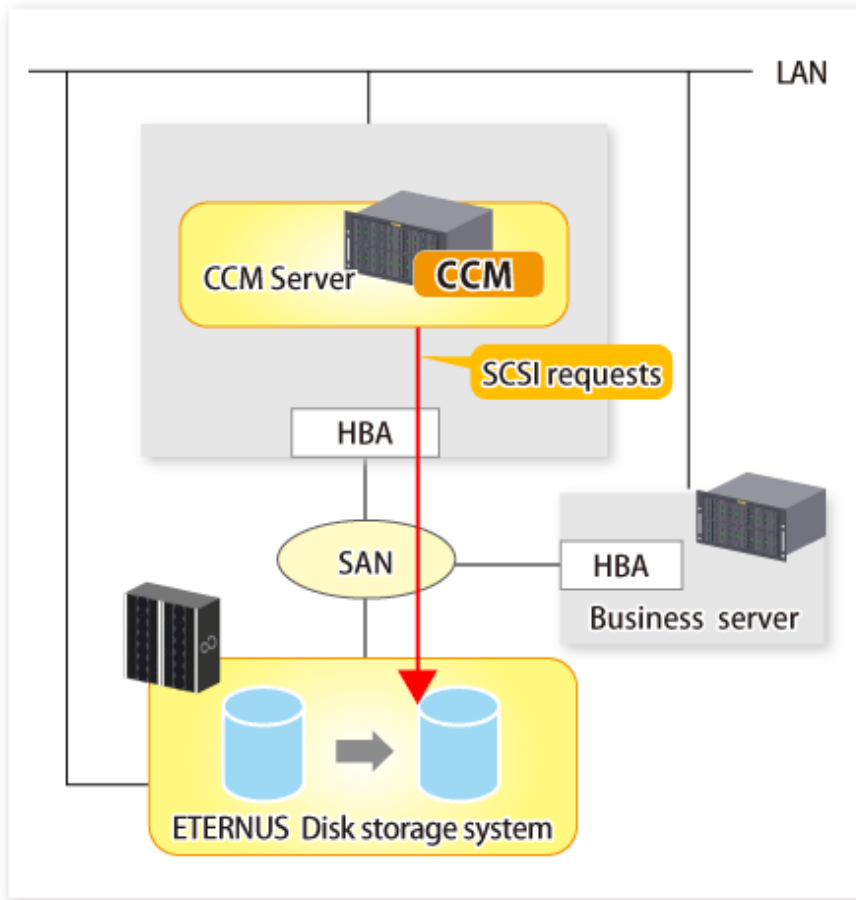
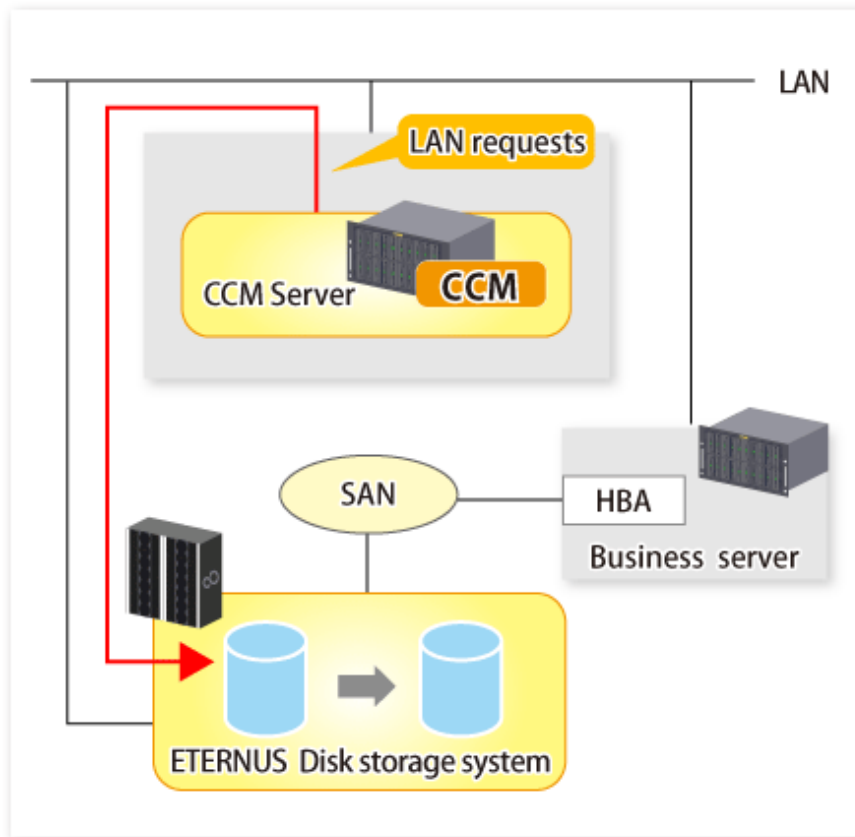


Figure 3.2 Copy Command via LAN



3.1.2 Notes about Number of Sessions with ETERNUS Disk Storage System

The Copy command via LAN communicates with ETERNUS Disk storage system using SSH.

One session is used for each ETERNUS Disk storage system which is operable with the Copy command via LAN.

The sessions used for LAN communication are included in the total number of active sessions in the ETERNUS Disk storage system. The maximum number of sessions is 16.

3.2 Executing Advanced Copy

This section explains the procedures for executing Advanced Copy function using AdvancedCopy Manager CCM.

Refer to "Overview of Advanced Copy Function" in the *Overview* for more information about each type of copy.

3.2.1 Executing Snapshot Type High-speed Copy

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

3.2.1.1 Backup via OPC

This section explains the operation methods of following processes.

- Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)
- Setting Volume Protection (Only If Volume Protection Is to Be Set)
- Checking Volume Protection Status (Only If Volume Protection Is to Be Set)
- Execution of Backup
- Checking Backup Execution Status

- [Check the OPC copy progress status](#)

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - -
0x0002      1024M Open      4 -          - -
0x0003      1024M Open      2 -          - -
:
```

Setting Volume Protection (Only If Volume Protection Is to Be Set)

Execute the [acinhbit set](#) command to set volume protection for the copy source logical volume.

[Execution example]

```
> acinhbit set -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - Yes
0x0002      1024M Open      4 -          - Yes
0x0003      1024M Open      2 -          - -
:
```

Execution of Backup

Execute the [acopc start](#) command to execute backups via OPC.

[Execution example]

```
> acopc start -g OpcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 00:00:00 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3/
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 00:00:02 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Checking Backup Execution Status

The execution status of the backup can be checked by executing the [acopc query](#) command.

[Execution example]

```
> acopc query -g OpcGroup

Copy Group Name : OpcGroup
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source      <=> Target      SID  OPC Status      Copy Phase Copied Block
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying"          0
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying"      471859
```

Check the OPC copy progress status

The OPC copy progress status of the backup can be checked by using the [acopc query](#) command with -progress option.

[Execution example]

```
> acopc query -g OpcGroup -progress

Copy Group Name : OpcGroup
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source      <=> Target      Progress Copied Block Total Block
-----
ET001/0x1 ==> ET001/0x3      0%          0      1048576
ET001/0x2 ==> ET001/0x4     45%      471859      1048576
```

3.2.1.2 Restore on OPC Backup Environment

This section explains the operation methods of following processes.

- [Pre-checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Releasing Volume Protection Settings \(Only If Volume Protection Is Already Set\)](#)
- [Checking Volume Protection Status \(Only If Volume Protection Status Was Changed\)](#)
- [Execution of Restore](#)
- [Checking Restore Execution Status](#)
- [Checking OPC Copy Progress Status](#)

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - Yes
0x0002      1024M Open      4 -          - Yes
0x0003      1024M Open      2 -          - -
:
```


Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the `acinhibit unset` command to release the volume protection settings.

[Execution example]

```
> acinhibit unset -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Status Was Changed)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l

LV No   LV Name   LV Size  LV Type  RG No  Encrypt  Virtual  Size  Copy  Inhibit
-----
0x0001   1024M  Open     4 -      - -
0x0002   1024M  Open     4 -      - -
0x0003   1024M  Open     2 -      - -
:
```

Execution of Restore

Execute an OPC in the reverse direction (from the copy destination volume to the copy source volume) by executing the `acopc start` command with the `-r` option.

[Execution example]

```
> acopc start -g OpcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 12:00:00 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 12:00:02 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Checking Restore Execution Status

The execution status of the restoration can be checked by executing the `acopc query` command with the `-r` option.

[Execution example]

```
> acopc query -g OpcGroup -r

Copy Group Name : OpcGroup
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase Copied Block
-----
```

ET001/0x1 <== ET001/0x3 0x42 "OPC Executing" "Copying"	9408
ET001/0x2 <== ET001/0x4 0x43 "OPC Executing" "Copying"	3728

Checking OPC Copy Progress Status

The OPC copy progress status of the restoration can be checked by executing the [acopc query](#) command with the -r and -progress options.

[Execution example]

```
> acopc query -g OpcGroup -r -progress

Copy Group Name : OpcGroup
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 <== ET001/0x3    1%         9408    1048576
ET001/0x2 <== ET001/0x4    1%         3728    1048576
```

Point

Protection settings can be set for a logical volume even while copy is in progress. Therefore, volume protection can be set again without waiting for completion of the restore process (physical copy completion).

3.2.1.3 Backup via QuickOPC

This section explains the operation methods of following processes.

- [Pre-checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Setting Volume Protection \(Only If Volume Protection Is to Be Set\)](#)
- [Checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Execution of First Backup](#)
- [Checking Backup Execution Status](#)
- [Checking Tracking Status](#)
- [Execution of Backup for Second or Subsequent Time](#)

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No   LV Name  LV Size  LV Type  RG No  Encrypt  Virtual Size  Copy Inhibit
-----
0x0001      1024M  Open      4 -      - -
0x0002      1024M  Open      4 -      - -
0x0003      1024M  Open      2 -      - -
:
```

Setting Volume Protection (Only If Volume Protection Is to Be Set)

Execute the [acinhibit set](#) command to set volume protection for the copy source logical volume.

[Execution example]

```
> acinhibit set -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l

LV No   LV Name  LV Size  LV Type  RG No  Encrypt  Virtual Size  Copy Inhibit
-----
0x0001      1024M  Open      4 -      - Yes
0x0002      1024M  Open      4 -      - Yes
0x0003      1024M  Open      2 -      - -
:
```

Execution of First Backup

Execute the [acopc start](#) command to execute backups via QuickOPC.

For the first QuickOPC, execute the [acopc start](#) command without the -diff option.

[Execution example]

```
> acopc start -g QuickOpcGroup

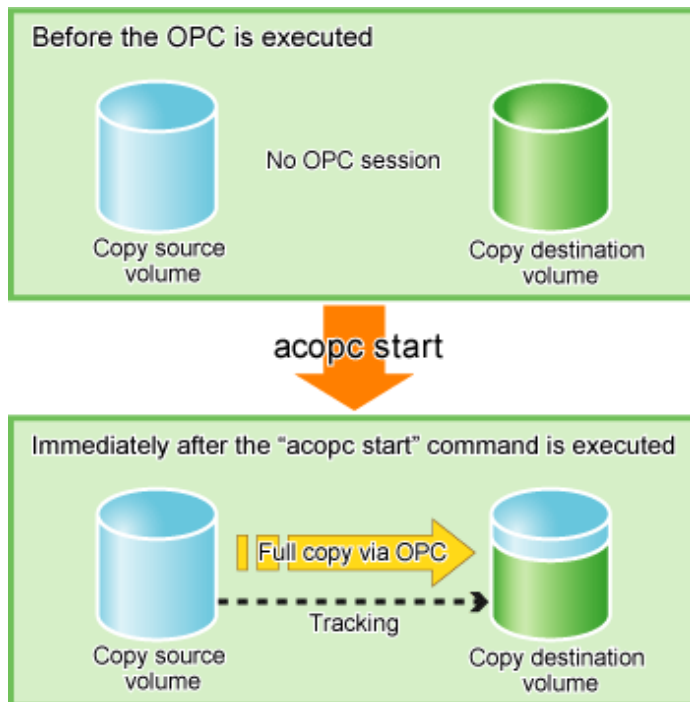
ET001/0x1:ET001/0x3
# DATE : 2008/06/25 00:00:00 - << Differential OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3//
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 00:00:02 - << Differential OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/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.

Figure 3.3 What Happens When `acopc start` Command Is Executed (for First Time)



Checking Backup Execution Status

The execution status of the backup can be checked by executing the `acopc query` command in the same way as for backups via OPC.

[Execution example]

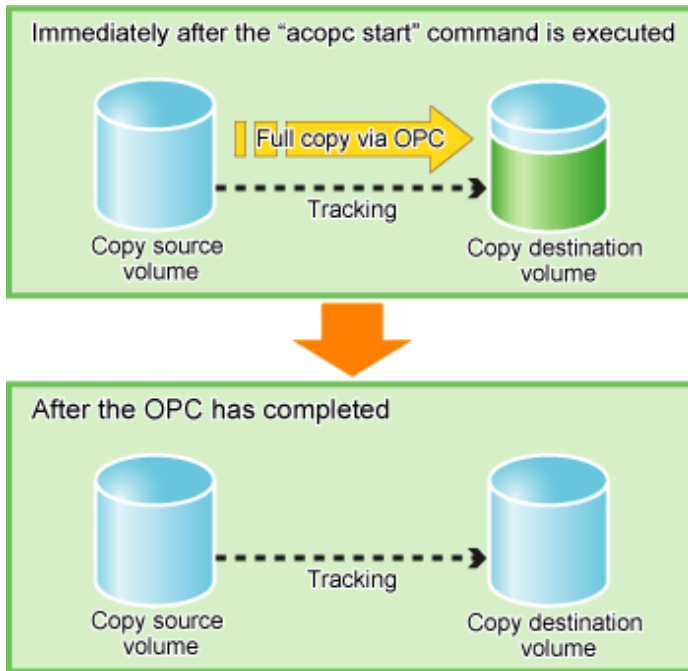
```
> acec query -g QuickOpcGroup

Copy Group Name : QuickOpcGroup
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase    Copied Block
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying/Tracking"    6912
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying/Tracking"    5760
```

When the physical copy of QuickOPC finishes, only the tracking process is still running.

Figure 3.4 What Happens When Snapshot Processing Finishes



Checking Tracking Status

The tracking status can be checked by executing the `acopc query` command. Confirm that the physical copying process has finished by checking that the Copy Phase is in "Tracking" mode.

[Execution example]

```
> acopc query -g QuickOpcGroup

Copy Group Name : QuickOpcGroup
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source  <=> Target  SID  OPC Status      Copy Phase Copied Block
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Tracking"      1048576
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Tracking"      1048576
```

Execution of Backup for Second or Subsequent Time

If the `acopc start` command is executed with the `-diff` option while the tracking processing is running, only the differential data updated since the last OPC is copied, which means that copies take less time to complete.

[Execution example]

```
> acopc start -g QuickOpcGroup -diff

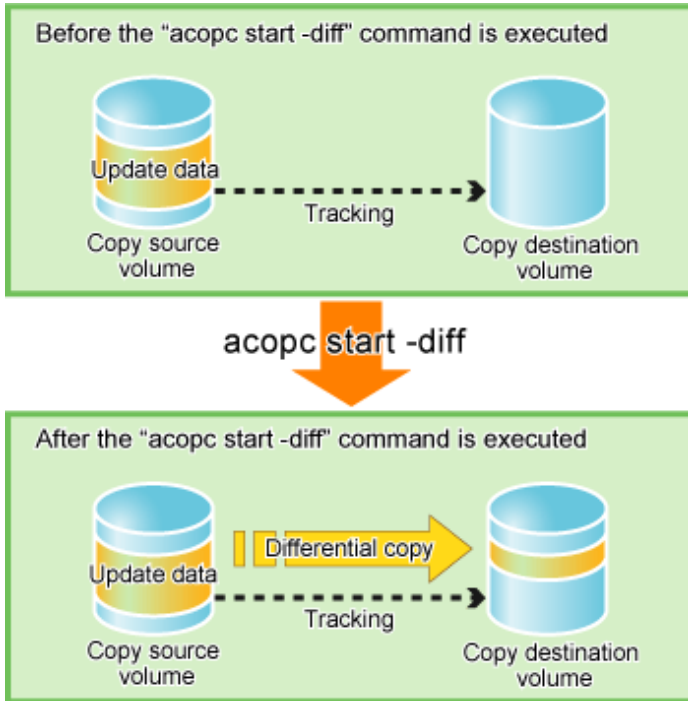
ET001/0x1:ET001/0x3
# DATE : 2008/06/26 00:00:00 - << Differential OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3/
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/26 00:00:02 - << Differential OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
```

```
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Figure 3.5 What Happens When acopc start Command Is Executed (for Second or Subsequent Time)



3.2.1.4 Restore on QuickOPC Backup Environment

This section explains the operation methods of following processes.

- Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)
- Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)
- Checking Volume Protection Status (Only If Volume Protection Status Was Changed)
- Execution of Restore
- Checking Restore Execution Status
- Checking QuickOPC Copy Progress Status

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name  LV Size  LV Type  RG No  Encrypt  Virtual  Size  Copy  Inhibit
-----  -----  -----  -----  -----  -----  -----  -----  -----  -----
0x0001          1024M  Open           4  -           -  Yes
0x0002          1024M  Open           4  -           -  Yes
0x0003          1024M  Open           2  -           -  -
:
```

Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the [acinhibit unset](#) command to release the volume protection settings.

[Execution example]

```
> acinhibit unset -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Status Was Changed)

Execute the [acing lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l

LV No   LV Name  LV Size LV Type  RG No  Encrypt  Virtual  Size  Copy  Inhibit
-----
0x0001      1024M Open      4  -           -  -
0x0002      1024M Open      4  -           -  -
0x0003      1024M Open      2  -           -  -
:
```

Execution of Restore

Execute a QuickOPC in the reverse direction (from the copy destination volume to the copy source volume) by executing the [acopc start](#) command with the -r option.

[Execution example]

```
> acopc start -g QuickOpcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/26 12:00:00 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/26 12:00:02 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed    : 0
```

Checking Restore Execution Status

The execution status of the restoration can be checked by executing the [acopc query](#) command with the -r option.

[Execution example]

```
> acopc query -g QuickOpcGroup -r

Copy Group Name : QuickOpcGroup
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase Copied Block
-----
```

```
ET001/0x1 <== ET001/0x3 0x42 "OPC Executing" "Copying" 974848
ET001/0x2 <== ET001/0x4 0x43 "OPC Executing" "Copying" 786432
```

Point

If a QuickOPC session exists, not all data on the logical volume, but only differential data that has been updated since the last OPC completed is copied. Because of that, not only backup copies, but restore copies are also completed in a short period of time for backup and restore operations that use QuickOPC.

If a QuickOPC session does not exist, all the data in the logical volume is copied.

Protection settings can be set for a logical volume even while copy is in progress. Therefore, volume protection can be set again without waiting for completion of the restore process (physical copy completion).

Checking QuickOPC Copy Progress Status

The QuickOPC copy progress status of the restoration can be checked by executing the `acopc query` command with the `-r` and `-progress` options.

[Execution example]

```
> acopc query -g QuickOpcGroup -r -progress

Copy Group Name : QuickOpcGroup
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 <== ET001/0x3    93%         974848    1048576
ET001/0x2 <== ET001/0x4    75%         786432    1048576
```

3.2.1.5 Backup via SnapOPC+

This section explains the operation methods of following processes:

- [Pre-checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Setting Volume Protection \(Only If Volume Protection Is to Be Set\)](#)
- [Checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Execution of Backup](#)
- [Checking Backup Execution Status](#)

Point

The types of logical volumes that can be used as the SnapOPC+ copy destination are Thin Provisioning Volumes (TPV), Flexible Tier Volumes (FTV), and Snap Data Volumes (SDV).

However, if the storage device is an ETERNUS DX S3 series (for earlier than V10L60 firmware) or an ETERNUS DX S2 series, SDV is the only logical volume type that can be used.

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
```



```

0x0001      1024M Open      4 -      - -
0x0002      1024M Open      4 -      - -
0x0003      1024M Open      2 -      - -
:

```

Setting Volume Protection (Only If Volume Protection Is to Be Set)

Execute the `acinhibit set` command to set volume protection for the copy source logical volume.

[Execution example]

```

> acinhibit set -v ET001/0x1
Successful completion

```

Checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```

> acinq lv -a ET001 -l

LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -      - Yes
0x0002      1024M Open      4 -      - Yes
0x0003      1024M Open      2 -      - -
:

```

Execution of Backup

Execute the `acsnap start` command to execute backups via SnapOPC+.

[Execution example]

```

> acsnap start -g SnapOPCPGroup

ET001/0x1:ET001/0x4
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

ET001/0x2:ET001/0x5
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

Succeeded : 2
Failed    : 0

```

Checking Backup Execution Status

The execution status of the backup can be checked by executing the `acsnap query` command.

[Execution example]

```

> acsnap query -g SnapOPCPGroup

Copy Group Name : SnapOPCPGroup
Copy Group Type : SnapOPCP
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source  <=> Target  SID  Snap Status          Gen  Date      Copied Block
-----
ET001/0x1 ==> ET001/0x4  0x22 "Copy On Write(Active)"  2   10minute  1048576
ET001/0x1 ==> ET001/0x3  0x21 "Copy On Write(Inactive)" 1   1day      1048576
ET001/0x2 ==> ET001/0x5  0x23 "Copy On Write(Active)"  1   10minute  1048576
ET001/0x2 N/A ET001/0x6  N/A  "Snap action not startup" N/A N/A      0

```

3.2.1.6 Stopping SnapOPC+

With SnapOPC+, only specific snap generations can be deleted from multiple snap generations. The following table shows the snap generations that can be deleted (refer to the storage device manual for details).

Table 3.1 Deletable SnapOPC+ Snap Generations

Storage Device Firmware Version	Copy Destination Volume	Oldest Snap Generation	Snap Generations Other than the Oldest
Earlier than V11L10-2000	TPV FTV SDV	Can be deleted.	Cannot be deleted.
V11L10-2000 or later	TPV FTV	Can be deleted.	Can be deleted. (*1)
	SDV	Can be deleted.	Can be deleted only when all of the copy pairs for the snap generation are created in LU to LU format. (*1)

*1: Cannot be deleted if the copy ratio of the snap generation to be deleted is different from the copy ratio of the snap generation prior to it.

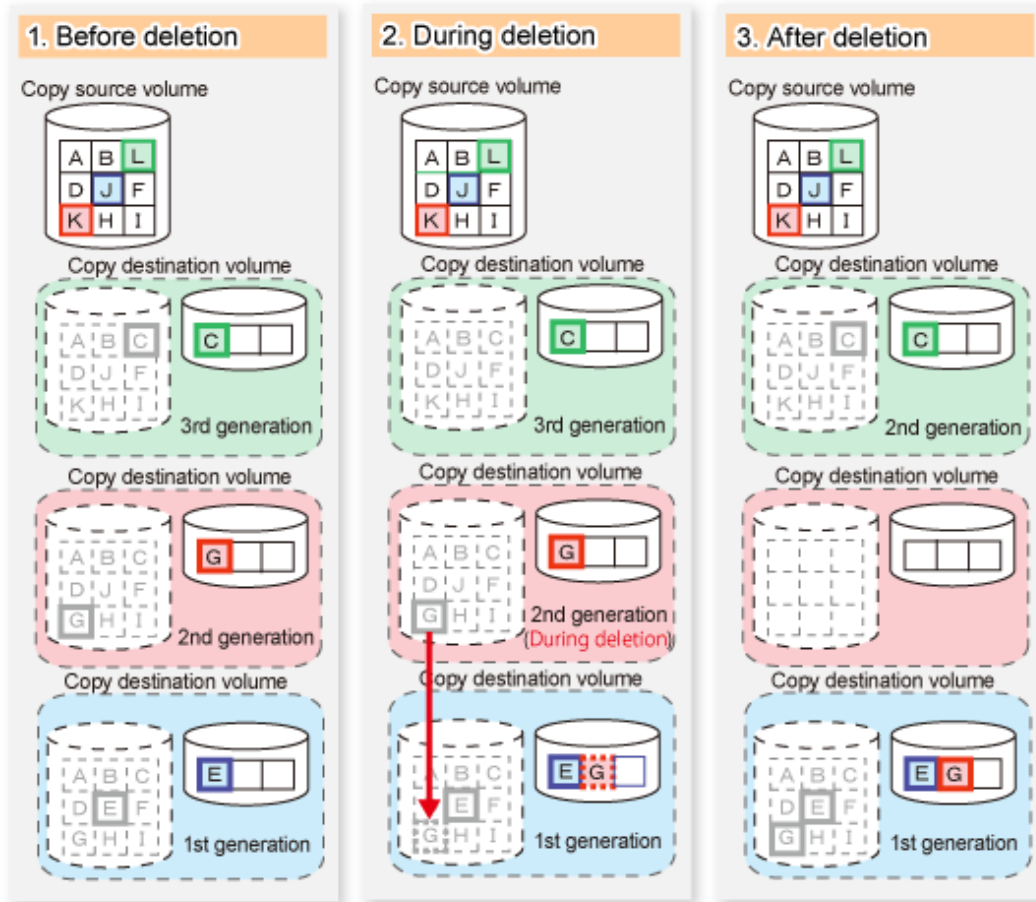
Snap generations are deleted as follows:

- Oldest snap generation

The SnapOPC+ session is stopped synchronously with the snap generation deletion operation using AdvancedCopy Manager CCM. Therefore, the SnapOPC+ session is stopped when the command is completed.

- Snap generations other than the oldest

Figure 3.6 Process Image When Deleting Snap Generations Other than the Oldest



When a snap generation that is not the oldest is deleted, the data stored in the deleted snap generation is migrated to the generation prior to it. Until this migration process is completed, the deleted snap generation remains as a SnapOPC+ session in the deleting state (when the `acsnap query` command is executed, the **Snap Status** field shows "Snap Deleting"). This process is performed asynchronously with the snap generation deletion operation using AdvancedCopy Manager CCM in the storage device. Therefore, when a snap generation other than the oldest is deleted with a command, the SnapOPC+ session that is being stopped may remain for a while even after the command has responded.

3.2.1.7 Restore on SnapOPC+ Backup Environment

This section explains the operation methods of following processes.

- Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)
- Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)
- Checking Volume Protection Status (Only If Volume Protection Status Was Changed)
- Execution of Restore
- Checking Restore Execution Status

Point

The restoration by using SnapOPC+ can be execution for the ETERNUS DX series (excluding the ETERNUS DX60 S2), the ETERNUS AF All-Flash Arrays, or the ETERNUS DX200F.

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - Yes
0x0002      1024M Open      4 -          - Yes
0x0003      1024M Open      2 -          - -
:
```

Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the `acinhibit unset` command to release the volume protection settings.

[Execution example]

```
> acinhibit unset -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Status Was Changed)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - -
0x0002      1024M Open      4 -          - -
0x0003      1024M Open      2 -          - -
:
```

Execution of Restore

Execute a SnapOPC+ in the reverse direction (from the copy destination volume to the copy source volume) by executing the `acsnap start` command with the `-r` option.

[Execution example]

```
> acsnap start -g SnapOPCGroup -r

ET001/0x1:ET001/0x4
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

ET001/0x2:ET001/0x5
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>

Succeeded : 2
Failed    : 0
```

Checking Restore Execution Status

The execution status of the restoration can be checked by executing the `acsnap query` command with the `-r` option.

[Execution example]

```
> acsnap query -g SnapOPCGroup -r
```

```
Copy Group Name : SnapOPCPGroup
Copy Group Type : SnapOPCP
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

Source	<=>	Target	SID	OPC Status	Copy Phase	Copied Block
ET001/0x1	<==	ET001/0x4	0x22	"Copy On Write(Active)"	"Copying"	1048576
ET001/0x1	N/A	ET001/0x3	N/A	"OPC action not startup"	"Not set"	0
ET001/0x2	N/A	ET001/0x5	N/A	"OPC action not startup"	"Not set"	0
ET001/0x2	N/A	ET001/0x6	N/A	"OPC action not startup"	"Not set"	0

Point

Protection settings can be set for a logical volume even while copy is in progress. Therefore, volume protection can be set again without waiting for completion of the restore process (physical copy completion).

3.2.1.8 Using Concurrent OPC Function on OPC/QuickOPC/SnapOPC+

The Concurrent OPC function simultaneously creates the snapshots of multiple logical volumes for ETERNUS Disk storage system. By using this function, a copy with consistency can be easily taken. In OPC/QuickOPC/SnapOPC+ can be used this function.

To use this function, execute the [acopc start](#) or [acsnap start](#) command with the -concur option.

Refer to the followings depends on your backup process for the operating methods.

- ["3.2.1.1 Backup via OPC"](#)
- ["3.2.1.3 Backup via QuickOPC"](#)
- ["3.2.1.5 Backup via SnapOPC+"](#)

Note

- The session may remain defined OPC when this command is forced to terminate by the task manager, by executing Ctrl-C, etc. In such a case, stop the session by re-execute this command, or by executing the [acopc cancel](#) or [acsnap cancel](#) command.
- The upper limit of the number of pairs that can simultaneously implement Concurrent OPC depends on the specifications of the ETERNUS Disk storage system.

3.2.2 Executing Synchronous High-speed Copy

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

3.2.2.1 Backup via EC

This section explains the operation methods of following processes.

- [Pre-checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Setting Volume Protection \(Only If Volume Protection Is to Be Set\)](#)
- [Checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Starting EC](#)
- [Checking EC Execution Status](#)
- [Checking EC Copy Progress Status](#)
- [Suspending EC](#)
- [Resuming EC](#)

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -      - -
0x0002      1024M Open      4 -      - -
0x0003      1024M Open      2 -      - -
:
```

Setting Volume Protection (Only If Volume Protection Is to Be Set)

Execute the `acinhbit set` command to set volume protection for the copy source logical volume.

[Execution example]

```
> acinhbit set -v ET001/0x1
Successful completion
```

Checking Volume Protection Status (Only If Volume Protection Status Was Changed)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -      - Yes
0x0002      1024M Open      4 -      - Yes
0x0003      1024M Open      2 -      - -
:
```

Starting EC

Execute the `acec start` command to start an EC.

[Execution example]

```
> acec start -g EcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/24 07:00:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=3/
Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/24 07:00:02 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Checking EC Execution Status

Check the execution status of the EC by executing the [acec query](#) command.

Check that all of the ECs in the copy group are in an equivalency maintenance state.

[Execution example]

```
> acec query -g EcGroup

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  EC Status    Copy Phase Copied Block
-----
ET001/0x1 ==> ET001/0x3 0x1  "EC Executing" "Paired"      1048576
ET001/0x2 ==> ET001/0x4 0x2  "EC Executing" "Paired"      1048576
```

Checking EC Copy Progress Status

The EC copy progress status of the backup can be checked by executing the [acec query](#) command with the `-progress` option.

[Execution example]

```
> acec query -g EcGroup -progress

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 ==> ET001/0x3    100%      1048576    1048576
ET001/0x2 ==> ET001/0x4    100%      1048576    1048576
```

Suspending EC

Execute the [acec suspend](#) command to temporarily suspend ECs. The backup process is now complete.

[Execution example]

```
> acec suspend -g EcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

Succeeded : 2
Failed    : 0
```

For suspend many ECs at the same time by using the concurrent suspend function, execute the [acec suspend](#) command with the `-concur` option.

[Execution example]

```
> acec suspend -g EcGroup -concur
Successful completion.
```

Resuming EC

If backup data is no longer required, execute the [acec resume](#) command to restart ECs in preparation for the next backup.

[Execution example]

```

> acec resume -g EcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 07:00:00 - << EC Resumed >>

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 07:00:02 - << EC Resumed >>

Succeeded : 2
Failed    : 0

```

3.2.2.2 Restore on EC Backup Environment

This section explains the operation methods of following processes.

- [Pre-checking Volume Protection Status \(Only If Volume Protection Is to Be Set\)](#)
- [Releasing Volume Protection Settings \(Only If Volume Protection Is Already Set\)](#)
- [Checking Volume Protection Status \(Only If Volume Protection Status Was Changed\)](#)
- [Starting EC](#)
- [Checking EC Execution Status](#)
- [Checking EC Copy Progress Status](#)
- [Suspending EC](#)
- [Resuming EC](#)

Pre-checking Volume Protection Status (Only If Volume Protection Is to Be Set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```

> acinq lv -a ET001 -l
LV No  LV Name  LV Size  LV Type  RG No  Encrypt  Virtual Size  Copy Inhibit
-----
0x0001      1024M  Open      4 -      - Yes
0x0002      1024M  Open      4 -      - Yes
0x0003      1024M  Open      2 -      - -
:

```

Releasing Volume Protection Settings (Only If Volume Protection Is Already Set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the [acinhibit unset](#) command to release the volume protection settings.

[Execution example]

```

> acinhibit unset -v ET001/0x1
Successful completion

```

Checking Volume Protection Status (Only If Volume Protection Status Was Changed)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```

> acinq lv -a ET001 -l

LV No  LV Name  LV Size  LV Type  RG No  Encrypt  Virtual Size  Copy Inhibit
-----
0x0001      1024M  Open      4 -      - -

```


0x0002	1024M Open	4 -	- -
0x0003	1024M Open	2 -	- -
:			

Starting EC

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 by executing the [acec reverse](#) command.

[Execution example]

```
> acec reverse -g EcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 12:00:00 - << EC Change >>

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 12:00:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

Note

If the copy destination logical volume is protected, a warning message is output when the [acec reverse](#) command is executed (the command completes successfully).

[Execution example]

```
> acec reverse -g RecEcGroup

ET001/0x1:ET001/0x3
# DATE : 2008/06/24 16:28:00 - << EC Change >>
Warning:ccm7001 The target logical volume is write protected. target logical
volume=ET001/0x1

Succeeded : 1
Failed    : 0
```

Execute the [acinhibit unset](#) command to release the volume protection settings.

2. Restart the EC by executing the [acec resume](#) command with the `-r` option.

[Execution example]

```
> acec resume -g EcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 12:01:00 - << EC Resumed >>

ET001/0x2:ET001/0x4
# 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:

Start an EC from the copy destination volume to the copy source volume by executing the [acec start](#) command with the `-r` option.

[Execution example]

```
> acec start -g EcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 12:00:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 12:00:02 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=4/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Checking EC Execution Status

Check the execution status of the EC by executing the [acec query](#) command with the -r option. Check that all of the ECs in the copy group are in an equivalency maintenance state.

[Execution example]

```
> acec query -g EcGroup -r

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  EC Status      Copy Phase Copied Block
-----
ET001/0x1 <== ET001/0x3 0x1  "EC Executing" "Paired"      1048576
ET001/0x2 <== ET001/0x4 0x2  "EC Executing" "Paired"      1048576
```

Checking EC Copy Progress Status

The EC copy progress status of the restoration can be checked by executing the [acec query](#) command with the -r and -progress options.

[Execution example]

```
> acec query -g EcGroup -r -progress

Copy Group Name : EcGroup
Copy Group Type : EC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 <== ET001/0x3    100%      1048576    1048576
ET001/0x2 <== ET001/0x4    100%      1048576    1048576
```



Protection settings can be set for a logical volume even while copy is in progress. Therefore, volume protection can be set again without waiting for completion of the restore process (physical copy completion).

Suspending EC

Temporarily suspend the EC by executing the [acec suspend](#) command with the -r option. The restoration process is now complete.

[Execution example]

```
> acec suspend -g EcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

Succeeded : 2
Failed    : 0
```

Resuming EC

Reverse the EC by executing the [acec reverse](#) command with the -r option in preparation for the next backup.

[Execution example]

```
> acec reverse -g EcGroup -r

ET001/0x1:ET001/0x3
# DATE : 2008/06/25 15:10:00 - << EC Change >>

ET001/0x2:ET001/0x4
# DATE : 2008/06/25 15:10:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

3.2.2.3 Backup via REC

The procedure for executing backup via REC depends on which transfer mode is being used.

If the transfer mode is synchronous mode, refer to "[Backup in Synchronous Mode](#)".

If the transfer mode is Stack mode or Consistency mode, refer to "[Backup in Stack Mode or Consistency Mode](#)".



Information

Refer to "[Transfer Mode](#)" for more information about these transfer modes.

Backup in Synchronous Mode

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

1. Pre-checking volume protection status (only if volume protection is to be set)

Execute the [acinq lv](#) command with the -l option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -      - -
0x0002      1024M Open      4 -      - -
0x0003      1024M Open      2 -      - -
:
```

2. Setting volume protection (only if volume protection is to be set)

Execute the `acinhibit set` command to set volume protection for the copy source logical volume.

[Execution example]

```
> acinhibit set -v ET001/0x1
Successful completion
```

3. Checking volume protection status (only if volume protection status was changed)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l

LV No   LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001          1024M Open      4 -          - Yes
0x0002          1024M Open      4 -          - Yes
0x0003          1024M Open      2 -          - -
:
```

4. Execute the `acec start` command 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]

```
> acec start -g RecGroup -transfer sync

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 07:00:02 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

5. Execute the `acec query` command to check that all of the RECs in the copy group are in an equivalency maintenance state.

[Execution example]

```
> acec query -g RecGroup

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target   SID(RSID)  EC Status      Copy Phase Copied Block Rcv  Split Xfer
-----
ET001/0x1 ==> ET002/0x1 0x49(0x10) "EC Executing" "Paired"          1048576 auto auto  sync
ET001/0x2 ==> ET002/0x2 0x4A(0x11) "EC Executing" "Paired"          1048576 auto auto  sync
```

The REC copy progress status of the backup can be checked by executing the `acec query` command with the `-progress` option.

[Execution example]

```

> acec query -g RecEcGroup -progress

Copy Group Name      : RecEcGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 ==> ET002/0x1    0%           0    1048576
ET001/0x2 ==> ET002/0x2  100%        1048576   1048576

```

- Temporarily suspend the REC by executing the [acec suspend](#) command.

The backup process is now complete.

[Execution example]

```

> acec suspend -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

Succeeded : 2
Failed    : 0

```

For suspend many RECs at the same time by using the concurrent suspend function, execute the [acec suspend](#) command with the `-concur` option.

[Execution example]

```

> acec suspend -g RecEcGroup -concur
Successful completion.

```

- If backup data is no longer required, restart the REC by executing the [acec resume](#) command in preparation for the next backup.

[Execution example]

```

> acec resume -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 07:00:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 07:00:02 - << EC Resumed >>

Succeeded : 2
Failed    : 0

```

Backup in Stack Mode or Consistency Mode

Use the following procedure to take a backup via REC in Stack mode or Consistency mode.

- Pre-checking volume protection status (only if volume protection is to be set)

Execute the [acing lv](#) command with the `-l` option added to check the volume protection status.

[Execution example]

```

> acing lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - -

```

```

0x0002          1024M Open          4 -          - -
0x0003          1024M Open          2 -          - -
:

```

2. Setting volume protection (only if volume protection is to be set)

Execute the `acinhibit set` command to set volume protection for the copy source logical volume.

[Execution example]

```

> acinhibit set -v ET001/0x1
Successful completion

```

3. Checking volume protection status (only if volume protection is to be set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```

> acinq lv -a ET001 -l

LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open          4 -          - Yes
0x0002      1024M Open          4 -          - Yes
0x0003      1024M Open          2 -          - -
:

```

4. Execute the `acec start` command to start a REC from the copy source volume to the copy destination volume.

- To copy in Stack mode

Specify the `"-transfer stack"` option.

[Execution example]

```

> acec start -g RecGroup -transfer stack

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 07:00:02 - << EC Started >>
#
From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed    : 0

```

- To copy in Consistency mode

Specify the `"-transfer consist"` option.

[Execution example]

```

> acec start -g RecGroup -transfer consist

```

```

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 07:00:00 - << EC Started >>
#
From:BoxID=303045343030304d33232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d39232323234538393053323041232323234b4f343037303633393030332323/
Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 07:00:02 - << EC Started >>
#
From:BoxID=303045343030304d33232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d39232323234538393053323041232323234b4f343037303633393030332323/
Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0

```

5. Execute the [acec query](#) command 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 by executing the command with the `-progress` option.

[Execution example]

```

> acec query -g RECGroup -progress

Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 ==> ET002/0x1    100%      1048576    1048576
ET001/0x2 ==> ET002/0x2    100%      1048576    1048576

```

- In the case of Consistency mode

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

[Execution example]

```

> acec query -g RecGroup

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target    SID(RSID)  EC Status      Copy Phase Copied Block Rcv Split Xfer
-----
ET001/0x1 ==> ET002/0x1 0x49(0x10) "EC Executing" "Paired"      1048576 auto ---- consist
ET001/0x2 ==> ET002/0x2 0x4A(0x11) "EC Executing" "Paired"      1048576 auto ---- consist

```

The REC copy progress status of the backup can be checked by executing the [acec query](#) command with the `-progress` option.

[Execution example]

```

> acec query -g RECGroup -progress

```

```

Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 ==> ET002/0x1    45%         471859    1048576
ET001/0x2 ==> ET002/0x2   100%        1048576    1048576

```

6. Forcibly and temporarily suspend the REC by executing the `acec suspend` command with the `-force` option.

[Execution example]

```

> acec suspend -g RecGroup -force

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 00:00:02 - << EC Suspended >>

Succeeded : 2
Failed    : 0

```

7. Execute the `acec change` command to change the REC transfer mode to "through".

[Execution example]

```

> acec change -g RecGroup -transfer through

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 00:01:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 00:01:02 - << EC Change >>

Succeeded : 2
Failed    : 0

```

8. Execute the `acec resume` command to restart RECs.

[Execution example]

```

> acec resume -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 00:02:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 00:02:02 - << EC Resumed >>

Succeeded : 2
Failed    : 0

```

9. Execute the `acec query` command to check that all of the RECs in the copy group are in an equivalency maintenance state.

[Execution example]

```

> acec query -g RecGroup

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

```


Source	<=> Target	SID(RSID)	EC Status	Copy Phase	Copied	Block Rcv	Split	Xfer
ET001/0x1	==> ET002/0x1	0x49(0x10)	"EC Executing"	"Paired"		1048576	auto	---- through
ET001/0x2	==> ET002/0x2	0x4A(0x11)	"EC Executing"	"Paired"		1048576	auto	---- through

10. Temporarily suspend the REC by executing the [acec suspend](#) command.

The backup process is now complete.

[Execution example]

```
> acec suspend -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 00:10:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 00:10:02 - << EC Suspended >>

Succeeded : 2
Failed : 0
```

11. If backup data is no longer required, execute the [acec change](#) command 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]

```
> acec change -g RecGroup -transfer stack

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 07:00:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 07:00:02 - << EC Change >>

Succeeded : 2
Failed : 0
```

- To change to Consistency mode

[Execution example]

```
> acec change -g RecGroup -transfer consist

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 07:00:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 07:00:02 - << EC Change >>

Succeeded : 2
Failed : 0
```

12. Execute the [acec resume](#) command to restart the REC.

[Execution example]

```
> acec resume -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 07:01:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
```

```
# DATE : 2008/06/25 07:01:02 - << EC Resumed >>

Succeeded : 2
Failed    : 0
```

3.2.2.4 Restore on REC Backup Environment

The procedure for executing restorations on REC backup environment depends on which transfer mode is being used. If the transfer mode is synchronous mode, refer to "[Restore in Synchronous Mode](#)". If the transfer mode is Stack mode or Consistency mode, refer to "[Restore in Stack Mode or Consistency Mode](#)".



Information

Refer to "[Transfer Mode](#)" for more information about these transfer modes.

Restore in Synchronous Mode

Execute restoration via REC using the following procedures.

1. Pre-checking volume protection status (only if volume protection is to be set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - Yes
0x0002      1024M Open      4 -          - Yes
0x0003      1024M Open      2 -          - -
:
```

2. Releasing volume protection settings (only if volume protection is already set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the `acinhibit unset` command to release the volume protection settings.

[Execution example]

```
> acinhibit unset -v ET001/0x1
Successful completion
```

3. Checking volume protection status (only if volume protection is already set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - -
0x0002      1024M Open      4 -          - -
0x0003      1024M Open      2 -          - -
:
```

4. 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 a REC session already.

- If there is a REC session between the copy source volume and the copy destination volume:
 - a. Execute the [acec reverse](#) command to reverse the REC copy direction.

[Execution example]

```
> acec reverse -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:00:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:00:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

 **Note**

If the copy destination logical volume is protected, a warning message is output when the [acec reverse](#) command is executed (the command completes successfully).

[Execution example]

```
> acec reverse -g RecEcGroup

ET001/0x1:ET002/0x3
# DATE : 2008/06/24 16:28:00 - << EC Change >>
Warning:ccm7001 The target logical volume is write protected. target logical
volume=ET001/0x1

Succeeded : 1
Failed    : 0
```

Execute the [acinhibit unset](#) command to release the volume protection settings.

- b. Execute the [acec resume](#) command with the -r option added to restart the REC.

[Execution example]

```
> acec resume -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:01:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# 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:

Start an REC from the copy destination volume to the copy source volume by executing the [acec start](#) command with the -r option.

[Execution example]

```
> acec start -g RecGroup -r -transfer sync

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
```

```

#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0

```

- Execute the [acec query](#) command to check the status of all of the RECs in the copy group.

[Execution example]

```

> acec query -g RecGroup -r

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    SID(RSID)  EC Status    Copy Phase Copied Block Rcv  Split Xfer
-----
ET001/0x1 <== ET002/0x1 0x49(0x10) "EC Executing" "Copying"      1048576 auto ---- sync
ET001/0x2 <== ET002/0x2 0x4A(0x11) "EC Executing" "Copying"      1048576 auto ---- sync

```

- Temporarily suspend the REC by executing the [acec suspend](#) command with the -r option.

The restoration process is now complete.

[Execution example]

```

> acec suspend -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

Succeeded : 2
Failed : 0

```

- Reverse the REC copy direction by executing the [acec reverse](#) command with the -r option in preparation for the next backup.

[Execution example]

```

> acec reverse -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:10:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:10:02 - << EC Change >>

```

```
Succeeded : 2
Failed    : 0
```

Point

The copy destination logical volumes for a REC session cannot have volume protection set.

If the REC session is cancelled after restoration, volume protection can be set.

Restore in Stack Mode or Consistency Mode

Execute restoration via REC using the following procedures.

1. Pre-checking volume protection status (only if volume protection is to be set)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - Yes
0x0002      1024M Open      4 -          - Yes
0x0003      1024M Open      2 -          - -
:
```

2. Releasing volume protection settings (only if volume protection is already set)

To restore data (copying to copy source), if the copy source logical volume has volume protection set, execute the `acinhibit unset` command to release the volume protection settings.

[Execution example]

```
> acinhibit unset -v ET001/0x1
Successful completion
```

3. Checking volume protection status (only if volume protection status was changed)

Execute the `acinq lv` command with the `-l` option added to check the volume protection status.

[Execution example]

```
> acinq lv -a ET001 -l
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0001      1024M Open      4 -          - -
0x0002      1024M Open      4 -          - -
0x0003      1024M Open      2 -          - -
:
```

4. 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 a REC session already.

- If there is a REC session between the copy source volume and the copy destination volume:

- a. Check the transfer mode of the REC by executing the `acec query` command.

If necessary, execute the `acec change` command as required to change to another transfer mode (Stack mode or Consistency mode).

In the case of Stack mode

[Execution example]

```

> acec change -g RecGroup -transfer stack

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:01:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:01:02 - << EC Change >>

Succeeded : 2
Failed    : 0

```

In the case of Consistency mode

[Execution example]

```

> acec change -g RecGroup -transfer consist

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:01:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:01:02 - << EC Change >>

Succeeded : 2
Failed    : 0

```

- b. Reverse the REC direction by executing the [acec reverse](#) command.

[Execution example]

```

> acec reverse -g RecGroup

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:00:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:00:02 - << EC Change >>

Succeeded : 2
Failed    : 0

```



Note

If the copy destination logical volume is protected, a warning message is output when the [acec reverse](#) command is executed (the command completes successfully).

[Execution example]

```

> acec reverse -g RecEcGroup

ET001/0x1:ET002/0x3
# DATE : 2008/06/24 16:28:00 - << EC Change >>
Warning:ccm7001 The target logical volume is write protected. target logical
volume=ET001/0x1

Succeeded : 1
Failed    : 0

```

Execute the [acinhibit unset](#) command to release the volume protection settings.

- c. Restart the REC by executing the [acec resume](#) command with the -r option.

[Execution example]

```

> acec resume -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:02:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# 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:

Start a REC from the copy destination volume to the copy source volume by executing the [acec start](#) command with the -r option.

- In the case of Stack mode

[Execution example]

```

> acec start -g RecGroup -r -transfer stack

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730363339303033232
3/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330363339303034232
3/Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730363339303033232
3/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330363339303034232
3/Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed    : 0

```

- In the case of Consistency mode

[Execution example]

```

> acec start -g RecGroup -r -transfer consist

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 12:00:00 - << EC Started >>
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730363339303033232
3/Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330363339303034232
3/Olu=1/Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 12:00:02 - << EC Started >>

```

```
#
From:BoxID=303045383030304d3923232323234538393053323041232323234b4f34303730363339303033232
3/Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045343030304d3323232323234534353053323041232323234b4434303330363339303034232
3/Olu=2/Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

5. Check the status of all of the RECs in the copy group by executing the [acec query](#) command with the -r option.

- In the case of Stack mode

Check that the copied block count and the entire block count are the same by executing the command with the -progress option.

[Execution example]

```
> acec query -g RECGroup -r -progress

Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 <== ET002/0x1    100%      1048576    1048576
ET001/0x2 <== ET002/0x2    100%      1048576    1048576
```

- In the case of Consistency mode

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

[Execution example]

```
> acec query -g RecGroup -r

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target    SID(RSID)  EC Status      Copy Phase Copied Block Rcv Split Xfer
-----
ET001/0x1 <== ET002/0x1 0x49(0x10) "EC Executing" "Paired"      1048576 auto ---- consist
ET001/0x2 <== ET002/0x2 0x4A(0x11) "EC Executing" "Paired"      1048576 auto ---- consist
```

6. Forcibly and temporarily suspend the REC by executing the [acec suspend](#) command with the -force option.

[Execution example]

```
> acec suspend -g RecGroup -r -force

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:00:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:00:02 - << EC Suspended >>

Succeeded : 2
Failed : 0
```


- Execute the `acec change` command to change the REC transfer mode to "through".

[Execution example]

```
> acec change -g RecGroup -r -transfer through

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:01:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:01:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

- Execute the `acec resume` command with the `-r` option to restart the REC.

[Execution example]

```
> acec resume -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:02:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:02:02 - << EC Resumed >>

Succeeded : 2
Failed    : 0
```

- Execute the `acec query` command with the `-r` option to check that all of the REC pairs in the copy group are in an equivalency maintenance state.

[Execution example]

```
> acec query -g RecGroup -r

Copy Group Name      : RecGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target  SID(RSID)  EC Status  Copy Phase Copied Block Rcv  Split Xfer
-----
ET001/0x1 <== ET002/0x1 0x49(0x10) "EC Executing" "Paired"          1048576 auto ---- through
ET001/0x2 <== ET002/0x2 0x4A(0x11) "EC Executing" "Paired"          1048576 auto ---- through
```

- Temporarily suspend the REC by executing the `acec suspend` command with the `-r` option.

The restoration process is now complete.

[Execution example]

```
> acec suspend -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:10:00 - << EC Suspended >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:10:02 - << EC Suspended >>

Succeeded : 2
Failed    : 0
```

11. Execute the `acec change` command with the `-r` option 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]

```
> acec change -g RecGroup -r -transfer stack

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:20:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:20:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

- In the case of Consistency mode

[Execution example]

```
> acec change -g RecGroup -r -transfer consist

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:20:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:20:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

12. Execute the `acec reverse` command with the `-r` option to reverse the REC copy direction.

[Execution example]

```
> acec reverse -g RecGroup -r

ET001/0x1:ET002/0x1
# DATE : 2008/06/25 15:21:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/25 15:21:02 - << EC Change >>

Succeeded : 2
Failed    : 0
```

Point

The copy destination logical volumes for a REC session cannot have volume protection set.

If the REC session is cancelled after restoration, volume protection can be set.

3.2.2.5 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.

Table 3.2 Types of Transfer Mode

Transfer Method	Transfer Mode	Explanation
Synchronous transfer method	Synchronous	<p>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.</p> <p>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.</p> <p>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.</p>
Asynchronous transfer methods	Stack	<p>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 updated before returning "complete" to the server. The data for this block is transferred using an independent transfer engine.</p> <p>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.</p>
	Consistency	<p>This mode guarantees the sequence of transfers between copy sessions for the copy destination ETERNUS Disk storage system, and is suitable for operations, such as on databases, that perform mirroring using copies that consist of multiple areas.</p> <p>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.</p>
	Through	<p>This mode is for transferring data that has not been transferred when copies in Stack mode or Consistency mode are stopped or suspended.</p>

Recovery Mode

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

Table 3.3 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.



.....
 The procedure to resume REC varies depending on the Advanced Copy status when an REC communication error occurs. Refer to "5.2 Resolving Hardware Error" for details.

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.

Table 3.4 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 is automatically disconnected and update processing to the copy source continues.
Manual Split	In this mode, if a communication error occurs for some reason while the REC is executing, the operator is 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.

3.2.2.6 Backup via REC Using Initial Copy Skip

The initial copy skip function is used when an initial copy cannot be executed by reason of network bandwidth shortage.

Change the REC synchronous processing to the suspend status by executing the `acec start` command with the `-skip` option. In this case, the data of copy source volume is not copied to copy destination volume.

[Execution example]

```
> acec start -g RecEcGroup -skip

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/Olu=1/
Adr_high=0/Adr_low=0

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 16:28:00 - << EC Started >>
#
From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=2/
Adr_high=0/Adr_low=0/size_high=0/size_low=0
#
To :BoxID=303045383030304d3923232323234538393053323041232323234b4f343037303633393030332323/Olu=2/
Adr_high=0/Adr_low=0

Succeeded : 2
Failed : 0
```

Execute the `acec query` command to check the status of all of the RECs in the copy group.

[Execution example]

```
> acec query -g RecEcGroup

Copy Group Name      : RecEcGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target  SID(RSID)  EC Status  Copy Phase  Copied Block  Rcv  Split  Xfer
-----
ET001/0x1 ==> ET002/0x1 0x4B(0x12) "EC Suspend" "Paired"      1048576 auto auto  through
ET001/0x2 ==> ET002/0x2 0x4A(0x11) "EC Suspend" "Paired"      1048576 auto auto  through
```

After changing the REC synchronous processing to the suspend status, back up the data from copy source volume to tape and restore its data from tape to copy destination volume.

Restart the RECs suspended by using initial copy skip function, by executing the [acec resume](#) command with the `-remain` option.

[Execution example]

```
> acec resume -g RecEcGroup -remain

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

Succeeded : 2
Failed    : 0
```

3.2.2.7 Restore on REC Backup Environment Using Initial Copy Skip

Refer to "[3.2.2.4 Restore on REC Backup Environment](#)", for the restoration procedure on REC backup environment using initial copy skip function.

3.2.2.8 Using Concurrent Suspend Function on EC/REC

The concurrent suspend function simultaneously suspends multiple EC/REC sessions for ETERNUS Disk storage system. By using this function, a copy with consistency can be easily taken.

To use the concurrent suspend function, execute the [acec suspend](#) command with the `-concur` option. Refer to "[3.2.2.1 Backup via EC](#)" or "[3.2.2.3 Backup via REC](#)" for the operating methods.



Note

- The concurrent suspend function of REC can be used only when the transfer mode is not Stack mode.
- The concurrent suspend function of REC is feasible under the following conditions:
If a storage device is the following storage device, both storage systems that execute REC are registered in "Registering devices operated by Copy command via SAN" or "Registering devices operated by Copy command via LAN" and the ETERNUS name specified by the `-a` option of the [acgroup create](#) command points to the copy source of the copy pair.
 - ETERNUS DX S2 series (excluding the ETERNUS DX60 S2. For earlier than V10L30 firmware)
- The concurrent suspend function of REC is feasible under the following conditions:
If a storage device is any of the following storage devices, even when one of the storage device using REC that has been registered as the remote ETERNUS Disk storage system.
 - ETERNUS DX S5 series (excluding the ETERNUS DX60 S5)
 - ETERNUS DX S4 series (excluding the ETERNUS DX60 S4)
 - ETERNUS DX S3 series (excluding the ETERNUS DX60 S3. V10L20 or later firmware is required for the ETERNUS DX100 S3.)
 - ETERNUS DX S2 series (excluding the ETERNUS DX60 S2. V10L30 or later firmware)
 - ETERNUS AF All-Flash Arrays
 - ETERNUS DX200F
- If the REC transfer mode is Consistency mode and the REC Disk buffer is used, check that no transferred data exists in the REC Disk buffer before executing the concurrent suspend.
You can check the data size by executing the [acrebuff stat](#) command with the `-disk` option in **DiskRate** column.
- The maximum number of copy pairs which execute the concurrent suspend function simultaneously is 845.

Changing Timeout Value for Concurrent Suspend Function

When there is more data to be transferred than can be transferred during the timeout interval, a timeout error occurs. When a timeout occurs, the following message is output.

[Execution example]

```
> acec suspend -g EcGroup -concur  
ccm5004 Operation failed. function=stxcec.SUSPEND.concur, message=STXC1300 ERROR Time out detected.
```

If this message is displayed, change the timeout value for the concurrent suspend function.



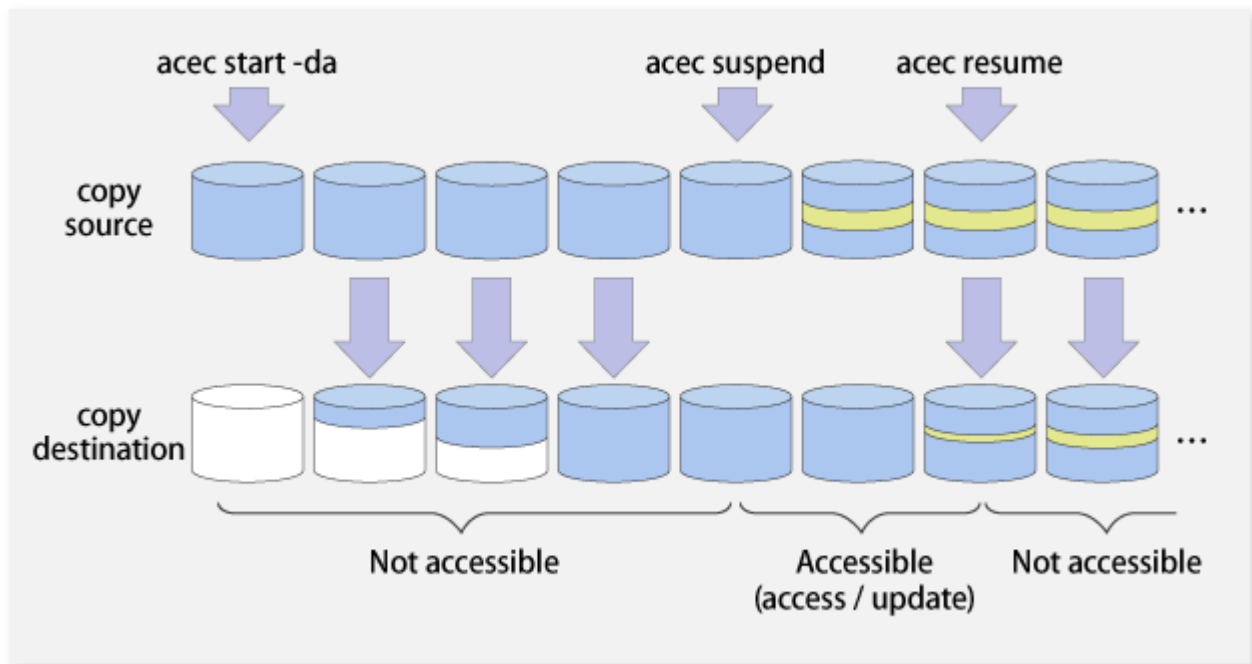
Refer to "[3.6.8 Changing Timeout Value for Concurrent Suspend Function](#)" for the method of changing the timeout value.

3.2.2.9 Using Destination Access Permission Function on EC/REC

The Destination Access Permission function suppresses access (reference and updates) to the copy destination logical volume during the time from the start to the suspension of the synchronous high-speed copy.

When using this function, it is possible to suppress the erroneous reference to copy destination logical volumes which are in an invalid status when part way through copying.

Figure 3.7 Example for If acec suspend Command Was Used



To set the Destination Access Permission function, execute the [acec start](#) command with the [-da](#) option.

The access suppression is continued until the suspension of the synchronous process with the [acec suspend](#) command or until the synchronous process is stopped with the [acec cancel](#) command.

If changing the settings, stop the synchronous process which is running by executing the [acec cancel](#) command and then execute the [acec start](#) command again.

Also, it is possible to check the access suppression status by executing the [acec query](#) command with the [-da](#) option.

3.3 Managing copy sessions

This section explains the method for performing the following tasks to all of the copy sessions set up to the target ETERNUS Disk storage system.

- [3.3.1 Displaying copy session information](#)
- [3.3.2 Forcibly Stopping Copy Sessions](#)
- [3.3.3 Forcibly Suspending REC Sessions](#)

3.3.1 Displaying copy session information

The displaying of copy session information is performed executing the [accopy query](#) command.

Display Information for All Existing Copy Sessions in ETERNUS Disk Storage System (Including REC Sessions)

Specify "all" in the -type option.

[Execution example]

```
> accopy query -a ET001 -type all
```

Display Information for All Existing Copy Sessions in ETERNUS Disk Storage System (Excluding REC Sessions)

Specify "local" in the -type option.

[Execution example]

```
> accopy query -a ET001 -type local
```

Display Information for All Existing Copy Sessions in ETERNUS Disk Storage System

Specify "remote" in the -type option.

[Execution example]

```
> accopy query -a ET001 -type remote
```

Display Information for All Existing Copy Sessions Between ETERNUS Disk Storage Systems

Specify the ETERNUS Disk Storage System names set up as REC session copy source and copy destination using the -sa and -ta options respectively.

[Execution example]

```
> accopy query -a ET001 -sa ET001 -ta ET002
```

3.3.2 Forcibly Stopping Copy Sessions

The forcible stop of copy sessions is performed executing the [accopy fcancel](#) command.

Forcibly Stop All Existing Copy Sessions in ETERNUS Disk Storage System (Including REC Sessions)

Specify "all" in the -type option.

[Execution example]

```
> accopy fcancel -a ET001 -type all
```

Forcibly Stop All Existing Copy Sessions in ETERNUS Disk Storage System (Excluding REC Sessions)

Specify "local" in the -type option.

[Execution example]

```
> accopy fcancel -a ET001 -type local
```

Forcibly Stop All Existing Copy Sessions in ETERNUS Disk Storage System

Specify "remote" in the -type option.

[Execution example]

```
> accopy fcancel -a ET001 -type remote
```

Forcibly Stop All Existing Copy Sessions Between ETERNUS Disk Storage Systems

Specify the ETERNUS Disk Storage System names set up as the copy source and the copy destination using the `-sa` and `-ta` options respectively.

[Execution example]

```
> accopy fcancel -a ET001 -sa ET001 -ta ET002
```

Forcibly Stop Single Copy Session

Specify the copy source volume and the copy destination volume using the `-s` and `-t` options respectively.

[Execution example]

```
> accopy fcancel -a ET001 -s ET001/0x1 -t ET001/0x2
```

Forcibly Stop Single Monitor Session

Specify the copy source volume with the `-v` option. At the same time, specify the `-estimate` option as well.

[Execution example]

```
> accopy fcancel -a ET001 -v ET001/0x1 -estimate
```

Forcibly Stop Multiple Copy Sessions

Using the `-stdin` option, specify the Tab Separated Value (TSV) type file upon which the information for the copy sessions to be forcibly stopped is written.

[Execution example]

```
> accopy fcancel -a ET001 -stdin < SESSIONS.txt
```



Note

Use ETERNUS Web GUI or ETERNUS CLI to stop the monitor session started by the following methods.

- Operation by Copy command via SAN
 - Started by Copy command via LAN
 - Started by ETERNUS Web GUI
 - Started by ETERNUS CLI
- Operation by Copy command via LAN
 - Started by Copy command via SAN

3.3.3 Forcibly Suspending REC Sessions

The forcible suspension of REC sessions is performed with the `accopy fsuspend` command.

Forcibly Suspend All Existing REC Sessions in ETERNUS Disk Storage System

[Execution example]

```
> accopy fsuspend -a ET001
```

Forcibly Suspend All Existing REC Sessions Between ETERNUS Disk Storage Systems

Specify the ETERNUS Disk Storage System names set up as REC session copy source and copy destination using the `-sa` and `-ta` options respectively.

[Execution example]

```
> accopy fsuspend -a ET001 -sa ET001 -ta ET002
```


Forcibly Suspend Single REC Session

Specify the copy source volume and copy destination volume using the -s and -t options respectively.

[Execution example]

```
> accopy fsuspend -a ET001 -s ET001/0x1 -t ET002/0x1
```

Forcibly Suspend Multiple REC Sessions

Using the -stdin option, specify the Tab Separated Value (TSV) type file upon which the information for the copy sessions to be forcibly stopped is written.

[Execution example]

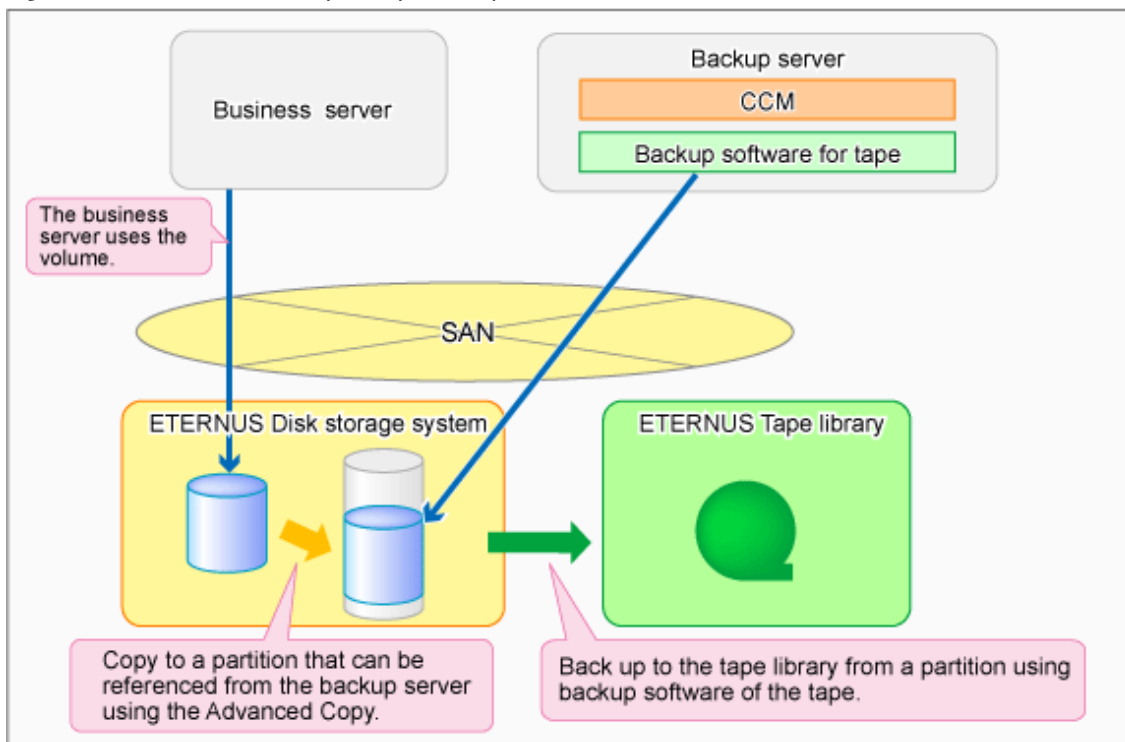
```
> accopy fsuspend -a ET001 -stdin < SESSIONS.txt
```

3.4 Backing Up to Tape

Back up the volume data to the tape device connected to the backup server.

AdvancedCopy Manager CCM copies backup data to a volume partition referenced from the backup server. Then, copied data to the partition is backed up to the tape library by using tape backup software.

Figure 3.8 Overview of backup to tape library



3.4.1 LU to Partition

If you want to copy the contents of a disk volume, AdvancedCopy Manager CCM can back up the contents of a volume to a partition by specifying the extent start position in the copy source volume, the extent size, and the extent start position in the copy destination volume. In this manual, this function is called "LU to Partition".

Figure 3.9 Copying Volume to Partition



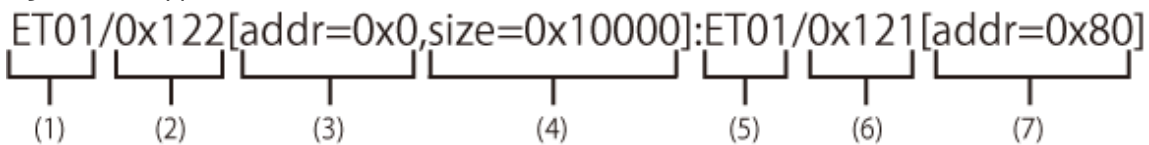
Note

You can use this function only if you back up the data of copy destination volumes to a secondary medium, such as tape. Do not use this function for copying from one disk to another disk.

Adding Copy Pair

To use the LU to Partition function, it is necessary to specify the extent start position and add a copy pair. Copy pairs are strings that define the copy source and copy destination logical volumes.

Figure 3.10 Copy Pair Format



- (1) Copy source ETERNUS name
- (2) Copy source logical volume number (*1)
- (3) Extent start position at the copy source volume (block units) (*1)
- (4) Extent size at the copy source volume (number of blocks) (*1)
- (5) Copy destination ETERNUS name
- (6) Copy destination logical volume number (*1)
- (7) Extent start position at the copy destination volume (block units) (*1)

*1: Specify the hexadecimal starting with "0x". (ex, "0x1" or "0x0001")

Follow the procedure below to add a copy pair.

1. Calculating the extent size at the copy source

Calculate the extent size at the copy source that is to be added to the copy pair.

- a. Execute the `acinq lv` command on the backup server to check the copy source logical volume number (LV No) and the logical volume size (LV Size).

[Execution example]

```
> acinq lv -a ET001
LV No  LV Name  LV Size  LV Type  RG No  Encrypt
-----
0x0000      128M  Open      0 -
0x0001      128M  Open      0 -
0x0002      128M  Open      0 -
0x0003      128M  Open      0 -
0x0004      128M  Open      0 -
```

0x0005	128M	Open	0	-
0x0006	128M	Open	0	-
0x0007	128M	Open	0	-
0x0008	1024M	Open	0	-
0x0009	1024M	Open	0	-
0x000A	1024M	Open	0	-
0x000B	1024M	Open	0	-
0x000C	1024M	Open	0	-
0x000D	1024M	Open	0	-
0x000E	1024M	Open	0	-
0x000F	1024M	Open	0	-

b. Calculate the extent size (number of blocks) from the logical volume size in MB by using the following formula.

```
extent size (number of blocks) = logical volume size (MB) * 1024 * 1024 / 512
```

Information

If the copy source logical volume number is not known

- For Solaris, Linux, HP-UX, or AIX environments

1. Execute the `acgetvolinfo` command on the business server to check the copy source logical volume number (LVNo) and the extent size (Size).

[Execution example]

[For Solaris environments]

```
# acgetvolinfo /dev/rdisk/c4t0d10s2
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x001,0x0,0x40000
```

[For Linux environments]

```
# acgetvolinfo /dev/sdo
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x001,0x0,0x40000
```

[For HP-UX environments]

```
# acgetvolinfo /dev/rdisk/clt0d20
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x001,0x0,0x40000
```

[For AIX environments]

```
# acgetvolinfo /dev/hdisk10
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x001,0x0,0x40000
```

2. Calculate the logical volume size (in bytes or MB) from the extent size (number of blocks) of the logical volume size by using the following formula.

```
logical volume size (in bytes) = extent size (in blocks) * 512
logical volume size (in MB) = extent size (in blocks) * 512 / (1024 * 1024)
```

- For Windows environments

1. Check the copy-source logical volume number (LV No) by executing the `acgetvolinfo` command in the transaction server.

[Execution example]

```
C:\> acgetvolinfo F:
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x001,0x80,0x20000
```

2. Check the logical volume size by executing the `acinq lv` command in the backup server.

2. Creating partitions

Create partitions at the copy destination volume.

The partition size must be larger than or equal to the copy source logical volume size. As a guideline, create a partition with a size that is 128 MB larger than the copy source logical volume.



Megabyte unit

In this document, the megabyte unit is defined as being 1024x1024 bytes.

However, when creating partitions, note that Linux calculates the megabyte unit as being 1000x1000 bytes.



Creating partitions

- For Windows environments

Create partitions with a drive letter.

- For Solaris environments

Create partitions without a VTOC label.

3. Checking the information on the copy destination logical volume

Execute the `acgetvolinfo` command on the backup server to check the copy destination logical volume (LV No), the extent start position (Address), and the extent size (Size) to be added.



Check that the extent size of the copy destination partition is larger than or equal to the extent size of the copy source volume. If the extent size of the copy destination partition is less than the extent size of the copy source volume, go back to step 2 and recreate the copy destination partition.

[Execution example]

- For Solaris environments

```
# acgetvolinfo /dev/dsk/c0t0d0s3
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x008,0x0100000,0x140cc3
```

- For Linux environments

```
# acgetvolinfo /dev/sda1
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x008,0x0100000,0x140cc3
```

- For Windows environments

```
C:\> acgetvolinfo X:
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104#####,0x008,0x0100000,0x140cc3
```

In a Windows environment, execute the mountvol command to unmount a partition.

[Execution example]

```
C:\> mountvol X: /p
```

Note

Do not mount the copy destination volume partition during AdvancedCopy Manager CCM operation.

4. Adding copy pairs

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

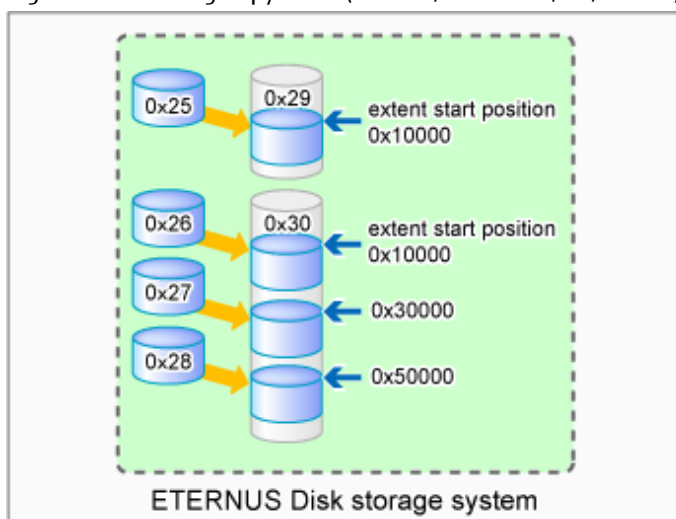
Create copy pairs at the copy source volume by specify the following values:

- Values specified to the copy source volume
 - Extent start position: 0x0
 - Extent size: Logical volume extent size calculated in step 1
- Values specified to the copy destination volume
 - Extent start position: Copy destination volume extent start position checked in step 3

The execution example below shows how to add copy groups.

- For OPC, QuickOPC, EC, or REC

Figure 3.11 Adding Copy Pairs (for OPC, QuickOPC, EC, or REC)



[Execution example]

```
> acpair add -g GRP1 -p "ET001/0x25[addr=0x0,size=0x5000]:ET001/0x29[addr=0x10000]"
Successful completion.
```

```

> acpair add -g GRP1 -p "ET001/0x26[addr=0x0,size=0x5000]:ET001/0x30[addr=0x10000]"
Successful completion.

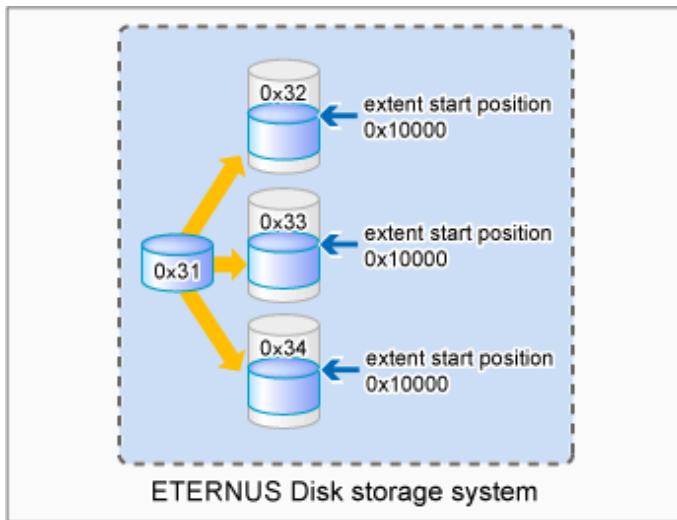
> acpair add -g GRP1 -p "ET001/0x27[addr=0x0,size=0x5000]:ET001/0x30[addr=0x30000]"
Successful completion.

> acpair add -g GRP1 -p "ET001/0x28[addr=0x0,size=0x5000]:ET001/0x30[addr=0x50000]"
Successful completion.

```

- For SnapOPCP

Figure 3.12 Adding Copy Pairs (for SnapOPCP)



[Execution example]

```

> acpair add -g GRP2 -p "ET001/0x31[addr=0x0,size=0x5000]:ET001/0x32[addr=0x10000]"
Successful completion.

> acpair add -g GRP2 -p "ET001/0x31[addr=0x0,size=0x5000]:ET001/0x33[addr=0x10000]"
Successful completion.

> acpair add -g GRP2 -p "ET001/0x31[addr=0x0,size=0x5000]:ET001/0x34[addr=0x10000]"
Successful completion.

```

 Note

Multiple sessions cannot be created for the same volume under SnapOPC+. Register copy pairs by creating one partition for one volume.

5. Checking added copy pairs

Checking the logical volume number of an added copy pair

Execute the [acgroup detail](#) command to display ETERNUS Disk storage system information, and check that the copy pair was added to the specified logical volume number.

[Execution example]

```

> acgroup detail -g GRP1

Copy Group Name : GRP1
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Pair
-----

```

```

ET001/0x25[addr=0x0,size=0x5000]:ET001/0x29[addr=0x10000]
ET001/0x26[addr=0x0,size=0x5000]:ET001/0x30[addr=0x10000]
ET001/0x27[addr=0x0,size=0x5000]:ET001/0x30[addr=0x30000]
ET001/0x28[addr=0x0,size=0x5000]:ET001/0x30[addr=0x50000]

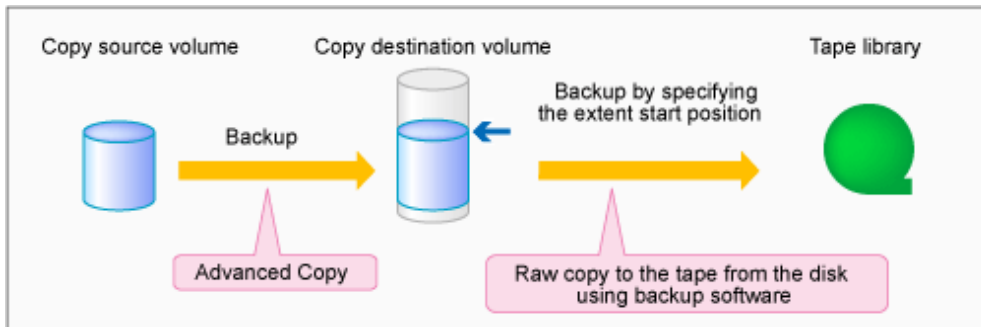
```

3.4.2 Backup to Tape

3.4.2.1 Overview of Backup

To back up a volume to the tape library using AdvancedCopy Manager CCM, use the LU to Partition function. Copy the contents of the copy source volume to a partition that can be referenced from the backup server. Then use the backup software to back up to the tape library.

Figure 3.13 Overview of Tape Backup

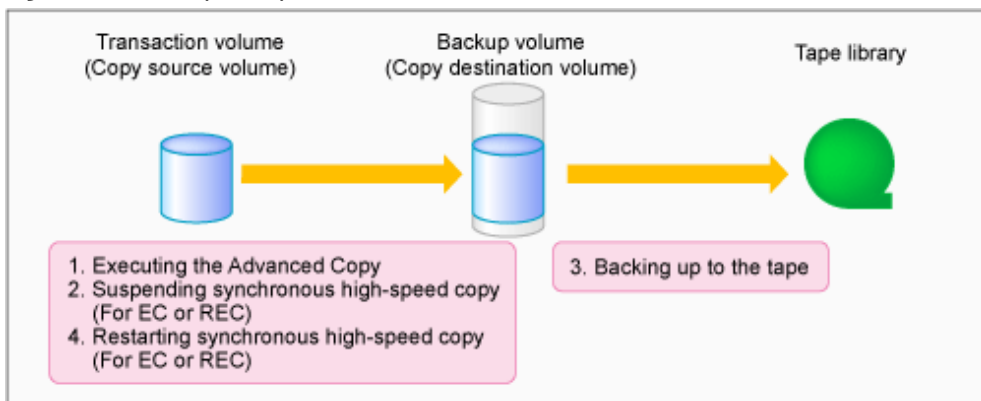


To manage the backup data on the tape library, the backup software with a function capable of performing RAW copy is required. Prepare the software that operates the ETERNUS Tape library or similar. Refer to the manuals of the backup software and tape device that you are using for details on how to back up to tape.

3.4.2.2 Backup Procedure

The flow to back up the transaction volume is shown below.

Figure 3.14 Backup to Tape



Follow the procedure below to back up transaction volume data to tape.

1. Executing Advanced Copy

Back up the contents of the transaction volume to the backup volume partition by executing the Advanced Copy. Refer to the copy types in "3.2 Executing Advanced Copy" for the execution procedure.

2. Temporarily suspending synchronous high-speed copy (EC and REC only)

Temporarily suspend synchronous high-speed copy.

- If the transfer mode for backup using EC or REC is synchronous mode:

Execute the [acec suspend](#) command to temporarily suspend synchronous high-speed copy.

[Execution example]

```
> acec suspend -g group01

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>

Succeeded : 1
Failed    : 0
```

- If the transfer mode for backup using REC is Stack mode or Consistency mode:

1. Execute the [acec suspend](#) command with the -force option to forcibly temporarily suspend REC.

[Execution example]

```
> acec suspend -g group01 -force

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 00:00:00 - << EC Suspended >>

Succeeded : 1
Failed    : 0
```

2. Execute the [acec change](#) command to change the REC transfer mode to "through".

[Execution example]

```
> acec change -g group01 -transfer through

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 00:01:00 - << EC Change >>

Succeeded : 1
Failed    : 0
```

3. Execute the [acec resume](#) command to restart REC.

[Execution example]

```
> acec resume -g group01

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 00:02:00 - << EC Resumed >>

Succeeded : 1
Failed    : 0
```

4. Execute the [acec query](#) command to check that the REC is in an equivalency maintenance state.

[Execution example]

```
> acec query -g group01

Copy Group Name      : group01
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source                <=> Target                SID(RSID)  EC
```



```

Status      Copy Phase Copied Block Rcv Split Xfer
-----
-----
ET001/0x1[addr=0x0,size=0x5000] ==> ET002/0x3[addr=0x10000] 0x49(0x10) "EC
Executing" "Paired"          1048576 auto ---- through

```

5. Execute the [acec suspend](#) command to temporarily suspend REC.

[Execution example]

```

> acec suspend -g group01

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 00:10:00 - << EC Suspended >>

Succeeded : 1
Failed    : 0

```

3. Backing up to tape

Use the backup software to back up the data created in the copy destination volume partition to tape. Refer to the manuals of the backup software and tape device that you are using for details on how to back up to tape.

4. Restarting synchronous high-speed copy (EC or REC only)

Restart synchronous high-speed copy.

- If the transfer mode for backup using EC or REC is synchronous mode:

Execute the [acec resume](#) command to restart synchronous high-speed copy.

[Execution example]

```

> acec resume -g group01

ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

Succeeded : 1
Failed    : 0

```

- If the transfer mode for back up using REC is Stack mode or Consistency mode:

1. Execute the [acec change](#) command to change the transfer mode to the original mode (Stack mode or Consistency mode).

If changing to Stack mode

[Execution example]

```

> acec change -g group01 -transfer stack

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 07:00:00 - << EC Change >>

Succeeded : 1
Failed    : 0

```

If changing to Consistency mode

[Execution example]

```

> acec change -g group01 -transfer consist

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/25 07:00:00 - << EC Change >>

```

```
Succeeded : 1
Failed    : 0
```

- Execute the [acec resume](#) command to restart synchronous high-speed copy.

[Execution example]

```
> acec resume -g group01

ET001/0x1[addr=0x0,size=0x5000]:ET002/0x3[addr=0x10000]
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

Succeeded : 1
Failed    : 0
```

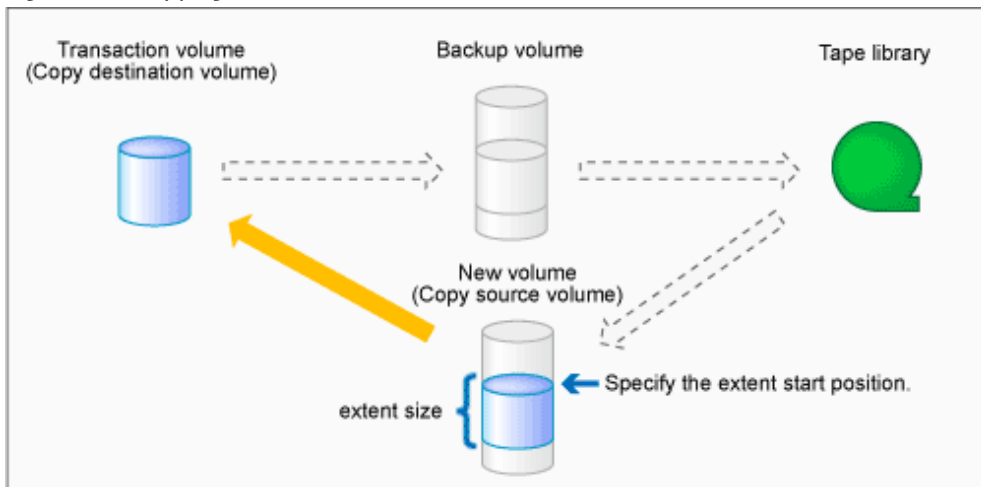
3.4.3 Partition to LU

If you want to restore data that was backed up with LU to Partition, AdvancedCopy Manager CCM can restore the contents of a partition to a volume by specifying the extent start position in the copy source volume, the extent size, and the extent start position in the copy destination volume. In this manual, this function is called "Partition to LU".

After restoring the backup data stored to tape in "3.4.2 Backup to Tape" by tape backup software to the partition of a temporary volume (called "new volume") different from a backup volume, Partition to LU is used for restoring the backup data from the partition of a new volume to a business volume.

The new volume must be able to reference from the tape backup software.

Figure 3.15 Copying Volume to Partition



Copy Pair Format

```
ET01/0x130[addr=0x80,size=0x10000]:ET01/0x122[addr=0x0]
```

(1) (2) (3) (4) (5) (6) (7)

- (1) Copy source ETERNUS name
- (2) Copy source logical volume number (*1)
- (3) Extent start position at the copy source volume (block units) (*1)
- (4) Extent size at the copy source volume (number of blocks) (*1)
- (5) Copy destination ETERNUS name

- (6) Copy destination logical volume number (*1)
- (7) Extent start position at the copy destination volume (block units) (*1)

*1: Specify the hexadecimal starting with "0x". (ex, "0x1" or "0x0001")

Point

The copy pair format of Partition to LU is the same as LU to Partition. However, the differences in the content that are specified are as follows.

Specification Items	Contents That Are Specified with LU to Partition	Contents That Are Specified with Partition to LU
Extent start position at the copy source volume	Start position of a volume (0x0)	Start position of a partition
Extent size at the copy source volume	Volume size	Partition size
Extent start position at the copy destination volume	Start position of a partition	Start position of a volume (0x0)

Adding Copy Pair

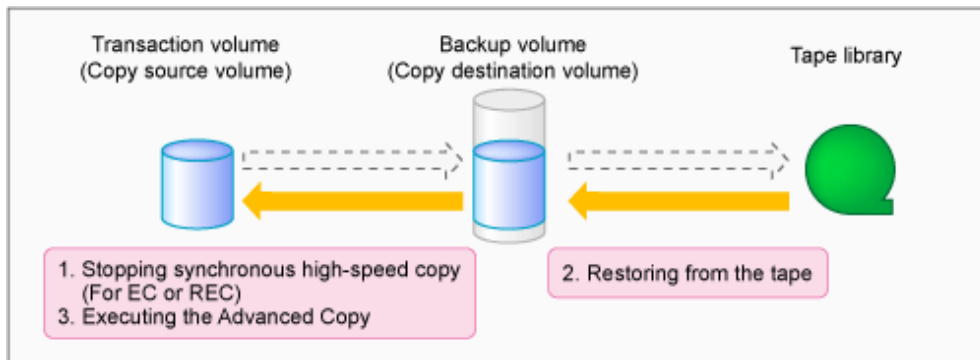
Refer to "Adding Copy Pair" in "3.4.1 LU to Partition" for the procedure to add a copy pair. However, check the size and create a partition by re-reading the copy source/destination in LU to Partition and the copy destination/source in Partition to LU.

3.4.4 Restoring from Tape

For OPC, QuickOPC, EC or REC, follow the procedure below to restore transaction volume data from tape. This method is called "Restoring using backup volume".

Refer to "3.4.4.1 Restoring Using Backup Volume" for details.

Figure 3.16 Restoring from Tape (Restore Using Backup Volume)

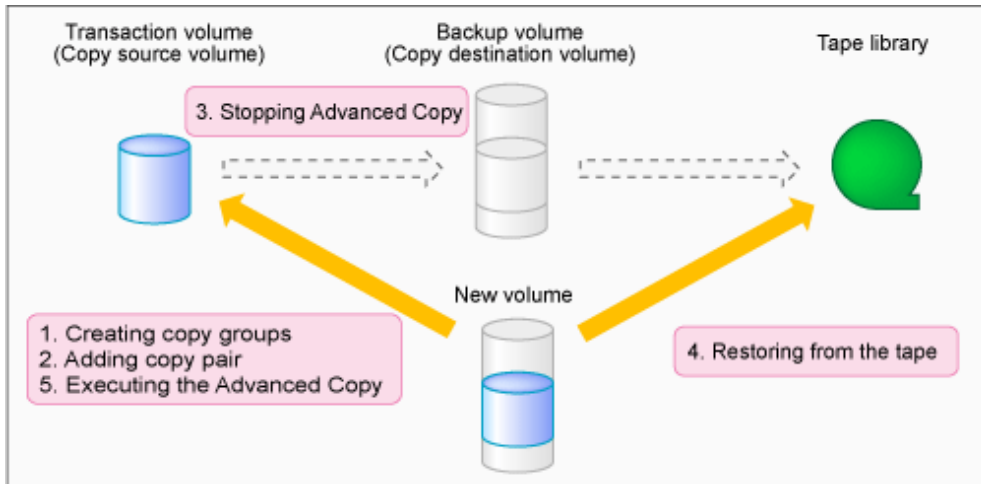


For SnapOPC+, follow the procedure below to restore transaction volume data from tape. This method is called "Restoring using a new volume".

In addition, if you do not use a backup volume that was used for backup regardless of copy type, follow the procedure below.

Refer to "3.4.4.2 Restoring Using New Volume" for details.

Figure 3.17 Restoring from Tape (Restore Using New Volume)



3.4.4.1 Restoring Using Backup Volume

The procedure to restore using a backup volume is as follows.



Note

This procedure uses a backup volume for restoring from a tape. For this reason, the backup volume contents are overwritten by the tape contents.

If you want to keep the backup volume data, perform restore the data using "3.4.4.2 Restoring Using New Volume".

1. Stopping synchronous high-speed copy (EC or REC only)

Execute the `acec cancel` command with the `-p` and `-force` options to stop synchronous high-speed copy.

[Execution example]

```
> acec cancel -g group01 -p "ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]" -force
ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

Succeeded : 1
Failed    : 0
```

2. Restoring from tape

Restore the data that was backed up to tape to the backup volume partition.

Refer to the manuals of the backup software and tape device that you are using for details on how to back up to tape.

3. Executing Advanced Copy

Restore the contents of the backup volume partition to the transaction volume.

Refer to the copy types in "3.2 Executing Advanced Copy" for the execution procedure.

3.4.4.2 Restoring Using New Volume

The procedure to restore data using a new volume is as follows.

1. Creating a copy group

To perform Advanced Copy from a new volume partition to the transaction volume, create a new copy group. Specify OPC as the copy type by executing the `acgroup create` command.

[Execution example]

```
> acgroup create -g group02 -type OPC -a ET001
Successful completion.
```

2. Adding copy pairs

Add a copy pair by specifying a new volume partition as the copy source and the transaction volume as the copy destination. Refer to "Adding Copy Pair" in "3.4.3 Partition to LU" for the procedure to add a copy pair.

[Execution example]

```
> acpair add -g group02 -p "ET001/0x4[addr=0x10000,size=0x5000]:ET001/0x1[addr=0x0]"
Successful completion.
```

Information

By specifying LU to Partition (business volume for the copy source and new volume partition for the copy destination), adding a copy pair may be possible. If you add a copy pair with LU to Partition, you must add the -r option (the reversed Advanced Copy specification) when executing the [acopc start](#) command in step 5.

3. Stopping Advanced Copy

To reinstate data to the transaction volume, stop Advanced Copy from the transaction volume to the backup volume.

- For OPC or QuickOPC

Execute the [acopc query](#) command to check the copy status.

If the session and the Tracking (only for QuickOPC) have not been stopped, execute the [acopc cancel](#) command with the -p option to stop physical copying and to stop Tracking (only for QuickOPC).

[Execution example]

```
> acopc query -g group01

Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source          <=> Target          SID  OPC Status      Copy Phase Copied
Block
-----
ET001/0x1[addr=0x0,size=0x5000] ==> ET001/0x3[addr=0x10000] 0x21 "OPC Executing"
"Copying"          0

> acopc cancel -g group01 -p "ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]"

ET001/0x1:ET001/0x3
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

Succeeded : 1
Failed    : 0
```

Note

If an operation is performing reverse copy, also check the reverse Advanced Copy status.

- For SnapOPC+

Execute the [acsnap query](#) command to check the copy status.

If the session has not been stopped, execute the [acsnap cancel](#) command with the -force option to stop synchronous high-speed copying.

[Execution example]

```

> acsnap query -g group01

Copy Group Name : group01
Copy Group Type : SnapOPCP
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source          <=> Target          SID  Snap Status
Gen Date       Copied Block
-----
ET001/0x31[addr=0x0,size=0x0] ==> ET001/0x34[addr=0x0,size=0x01000] 0x23 "Copy On
Write(Active)"   3 10minute      1048576
ET001/0x31[addr=0x0,size=0x0] ==> ET001/0x33[addr=0x0,size=0x01000] 0x22 "Copy On
Write(Inactive)" 2 3hour         1048576
ET001/0x31[addr=0x0,size=0x0] ==> ET001/0x32[addr=0x0,size=0x01000] 0x21 "Copy On
Write(Inactive)" 1 1day          1048576

> acsnap cancel -g group01 -force

ET001/0x31[addr=0x0,size=0x0]:ET001/0x32[addr=0x0,size=0x01000]
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

ET001/0x31[addr=0x0,size=0x0]:ET001/0x33[addr=0x0,size=0x01000]
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

ET001/0x31[addr=0x0,size=0x0]:ET001/0x34[addr=0x0,size=0x01000]
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>

Succeeded : 3
Failed    : 0

```

 Note

- If an operation is performing reverse copy, also check the reverse Advanced Copy status.
- Stop the SnapOPC+ sessions of all snap generations for the transaction volume.
If multiple copy groups are defined for the transaction volume, the SnapOPC+ sessions of all the snap generations within all the copy groups must be stopped.
The SnapOPC+ sessions of all the snap generations for the transaction volume can be stopped by executing the `acsnap cancel` command with the `-g` option (specify the copy group that has the latest snap generation for the transaction volume) and the `-force` option.

- For EC or REC

Execute the `acec cancel` command with the `-p` and `-force` options to stop synchronous high-speed copy.

[Execution example]

```

> acec cancel -g group01 -p
"ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]" -force

ET001/0x1[addr=0x0,size=0x5000]:ET001/0x3[addr=0x10000]
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

Succeeded : 1
Failed    : 0

```

4. Restoring from tape

Restore the data that was backed up to tape to the new volume partition.

Refer to the manuals of the backup software and tape device that you are using for details on how to back up to tape.

5. Executing Advanced Copy

Restore the contents of the new volume partition to the transaction volume.
Refer to "3.2.1.2 Restore on OPC Backup Environment" for the execution procedure.

[Execution example]

```
> acopc start -g group02 -p "ET001/0x4[addr=0x10000,size=0x5000]:ET001/0x1[addr=0x0]"

ET001/0x4[addr=0x10000,size=0x5000]:ET001/0x1[addr=0x0]
# DATE : 2008/06/25 12:00:00 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=4/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/Olu=1/Adr_high=0/Adr_low=0

Succeeded : 1
Failed : 0
```

Note

Copy from the transaction volume to the backup volume is not guaranteed until the physical copy from the partition of new volume to the transaction volume is completed (until the OPC session disconnects). Do not begin copying from the transaction volume to the backup volume until the physical copy is completed.

3.5 How to Back Up 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.

When using AdvancedCopy Manager CCM installed as a standalone program, refer to "3.8 How to Back Up License Management Database" and back up the license management database after backing up the environment settings files.

When using AdvancedCopy Manager CCM of the installed ETERNUS SF Manager, refer to "3.9 How to Back Up ETERNUS SF Manager Database" and back up the ETERNUS SF Manager database after backing up the environment settings files.

3.5.1 Backing Up Environment Settings Files

This section explains how to back up environment settings files.

For Non-cluster Operation

Copy the following files to a temporary directory.

- For Windows environments

File Name	Remarks
- \$ENV_DIR\CCM\etc\db\eternus.xml	
- All files under \$ENV_DIR\CCM\etc\db\cg directory	
- \$ENV_DIR\CCM\etc\prop\user.properties	Only when any files exist.
- \$ENV_DIR\CCM\etc\stxc.alias	
- \$ENV_DIR\CCM\etc\stxc_ext.alias	
- \$ENV_DIR\CCM\etc\stxcvolinf	
- \$TMP_DIR\CCM\var\micc\database\DeviceRegList.xml	

\$ENV_DIR is the "Environment Directory" as specified during AdvancedCopy Manager CCM installation.
 \$TMP_DIR is the "Work Directory" as specified during AdvancedCopy Manager CCM installation.

- For Solaris or Linux environments

File Name	Remarks
<ul style="list-style-type: none"> - /etc/opt/FJSVccm/db/eternus.xml - All files under /etc/opt/FJSVccm/db/cg directory 	
<ul style="list-style-type: none"> - /etc/opt/FJSVccm/prop/user.properties - /etc/opt/FJSVccm/accc/etc/stxc.alias - /etc/opt/FJSVccm/accc/etc/stxc_ext.alias - /etc/opt/FJSVccm/accc/etc/stxcvolinf 	Only when any files exist.
<ul style="list-style-type: none"> - /var/opt/FJSVccm/micc/database/DeviceRegList.xml 	

For Cluster Operation

Copy the following files to any directories.

- For Windows environments

File Name	Remarks
<ul style="list-style-type: none"> - \$SHARE_DL:\$SHARE_TOP\etc\db\eternus.xml - All files in the \$SHARE_DL:\$SHARE_TOP\etc\db\cg directory 	
<ul style="list-style-type: none"> - \$SHARE_DL:\$SHARE_TOP\etc\prop\user.properties - \$SHARE_DL:\$SHARE_TOP\etc\stxc.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxc_ext.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxcvolinf 	Only when any files exist.
<ul style="list-style-type: none"> - \$SHARE_DL:\$SHARE_TOP\var\micc\database\DeviceRegList.xml 	
<ul style="list-style-type: none"> - \$INS_DIR\micc\sys\install.sys - \$INS_DIR\bin\stxc_install.sys - \$INS_DIR\sys\sys.properties - \$INS_DIR\noncluster\micc\sys\install.sys - \$INS_DIR\noncluster\bin\stxc_install.sys - \$INS_DIR\noncluster\sys\sys.properties 	Do not restore in " 3.5.2 Restoring Environment Settings Files " or " 3.7 Changing Cluster Environment ".

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

\$INS_DIR is the "Program Directory" as specified during AdvancedCopy Manager CCM installation.

- For Solaris or Linux environments

File Name	Remarks
<ul style="list-style-type: none"> - \$SHARE_MNT/etc/opt/FJSVccm/db/eternus.xml - All files in the \$SHARE_MNT/etc/opt/FJSVccm/db/cg directory 	
<ul style="list-style-type: none"> - \$SHARE_MNT/etc/opt/FJSVccm/prop/user.properties 	Only when any files exist.

File Name	Remarks
- \$SHARE_MNT/etc/opt/FJsvccm/acc/etx/stxc.alias - \$SHARE_MNT/etc/opt/FJsvccm/acc/etx/stxc_ext.alias - \$SHARE_MNT/etc/opt/FJsvccm/acc/etx/stxcvolinf	
- \$SHARE_MNT/var/opt/FJsvccm/micc/database/DeviceRegList.xml	
- /opt/FJsvccm/micc/sys/.install.sys - /opt/FJsvccm/bin/.stxc_install.sys - /opt/FJsvccm/sys/sys.properties - /opt/FJsvccm/noncluster/micc/sys/.install.sys - /opt/FJsvccm/noncluster/bin/.stxc_install.sys - /opt/FJsvccm/noncluster/sys/sys.properties	Do not restore in "3.5.2 Restoring Environment Settings Files" or "3.7 Changing Cluster Environment".

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

This completes the backup for environment settings files.

3.5.2 Restoring Environment Settings Files

This section explains how to restore the environment settings files that were backed up in "3.5.1 Backing Up Environment Settings Files".

For Non-cluster Operation

Use the following procedure to restore the environment setting files.

1. Delete the following files.

- For Windows environments

File Name	Remarks
- All files under \$ENV_DIR\CCM\etc\db\cg directory	
- \$ENV_DIR\CCM\etc\prop\user.properties - \$ENV_DIR\CCM\etc\stxc.alias - \$ENV_DIR\CCM\etc\stxc_ext.alias - \$ENV_DIR\CCM\etc\stxcvolinf	Only when any files exist.

\$ENV_DIR is the "Environment Directory" as specified during AdvancedCopy Manager CCM installation.

- For Solaris or Linux environments

File Name	Remarks
- All files under /etc/opt/FJsvccm/db/cg directory	
- /etc/opt/FJsvccm/prop/user.properties - /etc/opt/FJsvccm/acc/etx/stxc.alias - /etc/opt/FJsvccm/acc/etx/stxc_ext.alias - /etc/opt/FJsvccm/acc/etx/stxcvolinf	Only when any files exist.

2. Copy the files that were backed up in "3.5.1 Backing Up Environment Settings Files" to the following directory:

- For Windows environments

File Name	Remarks
<ul style="list-style-type: none"> - \$ENV_DIR\CCM\etc\dbname\eternus.xml - All files under \$ENV_DIR\CCM\etc\dbname\cg directory 	
<ul style="list-style-type: none"> - \$ENV_DIR\CCM\etc\prop\user.properties - \$ENV_DIR\CCM\etc\stxc.alias - \$ENV_DIR\CCM\etc\stxc_ext.alias - \$ENV_DIR\CCM\etc\stxcvolinf 	Only when any files was backed up.
<ul style="list-style-type: none"> - \$TMP_DIR\CCM\var\micc\database\DeviceRegList.xml 	

\$ENV_DIR is the "Environment Directory" as specified during AdvancedCopy Manager CCM installation.
\$TMP_DIR is the "Work Directory" as specified during AdvancedCopy Manager CCM installation.

- For Solaris or Linux environments

File Name	Remarks
<ul style="list-style-type: none"> - /etc/opt/FJSVccm/db/eternus.xml - All files under /etc/opt/FJSVccm/db/cg directory 	
<ul style="list-style-type: none"> - /etc/opt/FJSVccm/prop/user.properties - /etc/opt/FJSVccm/accc/etc/stxc.alias - /etc/opt/FJSVccm/accc/etc/stxc_ext.alias - /etc/opt/FJSVccm/accc/etc/stxcvolinf 	Only when any files was backed up.
<ul style="list-style-type: none"> - /var/opt/FJSVccm/micc/database/DeviceRegList.xml 	

This completes the restoration for environment settings files.

For Cluster Operation

Use the following procedure to restore the environment setting files.

1. Delete the following files.

- For Windows environments

File Name	Remarks
<ul style="list-style-type: none"> - All files in \$SHARE_DL:\$SHARE_TOP\etc\dbname\cg directory 	
<ul style="list-style-type: none"> - \$SHARE_DL:\$SHARE_TOP\etc\prop\user.properties - \$SHARE_DL:\$SHARE_TOP\etc\stxc.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxc_ext.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxcvolinf 	Only when any files exist.

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.
\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

- For Solaris or Linux environments

File Name	Remarks
- All files in the \$SHARE_MNT/etc/opt/FJSVccm/db/cg directory	
- \$SHARE_MNT/etc/opt/FJSVccm/prop/user.properties - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxc.alias - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxc_ext.alias - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxcvolinf	Only when any files exist.

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

2. Copy the backed up files in "3.5.1 Backing Up Environment Settings Files" to the following files and directories.

- For Windows environments

File Name	Remarks
- \$SHARE_DL:\$SHARE_TOP\etc\db\eternus.xml - All files in the \$SHARE_DL:\$SHARE_TOP\etc\db\cg directory	
- \$SHARE_DL:\$SHARE_TOP\etc\prop\user.properties - \$SHARE_DL:\$SHARE_TOP\etc\stxc.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxc_ext.alias - \$SHARE_DL:\$SHARE_TOP\etc\stxcvolinf	Only when any files was backed up.
- \$SHARE_DL:\$SHARE_TOP\var\micc\database\DeviceRegList.xml	

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

- For Solaris or Linux environments

File Name	Remarks
- \$SHARE_MNT/etc/opt/FJSVccm/db/eternus.xml - All files in the \$SHARE_MNT/etc/opt/FJSVccm/db/cg directory	
- \$SHARE_MNT/etc/opt/FJSVccm/prop/user.properties - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxc.alias - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxc_ext.alias - \$SHARE_MNT/etc/opt/FJSVccm/accc/etc/stxcvolinf	Only when any files was backed up.
- \$SHARE_MNT/var/opt/FJSVccm/micc/database/DeviceRegList.xml	

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

This completes the restoration for environment settings files.

3.6 Changing Configuration

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

3.6.1 Registering Additional ETERNUS Disk Storage System

Register additional information for ETERNUS Disk storage system with AdvancedCopy Manager CCM.

Register the ETERNUS Disk storage system by following the procedure in "[2.4 Registering ETERNUS Disk Storage System](#)".

3.6.2 Changing Registered Information for ETERNUS Disk Storage System

This section explains how to change the registered information for ETERNUS Disk storage system that has been set up with AdvancedCopy Manager CCM.

The registration information for ETERNUS Disk storage system includes the following items:

- ETERNUS name
- Access volume
- Box ID
- IP address
- User
- Password

The registration information for remote ETERNUS Disk storage system includes the following items:

- ETERNUS name
- Box ID

Changing ETERNUS Name or Access Volume

Execute the [acarray change](#) command to change ETERNUS names or access volumes.

When AdvancedCopy Manager CCM is being operated using Web Console, after changing the ETERNUS name, implement the following procedures as well.

1. Using ETERNUS Web GUI, configure a device name that is the same as the changed ETERNUS name.
2. Refer to the "Reload ETERNUS Disk storage system configuration information" in the *Web Console Guide* to reload ETERNUS Disk storage system configuration information.

Using Access Volume Automatic Setting Function to Change Access Volume

Execute the [acarray pathscan](#) command to change the access volume.

Changing Information Other than ETERNUS Names and Access Volumes

Use the following procedure to change information other than ETERNUS names and access volumes.

1. Delete the registration information

Execute the [acarray remove](#) command to delete the registration information for ETERNUS Disk storage system that has been set up with AdvancedCopy Manager CCM.

2. Change the information for ETERNUS Disk storage systems [only when changing device information]
3. Re-register the ETERNUS Disk storage system

Register the ETERNUS Disk storage system (whose registration information was deleted) again using the new information. Register the ETERNUS Disk storage system by following the procedure in "[2.4 Registering ETERNUS Disk Storage System](#)".



Note

When changing other information than ETERNUS names and access volumes, perform step 1 and then change the information for the ETERNUS Disk storage system.

3.6.3 Deleting Registered Information for ETERNUS Disk Storage System

This section explains how to delete registration information for ETERNUS Disk storage system that has been set up with AdvancedCopy Manager CCM.

Use the following procedure to delete registration information for ETERNUS Disk storage system:

1. Delete copy groups

Delete all of the copy groups that have been set up for ETERNUS Disk storage system for which registration information is to be deleted.

Delete the copy groups by referring to "3.6.6 Deleting Copy Groups".

2. Delete the registration information for ETERNUS Disk storage system

Execute the `acarray remove` command to delete the registration information for ETERNUS Disk storage system that has been set up with AdvancedCopy Manager CCM.

3.6.4 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 "2.5 Creating Copy Groups".

3.6.5 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 storage system that has been set up with AdvancedCopy Manager CCM. Add copy pairs by referring to "2.7 Adding Copy Pairs".

Deleting Copy Pairs

Delete the copy pairs for the ETERNUS Disk 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.

- `acopc cancel` command
- `acsnap cancel` command
- `acec cancel` command

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.

- `acopc query` command
- `acsnap query` command
- `acec query` command

3. Delete copy pairs

Execute the `acpair remove` command to delete the copy pairs.



If copy pairs have been deleted by mistake:

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

- Use ETERNUS Web GUI to stop the Advanced Copy for the copy pair.
 - Add the same copy pair again, and then stop the Advanced Copy.
-

3.6.6 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 are 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.

- `acopc cancel` command
- `acsnap cancel` command
- `acec cancel` command

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.

- `acopc query` command
- `acsnap query` command
- `acec query` command

3. Delete the copy group

Execute the `acgroup remove` command to delete the copy group from AdvancedCopy Manager CCM.



If copy groups have been deleted by mistake:

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

- Use ETERNUS Web GUI 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.
-

3.6.7 Changing the Required Number of Free Volumes

For operation with SnapOPC+, the value of the required number of free volumes may need to be changed depending on the operation pattern to be used.

Check the required number of free volumes by referring to the operational example of "[2.6.1 Automatic Management of Snap Generations](#)" and if required, change the setting value for the required number of free volumes. For information on how to change the setting value, refer to "[2.6.3 Setting the Required Number of Free Volumes](#)".

3.6.8 Changing Timeout Value for Concurrent Suspend Function

This section explains the method of setting or changing the timeout value for the concurrent suspend function.

File Name for Setting

The timeout value must be defined in the following files.

- In the case of non-cluster operation

OS	File Name
Windows	\$INS_DIR\etc\prop\user.properties
Solaris Linux	/etc/opt/FJSVccm/prop/user.properties

\$INS_DIR means "Program Directory" specified at the AdvancedCopy Manager CCM installation.

- In the case of cluster operation

OS	File Name
Windows	\$SHARE_DL:\$SHARE_TOP\etc\prop\user.properties
Solaris Linux	\$SHARE_MNT/etc/opt/FJSVccm/user.properties

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

If the above files do not exist, they must be created.

Timeout Value Setting Method

Describe the timeout value in the above files.

Item Name	Explanations
concur.timeout	Specify the timeout value from 1 to 86400 (unit: seconds). The default is 60.



Example

To set the timeout value at 300 seconds:

```
concur.timeout=300
```

3.6.9 Adding User Accounts

This section explains how to add user accounts that can operate AdvancedCopy Manager CCM.

Refer to "Creating User Account for Using AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for the procedure for adding user accounts.

3.6.10 Model Upgrade for ETERNUS Disk Storage System

This section explains how to apply Model upgrade options for ETERNUS Disk storage systems.

When Using AdvancedCopy Manager CCM Installed as Standalone Program

Use the following procedure for applying Model upgrade options.

1. Stop Advanced Copy.

If Advanced Copy is in progress on the target device, stop all Advanced Copy processing including REC with other devices.

2. Apply Model upgrade options.

Apply Model upgrade options for ETERNUS Disk storage system.

3. Delete the device information. (For applying Model upgrade options for the ETERNUS DX80 S2/DX90 S2 to the ETERNUS DX410 S2/DX440 S2)

Execute the `acarray remove` command to delete the old device information.

4. Delete the license.

Execute the `esflm remove` command to delete the license registered with the old device.
Refer to "Removal of License" in the *Installation and Setup Guide* for details on how to delete licenses.

5. Register the license.

Execute the `esflm add` command to register the appropriate license to the new device.
Refer to "Registration of License" in the *Installation and Setup Guide* for details on how to register licenses.

6. Register the device information. (For applying Model upgrade options for the ETERNUS DX80 S2/DX90 S2 to the ETERNUS DX410 S2/DX440 S2)

Execute the `acarray add` command to register the new device information.

7. Perform Advanced Copy.

As necessary, perform Advanced Copy which you have stopped in step 1.

When Performing Agent-based Operation or Using AdvancedCopy Manager CCM of Installed ETERNUS SF Manager

Perform "Operation on Model Upgrade for ETERNUS Disk Storage System" in the *Web Console Guide*.

3.7 Changing Cluster Environment

This section explains the procedures for starting and stopping a cluster operation.

3.7.1 Start Cluster Operation

Use the following procedure to start a cluster operation.

1. Back up the environment files in reference to "[For Non-cluster Operation](#)".
2. Restore the environment files in reference to "[For Cluster Operation](#)".
3. If the access volume after restoration is different from the access volume before backup, perform the following procedure.
 - a. Execute the `acarray remove` command to delete the registered information of ETERNUS Disk storage system.
 - b. Execute the `acarray add` command to register ETERNUS Disk storage system.

3.7.2 Stop Cluster Operation

Use the following procedure to stop a cluster operation.

1. Back up the environment files in reference to "[For Cluster Operation](#)".
2. Restore the environment files in reference to "[For Non-cluster Operation](#)".
3. If the access volume after restoration is different from the access volume before backup, perform the following procedure.
 - a. Execute the `acarray remove` command to delete the registered information of ETERNUS Disk storage system.
 - b. Execute the `acarray add` command to register ETERNUS Disk storage system.



Point

.....
AdvancedCopy Manager CCM can be operated after stopping the cluster operation using the environment setting files.
.....

3.8 How to Back Up License Management Database

This section explains how to back up the license management database.

When using AdvancedCopy Manager CCM of the installed ETERNUS SF Manager, refer to "[3.9 How to Back Up ETERNUS SF Manager Database](#)" and back up the ETERNUS SF Manager database.

Information

About description in the procedure

Directory Name	Explanation
\$BAK_DIR	Backup destination directory
\$INS_DIR	"Program Directory" as specified during AdvancedCopy Manager CCM installation

3.8.1 Backing Up License Management Database

Back up the license management database.

In the case of cluster operation, perform the backup on the primary node. If the shared disk is not mounted, mount and back it up.

- For Windows environments

1. Using Explorer, create the following backup directory:

- \$BAK_DIR\LM

2. Execute the following command. The file specified with *fileName* is created as a backup file.

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

- For Solaris or Linux environments

1. Create a backup directory:

```
mkdir -p $BAK_DIR/LM
```

2. Execute the following command. The file specified with *fileName* is created as a backup file.

```
/opt/FJSVesflm/bin/esflm backup $BAK_DIR/LM/fileName
```

3.8.2 Restoring License Management Database

Restore the license management database that was backed up at "[3.8.1 Backing Up License Management Database](#)".

In the case of cluster operation, perform the backup on the primary node. If the shared disk is not mounted, mount and back it up.

- For Windows environments

Execute the following command. The file name of the created backup data is *fileName*.

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

- For Solaris or Linux environments

Execute the following command. The file name of the created backup data is *fileName*.

```
/opt/FJSVesflm/bin/esflm restore $BAK_DIR/LM/fileName
```

3.9 How to Back Up ETERNUS SF Manager Database

When using AdvancedCopy Manager CCM of the installed ETERNUS SF Manager, back up the ETERNUS SF Manager database.

Refer to "Operation Maintenance" in the *AdvancedCopy Manager Operation Guide* relevant to the operating system of the CCM Server for details.

3.10 Backup of NAS Environment

This chapter explains the backup operation of a NAS environment in the AdvancedCopy Manager CCM.

3.10.1 Backup / Restoration with Web Console

3.10.1.1 Preparing for Execution of Backup

In order to implement backup, it is required that the following NAS backup configurations have been implemented.

Preferences	Configuration Requirements
NAS Backup Volume	<ul style="list-style-type: none">- The volume is created in the same storage device as the NAS volume- The detailed purpose is "NAS Backup"- The volume is of the same capacity as the NAS volume
NAS Copy Group	<ul style="list-style-type: none">- The copy type is QuickOPC
NAS Copy Pair	<ul style="list-style-type: none">- The copying source is the NAS volume- The copying destination is the NAS backup volume

When NAS backup configurations have not been implemented, or when the above configuration requirements of the NAS backup configurations have not been satisfied, implement the configurations of a NAS backup. Refer to "Set NAS Backup" in the *Web Console Guide* for information on the procedures for configuring the NAS backup.

3.10.1.2 How to Execute Backup

Execute backup of the NAS volume with QuickOPC from Web Console.

Refer to "Backup of NAS Volume" in the *Web Console Guide* for information on the procedures for executing backup.

Information

.....
If a NAS backup volume is mounted, setup values (shared status, access settings, etc.) in the shared folder within the NAS backup volume are setup values for the NAS volume at the time of execution of the backup.
.....

Note

- For the ETERNUS DX100 S3/DX200 S3, DX500 S3/DX600 S3 whose firmware version number is earlier than V10L53, only when all CMs and NAS Engines in the device are in normal condition, a NAS volume can be backed up.
 - When backup is executed, even if the shared folder is set up so as to be accessible using FTP, information of the FTP settings information is not backed up.
-

3.10.1.3 How to Execute Restoration

Execute restoration of the NAS volume from Web Console.

Refer to "Restore to NAS Volume" in the *Web Console Guide* for information on the procedures for executing restoration.

Information

When executing a restore of the NAS volume, a completed backup is required. Confirm whether a backup has already been completed by referring to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide*.

Note

- The shared folder and quota settings for the NAS volume that is to be restored are reconfigured as a part of the restore in accordance with the configuration information at the time of the backup. Perform operations regarding the shared folder and quota settings after confirming that the restore operation has completed.

While restoring data to a NAS volume, if you perform operations on the shared folder and quota settings in that NAS volume, an error may occur. In that case, after confirming the error message, try the operation again.

- If the restore fails, data corruption may be occurring in the NAS volume. Remove the cause of the failure and re-execute the restore.

- The shared folder name must be unique within the ETERNUS Disk storage system.

If the shared folder name is duplicated as a result of the restore operation, a "\$" is appended to the head of the shared folder name and restore is executed. If the shared folder name is still duplicated despite the appended "\$", a "\$" is appended once more to the head of the shared folder name and restore is executed.

Also, for "homes" that is the shared folder for home directory, special care is required. If "\$" is appended to the head of "homes" by restore, the restored shared folder "\$homes" is handled as a shared folder to share files, not as a shared folder for home directory. To access the past home directory under "\$homes", enter the following format to the address bar or to the network drive mapping window:

- When Active Directory is configured as an authentication server

```
\\nasInterfaceIpAddress\shomes\domainName@userName\
```

- When no authentication server is configured

```
\\nasInterfaceIpAddress\shomes\userName\
```

The restored shared folder "\$homes" is accessible with the user set in Owner and Group.

- The block size of NAS file system after a restore is set to the value specified for the NAS volume when executing a backup.
- When backup is executed, even if the shared folder is set up so as to be accessible using FTP, information of the FTP settings information is not backed up. The FTP settings after restore are the values set before restore. If necessary, reset up the shared folder accessible using FTP. Refer to the ETERNUS Disk storage system manuals for FTP settings.
- Only when all CMs and NAS Engines in the ETERNUS Disk storage system are in normal condition, a NAS volume can be backed up.

3.10.1.4 Suspending / Confirming Status of Backup / Restoration

Confirming Status of Backup / Restoration

The status of the backup and restoration of the NAS volume can be confirmed from Web Console.

Refer to "Add/Display/Delete Copy Pair" in the *Web Console Guide* for information on the procedures for confirming the status.

Information

Confirm the copy group belonging to the copy pair by referring to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide*.

Note

There may be cases when the copy status that can be confirmed with Web Console does not match the success or failure of the backup / restoration of the NAS volume. Determine the success or failure of the backup from the operation history of backup /

restoration. Refer to "Display Operation History" in the *Web Console Guide* for the display method of the operation history of backup/restoration.

Suspending Backup / Restoration

Suspend backup / restoration of the NAS volume from Web Console.

Refer to "Cancel Copy Session of Copy Pair" in the *Web Console Guide* for information on the procedures for suspension.

Information

Confirm the copy group belonging to the copy pair by referring to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide*.

Note

- Suspension of the copying from the NAS volume to the NAS backup volume is implemented by the procedures for performing a secondary backup of the NAS volume.
- When copying is suspended while physical copying is taking place, even if the backup is a success, the backed up data cannot be guaranteed.

3.10.1.5 Deleting NAS Backup Settings

Delete the NAS volume backup settings from Web Console.

Refer to "Delete NAS Backup Settings" in the *Web Console Guide* for information on how to delete the NAS backup settings.

When performing this operation, the copy session between the NAS volume and the NAS backup volume is forcefully stopped and the following settings are deleted:

- Copy groups
- Copy pairs
- NAS backup volumes

In addition, with problems such as RAID failure, when recreating a NAS volume and restoring the NAS volume with a restore from the NAS backup volume, you can also select to keep the NAS backup volume.

Note

- Copy sessions that exist between the NAS volume and the NAS backup volume are forcefully stopped. When keeping the NAS backup volume, perform this operation if there are no physical copy sessions or copy sessions in an error state.
- When using the secondary backup of the NAS volume or inter-box backup/restore, stop the copy session in advance.
- Do not delete the NAS backup settings related to this NAS volume while restoring the NAS volume. When deleting, the NAS volume data is not guaranteed.

3.10.2 Backup/Restore with Commands

The NAS volume created with Web Console can also be backed up and restored using commands.

Commands can be used in cases such as when automatically scheduling backup of the NAS volume.

3.10.2.1 Preparing for Execution of Backup/Restore Commands

Be sure to implement the NAS backup configurations in advance with Web Console.

When performing a backup or restore of the NAS volume with commands, the copy group name of the NAS backup configurations is required. Confirm the copy group name of the NAS backup configurations with Web Console.

3.10.2.2 How to Execute Backup Commands

With the Management Server, execute the `acnas backup` command. Specify the copy group name of the NAS backup configurations with the `-g` option.

[Execution example]

```
acnas backup -g NAS_QuickOPC_NAS_Vol_0_0
```

Information

If a NAS backup volume is mounted, setup values (shared status, access settings, etc.) in the shared folder within the NAS backup volume are setup values for the NAS volume at the time of execution of the backup.

Note

- For the ETERNUS DX100 S3/DX200 S3, DX500 S3/DX600 S3 whose firmware version number is earlier than V10L53, only when all CMs and NAS Engines in the device are in normal condition, a NAS volume can be backed up.
- When backup is executed, even if the shared folder is set up so as to be accessible using FTP, information of the FTP settings information is not backed up.
- When multiple NAS volumes are being backed up, the number of concurrent executions of the `acnas backup` command is up to 40. Note that the actual number varies depending on the operational status of Web Console, the execution status of the other commands, or other factors. The actual number may be more or less than 40.

3.10.2.3 How to Execute Restore Commands

With the Management Server, execute the `acnas restore` command. Specify the copy group name of the NAS backup configurations with the `-g` option.

[Execution example]

```
acnas restore -g NAS_QuickOPC_NAS_Vol_0_0
```

Information

When executing a restore of the NAS volume, a completed backup is required. Confirm whether a backup has already been completed by referring to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide*.

Note

- The shared folder and quota settings for the NAS volume that is to be restored are reconfigured as a part of the restore in accordance with the configuration information at the time of the backup. Perform operations regarding the shared folder and quota settings after confirming that the restore operation has completed. While restoring data to a NAS volume, if you perform operations on the shared folder and quota settings in that NAS volume, an error may occur. In that case, after confirming the error message, try the operation again.
- If the restore fails, data corruption may be occurring in the NAS volume. Remove the cause of the failure and re-execute the restore.
- The shared folder name must be unique within the ETERNUS Disk storage system. If the shared folder name is duplicated as a result of the restore operation, a "\$" is appended to the head of the shared folder name and restore is executed. If the shared folder name is still duplicated despite the appended "\$", a "\$" is appended once more to the head of the shared folder name and restore is executed.

Also, for "homes" that is the shared folder for home directory, special care is required. If "\$" is appended to the head of "homes" by restore, the restored shared folder "\$homes" is handled as a shared folder to share files, not as a shared folder for home directory. To access the past home directory under "\$homes", enter the following format to the address bar or to the network drive mapping window:

- When Active Directory is configured as an authentication server

```
\\nasInterfaceIpAddress\${homes}\domainName@\userName\
```

- When no authentication server is configured

```
\\nasInterfaceIpAddress\${homes}\userName\
```

The restored shared folder "\$homes" is accessible with the user set in Owner and Group.

- The block size of NAS file system after a restore is set to the value specified for the NAS volume when executing a backup.
- When backup is executed, even if the shared folder is set up so as to be accessible using FTP, information of the FTP settings information is not backed up. The FTP settings after restore are the values set before restore. If necessary, reset up the shared folder accessible using FTP. Refer to the ETERNUS Disk storage system manuals for FTP settings.
- Only when all CMs and NAS Engines in the ETERNUS Disk storage system are in normal condition, a NAS volume can be backed up.
- When multiple NAS volumes are being restored, the number of concurrent executions of the [acnas restore](#) command is up to 40. Note that the actual number varies depending on the operational status of Web Console, the execution status of the other commands, or other factors. The actual number may be more or less than 40.

3.10.2.4 Confirming Copy Status of Backup/Restore and Stopping Backup

Stopping or confirming the status of Advanced Copy of the NAS volume can be performed with the following commands.

Confirming Status of Backup/Restore

The status of the copy from the NAS volume to the NAS backup volume can be confirmed with the [acopc query](#) command.

[Execution example]

```
acopc query -g NAS_QuickOPC_NAS_Vol_0_0
```

The status of the copy from the NAS backup volume to the NAS volume can be confirmed with the [acopc query](#) command by specifying the -r option.

[Execution example]

```
acopc query -g NAS_QuickOPC_NAS_Vol_0_0 -r
```



Note

There may be cases when the copy status that can be confirmed with the [acopc query](#) command does not match the success or failure of the backup/restore of the NAS volume. Determine the success or failure of the backup/restore from the results of the backup or restore command.

Stopping of Backup/Restore

When stopping the backup from the NAS volume to the NAS backup volume, execute the [acopc cancel](#) command.

[Execution example]

```
acopc cancel -g NAS_QuickOPC_NAS_Vol_0_0
```

When stopping a restore from the NAS backup volume to the NAS volume, execute the [acopc cancel](#) command by specifying the -r option.

[Execution example]

```
acopc cancel -g NAS_QuickOPC_NAS_Vol_0_0 -r
```

Note

- Stopping of the copying from the NAS volume to the NAS backup volume is implemented by the procedures for performing a secondary backup of the NAS volume.
- When copying is stopped while physical copying is taking place, even if the [acnas backup](#) command is successfully completed, the backed up data cannot be guaranteed.

3.10.3 Mounting / Unmounting Backup Destination

The NAS volume that has been backed up can be referred to or configured from Web Console.

With this function, it is possible for the NAS backup volume to be referenced as Read-Only, writing back from the NAS backup volume to the NAS volume is possible in units of individual files.

3.10.3.1 Mounting / Unmounting Procedures

Mounting NAS Backup Volume

Mount the NAS backup volume from Web Console.

After implementing the mounting, the shared folder within the NAS backup volume can be referenced as Read-Only.

When performing restoration in units of individual files, after executing the mounting, manually move the files from the shared folder within the NAS backup volume to the shared folder within the NAS volume.

Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for mounting.

To access the shared folder within the NAS backup volume, refer to ["3.10.4 How to Access Backup Destination Volume"](#).

Whether to mount a NAS backup volume varies with the ETERNUS Disk storage system. Refer to the ETERNUS Disk storage system manual for more information.

Information

- When executing mounting of the NAS backup volume, it is required that backup has already been implemented. Confirm whether backup has already been implemented by referring to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide*.
- Do not mount a NAS backup volume before performing the meta cache distribution. Mounting a NAS backup volume creates meta cache of the NAS backup volume. However, unless the NAS backup volume is mounted with meta cache distribution balanced, access performance to NAS file systems could be degraded.
"Meta cache" is cache data for managing NAS file systems. "Meta cache distribution" is a function to resolve and balance the disproportionation if meta cache is slanted to one CM.
Refer to the ETERNUS Disk storage system manuals for details about meta cache and meta cache distribution.
- When accessing it by the CIFS protocol, the shared folder within the NAS backup volume has a suffix (\$bak) assigned to its name and is shared as Read-Only.
For example, when the shared folder is created with the name NAS_Share, the shared folder within the NAS backup volume can be referenced with the name NAS_Share\$bak.
- When the NAS backup volume is mounted, the name of the shared folder within the NAS backup volume is not displayed in Web Console.
- While the NAS backup volume is mounted, backup / restore of the NAS volume cannot be executed.
- Setup values (shared status, access settings, etc.) in the shared folder within the NAS backup volume are setup values for the NAS volume at the time of execution of the backup.
The settings of the shared folder in the NAS backup volume cannot be changed.

- The shared folder in the NAS backup volume cannot be set up so as to be accessible using FTP. When backup is executed, even if the shared folder in the NAS backup volume is set up so as to be accessible using FTP, it is not accessible.
- Before unmounting the NAS backup volume, disconnect the network from the client. If unmounted while the network is connected to the client, the NAS backup volume may fail in use.

Unmounting NAS Backup Volume

Unmount the NAS backup volume from Web Console.
Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on unmounting procedures.



If an error occurs in the storage device when you unmount the NAS backup volume, Web Console may display that the NAS backup volume is mounted even though it is unmounted in the storage device. In this case, by unmounting the NAS backup volume again, Web Console displays the unmounted state.

3.10.4 How to Access Backup Destination Volume

If the NAS backup volume used as backup destination is mounted, it is accessible in Read-Only mode.

The section explains how to access the NAS backup volume:

Access Using CIFS Protocol

The NAS backup volume is accessible by the Windows file sharing or network drive mapping.

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

```
\\nasInterfaceIpAddress\sharedFolderName$bak
```

To access the home directory under "homes", the shared folder on the NAS backup volume, enter the following format. The folder "homes\$bak" is accessible with the user set in Owner and Group.

- When Active Directory is configured as an authentication server

```
\\nasInterfaceIpAddress\homes$bak\domainName\userName\
```

- When no authentication server is configured

```
\\nasInterfaceIpAddress\homes$bak\userName\
```

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

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



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



When multiple NAS backup volumes are mounted, it may not be possible to confirm shared folders with duplicate names. In this case, mount the NAS backup volumes individually.

Access Using NFS Protocol

The NAS backup volume is accessible by performing the NFS mount from a UNIX server using the following procedure:

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

1. Check the volume number of the NAS backup volume.
The volume number is displayed in the **NAS Backup Volume No.** in the **Basic** tab of the Detail Shared Folder screen. For the procedure to display the **Basic** tab of the Detail Shared Folder screen, refer to "Display Shared Folder" in the *Web Console Guide*.
2. Log in to the UNIX server with administrator privileges.
3. Execute the mount command to mount the shared folder.
When executing the mount command, specify the following:

[For Solaris environments]

```
mount -F nfs nasInterfaceIpAddress:/mnt/nas/nvnasBackupVolumeNumber/data/sharedFolderName  
mountDestinationDir
```

[For Linux environments]

```
mount -t nfs nasInterfaceIpAddress:/mnt/nas/nvnasBackupVolumeNumber/data/sharedFolderName  
mountDestinationDir
```



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

```
showmount -e nasInterfaceIpAddress
```

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

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

3.10.5 Concerning Secondary Backup of NAS Volume and Use of Data on Different Storage Devices

When performing a secondary backup of the NAS volume, implement a standard Advanced Copy session where the copy source is the NAS backup volume.

The types of Advanced Copy that can be utilized with secondary backup of the NAS volume are as follows.

- QuickOPC
- SnapOPC+
- REC



When creating an inter-box secondary backup using REC or using data on a different storage devices, refer to "[Appendix F Inter-box Backup/Restore of NAS Volumes](#)".

Procedures for Secondary Backup / Restoration of NAS Volume

Preparations

1. Create a logical volume that is the secondary backup destination of the NAS volume.
2. Create a copy group for secondary backup having the NAS backup volume and the logical volume of the secondary backup destination of the NAS volume as a copy pair.

Backup Procedures

1. According to the backup operation of the NAS environment, backup the NAS volume to the NAS backup volume.
2. Using the copy group for the secondary backup, backup the NAS backup volume to the logical volume of the secondary backup destination.

Restoration Procedures

1. If the NAS backup volume is mounted, unmount the volume first.
2. Suspend the copying in relation to the NAS backup volume being performed from the NAS volume.
3. Using the copy group for the secondary backup, implement restoration (copying) in relation to the NAS backup volume from the logical volume of the secondary backup destination.
4. According to the backup operation of the NAS environment, restore the NAS volume from the NAS backup volume.



When restoring from the logical volume of the secondary backup destination to a NAS backup volume, the NAS FS block size for the NAS backup volume that is displayed on Web Console may differ from the NAS file system block size at the time of the backup. In this case, when restoring from the NAS backup volume to the NAS volume, the correct NAS file system block size is displayed on Web Console.

3.10.6 Recovery Procedure When NAS Volume or NAS Backup Volume Fails

This section explains the recovery procedure when a NAS volume or a NAS backup volume is down due to failure of all the disks in RAID.

3.10.6.1 Data Recovery Procedure of NAS Volume

The procedure to recover data from malfunction of NAS volume is as follows:

1. Stopping of NAS volume backup

When the backup of the NAS volume is running, confirm the backup progress status and stop the backup.



Refer to "3.10.1.4 Suspending / Confirming Status of Backup / Restoration" for stopping the backup via Web Console. Refer to "3.10.2.4 Confirming Copy Status of Backup/Restore and Stopping Backup" for stopping the backup via Command Line Interface (CLI).

2. Unmounting of NAS backup volume

When the NAS backup volume is mounted, unmount the NAS backup volume by using Web Console.



Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for unmounting.

3. Recovery of the malfunction component of NAS volume

Recover the malfunction component of the NAS volume. For this operation, contact a Fujitsu customer engineer as required.

If it is necessary to recreate a NAS volume in this step, proceed to step 4.
If unnecessary to recreate a NAS volume, proceed to step 5.

4. Creating of shared folder

Create a temporary shared folder to recreate a NAS volume.

For a NAS volume to be recreated, specify the same volume name, volume capacity, and volume number as before the malfunction.

When using the NAS volume backup/restore function, perform the NAS backup settings.

When restoring from an existing NAS backup volume, check the **Existing** radio button in **Destination Volume to backup** field to check the radio button of the existing NAS backup volume.



Refer to "Create Shared Folder" in the *Web Console Guide* for information on the procedures for creating a shared folder.

5. Recovery of shared folder

When recovering data from a NAS backup volume, restore the data from the NAS backup volume to recover the shared folder. The shared folder temporarily created in step 4 is removed by this restore operation.

3.10.6.2 Data Recovery Procedure of NAS Backup Volume

The procedure to recover data from malfunction of NAS backup volume is as follows:

1. Recovery of the malfunction component of NAS backup volume

Recover the malfunction component of the NAS backup volume. For this operation, contact a Fujitsu customer engineer as required.

If it is necessary to recreate a NAS backup volume in this step, proceed to step 2.

If unnecessary to recreate a NAS backup volume, proceed to step 4.

2. Deleting of NAS backup settings

To delete the NAS backup volume, it is necessary to delete the backup settings of the NAS volume.

Check "Yes" of the **Delete NAS Backup Volume** field to delete the NAS backup settings.



Refer to "Delete NAS Backup Settings" in the *Web Console Guide* for information on the procedures for deleting the NAS backup settings.

3. Setting of NAS backup

It is necessary to create a new NAS backup volume by performing the NAS backup settings.

Check the **New** radio button in the **Destination Volume to backup** field to perform the NAS backup settings.



Refer to "Set NAS Backup" in the *Web Console Guide* for information on the procedures for setting the NAS backup.

4. Data recovery of NAS backup volume

Recover the NAS backup volume data in either of the following ways:

- Backing up the NAS volume to the NAS backup volume

Refer to "3.10.1.2 How to Execute Backup" for backing up via Web Console. Refer to "3.10.2.2 How to Execute Backup Commands" for backing up via Command Line Interface (CLI).

- Restoring from the secondary backup volume to the NAS backup volume

Refer to "[3.10.5 Concerning Secondary Backup of NAS Volume and Use of Data on Different Storage Devices](#)" for information on the procedures for restoring.

3.10.7 Important Points concerning Backup of NAS Environment

Do not implement Advanced Copy in relation to the NAS volume or the NAS backup volume for operations other than those described in this chapter. Doing so creates a situation where the NAS volume is not able to be properly restored.

3.10.8 Important Points When Using NAS Snapshot

This describes precautions when using NAS Snapshot to automatically collect snapshots of the NAS volume.

Information

Refer to "NAS Environment Snapshot" in the *Storage Cruiser Operation Guide* for the NAS Snapshot feature.

Sharing Resources with SAN Environment Advanced Copy

The NAS Snapshot feature is achieved using SnapOPC+.

For this reason, when used simultaneously with the SAN environment Advanced Copy, estimate the additional requirements for NAS Snapshots. The required capacity for NAS Snapshot is as follows:

- Number of ETERNUS Disk storage system copy sessions
The same number of copy sessions as the number of NAS volumes is required to operate NAS Snapshots.
- SDP (Snap Data Pool)
NAS Snapshot requires the amount of SDP capacity estimated according to the following formula:

SDP additional capacity = total value of NAS volume updates (*1) for each generation
--

*1: This is the amount of NAS volume updates from start of a snapshot until the next snapshot for this volume is started.

When it is difficult to estimate the update amount, we recommend adding the following capacity. As this is a recommended value, it needs to be modified according to the actual usage.

SDP additional capacity = total volume of target NAS volumes for NAS Snapshot * (a number between 0.3 and 0.5)
--

Execute Backup/Restore While Taking NAS Snapshot

If backup/restore is performed after starting snapshot collection of a NAS volume, a ccm5008 error message is output and the process is aborted.

Execute the NAS volume backup/restore after stopping snapshot collection.

Information

Refer to "Start/Stop Automatic Snapshot Collection" in the *Web Console Guide* for how to stop the automatic snapshot collection.

3.11 Operations of Advanced Copy Using TFOV

Advanced Copy can be performed for a TFOV using volumes that are not subject to Storage Cluster.

Advanced Copy between TFOVs is provided as the Storage Cluster Continuous Copy function. Refer to "[3.12 Storage Cluster Continuous Copy Function](#)" for the Storage Cluster Continuous Copy function.

A TFOV is a volume that is subject to Storage Cluster. The Storage Cluster function transparently performs switching from components of an operation system to components of a standby system via an external operating environment.

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for details about the Storage Cluster function.

System Configuration

The system configuration necessary for Advanced Copy of a TFOV is described here.

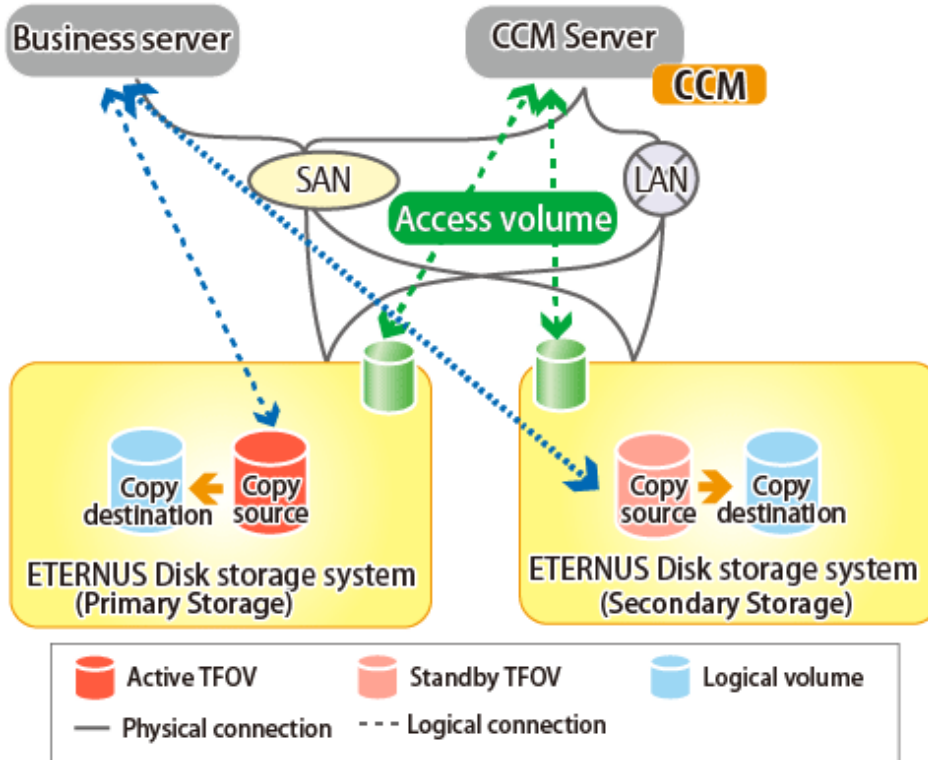
When using the Copy command via SAN, assign one logical volume of the ETERNUS Disk storage system that is subject to Storage Cluster to the CCM Server as an access volume.

Note

- When using the Copy command via SAN, and performing a backup of the ETERNUS Disk storage system on the secondary storage side, an access volume must be created for each ETERNUS Disk storage system.
- A TFOV cannot be set as an access volume.

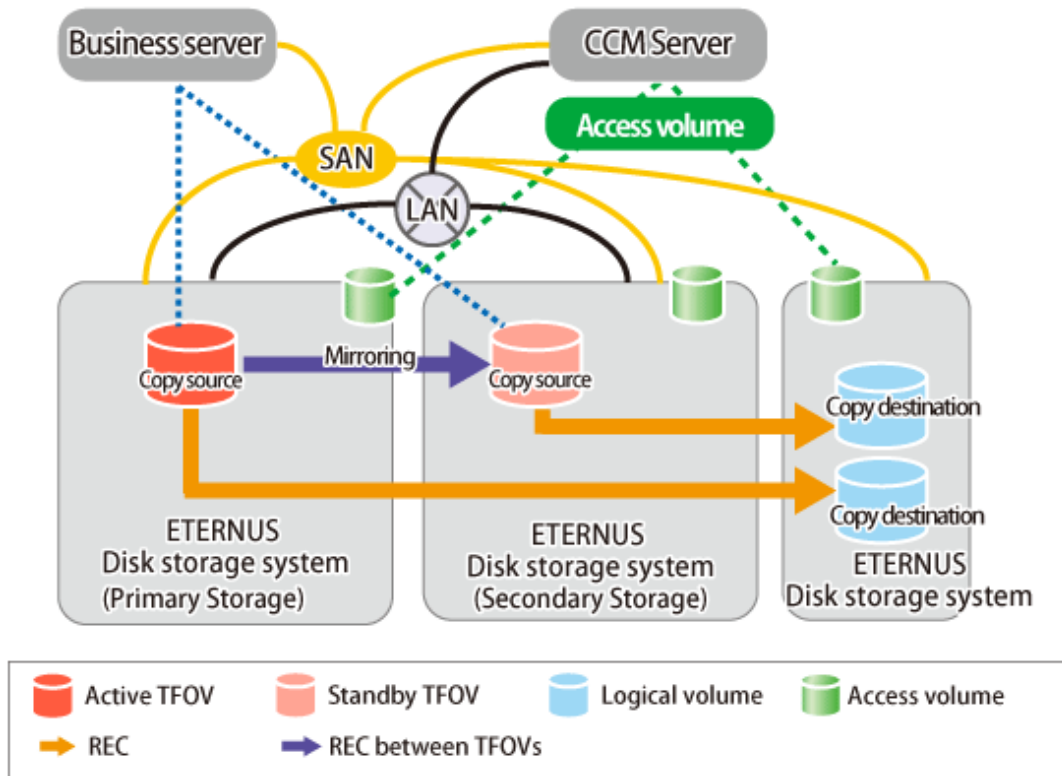
When Performing Intra-box Copy (OPC/QuickOPC/SnapOPC+/EC)

Figure 3.18 System Configuration for Performing Intra-box Copy (OPC/QuickOPC/SnapOPC+/EC)



When Performing Inter-box Copy (REC)

Figure 3.19 System Configuration for Performing Inter-box Copy (REC)



Point

- When using the Copy command via SAN, the access volume needs storage device on either the copy source or copy destination.
- An Inter-box copy from a TFOV to a non-TFOV is executed with a TFOV on either the Primary Storage or Secondary Storage as the copy source, and an ETERNUS Disk storage system non-TFOV that is different from the Primary Storage and Secondary Storage as the copy destination.
- An Inter-box copy can be performed from either one of or both the Primary Storage and Secondary Storage, but we recommend performing an inter-box copy from the Primary Storage. Performing an inter-box copy from both the Primary Storage and Secondary Storage impacts bandwidth between the RECs. Design the operation in line with the objective and usage.

3.11.1 Backup

A backup can be performed for a TFOV to a non-TFOV.

The following Advanced Copy functions are supported:

Table 3.5 Support Range of a TFOV

Advanced Copy functions	Support Range of AdvancedCopy Manager CCM for a TFOV	
Snapshot type high-speed copies	OPC	A
	QuickOPC	A
	SnapOPC	N/A
	SnapOPC+	A
Synchronous high-speed copies	EC	A
	Reversing the copy direction	N/A

Advanced Copy functions	Support Range of AdvancedCopy Manager CCM for a TFOV		
		Concurrent suspend function	A
	REC		A
		Reversing the copy direction	A
		Initial copy skip function	A
		Concurrent suspend function	A
		Displaying or changing information about the REC transfer buffer	A

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



See

For Advanced Copy that sets a TFOV as a copy source and a copy destination, refer to "3.12 Storage Cluster Continuous Copy Function".

3.11.1.1 Preparing for Execution of Backup

The backup preparation for a TFOV is the same as that for a non-TFOV.

Refer to "Chapter 2 Setup" for details about the procedure.



Note

- A TFOV cannot be set as an access volume.
- Volume protection cannot be set for a TFOV.

3.11.1.2 Execution of Backup

The backup operation method for a TFOV is the same as that for a non-TFOV.

Refer to "3.2 Executing Advanced Copy" for details about the procedure.

3.11.2 Restore

A restore for a TFOV can be performed using a volume that is not subject to Storage Cluster.

3.11.2.1 When Backing Up with Intra-box Copy (OPC/QuickOPC/SnapOPC+/EC)

If restoring to a TFOV, only OPC can be performed. Note that the restore destination TFOV must be a logical volume within an ETERNUS Disk storage system where the TFO status is "Active".

Refer to "3.2.1.2 Restore on OPC Backup Environment" for details about the procedure.

3.11.2.2 When Backing Up with Inter-box Copy (REC)

The backup method is the same as that for an REC from a non-TFOV to a non-TFOV.

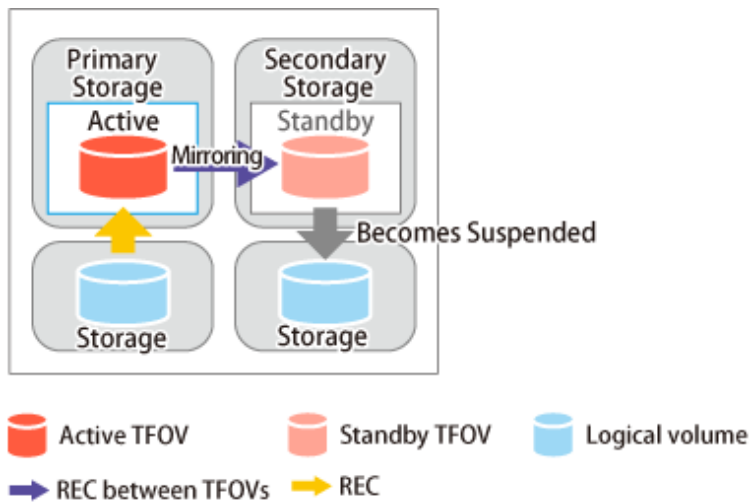
The restore destination TFOV must be a logical volume within an ETERNUS Disk storage system where the TFO status is "Active".

Refer to "3.2.2.4 Restore on REC Backup Environment" for details about the procedure.



Note

When restoring with backup from both the Primary Storage and the Secondary Storage, restore after changing the REC in the storage device where the TFO status is "Standby" into a suspended state.

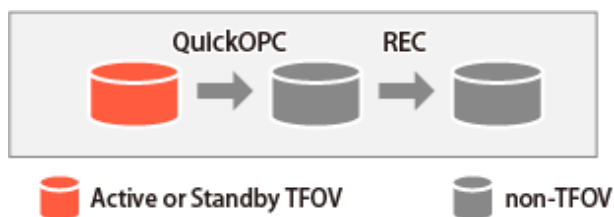


3.11.3 Cascade Copies with TFOV

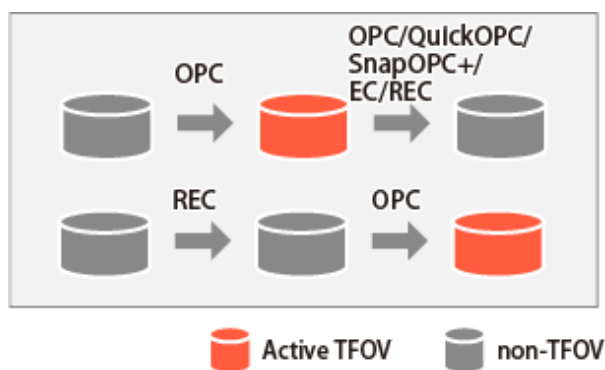
This section explains cascade copying that includes a TFOV.

Cascade copy connects copy processes by setting the copy destination as the copy source of another copy. Using cascade copy, it is possible to broaden operational scenarios, such as backups that combine duplication to remote areas and sub-center side backups.

When backing up, the following combinations of cascade copy are supported.



When restoring, the following combinations of cascade copy can be executed.

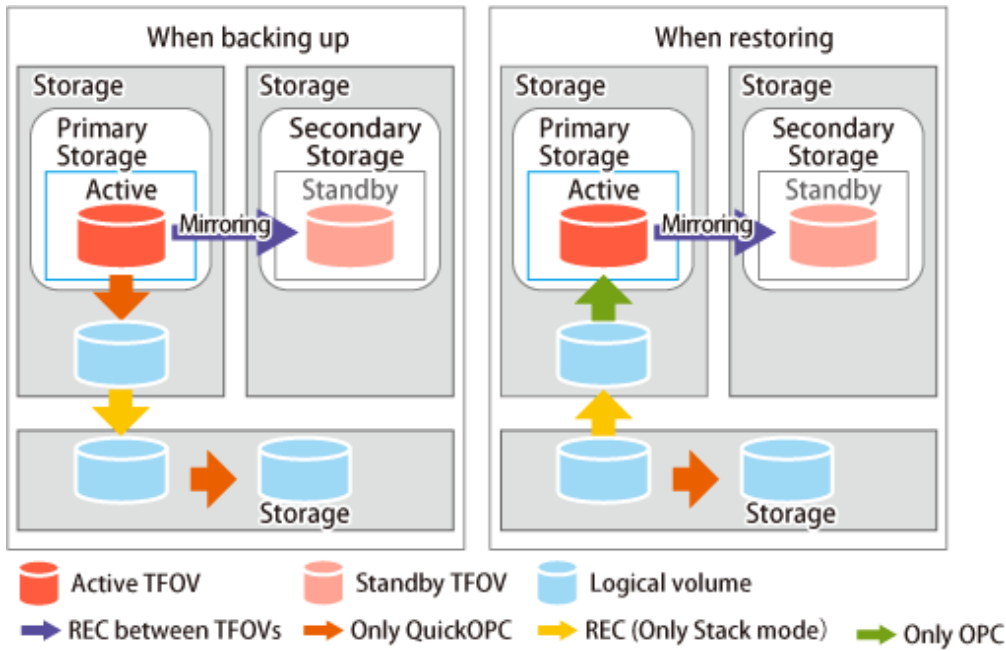


An example of backup and restore using the cascade copy in the Primary Storage is shown in "[Figure 3.20 Example of Backup/Restore Using Cascade Copy on Primary Storage](#)". Perform the backup and restore according to the following conditions.

- Use QuickOPC for intra-box copy.
- Use Stack mode as the data transfer mode for RECs.
- When restoring, execute OPC after stopping the intra-box copy (QuickOPC) with the TFOV as the copy source.

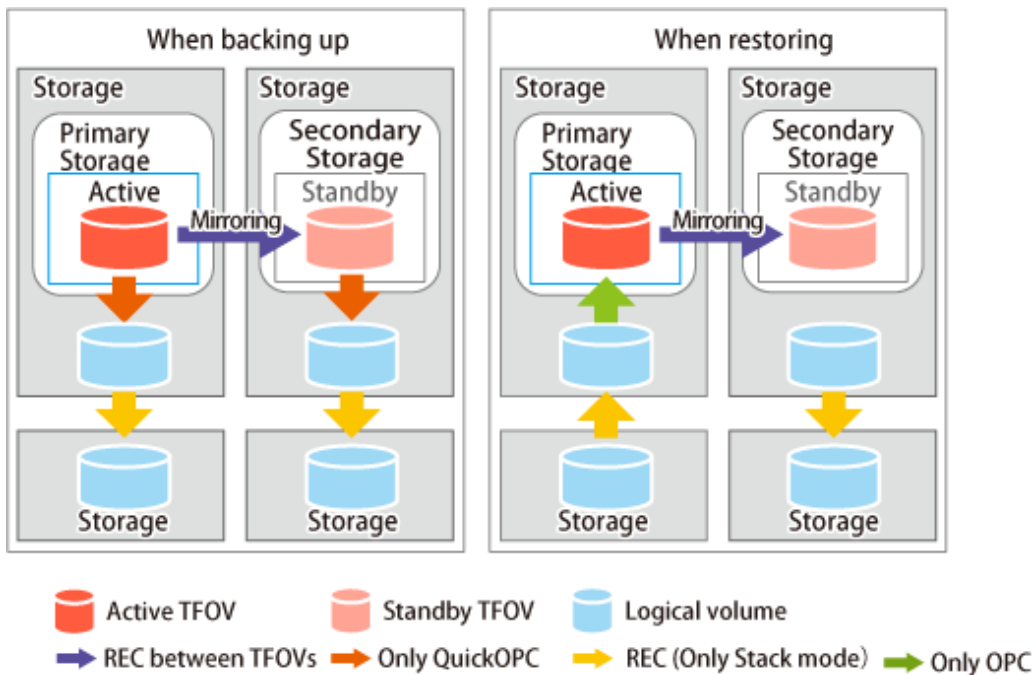
Cascade copy (QuickOPC) can be performed with the REC destination as the copy source.

Figure 3.20 Example of Backup/Restore Using Cascade Copy on Primary Storage



Further, cascade copy via QuickOPC and REC can be used with the Secondary Storage.

When restoring, execute OPC on the storage device where the TFO status is "Active" after stopping intra-box copy (QuickOPC) with the Primary Storage and Secondary Storage.



3.11.4 Recovery from Hardware Failure

This indicates a transition of state in the case of a hardware failure occurring on either the Primary Storage or Secondary Storage during Advanced Copy from a TFOV to a non-TFOV.

Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for details about the recovery procedure.



Note

In a storage device where the TFO status is "Active", if there are bad sectors in the copy source logical volume, and if **Status** of the **Volume** tab on the **TFO Group Detail** screen in Web Console is other than "Active", it is not possible to recover with data in the storage device where the TFO status is "Standby". In this case, after using the Storage Cluster function to recover the bad sector, recovering the data according to the usage state of the copy source logical volume is required.

Perform recovery by following the steps outlined below.

1. Use ETERNUS Web GUI to check the Advanced Copy status and the copy process error codes.
 - a. From the **Display status** menu, click **Advanced Copy status display** in the status display.
 - b. At **Session status**, click the **Number of active sessions** link for the relevant copy type.
 - c. Refer to the value in the **Error code** column of the relevant copy process.
2. Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* to recover the Storage Cluster environment, and recover the bad sector.
3. Recover data according to the error code checked in step 1.
 - For "0xBA":
Recover data from the copy destination logical volume.
 - Other than "0xBA":
Contact Fujitsu Technical Support.

Figure 3.21 When Hardware Failure Occurs on Storage where TFO Status is "Active"

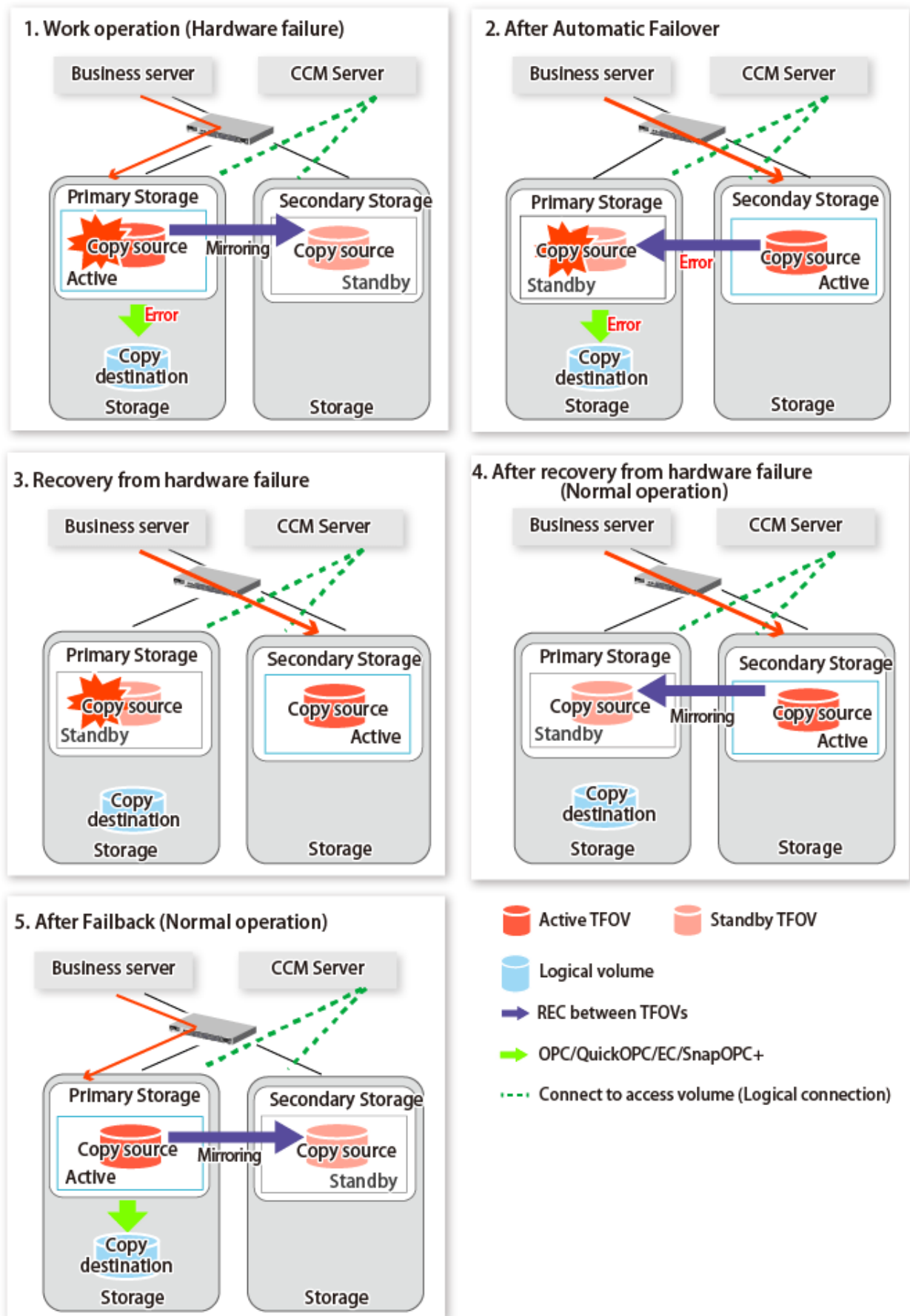
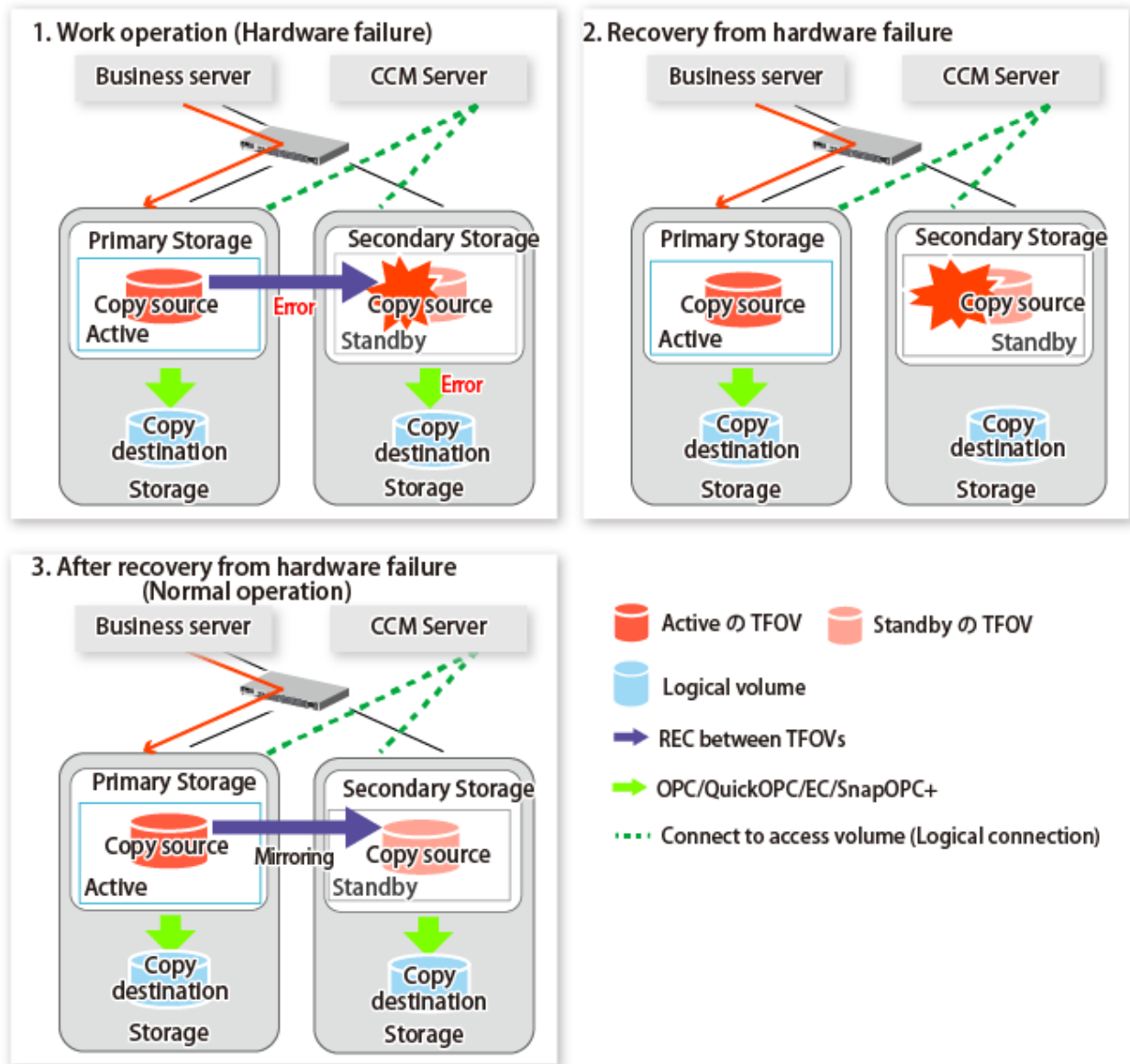


Figure 3.22 When Hardware Failure Occurs on Storage where TFO Status is "Standby"



P Point

It is not necessary to stop copy sessions on storage on which failure has not occurred.

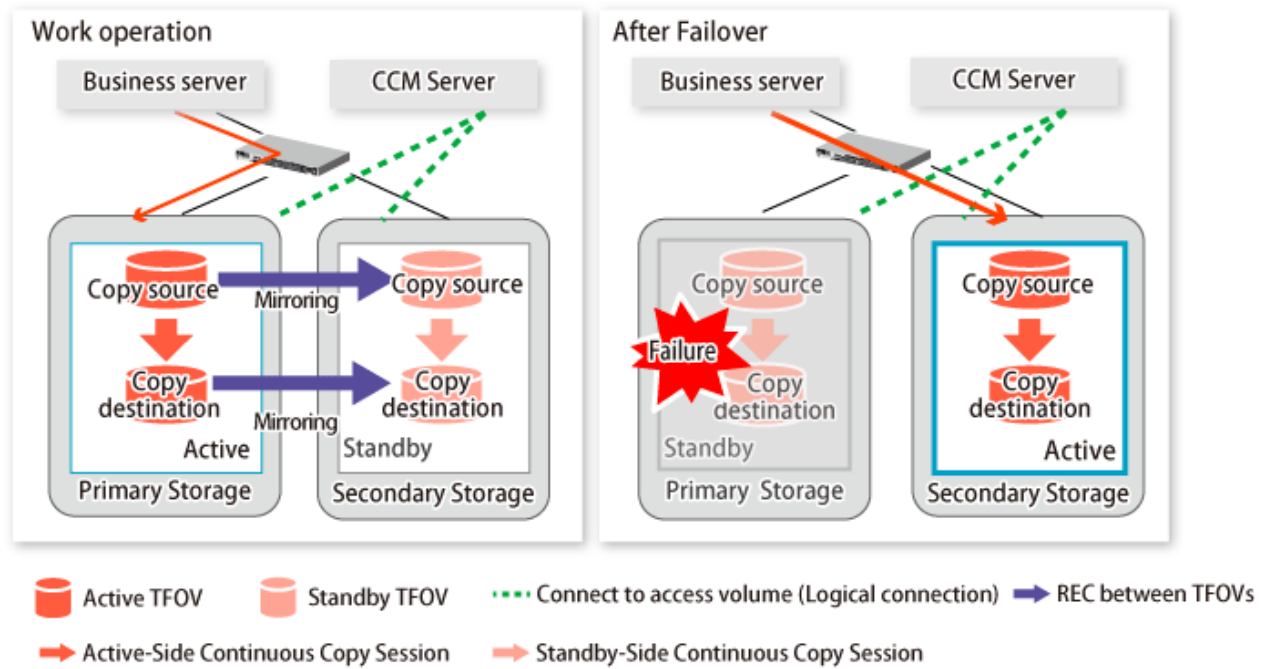
3.12 Storage Cluster Continuous Copy Function

The Storage Cluster Continuous Copy function is an ETERNUS Disk storage system function that maintains consistency on both storage devices by copying in the Primary Storage and Secondary Storage simultaneously. In a Storage Cluster environment, if a failover occurs in the Primary Storage while executing Advanced Copy, this is a function that can continue the copy operation with the Secondary Storage by automatically taking over the Advanced Copy process. For this reason, even if the power is interrupted due to a power cut, or a box failure occurs, the Advanced Copy operation can be continued without stopping the copy session.

This section explains the operation of AdvancedCopy Manager CCM when using the Storage Cluster Continuous Copy function.

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for Storage Cluster function explanation.

Figure 3.23 Storage Cluster Continuous Copy Function



When using the Storage Cluster Continuous Copy function, AdvancedCopy Manager CCM creates copy pairs for the Primary Storage and Secondary Storage simultaneously when setting the environment. When operating the copy sessions, specify the copy group or one of the copy pairs for either the Primary Storage or Secondary Storage when executing commands. When executing Advanced Copy from a TFOV to a TFOV, operation of the Storage Cluster Continuous Copy function starts the copy sessions on both the Primary Storage and Secondary Storage. For this reason, Advanced Copy can be executed without considering the storage device status.

In AdvancedCopy Manager CCM, sessions on the storage device where the TFO status is "Active" are referred to as "Active-Side Continuous Copy Session" and sessions on the storage device where the TFO status is "Standby" are referred to as "Standby-Side Continuous Copy Session".

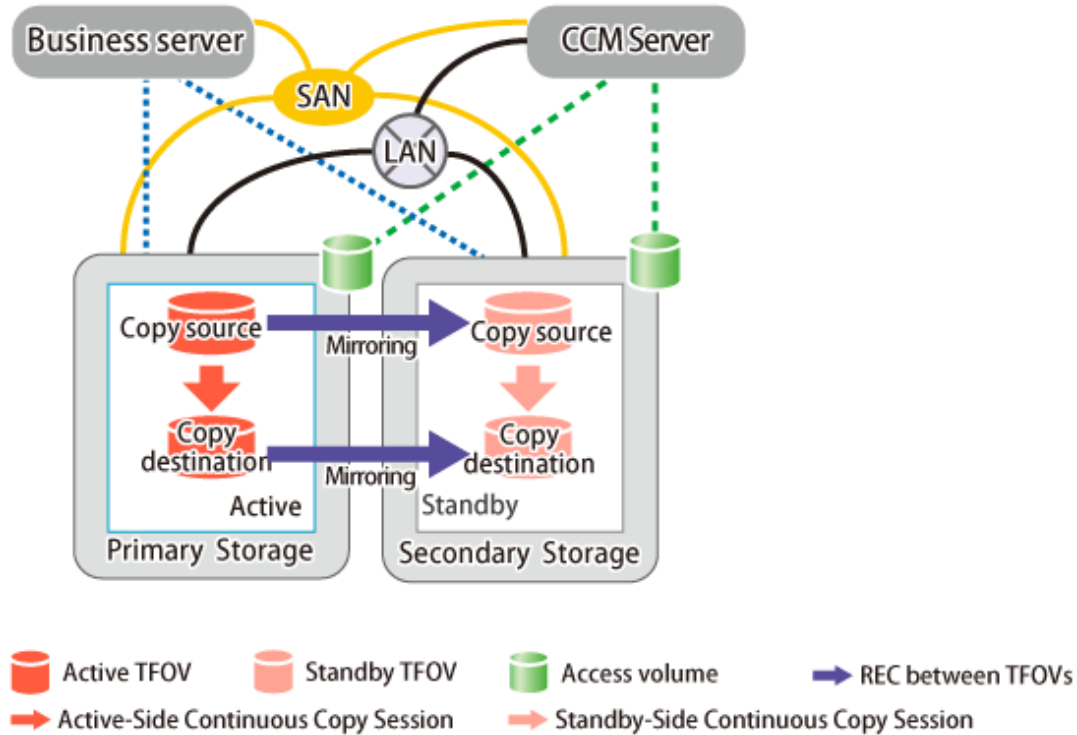
Point

- Advanced Copy can be executed even if either the Primary Storage or Secondary Storage is stopped. When executing AdvancedCopy Manager CCM commands, it is possible to specify copy pairs on the storage device that is stopped. Even when copy pairs are specified on either the Primary Storage or Secondary Storage, the ETERNUS Disk storage system where the TFO status is "Active" is automatically determined, and copying is performed on that ETERNUS Disk storage system.
- The Storage Cluster Continuous Copy function cannot be used in the following combinations. Use the previous Advanced Copy.
 - TFOV and non-TFOV
 - Non-TFOV and non-TFOV
- Remote Advanced Copy from a TFOV to a TFOV is not supported.
 In the Storage Cluster environment, Remote Advanced Copy from a TFOV to a non-TFOV is supported. Refer to "3.11 Operations of Advanced Copy Using TFOV" for details.

3.12.1 System Configuration

This section explains the system configuration when the Storage Cluster Continuous Copy function is used.

Figure 3.24 System Configuration When Storage Cluster Continuous Copy Function is Used



Note

- When using the Copy command via SAN, there needs to be an access volume on the ETERNUS Disk storage system for both the Primary Storage and Secondary Storage.
- A TFOV cannot be set as an access volume.
- The Storage Cluster Continuous Copy function cannot use non-TFOVs.
- The Copy command via SAN and the Copy command via LAN cannot be used simultaneously. Register the same communication method on the respective ETERNUS Disk storage systems for the Primary Storage and Secondary Storage.

3.12.2 Operating Conditions

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide*.

3.12.3 Supported Functions

The support range of a Storage Cluster Continuous Copy function is shown below.

Advanced Copy Functions	Support Range of AdvancedCopy Manager CCM for TFOV	
Snapshot type highspeed copies	OPC	A
	QuickOPC	A
	SnapOPC	N/A
	SnapOPC+	N/A
Synchronous highspeed copies	EC	A
	REC	N/A

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

The range of functions supported by the Storage Cluster Continuous Copy function of AdvancedCopy Manager CCM is shown below.

Function	Windows	Solaris	Linux
Backing up to Tape	A	A	A
Backup and restoration of ZFS file systems	-	A	-
Operation in Oracle VM Server for SPARC	-	A	-
VMware virtual machine automatic backup/restore (Script)	N/A	N/A	N/A
Backup of the NAS environment	N/A	N/A	N/A
Inter-box backup/restore of NAS volumes	N/A	N/A	N/A

(A=Available, N/A=Not Available, -: Platforms that do not provide functions)

3.12.4 Setup

This section explains the environment settings for using the Storage Cluster Continuous Copy function in AdvancedCopy Manager CCM.

Configure settings according to the following procedure.

1. Creating User Account

Create a user for using AdvancedCopy Manager CCM.
Refer to "[2.1 Creating User Account](#)".

2. Settings Access Volume

When operating the Copy command via SAN, configure the ETERNUS Disk storage system access volume. Set the access volume for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage.
Refer to "[2.2 Access Volume Settings](#)" for the method of access volume settings.

Note

A TFOV cannot be set as an access volume.

3. Registering Advanced Copy License

In order to execute Advanced Copy, register the Advanced Copy license using the license management function.
Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage.
Refer to "Registration of License" in the *Installation and Setup Guide* to register the Advanced Copy license.

4. Registering ETERNUS Disk Storage System

Execute the `acarray add` command, and register the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage in AdvancedCopy Manager CCM.
Refer to "[2.4 Registering ETERNUS Disk Storage System](#)" for registering ETERNUS Disk storage system procedure.

Note

The Copy command via SAN and Copy command via LAN cannot be used simultaneously when the Storage Cluster Continuous Copy function is used. Register the same communication method on the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage.

5. Creating Copy Groups

Specify the ETERNUS Disk storage system for the Primary Storage and Secondary Storage with the `-a` option and `-tfoa` option of the `acgroup create` command.
With the `-tfoa` option, specify an ETERNUS Disk storage system belonging to a TFO group that is paired with a TFO group belonging

to an ETERNUS Disk storage system specified with the -a option.
Refer to "2.5 Creating Copy Groups" and the `acgroup create` command for creating.

6. Adding Copy Pairs

Execute the `acpair add` command, add the TFOV as a copy source/copy destination pair to the created copy group.
Using the -p option, specify the copy pair on either the Primary Storage or Secondary Storage. The ETERNUS Disk storage system and logical volume number that become the Storage Cluster pair are automatically retrieved from the specified ETERNUS Disk storage system and logical volume number, and the copy pairs for both the Primary Storage and Secondary Storage are added.
Refer to "2.7 Adding Copy Pairs" and the `acpair add` command for adding.

Note

- The copy source and copy destination TFOV need to belong to the same TFOV group.
- All copy pairs registered in the copy group need to belong to the same TFOV group.
- Copy pairs that include a non-TFOV cannot be registered.
- Copy pairs that include a TFOV not synchronized between the Primary Storage and Secondary Storage cannot be registered.
- When registering copy pairs, do not perform a failover or a failback.
- The `acgetvolinfo` command displays logical volume information for ETERNUS Disk storage systems where the TFO status is "Active". Even if the Primary Storage or Secondary Storage is specified using the -p option of the `acpair add` command, both copy pairs can be registered. Specify the ETERNUS name of the ETERNUS Disk storage system where the TFO status is "Active" and the copy source/destination logical volume numbers that are displayed with the `acgetvolinfo` command.

3.12.5 Operating Advanced Copy

This section explains the procedure for operating the Storage Cluster Continuous Copy function using AdvancedCopy Manager CCM.
Operation of Advanced Copy using the Storage Cluster Continuous Copy function is the same as that in the case of a non-TFOV. Refer to "3.1 Operating Advanced Copy" for details.

Point

- The Storage Cluster Continuous Copy function needs to connect to the copy destination logical volume server.

When operating the copy destination logical volume by connecting to a Windows or Linux server, execute the following command so that after performing the copy, the copy destination volume data is recognized by the OS.

- For Windows environments

```
acutil refresh -d deviceName
```

deviceName : copy destination volume physical device name (PhysicalDrive[disk number])

- For Linux environments

```
sfdisk -R deviceName
```

deviceName : copy destination volume device name (/dev/sd*)

3.12.6 Executing Advanced Copy

This section explains the procedure for executing the Advanced Copy using the Storage Cluster Continuous Copy function.

Execution of Advanced Copy using the Storage Cluster Continuous Copy function is the same as that in the case of a non-TFOV. When specifying the copy pair using the -p option, specify either the Primary Storage or Secondary Storage copy pair.

Refer to "3.2 Executing Advanced Copy" for details about executing Advanced Copy.

Additionally, refer to "Chapter 4 Command References" for the specifications and case examples for each command.

Point

- Volume protection cannot be configured for a TFOV.
 - When the TFO group status is "Normal", and Advanced Copy cannot be operated on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the ETERNUS Disk storage system where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, ccm7002 message may be output.
If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to ["3.12.11 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.
 - Advanced Copy cannot be operated during a failover or a failback.
 - If the volume that is the target of Storage Cluster or the TFO group of the volume is changed, refer to ["3.12.12.2 When Changing Storage Cluster Target Volume"](#) and register the copy pair again.
 - For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - `acopc start` command
 - `acec start` command
 - `acec suspend` command
 - `acec resume` command
 - `acec reverse` command
-

3.12.7 Backing up/Restore to Tape Devices

When backing up to a tape device or restoring from a tape device, refer to ["3.4 Backing Up to Tape"](#).

3.12.8 Backup and restoration of ZFS file systems

For the ZFS file system backup/restore operation, refer to ["Appendix B Backup and Restoration of ZFS File Systems"](#).

3.12.9 Operation in Oracle VM Server for SPARC

For the Oracle VM Server for SPARC backup operation, refer to ["Appendix D Operation in Oracle VM Server for SPARC"](#).

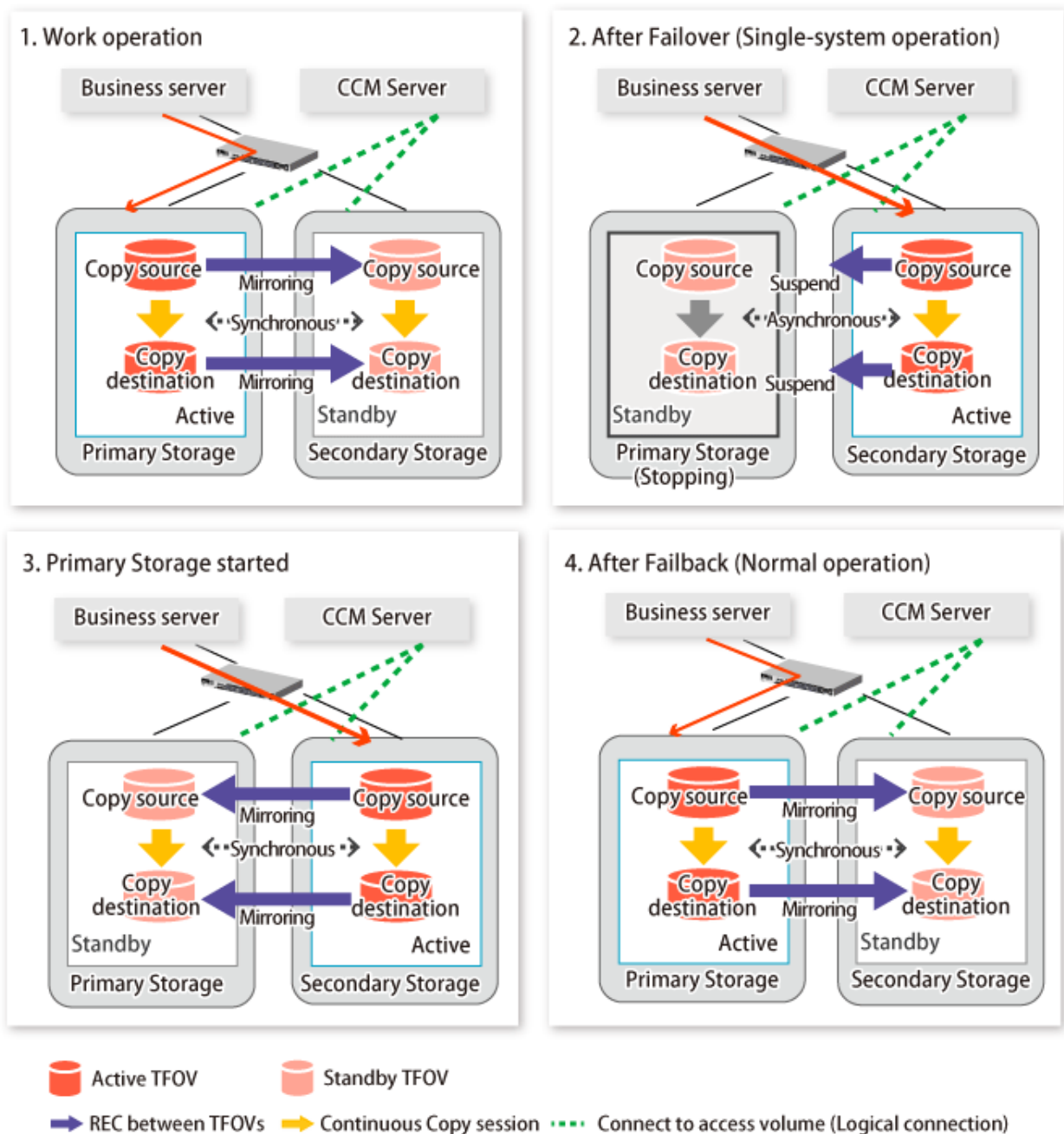
3.12.10 Operation during Maintenance

When using the Storage Cluster Continuous Copy function, even if either the Primary Storage or Secondary Storage is stopped, Advanced Copy operation on the other storage can be continued. Further, when starting an ETERNUS disk storage system that has been stopped, Primary Storage and Secondary Storage Advanced Copy automatically synchronizes.

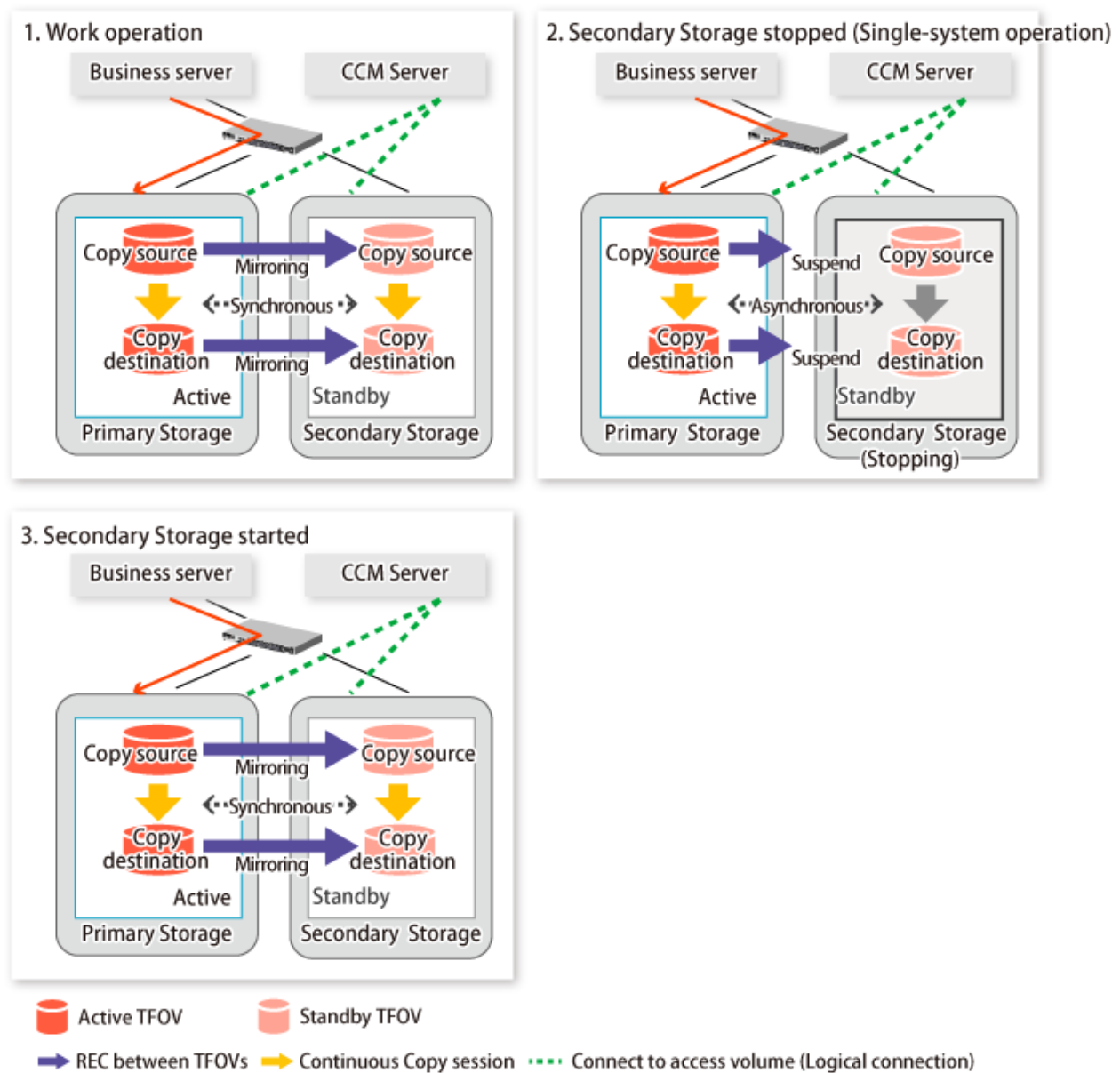
A description of how the Storage Cluster Continuous Copy function operates in a maintenance state is as follows.

Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for the Storage Cluster environment of maintenance procedure.

When Primary Storage Is Stopped



When Secondary Storage Is Stopped

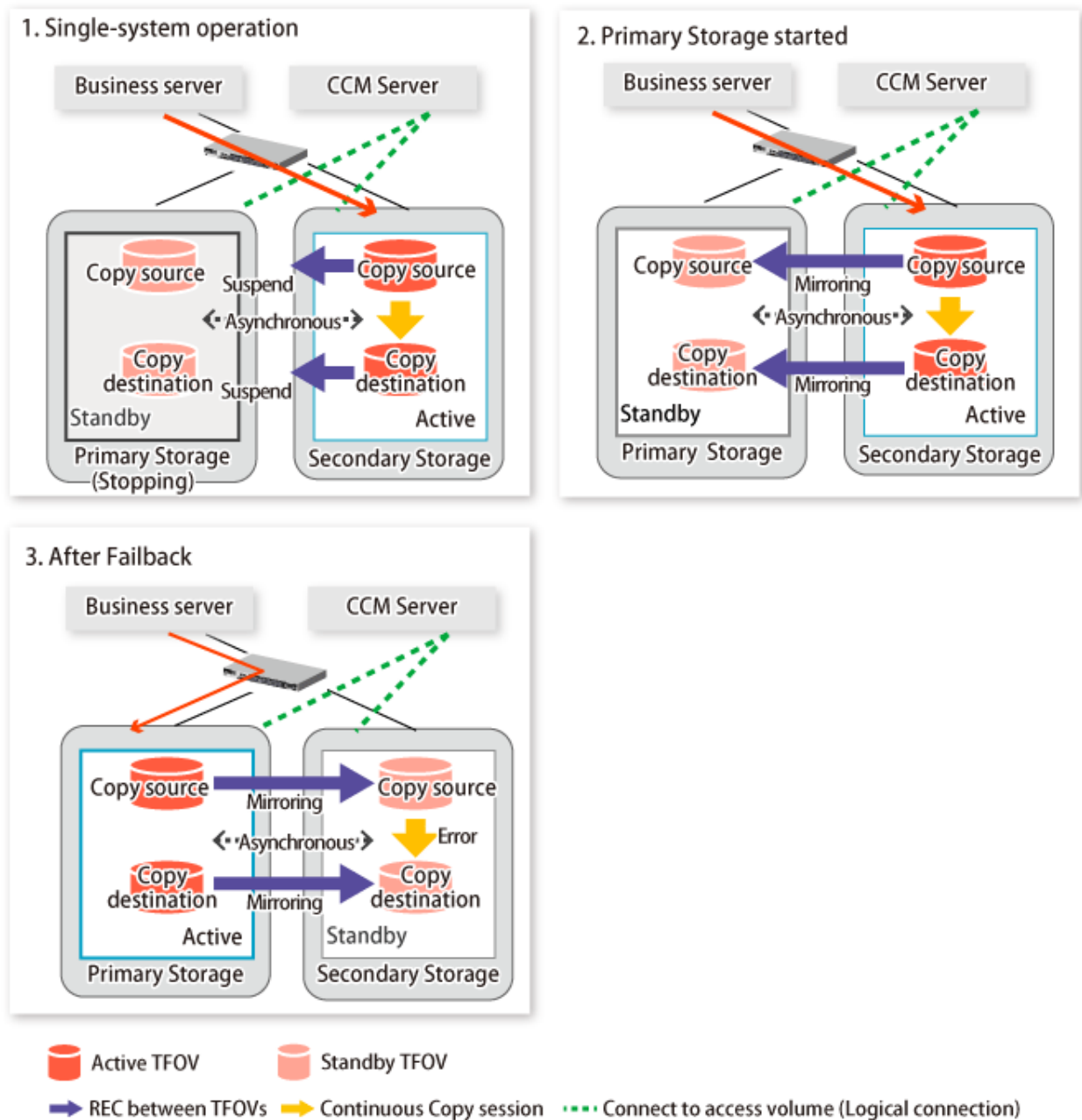


Point

- This command starts or stops copying while one side is operating and terminates normally, but there may be times when the ccm7002 message is output. No measures need to be taken in regard to the ccm7002 message.
- Even after the stopped ETERNUS Disk storage system is started, it may not be possible to synchronize the Primary Storage and Secondary Storage sessions. In addition, if a failover or a failback is performed in a state where a session is only on either the Primary Storage or the Secondary Storage, the session transitions to an Error Suspend state. For this reason, refer to "3.12.11 When

Recovering Storage Cluster Continuous Copy Function" and check that the status of the Primary Storage and the Secondary Storage are the same.

Figure 3.25 When Failback Is Carried Out in State Where There Are Only Sessions on Storage Where TFO Status Is "Active"



3.12.10.1 Recovery from Hardware Failure

This shows the state transition, with the Storage Cluster Continuous Copy function, where either of the Primary Storage or Secondary Storage volumes have a hardware failure.

Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for details about the recovery procedure.

When using the Storage Cluster Continuous Copy function, Advanced Copy operation can continue with only a single storage device in the following cases. Stop only the Error Suspend state session that exists within the storage device where failure occurred.

- Hardware failure occurred on the Primary Storage and Automatic Failover was performed
- Hardware failure occurred on a storage device where the TFO status is "Standby"

For cases other than those above, since Advanced Copy cannot continue on only a storage device where the TFO status is "Standby" only, the Primary Storage and Secondary Storage session states transition to Error Suspend. When sessions for both the Primary Storage and Secondary Storage have transitioned to Error Suspend, stop both sessions.

Note

- If a TFO pairing is canceled while recovering from a hardware failure such as a RAID failure and RAID close, since the TFOV between the Primary Storage and Secondary Storage is not synchronized, the following commands cannot be executed until the TFO pairing is restored:
 - `acopc start` command
 - `acec start` command
 - `acec suspend` command
 - `acec resume` command
 - `acec reverse` command

Back up the copy source volume before cancelling the TFO pairing as required

- In a storage device where the TFO status is "Active", if there are bad sectors in the copy source logical volume, and if **Status** of the **Volume** tab on the **TFO Group Detail** screen in Web Console is other than "Active", recovering the data according to the usage state of the copy source logical volume is required.
Perform recovery by following the steps outlined below.

1. Use ETERNUS Web GUI to check the Advanced Copy status and the copy process error codes.
 - a. From the **Display status** menu, click **Advanced Copy status display** in the status display.
 - b. At **Session status**, click the **Number of active sessions** link for the relevant copy type.
 - c. Refer to the value in the **Error code** column of the relevant copy process.
 2. Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* to recover the Storage Cluster environment, and recover the bad sector.
 3. Recover data according to the error code checked in step 1.
 - For "0xBA":
Recover data from the copy destination logical volume.
 - Other than "0xBA":
Contact Fujitsu Technical Support.
-

Figure 3.26 When Automatic Failover Is Performed Due to Hardware Failure Occurring on Primary Storage Where TFO Status Is "Active"

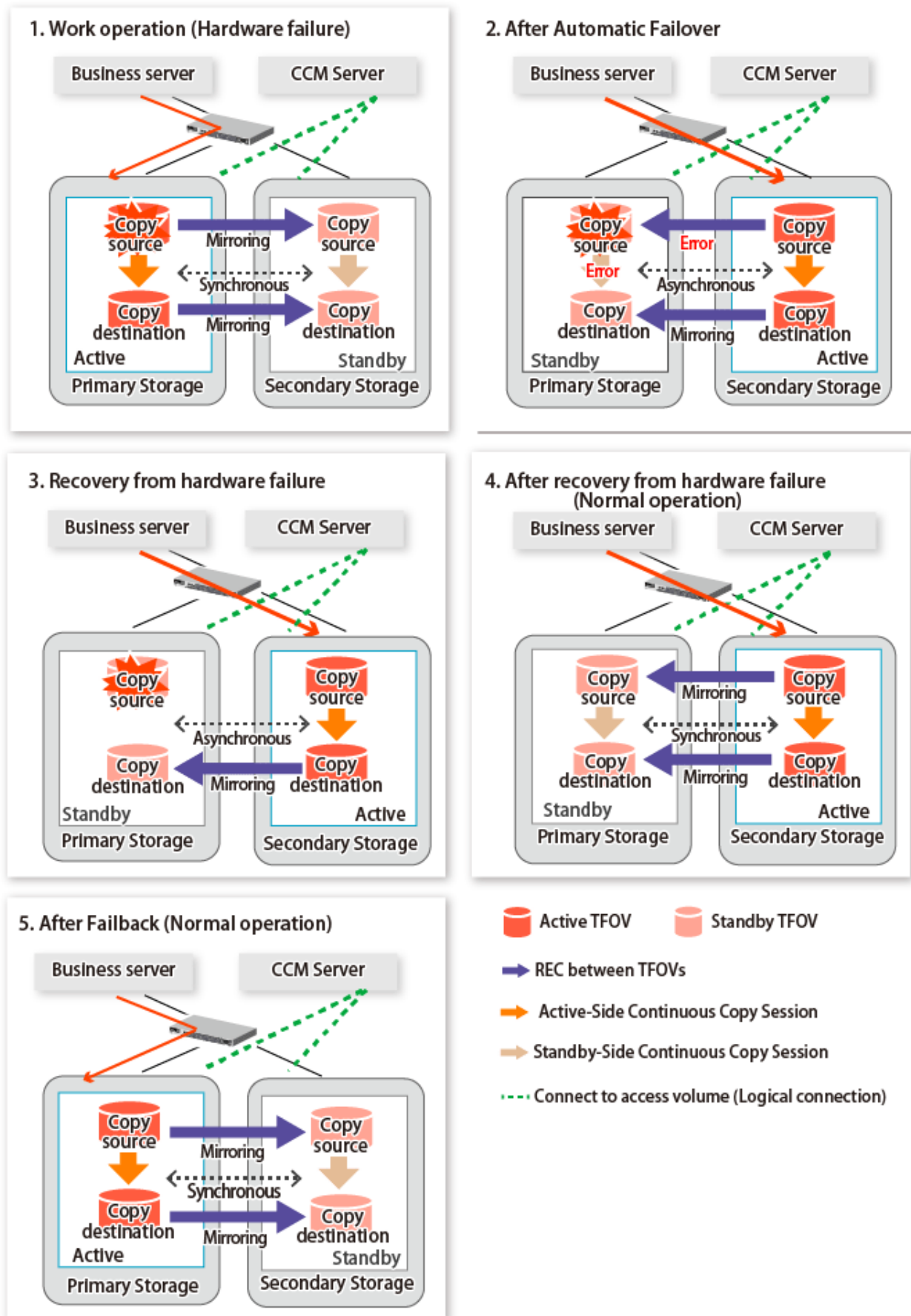


Figure 3.27 When Manual Failover Is Performed Due to Hardware Failure Occuring on Storage Device Where TFO Status Is "Active"

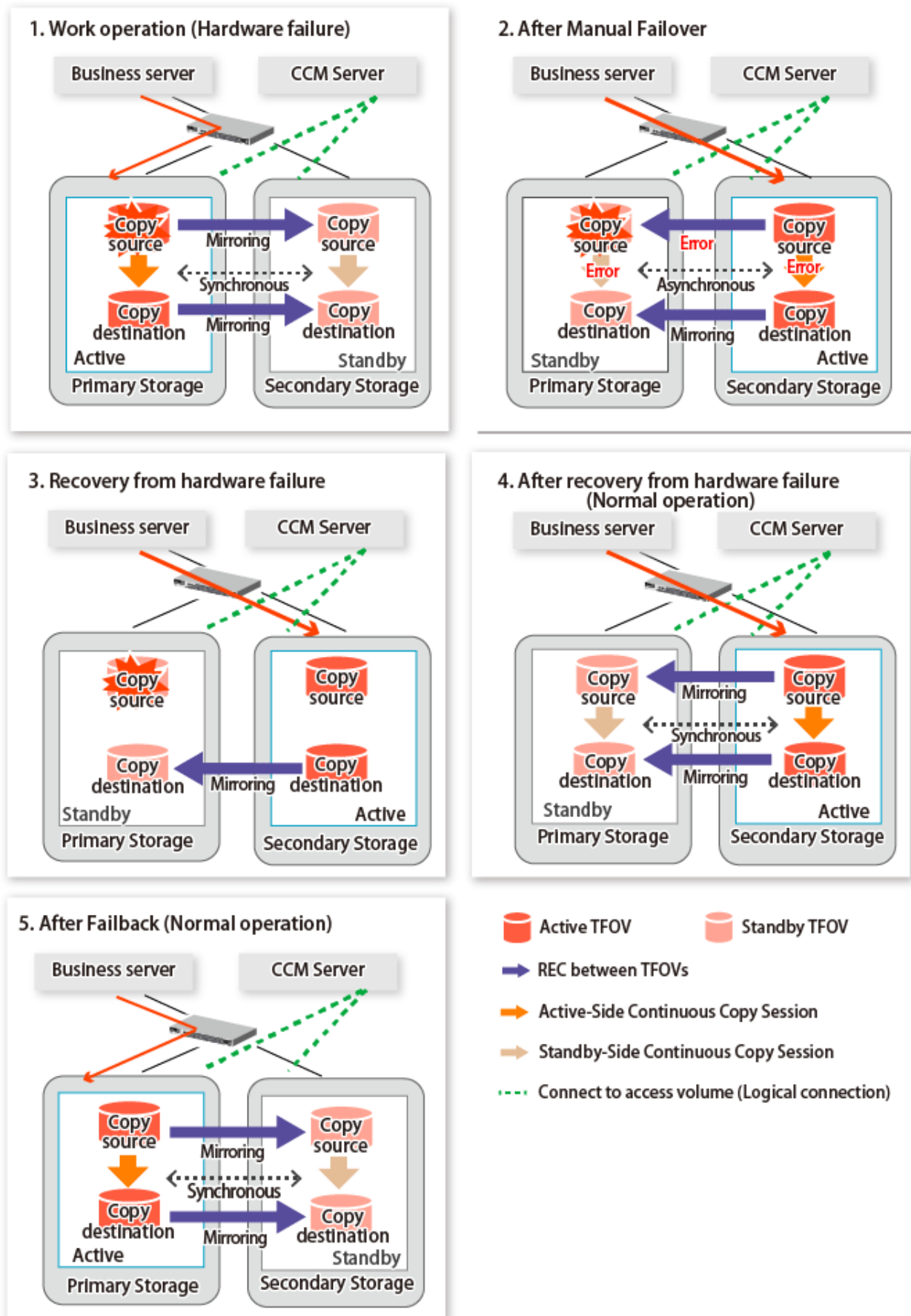
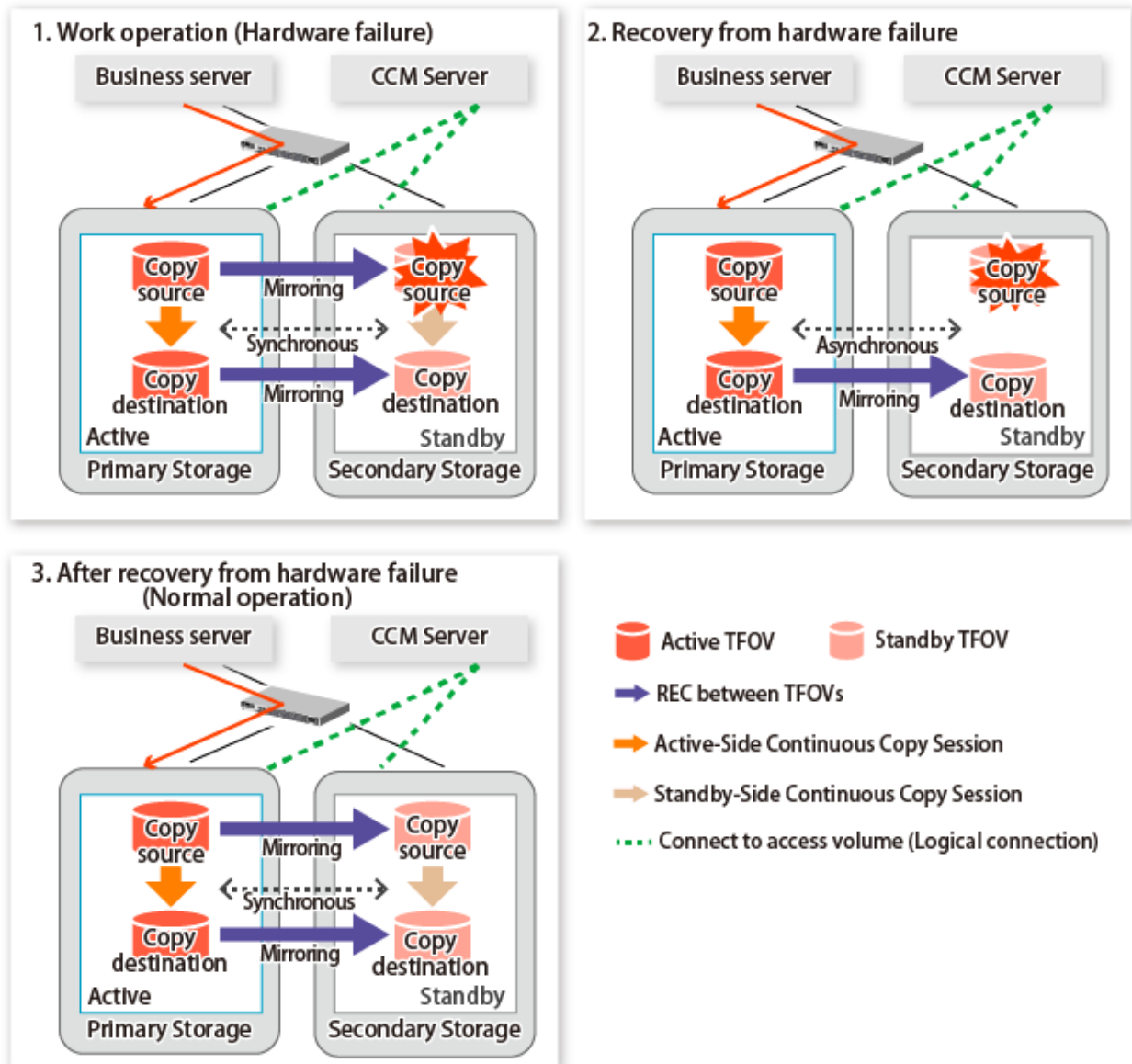


Figure 3.28 When Hardware Failure Occurred on Storage Device Where TFO Status Is "Standby"



3.12.11 When Recovering Storage Cluster Continuous Copy Function

In a state where either the Primary Storage or Secondary Storage is stopped, if the copy is started or stopped, there may be times when the Primary Storage or Secondary Storage sessions are not synchronized.

Take measures after confirming the Advanced Copy status and the Storage Cluster Continuous Copy Session status. The methods for confirming and dealing with the Advanced Copy status and the Storage Cluster Continuous Copy Session status are shown below.

Point

If the command is executed when the session is not synchronized between the Primary Storage and Secondary Storage, the ccm5004 message (detail message is STXC3015) may be output.

If this message is output, after forcibly stopping the copy with one of the following methods, then take action with "Countermeasures":

- For using command
Specify the storage device where the TFO status is "Standby" with the -a option and forcible cancel the copy sessions by the `accopy fcancel` command.

- For using Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*, and forcible cancel the copy session.

Advanced Copy Status and Storage Cluster Continuous Copy Session Status

1. Confirm the status of the Standby-Side Continuous Copy Session from the storage device where the TFO status is "Active".
 - When checking by command
Check using the following commands.
 - [acopc query](#) command
The Standby-Side Continuous Copy Session status can be confirmed from the **Standby-Session** column.
 - [acec query](#) command
The Standby-Side Continuous Copy Session status can be confirmed from the **Standby-Session** column.
 - When confirming from Web Console
Refer to "Add/Display/Delete Copy Pair" in the *Web Console Guide*, and display the copy session. The Standby-Side Continuous Copy Session status can be confirmed from the **Standby Copy Session** column.
2. Confirm the status of the Active-Side Continuous Copy Session from the storage device where the TFO status is "Standby".
 - When checking by command
Check using the following command.
 - [acopc query](#) command
Specify the storage device where the TFO status is "Standby" for -a option to execute the command. The Active-Side Continuous Copy Session status can be checked in the **TFO Info** column displayed when -tfoinfo option is specified.
 - When confirming from Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*, and display the Copy Session. Active-Side Continuous Copy Session status can be confirmed from the **Storage Cluster/Session Status** column.

Countermeasures

Advanced Copy Status of Storage Where TFO Status Is "Active"	Storage Cluster Continuous Copy Session Status	Action
OPC Starting OPC Executing	- When the Standby-Session column for the acopc query command, or the Standby copy Session column for Web Console is "Not-Exist".	1. Execute the acopc start command. When taking measures on Web Console, refer to "Perform Advanced Copy" in the <i>Web Console Guide</i> , and start the copy.
EC Starting EC Executing	- When the Standby-Session column for the acec query command, or the Standby copy Session column for Web Console is "Not-Exist".	1. Execute the acec suspend command to temporarily suspend EC (Suspend). 2. Execute the acec resume command to resume EC. When taking measures on Web Console, refer to "Perform Advanced Copy" in the <i>Web Console Guide</i> and to temporarily suspend/resume copying.
EC Suspend	- When the Standby-Session column for the acec query command, or the Standby copy Session column for Web Console is "Not-Exist".	1. Execute the acec resume command, to resume EC. 2. Execute the acec suspend command, to temporarily suspend EC (Suspend). When taking measures on Web Console, refer to "Perform Advanced Copy" in the <i>Web Console Guide</i> .

Advanced Copy Status of Storage Where TFO Status Is "Active"	Storage Cluster Continuous Copy Session Status	Action
		<i>Guide</i> and to resume/temporarily suspend copying.
OPC Error Suspend EC Error Suspend	- When the Standby-Session column for the acopc query or acec query command, or the Standby copy Session column for Web Console is "Not-Exist".	<ol style="list-style-type: none"> 1. Execute the acopc cancel or acec cancel command, and stop the copy. 2. Execute the acopc start or acec start command, and start the copy. <p>When taking measures on Web Console, refer to "Perform Advanced Copy" in the <i>Web Console Guide</i> and to suspend/resume copying.</p>
OPC action not startup EC action not startup	- When the TFO Info column for the accopy query command, or the Storage Cluster/Session Status column for Web Console is "unpaired".	<ol style="list-style-type: none"> 1. Specify the storage device where the TFO status is "Standby" with the -a option and forcibly cancel the copy sessions with the accopy fcancel command. 2. Execute the acopc start or acec start command, start the copy. <p>When taking measures on Web Console, refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" and "Perform Advanced Copy" in the <i>Web Console Guide</i> and to force stop/start copying.</p>

3.12.12 When Changing Configurations/Settings

This section describes the procedure for changing the configurations and settings of the AdvancedCopy Manager CCM with the Storage Cluster Continuous Copy function.

The procedure for configuration and setting is the same as a non-TFOV.
Refer to "[3.6 Changing Configuration](#)".

3.12.12.1 Deleting Storage Cluster Environment

When deleting the Storage Cluster environment, delete the copy group settings for the AdvancedCopy Manager CCM.

The copy pairs included in the copy group to be deleted are deleted with the copy group.
Refer to "[3.6.6 Deleting Copy Groups](#)" for the procedure for deleting the copy group.

3.12.12.2 When Changing Storage Cluster Target Volume

When the copy pair logical volume number for either the Primary Storage or Secondary Storage is changed, change the configuration of the copy group by adding/deleting the copy pair set in AdvancedCopy Manager CCM.

Follow the procedure below to change the configuration of the copy group.

1. Deleting Copy Pairs
Execute the [acpair remove](#) command, and delete the copy pairs.
2. Adding Copy Pairs
Refer to "Adding Copy Pairs" in "[3.12.4 Setup](#)", and add the copy pairs for the same copy group.

3.12.13 Cascade Copies

This section describes cascade copy when using the Storage Cluster Continuous Copy function.

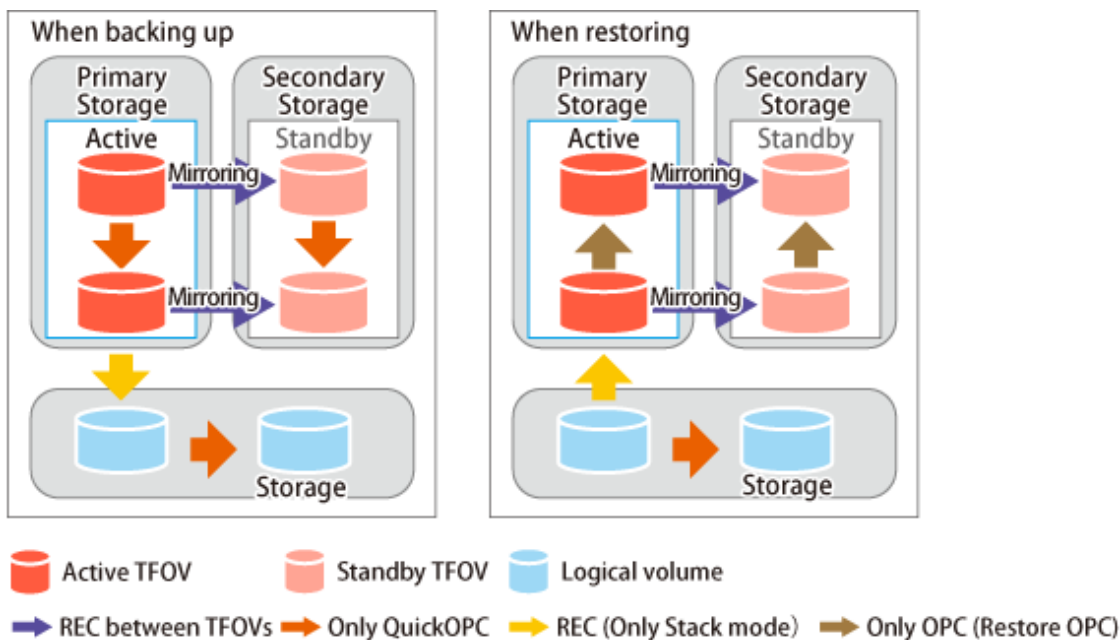
A cascade copy links the copy destination to the processing of another copy as a copy source. Refer to the ETERNUS Disk storage system manuals for details about the cascade copies.

Using cascade copy, it is possible to broaden application scenarios, such as backups that combine duplication to remote areas and sub-center side backups. When using the Storage Cluster Continuous Copy function, configuring cascade copies to different boxes as the backup target are supported. In this way, it can be operated as a secondary backup.

Point

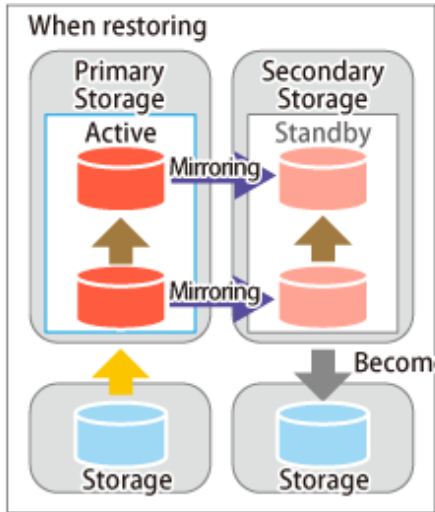
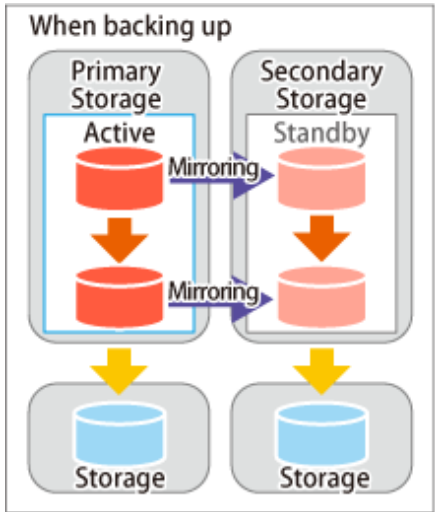
- Use QuickOPC for intra-box copy.
- Use Stack mode for the data transfer mode in REC.

In addition, cascade copy (QuickOPC) can be performed with the REC destination as the copy source.



Point

Cascade copy can be performed from the Secondary Storage via REC. When restoring, put the REC for the storage device where the TFO status is "Standby" into suspend state, and then perform REC.



■ Active TFOV
 ■ Standby TFOV
 ■ Logical volume

➡ REC between TFOVs
 ➡ Only QuickOPC
 ➡ REC (Only Stack mode)
 ➡ Only OPC (Restore OPC)



Chapter 4 Command References

This chapter explains the various commands that are used with AdvancedCopy Manager CCM or Express.

Refer to "Creating User Account for Using AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for information on user accounts that can use commands.

Point

For using the commands, it is necessary to set up the environment variable PATH. Refer to "Setting Environment Variable PATH" in "Setup of AdvancedCopy Manager CCM" in the *Installation and Setup Guide* for information on how to set up.

4.1 Control Commands for ETERNUS Disk Storage System

4.1.1 `acarray add` (ETERNUS Disk Storage System Registration Command)

NAME

`acarray add` - Register ETERNUS Disk storage systems

SYNOPSIS

- To register a storage device which is operated by Copy Command via SAN

```
acarray add -a diskArrayName -ip diskArrayIP -user userName -password password [-san] [-path volumeName] [-xml]
```

- To register a storage device which is operated by Copy Command via LAN

```
acarray add -a diskArrayName -ip diskArrayIP -user userName -password password -lan [-xml]
```

- To register a remote ETERNUS Disk storage system

```
acarray add -a diskArrayName -boxid boxID -remote [-xml]
```

DESCRIPTION

This command registers the specified ETERNUS Disk storage system to this software.

OPTIONS

`-a diskArrayName`

This option specifies the ETERNUS names that are used by AdvancedCopy Manager CCM or Express.

Specify it in the alphanumeric character within 255 characters.

When using Web Console, specify a device name of ETERNUS Disk storage system as ETERNUS name.

ETERNUS names are case-sensitive.

Point

When you specify an ETERNUS name by using another AdvancedCopy Manager CCM command, it is necessary to enter the ETERNUS name specified with this option correctly.

`-ip diskArrayIP`

This option specifies the IP address of an ETERNUS Disk storage system to be registered. The following IP addresses can be specified.

- IPv4 address

Format that separates decimal digits with periods ".". (Values according to the IPv4 rules)

It is a specification example as follows:

192.0.2.1

- IPv6 address

Format that separates hexadecimal digits with colons ":".

It is a specification example as follows:

2001:0db8:0000:0000:1234:0000:0000:0001

2001:db8::1234:0:0:1 (abbreviated notation)

An error may occur when an attempt is made to register an ETERNUS Disk storage system with the same IP address as an ETERNUS Disk storage system that has already been registered. Moreover, even if IP address is different, it becomes an error when the same ETERNUS Disk storage system has already been registered.

-user *userName*

This option specifies the user who has the following privileges. Specify the user name using a string that is between 1 and 32 characters long.

Storage Device	Privileges
ETERNUS Disk storage system which can operate by using Copy command via LAN	Software role of ETERNUS Disk storage system
ETERNUS Disk storage system which cannot operate by using Copy command via LAN	Administrator authorization of ETERNUS Disk storage system

-password *password*

This option specifies the password for the user name specified with the -user option.

-path *volumeName*

This option specifies the access volume in the logical volume within an ETERNUS Disk storage system to be registered.

OS Type	Explanation
Windows	Specify the drive letter (e.g. X:).
Solaris	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/rdisk/*) - Solaris standard multipath (MPxIO) device name (/dev/rdisk/*) - ETERNUS multipath device name (/dev/FJSMplb/rdisk/*) - VxVM device name (/dev/vx/rdmp/*)
Linux	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/sd*) - Multipath device name generated by device mapper facility of OS (/dev/mapper/*) - udev device name generated by udev facility of OS (/dev/disk/by-id/*, /dev/disk/by-path/*)

The access volume is automatically set if this option is omitted.

When registering the ETERNUS Disk storage system which is operated by Copy command via LAN, it is unnecessary to specify this option.

A TFOV cannot be specified.

-san

This option specifies the Copy command via SAN as the method of sending the copy command.

This option can be omitted.

-lan

This option specifies the Copy command via LAN as the method of sending the copy command.
The method of sending the copy command is set to Copy command via SAN, if this option is omitted.

-box-id *boxID*

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

-remote

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

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- To register a storage device which is operated by Copy command via SAN

```
> acarray add -a ET001 -ip 192.0.2.10 -user **** -password **** -san -path X:  
Successful completion.
```

- To register a storage device which is operated by Copy command via LAN

```
> acarray add -a ET001 -ip 192.0.2.10 -user **** -password **** -lan  
Successful completion.
```

- To register a storage device which is at remote site

```
> acarray add -a ET001 -boxid 00ETERNUSDXM##ET44S20A####HK000104##### -remote  
Successful completion.
```

4.1.2 acarray change (ETERNUS Name and Access Volume for ETERNUS Disk Storage System Change Command)

NAME

acarray change - Change ETERNUS names and access volumes

SYNOPSIS

```
acarray change -a diskArrayName {-path volumeName | -new newDiskArrayName} [-xml]  
acarray change -a diskArrayName -new newDiskArrayName -remote [-xml]
```

DESCRIPTION

This command changes the ETERNUS names and access volumes of the ETERNUS Disk storage system that is registered in this software.

OPTIONS

-a *diskArrayName*

This option specifies the current ETERNUS name of the target ETERNUS Disk storage system.

-path *volumeName*

This option specifies the new access volume to be set.

This option cannot use for the ETERNUS Disk storage system which is registered to operate by Copy command via LAN.

OS Type	Explanation
Windows	Specify the drive letter (e.g. Y:).
Solaris	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/rdisk/*) - Solaris standard multipath (MPxIO) device name (/dev/rdisk/*) - ETERNUS multipath device name (/dev/FJSMplb/rdisk/*) - VxVM device name (/dev/vx/rdmp/*)
Linux	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/sd*) - Multipath device name generated by device mapper facility of OS (/dev/mapper/*) - udev device name generated by udev facility of OS (/dev/disk/by-id/*, /dev/disk/by-path/*)

A TFOV cannot be specified.

`-new newDiskArrayName`

This option specifies the new ETERNUS name to be set.

`-remote`

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

`-xml`

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Changing the settings of the ETERNUS Disk storage system which is in a local site

```
> acarray change -a ET001 -p path Y:
Successful completion.
```

- Changing the settings of the ETERNUS Disk storage system which is in a remote site

```
> acarray change -a ET001 -new ET001R -remote
Successful completion.
```

4.1.3 acarray list (ETERNUS Disk Storage System Information Display Command)

NAME

`acarray list` - Display the ETERNUS Disk storage system information

SYNOPSIS

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

DESCRIPTION

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

OPTIONS

-remote

This option specifies when displaying of information on the ETERNUS Disk storage system which is in a remote site.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Displaying ETERNUS Disk storage systems which are at local site:

```
> acarray list
```

```
Name  BOX-ID                                     IP Address
-----
ET001 00ETERNUSDXM##ET44S20A####HK000104##### 192.0.2.10
ET002 00ETERNUSDXH##ET87S20A####NC4110699004## 192.0.2.11
```

The following table shows the meanings of the information displayed.

Title	Explanation
Name	Displays the ETERNUS name.
BOX-ID	Displays the Box ID for ETERNUS Disk storage system.
IP Address	Displays the IP address for ETERNUS Disk storage system. Either following addresses are displayed. <ul style="list-style-type: none"> - IPv4 address Form to which decimal mark is delimited by "." (value according to rule of IPv4) Example) 192.0.2.1 - IPv6 address Form to which hexadecimal mark is delimited by ":" (It is displayed by the abbreviated notation). Example) 2001:db8::1234:0:0:1

- Displaying ETERNUS Disk storage systems which are at remote site:

```
> acarray list -remote
```

```
Name  BOX-ID                                     IP Address
-----
ET001 00ETERNUSDXM##ET44S20A####HK000104#####
ET002 00ETERNUSDXH##ET87S20A####NC4110699004##
```

The following table shows the meanings of the information displayed.

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

4.1.4 acarray detail (ETERNUS Disk Storage System Detail Information Display Command)

NAME

acarray detail - Display the detail information of ETERNUS Disk storage system

SYNOPSIS

```
acarray detail -a diskArrayName [-route] [-xml]
```

DESCRIPTION

This command displays the detail information about the ETERNUS Disk storage system that has been registered.

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-route

This option specifies the displaying by the extended format.
Refer to the table of EXAMPLES for the displayed items.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

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

```
> acarray detail -a ET001
```

```
Disk Array Name : ET001
BOX-ID          : 00ETERNUSDXM##ET44S20A####HK000104#####
IP Address      : 192.0.2.10
Admin User      : ****
Access Volume   : X:
```

The following table shows the meanings of the information displayed.

Title	Explanation
Disk Array Name	Displays the ETERNUS name.
BOX-ID	Displays the Box ID for ETERNUS Disk storage system.
IP Address	Displays the IP address for ETERNUS Disk storage system. (*1) Either following addresses are displayed. <ul style="list-style-type: none">- IPv4 address Form to which decimal mark is delimited by "." (value according to rule of IPv4) Example) 192.0.2.1- IPv6 address

Title	Explanation
	Form to which hexadecimal mark is delimited by ":" (It is displayed by the abbreviated notation). Example) 2001:db8::1234:0:0:1
Admin User	Displays the user name of ETERNUS Disk storage system. (*1) - For the storage device which can operate by using Copy command via LAN: User who has Software role of ETERNUS Disk storage system - For the storage device which cannot operate by using Copy command via LAN: User who has Administrator authorization of ETERNUS Disk storage system
Access Volume	Displays the access volume set up for the ETERNUS Disk storage system. (*1, *2) - For Windows environments Displays the device name of the physical drive. If the access volume is automatically set by the <code>acarray add</code> or <code>acarray pathscan</code> command, the form of "PhysicalDrive [disk number]" is used for display. The disk number is the same value as the "disk?" in the AdvancedCopy Manager block device name and the "Disk #" displayed by clicking the Start menu > Management Tool > Computer Management > Disk Management . - For Solaris environments Displays the RAW device name. - For Linux environments Displays the device name.
Access Route	Displays the method of sending the copy command to the ETERNUS Disk storage system. (*1) This item is displayed only when the <code>-route</code> option is specified. - lan: sends the Copy command via LAN - san: sends the Copy command via SAN

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

*2: If the [Access Route] is "lan", a hyphen (-) is displayed.

4.1.5 `acarray pathscan` (Access Volume Automatic Setting Command)

NAME

`acarray pathscan` - Set access volumes automatically

SYNOPSIS

```
acarray pathscan -a diskArrayName [-xml]
```

DESCRIPTION

This command searches the ETERNUS Disk storage system and sets access volumes automatically.

OPTIONS

`-a diskArrayName`

This option specifies the ETERNUS name.

-xml

This option specifies that the access volume be displayed in XML format.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
> acarray pathscan -a ET001  
Successful completion.
```

NOTES

This command is not available for the following ETERNUS Disk storage systems.

- ETERNUS Disk storage system which is registered as a remote device
- ETERNUS Disk storage system which is registered to operate by Copy command via LAN

4.1.6 acarray remove (ETERNUS Disk Storage System Registration Information Deletion Command)

NAME

acarray remove - Delete the registered ETERNUS Disk storage system information

SYNOPSIS

```
acarray remove -a diskArrayName [-xml]
```

DESCRIPTION

This command deletes registration information for ETERNUS Disk storage system.

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-xml

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

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
> acarray remove -a ET001  
Successful completion.
```

4.2 Commands for Displaying Information Related to ETERNUS Disk Storage System

4.2.1 acinq lv (Logical volume information display command)

NAME

acinq lv - Display the logical volume information

SYNOPSIS

```
acinq lv -a diskArrayName [-free] [-l] [-xml]
```

DESCRIPTION

This command displays a list of the logical volumes for ETERNUS Disk storage system, together with information about each logical volume.

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

- Open Volume (Open)
- Flexible Tier Volume (FTV)
- Snap Data Volume (SDV)
- Thin Provisioning Volume
- Wide Striping Volume (WSV)

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-free

Displays list of logical volumes that meet the following requirements.

- Not registered with an affinity group
- Not used by LUN Mapping settings if the affinity function is disabled

-l

This option specifies that the logical volumes be displayed in extended format.

Refer to the table of execution examples for the items displayed when this option is specified.

Note that, in future versions, additional items may be displayed when this option is specified to support new functions provided in those versions.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When you specify the -free option:

```
> acinq lv -a ET001 -free
```

```
LV No  LV Name LV Size LV Type RG No Encrypt
```

```
-----
0x0023          1024M Open          5 -
```

- When you do not specify the -free option:

```
> acinq lv -a ET001
```

```
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 -
```

- When you specify the -l option:

```
> acinq lv -a ET001 -l
```

```
LV No  LV Name LV Size LV Type RG No Encrypt Virtual Size Copy Inhibit
-----
0x0010          1024M Open          4 -                - Yes
0x0011          1024M Open          4 -                - Yes
0x0012          1024M Open          4 -                - Yes
0x0013          1024M SDV          2 -             4096M -
0x0014          1024M TPV          - -                - -
```

The following table shows the meanings of the information displayed.

Title	Explanation
LV No	Displays the logical volume number in hexadecimal.
LV Name	Displays the alias for the logical volume (0 to 32 characters). (Only be displayed when used with an ETERNUS Disk storage system that supports logical volume alias name.)
LV Size	Displays the size of the logical volume in Megabytes.
LV Type	Displays the logical volume type. <ul style="list-style-type: none"> - Open: This refers to an "Open Volume", which means a volume that can be used with open systems. - FTV: This refers to a "Flexible Tier Volume", which means a hierarchy target volume that can be used with open systems. - SDV: This refers to a "Snap Data Volume", which means a volume that can be used as the copy destination for SnapOPC/SnapOPC+. The volume of this type cannot be used as the copy destination for OPC/QuickOPC/EC/REC. - TPV: This refers to a "Thin Provisioning Volume", which means a virtual volume that can be used with open systems. - WSV: This refers to a "Wide Striping Volume", which means a volume that concatenates multiple RAID groups by striping.
RG No	Displays the RAID group number. The hyphen (-) is displayed, when "TPV" is displayed in LV Type column. When the LV Type column is "WSV", the displayed items are delimited by commas (,). "Ext" is displayed for the External RAID Group.
Encrypt	Displays the encryption status of the logical volume. <ul style="list-style-type: none"> - -: Indicates an unencrypted volume. - Yes: Indicates an encrypted volume.

Title	Explanation
Virtual Size	Displays the virtual size of the Snap data volume in MB if the -l option is specified. If the logical volume type is other than "SDV", a hyphen (-) is displayed.
Copy Inhibit	Displays the volume protection status. The status is displayed only if the -l option is specified. <ul style="list-style-type: none"> - -: The volume is not protected. - Yes: The volume is protected. If the logical volume type is "SDV" or the device does not support the volume protection function, a hyphen (-) is displayed.

NOTES

- This command is not available for ETERNUS Disk storage system registered as a remote device.
- To display logical volume information of ETERNUS Disk storage systems registered as a remote device, login to ETERNUS Web GUI, and confirm the information.

4.2.2 acinq lunmap (LUN Mapping Information Display Command)

NAME

acinq lunmap - Display the LUN Mapping information

SYNOPSIS

```
acinq lunmap -a diskArrayName -agno groupNumber [-xml]
```

DESCRIPTION

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

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-agno *groupNumber*

This option specifies an affinity group number.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

```
> acinq lunmap -a ET001 -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 (0 to 32 characters). (Displayed only when used with an ETERNUS Disk storage system that supports logical volume alias name.)

NOTES

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

4.2.3 acinq ag (Affinity Group List Display Command)

NAME

acinq ag - Display a list of affinity groups

SYNOPSIS

```
acinq ag -a diskArrayName [-xml]
```

DESCRIPTION

This command displays a list of affinity groups for ETERNUS Disk storage system.

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

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acinq ag -a ET001
```

```
AG No AG Name
```

```
-----
```

```
0x000 ag_78
```

```
0x001 ag_76
```

The following table shows the meanings of the information displayed.

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

NOTES

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

4.2.4 acinq hostag (Host Affinity Group List Display Command)

NAME

acinq hostag - Display a list of host affinity groups

SYNOPSIS

```
acinq hostag -a diskArrayName [-xml]
```

DESCRIPTION

This command displays host affinity groups for ETERNUS Disk storage system.

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

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acinq hostag -a ET001
```

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

The following table shows the meanings of the information displayed.

Title	Explanation
Host Name	Displays the host name or alias name. (Only ETERNUS Disk storage system attaches host names or alias names.) The host name is displayed for the FC-CA or the Serial Attached SCSI. The alias name is displayed for the iSCSI-CA.
Port Type	Displays the data transfer method. The following type is displayed. <ul style="list-style-type: none">- FC: fibre channel connection- iSCSI: iSCSI connection- SAS: Serial Attached SCSI connection

Title	Explanation
Address	Displays the address for the connection destination. <ul style="list-style-type: none"> - The WWN is displayed for the FC-CA. - The iSCSI address is displayed for the iSCSI-CA. - The SAS address is displayed for the Serial Attached SCSI. - "*" is displayed if iSCSI address is omitted.
AG No	Displays the affinity group number in hexadecimal.
AG Name	Displays the affinity group name.

NOTES

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

4.3 Logical Volume Control Commands

4.3.1 acinhibit set (Volume Protection Settings Command)

NAME

acinhibit set - Set the volume protection

SYNOPSIS

```
acinhibit set -v volumeName [-xml]
```

DESCRIPTION

This command sets volume protection settings.

Protection settings prevent transaction volumes being accidentally destroyed by Advanced Copy as a result of operator error.

The following type of logical volume can be specified:

- Open Volume (Open)
- Flexible Tier Volume (FTV)
- Thin Provisioning Volume
- Wide Striping Volume (WSV)

OPTIONS

-v *volumeName*

This option specifies the logical volume.

The format used to specify the logical volume is as follows:

```
ET01/0x1
┌──┬──┐
└──┴──┘
(1) (2)
```

- (1) ETERNUS name
- (2) Logical volume number

The extent start position and the extent size cannot be specified.

-xml

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

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

```
> acinhibit set -v ET001/0x1  
Successful completion
```

NOTES

The copy volume protection function cannot use for the following volumes:

- Logical volumes in remote ETERNUS Disk storage system
- REC session destination logical volumes
- TFOV

4.3.2 acinhibit unset (Volume Protection Settings Release Command)

NAME

acinhibit unset - Release the volume protection settings

SYNOPSIS

```
acinhibit unset -v volumeName [-xml]
```

DESCRIPTION

This command releases volume protection settings.

The following type of logical volume can be specified:

- Open Volume (Open)
- Flexible Tier Volume (FTV)
- Thin Provisioning Volume
- Wide Striping Volume (WSV)

OPTIONS

-v *volumeName*

This option specifies the logical volume.

The following example shows the format for specifying logical volumes.

```
ET01/0x1  
└──┬──┘ └──┬──┘  
  (1)  (2)
```

- (1) ETERNUS name
- (2) Logical volume number

The extent start position and the extent size cannot be specified.

-xml

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

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
> acinhibit unset -v ET001/0x1  
Successful completion
```

NOTES

The copy volume protection function cannot use for the following volumes:

- Logical volumes in remote ETERNUS Disk storage system

4.4 Commands for REC Transfer Buffers

4.4.1 acrebuff set (REC Transfer Buffer Setting Command)

NAME

acrebuff set - Set up REC transfer buffers

SYNOPSIS

```
acrebuff set -a diskArrayName -id bufferID -use {SEND | RECV} [-xml]
```

DESCRIPTION

The settings for transfer buffers used in ETERNUS Disk storage systems are changed.
To execute this command, it is required that the REC transfer buffers have been already set.

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-id *bufferID*

This option specifies a REC transfer buffer ID.

-use {SEND | RECV}

This option specifies the use purpose of the REC transfer buffer.

- SEND : For sending

- RECV : For receiving

-xml

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

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
> acrecbuf set -a ET001 -id 1 -use SEND
Successful completion
```

NOTES

- Set up buffers while no session exists in asynchronous Consistency mode, which is in ACTIVE or ERROR SUSPEND status.
- It takes tens of seconds to change buffer settings. Since REC transfer buffers are not available while their settings are changed, do not execute REC operations.
- This command is not available for ETERNUS Disk storage system registered as a remote device.

4.4.2 acrecbuf stat (REC Transfer Buffer Status Display Command)

NAME

acrecbuf stat - Display REC transfer buffer information

SYNOPSIS

```
acrecbuf stat -a diskArrayName [-disk] [-xml]
```

DESCRIPTION

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

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS name.

-disk

This option displays REC Disk buffer information.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- If the -disk option is specified:

```
> acrecbuf stat -a ET001 -disk
ID  Use  Rate RemoteBoxID                               DiskBuff  DiskRate
-----
1   SEND  12% 00ETERNUSDXM##ET41S20A#####HM000208##### "active"    30%
2   RECV   0% 00ETERNUSDXM##ET41S20A#####HM000208##### "-----"   ----
```

- If the -disk option is not specified:

```
> acrecbuf stat -a ET001
ID  Use  Rate RemoteBoxID
-----
1   SEND  12% 00ETERNUSDXM##ET44S20A#####HK000104#####
2   RECV   0% 00ETERNUSDXM##ET44S20A#####HK000104#####
```

The following table shows the meanings of the information displayed.

Title	Description
ID	Displays a REC transfer buffer ID.
Use	Displays the use purpose of REC transfer buffer. <ul style="list-style-type: none"> - SEND: for sending - RECV: for receiving
Rate	Displays the REC transfer buffer usage as a percentage. When the REC transfer buffer is not available, "----" is displayed. <ul style="list-style-type: none"> - For sending: <p>Displays the transfer buffer usage as a percentage. Even if REC in asynchronous Consistency mode is not executed, the usage does not become 0 %.</p> - For receiving: <p>"0 %" is displayed at all times.</p>
RemoteBoxID	Displays the Box ID for the ETERNUS Disk storage system.
DiskBuff	Displays the REC Disk buffer status. This is displayed only if the -disk option is specified. <ul style="list-style-type: none"> - ---: Transfer buffer is for reception - active: REC Disk buffer is in the usable state - invalid: REC Disk buffer is not set - warning(code=xx): REC Disk buffer is in the usable state but the disk has a fault One of the following codes is entered at code=xx: <ul style="list-style-type: none"> - 04: Rebuild or other recovery operation is in progress (REC Disk buffer is in the usable state) - 08: RAID that comprises the REC Disk buffer includes RAID group that does not have redundancy - in active(code=xx): REC Disk buffer is not in the usable state One of the following codes is entered at code=xx: <ul style="list-style-type: none"> - 05: RAID group that comprises the REC Disk buffer has error status - 06: REC Disk buffer RAID group is being formatted - 07: Copy destination does not support REC Disk buffer - not support: REC Disk buffer is not supported
DiskRate	If the REC Disk buffer state is "active" or "warning", the busy rate is displayed as a percentage The busy rate is displayed only if the -disk option is specified. If the REC Disk buffer is not used, "0%" is displayed. In cases other than the above, "----" is displayed.

NOTES

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

4.5 Commands for Setting Up Copy Groups

4.5.1 acgroup create (Copy Group Creation Command)

NAME

acgroup create - Create copy groups

SYNOPSIS

```
acgroup create -g copyGroup -type {OPC | QuickOPC | EC} -a diskArrayName [-tfoa tfoDiskArrayName] [-xml]
acgroup create -g copyGroup -type SnapOPCP -a diskArrayName [-xml]
acgroup create -g copyGroup -type REC -a diskArrayName -remote remoteDiskArrayName [-xml]
```

DESCRIPTION

This command creates a copy group.

OPTIONS

-g copyGroup

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 or Express.

Specify using up to 64 alphanumeric characters, minus sign (-), underscore (_), number sign (#), period (.), and plus sign (+). The first character must be an alphanumeric character.

For Windows environments, copy group names are not case-sensitive.

For Solaris or Linux environments, copy group names are case-sensitive.

An error may occur when an attempt is made to create a copy group with the same name as a copy group that has already been registered.

-type {OPC | QuickOPC | SnapOPCP | EC | REC}

This option specifies the type of copy used within the copy group.

Specify one of the following copy types. The meaning of "SnapOPCP" is SnapOPC+.

- OPC
- QuickOPC
- SnapOPCP
- EC
- REC

-a diskArrayName

This option specifies the ETERNUS name.

Specify the following ETERNUS Disk storage system:

- ETERNUS Disk storage system which is operated by Copy command via SAN
For REC, the access volume of the ETERNUS Disk storage system specified here is used.
- ETERNUS Disk storage system which is operated by Copy command via LAN
For REC, the connection route for the ETERNUS Disk storage system specified here is used.

-tfoa tfoDiskArrayName

Specify when creating a copy group using the Storage Cluster Continuous Copy function. Specify the ETERNUS Disk storage system to which the TFO group that is paired with a TFO group belonging to the ETERNUS Disk storage system specified with the *-a* option belongs.

An ETERNUS Disk storage system with a different communication method from the ETERNUS Disk storage system specified with the *-a* option cannot be specified.

An ETERNUS Disk storage system registered as a remote ETERNUS Disk storage system device cannot be used.

This option can only be specified when the copy type specified with the *-type* option is "OPC", "QuickOPC" or "EC".

-remote remoteDiskArrayName

For REC, the ETERNUS name besides the specified ETERNUS Disk storage system is specified by the *-a* option.

The access volume or connection route of the ETERNUS Disk storage system specified by the -a option is used, instead of the access volume or connection route of the ETERNUS Disk storage system specified here.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When the Storage Cluster Continuous Copy function is not used

```
> acgroup create -g group01 -type OPC -a ET001
Successful completion.
```

- When the Storage Cluster Continuous Copy function is used

```
> acgroup create -g group01 -type OPC -a ET001 -tfoa ET002
Successful completion.
```

4.5.2 acgroup list (Copy Group Display Command)

NAME

acgroup list - Display copy groups

SYNOPSIS

```
acgroup list [-xml]
```

DESCRIPTION

This command displays a list of copy groups.

OPTIONS

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

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

The following table shows the meaning of the information displayed.

Title	Explanation
CG Name	Displays the copy group name.

4.5.3 acgroup detail (Copy Group Detail Information Display Command)

NAME

acgroup detail - Display the detail information of copy groups

SYNOPSIS

```
acgroup detail -g copyGroup [-active] [-xml]
```

DESCRIPTION

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

When the Storage Cluster Continuous Copy function is used, the Primary Storage and Secondary Storage copy pairs are displayed.

OPTIONS

-g *copyGroup*

This option specifies the copy group name.

-active

When the Storage Cluster Continuous Copy function is used, the storage device where the TFO status is "Active" is displayed.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- In the case of OPC/QuickOPC/SnapOPCP/EC that do not use the Storage Cluster Continuous Copy function

```
> acgroup detail -g group01
```

```
Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

```
Pair
```

```
-----
ET001/0x1:ET001/0x6
ET001/0x2:ET001/0x7
ET001/0x3:ET001/0x8
```

```
> acgroup detail -g group01 -active
```

```
Copy Group Name : group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

```
Pair                Active Side
```

```
-----
ET001/0x1:ET001/0x6 ----
ET001/0x2:ET001/0x7 ----
ET001/0x3:ET001/0x8 ----
```

- In the case of OPC/QuickOPC/EC that use the Storage Cluster Continuous Copy function

```
> acgroup detail -g group01
Copy Group Name      : group01
Copy Group Type      : OPC
```

```
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
TFO Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Primary Pair      Secondary Pair
-----
ET001/0x1:ET001/0x6 ET002/0x1:ET002/0x11
ET001/0x2:ET001/0x7 ET002/0x2:ET002/0x12
```

```
> acgroup detail -g group01 -active
Copy Group Name      : group01
Copy Group Type      : OPC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
TFO Disk Array Name  : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Primary Pair      Secondary Pair      Active Side
-----
ET001/0x1:ET001/0x6 ET002/0x1:ET002/0x11 Primary
ET001/0x2:ET001/0x7 ET002/0x2:ET002/0x12 Primary
```

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 for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Pair	When the Storage Cluster Continuous Copy function is not used, the configured copy pair is displayed.
Primary Pair	When the Storage Cluster Continuous Copy function is used, the Primary Storage copy pair is displayed.
Secondary Pair	When the Storage Cluster Continuous Copy function is used, the Secondary Storage copy pair is displayed.
Active Side	When the Storage Cluster Continuous Copy function is used and the -active option is specified, the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none"> - Primary: Primary Storage. - Secondary: Secondary Storage. - ??? : Failed to get the TFO status. - ----: The Storage Cluster Continuous Copy function is not used.

- For REC

```
> acgroup detail -g group01

Copy Group Name      : group01
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Pair
-----
ET001/0x1:ET002/0x1
ET001/0x2:ET002/0x2
ET001/0x3:ET002/0x3
```

```
> acgroup detail -g group01 -active
Copy Group Name      : group01
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Pair                Active Side
-----
ET001/0x1:ET002/0x1 ----
ET001/0x2:ET002/0x2 ----
ET001/0x3:ET002/0x3 ----
```

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 <code>-a</code> option for the <code>acgroup create</code> command.
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the <code>-remote</code> option for the <code>acgroup create</code> command.
Pair	Displays the copy pairs that have been set up.
Active Side	When the <code>-active</code> option is specified, the storage device where the TFO status is "Active" is displayed. In case the Copy Group Type is REC, "-----" is permanently displayed.

4.5.4 acgroup remove (Copy Group Deletion Command)

NAME

`acgroup remove` - Delete copy groups

SYNOPSIS

```
acgroup remove -g copyGroup [-xml]
```

DESCRIPTION

This command removes copy groups.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-xml`

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

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

4.5.5 acpair add (Copy Pair Addition Command)

NAME

acpair add - Add copy pairs

SYNOPSIS

```
acpair add -g copyGroup -p copyPair [-xml]
```

DESCRIPTION

This command adds copy pairs to copy groups.

When the Storage Cluster Continuous Copy function is used, the copy pairs for both the Primary Storage and Secondary Storage are added.

OPTIONS

-g *copyGroup*

This option specifies the copy group name.

-p *copyPair*

This option specifies the copy pair to be added.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system and logical volume number that become the Storage Cluster pair are automatically retrieved from the specified ETERNUS Disk storage system and logical volume number, and the copy pairs for both the Primary Storage and Secondary Storage are added.

The following example shows the format for specifying copy pairs.

ET01/0x1:ET01/0x6

(1) (2) (3) (4)

- (1) ETERNUS name for the copy source
- (2) Logical volume number for the copy source
- (3) ETERNUS name for the copy destination
- (4) Logical volume number for the copy destination

This option can also be specified in LU to Partition format.

An example is shown below.

ET01/0x122[addr=0x0,size=0x10000]:ET01/0x121[addr=0x80]

(1) (2) (3) (4) (5) (6) (7)

- (1) ETERNUS name for the copy source
- (2) Logical volume number for the copy source
- (3) Extent start position for the copy source volume (block units)

- (4) Extent size for the copy source volume (number of blocks)
- (5) ETERNUS name for the copy destination
- (6) Logical volume number for the copy destination
- (7) Extent start position for the copy destination volume (block units)

Character strings starting with "0x" are hexadecimal expressions.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-xml

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

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Adding a copy pair in LU to LU format

```
> acpair add -g group01 -p ET001/0x1:ET001/0x6
Successful completion.
```

- Adding a copy pair in LU to Partition format

```
> acpair add -g group01 -p "ET001/0x122[addr=0x0,size=0x1]:ET001/0x121[addr=0x0]"
Successful completion.
```

NOTES

- Make sure that the logical volumes specified for the copy source and the copy destination are of the same size.
- If the copy type is OPC, QuickOPC or EC
 - When the Storage Cluster Continuous Copy function is used
 - Specify the ETERNUS name that was specified with the -a option or -tfoa option for the [acgroup create](#) command.
 - The copy source TFOV and the copy destination TFOV must belong to the same TFO group.
 - All copy pairs must belong to the same TFO group.
 - Copy pairs that include a non-TFOV cannot be registered.
 - When the Storage Cluster Continuous Copy function is not used
 - Specify the ETERNUS name that was specified with the -a option for the [acgroup create](#) command.
- If the copy type is SnapOPCP
 - Specify the ETERNUS name that was specified with the -a option for the [acgroup create](#) command.
 - In the case that the copy source of the specified copy pair is same with other copy pairs, an error may occur when the number of SnapOPC+ max session is exceeded.
- If the copy type is REC
 - Specify the ETERNUS name that was specified with either the -a or -remote option for the [acgroup create](#) command.
 - Specify different ETERNUS names for the copy source and the copy destination.
 - The copy source ETERNUS name and the copy destination ETERNUS name for the copy pair being added must be the same as the copy source ETERNUS name and copy destination ETERNUS name for any copy pairs that have already been added to the copy group.

4.5.6 `acpair remove` (Copy Pair Deletion Command)

NAME

`acpair remove` - Delete copy pairs

SYNOPSIS

```
acpair remove -g copyGroup -p copyPair [-xml]
```

DESCRIPTION

This command deletes copy pairs from copy groups.

When the Storage Cluster Continuous Copy function is used, delete the copy pairs on both the Primary Storage and Secondary Storage.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-p copyPair`

This option specifies the copy pair to be deleted.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified copy pair, and the copy pairs on both the Primary Storage and Secondary Storage are deleted.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

`-xml`

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Deleting a copy pair in LU to LU format

```
> acpair remove -g group01 -p ET001/0x1:ET001/0x6  
Successful completion.
```

- Deleting a copy pair in LU to Partition format

```
> acpair remove -g group01 -p "ET001/0x122[addr=0x0,size=0x1]:ET001/0x121[addr=0x0]"  
Successful completion.
```

NOTES

When this command is executed, the copy pair is deleted regardless of the Advanced Copy status. Therefore, it is essential to check the Advanced Copy status before executing this command.

If a copy pair is deleted accidentally, either stop Advanced Copy of the copy pair that was added by ETERNUS Web GUI, or add the copy pair again and then stop Advanced Copy.

4.6 Control Commands for Snapshot Type High-speed Copying

4.6.1 `acopc start` (OPC/QuickOPC Copy Start Command)

NAME

acopc start - Start OPC or QuickOPC

SYNOPSIS

- For OPC copy groups

```
acopc start -g copyGroup [-p copyPair] [-r] [-xml]
acopc start -g copyGroup -concur [-xml]
```

- For QuickOPC copy groups

```
acopc start -g copyGroup [-p copyPair] [-diff|-auto|-r] [-xml]
acopc start -g copyGroup -concur [-diff|-auto] [-xml]
```

DESCRIPTION

This command performs OPC or QuickOPC for the specified copy group or copy pair.

When the Storage Cluster Continuous Copy function is used, OPC or QuickOPC is performed on both the Primary Storage and Secondary Storage.

OPTIONS

-g copyGroup

This option specifies the copy group name.

-p copyPair

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified copy pairs, and copying is started on both the Primary Storage and Secondary Storage.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-diff

This option starts a differential copy.

If the **-diff** option is not specified, a full copy is started.

-auto

This option automatically selects full copy/differential copy of QuickOPC.

Depending on the statuses in the **OPC Status** and **Copy Phase** columns for the [acopc query](#) command, the following actions start:

OPC Status	Copy Phase	Processing Action
OPC action not startup	Not set	Full copy starts.
OPC Starting	N/A	After session stops, full copy starts.
OPC Executing	Readying	After session stops, full copy starts.
	Copying	After session stops, full copy starts.
	Tracking	Differential copy starts.
	Copying/Tracking	Differential copy starts.
OPC Error Suspend	N/A	After session stops, full copy starts.

When the Concurrent OPC function is in use, snapshots of multiple logical volumes are concurrently created, so the following actions start:

QuickOPC Session Status	Processing Action
The statuses of Copy Phase in QuickOPC sessions are only "Tracking" and "Copying/Tracking".	Differential copy starts.
Other than those above.	<ul style="list-style-type: none"> - If no QuickOPC session exists: Full copy starts. - If QuickOPC session exists: After session stops, full copy starts.

-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 is executed.

-xml

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

-concur

This option executes OPC or QuickOPC by using Concurrent OPC function.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Start OPC (When the Storage Cluster Continuous Copy function is not used)

```
> acopc start -g group01
```

```
ET001/0x1:ET001/0x6
```

```
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
```

```
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
```

```
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=6/Adr_high=0/Adr_low=0
```

```
ET001/0x2:ET001/0x7
```

```
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
```

```
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
```

```
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=7/Adr_high=0/Adr_low=0
```

```
ET001/0x3:ET001/0x8
```

```
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
```

```
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
```

```
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/  
Olu=8/Adr_high=0/Adr_low=0
```

```
Succeeded : 3
```

```
Failed : 0
```

- Start OPC (When the Storage Cluster Continuous Copy function is used)

```
> acopc start -g group01
```

```
ET001/0x1:ET001/0x6
```

```
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
```



```
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0
# Standby-Session : ET002/0x1:ET002/0x11
```

```
ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=7/Adr_high=0/Adr_low=0
# Standby-Session : ET002/0x2:ET002/0x12
```

```
Succeeded : 2
Failed : 0
```

- Start OPC by using Concurrent OPC function.

```
> acopc start -g group01 -concur
Successful completion.
```

NOTES

- When the copy type of copy group is EC, REC or SnapOPCP, this command cannot be executed.
- This command terminates abnormally if the copy destination logical volume of the specified copy group or pair is protected by the [acinhbit set](#) command.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and OPC or QuickOPC cannot be started on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command starts OPC or QuickOPC on the storage device that has an "Active" TFO status and terminates normally. However, OPC or QuickOPC could not be started on the storage device that has a "Standby" TFO status. In this case, ccm7002 message may be output.
If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[3.12.11 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

4.6.2 acopc query (OPC/QuickOPC Copy Status Display Command)

NAME

acopc query - Display the copy status of OPC or QuickOPC

SYNOPSIS

```
acopc query -g copyGroup [-p copyPair] [-r] [-progress] [-date] [-xml]
acopc query -g copyGroup [-p copyPair] [-r] -all [-xml]
```

DESCRIPTION

This command displays the copy status of the OPC or QuickOPC for the specified copy group or copy pair.
When the Storage Cluster Continuous Copy function is used, this command displays the copy status of both the Primary Storage and Secondary Storage.

OPTIONS

-g copyGroup

This option specifies the copy group name.

-p *copyPair*

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system that is the Storage Cluster pair is automatically retrieved from the specified copy pair and the copy status of both the Primary Storage and Secondary Storage is displayed.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-r

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-progress

This option displays the progress of copy processes.

-date

This option displays the last execution date of OPC or QuickOPC for the copy pair.

-all

This option specifies the displaying by the extended format. Refer to the table of EXAMPLES for the displayed items.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- For OPC (When the Storage Cluster Continuous Copy function is not used)

- When the -progress and -date options are not specified:

```
> acopc query -g Group01
```

```
Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

Source	<=>	Target	SID	OPC Status	Copy Phase	Copied Block
ET001/0x1	==>	ET001/0x3	0x21	"OPC Executing"	"Copying"	0
ET001/0x2	==>	ET001/0x4	0x22	"OPC Executing"	"Copying"	1048576

- When the -progress option is specified:

```
> acopc query -g Group01 -progress
```

```
Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

Source	<=>	Target	Progress	Copied Block	Total Block
ET001/0x1	==>	ET001/0x3	0%	0	1048576
ET001/0x2	==>	ET001/0x4	45%	1048576	2330168

- When the -date option is specified:

```
> acopc query -g Group01 -date

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase Copied Block Operation Date
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying"          0 "2010/10/20 09:00:00"
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying"        1048576 "2010/10/20 09:00:00"
```

- When the -progress and -date options are specified, or the -all option is specified:

```
> acopc query -g Group01 -progress -date

Copy Group Name : Group01
Copy Group Type : OPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase Progress Copied Block Total Block
Operation Date
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying"          0%           0      1048576
"2010/10/20 09:00:00"
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying"        45%       1048576      2330168
"2010/10/20 09:00:00"
```

- For QuickOPC (When the Storage Cluster Continuous Copy function is not used)

- When the -progress and -date options are not specified:

```
> acopc query -g Group01

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase Copied Block
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Tracking"        1048576
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Tracking"        1048576
```

- When the -progress option is specified:

```
> acopc query -g Group01 -progress

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    Progress Copied Block Total Block
-----
ET001/0x1 ==> ET001/0x3          0%           0      1048576
ET001/0x2 ==> ET001/0x4        45%       471859      1048576
```

- When the -date option is specified:

```
> acopc query -g Group01 -date

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

```

Source    <=> Target    SID  OPC Status    Copy Phase    Copied Block Operation Date
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying/Tracking"    0 "2010/10/20 09:00:00"
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying/Tracking"    1048576 "2010/10/20
09:00:00"

```

- When the -progress and -date options are specified, or the -all option is specified:

```

> acopc query -g Group01 -progress -date

Copy Group Name : Group01
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)

Source    <=> Target    SID  OPC Status    Copy Phase    Progress Copied Block Total Block
Operation Date
-----
ET001/0x1 ==> ET001/0x3 0x21 "OPC Executing" "Copying/Tracking"    0%            0    1048576
"2010/10/20 09:00:00"
ET001/0x2 ==> ET001/0x4 0x22 "OPC Executing" "Copying/Tracking"    45%          1048576    2330168
"2010/10/20 09:00:00"

```

- For OPC using the Storage Cluster Continuous Copy function

- When the -progress and -date options are not specified:

```

> acopc query -g Group01
Copy Group Name      : Group01
Copy Group Type      : OPC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
TFO Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    SID  OPC Status    Copy Phase Copied Block Standby-Source Standby-
Target Standby-Session
-----
ET001/0x1 ==> ET001/0x6 0x21 "OPC Executing" "Copying"    0 ET002/0x1    ET002/0x11
"Exist"
ET001/0x2 ==> ET001/0x7 0x22 "OPC Executing" "Copying"    1048576 ET002/0x2
ET002/0x12    "Not-Exist"

```

The following table shows the meanings of the information displayed.

Table 4.1 When -progress and -date Options Are Not Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. - N/A: No copying is performed.

Title	Explanation
	<ul style="list-style-type: none"> - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	<p>Displays the logical volume for the copy destination.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.</p>
SID	<p>Displays the session ID for the copy source.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.</p>
OPC Status	<p>Displays the execution status of the OPC.</p> <p>If the Storage Cluster Continuous Copy function is used, the OPC execution status of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - 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	<p>Displays the current phase.</p> <p>If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Readyng: Concurrent OPC is defined. - 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. - Not set: Copy processing has not been performed.
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>If the copy process finishes and is in Tracking status, it displays the number of blocks that have not been updated since after the last execution of the logical copy.</p> <p>If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed.</p> <p>The "N/A" is displayed when the copy process is not executed.</p> <p>If the number of copied blocks is unknown, it is displayed "???".</p>
Standby-Source	<p>If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Target	<p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.2 When -progress Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target - <==: Copying from the target to the source
Target	Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.
Progress	Displays the progress of copy processes as a percentage. If the Storage Cluster Continuous Copy function is used, the replication progress rate of the ETERNUS Disk storage system where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the progress of copy processes is unknown, it is displayed "???".
Copied Block	Displays the number of blocks that have been copied. If the copy process finishes and is in Tracking status, it displays the number of blocks that have not been updated since after the last execution of the logical copy. If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the number of copied blocks is unknown, it is displayed "???".
Total Block	Displays the number of total blocks. If the Storage Cluster Continuous Copy function is used, the number of total blocks of the storage device where the TFO status is "Active" is displayed. If the number of total blocks is unknown, it is displayed "???".
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed. <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.3 When -date Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target - <==: Copying from the target to the source
Target	Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.
SID	Displays the session ID for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.
OPC Status	Displays the execution status of the OPC. If the Storage Cluster Continuous Copy function is used, the OPC execution status of the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none"> - 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. If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none"> - Ready: Concurrent OPC is defined. - 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. - Not set: Copy processing has not been performed.
Copied Block	Displays the number of blocks that have been copied. If the copy process finishes and is in Tracking status, it displays the number of blocks that have not been updated since after the last execution of the logical copy. If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the number of copied blocks is unknown, it is displayed "???".
Operation Date	If an OPC session exists, it displays the date for when the OPC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format.

Title	Explanation
	<p>The displaying of the date is performed on the basis of the target device's time zone. If the Storage Cluster Continuous Copy function is used, the date and time of storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Starting logical copy (execution of <code>acopc start</code> or <code>acopc start -diff</code>) - State transitions to error suspend (OPC Status column displays "OPC Error Suspend") <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--."</p> <ul style="list-style-type: none"> - If an OPC session does not exist (OPC Status column displays "OPC action not startup") - If the OPC session's copy status could not be acquired from the device (OPC Status column displays "??") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.4 When `-progress` and `-date` Options Are Specified, or `-all` Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the <code>-a</code> option for the <code>acgroup create</code> command.
TFO Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the <code>-tfoa</code> option for the <code>acgroup create</code> command.
Source	<p>Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.</p>
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target - <==: Copying from the target to the source
Target	<p>Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.</p>

Title	Explanation
SID	<p>Displays the session ID for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.</p>
OPC Status	<p>Displays the execution status of the OPC. If the Storage Cluster Continuous Copy function is used, the OPC execution status of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - 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	<p>Displays the current phase. If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Readyng: Concurrent OPC is defined. - 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. - Not set: Copy processing has not been performed.
Progress	<p>Displays the progress of copy processes as a percentage. If the Storage Cluster Continuous Copy function is used, the replication progress rate of the ETERNUS Disk storage system where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the progress of copy processes is unknown, it is displayed "???".</p>
Copied Block	<p>Displays the number of blocks that have been copied. If the copy process finishes and is in Tracking status, it displays the number of blocks that have not been updated since after the last execution of the logical copy. If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the number of copied blocks is unknown, it is displayed "???".</p>
Total Block	<p>Displays the number of total blocks. If the Storage Cluster Continuous Copy function is used, the number of total blocks of the storage device where the TFO status is "Active" is displayed. If the number of total blocks is unknown, it is displayed "???".</p>
Operation Date	<p>If an OPC session exists, it displays the date for when the OPC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format. The displaying of the date is performed on the basis of the target device's time zone. If the Storage Cluster Continuous Copy function is used, the date and time of storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Starting logical copy (execution of acopc start or acopc start -diff) - State transitions to error suspend (OPC Status column displays "OPC Error Suspend") <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--."</p> <ul style="list-style-type: none"> - If an OPC session does not exist (OPC Status column displays "OPC action not startup") - If the OPC session's copy status could not be acquired from the device (OPC Status column displays "???")

Title	Explanation
	- If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed, <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

NOTES

- When the copy type of copy group is EC, REC or SnapOPCP, this command cannot be executed.
- Information such as Copy direction data and SID data may display as "???". Refer to ["5.3 Resolving for Displaying ??? in Advanced Copy Status"](#) and take action.
- The copying progress for OPC and QuickOPC may not reach 100% due to such things as data updates to the copy source.
If **Copy Phase** column is either of the following, the copying is complete.
 - Not Set (when the copy type is OPC)
 - Tracking (when the copy type is QuickOPC)
- When the Storage Cluster Continuous Copy function is used, it may be necessary to take measures, depending on the content displayed in the **Standby-Session** column.
 - For "Not-Exist":
Refer to ["3.12.11 When Recovering Storage Cluster Continuous Copy Function"](#).
 - Other than those above:
No action is required.

4.6.3 acopc cancel (OPC/QuickOPC Copy Stop Command)

NAME

acopc cancel - Stop OPC or QuickOPC

SYNOPSIS

- For OPC copy groups

```
acopc cancel -g copyGroup [-p copyPair] [-r] [-xml]
```

- For QuickOPC copy groups

```
acopc cancel -g copyGroup [-p copyPair] [-r] [-force] [-xml]
```

DESCRIPTION

This command stops the OPC or QuickOPC copy for the specified copy group or copy pair.

When the Storage Cluster Continuous Copy function is used, stops OPC or QuickOPC on both the Primary Storage and Secondary Storage.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-p copyPair`

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage cluster pair is automatically retrieved from the specified pairs, and OPC or QuickOPC is stopped on both the Primary Storage and Secondary Storage.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

`-r`

This option stops copying in the direction opposite to the specified one.

`-force`

This option stops physical copying and tracking.

If this option is not specified, only tracking is stopped. The physical copying currently being executed continues.

If this option is specified with the `-r` option, only the physical copying is stopped.

`-xml`

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When the Storage Cluster Continuous Copy function is not used

```
> acopc cancel -g group01
ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

ET001/0x3:ET001/0x8
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>

Succeeded : 3
Failed    : 0
```

- When the Storage Cluster Continuous Copy function is used

```
> acopc cancel -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>
# Standby-Session : ET002/0x1:ET002/0x11

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>
```

```
# Standby-Session : ET002/0x2:ET002/0x12

Succeeded : 2
Failed    : 0
```

NOTES

- When the copy type of copy group is EC, REC or SnapOPCP, this command cannot be executed.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and OPC or QuickOPC cannot be stopped on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or the status of the TFO group is "Halt", the command stops OPC or QuickOPC on the storage device that has an "Active" TFO status and terminates normally. However, OPC or QuickOPC could not be stopped on the storage that has a "Standby" TFO status. In this case, ccm7002 message may be output. If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[3.12.11 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

4.6.4 acsnap start (SnapOPC+ Copy Start Command)

NAME

acsnap start - Start SnapOPC+

SYNOPSIS

```
acsnap start -g copyGroup [-p copyPair | -v volumeName] [-r] [-xml]
acsnap start -g copyGroup -concur [-xml]
acsnap start -estimate -v volumeName [-xml]
```

DESCRIPTION

The SnapOPC+ is executed onto a specified copy group or copy pair.

- If a copy group is specified only with the -g option, the copy pair for each copy source logical volume in the copy group is automatically selected according to "[2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+](#)" and then the SnapOPC+ copy starts.
- If a copy pair is specified with the -p option, SnapOPC+ copy starts for the specified copy pair.
If the specified copy destination is not the oldest snap generation (snap generation number is "2" or later), this command terminates with an error.
- If a copy source logical volume is specified with the -v option, the copy pair for that logical volume is automatically selected according to "[2.6.2 Logic for Selection of Copy Pair to Start SnapOPC+](#)" and then the SnapOPC+ copy starts.

If the -estimate option is specified, the monitor session of the update amount measurement starts for the specified volume.

OPTIONS

-g *copyGroup*

This option specifies the copy group name.

-p *copyPair*

This option specifies a copy pair.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-r

This option performs a copy in the reverse direction to the direction that has been specified.

If a copy pair is not specified, the latest snap generation in the copy group is selected as the copy source.

-v *volumeName*

Specify a logical volume.

If this option is specified when starting SnapOPC+ copy, the copy destination is automatically selected.

When starting the monitor session of the update amount measurement, specify a logical volume to be measured.

The following is an example of a format to specify a logical volume.

ET01/0x1
└──┬──┘ └──┬──┘
 (1) (2)

- (1) ETERNUS name

- (2) Logical volume number

The extent start position and the extent size can be specified.

ET01/0x1[addr=0x0,size=0x99]
└──┬──┘ └──┬──┘ └──┬──┘ └──┬──┘
 (1) (2) (3) (4)

- (1) ETERNUS name

- (2) Logical volume number

- (3) Extent start position (block units)

- (4) Extent size (number of blocks)

A character string starting with "0x" expresses a hexadecimal value.

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-estimate

Specify this option when starting the monitor session of the update amount measurement.

-xml

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

-concur

This option executes SnapOPC+ by using Concurrent OPC function.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Starting the SnapOPC+

```
> acsnap start -g group01
```

```
ET001/0x1:ET001/0x6  
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>
```

```
ET001/0x2:ET001/0x7  
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>
```

```
ET001/0x3:ET001/0x8
```

```
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Started >>
```

```
Succeeded : 3  
Failed    : 0
```

- Starting the monitor session of the update amount measurement

```
> acsnap start -estimate -v ET001/0x1  
Successful completion.
```

- Executing SnapOPC+ by using the Concurrent OPC function

```
> acsnap start -g group01 -concur  
Successful completion.
```

NOTES

- When the copy type of copy group is OPC, QuickOPC, EC or REC, this command cannot be executed.
- This command is not available for ETERNUS Disk storage system registered as a remote device.
- This command terminates abnormally if the copy destination logical volume of the specified copy group or pair is protected by the [acinhibit set](#) command.

SEE ALSO

To perform automatic management of copy pairs, refer to the operation example in "[2.6.1 Automatic Management of Snap Generations](#)".

4.6.5 acsnap query (SnapOPC+ Copy Status Display Command)

NAME

acsnap query - Display the copy status of SnapOPC+

SYNOPSIS

```
acsnap query -g copyGroup [-p copyPair] [-r] [-date] [-xml]  
acsnap query -g copyGroup [-p copyPair] [-r] -all [-xml]  
acsnap query -estimate -v volumeName [-xml]
```

DESCRIPTION

This command displays the copy status of the SnapOPC+ for the specified copy group or copy pair.

The copy-source logical volume and snap generation number are sorted and displayed. (However, a copy pair that has no session is displayed at the bottom of the sort column.)

If the `-estimate` option is specified, the update amount after the monitor session has started is displayed.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-p copyPair`

This option specifies a copy pair.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

`-r`

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-date

This option displays the last execution date of SnapOPC+ for the copy pair.

-all

This option specifies the displaying by the extended format.
Refer to the table of EXAMPLES for the displayed items.

-estimate

Specify this option when referencing the update amount.

-v *volumeName*

Specify a logical volume when referencing the update amount.
The following is an example of a format to specify a logical volume.

ET01/0x1
┌───┬───┐
└───┴───┘
(1) (2)

- (1) ETERNUS name
- (2) Logical volume number

The extent start position and the extent size can be specified.

ET01/0x1[addr=0x0,size=0x99]
┌───┬───┬───┬───┐
└───┴───┴───┴───┘
(1) (2) (3) (4)

- (1) ETERNUS name
- (2) Logical volume number
- (3) Extent start position (block units)
- (4) Extent size (number of blocks)

A character string starting with "0x" expresses a hexadecimal value.

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Displaying the SnapOPC+ copy status
 - When the -date option is not specified:

```
> acsnap query -g group01
```

```
Copy Group Name : group01  
Copy Group Type : SnapOPCP  
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
```

```

Source    <=> Target    SID  Snap Status                Gen Date    Copied Block
-----
ET001/0x1 ==> ET001/0x5 0x23 "Copy On Write(Active)"    3  10minute    1048576
ET001/0x1 ==> ET001/0x4 0x22 "Copy On Write(Inactive)"  2  3hour       1048576
ET001/0x1 ==> ET001/0x3 0x21 "Copy On Write(Inactive)"  1  1day        1048576

```

- When the -date or -all option is specified:

```
> acsnap query -g Group01 -date
```

```

Copy Group Name : Group01
Copy Group Type : SnapOPCP
Disk Array Name : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Source    <=> Target    SID  Snap Status                Gen Date    Copied Block Operation Date
-----
ET001/0x1 ==> ET001/0x5 0x23 "Copy On Write(Active)"    3  10minute    1048576 "2010/10/19
12:10:00"
ET001/0x1 ==> ET001/0x4 0x22 "Copy On Write(Inactive)"  2  3hour       1048576 "2010/10/19
09:00:00"
ET001/0x1 ==> ET001/0x3 0x21 "Copy On Write(Inactive)"  1  1day        1048576 "2010/10/18
09:00:00"

```

The following table shows the meanings of the information displayed.

Table 4.5 When -date Option Is Not Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -a option for the acgroup create command.
Source	Displays a copy-source logical volume.
<=>	Displays a copy direction. The following information is displayed. <ul style="list-style-type: none"> - N/A: No copy process is executed - ==>: Copy process from source to target - <==: Copy process from target to source
Target	Displays a copy-destination logical volume.
SID	Displays a copy source session ID.
Snap Status	Displays the SnapOPC+ execution status. If the -r option is specified, no information is displayed. <ul style="list-style-type: none"> - Snap action not startup: No specified session exists. - Snap Starting: SnapOPC+ is starting. (The starting process of SnapOPC+ logical copy is in progress) - Snap Deleting: SnapOPC+ processing is being stopped (snap generation is being deleted) - Copy On Write(Readying): Concurrent OPC is defined. (Latest snap generation) - Copy On Write(Active): SnapOPC+ is in process. (Latest snap generation) - Copy On Write(Inactive): SnapOPC+ is in process. (Past snap generations)

Title	Explanation
	- Snap Error Suspend: Error that cannot continue copy process occurred.
OPC Status	Displays OPC executed status. The information is only displayed when the -r option is specified. <ul style="list-style-type: none"> - OPC action not startup: No specified session exists. - OPC Starting: OPC is being started. (OPC logical copy is in boot process.) - OPC Executing: OPC is in process. (OPC logical copy completed, physical copy being in process.) - OPC Error Suspend: Error that cannot continue copy process occurred.
Copy Phase	Displays the current phase. The information is only displayed when the -r option is specified. <ul style="list-style-type: none"> - Not set: No copy process is executed. - Copying: Copy is in process.
Gen	Displays snap generation numbers. If the -r option is specified, no information is displayed. For snap generation numbers, 1 is the oldest and as the number is larger, it shows more new generations. If no copy process is executed, it is displayed as "N/A".
Date	Displays the elapsed time of Snapshot type copy execution. If the -r option is specified, no information is displayed. The output format is as follows. <ul style="list-style-type: none"> - N/A: No copy process is executed. - Less than 1H: Displayed on a per minute basis. If below one minute, it is displayed as "0minute". - Less than 24H: Displayed on a per hour basis. - 24H or more: Displayed on a per day basis.
Copied Block	Displays the number of copied blocks. If no copy process is executed, it is displayed as "N/A". If the number of copied blocks is unknown, it is displayed "???".

Table 4.6 When -date or -all Option Is Specified:

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and the ETERNUS name that was specified with the -a option for the acgroup create command.
Source	Displays a copy-source logical volume.
<=>	Displays a copy direction. The following information is displayed. <ul style="list-style-type: none"> - N/A: No copy process is executed - ==>: Copy process from source to target - <==: Copy process from target to source
Target	Displays a copy-destination logical volume.
SID	Displays a copy source session ID.
Snap Status	Displays the SnapOPC+ execution status. If the -r option is specified, no information is displayed.

Title	Explanation
	<ul style="list-style-type: none"> - Snap action not startup: No specified session exists. - Snap Starting: SnapOPC+ is starting. (The starting process of SnapOPC+ logical copy is in progress) - Snap Deleting: SnapOPC+ processing is being stopped (snap generation is being deleted) - Copy On Write(Readying): Concurrent OPC is defined. (Latest snap generation) - Copy On Write(Active): SnapOPC+ is in process. (Latest snap generation) - Copy On Write(Inactive): SnapOPC+ is in process. (Past snap generations) - Snap Error Suspend: Error that cannot continue copy process occurred.
OPC Status	<p>Displays OPC executed status. The information is only displayed when the -r option is specified.</p> <ul style="list-style-type: none"> - OPC action not startup: No specified session exists. - OPC Starting: OPC is being started. (OPC logical copy is in boot process.) - OPC Executing: OPC is in process. (OPC logical copy completed, physical copy being in process.) - OPC Error Suspend: Error that cannot continue copy process occurred.
Copy Phase	<p>Displays the current phase. The information is only displayed when the -r option is specified.</p> <ul style="list-style-type: none"> - Not set: No copy process is executed. - Copying: Copy is in process.
Gen	<p>Displays snap generation numbers. If the -r option is specified, no information is displayed. For snap generation numbers, 1 is the oldest and as the number is larger, it shows more new generations. If no copy process is executed, it is displayed as "N/A".</p>
Date	<p>Displays the elapsed time of Snapshot type copy execution. If the -r option is specified, no information is displayed. The output format is as follows.</p> <ul style="list-style-type: none"> - N/A: No copy process is executed. - Less than 1H: Displayed on a per minute basis. If below one minute, it is displayed as "0minute". - Less than 24H: Displayed on a per hour basis. - 24H or more: Displayed on a per day basis.
Copied Block	<p>Displays the number of copied blocks. If no copy process is executed, it is displayed as "N/A". If the number of copied blocks is unknown, it is displayed "???".</p>
Operation Date	<p>If an SnapOPC+ session exists, it displays the date for when the SnapOPC+ session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format. The displaying of the date is performed on the basis of the target device's time zone.</p> <ul style="list-style-type: none"> - Starting logical copy (execution of acsnap start) - State transitions to error suspend (Snap Status column displays "Snap Error Suspend") - State transitions to error suspend (OPC Status column displays "OPC Error Suspend") <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--".</p>

Title	Explanation
	<ul style="list-style-type: none"> - If an OPC session does not exist (OPC Status column displays "OPC action not startup") - If the OPC session's copy status could not be acquired from the device (OPC Status column displays "??") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)

- Referencing the update amount

```
> acsnap query -estimate -v ET001/0x1
Update
-----
      10M
```

The following table shows the meanings of the information displayed.

Title	Explanation
Update	Displays the update amount after monitor session is started. The displayed unit is megabyte.

NOTES

- When the copy type of copy group is OPC, QuickOPC, EC or REC, this command cannot be executed.
- Information such as Copy direction data and SID data may display as "??". Refer to ["5.3 Resolving for Displaying "???" in Advanced Copy Status"](#) and take action.
- This command is not available for ETERNUS Disk storage system registered as a remote device.

4.6.6 acsnap cancel (SnapOPC+ Copy Stop Command)

NAME

acsnap cancel - Stop SnapOPC+

SYNOPSIS

```
acsnap cancel -g copyGroup [-p copyPair | -v volumeName] [-r | -force][-xml]
acsnap cancel -estimate -v volumeName [-xml]
```

DESCRIPTION

This command stops the SnapOPC+ copy for the copy group or copy pair.

However, when the copy group is specified with the `-force` option, the SnapOPC+ copy for snap generations not included in the specified copy group may also be stopped.

If the `-estimate` option is specified, the monitor session of the update amount measurement is stopped.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-p copyPair`

This option specifies a copy pair.

When specifying a copy pair for a snap generation other than the oldest in a storage device that does not support deletion of snap generations other than the oldest (snap generation number is "2" or later), also specify the `-force` option. Refer to ["3.2.1.6 Stopping SnapOPC+"](#) for information on the storage devices that do not support deletion of snap generations other than the oldest.

When the `acsnap start` command was executed by specifying both the `-r` and `-p` options, it is necessary to specify this option to cancel the SnapOPC+ copy.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-r

This option stops copying in the reverse direction to the direction that has been specified.

-force

This option forcibly stops the SnapOPC+ copy. The SnapOPC+ sessions that are forcibly stopped are as follows.

- When the -p option is not specified

From among all the SnapOPC+ sessions for the copy source volume of the copy group specified with the -g option, the latest SnapOPC+ session in the copy group specified with the -g option and all the SnapOPC+ sessions created prior to that session

- When the -p option is specified

From among all the SnapOPC+ sessions for the copy source volume of the copy group specified with the -g option, the SnapOPC+ session of the copy pair specified with the -p option and all the SnapOPC+ sessions created prior to that session

"All the SnapOPC+ sessions for the copy source volume" refers to all the SnapOPC+ sessions for the copy source volume in the storage device where its volume exists. For example, when multiple copy groups are defined for the copy source volume, in addition to the SnapOPC+ sessions of the target copy group, the SnapOPC+ sessions of other copy groups are also included.

This option is specifiable even if there is only one snap generation.

-v *volumeName*

The copy process of a specified logical volume is cancelled.

- If the -force option is specified, the SnapOPC+ session of the latest snap generation in the copy group is stopped.
- If the -force option is not specified, the SnapOPC+ session of the oldest snap generation in the copy group is stopped.
- If the -r option is specified, restoration of the SnapOPC+ session of the latest snap generation in the copy group is stopped.

When stopping the monitor session of the update amount measurement, specify a logical volume to be measured.

The following is an example of a format to specify a logical volume.

ET01/0x1
┌───┬───┐
└───┘└───┘
(1) (2)

- (1) ETERNUS name
- (2) Logical volume number

The extent start position and the extent size can be specified.

ET01/0x1[addr=0x0,size=0x99]
┌───┬───┬───┬───┐
└───┘└───┘└───┘└───┘
(1) (2) (3) (4)

- (1) ETERNUS name
- (2) Logical volume number
- (3) Extent start position (block units)
- (4) Extent size (number of blocks)

A character string starting with "0x" expresses a hexadecimal value.

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-estimate

Specify this option when stopping the monitor session of the update amount measurement.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Stopping the SnapOPC+ copy

```
> acsnap cancel -g group01
```

```
ET001/0x1:ET001/0x6
```

```
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>
```

```
ET001/0x2:ET001/0x7
```

```
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>
```

```
ET001/0x3:ET001/0x8
```

```
# DATE : 2008/06/24 16:28:00 - << SnapOPCP Disconnected >>
```

```
Succeeded : 3
```

```
Failed : 0
```

- Stopping the monitor session of the update amount measurement

```
> acsnap cancel -estimate -v ET001/0x1
```

```
Successful completion.
```

NOTES

- If you stop a session of defined Concurrent OPC (Readying), specify a copy pair by using the -p option.
- When the copy type of copy group is OPC, QuickOPC, EC or REC, this command cannot be executed.
- This command is not available for ETERNUS Disk storage system registered as a remote device.
- Use ETERNUS Web GUI or ETERNUS CLI to stop the monitor session started by the following methods.
 - Operation by Copy command via SAN
 - Started by Copy command via LAN
 - Started by ETERNUS Web GUI
 - Started by ETERNUS CLI
 - Operation by Copy command via LAN
 - Started by Copy command via SAN
- SnapOPC+ snap generations are deleted differently depending on whether the target storage device supports deletion of a snap generation other than the oldest. Refer to ["3.2.1.6 Stopping SnapOPC+"](#) for information on support requirements.
 - When deletion is supported

Specific snap generation can be deleted while past snap generations are retained.

When a snap generation other than the oldest (snap generation number is "2" or later) is deleted, the snap generation may remain for some time after the command is executed with the status of "Snap Deleting".

Before reusing the copy destination volume that is being used for the deletion target snap generation as the copy destination volume, confirm that the generation deletion process is completed.

If the command is executed again for the snap generation being deleted, the command completes successfully. However, since the targeted snap generation is already being deleted, the status of that snap generation does not change from "Snap Deleting".

- When deletion is not supported

The oldest snap generation (snap generation number is "1") must be deleted first.

To forcibly delete a snap generation other than the oldest, specify the `-force` option. In this case, the specified snap generation and all snap generations prior to that generation are deleted.

- When SnapOPC+ snap generations are deleted, the remaining snap generation numbers are moved up.
When snap generations other than the oldest (snap generation number is "2" or later) are deleted, the snap generation numbers are moved up when the deletion process of the snap generation is completed.

4.7 Control Commands for Synchronous High-speed Copying

4.7.1 `acec start` (Synchronous High-speed Copy Start Command)

NAME

`acec start` - Start the synchronous high-speed copying

SYNOPSIS

- When the copy type set in the copy group is EC

```
acec start -g copyGroup [-p copyPair] [-r] [-da] [-xml]
```

- When the copy type set in the copy group is REC

```
acec start -g copyGroup [-p copyPair] [-r] [-transfer {sync [-split {auto | manual}] | through | consist | stack}] [-recovery {auto | manual}] [-skip] [-da] [-xml]
```

DESCRIPTION

This command starts synchronous processing for the synchronous high-speed copy for the specified copy group or copy pair. When the Storage Cluster Continuous Copy function is used, start the synchronous high-speed copy synchronization processing on both the Primary Storage and Secondary Storage.

OPTIONS

`-g copyGroup`

This option specifies the copy group name.

`-p copyPair`

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage systems copy pair that is the Storage Cluster pair is automatically retrieved from the specified pairs, and the synchronous high-speed copy synchronization processing is started on both the Primary Storage and Secondary Storage.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

`-r`

This option performs a copy in the reverse direction to the direction that has been specified.

`-transfer {sync [-split {auto | manual}] | through | consist | stack}`

This option specifies the transfer mode. (Only for REC)

The default mode is "stack". Refer to "3.2.2.5 REC Operating Modes" for information on each mode.

- sync: Synchronous mode

This option specifies the split mode when sync was specified with the -transfer option (Only for REC)

-split

The default mode is "auto".

- auto: Automatic Split
- manual: Manual Split

- through: Through mode

When the storage device is registered to operate by Copy command via LAN, this transfer mode cannot be specified.

- consist: Consistency mode
- stack: Stack mode

-recovery {auto | manual}

This option specifies the recovery mode. (Only for REC)

The default mode is "auto". Refer to "3.2.2.5 REC Operating Modes" for information on each mode.

- auto: Automatic Recovery
- manual: Manual Recovery

-skip

This option specifies when the synchronous process is suspended by using the initial copy skip function.

This option can be specified when the synchronous high-speed copy for inter-box is started.

-da

From the start of the EC/REC synchronous high-speed copy process until its suspension, always set the copy destination logical volume to unreadable.

It is not possible to use this option if one registered the device as a device which is operated by Copy command via SAN and moreover has specified "through" with the -transfer option.

-xml

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

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Start the synchronous high-speed copy (When the Storage Cluster Continuous Copy function is not used)

```
> acec start -g group01
```

```
ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0
```

```
ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=7/Adr_high=0/Adr_low=0
```

```

ET001/0x3:ET001/0x8
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=3/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=8/Adr_high=0/Adr_low=0

```

```

Succeeded : 3
Failed    : 0

```

- Start the synchronous high-speed copy (When the Storage Cluster Continuous Copy function is used)

```
> acec start -g group01
```

```

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0
# Standby-Session : ET002/0x1:ET002/0x11

```

```

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=2/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=7/Adr_high=0/Adr_low=0
# Standby-Session : ET002/0x2:ET002/0x12

```

```

Succeeded : 2
Failed    : 0

```

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- This command terminates abnormally if the copy destination logical volume of the specified copy group or pair is protected by the [acinhibit set](#) command.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and the synchronous high-speed copy synchronization processing cannot be started on either or both of the Primary Storage or Secondary Storage, the command may be terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group state is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command starts synchronous high-speed copy synchronization processing on the storage device that has an "Active" TFO status and terminates normally. However, synchronous high-speed copy synchronization processing could not be started on the storage device that has a "Standby" TFO status. In this case, ccm7002 message may be output. If a ccm7002 message is output, after the TFO group state becomes "Normal" and the phase is not "Maintenance", refer to ["3.12.11 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.

4.7.2 acec query (Synchronous High-speed Copy Status Display Command)

NAME

acec query - Display the copy status of synchronous high-speed copying

SYNOPSIS

```
acec query -g copyGroup [-p copyPair] [-r] [-progress] [-da] [-date] [-xml]
acec query -g copyGroup [-p copyPair] [-r] -all [-xml]
```

DESCRIPTION

This command displays the status of the synchronous high-speed copy for the specified copy group or copy pair. When the Storage Cluster Continuous Copy function is used, the synchronous high-speed copy processing status for both the Primary Storage and Secondary Storage is displayed.

OPTIONS

-g copyGroup

This option specifies the copy group name.

-p copyPair

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage systems copy pair that is the Storage Cluster pair is automatically retrieved from the specified pairs, and synchronous high-speed copy processing status for both the Primary Storage and Secondary Storage is displayed.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-r

This option displays the status of a copy in the reverse direction to the direction that has been specified.

-progress

This option displays the progress of copy processes.

-da

This option displays the suppression settings for access to the EC/REC copy destination area.

-date

This option displays the last execution date of synchronous high-speed copy for the copy pair.

-all

This option specifies the displaying by the extended format.

Refer to the table of EXAMPLES for the displayed items.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- For EC (When the Storage Cluster Continuous Copy function is not used)

- When the *-progress*, *-da* and *-date* options are not specified:

```
> acec query -g ECGroup
```

```
Copy Group Name : ECGroup
```

```
Copy Group Type : EC
```

```
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Source    <=> Target    SID    EC Status    Copy Phase Copied Block
```

```

-----
ET002/0x1 N/A ET002/0x3 N/A "EC action not startup" "Not set" 0
ET002/0x2 ==> ET002/0x4 0x41 "EC Executing" "Copying" 1048576

```

- When the -progress option is specified:

```

> acec query -g ECGroup -progress

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    Progress Copied Block Total Block
-----
ET002/0x1 N/A ET002/0x3    N/A      N/A      N/A
ET002/0x2 ==> ET002/0x4    45%     471859  1048576

```

- When the -da option is specified:

```

> acec query -g ECGroup -da

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    SID  EC Status          Copy Phase Copied Block Copy DA
-----
ET002/0x1 N/A ET002/0x3 N/A  "EC action not startup" "Not set"      N/A    off
ET002/0x2 ==> ET002/0x4 0x41 "EC Executing"          "Copying"     471859  on

```

- When the -date option is specified:

```

> acec query -g ECGroup -date

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    SID  EC Status          Copy Phase Copied Block Operation Date
-----
ET002/0x1 N/A ET002/0x3 N/A  "EC action not startup" "Not set"      N/A  "----/--/-- --:--:--"
ET002/0x2 ==> ET002/0x4 0x41 "EC Suspend"          "Paired"     471859 "2010/10/20 09:00:00"

```

- When the -progress, -da and -date options are specified, or the -all option is specified:

```

> acec query -g ECGroup -progress -da -date

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source    <=> Target    SID  EC Status          Copy Phase Progress Copied Block Total Block
Copy DA Operation Date
-----
ET002/0x1 N/A ET002/0x3 N/A  "EC action not startup" "Not set"      N/A      N/A      N/A
A    off "----/--/-- --:--:--"
ET002/0x2 ==> ET002/0x4 0x41 "EC Suspend"          "Paired"     100%     1048576
1048576    on "2010/10/20 09:00:00"

```

- For EC (When the Storage Cluster Continuous Copy function is used)

- When -progress and -date Options Are Not Specified

```
> acec query -g group01
```

```
Copy Group Name      : group01
Copy Group Type      : EC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
TFO Disk Array Name  : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target  SID  EC Status          Copy Phase Copied Block Standby-Source Standby-
Target Standby-Session
-----
-----
ET001/0x1 N/A ET001/0x6 N/A "EC action not startup" "Not set"          N/A ET002/0x1
ET002/0x11      "----"
ET001/0x2 ==> ET001/0x7 0x41 "EC Suspend"      "Paired"          1048576 ET002/0x2
ET002/0x12      "Exist"
```

The following table shows the meanings of the information displayed.

Table 4.7 When -progress, -da and -date Options Are Not Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.
SID	Displays the session ID. If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.
EC Status	Displays the execution status of the EC. If the Storage Cluster Continuous Copy function is used, the EC execution status of the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none"> - 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.

Title	Explanation
Copy Phase	<p>Displays the current phase.</p> <p>If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Not set: Either the specified session does not exist, or the copy process is not running.
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed.</p>
Standby-Source	<p>If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Target	<p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.8 When -progress Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	<p>Displays the logical volume for the copy source.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.</p>
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	<p>Displays the logical volume for the copy destination.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.</p>
Progress	<p>Displays the progress of copy processes as a percentage.</p> <p>If the Storage Cluster Continuous Copy function is used, the replication progress rate of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p>

Title	Explanation
	The "N/A" is displayed when the copy process is not executed. If the progress of copy processes is unknown, it is displayed "???".
Copied Block	Displays the number of blocks that have been copied. If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage where the TFO status is "Active" is displayed. The "N/A" is displayed when the copy process is not executed. If the number of copied blocks is unknown, it is displayed "???".
Total Block	Displays the number of total blocks. If the Storage Cluster Continuous Copy function is used, the number of total blocks of the storage device where the TFO status is "Active" is displayed. If the number of total blocks is unknown, it is displayed "???".
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed. <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.9 When -da Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.
SID	Displays the session ID. If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.

Title	Explanation
EC Status	<p>Displays the execution status of the EC.</p> <p>If the Storage Cluster Continuous Copy function is used, the EC execution status of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - 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	<p>Displays the current phase.</p> <p>If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Not set: Either the specified session does not exist, or the copy process is not running.
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed.</p>
Copy DA	<p>If the copy type is EC/REC, this displays the suppression settings for access to the copy destination area.</p> <p>If the Storage Cluster Continuous Copy function is used, the suppression settings for access to the copy destination area for the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - on: Access is suppressed. - off: Access is not suppressed. <p>If the access suppression setting is unknown, it is displayed "???".</p>
Standby-Source	<p>If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Target	<p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.</p>
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ????: The Standby-Side Continuous Copy Session status is unknown.

Table 4.10 When -date Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.

Title	Explanation
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	Displays the logical volume for the copy source. If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.
<=>	Displays the copy direction. <ul style="list-style-type: none">- N/A: No copying is performed.- ==>: Copying from the source to the target.- <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination. If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.
SID	Displays the session ID. If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.
EC Status	Displays the execution status of the EC. If the Storage Cluster Continuous Copy function is used, the EC execution status of the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none">- 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. If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none">- Copying: Copy processing is executing.- Paired: The copy is in the 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. If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed.
Operation Date	If an EC session exists, it displays the date for when the EC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format. The displaying of the date is performed on the basis of the target device's time zone. If the Storage Cluster Continuous Copy function is used, the date and time of storage device where the TFO status is "Active" is displayed. <ul style="list-style-type: none">- Suspend (execution of <code>acec suspend</code>)- Concurrent suspend (execution of <code>acec suspend -concur</code>)- State transition to an error Suspend (EC Status column displays "EC Error Suspend"). If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--".

Title	Explanation
	<ul style="list-style-type: none"> - If an EC session does not exist (EC Status column displays "EC action not startup") - If the initial copy (acec start) was started from a status of an EC session not existing - If the EC session's copy status could not be acquired from the device (EC Status column displays "???") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ??? : The Standby-Side Continuous Copy Session status is unknown.

Table 4.11 When -progress, -da and -date Options Are Specified, or -all Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
TFO Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -tfoa option for the acgroup create command.
Source	<p>Displays the logical volume for the copy source.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Active" is displayed.</p>
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	<p>Displays the logical volume for the copy destination.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Active" is displayed.</p>
SID	<p>Displays the session ID.</p> <p>If the Storage Cluster Continuous Copy function is used, the copy source session ID of the storage device where the TFO status is "Active" is displayed.</p>
EC Status	<p>Displays the execution status of the EC.</p> <p>If the Storage Cluster Continuous Copy function is used, the EC execution status of the storage device where the TFO status is "Active" is displayed.</p>

Title	Explanation
	<ul style="list-style-type: none"> - 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	<p>Displays the current phase.</p> <p>If the Storage Cluster Continuous Copy function is used, the phase of the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Not set: Either the specified session does not exist, or the copy process is not running.
Progress	<p>Displays the progress of copy processes as a percentage.</p> <p>If the Storage Cluster Continuous Copy function is used, the replication progress rate of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <p>The "N/A" is displayed when the copy process is not executed.</p> <p>If the progress of copy processes is unknown, it is displayed "???".</p>
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>If the Storage Cluster Continuous Copy function is used, the number of blocks of the storage device where the TFO status is "Active" is displayed.</p>
Total Block	<p>Displays the number of total blocks.</p> <p>If the Storage Cluster Continuous Copy function is used, the number of total blocks of the storage device where the TFO status is "Active" is displayed.</p> <p>If the number of total blocks is unknown, it is displayed "???".</p>
Copy DA	<p>If the copy type is EC/REC, this displays the suppression settings for access to the copy destination area.</p> <p>If the Storage Cluster Continuous Copy function is used, the suppression settings for access to the copy destination area for the storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - on: Access is suppressed. - off: Access is not suppressed. <p>If the access suppression setting is unknown, it is displayed "???"</p>
Operation Date	<p>If an EC session exists, it displays the date for when the EC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format. The displaying of the date is performed on the basis of the target device's time zone.</p> <p>If the Storage Cluster Continuous Copy function is used, the date and time of storage device where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - Suspend (execution of acec suspend) - Concurrent suspend (execution of acec suspend -concur) - State transition to an error Suspend (EC Status column displays "EC Error Suspend"). <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--".</p> <ul style="list-style-type: none"> - If an EC session does not exist (EC Status column displays "EC action not startup") - If the initial copy (acec start) was started from a status of an EC session not existing

Title	Explanation
	<ul style="list-style-type: none"> - If the EC session's copy status could not be acquired from the device (EC Status column displays "??") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)
Standby-Source	If the Storage Cluster Continuous Copy function is used, the copy source logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Target	If the Storage Cluster Continuous Copy function is used, the copy destination logical volume of the storage device where the TFO status is "Standby" is displayed.
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - Exist: A Standby-Side Continuous Copy Session exists. - Not-Exist: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - ----: A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - ??? : The Standby-Side Continuous Copy Session status is unknown.

- For REC

- When the -progress, -da and -date options are not specified:

```
> acec query -g RECGroup
```

```
Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Source  <=> Target  SID(RSID)  EC Status          Copy Phase Copied Block Rcv  Split Xfer
-----
-----
ET001/0x1 N/A ET002/0x6 N/A          "EC action not startup" "Not set"          0 ---- ---- ----
ET001/0x2 ==> ET002/0x7 0x4A(0x11) "EC Executing"        "Copying"          0 auto ----
through
ET001/0x3 ==> ET002/0x8 0x4C(0x13) "EC Suspend"          "Paired"          1048576 auto ----
through
```

- When the -progress option is specified:

```
> acec query -g RECGroup -progress
```

```
Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
```

```
Source  <=> Target  Progress Copied Block Total Block
-----
-----
ET001/0x1 N/A ET002/0x6      N/A          N/A          N/A
ET001/0x2 ==> ET002/0x7      45%          471859      1048576
ET001/0x3 ==> ET002/0x8      100%         1048576     1048576
```

- When the -da option is specified:

```
> acec query -g RECGroup -da
```

```
Copy Group Name      : RECGroup
```

```

Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
Source <=> Target    SID(RSID)  EC Status          Copy Phase Copied Block Rcv Split
Xfer   Copy DA
-----
ET001/0x1 N/A ET002/0x6 N/A      "EC action not startup" "Not set"              0 ----
----      off
ET001/0x2 ==> ET002/0x7 0x4A(0x11) "EC Executing"         "Copying"              471859 auto ----
through   on
ET001/0x3 ==> ET002/0x8 0x4C(0x13) "EC Suspend"          "Paired"              1048576 auto ----
through   on

```

- When the -date option is specified:

```

> acec query -g RECGroup -date

Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
Source <=> Target    SID(RSID)  EC Status          Copy Phase Copied Block Rcv Split
Xfer   Operation Date
-----
ET001/0x1 N/A ET002/0x6 N/A      "EC action not startup" "Not set"              0 ----
----      "----/--/-- -:-:--"
ET001/0x2 ==> ET002/0x7 0x4A(0x11) "EC Executing"         "Copying"              471859 auto ----
through "----/--/-- -:-:--"
ET001/0x3 ==> ET002/0x8 0x4C(0x13) "EC Suspend"          "Paired"              1048576 auto ----
through "2010/10/18 13:00:00"

```

- When the -progress, -da and -date options are specified or -all option is specified:

```

> acec query -g RECGroup -progress -da -date

Copy Group Name      : RECGroup
Copy Group Type      : REC
Disk Array Name      : ET001 (00ETERNUSDXM##ET44S20A####HK000104#####)
Remote Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source <=> Target    SID(RSID)  EC Status          Copy Phase Progress Copied Block Total
Block Rcv Split Xfer   Copy DA Operation Date
-----
ET001/0x1 N/A ET002/0x6 N/A      "EC action not startup" "Not set"              0%           0
0 ----      off "----/--/-- -:-:--"
ET001/0x2 ==> ET002/0x7 0x4A(0x11) "EC Executing"         "Copying"              45%           471859
1048576 auto ---- through   on "----/--/-- -:-:--"
ET001/0x3 ==> ET002/0x8 0x4C(0x13) "EC Suspend"          "Paired"              100%          1048576
1048576 auto ---- through   on "2010/10/18 13:00:00"

```

The following table shows the meanings of the information displayed.

Table 4.12 When -progress, -da and -date Options Are Not Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.

Title	Explanation
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -remote option for the acgroup create command.
Source	Displays the logical volume for the copy source.
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID(RSID)	Displays the Session ID of ETERNUS Disk storage system (i.e. the Disk Array Name) and the Session ID of remote ETERNUS Disk storage system (i.e. the Remote Disk Array Name).
EC Status	<p>Displays the execution status of the REC.</p> <ul style="list-style-type: none"> - EC Starting: The REC is starting up. - EC Executing: The REC is executing. - EC Suspend: The REC 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 REC has paused because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC DISK): The REC Disk buffer is in use because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC BUFFER): The REC transfer buffer is in use because of a hardware error, such as a problem with the path between hardware devices. <p>"EC Hardware Suspend(Use REC DISK)" and "EC Hardware Suspend(Use REC BUFFER)" are displayed in the following case.</p> <ul style="list-style-type: none"> - When the ETERNUS Disk storage system that was specified with the -a option for the acgroup create command is the copy source device of REC.
Copy Phase	<p>Displays the current phase.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the 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	<p>Displays the recovery mode for REC copies.</p> <ul style="list-style-type: none"> - 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	<p>Displays the split mode for REC copies.</p> <ul style="list-style-type: none"> - auto: Indicates that the split mode is "Automatic".

Title	Explanation
	<ul style="list-style-type: none"> - 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	<p>Displays the transfer mode for REC copies.</p> <ul style="list-style-type: none"> - 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". - ----: REC copy is not being performed.

Table 4.13 When -progress Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -remote option for the acgroup create command.
Source	Displays the logical volume for the copy source.
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
Progress	<p>Displays the progress of copy processes as a percentage.</p> <p>The "N/A" is displayed when the copy process is not executed.</p> <p>If the progress of copy processes is unknown, it is displayed "???".</p>
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>The "N/A" is displayed when the copy process is not executed.</p> <p>If the number of copied blocks is unknown, it is displayed "???".</p>
Total Block	<p>Displays the number of total blocks.</p> <p>If the number of total blocks is unknown, it is displayed "???".</p>

Table 4.14 When -da Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -remote option for the acgroup create command.
Source	Displays the logical volume for the copy source.

Title	Explanation
<=>	Displays the copy direction. <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID(RSID)	Displays the Session ID of ETERNUS Disk storage system (i.e. the Disk Array Name) and the Session ID of remote ETERNUS Disk storage system (i.e. the Remote Disk Array Name).
EC Status	Displays the execution status of the REC. <ul style="list-style-type: none"> - EC Starting: The REC is starting up. - EC Executing: The REC is executing. - EC Suspend: The REC 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 REC has paused because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC DISK): The REC Disk buffer is in use because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC BUFFER): The REC transfer buffer is in use because of a hardware error, such as a problem with the path between hardware devices. "EC Hardware Suspend(Use REC DISK)" and "EC Hardware Suspend(Use REC BUFFER)" are displayed in the following case. <ul style="list-style-type: none"> - When the ETERNUS Disk storage system that was specified with the -a option for the acgroup create command is the copy source device of REC.
Copy Phase	Displays the current phase. <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the 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. <ul style="list-style-type: none"> - 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. <ul style="list-style-type: none"> - 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.

Title	Explanation
Xfer	<p>Displays the transfer mode for REC copies.</p> <ul style="list-style-type: none"> - 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". - ----: REC copy is not being performed.
Copy DA	<p>If the copy type is EC/REC, this displays the suppression settings for access to the copy destination area.</p> <ul style="list-style-type: none"> - on: Access is suppressed. - off: Access is not suppressed. <p>If the access suppression setting is unknown, it is displayed "???"</p>

Table 4.15 When -date Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -remote option for the acgroup create command.
Source	Displays the logical volume for the copy source.
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID(RSID)	Displays the Session ID of ETERNUS Disk storage system (i.e. the Disk Array Name) and the Session ID of remote ETERNUS Disk storage system (i.e. the Remote Disk Array Name).
EC Status	<p>Displays the execution status of the REC.</p> <ul style="list-style-type: none"> - EC Starting: The REC is starting up. - EC Executing: The REC is executing. - EC Suspend: The REC 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 REC has paused because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC DISK): The REC Disk buffer is in use because of a hardware error, such as a problem with the path between hardware devices.

Title	Explanation
	<ul style="list-style-type: none"> - EC Hardware Suspend(Use REC BUFFER): The REC transfer buffer is in use because of a hardware error, such as a problem with the path between hardware devices. <p>"EC Hardware Suspend(Use REC DISK)" and "EC Hardware Suspend(Use REC BUFFER)" are displayed in the following case.</p> <ul style="list-style-type: none"> - When the ETERNUS Disk storage system that was specified with the -a option for the acgroup create command is the copy source device of REC.
Copy Phase	<p>Displays the current phase.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Not set: Either the specified session does not exist, or the copy process is not running.
Copied Block	<p>Displays the number of blocks that have been copied.</p>
Rcv	<p>Displays the recovery mode for REC copies.</p> <ul style="list-style-type: none"> - 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	<p>Displays the split mode for REC copies.</p> <ul style="list-style-type: none"> - 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	<p>Displays the transfer mode for REC copies.</p> <ul style="list-style-type: none"> - 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". - ----: REC copy is not being performed.
Operation Date	<p>If an REC session exists, it displays the date for when the REC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format.</p> <p>The displaying of the date is performed on the basis of the target device's time zone.</p> <ul style="list-style-type: none"> - Starting of REC using the initial copy skip function (execution of <code>accec start -skip</code>) - Suspend (execution of <code>accec suspend</code>) <ul style="list-style-type: none"> - If a forced suspension was performed to an REC session in Hardware Suspend status, the last execution date is initialized as "----/--/-- --:--:--." - If a forced suspension was performed to an REC session while the execution of a copy was in progress, the last execution date is not updated. - Concurrent suspend (execution of <code>accec suspend -concur</code>) - State transition to an error Suspend (EC Status column displays "EC Error Suspend").

Title	Explanation
	<ul style="list-style-type: none"> - State transition to a hardware Suspend (EC Status column displays "EC Hardware Suspend"). <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--."</p> <ul style="list-style-type: none"> - If an REC session does not exist (EC Status column displays "EC action not startup") - If the initial copy (acec start) was started from a status of an REC session not existing - If the REC session's copy status could not be acquired from the device (EC Status column displays "??") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)

Table 4.16 When -progress, -da and -date Options Are Specified, or -all Option Is Specified

Title	Explanation
Copy Group Name	Displays the copy group name.
Copy Group Type	Displays the type of copy that has been set up for the copy group.
Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -a option for the acgroup create command.
Remote Disk Array Name	Displays the Box ID and ETERNUS name that was specified with the -remote option for the acgroup create command.
Source	Displays the logical volume for the copy source.
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - N/A: No copying is performed. - ==>: Copying from the source to the target. - <==: Copying from the target to the source.
Target	Displays the logical volume for the copy destination.
SID(RSID)	Displays the Session ID of ETERNUS Disk storage system (i.e. the Disk Array Name) and the Session ID of remote ETERNUS Disk storage system (i.e. the Remote Disk Array Name).
EC Status	<p>Displays the execution status of the REC.</p> <ul style="list-style-type: none"> - EC Starting: The REC is starting up. - EC Executing: The REC is executing. - EC Suspend: The REC 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 REC has paused because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC DISK): The REC Disk buffer is in use because of a hardware error, such as a problem with the path between hardware devices. - EC Hardware Suspend(Use REC BUFFER): The REC transfer buffer is in use because of a hardware error, such as a problem with the path between hardware devices.

Title	Explanation
	<p>"EC Hardware Suspend(Use REC DISK)" and "EC Hardware Suspend(Use REC BUFFER)" are displayed in the following case.</p> <ul style="list-style-type: none"> - When the ETERNUS Disk storage system that was specified with the -a option for the acgroup create command is the copy source device of REC.
Copy Phase	<p>Displays the current phase.</p> <ul style="list-style-type: none"> - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Not set: Either the specified session does not exist, or the copy process is not running.
Progress	<p>Displays the progress of copy processes as a percentage. The "N/A" is displayed when the copy process is not executed. If the progress of copy processes is unknown, it is displayed "???".</p>
Copied Block	<p>Displays the number of blocks that have been copied.</p>
Total Block	<p>Displays the number of total blocks. If the number of total blocks is unknown, it is displayed "???".</p>
Rcv	<p>Displays the recovery mode for REC copies.</p> <ul style="list-style-type: none"> - 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	<p>Displays the split mode for REC copies.</p> <ul style="list-style-type: none"> - 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	<p>Displays the transfer mode for REC copies.</p> <ul style="list-style-type: none"> - 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". - ----: REC copy is not being performed.
Copy DA	<p>If the copy type is EC/REC, this displays the suppression settings for access to the copy destination area.</p> <ul style="list-style-type: none"> - on: Access is suppressed. - off: Access is not suppressed. <p>If the access suppression setting is unknown, it is displayed "???"</p>
Operation Date	<p>If an REC session exists, it displays the date for when the REC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format. The displaying of the date is performed on the basis of the target device's time zone.</p> <ul style="list-style-type: none"> - Starting of REC using the initial copy skip function (execution of <code>accc start -skip</code>)

Title	Explanation
	<ul style="list-style-type: none"> - Suspend (execution of <code>acec suspend</code>) <ul style="list-style-type: none"> - If a forced suspension was performed to an REC session in Hardware Suspend status, the last execution date is initialized as "----/--/-- --:--:--." - If a forced suspension was performed to an REC session while the execution of a copy was in progress, the last execution date is not updated. - Concurrent suspend (execution of <code>acec suspend -concur</code>) - State transition to an error Suspend (EC Status column displays "EC Error Suspend"). - State transition to a hardware Suspend (EC Status column displays "EC Hardware Suspend"). <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--."</p> <ul style="list-style-type: none"> - If an REC session does not exist (EC Status column displays "EC action not startup") - If the initial copy (<code>acec start</code>) was started from a status of an REC session not existing - If the REC session's copy status could not be acquired from the device (EC Status column displays "??") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- Information such as Copy direction data and SID data may display as "??". Refer to ["5.3 Resolving for Displaying '??' in Advanced Copy Status"](#) and take action.
- When the Storage Cluster Continuous Copy function is used, it may be necessary to take measures, depending on the content displayed in the **Standby-Session** column.
 - For "Not-Exist":
Refer to ["3.12.11 When Recovering Storage Cluster Continuous Copy Function"](#).
 - Other than those above:
No action is required.

4.7.3 `acec suspend` (Synchronous High-speed Copy Temporary Suspension Command)

NAME

`acec suspend` - Suspend the synchronous high-speed copying

SYNOPSIS

- For EC copy groups

```
acec suspend -g copyGroup [-p copyPair | -concur] [-r] [-xml]
```

- For REC copy groups

```
acec suspend -g copyGroup [-p copyPair] [-r] [-force] [-xml]
acec suspend -g copyGroup -concur [-r] [-xml]
```

DESCRIPTION

This command temporarily suspends the synchronous high-speed copy for the specified copy group or copy pair. When the Storage Cluster Continuous Copy function is used, the synchronous high-speed copy synchronization processing on both the Primary Storage and Secondary Storage is temporarily suspended.

OPTIONS

`-g copyGroup`

This option specifies the copy group.

`-p copyPair`

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified pairs, and the synchronous high-speed copy synchronization processing on both the Primary Storage and Secondary Storage is temporarily suspended.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

`-concur`

This option suspends synchronous high-speed copy using the concurrent suspend function.

When the copy type of the copy group is REC, this option can be specified only if the transfer mode is not Stack mode.

`-r`

This option temporarily suspends copying in the direction opposite to the specified one.

`-force`

This option forcibly and temporarily suspends the REC session.

If the execution status (EC Status) displayed with the [acec query](#) command is either of the following, it is not possible to forcibly suspend the REC session.

- EC Hardware Suspend(Use REC DISK) : The REC Disk buffer is in use because of a hardware error, such as a problem with the path between hardware devices.
- EC Hardware Suspend(Use REC BUFFER) : The REC transfer buffer is in use because of a hardware error, such as a problem with the path between hardware devices.

`-xml`

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Suspending synchronous high-speed copy (When the Storage Cluster Continuous Copy function is not used)

```
> acec suspend -g group01
```

```
ET001/0x1:ET001/0x6  
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>
```

```
ET001/0x2:ET001/0x7  
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>
```

```
ET001/0x3:ET001/0x8  
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>
```

```
Succeeded : 3
Failed    : 0
```

- Suspending synchronous high-speed copy (When the Storage Cluster Continuous Copy function is used)

```
> acec suspend -g group01
```

```
ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>
# Standby-Session : ET002/0x1:ET002/0x11
```

```
ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Suspended >>
# Standby-Session : ET002/0x2:ET002/0x12
```

```
Succeeded : 2
Failed    : 0
```

- Suspending synchronous high-speed copy using the concurrent suspend function

```
> acec suspend -g group01 -concur
Successful completion.
```

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- One of the following messages may be displayed when this command is executed by specifying the -concur option for the REC copy group.

```
ccm5004 Operation failed. function=stxcec.SUSPEND.concur, message=STXC1002 ERROR Invalid logical volume name. Volume name=(0xa@00ETERNUSDXH##ET87S20A####NC4110699004##).
```

```
ccm5004 Operation failed. function=stxcec.SUSPEND.concur, message=STXC1034 ERROR The set Alias name for the option to specify the target to which the copy request is issued is not the copy source or is not the copy target.
```

```
ccm5004 Operation failed. function=stxcec.SUSPEND.concur, message=STXC1035 ERROR The set Alias name for the option to specify the target to which the copy request is issued exists, but access path information does not exist.
```

Check that ETERNUS Disk storage system of the copy source is not registered as a remote device, if the above message is displayed.

If the problem is not resolved, follow the procedure in "[Changing Information Other than ETERNUS Names and Access Volumes](#)" and execute this command after re-registering the copy source ETERNUS Disk storage system.

- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and the synchronous high-speed copy synchronization processing on either the Primary Storage or Secondary Storage cannot be temporarily suspended, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command temporarily suspends the synchronous high-speed copy synchronization processing on the storage device that has an "Active" TFO status and terminates normally. However, the synchronous high-speed copy synchronization processing could not be temporarily suspended on the storage device that has a "Standby" TFO status. In this case, ccm7002 message may be output.
If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[3.12.11 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

4.7.4 acec resume (Synchronous High-speed Copy Restart Command)

NAME

acec resume - Resume the synchronous high-speed copying

SYNOPSIS

- When the copy type set in the copy group is EC

```
acec resume -g copyGroup [-p copyPair] [-r] [-xml]
```

- When the copy type set in the copy group is REC

```
acec resume -g copyGroup [-p copyPair] [-r] [-remain] [-xml]
```

DESCRIPTION

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

When the Storage Cluster Continuous Copy function is used, restarts the synchronous high-speed copy synchronization processing on both the Primary Storage and Secondary Storage.

OPTIONS

-g copyGroup

This option specifies the copy group name.

-p copyPair

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified pairs, and the synchronous high-speed copy synchronization processing on both the Primary Storage and Secondary Storage is resumed.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-r

This option restarts copying in the reverse direction to the direction that has been specified.

-remain

This option restarts the synchronous high-speed copy for the copy group or copy pair that suspended by using the initial copy skip function.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When the Storage Cluster Continuous Copy function is not used

```
> acec resume -g group01
```

```
ET001/0x1:ET001/0x6
```

```
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>
```

```
ET001/0x2:ET001/0x7
```

```
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>
```

```
ET001/0x3:ET001/0x8
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>

Succeeded : 3
Failed    : 0
```

- When the Storage Cluster Continuous Copy function is used

```
> acec resume -g group01
```

```
ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>
# Standby-Session : ET002/0x1:ET002/0x11
```

```
ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Resumed >>
# Standby-Session : ET002/0x2:ET002/0x12
```

```
Succeeded : 2
Failed    : 0
```

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- This command terminates abnormally if the copy destination logical volume of the specified copy group or pair is protected by the [acinhibit set](#) command.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and the synchronous high-speed copy synchronization processing cannot be resumed on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command resumes the synchronous high-speed copy synchronization processing on the storage device that has an "Active" TFO status and terminates normally. However, the synchronous high-speed copy synchronization processing cannot be resumed on the storage device that has a "Standby" TFO status. In this case, ccm7002 messages may be output. If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[3.12.11 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

4.7.5 acec reverse (Synchronous High-speed Copy Reverse Command)

NAME

acec reverse - Reverse the synchronous high-speed copying

SYNOPSIS

```
acec reverse -g copyGroup [-p copyPair] [-r] [-xml]
```

DESCRIPTION

This command reverses the direction of the synchronous high-speed copy for the specified copy group or copy pair. When the Storage Cluster Continuous Copy function is used, the synchronous high-speed copy synchronization processing is reversed on both the Primary Storage and Secondary Storage.

OPTIONS

-g copyGroup

This option specifies the copy group name.

Only the following types of copy set in the copy group can be specified:

- EC
- REC

-p copyPair

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified copy pairs, and the synchronous high-speed copy synchronization processing is reversed on both the Primary Storage and Secondary Storage.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-r

This option reverses the copying in the reverse direction to the direction that has been specified, so that the copy direction becomes the direction that has been specified.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When the Storage Cluster Continuous Copy function is not used

```
> acec reverse -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

ET001/0x3:ET001/0x8
# DATE : 2008/06/24 16:28:00 - << EC Change >>

Succeeded : 3
Failed    : 0
```

- When the Storage Cluster Continuous Copy function is used

```
> acec reverse -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>
# Standby-Session : ET002/0x1:ET002/0x11

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>
# Standby-Session : ET002/0x2:ET002/0x12

Succeeded : 2
Failed    : 0
```


NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and the synchronous high-speed copy synchronization processing cannot be reversed on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command reverses the synchronous high-speed copy synchronization processing for the storage device that has an "Active" TFO status and terminates normally.

4.7.6 acec change (Synchronous High-speed Copy Mode Change Command)

NAME

acec change - Change the mode of the synchronous high-speed copying

SYNOPSIS

```
acec change -g copyGroup [-p copyPair] [-r] [-transfer {sync [-split {auto | manual}] | through | consist | stack}] [-recovery {auto | manual}] [-xml]
```

DESCRIPTION

This command changes the mode of the synchronous high-speed copy for the specified copy group or copy pair.

Suspend the REC session before execution.

This command is only enabled when the copy type that was set in the copy group is REC.

OPTIONS

-g *copyGroup*

This option specifies the copy group.

-p *copyPair*

This option specifies a copy pair.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-r

This option changes the mode for copying in the reverse direction.

-transfer {sync [-split {auto | manual}] | through | consist | stack}

This option specifies the transfer mode. Refer to "[3.2.2.5 REC Operating Modes](#)" for information on each mode.

- sync: Synchronous mode

This option specifies the split mode when sync was specified with the -transfer option.

-split

- auto: Automatic Split

- manual: Manual Split

- through: Through mode

- consist: Consistency mode

- stack: Stack mode

-recovery {auto | manual}

This option specifies the recovery mode. Refer to "3.2.2.5 REC Operating Modes" for information on each mode.

- auto: Automatic Recovery
- manual: Manual Recovery

-xml

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

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

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

ET001/0x1:ET002/0x1
# DATE : 2008/06/24 16:28:00 - << EC Change >>

ET001/0x2:ET002/0x2
# DATE : 2008/06/24 16:28:00 - << EC Change >>

ET001/0x3:ET002/0x3
# DATE : 2008/06/24 16:28:00 - << EC Change >>

Succeeded : 3
Failed    : 0
```

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- Specify the -force option for the [acec suspend](#) command and forcibly suspend REC session to execute this command if the REC transfer mode is Consistency mode or Stack mode.

4.7.7 acec cancel (Synchronous High-speed Copy Stop Command)

NAME

acec cancel - Stop the synchronous high-speed copying

SYNOPSIS

```
acec cancel -g copyGroup [-p copyPair] [-r] [-force] [-xml]
```

DESCRIPTION

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

When the Storage Cluster Continuous Copy function is used, the synchronous high-speed synchronization processing is stopped on both the Primary Storage and Secondary Storage.

OPTIONS

-g *copyGroup*

This option specifies the copy group name.

-p *copyPair*

This option specifies a copy pair.

When the Storage Cluster Continuous Copy function is used, specify either the Primary Storage or Secondary Storage copy pair. The

ETERNUS Disk storage system copy pair that is the Storage Cluster pair is automatically retrieved from the specified copy pairs, and the synchronous high-speed copy synchronization processing is stopped on both the Primary Storage and Secondary Storage.

When specifying with the LU to Partition format or the Partition to LU format, you must enclose the entire argument for this option within double quotations ("") depending on the shell being used.

-r

This option stops copying in the reverse direction to the direction that has been specified.

-force

This option forcibly stops the session.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- When the Storage Cluster Continuous Copy function is not used

```
> acec cancel -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

ET001/0x3:ET001/0x8
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>

Succeeded : 3
Failed    : 0
```

- When the Storage Cluster Continuous Copy function is used

```
> acec cancel -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>
# Standby-Session : ET002/0x1:ET002/0x11

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Disconnected >>
# Standby-Session : ET002/0x2:ET002/0x12

Succeeded : 2
Failed    : 0
```

NOTES

- When the copy type of copy group is OPC, QuickOPC or SnapOPCP, this command cannot be executed.
- Specify the `-force` option to forcibly suspend REC session by executing this command if the REC transfer mode is Consistency mode or Stack mode. In this case, the consistency of the copy destination is not guaranteed.

Follow the procedure below to forcibly stop REC session.

1. Execute the [acec suspend](#) command with the `-force` option to forcibly suspend the REC session.
2. Execute the [acec change](#) command to change the REC transfer mode to Through mode.

3. Execute the [accec resume](#) command to restart the REC.
 4. Execute the [accec query](#) command to check the copy phase is in an equivalency maintenance state.
 5. Execute the [accec suspend](#) command to suspend the REC session.
Do not specify the -force option.
 6. Execute this command to stop the REC session.
Do not specify the -force option.
- When the Storage Cluster Continuous Copy function is used
 - When the status of the TFO group is "Normal", and synchronous high-speed copy synchronization processing cannot be stopped on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command stops synchronous high-speed copy synchronization processing on the storage device that has an "Active" TFO status and terminates normally. However, synchronous high-speed copy synchronization processing could not be stopped on the storage device that has a "Standby" TFO status. In this case, ccm7002 message may be output.
If a ccm7002 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[3.12.11 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

4.8 Commands for NAS Volume

4.8.1 acnas backup (NAS volume backup command)

NAME

acnas backup - Back up NAS volumes

SYNOPSIS

```
acnas backup -g copyGroup
```

DESCRIPTION

This command performs a backup of the NAS volume coordinated with the NAS environment of the ETERNUS Disk storage system.

OPTIONS

-g copyGroup

Specify the copy group name of the NAS backup configurations. The copy group name of the NAS backup configurations can be confirmed with Web Console.

Refer to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide* for information on how to confirm the copy group name with Web Console.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Backing up the NAS volume

```
> acnas backup -g NAS_QuickOPC_NAS_Vol_0_0
Successful completion.
```

NOTES

- This command is to be executed with the Management Server. It is not possible to execute this command in an environment where only the AdvancedCopy Manager CCM has been installed.
- In order to implement backup of the NAS volume, it is necessary to perform NAS backup configurations in advance with Web Console.
- In relation to the copy group of the NAS backup configuration, do not perform operations other than suspending the copy or displaying the status.
- When the NAS backup volume is in a state of being mounted, this command cannot be executed. Execute this command after unmounting the NAS backup volume. Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for mounting / unmounting the NAS backup volume.

4.8.2 acnas restore (NAS volume restore command)

NAME

acnas restore - Restore NAS volumes

SYNOPSIS

```
acnas restore -g copyGroup
```

DESCRIPTION

This command performs a restore of the NAS volume coordinated with the NAS environment of the ETERNUS Disk storage system.

OPTIONS

-g copyGroup

Specify the copy group name of the NAS backup configurations. The copy group name of the NAS backup configurations can be confirmed with Web Console.

Refer to "Display Shared Folder" or "Display Backup Information" in the *Web Console Guide* for information on how to confirm the copy group name with Web Console.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Restoring the NAS volume

```
> acnas restore -g NAS_QuickOPC_NAS_Vol_0_0  
Successful completion.
```

NOTES

- This command is to be executed with the Management Server. It is not possible to execute this command in an environment where only the AdvancedCopy Manager CCM has been installed.
- In relation to the copy group of the NAS backup configuration, do not perform operations other than suspending the copy or displaying the status.
- When the NAS backup volume is in a state of being mounted, this command cannot be executed. Execute this command after unmounting the NAS backup volume. Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for mounting / unmounting the NAS backup volume.

4.9 Copy Session Management Commands

4.9.1 accopy query (Copy Session Information Display Command)

NAME

accopy query - Display copy session information

SYNOPSIS

- To display copy session information by device unit

```
accopy query -a diskArrayName -type {local | remote | odx | vvol | all} [-tfoinfo] [-xml]
```

- To display REC session information

```
accopy query -a diskArrayName -sa srcDiskArrayName -ta dstDiskArrayName [-xml]
```

DESCRIPTION

This command displays the status of the copy sessions being performed in the specified ETERNUS Disk storage system. This command also targets the copy sessions that are started by software other than AdvancedCopy Manager.

OPTIONS

-a *diskArrayName*

This option specifies the name of ETERNUS Disk storage system for which the execution status of copy sessions is displayed.

-type {local | remote | odx | vvol | all}

This option specifies the type of copy sessions to display.

- local: Displays only OPC, QuickOPC, EC, SnapOPC, SnapOPC+, monitor sessions, and Extended Copy.
- remote: Displays only REC sessions.
- odx: Displays ODX.
- vvol: Displays WOL sessions.
- all: Displays all sessions.

-tfoinfo

This option is specified when displaying information about the Storage Cluster Continuous Copy function. Refer to the EXAMPLES table for items displayed when this option is specified.

-sa *srcDiskArrayName* -ta *dstDiskArrayName*

This option specifies the display of information for all REC sessions set up from the device specified with the -sa option towards the device specified with the -ta option.

Either *srcDiskArrayName* or *dstDiskArrayName* must match with the ETERNUS name specified to the -a option.

If specifying a device other than a management device for AdvancedCopy Manager CCM or Express, specify the Box ID (40 characters) instead of the ETERNUS name of AdvancedCopy Manager CCM or Express.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Displaying the information of copy sessions in storage device units

```
> accopy query -a ET001
```

```
Disk Array Name : ET001
```

```
BOX-ID : 00ETERNUSDXM##ET44S20A####HK000104#####
```

Source	<=>	Target	SID(RSID)	Copy Type	Copy Status	Copy
Phase	Progress	Copied Block	Total Block	Operation	Date	
ET001/0x1	==>	ET001/0x3	0x19(----)	OPC	"Executing"	
Copying	N/A	471859	N/A	"2010/10/20 09:02:03"		
ET001/0x2[addr=0x800,size=0xC800000]	==>	ET001/0x4[addr=0x800]	0x22(----)	EC	"Executing"	
Copying	68%	142606336	209715200	"2010/10/20 10:23:30"		
ET001/0x5	==>	ET001/0x6	0x24(----)	SnapOPCP	"Executing"	
Copying	N/A	524288	N/A	"2010/10/20 11:45:34"		
ET001/0x7[addr=0x3F,size=0x1400000]	==>	ET001/0x8[addr=0x7F]	0x35(----)	SnapOPCP	"Executing"	
Copying	N/A	20971520	20971520	"2010/10/19 12:00:45"		
ET002/0x9	==>	ET001/0x9	0x48(0x42)	REC	"Executing"	
Paired	N/A	4294967295	N/A	"2010/10/20 03:35:03"		
ET001/0xA[addr=0x3F,size=0x7FFFFFFC0]	==>	----	0x88(----)	Estimate	"Executing"	
Copying	N/A	3456777	2147483584	"2010/10/20 10:30:03"		
ET001/0xB	==>	ET001/0xC	0x92(----)	QuickOPC	"Executing"	
Readying	N/A	0	N/A	"----/--/-- --:--:--"		
ET001/0xD[addr=0x3F,size=0x1400000]	==>	ET001/0xE[addr=0x7F]	0x19(----)	Xcopy	"Executing"	
Copying	N/A	512	N/A	"2010/10/20 10:02:03"		

- Displaying the information of REC copy sessions

```
> accopy query -a ET001 -sa ET002 -ta ET001
```

```
Disk Array Name : ET001
```

```
BOX-ID : 00ETERNUSDXM##ET44S20A####HK000104#####
```

Source	<=>	Target	SID(RSID)	Copy Type	Copy Status	Copy Phase	Progress	Copied Block	Total
Block	Operation	Date							
ET002/0x9	==>	ET001/0x9	0x48(0x42)	REC	"Executing"	Paired	N/A	4294967295	
N/A		"2010/10/20 03:35:03"							

- Displaying the copy session information in device units specified with the -tfoinfo option

```
> accopy query -a ET001 -type all -tfoinfo
```

```
Disk Array Name : ET001
```

```
BOX-ID : 00ETERNUSDXM##ET44S20A####HK000104#####
```

Source	<=>	Target	SID(RSID)	Copy Type	Copy Status	Copy Phase	Progress	Copied Block	Total
Block	Operation	Date	Active/Standby	TFO	Info				
ET001/0x1	==>	ET001/0x6	0x11(----)	QuickOPC	"Executing"	Copying	N/A	471859	N/
A		"2014/07/24 18:31:12"	Active		normal				
ET001/0x2	==>	ET001/0x7	0x21(----)	EC	"Executing"	Copying	68%	209715200	N/A
"2014/07/24 18:31:22"			Active		normal				
ET001/0x3	==>	ET001/0x8	0x31(----)	OPC	"Executing"	Copying	N/A	142606336	N/A
"2014/07/24 18:31:32"			----		----				
ET001/0x11	==>	ET001/0x16	0x12(----)	QuickOPC	"Executing"	Copying	N/A	3456777	N/
A		"2014/07/24 18:31:12"	Standby		unpaired				

ET001/0x14 ==> ET001/0x19 0x42(----) QuickOPC "Executing" Copying N/A 142606336 N/
A "2014/07/24 18:31:12" Standby unpaired

The following table shows the meanings of the information displayed.

Title	Explanation
Source	<p>Displays the logical volume for the copy source.</p> <ul style="list-style-type: none"> - When the copy is executed in logical volume units: <ul style="list-style-type: none"> - ETERNUS name or Box ID - Logical volume number - When the copy is executed in extent units: <ul style="list-style-type: none"> - ETERNUS name or Box ID - Logical volume number[addr=copy_start_location,size=copy_size] <p>The logical volume number, copy start location and copy size are displayed in hexadecimal.</p>
<=>	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> - "==" (Copying from the source to the target) is always displayed.
Target	<p>Displays the logical volume for the copy destination.</p> <ul style="list-style-type: none"> - When the copy is executed in logical volume units: <ul style="list-style-type: none"> - ETERNUS name or Box ID - Logical volume number - When the copy is executed in extent units: <ul style="list-style-type: none"> - ETERNUS name or Box ID - Logical volume number[addr=copy_start_location,size=copy_size] <p>The logical volume number, copy start location and copy size are displayed in hexadecimal.</p> <p>When Copy Type column is "Estimate", "----" is displayed.</p>
SID(RSID)	<p>Displays the session ID, REC session ID, and WVOL session ID in "x(y)" format.</p> <ul style="list-style-type: none"> - For OPC, QuickOPC, EC, SnapOPC, SnapOPC+, Extended Copy, and Offloaded Data Transfer: <ul style="list-style-type: none"> - x: Session ID - y: ---- - For REC: <ul style="list-style-type: none"> - x: Session ID (the ID for the session in the device specified with the -a option) - y: REC session ID (the ID for the session in the copy destination device specified with the -a option) - For WVOL session: <ul style="list-style-type: none"> - x: WVOL session ID (may overlap with the Session ID) - y: ----
Copy Type	<p>Displays the copy type.</p> <ul style="list-style-type: none"> - OPC: The OPC is executing. - QuickOPC: The QuickOPC is executing.

Title	Explanation
	<ul style="list-style-type: none"> - SnapOPCP: The SnapOPC+ or SnapOPC is executing. - EC: The EC is executing. - REC: The REC is executing. - Estimate: monitor session is executing. - Xcopy: The Extended Copy is executing. - ODX: Offloaded Data Transfer is executing. - WWOL-Snapshot, WWOL-Clone, WWOL-Fastclone, WWOL-Revert, WWOL-CopyDiffs: WWOL session is executing.
Copy Status	<p>Displays the copy execution status.</p> <ul style="list-style-type: none"> - Starting: The copy is starting up. - Executing: The copy is executing. - Suspend: The EC or REC is suspended. - Error Suspend: An error has occurred, preventing the copy process from continuing. - Hardware Suspend: The copy is temporarily stopped due to a path error between devices. (If using REC) - Hardware Suspend(Use REC DISK): The copy is using the REC Disk buffer due to a path error between devices. (If using REC) - Hardware Suspend(Use REC BUFFER): The copy is doing REC buffering due to a path error between devices. (If using REC) <p>"EC Hardware suspend (Use REC DISK)" and "EC Hardware suspend (Use REC BUFFER)" is displayed in the following circumstance.</p> <ul style="list-style-type: none"> - If the device specified with the -a option for the acgroup create command has become the REC copy source device
Copy Phase	<p>Displays the current phase.</p> <ul style="list-style-type: none"> - Ready: Concurrent OPC is defined. - Copying: Copy processing is executing. - Paired: The copy is in the equivalency maintenance state. - Tracking: QuickOPC copy processing has completed, and tracking is in progress. - Copying/Tracking: Both QuickOPC copy processing and tracking are in progress. - N/A: Copy processing has not been performed.
Progress	<p>Displays the progress of copy processes as a percentage. The "N/A" is displayed in the following case.</p> <ul style="list-style-type: none"> - When Copy Type column is SnapOPCP or Estimate - When the copy is executed in logical volume units on the following storage devices: <ul style="list-style-type: none"> - ETERNUS DX80 S2 (for earlier than V10L30 firmware) - ETERNUS DX90 S2 (for earlier than V10L30 firmware) - ETERNUS DX400 S2 series (for earlier than V10L30 firmware) - ETERNUS DX8000 S2 series (for earlier than V10L30 firmware)

Title	Explanation
Copied Block	<p>Displays the number of blocks that have been copied.</p> <p>If Copy Phase column displays "Tracking", it displays the number of blocks that have not been updated after the last execution of the logical copy.</p>
Total Block	<p>Displays the number of total blocks.</p> <p>When the copy is executed in logical volume units, it is displayed "N/A".</p>
Operation Date	<p>If a copy session exists, it displays the date for when the EC session state transitions indicated below last occurred (last execution date) in a "yyyy/mm/dd hh:mm:ss" format.</p> <p>The displaying of the date is performed on the basis of the target device's time zone.</p> <ul style="list-style-type: none"> - For OPC, QuickOPC, Extended Copy, Offloaded Data Transfer, and WVOL session: <ul style="list-style-type: none"> - Starting logical copy - State transition to error suspend (Copy Status column displays "Error Suspend") - For SnapOPC+ and SnapOPC: <ul style="list-style-type: none"> - Starting logical copy - State transition to error suspend (Copy Status column displays "Error Suspend") - For EC: <ul style="list-style-type: none"> - Suspend - Concurrent suspend - State transition to error suspend (Copy Status column displays "Error Suspend") - For REC: <ul style="list-style-type: none"> - Start of REC by initial copy skip function - Suspend <ul style="list-style-type: none"> - If a forced suspension was performed to an REC session in a Hardware suspend status, the last execution date is initialized as "----/--/-- --:--:--." - If a forced suspension was performed to an REC session with the execution of a copy in progress, the last execution date is not updated. - Concurrent suspend <ul style="list-style-type: none"> - During a not-yet transmitted suspension, the last execution date is not updated. - State transition to an Error suspend (Copy Status column displays "Error Suspend") - State transition to a Hardware suspend (Copy Status column displays "Hardware Suspend") <p>If any of the following conditions apply, the date is displayed as "----/--/-- --:--:--."</p> <ul style="list-style-type: none"> - If an EC/REC initial copy was started from a status of a copy session not existing - If the REC session underwent an automatic recovery from a Hardware suspend status (Copy Status column displays "Hardware Suspend") - If using a device for which the last execution date recording function is not supported (ETERNUS DX60 S2)
Active/Standby	<p>This is displayed when the -tfoinfo option is specified.</p> <p>If the Storage Cluster Continuous Copy function is used, the TFO status is displayed.</p> <ul style="list-style-type: none"> - Active: An Active-Side Continuous Copy Session. - Standby: A Standby-Side Continuous Copy Session. - ??? : Failed to get the TFO status.

Title	Explanation
	- ----: The Storage Cluster Continuous Copy function is not used.
TFO Info	<p>This is displayed when the -tfoinfo option is specified. If the Storage Cluster Continuous Copy function is used, the Storage Cluster Continuous Copy session status is displayed.</p> <ul style="list-style-type: none"> - normal: The Storage Cluster Continuous Copy sessions are synchronized on the Primary Storage and Secondary Storage. - unpaired: The Storage Cluster Continuous Copy sessions are not synchronized on the Primary Storage and Secondary Storage. - ????: Failed to get the TFO status. - ----: The Storage Cluster Continuous Copy function is not used.

NOTES

- If the information acquisition operation has failed, this command outputs the following message and then terminates with an error.

```
ccm5004 Operation failed. function=stxccopy.QUERY, message=message
```

It is possible that the access volume is incorrect. Therefore, check it using the [acarray detail](#) command and check that the CCM Server can access to the access volume.

If inaccessible, set up a volume for which access is possible by using the [acarray change](#) command.

- For the Source and Target, either of the following information is displayed.
 - ETERNUS name
If using a device registered to AdvancedCopy Manager CCM or Express
 - Box ID
If using a device not registered to AdvancedCopy Manager CCM or Express.

There are cases of [***Other-Storage***] being displayed for the **Source** or **Target** column. If, after specifying the device which is correctly displayed and executing the [acarray remove](#) command, one then re-executes the [acarray add](#) command, both ETERNUS names are correctly displayed.

- In the following VVOL sessions, the progress of copy processes may not reach 100 % depending on the data update status.
 - VVOL-Snapshot
 - VVOL-Fastclone

4.9.2 accopy fcancel (Copy Session Forcible Stop Command)

NAME

accopy fcancel - Stop the copy session forcibly

SYNOPSIS

- For forcibly stopping copy sessions by device unit

```
accopy fcancel -a diskArrayName -type {local | remote | odx | vvol | all} [-xml]
```

- For forcibly stopping REC sessions

```
accopy fcancel -a diskArrayName -sa srcDiskArrayName -ta dstDiskArrayName [-xml]
```

- For forcibly stopping copy sessions by session unit

```
accopy fcancel -a diskArrayName -s srcVolume -t dstVolume [-xml]
```

- For forcibly stopping monitor sessions by session unit

```
accopy fcancel -v srcVolume -estimate [-xml]
```

- For forcibly stopping multiple copy sessions

```
accopy fcancel -a diskArrayName -stdin [-xml]
```

DESCRIPTION

This command forcibly stops the copy sessions being performed in the specified ETERNUS Disk storage system. This command also targets the copy sessions that are started by software other than AdvancedCopy Manager.

OPTIONS

-a *diskArrayName*

This option specifies the name of ETERNUS Disk storage system for which the forcible stop of copy sessions is to be executed.

-type {local | remote | odx | vvol | all}

This option specifies the type of copy session that is to undergo a forcible stop.

- local: Stops only OPC, QuickOPC, EC, SnapOPC, SnapOPC+, monitor sessions, and Extended Copy forcibly.
- remote: Stops only REC sessions forcibly.
- odx: Stops ODX forcibly.
- vvol: Stops VVOL sessions forcibly.
- all: Stops all sessions forcibly.

-sa *srcDiskArrayName* **-ta** *dstDiskArrayName*

This option specifies the forcible stop of all REC sessions set up from the device set with the **-sa** option toward the device set with the **-ta** option.

Either *srcDiskArrayName* or *dstDiskArrayName* must match with the ETERNUS name specified to the **-a** option.

If specifying a device other than a AdvancedCopy Manager CCM management device, specify the Box ID (40 characters) instead of the ETERNUS name of the AdvancedCopy Manager CCM.

-s *srcVolume* **-t** *dstVolume*

This option specifies the forcible stopping of the copy session from the volume specified with the **-s** option to the volume specified with the **-t** option.

Either *srcVolume* or *dstVolume* must be the same volume for the device specified with the **-a** option.

For *srcVolume* and *dstVolume*, specify the names of the volumes displayed as **Source** and **Target** columns respectively with the [accopy query](#) command. However, one cannot specify volumes that are displayed as [***Other-Storage***].

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-v *srcVolume* **-estimate**

This option specifies the forcible stop of monitor sessions which has been set to the **-v** option.

For *srcVolume*, specify the name of the volume displayed as **Source** column with the [accopy query](#) command.

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-stdin

This option specifies the forcible stop of multiple copy sessions read from standard input.

Specify the copy sessions which are to be forcibly stopped in Tab Separated Values (TSV) format as follows.

- When the copy type is not "Estimate":

```
copySourceVolume<TAB>copyDestinationVolume<RETURN>
```

- When the copy type is "Estimate":

```
copySourceVolume<RETURN>
```

-xml

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

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Stopping copy sessions in storage device units forcibly

```
> accopy fcancel -type all -a ET001

ET001/0x1:ET001/0x2
# DATE : 2008/06/24 16:28:00 - << OPC Disconnected >>
ET001/0x3:ET001/0x4
# DATE : 2008/06/24 16:28:01 - << OPC Disconnected >>
[Omission]
ET001/0x146:ET002/0x146
# DATE : 2008/06/24 16:40:20 - << EC Disconnected >>

Succeeded : 720
Failed    : 0
```

- Stopping REC sessions forcibly

```
> accopy fcancel -a ET001 -sa ET002 -ta ET001
ET002/0x1:ET001/0x1
# DATE : 2010/06/24 16:28:00 - << EC Disconnected >>
ET002/0x2:ET001/0x2
# DATE : 2010/06/24 16:28:01 - << EC Disconnected >>
[Omission]
ET002/0x159:ET001/0x159
# DATE : 2010/06/24 16:40:34 - << EC Disconnected >>

Succeeded : 345
Failed    : 0
```

- Stopping a copy session in session units forcibly

```
> accopy fcancel -a ET001 -s "ET001/0x1[addr=0x3F,size=0x7FFF]" -t "ET001/0x2[addr=0x3F]"
ET001/0x3[addr=0x3F,size=0x7FFF]:ET001/0x3[addr=0x3F]
# DATE : 2010/06/24 16:40:34 - << Disconnected >>
Succeeded : 1
Failed    : 0
```

- Stopping a monitor session in session units forcibly

```
> accopy fcancel -v "ET001/0xA[addr=0x3F,size=0x7FFFFFFC0]" -estimate
ET001/0xA[addr=0x3F,size=0x7FFFFFFC0]
# DATE : 2010/06/24 16:28:00 - << Estimate Disconnected >>

Succeeded : 1
Failed    : 0
```

- Stopping multiple copy sessions forcibly

```
> type SESSIONS.txt
ET001/0x1    ET001/0x3
```

```

ET001/0x2[addr=0x800,size=0xC800000]    ET001/0x4[addr=0x800]
ET001/0x5    ET001/0x6
ET001/0x7[addr=0x3F,size=0x1400000]    ET001/0x8[addr=0x7F]
ET002/0x9    ET001/0x9
ET001/0xA[addr=0x3F,size=0x7FFFFFFC0]
ET001/0xB    ET001/0xC
ET001/0xD[addr=0x3F,size=0x1400000]    ET001/0xE[addr=0x7F]

> accopy fcancel -a ET001 -stdin < SESSIONS.txt
ET001/0x1:ET001/0x3
# DATE : 2010/06/24 16:28:00 - << EC Disconnected >>
ET001/0x2[addr=0x800,size=0xC800000]:ET001/0x4[addr=0x800]
# DATE : 2010/06/24 16:28:00 - << OPC Disconnected >>
ET001/0x5:ET001/0x6
# DATE : 2010/06/24 16:28:00 - << SnapOPCP Disconnected >>
ET001/0x7[addr=0x3F,size=0x1400000]:ET001/0x8[addr=0x7F]
# DATE : 2010/06/24 16:28:00 - << SnapOPCP Disconnected >>
ET002/0x9:ET001/0x9
# DATE : 2010/06/24 16:28:00 - << REC Disconnected >>
ET001/0xA[addr=0x3F,size=0x7FFFFFFC0]
# DATE : 2010/06/24 16:28:00 - << Estimate Disconnected >>
ET001/0xB:ET001/0xC
# DATE : 2010/06/24 16:28:00 - << QuickOPC Disconnected >>
ET001/0xD[addr=0x3F,size=0x1400000]    ET001/0xE[addr=0x7F]
# DATE : 2010/06/24 16:28:00 - << Xcopy Disconnected >>

Succeeded : 8
Failed    : 0

```

NOTES

- Use ETERNUS Web GUI or ETERNUS CLI to stop the monitor session started by the following methods.
 - Operation by Copy command via SAN
 - Started by Copy command via LAN
 - Started by ETERNUS Web GUI
 - Started by ETERNUS CLI
 - Operation by Copy command via LAN
 - Started by Copy command via SAN
- When the Storage Cluster Continuous Copy function is used
 - When the Active-Side Continuous Copy session of the ETERNUS Disk storage system specified with the -a option is stopped, the Standby-Side Continuous Copy session is also forced to stop. On the other hand, even if the Standby-Side Continuous Copy session of the ETERNUS Disk storage system specified with the -a option is stopped, the Active-Side Continuous Copy session is not be forced to stop.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or the status of the TFO group is "Halt", the copy sessions on the ETERNUS Disk storage system that is the ETERNUS Disk storage system Storage Cluster pair specified by the -a option may be stopped. Specify the ETERNUS Disk storage system that is be the Storage Cluster pair with the -a option and execute the [accopy query](#) command to confirm the target copy session. When the target copy session is not stopped, specify the -a option for the ETERNUS Disk storage system that is the Storage Cluster pair, and execute the command.

4.9.3 accopy fsuspend (REC Session Forcible Suspend Command)

NAME

accopy fsuspend - Stop the REC session forcibly

SYNOPSIS

- For forcibly suspending REC sessions by device unit

```
accopy fsuspend -a diskArrayName [-xml]
```

- For forcibly suspending REC sessions

```
accopy fsuspend -a diskArrayName -sa srcDiskArrayName -ta dstDiskArrayName [-xml]
```

- For forcibly suspending REC sessions by session unit

```
accopy fsuspend -a diskArrayName -s srcVolume -t dstVolume [-xml]
```

- For forcibly suspending multiple REC sessions

```
accopy fsuspend -a diskArrayName -stdin [-xml]
```

DESCRIPTION

This command forcibly suspends the copy session being performed in the specified ETERNUS Disk storage system. This command also targets the copy sessions that are started by software other than AdvancedCopy Manager.

OPTIONS

-a *diskArrayName*

This option specifies the name of the ETERNUS Disk storage system for which the forcible suspend of the REC sessions is to be executed.

-sa *srcDiskArrayName* -ta *dstDiskArrayName*

This option specifies the forcible suspend of all REC sessions set up from the device set with the -sa option toward the device set with the -ta option.

Either *srcDiskArrayName* or *dstDiskArrayName* must match with the ETERNUS name specified to the -a option.

If specifying a device other than a management device for AdvancedCopy Manager CCM or Express, specify the Box ID (40 characters) instead of the ETERNUS name of AdvancedCopy Manager CCM or Express.

-s *srcVolume* -t *dstVolume*

This option specifies the forcible suspend the REC sessions from the volume specified with the -s option to the volume specified with the -t option.

Either *srcVolume* or *dstVolume* must be the same volume for the device specified with the -a option.

For *srcVolume* and *dstVolume*, specify the names of the volumes displayed as **Source** and **Target** columns respectively with the [accopy query](#) command.

However, one cannot specify volumes that are displayed as [***Other-Storage***].

When specifying the extent start position and the extent size, you must enclose the entire argument for this option within double quotations (") depending on the shell being used.

-stdin

This option specifies the forcible suspend of multiple copy sessions read from standard input.

Specify the copy sessions which are to be forcibly suspended in Tab Separated Value (TSV) format as follows.

```
copySourceVolume<TAB>copyDestinationVolume<RETURN>
```

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Suspending REC sessions in storage device units forcibly

```
> accopy fsuspend -a ET001
ET001/0x1:ET002/0x1
# DATE : 2010/06/24 16:28:00 - << EC Suspended >>
ET001/0x2:ET002/0x2
# DATE : 2010/06/24 16:28:01 - << EC Suspended >>
[Omission]
ET001/0x2D0:ET002/0x2D0
# DATE : 2010/06/24 16:49:00 - << EC Suspended >>

Succeeded : 720
Failed    : 0
```

- Suspending REC sessions forcibly

```
> accopy fsuspend -a ET001 -sa ET002 -ta ET001
ET002/0x1:ET001/0x1
# DATE : 2010/06/24 16:28:00 - << EC Suspended >>
ET002/0x2:ET001/0x2
# DATE : 2010/06/24 16:28:01 - << EC Suspended >>
[Omission]
ET002/0x159:ET001/0x159
# DATE : 2010/06/24 16:40:34 - << EC Suspended >>

Succeeded : 345
Failed    : 0
```

- Suspending a REC session in session units forcibly

```
> accopy fsuspend -a ET001 -s "ET001/0x3[addr=0x3F,size=0x7FFF]" -t "ET002/0x3[addr=0x3F]"
ET001/0x3[addr=0x3F,size=0x7FFF]:ET001/0x3[addr=0x3F]
# DATE : 2010/06/24 16:40:34 - << EC Suspended >>

Succeeded : 1
Failed    : 0
```

- Suspending multiple REC sessions forcibly

```
> type SESSIONS.txt
ET002/0x9      ET001/0x9
ET001/0xA      ET002/0xA
> accopy fsuspend -a ET001 -stdin < SESSIONS.txt
ET002/0x9:ET001/0x9
# DATE : 2010/06/24 16:28:00 - << EC Suspended >>
ET001/0xA:ET002/0xA
# DATE : 2010/06/24 16:28:01 - << EC Suspended >>

Succeeded : 2
Failed    : 0
```

NOTES

If **Copy Status** column displayed with the [accopy query](#) command is either of the following, it is not possible to forcibly suspend the copy session.

- EC Hardware Suspend(Use REC DISK): A line error has occurred and the REC Disk buffer is being used
- EC Hardware Suspend(Use REC BUFFER): A line error has occurred and the REC buffer is being used

4.10 Server Utility Commands

4.10.1 acutil devs (Logical Volume Information Display Command)

NAME

acutil devs - Display the logical volume information

SYNOPSIS

```
acutil devs [-xml]
```

DESCRIPTION

This command displays logical volume information of the ETERNUS Disk storage system that is connected to the CCM Server via SAN. The devices of the following format can be displayed.

- For Windows environments
 - Device generated by "Disk #" displayed by clicking the **Start** menu > **Management Tool** > **Computer Management** > **Disk Management** (PhysicalDrive [disk number])
- For Solaris environments
 - OS standard device (/dev/rdisk/*)
 - Solaris standard multipath (MPxIO) device (/dev/rdisk/*)
 - ETERNUS multipath device (/dev/FJsvmp1b/rdisk/*)
 - VxVM device (/dev/vx/rdmp/*)
- For Linux environments
 - OS standard device (/dev/sd*)
 - Multipath device generated by device mapper facility of OS (/dev/mapper/*)
 - udev device generated by udev facility of OS (/dev/disk/by-id/*, /dev/disk/by-path/*)

OPTIONS

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- For Windows environments

```
> acutil devs
```

Device	BOX-ID	LV No	Size
PHYSICALDRIVE4	00ETERNUSDXH##ET87S20A####NC4110699004##	0x61	1048576
PHYSICALDRIVE5	00ETERNUSDXH##ET87S20A####NC4110699004##	0x62	1048576
PHYSICALDRIVE6	00ETERNUSDXH##ET87S20A####NC4110699004##	0x63	1048576

- For Solaris environments

```
>acutil devs
```

```
Device                                BOX-ID                                LV No  Size
-----                                -
/dev/rdisk/clt16d0s2                  00ETERNUSDXH##ET87S20A####NC4110699004## 0x0208 8388608
/dev/FJSVmplb/rdisk/mp1b1s2          00ETERNUSDXH##ET87S20A####NC4110699004## 0x0062 8388608
/dev/vx/rdmp/c2t16d0s2                00ETERNUSDXH##ET87S20A####NC4110699004## 0x0061 8388608
```

- For Linux environments

```
>acutil devs
```

```
Device                                BOX-ID                                LV No  Size
-----                                -
/dev/mapper/mpath0                    00ETERNUSDXH##ET87S20A####NC4110699004## 0x0084
12582912
/dev/sdb                               00ETERNUSDXH##ET87S20A####NC4110699004## 0x0084
12582912
/dev/disk/by-id/scsi-36000b5d0006a0000006a000200840000 00ETERNUSDXH##ET87S20A####NC4110699004##
0x0084 12582912
/dev/disk/by-path/pci-0000:00:10.0-scsi-0:0:1:0          00ETERNUSDXH##ET87S20A####NC4110699004##
0x0084 12582912
```

The following table shows the meanings of the information displayed.

Title	Explanation
Device	<ul style="list-style-type: none"> - For Windows environments Displays the name of the physical device using the "PhysicalDrive [disk number]" format. - For Solaris environments Displays the RAW device name. - For Linux environments Displays the device name.
BOX-ID	Displays the Box ID for ETERNUS Disk storage system.
LV No	Displays the logical volume number in hexadecimal.
Size	Displays the size (in blocks) of the logical volume in decimal.

NOTES

If the logical volume is a TFOV, this command displays the information on ETERNUS Disk storage systems where the TFO status is "Active".

4.10.2 acgetvolinfo (Logical Volume Information Display Command)

NAME

acgetvolinfo - Display the logical volume information

SYNOPSIS

```
acgetvolinfo deviceName
```

DESCRIPTION

This command displays logical volume information of the ETERNUS Disk storage system that is connected to the business server via SAN. This command is used on the business server.

This command can be used with the following operating systems:

- Microsoft Windows Server 2012 or later
- Solaris 11 (11/11 or later)
- Solaris 10
- Red Hat Enterprise Linux 8 (for Intel64)
- Red Hat Enterprise Linux 7 (for Intel64)
- Red Hat Enterprise Linux 6 (for Intel64)
- SUSE Linux Enterprise Server 15 for AMD64 & Intel64
- SUSE Linux Enterprise Server 12 Service Pack 4 for AMD64 & Intel64
- HP-UX 11i v3
- AIX V7.1

Depending on a business server OS, 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 [Point] below.

Point

Install commands using the installation procedure supported by the business server OS.

- For Windows, Solaris, or Linux environments

Install and use AdvancedCopy Manager CCM on the business server. Or, copy the utility file supported by the OS from the CCM Server where AdvancedCopy Manager CCM is installed to the business server, and then use it.

- For HP-UX or AIX environments

Copy the utility file supported by the OS from the CCM Server where AdvancedCopy Manager CCM is installed to the business server, and then use it.

If installing AdvancedCopy Manager CCM on the business server and using it, refer to "Installation of ETERNUS SF Manager" or "Installation of AdvancedCopy Manager CCM" in the *Installation and Setup Guide*.

If copying the utility file to the business server and then using it, copy using the procedures below.

1. Copy the utility file to an arbitrary location on the business server.

The utility file can be found in the following directory on the CCM Server.

- For Windows environments

Operating System	Utility File (*1)
Microsoft Windows Server 2012 or later	\$INS_DIR\tools\server_utility_windows.zip
Solaris 11 Solaris 10	\$INS_DIR\tools\server_utility_solaris.tar
Red Hat Enterprise Linux 8 (for Intel64)	\$INS_DIR\tools\server_utility_rhel8x64.tar
Red Hat Enterprise Linux 7 (for Intel64) Red Hat Enterprise Linux 6 (for Intel64)	\$INS_DIR\tools\server_utility_rhel6x86.tar
SUSE Linux Enterprise Server 15 for AMD64 & Intel64 SUSE Linux Enterprise Server 12 for AMD64 & Intel64	\$INS_DIR\tools\server_utility_sles12x64.tar
HP-UX 11i v3	\$INS_DIR\tools\server_utility_hp-ux.tar

Operating System	Utility File (*1)
AIX V7.1	\$INS_DIR\tools\server_utility_aix.tar

*1: \$INS_DIR is the "Program Directory" specified at the AdvancedCopy Manager CCM installation.

- For Solaris or Linux environments

Operating System	Utility File
Microsoft Windows Server 2012 or later	/opt/FJsvccm/tools/server_utility_windows.zip
Solaris 11 Solaris 10	/opt/FJsvccm/tools/server_utility_solaris.tar
Red Hat Enterprise Linux 8 (for Intel64)	/opt/FJsvccm/tools/server_utility_rhel8x64.tar
Red Hat Enterprise Linux 7 (for Intel64) Red Hat Enterprise Linux 6 (for Intel64)	/opt/FJsvccm/tools/server_utility_rhel6x86.tar
SUSE Linux Enterprise Server 15 for AMD64 & Intel64 SUSE Linux Enterprise Server 12 for AMD64 & Intel64	/opt/FJsvccm/tools/server_utility_sles12x64.tar
HP-UX 11i v3	/opt/FJsvccm/tools/server_utility_hp-ux.tar
AIX V7.1	/opt/FJsvccm/tools/server_utility_aix.tar

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

- For Windows environments

Uncompress the zip file, and then change the active directory by using the Command prompt tool etc.

- For Solaris, Linux, HP-UX, or AIX environments

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

OPERANDS

- Install and use AdvancedCopy Manager CCM on the business server

deviceName

Specifies the device name.

OS Type	Explanation
Windows	Specify the drive letter (e.g. X:).
Solaris	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/rdisk/*) - Solaris standard multipath (MPxIO) device name (/dev/rdisk/*) - ETERNUS multipath device name (/dev/FJsvmplb/rdisk/*) - VxVM device name (/dev/vx/rdmp/*)
Linux	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/sd*) - Multipath device name generated by device mapper facility of OS (/dev/mapper/*) - udev device name generated by udev facility of OS (/dev/disk/by-id/*, /dev/disk/by-path/*)

- Copy utility file to the business server and use

deviceName

Specifies the device name.

OS Type	Explanation
Windows	Specify the drive letter (e.g. X:).
Solaris	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/rdisk/*) - Solaris standard multipath (MPxIO) device name (/dev/rdisk/*) - ETERNUS multipath device name (/dev/FJSVmplb/rdisk/*) - VxVM device name (/dev/vx/rdmp/*)
Linux	Specify a device name from the following: <ul style="list-style-type: none"> - OS standard device name (/dev/sd*) - Multipath device name generated by device mapper facility of OS (/dev/mapper/*) - udev device name generated by udev facility of OS (/dev/disk/by-id/*, /dev/disk/by-path/*)
HP-UX	Specifies the RAW device name (e.g. /dev/rdisk/c1t0d20).
AIX	Specifies the physical device name (e.g. /dev/hdisk10).

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Install and use AdvancedCopy Manager CCM on the business server

- For Windows environments

```
C:\> acgetvolinfo X:
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x043 , 0x0 , 0x800000
```

- For Solaris environments

```
# acgetvolinfo /dev/rdisk/c4t0d10s2
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x041 , 0x0 , 0x800000
```

- For Linux environments

```
# acgetvolinfo /dev/sdo
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x042 , 0x0 , 0x800000
```

The following table shows the meanings of the information displayed.

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

Title	Explanation
Size	Displays the extent size (in blocks) in hexadecimal.

- Copy utility file to the business server and use

- For Windows environments

```
C:\> .\acgetvolinfo X:
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x043, 0x0, 0x800000
```

- For Solaris environments

```
# ./acgetvolinfo /dev/rdisk/c4t0d10s2
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x041, 0x0, 0x800000
```

- For Linux environments

```
# ./acgetvolinfo /dev/sdo
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x042, 0x0, 0x800000
```

- For HP-UX environments

```
# ./acgetvolinfo /dev/rdisk/clt0d20
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x043, 0x0, 0x800000
```

- For AIX environments

```
# ./acgetvolinfo /dev/hdisk10
BOX-ID,LV No,Address,Size
00ETERNUSDXM##ET44S20A####HK000104##### , 0x044, 0x0, 0x800000
```

The following table shows the meanings of the information displayed.

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

NOTES

If the logical volume is a TFOV, this command displays the information on ETERNUS Disk storage systems where the TFO status is "Active".

SEE ALSO

Refer to the *Messages* for information on messages output by this command.

4.10.3 acutil refresh (Partition Table Refresh Command) [Windows only]

NAME

acutil refresh - Refresh partition tables

SYNOPSIS

```
acutil refresh -d deviceName [-xml]
```

DESCRIPTION

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

This command can be used for logical volumes in the ETERNUS Disk storage system that is connected to the CCM Server via SAN.

OPTIONS

-d *deviceName*

Displays the name of the physical device using the following format: "PhysicalDrive [disk number]". The disk number is the same value as the "disk?" in the AdvancedCopy Manager block device name and the "Disk #" displayed by clicking the **Start** menu > **Management Tool** > **Computer Management** > **Disk Management**.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acutil refresh -d PhysicalDrive2  
Successful completion.
```

4.10.4 acutil fsflush (File System Flush Command) [Windows only]

NAME

acutil fsflush - flush file system

SYNOPSIS

```
acutil fsflush -m mountPoint [-xml]
```

DESCRIPTION

This command explicitly writes the data within the buffer to the disk.

This command is used for file server operations and the like which do not unmount the copy source logical volume.

This command can be used for logical volumes in the ETERNUS Disk storage system that is connected to the CCM Server via SAN.

OPTIONS

-m *mountPoint*

This option specifies a drive letter or a mount point. (e.g. F:\, C:\mnt\)

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acutil fsflush -m F:\
Successful completion.
```

NOTES

If using this command, it is necessary to first stop all writing processes to the copy source logical volume.

If Advanced Copy is performed without stopping the write processes, the integrity of the copy source logical volume data cannot be guaranteed.

4.10.5 acsdv init (Snap Data Volume Initialization Command)

NAME

acsdv init - Initialize Snap Data Volumes

SYNOPSIS

```
acsdv init -v volumeName [-xml]
```

DESCRIPTION

This command initializes a Snap Data Volume.

OPTIONS

-v *volumeName*

Specify a Snap Data Volume to be initialized by the following format.

```
ET01/0x1
└──┬──┘ └──┬──┘
  (1)  (2)
```

- (1) ETERNUS name

- (2) Logical volume number

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acsdv init -v ET001/0x1
Successful completion
```

NOTES

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

4.10.6 acsdv stat (Snap Data Volume Status Display Command)

NAME

acsdv stat - Display the status of a Snap Data Volume

SYNOPSIS

```
acsdv stat -v volumeName [-xml]
```

DESCRIPTION

This command displays the status of a Snap Data Volume.

OPTIONS

-v *volumeName*

Specify a Snap Data Volume to be displayed by the following format.

```
ET01/0x1
└──┬──┘
(1) (2)
```

- (1) ETERNUS name
- (2) Logical volume number

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

```
> acsdv stat -v ET001/0x1
```

```
Rate Logical Physical Used Copy Host Pool
-----
0% 8388608 1048576 0 0 0 0
```

The following table shows the meanings of the information displayed.

Title	Explanation
Rate	Displays the usage of a Snap Data Volume as a percentage.
Logical	Displays the logical capacity of a Snap Data Volume in blocks.
Physical	Displays the physical capacity of a Snap Data Volume in blocks.
Used	Displays the capacity of a Snap Data Volume used area in blocks. Displays the sum capacity of copy usage(*1) and host usage(*1).
Copy	Displays the copy usage(*1) out of Snap Data Volume used capacity in blocks.
Host	Displays the host usage(*1) out of Snap Data Volume used capacity in blocks.
Pool	Displays the usage of a Snap Data Pool allocated to a snap data volume in blocks.

(*1)

Copy usage: Usage of updates performed during SnapOPC+ execution.

Host usage: Usage of Snap Data Volume updates performed when SnapOPC+ is not executed.

NOTES

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

4.10.7 acsdv poolstat (Snap Data Pool Status Display Command)

NAME

acsdv poolstat - Display the status of a Snap Data Pool

SYNOPSIS

```
acsdv poolstat -a diskArrayName [-xml]
```

DESCRIPTION

This command displays the status of a Snap Data Pool.

OPTIONS

-a *diskArrayName*

This option specifies the ETERNUS names.

-xml

This option specifies when displaying by the XML format.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acsdv poolstat -a ET001
```

```
Pool-Type Rate Total Used Copy Host Free
-----
Normal 10% 20971520 2097152 0 2097152 18874368
Encrypted 0% 20971520 0 0 0 20971520
```

The following table shows the meanings of the information displayed.

Title	Explanation
Pool-Type	Displays the type of a Snap Data Pool. - Normal: Normal (unencrypted) - Encrypted: Encrypted
Rate	Displays the usage of a Snap Data Pool as a percentage.
Total	Displays the total capacity of a Snap Data Pool in blocks.
Used	Displays the capacity of a Snap Data Pool used area in blocks. Displays the sum capacity of copy usage(*1) and host usage(*1).
Copy	Displays the copy usage(*1) out of Snap Data Pool used capacity in blocks.
Host	Displays the host usage(*1) out of Snap Data Pool used capacity in blocks.
Free	Displays the capacity of Snap Data Pool unused area in blocks.

(*1)

Copy usage: Usage of updates performed during SnapOPC+ execution.

Host usage: Usage of snap data volume updates performed when SnapOPC+ is not executed.

NOTES

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

4.11 Maintenance Command

4.11.1 acservice stop (Management Service Stop Command)

NAME

acservic stop - stop management services

SYNOPSIS

```
acservic stop -lan [-xml]
```

DESCRIPTION

This command stops the management services of AdvancedCopy Manager CCM.

OPTIONS

-lan

This option specifies to stop the management services which are used by Copy command via LAN.

-xml

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

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> acservic stop -lan  
Successful completion.
```

NOTES

Execute this command after AdvancedCopy Manager CCM processing has been stopped.

4.12 Troubleshooting Data Collection Command

4.12.1 esfsnap (CCM Server Troubleshooting Data Collection Command)

NAME

esfsnap - Collect the troubleshooting information on the CCM Server

SYNOPSIS

For Windows environments

```
$INS_DIR\Common\bin\esfsnap -dir dirName [-all]
```

(\$INS_DIR is the "Program Directory" as specified during ETERNUS SF Manager installation.)

For Solaris or Linux environments

```
/opt/FJSVesfcm/bin/esfsnap -dir dirName [-all]
```

DESCRIPTION

This command collects the troubleshooting information on the CCM Server when a problem occurs. Only user has the OS administrator privilege can execute this command.

Send the collected data to Fujitsu Technical Support.

OPTIONS

-dir *dirName*

Specify a directory where the troubleshooting data is stored.

- For Windows environments

It is necessary to specify the full path name that begins with a drive letter for *dirName*.
The maximum length that can be specified for *dirName* is 70 bytes.

- For Solaris or Linux environments

It is necessary to specify the full path name for *dirName*.

The collected troubleshooting data is stored in the directory which its name begins with "esfsnap_". Before executing this command, check that *dirname* directory has the following free space.

Collected Information	Required Free Space
Initial investigation information	more than 40 MB
All troubleshooting information	more than "80 + (2 * number of registered device)" MB

-all

Collects all troubleshooting data on the CCM Server. Data includes lots of information, which increases the size of the data. This option is not necessary for initial investigation.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- For Windows environments

Collect the troubleshooting data for initial investigation on D:\temp directory.

```
> esfsnap -dir D:\temp
```

- For Solaris or Linux environments

Collect the troubleshooting data for initial investigation on /var/tmp directory.

```
> esfsnap -dir /var/tmp
```

NOTES

- When using AdvancedCopy Manager, execute this command when other commands or GUI processing of AdvancedCopy Manager are in the stopped state. Data collection may not be performed correctly if other commands or GUI processing of AdvancedCopy Manager are running.

- When using Express, execute this command when other commands or GUI processing of Express are in the stopped state. Data collection may not be performed correctly if other commands or GUI processing of Express are running.
- Collect the following data if the install destination directory is changed when AdvancedCopy Manager CCM installation.
 - All files in the "Environment Directory" as specified during AdvancedCopy Manager CCM installation.
 - All files in the "Work Directory" as specified during AdvancedCopy Manager CCM installation.
- When operating in the cluster environment, execute this command on all nodes. Execute the command after mounting the shared disk on any node for collecting information of the shared disk.
- Collect the following data when operating in the cluster environment.
 - Data in the shared disk for AdvancedCopy Manager CCM shared data.

Chapter 5 Troubleshooting

This appendix explains how to resolve problems that may occur with AdvancedCopy Manager CCM.

5.1 Collecting Troubleshooting Information

Log into the CCM Server, and execute the [esfsnap](#) command to collect data for investigating the problem.

Send the collected data to Fujitsu Technical Support.

5.2 Resolving Hardware Error

If, as a result of a hardware error, the Advanced Copy cannot continue, the ETERNUS Disk storage system automatically suspends it.

If a problem occurs, check the copy status and error code, and take action.

- Procedure for checking copy status

If the copy is suspended, then its status is changed to one of the following:

- OPC Error Suspend
- EC Error Suspend
- EC Hardware Suspend
- EC Hardware Suspend (Use REC DISK)
- EC Hardware Suspend (Use REC BUFFER)
- Snap Error Suspend

To check the status of the Advanced Copy processing, use the [acopc query](#), [acec query](#), or [acsnap query](#) command.

- Procedure for checking error code

Use ETERNUS Web GUI to check error codes:

1. From the **Display status** menu, click **Advanced Copy status display** in the status display.
2. At **Session status**, click the **Number of active sessions** link for the relevant copy type.
3. Refer to the value in the **Error code** column of the relevant copy process.

This section explains how to resolve problems.

Table 5.1 Causes and Action in Response to Hardware Error

Advanced Copy Status	Error Code	Cause / Action
OPC Error Suspend	0xB2	[Cause] As the Storage Cluster Continuous Copy sessions on the Primary Storage and Secondary Storage cannot be synchronized, the Advanced Copy could not be continued. [Action] Refer to " 3.12.11 When Recovering Storage Cluster Continuous Copy Function ".
	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] When the Storage Cluster Continuous Copy function is used, refer to " 3.12.10.1 Recovery from Hardware Failure ". In cases other than the above, take the following measures.

Advanced Copy Status	Error Code	Cause / Action
		<ol style="list-style-type: none"> 1. Execute the acopc cancel command to cancel the copy. If it cannot be cancelled using commands, then use ETERNUS Web GUI. 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. <ul style="list-style-type: none"> - 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 system command (for example, the UNIX dd command or the Windows format 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	<p>[Cause] An error other than 0xBA occurred. For error details, confirm with Fujitsu Technical Support.</p> <p>[Action] When the Storage Cluster Continuous Copy function is used, refer to "3.12.10.1 Recovery from Hardware Failure". In cases other than the above, take the following measures.</p> <ol style="list-style-type: none"> 1. Execute the acopc cancel command to cancel the copy. If it cannot be cancelled using commands, then use ETERNUS Web GUI. 2. Execute the acpair remove command to remove the copy pair. 3. Execute the acpair add command to add a new copy pair.
EC Error Suspend	0xB2	<p>[Cause] As the Storage Cluster Continuous Copy sessions on the Primary Storage and Secondary Storage cannot be synchronized, the Advanced Copy could not be continued.</p> <p>[Action] Refer to "3.12.11 When Recovering Storage Cluster Continuous Copy Function".</p>
	0xBA	<p>[Cause] EC/REC is in suspend status (copy establishment status) and a bad sector has occurred in the logical volume of the copy source.</p> <p>[Action] When the Storage Cluster Continuous Copy function is used, refer to "3.12.10.1 Recovery from Hardware Failure". In cases other than the above, take the following measures.</p> <ol style="list-style-type: none"> 1. Execute the acec cancel command to cancel the copy. If it cannot be cancelled using commands, then use ETERNUS Web GUI.

Advanced Copy Status	Error Code	Cause / Action
		<p>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.</p> <ul style="list-style-type: none"> - Recovery method 1 <p>If the area can be recovered from the parent software (for example, the file system or DBMS), then recover it.</p> <ul style="list-style-type: none"> - Recovery method 2 <p>Use a system command (for example, the UNIX dd command or the Windows format 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.</p> <ul style="list-style-type: none"> - Recovery method 3 <p>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).</p>
	Other than 0xBA	<p>[Cause]</p> <p>An error other than 0xBA occurred. For error details, confirm with Fujitsu Technical Support.</p> <p>[Action]</p> <p>When the Storage Cluster Continuous Copy function is used, refer to "3.12.10.1 Recovery from Hardware Failure".</p> <p>In cases other than the above, take the following measures.</p> <ol style="list-style-type: none"> 1. Execute the accec cancel command to cancel the copy. If it cannot be cancelled using commands, then use ETERNUS Web GUI. 2. Execute the acpair remove command to remove the copy pair. 3. Execute the acpair add command to add a new copy pair.
EC Hardware Suspend	-	<p>[Cause]</p> <p>An all path halt occurred.</p> <p>[Action]</p> <p>The REC resume procedure varies according to the REC Recovery mode.</p> <ul style="list-style-type: none"> - [In Automatic Recovery mode] <ol style="list-style-type: none"> 1. Remove the cause of all the path halt. 2. REC is automatically restarted (resumed) by ETERNUS Disk storage system. - [In Manual Recovery mode] <ol style="list-style-type: none"> 1. Remove the cause of all the path halt. 2. Execute the accec suspend command with the -force option to forcibly and temporarily suspend the REC. 3. Execute the accec resume command to resume the REC.
EC Hardware Suspend (Use REC DISK)	-	<p>[Cause]</p> <p>An all path halt occurred while transfer data was in the saved state in the REC Disk buffer.</p> <p>[Action]</p>

Advanced Copy Status	Error Code	Cause / Action
		<ol style="list-style-type: none"> 1. Remove the cause of all the path halt. 2. REC is automatically restarted (resumed) by ETERNUS Disk storage system.
EC Hardware Suspend (Use REC BUFFER)	-	<p>[Cause]</p> <p>An all path halt occurred while transfer data was in the saved state in the REC transfer buffer.</p> <p>[Action]</p> <ol style="list-style-type: none"> 1. Remove the cause of all the path halt. 2. REC is automatically restarted (resumed) by ETERNUS Disk storage system.
Snap Error Suspend	0x1E, 0x2E, 0xBB	<p>[Cause]</p> <p>A capacity shortage occurred in the copy destination volume of SnapOPC+.</p> <p>[Action]</p> <ol style="list-style-type: none"> 1. Execute the acsnap cancel command to cancel the process for which the error occurred. If this command cannot be used to cancel the process, cancel it from ETERNUS Web GUI. 2. Check the status of the copy destination volume and initialize it. <ul style="list-style-type: none"> - If the copy destination volume is TPV <p>Use Storage Cruiser or ETERNUS Web GUI to check the status of the destination volume and initialize it.</p> <p>For the operation procedure when using Storage Cruiser, refer to "Display Volume" and "Delete Reserved Volume or Forcible Delete/Format Volume" in the <i>Web Console Guide</i>.</p> - If the copy destination volume is FTV <p>Use Storage Cruiser or ETERNUS Web GUI to check the status of the destination volume and initialize it.</p> <p>For the operation procedure when using Storage Cruiser, refer to "Display FTV" and "Format FTV" in the <i>Web Console Guide</i>.</p> - If the copy destination volume is SDV <p>Use Storage Cruiser, the <code>acsdv</code> command, or ETERNUS Web GUI to check the status of the destination volume and initialize it.</p> <p>For the operation procedure when using Storage Cruiser, refer to "Display Volume" and "Delete Reserved Volume or Forcible Delete/Format Volume" in the <i>Web Console Guide</i>.</p> <p>The operation procedure when using the <code>acsdv</code> command is as follows:</p> <ol style="list-style-type: none"> 1. Execute the acsdv stat command and check the status of the SDV. 2. Execute the acsdv init command and initialize the SDV. 3. Recreate partitions (slices) in the copy destination volume. <p>The following factors may have caused a capacity shortage of the physical space in the copy destination volume of SnapOPC+:</p> <ol style="list-style-type: none"> a. The estimate of the required physical space for the copy destination volume is not adequate. b. Although the estimate of the required physical space for the copy destination volume is adequate, because large amounts of updates have been performed in the copy destination volume in which SnapOPC+ session does not exist, the physical space of the copy destination volume is being wasted.

Advanced Copy Status	Error Code	Cause / Action
		<p>When corresponding to the above "a", re-estimate the physical space required for the copy destination volume and consider the disk expansion.</p> <ul style="list-style-type: none"> - If TPV is used as the copy destination volume <p>Use Storage Cruiser or ETERNUS Web GUI to check the status of the Thin Provisioning Pool and expand the capacity of the Thin Provisioning Pool. For the operation procedure when using Storage Cruiser, refer to "Display Thin Provisioning Pool" and "Expand Capacity of/Format/Change Threshold Value of/Delete Thin Provisioning Pool" in the <i>Web Console Guide</i>.</p> - If FTV is used as the copy destination volume <p>Use Storage Cruiser or ETERNUS Web GUI to check the status of the Tier pool and expand the sub-pool capacity of the Tier pool. For the operation procedure when using Storage Cruiser, refer to "Display Tier Pool" and "Expand Capacity of Sub-Pool in Tier Pool" in the <i>Web Console Guide</i>.</p> - If SDV is used as the copy destination volume <p>Use the acsdv poolstat command or ETERNUS Web GUI to check the status of the SDP and expand the SDP capacity. Creating an exclusive volume named Snap Data Pool Volume (SDPV) enables the SDP and the created SDPV is automatically incorporated in the SDP. Creating an SDPV of the physical capacity that is assigned to a copy destination volume expands the SDP capacity. The operation procedure when using the acsdv poolstat command is as follows:</p> <ol style="list-style-type: none"> 1. Execute the acsdv poolstat command and check the status of the SDP. 2. Create the SDPV with ETERNUS Web GUI.

5.3 Resolving for Displaying "???" in Advanced Copy Status

Information such as Copy direction data and SID data may display as "???" in Advanced Copy status.

Check a cause in the following table and take action.

Cause	Action
An access volume of registered ETERNUS Disk storage system is incorrect (For operation by Copy command via SAN only)	Execute the acarray detail command to check access volumes. If the access volume is incorrect, refer to "2.2 Access Volume Settings" and set an appropriate access volume.
A connection route between CCM Server and ETERNUS Disk storage system is disconnected. (For operation by Copy command via LAN only)	Check the connection route between CCM Server and ETERNUS Disk storage system.
Logical volume sizes of copy-source and copy-destination are different. (For SnapOPC+ only)	Check logical volume sizes of copy-source and copy-destination. If it is different, register the copy pair that the copy-source logical volume size and copy destination logical volume size are same.
The logical volume used as the access volume is set as a TFOV	Change the access volume to a non-TFOV. Refer to "3.6.2 Changing Registered Information for ETERNUS Disk Storage System" to change the access volume.
When the Storage Cluster Continuous Copy function is used, the configuration is different to when creating the copy pair.	Check the volume attributes and volume number, and correct them so that the configuration is the same as that when creating the copy pair. Alternatively, delete the copy pair and perform registration again.

Cause	Action
A failover occurs in the Storage Cluster function when performing copy processing.	Re-execute the command after confirming completion of the failover.

When this occurs while utilizing REC, confirm the following table as well.

Cause	Troubleshooting
The copy path of REC is not configured with the ETERNUS Disk storage system.	Configure the copy path of REC.
Delete the ETERNUS Disk storage system that is defined to the copy group, and re-register this as a remote ETERNUS Disk storage system.	Execute the acgroup detail command and confirm the ETERNUS Disk storage system that is displayed under "Disk Array Name". Delete registration of the ETERNUS Disk storage system that confirms it, and re-register this as storage device which is operated by Copy command via SAN or Copy command via LAN.

Chapter 6 Notes on Operations

This appendix explains the notes for AdvancedCopy Manager CCM operation.

6.1 Notes on SnapOPC+ Operation

6.1.1 SnapOPC+ Copy Destination Volume

If the physical capacity of the copy destination volume is insufficient, you cannot access the copy destination volume. Because of that, after estimating the physical capacity required for the copy destination volume according to the following procedure, create the copy destination volume.

1. [Estimated Required Capacity for Copy Destination Volumes](#)
2. [Creating of Copy Destination Disk](#)

Estimated Required Capacity for Copy Destination Volumes

The formula to estimate the physical capacity required for the SnapOPC+ copy destination volume is shown below.

```
Physical capacity = (number of updated blocks for the copy source volume) * (safety factor)
```

Strictly speaking, both the number of blocks that have been updated on the copy destination volume and the management area used by the hardware (about 0.1% of the logical capacity) should also be taken into consideration before SnapOPC+ is performed. However, this can be covered by increasing the safety factor.

For the update amount produced in the copy source volume, measure using the following procedure:

1. Start the estimation of the update amount by configuring a monitor session on the copy source volume.

[Execution example]

```
> acsnap start -estimate -v ET001/0x1
Successful completion
```

2. Start transactions. Blocks that are updated by transactions are recorded on the hardware.
3. After the estimation period has elapsed, check the number of blocks that have been updated.

[Execution example]

```
> acsnap query -estimate -v ET001/0x1
Update
-----
    10M
```

4. After the estimation is completed, cancel the monitor session.

[Execution example]

```
> acsnap cancel -estimate -v ET001/0x1
```



Point

.....
If an advance estimation is difficult, it is recommended that the physical capacity of the copy destination volume is 30 to 50 % of the total capacity of the copy source. As this is a recommended value, you must adjust according to the operational status.
.....



See

Refer to "[Chapter 4 Command References](#)" for information on the commands.

Creating of Copy Destination Disk

To create a copy destination disk, use Storage Cruiser or ETERNUS Web GUI.



Point

- Make logical space on a copy destination volume equal to that on a copy source volume.
- Consider a disk expansion from the required physical capacity in the copy destination volume.
 - If TPV is used as the copy destination volume
 - Use Storage Cruiser or ETERNUS Web GUI to check the status of the Thin Provisioning Pool and expand the capacity of the Thin Provisioning Pool.
 - For the operation procedure when using Storage Cruiser, refer to "Display Thin Provisioning Pool" and "Expand Capacity of/Format/Change Threshold Value of/Delete Thin Provisioning Pool" in the *Web Console Guide*.
 - If FTV is used as the copy destination volume
 - Use Storage Cruiser or ETERNUS Web GUI to check the status of the Tier pool and expand the sub-pool capacity of the Tier pool.
 - For the operation procedure when using Storage Cruiser, refer to "Display Tier Pool" and "Expand Capacity of Sub-Pool in Tier Pool" in the *Web Console Guide*.
 - If SDV is used as the copy destination volume
 - Use the `acsdv poolstat` command or ETERNUS Web GUI to check the status of the SDP and expand the SDP capacity.
 - Creating an exclusive volume named Snap Data Pool Volume (SDPV) enables the SDP and the created SDPV is automatically incorporated in the SDP. Creating an SDPV of the physical capacity that is assigned to a copy destination volume expands the SDP capacity.
 - The operation procedure when using the `acsdv poolstat` command is as follows:
 1. Execute the `acsdv poolstat` command and check the status of the SDP.
 2. Create the SDPV with ETERNUS Web GUI.
- If you use an SDV as the copy destination volume, initialize the SDV. To avoid wasting the physical space of the SDV, limit the creation of file systems to the minimum requirement for the update after initializing the SDV.



See

Refer to "Create Volume" in the *Web Console Guide* for information on how to create TPV/SDV/SDPV using Storage Cruiser. Refer to "Create FTV" in the *Web Console Guide* for information on how to create FTV.

6.1.2 Monitor Usage of Copy Destination Volume

If the physical capacity of the copy destination volume is insufficient, you cannot access the copy destination volume. This status makes it impossible to read data from the copy destination volume and write data into the copy destination volume. As for SnapOPC+, read/write is not allowed not only on the copy destination volume, but also on earlier generation's copy destination volumes.

For this reason, you must monitor so that a capacity shortage of the physical space in the copy destination volume does not occur during operation.

Monitoring When Using TPV/FTV as Copy Destination Volume

The physical space on the TPV/FTV is assigned per block. This may require more physical space than estimated. To prevent a capacity shortage of the physical space in the copy destination volume, use Storage Cruiser to change the settings of capacity threshold as

required and monitor the usage.

Refer to "Thin Provisioning Management" in the *Storage Cruiser Operation Guide* for details about TPV monitoring.

Refer to "Automated Storage Tiering Management" in the *Storage Cruiser Operation Guide* for details about FTV monitoring.

Monitoring When Using SDV as Copy Destination Volume

Execute the `acsdv poolstat` command periodically to monitor whether a capacity shortage of the space in the SDP occurs.

In the SDP area, if any area exceeding 50 % of usage exists regardless of encryption, consider increasing SDPVs. Also, increase the frequency of monitoring the SDP.

In the SDP area, if any area exceeding 70 % of usage exists regardless of encryption, increase SDPVs immediately.

6.1.3 Stopping SnapOPC+

If the SnapOPC+ backup process is stopped, the deletable snap generations and the results of the `acsnap cancel` command vary depending on factors such as the firmware version of the storage device and the volume type of the copy destination volume. Refer to "3.2.1.6 Stopping SnapOPC+" for details.

To prevent necessary sessions from being stopped, confirm that the target storage device, its firmware version, the volume type of the copy destination volume, and the snap generation are all correct before stopping SnapOPC+.

6.2 Notes about Cluster Operation

There are the following cautions for backups in a clustered system.

- Use the same access volume is required when a cluster operation using Copy command via SAN. If you specify the access volume in "2.4 Registering ETERNUS Disk Storage System", execute the `acarray add` command with the `-path` option.
- In a cluster operation, execute AdvancedCopy Manager CCM commands on active nodes that can use the shared disk for AdvancedCopy Manager CCM shared data. AdvancedCopy Manager CCM command cannot be executed on standby nodes.
- If a failover occurs while running a command, execute the `acservicestop` command with the `-lan` option. After that, turn the failed over server into the active server.

6.3 Notes on Combining Cascade Copy and Concurrent OPC in Operation

If you specify a volume used in cascade copy as the copy source and then execute a Concurrent OPC by the `acopc start` or `acsnap start` command, it may not be possible to preserve the sequence of data updates across multiple volumes. In this case, an error message is displayed and the command terminates in an error.

If the error cannot be resolved by responding to the message, we recommend you to change the operating method of AdvancedCopy or reconfigure the system.

If you cannot change the operation method of AdvancedCopy or reconfigure the system, create a file (`user.properties`) that sets the sequence of data updates across multiple volumes. Then, disable sequence preservation before you retry Concurrent OPC.

Create `user.properties` on the following path of the server on which to execute the `acopc start` or `acsnap start` command:

- In a non-cluster environment

OS	Location of File Creation
Windows	<code>\$INS_DIR\etc\prop</code>
Solaris Linux	<code>/etc/opt/FJSVccm/prop</code>

`$INS_DIR` is the "Program Directory" as specified during AdvancedCopy Manager CCM installation.

- In cluster environment

OS	Location of File Creation
Windows	\$SHARE_DL:\$SHARE_TOP\etc\prop
Solaris Linux	\$SHARE_MNT/etc/opt/FJSVccm

\$SHARE_DL is the drive letter of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_TOP is the directory that contains "Environment Directory" and "Work Directory" of the shared disk for AdvancedCopy Manager CCM shared data.

\$SHARE_MNT is the mount point of the shared disk for AdvancedCopy Manager CCM shared data.

Table 6.1 File Format of user.properties File

Key Name	Description
concurOPC.cascade	Set preservation of the sequence of data updates across multiple volumes. By setting "off", preservation of the sequence is disabled. By setting any value other than "off", preservation of the sequence is enabled.

[Example for disabling sequence preservation]

```
concurOPC.cascade=off
```

 **Point**

For any of the storage devices below, Concurrent OPC can be executed regardless of sequence preservation of data updates. However, the sequence of data updates is not preserved across multiple volumes.

- ETERNUS DX80 S2 (for earlier than V10L30 firmware)
- ETERNUS DX90 S2 (for earlier than V10L30 firmware)
- ETERNUS DX400 S2 series (for earlier than V10L30 firmware)
- ETERNUS DX8000 S2 series (for earlier than V10L30 firmware)

6.4 Notes about Changing Disk Configuration

When changing disk configuration of CCM Server in the operation using Copy command via SAN, check that the access volume of the registered ETERNUS Disk storage system is correct.

6.5 Use in Combination with ODX (Offloaded Data Transfer)

When using an ETERNUS Disk storage system that supports the Offloaded Data Transfer (hereinafter referred to as "ODX") function, ODX session starts within the ETERNUS Disk storage system by Microsoft Windows Server 2012 or later Offloaded Data Transfer function when files are copied or transferred. However, Advanced Copy cannot be performed by AdvancedCopy Manager on the condition that a volume on which ODX session is running is taken as copy destination. For this reason, if the [acopc start](#) or [acec start](#) command is executed on the condition that a volume containing the area in which files are being copied or transferred by the Offloaded Data Transfer function is taken as copy destination, an error message is displayed and the command may terminate abnormally.

If the command terminates abnormally, check on Web Console or by the [accopy query](#) command that no ODX session exists on the copy destination volume and then re-execute the command.

If the error is not resolved, review the copied volume or take either of the following actions to temporarily prevent the ODX session from running and then re-execute the command:

- Disabling Microsoft Windows Server 2012 or later Offloaded Data Transfer (ODX)

Refer to the steps provided by Microsoft Corporation at the following URL for information on how to disable the setting.

<http://technet.microsoft.com/en-us/library/jj200627.aspx>

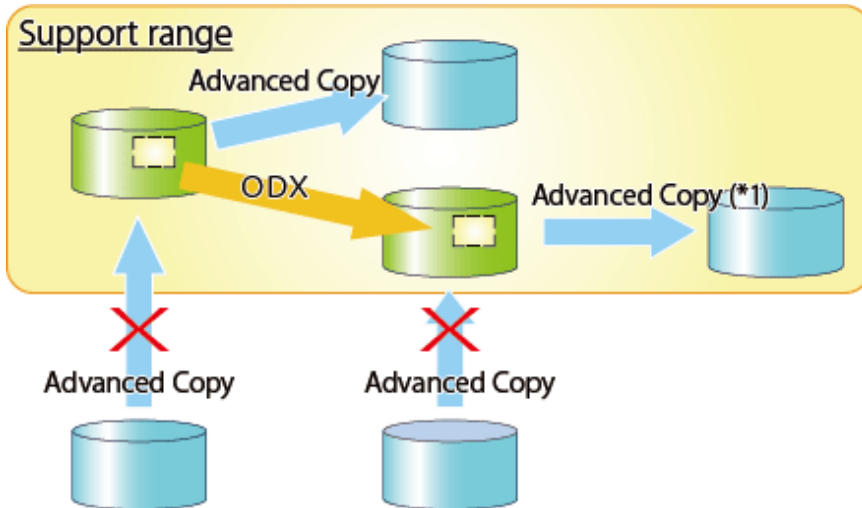
This setting affects only the servers on which the operation is performed.

- Stopping the Offloaded Data Transfer function of the ETERNUS Disk storage system

Refer to the ETERNUS Disk storage system manual for how to stop.

This setting affects all the servers that use the ETERNUS Disk storage system.

Figure 6.1 Use in Combination with ODX



*1: In the following storage devices whose firmware version is earlier than V10L50, Advanced Copy cannot be performed by AdvancedCopy Manager for a volume on which ODX session is running.

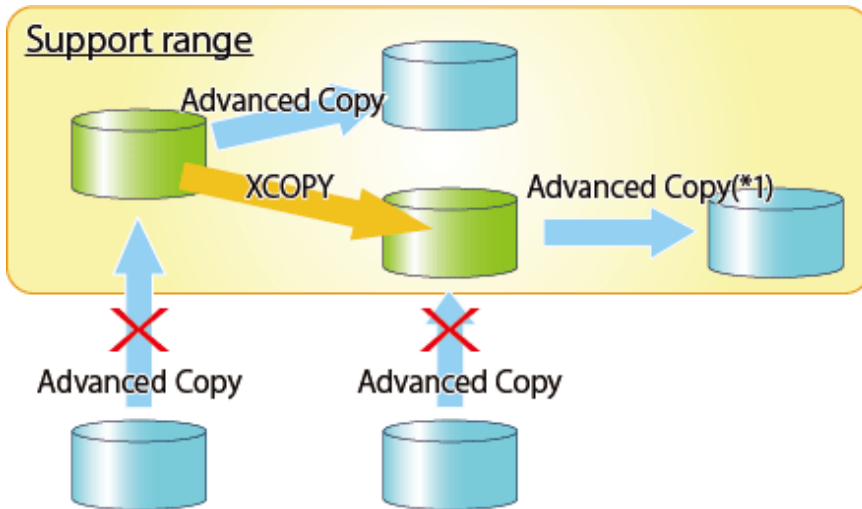
- ETERNUS DX80 S2
- ETERNUS DX90 S2
- ETERNUS DX400 S2 series
- ETERNUS DX8000 S2 series

6.6 Use in Combination with XCOPY (Extended Copy)

When copying data by replicating VMware vSphere virtual machines or running Storage vMotion, Extended Copy (hereinafter referred to as "XCOPY") session starts by the Full Copy function of VMware vStorage APIs for Array Integration (VMware VAAI). However, Advanced Copy cannot be performed by AdvancedCopy Manager on the condition that a volume on which XCOPY session is running is taken as copy destination. For this reason, if you execute the `acopc start` or `acec start` command on the condition that a volume which is copying data by replicating virtual machines or running Storage vMotion is taken as copy destination, an error message is displayed and the command may terminate abnormally.

If the command terminates abnormally, check on Web Console or by the `accopy query` command that no XCOPY session exists on the copy destination volume and then re-execute the command.

Figure 6.2 Use in Combination with XCOPY



*1: In the following storage devices whose firmware version is earlier than V10L50, Advanced Copy cannot be performed by AdvancedCopy Manager for a volume on which XCOPY session is running:

- ETERNUS DX80 S2
- ETERNUS DX90 S2
- ETERNUS DX400 S2 series
- ETERNUS DX8000 S2 series

6.7 Notes on Operating AdvancedCopy Manager CCM on Microsoft Windows Server 2019 or Later

If AdvancedCopy Manager CCM is used on Microsoft Windows Server 2019 or later, the AdvancedCopy Manager CCM commands are blocked and terminate with an error if the Controlled folder access feature of Windows Defender Exploit Guard is enabled. Therefore, disable the Controlled folder access feature of Windows Defender Exploit Guard.

Refer to the steps provided by Microsoft Corporation at the following URL for information on how to disable the setting.

<https://support.microsoft.com/en-za/help/4046851/windows-10-allow-blocked-app-windows-security>

6.8 Executing the Command That Displays the Advanced Copy Status

If multiple commands that display the Advanced Copy status, such as the `acopc query` command, `accc query` command, and `acsnap query` command, are executed simultaneously, the response speed from the storage device is reduced and may affect command executions and transactions.

For this reason, design the operation so that multiple commands cannot be executed at the same time.

Appendix A Preliminary Checks of Advanced Copy Status

This appendix explains the circumstances for check errors with the various commands for AdvancedCopy Manager CCM which has a feature which determines the Advanced Copy's various statuses and then checks beforehand whether or not the status allows for the execution of commands. It also explains the ID's for the error messages output during these check errors.

Table A.1 Commands Which Have Preliminary Check Function and Check Error Condition

Command Name	Check Error Condition and Error Message ID
acopc start	<ul style="list-style-type: none"> - Copy Group Type is QuickOPC. - There are no copy sessions. - The -diff option has been specified. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is QuickOPC. - Copy Phase is "Copying/Tracking" or "Tracking". - The -diff option has not been specified. - Error message ID is ccm4013.
	<ul style="list-style-type: none"> - Copy Group Type is QuickOPC. - Copy Phase is "Copying". - The -diff option has been specified. - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is OPC or QuickOPC. - OPC Status is "OPC Error Suspend". - Error message ID is ccm4014.
acopc cancel	<ul style="list-style-type: none"> - Copy Group Type is OPC or QuickOPC. - There are no copy sessions. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is QuickOPC. - Copy phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4014.
acsnap start	<ul style="list-style-type: none"> - Copy Group Type is SnapOPCP. - Snap Status is "Copy On Write(Active)" or "Copy On Write(Inactive)". - The -p option has been specified. (The operation target snap generation is other than snap generation number 1.) - The target storage device does not support the deletion function for generations other than the oldest one. - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is SnapOPCP. - Snap Status is "Snap Error Suspend".

Command Name	Check Error Condition and Error Message ID
	<ul style="list-style-type: none"> - The -p option has been specified. (The operation target snap generation is other than snap generation number 1.) - The target storage device does not support the deletion function for generations other than the oldest one. - Error message ID is ccm4014.
acsnap cancel	<ul style="list-style-type: none"> - Copy Group Type is SnapOPCP. - There are no copy sessions. - The -p option has been specified. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is SnapOPCP. - Snap Status is "Copy On Write(Active)" or "Copy On Write(Inactive)". - The -p option has been specified. (The operation target snap generation is other than snap generation number 1.) - The target storage device does not support the deletion function for generations other than the oldest one. - The -force option has not been specified. - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is SnapOPCP. - Snap Status is "Snap Error Suspend". - The -p option has been specified. (The operation target snap generation is other than snap generation number 1.) - The target storage device does not support the deletion function for generations other than the oldest one. - The -force option has not been specified. - Error message ID is ccm4014.
acec start	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are copy sessions. - Error message ID is ccm4013.
	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - EC Status is "EC Error Suspend", "EC Hardware Suspend", "EC Hardware Suspend(Use REC DISK)" or "EC Hardware Suspend(Use REC BUFFER)". - Error message ID is ccm4013.
	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are copy sessions. (Copy direction is reverse to the specified.) - Error message ID is ccm4016.
acec suspend	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are no copy sessions. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is EC.

Command Name	Check Error Condition and Error Message ID
	<ul style="list-style-type: none"> - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4015. <hr/> <ul style="list-style-type: none"> - Copy Group Type is EC. - EC Status is "EC Suspend". - Error message ID is ccm4014. <hr/> <ul style="list-style-type: none"> - Copy Group Type is EC. - EC Status is "EC Error Suspend". - Error message ID is ccm4014. <hr/> <ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Synchronous" or "Through". - EC Status is "EC Starting" or "EC Executing". - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4015. <hr/> <ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Consistency" or "Stack". - EC Status is "EC Starting" or "EC Executing". - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4014. <hr/> <ul style="list-style-type: none"> - Copy Group Type is REC. - EC Status is "EC Suspend". - Error message ID is ccm4014. <hr/> <ul style="list-style-type: none"> - Copy Group Type is REC. - EC Status is "EC Error Suspend", "EC Hardware Suspend", "EC Hardware Suspend(Use REC DISK)" or "EC Hardware Suspend(Use REC BUFFER)". - The -force option has not been specified. - Error message ID is ccm4014.
acec resume	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are no copy sessions. - Error message ID is ccm4012. <hr/> <ul style="list-style-type: none"> - Copy Group Type is EC or REC. - EC Status is not "EC Suspend". - Error message ID is ccm4014.
acec reverse	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are no copy sessions.

Command Name	Check Error Condition and Error Message ID
	<ul style="list-style-type: none"> - Error message ID is ccm4012.
acec change	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - EC Status is not "EC Suspend". - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - There are no copy sessions. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - EC Status is not "EC Suspend". - Error message ID is ccm4014.
acec cancel	<ul style="list-style-type: none"> - Copy Group Type is EC or REC. - There are no copy sessions. - Error message ID is ccm4012.
	<ul style="list-style-type: none"> - Copy Group Type is EC. - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4015.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Synchronous" or "Through". - EC Status is "EC Starting" or "EC Executing". - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4015.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Synchronous" or "Through". - EC Status is "EC Suspend". - Copy Phase is "Copying". - The -force option has not been specified. - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Synchronous" or "Through". - EC Status is "EC Hardware Suspend", "EC Hardware Suspend(Use REC DISK)" or "EC Hardware Suspend(Use REC BUFFER)". - The -force option has not been specified. - Error message ID is ccm4014.
	<ul style="list-style-type: none"> - Copy Group Type is REC. - Transfer mode is "Consistency" or "Stack".

Command Name	Check Error Condition and Error Message ID
	<ul style="list-style-type: none">- Copy Phase is "Copying".- The -force option has not been specified.- Error message ID is ccm4014.

Appendix B Backup and Restoration of ZFS File Systems

Refer to "Backup and Restoration of ZFS File Systems" in the *AdvancedCopy Manager Operation Guide (for Solaris)* for backup and restoration of ZFS file systems using AdvancedCopy Manager CCM.

Appendix C XML Format Output Function

C.1 Commands That Support XML Format Output

The following commands support the XML format output.

Table C.1 Commands That Support XML Format Output

Command Name	Command Type	
	Display Type	Execution Type
acarray add	-	YES
acarray change	-	YES
acarray list	YES	-
acarray detail	YES	-
acarray remove	-	YES
acarray pathscan	-	YES
acinq lv	YES	-
acinq lunmap	YES	-
acinq ag	YES	-
acinq hostag	YES	-
acgroup create	-	YES
acgroup list	YES	-
acgroup detail	YES	-
acgroup remove	-	YES
acpair add	-	YES
acpair remove	-	YES
acopc start	-	YES
acopc query	YES	-
acopc cancel	-	YES
acsnap start	-	YES
acsnap query	YES	-
acsnap cancel	-	YES
acsdv init	-	YES
acsdv stat	YES	-
acsdv poolstat	YES	-
acec start	-	YES
acec query	YES	-
acec suspend	-	YES
acec resume	-	YES
acec reverse	-	YES
acec change	-	YES

Command Name	Command Type	
	Display Type	Execution Type
acec cancel	-	YES
accopy query	YES	-
accopy fcancel	-	YES
accopy fsuspend	-	YES
acrecbuff set	-	YES
acrecbuff stat	YES	-
acinhibit set	-	YES
acinhibit unset	-	YES
acutil devs	YES	-
acutil refresh	-	YES
acutil fsflush	-	YES
acservicestop	-	YES



See

The XML format between display type command and execution type command is different. Refer to "[C.2.1 XML Format of Display Type Command](#)" or "[C.2.2 XML format of Execution Type Command](#)" for the each XML format.

C.2 XML Format

C.2.1 XML Format of Display Type Command

The XML format of display type command is follows:

- List part only
- Table part only
- List part and table part

The display example for each XML format shows the followings.

Display Example of List Part Only

- Without the -xml option

```
> acarray detail -a ET001

Disk Array Name : ET001
BOX-ID          : 00ETERNUSDXM##ET44S20A####HK000104#####
IP Address      : 192.0.2.10
Admin User      : root
Access Volume   : X:
```

- With the -xml option

```
> acarray detail -a ET001 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
```

```

<ReturnCode>0</ReturnCode>
<Message></Message>
<List>
  <Data id="Disk Array Name">ET001</Data>
  <Data id="BOX-ID">00ETERNUSDXM##ET44S20A####HK000104#####</Data>
  <Data id="IP Address">192.0.2.10</Data>
  <Data id="Admin User">root</Data>
  <Data id="Access Volume">X:</Data>
</List>
</Response>

```

Display Example of Table Part Only

- Without the -xml option

```

> acarray list

Name  BOX-ID                                     IP Address
-----
ET001 00ETERNUSDXM##ET44S20A####HK000104##### 192.0.2.10
ET002 00ETERNUSDXH##ET87S20A####NC4110699004## 192.0.2.11

```

- With the -xml option

```

> acarray list -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <Table>
    <Row>
      <Data id="Name">ET001</Data>
      <Data id="BOX-ID">00ETERNUSDXM##ET44S20A####HK000104#####</Data>
      <Data id="IP Address">192.0.2.10</Data>
    </Row>
    <Row>
      <Data id="Name">ET002</Data>
      <Data id="BOX-ID">00ETERNUSDXH##ET87S20A####NC4110699004##</Data>
      <Data id="IP Address">192.0.2.11</Data>
    </Row>
  </Table>
</Response>

```

NOTE: If there is no data in the table part, the Table tag is not displayed.

Display Example of List Part and Table Part (When Not Using Storage Cluster Continuous Copy Function)

- Without the -xml option

```

> acec query -g ECGroup

Copy Group Name : ECGroup
Copy Group Type : EC
Disk Array Name : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)

Source  <=> Target  SID  EC Status  Copy Phase Copied Block
-----
ET002/0x1 N/A ET002/0x3 N/A "EC action not startup" "Not set" N/A
ET002/0x2 ==> ET002/0x4 0x41 "EC Executing" "Copying" 1048576

```

- With the -xml option

```
> acec query -g ECGroup -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <List>
    <Data id="Copy Group Name">ECGroup</Data>
    <Data id="Copy Group Type">EC</Data>
    <Data id="Disk Array Name">ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)</Data>
  </List>
  <Table>
    <Row>
      <Data id="Source">ET002/0x1</Data>
      <Data id="&lt;=&gt;">N/A</Data>
      <Data id="Target">ET002/0x3</Data>
      <Data id="SID">N/A</Data>
      <Data id="EC Status">"EC action not startup"</Data>
      <Data id="Copy Phase">"Not set"</Data>
      <Data id="Copied Block">N/A</Data>
    </Row>
    <Row>
      <Data id="Source">ET002/0x2</Data>
      <Data id="&lt;=&gt;">==&gt;</Data>
      <Data id="Target">ET002/0x4</Data>
      <Data id="SID">0x41</Data>
      <Data id="EC Status">"EC Executing"</Data>
      <Data id="Copy Phase">"Copying"</Data>
      <Data id="Copied Block">1048576</Data>
    </Row>
  </Table>
</Response>
```

NOTE: If there is no data in the table part, the Table tag is not displayed.

Display Example of List Part and Table Part (When Using Storage Cluster Continuous Copy Function)

- Without the -xml option

```
> acec query -g ECGroup

Copy Group Name      : ECGroup
Copy Group Type      : EC
Disk Array Name      : ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)
TFO Disk Array Name : ET003 (00ETERNUSDXH##ET44S20A####HK000104#####)

Source  <=> Target  SID  EC Status          Copy Phase Copied Block Standby-Source Standby-
Target Standby-Session
-----
ET002/0x1 N/A ET002/0x3 N/A  "EC action not startup" "Not set"          N/A ET003/0x1
ET003/0x11 "----"
ET002/0x2 ==> ET002/0x4 0x41 "EC Executing"      "Copying"          1048576 ET003/0x2
ET003/0x12 "Exist"
```

- With the -xml option

```
> acec query -g ECGroup -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>0</ReturnCode>
  <Message></Message>
  <List>
```

```

<Data id="Copy Group Name">ECGroup</Data>
<Data id="Copy Group Type">EC</Data>
<Data id="Disk Array Name">ET002 (00ETERNUSDXH##ET87S20A####NC4110699004##)</Data>
<Data id="TFO Disk Array Name">ET003 (00ETERNUSDXH##ET44S20A####HK000104#####)</Data>
</List>
<Table>
<Row>
  <Data id="Source">ET002/0x1</Data>
  <Data id="&lt;=&gt;">N/A</Data>
  <Data id="Target">ET002/0x3</Data>
  <Data id="SID">N/A</Data>
  <Data id="EC Status">"EC action not startup"</Data>
  <Data id="Copy Phase">"Not set"</Data>
  <Data id="Copied Block">N/A</Data>
  <Data id="Standby-Source">ET003/0x1</Data>
  <Data id="Standby-Target">ET003/0x11</Data>
  <Data id="Standby-Session">"----"</Data>
</Row>
<Row>
  <Data id="Source">ET002/0x2</Data>
  <Data id="&lt;=&gt;">==&gt;</Data>
  <Data id="Target">ET002/0x4</Data>
  <Data id="SID">0x41</Data>
  <Data id="EC Status">"EC Executing"</Data>
  <Data id="Copy Phase">"Copying"</Data>
  <Data id="Copied Block">1048576</Data>
  <Data id="Standby-Source">ET003/0x2</Data>
  <Data id="Standby-Target">ET003/0x12</Data>
  <Data id="Standby-Session">"Exist"</Data>
</Row>
</Table>
</Response>

```

NOTE: If there is no data in the table part, the Table tag is not displayed.

Information

If the error occurs when the command is executed (e.g. parameter error), the command outputs the error information like as follows.

- Without the -xml option

```

> acarray detail -a ET001
ccm8003 Could not open the file. file=C:\Program Files\AdvancedCopy Manager Copy Control Module\etc
\db\eternus.xml.lck

```

- With the -xml option

```

> acarray detail -a ET001 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>8</ReturnCode>
  <Message>ccm8003 Could not open the file. file=C:\Program Files\AdvancedCopy Manager Copy
Control Module\etc\db\eternus.xml.lck</Message>
</Response>

```

C.2.2 XML format of Execution Type Command

The XML format of execution type command is follows:

- Execution result message only
- Execution result including the detail information

The display example for each XML format shows the followings.

Display Example of Execution Result Message Only

- Without the -xml option

```
> acgroup create -g group01 -type OPC -a ET001
Successful completion.
```

- With the -xml option

```
> acgroup create -g group01 -type OPC -a ET001 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>0</ReturnCode>
  <Message>Successful completion.</Message>
</Response>
```

Display Example of Execution Result Including Detail Information

- Without the -xml option

```
>acec start -g ECGroup

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Started >>
# From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0
# To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0

ET001/0x2:ET001/0x7
ccm5004 Operation failed. function=STXCopyEC.START, message=invalid BoxID.

Succeeded : 1
Failed : 1
```

- With the -xml option

```
>acec start -g ECGroup -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>6</ReturnCode>
  <Message></Message>
  <ResultList>
    <Result>
      <Object>ET001/0x1:ET001/0x6</Object>
      <Status>Succeeded</Status>
      <Message></Message>
      <Detail>DATE : 2008/06/24 16:28:00 - &lt;&lt; EC Started &gt;&gt; &#13;
From:BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=1/Adr_high=0/Adr_low=0/size_high=0/size_low=0&#13;
To :BoxID=303045343030304d3323232323234534353053323041232323234b44343033303633393030342323/
Olu=6/Adr_high=0/Adr_low=0</Detail>
    </Result>
    <Result>
      <Object>ET001/0x2:ET001/0x7</Object>
      <Status>Failed</Status>
      <Message>ccm5004 Operation failed. function=STXCopyEC.START, message=invalid BoxID.</Message>
      <Detail></Detail>
    </Result>
  </ResultList>
</Response>
```

Information

If the error occurs when the command is executed (e.g. parameter error), the command outputs the error information like as follows.

- Without the -xml option

```
> acec start -g
ccml001 An invalid argument was specified.

Usage:
  acec start -g COPY-GROUP(EC) [-p PAIR] [-r] [-xml]
  acec start -g COPY-GROUP(REC) [-p PAIR] [-r]
              [-transfer {sync [-split {auto|manual}]|through|consist|stack}]
              [-recovery {auto|manual}]
              [-skip]
              [-xml]
```

- With the -xml option

```
> acec start -g -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>1</ReturnCode>
  <Message>ccml001 An invalid argument was specified.</Message>
</Response>
```

The warning message by executing the command is output as follows.

- Without the -xml option

```
> acec reverse -g group01

ET001/0x1:ET001/0x6
# DATE : 2008/06/24 16:28:00 - << EC Change >>
Warning:ccm7001 The target logical volume is write protected. target logical volume=ET001/0x1

ET001/0x2:ET001/0x7
# DATE : 2008/06/24 16:28:00 - << EC Change >>

Succeeded : 2
Failed    : 0
```

- With the -xml option

```
> acec reverse -g group01 -xml
<?xml version="1.0" encoding="UTF-8"?>
<Response version="1.0">
  <ReturnCode>0</ReturnCode>
  <Message>Successful completion.</Message>
  <ResultList>
    <Result>
      <Object>ET001/0x1:ET001/0x6</Object>
      <Status>Succeeded</Status>
      <Message>Warning:ccm7001 The target logical volume is write protected. target logical
volume=ET001/0x1</Message>
      <Detail>DATE : 2008/06/24 16:28:00 - &lt;&lt; EC Change &gt;&gt;</Detail>
    </Result>
    <Result>
      <Object>ET001/0x2:ET001/0x7</Object>
      <Status>Succeeded</Status>
      <Message></Message>
      <Detail>DATE : 2008/06/24 16:28:00 - &lt;&lt; EC Change &gt;&gt;</Detail>
    </Result>
  </ResultList>
```

```
</ResultList>  
</Response>
```



Appendix D Operation in Oracle VM Server for SPARC

Refer to "Operation in Oracle VM Server for SPARC" in the *AdvancedCopy Manager Operation Guide (for Solaris)* for Oracle VM Server for SPARC in the operation using AdvancedCopy Manager CCM.

Appendix E VMware Virtual Machine Automatic Backup/Restore (Script)

This chapter explains the scripts used for automated backup/restoration of the VMware virtual machine environment on the VMFS data store using functions provided by the AdvancedCopy Manager CCM.

In the explanations, it is assumed that AdvancedCopy Manager CCM environment configuration, described in the following sections of the *Installation and Setup Guide*, has been completed.

- "Registering AdvancedCopy Manager License"
- "Setup of AdvancedCopy Manager CCM"

Furthermore, in the following explanation, the virtual disk on which the OS of the virtual machine is installed is referred to as the "System Area", the virtual disk on which the data of the virtual machine is stored is referred to as the "Data Area", and Raw Device Mapping is abbreviated as "RDM".

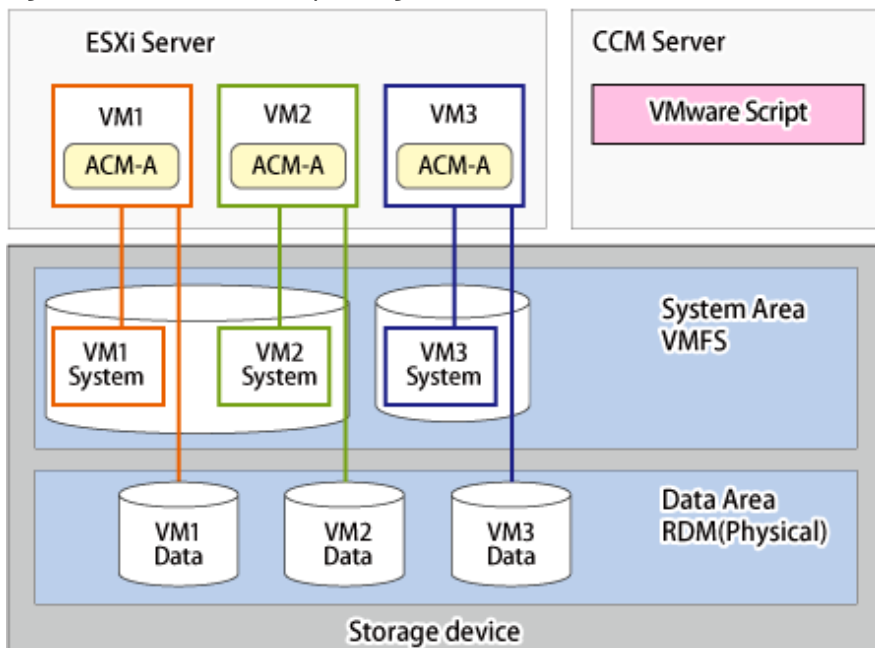
E.1 Backup / Restoration in VMware Virtual Environment

E.1.1 Virtual Machine with RDM Data Area

When performing a backup / restoration of a virtual machine with a Data Area of RDM in a VMware virtual environment, operation in the environment shown below is recommended.

- Create the System Area of the virtual machine on the VMFS data store
- Create the Data Area of the virtual machine with RDM Compatibility Mode Physical

Figure E.1 Recommended Operating Environment



ACM-A: AdvancedCopy Manager's agent

The recommended backup method is as follows.

Area Type	File System	Purpose	Backup Method
System Area	VMFS	OS, Application	Backup on VMware script

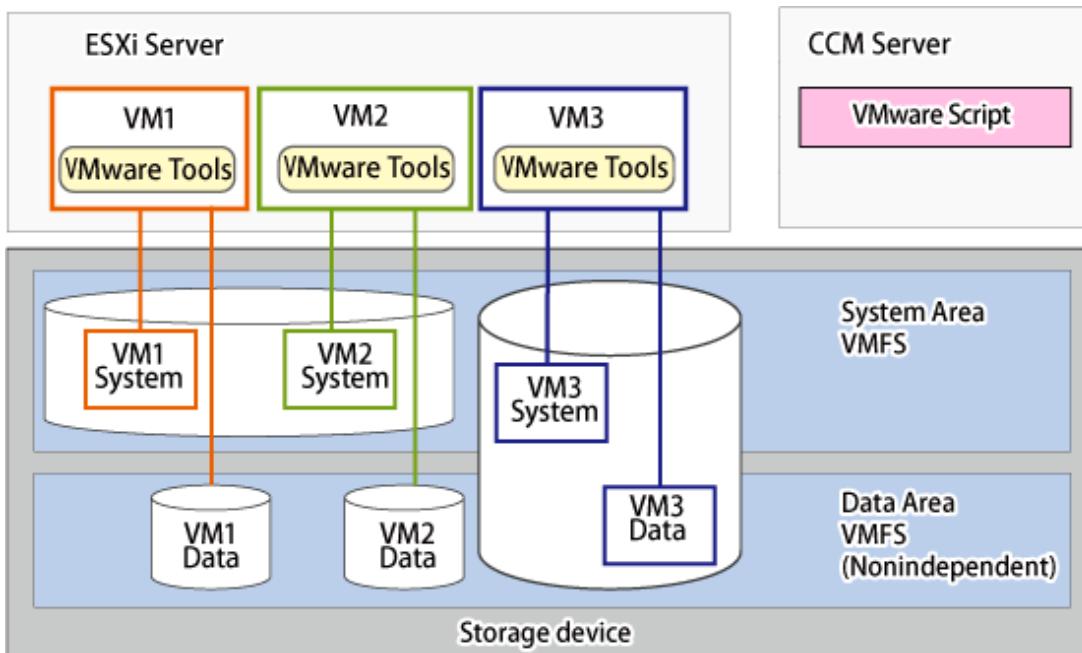
Area Type	File System	Purpose	Backup Method
Data Area	RDM(Compatibility Mode Physical)	Database	Backup with the AdvancedCopy Manager's agent installed on each virtual machine

E.1.2 Virtual Machine with VMFS Data Area

When performing a backup / restoration of a virtual machine with a Data Area of VMFS in a VMware virtual environment, operation in the environment shown below is recommended.

- Create the System Area of the virtual machine on the VMFS data store
- Create the Data Area of the virtual machine with VMFS (Nonindependent)

Figure E.2 Recommended Operating Environment



VMware Tools: Utility software installed in the OS to improve the performance of the virtual machine

The recommended backup method is as follows.

Area Type	File System	Purpose	Backup Method
System Area	VMFS	OS, Application	Backup on VMware script
Data Area	VMFS (Nonindependent)	Database	

Point

The VMFS Nonindependent is the mode for capturing snapshots. Snapshots cannot be captured when set to Independent. When capturing a snapshot with the Quiesce guest file system option enabled, install VMware Tools on the virtual machine.

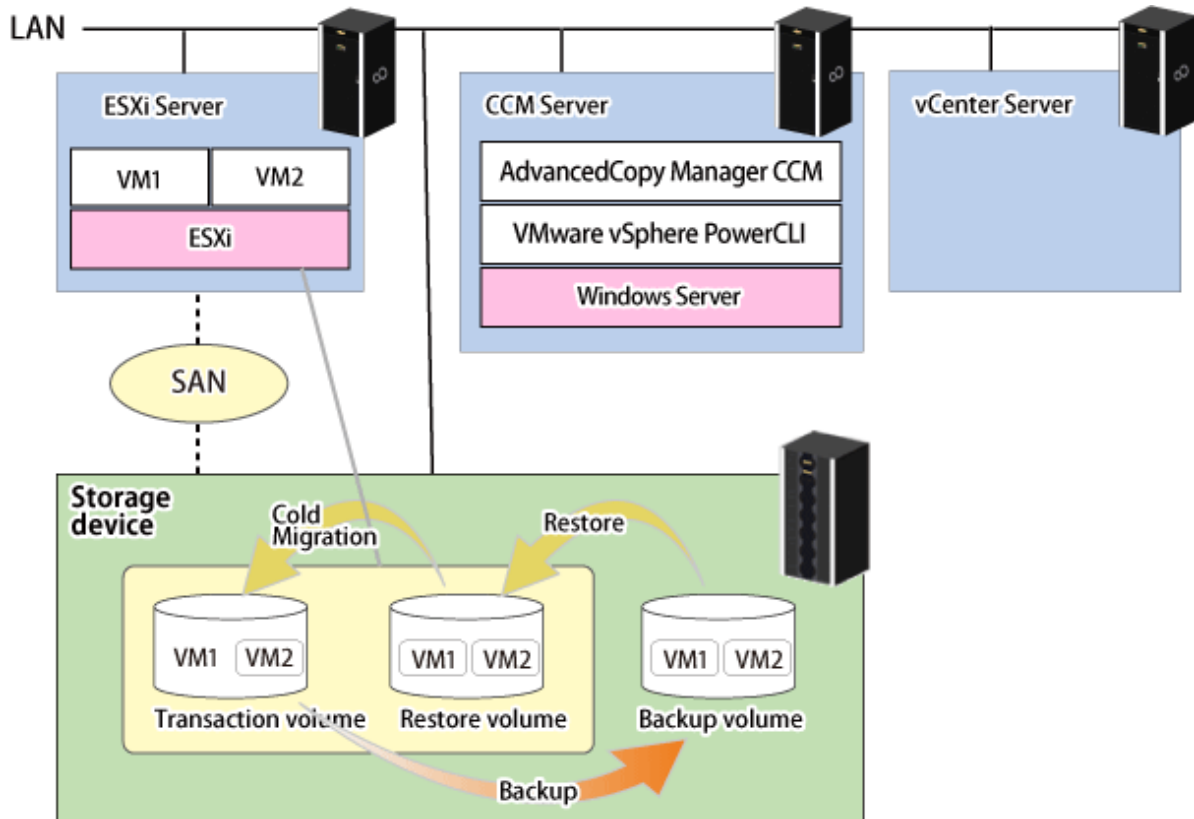
E.2 VMware Script Overview

The script in a VMware environment is provided. This script automatic backup/restores a System Area and a Data Area is installed by using the snapshot function and AdvancedCopy Manager CCM of a virtual machine.

Backup is performed by copying LU to LU from the transaction volume to the backup volume of a virtual machine using QuickOPC. Restoration is performed by copying from the backup volume to the restore volume and then restoring to a specific transaction volume of a virtual machine using SnapOPC+.

VMware scripts allow you to run this series of operations automatically.

Figure E.3 Overview of VMware Virtual Machine Automated Backup / Restore



These VMware scripts operate based on the following volume configuration.

Table E.1 Volume Configuration

Item Number	Volume Type	Explanation	Type	Size	Quantity (*1)	Comments
1	Transaction volume	Volume containing the System Area / Data Area of a virtual machine in which operation takes place	Open	Arbitrary	Arbitrary	It must be connected to the ESXi Server.
2	Backup volume	Backup destination volume	Open	Same as the transaction volume	Same as the transaction volume	QuickOPC destination volume must be an Open Volume because it is a complete backup of the source volume. Do not connect to the ESXi Server.
3	Restore volume	Restore destination volume	SDV, TPV, FTV	Same as the transaction volume	Same as the transaction volume	SnapOPC+ destination must be SDV, TPV, or FTV. It must be connected to the ESXi Server because virtual machines are restored after restore.

*1: Required number of volumes for each virtual machine

E.3 System Area and Data Area Configuration Supported by VMware Script

The VMware script supports the following virtual machine data store configurations.

Table E.2 System Area and Data Area Configuration Supported by VMware Script

Item Number	Data Store Configured in VM			Supported by Script		Comments
	System Area	Data Area	Location of System Area and Data Area	System Area Only	System Area and Data Area	
1	VMFS-5 Nonindependent	None	-	A	-	-
2		VMFS-5 Independent (Persistent)	Same Volume	N/A	-	-
3			Separate volume	A	-	-
4		VMFS-5 Nonindependent	Same Volume	N/A	A	Recommended
5			Separate volume	N/A	A	Recommended
6		RDM Compatibility Mode Physical	Separate volume	A	- (*1)	Recommended
7		RDM Compatibility Mode Virtual Independent (Persistent)	Separate volume	A	-	-
8		RDM Compatibility Mode Virtual Nonindependent	Separate volume	N/A	-	-

-: Not supported
A: Available
N/A: Not available

Recommended: Recommended configuration pattern for "[E.1 Backup / Restoration in VMware Virtual Environment](#)"

*1: If the Data Area is in RDM Compatibility Mode Physical, backup/restore the Data Area using the AdvancedCopy Manager's agent.

Examples of the configurations that can be backed up using the VMware script are shown below. The numbers for the VM names within the diagram correspond to the item number in "[Table E.2 System Area and Data Area Configuration Supported by VMware Script](#)".

Figure E.4 Examples of Configurations in Which Only System Area Can Be Backed Up

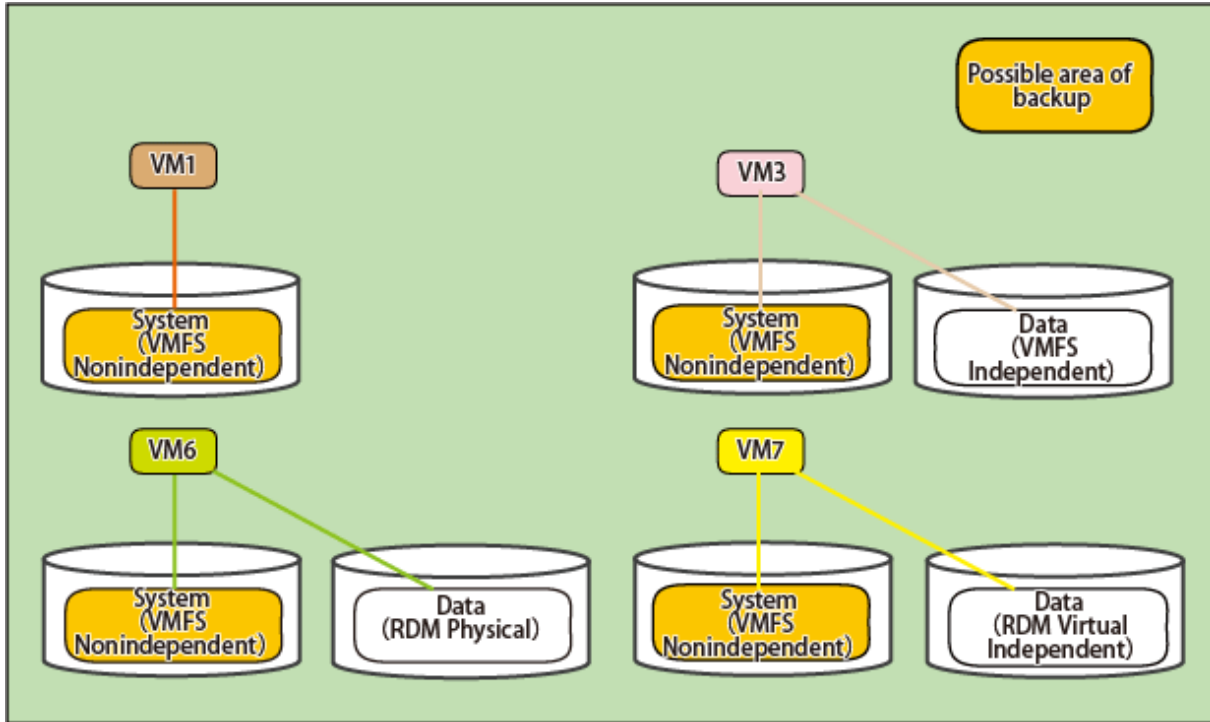
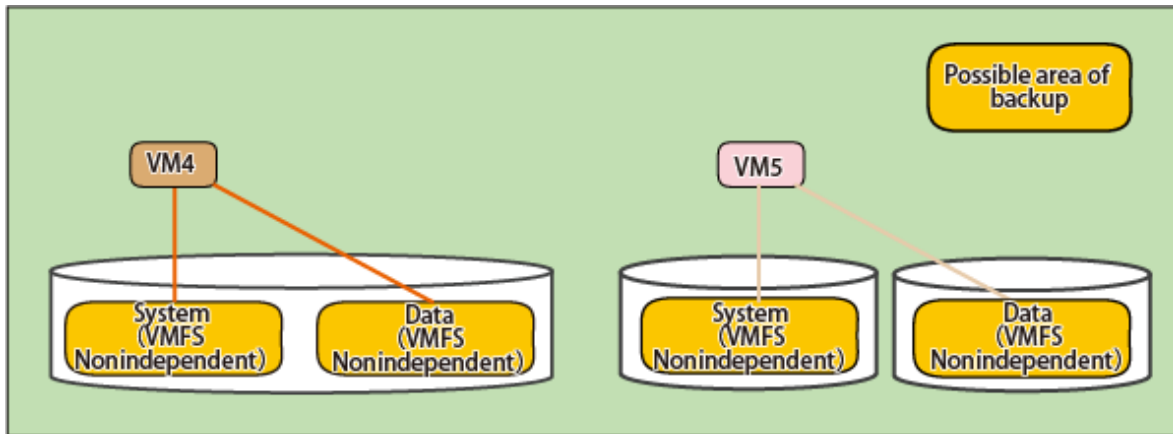


Figure E.5 Examples of Configurations in which System Area and Data Area are Backed up as Set



*1: In case of this configuration, it is not possible to back up only the System Area.

E.4 VMware Script Configuration

VMware script configuration is as follows.

Figure E.6 VMware Script Configuration

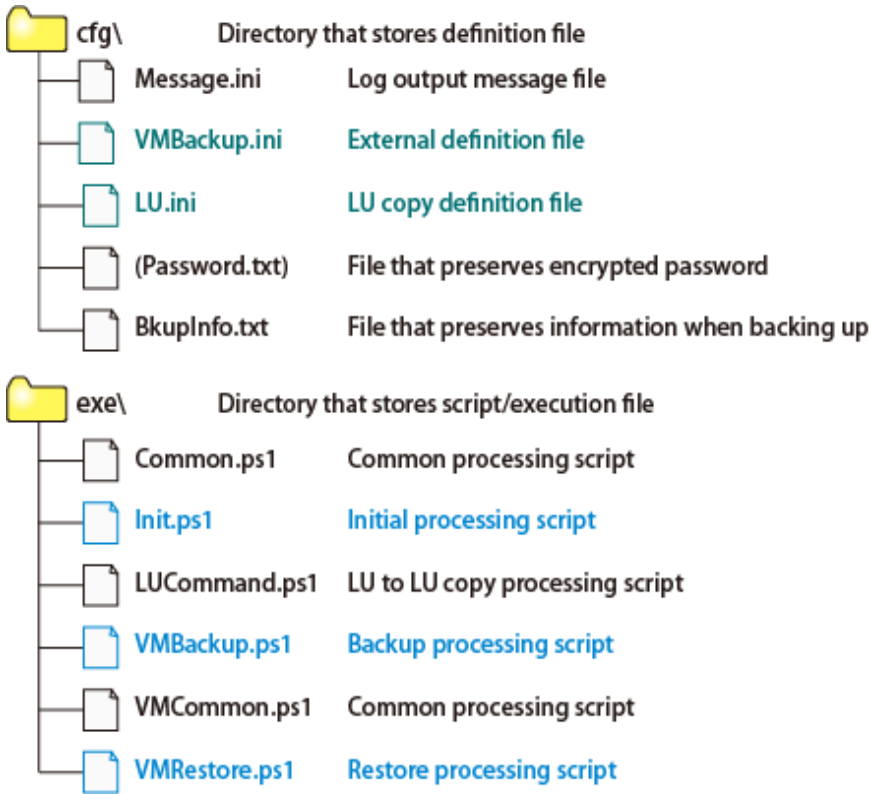


Table E.3 Definition File to Be Edited

Item Number	File Name	Type	Explanation
1	VMBackup.ini	External definition file	Defines external information for performing backups
2	LU.ini	LU copy definition file	Defines LU information of backup/restore targets

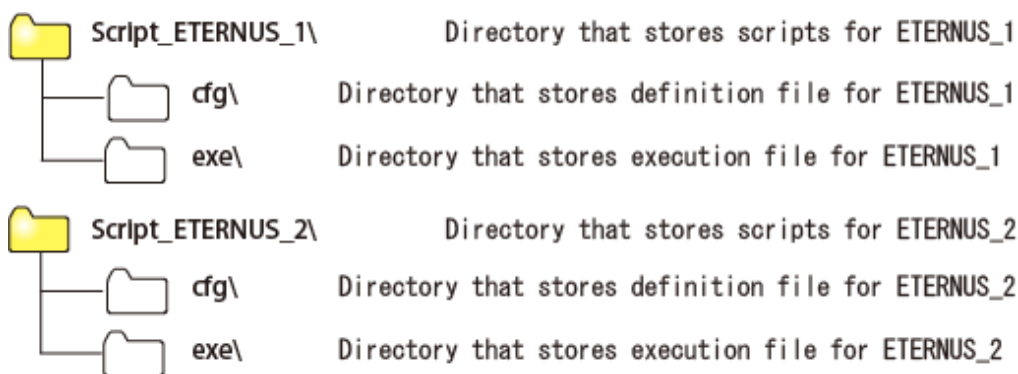
Table E.4 Scripts to Be Executed

Item Number	Script Name	Type	Explanation
1	Init.ps1	Initial processing	Password encryption
2	VMBackup.ps1	Backup	Automated backup execution
3	VMRestore.ps1	Restore	Automated restore execution

Point

When using scripts in an environment where multiple ETERNUS Disk storage systems exist, it is required to create script execution files and definition files for each ETERNUS Disk storage system.

As shown in the following figure, create a directory in which to store scripts for each ETERNUS Disk storage system.



E.5 Operating Conditions

Software Requirements

Software requirements for executing the provided VMware scripts are as follows.

Table E.5 Supported OS

Item Number	Product Name	Explanation
1	Microsoft Windows Server 2022 Microsoft Windows Server 2019 Microsoft Windows Server 2016 Microsoft Windows Server 2012 R2 Microsoft Windows Server 2012	Supported operating system (*1, *2)

*1: OS supported by VMware vSphere PowerCLI, which is essential software.

*2: To execute this script, the OS user must have administrator rights.

Table E.6 Essential Software

Item Number	Software	Version	Remarks
1	VMware vSphere (ESXi)	6.5, 6.7, 7.0, or 8.0	-
2	VMware vCenter Server	6.5, 6.7, 7.0, or 8.0	*1
3	VMware vSphere PowerCLI	6.5, 10.1, 11.5, 12.5, or 12.7	*2

*1: To execute this script, the vCenter Server login user must have administrator rights.

*2: Download individually from the following VMware website and install.

<https://code.vmware.com/tool/vmware-powercli>

Hardware Requirements

Refer to "Operating Environment of AdvancedCopy Manager CCM" in the *Installation and Setup Guide*.

About Internet Protocol (IP)

This VMware script does not support IPv6. Use it in an IPv4 environment.

E.6 Operation Design

Designing Server Configuration

CCM Server

This server is a backup server that executes the VMware script.

vCenter Server

This server manages and operates all virtual machines.

ESXi Server

This server provides a virtual machine execution environment.

The VMware script may also be used in the following environments where VMware vSphere is in operation.

- vSphere HA
- vSphere DRS
- vMotion
- Storage DRS (only within the same ETERNUS Disk storage system)
- Storage vMotion (only within the same ETERNUS Disk storage system)



Note

Storage DRS or Storage vMotion can be used with the virtual machine in which only System Area is backed up.

Designing Volume Configuration

Design a volume (LU) configuration that meets the following requirements.

- The transaction volume, backup volume, and restore volume are placed on the same ETERNUS Disk storage system.
- The transaction volume and backup volume are an Open Volume of the same size.
- The restore volume is SDV, TPV, or FTV, and is of the same size (logical capacity) as the transaction volume.
- The transaction volume and restore volume are connected to the ESXi Server.
- The backup volume is not connected to the ESXi Server.

Estimation Formula for Capacity of Transaction Volume

```
[System Area size or Data Area size: for 20 GB or higher]
transaction volume size = System Area size or Data Area size (size of virtual disk) * 2

[System Area size or Data Area size: less than 20 GB]
transaction volume size = System Area size or Data Area size (size of virtual disk) + 20 GB
```

Notes When Virtual Machine Is Constructed

The following notes apply when building a virtual machine (VM) on the ESXi Server.

- Virtual machines to be backed up/restored using these VMware scripts are those created on a VMFS-5 datastore. Always select a VMFS-5 datastore when building a virtual machine.
- For virtual machine System Area and Data Area patterns, refer to "[E.3 System Area and Data Area Configuration Supported by VMware Script](#)".
- You may create multiple virtual machines on a single transaction volume.
- In the case of virtual machines with RDM Data Areas, locate the mapping file on the System Area transaction volume.
- Connect all virtual disks including the System Area of a virtual machine with SCSI.

- The following guest OS are supported:
 - Microsoft Windows Server 2022
 - Microsoft Windows Server 2019
 - Microsoft Windows Server 2016
 - Microsoft Windows Server 2012 R2
 - Microsoft Windows Server 2012
 - Red Hat Enterprise Linux 7 (for Intel64)
 - Red Hat Enterprise Linux 6 (for Intel64)
 - SUSE Linux Enterprise Server 15 for AMD64 & Intel64
 - SUSE Linux Enterprise Server 12 for AMD64 & Intel64
- In this VMware script, the virtual machine snapshot is acquired in the snapshot name called "ETERNUS_Backup". Do not acquire the snapshot of the same name to avoid the repetition of the snapshot name.
- When enabling the Quiesce guest file system option and capturing a snapshot, install VMware Tools in the virtual machines to be backed up. When the VMware Tools are not installed or are stopped, the snapshot is captured with the Quiesce guest file system option disabled.

Figure E.7 Configuration Image of Volumes Backed Up / Restored Using These VMware Scripts (Configuration in which only System Area Is Backed Up)

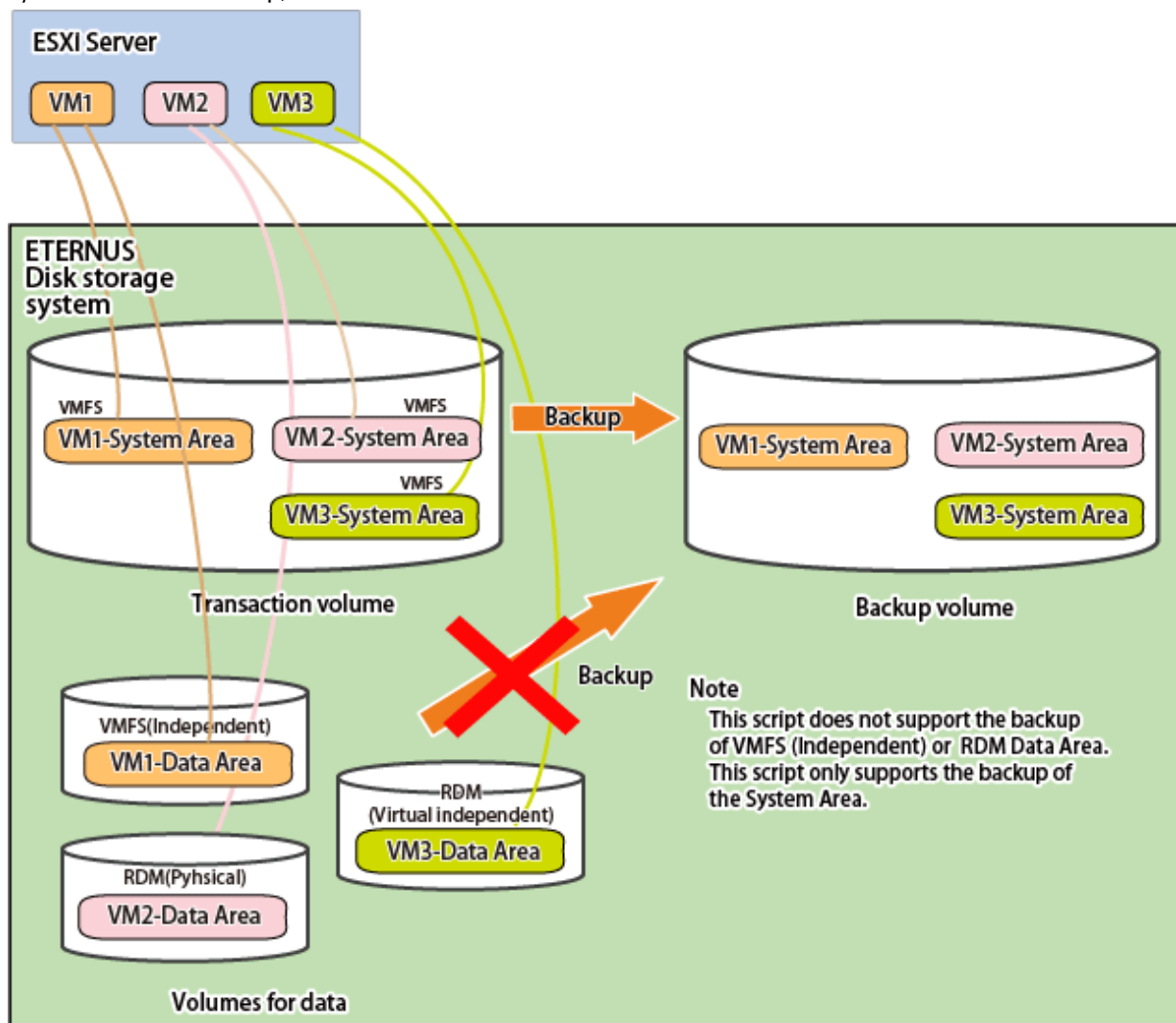
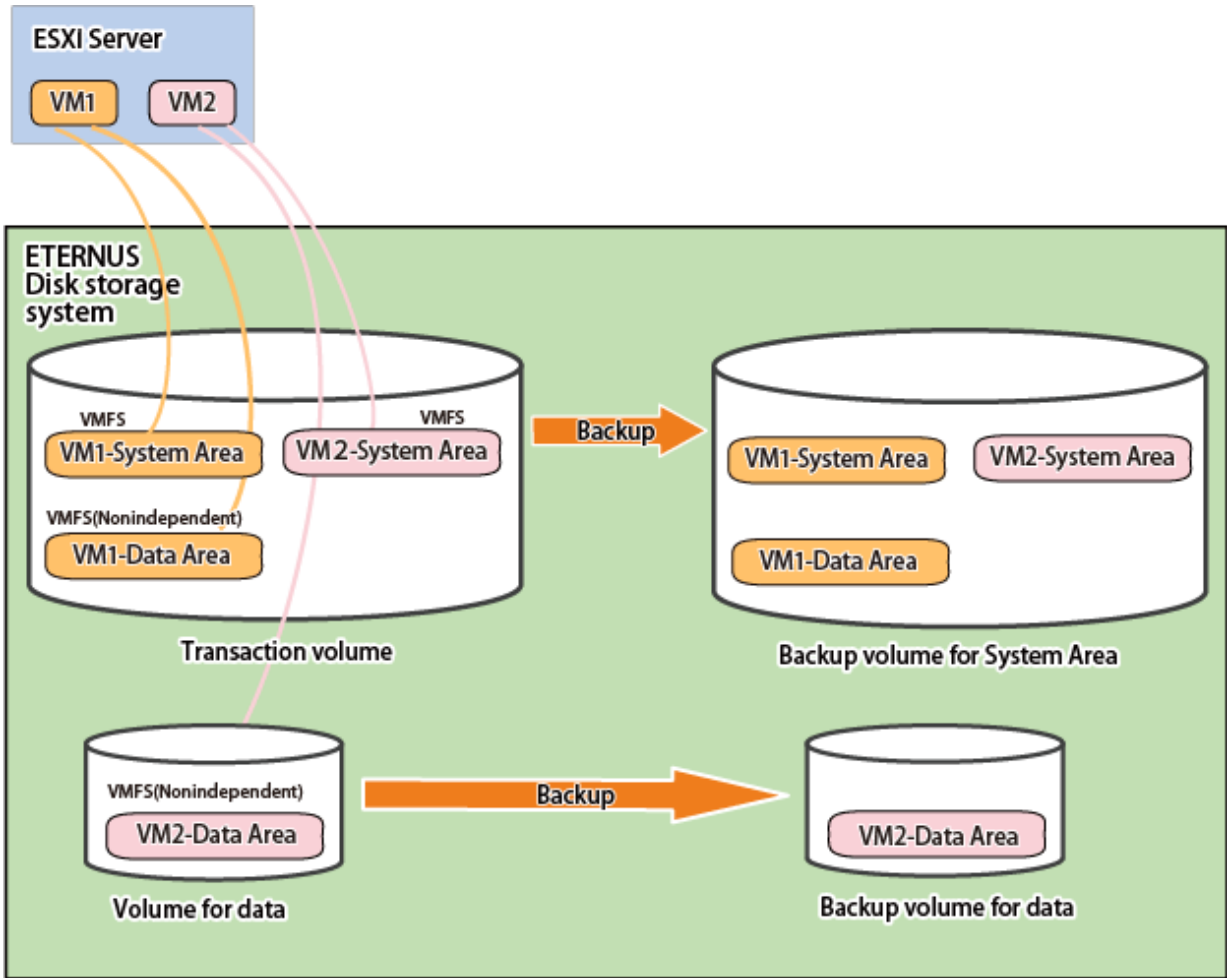


Figure E.8 Configuration Image of Volumes Backed Up / Restored Using These VMware Scripts (Configuration that Backs Up System Area and Data Area as Set)



E.7 Preparations for Executing VMware Scripts

The following preparations are required to execute the provided VMware scripts.

Perform steps 2 to 6 for each ETERNUS Disk storage system.

1. Set the execution policy for the PowerShell script
2. Unzip the script
3. Configure the initial settings for the script operating environment
4. Prepare a backup volume and a restore volume
5. Configure the environment for AdvancedCopy Manager CCM
6. Configure the LU copy definition file

E.7.1 Execution Policy Settings for PowerShell Script

Set the script execution policy.

Set the execution policy to RemoteSigned or Unrestricted according to the method described in following URL.

<http://technet.microsoft.com/en-us/library/ee176961.aspx>

E.7.2 Unzip Script

Scripts are saved in the following location.

```
installDir\tools\vmware_scripts.zip
```

Note: *installDir* is the "Program directory" when AdvancedCopy Manager CCM has been installed.

Copy the above zip file to a directory of your choice and then unzip it.

If you unzip the above zip file, it is extracted to one of the following directories depending on the patch applied for AdvancedCopy Manager CCM.

- Case 1

The following two directories are created according to the PowerCLI version and under each of those directories are the exe directory and the cfg directory.

- for_pcli_under_6.5
Scripts for PowerCLI versions earlier than 6.5
- for_pcli_6.5_and_later
Scripts for PowerCLI versions 6.5 or later

For this case, create a directory of your choice for each ETERNUS Disk storage system and then copy the exe directory and the cfg directory that are under the directories that correspond to the used PowerCLI version to those created directories.

- Case 2

The exe directory and the cfg directory are created. The scripts for PowerCLI versions earlier than 6.5 are stored in those directories. For this case, create a directory of your choice for each ETERNUS Disk storage system and then copy the exe directory and the cfg directory to those created directories.

Hereafter, the scripts that are assumed to be copied to the "C:\Script_ETERNUS_1" directory are described.

E.7.3 Configure Initial Settings for VMware Script Operating Environment

Perform the "VMBackup.ini" file setup and password encryption to configure the initial settings for the VMware script operating environment.

VMBackup.ini File Setting

Write the following information to the "VMBackup.ini" file (external definition file).

Parameter Name	Explanation
Server	Specifies the vCenter Server IP address or server name.
User	Specifies the vCenter Server user name.
VM	List all the VM names to be backed up with comma separation among VMs on the ETERNUS Disk storage system for which this script is intended. VM names may contain a wildcard ("*"). Do not specify any VM name on other ETERNUS Disk storage system.
LUCmdPath	Specifies the AdvancedCopy Manager CCM bin directory with the full path.
Quiesce	Select whether to enable/disable the Quiesce guest file system option when capturing the snapshots. Specify as ON to enable and OFF to disable. The setting of this parameter is applied to all virtual machines to be backup. When set to ON, install VMware Tools in all virtual machines to be backed up. When this parameter is omitted or other than ON/OFF is specified, the operation occurs as if set to OFF.

The following is a "VMBackup.ini" file example.

```
Server=vcserver  
User=administrator
```

```

VM=VM*,Template
LUCmdPath=C:\ETERNUS_SF\CCM\bin
Quiesce=ON

```

Password Encryption

In Command Prompt, execute Init.ps1 (initial processing script) in PowerShell. The following is an example.

```
> powershell C:\Script_ETERNUS_1\exe\Init.ps1
```

A password prompt message is displayed. Enter the user password to log into the vCenter Server specified in the "VMBackup.ini" file. When the process ends normally, a "Password.txt" file is created in the directory where the "VMBackup.ini" file is saved.



Note

Execute Init.ps1 to update the "Password.txt" file, when you change the vCenter Server password.

E.7.4 Prepare Backup Volume and Restore Volume

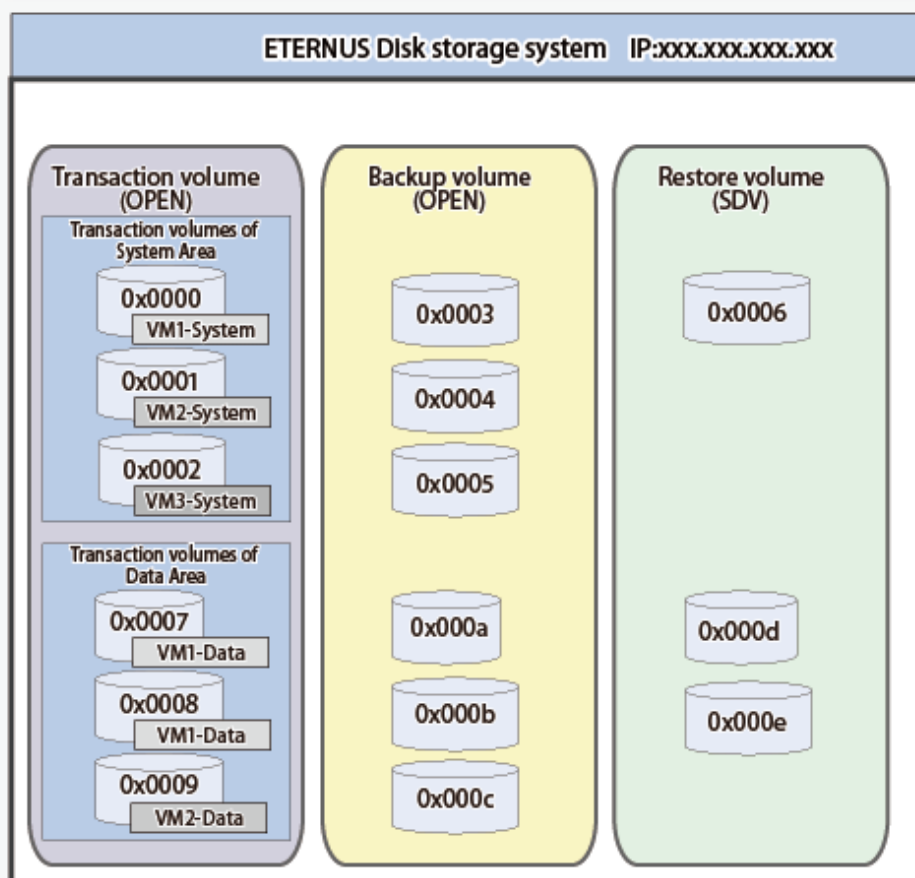
Prepare a backup volume and a restore volume that meet the requirements described in "Table E.1 Volume Configuration".

E.7.5 Configure Environment for AdvancedCopy Manager CCM

Configure the environment for backing up/restoring volumes on the CCM Server.

This AdvancedCopy Manager CCM command example is based on the following volume configuration.

Figure E.9 Volume Configuration in Command Example



Volume Type	OLU Number	Type of Volume
Transaction volume for System Area	0x0000, 0x0001, 0x0002	Open Volume
Transaction volume for Data Area	0x0007, 0x0008, 0x0009	Open Volume
Backup volume	0x0003, 0x0004, 0x0005, 0x000a, 0x000b, 0x000c	Open Volume
Restore volume for System Area	0x0006	Snap Data Volume
Restore volume for Data Area	0x000d, 0x000e	Snap Data Volume

Point

- A restore volume for the System Area can be used together with System Area transaction volumes of the same size.
- A restore volume for the Data Area can be used together only with Data Area transaction volumes of the same size but on a different virtual machine.

ETERNUS Disk Storage System Registration

Execute the `acarray add` command to register the ETERNUS Disk storage system used for backup to AdvancedCopy Manager CCM. The following is an example of a command using the copy control function through LAN.

```
# acarray add -a ET001 -ip 192.0.2.10 -user **** -password **** -lan
Successful completion.
#
```

Execute the `acarray list` command to check the list of registered ETERNUS Disk storage systems.

```
# acarray list

Name      BOX-ID                                IP Address
-----
ET001    00ETERNUSDXLS2ET082DC#####KN4521045063## 192.0.2.10
#
```

Execute the `acarray detail` command to check the detailed information about the registered ETERNUS Disk storage system.

```
# acarray detail -a ET001 -route

Disk Array Name : ET001
Box-ID          : 00ETERNUSDXLS2ET082DC#####KN4521045063##
IP Address      : 192.0.2.10
Admin User      : ****
Access Volume   : -
Access Route    : lan
#
```

Copy Group Creation

Execute the `acgroup create` command to create a copy group for backup and a copy group for restoration.

```
# acgroup create -g bk -type QuickOPC -a ET001
Successful completion.
# acgroup create -g rst_snap -type SnapOPCP -a ET001
Successful completion.
#
```

Point

- When creating a copy group for backup, set "QuickOPC" in the -type option.
- When creating a copy group for restoration, set "SnapOPCP" in the -type option.

Copy Pair Addition

Execute the `acinq lv` command to check the list of ETERNUS Disk storage system logical volume numbers.

```
# acinq lv -a ET001

LV No   LV Name   LV Size  LV Type  RG No  Encrypt
-----
0x0000   30720M  Open     0 -
0x0001   30720M  Open     0 -
0x0002   30720M  Open     0 -
0x0003   30720M  Open     1 -
0x0004   30720M  Open     1 -
0x0005   30720M  Open     1 -
0x0006   30720M  SDV      2 -
0x0007   1024M   Open     0 -
0x0008   2048M   Open     0 -
0x0009   2048M   Open     0 -
0x000a   1024M   Open     1 -
0x000b   2048M   Open     1 -
0x000c   2048M   Open     1 -
0x000d   1024M   SDV      2 -
0x000e   2048M   SDV      2 -

#
```

Execute the `acpair add` command to add a copy pair to the copy group for backup and the copy group for restoration.

```
# acpair add -g bk -p ET001/0x0000:ET001/0x0003
Successful completion.
#
# acpair add -g rst_snap -p ET001/0x0003:ET001/0x0006
Successful completion.
#
```

Point

Specify a volume that meets the requirements described in "Table E.1 Volume Configuration" for a copy pair.

Execute the `acgroup detail` command to check the copy group and copy pair information.

```
# acgroup detail -g bk

Copy Group Name : bk
Copy Group Type : QuickOPC
Disk Array Name : ET001 (00ETERNUSDxLS2ET082DC#####KN4521045063##)

Pair
-----
ET001/0x0000:ET001/0x0003
#
```

E.7.6 LU.ini File Setting

Write to the "LU.ini" file (LU copy definition file) information set in "E.7.5 Configure Environment for AdvancedCopy Manager CCM". Write to LU.ini file only the copy group information for the ETERNUS Disk storage system for which this script is intended.

The "LU.ini" file format is as follows.

Column	Explanation
Column 1	Name of copy group for backup
Column 2	Name of copy group for restoration
Column 3	Copy source information of copy group for backup
Column 4	Copy destination information for Column 3
Column 5	Information about LU for restoration

The following is an example of a "LU.ini" file.

```
bk,rst_snap,ET001/0x0000,ET001/0x0003,ET001/0x0006
bk,rst_snap,ET001/0x0001,ET001/0x0004,ET001/0x0006
bk,rst_snap,ET001/0x0002,ET001/0x0005,ET001/0x0006
bk,rst_snap,ET001/0x0007,ET001/0x000a,ET001/0x000d
bk,rst_snap,ET001/0x0008,ET001/0x000b,ET001/0x000e
bk,rst_snap,ET001/0x0009,ET001/0x000c,ET001/0x000e
```

Note

- When using the Storage DRS or Storage vMotion feature, it is necessary to configure, in the LU.ini file, copy group information for all volumes the virtual machine is transferring.
- When backing up Data Areas, the copy groups for all relevant target Data Areas must be configured in the LU.ini file.

E.8 Virtual Machine Backup

The following is a description of the procedures used to perform automated backup using the VMware script provided.

1. Stop business applications running on a virtual machine to be backed up to stop all I/O of business applications.

Note

It is recommended that backup be performed while the virtual machine is stopped in order to perform a backup with maximum data integrity.

When the virtual machine is not stopped, it is recommended the backup with the Quiesce guest file system option enabled (Quiesce=ON).

2. Execute the backup script from the command prompt on the CCM Server for each ETERNUS Disk storage system. The following is an example.

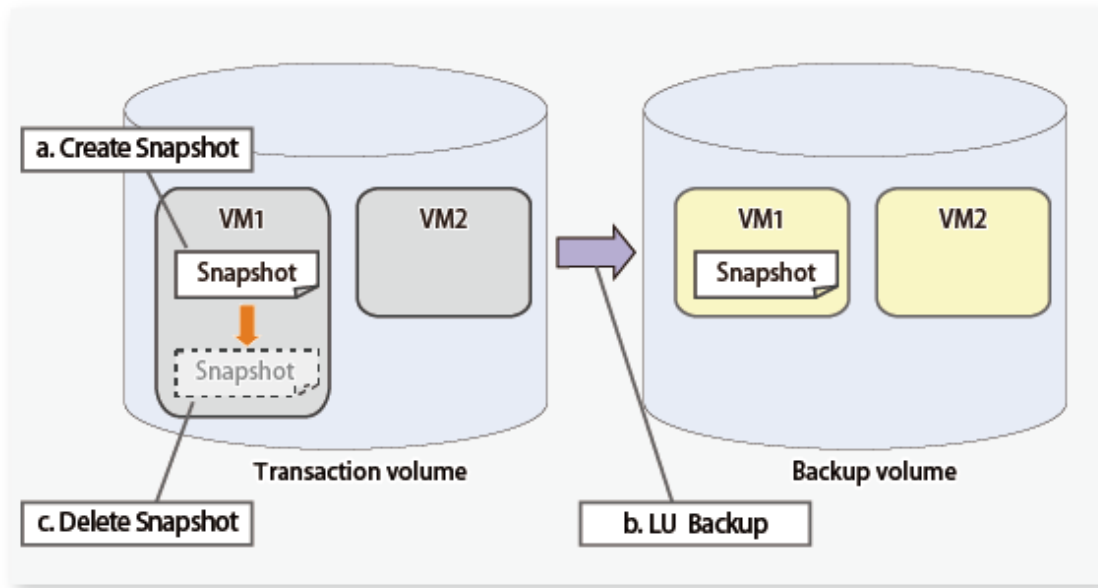
```
> powershell C:\Script_ETERNUS_1\exe\VMBackup.ps1 -l C:\Script_ETERNUS_1\log\backup.log
```

The backup script is processed in the following sequence.

- a. Virtual machine snapshots are created using the snapshot function of the virtual machine.
 - b. The transaction volume is backed up (copied) to the backup volume using AdvancedCopy Manager CCM.
 - c. When backup is complete, the first snapshot created is deleted.
3. Restart business applications on the virtual machine after the backup script executing has been completed.

The following is an overview of backup script processing executed in step 2.

Figure E.10 Overview of Backup Script Processing (When "VM1" is specified for the VM parameter of VMBackup.ini)



Note

The backup script retains one-time backup data alone. Performing backup makes the previous backup data invalid.

E.9 Virtual Machine Restoration

The following is a description of the procedures used to perform automated restoration using the VMware script provided.

1. Stop the virtual machine to be restored.
2. Delete all snapshots of the virtual machine to be restored.
3. Execute the restore script in the same directory as the backup script from the command prompt on the CCM Server. The following is an example.

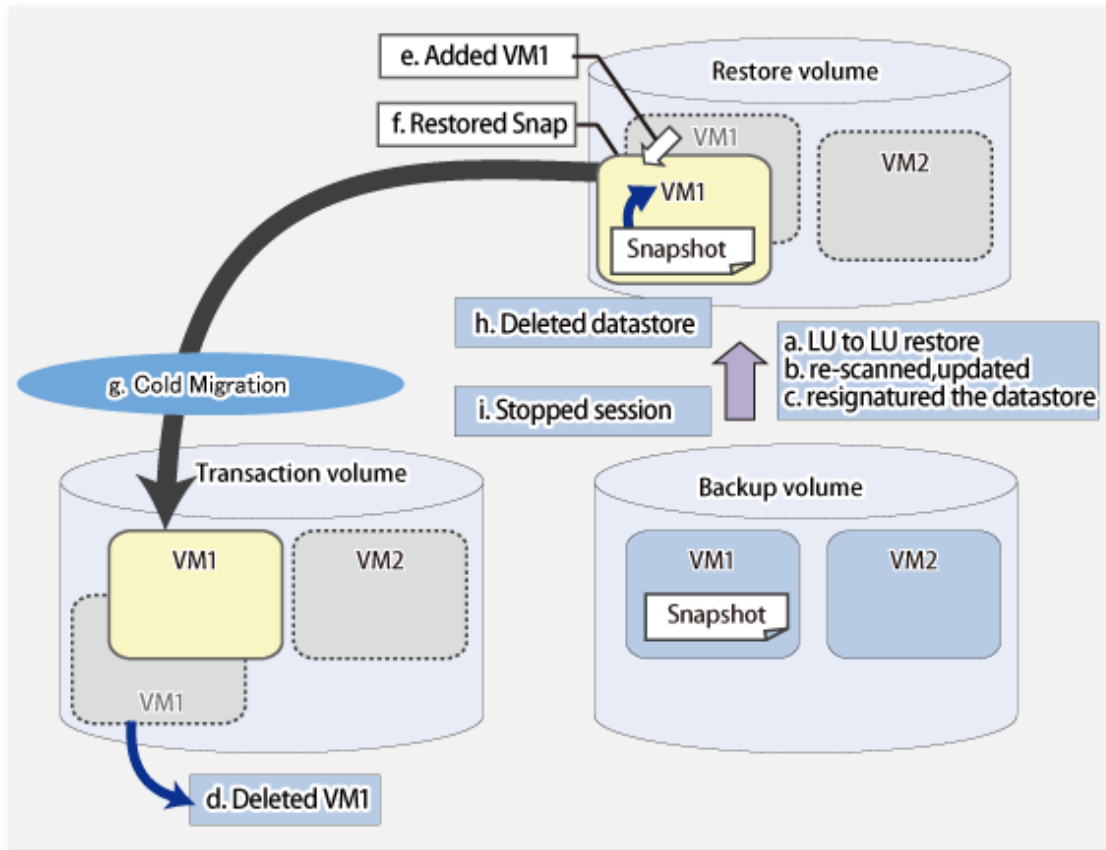
```
> powershell C:\Script_ETERNUS_1\exe\VMRestore.ps1 -vm VM1 -l C:\Script_ETERNUS_1\log\backup.log
```

The restore script is processed in the following sequence.

- a. The data of backup volume is restored to the restore volume.
 - b. Storage adapter is re-scanned and datastore is updated.
 - c. The restore volume is resignatured with the datastore.
 - d. The System Area of a virtual machine on a transaction volume to be restored is deleted from the disk.
 - e. A virtual machine to be restored is added from the resignatured datastore on the restore volume.
 - f. The snapshots of the restored virtual machine are restored.
 - g. The virtual machine restored to the restore volume is moved to the original transaction volume through Cold Migration.
 - h. The datastore resignatured for restoration is deleted.
 - i. The copy session for restore is stopped.
4. Start the virtual machine restored in step 3.

The following is an overview of restore script processing executed in step 3.

Figure E.11 Overview of Restore Script Processing (When "VM1" is specified for -vm option at the time the restore script is executed)



Note

- This script may be restored when a virtual machine subject to restoration exists. If a virtual machine subject to restoration does not exist, make a new registration with the same virtual machine name as when the backup was performed.
- Virtual machines that backup the System Area and Data Area as a set also restore the System Area and Data Area as a set.

E.10 VMware Script References

E.10.1 Init.ps1 (Initial Processing Script)

NAME

Init.ps1 - password encryption

SYNOPSIS

```
powershell scriptDir\exe\Init.ps1
```

(scriptDir is the folder to which the script has been copied)

DESCRIPTION

Enter the user password used to connect to the vCenter Server, and save it encrypted.
This file is used to log into the vCenter Server, when executing the backup or restore script.
The name and contents of the generated file are as follows.

File Name	Contents
Password.txt	Encrypted vCenter Server login password

EXAMPLES

```
> powershell C:\Script_ETERNUS_1\exe\Init.ps1  
input password.  
Server: vcserver User: Administrator: *****
```

NOTES

Execute this script after installation and after changing the password.

E.10.2 VMBackup.ps1 (Backup Script)

NAME

VMBackup.ps1 - Automated backup execution

SYNOPSIS

```
powershell scriptDir\exe\VMBackup.ps1 [-l logFileName] [-e]
```

(*scriptDir* is the folder to which the script has been copied)

DESCRIPTION

This script backs up the System Area and Data Area of any virtual machine after acquiring virtual machine snapshots. When backup is complete, the acquired snapshots are deleted.

The transaction volume of the virtual machine is copied to the backup volume for each LU.

Refer to "Execute the backup script" in "[E.8 Virtual Machine Backup](#)" for the automated processes executed with this script.

OPTIONS

-l *logFileName*

Specify the name of the script execution log output file with an absolute path. The log output destination directory must be created in advance.

This option can be specified concurrently with the -e option.

Refer to "[E.11 Log Format and Messages](#)" for information on the output log.

If this option has been omitted, an execution log is output to the command prompt.

-e

Output a log to Windows event log.

This option can be specified concurrently with the -l option.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> powershell C:\Script_ETERNUS_1\exe\VMBackup.ps1 -l C:\Script_ETERNUS_1\log\backup.log
```

NOTES

- A warning about electronic authentication may appear when connecting to the vCenter Server because this script uses VMware vSphere PowerCLI. This warning appears when a default test certificate is used. It can therefore be ignored.
- Do not restore virtual machines for which the backup process (physical copy in the ETERNUS Disk storage system) has not been completed. Virtual machines restored before backup is complete do not operate normally.
- Always execute this script after the applications on the target virtual machine are stopped (I/O is stopped).
- This script acquires target virtual machine snapshots at backup. Acquiring "Snapshot the virtual machine's memory", which are options for acquisition, are disabled (OFF).

E.10.3 VMRestore.ps1 (Restore Script)

NAME

VMRestore.ps1 - Automated restore execution

SYNOPSIS

```
powershell scriptDir\exe\VMRestore.ps1 -vm vmName [-l logFileName] [-e]
```

(*scriptDir* is the folder to which the script has been copied)

DESCRIPTION

This script restores any backed up virtual machines. When a virtual machine to be restored on the transaction volume is deleted, transaction volume data is restored to the restore volume, the virtual machine is recovered, and snapshots are restored. When the virtual machine has been restored to the restore volume, it is moved to the transaction volume by way of Cold Migration.

Refer to "Execute the restore script" in ["E.9 Virtual Machine Restoration"](#) for the automated processes executed with this script.

OPTIONS

-vm *vmName*

Specify the name of a virtual machine to be restored.

-l *logFileName*

Specify the name of the script execution log output file with an absolute path. The log output destination directory must be created in advance.

This option can be specified concurrently with the -e option.

Refer to ["E.11 Log Format and Messages"](#) for information on the output log.

If this option has been omitted, an execution log is output to the command prompt.

-e

Output a log to Windows event log.

This option can be specified concurrently with the -l option.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
> powershell C:\Script_ETERNUS_1\exe\VMRestore.ps1 -vm VM1 -l C:\Script_ETERNUS_1\log\backup.log
```

NOTES

- A warning about electronic authentication may appear when connecting to the vCenter Server because this script uses VMware vSphere PowerCLI. This warning appears when a default test certificate is used. It can be ignored.
- Do not restore virtual machines for which the backup process (physical copy in the ETERNUS Disk storage system) has not been completed. Virtual machines restored before backup is complete do not operate normally.
- This script may be restored when a virtual machine subject to restoration exists. If a virtual machine subject to restoration does not exist, make a new registration with the same virtual machine name as when the backup was performed.

E.11 Log Format and Messages

This section explains the log format and messages generated by the backup script and restore script.

E.11.1 Log Format

Regular Log

This log is generated when the scripts are executed with the -l option. The log is generated in the following format.

```
yyyy/mm/dd hh:MM:ss :level :message
```

level is the message level. "Info" (information), "Warn" (warning), or "ERROR" (error) is shown.
message is the message itself. Refer to "E.11.2 List of Messages" for details.

Event Log (Application)

This log is written to the Windows Event Log when the scripts are executed with the -e option.

Item	Explanation
EntryType	This is the type of event log entry. "Information", "Warning", or "Error" is shown.
Source	This is the event source. It always shows "WSH".
EventID	This is the event identifier. It always shows "0".
Message	This is the event message. Refer to "E.11.2 List of Messages" for details.

E.11.2 List of Messages

The following messages appear in the log.

Message Level	Message	Explanation
Information : Info :	script started.	The script has started processing.
	vCenter Server connected.	Logged in to the vCenter Server.
	vCenter Server disconnected.	Logged out of the vCenter Server.
	script ended normally.	The script has finished processing.
	execute CCM. <i>command operand copyGroup orgLu:backupLu</i>	LU to LU copying has been executed. An AdvancedCopy Manager CCM command appears after this message.
	output password file.	A password file has been generated.
	create snapshot. (VM= <i>vmName</i>)	A snapshot has been created.
	delete snapshot.	Snapshots have been deleted.

Message Level	Message	Explanation
	rescan storage. <i>esxName</i>	Storage has been re-scanned on the ESXi Server.
	update storage. <i>esxName</i>	Storage has been updated on the ESXi Server.
	complete resignature datastore for restore. <i>luName datastoreName</i>	The datastore for restoration has been resignatured.
	delete datastore for restore. <i>datastoreName</i>	The datastore for restoration has been deleted.
	remove haddisk of target VM. <i>harddiskName</i>	The hard disk of the virtual machine to be restored has been removed.
	delete Snapshot of target VM. <i>vmName</i>	Snapshots of the virtual machine to be restored have been deleted.
	delete target VM. <i>vmName</i>	The virtual machine to be restored has been deleted.
	add VM to inventory. <i>datastoreName vmName vmxFileName</i>	The backup data virtual machine has been added to the inventory.
	delete VM. <i>vmName</i>	The backup data virtual machine has been deleted.
	move to target Snapshot. <i>vmName snapshotName</i>	Snapshots have been restored using the backup data virtual machine.
	delete Snapshot. <i>vmName snapshotName</i>	Snapshots restored from the backup data virtual machine have been deleted.
	execute Cold Migration. <i>vmName srcDatastoreName -> dstDatastoreName</i>	The backup data virtual machine has been moved to the running datastore.
	Failed to delete snapshot.	Failed to delete snapshots. Delete it if you confirm the existence of the snapshot called "ETERNUS_Backup" at Snapshot Manager.
	checking haddisks started. VM= <i>vmName</i>	The checking of the hard disk of the targeted virtual machine is started.
	checking haddisks ended normally. VM= <i>vmName</i>	The checking of the hard disk of the targeted virtual machine has successfully ended.
Warning	<i>parameter</i> : Not found in <i>fileName</i>	Cannot find the definition file parameter. Check the contents of the definition file.
" : < Warn > : "	<i>Message</i>	Check the contents of <i>Message</i> generated by the system.
Error	parameter incorrect. <i>fileName</i>	The definition file format is incorrect.
" : ## ERROR ## : "	can not make LogFile. <i>logFilePath</i> .	Cannot create a log file. Check for errors in the specified path.
	vCenter Server connection failed. <i>serverName userName</i>	Could not log in to the vCenter Server. Check the PowerCLI (Connect-VIServer) error information shown after this message.
	vCenter Server disconnection failed.	Could not log out of the vCenter Server. Check the PowerCLI (Connect-VIServer) error information shown after this message.
	password file not found. <i>path</i>	Cannot find the "Password.txt" file. Execute initial processing.
	password file incorrect.	"Password.txt" file is unusable. Recreate by executing initial processing.

Message Level	Message	Explanation
	failed to CCM. <i>command copyGroup orgLu:backupLu</i>	LU to LU copying has failed. Check the AdvancedCopy Manager CCM error information shown after this message.
	do not set CCM path. <i>fileName parameter</i>	The definition file does not include the parameter indicating the bin directory path of AdvancedCopy Manager CCM.
	do not get VM. <i>vmName</i>	Failed to acquire virtual machine information. <i>vmName</i> shows the name of the failed virtual machine. Check the PowerCLI (Get-VM) error information shown after this message.
	data not found. <i>path</i>	There is no valid data in the file shown in <i>path</i> . Check the contents.
	do not get LU to target datastore. <i>datastoreName</i>	Cannot acquire LU information storing the datastore shown in <i>datastoreName</i> . Check the PowerCLI (Get-Datastore, Get-ScsiLun) error information shown after this message.
	definition of LU that target VM not found. <i>vmName lunVNo</i>	Copy definition about LU stored in the virtual machine has not been written to LU.ini. Add a definition to LU.ini or review the VM to be backed up.
	failed to create snapshot.	Failed to create snapshots. Check the PowerCLI (Remote-Snapshot) error information shown after this message.
	do not set VM Name.	In startup parameter "-vm", specify the name of the virtual machine to be restored.
	not exist VM.	The specified virtual machine does not exist. Specify the name of an existing virtual machine. Check the PowerCLI (Get-VM) error information shown after this message.
	VM is not unique. <i>vmName</i>	There are several virtual machines with the same name. Specify a unique virtual machine.
	do not get datastore of target VM. <i>datastoreName</i>	Cannot acquire information for the datastore storing the vmx file of the virtual machine. Check the PowerCLI (Get-Datastore) error information shown after this message.
	found datastore in LU for Restore. <i>luName datastoreName</i>	The ESXi Server found an LU for restoration. Delete the LU for restoration from the datastore.
	backup setting is not found. <i>vmName</i>	The virtual machine to be restored has not been backed up or the "BkupInfo.txt" file is broken.
	do not set LU of Restore. <i>backupLu</i>	The LU for restoration for the backup destination LU has not been defined. Check the contents of the "LU.ini" file.
	LU for restore not found. <i>backupLu</i>	Several LUs for restoration for the backup destination LU have been defined. Check the contents of the "LU.ini" file.
	failed to rescan storage devices. <i>esxName</i>	Failed to re-scan storage. Check the PowerCLI (Get-VMHostStorage) error information shown after this message.

Message Level	Message	Explanation
	failed to update storage. <i>esxName</i>	Failed to update storage. Check the PowerCLI (Get-VMHostStorage) error information shown after this message.
	LU for restore not found. <i>luName</i>	The ESXi Server could not find the LU for restoration. When it is not connected, check the connection between the LU for restoration specified in the "LU.ini" file and the ESXi Server of the virtual machine to be restored.
	failed to resignature datastore for restore. <i>luName</i>	Failed to resignature the LU for restoration. In cases when the backup volume is connected to the ESXi server, re-execute the restoration after disconnecting it. Check the PowerCLI (ResignatureUnresolvedVmfsVolume method) error information shown after this message.
	failed to get datastore for restore. <i>luName</i> <i>datastoreID</i>	Failed to acquire datastore information for restoration. Check the PowerCLI (Get-Datastore) error information shown after this message.
	failed to remove harddisk of target VM. <i>hardDiskName</i>	Failed to remove the hard disk for the Data Area of the virtual machine to be restored. Check the PowerCLI (Remove-HardDisk) error information shown after this message.
	failed to delete Snapshot of target VM. <i>vmName</i>	Failed to delete the snapshots of the virtual machine for restoration. Check the PowerCLI (Remove-Snapshot) error information shown after this message.
	failed to delete target VM. <i>vmName</i>	Failed to delete the virtual machine for restoration. Check the PowerCLI (Remove-VM) error information shown after this message.
	failed to add inventory. <i>datastoreName</i> <i>vmName</i> <i>vmxFileName</i>	Could not add the backup data virtual machine to the inventory. Check the PowerCLI (New-VM) error information shown after this message.
	failed to delete VM. <i>vmName</i>	Could not delete the backup data virtual machine to the inventory. Check the PowerCLI (Remove-VM) error information shown after this message.
	Snapshot of target VM not found. <i>vmName</i> <i>snapshotName</i>	There is no snapshot called "ETERNUS_Backup" in the backup data virtual machine. Virtual machines not backed up using the backup script cannot be restored.
	backup setting is not specified. <i>vmName</i>	Cannot identify backup information. The virtual machine to be restored has not been backed up or the "BkupInfo.txt" file is broken.
	failed to move of target Snapshot. <i>vmName</i> <i>snapshotName</i>	Failed to restore snapshots in the virtual machine restored from the backup data. A PowerCLI (Set-VM) error information appears after this message.
	failed to delete Snapshot. <i>vmName</i> <i>snapshotName</i>	Failed to delete snapshots in the virtual machine restored from the backup data. A PowerCLI (Remove-Snapshot) error information appears after this message.

Message Level	Message	Explanation
	do not get datastore of target VM. <i>datastoreName vmName</i>	Failed to acquire datastore information containing the hard disk of the virtual machine to be restored. Check the PowerCLI (Get-Datastore) error information shown after this message.
	failed to Cold Migration. <i>vmName srcDatastoreName dstDatastoreName</i>	The virtual machine restored from the backup data could not be moved from <i>srcDatastoreName</i> to <i>dstDatastoreName</i> . A PowerCLI (RelocateVM method) error information appears after this message.
	the following data disk must have the property 'IndependentPersistent'.	The Data Area is not Independent (Persistent). Confirm the classification of the Data Area that has been output following this message.
	the following data disk must not be stored in the same datastore with system disk.	The Data Area is allocated on the same volume as the System Area. Confirm the Data Area that has been output following this message.
	unsupported disk type.	The type of disk is not supported.
	checking harddisks ended abnormally. <i>VM=vmName</i>	An error has been detected while checking the hard disk of the virtual machine.
	the target VM has not been shut down.	The virtual machine subject to restoration has not been shut down.
	LUNs are not in the same storage.	Information for more than one ETERNUS Disk storage system is specified in the LU copy information configured in the "LU.ini" file.
	the target VMs are not in the same storage.	Virtual machines residing on more than one ETERNUS Disk storage system have been specified in the "VMBackup.ini" file.
	failed to get VMHost.	Failed to acquire the ESXi Server information. Check the status of the vCenter Server.
	failed to get information of the target datastore. <i>datastoreName</i>	The disk file information cannot be acquired from the specified data store. A PowerCLI (Get-Harddisk) error information appears after this message.
	failed to copy hard disk file.	Data Area copy failed during restore. Error information appears after this message.

The following message is output to the command prompt that activated the script.

Message	Explanation
The VMware vSphere PowerCLI core component seems to be not installed.	VMware vSphere PowerCLI has not been installed.

Appendix F Inter-box Backup/Restore of NAS Volumes

In this appendix, the procedure for the inter-box backup/restore of NAS volumes using the REC function of the ETERNUS Disk storage system and the functions provided by AdvancedCopy Manager CCM, and the sample script for performing an operation automation are explained.

The explanation of this function requires an understanding of NAS management for the ETERNUS Disk storage system and backup of the NAS environment. For NAS management of ETERNUS Disk storage system, refer to "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide*. For backup of NAS environment, refer to "3.10 Backup of NAS Environment".

F.1 Overview

In the NAS operating environment, by using the ETERNUS Disk storage system REC function and the function provided by AdvancedCopy Manager CCM, the inter-box backup/restore of the NAS volume can be achieved.

The following two operations are available.

Operating Method	Explanation
Data protection operation	<ul style="list-style-type: none">- This operation is for backing up NAS volume data to the backup volume of the REC destination device.- In case of a disaster, recover the operating device and restart operations after restoring data from the backup volume of the REC destination device.
Standby operation	<ul style="list-style-type: none">- This is the operation to restore data to the NAS volume of the REC destination device and continue operation with the REC destination device.- In case of a disaster, you can continue operations using the NAS volume of the REC destination device.- When performing this operation, the NAS function must also be loaded on the REC destination device.

F.1.1 About Prior Work

The prior work necessary for using this function is explained below.

When Performing Data Protection Operation

No prior work is required.

When Performing Standby Operation

In the case where the device for REC is used as a device in the standby side, introduction of NAS management is necessary as in the device in the operation side. For the prior setting and introduction procedures for NAS operation, refer to "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide*.



Note

- If the ETERNUS DX100 S3/DX200 S3, DX500 S3/DX600 S3, whose firmware version is earlier than V10L51, is either operation side device or standby side device, or both, the logical volume number of a NAS volume to be created on a standby side device must be the same as the logical volume number of the corresponding NAS volume on an operation side device.
In this case, if a volume of the same logical volume number already exists in the standby side, after moving the volume data of the volume to another volume, delete that volume so that the logical volume number of its corresponding NAS volume in the operation side can be used.
- The devices in the operation and standby sides must be in one-to-one relation. Use of one device in the standby side for multiple devices in the operation side is not possible.

- If the operation side device and the standby side device are any of the following, the firmware version of both devices must be the same.
 - ETERNUS DX100 S4/S3
 - ETERNUS DX200 S4/S3
 - ETERNUS DX500 S4/S3
 - ETERNUS DX600 S4/S3
- For the operation side device and the standby side device, if either or both are an ETERNUS DX S5 series (excluding the ETERNUS DX60 S5), refer to "Backup" in "NAS Functions" in the *ETERNUS DX S5 series Hybrid Storage Systems Design Guide* and confirm the notes and cautions.

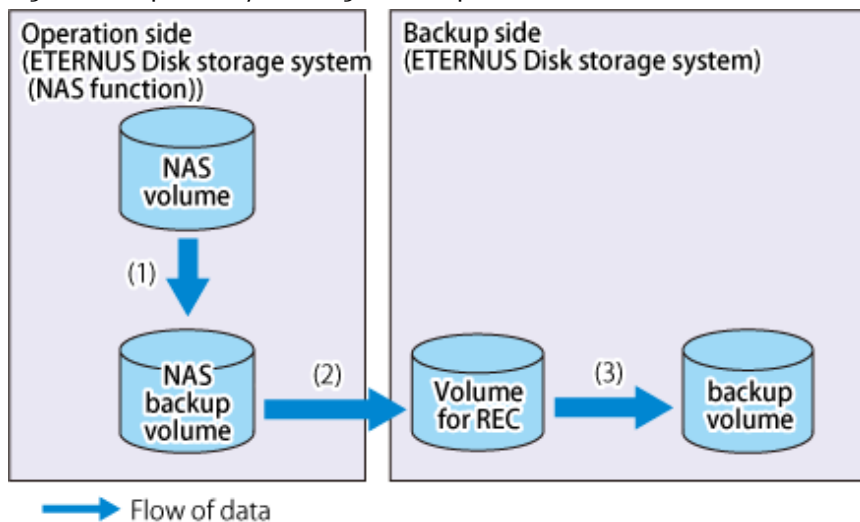
F.1.2 Overview of Data Protection Operation

Backup Procedures

An overview of the backup procedures is explained below.

For details about the backup procedures, refer to "F.2 Details of Data Protection Operation".

Figure F.1 Explanatory Drawing of Backup



1. In the operation side, back up the NAS volume using the `acnas backup` command or Web Console.
2. Using REC, copy the NAS backup volume in the operation side to the volume for REC in the backup side.
3. Using QuickOPC, copy from the volume for REC to the backup volume.

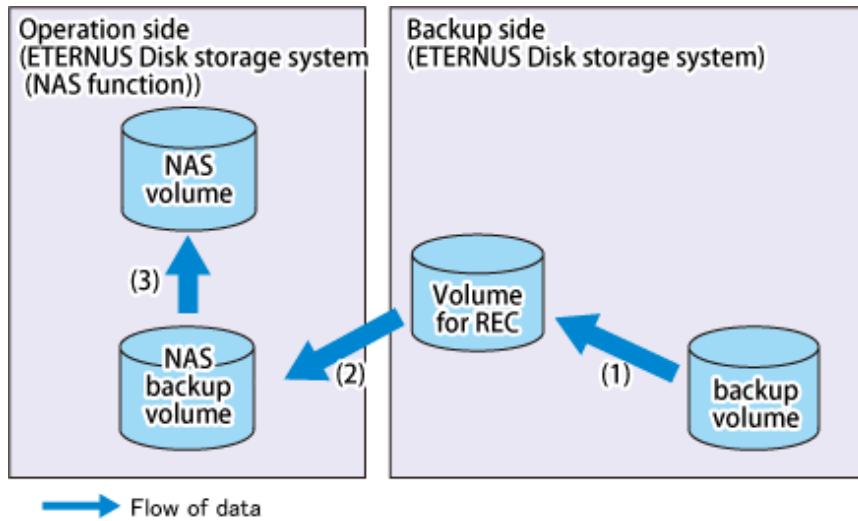
Restoration Procedures

An overview of the restoration procedures is explained below.

For details about the restoration procedures, refer to "F.2 Details of Data Protection Operation".

- When a REC session exists between a NAS backup volume in the operation side and a volume for REC in the backup side

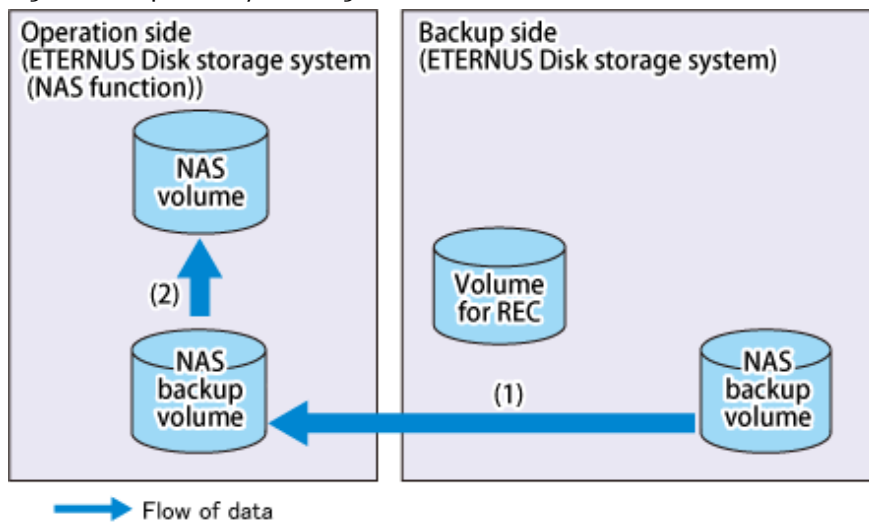
Figure F.2 Explanatory Drawing of Restore



1. In the backup side, copy the data from the backup volume to the using QuickOPC in the reverse direction.
2. Recover the data from the volume for REC to a NAS backup volume in the operation side using REC in the reverse direction.
3. In the operation side, restore the data from the NAS backup volume to a NAS volume.

- When no REC session exists between a NAS backup volume in the operation side and a volume for REC in the backup side

Figure F.3 Explanatory Drawing of Restore



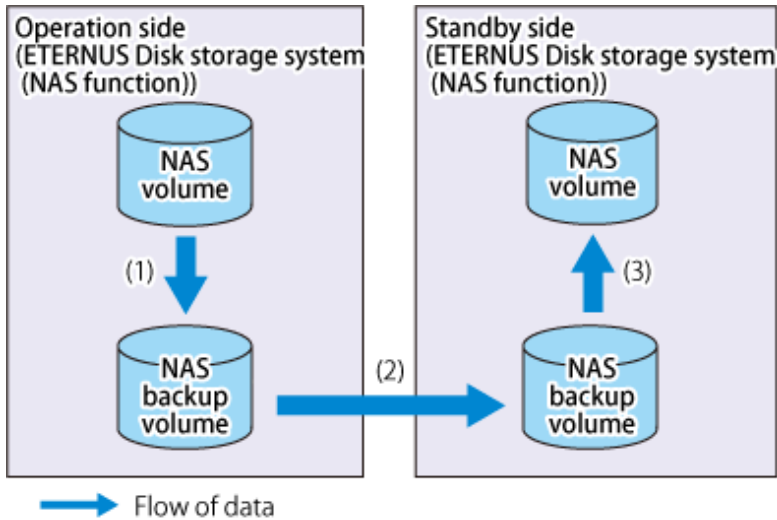
1. Using REC, copy the backup volume in the backup side to the NAS backup volume in the operation side.
2. In the operation side, restore the data from the NAS backup volume to a NAS volume.

F.1.3 Overview of Standby Operation

An overview of the standby operation is explained below.

For details about the standby operation, refer to "F.3 Details of Standby Operation".

Figure F.4 Explanatory Standby Operation



1. In the operation side, back up the NAS volume using the [acnas backup](#) command or Web Console.
2. Using REC, copy the NAS backup volume in the operation side to the NAS backup volume in the standby side.
3. In the standby side, restore the data from the NAS backup volume to the NAS volume using the [acnas restore](#) command or Web Console.

When a malfunction or failure occurs on the operation side, you can continue NAS operations using the NAS volume in the standby side.

Note

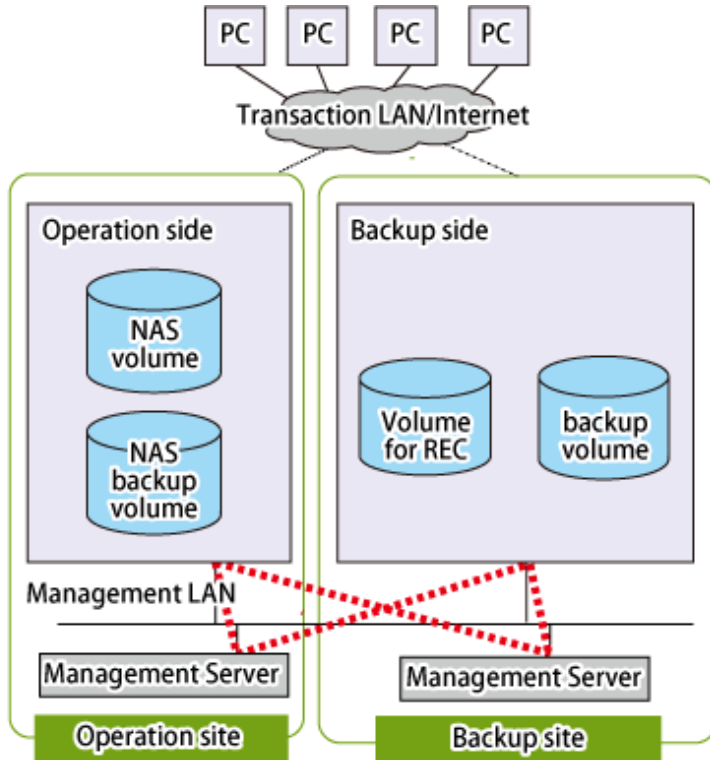
When the NAS backup volume in the standby side is mounted, do not execute REC to this NAS backup volume. Executing REC may destroy the NAS environment in the standby side.

F.2 Details of Data Protection Operation

The data protection operation supports the following two configurations:

- Data protection operation in the same site
This is a configuration in case of a device failure.
The Management Server manages the operation side device and the backup side device.
- Data protection operation between different sites
This is a configuration in case of a site disaster.
The Management Server at each site manages their respective operation side devices and backup side devices.

Figure F.5 Explanatory Data Protection Operation between Different Sites (Assuming Device Failure and Site Disaster)



F.2.1 Creation of Environment

Management Server

Allocate a Management Server to manage the operation side device and the backup side device. Register the operation side device and backup side device in the Management Server.

Volume Creation

Create the following volumes in the operation side device and backup side device.

Device	Volume
Operation side device	<ul style="list-style-type: none"> - NAS volume - NAS backup volume
Backup side device	<ul style="list-style-type: none"> - Volume for REC (temporary volume used in backup) - Backup volume

- Operation side device

1. Create a NAS volume according to the installation procedures for the NAS operation.
2. Perform a NAS backup setting to create a NAS backup volume.

- Backup side device

1. Create a logical volume for the REC volumes.
2. Create a logical volume as the backup volume.



See

- For the introduction procedures for NAS operation, refer to "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide*.

- For the procedure to create a NAS backup volume, refer to "Set NAS Backup" in the *Web Console Guide*.

Note

- The volume for REC needs to be assigned a Logical volume of the same capacity as that of the NAS backup volume of the REC source. A Thin Provisioning Volume is recommended for it.
- Arrange a volume for REC apart from the backup volume to secure at least a generation of backup data in the backup side.

Registration of Copy Group / Copy Pair

The copy groups shown below are created.

Copy Group / Copy Pair	Creation Method	Copy Type
Copy group of NAS volume and NAS backup volume	NAS backup settings	QuickOPC
Copy group of NAS backup volume and volume for REC	Execution of the acgroup create command	REC
Copy group of volume for REC and backup volume	Execution of the acgroup create command	QuickOPC

Point

- When performing a data protection operation between different sites, arrange a Management Server in each site. Register all the copy groups/copy pairs to the Management Servers to allow execution of all the backup/restore procedures.
- Use Stack mode for the REC data transmission mode.
- In the case of backup to a tape to use the REC initial copy skip function, direct backup to a tape from the NAS volume or NAS backup volume is not available. Back up to a tape from other secondary backup executed volume. For the secondary backup of a NAS volume, refer to "3.10.5 Concerning Secondary Backup of NAS Volume and Use of Data on Different Storage Devices".

F.2.2 Backup Procedures

For a data protection operation, either perform using the sample script for automating the backup, or perform the backup manually.

For the detail of the case of using sample script, refer to "F.4 Automation of Operation".

1. In the operation side, back up the NAS volume.

Point

After backing up the NAS volume, you need to wait for the physical copy completion. Confirm the completion of the physical copy by checking that the copy phase turns to the "Tracking" state after executing the [acopc query](#) command.

2. Using REC, copy the NAS backup volume in the operation side to the volume for REC in the backup side.

Point

After copying with REC, you must check whether the REC source and destination volumes are in an equivalency maintenance state. For details, refer to "3.2.2.3 Backup via REC".

3. In the backup side, copy from the volume for REC to the backup volume using QuickOPC.

Point

After copying with QuickOPC, you need to wait for physical copy completion. Confirm the completion of the physical copy by checking that the copy phase turns to the "Tracking" state after executing the `acopc query` command.

F.2.3 Restoration Procedures

Restoration procedures vary depending on the NAS backup volume malfunction, and the malfunction of the device in the operation side.

The recovery procedures for each malfunction are explained below:

Recover from Malfunction of NAS Backup Volume

The procedure to recover from malfunction of NAS backup volume is as follows. After performing this procedure, restore data to a NAS volume as required:

- At the time of file system failure

1. When the NAS backup volume is mounted, unmount the NAS backup volume by using Web Console.

See

Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for unmounting.

2. In the operation side, stop QuickOPC that is copying from the NAS volume to NAS backup volume (stop the physical copy and Tracking processing).
3. Suspend REC and perform an REC reversal (from the backup side to the operation side).
4. In the backup side, restore from the backup volume to the REC destination volume.

See

Refer to "3.2.1.4 Restore on QuickOPC Backup Environment" for information on the procedures for restoring.

Point

After copying with restore, you need to wait for the physical copy completion. To confirm the progress status of the physical copy, execute the `acopc query` command with the `-r` and `-progress` options.

5. Resume REC from the REC destination volume in the backup side to the NAS backup volume in the operation side.
6. Suspend REC after REC becomes equivalent state.
7. Perform an REC reversal (from the device in the operation side to the device in the backup side) and resume REC.

Point

After copying to a NAS backup volume in the operation side using REC, you must check whether the REC source and destination volumes are in an equivalency maintenance state. Refer to "3.2.2.4 Restore on REC Backup Environment" for details.

- At the time of RAID failure

1. When the NAS backup volume is mounted, unmount the NAS backup volume by using Web Console.



Refer to "Mount/Unmount Backup Destination" in the *Web Console Guide* for information on the procedures for unmounting.

2. In the operation side, stop QuickOPC that is copying from the NAS volume to NAS backup volume (stop the physical copy and Tracking processing).
3. Stop REC.
4. Recover the NAS backup volume in the operation side.
Perform the steps 1 to 3 in "[3.10.6.2 Data Recovery Procedure of NAS Backup Volume](#)".
5. In NAS backup volume recovery process, if a NAS backup volume, once removed, has been recreated, recreate a copy group between the NAS backup volume and the REC destination volume.
6. In the backup side, restore from the backup volume to the REC destination volume.



Refer to "[3.2.1.4 Restore on QuickOPC Backup Environment](#)" for information on the procedures for restoring.



After copying with restore, you need to wait for the physical copy completion. To confirm the progress status of the physical copy, execute the `acopc query` command with the `-r` and `-progress` options.

7. Perform REC in the reverse direction from the REC destination volume in the backup side to the NAS backup volume in the operation side.
8. Suspend REC after REC becomes equivalent state.
9. Perform an REC reversal (from the operation side to the backup side) and resume REC.



After copying to a NAS backup volume in the operation side using REC, you must check whether the REC source and destination volumes are in an equivalency maintenance state. Refer to "[3.2.2.4 Restore on REC Backup Environment](#)" for details.

Malfunction of Device in Operation Side

- Business continuance by replacing the device in the operation side
 1. Stop REC.
 2. Replace the device.
 3. Preconfigure to introduce NAS Management.



Refer to "ETERNUS Disk Storage System Configuration" and "Prior Configuration of Management Server" in the *Storage Cruiser Operation Guide* for information on the procedures for prior configuring.

4. Create a NAS volume and a NAS backup volume.
Create a temporary shared folder to create a NAS volume.
For a NAS volume to be created, specify the same volume name, volume capacity, and volume number as before the malfunction.

Check the **New** radio button in the **Destination Volume to backup** field to create a NAS backup volume.

 See

Refer to "Create Shared Folder" in the *Web Console Guide* for information on the procedures for creating a shared folder.

5. Back up the NAS volume of the replaced device using Web Console or the `acnas backup` command. Refer to "[3.10.1.2 How to Execute Backup](#)" for backups using Web Console. Refer to "[3.10.2.2 How to Execute Backup Commands](#)" for backups using the `acnas backup` command.
6. Stop QuickOPC from NAS volume to NAS backup volume (stop the physical copy and Tracking processing).
7. In the backup side, restore from the backup volume to the REC destination volume.

 See

Refer to "[3.2.1.4 Restore on QuickOPC Backup Environment](#)" for information on the procedures for restoring.

 Point

After copying with restore, you need to wait for the physical copy completion. To confirm the progress status of the physical copy, execute the `acopc query` command with the `-r` and `-progress` options.

8. Create an REC copy group to perform an REC from the backup volume in the backup side to the NAS backup volume in the replaced device, and then perform an REC. After confirming the equivalency state, suspend REC.

 Point

After copying to a NAS backup volume in the operation side using REC, you must check whether the REC source and destination volumes are in an equivalency maintenance state. Refer to "[3.2.2.4 Restore on REC Backup Environment](#)" for details.

9. On the operation side, recover the NAS volume data in either of the following ways:
 - Restoring from the NAS backup volume to the NAS volume
The restoration to a NAS volume can be executed via Web Console or the `acnas restore` command. Refer to "[3.10.1.3 How to Execute Restoration](#)" for information on the procedures for restoring via Web Console. Refer to "[3.10.2.3 How to Execute Restore Commands](#)" for information on the procedures for restoring via the `acnas restore` command.
 - Mounting the NAS backup volume, and manual copying a file in the NAS backup volume to the NAS volume
Refer to "[3.10.3.1 Mounting / Unmounting Procedures](#)" for information on the procedures for mounting the NAS backup volume.
10. Perform an REC reversal (from the operation side to the backup side) and resume REC.

 Note

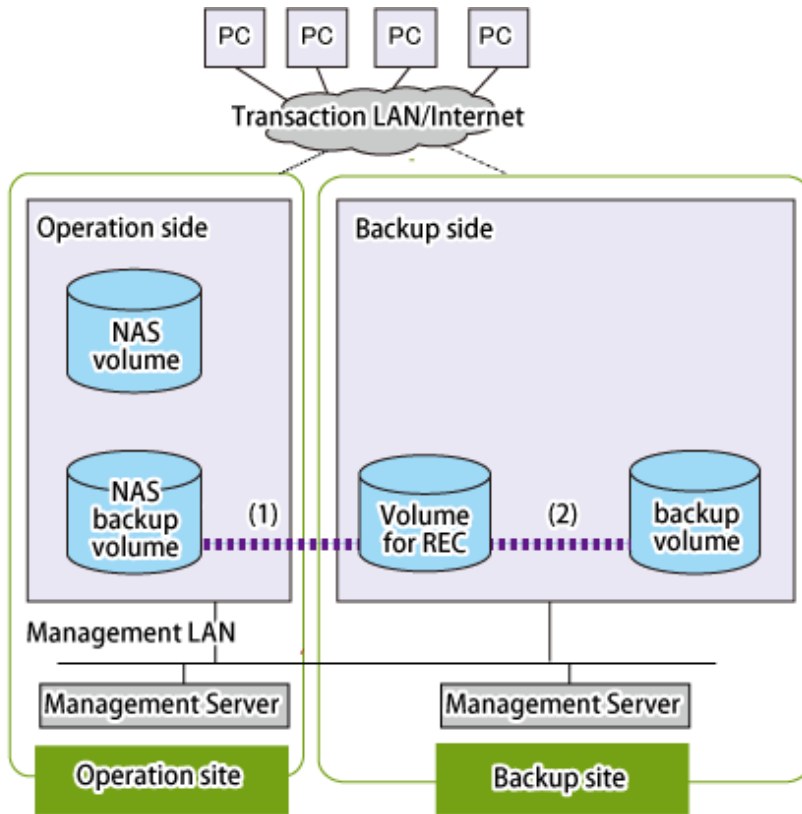
In the case of restoration in the device after replacement due to malfunction of the device in the operation side, access to shared folders need to be enabled again.

For how to access shared folders, refer to "Operation Method" in "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide*.

F.2.4 Deleting Data Protection Operation Definition

This section explains the procedure for deleting the definition of the data protection operation.

Figure F.6 Explanatory Deleting Data Protection Operation Definition



- Work on the Management Server of the operation side
 1. In the case REC session exists between NAS backup volume and the volume for REC, stop the REC session (1).
 2. In the case QuickOPC session exists between the volume for REC and the backup volume, stop the QuickOPC session (2).
 3. Delete the copy pair definition and copy group definition of (1) and (2).
- Work on the Management Server of the backup side
 1. Delete the copy pair definition and copy group definition of (1) and (2).
 2. Delete the volume for REC and the backup volume.

Information

When you also delete the NAS backup settings after deleting the definition of the data protection operation, refer to "[3.10.1.5 Deleting NAS Backup Settings](#)".

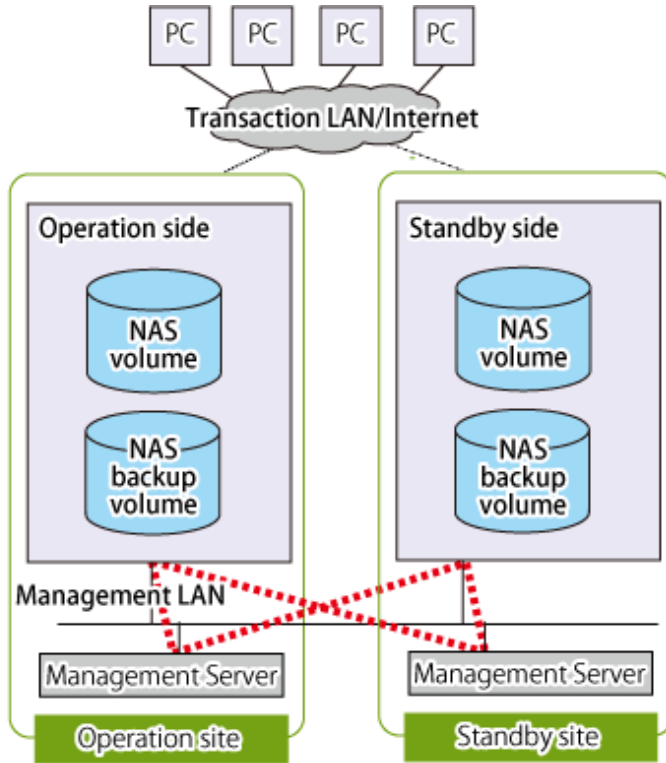
In addition, when deleting the NAS environment, refer to "Deleting of NAS Environment" in the *Storage Cruiser Operation Guide*.

F.3 Details of Standby Operation

The standby operation supports the following two configurations:

- Standby operation in the same site
 - This is the configuration in case of a device failure.
 - The Management Server manages the operation side device and the standby side device.
- Standby operation between different sites
 - This is the configuration in case of a site disaster.
 - The Management Server for each site manages their respective operation side devices and standby side devices.

Figure F.7 Example of Inter-box Standby Operation Between Different Sites



Point

For authentication servers in both the operation side and the standby side, perform redundancy by using those authentication servers. Refer to "Authentication Server Setup" in the *Storage Cruiser Operation Guide* or *Express Operation Guide* for information on how to register redundant authentication servers.

F.3.1 Environment Creation

Management Server

Allocate a Management Server to manage the operation side device and the standby side device. Register the operation side device and the standby side device in the Management Server.

Standby Side Device

NAS management is implemented in the same way as on the operation side device. For prior settings and the installation procedure for performing a NAS operation, refer to "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide*.

Volume Creation

Create the following volumes in the operation side device and standby side device.

Device	Volume
Operation side device	<ul style="list-style-type: none"> - NAS volume - NAS backup volume
Standby side device	<ul style="list-style-type: none"> - NAS volume (*1) - NAS backup volume

*1: In the ETERNUS DX100 S3/DX200 S3, DX500 S3/DX600 S3 whose firmware version is earlier than V10L51, the logical volume number of a NAS volume to be created must be the same as the logical volume number of the corresponding NAS volume on an operation side device.

- Operation side device
 1. Create a NAS volume according to the installation procedure for the NAS operation.
 2. Perform a NAS backup setting to create a NAS backup volume.
- Standby side device
 1. Create a NAS volume according to the installation procedures for the NAS operation. In the ETERNUS DX100 S3/DX200 S3, DX500 S3/DX600 S3 whose firmware version is earlier than V10L51, the logical volume number of a NAS volume to be created must be the same as the logical volume number of the corresponding NAS volume on an operation side device.
 2. Perform a NAS backup setting to create a NAS backup volume



See

- Refer to "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide* for the installation procedure to perform a NAS operation.
- Refer to "Set NAS Backup" in the *Web Console Guide* for the procedure to create a NAS backup volume.

Registration of Copy Group / Copy Pair

Create the following three copy groups.

Copy Group / Copy Pair	Creation Method	Copy Type
Copy group of the NAS volume and the NAS backup volume (in the operation side device)	NAS backup settings	QuickOPC
Copy group of the NAS volume and the NAS backup volume (in the standby side device)	NAS backup settings	QuickOPC
NAS backup volume (in the operation side device) and NAS backup volume (in the standby side device) copy group	Execute the acgroup create command	REC



Point

- When performing a standby operation between different sites, allocate a Management Server in each site. In order to make all operation procedures executable in each Management Server, register all the copy groups/copy pairs.
- Use the Stack mode for the REC data transmission mode.
- When backing up to a tape to use the REC initial copy skip function, a direct backup to a tape from the NAS volume or the NAS backup volume is not available. Back up to a tape from a different secondary backup volume. Refer to "[3.10.5 Concerning Secondary Backup of NAS Volume and Use of Data on Different Storage Devices](#)" for the secondary backup of the NAS volume.

NAS Volume Backup on Standby Side

Before backing up the NAS volume in the operation side, use the following procedures to back up the NAS volume in the standby side.

1. Back up the NAS volume in the standby side using Web Console or the [acnas backup](#) command. Refer to "[3.10.1.2 How to Execute Backup](#)" for backups using Web Console and "[3.10.2.2 How to Execute Backup Commands](#)" for backups using the [acnas backup](#) command.
2. Stop QuickOPC that is copying from the NAS volume to the NAS backup volume in the standby side (stop the physical copy and Tracking processing).

 **Point**

.....
If you perform a standby operation using the sample scripts for automating the operations, the above steps are unnecessary. Refer to "F.4 Automation of Operation" for details when using the sample script.
.....

F.3.2 Operation Procedure

For a standby operation, either perform using the sample script for automating the operation, or perform the operation manually. This section explains the procedure for executing the operation manually.

Refer to "F.4 Automation of Operation" for details when using the sample script.

1. Back up the NAS volume in the operation side.

 **Point**

.....
After backing up the NAS volume, you need to wait for the physical copy completion. Confirm the completion of the physical copy by checking that the copy phase turns to the "Tracking" state after executing the `acopc query` command.
.....

2. Using REC, copy the NAS backup volume in the operation side to the volume for REC in the standby side.

 **Point**

.....
After copying with REC, you must check whether the REC source and destination volumes are in an equivalency maintenance state. For details, refer to "3.2.2.3 Backup via REC".
.....

 **Note**

.....
Do not execute REC when the NAS backup volume in the standby side is mounted.
.....

3. Restore from the NAS backup volume to the NAS volume in the standby side.

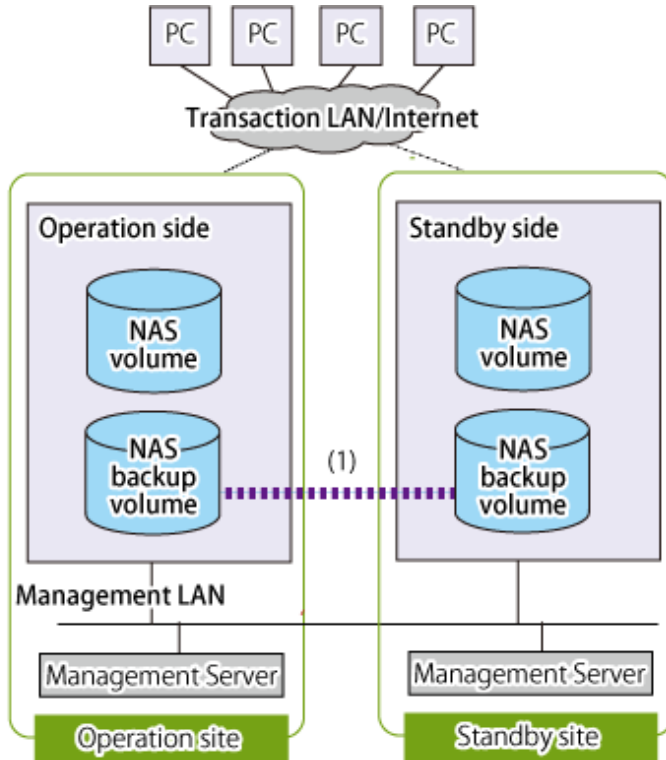
 **Point**

.....
When the operation side device fails, you can continue operation using the NAS volume in the standby side.
When using the NAS volume in the standby side, you must enable access to the shared folder again.
Refer to "Operation Method" under "NAS Management" in the *Storage Cruiser Operation Guide* or *Express Operation Guide* for access methods to the shared folder.
.....

F.3.3 Deleting Standby Operation Definition

This section explains the procedure for deleting the standby operation definition.

Figure F.8 Explanatory Deletion of Standby Operation Definition



- Work on the Management Server of the operation side
 1. In a REC session exists between the NAS backup volume (in the operation side) and the NAS backup volume (in the standby side), stop the REC session (1).
 2. Delete the copy pair definition and copy group definition of (1).
- Work on the Management Server of the standby side

Delete the copy pair definition and copy group definition of (1).

Information

When you also delete the NAS backup settings after deleting the definition of the standby operation, refer to "[3.10.1.5 Deleting NAS Backup Settings](#)".

In addition, when deleting the NAS environment, refer to "Deleting of NAS Environment" in the *Storage Cruiser Operation Guide*.

F.4 Automation of Operation

A sample script for executing a series of procedures is provided to simplify the automation of the operation.

Script Operating Conditions

The sample script can run on the Management Server.

Create the necessary volumes and the copy groups/copy pairs in accordance with the contents of this section.

Note

- Only one copy pair can be defined in each copy group.
- The number of copy pairs or defined volume combinations in a copy group is not validated by the provided sample script. Define the correct volumes.

- All the AdvancedCopy Manager CCM commands executed by the provided sample script are executed in units of copy group. For that reason, when defining multiple copy pairs in a copy group, the copies are executed simultaneously.

Setting Script Execution Policy of PowerShell (for Windows environments)

Set the execution policy of the script.

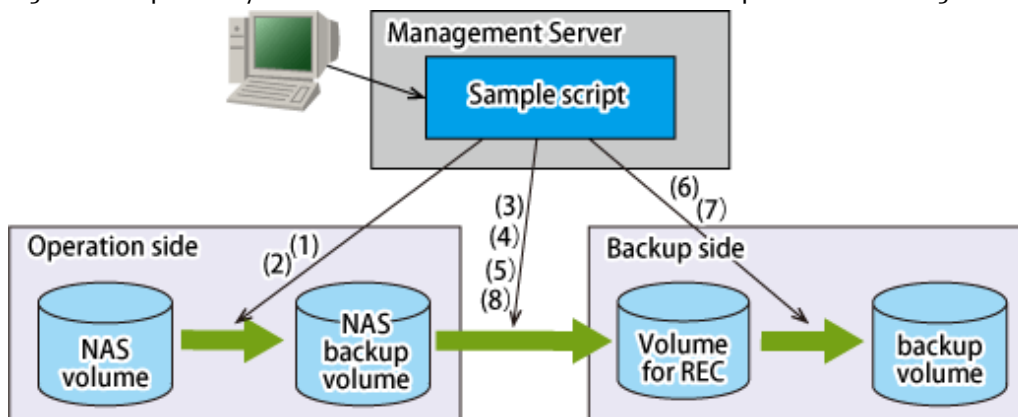
Set the execution policy to "RemoteSigned" or "Unrestricted" in accordance with the method mentioned in the following URL:

<http://technet.microsoft.com/en-us/library/ee176961.aspx>

F.4.1 Sample Script of Data Protection Operation

This section explains the sample script for simplifying the automation of the data protection operation.

Figure F.9 Explanatory Automation Procedure of Data Protection Operation According to Sample Script



1. In the operation side, the NAS volume is backed up by executing the `acnas backup` command.
2. Waiting for the physical copy completion of the NAS volume backup is performed by executing the `acopc query` command.
3. An REC from the NAS backup volume in the operation side to the volume for REC in the backup side is performed by executing the `acec start` command.
4. Waiting for the REC equivalency is performed by executing the `acec query` command.
5. The REC is Suspended by executing the `acec suspend` command.
6. In the backup side, a QuickOPC from the volume for REC to the backup volume is performed by executing the `acopc start` command.
7. Waiting for the physical copy completion of QuickOPC is performed by executing the `acopc query` command.
8. The REC is resumed REC by executing the `acec resume` command.

Information

The sample script checks whether an REC copy session exists when starting REC in step (3), and if no copy session exists, perform an initial copy. In order to shorten processing time, it is recommended that you execute the `acnas backup` command in advance to back up the NAS volume and after confirming that the physical copy is complete, start REC.

Sample Script Name / Stored Directory

The name and stored directory of the sample script are explained below:

Copy all files under the stored directory of the sample script to a different directory. In addition, after customizing the copied files according to the actual backup operation, use those files.

- For Windows environments

Types	Batch File Name	Stored Directory Name
Backup	nas_rec_backup.bat	<Environment Directory >\CCM\etc\sample\nasrec

- For Solaris or Linux environments

Types	Script File Name	Stored Directory Name
Backup	nas_rec_backup.sh	/etc/opt/FJSVccm/samp/nasrec

How to Start

- For Windows environments

nas_rec_backup.bat *NASCopyGroup RECCopyGroup QuickCopyGroup*

- For Solaris or Linux environments

nas_rec_backup.sh *NASCopyGroup RECCopyGroup QuickCopyGroup*

Operands

NASCopyGroup

Copy group name (for QuickOPC) of the NAS volume and the NAS backup volume in the operation side

RECCopyGroup

Copy group name (for REC) of the NAS backup volume in the operation side and the volume for REC in the backup side

QuickCopyGroup

Copy group name (for QuickOPC) of the volume for REC and the backup volume in the backup side

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

Examples

- Usage example of when executing this script in Solaris with a normal completion

```
> nas_rec_backup.sh NAS_QuickOPC_NAS_Vol_0_1 RECGRP QUICKGRP
nas_rec_backup start
backup from NAS volume to primary backup volume start
backup from NAS volume to primary backup volume end rc=0
rec from primary backup volume to rec dest volume start
rec from primary backup volume to rec dest volume end rc=0
suspend rec from primary backup volume to rec dest volume start
suspend rec from primary backup volume to rec dest volume end rc=0
copy from rec dest volume to secondary backup volume start
copy from rec dest volume to secondary backup volume end rc=0
```



```

resume rec from primary backup volume to rec dest volume start
resume rec from primary backup volume to rec dest volume end rc=0
nas_rec_backup end rc=0
>

```

- Usage example of when executing this script in Solaris with an abnormal completion

```

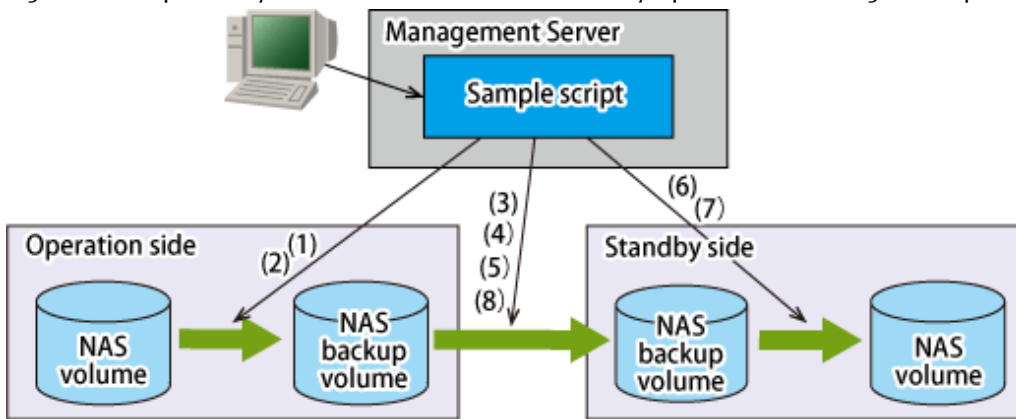
> nas_rec_backup.sh NAS_QuickOPC_NAS_Vol_0_1 RECGRP QUICKGRP
nas_rec_backup start
backup from NAS volume to primary backup volume start
cmmxxxxx(Some error occurred in AdvancedCopy Manager CCM and AdvancedCopy Manager CCM output a
message)
backup from NAS volume to primary backup volume end rc=2
nas_rec_backup end rc=2
>

```

F.4.2 Sample Script of Standby Operation

This section explains the sample script for simplifying the automation of the standby operation.

Figure F.10 Explanatory Automation Procedure of Standby Operation According to Sample Script



1. In the operation side, the NAS volume is backed up by executing the `acnas backup` command.
2. Waiting for the physical copy completion of the NAS volume backup is performed by executing the `acopc query` command.
3. An REC from the NAS backup volume in the operation side to the NAS backup volume in the standby side is performed by executing the `acec start` command.
4. Waiting for the REC equivalency by executing the `acec query` command.
5. The REC is suspended REC is performed by executing the `acec suspend` command.
6. In the standby side, the NAS volume is restored by executing the `acnas restore` command.
7. Waiting for the physical copy completion of the NAS volume restore is performed by executing the `acopc query` command with the `-r` option.
8. The REC is resumed REC by executing the `acec resume` command.

Information

The sample script checks whether an REC copy session exists when starting REC in step (3), and if no copy session exists, perform an initial copy. In order to shorten processing time, it is recommended that you execute the `acnas backup` command in advance to back up the NAS volume and after confirming that the physical copy is complete, start REC.



Note

Do not execute this script when the NAS backup volume in the standby side is mounted.

Sample Script Name / Stored Directory

The name and stored directory of the sample script are explained below:

Copy all files under the stored directory of the sample script to a different directory. In addition, after customizing the copied files according to the actual operation, use those files.

- For Windows environments

Batch File Name	Stored Directory Name
nas_rec_backup2.bat	<Environment settings directory>\CCM\etc\sample\nasrec

- For Solaris or Linux environments

Script File Name	Stored Directory Name
nas_rec_backup2.sh	/etc/opt/FJ/VCcm/samp/nasrec

How to Start

- For Windows environments

```
nas_rec_backup2.bat NASCopyGroup RECCopyGroup NASRestoreCopyGroup
```

- For Solaris or Linux environments

```
nas_rec_backup2.sh NASCopyGroup RECCopyGroup NASRestoreCopyGroup
```

Operands

NASCopyGroup

Copy group name (for QuickOPC) of the NAS volume and the NAS backup volume in the operation side

RECCopyGroup

Copy group name (for REC) of the NAS backup volume in the operation side and the NAS backup volume in the standby side

NASRestoreCopyGroup

Copy group name (for QuickOPC) of the NAS backup volume and the NAS volume in the standby side

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

Example

- Usage example of when executing this script in Solaris with a normal completion

```
> nas_rec_backup2.sh NAS_QuickOPC_NAS_Vol_0_1 RECGRP NASRestoreCopyGroup
nas_rec_backup2 start
backup from primary NAS volume to primary backup volume start
backup from primary NAS volume to primary backup volume end rc=0
rec from primary backup volume to secondary backup volume start
rec from primary backup volume to secondary backup volume end rc=0
suspend rec from primary backup volume to secondary backup volume start
suspend rec from primary backup volume to secondary backup volume end rc=0
restore from secondary backup volume to secondary NAS volume start
restore from secondary backup volume to secondary NAS volume end rc=0
resume rec from primary backup volume to secondary backup volume start
resume rec from primary backup volume to secondary backup volume end rc=0
nas_rec_backup end rc=0
>
```

- Usage example of when executing this script in Solaris with an abnormal completion

```
> nas_rec_backup2.sh NAS_QuickOPC_NAS_Vol_0_1 RECGRP NASRestoreCopyGroup
nas_rec_backup2 start
backup from NAS volume to primary backup volume start
cmxxxxxx(Some error occurred in AdvancedCopy Manager CCM, and its message was output)
backup from NAS volume to primary backup volume end rc=2
nas_rec_backup end rc=2
>
```

F.4.3 Message Output by Sample Script

This sample script outputs a message in the standard output. The output messages are as follows:

nas_rec_backup start

Explanation

Script starts.

nas_rec_backup2 start

Explanation

Script starts.

script parameter error

Explanation

The parameter of the script is invalid.

System Administrator Corrective Action

Check the contents of the designated parameter. Re-run after designating a correct value for the parameter.

script environment error

Explanation

The execution environment of the script is invalid.

System Administrator Corrective Action

Check if the required script is correctly arranged or the contents of the copy group are correct. In the case it is the invalid state, change it into the right state and re-run it.

backup from NAS volume to primary backup volume start**Explanation**

The backup processing from NAS volume to NAS backup volume starts.

backup from NAS volume to primary backup volume end rc=rc**Explanation**

The backup processing from NAS volume to NAS backup volume is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take corrective action according to the error message output immediately before this message.

backup from primary NAS volume to primary backup volume start**Explanation**

The backup processing from NAS volume to NAS backup volume starts in the operation side.

backup from primary NAS volume to primary backup volume end rc=rc**Explanation**

The backup processing from NAS volume to NAS backup volume is completed with return code *rc* in the operation side.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take corrective action according to the error message output immediately before this message.

rec from primary backup volume to rec dest volume start**Explanation**

The REC processing from NAS backup volume to the volume for REC starts.

rec from primary backup volume to secondary backup volume start**Explanation**

The REC processing from NAS backup volume in the operation side to the NAS backup volume in the standby side starts.

error invalid copy status

Explanation

The copy status is invalid.

error invalid copy mode

Explanation

The copy mode is invalid.

rec from primary backup volume to rec dest volume end rc=rc

Explanation

The REC processing from NAS backup volume to the volume for REC is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

rec from primary backup volume to secondary backup volume end rc=rc

Explanation

The REC processing from NAS backup volume in the operation side to the NAS backup volume in the standby side is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

suspend rec from primary backup volume to rec dest volume start

Explanation

The REC suspension processing from NAS backup volume to the volume for REC has started.

suspend rec from primary backup volume to rec dest volume end rc=rc

Explanation

The REC suspension processing from NAS backup volume to the volume for REC is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

suspend rec from primary backup volume to secondary backup volume start

Explanation

The REC suspension processing from NAS backup volume in the operation side to the NAS backup volume in the standby side has started.

suspend rec from primary backup volume to secondary backup volume end rc=*rc*

Explanation

The REC suspension processing from NAS backup volume in the operation side to the NAS backup volume in the standby side is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

copy from rec dest volume to secondary backup volume start

Explanation

The copy processing from the volume for REC to the backup volume has started.

copy from rec dest volume to secondary backup volume end rc=*rc*

Explanation

The copy processing from the volume for REC to the backup volume is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

restore from secondary backup volume to secondary NAS volume start

Explanation

The restore processing from NAS backup volume to NAS volume starts in the standby side.

restore from secondary backup volume to secondary NAS volume rc=*rc*

Explanation

The restore processing from NAS backup volume to NAS volume is completed with return code *rc* in the standby side.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

resume rec from primary backup volume to rec dest volume start

Explanation

The REC resume processing from NAS backup volume to the volume for REC has started.

resume rec from primary backup volume to secondary backup volume start

Explanation

The REC resume processing from NAS backup volume in the operation side to the NAS backup volume in the standby side has started.

resume rec from primary backup volume to rec dest volume end rc=*rc*

Explanation

The REC resume processing from NAS backup volume to the volume for REC is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

resume from primary backup volume to secondary backup volume end rc=*rc*

Explanation

The REC resume processing from NAS backup volume in the operation side to the NAS backup volume in the standby side is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

nas_rec_backup end rc=*rc*

Explanation

The sample script is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this message.

nas_rec_backup2 end rc=*rc*

Explanation

The sample script is completed with return code *rc*.

Parameters

<i>rc</i>	Meaning
0	Completed successfully
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

System Administrator Corrective Action

Take a measure according to the error message output immediately before this

F.4.4 Sample Script in Each Processing Phase

This sample script sequences scripts for each of the processing phases shown below. Arrange these scripts in the same storage directory as that of the sample script.

- For Windows environments

Types	Batch File Name	Storage Directory Name
Backup	start_nas_backup.ps1 wait_qopc_completion.ps1 start_rec.ps1 wait_rec_equivalent.ps1 suspend_rec.ps1 start_qopc.ps1 resume_rec.ps1 start_nas_restore.ps1	<Environment Directory>\CCM\etc\sample\nasrec

- For Solaris or Linux environments

Types	Script File Name	Storage Directory Name
Backup	start_nas_backup.sh wait_qopc_completion.sh start_rec.sh wait_rec_equivalent.sh suspend_rec.sh start_qopc.sh resume_rec.sh start_nas_restore.sh	/etc/opt/FJSVccm/samp/nasrec

start_nas_backup

How to Start

For Windows environments

```
start_nas_backup.ps1 NASCopyGroup
```

For Solaris or Linux environments

```
start_nas_backup.sh NASCopyGroup
```

Overview

Execute the [acnas backup](#) command.

Operands

NASCopyGroup

Copy group name (QuickOPC) of NAS volume and NAS backup volume

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment

wait_qopc_completion

How to Start

For Windows environments

```
wait_qopc_completion.ps1 QuickCopyGroup [-r]
```

For Solaris or Linux environments

```
wait_qopc_completion.sh QuickCopyGroup [-r]
```

Overview

Queue physical copy completion of QuickOPC.

Options

-r

Specify this option when waiting for the physical copy completion of restore OPC.

Operands

QuickCopyGroup

Copy group name of QuickOPC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

start_rec

How to Start

For Windows environments

```
start_rec.ps1 RECCopyGroup
```

For Solaris or Linux environments

```
start_rec.sh RECCopyGroup
```

Overview

Start REC.

Operands

RECCopyGroup

Copy group name of REC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM Command error
3	Abnormal copy state
5	Invalid environment

wait_rec_equivalent

How to Start

For Windows environments

`wait_rec_equivalent.ps1 RECCopyGroup`

For Solaris or Linux environments

`wait_rec_equivalent.sh RECCopyGroup`

Overview

Queue equivalency of REC.

Operands

RECCopyGroup

Copy group name of REC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
4	Invalid copy mode
5	Invalid environment

suspend_rec

How to Start

For Windows environments

`suspend_rec.ps1 RECCopyGroup`

For Solaris or Linux environments

`suspend_rec.sh RECCopyGroup`

Overview

Suspend REC.

Operands

RECCopyGroup

Copy group name of REC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
3	Abnormal copy state
5	Invalid environment

start_qopc

How to Start

For Windows environments

`start_qopc.ps1 QuickCopyGroup`

For Solaris or Linux environments

`start_qopc.sh QuickCopyGroup`

Overview

Execute QuickOPC.

Operands

QuickCopyGroup

Copy group name of QuickOPC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment

resume_rec

How to Start

For Windows environments

`resume_rec.ps1 RECCopyGroup`

For Solaris or Linux environments

`resume_rec.sh RECCopyGroup`

Overview

Resume REC.

Operands

RECCopyGroup

Copy group name of REC

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment

start_nas_restore

How to Start

For Windows environments

```
start_nas_restore.ps1 NASRestoreCopyGroup
```

For Solaris or Linux environments

```
start_nas_restore.sh NASRestoreCopyGroup
```

Overview

Execute the [acnas restore](#) command.

Operands

NASRestoreCopyGroup

Copy group name (for QuickOPC) of the NAS volume and the NAS backup volume

Exit Status

=0: Completed successfully

>0: Terminated abnormally

Exit Status	Meaning
1	Parameter error
2	AdvancedCopy Manager CCM command error
5	Invalid environment