



J2UZ-8170-04ENZO (A)

ETERNUS SF AdvancedCopy Manager V13.3

Operator's Guide (Linux)



FUJITSU

Preface

Purpose

This manual describes the operations available on ETERNUS SF AdvancedCopy Manager.

Intended Readers

This manual is intended for a system administrator who performs storage management using ETERNUS SF AdvancedCopy Manager.

Organization

This manual has the following chapters:

Chapter 1 Overview of AdvancedCopy Manager

This chapter provides an overview of ETERNUS SF AdvancedCopy Manager.

Chapter 2 Starting and Stopping Daemons

This chapter describes starting and stopping a Daemon provided by ETERNUS SF AdvancedCopy Manager.

Chapter 3 Security Operation Using Authentication Feature

This chapter describes the security operation on ETERNUS SF AdvancedCopy Manager.

Chapter 4 Backup Operations (Normal Transaction Volumes)

This chapter describes how to back up data.

Chapter 5 Backup Operations (Symfaware)

This chapter describes how to back up data (Symfaware).

Chapter 6 Backup Process That Uses the Suspend/Resume Function

This chapter describes how to use the Suspend/Resume function when backing up data.

Chapter 7 Backup Operation by the QuickOPC Function

This chapter describes how to use the QuickOPC function when backing up data.

Chapter 8 Replication

This chapter describes how to replicate data.

Chapter 9 Configuration Maintenance

This chapter details how to maintain a database, and how to perform troubleshooting and other maintenance.

Chapter 10 Commands

This chapter describes commands.

Chapter 11 Notes on Operations

This chapter describes operating notes.

Appendix A Pre-processing and Post-processing of Backup and Restoration

This appendix describes shell scripts used for pre-processing and post-processing for backup and restore.

Appendix B Sample Shell Script for Oracle Integration Backup Operations

This appendix describes sample shell script for backups for ETERNUS SF AdvancedCopy Manager.

Appendix C Pre-processing and Post-processing of Replication

This appendix describes replication scripts used by ETERNUS SF AdvancedCopy Manager.

Appendix D System Volume Backup Operation

This appendix describes how to back up and restore the system volume.

Appendix E Backup Operations Using Power-Saving

This appendix describes backup operations using the power-saving operations built into the hardware.

Related Manuals

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

- ETERNUS SF AdvancedCopy Manager Overview
Provides an overview of ETERNUS SF AdvancedCopy Manager.
- ETERNUS SF AdvancedCopy Manager Installation Guide
Describes the installation procedure for ETERNUS SF AdvancedCopy Manager.
- ETERNUS SF AdvancedCopy Manager Operator's Guide
Describes the operating procedures for ETERNUS SF AdvancedCopy Manager.
A different operator's guide is provided for each supported operating system.
- ETERNUS SF AdvancedCopy Manager GUI User's Guide
Describes the operating procedures for the GUI Client of ETERNUS SF AdvancedCopy Manager.
- ETERNUS SF AdvancedCopy Manager Message Guide
Explains the messages output by ETERNUS SF AdvancedCopy Manager and the associated troubleshooting.
- ETERNUS SF AdvancedCopy Manager Operator's Guide for Cluster Environment
Describes the installation and customization procedures for ETERNUS SF AdvancedCopy Manager in a cluster environment.
- ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option
Describes the operating procedures for tape backup with ETERNUS SF AdvancedCopy Manager.

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

Conventions

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

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Table of Contents

Chapter 1	Overview of AdvancedCopy Manager	1
1.1	What is AdvancedCopy Manager?	2
1.1.1	High-speed backup (24-hour basis)	2
1.1.2	Non-stop backup [database]	2
1.1.3	High-speed replication	2
1.2	Product Configuration of AdvancedCopy Manager	3
1.2.1	Function overview	3
1.2.2	System configuration	6
1.2.3	Combinations of products	7
1.3	Function Overview of AdvancedCopy Manager	8
1.3.1	What is the backup function?	8
1.3.2	What is the replication function?	9
1.3.3	Authentication feature function	9
1.3.4	GUI client	9
1.4	Operating Environment of AdvancedCopy Manager	10
1.4.1	Hardware requirements	10
1.4.2	Software requirements	10
1.5	Managing a Device on AdvancedCopy Manager	12
1.5.1	Normal devices	12
1.5.2	SDX objects of PRIMECLUSTER GDS/SynfinityDISK	13
Chapter 2	Starting and Stopping Daemons	15
2.1	Daemons that Configure AdvancedCopy Manager	16
2.2	Starting a Daemon	17
2.3	Stopping a Daemon	18
Chapter 3	Security Operation Using Authentication Feature	19
3.1	Overview	20
3.2	Access Permission	21
3.3	Setup Procedure	23
3.4	Security Operation in Cluster Configuration	24
Chapter 4	Backup Operations (Normal Transaction Volumes)	25
4.1	Overview	26
4.1.1	Snapshot backup processing	27
4.1.2	Synchronized high-speed backup processing	28
4.1.3	Restoration processing	30
4.2	Operation Setup and Configuration	31
4.2.1	Selecting a server on which the backup operation should be performed	31
4.2.2	Selecting a backup target	32
4.2.3	Configuring a backup policy	33
4.2.4	Preparing a backup volume	33
4.2.5	Preparing the automatic backup operation	35
4.3	Flow of Operation	37
4.4	Preparations	38
4.4.1	Activating daemons	38
4.4.2	Configuring access permission	38
4.4.3	Starting the GUI client	38
4.4.4	Registering a Storage Server	38
4.4.5	Fetching device information on a Storage Server	38
4.4.6	Configuring the environment for a backup operation server	39
4.4.7	Configuring the operation type for a device	39

4.4.8	Configuration options.....	40
4.4.9	Configuring backup policies.....	41
4.4.10	Customizing pre-processing and post-processing scripts.....	42
4.4.11	Preparing a device map file.....	42
4.5	Operation.....	44
4.5.1	Performing the snapshot fast backup.....	44
4.5.2	Performing the synchronized high-speed backup.....	44
4.5.3	Performing data restoration.....	45
4.5.4	Managing a backup history.....	45
4.6	Changing the configuration information.....	47
4.6.1	Adding a device.....	47
4.6.2	Deleting a device.....	47
4.6.3	Adding a Storage Server.....	48
4.6.4	Deleting a Storage Server.....	49
4.7	Stopping the Operation.....	50
4.8	SDX Object Operations.....	51
4.8.1	Units of SDX object operations.....	51
4.8.2	Backup operation in units of logical volumes (method with GDS Snapshot).....	52
4.8.3	Backup operation in units of slices (method without GDS Snapshot).....	57
Chapter 5	Backup Operations (Symfaware).....	61
Chapter 6	Backup Process That Uses the Suspend/Resume Function.....	63
6.1	Overview.....	64
6.2	Backup Operation Design.....	66
6.3	Flow of Operations.....	67
6.4	Preparations.....	68
6.4.1	Configuring up the AdvancedCopy Manager environment.....	68
6.4.2	Configuring Storage Server configuration information.....	68
6.4.3	Configuring device information.....	68
6.4.4	Configuring a backup policy.....	68
6.4.5	Preparing a device map file.....	69
6.5	Backup Operations.....	70
6.5.1	Starting synchronous processing.....	72
6.5.2	Backing up.....	73
6.5.3	Displaying the synchronous processing execution status.....	74
6.5.4	Cancelling synchronous processing.....	75
6.5.5	History management.....	78
6.5.6	Restoring.....	79
Chapter 7	Backup Operation by the QuickOPC Function.....	81
7.1	Overview.....	82
7.2	Configuring Backup Operation.....	84
7.3	Operation Flow.....	85
7.4	Preparation.....	86
7.4.1	Configuring the AdvancedCopy Manager environment.....	86
7.4.2	Configuring the environment for Storage Server.....	86
7.4.3	Configuring the operation type for a device.....	86
7.4.4	Configuring a backup policy.....	87
7.4.5	Preparing a device map file.....	87
7.5	Operation.....	88
7.5.1	Executing backup.....	88
7.5.2	History management.....	90
7.5.3	Restoration.....	91
7.5.4	Canceling restoration.....	92
7.5.5	Displaying the execution status of tracking processing.....	92
7.5.6	Stopping tracking processing.....	93

Chapter 8	Replication.....	95
8.1 Overview.....		96
8.1.1 Snapshot replication processing.....		96
8.1.2 Synchronized replication processing.....		105
8.2 Operational configuration.....		107
8.2.1 Determining the server that performs replication.....		107
8.2.2 Determining a replication target.....		108
8.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication.....		110
8.3 Flow of Operations.....		116
8.4 Preparations.....		117
8.4.1 Starting a daemon.....		117
8.4.2 Starting a GUI client.....		117
8.4.3 Registering a Storage Server.....		117
8.4.4 Fetching device information from a Storage Server.....		117
8.4.5 Configuring the original volume and replica volume.....		118
8.4.6 Customizing pre-processing and post-processing scripts.....		118
8.4.7 Creating groups.....		119
8.5 Operations.....		123
8.5.1 Executing snapshot replication.....		123
8.5.2 Executing synchronized replication.....		134
8.5.3 Backup and restoration using the replication function.....		144
8.5.4 Executing synchronous-type reversal.....		145
8.6 Changing the Configuration Information.....		146
8.6.1 Changing an original volume or replica volume.....		146
8.6.2 Deleting an original volume or replica volume.....		146
8.6.3 Changing the device information of an original or replica volume.....		146
8.7 Stop Replication processing.....		147
8.8 SDX Object Replication.....		148
8.8.1 Operation with Units of the SDX object operation.....		148
8.8.2 Replication operation in units of logical volumes (method with GDS Snapshot).....		148
8.8.3 Replication operation in units of slices (method without GDS Snapshot).....		154
Chapter 9	Configuration Maintenance.....	157
9.1 Maintenance of Database.....		158
9.1.1 Individually backup of databases.....		160
9.1.2 Making a package backup of databases.....		166
9.2 Troubleshooting.....		177
9.2.1 Troubleshooting for insufficient free space in a repository.....		177
9.2.2 Collecting maintenance information.....		181
9.2.3 Troubleshooting a failure when accessing a repository database.....		183
9.3 Troubleshooting for a hardware error, etc. occurring during backup.....		185
9.3.1 Overview.....		185
9.3.2 Troubleshooting.....		185
9.4 Troubleshooting a Hardware Error or Other Error during Replication.....		189
9.4.1 Overview.....		189
9.4.2 Troubleshooting.....		189
9.5 Changing the Operating Environment.....		194
9.5.1 Changing the IP address of a Storage Management Server.....		194
9.5.2 Changing the IP address of a Storage Server.....		195
9.5.3 Changing the port number of a Storage Management Server or Storage Server.....		196
9.5.4 Changing the server name of a Storage Management Server or Storage Server.....		196
9.5.5 Changing the device configuration.....		197
9.5.6 Changing the IP address for web client connection of a Storage Management Server.....		198
9.5.7 Change of deletion/password of the user who specified it as the repository access user....		198
9.5.8 Changing the configuration in a cluster environment.....		198

9.5.8.1	Changing the IP address of a Storage Management Server transaction.....	199
9.5.8.2	Changing the IP address of a Storage Server transaction.....	199
9.5.8.3	Changing the port number of a Storage Management Server transaction or Storage Server transaction.....	200
9.5.8.4	Changing the server name of a Storage Management Server transaction or Storage Server transaction.....	200
9.5.8.5	Deleting a user' s repository access or changing a user' s repository access password.	201
9.5.8.6	Changing the logical node name.....	201
9.5.8.7	Changing the service name.....	203
9.5.8.8	Changing a shared disk for shared data.....	205
9.5.8.9	Changing the repository shared disk.....	207
Chapter 10	Commands	209
10.1	Command list	210
10.2	Backup Management Commands	214
10.2.1	Environment definition commands.....	217
10.2.2	Operation commands.....	227
10.2.3	Maintenance commands.....	257
10.3	Configuration Management Commands	261
10.3.1	Management server information change command (stgcmmodnode)	263
10.3.2	Repository access user change command (stguseraset)	264
10.3.3	GUI connection information configuration command (stgguiipset).....	265
10.3.4	Server information addition command (stgxfwcmaddsrv)	266
10.3.5	Server information change command (stgxfwcmmodsrv)	267
10.3.6	Server information deletion command (stgxfwcmdeletesrv).....	271
10.3.7	Device information collection/display command (stgxfwcmsetdev).....	272
10.3.8	Device information deletion command (stgxfwcmdeledev)	275
10.3.9	Server information display command (stgxfwcmdispsrv).....	276
10.3.10	Device information display command (stgxfwcmdispdev).....	277
10.3.11	Partition information display command (stgxfwcmdisppat).....	280
10.3.12	Environment information display command (stgenvdisp).....	281
10.3.13	Management information package backup server registration/deletion command (stgmgrinfoset).....	286
10.3.14	Management information package backup command (stgmgrinfobkup)	287
10.3.15	Management information package backup status display command (stgmgrinfodisp).....	290
10.3.16	SDX object management unit configuration command (stgxfwcmsetsdx).....	291
10.3.17	Information collection mode configuration command (stgxfwcmsetmode).....	292
10.4	Replication Management Command	294
10.4.1	Environment definition commands.....	296
10.4.2	Operation commands.....	308
10.4.3	Maintenance commands.....	332
10.5	Start/Stop Daemon Commands	334
10.5.1	Starting and stopping the communication daemon.....	334
10.5.2	Starting and stopping the RMI daemon.....	334
10.5.3	Starting and stopping the RDB daemon.....	334
10.5.4	Starting and stopping the authentication daemon.....	335
10.5.5	Starting and stopping AdvancedCopy Manager daemons.....	335
10.6	SnapOPC/SnapOPC+ Support	336
10.6.1	Update volume measurement command (swstestupdate).....	336
10.6.2	Snap Data Volume operation/reference command (swstsdv).....	338
Chapter 11	Notes on Operations	343
11.1	Notes on Backup and Replication Operation	344
11.1.1	General notes.....	344
11.1.2	Notes on the snapshot high-speed backup.....	352
11.1.3	Notes on synchronous high-speed backup.....	352

11.1.4	Notes on restoration.....	352
11.1.5	Notes on SDX object operations (backup management).....	353
11.1.6	Notes on SDX object operations (replication management).....	356
11.1.7	Notes on cluster operation.....	359
11.1.8	Notes on backup operation in cluster operation.....	360
11.1.9	Notes on replication operation in cluster operation.....	362
11.1.10	Notes on using ETERNUS VS900 (virtualization switch).....	365
Appendix A	Pre-processing and Post-processing of Backup and Restoration.....	367
A.1	Overview.....	368
A.2	Pre-processing and Post-processing of Backup.....	369
A.2.1	Pre-processing of backup.....	369
A.2.2	Post-processing of backup.....	372
A.2.3	Customizing the shell script.....	376
A.3	Pre-processing and Post-processing of Restoration.....	378
A.3.1	Pre-processing of restoration.....	378
A.3.2	Post-processing of restoration.....	381
Appendix B	Sample Shell Script for Oracle Integration Backup Operations.....	385
B.1	Overview.....	386
B.2	Backup and Restoration of a Transaction volume.....	387
B.2.1	Backup procedure.....	387
B.2.2	Restoration procedure.....	387
B.3	Sample Shell Scripts.....	388
B.3.1	Overview of sample shell scripts.....	388
B.3.2	Applying the sample shell scripts.....	393
B.3.3	Restore Method.....	394
B.3.4	Notes about using the sample shell scripts.....	394
Appendix C	Pre-processing and Post-processing of Replication.....	397
C.1	Overview.....	398
C.2	Pre-processing and Post-processing of Replication.....	399
C.2.1	Pre-processing and post-processing for a file system.....	399
C.2.2	Pre-processing when replication is executed.....	401
C.2.3	Post-processing when replication is executed.....	407
C.2.4	Customizing the shell script.....	407
Appendix D	System Volume Backup Operation.....	415
Appendix E	Backup Operations Using Power-Saving.....	415
E.1	Overview.....	416
E.2	Structure.....	417
E.3	Operating Environment.....	418
E.4	Environment settings.....	419
E.4.1	Procedure for environment settings.....	419
E.4.2	Settings for an ETERNUS Disk array.....	419
E.4.3	Settings for AdvancedCopy Manager.....	422
E.4.4	Settings for ETERNUS SF Storage Cruiser.....	422
E.5	Operation.....	423
E.5.1	Starting the disk drive.....	423
E.5.2	Performing AdvancedCopy Manager operations.....	423
E.5.3	Stopping the disk drive.....	423

Chapter 1 Overview of AdvancedCopy Manager

This chapter provides an overview of AdvancedCopy Manager.

1.1 What is AdvancedCopy Manager?

AdvancedCopy Manager provides storage management in an open system and includes the following features.

1.1.1 High-speed backup (24-hour basis)

A hardware function called Advanced Copy Function (OPC, EC) of Fujitsu Storage Systems ETERNUS is used to back up data quickly. The Advanced Copy Function provides a fast data copy function regardless of data size. Scheduled or fixed backup times can always be maintained regardless of any increase in the amount of data volume allowing for significant reductions in downtime required for backup.

ACM operations management is seamlessly interfaced with the ORACLE DBMS allowing high-speed backup to be performed without interruption to live processing.

If a database other than Oracle or a general file system is used, the duration for which live processing is interrupted is still significantly reduced.

Using the remote copy function in the ETERNUS storage system, it is also possible to back up to disk array devices at remote locations.

1.1.2 Non-stop backup [database]

Using AdvancedCopy Manager, the Oracle database can be backed up without stopping the application. Please refer to the following for the backup method for Oracle databases:

- "Sample Shell Script for Oracle Integration Backup Operations"

AdvancedCopy Manager can also back up independently of PRIMECLUSTER GDS, including the mirror volume (SDX object) environment.

1.1.3 High-speed replication

The hardware function called Advanced Copy Function [OPC/EC] of the Fujitsu Storage Systems ETERNUS enables data to be used for a variety of purposes, and also allows you to maintain mirrored copies of data for redundancy purposes.

Using the remote copy function in ETERNUS storage system, it is also possible to mirror data on disk array devices at remote locations.

Using a shell script to manage replication for the ORACLE DBMS allows high-speed mirroring without stopping live processing.



Point

As an example for copying Oracle databases, the script created for replication is shown in Sample Shell Script for Oracle Integration Backup Operations.

1.2 Product Configuration of AdvancedCopy Manager

1.2.1 Function overview

AdvancedCopy Manager consists of the following three functions:

Table: Functions

Function name	Description
Manager of AdvancedCopy Manager	Operates on the Storage Management Server, managing two or more Storage Servers. Backup and replication management are performed.
Agent of AdvancedCopy Manager	Operates on the Storage Server with which the storage device is connected. Backup and replication management are performed. This product (Agent) can be managed by a manager of AdvancedCopy Manager running on the Solaris, Windows, or Linux operating systems.
AdvancedCopy Manager GUI client	The GUI client can be made to run in the same way as other applications using the Windows client application that runs on the local computer (client) of the user. The AdvancedCopy Manager environment can be monitored/managed by starting the GUI client and then connecting to the AdvancedCopy Manager Storage Management Server.



Note

- The Manager product includes the Agent function.

The AdvancedCopy Manager server type depends on the operating environment to the extent that not all management functions are supported on all platforms.

- Storage Server

The Agent component of AdvancedCopy Manager is installed on the Storage Server where execution of all the backup, restore and replication operations offered by AdvancedCopy Manager is performed. If a Storage Server is also to be used as the Storage Management Server then the Manager component, will also need to be installed. The Agent is always installed as part of the Manager installation.

- Storage Management Server

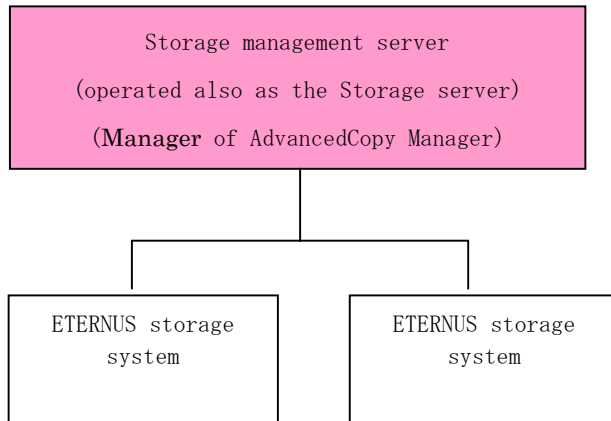
The Manager component of AdvancedCopy Manager is installed on the Storage Management Server which manages the Storage Servers of which only one instance can exist in a single implementation of ACM.

Three typical operating configurations for the AdvancedCopy Manager are demonstrated below:

- When only one Storage Server is installed

In this configuration, only the Manager of AdvancedCopy Manager needs to be installed as the Manager of AdvancedCopy Manager includes the Agent functions of AdvancedCopy Manager.

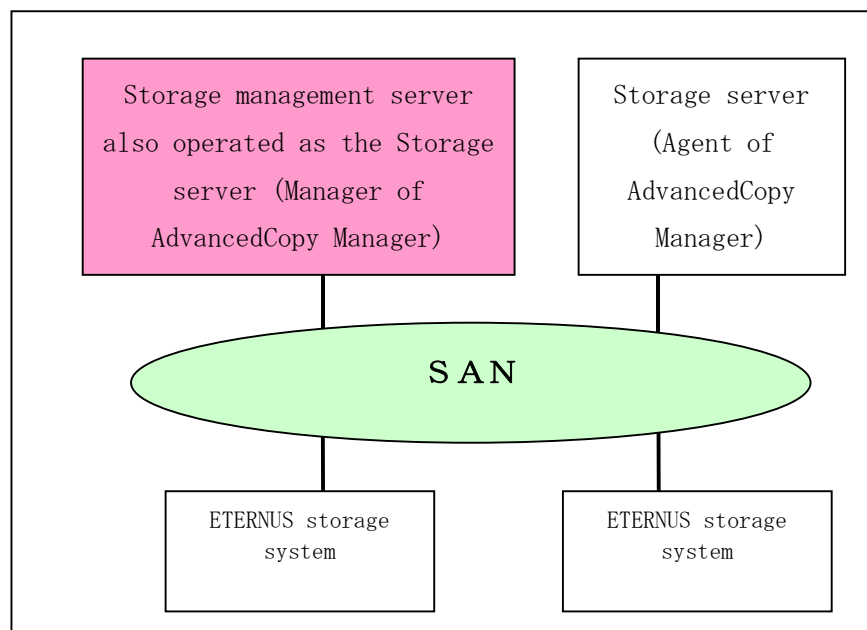
Figure: When only one Storage Server is installed



- When two or more Storage Servers exist.
When two or more AdvancedCopy Manager servers are available, configure only one of them as the Storage Management Server, or set up a new server with no disk drive connected as the Storage Management Server.
Each configuration is explained below.

- a. When the Storage Server operates as a Storage Management Server
One of the servers functions as a Storage Management Server. The Storage Management Server has a repository where management information for all Storage Servers is stored.
When multiple Storage Servers exist, they all compete for access to the repository. This will affect the performance of other applications running on to the same server. Therefore, the Storage Management Server should ideally be a dedicated server with no Storage Server roles.
When the Storage Server is also used as a Storage Management Server, it has the following configuration:

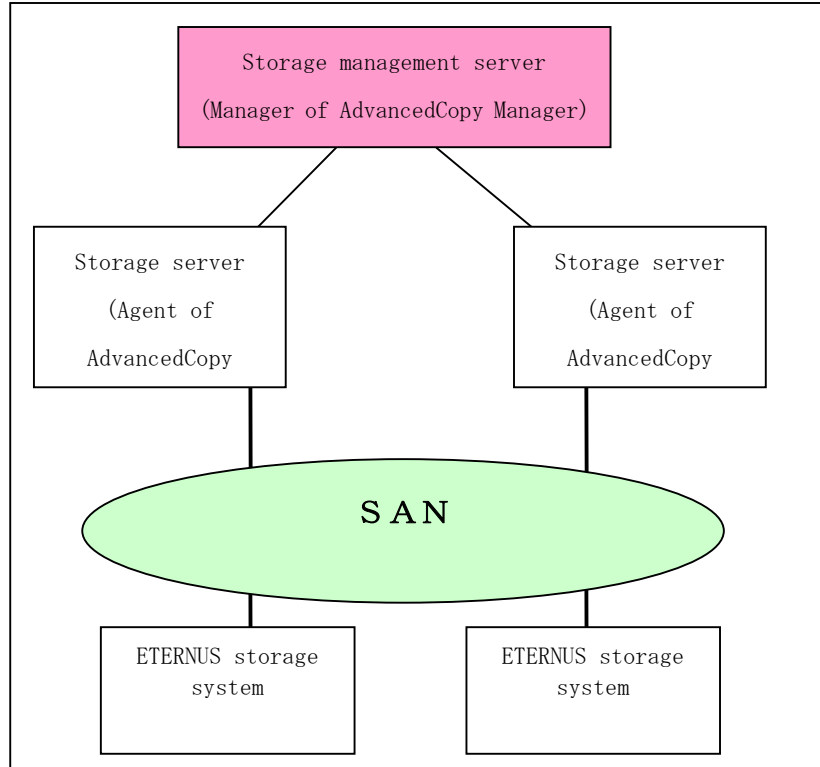
Figure: When the Storage Server is also operated as a Storage Management Server



Setting up the special Storage Management Server

This setup comprises two or more Storage Servers with a dedicated Storage Management Server.

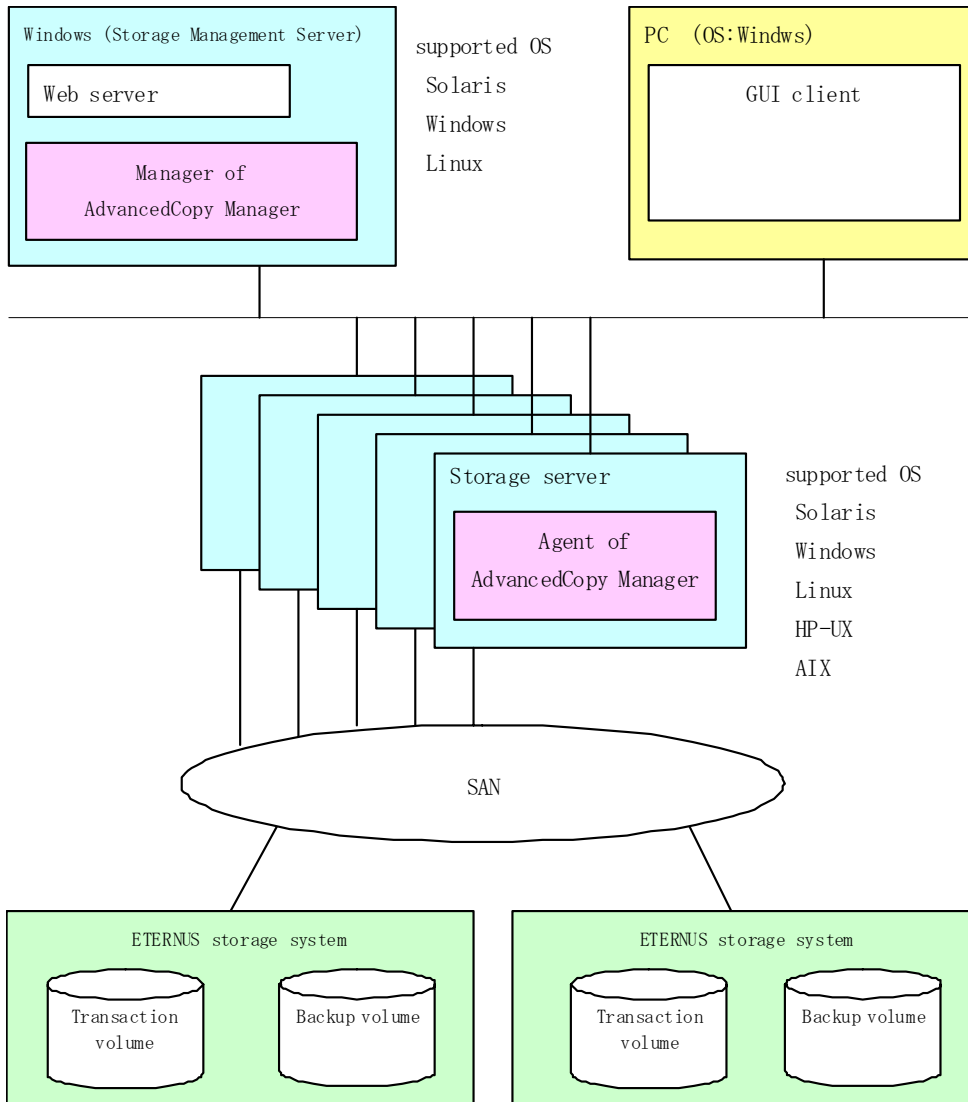
Figure: When a dedicated Storage Server is a Storage Management Server



1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

Figure: System configuration of Storage Management Server and two or more Storage Servers



1.2.3 Combinations of products

The following combinations of product levels of the AdvancedCopy Manager Agent and Manager can be used on different platforms.

Table: Combinations of products

		Agent platform (Storage Server)															
		Solaris			Windows			Linux			HP			AIX			
		10. x	11. x	13. x	V10.0 Lxx	V11.0 Lxx	13. x	V10.0 Lxx	V11.0 Lxx	13. x	10. x	11. x	13. x	10. x	11.0	13. x	
Manager platform (Storage Management Server)	Solaris	10. x	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		11. x	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13. x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A
	Windows	V10.0Lx x	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lx x	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13. x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A
	Linux	V10.0Lx x	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lx x	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13. x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A

A : Compatible

B : Compatible (However, any function supported since the version of the Storage Server is unusable.)

C : Incompatible



Note

- There is some differences in functionality at some product levels, therefore installation of the manager and agent of the same version at least level is recommended.
- The following restrictions apply to combinations of Manager and Agent products at different revision levels:
 - If the Manager is a more recent level than the Agent
Compatibility is possible (but functions supported by levels later than that of the Storage Server cannot be used)
 - If the Agent is a newer level than the Manager
It is incompatible
- The versions of Softek AdvancedCopy Manager are listed in "Table: Combinations of products" as 10. x, 11. x, V10.0Lxx, V11.0Lxx.

1.3 Function Overview of AdvancedCopy Manager

1.3.1 What is the backup function?

The backup function of AdvancedCopy Manager provides operational management for high speed backup using the OPC (One Point Copy), ROPC (Remote One Point Copy), EC (Equivalent Copy), and REC (Remote Equivalent) features of a Fujitsu Storage Systems ETERNUS.

The following sub sections provide more information about backup.

High-speed backup operation

The advanced copy function (OPC/EC function) of the disk array unit is used to perform high speed backup between volumes regardless of volume capacities. This function greatly reduces the impact of a backup operation.

Faster backups can be made by performing update differential copies using the Advanced Copy function.

Backup operation in for Oracle DBMS (sample shell scripts)

The following sample shell scripts support AdvancedCopy Manager commands in use with Oracle environments:

- Acquisition of DBMS (Oracle) resource information
- Synchronization with DBMS (Oracle) and volume duplication

The following functions allow you to manage the backup.

Policy management function

The policy management function manages the number of backup preservation generations and the frequency intervals (in days). Any delays as determined against the frequency interval for scheduled backups are alarmed in a display of volume information.

Storage configuration management function

The storage configuration management function manages the configurations of live source volumes and backup destination volumes.

AdvancedCopy Manager refers to a resource to be backed up as a transaction volume and a volume to which a backup should be saved is called a backup destination volume.

Backup and restore functions

The backup and restore functions back up and restore a specified volume.



Note

Backup using ROPC/REC is limited to disk array devices within the same Storage Server that support ROPC/REC.

History information management function

The history information management function manages, the information in preserved backup generations using previously backed up data.

Consistency recovery function

The consistency recovery function resolves inconsistencies in the AdvancedCopy Manager backup management information caused by a system or other type of failure.

1.3.2 What is the replication function?

The replication function of AdvancedCopy Manager provides operational management of data replication using the OPC (One Point Copy), ROPC (Remote One Point Copy), EC (Equivalent Copy), and REC (Remote Equivalent) features of a Fujitsu Storage Systems ETERNUS.

Replication features include:

High-speed replication operation

The advanced copy function of the disk array unit (for example, OPC/EC function) is used to perform high speed replication between volumes regardless of volume capacities. This function greatly reduces the impact of a replication operation in terms of downtime or system load. Faster backups can be made by performing differential updating of copies using Advanced Copy functionality.

Consistency recovery function

The consistency recovery function resolves inconsistencies in the management information caused by a system or other failure.

Main differences with backup function

While the backup function offers policy and history management, these features are not available using the replication function.

1.3.3 Authentication feature function

The GUI client provided by AdvancedCopy Manager can be used to manage users who have access to the system. This allows the configuration of secure operations that specify the functions each user can access. Refer to "Security Operation Using Authentication Feature" for more information.

1.3.4 GUI client

The following functionality is available using a GUI client:

- Security management
Functionality management for each user can be set up using the GUI client.
- Backup management
Backup Management tasks such as defining a server or a device, backup, restore) can be performed using a GUI client.
- Replication management
AdvancedCopy Manager replication management tasks, such as defining volumes and executing replications can be performed using the GUI client.

A GUI client can be used to access the Management Server. The AdvancedCopy Manager GUI client must be installed as the GUI client. For details, refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide".

Backup management and replication management can also be performed at the command line as well as the GUI client.

For more information on the GUI client, see "GUI Client" in the "ETERNUS SF AdvancedCopy Manager GUI client User's Guide".

1.4 Operating Environment of AdvancedCopy Manager

1.4.1 Hardware requirements

One of the following hardware devices is required to perform backup management or replication management. In addition, an advanced copy license and a suitable cache table size need to be configured. The settings required for the provided advanced copy functions differ for each hardware device, so check the required settings with your Fujitsu systems engineer (SE).

- ETERNUS2000 disk array unit (model 100 or higher)
- ETERNUS3000 disk array unit (model 100 or higher)
- ETERNUS4000 disk array unit (model 100 or higher)
- ETERNUS6000 disk array unit
- ETERNUS8000 disk array unit
- ETERNUS GR720 disk array unit
- ETERNUS GR730 disk array unit
- ETERNUS GR740 disk array unit
- ETERNUS GR820 disk array unit
- ETERNUS GR840 disk array unit
- ETERNUS VS900 virtualization switch



Note

If ETERNUS VS900 is used

If ETERNUS VS900 is used, refer to “Notes on using ETERNUS VS900 (virtualization switch)” .

1.4.2 Software requirements

1.4.2.1 Manager of AdvancedCopy Manager

The following table lists the software requirements for Manager of AdvancedCopy Manager.

Table: Software requirements for Manager of AdvancedCopy Manager

Product name	Requirement	Remarks
Red Hat Enterprise Linux AS (v.3 for x86)	Required	Support OS
Red Hat Enterprise Linux ES (v.3 for x86)		
Red Hat Enterprise Linux AS (v.4 for x86)		
Red Hat Enterprise Linux ES (v.4 for x86)		
Red Hat Enterprise Linux AS (v.4 for EM64T)		
* Operates in 32-bit compatible mode		
Red Hat Enterprise Linux ES (v.4 for EM64T)		
* Operates in 32-bit compatible mode		
Red Hat Enterprise Linux AS (v.4 for Itanium)		
Red Hat Enterprise Linux 5 (for x86)		
Red Hat Enterprise Linux 5 (for Intel64)		
* Operates in 32-bit compatible mode		
Red Hat Enterprise Linux 5 (for Intel Itanium)		

Product name	Requirement	Remarks
PRIMECLUSTER 4.1A20 or later	Conditionally required	For cluster operation with Manager of AdvancedCopy Manager
GR multipath driver (GRMPD) 1.0 for Linux	Conditionally required	For multipath disk control and path load balancing
ETERNUS multipath driver	Conditionally required	For multipath disk control and path load balancing
PRIMECLUSTER GDS Snapshot 4.1A30 or later	Conditionally required	When the Storage Management Server also operates as the Storage Server, and when backups or replications are used with GDS Snapshot.

1.4.2.2 Agent of AdvancedCopy Manager

Table: Software requirements for Agent of AdvancedCopy Manager

Product name	Requirement	Remarks
Red Hat Enterprise Linux AS (v.3 for x86)	Required	Support OS
Red Hat Enterprise Linux ES (v.3 for x86)		
Red Hat Enterprise Linux AS (v.4 for x86)		
Red Hat Enterprise Linux ES (v.4 for x86)		
Red Hat Enterprise Linux AS (v.4 for EM64T) *For use with 32-bit compatibility modes		
Red Hat Enterprise Linux ES (v.4 for EM64T) *For use with 32-bit compatibility modes		
Red Hat Enterprise Linux AS (v.4 for Itanium)		
Red Hat Enterprise Linux (v.5 for x86)		
Red Hat Enterprise Linux (v.5 for EM64T) ※ For use with 32-bit compatibility modes		
Red Hat Enterprise Linux (v.5 for Intel Itanium)		
PRIMECLUSTER 4.1A20 or later	Conditionally required	For cluster operation with Agent of AdvancedCopy Manager
GR multipath driver (GRMPD) 1.0 for Linux	Conditionally required	For multipath disk control and path load balancing
ETERNUS multipath driver	Conditionally required	For multipath disk control and path load balancing
PRIMECLUSTER GDS Snapshot 4.1A30 or later	Conditionally required	When backups or replications are used with GDS Snapshot.

1.4.2.3 GUI client

In order to use the AdvancedCopy Manager GUI client, the conditions described in "Supported Environment" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" must be met.

1.5 Managing a Device on AdvancedCopy Manager

1.5.1 Normal devices

The following devices are supported in backup and replication management.

- sd driver resources
- MPHD resources
- MPLB resources

Moreover, the unit of management is a disk partition unit or a Logical Unit (disk) unit. AdvancedCopy Manager uses the following device names for ordinary devices:

- The device name set during Linux OS startup (compatible device name)
Example: /dev/sda1 (for disk partition units)
Example: /dev/sda (for Logical Unit units)
- The device name generated by the Linux OS udev facility (udev device name)
Example: /dev/disk/by-id/xxxxxxx (for disk partition units)
Example: /dev/disk/by-id/xxxxxxx (for Logical Unit units)
(xxxxxxx is the information generated from the identification information set in the disk.)
Example: /dev/disk/by-path/yyyyyyy (for disk partition units)
Example: /dev/disk/by-path/yyyyyyy (for Logical Unit units)
(yyyyyyy is the information generated from the disk location information.)

The udev device name takes priority and is used in environments that have udev device names. The by-id name and by-path name can be used in udev device names, but the by-id name takes priority and is used in environments that have both by-id names and by-path names. If the environment contains udev device names but you want to use the compatible device names for operations, then before the device information collection and reflection processing is performed, you must change the information collection mode so that udev device names are not used.

Refer to the "Information collection mode configuration command (stgxfwcmsetmode)" for details.



Note

Refer to "Notes on executing Logical Unit (disk) unit copy" if operation is in Logical Unit (disk) units.



Note

If udev device names are used in an environment in which ETERNUS multi-path drivers are installed, configure them so that by-id names are used.
If by-id names are not generated, change the settings so that by-id names are generated.



Note

Note the following if udev device names are used in an environment in which ETERNUS multi-path drivers are not installed:
The udev device name may change if by-id is used and disks are exchanged, or if by-path is used and the connection configuration is changed. If the udev device name has been changed, the steps described in "Changing the device configuration" are required.

1.5.2 SDX objects of PRIMECLUSTER GDS/SynfinityDISK

The main function of PRIMECLUSTER GDS (hereafter referred to as GDS)/SynfinityDISK is to mirror disk units.

AdvancedCopy Manager can back up and replicate the SDX objects of GDS/SynfinityDISK.

SDX objects are virtual resources managed by GDS/SynfinityDISK, and they include classes, groups, disks, volumes, and slices.

AdvancedCopy Manager can back up and replicate SDX objects in units of logical volumes or slices.

The format of the device name that is specified in AdvancedCopy Manager for the logical volume unit and the slice unit is different, as follows:

- Logical volume unit operations
/dev/sfdsk/(class name)/dsk/(volume name)
- Slice unit operations
/dev/sfdsk/(class name)/dsk/(volume name):(the device name used for volume configuration)

Either of the following is used as the device name for volume configuration:

- sdxinfo DEVNAM values

Example: sda

- The device name generated by the facility indicated by the sdxinfo DEVNAM value (udev device name)

Example: /dev/disk/by-id/xxxxxxx

(xxxxxxx is the information generated from the identification information set in the disk)

Example: /dev/disk/by-path/yyyyyyy

(yyyyyyy is the information generated from the disk location information.)

The udev device name takes priority and is used in environments that have udev device names. The by-id name and by-path name can be used in udev device names, but the by-id name takes priority and is used in environments that have both by-id names and by-path names.

If the environment contains udev device names but you want to use the the sdxinfo DEVNAM value for operations, then before the device information collection and reflection processing is performed, you must change the information collection mode so that udev device names are not used.

Refer to the "Information collection mode configuration command (stgxfwcmsetmode)" for details.

Example: When the class name is 'class1', the volume name is 'volume1', the sdxinfo DEVNAM value is 'sda', and the udev device name indicated by sda is /dev/disk/by-id/SFUJITSU_MAP3367NC_UPP4P4307J95

- Logical volume unit operations
/dev/sfdsk/class1/dsk/volume1
- Slice unit operations (the sdxinfo DEVNAM value)
/dev/sfdsk/class1/dsk/volume1:sda
- Slice unit operations (the udev device name)
/dev/sfdsk/class1/dsk/volume1:/dev/disk/by-id/SFUJITSU_MAP3367NC_UPP4P4307J95



Note

To use the udev device name in an environment in which the ETERNUS multi-path driver is installed, enable use of the by-id name.

If the by-id name has not been generated, modify the settings so that it is generated.



Note

Note the following points when using the udev device name in an environment in which the ETERNUS multi-path driver is not installed.

- The udev device name may change if by-id is used and disks are exchanged, or if by-path is used and the connection configuration is changed. If the udev device name has been changed, perform the steps described in "Changing the device configuration".



Note

- PRIMECLUSTER GDS 4.1A30 or later and PRIMECLUSTER GDS Snapshot 4.1A30 or later are required to perform separate operations for each logical volume.
- It is not possible to operate in units of logical volumes and units of slices at the same time on a single Storage Server. For cluster operations, each Storage Server transaction can operate in either logical volume units or slice units.

For details on backup of SDX objects, refer to "SDX Object Operations". For details on replication of SDX objects, refer to "SDX Object Operations".

Chapter 2 Starting and Stopping Daemons

This chapter explains how to activate and stop different daemons provided by AdvancedCopy Manager.

For more information on how to activate and stop the daemons described in this chapter, see "Start/Stop Daemon Commands."

2.1 Daemons that Configure AdvancedCopy Manager

Manager of AdvancedCopy Manager is configured with the following daemons:

Table: Types of daemons that configure Manager of AdvancedCopy Manager

Daemon type	Description
The communication daemon	Communicates with the Storage server
The RMI daemon	Manages the GUI display
The RDB daemon	Accesses the repository
The authentication daemon	Manages the authentication feature

Agent of AdvancedCopy Manager is configured with the following daemons:

Table: Types of daemons that configure Agent of AdvancedCopy Manager

Daemon type	Description
The communication daemon	Communicates with the Storage management server and other storage servers

When the storage management server is in cluster operation, the following daemons compose storage management server transactions:

Table: Types of daemons used for storage management server transactions

Daemon type	Description
Transaction-intended communication daemon	Daemon for communication with storage servers
RMI daemon	Daemon for controlling GUI windows
RDB daemon	Daemon for accessing the repository
Authentication daemon	Daemon for controlling the authentication mechanism

The following daemon composes a AdvancedCopy Manager agent:

Table: Type of daemon using for storage server transactions

Daemon type	Description
Transaction-intended communication daemon	Daemon handling communication with storage management servers and other storage servers



Note

The Communication daemon (local daemon) cannot be used for a storage management server transaction or storage server transaction.

2.2 Starting a Daemon

A daemon must be running on both a Storage management server and a Storage server.
If for whatever reason a daemon stops, the daemon must be restarted on each server.

```
# /opt/swstorage/bin/startacm
```



Note

- Before executing the startacm command, confirm that the SWSTGNODE environment variable is not defined.

When the storage management server or storage server is in cluster operation, start up the daemon(s) from the cluster system. For the start procedure, see the relevant cluster software manual.



Note

To start the daemon separately for certain AdvancedCopy Manager transactions follow the steps described below:

- Communication daemon:
You must start the daemon for each AdvancedCopy Manager transaction (including storage local transactions using the following procedure for the respective transactions.
 - 1) Execute the following command on the command line:

```
# ps -elf | grep stgxfws
```

Confirm that command execution does not display:

```
/opt/FJSVswstf/bin/stgxfws logical-node-name
```

If the message above is displayed, the daemon has already started.

- 2) For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.
 - 3) Start the communication daemon.
For the startup command, see "Start/Stop Daemon Commands".
- For daemons other than the communication daemon:
Start the daemon by referencing "Start/Stop Daemon Commands". However, you must specify the logical node name in environment variable SWSTGNODE, and then execute the daemon startup command.

2.3 Stopping a Daemon

Stop daemons from the Storage management server and the Storage server. Normally, they are automatically stopped on system shutdown.

To stop a daemon on a server, execute the following command on the server:

```
# /opt/swstorage/bin/stopacm
```



Note

- Before executing the stopacm command, confirm that the SWSTGNODE environment variable is not defined.

When the storage management server or storage server is in cluster operation, stop the daemon(s) from the cluster system. For the stop procedure, see the relevant cluster software manual.



Note

To stop the daemon separately on AdvancedCopy Manager transactions follow the steps described below.

- Communication daemon:

You must stop the daemon in each AdvancedCopy Manager transaction (including storage local transactions) using the following procedure for the respective transactions.

- 1) Execute the following command on the command line:

```
# ps -elf | grep stgxfws
```

Confirm that command execution displays:

```
/opt/FJSVswstf/bin/stgxfws logical-node-name
```

If the message above is not displayed, the daemon has already stopped.

- 2) For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.
- 3) Stop the communication daemon.
For the stop command, see "Start/Stop Daemon Commands".



Note

Terminating the communication daemon, may take up to 10 seconds to complete successfully.

- For daemons other than the communication daemon:
Stop the daemon by referencing "Start/Stop Daemon Commands". However, specify the logical node name in environment variable SWSTGNODE, and then execute the daemon stop command.

Chapter 3 Security Operation Using Authentication Feature

This chapter describes the security operation using the authentication feature provided by AdvancedCopy Manager.

3.1 Overview

AdvancedCopy Manager provides features for backup management, and replication management or operation. If any of the features is incorrectly used, the operation may stop.

Thus, AdvancedCopy Manager's GUI client provides a function of setting access permissions for each user on the backup operation and the replication operation (authentication feature). Use this function to provide security of the backup operation.

On AdvancedCopy Manager the user name and password must be as follows:

- A user name consists of two to eight alphanumeric characters (The colon symbol cannot be used.)
- The password for the user name consists of up to 28 alphanumeric characters.

3.2 Access Permission

The following table shows access permissions that can be specified on AdvancedCopy Manager.

Table: Access permissions on AdvancedCopy Manager

Access permission	Description
Write permission	Allows you to change the configuration information (such as policy information) and perform a series of storage operations. A write permission includes execute and read permissions.
Execute permission	Allows you to perform a series of storage operations and read information. An execute permission includes a read permission.
Read permission	Allows you only to read information.

The following table shows the GUI client operations available, according to user access permissions.

Table: GUI client operations according to user access permissions

Operation name	Write permission	Execute permission	Read permission
Server information display	Yes	Yes	Yes
Device information display	Yes	Yes	Yes
Partition information display	Yes	Yes	Yes
Columns	Yes	Yes	Yes
Refresh	Yes	Yes	Yes
List Devices Using the Same Copy Area	Yes	Yes	Yes
Add Server	Yes	No	No
Update Server	Yes	No	No
Delete Server	Yes	No	No
Refresh Server	Yes	No	No
Refresh Device	Yes	No	No
Delete Device	Yes	No	No

Yes: Enabled No: Disabled



Note

The GUI client access permissions are determined by the logical sum of the access permissions for the backup management function and the replication management functions.

The following table shows the backup management functionality available according to access permissions.

Table: Backup management functionality according to access permissions

Operation name	Write permission	Execute permission	Read permission
Window display	Yes	Yes	Yes
Backup	Yes	Yes	No
Restoration	Yes	Yes	No
Recovery	Yes	Yes	No
Delete History	Yes	Yes	No
Start Backup Synchronization processing	Yes	Yes	No
Cancel Backup synchronization processing	Yes	Yes	No
Match Resources	Yes	Yes	No
Set Backup Policy	Yes	No	No
Delete Backup Policy	Yes	No	No
Set Device Information	Yes	No	No
Set Storage Server Configuration Information	Yes	No	No

Yes: Enabled No: Disabled

The following table shows the replication management operations that are made available for each of the access permissions.

Table: Replication management functionality according to access permissions

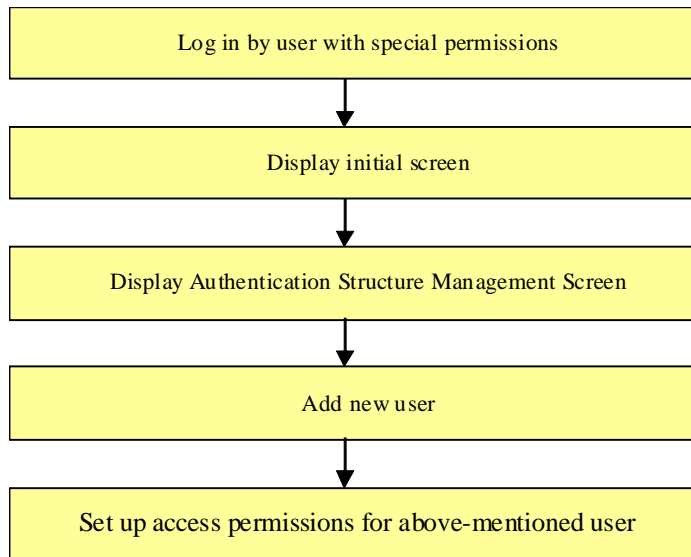
Operation name	Write permission	Execute permission	Read permission
Window display	Yes	Yes	Yes
Transfer Buffer Status	Yes	Yes	Yes
Start Synchronous Processing	Yes	Yes	No
Change Synchronization Mode	Yes	Yes	No
Replicate	Yes	Yes	No
Cancel Replication Processing	Yes	Yes	No
Reverse Synchronous Processing Direction	Yes	Yes	No
Perform Resource Adjustment	Yes	Yes	No
Set Replication Volume Information	Yes	No	No
Delete Replication Volume Information	Yes	No	No
Change Buffer Setting	Yes	No	No

Yes: Enabled No: Disabled

3.3 Setup Procedure

This section describes how to perform the security operation on AdvancedCopy Manager. Refer to "Management of User Accounts and Permissions" in the "ETERNUS SF AdvancedCopy Manager GUI Manual" for details on set up.

Diagram: Security Setup Flow



Point

If the user is not a privileged user (root), the toolbar for [User Accounts] in the File menu will be disabled.

3.4 Security Operation in Cluster Configuration

The following points are specific to using an authentication mechanism in a cluster system:

- Set the same account information (e.g., user accounts, passwords, groups) to the primary node and secondary node.
- To transfer authentication information to a Storage Management Server in non-cluster operation, take the following steps:
 - 1) Before canceling the cluster configuration of the Storage Management Server transaction, execute the `/opt/FJSVswssc/bin/smmkbat` command on the primary side of the Storage Management Server transaction to extract the definition information. Execute the command with root or superuser permission. The information is extracted as a shell script enumerating commands that reflect the definition information.

```
/opt/FJSVswssc/bin/smmkbat -f definition-information-output-shell-script
```

- 2) On the Storage Management Server, execute the cluster setup command of AdvancedCopy Manager to cancel the cluster configuration.
- 3) On the Storage Management Server, run the definition information output shell script extracted. Run the script with root or superuser permission.

Chapter 4 Backup Operations (Normal Transaction Volumes)

This chapter explains backup operations for normal transaction volumes of AdvancedCopy Manager.

4.1 Overview

This chapter describes the backup and restore functions of AdvancedCopy Manager.

AdvancedCopy Manager performs high-speed backup between volumes, regardless of the volume capacities, using the advanced copy function (OPC or EC function) of a disk array unit. Backup that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of an ETERNUS storage system disk array unit is called snapshot fast backup. Backup that uses the Equivalent Copy (EC) or Remote Equivalent Copy (REC) function is called synchronized high-speed backup.

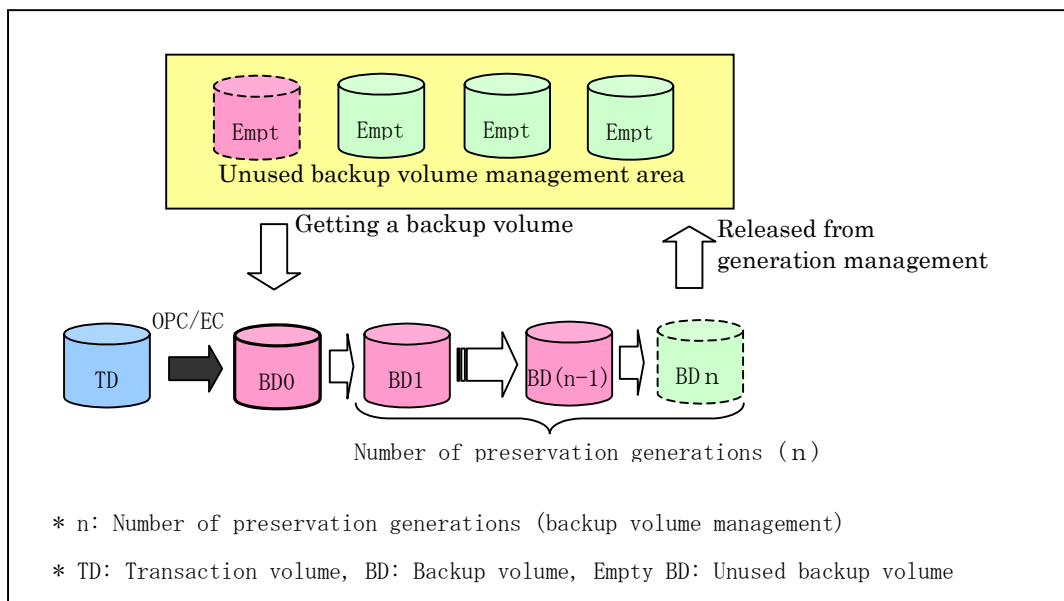
Automatic snapshot backup can be scheduled without first estimating the time required because it does not require backup synchronous processing. Note, however, that when the save number is 1, a state in which there is no backup data may occur, because a snapshot backup deletes the history prior to copy processing.

As synchronized high-speed backup deletes the history after backup processing completes, there is no status in which backup data does not exist even though the generation number is 1. However, synchronized high-speed backup requires one more backup volume than snapshot fast backup and, as it requires synchronized backup pre-processing before the backup execution command is invoked, execution of automatic synchronized high-speed backup must be scheduled so that the time required for synchronized processing is estimated in advance. Synchronized backup processing is then started based on the estimated time, and the backup execution command is entered after equivalency maintenance status has been achieved. When backing up an Oracle database, it is performed with the sample script which AdvancedCopy Manager offers, to enable on-line backup to be performed.

AdvancedCopy Manager automatically manages and selects a resource to be used for backup (a backup volume).

AdvancedCopy Manager also manages the backup carriers and generations and allows you to restore data from the latest or other past generations.

Figure: Managing a backup volume



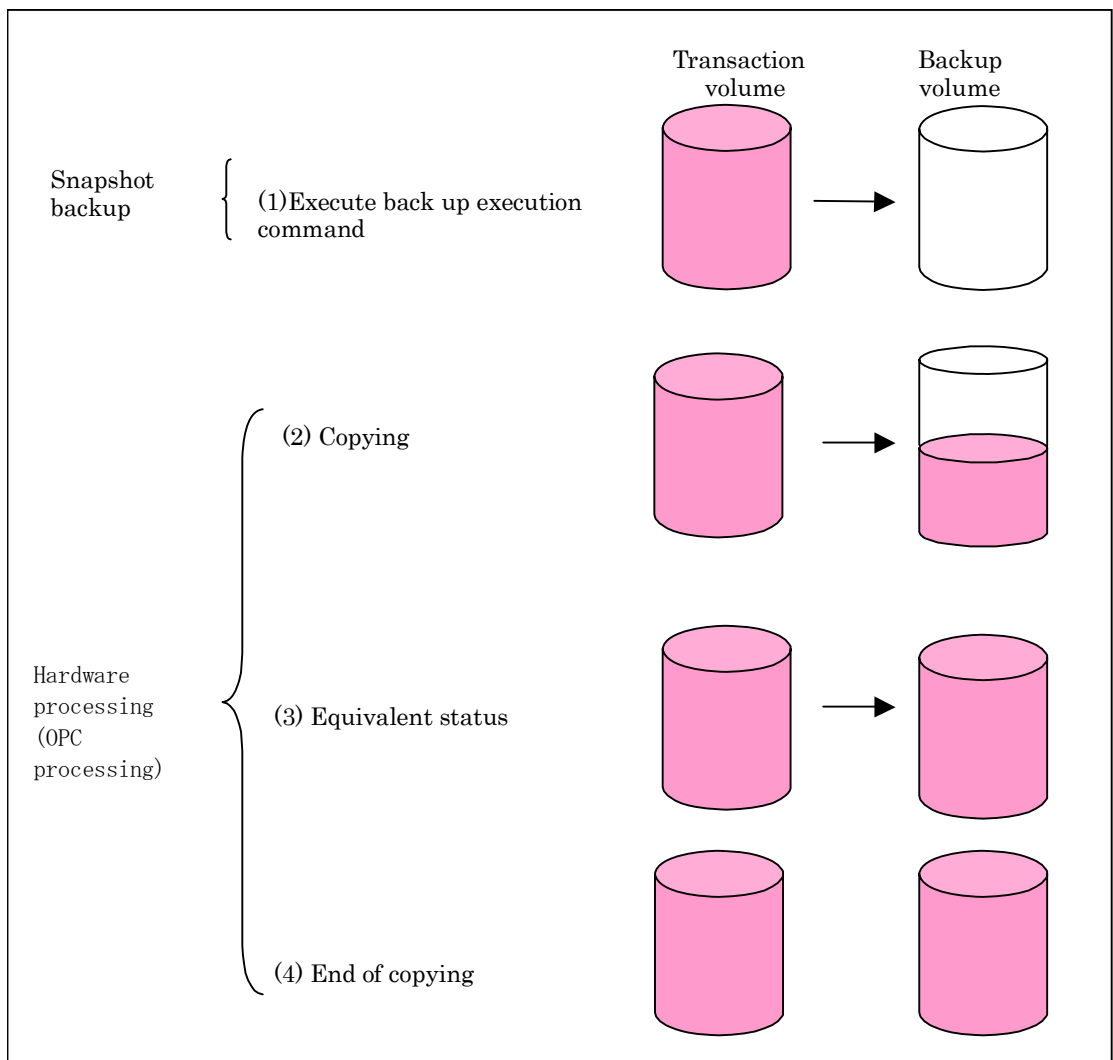
4.1.1 Snapshot backup processing

The OPC (One Point Copy)/ROPC (Remote One Point Copy) function of the disk array unit ETERNUS storage system is used to copy data from a transaction volume to an unused backup volume.

The snapshot fast backup performs processing as follows:

1. Execute the backup execution command (swstbackup) ((1) in the figure below). The following processing will be performed:
 - If backup volumes under generation management exist for all the generations, the oldest backup volume will be assumed to be an unused backup volume.
 - An unused backup volume will be acquired from the unused backup volume management area.
2. Data on the transaction volume will be copied to the selected unused backup volume ((2) to (4) in the figure below).
3. Backup carrier information will be set.

Figure: Snapshot fast backup processing



The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC hardware function of the disk array unit of the ETERNUS storage system.

Using the QuickOPC function in the snapshot high-speed backup, physically copying only the data differences from the start of the previous backup can create a complete snapshot image, which can greatly reduce the time taken for physical copying.

For information on the QuickOPC function, see "Backup Operation by the QuickOPC Function".



Note

- If all generations of backup volumes are managed, and if no backup volume can be obtained from the unused region in the backup volume management area, backup copies cannot be created.
- Backup using ROPC/REC is limited to disk array devices within the same Storage Server that support ROPC/REC.

4. 1. 2 Synchronized high-speed backup processing

The Equivalent Copy (EC) or The Remote Equivalent Copy (REC) function of the ETERNUS storage system of disk array units is used to copy data from a transaction volume to an unused backup volume.

To perform Synchronized high-speed backup take the following steps:

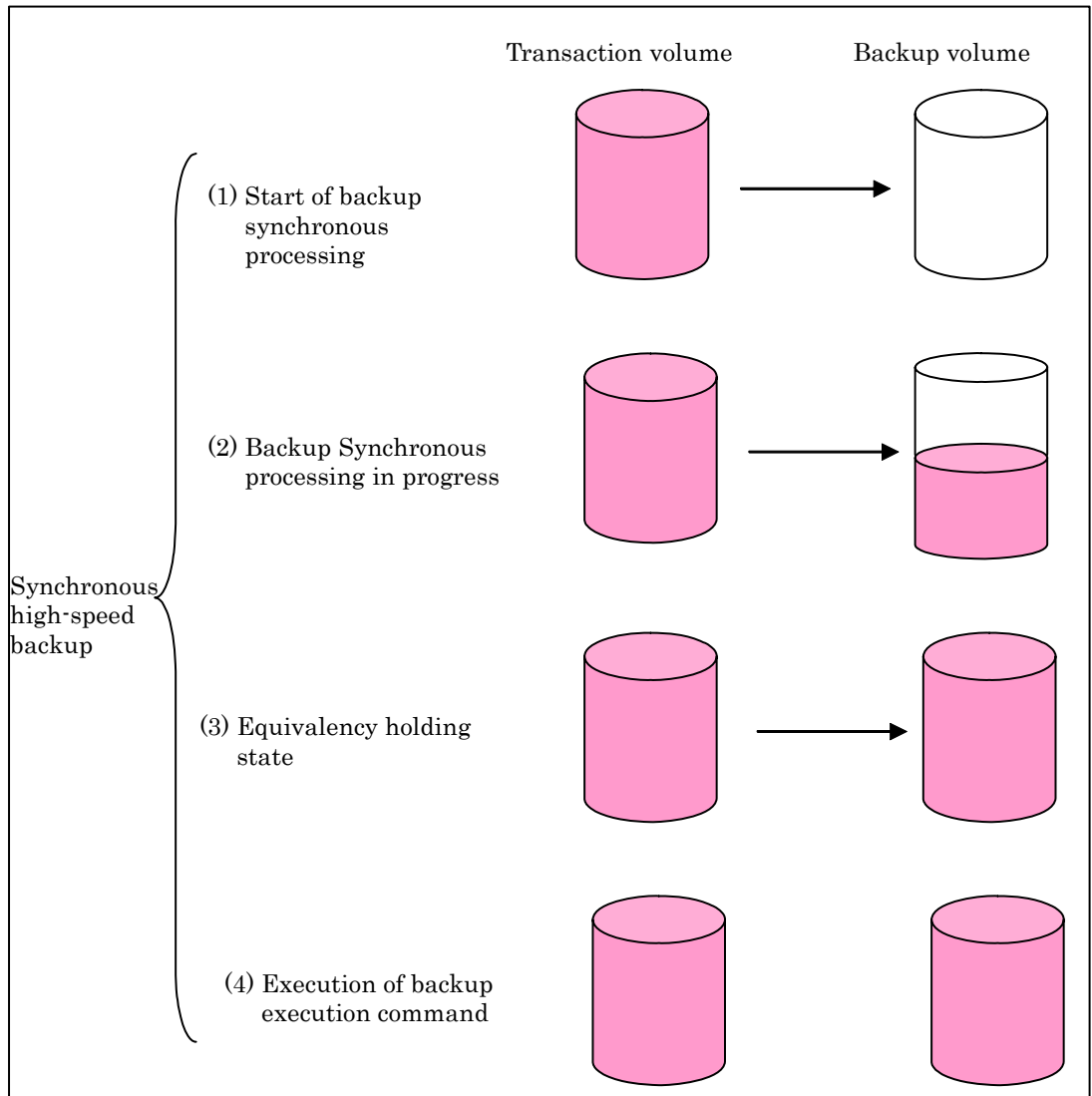
1. Execute the backup synchronous processing start command (swststartsync) ((1) in the figure below). An unused backup volume with the same capacity as the transaction volume is selected from the unused backup management area, and the synchronized backup processing starts.
2. The transaction and backup volumes are both placed in an equivalent status. From this point on, equivalence between the transaction volume and backup volume is maintained. This status is referred to as equivalency maintenance status ((3) in the figure below).
3. Execute the backup execution command (swstbackup) ((4) in the figure below). The backup synchronization processing stops and the backup history information is set.
4. When the generation number of the newly backed up data exceeds the number of generations of backup history being kept, the oldest backup volume is treated as an unused backup volume. Redundant history data is deleted, the unused backup volume is overwritten with the new data and the new history data is saved.



Note

The backup execution command cannot be executed before the transaction and backup volumes have attained equivalency maintenance status.

Figure: Backup using the synchronized high-speed backup function



During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. Consequently, the synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

For information on the Suspend/Resume function, see "Backup Operation That Uses the Suspend/Resume Function".



Note

- If all generations of backup volumes are managed, and if no backup volume can be obtained from the unused region in the backup volume management area, backup copies cannot be created.
- Backup using ROPC/REC is limited to disk array devices within the same Storage Server that support ROPC/REC.

4. 1. 3 Restoration processing

This section describes how data is restored in AdvancedCopy Manager.

The restoration operation refers to restoring data from a backup volume managed by the backup carrier information to a transaction volume and uses the OPC function provided by the disk array unit to restore data from a backup volume to a transaction volume.

If the data on a backup volume under carrier management is restored to a transaction volume, the carrier management information will not change.

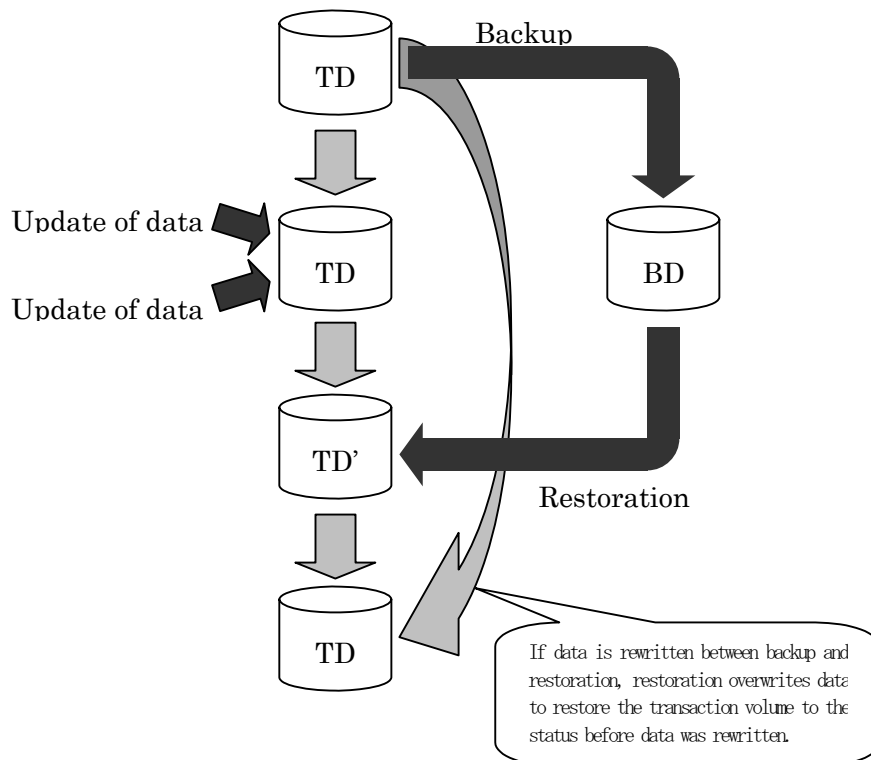
Restoration processing is performed to the transaction volume that was the backup source. However, it is also possible to change the restore destination



Note

If the contents of a transaction volume are rewritten in the period between collection of the latest backup volume and a subsequent restore operation, the accuracy of the rewritten data cannot be guaranteed.

Figure: Notes on restore operations in AdvancedCopy Manager



TD: Transaction volume

BD: Backup volume

4.2 Operation Setup and Configuration

This chapter describes the backup operation on AdvancedCopy Manager.

Design a backup operation as follows:

- Selecting a server on which the backup operation should be performed
- Selecting a backup source target
- Selecting a backup policy
- Preparing a backup volume
- Preparing the automatic backup operation

4.2.1 Selecting a server on which the backup operation should be performed

Determine the server that will be used to perform backup.

The following servers can be used to perform backup:

- Storage Management Server

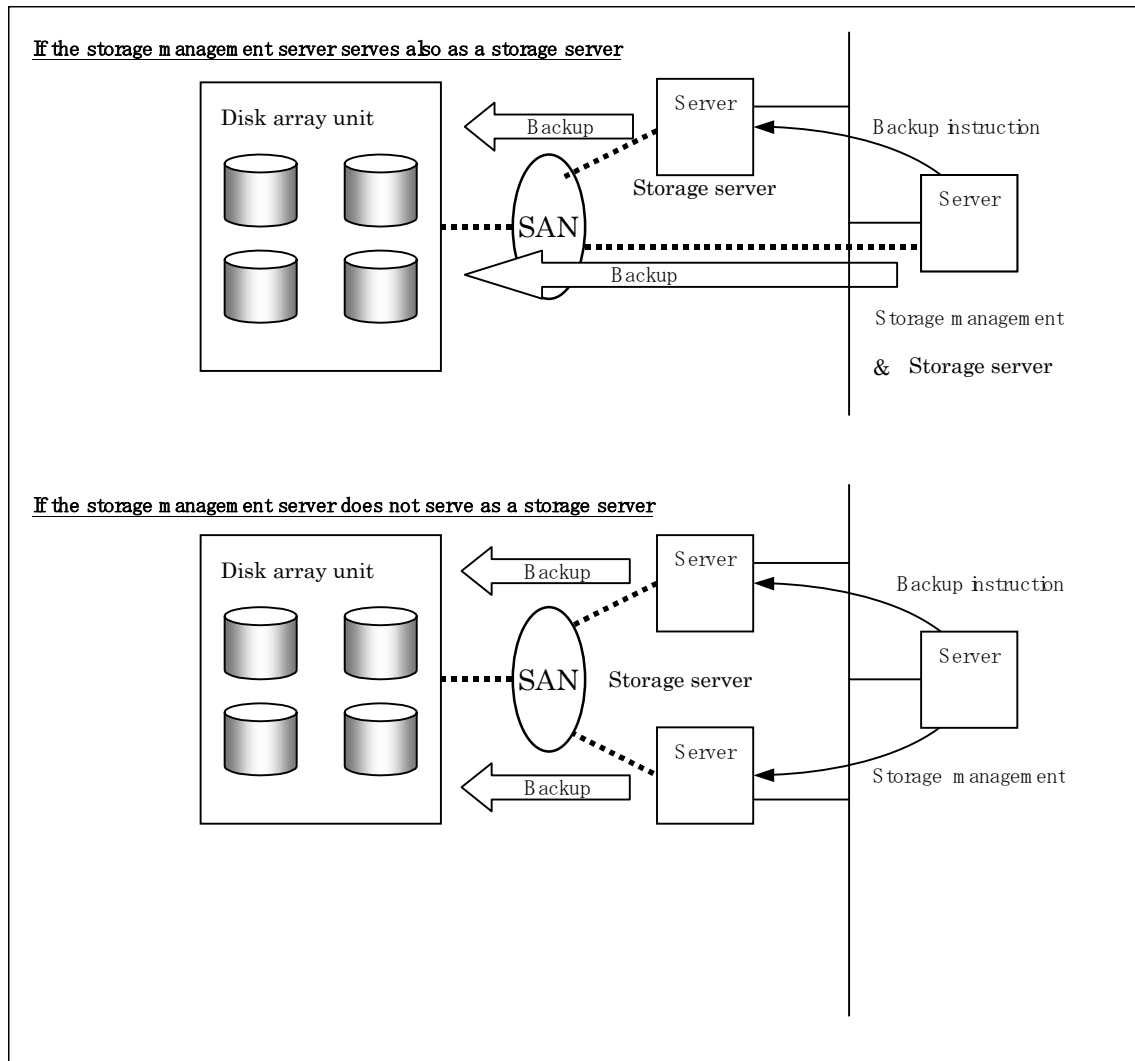
Multiple Storage Servers are managed centrally from a Storage Management Server which can also serve as a Storage Server.

Note that a Storage Management Server management module is ONLY supported on the Windows, Solaris or Linux operating systems.

- Storage Server

The AdvancedCopy Manager product includes the Storage Server functionality and can also be installed as a Storage Server.

Figure: Configuration of servers on which the backup operation should be performed



4.2.2 Selecting a backup target

AdvancedCopy Manager backs up data in units of partition. A slice that stores work data is called a transaction volume. A transaction volume to be backed up must be placed on the disk array unit ETERNUS storage system.

For information on configuring a transaction volume, see "Configuring the operation type for a device".



Note

For backup targets, do not select partition in which a system is stored or AdvancedCopy Manager is installed.



Note

Do not select the logical volume and volume group of LVM (Logical Volume Manager) as a backup target.



Note

See "General notes", for notes on determining a backup target.

- Exclusion from Backup Targets or Replication Targets
- Size of a Logical Disk
- Mirroring in GDS

4.2.3 Configuring a backup policy

To setup a backup policy on a transaction volume, set the following items:

Number of preservation generations

The number of preservation generations refers to the number of generations of backup data should be kept. This number is configurable.

The snapshot fast backup first releases the oldest generation from the generation management. If a system failure or any other failure occurs while the backup is running, there may not be as many generations of backup data as required. If this occurs, it is recommended that another backup attempt be made immediately.

If the number of backup preservation generations is set at one (1) when configuring a snapshot type high-speed backup, it is recommended that a backup to tape is also performed. A synchronous high-speed backup operation releases the oldest generation from generation management after backup of the latest generation is completed. Therefore, the minimum number of backup volumes for the corresponding transaction volume should be configured at <number of backup generations required> + 1.

Interval days

Interval days refers to the time interval (in days) between successive backups. A notification that backup is overdue is displayed if a period longer than the specified interval has passed since the last backup date.

Note that backup is not performed automatically in this instance, even if you have specified the interval days between backups.

For information on configuring a backup policy, see "Configuring backup policy".

4.2.4 Preparing a backup volume

This section describes how to prepare the backup volume.

The backup unit of AdvancedCopy Manager is a slice. In AdvancedCopy Manager, the slice in which the transaction data backup source target is called the transaction volume. A corresponding backup volume must be placed on the disk array unit ETERNUS storage system.

The backup volume size must be the same as that of the transaction volume. The number of backup volumes used for snapshot-type high-speed buffer operations and that for synchronous high-speed buffer operations are listed below:

Table: Number of backup volumes required for backup operations

Backup	Number of required backup volumes
For snapshot fast backup	Number of backup generations
For synchronized high-speed backup	Number of backup generations + 1

When backup policies have already been set for multiple transaction volumes, the registration of a backup policy for a newly registered transaction volume requires that the following number of backup volumes be registered beforehand:

Table: Number of backup volumes required for backup operations (if a backup policy is already set)

Backup	Number of required backup volumes
For snapshot fast backup	Total number of backup generations in the registered backup policies + number of generations in the new backup policy being set
For synchronized high-speed backup	Total number of backup generations in the registered backup policies + number of registered transaction volumes + number of generations in the new backup policy being set + 1

Refer to “Setting the device type” for information on how to set a backup volume.



Note

When selecting backup volumes, do not select a partition which hosts a system partition or where AdvancedCopy Manager is stored or installed.



Note

Do not select the logical volume and volume group of LVM (Logical Volume Manager) as a backup volume.



Note

Note the following points when performing backup to a backup volume in a cabinet that is not the same as the cabinet containing the transaction volume.

- Disk array devices must support the REC or ROPC function.
- Both cabinets must be connected to an FCRA (FC Remote Adapter).
- Since data flows only from the Initiator side to the Target side through an FCRA connection, FCRA connections must be established in minimum sets of two.
- In a backup operation involving a disk array device that does not support the ROPC function (and only the REC function can be used), backing up data to a backup volume in a cabinet containing no transaction volume is impossible since the backup operation uses the ROPC function during restoration.



Point

If the number of backup volumes that can be prepared in synchronized high-speed backup is only the number of preservation generations, the backup operation can be carried out by saving the backup volumes to secondary media, such as tapes.

In this case, the procedure detailed below should be followed

1. Start backup synchronization.
2. Confirm the equivalency maintain status.
3. Execute backup.
4. Save the backup volumes to secondary media.
5. Delete history information.
6. Return to step 1.

If the history information is deleted, the restore execution command cannot be used for restoration of data of the period beginning with the time of deletion until the completion of the next backup is completed. In this event, the data must be restored directly from the secondary media.

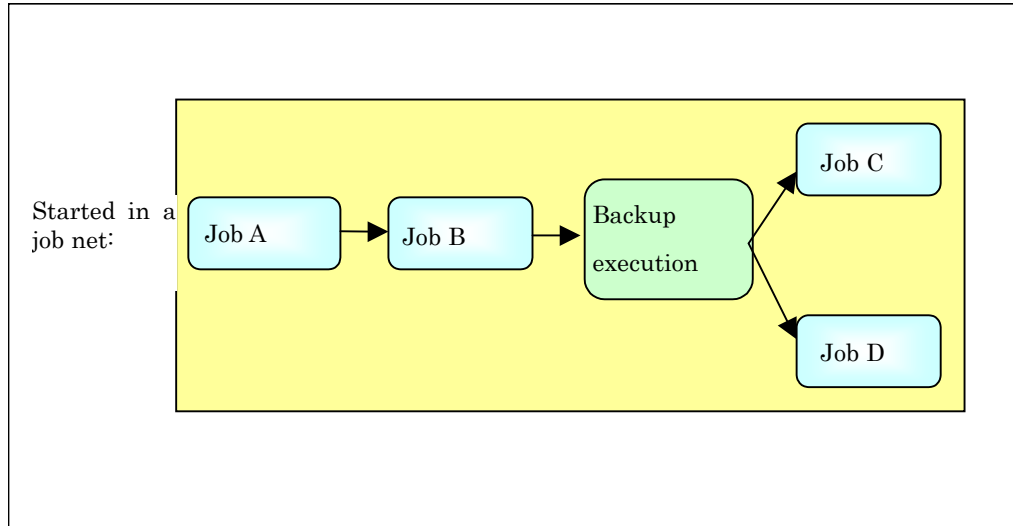
4.2.5 Preparing the automatic backup operation

The backup operation of AdvancedCopy Manager can be automated using SystemWalker Operation Manager, etc.

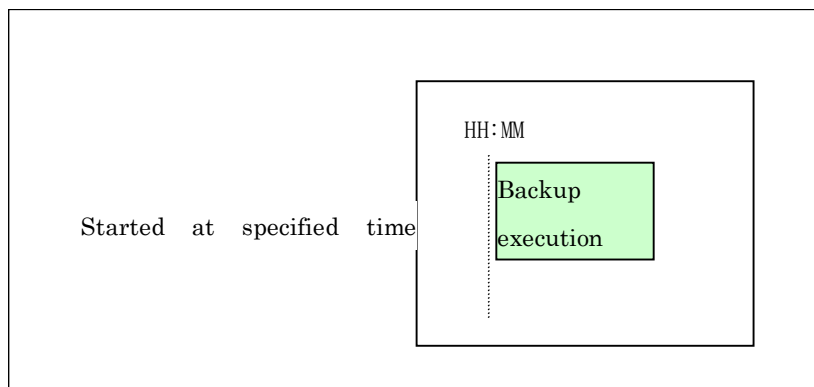
Automatic snapshot fast backup

Automatic snapshot fast backup can be executed in one of the following two ways.

- Start the backup command in a job net of a batch job every time when a backup should be collected.



- Start the backup command at the specified time.



Automatic synchronized high-speed backup

For synchronized high-speed backup, the transaction and backup volumes must have been assigned equivalency maintenance at the scheduled time for backup.

For this reason, if synchronized high-speed backup is automated, the backup synchronous processing start command and the backup execution command must be started separately, as described below.

Starting the backup synchronous processing start command

Estimate the time required for the synchronized backup processing.

Execute the backup synchronous processing start command. To do this, specify the time obtained by subtracting the estimated time (or more) from the time that the backup execution command is to start. The transaction and backup volumes will then have maintained equivalency status when backup is subsequently executed.

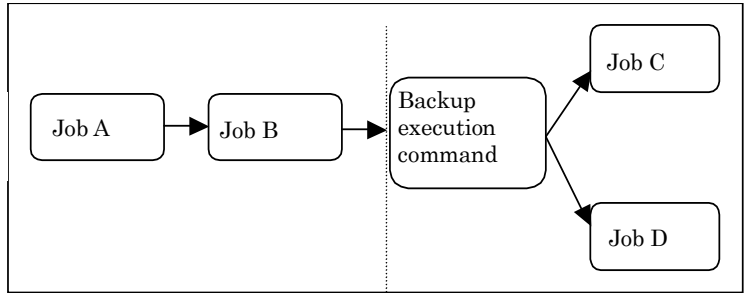
The time between the start of synchronized backup processing and the transition to equivalency maintain status will depend on the capacity of the volume to be copied

Starting the backup execution command

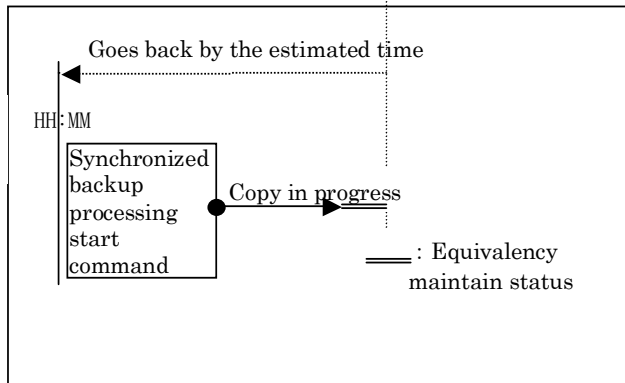
Use either of the following methods to automatically execute the backup execution command:

- Start the backup execution command in a job net of a batch job at the same time at which the backup data is to be collected.

Start the backup execution command in a job net:



Start the synchronized backup processing start command by specifying a time:

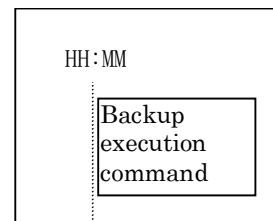


Note

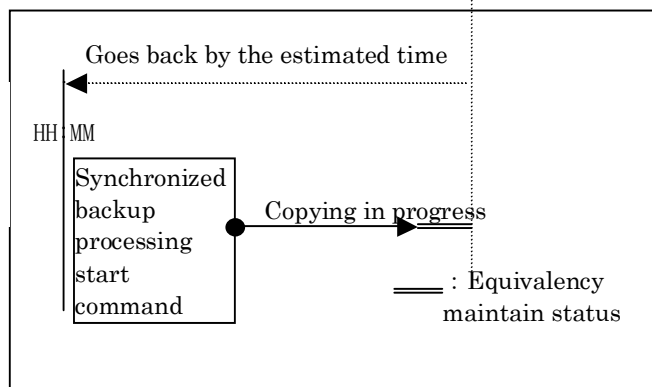
If there are other jobs (jobs A and B in the figure) to be executed before the backup execution command in the job net, the start time of the backup execution command cannot be determined. Assume that the start time of the backup execution command is the time obtained by adding the shortest time required for jobs A and B to the job net start time. Determine the start time of the backup synchronous processing start command by subtracting the estimated time from the start time of the backup execution command.

- Start the backup execution command with the time specified.

Start the backup execution command with the time specified:



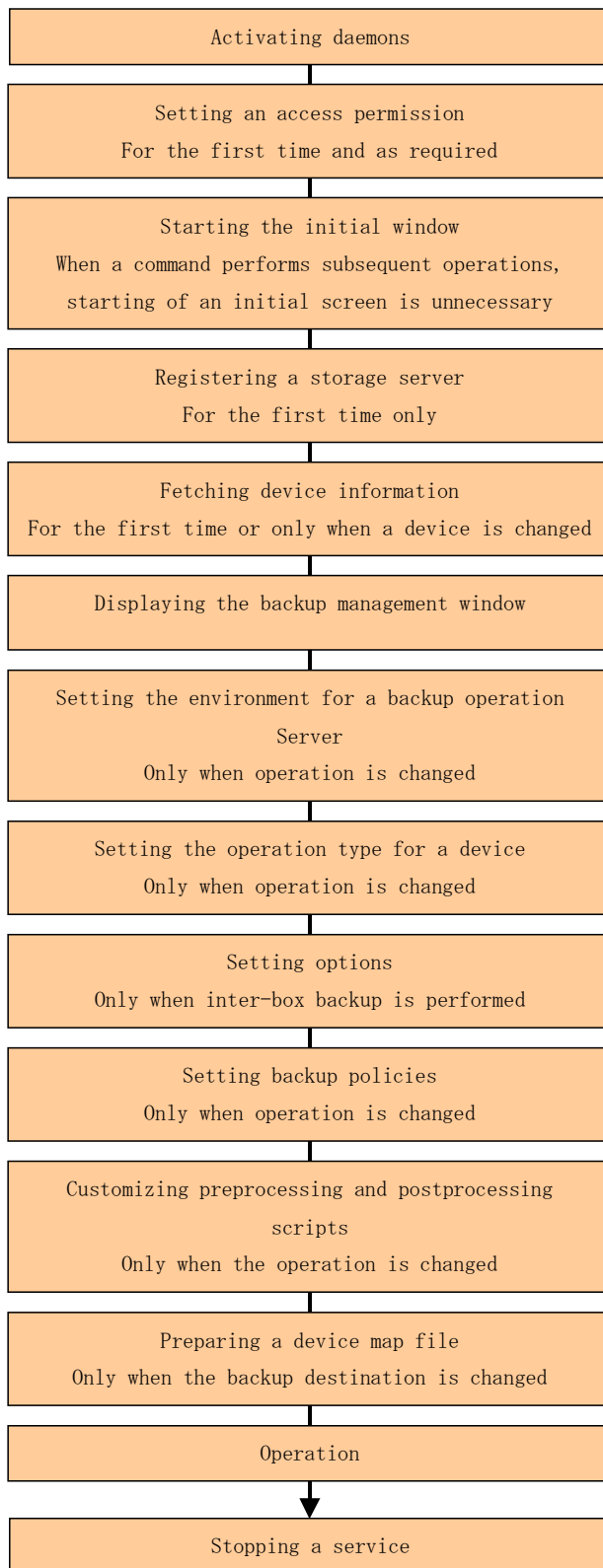
Start the synchronized backup processing start command with the time specified:



4.3 Flow of Operation

The following shows the flow of backup operation on a regular transaction volume.

Figure: Flow of backup operation



4.4 Preparations

The following preparations are required before the backup operation is started.

4.4.1 Activating daemons

Before the backup operation is started, the daemons of AdvancedCopy Manager must be started on the Storage Management Server and the Storage Servers. Normally, these daemons are automatically started up when the system is started. If the startup fails the system can be started by starting the composing daemons. For information on starting a daemon, see "Starting and Stopping Daemons".

4.4.2 Configuring access permission

When performing backup from a backup management web client screen, access permission is set up for each function of the backup management screen. For details of the configuration Method, see "Security Operation Using Authentication Feature".

When performing backup at the command line, the setup of access permission is not required.

4.4.3 Starting the GUI client

For details on starting the GUI client, refer to "Starting the GUI client," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

The GUI client is not required if commands are used.

4.4.4 Registering a Storage Server

The Storage Management Server registers the Storage Servers to be managed. When the Storage Server is operated as a Storage Management Server the server does not need to be registered. The Storage Server registration processing can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Registering a new Storage Server," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the server information addition command (stgxfwcmaddsrv).

4.4.5 Fetching device information on a Storage Server

This processing can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Device management," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the device information collection/reflection command (stgxfwcmsetdev).



Note

The device information on a Storage Server must be temporarily saved to the repository. There may not be sufficient area available for updating the repository if information is to be fetched for devices under two or more Storage Servers. Check if the area required when updating the repository is available before fetching the device information. If there is insufficient area, allocate the required area, then fetch the device information. Refer to step 2 of "Action required when access to repository fails" for the method for checking the required area.



Note

The time required to add a new device is in proportion to the number of devices defined on the Storage Server. For this reason, if a large number of devices have been defined, perform this process only while the CPU load on the system is low. As a guide, each operation takes about 0.5 seconds per device (i.e., partition) in a state without load.

4.4.6 Configuring the environment for a backup operation server

The server environment can be set using either GUI operations or command operations. For information on using the GUI, refer to "Setting Storage Server configuration information," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the Storage Server configuration information configuration command (swstsvrset).

If commands are used for all operations, the Storage Server configuration information setting command must be executed when starting operations.



Point

If the Storage Management Server is also used as a Storage Server, environment settings are still required for the Storage Management Server.

If the environment is already set for the Storage Server, this operation is not required.

4.4.7 Configuring the operation type for a device

This section describes how to set the volume type for devices connected to the Storage Server. The operation types to be set are as follows:

- Define the volume to be backed up as a transaction volume.
- Prepare backup volumes. Prepare as many volumes as the number required for the backup type, each of which has the same size as the transaction volume, and define them as the backup volumes:

Table: Number of backup volumes required for backup operation

Backup	Number of required backup volumes
Snapshot fast backup	Number of backup generations
Synchronized high-speed backup	Number of backup generations + 1

This process can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Setting the volume type," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the device information setting command (swstdevinfofet).



Note

To change the configuration of a partition (slice) registered as the transaction volume or backup volume, take the following steps.

1. Delete the registered configuration, and then change the configuration.
2. Fetch the device information on the Storage Server.
3. Register the information by executing the device information configuration command (swstdevinfofet).



Note

The backup volume must be the same size (have the same number of bytes) as the transaction volume.



Note

Backup and backup volumes are not supported for the system partition or the partition where ETERNUS SF AdvancedCopy Manager is installed.



Note

The mounted device cannot be set to backup volume but, it is possible to set it to the transaction volume.



Note

Do not select the logical volume and volume group of LVM (Logical Volume Manager) as a backup target or backup volume.



Note

Logical Units (disks) cannot be set for transaction volumes or backup volumes.



Point

You can check what has been registered as follows:

- Check using a GUI client

Transaction volume information and backup volume information can be referenced from the GUI client. Refer to the “ETERNUS SF AdvancedCopy Manager User’s Guide” for details.
- Check using a command

You can also view information on a registered transaction volume or backup volume using the device usage status display command (swstdevdisp) at the command line.

4.4.8 Configuration options

When performing backup to a backup volume in a cabinet that is not the same as the cabinet containing the transaction volume, the options below must set. Backup operations may not be able to continue if the options setup file is changed after operations start. Therefore, do not change the options setup file after operations start. If the options setup file is changed, the backup policy must also be reset.



Note

- Disk array devices must support the REC or ROPC function.
- Both cabinets must be connected to an FCRA (FC Remote Adapter).

Since data flows only from the Initiator side to the Target side through an FCRA connection, FCRA connections must be established in minimum sets of two.
- In a backup operation involving a disk array device that does not support the ROPC function (and only the REC function can be used), backing up data to a backup volume in a cabinet containing no transaction volume is impossible since the backup operation uses the ROPC function during restoration.

Create the following files to set options:

- For normal operation (non-cluster)

```
/etc/opt/FJSVswsts/data/DEFAULT/check.ini
```

- For cluster operation

```
/etc/opt/FJSVswsts/logical-node-name(*1)/data/DEFAULT/check.ini
```

(*1) Logical node name of AdvancedCopy Manager specified during setting up of a cluster.

Code as follows:

```
[check]
RemoteCopy=Yes
```

4.4.9 Configuring backup policies

For all transaction volumes registered on a Storage Server, set the following backup policy parameters:

- Preservation generations

This refers to how many generations of backup data should be retained.

- Interval days

This is the number of days until the next backup should be performed. If the specified number of days is exceeded and no backup has been performed, you will be prompted to perform a backup by the AdvancedCopy Manager GUI client.

This process can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Setting a backup policy," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the backup policy setting command (swstbkpolset).



Note

- Even if the number of interval days has been specified, AdvancedCopy Manager does not automatically invoke the backup when the date for the next backup is reached. This value is used only to prompt the user to perform backup when the number of backup interval days is exceeded.
- When you set a backup policy, there must be as many registered backup volumes as required to perform backup according to the specified backup policy. For information on the necessary number of backup volumes, see "Preparing a backup volume".
- Even though the number of backup volumes required for the backup may not have been registered when backup policies for synchronized high-speed backup were set, this number can be set by default provided the number of backup volumes required for snapshot fast backup have been previously registered. Otherwise, it may not be possible to execute synchronized high-speed backup



Point

The configuration of backup policies can be checked in the following ways:

- Using the GUI client

For information about polices, see "Setting a backup policy" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

- Using commands

Information on a defined backup policy can be checked using the backup policy display command (swstbkpoldisp).

4.4.10 Customizing pre-processing and post-processing scripts

In AdvancedCopy Manager, backup or restore processing must be performed while transaction volumes are unmounted. These essential steps, mount and unmount, are typically performed using pre-processing and post-processing scripts which may need to be customized to include the mount/unmount operation and any other actions that may be deemed necessary at the time. The backup or restore processing is not executed when the transaction volume can not be unmounted.

For details of the pre-processing and post-processing script, refer to "Preprocessing and Postprocessing of Backup and Restoration" .



Point

When AdvancedCopy Manager is upgraded

Where there has been an upgrade to existing versions of AdvancedCopy Manager or its components, any scripts used with AdvancedCopy Manager or its components should be reviewed and customized accordingly after upgrading rather than continuing to reuse scripts from previous versions.

4.4.11 Preparing a device map file

When using AdvancedCopy Manager to back up data, a backup volume with the same capacity as a transaction volume is automatically selected from the available registered backup volumes. If a specific backup volume is to be used to back up a given transaction volume, a "Device map file" must be created. A "Device map file" is a file defining the relationship between the transaction and a specific backup volume.

A device map file may be created anywhere on the Storage Server that performs backup. If you specify this file while performing a backup, an operation that recognizes the backup destination is enabled.



Point

To manage multiple generations of backups using defined transaction volume to backup volume relationships, multiple device map files must be prepared.

The device map file used when backing up or starting synchronous processing should meet either of the following requirements:

- Either an unused backup volume must be specified,
or
- A backup volume detailed in the history information that was deleted by this backup must be specified.

Care should be taken to ensure that the device map file is configured and used correctly where the backup system uses two or more backup volumes.

If the number of backup volumes prepared for synchronized high-speed backup is no more than the number of preservation generations, the backup operation can be performed by saving the backup volumes to secondary media, such as tape, and then deleting corresponding history information.

In such cases, the device map file specified at the start of synchronous backup processing is the file specifying the backup volumes that become available for reuse when history information is deleted.

4.4.11.1 Describing a device map file

The following shows an example of a device map file.

```
# A comment line starts with "#".
# Business volume name      Output destination backup volume name

# Normal Disks
/dev/sdc1                   /dev/sdv1
/dev/sdc2                   /dev/sdv2
/dev/sdc3                   /dev/sdv3

# A comment can also be entered in this section.
/dev/sdd1                   /dev/sdz1
/dev/sdd2                   /dev/sdz2
/dev/sdd3                   /dev/sdz3

/dev/sdg4                   /dev/sdl4
/dev/sdg5                   /dev/sdl5
:
:
```

The rules for creating a device map file are as follows:

- Describe a transaction volume name and a corresponding target backup volume name in one line. Separate the transaction volume name and target backup volume name with one or more space or tab characters.
- One or more spaces or tabbed spaces may be used as delimiters between the beginning of a line and a transaction volume name or between the end of a target backup volume name and the end of a line (new line character).
- A blank line (possibly containing spaces or tabbed spaces) may be included in a file.
- Text in a single line preceded by the symbol “#” at the beginning of the line to the end of a line is assumed to be a comment. If the comment uses more than a single line, then each line must be preceded by a “#” character.
- You cannot specify more than one target backup volume for one working disk in one device map file. If you do, only the information in the line first found will be valid. While the device map file will still be read, the lines after the first line will be ignored.
- A device map file may include descriptions of transaction volumes other than the processing target. See the description example provided in the beginning of this chapter.

4.5 Operation

This section describes how to perform a backup in AdvancedCopy Manager.

Before performing the backup operation, configure the environment settings required for the backup operation according to "Preparations".

There are two kinds of backup in AdvancedCopy Manager:

- Snapshot fast backup operations
- Synchronous high-speed backup operations

4.5.1 Performing the snapshot fast backup

A Snapshot fast backup can be performed using either GUI operations or command operations. For information on using the GUI, refer to "Executing snapshot fast backup," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

For information on using commands, refer to the backup execution command (swstbackup).

Note that the backup execution status display command (swstbackstat) can be used to check the status of backups that are run using commands.



Note

When QuickOPC is used for snapshot high-speed backups, tracking can only be cancelled using the tracking cancel command (swstcanceltrk); the GUI client cannot be used.

4.5.2 Performing the synchronized high-speed backup

Synchronized high-speed backups can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Executing synchronized high-speed backup," in the "ETERNUS SF AdvancedCopy Manager User's Guide."

If commands are used, perform the backup synchronization for transaction volumes that are to be backed up, and then perform the actual backup.

Refer to the following for command details:

- Use the backup synchronous processing start command (swststartsync) to start the synchronization process.
- Use the backup synchronous processing progress display command (swstsyncstat) to check the status of synchronous processing.
- Use the backup execution command (swstbackup) command to run the backup process.
- Use the Backup execution status display command (swstbackstat) to check the status of the backup process.



Note

- The backup execution command causes an error if it is executed before the transaction and backup volumes have entered equivalence status.
- The device map cannot be specified during backup.



Note

When the Suspend/Resume function is used for synchronous high-speed backup, the operations listed below cannot be performed from the GUI client. Enter the appropriate command for operation.

- If one transaction volume has multiple synchronous processing (EC sessions), then specify the backup volume and cancel only the specified EC session Backup synchronous processing cancel command (swstcancelsync).

4.5.3 Performing data restoration

This section describes how to restore a volume or other data that has been backed up.

4.5.3.1 Restoring an entire volume

All data backed up in the snapshot high-speed backup can be restored using either GUI operations or command operations.

For information on using the GUI, refer to "Restore" under "Executing snapshot fast backup," in the "ETERNUS SF AdvancedCopy Manager User's Guide".

To restore an entire volume using commands, use the restore execution command (swstrestore).

Note that the restore execution status display command (swstreststat) can be used to check the restoration status.



Note

Stop transactions before performing a restore on an ordinary file system.

4.5.3.2 Restoring an individual file

Restore an individual file as shown below. Note that you cannot restore an individual file using the GUI client.

1. Mount backup volume. Check backup volume by the history list view or by executing the history information display command (swsthistdisp).
2. Copy files to restore using the cp command.
3. Unmount backup volume.

4.5.4 Managing a backup history

Display backup history information to check backup volume names, backup date, etc. of backup data under generation management for a specific transaction volume.



Point

- Backup history information is used to manage only information stored on a backup volume.
- Any backup history information exceeding the number of preservation generations defined in a backup policy will be automatically deleted.

4.5.4.1 Displaying a backup history

The backup history can be displayed using either GUI operations or command operations.

For information on using the GUI, refer to "Displaying the backup history," in the "ETERNUS SF AdvancedCopy Manager User's Guide" .

To display backup history using commands, use the history information display command (swsthistdisp).

4.5.4.2 Deleting a backup history

The backup history can be deleted using either GUI operations or command operations.

For information on using the GUI, refer to "Deleting the backup history," in the "ETERNUS SF AdvancedCopy Manager User's Guide" .

To delete backup history using commands, use the history information deletion command (swsthistdel).

4.6 Changing the configuration information

It will be necessary to change the configuration of AdvancedCopy Manager if changes are made to the configuration of a Storage Server or a device associated with a Storage Server used in the backup operation. This section describes how to perform these changes.

4.6.1 Adding a device

After a device is added to any Storage Server, it must be incorporated (i.e., detected) into the AdvancedCopy Manager configuration environment. This processing can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Adding a new device," in the "ETERNUS SF AdvancedCopy Manager User's Guide".

Use the following procedures to add a device using commands:

1. Use the device information collection/reflection command (`stgxfwcmsetdev`) to collect information for the newly added device and update the management information file.
2. Use the device information setting command (`swstdevinfo`) to set the operational type of the added device.
3. If the added device is to be defined as a transaction volume, use the backup policy setting command (`swstbkpolset`) to set the backup policy.



- System resources such as disk and memory resources may be insufficient when a device is added. Re-estimate the system resource requirements before adding a device. Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.
- There may not be sufficient area available for updating the repository when a device is added. Check if the area required when updating the repository is available before fetching the device information. If there is insufficient area, free an area, then fetch the device information. Refer to step 2 of "Troubleshooting a failure when accessing a repository database" for the method for checking the required area.
- The repository (directory for the DB space that stores repository data) may be too small when a device is added. Re-estimate the repository size before adding a device. Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for the estimation method.
If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a device. Refer to "Troubleshooting a failure when accessing a repository database" for the extension method.

4.6.2 Deleting a device

This chapter describes how to delete a device according to the device type.

4.6.2.1 Deleting a transaction volume

A transaction volume can be deleted using either GUI operations or command operations.

For information on using the GUI, refer to "Deleting a transaction volume," in the "ETERNUS SF AdvancedCopy Manager User's Guide".

Use the following procedure to delete a transaction volume using commands:

1. Use the history information deletion command (swsthistdel) to delete the backup history.
2. Use the backup policy deletion command (swstbkpoldel) to delete the backup policy.
3. Use the device information setting command (swstdevinfofet) to delete the device information for the volume being deleted.



Point

These tasks must be performed for the volume being deleted before it is physically removed.

4.6.2.2 Deleting a backup volume

A backup volume can be deleted using either GUI operations or command operations.

For information on using the GUI, refer to "Deleting a backup volume," in the "ETERNUS SF AdvancedCopy Manager User's Guide".

Use the following procedure to delete a backup volume using commands:

1. If a backup volume is to be deleted, it is essential to first use the backup policy display command (swstbkpoldisp) to check the backup policies that have been set.



Note

If a backup volume is deleted, an existing backup policy may no longer be met (for example, if the number of backup volumes is less than the number of preservation generations). The backup could not continue if this was the case. To avoid such a situation, be sure to check existing backup policies before deleting a backup volume, and if necessary register a new backup volume before deleting the target backup volume.

2. Use the history information deletion command (swsthistdel) to delete the backup history so that the relevant volume no longer exists in the backup history. If there is no backup history, proceed to the next step.
3. Use the device information setting command (swstdevinfofet) to delete the device information for the volume being deleted.



Point

These tasks must be performed for the volume being deleted before it is physically removed.

4.6.3 Adding a Storage Server

Adding a Storage Server to the backup process can be performed using either GUI operations or command operations.

For information on using the GUI, refer to "Registering a new Storage Server," in the "ETERNUS SF AdvancedCopy Manager User's Guide".

Use the server information addition command (stgxfwcmaddsrv) to add a Storage Server using commands.

To add a Storage Server follow the steps below:

1. Register the Storage Server. For more information, refer to "Registering a Storage Server".
2. Collect all the information on devices connected to the newly added Storage Server. For more information, refer to "Fetching device information on a Storage Server".
3. Set the environment information for the Storage Server. For more information, refer to "Setting the environment for a backup operation server".
4. Set the operational type for the device for which information has been obtained in Step 2. For more information, refer to "Setting the operation type for a device".
5. Configure a backup policy for all the transaction volumes registered in Step 4. For more information, refer to "Setting backup policies".



Note

- System resources such as disk and memory resources may be insufficient when a Storage Server is added. Re-estimate the system resource requirements before adding a Storage Server. Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.
- There may not be sufficient area available for updating the repository when a Storage Server is added. Check if the area required when updating the repository is available before adding the Storage Server. If there is insufficient area, free an area, then add the Storage Server. Refer to step 2 of "Troubleshooting a failure when accessing a repository database" for the method for checking the required area.
- The repository (directory for the DB space that stores repository data) may be too small when a Storage Server is added. Re-estimate the repository size before adding a Storage Server. Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for the estimation method.
If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a Storage Server. Refer to "Troubleshooting for insufficient free space in a repository" for the extension method.

4.6.4 Deleting a Storage Server

A Storage Server can be deleted using either GUI operations or command operations.

For information on using the GUI, refer to "Deleting a Storage Server registration," in the "ETERNUS SF AdvancedCopy Manager User's Guide" .

Use the Server information deletion command (stgxfwcmdelsrv) to delete a Storage Server using commands.



Point

These steps must be performed for the server being deleted before it is physically removed.

To delete a Storage Server follow the steps below:

1. Display the backup management window. For more information, see "Displaying the backup management window".
2. Delete the backup history for all the transaction volumes on the server being deleted. This can be done using either GUI operations or command operations. For information on using the GUI, refer to "Deleting a backup policy," in the "ETERNUS SF AdvancedCopy Manager User's Guide", or use the backup policy deletion command (swstbkpodel).
3. Delete the volume type that was registered for the devices connected to the Storage Server using the device information setting command (swstdevinforeset).
4. Delete the Storage Server.

4.7 Stopping the Operation

To stop a backup operation, stop any daemons running on the Storage Server. Normally, they are automatically stopped when the system stops.

You can stop a specific daemon if you need to do so for some reason. For more information, see "Starting and Stopping Daemons".



Note

- When all daemons have stopped, all functions of AdvancedCopy Manager running on the Storage Server will stop.
- Stop daemons on a Storage Management Server only after ensuring that all the Storage Servers that it manages have also been stopped.

4.8 SDX Object Operations

This section describes the backup and restore operations of SDX objects. A good understanding of the basic operation of normal volumes is required for these operations. For details on GDS, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

4.8.1 Units of SDX object operations

There are two types of backup operations (with different copy units for each type):

1. Backup operation in units of logical volumes (method with GDS Snapshot)
2. Backup operation in units of slices (method without GDS Snapshot)

For details on how to confirm and select the type of operation, refer to "Configuring the unit of SDX object operations".



Note

The two types of operation cannot be performed on the same Storage Server.

4.8.1.1 Configuring the unit of SDX object operations

The unit of SDX object operations is normally set as follows:

- Units of Logical volumes
When PRIMECLUSTER GDS Snapshot has been included PRIMECLUSTER GDS 4.1A30 or later
- Units of Slices
In cases other than the above

For operation in units of slices in an environment with PRIMECLUSTER GDS 4.1A30 or later installed, use the command described in "SDX object management unit setting command (stgxfwcmsetsdx)", and then set operation in units of slices by taking action as described in "Fetching device information from a Storage Server".



Note

If PRIMECLUSTER GDS has already been upgraded from version 4.1A20 or earlier to 4.1A30 or later, follow the procedure below to change the setting to operation in units of logical volumes.

- 1) Refer to "Deleting the Storage Server", and delete the Storage Server.
- 2) Use the command described in "SDX object management unit configuration command (stgxfwcmsetsdx)", to specify management in units of logical volumes.
- 3) Perform the steps as described in "Registering the Storage Server", and perform the subsequent operations.

For operation in units of slices as before, the above procedure need not be followed.



Note

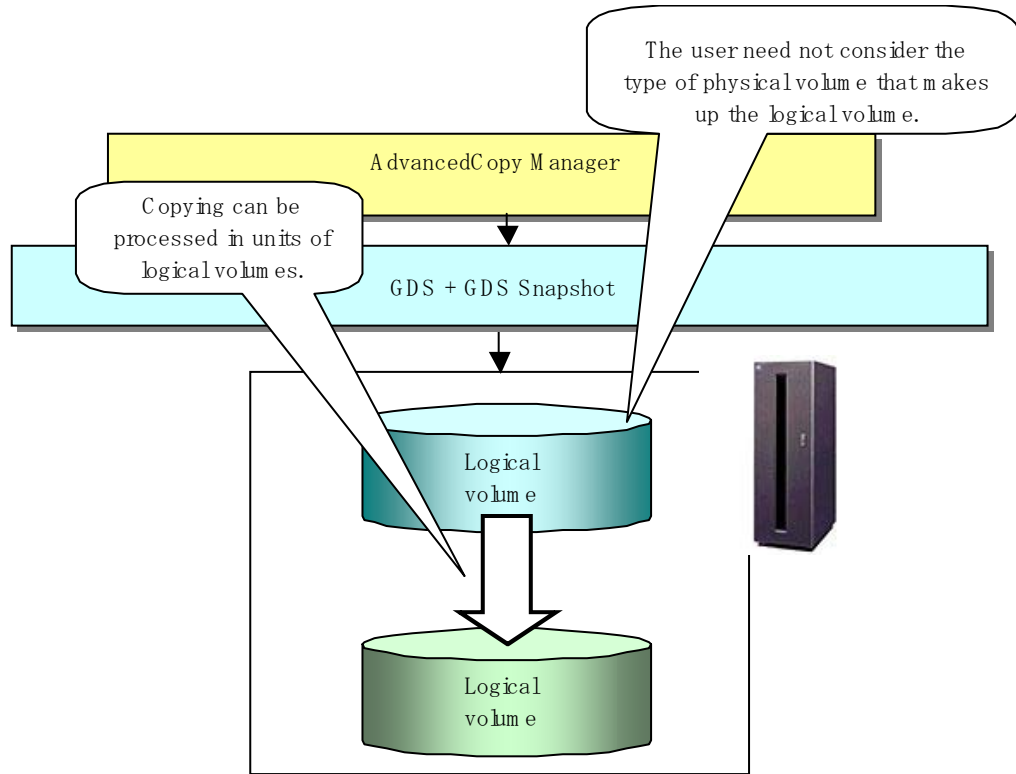
If AdvancedCopy Manager has been upgraded from version 10.3 or earlier in an environment that includes PRIMECLUSTER GDS 4.1A30 or later, the operation described in "Fetching device information from a Storage Server" results in a change to the unit of an SDX object operations will detect a change to a managed device.

To keep the operation in units of slices, abort the fetching operation without accepting the detected change, and use the command described in "SDX object management unit configuration command (stgxfwcmsetsdx)" to set operation in units of slices, and re-specify the required values as necessary

4.8.2 Backup operation in units of logical volumes (method with GDS Snapshot)

Backup operation in units of logical volumes is possible in collaboration with GDS Snapshot. The physical structure of the logical volumes is not important.

Figure: Backup operation in units of logical volumes



To specify a GDS logical volume in the AdvancedCopy Manager command, specify the GDS logical volume name.

```
dev/sfdsk/class-name/dsk/volume-name
```



Note Configuration and conditions of unsupported SDX objects

AdvancedCopy Manager does not support the following SDX objects (volumes):

- Volume of a shadow class
 - Stripe volume
 - Switch volume
 - Volume in a concatenation group
- Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.

Copying cannot be processed in the following circumstances:

- if the total number of the slices that make up the transaction volume plus all slices that make up all backup volumes associated with the transaction volume at the start of synchronous processing or snapshot-type backup processing is 33 or greater,

- If either the source volume (the transaction volume for backup processing or the backup volume for restore processing) are in an invalid state



Point

To confirm the type of volume being used, (that is: single, mirror, stripe, concatenation, or switch), execute "sdxinfo -e long" at the command line and check the volume type attribute values returned.

The value in the TYPE column on the line indicated for the volume in the OBJ column will match one of the following:

[Volume object type attributes]

- single : Single volume (supported)
- mirror : Mirror volume (supported)
- stripe : Stripe volume (not supported)
- concat : Volume in a concatenation group (not supported)
- switch : Switch volume (not supported)

4.8.2.1 Designing the backup operation

The following information about performing the backup operation should be noted.

For a backup performed in collaboration with GDS Snapshot, AdvancedCopy Manager processes binding, separation, and release of volumes by using the GDS Snapshot function.

Therefore, an SDX object used by AdvancedCopy Manager must be set to a state in which the object can operate as either a master object or proxy object.

A transaction volume operates as a master object, and a backup volume as a proxy object. Configure the GDS volume structure accordingly before registering a volume with AdvancedCopy Manager.

When configuring SDX objects of GDS for use by AdvancedCopy Manager, pay careful attention to the relevant structure attributes of "Transaction volume" and "Backup volume" described in the next sections.

For details on GDS Snapshot and premises of the proxy structure, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

4.8.2.2 Transaction volume

To use an SDX object (logical volume) for transactions, register it as a transaction volume. The transaction volume operates as a master object of GDS Snapshot.

Therefore, note the following about configuring the backup operation:

- An SDX object that belongs to a shadow class cannot be registered as the transaction volume.
- The only types of logical volumes that can be registered as the transaction volume are single volumes and mirror volumes.
- A stripe volume, a volume in a concatenation group, or a switch volume cannot be registered as the transaction volume.
Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.
- A volume in a disk group to which a backup volume also belongs cannot be registered as the transaction volume.
- A logical volume that belongs to the single disk group with a backup volume cannot be registered as the transaction volume.
- If any of the slices that make up the transaction volume are separated temporarily or are being copied, backup cannot be performed.
- If the transaction volume (logical volume) is in the invalid state, backup cannot be performed.
- A proxy object of GDS Snapshot cannot be used as the transaction volume.

4.8.2.3 Backup volumes

Register an SDX object (logical volume) as a backup volume.

The backup volume operates as a proxy object of GDS Snapshot.

Therefore, note the following about configuring the backup operation:

- An SDX object that belongs to a shadow class cannot be registered as a backup volume.
- The types of logical volumes that can be registered as backup volumes are single volumes and mirror volumes. A stripe volume, a volume in a concatenation group, or a switch volume cannot be registered as a backup volume.
Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.
- A volume in a disk group to which a transaction volume also belongs cannot be registered as a backup volume.
- A logical volume that belongs to the single disk with the transaction volume cannot be registered as a backup volume.
- An object whose class is different from that of the transaction volume cannot be used as a backup volume.
- A master object of GDS Snapshot cannot be used as a backup volume.
- A backup volume for backup by using EC or OPC must be a non-mirroring volume. If the backup volume is in a mirroring structure, only software-copy can be used.
- If a backup volume is in use or is accessible by any application, backup cannot be performed.
- If any slices of the slices that make up a backup volume is separated temporarily or being copied, backup cannot be performed.
- As a backup volume, a logical volume must be the same size as the transaction volume.
- For the backup operation, the total number of the slices that make up the transaction volume and slices that make up all backup volumes associated with the transaction volume must not exceed 32.

4.8.2.4 Copy functions available when used with GDS Snapshot

The following copy functions can be used in linkage with GDS Snapshot:

- Advanced copy: Copying with the hardware function of ETERNUS, Fujitsu's storage systems
- Software-copy: Copying with the disk driver of PRIMECLUSTER GDS

The following table shows the relationship between SDX object structures and their available copy functions.

Table: Copy functions available in linkage with GDS Snapshot (backup)

Unit	Volume	SDX object structure		Available copy function
		Stripe- and concatenation-type objects cannot be copied.		
Logical volume	Transaction	Single		Advanced copy Software-copy
		Mirror	No subordinate group exists.	Advanced copy Software-copy
			A subordinate group exists.	Software-copy
	Backup	Single		Advanced copy Software-copy
		Mirror	This consists of one disk.	Advanced copy Software-copy
			This consists of multiple disks.	Software-copy

Table: Copy functions available in linkage with GDS Snapshot (restore)

Unit	Volume	SDX object structure Stripe-, concatenation-, and switch-type objects cannot be copied.		Available copy function
Logical volume	Backup	Single		Advanced copy Software-copy
		Mirror	No subordinate group exists.	Advanced copy Software-copy
			A subordinate group exists.	Software-copy
	Transaction	Single		Advanced copy Software-copy
		Mirror	This consists of one disk.	Advanced copy Software-copy
			This consists of multiple disks.	Advanced copy Software-copy

4.8.2.5 Configuration options

Specify options when performing backup to a backup volume in a cabinet that does not contain the transaction volume.

Backup with GDS Snapshot does not require a setting to indicate inter-cabinet copying.

4.8.2.6 Fetching device information from a Storage Server

To perform the backup operation with a Storage Server and obtain information of a subordinate device related to the Storage Server, you must register the server.

For details on how to fetch the device information, refer to the section titled "Fetching device information from a Storage Server".

4.8.2.7 Configuring the operation type for a device

Register a GDS logical volume as a transaction volume or backup volume.

```
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/sfdsk/CLS1/dsk/voll
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/sfdsk/CLS1/dsk/bvoll
swstdevinfofet completed
```



Note

The following SDX objects cannot be registered as transaction volumes or backup volumes:

- Object of a shadow class
- Stripe-type object
- Concatenation-type object
- Switch-type object

4.8.2.8 Configuring a backup policy

Checking the number of backup generations

Before configuring a backup policy, the required number of backup volumes for operation must be prepared according to the backup policy. (For details, refer to the section titled "Configuring a backup policy".)

If the transaction volume is an SDX object, verify that there are enough backup volumes registered as proxy objects to match the required number of backup generations.

If the transaction volume is a GDS logical volume, each backup volume must be also a GDS logical volume.

```
#/opt/FJSVswsts/bin/swstbkpolset -s 3 /dev/sfdsk/CLS01/dsk/VOL01
/dev/sfdsk/CLS01/dsk/VOL01 swstbkpolset completed
#
```



Note

In the following cases, some SDX objects are not counted as available backup volumes:

- Where the backup volume is an object whose class is different from that of the transaction volume
- Where the size of the backup volume is different from that of the transaction volume

Limit on the number of slices

Where an SDX object is to be backed up, the transaction volume is described as the master and its associated backup volume is described as the proxy. Therefore, the total number of the slices that make up the transaction volume plus the number of slices that make up the associated backup volume must not exceed 32. Consequently, the number of backup generations that can be used is limited according to the GDS structure. This will be important when configuring a backup policy. For example, if both the transaction volume and backup volume are single volumes, you can set the number of backup generations to 31, which is the maximum value. However, if both the transaction volume and backup volume have a two-slice structure, the number of backup generations is limited to 15. If 16 or a higher value is set, the 16th generation and subsequent generations are not backed up.

4.8.2.9 Backup

Backup in units of logical volumes

If the transaction volume is an SDX object, select a backup volume that can be a valid proxy object for backup.

AdvancedCopy Manager automatically selects it from the registered backup volumes.

```
# /opt/FJSVswsts/bin/swstbackup /dev/sfdsk/CLS1/dsk/vol1
/dev/sfdsk/CLS1/dsk/vol1 swstbackup completed
```

Available copy processing methods

The available copy methods vary depending on the hardware environment or configuration supporting the GDS logical volumes.

EC/OPC cannot be used in the following cases:

- The backup volume is an SDX object in a mirroring structure
- A subordinate group is connected to the disk group to which the transaction volume and backup volume belong

Table: Hardware and the available copy processing methods

Hardware	Available copy processing method
EC/OPC can be used.	Synchronous high-speed backup: EC, software-copy Snapshot-type high-speed backup: OPC
Only OPC can be used.	Synchronous high-speed backup: Software-copy Snapshot-type high-speed backup: OPC
EC/OPC cannot be used.	Synchronous high-speed backup: Software-copy Snapshot-type high-speed backup: Unavailable

4.8.2.10 Restore

Restoration to a transaction volume in units of logical volumes

For restoration to a transaction volume in units of GDS logical volumes, copy the proxy to the master.

```
# /opt/FJSVswsts/bin/swstrestore /dev/sfdsk/CLS1/dsk/vol1
/dev/sfdsk/CLS1/dsk/vol1 swstrestore completed
```

Restoration with the restore destination specified

If the transaction volume is a GDS logical volume, restoration cannot be performed with the restore destination specified.

Available copy processing methods

The available copy processing methods vary depending on the hardware environment or configuration supporting the GDS logical volumes.

OPC cannot be used in the following case:

- A subordinate group is connected to the disk group to which the transaction volume and backup volume belong.

Table: Hardware and the available copy processing methods

Hardware	Available copy processing method
OPC can be used.	OPC, software-copy
OPC cannot be used.	Software-copy

4.8.2.11 Operational notes

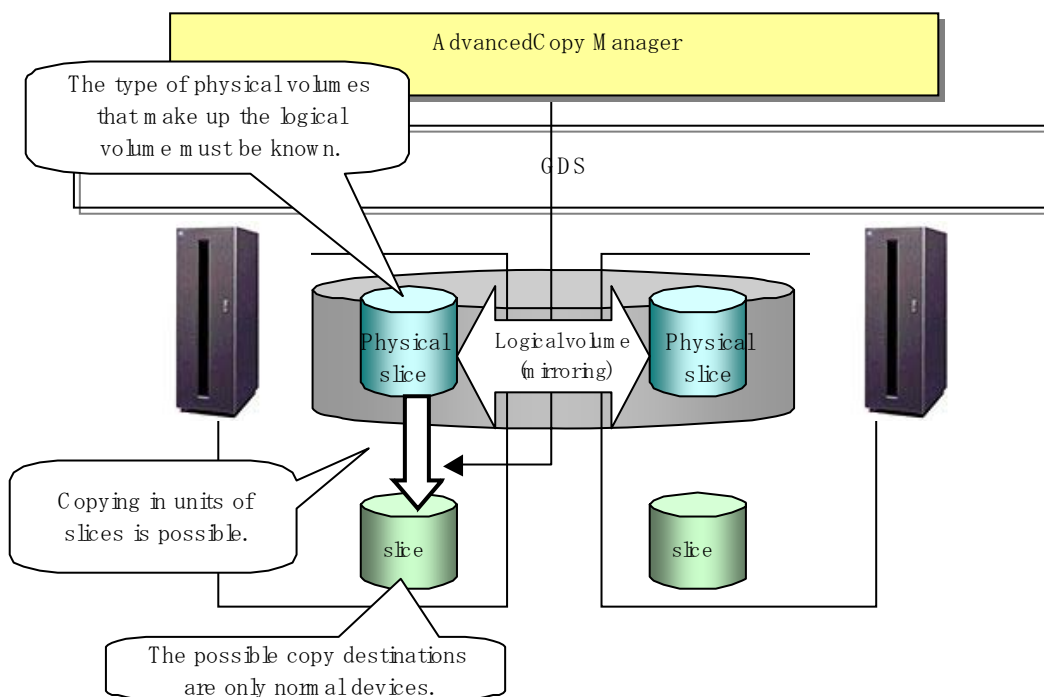
Do not use the “sdxproxy” command directly to change the state of a volume registered for backup management.

Use of the “sdxproxy” command may create inconsistencies between the backup management information and the actual volume state. In such cases, perform recovery by executing the resource match command (swstsrsemch).

4.8.3 Backup operation in units of slices (method without GDS Snapshot)

This backup operation uses only the AdvancedCopy Manager function without GDS Snapshot. For reliable configuration and operation, you need to know the type of physical volumes that make up the logical volume.

Figure: Backup operation in units of slices



When specifying a name in an AdvancedCopy Manager command, combine the logical volume name and the AdvancedCopy Manager device name using the format shown below. Refer to "PRIMECLUSTER GDS SDX objects" for details.

`dev/sfdsk/class-name/dsk/volume-name: (device name where volume is constructed)`



Note

For notes on SDX object operations, refer to "Notes on SDX object operations (backup management)", and "Notes on SDX object operations (replication management)".



Note

If mirroring between cabinets is enabled and restoration by OPC is required in the event of a cabinet failure, both mirrored systems must be backed up. In such cases, the required capacity of the backup volume is not the size of the logical volume but the size of the physical volume.



Note

The SDX objects that can be used for operations in slice units are as follows:

- Single volumes
- Non-layered mirror volumes



Point

You can find out if the volume being used is the single, mirror, stripe, concatenation, or switch volume type by executing “`sdxinfo -e long`”. (Check the value in the TYPE column in the line displayed for the volume in the OBJ column.)

[Volume object type attribute]

- single: Single volume (operation possible)
- mirror: Mirror volume (operation possible)
- stripe: Stripe volume (operation not possible)
- concat: Volume in a concatenation group (operation not possible)
- switch: Switch volume (operation not possible)

4.8.3.1 Configuring the backup operation

For notes on configuring the backup operation, refer to the section titled “Notes on SDX object operations (backup management)”.

4.8.3.2 Fetching device information from a Storage Server

To perform the backup operation with a Storage Server and obtain information of a subordinate device of the Storage Server, you must register the server.

For details on how to fetch the device information, refer to the section titled “Fetching device information on a Storage Server”.

4.8.3.3 Configuring the operation type for a device

Transaction volume

Register the slices that make up the logical volume used for transactions as a transaction volume.

```
#/opt/FJSVswsts/bin/swstdevinfofet -t /dev/sfdsk/CLS01/dsk/VOL01:sda
swstdevinfofet completed
#
```

Backup volume

Slices of an SDX object cannot be registered as a backup volume.
General slices must be used for a backup volume.

```
#/opt/FJSVswsts/bin/swstdevinfofet -b /dev/sdd6
swstdevinfofet completed
#
```

4.8.3.4 Backup

Backup example

```
#/opt/FJSVswsts/bin/swstbackup /dev/sfdsk/CLS01/dsk/VOL01:sda
/dev/sfdsk/CLS01/dsk/VOL01:sda swstbackup completed
#
```

Backup states

Backup can only be performed when the SDX object that makes up the applicable logical volume is in one of the states listed below.

If the object is in any other state, backup cannot be performed.

AdvancedCopy Manager checks the state of the SDX object by using the “sdxinfo” command of PRIMECLUSTER GDS.

1. The state of the volume is “ACTIVE” or “STOP” .
2. The state of the physical disk is “ENABLE” .
3. The state of the slice is “ACTIVE” or “TEMP” .

Backup pre-processing and post-processing

In the following case, the pre-processing and post-processing scripts are not executed:

- A slice of an SDX object is in the TEMP state.

4.8.3.5 Restore

For operation in units of slices, restoration can be performed only if the transaction volume is a single volume.

An SDX object that is not a single volume cannot be restored.

For details on restoration of an SDX object that is not a single volume, refer to “Notes on SDX object operations (backup management)” .

Restoration example

```
#!/opt/FJSVswsts/bin/swstrestore /dev/sfdsk/CLS01/dsk/VOL01:sda
/dev/sfdsk/CLS01/dsk/VOL01:sda swstbackup completed
#
```


Chapter 5 Backup Operations (Symfoware)

The Backup Operations (Symfoware) is supported in a Linux operating environment.

Chapter 6 Backup Process That Uses the Suspend/Resume Function

This chapter explains the backup process that uses the Suspend/Resume function.

6.1 Overview

The Suspend/Resume function sets Suspend/Resume for the equivalency maintenance status by using Equivalent Copy (EC). Using this function for differential copying from the Suspend state enables higher-speed synchronous backup operation.

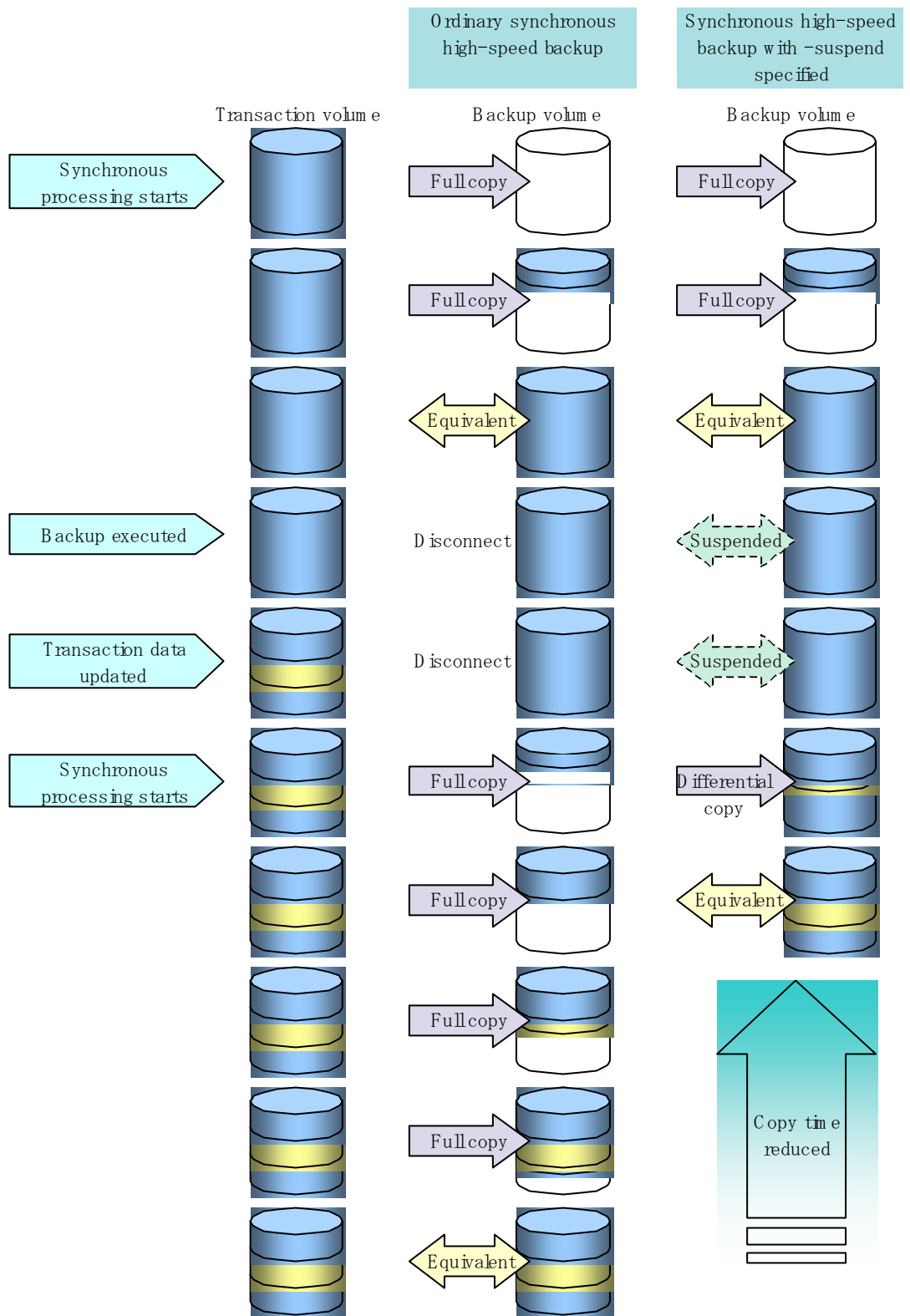
AdvancedCopy Manager provides two backup functions: snapshot high-speed backup and synchronous high-speed backup. In snapshot high-speed backup, OPC is used to create a backup; whereas in the synchronous high-speed backup, EC is used to create a backup. The Suspend/Resume function is a kind of synchronous high-speed backup that uses EC.

In ordinary synchronous high-speed backup, the synchronous processing start command starts copying with EC and sets the equivalency maintenance status after the copying is completed. The backup execution start command is then executed. This cancels EC and creates a backup.

In synchronous high-speed backup that uses the Suspend/Resume function, when the backup execution start command with "-suspend" specified is executed, EC is suspended, the backup process is completed, and the EC session is maintained. The next time that the synchronous processing start command is executed, EC resumes and only data that has been updated since the suspend state was last set is copied. As a result, the backup preparation time is shorter.

A comparison between ordinary synchronous high-speed backup and synchronous high-speed backup using the Suspend/Resume function is shown below.

Figure: Comparison between ordinary synchronous high-speed backup and synchronous high-speed backup using the Suspend/Resume function



6.2 Backup Operation Design

Notes about synchronous high-speed backup using the Suspend/Resume function and backup operation configuration are given below, in addition to information related to backup management operation configuration (see "Operation configuration").

Transaction volume

Register the backup source device used for a transaction as the transaction volume.

Backup volume

Register the backup destination device in which transaction volume data is saved as the backup volume.

When the backup command with "-suspend" specified is executed, the EC session between the transaction volume and backup volume is maintained in the Suspend state. In the Suspend state, the backup volume cannot be used as the backup destination of another transaction volume.



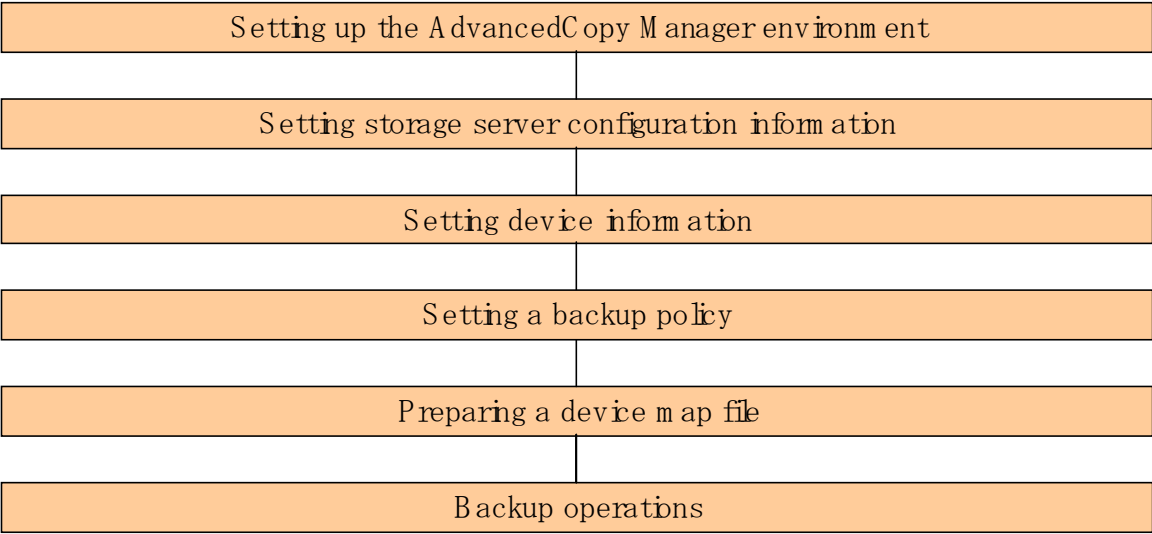
Point

For the backup process that uses the Suspend/Resume function, each transaction volume requires as many backup volumes as the saved generation number + one.

6.3 Flow of Operations

The flow of backup operations using the Suspend/Resume function is shown below.

Figure: Flow of backup operations using the Suspend/Resume function



6.4 Preparations

This section describes preparations for the backup process that uses the Suspend/Resume function.

6.4.1 Configuring up the AdvancedCopy Manager environment

Install AdvancedCopy Manager and set up its operating environment according to the "ETERNUS SF AdvancedCopy Manager Installation Guide" and "ETERNUS SF AdvancedCopy Manager Operator's Guide".

6.4.2 Configuring Storage Server configuration information

Set the configuration information on the Storage Server processing the backup operations. This process can be carried out using either GUI operations or commands. For information on the method using GUI, refer to "Modify Storage Server Information" in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

For information on the operation method using commands, refer to the Storage Server configuration information command (swstsvrset). In addition, once it is set, you can display the Storage Server configuration information by executing the Storage Server configuration information display command (swstsvrdisp).

6.4.3 Configuring device information

Configuring device information involves registering a transaction volume as the backup source and a backup volume as the backup destination.

This process can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Define the Role of a Volume" in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

For information on registration of transaction volume and backup volume using commands, refer to the Device information configuration command (swstdevinfo). In addition, to display the registered volume information, execute the Device usage status display command (swstdevdisp).



Note

- A suspended transaction volume cannot be changed to be used for a different purpose.
- A suspended backup volume cannot be changed to be used for a different purpose.



Point

When the device information of a suspended backup volume is displayed, "Backup (used)" is displayed in the Device-Mode field.

6.4.4 Configuring a backup policy

Before a backup policy can be set, as many usable backup volumes as necessary for the operation according to the specified backup policy must be registered.

This process can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Set Backup Policy" in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

For information on the operation method using commands, refer to the following:

- Backup Policy Setup: Backup policy configuration command (swstbkpolset)
- Check Backup Policy that has been set up: Backup policy display command (swstbkpoldisp)
- Backup Policy Deletion: Backup policy deletion command (swstbkpoldel)

6.4.5 Preparing a device map file

To determine the backup destination in normal backup operations, AdvancedCopy Manager automatically selects a device that has the same capacity as the transaction volume from among a group of devices registered as backup volumes.

If there is a suspended backup volume at the time of backup destination selection and the start of the synchronous processing, then its corresponding device is selected as the preferred device and is used as the backup destination.

To monitor and manage backup destination devices, create a device map file that maps transaction volumes to backup volumes in advance. Specifying this file at the start of the synchronous processing or during the backup process enables better management of backup volume resources.



Point

To manage multiple generations of backups, multiple device map files must be prepared.

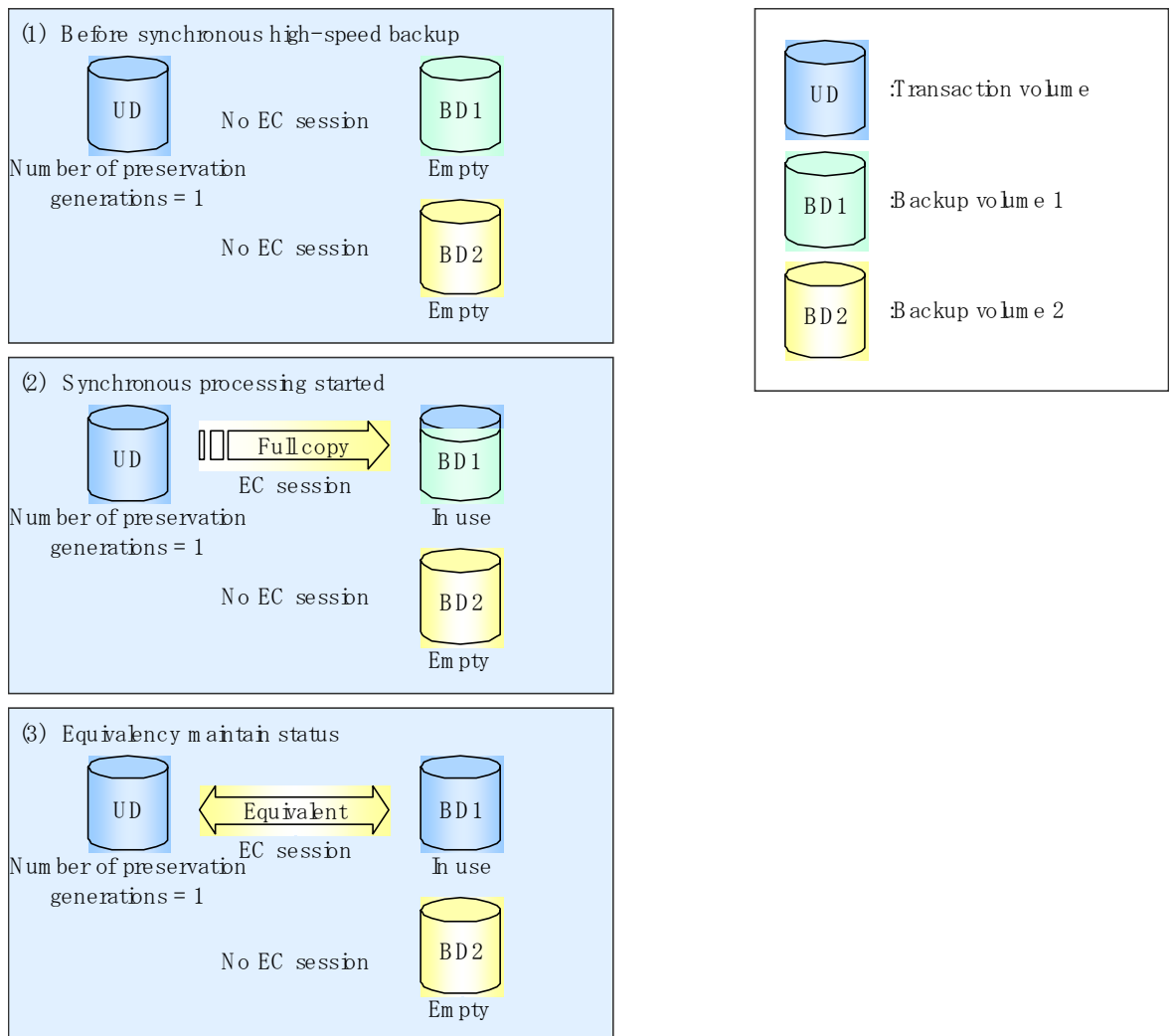
6.5 Backup Operations

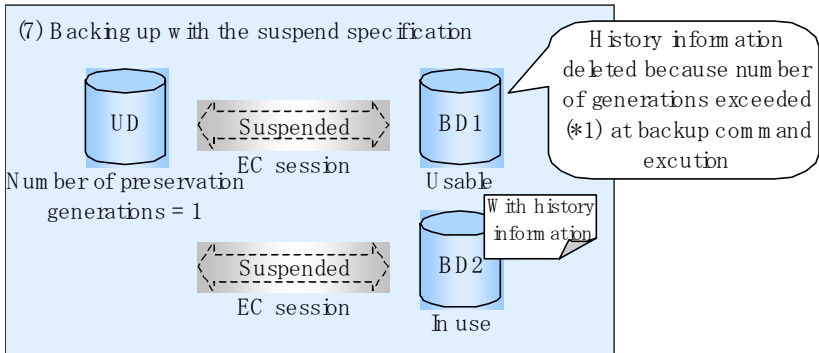
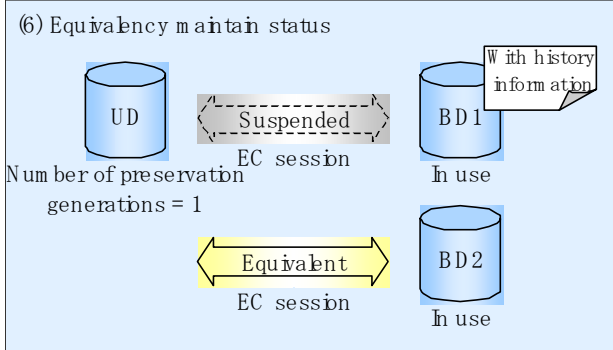
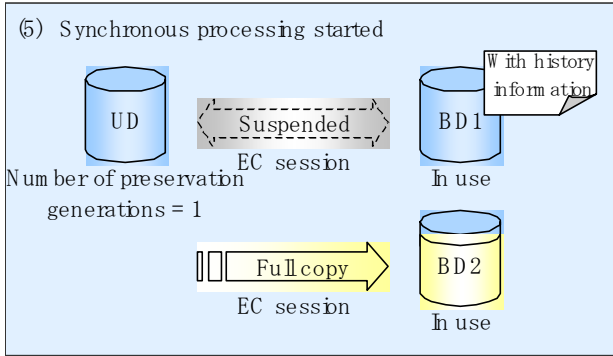
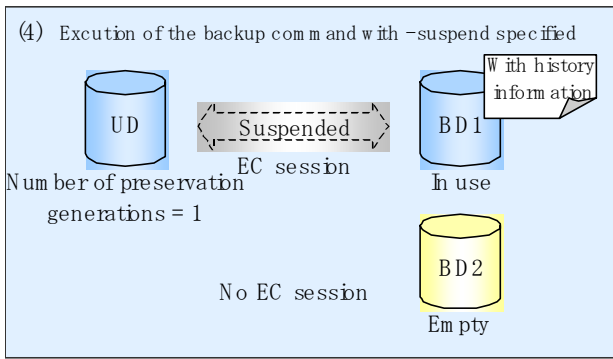
For synchronous high-speed backup using the Suspend/Resume function, execute the backup execution command (swstbackup) with "-suspend" specified after the synchronous processing has started and the equivalency maintenance status has been set, and then suspend the synchronous processing. Then, when history information is deleted because the number of generations has been exceeded or by the history information deletion command, the backup volume enters the Suspend state without history information. If new synchronous processing starts at this time, then the suspended backup volume without history information is selected as a preference, and differential copying starts. Only data that has been updated since the Suspend state was last set is copied, allowing equivalency maintenance status to be attained quickly.

Note that synchronous high-speed backup that uses the Suspend/Resume function can also be executed from a GUI client. Refer to the "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details of the GUI client.

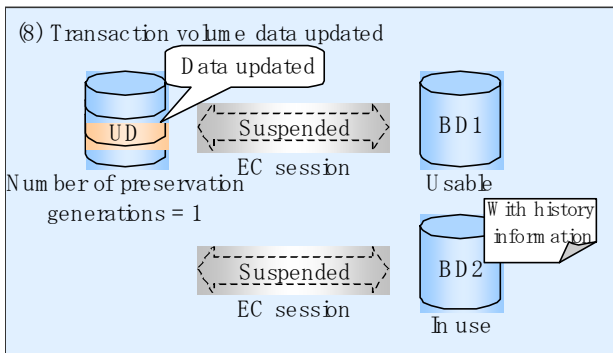
The flow of synchronous high-speed backup operations using the Suspend/Resume function is shown below.

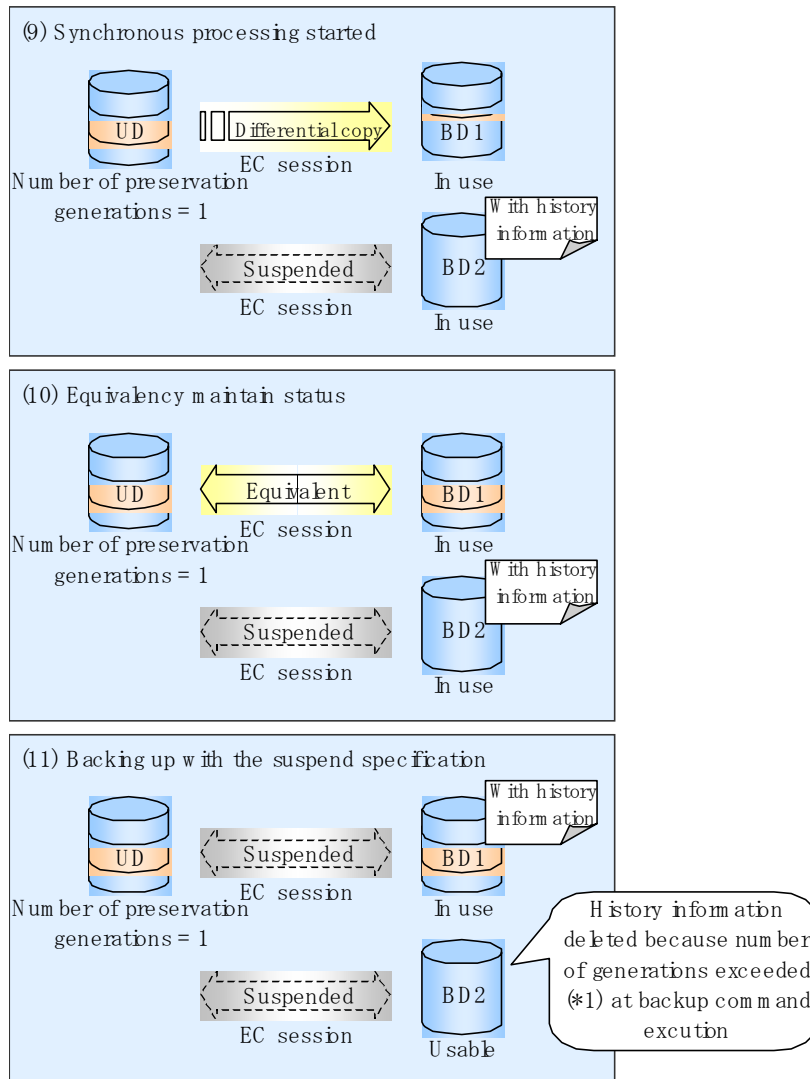
Figure: Synchronous high-speed backup operations using the Suspend/Resume function





*1 "Number of generations exceeded" means that the oldest history information is automatically deleted if existing history information has a certain number of saved generations when the backup command is executed.





6.5.1 Starting synchronous processing

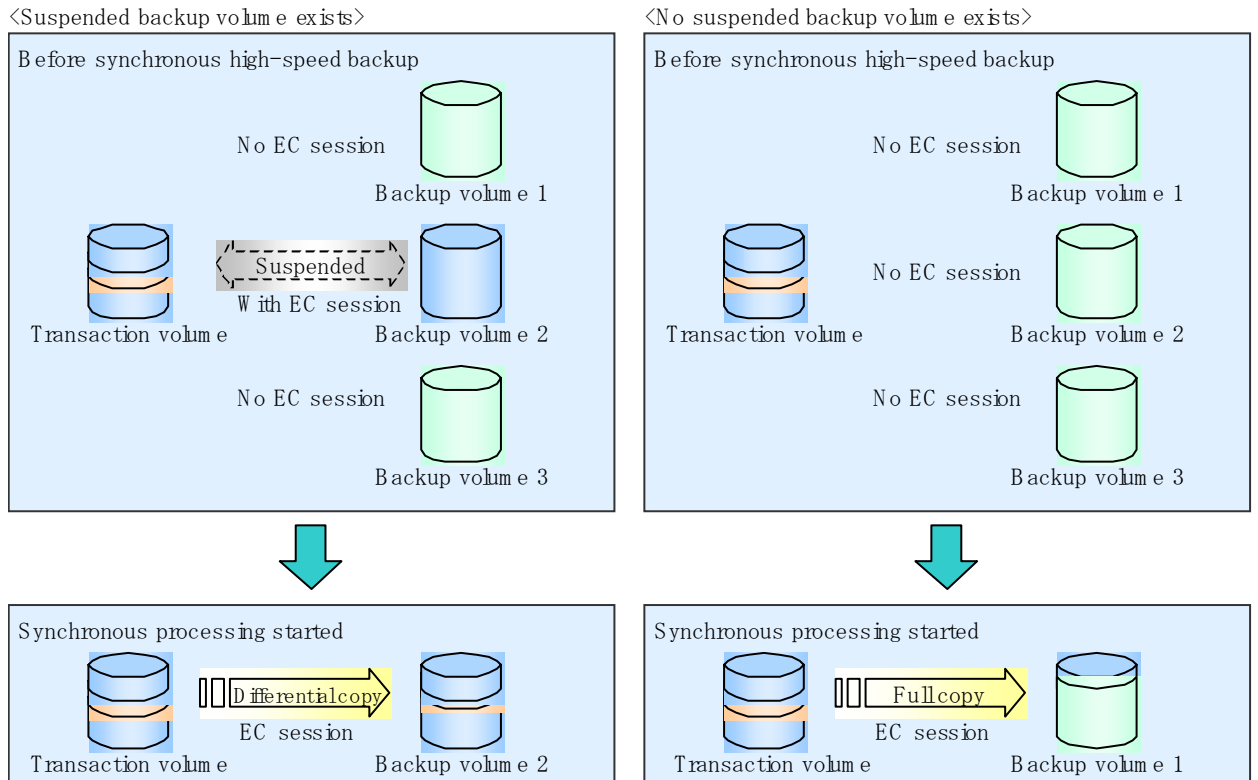
For synchronous high-speed backup, execute the synchronous processing start command (swststartsync) to start the synchronous processing. If there is a suspended backup volume at the start of the synchronous processing, then the following devices are the preferred selections, and EC resumes (differential copying starts (Resume function)).

- The backup volume from which history information is deleted because the number of generations has been exceeded or,
- The suspended backup volume has no history information

If there is no suspended backup volume at the start of the synchronous processing, EC (it, a full copy) starts.

The process of backup volume selection at the start of the synchronous processing is shown below.

Figure: Backup volume selection at the start of synchronous processing



Note

If synchronous processing is started with a device map specified, other transaction volumes and suspended backup volumes cannot be used as the backup destination. To check which transaction volumes are suspended along with their associated backup volumes, execute the backup synchronous processing progress display command (swstsyncstat).

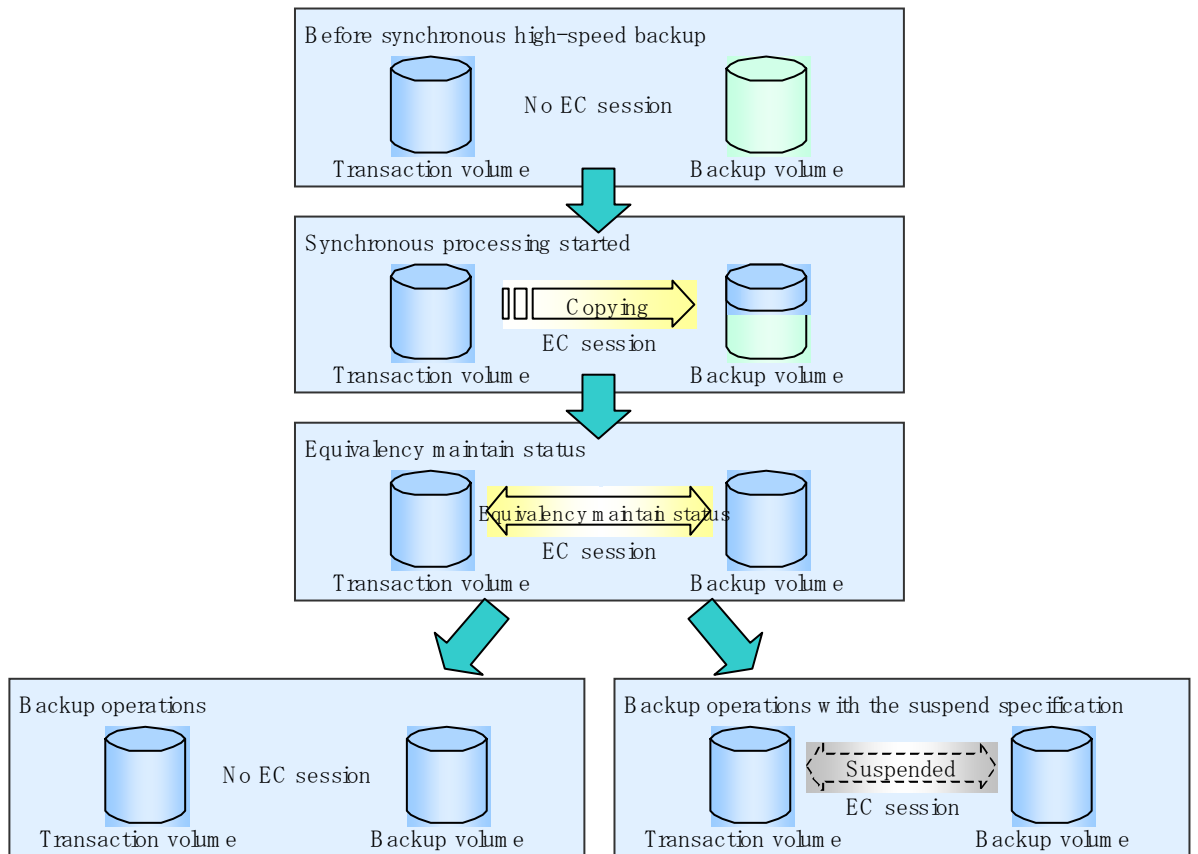
6.5.2 Backing up

For synchronous high-speed backup using the Suspend/Resume function, start synchronous processing. Then, when the copy statuses of the transaction volume and backup volume reach equivalency maintenance status, execute the backup execution command (swstbackup) with "-suspend" specified.

In synchronous high-speed backup, executing the backup command without "-suspend" specified releases the EC session. Executing it with "-suspend" specified suspends the EC session instead of releasing it.

Ordinary backup operations and backup operations with the suspend specification are shown below.

Figure: Ordinary backup operations and backup operations with the suspend specification



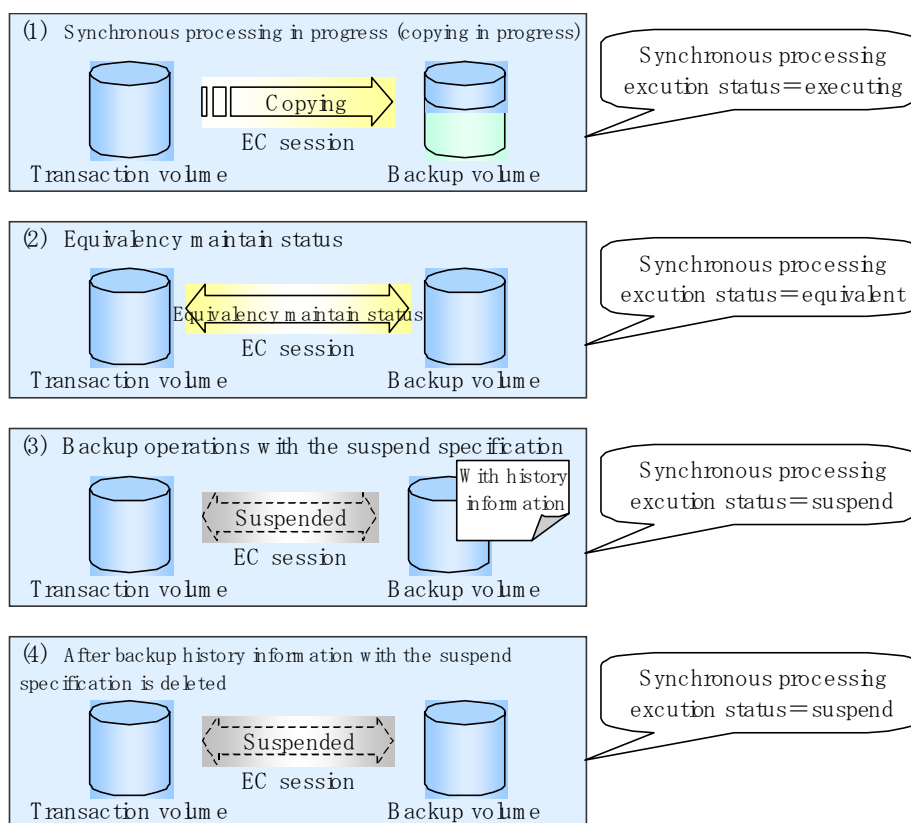
6.5.3 Displaying the synchronous processing execution status

To check the status of synchronous high-speed backup that uses the Suspend/Resume function, execute the synchronous processing progress display command (swtsyncstat). If one transaction volume has multiple EC sessions, then this command displays the status of all EC sessions. The statuses displayed for synchronous processing are explained below.

- executing: synchronous processing in progress (copying in progress)
- equivalent: equivalency maintenance status
- suspend: suspended processing

The command displays the synchronous processing execution status as shown below.

Figure: Ordinary backup operations and backup operations with the suspend specification



6.5.4 Cancelling synchronous processing

To cancel synchronous processing (EC session), execute the synchronous processing cancel command (swstcancelsync). The statuses of the synchronous processing cancelled by the synchronous processing cancel command are explained below.

- executing: synchronous processing in progress (copying in progress)
- equivalent: equivalency maintenance status
- suspend: suspended processing

After the backup command with "-suspend" specified is executed, the Suspend state is maintained even if history information is deleted. A suspended EC session cannot be released unless the synchronous processing is cancelled.

If the synchronous processing is cancelled with no options specified, then the EC session in the synchronous processing status or in the equivalency maintenance status is cancelled.

If one transaction volume has multiple synchronous processing (EC sessions) occurring, then only the EC sessions that correspond to specific backup volumes can be cancelled. All of the synchronous processing of the transaction volume can be cancelled by specifying the synchronous processing.



Note

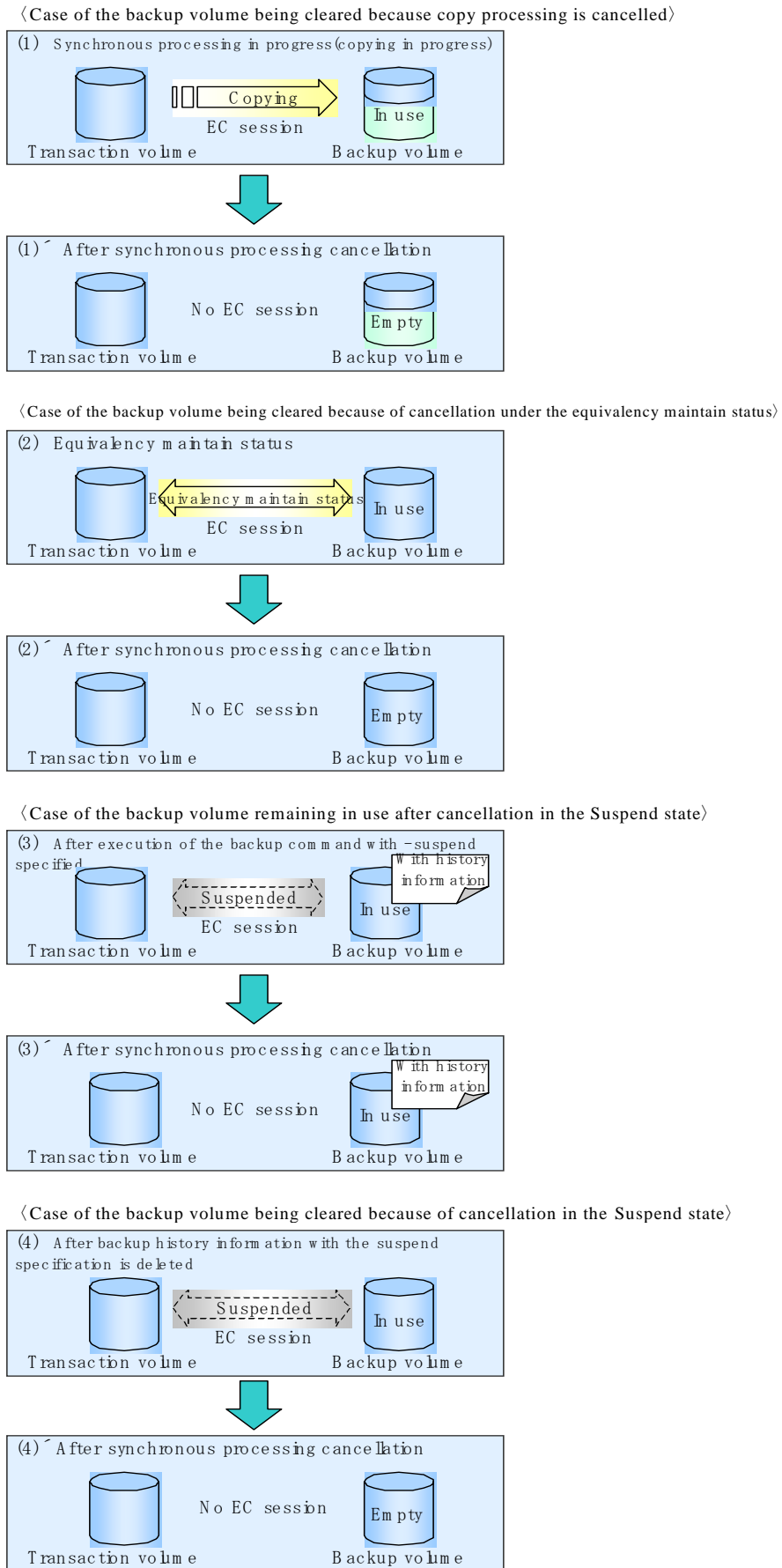
- Both the backup volume and all synchronous processing cannot be specified simultaneously.



Point

- Cancelling suspended synchronous processing that has history information does not delete the history information.
- Cancelling synchronous processing (during copying, in the equivalency maintenance status, or in the Suspend state) that does not have any history information sets the backup volume to the unused state. Cancelling the synchronous processing (in the Suspend state) that has history information leaves the backup volume in the used state. Operational states occurring when synchronous processing is cancelled are shown below.

Figure: Operational states caused by synchronous processing cancellation



6.5.5 History management

To obtain backup history information, execute the history information display command (swsthistdisp).

To delete backup history information, execute the history information deletion command (swsthistdel).

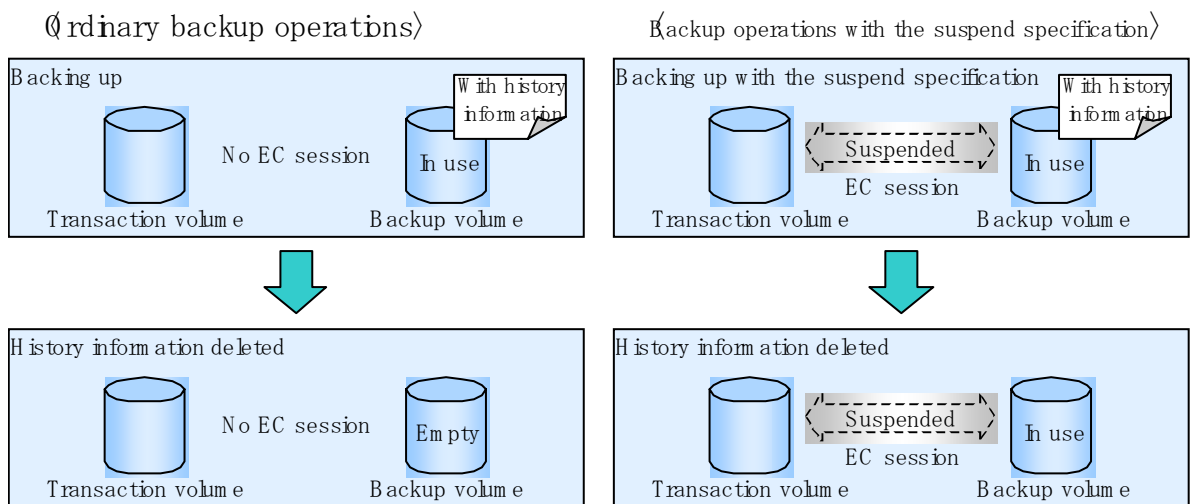


Point

- Even when the history information created during backup operations with the suspend specification is deleted, an associated EC session is not released.
- Deleting history information during ordinary synchronous high-speed backup releases the backup volume, and Backup(free) is displayed in the Device-Mode field by the device usage status display command (swstdevdisp). Deleting history information during backup operations with the suspend specification does not release the backup volume after the information is deleted and Backup(used) is displayed in the Device-Mode field by the device usage status display command.

The process of deleting ordinary backup history information and backup history information with the suspend specification is shown below.

Figure: Deleting ordinary backup history information and backup history information with the suspend specification



6.5.6 Restoring

Before restoration, the synchronous processing cancel command (swstcancelsync) must be executed to release all EC sessions that are set on the transaction volume. To check EC sessions set on the transaction volume, execute the synchronous processing progress display command (swstsyncstat).

To restore data from a backup volume, execute the restore execution command (swstrestore). To cancel restoration or to delete management information associated with restoration that ended abnormally, execute the restore cancellation command (swstcancelrest).



Note

- If the transaction volume has a backup volume being copied by EC, backup volume under the equivalency maintenance status, or suspended backup volume, then restoration is not possible.
- A suspended backup volume cannot be used as the restore destination volume.

Chapter 7 Backup Operation by the QuickOPC Function

This chapter explains the backup operation using the QuickOPC (previously referred to as Differential OPC) function.

7.1 Overview

When a snapshot high-speed backup using OPC is performed, the entire transaction volume must be copied to the backup volume every time the backup (OPC) is started. However, as long as the same transaction volume and backup volume pair is used, the entire transaction volume need not be physically copied every time OPC is started. Instead, physically copying only the data that has been modified since the start of the previous backup can create a complete snapshot image. This can greatly reduce the time taken for physical copying.

The QuickOPC function achieves this by copying only the data that has been changed from the point of the previous physical copy.

The snapshot high-speed backup using the QuickOPC function is referred to as the differential snapshot high-speed backup.

The conventional snapshot high-speed backup and the differential snapshot high-speed backup are compared below:



Note

To implement the differential snapshot high-speed backup using the QuickOPC function, a disk array that supports the QuickOPC function is required.

The QuickOPC function can be used only for an intra-cabinet copy (OPC). It cannot be used for an inter-cabinet copy (ROPC).

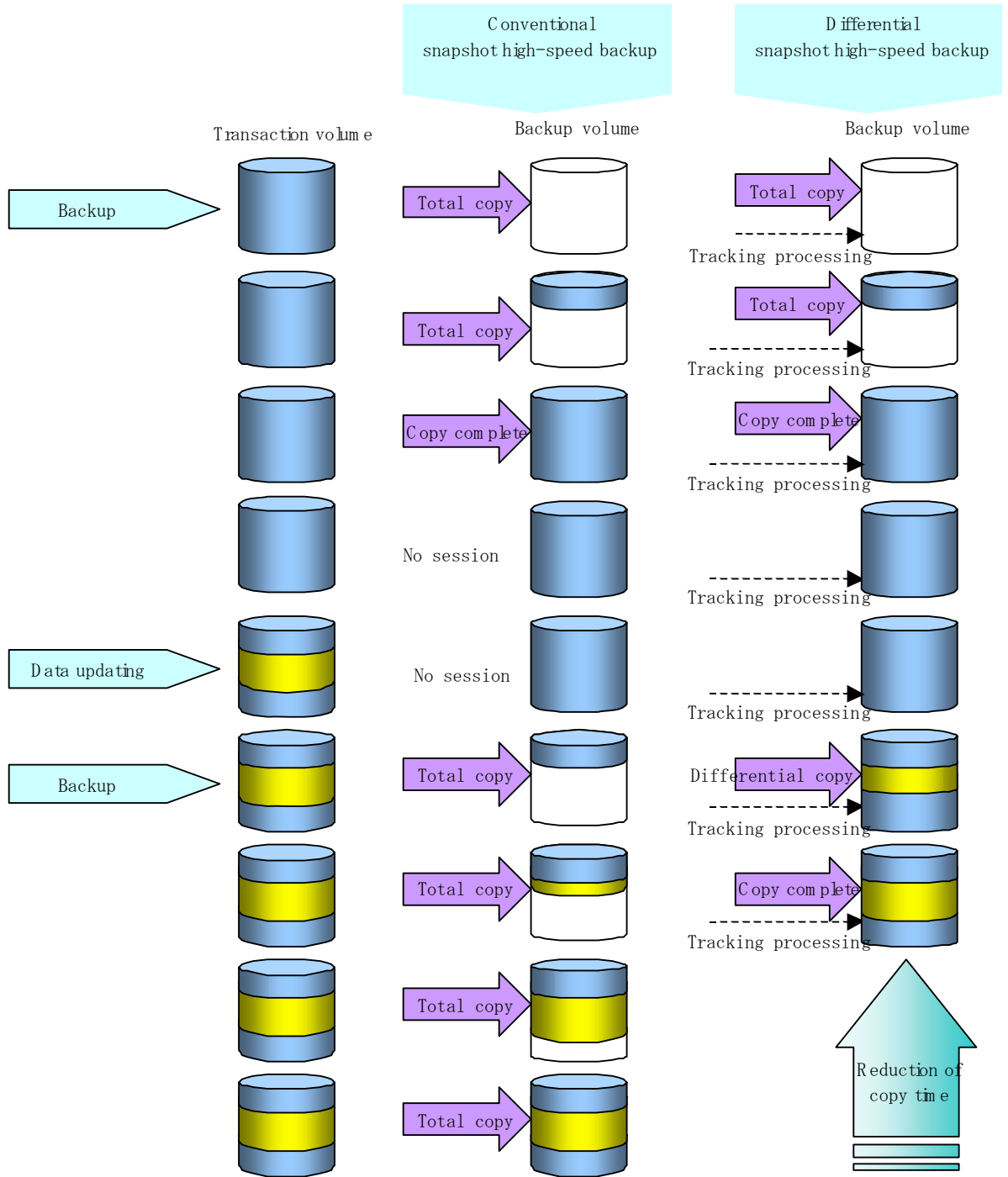
Where SDX objects in units of logical volumes are used, the QuickOPC function cannot be used for backup.



Point

When the QuickOPC function is used, the hardware records any changes that are made to the copy source and destination after completing the OPC logical copy. The state in which the hardware keeps a record of changes is called the "tracking state."

Figure: Comparison between conventional snapshot high-speed backup and differential snapshot high-speed backup



7.2 Configuring Backup Operation

Configure the differential snapshot high-speed backup using the QuickOPC function by noting the following in addition to the information given in Operation Design for backup management.



Note

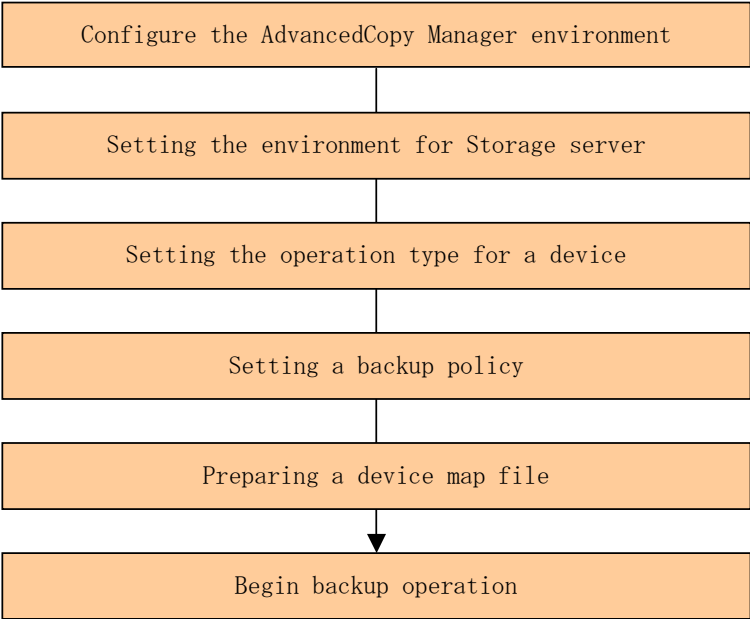
Note the following when making decisions on backup policy configuration and backup volume preparation:

- In a backup operation using the QuickOPC function, an OPC session remains even after the physical copy has been completed. Specify the number of preservation generations so that the maximum number of OPC sessions that can be defined for the same logical unit cannot be exceeded.
- The QuickOPC function can be used only for an intra-cabinet copy (OPC). It cannot be used for an inter-cabinet copy (ROPC). Prepare a backup volume in the same cabinet as the transaction volume to be backed up.

7.3 Operation Flow

A flow of operation using the QuickOPC function is shown below.

Figure: Flow of backup using the QuickOPC function



7.4 Preparation

This section explains the preparation for a backup operation using the QuickOPC function.

7.4.1 Configuring the AdvancedCopy Manager environment

For information regarding configuration of the AdvancedCopy Manager environment, see the "ETERNUS SF AdvancedCopy Manager Installation Guide" and "ETERNUS SF AdvancedCopy Manager Operations Guide".

7.4.2 Configuring the environment for Storage Server

Set the configuration information of the Storage Server used for backup.

This process can be carried out using either GUI operations or commands. For information on the method using GUI, refer to "Modify Storage Server Information in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

For information on the operation method using commands, refer to the Storage Server configuration information configuration command (swstsvrset). In addition, once it is set, you can display the Storage Server configuration information by executing the Storage server configuration information display command (swstsvrdisp)

7.4.3 Configuring the operation type for a device

Register a transaction volume as the backup source and a backup volume to be used as the backup destination.

This process can be carried out using either GUI operations or commands. For information on the operation method using the GUI, refer to "Define the Role of a Volume" in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

For information on registration of transaction volume and backup volume using commands, refer to the Device information configuration command (swstdevinfo). In addition, to display the registered volume information, execute the Device usage status display command (swstdevdisp).

The transaction volume in the tracking state can be checked with the Tracking status display command (swsttrkstat)



Note

- The configuration of the transaction volume in the tracking state cannot be changed.
- The configuration of the backup volume in the tracking state cannot be changed.



Point

The "-b" and "-u" options can be specified together in the device use status display command to check for backup volumes, whose histories were deleted, in the suspend or tracking state.

7.4.4 Configuring a backup policy

When a backup policy is configured, you will need to register as many usable backup volumes as required to perform the operation in accordance with the specified backup policy. This process can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Set Backup Policy in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

For information on the operation method using commands, refer to the following:

- Backup Policy Setup: Backup policy configuration command (swstbkpolset)
- Check Backup Policy that has been set up: Backup policy display command (swstbkpoldisp)
- Backup Policy Deletion: Backup policy deletion command (swstbkpoldel)

7.4.5 Preparing a device map file

To determine the backup destination, AdvancedCopy Manager automatically selects a device that has the same capacity as the target transaction volume from a group of devices registered as backup volumes.

If a backup volume in the tracking state exists when AdvancedCopy Manager looks for a backup volume for the snapshot high-speed backup, it will select a backup volume in the tracking state as a preference to any others and uses it as the backup destination.

When it is necessary to specify the backup destination device, a device map file that defines the relationship between a transaction volume and backup volume must be created in advance. By specifying the device map file when starting the backup operation, the backup operation can thus be performed as if the backup destination is specified.



If multiple generations are to be managed, multiple device map files must be prepared.

7.5 Operation

7.5.1 Executing backup

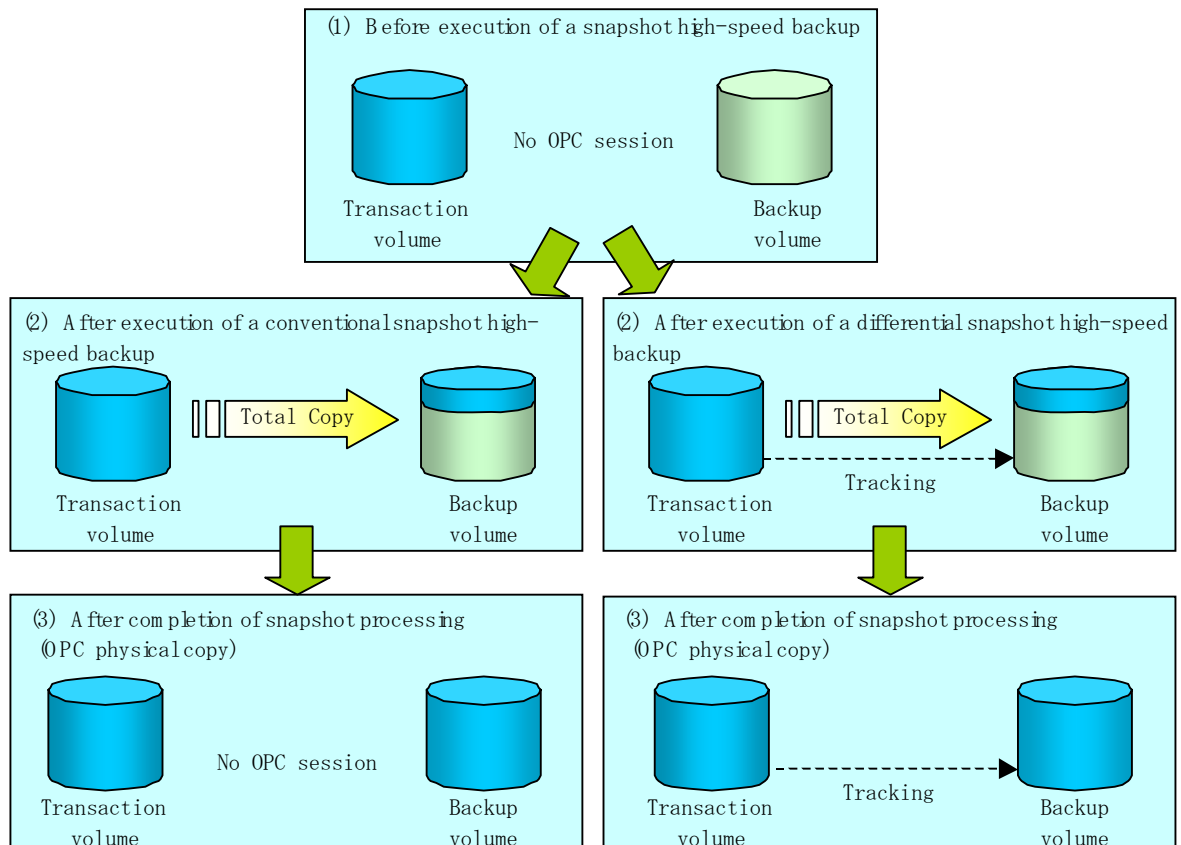
Execute the differential snapshot high-speed backup by specifying the `-T` option in the backup command (`swstbackup`).

Executing the backup command using the `-T` option starts the QuickOPC, and the physical copy and tracking processing begins. When the physical copy is complete, only the tracking processing is active. When the backup command is subsequently executed the next time using the `-T` option, only the difference in data from where OPC was started previously is copied physically.

Note that differential snapshot high-speed backup can also be executed from a GUI client. Refer to "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's guide" for details of the GUI client.

The figure below shows the conventional snapshot high-speed backup and the differential snapshot high-speed backup.

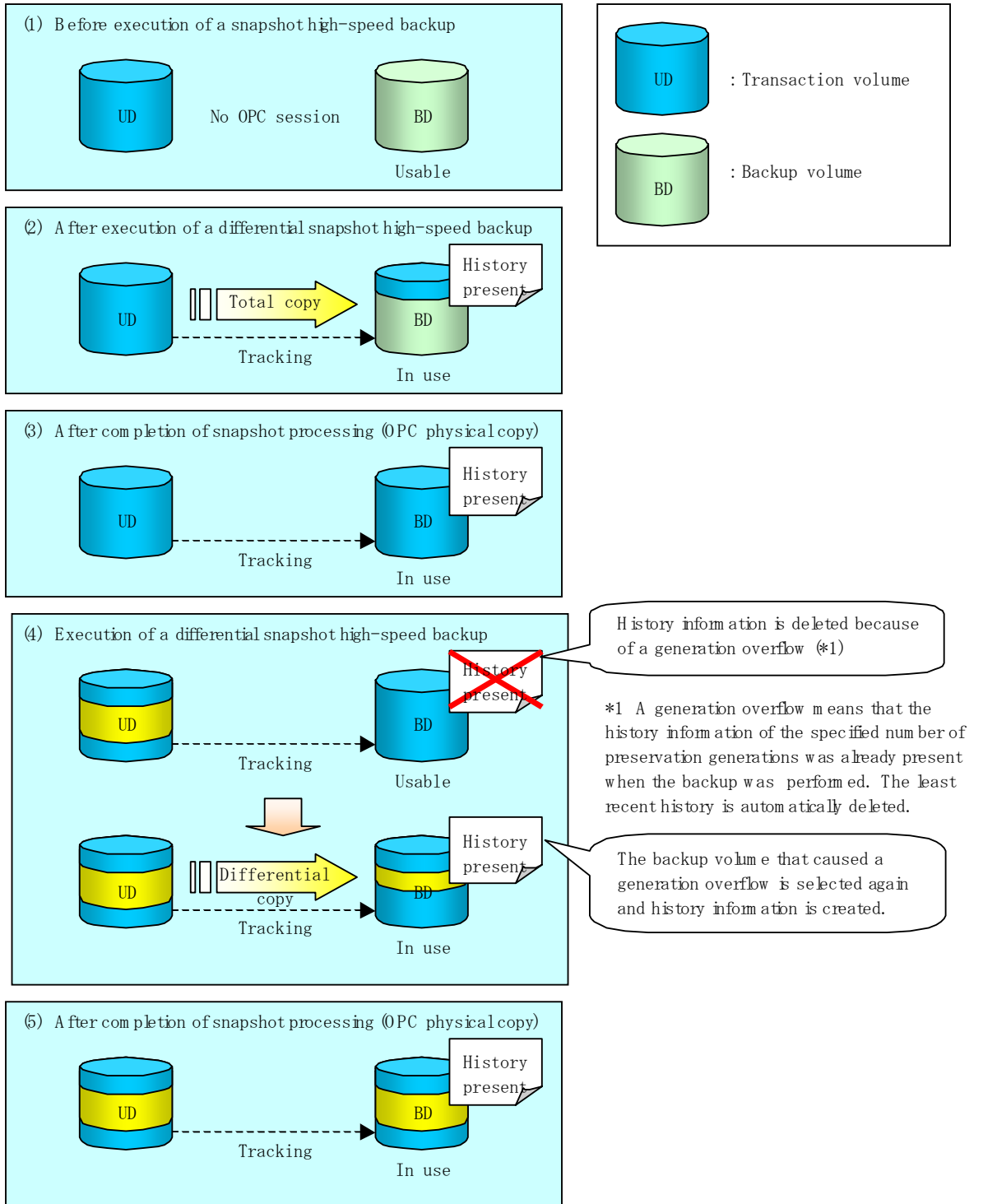
Figure: Conventional snapshot high-speed backup and differential snapshot high-speed backup



After history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without any history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history information is selected as a first preference to start the differential data copy. The physical copy can thus be completed in a short period because only the data which is different from where OPC was started previously is copied.

The figure below shows a flow of a differential snapshot high-speed backup operation in which only one generation is preserved.

Figure: Flow of differential snapshot high-speed backup operation



7.5.2 History management

Backup history information can be referenced using the history information display command (swsthistdisp).

Backup history information can be deleted using the history information deletion command (swsthistdel).

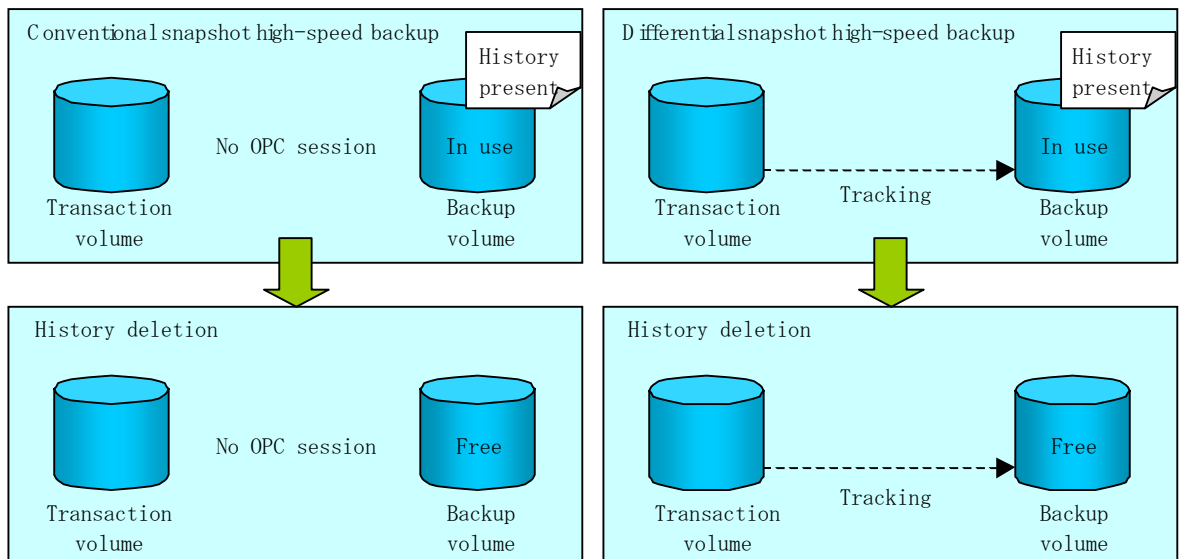
Even if the history information created by the differential snapshot high-speed backup is deleted, the tracking state is not released (that is, the physical copy, if it is being executed, is not stopped).

In the conventional snapshot high-speed backup, after the history information is deleted, the backup volume is released and "Backup (free)" is displayed in the Device-Mode column by the device usage status display command (swstdevdisp). In the differential snapshot high-speed backup, however, the backup volume is not released even after the history information is deleted and "Backup (used-T)" is displayed in the Device-Mode column by the device use status display command.

To check for backup volumes in the tracking state, specify the "-u" option in the device use status display command. For a backup volume in the tracking state, "Backup (used-T)" is displayed in the Device-Mode column.

The figure below shows a comparison of history deletion between the conventional snapshot high-speed backup and the differential snapshot high-speed backup.

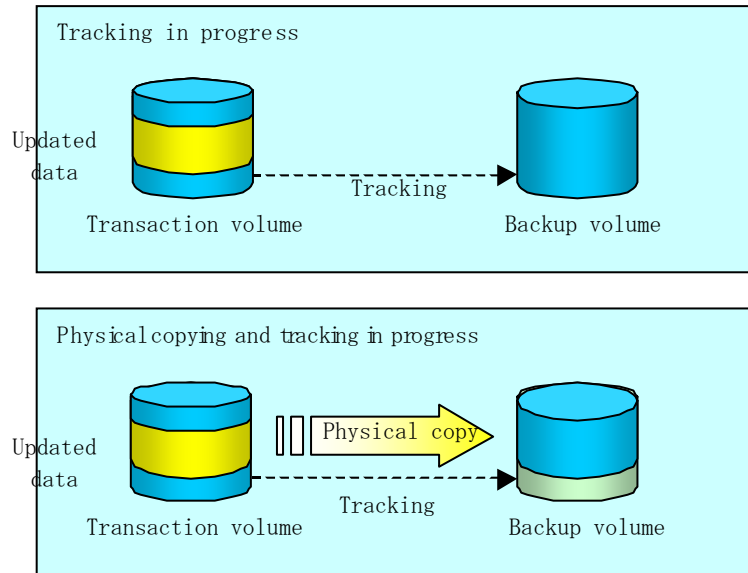
Figure: Comparison of history deletion between snapshot high-speed backup and differential snapshot high-speed backup



7.5.3 Restoration

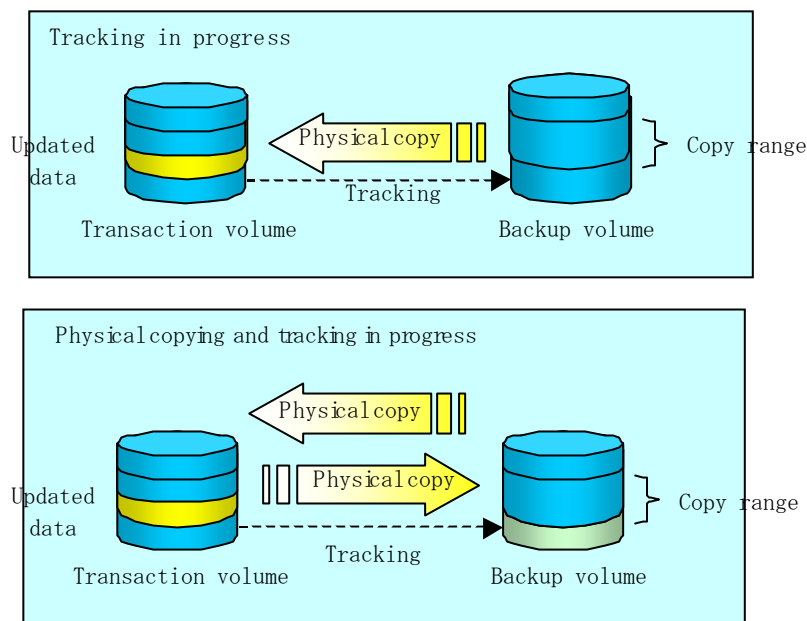
This section explains how to use the restore execution command (swstorestore) for restoration. In differential snapshot high-speed backup, tracking processing from the transaction volume to the backup volume is performed.

Figure: Before restoration of differential snapshot high-speed backup



When restoration is executed, normal OPC from the backup volume to the transaction volume is started while the tracking state from the transaction volume to the backup volume is maintained. Because OPC for restoration physically copies only the data that has been updated after the most recent backup, the time taken for the physical copy can be reduced for the restoration, as well as for the backup.

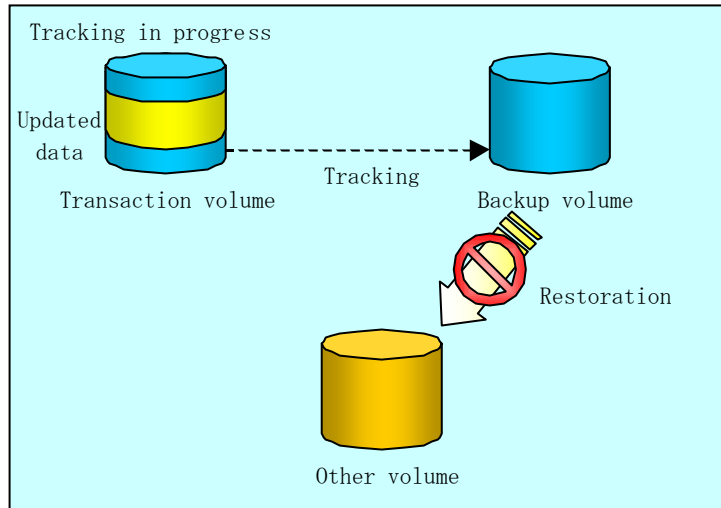
Figure: After restoration of differential snapshot high-speed backup



While tracking processing is being performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes is required, the following steps must be performed in advance:

1. If the OPC physical copy from the transaction volume to the backup volume is in progress, you must wait for completion of the copy.
2. Stop tracking processing using the tracking cancel command (swstcanceltrk).

Figure: When tracking is in progress



If tracking processing is terminated, all data in the transaction volume is physically copied by the next differential snapshot high-speed backup.

7.5.4 Canceling restoration

Use the restore cancellation command (swstcancelrest) to cancel the restoration.



Canceling the restoration does not release tracking from the transaction volume to the backup volume.

7.5.5 Displaying the execution status of tracking processing

The execution status of tracking processing by the QuickOPC function can be checked with the tracking execution status display command (swsttrkstat).

Information on any OPC session that is not in tracking is excluded from the display. In the case of an OPC session with an execution status of tracking, the amount of data that has been updated after execution of the QuickOPC (that is, the logical copy) is displayed as a percentage in the Update column.

7.5.6 Stopping tracking processing

Use the tracking cancel command (`swstcanceltrk`) to stop tracking processing.



If the command is issued while the physical copy and tracking are in progress, only the tracking is stopped but the physical copy is not stopped.

Chapter 8 Replication

This chapter explains AdvancedCopy Manager replication in a Linux system. AdvancedCopy Manager uses a partition or a Logical Unit (disk) as the replication unit. In this manual, the term "volume" is used instead of "partition" or "Logical Unit (disk)".

8.1 Overview

This chapter explains the AdvancedCopy Manager replication function.

Using the advanced copy function (OPC or EC function) of an ETERNUS disk array, the AdvancedCopy Manager replication function performs high-speed replication between volumes, regardless of the volume capacities.

Replication that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of an ETERNUS storage system disk array unit is called snapshot replication. Replication that uses the Equivalent Copy (EC) or Remote Equivalent Copy (REC) function is called synchronized replication.

The replication function creates copies so that the information at a certain point of time can be used for different purposes. It can be used independently of or combined with the backup function.

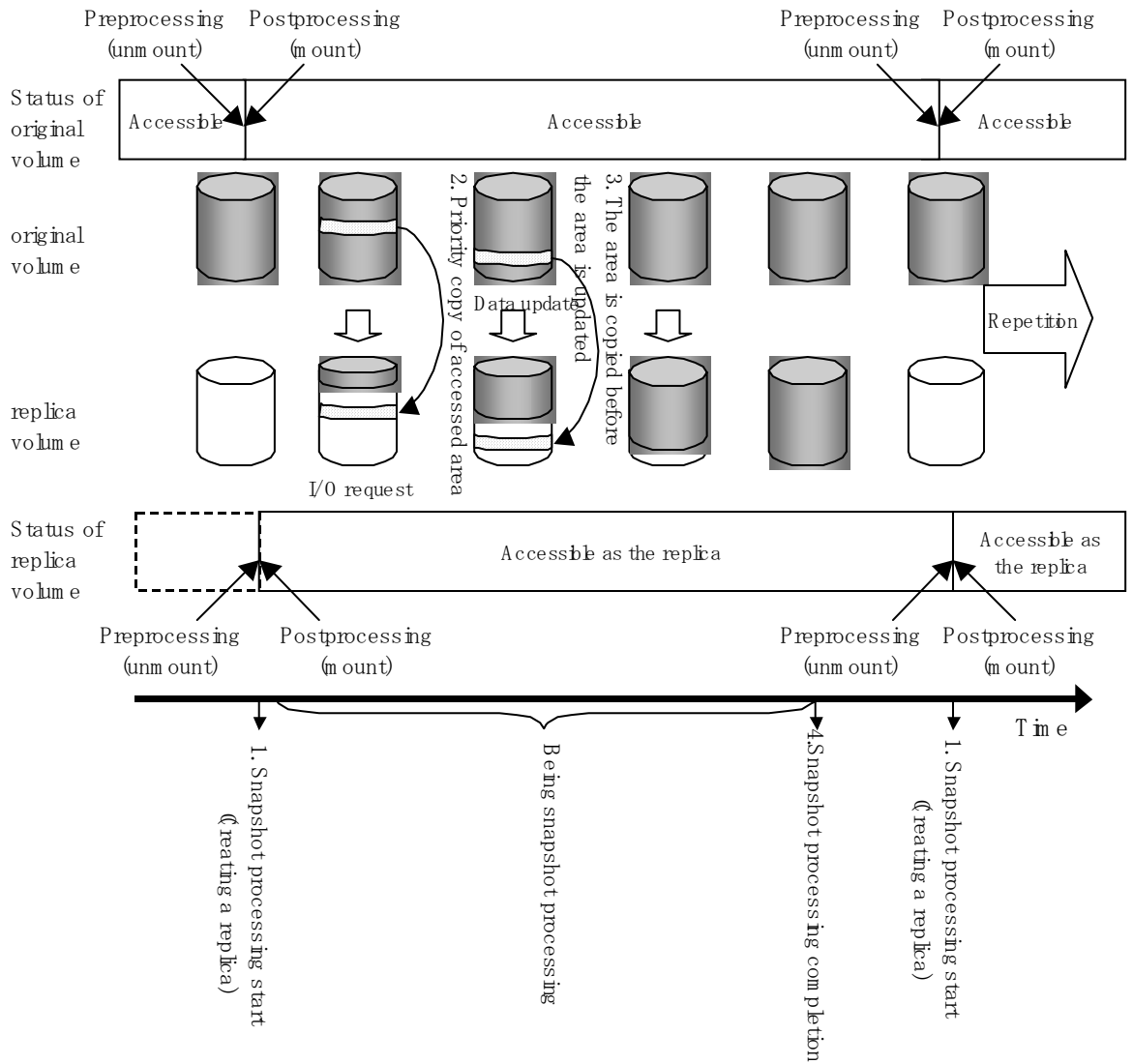
8.1.1 Snapshot replication processing

Snapshot replication creates replicas by copying from an original volume to a replica volume using the OPC or ROPC function of an ETERNUS disk array.

The snapshot replication performs the following two types of processing:

1. When a copy is created, the snapshot processing (OPC or ROPC) from the original volume to the replica volume is executed with the replication creation command (swsrpmake). The replication creation command (swsrpmake) dismounts or mounts the original volume. This will determine the original data (for details, refer to "Preprocessing and Postprocessing of Replication"). ((1) to (4) in the following figure)
2. If the user wants to re-create a replica, only the replication creation command (swsrpmake) is required. If the previous snapshot processing is in progress, it is stopped and new snapshot processing is started.

Figure: Snapshot replication processing



Snapshot replication is completed when the replication creation command is issued. The actual data is internally copied by the OPC or ROPC function of the ETERNUS storage system disk array unit.



Note

An ETERNUS disk array that supports the ROPC function is required in order to use it in the Advanced Copy function snapshot replication.

8.1.1.1 Snapshot replication types

The following types of snapshot replication are available, depending on the AdvancedCopy Manager functions used:

- Ordinary snapshot replication
- QuickOPC replication
- SnapOPC replication
- SnapOPC+ replication



Note

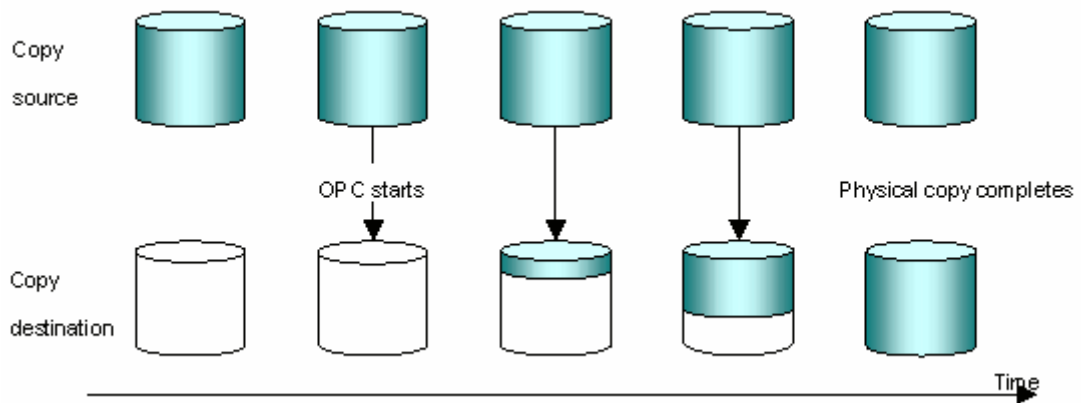
SnapOPC+ replication cannot be used with the following OS:

- Red Hat Enterprise Linux AS (v.3 for x86)
- Red Hat Enterprise Linux ES (v.3 for x86)

Ordinary snapshot replication

All data at a specific point in time (logical copy) is copied to the copy destination disk area.

Figure: Ordinary snapshot replication



Point

The copy destination disk area must be the same or larger than the copy source disk area.

The copy time is the time taken to copy all the data.

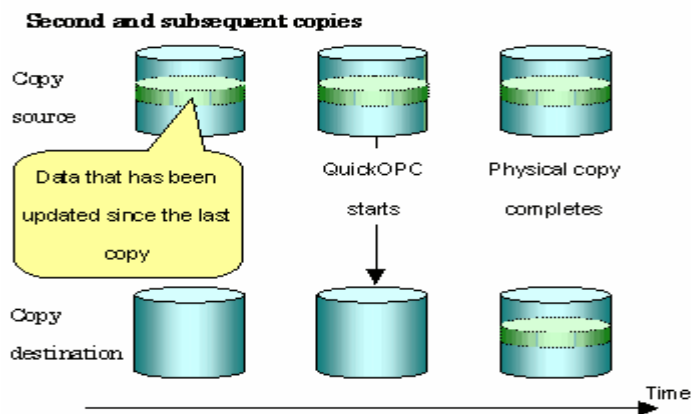
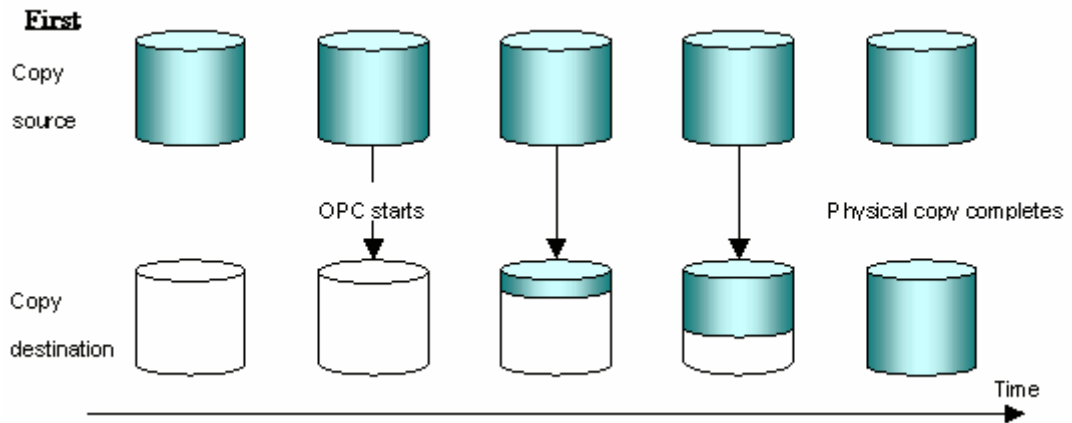
QuickOPC type replication

If the ETERNUS disk array supports the QuickOPC function, then QuickOPC replication can be performed.

Initially, all the data at a specific point in time (logical copy) is copied to the copy destination disk area.

Second and subsequent copy operations copy only the data that has been updated since the previous copy operation. This enables large reductions in the time taken for physical copying.

Figure: QuickOPC replication



Point

The copy destination disk area must be the same or larger than the copy source disk area.
The time for second and subsequent copy operations is the time taken for copying the differential data.



Note

To execute QuickOPC replication, an ETERNUS disk array that supports the QuickOPC function is required.
The QuickOPC function can be used only for copying within a cabinet (OPC). The function cannot be used for copying between cabinets (ROPC).
The QuickOPC function also cannot be used for replicating SDX objects in the units of logical volumes.



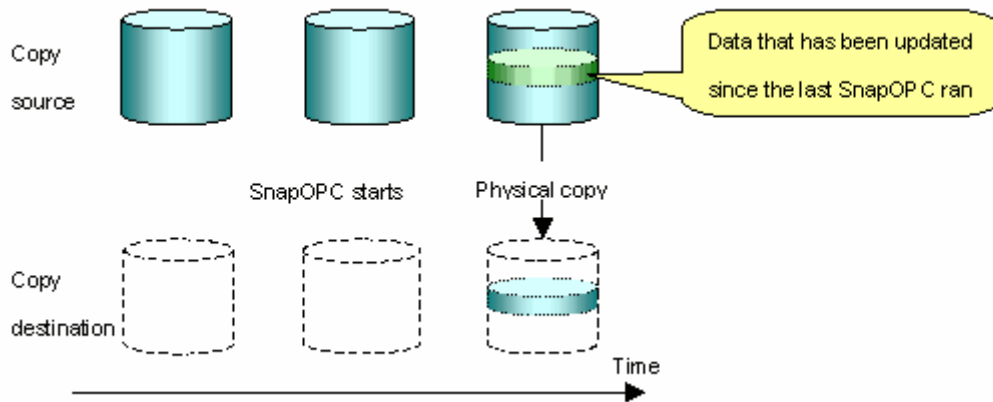
Point

In the case of QuickOPC, the hardware functionality records the updates made to the copy source or destination after the completion of OPC logical copying. The status in which the hardware records updates is referred to as the "tracking status."

SnapOPC type replication

SnapOPC is a function that enables only data that has been updated to the copy source disk area since a certain point in time (logical copy) to be copied to the copy destination disk area.

Figure: SnapOPC replication



Point

The copy destination disk area can be smaller than the copy source disk area. The copy time is the time needed to copy data that has been updated.



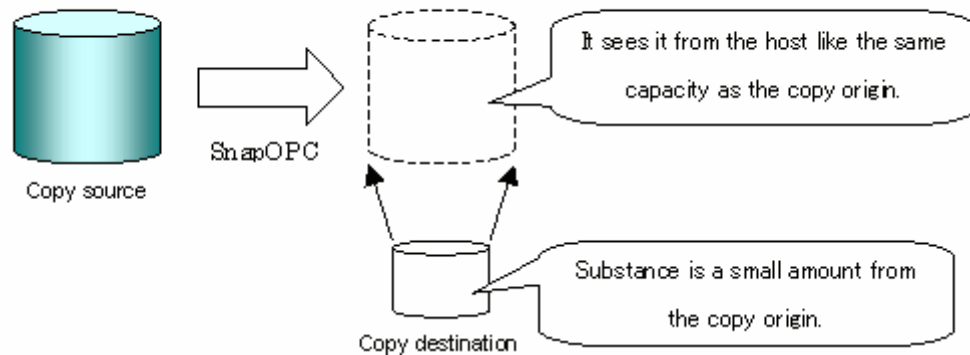
Note

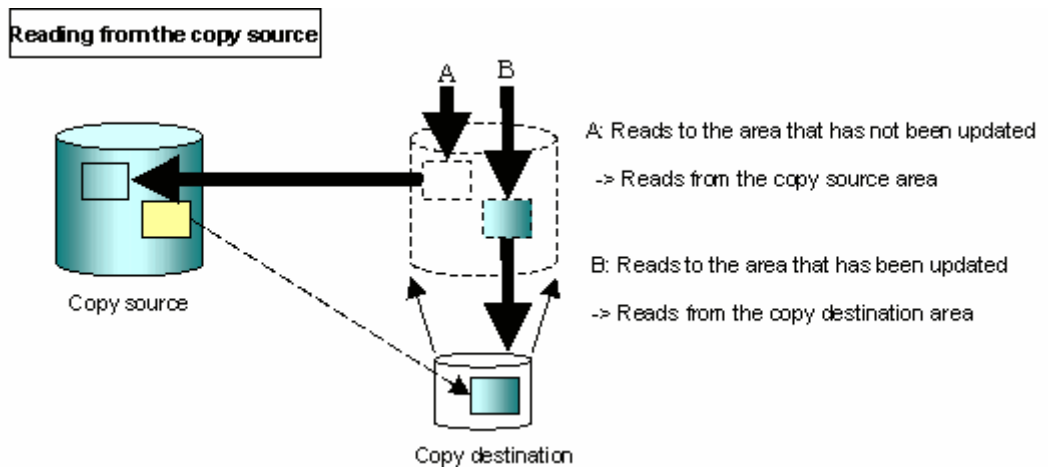
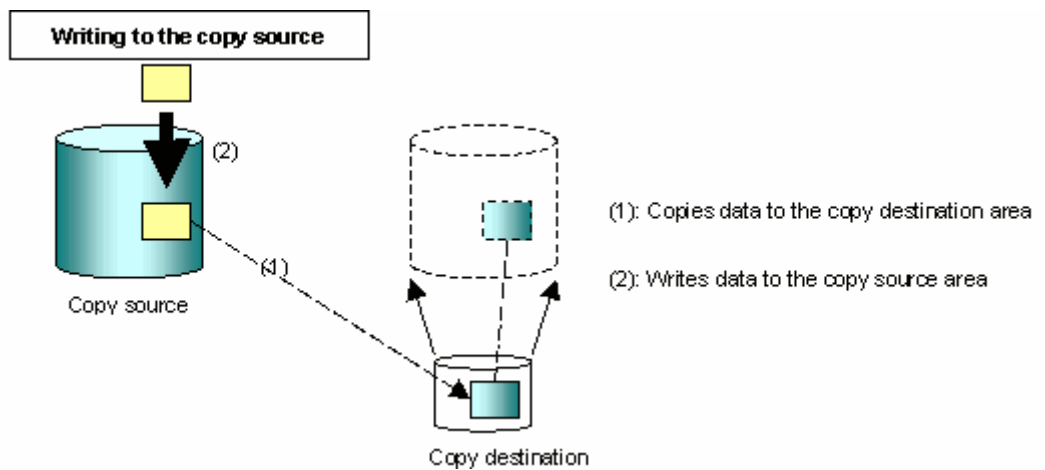
SnapOPC can only be used for replication (OPC) within a cabinet, not for inter-cabinet replication (ROPC).

The copy destination disk for SnapOPC is referred to as a Snap Data Volume.

Figure: SnapOPC mechanism

Mechanism of SnapOPC





In some ways, SnapOPC is superior to conventional OPCs, since copy times are shorter and copy destination volumes have a smaller capacity. However, there are problems in terms of access performance and the reliability of copy data.

Access performance

Since the data copy from the copy source to the copy destination occurs within the hardware in the case of SnapOPC, sometimes the access performance of the copy source drops, as well as the access performance of the copy destination.

Reliability of copy data

Copy data is made up of two parts: the "copy source" and "updated part of the copy source". Therefore, a hardware fault with the copy source can cause copy data to be lost. Additionally, performing a restoration is equivalent to losing the "copy source" data, and so even if there are multiple "updated parts of the copy source", these would become redundant from the point when the restoration is performed.

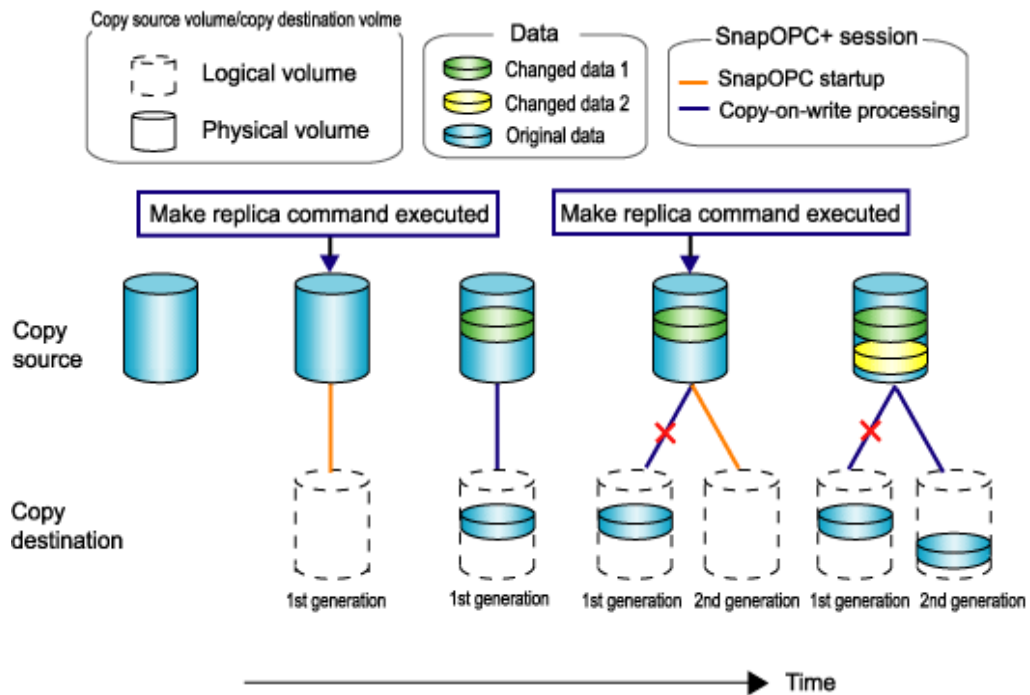
These points suggest that SnapOPC should be used only as staging areas for tape backups in hardware configurations where access performance is not an important consideration.

SnapOPC+ type replication

When data is updated, the SnapOPC+ function copies only the pre-update data of the updated data, and saves the data in snap generation units.

The following figure shows the flow of SnapOPC+ processing.

Figure: SnapOPC+ function flow



1. Logical copy is performed from the copy source to the copy destination.
2. After the logical copy, a SnapOPC+ session is set between the copy source and the copy destination.
3. After the SnapOPC+ session is set, only the pre-update data of the data updated at the copy source is copied to the copy destination (copy-on-write processing).
4. When the next copy destination volume is created, the copy-on-write processing is stopped.
5. Then, a SnapOPC+ session is set between the copy source volume and the new copy destination volume, and copy-on-write processing is performed.
6. Each time a copy destination volume is created, a snap generation number is assigned to that volume.
(Snap generation numbers are assigned in sequence from 1 to 8, starting with the oldest.)

Since SnapOPC+ copy-on-write processing is performed only between the copy source volume and the latest copy destination volume, there is no effect on access performance to the copy source volume even when the number of copy destination volumes increases.

In addition, space at the copy destination volume is required only for the amount of pre-update data for the data updated immediately prior and for a hardware management area. Thus, use of SnapOPC+ enables the saved data area to be kept to the minimum area required.

Snapshot replication that uses SnapOPC+ is called SnapOPC+ replication.

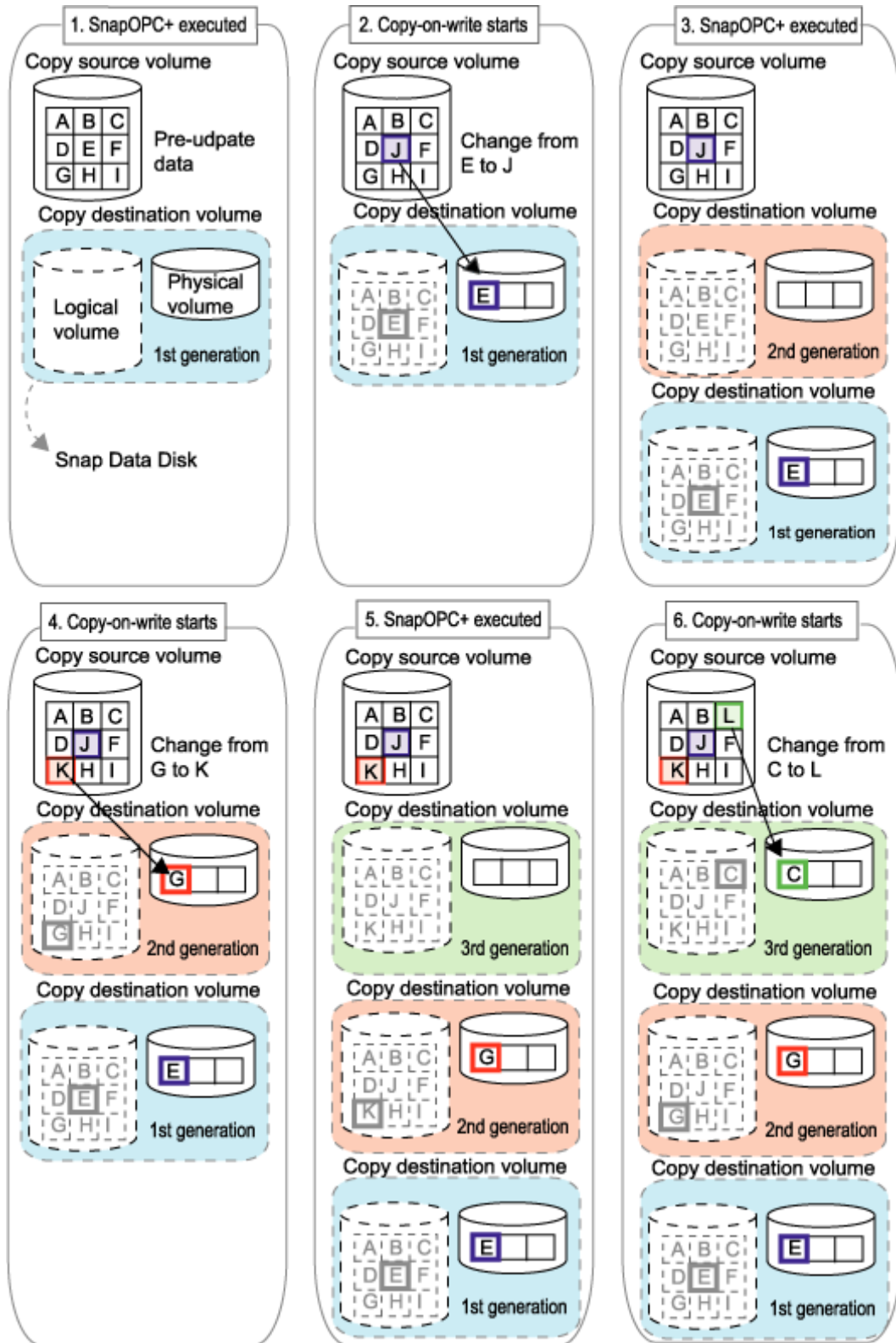


Note

The replication function cannot be used restore data when SnapOPC+ is used. If restoration is required, the data must be copied manually from the copy destination volume.

The following figure shows use of SnapOPC+ to perform 1:N replication operations between a copy source volume (1) and multiple snap generations (N: 1 to 8).

Figure: 1:3 replication operations using SnapOPC+



Due to the mechanism and features of SnapOPC+, it is assumed that SnapOPC+ will be used as a backup to enable recovery from soft errors, such as operator mistakes and software errors. In order to also be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all data by means of OPC/QuickOPC/EC/REC.

The following table lists the function differences between SnapOPC and SnapOPC+.

Table: List of function differences between SnapOPC and SnapOPC+

Function	SnapOPC	SnapOPC+
Copy method	Copy-on-write method	Copy-on-write method
Copy time (logical copy duration)	Instant	Instant
Copy destination volume type	Snap Data Volume	Snap Data Volume
1:N operation	Yes	Conditionally: Access performance to the copy source volume is better than with SnapOPC. Also, compared with SnapOPC, less physical space is required at the copy destination volume.
Snap generation numbers	No	Yes
Maximum number of sessions(*)	8	8
Restoration using the replication function	Yes	No
Usefulness	<ul style="list-style-type: none"> ● Tape backup temporary area ● Backup of file servers or similar that have a small amount of updates 	<ul style="list-style-type: none"> ● Tape backup temporary area ● Backup of file servers or similar that have a small amount of updates

*: The maximum number of sessions is the maximum number of sessions that can be set for one copy source volume.

8.1.1.2 Snap Data Volume extension function

If there are updates that are larger than the physical capacity of a Snap Data Volume, this function enables area to be added from a Snap Data Pool that has been set in advance in order to extend the physical capacity of the Snap Data Volume.

If Snap Data Volume extension is not required, the Snap Data Volume can be used without setting a Snap Data Pool.

See below for further details.

Snap Data Volume

The copy destination volumes of Snap OPC and Snap OPC+ are called Snap Data Volumes. The capacity of these copy destination volumes (Snap Data Volumes) seen from the host is called the "logical capacity", and the physically configured capacity is called the "physical capacity".

For the logical capacity, set a value that is the same or larger than the copy source capacity. In addition to storing backup data, the physical capacity has control information (conversion tables) used for managing backup data. The size of the control information amounts to 0.1% of the logical capacity.



Note

If a capacity shortage occurs for the Snap Data Volume, access to the copy destination volume (Snap Data Volume) becomes completely impossible. If a capacity shortage occurs, refer to "Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs".

Snap Data Pool

The Snap Data Volume pool function of ETERNUS enables a Snap Data Pool to be set.

If a Snap Data Pool has been set, area is automatically added from the Snap Data Pool when a Snap Data Volume capacity shortage occurs.

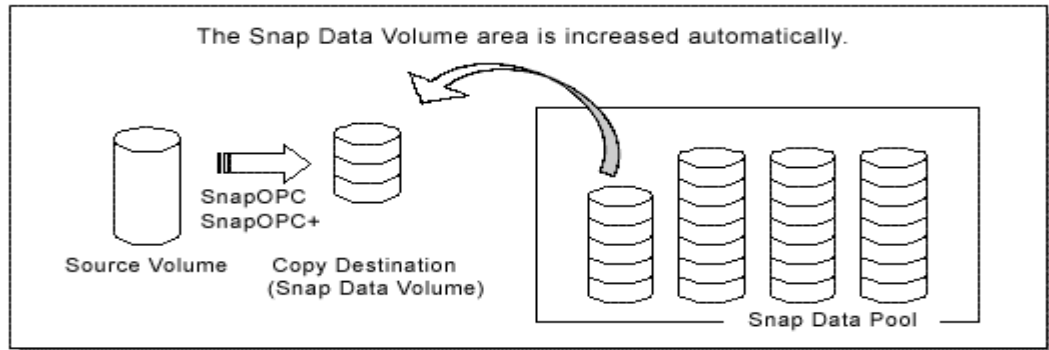


Note

When a Snap Data Pool capacity shortage occurs, the same as when a Snap Data Volume shortage occurs, access to the copy destination volume (Snap Data Volume) becomes completely impossible.

If a capacity shortage occurs, refer to "Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs".

Figure: Snap Data Volume extension image



8.1.2 Synchronized replication processing

Replicas are created by copying from the original volume to the replica volume using the EC or REC function of a ETERNUS storage system disk array unit.

Synchronized replication uses two methods to create a copy

- Full copying where all of the original volume is completely copied,
- Incremental copying where only modified data from the previous copy is copied

- Creating replicas with full copying
Use this method to create the first copy in a replication.
- Creating copies with incremental copying
Use this method to create subsequent copies once a previous replica already exists.
Copies are created by copying the data that has been updated after an initial copy has been made (full copying and incremental copying).

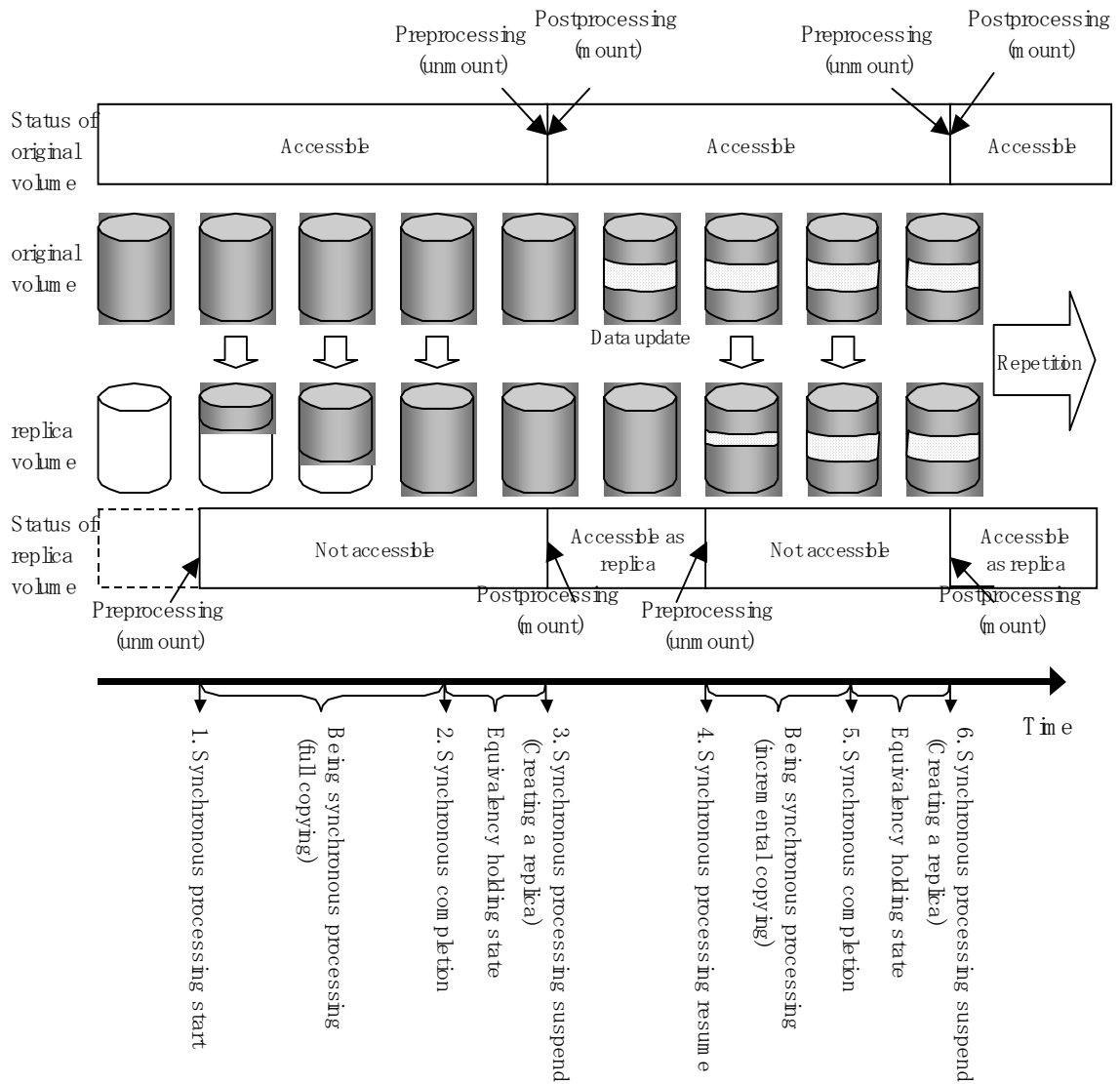
The following steps describe the procedure for synchronized replication:

1. Synchronized processing (EC/REC) using the synchronous processing start command (swsrpstartsync) starts, then full copying starts. (See (1) in the following figure)
2. When full copying is complete, both the original volume and replica volume both enter equivalence status. From this point on, updates in the original volume is sequentially reflected in the replica volume so that data equivalence is always maintained (equivalency maintenance state). (States in (2) and (3) in the following figure)
3. Synchronized processing is temporarily stopped with the replication creation command (swsrpmake) to create a copy of the original volume. The replication creation command dismounts or mounts the original volume. This process will define the original data image (for details, refer to "Preprocessing and Postprocessing of Replication"). After execution of the replication creation command, the replica volume can be accessed (copy established status). (States in (3) and (4) in the following figure)
4. To create another copy, the synchronized processing that has been temporarily stopped is restarted with the synchronous processing start command. For this copy, the only data copied to the replica volume is the (incremental) data on the original volume that has been updated since the previous copy was made until the restart of synchronized processing ((4) in the following figure).

When the replica volume has been updated after the previous copy is made, the content of the previous update of the replica volume is cleared.

5. When the incremental data has been copied, the status returns to the equivalency maintenance state again. (States in (5) and (6) in the following figure)
6. When this status has been set, the copy is re-created with the replication creation command. ((6) in the following figure)

Figure: Synchronized replication processing



Note

- To use using the EC or REC function in synchronized replication, the disk array devices must support the EC or REC function.
- The replication creation command (swsrpmake) cannot be executed unless both the original volume and replica volume are in the equivalence maintenance status.

8.2 Operational configuration

This chapter explains the operation of AdvancedCopy Manager replication.

Design replication using the following procedures:

- Determine the server that performs replication.
- Determine the replication target.

Refer to "Notes of the design in SnapOPC/SnapOPC+ replication", when the SnapOPC/SnapOPC+ snapshot replication is used.

To backup or restore a system volume, refer to "System volume backup operations" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Linkage".

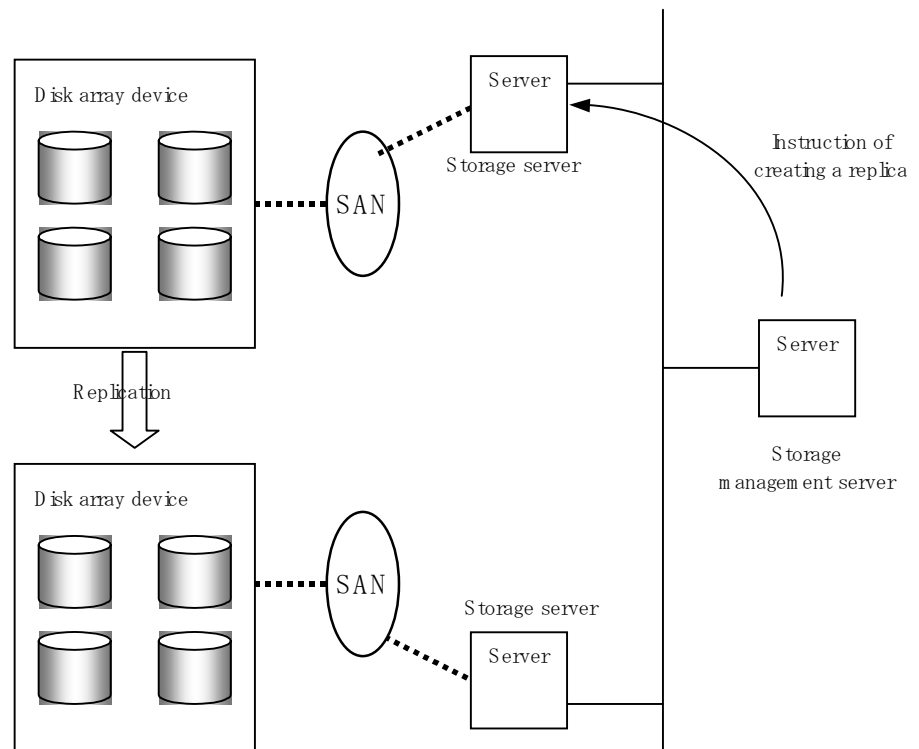
8.2.1 Determining the server that performs replication

Determine the server that performs replication.

The following servers are used to perform replication:

- Storage Management Server
Multiple Storage Servers are logically grouped and managed by a Storage Management Server which can also be used as a Storage Server.
- Storage Server
AdvancedCopy Manager operations are performed on the Storage Server/s.

Figure: Configuration of the servers that perform replication



Note

The following requirements apply when box-to-box replication is performed using the remote copying function (ROPC or REC) of an ETERNUS storage system disk array unit:

- The ROPC or REC function must be installed in both boxes.
- Both boxes must already be connected using an FC remote adapter (FCRA). In a connection that uses an FCRA, data flows only from the Initiator side to the Target side. For bi-directional copying, at least two FCRA connections are required.

8.2.2 Determining a replication target

Determine the original source volume and replica volume to be used in the replication.



Point

- The original source volume is the volume on which original source data to be replicated is stored.
- The replica volume is the volume on which an image of the original source data is created.
- The original source volume and the replica volume can be copied in Logical Units (disk units).

In addition, determine the following attributes to be assigned to the original source volume and replica volume:

1. Copy direction

Determine the direction of copying used in replication. Specify one of the following directions:

- bi-direction: Copying can be performed in either direction between the original source volume and replica volume.
- uni-direction: Data can copied only from the original source volume to the replica volume. During this operation, copying from the replica to the original volume is to be disabled.

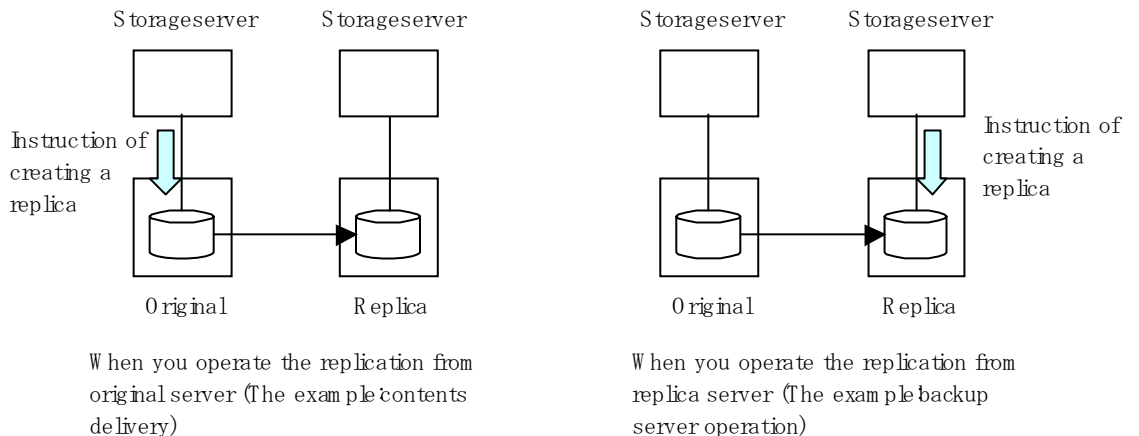
2. Operation servers (used only for server-to-server replication)

In replication between servers, you can specify whether to allow replication to be performed on only the copy source server or copy destination server, or on both servers:

- "Original server": Sets the Storage Server with the original volume connected as the operational server.
- "Replica server": Sets the Storage Server with the replica volume connected as the operational server.
- "Both servers": Sets both the copy source server and copy destination server as operational servers.

It is possible to create a group by arranging multiple copy source volumes and copy destination volumes. Replication activity for multiple copy source volumes and copy destination volumes can be performed as a unit comprising this group. For details, refer to "Creating groups".

Figure: Servers used in performing replication



In this manual, a Storage Server used to perform replication is called the operation server. An original server or replica server can be specified as the operational server. An operational server can use all of the replication functions. In contrast, any other type of server can use only the information display function and operational release function.



Note

Do not select the logical volume and volume group of LVM (Logical Volume Manager) as a replication target.



Note

When determining candidates for backup, refer to “General notes”, for information on the following points.

- Exclusion from Backup Targets or Replication Targets
- Size of a Partition
- Mirroring in GDS

8.2.2.1 Logical Unit (disk unit) operation

Replication operations can copy data in Logical Units (disk units).

The following disk formats are supported for Logical Unit (disk unit) copying:

- MBR disk format (DOS format)
- GPT disk format

Replication of volumes (partitions) can also be performed.

Refer to “Notes on using Logical Unit (disk) unit copying” for notes concerning copying in Logical Units (disk units).



Note

Logical Unit (disk unit) copying using GPT disks cannot be performed under the following operating systems:

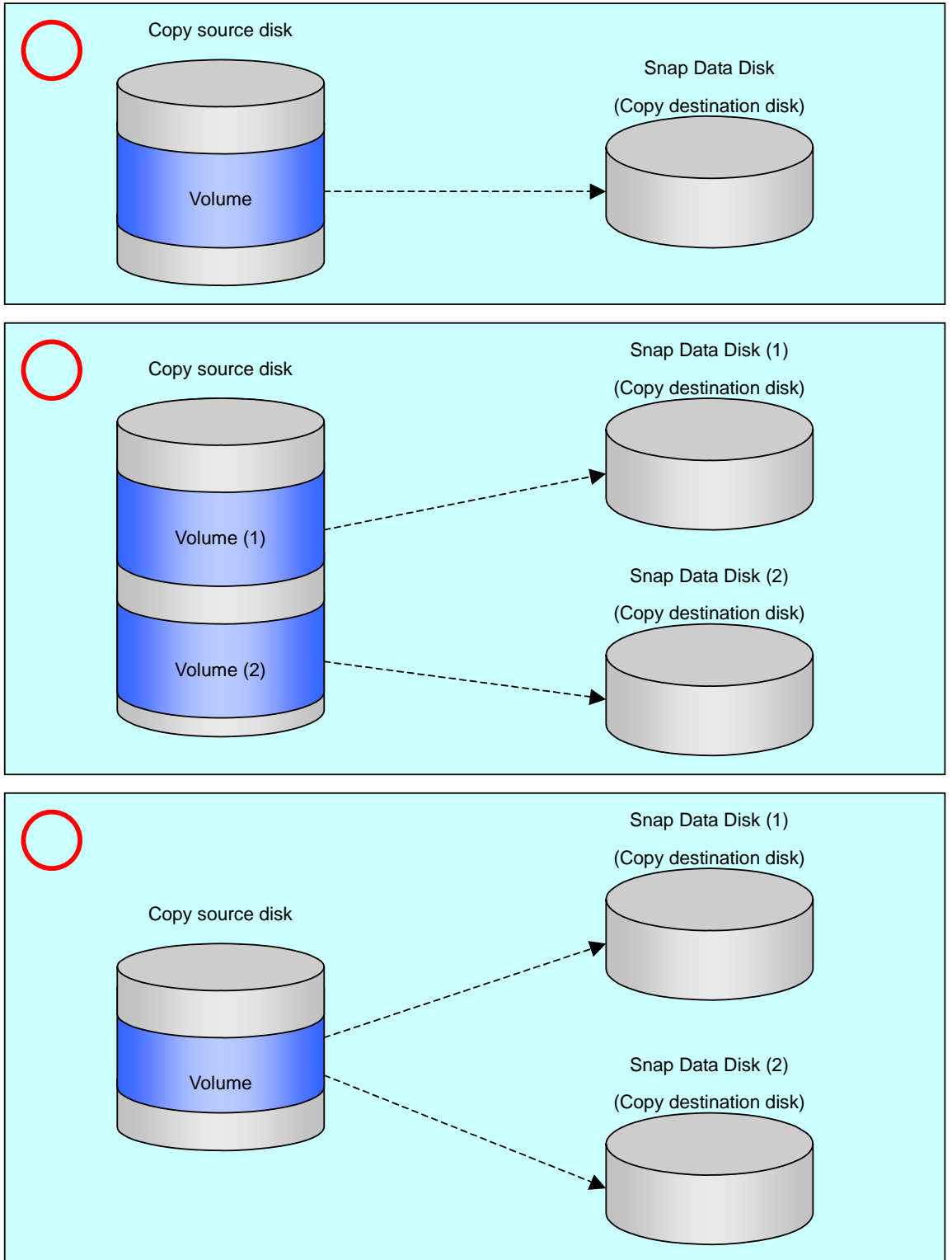
- Red Hat Enterprise Linux AS (v.3 for x86)
- Red Hat Enterprise Linux ES (v.3 for x86)

8.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication

8.2.3.1 Session settings

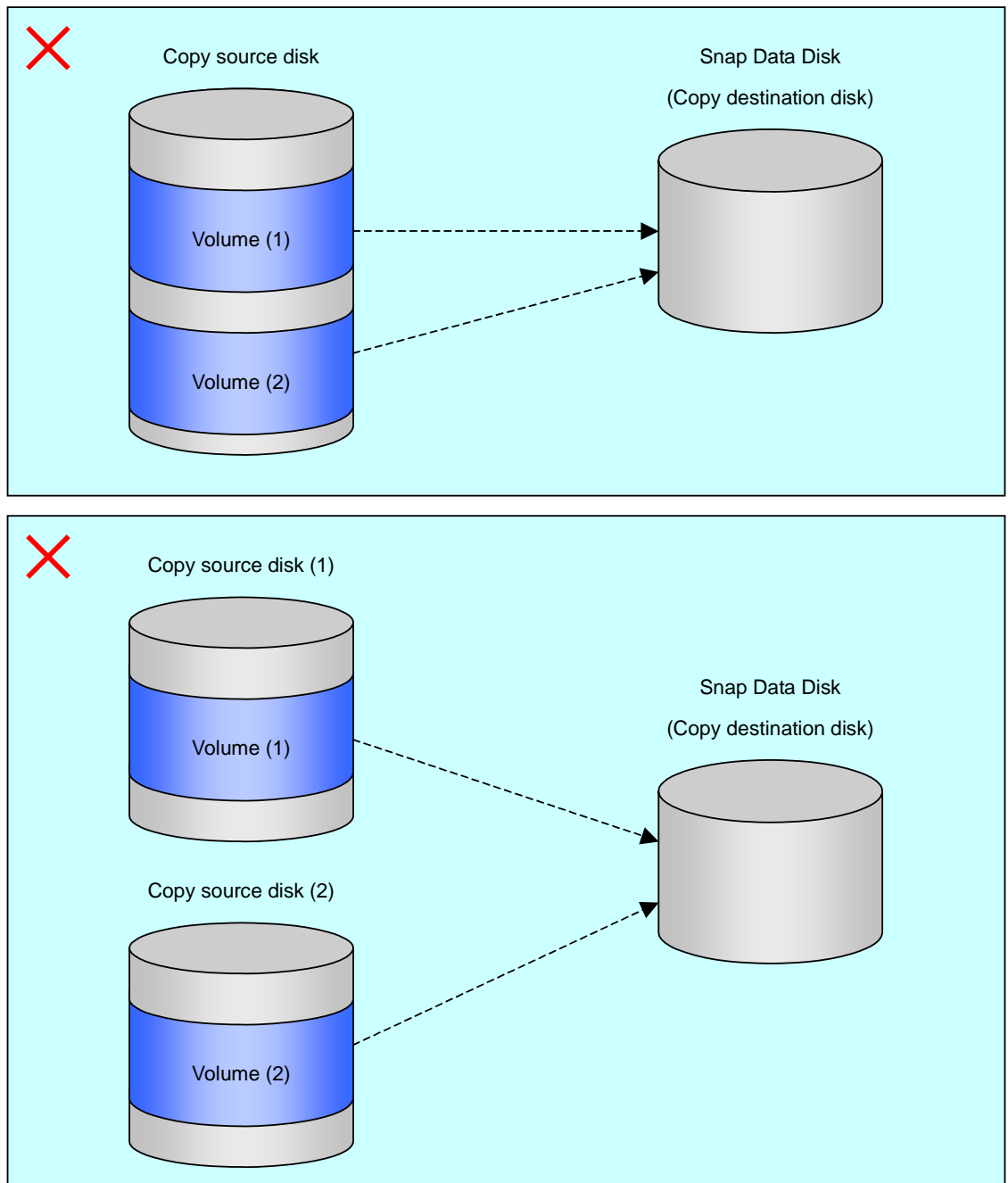
Only one session can be set up for each Snap Data Volume that is a SnapOPC/SnapOPC+ copy destination disk.

Figure: When one session is set for a Snap Data Volume



Accordingly, multiple sessions cannot be set up for a single Snap Data Volume, as shown in the following figure:

Figure: When more than one session is set for a Snap Data Volume

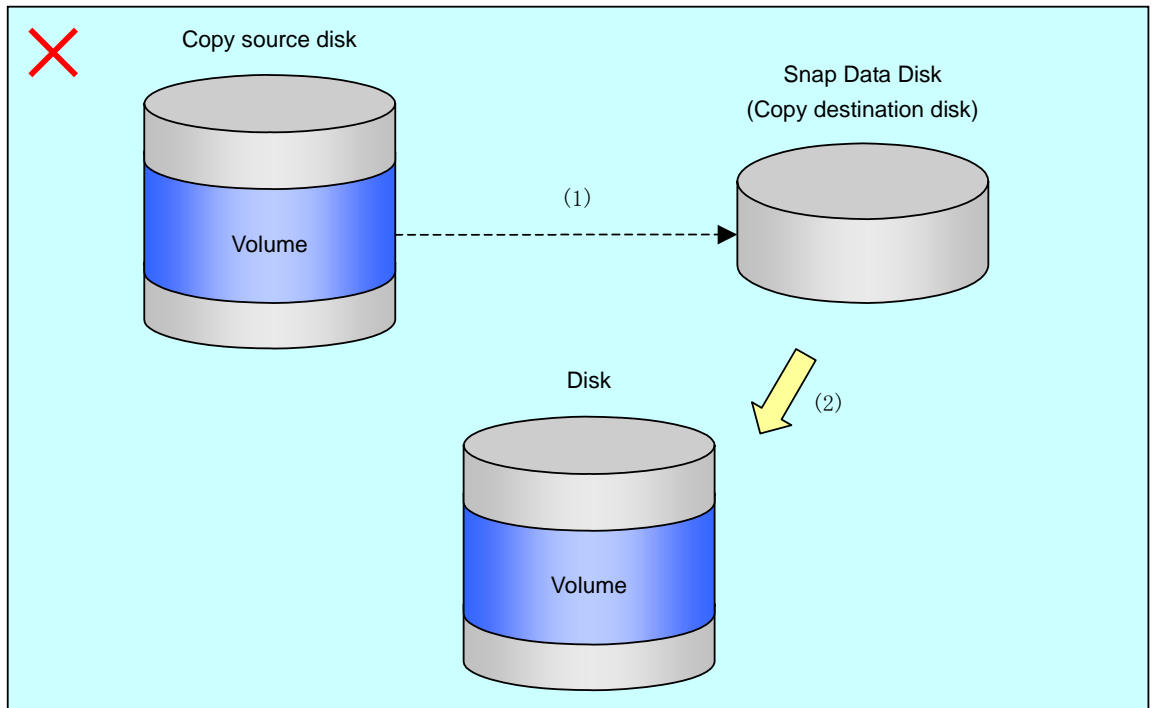


The following restrictions apply:

- While SnapOPC is started, it is not possible to copy from the Snap Data Volume to a disk other than the copy source disk.

While SnapOPC+ is started, it is not possible to copy from the Snap Data Volume to a different disk.

Figure: When copying from a Snap Data Volume to a disk other than the copy source disk



8.2.3.2 Creating a Snap Data Volume

Create a Snap Data Volume by performing the following steps:

1. Calculate the physical capacity for the Snap Data Volume.
2. Define and initialize the Snap Data Volume.
3. Connect to the host.
4. Create partitions and file systems.

Calculate the physical capacity for the Snap Data Volume.

The formula for estimating the physical capacity of Snap Data Volumes is as follows:

$$\text{Physical capacity} = (\text{number of updated blocks for the copy source volume}) \times (\text{safety factor})$$

To be precise, both the number of blocks that have been updated on the Snap Data Volume before the SnapOPC is taken and the management area used by the hardware (about 0.1% of the logical capacity) should also be taken into account, however this can be covered by increasing the safety factor.

The number of blocks that have been updated on the copy source volume can be estimated using the update amount measurement command (swstestupdate).

Make this measurement using the following procedure:

- 1) Start measuring the update amount by setting up a pseudo session on the copy source volume.

```
# /opt/FJSVswsts/bin/swstestupdate start /dev/sdal
/dev/sdal swstestupdate completed
#
```

- 2) Start transactions. Blocks that are updated by transactions will be recorded on the hardware.
- 3) After the measurement period has elapsed, check the number of blocks that have been updated.

```
# /opt/FJSVswsts/bin/swstestupdate status /dev/sda1
Volume-Name Update
/dev/sda1 644333
#
```

- 4) After the measurements are complete, cancel the pseudo session.

```
# /opt/FJSVswsts/bin/swstestupdate stop /dev/sda1
/dev/sda1 swstestupdate completed
#
```

Define and initialize the Snap Data Volume.

Define and initialize the Snap Data Volume using ETERNUSmgr. At this point, set the logical capacity to that of the copy source disk (in order to use the same partition configuration for both the copy source disk and the copy destination disk).

Connect to the host.

Establish a connection between the created Snap Data Volume and the host. Refer to the manual for the disk array system (the Server Connection Guide) for information on this procedure.

Create partitions and file systems.

Create partitions and file systems so that a copy source volume can be created on the Snap Data Volume



Note

Once file systems have been created, limit updates to the copy destination volume as much as possible, to avoid unnecessarily using up the physical capacity of the Snap Data Volume.

8.2.3.3 Creating a Snap Data Pool

Use ETERNUSmgr to create a Snap Data Pool.

Note the following points when creating a Snap Data Pool.



Note

- In principle, the copy capacity should be a suitable estimate, and operations should be such that copying can be completed within the calculated Snap Data Volume capacity. Endeavour to design operations such that area is not normally added to the Snap Data Volume from the Snap Data Pool when copying, and the Snap Data Pool is just used as a supplementary area wherever possible.
- Estimate the capacity of updates for each copy source volume and determine the Snap Data Volume capacity and the Snap Data Pool capacity. If it is difficult to estimate the capacity in advance, a value of 30 to 50% of the total copy source capacity is recommended for the Snap Data Volume capacity plus the Snap Data Pool capacity. (This is only a recommended value, and the Snap Data Pool capacity must be modified to suit operating conditions.)

8.2.3.4 Snap Data Volume and Snap Data Pool monitoring

If a capacity shortage occurs for the Snap Data Volume or the Snap Data Pool, access to the copy destination volume (Snap Data Volume) becomes completely impossible. (The copy destination data cannot be read and data cannot be written to the copy destination.) For SnapOPC+, read and write becomes impossible for not only the copy destination but also previous generations of copy destinations.

Thus, it is necessary to monitor operations so that Snap Data Volume and Snap Data Pool capacity shortages do not occur.

- Use of only Snap Data Volumes (a Snap Data Pool is not set)
Specify "stat" in a subcommand of the Snap Data Volume operation/reference command (swstsdv) to perform regular monitoring to check whether a Snap Data Volume capacity shortage has occurred.
- Snap Data Pool is used (a Snap Data Pool has been set)
Specify "poolstat" in a subcommand of the Snap Data Volume operation/reference command (swstsdv) to perform regular monitoring to check whether a Snap Data Pool capacity shortage has occurred.
Regardless of encryption, if the Snap Data Pool area includes areas where the busy rate exceeds 50%, consider extending the Snap Data Pool. In addition, increase the Snap Data Pool monitoring frequency.
Regardless of encryption, if the Snap Data Pool area includes areas where the busy rate exceeds 70%, immediately extend the Snap Data Pool.

If a capacity shortage occurs for the Snap Data Volume or the Snap Data Pool, refer to "Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs".

Creating an access path

If a capacity shortage occurs for the Snap Data Volume or the Snap Data Pool, access to the copy destination volume (Snap Data Volume) becomes completely impossible.

In addition, even if there is no Snap Data Volume or Snap Data Pool capacity shortage, access to the Snap Data Volume becomes impossible under the following circumstances:

- Access to the Snap Data Volume after Snap Data Volume initialization
- Access to the Snap Data Volume after initialization of the disk management information

Therefore, preparation in advance of a volume (access path) other than the Snap Data Volume is recommended.

Create the volume to be used as an access path on the same ETERNUS disk array as the Snap Data Volume. Since this volume is not used for data storage, its capacity can be small. Create a volume of any size.

The following operations are possible using the access path:

- Snap Data Volume initialization
- Snap Data Volume status display
- Snap Data Pool status display

8.2.3.5 Cluster Operations

Do not use Snap Data Volumes as shared disks for cluster systems. This is to avoid the danger of the cluster system failing over when the physical capacity shortage occurs for the Snap Data Volume.

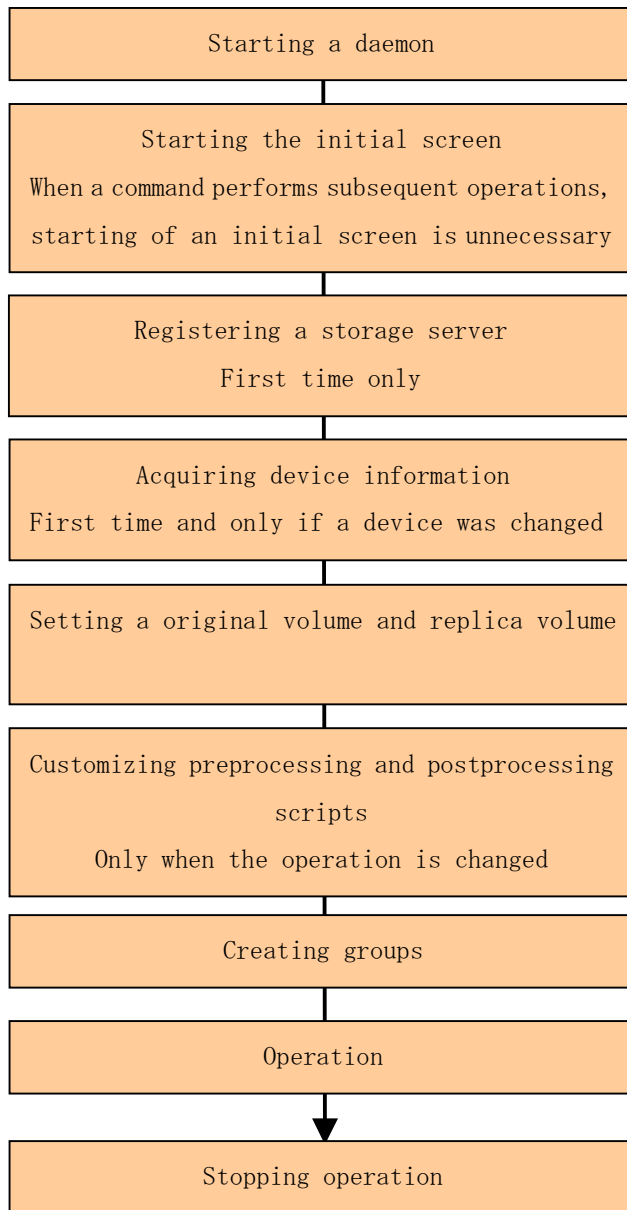
For cluster operations, use one of the following methods to prevent the Snap Data Volume from being used as a shared disk.

- a. Permit the Snap Data Volume to be referenced from all the nodes in the cluster system.
- b. Use inter-server replication between the cluster system and a non-cluster system.

8.3 Flow of Operations

The following figure shows the flow of the replication operations.

Figure: Flow of replication operations



8.4 Preparations

The following preparations are required before replication can start.

8.4.1 Starting a daemon

Before replication is started, the AdvancedCopy Manager daemon must be started on the Storage Management Server and Storage Server. Normally, the daemon is configured to be automatically invoked at system startup.

However, if a daemon fails to start for some reason or has stopped, both servers must restart their respective daemons. For information about starting daemons, refer to "Starting and Stopping Daemons".

8.4.2 Starting a GUI client

Start the GUI client. Refer to "Starting the GUI client" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details.

If commands are to be used for all operations, this operation is not necessary.

8.4.3 Registering a Storage Server

The Storage Management Server registers the Storage Server to be managed.

When a Storage Server also operates as a Storage Management Server, the Storage Server does not need to be registered as a server.

The Storage Server registration processing can be performed using either GUI operations or command operations.

For the operation method using the GUI, refer to "Registering a new Storage Server," in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide."

For the operation method using commands, refer to the server information addition command (stgxfwcmaddsrv).

8.4.4 Fetching device information from a Storage Server

This processing can be performed using either GUI operations or command operations.

For the operation method using the GUI, refer to "Device management," in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide."

For the operation method using commands, refer to the device information collection/reflection command (stgxfwcmsetdev).



Note

Device information on a Storage Server must be temporarily stored in the repository. The area required when updating the repository may not be available when information concerning devices under multiple Storage Servers is fetched. Therefore, check if there is sufficient area for updating the repository before fetching the device information. If there is insufficient area, allocate the required area before fetching the device information. Refer to Step 2 in "Troubleshooting a failure when accessing a repository database" for the method for checking the required area.



Note

The time required for this operation depends on the total number of devices defined on the Storage Server. If the number of devices is high, ideally perform this operation while the CPU load and I/O load are low. As a guideline for reference, each operation takes about 0.5 s per device (partition) under no-load conditions.

8.4.5 Configuring the original volume and replica volume

Use the replication volume information setting command (swsrpsetvol) to set the original volume and replica volume that will be used in the replication. The information on the registered original volume and replica volume can be checked with the replication volume information display command (swsrpvoinfo).

When specifying the volume of another Storage Server in server-to-server replication, specify the volume using the following format: "<volume-name>@<storage-server-name>".

8.4.6 Customizing pre-processing and post-processing scripts

In AdvancedCopy Manager, replication processing must be performed while volumes are unmounted. Therefore, when replication is executed, processing to mount and unmount the volume is performed by the pre-processing and post-processing scripts respectively.

The replication processing is not executed when the volume can not be unmounted.

For details of the pre-processing and post-processing script, refer to "Pre-processing and Post-processing of Replication."

The replication pre-processing and post-processing scripts will need to be customized when:

- For specific operational requirements, you want to avoid the unmount/mount processing of the volume where a file system is constructed
- You want to add special pre-processing and post-processing instructions to the pre-processing and post-processing scripts

Refer to "Pre-processing and Post-processing of Replication" for details on the customization.



Note

The pre-processing and post-processing are not performed in case of replicating a group. Unmount all the volumes in the group before replication, and mount all the volumes after replication.



Note

Pre-processing and post-processing are not executed for the partitions included in a Logical Unit (disk) when Logical Unit (disk) unit copying is executed. Therefore, the partitions included in a Logical Unit (disk) must be unmounted before a replica is created, and the unmounted partitions must be mounted after the replica is created.



Point

When AdvancedCopy Manager is upgraded

The pre-processing and post-processing scripts should be checked and updated whenever an upgrade is affected for any component of AdvancedCopy Manager software.

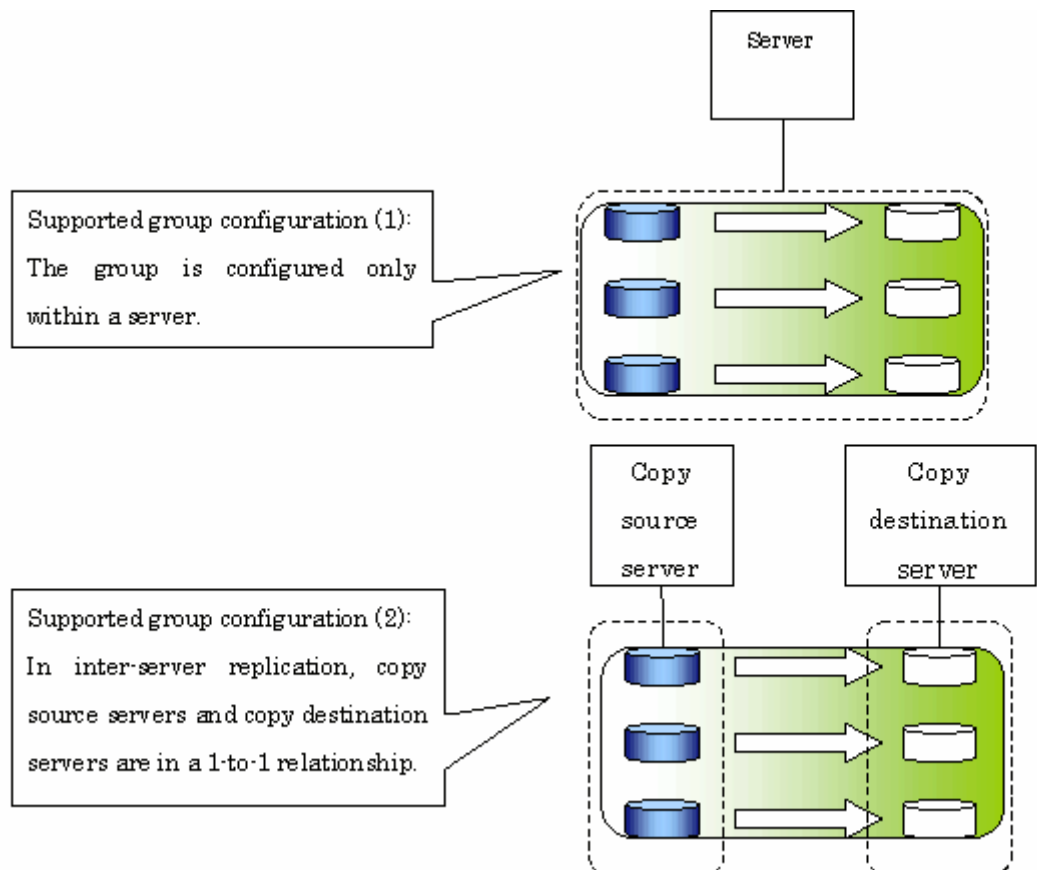
8.4.7 Creating groups

8.4.7.1 Conditions for the replication volume information that makes up the group

The replication volume information that makes up the group (i.e., copy source volume and the copy destination volume pairs) must meet the following conditions:

1. The copy source servers and copy destination servers respectively must all match.
2. The operational servers and the copy directions respectively must all match. (The values for the operational servers and the copy directions can be checked using the "Op-Server" and "Copy" in the results of the replication volume information display command (swsrpvoinfo).
3. The replication volume information being registered must not be registered in any other group.
4. Copy source volumes and copy destination volumes must not be duplicated within the group.
5. GDS logic volume must not be contained.
6. If a Logical Unit (disk) is specified, the replication volume information of the partition (slice) that includes the Logical Unit (disk) must not be registered in another group.
7. If a Logical Unit (disk) is specified, the replication volume information of the partition (slice) that includes the Logical Unit (disk) must not be registered in the same group.

Figure: Condition 1



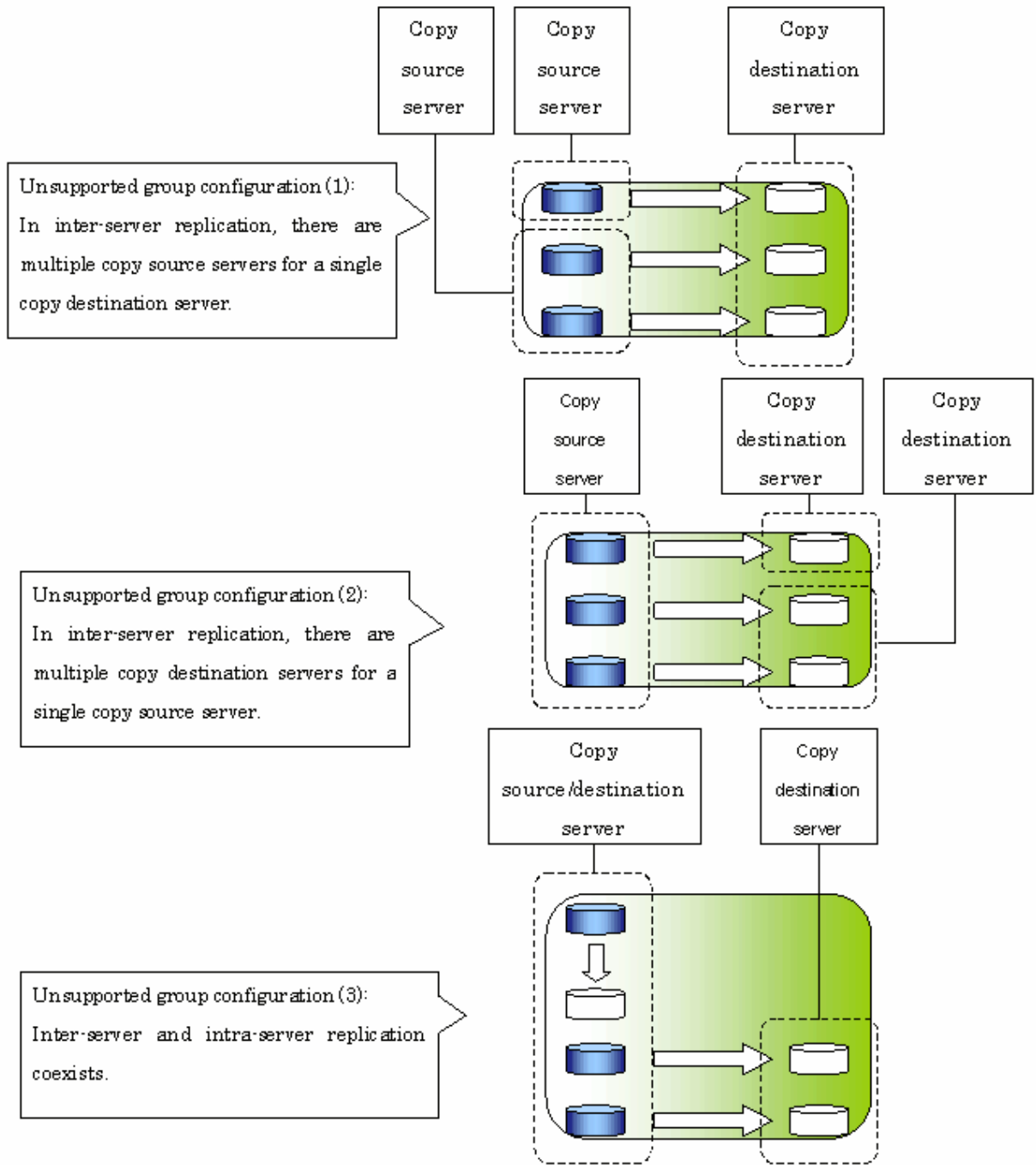


Figure: Condition 3

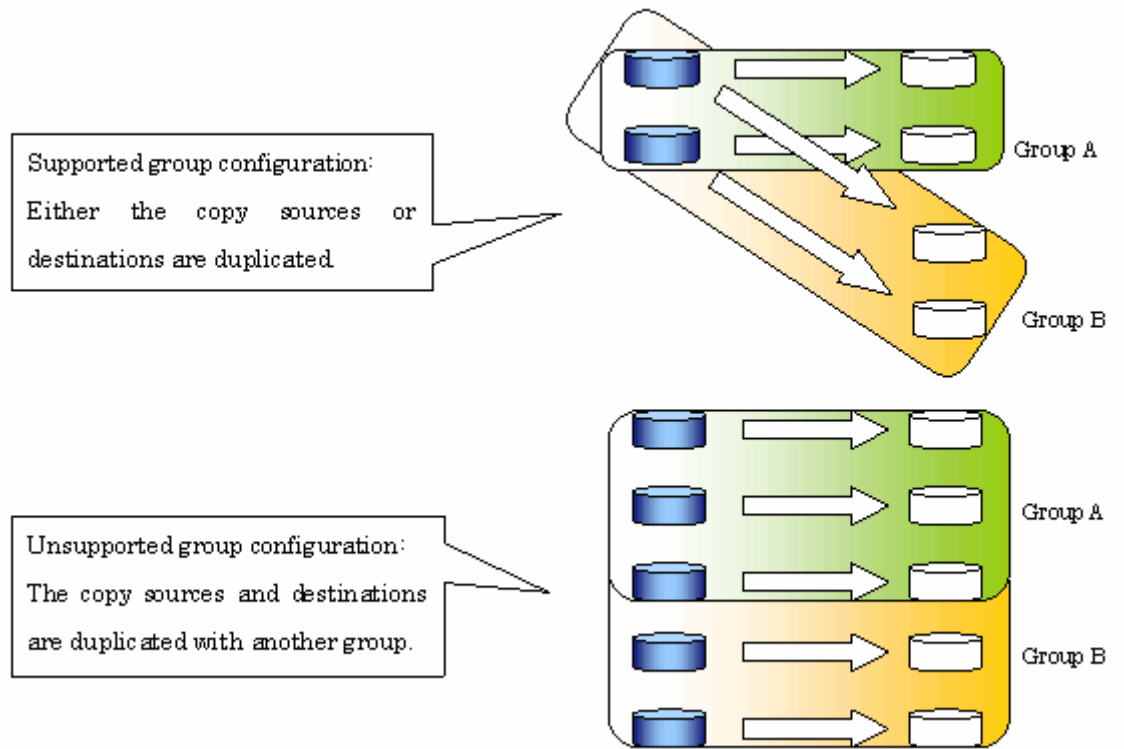


Figure: Condition 4

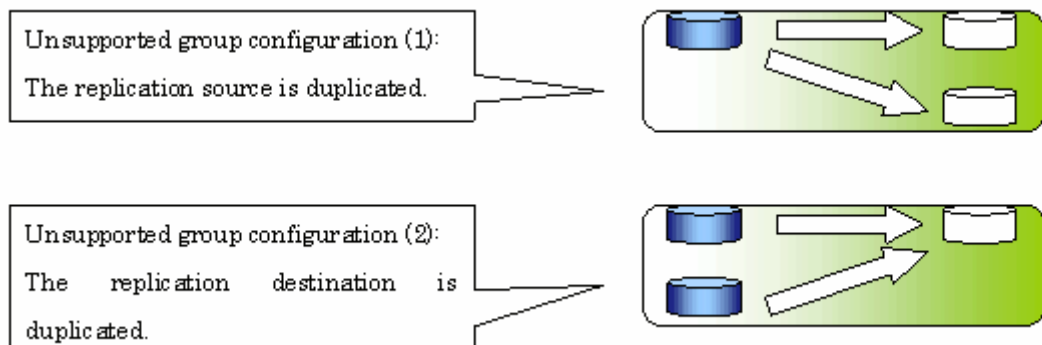
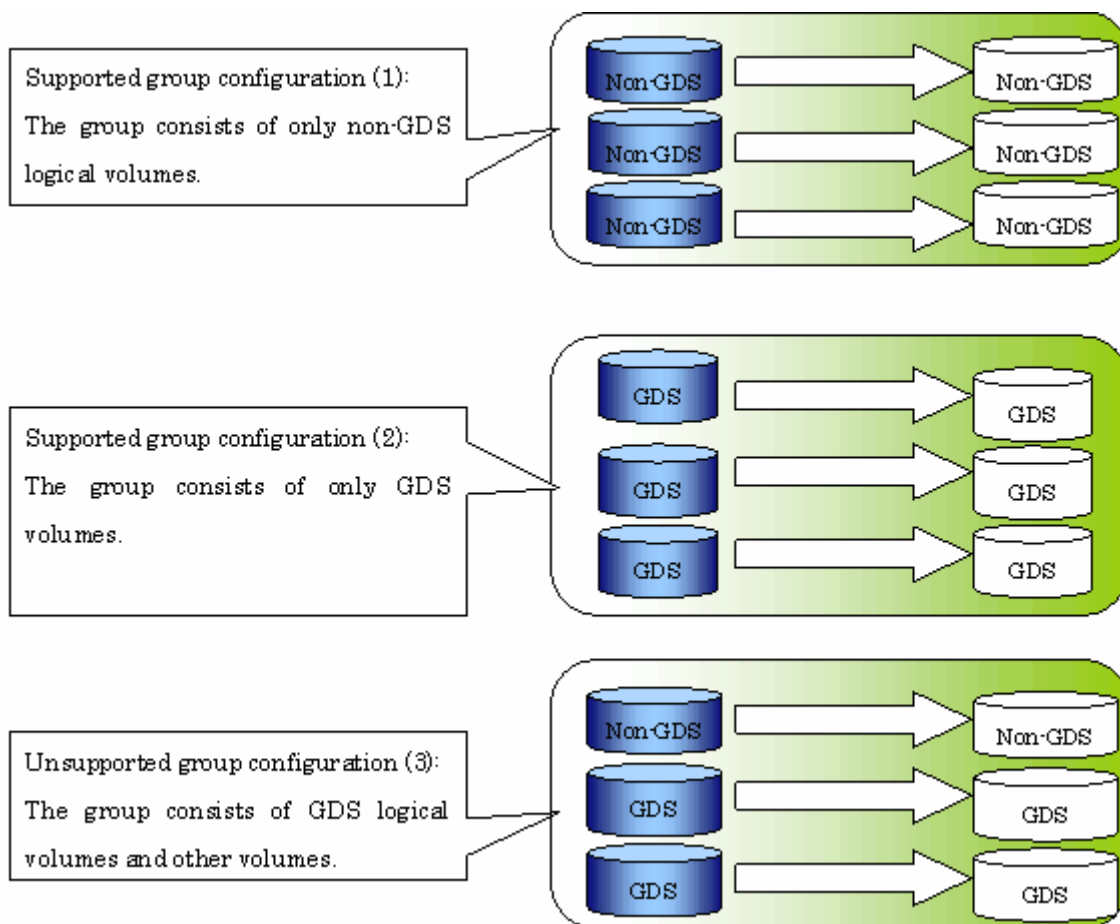


Figure: Condition 5



8.4.7.2 How to create groups

Groups are created using the replication volume information setting command (swsrpsetvol). Information for **created** groups can be displayed using **the** replication volume information display command (swsrpvoinfo).

[Execution example]

Two groups (GRP1) consisting of an original volume and the replica volumes are created.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/sdb1@SRC /dev/sdb1@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/sdc1@SRC /dev/sdc1@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpvoinfo - L
Server Original-Volume Size    Replica-Volume  Size    Copy    Op-Server Group
SRC    /dev/sdb1@SRC  4.0Gbyte /dev/sdb1@TARG-1 4.0Gbyte bi-direction both    GRP1
SRC    /dev/sdc1@SRC  4.0Gbyte /dev/sdc1@TARG-1 4.0Gbyte bi-direction both    GRP1
#
```

8.5 Operations

This chapter explains AdvancedCopy Manager replication.

Before performing replication, see "Preparations," to set up the environment required for replication.

This section describes the operation of Replication Management using commands. Refer to "Replication Management functions" of a "ETERNUS SF AdvancedCopy Manager GUI User's Guide" about using the GUI client.

8.5.1 Executing snapshot replication

The replication creation command (`swsrpmake`) is used to perform snapshot replication. Refer to "Snapshot replication processing" for an explanation of snapshot replication.

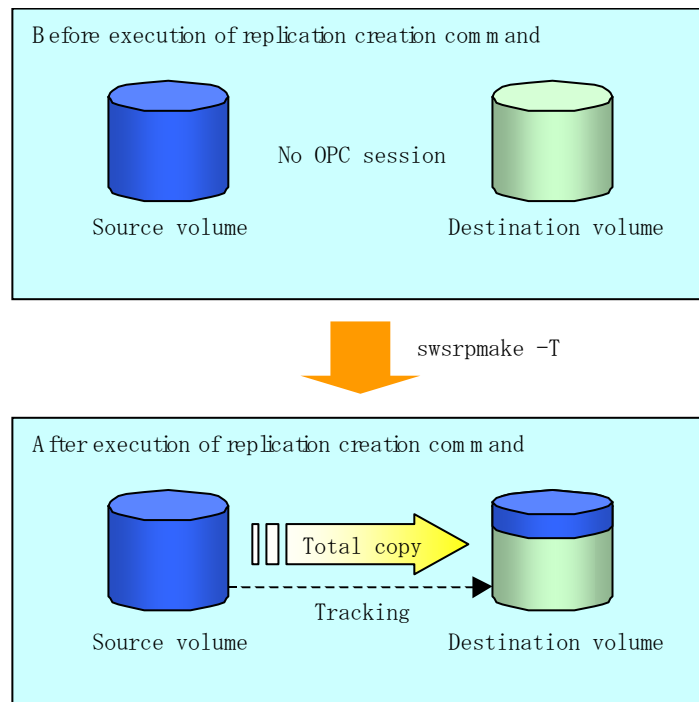
The execution status of a physical copy can be checked by executing the operation status display command (`swsrpstat`).

QuickOPC replication

Execute QuickOPC replication by specifying the "-T" option in the replication creation command (`swsrpmake`).

If no OPC session exists when the replication creation command is executed, the command starts snapshot processing (OPC physical copying), and tracks processing from the source volume to the destination volume.

Figure: When the replication creation command is executed (for the first time)

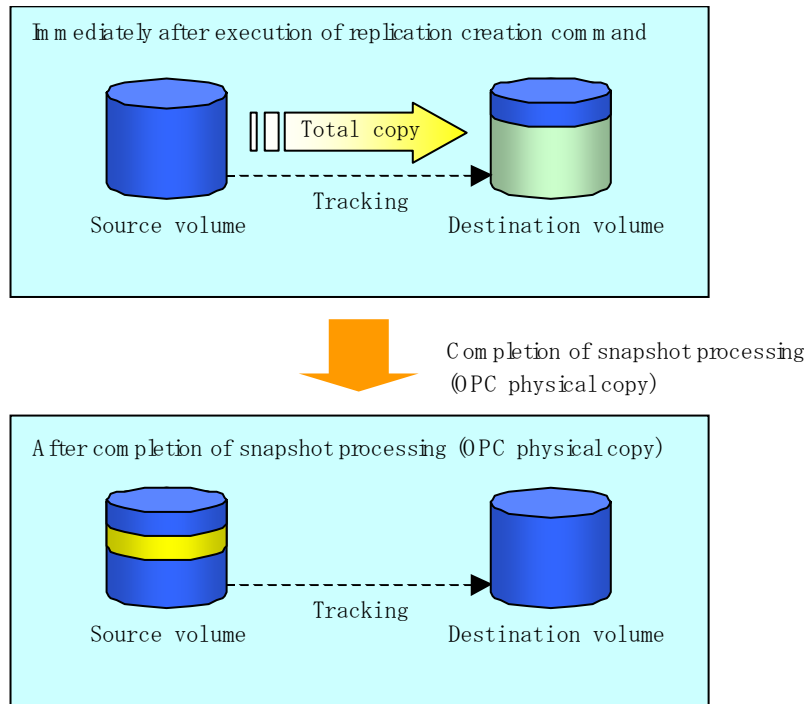


To check the execution status of physical copying, use the operation status display command (`swsrpstat`) in the same way as for an ordinary snapshot replication.

After snapshot processing (OPC physical copy) is complete, only the tracking processing is active.

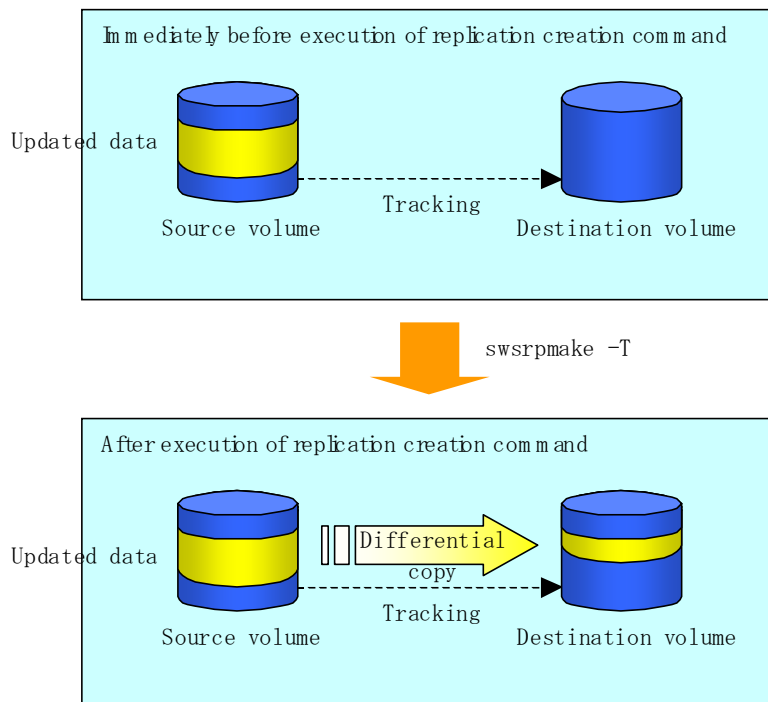
To check the tracking status, use the operation status display command (`swsrpstat`) with the "-L" option specified.

Figure: When snapshot processing is completed



Entering the replication creation command (swsrpmake) with the “-T” option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

Figure: When the replication creation command is executed (for the second time)



When performing a restoration with tracking, you need to perform a restoration using OPC (i.e., execute swsrpmake without “-T” option).

The replication operation using QuickOPC is done as follows:

```
[backup]
swsrpmake -T <original volume name> <replica volume name>

[restore]
swsrpmake <replica volume name> <original volume name>
```

Though a restoration is executed with OPC, not all the data, only the data that has been updated after the previous replication (it can be referred at 'Update' column of swsrpstat) is copied. Therefore, replication operation using QuickOPC, is also completed in a short period of time. To check the progress of the restore operation, execute the Operation status display command (swsrpstat) with the -E option specified.

SnapOPC type replication

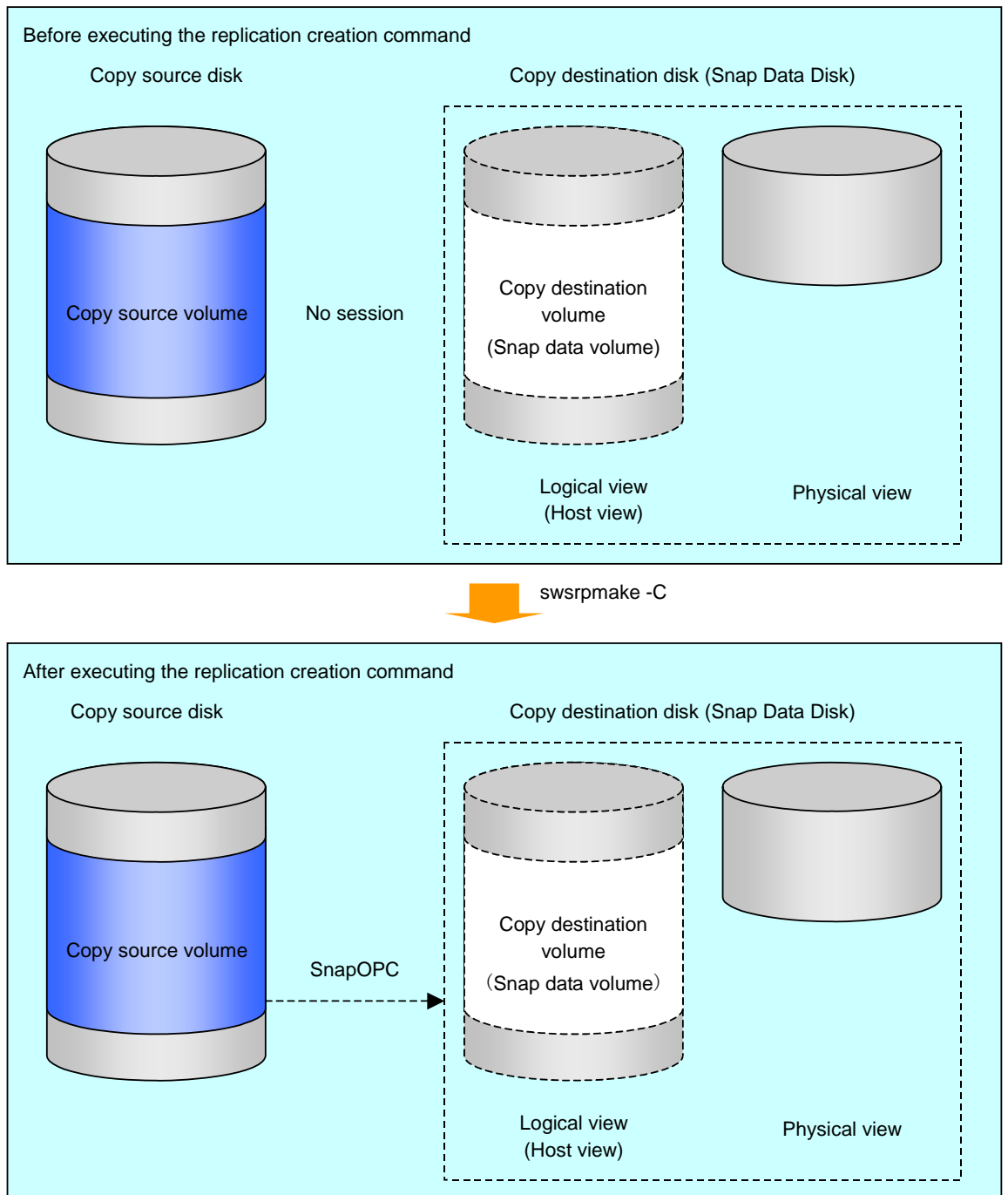
Execute SnapOPC type replications with the -C option specified in the replication creation command (swsrpmake).

When the replication creation command is executed, a SnapOPC session will be set up between the copy source volume and the copy destination volume.

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpmake -C /dev/sda1 /dev/sdc1
FROM=/dev/sda1@SV1,T0=/dev/sdc1@SV1 swsrpmake completed
#
```

Figure: When the replication creation command is executed



Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the copy source volume, but instead copy only the data that has been updated on the copy source or copy destination since the SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure: When the copy source volume is updated

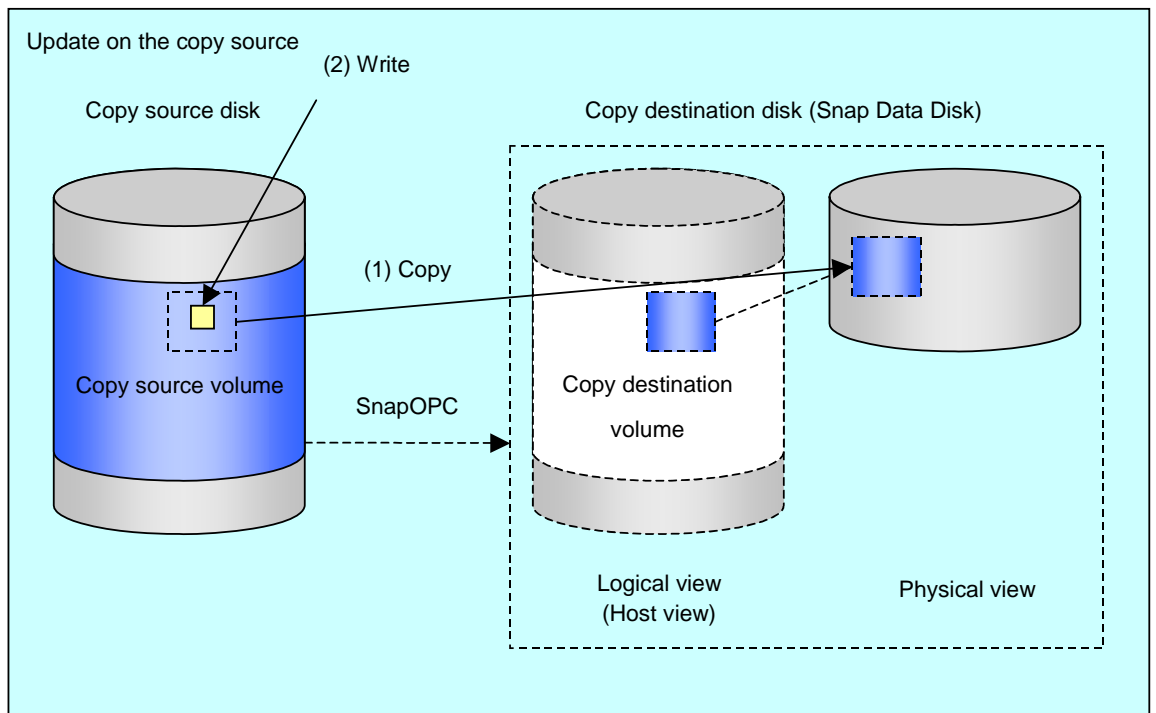
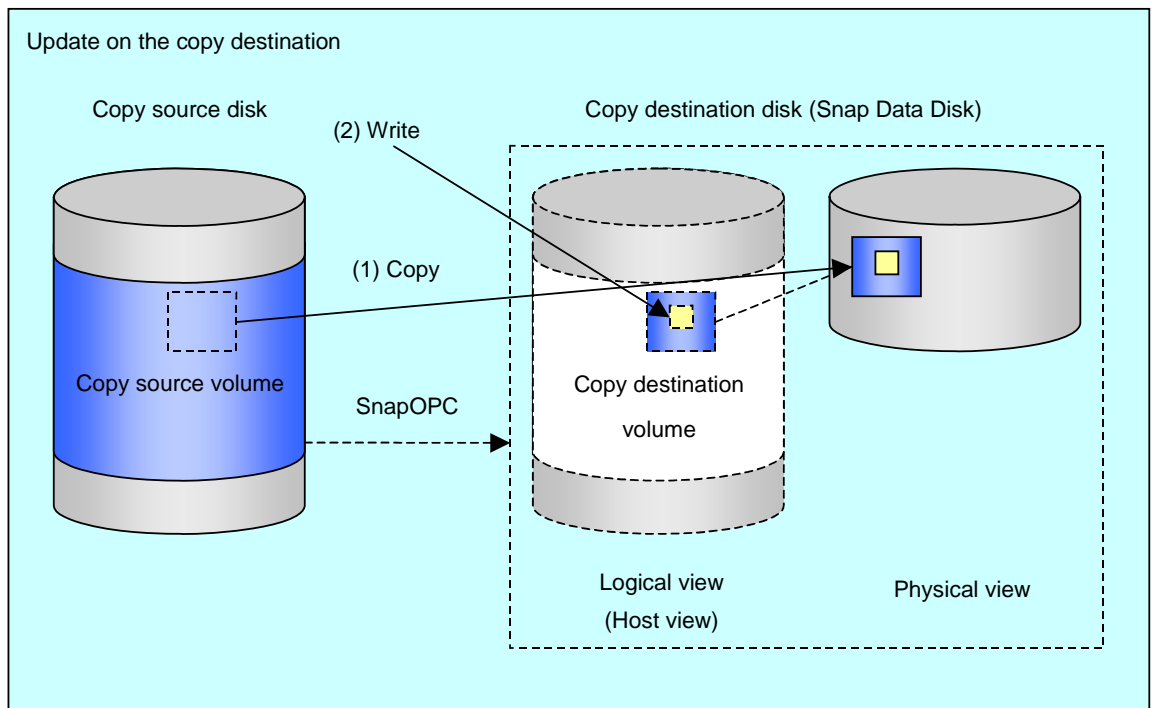


Figure: When the copy destination volume is updated



Note: The units for host I/O and storage device copies are different (512 bytes for host I/O and 8 kilobytes for storage device copies), and therefore data copies also occur when the copy destination is updated.

The execution status of SnapOPC sessions can be checked using the operation status display command (swsrpstat).

The following example shows the output of the execution status display command (swsrpstat) immediately after a SnapOPC snapshot has started. While SnapOPC is being performed, "copy-on-write" is displayed in the Status field, and the amount of data updated since the last copy was created is displayed in the Update field as a percentage.

Execution example

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/sdb1
Server Original-Volume Replica-Volume Direction Status      Execute Trk  Update Rcv  Split
Xfer Snap-Gen
SV1    /dev/sdb1@SV1    /dev/sbc1@SV1    regular    copy-on-write ----   off  0%    ----
-----
#
```

If the replication creation command (swsrpmake) is executed again during SnapOPC processing the SnapOPC session that has already been set up will be canceled, and a new SnapOPC session will be set up.



Note

If a capacity shortage occurs for the Snap Data Volume or the Snap Data Pool, the SnapOPC execution status will become error-suspended ("failed") and the replica volume will become unusable.

The SnapOPC execution status can be checked from the Status field of the results output by the operation status display command (swsrpstat).

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/sdb1
Server Original-Volume Replica-Volume Direction Status Execute Trk  Update Rcv  Split
Xfer Snap-Gen
SV1    /dev/sdb1@SV1    /dev/sdc1@SV1    regular    failed ----   off  ----  ----
-----
#
```

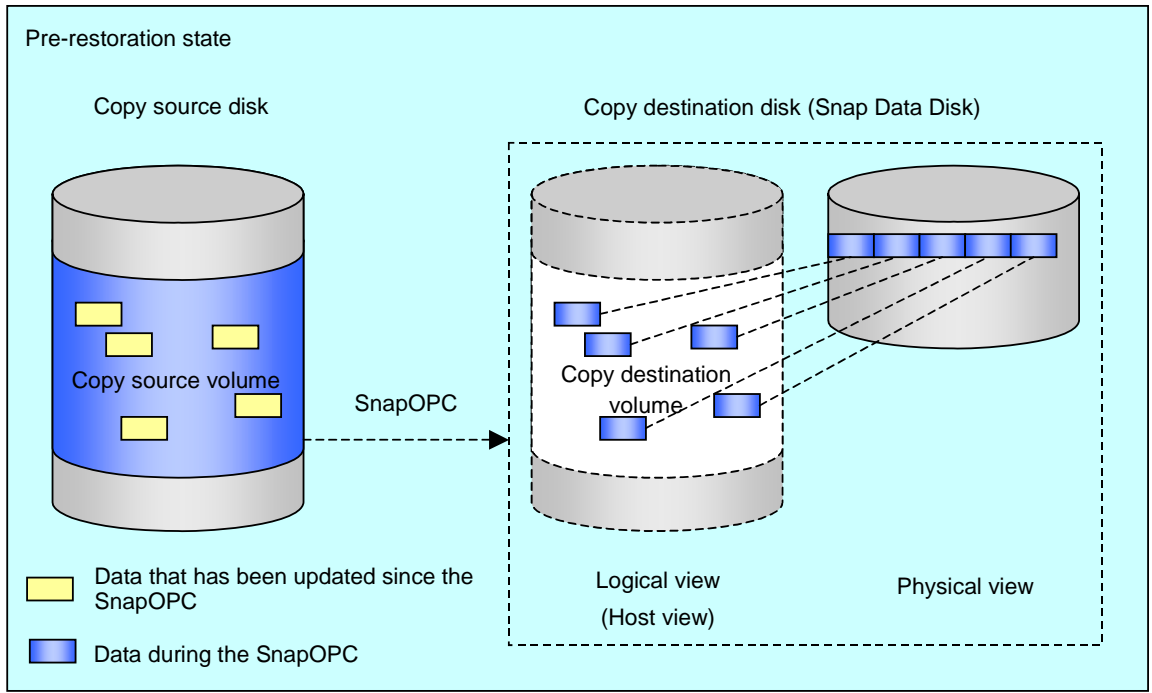
If the SnapOPC execution status is error-suspended ("failed"), refer to "Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs".

Perform restorations from Snap Data Volumes by running an OPC using the replication creation command (swsrpmake).

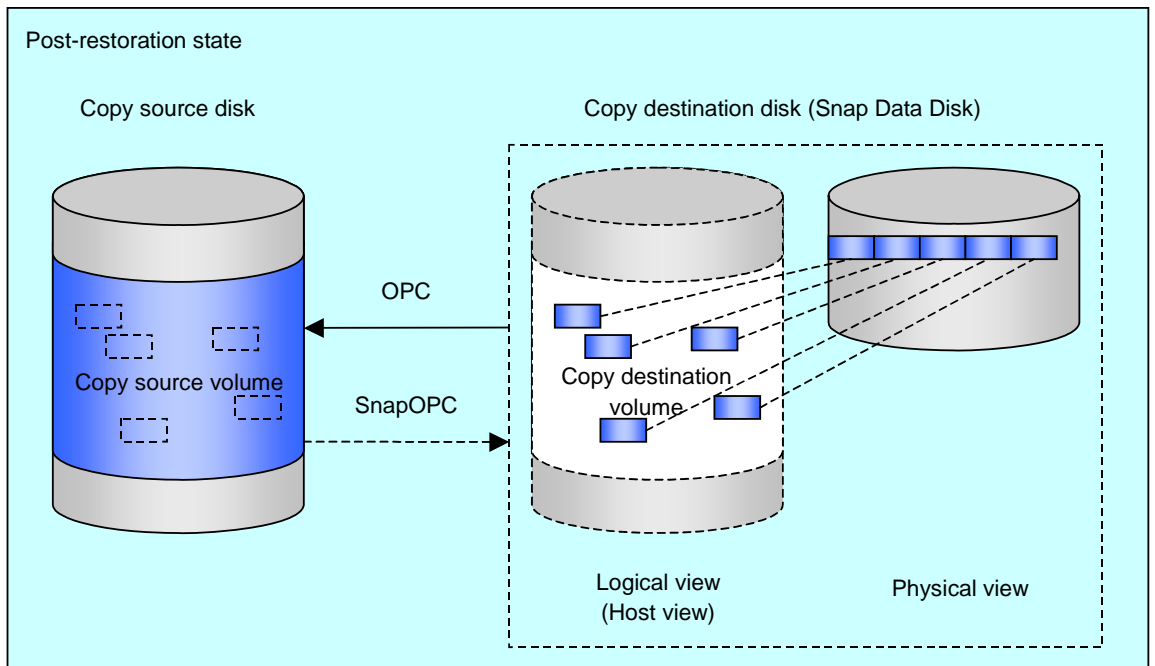
```
# /opt/FJSVswsrp/bin/swsrpmake /dev/sdc1 /dev/sdb1
FROM=/dev/sdc1@SV1,T0=/dev/sdb1@SV1 swsrpmake completed
#
```

When restorations are executed, the SnapOPC session from the copy source volume to the copy destination volume is maintained as is, and a normal OPC from the copy destination volume to the copy source volume is started. At this point, the time taken to restore the physical copy is reduced, because only data that has been updated since the last copy is copied.

Figure: When restoration is executed



swsrpmake



The execution status of restorations can be checked by specifying the “-E” option with the operation status display command (swsrpstat).

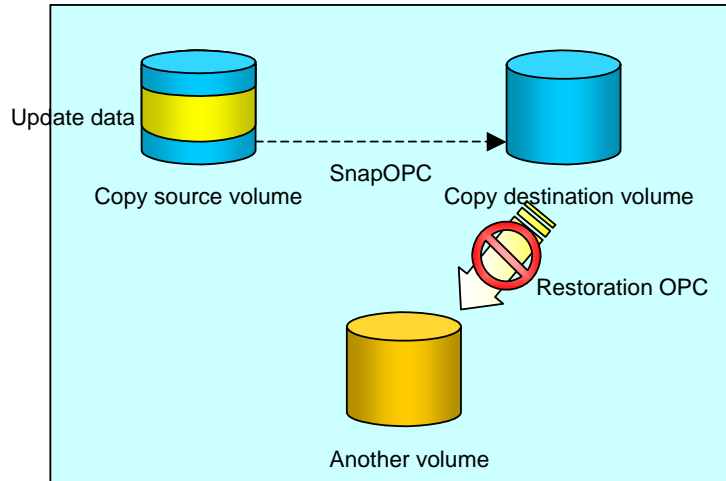
```
# /opt/FJVSwsrp/bin/swsrpstat -E /dev/sda1
Server Original-Volume Replica-Volume Direction Status Execute
SV1 /dev/sda1@SV1 /dev/sdb1@SV1 reverse snap 80%
#
```



Note

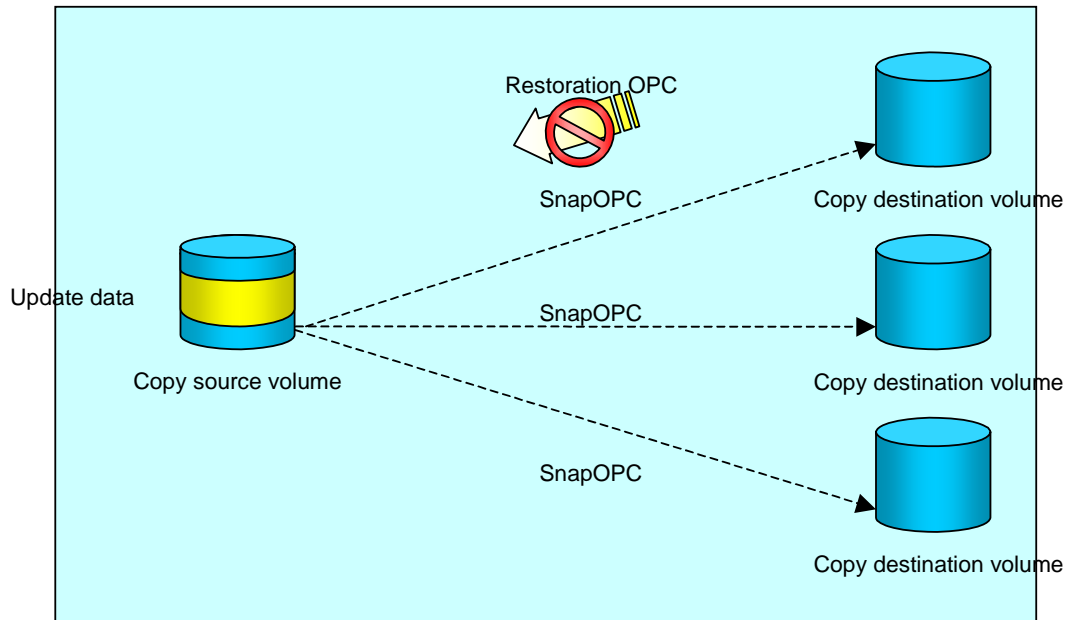
If a SnapOPC is being performed between the copy source volume and the copy destination volume, restorations to volumes other than the copy source volume cannot be executed. To restore to a volume other than the copy source volume, operating system copy functions (such as the cp command or the copy command) must be used.

[Figure: When restoration is to a volume other than the copy source volume]



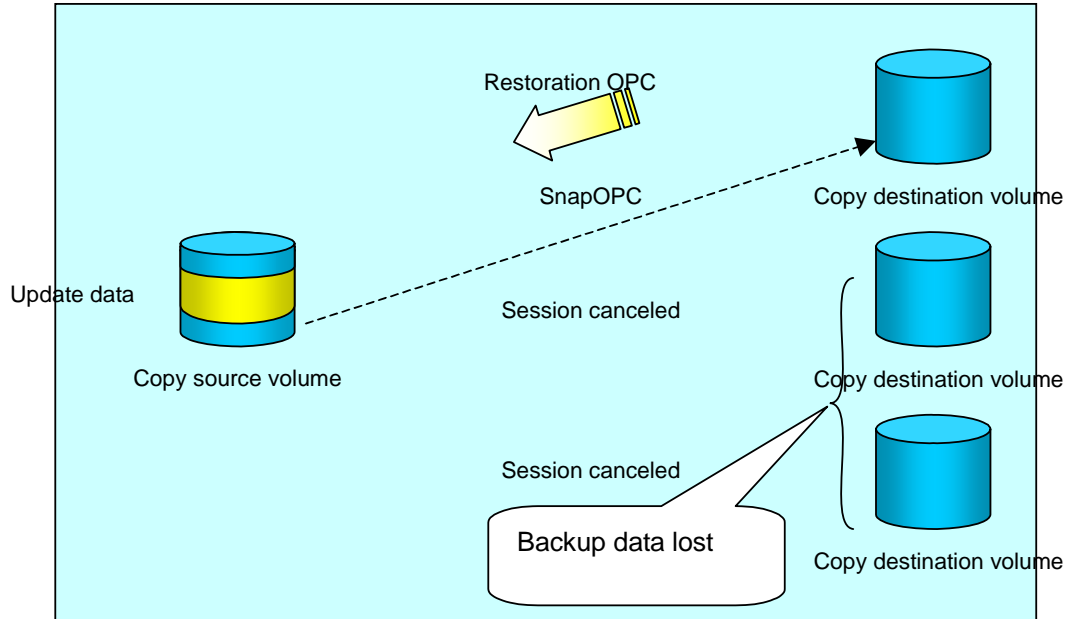
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

[Figure: When SnapOPC is performed to more than one copy destination volume]



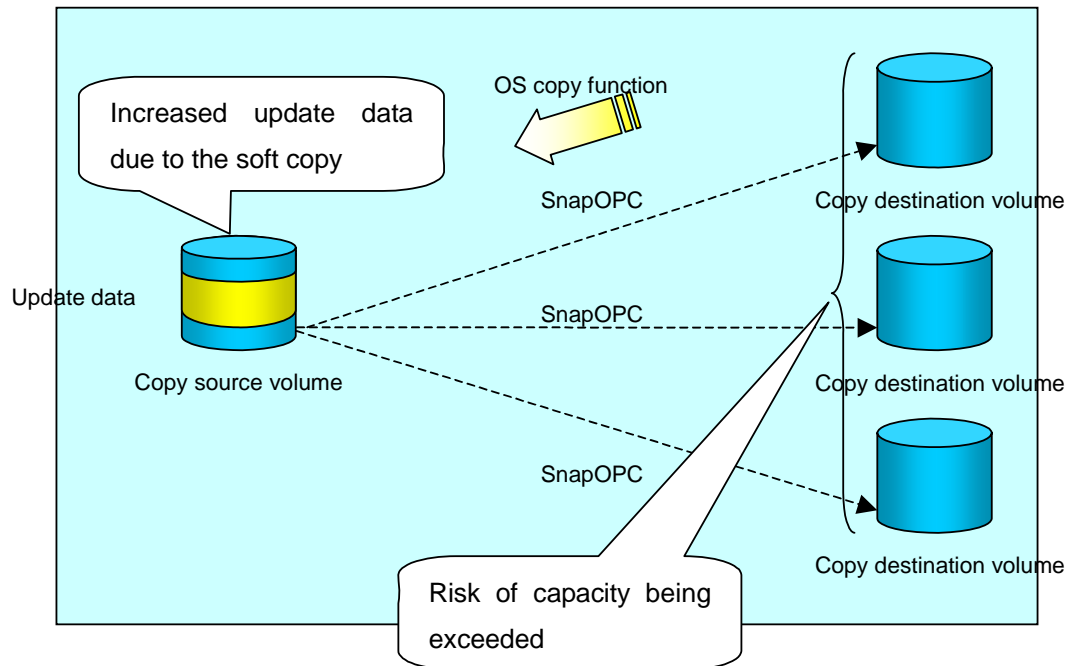
In this case, restoration using an OPC can be performed by cancelling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were canceled will be lost.

[Figure: When SnapOPC sessions are cancelled to perform restoration]



To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration. However, if restoration is performed using operating system functionality, the amount of updated data on the copy source volume will increase, and there is a risk of a capacity shortage at the SnapOPC volume.

[Figure: When restoration is performed without cancelling SnapOPC sessions]



SnapOPC+ replication

Execute the replication creation command (swsrpmake) with the -P option specified to perform SnapOPC+ replication. Execution of this command with the -P option specified sets a SnapOPC+ session between the copy source volume and the copy destination volume. After the SnapOPC+ session is set, copy-on-write is performed between the copy source volume and the copy destination volume.

An example of executing the replication creation command with the -P option specified is shown below.

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpmake -P /dev/sdb3 /dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV, TO=/dev/sdb3@TARG-SV swsrpmake completed
#
```

At this time, the logically copied copy destination volume is saved as snap generation number 1.

The next time the replication creation command is executed with a different copy destination volume specified for the above copy source volume, the copy-on-write processing being executed between the copy source volume and the previous generation of the copy destination volume is stopped. Then, a SnapOPC+ session is set between the copy source volume and the newly specified copy destination volume, and copy-on-write is performed.

An example of executing the replication creation command with the -P option specified for the newly specified copy destination volume is shown below.

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpmake -P /dev/sdb3 /dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV, TO=/dev/sdb3@TARG-SV swsrpmake completed
#
```

This time, the logically copied copy destination volume is saved as snap generation number 2.

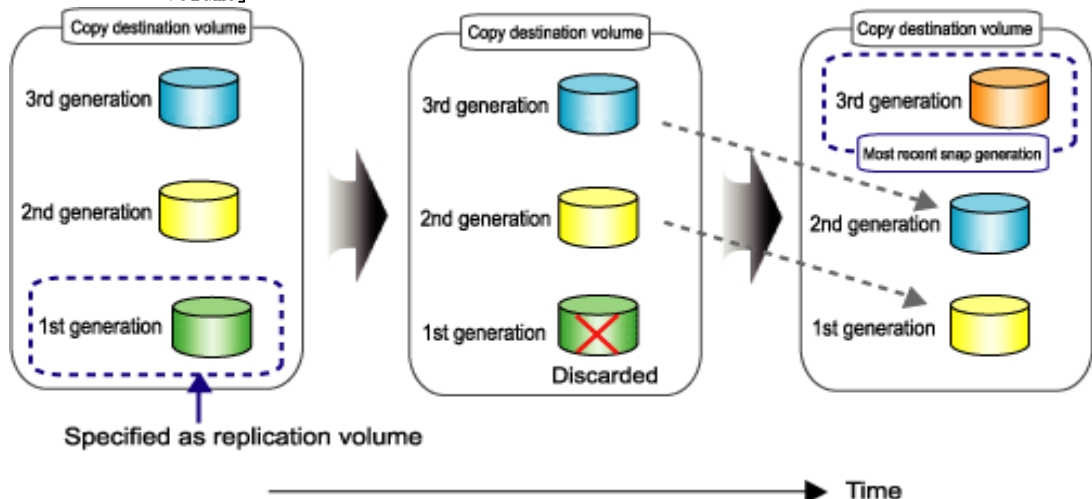
Similarly, each time there is a new copy destination volume, a snap generation number is assigned, up to a maximum of 8 generations.



Note

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when the replication creation command is executed, the replication creation command terminates with an error. If the oldest snap generation is specified as the copy destination volume, that snap generation is automatically discarded and a replica is created as the newest snap generation. In this case, subsequent snap generations (second, third) are assigned a snap generation number that is one generation prior (second generation => first generation, and third generation => second generation).

[Figure: When the oldest snap generation number is specified as the replication volume]



The operation status of SnapOPC+ replication can be checked by executing the operational status display command (swsrpstat) with the -L option specified.

For the most recent snap generation, "copy-on-write(active)" is displayed in the Status column. For past snap generations, "copy-on-write(inactive)" is displayed. In the Update column, the amount of data that has finished being updated after replication creation is displayed as a percentage. In the Snap-Gen column, the snap generation number is displayed.

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L
Server Original-Volume  Replica-Volume  Direction  Status
Execute Trk  Update Rcv  Split Xfer  Snap-Gen
SRC-SV /dev/sdb3@SRC-SV  /dev/sdb3@TARG-SV  regular    copy-on-write(inactive) ----
off 0%      ---- ----  ----  1
SRC-SV /dev/sdb3@SRC-SV  /dev/sdb3@TARG-SV  regular    copy-on-write(active) ----
off 5%     ---- ----  ----  2
#
```



Note

If a capacity shortage occurs for the Snap Data Volume or the Snap Data Pool, snapOPC+ execution status becomes error-suspended ("failed"), and the execution status also becomes error suspended ("failed") for prior SnapOPC+ sessions. The replica volumes for which error suspend occurred can no longer be used.

The execution status of SnapOPC+ replication can be checked in the Status column of the results output by the operational status display command (swsrpstat).

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L
Server Original-Volume  Replica-Volume  Direction  Status  Execute Trk  Update Rcv
Split Xfer  Snap-Gen
SRC-SV /dev/sdb3@SRC-SV  /dev/sdc3@TARG-SV  regular    failed  ----  off  ----
---- ----  ----
SRC-SV /dev/sdb3@SRC-SV  /dev/sdd3@TARG-SV  regular    failed  ----  off  ----
---- ----  ----
#
```

If the SnapOPC+ execution status becomes error-suspended ("failed"), refer to "Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs".



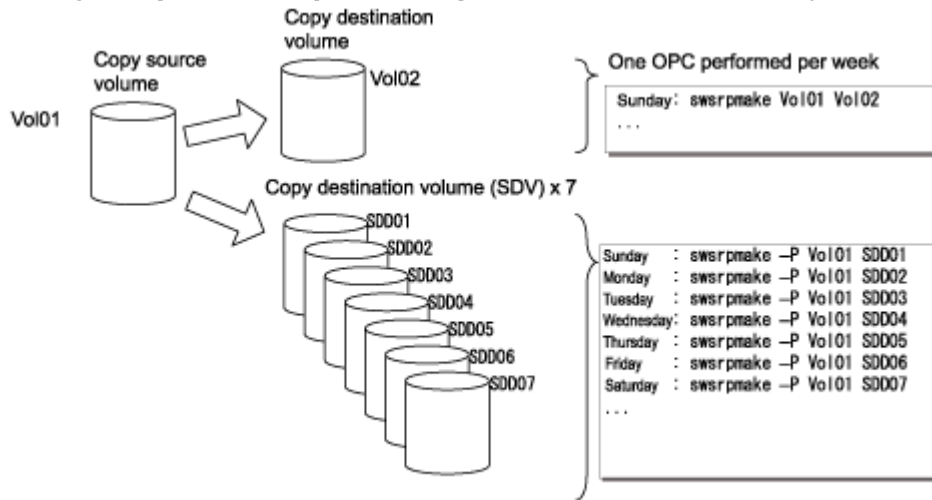
Point

Fujitsu recommends operating SnapOPC+ in conjunction with use of OPC/QuickOPC/EC(REC) to make a complete copy in case a hardware error occurs.

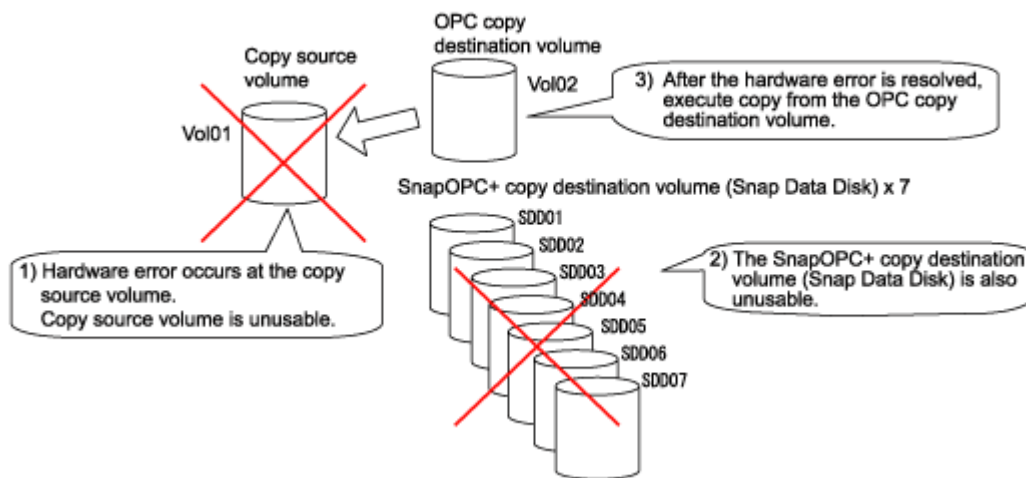
Even if snapOPC+ and OPC/QuickOPC/EC(REC) are used in conjunction, the maximum number of sessions that can be set for one copy source volume is 8.

The next example shows the operation of one OPC per week in conjunction with one SnapOPC+ per day.

[Figure: Operation example when SnapOPC+ and OPC are used in conjunction]



If a hardware error occurs at the copy source volume, perform restoration from the OPC copy destination volume.



8.5.2 Executing synchronized replication

To perform synchronized replication, use the following procedure:

1. Start synchronized processing using the synchronous processing start command (swsrpstartsync). Use the replication cancellation command (swsrpcancel) to cancel synchronized processing that has already started.
2. After making sure that equivalency maintenance status has been established with the operation status display command (swsrpstat), temporarily stop synchronized processing with the replication creation command (swsrpmake) to create a replica of the original volume.
3. To copy the updated (incremental) data, restart synchronized processing with the synchronous processing start command (swsrpstartsync).

8.5.2.1 Intra-box synchronous replication

Intra-box synchronous replication creates a replication from a source volume to a destination volume by using the EC function of the disk array.

The EC function operates in a mode in which a copy is made to a destination volume in synchronization through a write to a source volume (in synchronous write mode).

In addition, EC functions enable the copy direction to be reversed from a suspend status.

8.5.2.2 Inter-box synchronous replication

Inter-box synchronous replication creates a replication from a source volume to a destination volume by using the REC function of the disk array.

The REC function provides three copy operational modes that can be selected for operation:

- Transfer mode
- Recovery mode
- Split mode

In addition, the REC function enables the copy direction to be reversed in suspended status.

Transfer mode

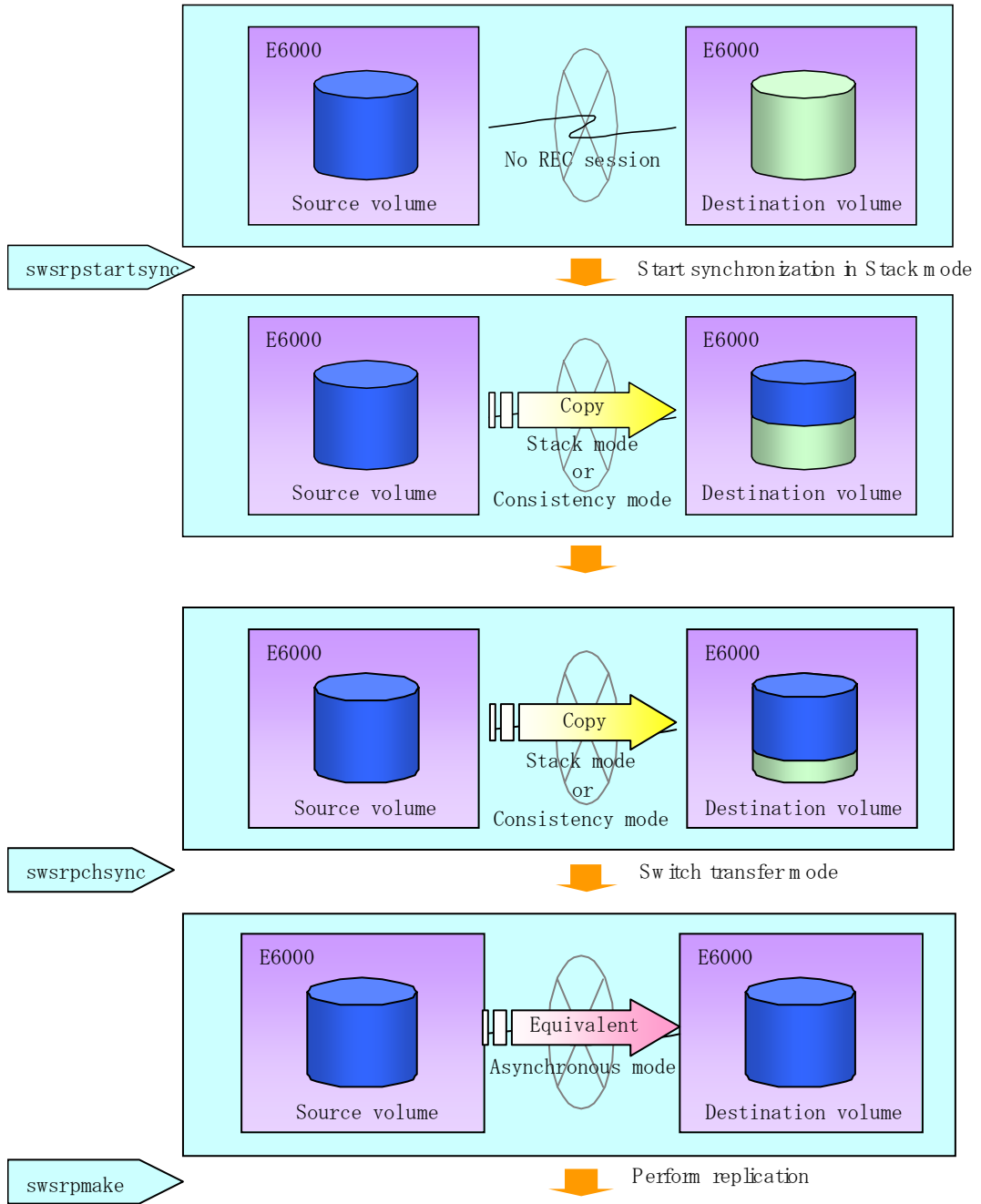
The transfer mode provides the REC data transmission modes described below.

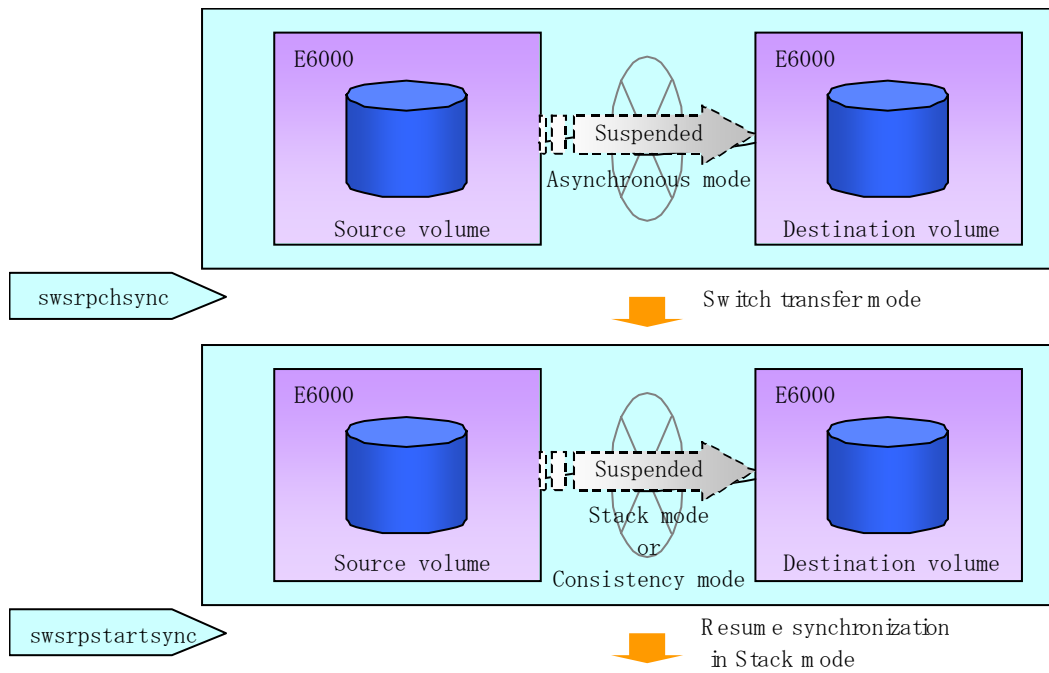
Table: Types of transfer modes

Mode	Description
Synchronous	When a write operation to a source volume occurs, this transfer mode returns the completion of write operations to the host after copying is completed. In synchronous transfer mode, the performance of a write response depends on the performance of the circuit between the boxes. Thus, any deterioration in circuit performance adversely affects the performance of a write response.
Asynchronous (sequential transfer)	This transfer mode starts sending data to a destination volume immediately after a response is made by a write operation to the source volume. The order of write operations is thus secured. If the volume of updates made to the source volume is excessive compared with transmission performance between the boxes, data to be copied remains stored, and write operations to the host are queued until the further data is copied to some extent. To use asynchronous mode, the circuit must have at least the same performance as the update speed to source volumes.
Stack	This mode stores (stacks) data in the source box to be transferred and copies the data at irregular intervals to lower the speed of data transferred to the destination box. Update data on the source volume is transferred to the destination volume at irregular intervals, thus the order of write operations is not guaranteed.
Consistency	This transfer mode guarantees the order in which multiple synchronous processes reflect data. Data updates in multiple synchronous processes are copied periodically and collectively, thus the order of write operations can be secured among multiple synchronous processes.

To perform a synchronous replication operation in Stack mode or Consistency mode, use the replication start command (swsrpstartsync), replication creation command (swsrpmake), and synchronization mode change command (swsrpchsyc). To check the execution status, use the operating status display command (swsrpstat). The figures below show how synchronous replication operation is done in Stack mode or Consistency mode.

Figure: Flow of synchronous replication (for Stack mode/Consistency mode)





Note

If the REC operating mode is changed when in equivalency maintenance status, after the operating mode is changed, the user must wait until the equivalency maintenance status is attained.

Recovery mode

Recovery mode includes two modes to restart copying after recovery from an inter-box path error (halt status).

Table: Types of recovery modes

Mode	Description
Automatic Recovery	In this mode, the REC session automatically switches from halt status to regular status, and copy processing resumes when the inter-box FCRA path is recovered.
Manual Recovery	In this mode, the REC session remains in halt status and copy processing does not resume even if the inter-box FCRA path is recovered. Manually resume copying. This mode is used, for example, when operating a standby database.

Split mode

Split mode includes two modes for write operation to the source volume when REC is used for synchronous transfer mode and for recovery from an inter-box path error (halt status).

Table: Types of Split modes

Mode	Description
Automatic Split	This split mode forcibly executes successful write operations to source volumes even if the inter-box FCRA path is fully blocked and halt status occurs. This mode enables write operations to source volumes even if the inter-box FCRA path is fully blocked, thus this mode does not affect transactions. When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode settings.

Mode	Description
Manual Split	This split mode rejects write operations to source volumes (returns an error) if the inter-box FCRA path is fully blocked and halt status occurs. This mode enables source volumes and destination volumes to be fully synchronized even if the FCRA path is fully blocked. When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode settings.

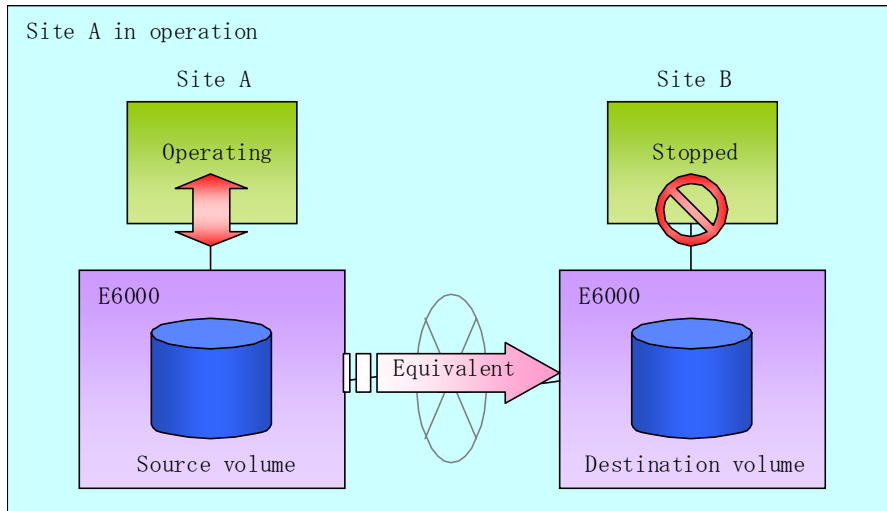
Copy direction reversal

The copy direction reverser allows you to smoothly switch between center sites.

The following figures show an example of how to switch the copy direction:

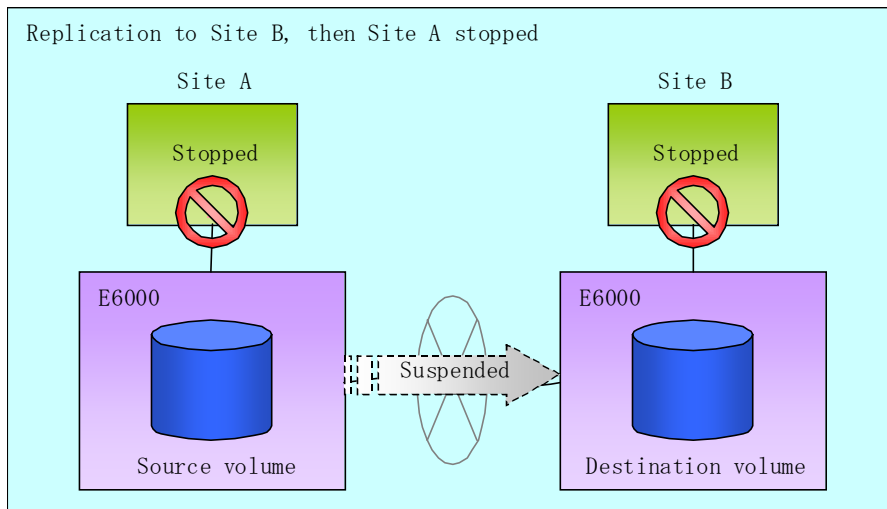
1. Assume that Site A is operating as the copy source and REC is operating from Site A to Site B.

Figure: When REC performed from Site A to Site B



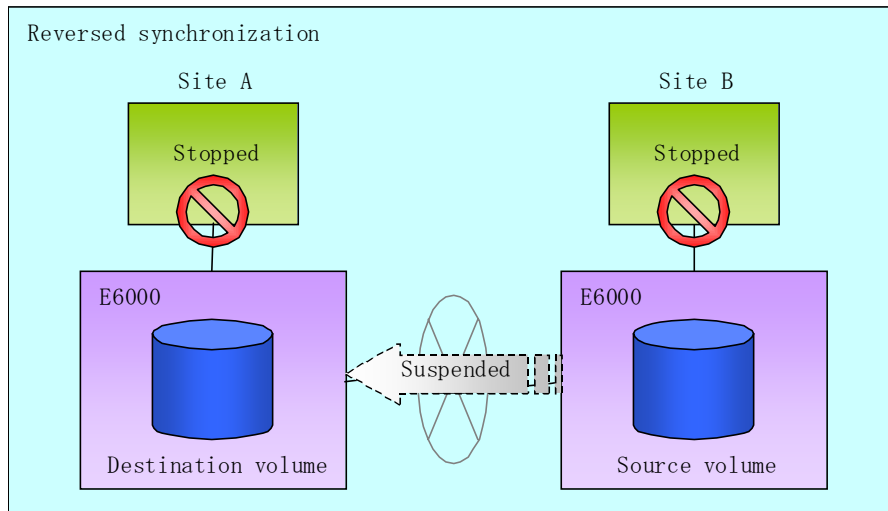
2. To switch the sites, execute the replication creation command (swsrpmake) to make a replication to Site B. Then, stop operating Site A.

Figure: When the replication creation command is used to create a replica on Site B



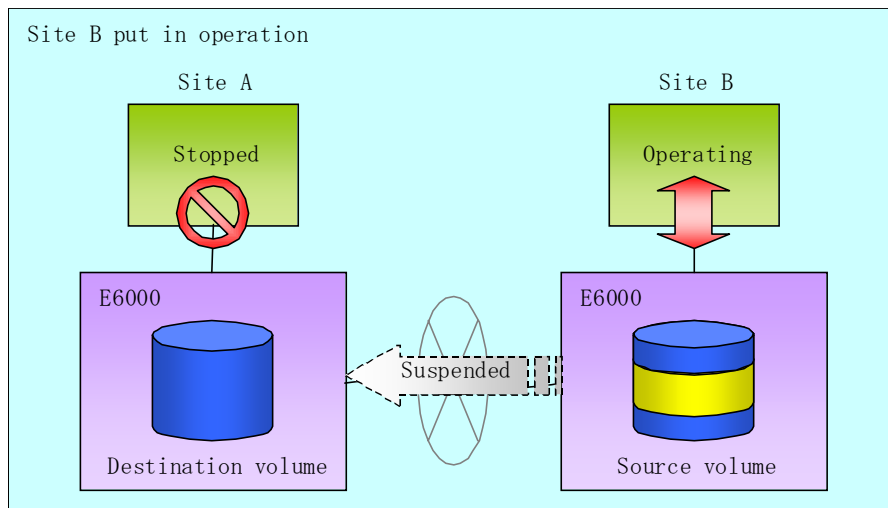
- Execute the synchronization reverse command (swsrprevsync) to reverse the copy direction.

Figure: When the synchronization reverse command is executed



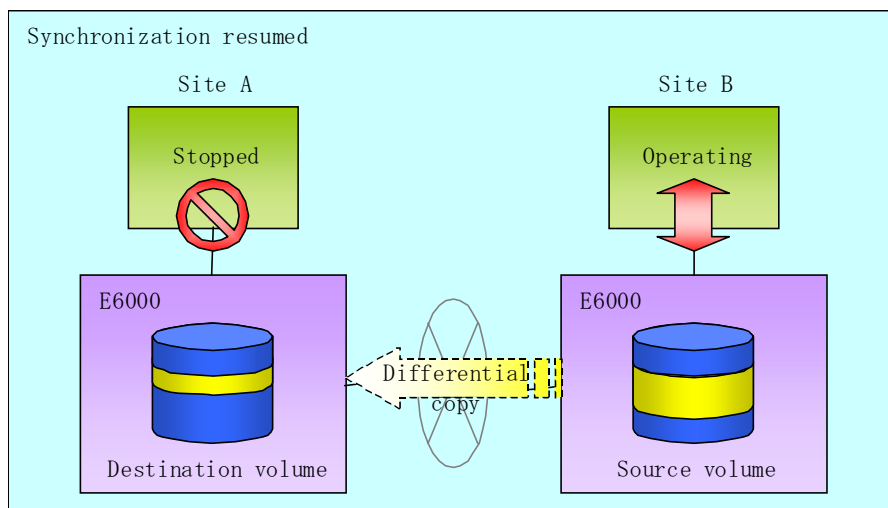
- Put Site B into operation as the copy source. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure: When Site B operation is started (synchronization suspend status)



- Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected into Site A with differential copies.

Figure: When Site B operation is started (synchronization resume)



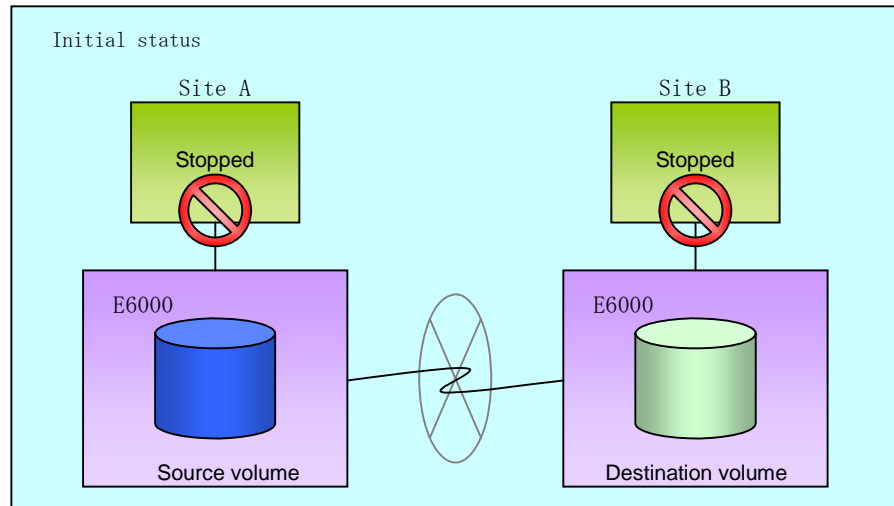
8.5.2.2.1 Initial copy skip function

The initial copy skip function is used when the initial copy cannot be executed because of the insufficient line capacity.

The following example shows the initial copy being skipped via tape transfer.

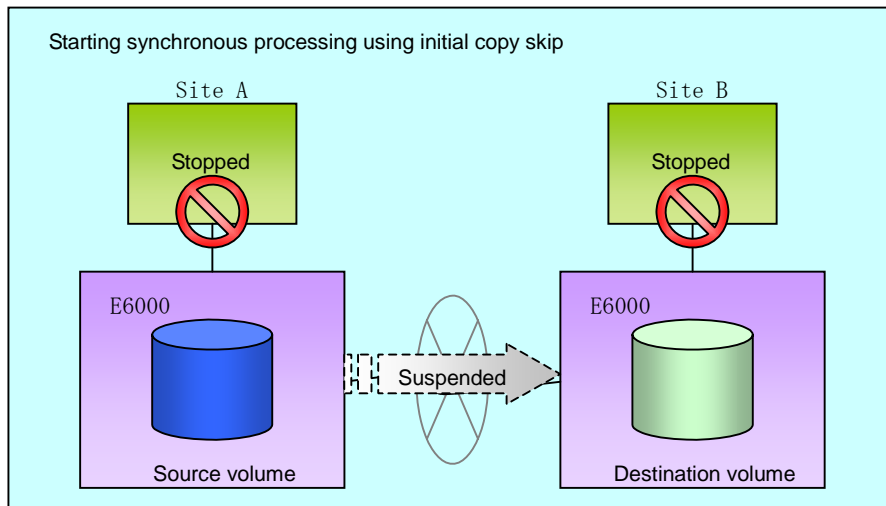
1. Suppose that operations at Site A have stopped.

Figure: When Site A operations have stopped



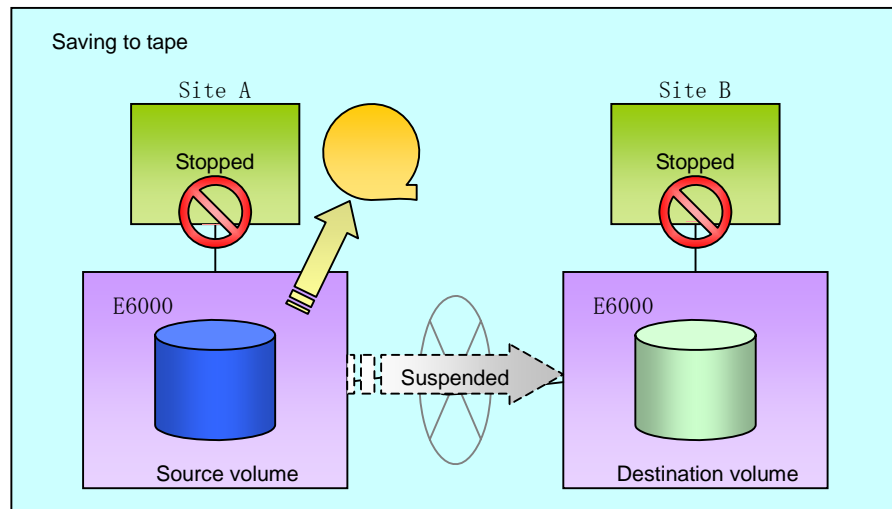
2. Next, synchronous processing begins, using the initial copy skip function. At this point, an REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

Figure: When synchronous processing is started using the initial copy skip function



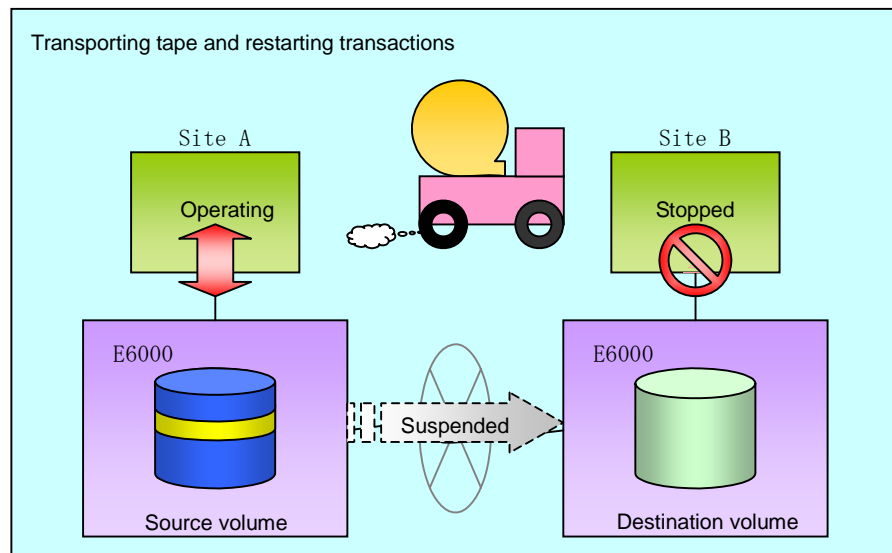
- Next, the data on the copy source volume is backed up to tape.

Figure: When copy source data is backed up to tape



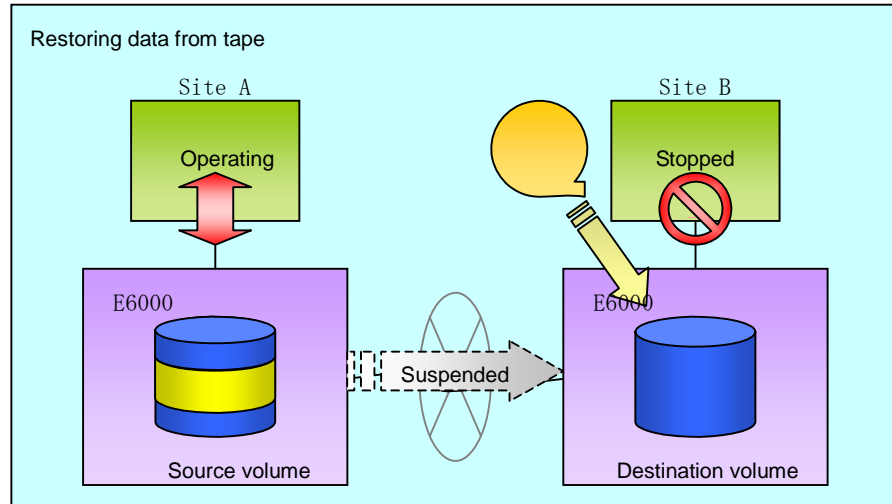
- The tape medium is sent to Site B, and jobs at Site A restart.

Figure: When Site A operations restart



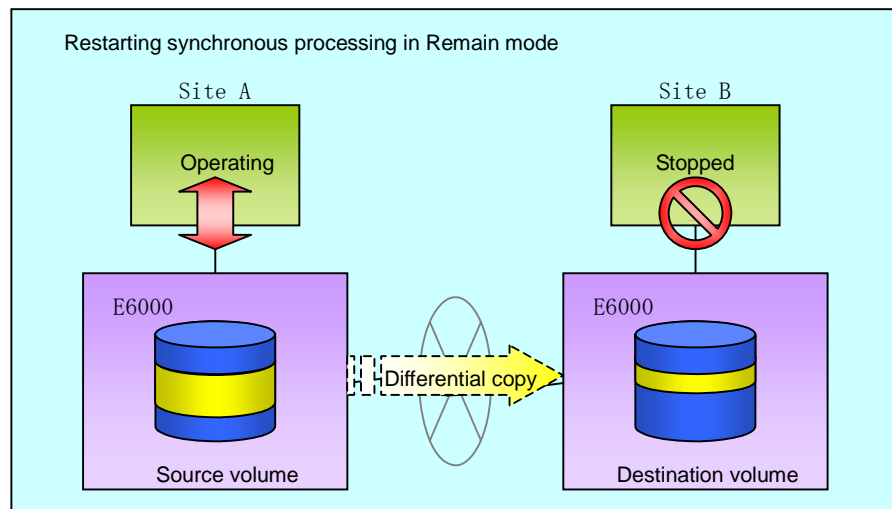
- The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure: When a tape is restored to the copy destination



6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied. Execute `swrepstartsync` with `-Xremain` option to restart in Remain mode.

Figure: When synchronous processing restarts in Remain mode



8.5.2.3 Concurrent suspension function

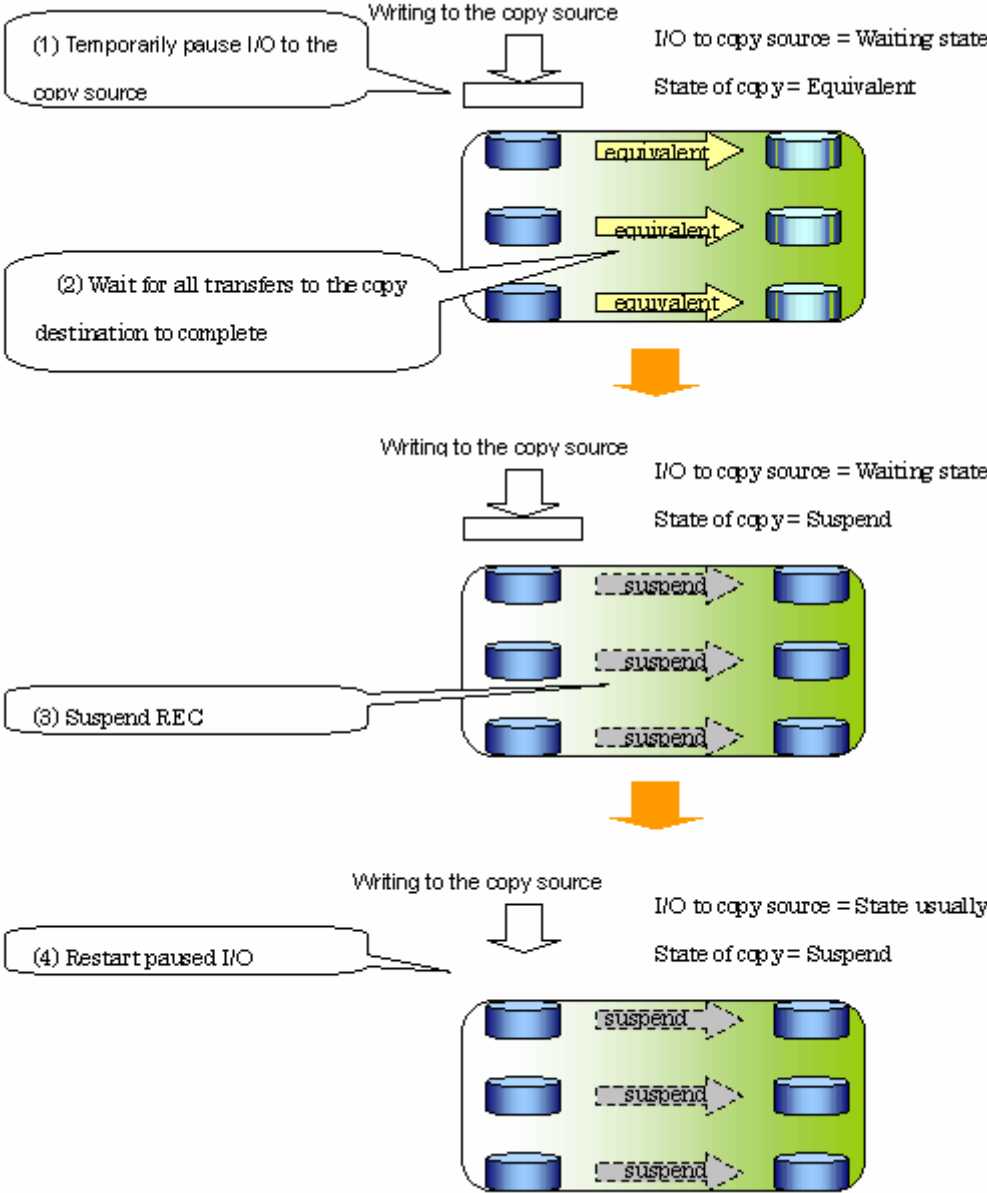
The concurrent suspension function simultaneously suspends multiple EC/REC sessions for disk array systems.

With this function, a copy with consistency can be easily performed.

This is useful for databases composed of multiple volumes.

The manner in which this operates within the disk array system is shown below.

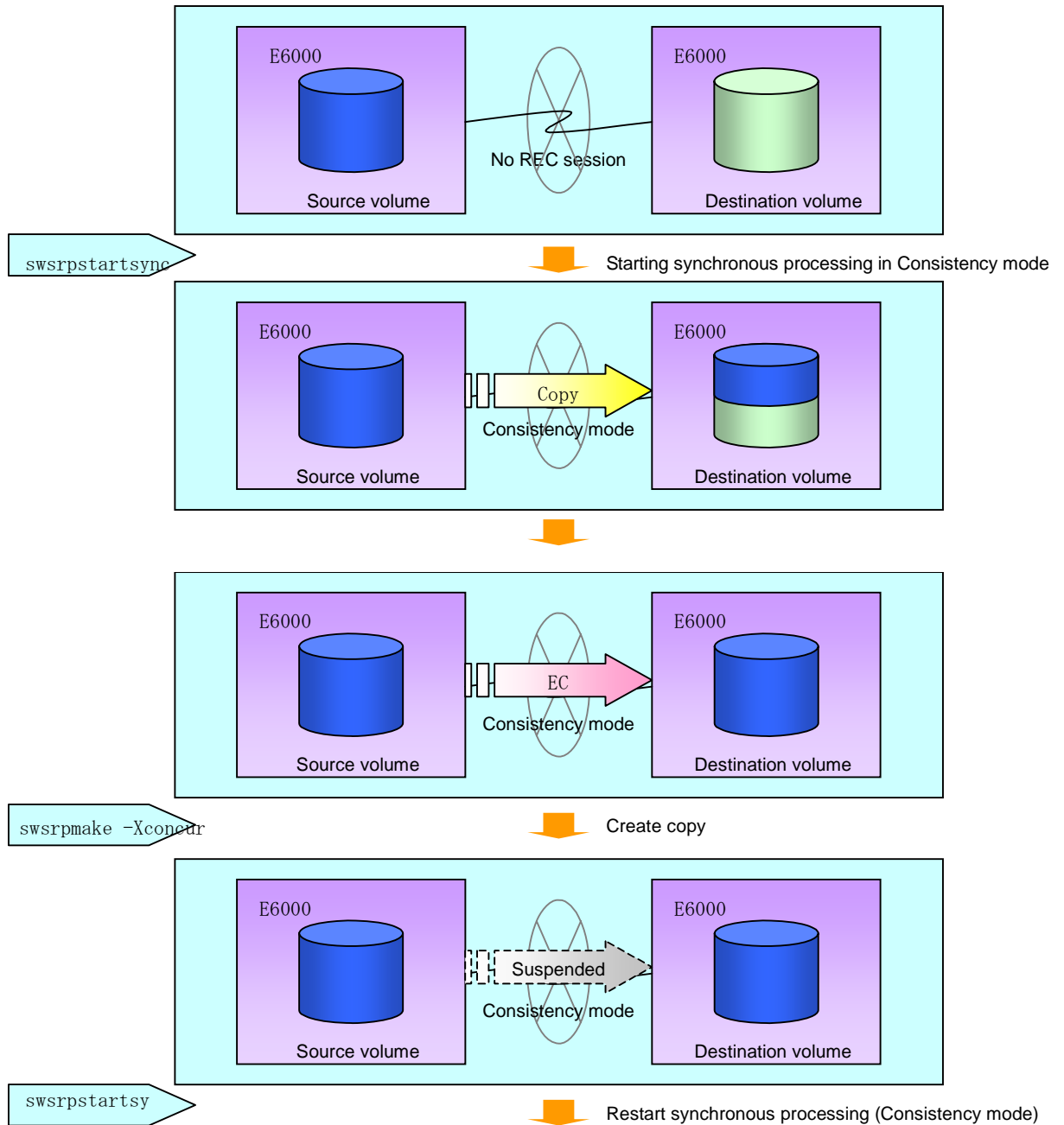
Figure: Internal operation of disk array unit



Replication using the concurrent suspension function is performed by specifying the "-Xconcur" option for the replication creation command (swsrpmake).

If concurrent suspension is performed using the Consistency transfer mode, it is no longer necessary to make temporary mode changes during multiple creation processes (Refer to the figure below). The operating procedure used when concurrent suspension is executed in Consistency mode is the same as the procedure for asynchronous mode and synchronous mode.

Figure: With Consistency mode



8.5.3 Backup and restoration using the replication function

Data can be restored from the replica volume to the original volume if a volume pair has been defined as bi-directional copy capable within the replication volume information setting command (`swsrpsetvol`).

Restoration can be executed in accordance with the following procedures.

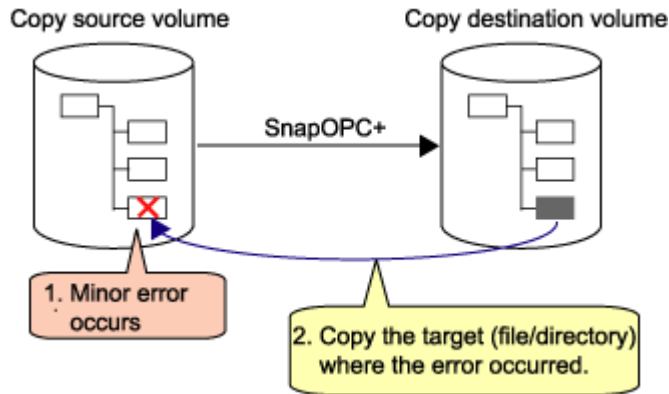
1. Execute the replication cancellation command (`swsrpcancel`) when the target volume for restoration is in EC session.
2. Execute the replication creation command (`swsrpmake`). The specification of an original volume and the replica volume is reversed at the time that the replication was executed. The replication command is executed specifying neither "-T" option nor "-C" option for QuickOPC/SnapOPC backup operation.



Note

- With SnapOPC+, the replication function cannot be used to restore data from the copy destination volume to the copy source volume. If restoration is required, copy the data from the copy destination volume manually.

Figure: Restoration with SnapOPC+

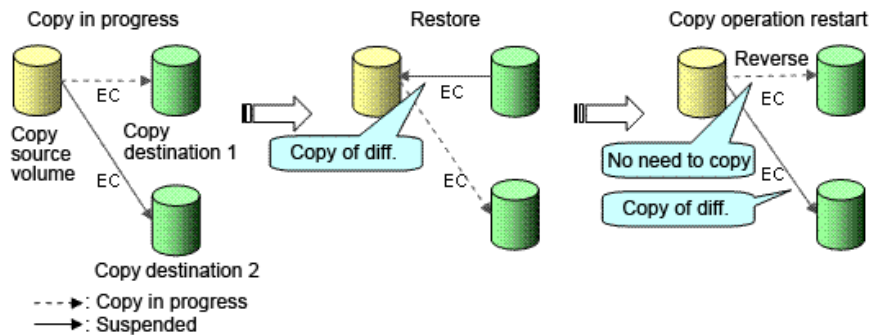


8.5.4 Executing synchronous-type reversal

Use of the synchronous processing reverse command (swsrprevsync) greatly reduces the physical copy size during restoration if the differential data capacity is small, thereby reducing the time taken for AdvancedCopy.

In addition, for operations that combine multiple copy operations, restore can be performed without cancelling other copy operations. Thus, a complete copy need not be made after restoration, and the load on ETERNUS is reduced when operations are restarted.

Figure: Example of EC reverse operation



8.6 Changing the Configuration Information

When a Storage Server or device required in the replication operation has been changed, the information set in AdvancedCopy Manager must also be changed. This chapter explains how to change the information set in AdvancedCopy Manager.

8.6.1 Changing an original volume or replica volume

To change existing attributes of the original source volume and/or replica volume such as copy direction and operational servers of server-to-server replication, delete the configuration information using the replication volume information deletion command (swsrpdelvol) and then invoke the replication volume information setting command (swsrpsetvol) to set the attributes to the required values.

8.6.2 Deleting an original volume or replica volume

To delete existing attributes of the original volume or replica volume that are set, use the replication volume information deletion command (swsrpdelvol).

8.6.3 Changing the device information of an original or replica volume

When changing device size and composition information for an original/replica volume/s, device composition is only changed after the deletion and re-configuration of the original/replica volume/s is complete.

The following steps should be taken when performing any composition changes to an original/replica volume/s. If these steps are not adhered to, the changes may not be completed properly

1. Perform deletion processing for the original / replica volume for device change. For details, see "Deleting an original volume or replica volume".
2. Change the device composition.
3. Perform configuration processing of a device as normal. For more information, see "Fetching device information from a Storage Server".
4. Perform Configuration of the original / replica volume.

8.7 Stop Replication processing

To stop the replication processing, or to change the snapshot replication to synchronized replication, use the replication cancellation command (swsrpcancel).



Note

To stop replication processing by SnapOPC+, the replication must be stopped starting with the oldest snap generation.

To forcibly stop the second or subsequent snap generations, specify the `-Xforce` option in the replication cancellation command (swsrpcancel). However, in this case, the specified snap generation and all earlier snap generations are stopped.

If the `-Xforce` option and the `-Xgroup` option are specified simultaneously, the SnapOPC+ sessions within the group are stopped, and the snap generations and all prior snap generations within the group are stopped.

To stop replication operation, stop the daemon on the Storage Server. In general, the daemon stops when the system stops.

The daemon can be stopped independently if it needs to be stopped for some reason. For more information, see "Starting and Stopping Daemons".



Note

- When the daemon stops, all functions of AdvancedCopy Manager running on the Storage Server stop.
- Before stopping the Storage Management Server daemon, make sure that operations on all Storage Servers under management have stopped.

8.8 SDX Object Replication

This section describes the replication operation of SDX objects.

A good understanding of the basic operation of normal volumes is required for this operation.

For details on GDS, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

8.8.1 Operation with Units of the SDX object operation

There are two modes of operation according to the difference in copy units:

1. Replication operation in units of logical volumes (method with GDS Snapshot)
2. Replication operation in units of slices (method without GDS Snapshot)

For details on how to confirm and select the type of operation, refer to the section titled "Setting the unit of SDX object operations". Replication in units of logical volumes (method with GDS Snapshot) is applicable only to replication within a server.

For replication between servers, you must use units of slices.



Note

The two types of operation cannot be performed on a single Storage Server.

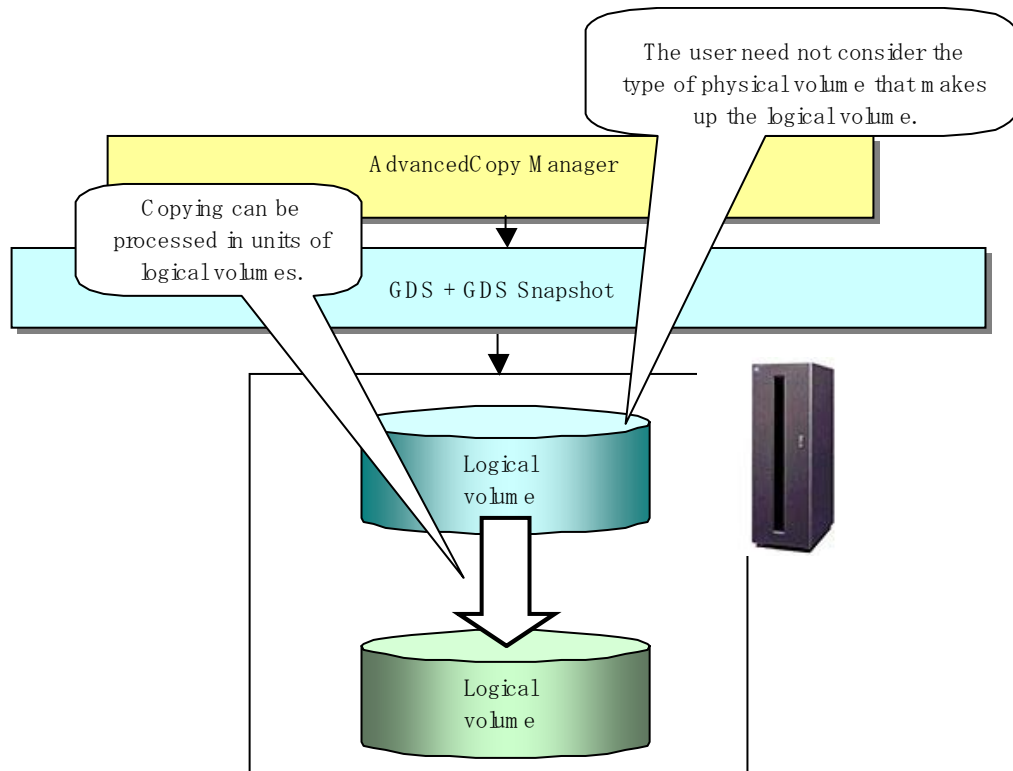
8.8.2 Replication operation in units of logical volumes (method with GDS Snapshot)

SDX objects of GDS can be replicated in units of logical volumes.

Replication is performed in linkage with GDS Snapshot.

You can specify a GDS logical volume name as the target volume. Therefore, you need not consider the physical disk structure of the SDX object. For operation in units of slices, all physical slices that make up the mirror volume must be specified, and the physical structure must be considered in the configuration and operation of replication.

Figure: Backup operation in units of logical volumes



To specify a GDS logical volume in an AdvancedCopy Manager command, specify the name of the GDS logical volume.

```
/dev/sfdsk/class-name/dsk/volume-name
```



Note Configuration and conditions of unsupported SDX objects

The supported volume types are single volumes and mirror volumes.

AdvancedCopy Manager does not support the following SDX objects (volumes):

- Volume of a shadow class
- Stripe volume
- Switch volume
- Volume in a concatenation group

Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.

If the total number of the slices that make up the original volume and slices that make up all replica volumes associated with the original volume at the start of synchronous replication or snapshot-type replication is 33 or greater, copying cannot be processed.

Also, if the original volume is in the invalid state, copying cannot be processed.



Point

To confirm whether the type of volume being used is either single, mirror, stripe, concatenation, or switch, execute the command `<sdxinfo -e long>` and check the volume type attribute displayed in the TYPE column for the matching volume label in the OBJ column.

[Volume object type attributes]

- single : Single volume (supported)
- mirror : Mirror volume (supported)
- stripe : Stripe volume (not supported)
- concat : Volume in a concatenation group (not supported)
- switch : Switch volume (not supported)

8.8.2.1 Configuring the replication operation

Note the following about performing the replication operation.

For replication with the function in linkage with GDS Snapshot, AdvancedCopy Manager processes binding and separation of volumes by using the GDS Snapshot function.

Therefore, the original and replica volumes must be SDX objects that can be used as a master object and proxy object respectively for a GDS Snapshot.

The copy source volume is the master object, and the copy destination volume is the proxy object.

Specify the GDS volume structure before registering a volume with AdvancedCopy Manager.

Note the compatibility requirements described below for replication in units of physical slices.

For detailed conditions on what constitutes a master/proxy volume, refer to "Preconditions for Proxy Constitution", "Cautions," in the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

- The original volume and replica volume must be the same type of SDX objects. Replication volume information based on logical volumes in a combination that includes slices or volumes of another OS cannot be set. When logical volumes are used, the original volume and replica volume must be the same size.

If the volumes are separated or there is no copy session, AdvancedCopy Manager assumes a non-replicated state. The following conditions will result in this state:

- OPC is started by the replication creation command (swsrpmake), and copy processing is completed.
- The replication start command (swsrpstartsync) is executed with the "software-copy" operand specified, and synchronous processing is suspended by the replication creation command (swsrpmake).

If a pair of separated replication volumes is specified, the replication start command (swsrpstartsync), or the replication creation command (swsrpmake) or the replication volume information deletion command (swsrptdelvol) will automatically clear the separated state. To clear the separated state without a copy session for operational reasons, delete the replication volumes by using the replication volume information deletion command (swsrptdelvol) or by using the "sdxproxy" command, referring to "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

8.8.2.2 Replication volumes

To use the advanced copy function, the structures of the original volume and replica volume must satisfy the following conditions.

Structures of copy source volumes

To use the advanced copy function, the structure of the copy source volume must be one of the following:

- Single volume
- Not the root class
- Mirror volume belonging to a mirror group that has no subordinate groups

For a mirror volume in a mirror group connected to a subordinate group, only software-copy can be used.

AdvancedCopy Manager does not support the following SDX objects (volumes):

- Volume of a shadow class
- Stripe volume
- Switch volume
- Volume in a concatenation group

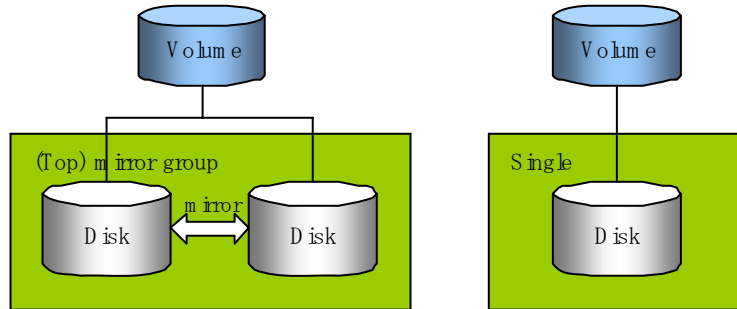
Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.

If the total number of the slices that make up the original volume plus the slices that make up all replication volumes associated with the original volume at the start of synchronous processing or snapshot-type replication processing is 33 or greater, copying cannot be processed.

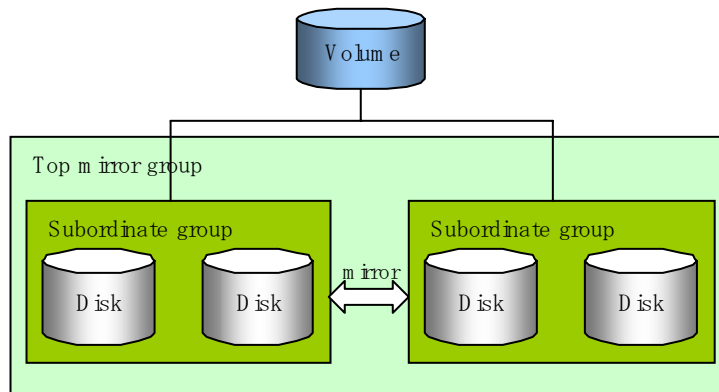
Also, if the copy source volume is in the invalid state, copying cannot be processed.

Figure: Copy source volume structures supported by the advanced copy function

Structure supported by the advanced copy function
(m i r r o r group not connected to a subordinate group)



Structure supported only by the software-copy function
(m i r r o r group connected to a subordinate group)



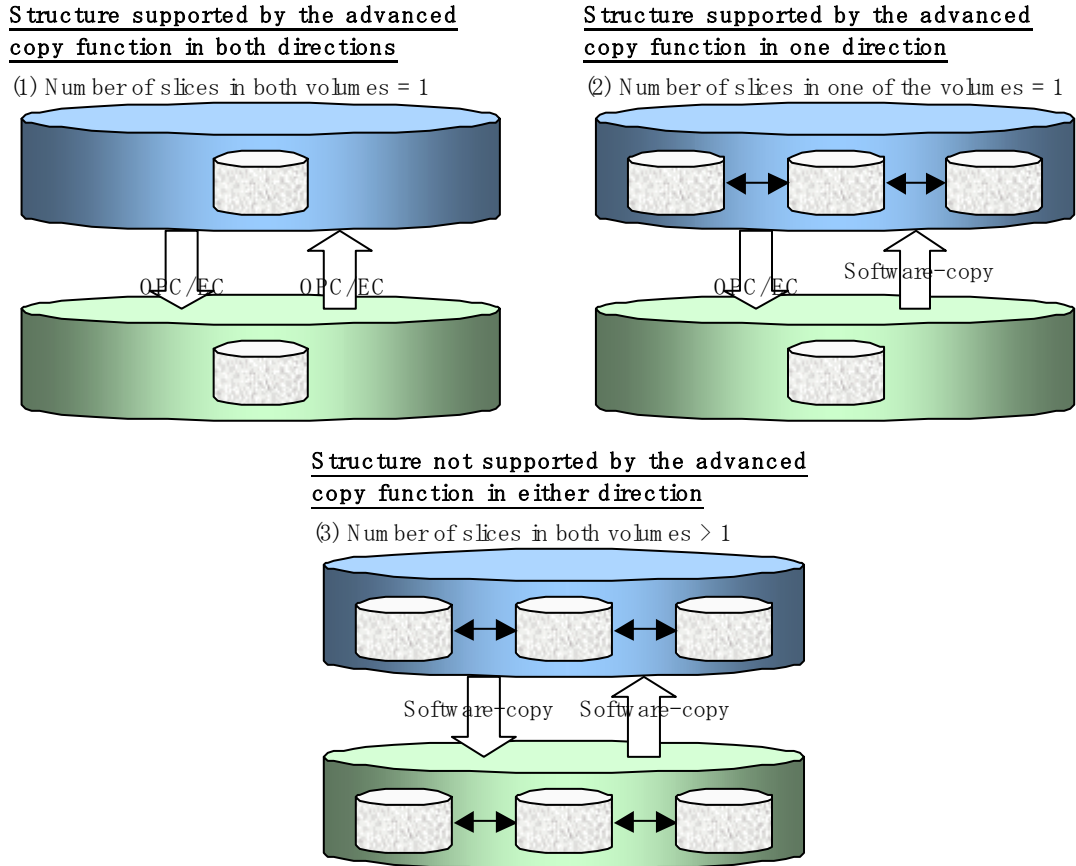
Structures of copy destination volumes

To use the advanced copy function, the structure of the copy destination volume must be one of the following:

- Single structure
This means that the type attribute of the volume is "single" or the type attribute is "mirror" and one disk makes up the disk group.
- Not the root class
- Not a Stripe or Concatenation type

If the copy destination volume is a mirror volume, only the software-copy function can be used. To use the advanced copy function in both directions, both volumes must be in a single structure. Neither a stripe nor concatenation volume can be used as the copy destination volume.

Figure: Copy destination volume structures supported by the advanced copy function



8.8.2.3 Copy functions available for each GDS structure

The two types of GDS Snapshot copy functions are described below.

The availability of the functions depends on the SDX object structure.

- Advanced copy: Copying with the hardware function of ETERNUS, Fujitsu's storage systems
- Software-copy: Copying with the disk driver of PRIMECLUSTER GDS

The following table shows the relationship between SDX object structures and their available copy functions.

Table: SDX object structures and available copy functions

Replication structure	Unit	Copy source/destination	SDX object structure Stripe/concatenation/switch-types of objects cannot be copied.	Available copy function	
Within a server	Logical volume	Copy source	Single	Advanced copy Software-copy	
			Mirror	No subordinate group exists.	Advanced copy Software-copy
				Subordinate groups exist.	Software-copy
		Copy destination	Single	Advanced copy Software-copy	
			Mirror	This consists of one disk.	Advanced copy Software-copy
				This consists of multiple disks.	Software-copy

8.8.2.4 Fetching device information from a Storage Server

To perform the replication operation with a Storage Server and obtain information relating to a subordinate device of the Storage Server, you must register the server. For details on how to fetch the device information, refer to the section titled "Fetching device information from a Storage Server."

8.8.2.5 Configuring replication volumes

Note the following about configuring the original and replica volumes.

- Confirm that the volume is of a structure as described in the section titled "Supported logical volume structures".
- Confirm that the original/replica volume is not a master volume or proxy volume.

Register GDS logical volumes as the original and replica volumes.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1
/dev/sfdsk/CLS1/dsk/VOL2
swsrpsetvol completed
#
```

8.8.2.6 Executing replication

Note the following about performing replication of SDX objects.

To start or resume synchronous processing (synchronous processing start command (swsrpstartsync)) or to start snapshot processing (replication creation command (swsrpmake)), the logical volume of the copy destination must be inactive.

If the logical volume of the copy destination is active when the command is executed, processing to stop the volume will be performed within the command. If the copy destination volume is a file system volume, the file system is unmounted during replication preprocessing and the volume is then stopped.

If the volume cannot be stopped (because the volume is accessed by an application), the command will be terminated abnormally.

Example of synchronous replication

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1
/dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpstartsync completed
Equivalency holding state
# swsrpmake -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpmake completed
```

Example of snapshot replication

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpmake completed
#
```

8.8.2.7 Operational notes

Do not use the "sdxproxy" command directly to change the state of a volume registered for the replication function.

Otherwise, the "sdxproxy" command may create an inconsistency between the management information of the replication function and the actual volume state. In this case, use the replication cancellation command (swsrpcancel) to cancel the replication operation.

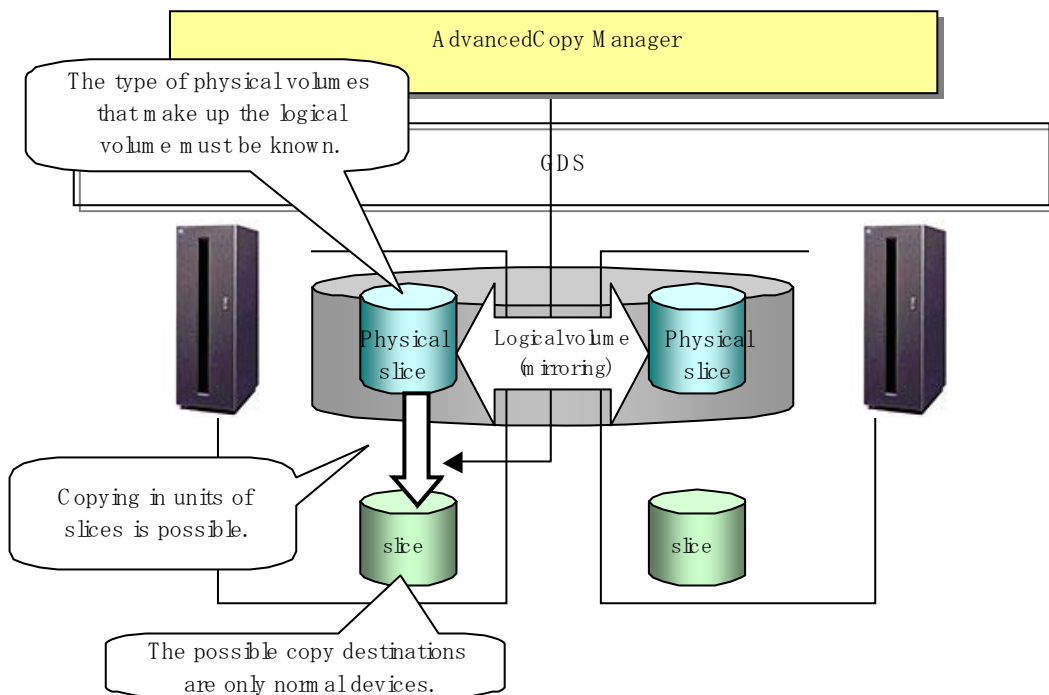
8.8.3 Replication operation in units of slices (method without GDS Snapshot)

SDX objects of GDS can be replicated in units of slices where replication is performed without GDS Snapshot.

This operation however requires that the physical disks that make up the GDS logical volume be specified.

For details on GDS, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)".

Figure: Replication operation in units of slices



Note

If mirroring between cabinets is enabled and copying to the original volume by OPC is required in the event of a cabinet failure, both mirrored systems must be replicated. In such cases, the required capacity of the replica volume is not the size of the logical volume but the size of the physical volume.



Note

The SDX objects that can be used for operations in slice units are as follows:

- Single volumes
- Non-layered mirror volumes



Note

You can determine if the volume being used is the single, mirror, stripe, concatenation, or switch volume type by executing "sdxinfo -e long". (Check the value in the TYPE column in the line displayed for the volume in the OBJ column.)

[Volume object type attribute]

- single: Single volume (operation possible)
- mirror: Mirror volume (operation possible)
- stripe: Stripe volume (operation not possible)
- concat: Volume in a concatenation group (operation not possible)
- switch: Switch volume (operation not possible)

When specifying a name in the AdvancedCopy Manager command, use the following name format that combines a logical volume name and an AdvancedCopy Manager device name. Refer to "PRIMECLUSTER GDS SDX objects" for details.

`dev/sfdsk/class-name/dsk/volume-name: (device name where volume is constructed)`



Note

If, as a countermeasure for a missing device name, the udev name is to be used instead of the sdxinfo DEVNAM value, and if the operation is an inter-server operation, both servers must run AdvancedCopy Manager 13.3 or later.

8.8.3.1 Configuring the replication operation

For notes on configuring the replication operation, refer to the section titled "Notes on SDX object operations (replication management)".

8.8.3.1.1 Supported logical volume structures

Replication with the copy destination volume of a mirror slice is not supported. Consequently, if either the original volume or replica volume is a mirror slice, you can perform replication only from the mirror slice to a physical slice. To copy data to a mirror slice, use the "dd" command. Copying must be executed for all mirror slices that make up the logical volume.

8.8.3.2 Fetching device information from a Storage Server

To perform the replication operation with a Storage Server and obtain information about a subordinate device of the Storage Server, you must register the server. For details on how to fetch the device information, refer to "Fetching device information from a Storage Server."

8.8.3.3 Configuring replication volumes

Register the mirror slices that make up a mirror volume of GDS as replication volumes.

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/sfdsk/CLS1/dsk/VOL1:sda /dev/sfdsk/CLS1/dsk/VOL2:sdb
swsrpsetvol completed
#
```

8.8.3.4 Executing replication

Example of snapshot replication

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/sfdsk/CLS1/dsk/VOL1:sda /dev/sfdsk/CLS1/dsk/VOL2:sdb
FROM=/dev/sfdsk/CLS1/dsk/VOL1:sda, T0=/dev/sfdsk/CLS1/dsk/VOL2:sdb swsrpmake completed
#
```

States of the objects in replication creation

Replication can be performed when the SDX object that makes up the relevant logical volume is in one of the states listed below. If the object is in any other state, replication cannot be performed. (AdvancedCopy Manager checks the state of the SDX object by using the `sdxinfo` command of GDS.)

1. The state of the mirror volume is ACTIVE or STOP.
2. The state of the physical disk is ENABLE.
3. The state of the mirror slice is ACTIVE or TEMP.

Replication pre-processing and post-processing

Pre-processing and post-processing scripts are not executed when a slice of the SDX object is in the TEMP state.

Chapter 9 Configuration Maintenance

This chapter describes maintenance of the management database, performing troubleshooting, and changing the configuration information.

9.1 Maintenance of Database

AdvancedCopy Manager holds various files and database tables of critical management information for use in backup operations.

It is recommended that these management information files and tables are backed up regularly to ensure there is always sufficient capacity to cater for the typically high volume of dynamic information such configuration and device related data, scripts, authentication lists, history information and other critical management information built up over long term use of the system. Corruption or loss of this critical management data particularly history data could lead to data inconsistencies in live volumes and generation and tracking inconsistencies in backup volumes. Please note that these files and tables will differ in environments involving ORACLE databases.

The following table lists the backup frequency relating to this information according to Host, type and purpose.

Table: Databases on a Storage Management Server

Type	When backup to be made	Backup method (reference)	Size
Database	A Storage Server has been added, the configuration information has changed as a result of loading of new device information or for some other reason, or the information about the backup management or replication management operation has changed.	Saving a database or Making a package backup of databases	Refer to Saving a database.
Authentication management list	Authenticated data has been set.	Backing up an authentication management list or Making a package backup of databases	Refer to Backing up an authentication management list.
Registry	DB setup has been performed on a Storage Management Server (a transaction on a Storage Management Server has been created in a cluster system) or the Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.

Table: Databases on a Storage Server

Type	When backup to be made	Backup method (reference)	Size
Registry	A Storage Server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.

Type	When backup to be made	Backup method (reference)	Size
Backup management list	A backup transaction has been completed.	Backing up a backup management list or Making a package backup of databases	Refer to Backing up a backup management list.
Pre-processing and post-processing scripts for backup management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the pre-processing and post-processing script file for backup management.
Pre-processing and post-processing scripts for tape-copy	A pre-processing or post-processing script has changed.	Saving a database by using the copy command OR Making a package backup of databases	Check the size of the pre-processing and post-processing script files for tape-copy.
Replication management list	A replication transaction has been completed.	Backing up a replication management list or Making a package backup of databases	Refer to Backing up a replication management list.
Pre-processing and post-processing scripts for replication management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the pre-processing and post-processing script file for replication management.
Policy file for management information package backup	The policy file has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the policy file for management information package backup.

Table: Databases on a tape server

Type	When backup to be made	Backup method (reference)	Size
Registry	A tape server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.
Tape management list	A tape-backup transaction has been completed.	Backing up a tape management list or Making a package backup of databases	Refer to Backing up a tape management list.



Point

You can make backups of databases either individually or as a whole.

If a Storage Server also operates as a Storage Management Server, the Storage Server contains a database for the Storage Management Server as well as for the Storage Server.

9.1.1 Individually backup of databases

9.1.1.1 Maintaining a backup a management list

This chapter describes maintenance of a backup management list. A backup management list is maintained on the server that performs the backup operation.

9.1.1.1.1 Backing up a backup management list

A backup management list is backed up.

For details, please refer to "Resource backup command (swstresback)".

Backup management list backup data size

Check the size of the subordinate directories of the following path.

```
/etc/opt/FJSVswsts/data
```

In the cluster environment, check the size of the subordinate directories of the following path.

```
/etc/opt/FJSVswsts/<logic node name>/data
```



Point

When you reuse a directory used before to save the data, the size of this directory must be capable of supporting repositories which have been allocated a size to cater for high growth. Rule of thumb would suggest that the file system in which these directories exist should be at least three times greater than the size returned in query above.

9.1.1.1.2 Restoring a backup management list

A backup management list is restored.

For details, please refer to "Resource restore command (swstresrst)".

9.1.1.2 Maintaining a replication management list

This chapter describes maintenance of a replication management list.

9.1.1.2.1 Backing up a replication management list

To back up a replication management list, back up the repository of the Storage Management Server. For information about backing up a repository, see "Database save command (saving a database)."



Point

- Management information for replication management is saved in a repository.
- It is recommended that a replication management list be backed up when management information for replication management is changed with the replication volume information configuration command (swsrpsetvol) or the replication volume information deletion command (swsrpdelvol).

9.1.1.2 Restoring a replication management list

Take the following steps to restore a replication management list.

1. Restore the repository on the Storage Management Server. For information about restoring a repository, see "Database recovery command (recovering a database)." Specify 0 as the recovery mode.
2. On the Storage Server, execute the resource adjustment command (swsrprecoverres) with the "-r" option specified. For details of the resource adjustment command, see "Resource match command."



Point

- When the procedure above is performed, information for replication management of a repository is copied to a Storage Server, where it is available for use.
- When the information for replication management in the repository does not need to be changed and only the information on the Storage Server is only incorrect for some other reason, perform the procedure above.

9.1.1.3 Maintaining a database

This chapter describes maintaining a database used by a Storage Management Server.

9.1.1.3.1 Saving a database

Execute the database save command to save a database space.

Execute this command on the Storage Management Server.



Note

- To execute the database save command, log in as a root user.
- Use the locale specified at Storage Management Server installation.
- Processing may not end normally if a browser client is used to perform this operation or if another command is executed while this command is being executed. In this case, execute the command at the command line or wait until all other processes have terminated.
- If no data is saved by this command, the respective database cannot be recovered with the database recovery method if an I/O error occurs in the database space.
- When the Storage Management Server is in cluster operation, you should prepare directories into which data is saved on shared disks.

a. Specification

```
# /opt/swstorage/bin/stgdbdmp -d Backup-Directory [-y]
```

b. Explanation of options

Option	Explanation
-d	Specify the name of the directory in which to save a database space. This directory must be created in advance.
-y	Existing contents of the specified directory, will be overwritten when the database space is saved. If this option is omitted and existing content is retained in the specified directory, processing ends without saving the database space.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

```
# /opt/swstorage/bin/stgdbdmp -d /storage/dmpdir - y

///// AdvancedCopy Manager database save /////

=====
DB data will be saved.
=====

Editing of the work file used for save processing is complete.
.
Update of the DB space is suppressed.
Forced switching of archive log files is complete.
.....
Save processing of DSI data is complete.
Archive log files have been completely discarded.
Save processing of RDB dictionary data is complete.
Suppression of DB space updates has been completely canceled.
=====

Save processing of DB data is complete.
=====

Database save processing ended normally.

#
```



Note

- Use this save method only when configuration information is changed due to the addition of another Storage Server or fetching of device information. It is recommended that saving the database should be performed at least once per day.
- To prepare for an I/O error in an external file while save data is being acquired, you are recommended to keep at least two generations of save data.

Database backup data size

Calculate the size with the following formula:

$$60 + (\text{number of devices to be managed} \times 0.001) \text{ megabytes}$$

9.1.1.3.2 Finding an error in a database

Refer to the following file, and beginning from the last line, search for any message with "rdb: ERROR: qdgXXXXX-" in its contents (also check the messages displayed at the same time). Then, obtain the value of "qdgXXXXX" to determine the recovery mode.
 (For non-cluster operation) /var/opt/FJSVswstf/log/RDBSWSTF.log
 (For cluster operation) /var/opt/FJSVswstf/<logical-node-name>/log/RDBSWSTF.log

Table: Relationships between the qdg message and recovery mode

qdg message	Description of error	Target of checking	Recovery mode
qdg13039u	i/o error or detected damage	The directory for storing data of a DB space in a repository/hdrdb_rep1	1
qdg12079e	File delete		
qdg03400u	Rollback disabled		
qdg03401u		-	
qdg03121u	I/O error	The directory for the RDB dictionary/hdrdic	2
qdg12078u	File delete		

qdg message	Description of error	Target of checking	Recovery mode
qdg03420u	I/O error, detected damage, etc.	The directory for DB file/SWSTFDB/rdbdir/DIR_FILE1	
qdg12150u	File open error	The directory for DB file/SWSTFDB/rdbdir/DIR_FILE2	
qdg12151u			
qdg12251e	I/O error	The directory for DB file/SWSTFDB/rdbdir/rdblogmanag e	3
qdg12443u			
qdg12434u	File error		
qdg02290u	File delete		
qdg12111u	I/O error	The directory for RDB log files/hdrlog	4
qdg12440u			
qdg12441u			
qdg12442u			
qdg02296u	File delete		
qdg03815u	System call error	The directory for DB file/SWSTFDB/rdbdir/archive1	5
qdg12275W			
qdg12250u	Damage detection	The directory for DB file/SWSTFDB/rdbdir/archive2	
qdg12483u	File read error		



Note

- If multiple errors occur simultaneously, recovery using recovery modes 1 to 5 may not be possible.
To restore a database to its state when it was last saved, re-create the database and execute the database save command in recovery mode 0. (Data updated or inserted after the last time the database was saved cannot be recovered.)
- At this point, execute the resource match command (swstsrsemitch) (see "Resource match command") with option "-x" on all the Storage Servers on which the backup operation is performed.
- Then, execute the resource adjustment command (see "Resource adjustment command") with option "-r" on all the Storage Servers on which the replication operation is performed.

9.1.1.3.3 Recovering a database

Execute the database recovery command for database recovery if an I/O error occurs in a database space.

Execute this command on the Storage Management Server.



Note

- To execute the database recovery command, log in as a root user.
- Use the location specified at Storage Management Server installation.



Note

- After the database recovery command ends normally, acquire the latest save data using the database save method. Fujitsu recommends using a different save data storage directory than the save data storage directory used by the recovery command.
- After the database recovery command ends normally, restart (start after stopping) the AdvancedCopy Manager daemons. For an explanation on restarting the daemons, see "Starting and Stopping Daemons."

a. Specification

```
# /opt/swstorage/bin/stgdbrcv -m mode [-d Backup-Directory]
```

b. Explanation of options

Option	Explanation
-m	Specify a recovery mode based on the type of error that occurred in a database space. For the relationship between types of errors and recovery modes, see "Table: Relationships between the qdg message and recovery mode".
-d	Specify the name of the directory storing the saved data. This option is required if 0, 1, 2, or 4 is specified in the -m option.

c. End status

= 0: Normal end
> 0: Abnormal end

d. Execution example

```
# /opt/swstorage/bin/stgdbrcv -m 1 -d /storage/dmpdir
```

```
///// AdvancedCopy Manager database recovery /////
```

```
=====
DSI recovery (FW mode) will start.
=====
```

```
Editing of the work file used for recovery is complete.
DSI access inhibition is complete.
```

```
.....
DSI data recovery is complete.
```

```
=====
DSI recovery (FW mode) is complete.
=====
```

```
Database recovery ended normally.
```

```
#
```

9.1.1.4 Maintaining authentication management list

This chapter describes maintenance of the authentication feature. Execute the command on the server (Storage Management Server) where the authentication feature is implemented.

9.1.1.4.1 Backing up an authentication management list

On a Storage Management Server, execute the `/opt/FJSVswssc/bin/smmkbat` command to extract authentication management information. The root user must execute this command.

```
# /opt/FJSVswssc/bin/Smmkbat - f definition-information-output-shell-script-name
```

Example: `/opt/FJSVswssc/bin/smmkbat - f acldata.sh`

The definition information output shell script is extracted as a shell script in which the command example for reflecting definition information is described.

Authentication management list backup data size

Calculate the size with the following formula:

$400 + (\text{length of the account name with an access permission assigned} + 29 (*1)) \text{ bytes}$

*1 Add the lengths of all accounts with an access permission assigned.

9.1.1.4.2 Restoring an authentication management list

Execute the definition information output shell script. This script must be executed by a root user.

9.1.1.5 Maintaining a registry

This chapter describes maintaining a registry. Perform this procedure on a Storage Management Server or a Storage Server.

9.1.1.5.1 Backing up a registry

Back up the following file by executing the “cp” command.

a. File names

For non-cluster operation

```
/etc/opt/swstorage/swnode.ini
```

For cluster operation

```
/etc/opt/swstorage/Logical-node-name/swnode.ini
```

b. Execution example

Save it in the /backup directory.

```
# cp /etc/opt/swstorage/swnode.ini /backup
```

Registry backup data size

Check the size of the file to be backed up.

9.1.1.5.2 Restoring a registry

Restore the following file by executing the cp command:

a. File names

In the case of a non-cluster

```
/etc/opt/swstorage/swnode.ini
```

In the case of a cluster

```
/etc/opt/swstorage/Logical-node-name/swnode.ini
```

Registry backup data size

Check the size of the file to be backed up.

b. Execution example

Restore the following file saved in the /backup directory:

```
# cp /backup/swnode.ini /etc/opt/swstorage
```

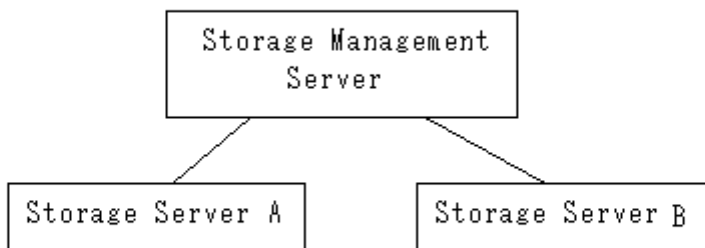
9.1.2 Making a package backup of databases

This section describes the function for making a backup of management information (e.g., databases and files) for AdvancedCopy Manager from a single Storage Server, Storage Management Server, or tape server.

With a packaged backup of management information, you can execute a backup of management information across all Storage Servers, Storage Management Servers, and tape servers from a single participating server.

The server from which you invoke a packaged backup of management information is called the “package-backup-of-the-management-information execution server”. The servers, whose data is to be backed up are called the “package-backup-of-the-management-information target.

Figure: Storage Management Server and Storage Server



Example: Assume that the package backup of management information function has been used to back up the management information on a Storage Management Server, Storage Server A, and Storage Server B onto Storage Server B in the diagram above. In this case, Storage Server B is the management information package backup execution server.

The Storage Management Server, Storage Server A, and Storage Server B are the management information package backup target servers. That is, Storage Server B operates as both the management information package backup execution server and a management information package backup target server.

The following table shows the types of management information handled in a package backup of management information.

Table: Types of management information handled in a package backup of management information

Function	Type of data
Database	Database
Authentication feature	Authentication management list
Registry	Registry
Backup management	Backup management list, or backup management list and recovery control file Pre-processing and post-processing scripts Tape-copy pre-processing and post-processing scripts Transaction volume locking specification file for backups Backup volume locking specification file for backups Backup-restored volume locking specification file Tape-copy backup volume-locking file
Replication management	Pre-processing and post-processing scripts Copy-source volume locking specification file Copy-destination volume locking specification file
Package backup of management	Policy file

Function	Type of data
information	
Tape backup management	Tape management information



Note

Storage Server management information created by Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier cannot be handled by the package backup of management information function. To create a backup, back up each management information component individually as described in "Maintaining a database" in the Operator's Guide applicable to the Storage Server.

9.1.2.1 Preliminaries

Before making a package backup of management information, you must perform the following:

1. Determine the management information package backup target servers and the types of management information to be backed up.
2. Determine the management information package backup execution server.
3. Create a directory where the management information package backup execution server will store the backup data. The size of the directory must not be less than the total of the following sizes:
 - The required size for a database is the size of the database backup data multiplied by 1.2.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
 - The required size for an authentication management list is the size of the authentication management list backup data.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
 - The required size for the registries is the total of the data sizes of the registry backup data on the management information package backup target servers.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.
 - The required size for backup management is the total of the sizes below for each management information package backup target server:
For the size of each backup data, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.
 - Size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 1.2
 - Size of the pre-processing and post-processing scripts for backup management
 - Sizes of the pre-processing and post-processing scripts for tape-copy
 - Size of the transaction volume locking specification file for backups for backup management
 - Size of the backup volume locking specification file for backups for backup management
 - Size of the backup-restored volume locking specification file for backup management
 - Size of the backup volume locking specification file for backups for tape copy
 - The required size for replication management is the total of the following sizes for each management information package backup target server:
 - Size of the pre-processing and post-processing scripts for replication management
 - Size of the copy-source volume locking specification file for replication management

- Size of the copy-destination volume locking specification file for replication management
 - The required size for the policy file for package backup of management information is the size of the policy file backup.
 - The size required for tape management information is 1.2 times the size of backup of the tape management information.

For details on the size of tape management information, see "Maintaining Databases" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".
4. Check the size of the work directory for the management information package backup target servers (or the shared disk for shared data for AdvancedCopy Manager in a cluster system). The sizes described below are needed only when a package backup of management information is being done. Use the largest value of the sizes of the databases to be backed up from the management information package backup target servers. The required sizes are as follows:
- The required size for the databases is the size of the database backup data multiplied by 2.2.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
 - The required size for the authentication management list is the size of the authentication management list backup data.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
 - The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.
 - The work directory does not require any space for registry, replication management, and policy file backups.
5. Execute the stgmgrinfo command as described in "Management information package backup server registration/deletion command (stgmgrinfo)", on the management information package backup execution server (determined in step 2).
6. Create a policy file on the management information package backup execution server.

Table: Management information package backup execution server environment and policy file paths

Management information package backup execution server		Policy file path
OS	Operation type	
Windows	Non-cluster	environment-setting-directory\etc\stgmgrinfo_policy.ini
	Cluster	<AdvancedCopy-Manager-shared-data>\etc\opt\swstorage\etc\stgmgrinfo_policy.ini
Solaris	Non-cluster	/etc/opt/FJSVswstf/stgmgrinfo_policy.ini
HP-UX Linux AIX	Cluster	etc/opt/FJSVswstf/<logical-node-name>/stgmgrinfo_policy.ini



Note

- Do not specify more than one Storage Server as a management information package backup execution server.
- When the management information package backup execution server is used for executing transactions on the Storage Server in a cluster system, create a directory for storing backup data on a shared disk.
- For databases, backup management, authentication management lists, and tape backup management, backup commands are executed on the respective management information package backup target servers. In addition, for database backups, backup management (backup management lists) backups, and tape backup management information backups, a temporary capacity that is approximately 2.2 times greater than the total size of the backups is required to put the backup data in an archive file.

Table: Policy file format

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape server
Server name	DBData	Specifies whether to make a backup of the database. Yes: Make a backup of the database. No: Do not make a backup of the database. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	A	C	C
	AuthData	Specifies whether to make a backup of the authentication feature. Yes: Make a backup of the authentication feature. No: Do not make a backup of the authentication feature. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	A	C	C
	BkupData	Specifies whether to make a backup of the backup management. Yes: Make a backup of the backup management. No: Do not make a backup of the backup management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	B	B	C

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape server
	ReplData	Specifies whether to make a backup of the replication management. Yes: Make a backup of the replication management. No: Do not make a backup of the replication management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	B	B	C
	TapeData	Specifies whether to make a backup of tape backup management information. Yes: Make a backup of tape backup management information. No: Do not make a backup of tape backup management information. Note that failing to specify "Yes" with the correct capitalization ("Y" in uppercase or "es" in lowercase) or failing to specify the key implicitly sets "No."	C	C	B

A: Configurable,

B: Configurable only when the applicable function is operating on the server,

C: Non- Configurable

Example: Set up a policy file as follows:

- The Storage Management Server named ACMMGR creates backups for the database, the authentication feature, and backup management.
- The Storage Server named ACMAGT1 creates backups for backup management.
- The Storage Server named ACMAGT2 creates backups for replication management.
- The tape server (name: ACMTAPE) makes a tape backup management backup.

```
[ACMMGR]
DBData=Yes
AuthData=Yes
BkupData=Yes
[ACMAGT1]
BkupData=Yes
[ACMAGT2]
ReplData=Yes
[ACMTAPE]
TapeData=Yes
```



Note

- Create a policy file only if it will be used.
- The policy file cannot include any settings for backups of registries and of the policy file for management information package backup.

9.1.2.2 Backup operations

Executing the management information package backup command (stgmgrinfobkup) on the management information package backup execution server stores the backup data in the directory under the following structure:

Table: Directory structure when management information package backup is executed

Directory		Data type		
*1	Server name	DBData	Database	
		AuthData	Authentication management list	
		RegiData	Registry	
		BkupData	FJSVswsts	Backup management list, or backup management list and recovery control file
			Scripts	Pre-processing and post-processing scripts for backup management Pre-processing and post-processing scripts for tape-copy
			data	Transaction volume locking specification file for backups for backup management Backup volume locking specification file for backups for backup management Backup-restored volume locking specification file for backups for backup management Backup volume locking specification file for tape copy
		ReplData	Scripts	Pre-processing and post-processing scripts for replication management
			data	Copy-source volume locking specification file for replication management Copy-destination volume locking specification file for replication management
		MgrInfoData	Policy file for management information package backup	
		TapeData	Tape management list	

*1 is the backup data storage directory specified by the management information package backup server registration/deletion command (stgmgrinfoset).

Example: When *1 is /ACMBkupData and the server name is ACMAGT1, the pre-processing and post-processing scripts for backup management are put in the following directory:

/ACMBkupData/ACMAGT1/BkupData/Scripts

Initial operations

The initial operations are as follows:

1. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make backups of the registries on all of the Storage Servers.
2. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

General operations

Operations under general use are as follows:

1. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server when you need to make backups of the target data.

For the timing of the backups, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the applicable operating system.

Operations when a server is added or deleted

Operations when server added

1. On the management information package backup execution server, set up a policy for the added Storage Server in the policy file.
2. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the registry of the added Storage Server.
3. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

[Operations when server deleted]

1. On the management information package backup execution server, delete the information about the Storage Server deleted from the policy file.
2. In the backup data directory on the management information package backup execution server, delete the directory having the name of the deleted Storage Server.
3. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

Operations when server name changed

1. On the management information package backup execution server, delete the information for the Storage Server from the policy file.
2. In the backup data directory on the management information package backup execution server, delete the directory having the name of the Storage Server.
3. On the management information package backup execution server, set up a policy for the renamed Storage Server in the policy file.
4. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the registry of the renamed Storage Server.
5. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

9.1.2.3 Restore operations

This section describes how to use the backup data created by management information package backup command (stgmgrinfobkup) to execute restoration.

Perform the operations below as a root user or with an account that belongs to the administrators group.

Restoring a registry

1. Execute management information package backup server registration/deletion command (stgmgrinfofet) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the registry backup to the following directory:
Windows version:
 `directory-determined-in-step1\<server-whose-registry-to-be-restored>\RegiData`
Solaris, Linux, HP-UX, or AIX version:
 `directory-determined-in-step1/<server-whose-registry-to-be-restored>/RegiData`
3. Transfer the registry backup copied in step 2 to the target server in binary mode.
4. Restore the registry on the server. For details on restoring a registry, refer to "Restoring a registry" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.

Restoring a database

1. Execute the management information package backup server registration/deletion command (stgmgrinfofet) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the backup of the database to the following directory:
Windows version:
directory-determined-in-step1¥<storage-management-server-name>¥RegiData
Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/< storage-management-server-name>/RegiData
3. Transfer the backup of the database copied in step 2 to the Storage Management Server in binary mode.
4. On the Storage Management Server, expand the database backup transferred in step 3. In the Windows environment, expand the database backup by using the expand backup data command. For the backup data expansion command, refer to "Backup data expansion command (stgarcext)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". On the Storage Management Server in Solaris/Linux UNIX environments, expand the database backup by using the tar command supported by the operating system.
5. On the Storage Management Server, restore the database. For details on restoring a database, refer to "Restoring a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server. The backup data storage directory specified for database restoration is the directory expanded in step 4.

Restoring an authentication feature

1. Execute the management information package backup server registration/deletion command (stgmgrinfo) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backup of the authentication management list to the following directory:
Windows version:
directory-determined-in-step1¥<storage-management-server-name>¥AuthData
Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<storage-management-server-name>/AuthData
3. Transfer the backup of the authentication management list copied in step 2 to the Storage Management Server in binary mode.
4. On a Storage Management Server in a Solaris/Linux environment, change the access permission assigned to the backup of the authentication management list transferred in step 3 by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.
5. On a Storage Management Server in Windows environment, copy the backup of the authentication management list transferred in step 3 to -AdvancedCopy-Manager-program-directory¥bin.
6. On the Storage Management Server, restore the authentication management list. For details on restoring the authentication management list, refer to "Restoring an authentication management list" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server. A definition output batch file and a definition output shell script are the backup data of the authentication management list handled in steps 4 and 5.

Restoring a backup management list, or backup management list and recovery control file

1. Execute the management information package backup server registration/deletion command (stgmgrinfo) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backup of the backup management list or the backups of the backup management list and the recovery control file to the following directory:
Windows version:
directory-determined-in-step1¥<server-whose-list/file-to-be-restored>¥BkupData¥FJSV swsts

Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-list/file-to-be-restored>/BkupData/FJSV swsts
3. Transfer the backup of the backup management list or the backups of the backup management list and the recovery control file copied in step 2 to the target server in binary mode.

4. Expand the backup of the backup management list or the backups of the backup management list and recovery control file transferred in step 3 on the target server. On a Windows-version server, expand the backup of the backup management list by using the expand backup data command. For the backup data expansion command, refer to "Backup data expansion command (stgarcext)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". In Solaris/Linux/HP-UX/AIX UNIX environments, expand the backup of the backup management list or the backups of the backup management list and recovery control file by using the tar command supported by the operating system.
5. Restore the backup management list, or the backup management list and recovery control file on the target server. For details on restoring, refer to "Restoring a backup management list" or "Restoring a backup management list and recovery control file" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server. The Backup-Directory specified in the resource restoration command is the directory expanded in step 4.

Restoring backup and tape-copy management pre-processing/post-processing scripts

1. Execute the management information package backup server registration/deletion command (stgmgrinforeset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the backup and tape-copy management pre-processing/ post-processing scripts to the following directory:
Windows version:
directory-determined-in-step1¥<server-whose-scripts-to-be-restored>¥BkupData¥Scripts
- Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-scripts-to-be-restored>/BkupData/Scripts
3. Transfer the backups of the backup and tape-copy management pre-processing/post-processing scripts copied in step 2 to the target server in binary mode.
4. Transfer the backups of the backup and tape-copy management pre-processing/post-processing scripts copied in step 3 to the directory in which the scripts will be executed on the target server in binary mode. For the directory in which the pre-processing and post-processing scripts for backup management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing for backup/restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.
5. In a Solaris/Linux/UP-UX/AIX UNIX environment, change the access permission assigned to the pre-processing and post-processing scripts for backup management copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring locking specification files for backup management

1. Execute the management information package backup server registration/deletion command (stgmgrinforeset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the locking specification files for backup management to the following directory:
Windows version:
directory-determined-in-step1¥<server-whose-files-to-be-restored>¥BkupData¥data
- Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-files-to-be-restored>/BkupData/data
3. Transfer the backups of the locking specification files for backup management copied in step 2 to the target server in binary mode.
4. Copy the backups of the locking specification files for backup management transferred in step 3 to the target server. For the directory in which the locking specification files for backup management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Backup and Restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring pre-processing and post-processing scripts for replication management

1. Execute the management information package backup server registration/deletion command (stgmgrinfo) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the pre-processing and post-processing scripts for replication management to the following directory:
Windows version:
directory-determined-in-step1\<server-whose-scripts-to-be-restored>\ReplData\Scripts

Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-scripts-to-be-restored>/ReplData/Scripts
3. Transfer the backups of the pre-processing and post-processing scripts for replication management copied in step 2 to the target server in binary mode.
4. Copy the backups of the pre-processing and post-processing scripts for replication management transferred in step 3 to the directory in which the scripts will be executed on the target server. For the directory in which the pre-processing and post-processing scripts for replication management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing of replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.
5. In Solaris/Linux/UP-UX/AIX UNIX environments, change the access permission assigned to the pre-processing and post-processing scripts copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring locking specification files for replication management

1. Execute the management information package backup server registration/deletion command (stgmgrinfo) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the locking specification files for replication management to the following directory:
Windows version:
directory-determined-in-step1\<server-whose-files-to-be-restored>\ReplData\data

Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-files-to-be-restored>/ReplData/data
3. Transfer the backups of the locking specification files for replication management copied in step 2 to the target server in binary mode.
4. Copy the backups of the locking specification files for replication management transferred in step 3 to the target server. For the directory in which the locking specification files for replication management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring a policy file for management information package backup

1. Execute the management information package backup server registration/deletion command (stgmgrinfo) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the policy file located in the following directory to the policy file for the management information package backup command:
Windows version:
directory-determined-in-step1\<server-whose-file-to-be-restored>\MgrInfoData
Solaris, Linux, HP-UX, or AIX version:
directory-determined-in-step1/<server-whose-file-to-be-restored>/MgrInfoData
For the directory for the policy file for the management information package backup command, refer to step 6 in the section "Preliminaries".

Restoring the tape management information

1. On the package-backup-of-the-management-information execution server, execute the management information package backup server registration/deletion command (stgmgrinfo) to check the directory that contains the backup data.
2. On the package-backup-of-the-management-information execution server, copy the backup data of the tape management information from the directory indicated below:
For the Windows version:
directory-checked-at-step-1\<name-of-the-target-server-of-restoration>\TapeData
For the Solaris OE/Linux/HP-UX/AIX version:
directory-checked-at-step-1/<name-of-the-target-server-of-restoration>/TapeData
3. Transfer the backup data of the tape management information copied in Step 2 to the target server in binary mode.
4. Expand the tape management information transferred in Step 3 on the target server. If the target server is the Solaris OE or Linux version, expand the tape management information by using the OS tar command.
5. On the target server, restore the tape management information. For details on how to restore it, see "Restoring the tape management information" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".

9.2 Troubleshooting

9.2.1 Troubleshooting for insufficient free space in a repository

This chapter describes what to do if there is insufficient free space in a repository used by a Storage Management Server.

Perform this procedure on a Storage Management Server.



Point

You can use this troubleshooting method when there is insufficient free space in a repository and if the operation status is significantly different from the initial installation time to prevent the occurrence of insufficient free space in the repository.

Extend the repository space as follows:

1. Backup of the registry of a Storage Management Server (See "backing up a registry")
2. Store data saved in the processing (see chapter "Database backup")
3. Release a repository (See "Cancel of repository settings," of the "ETERNUS SF AdvancedCopy Manager Installation Guide" .)
4. Re-estimating the database size (see "Estimation of Database area," of the "ETERNUS SF AdvancedCopy Manager Installation Guide").
5. Re-create partitions (See "Directory creation," of the "ETERNUS SF AdvancedCopy Manager Installation Guide" .)
6. Create a repository (See "Database creation," of the "ETERNUS SF AdvancedCopy Manager Installation Guide" .)
7. Starting of a RDB daemon (see "Starting and stopping RDB Daemon")
8. Save data restore processing (see "Database restoration")
9. Restore the registry of a Storage Management Server (See "Restoring a registry")

9.2.1.1 Database backup

This chapter describes saving data stored in a database to the specified directory collectively.

This method is mainly used for converting data. To save normal operation data, use the Saving a database method.



Note

- A directory in which data will be saved must be created in advance.
- To start the database backup, log in as a root user.
- Use the location specified at Storage Management Server installation.

Back up a database as follows:

1. Start database backup.

Enter the following command to start database backup:

```
# /opt/swstorage/bin/stgdbbackup
```

- Confirm to continue processing.
Enter "y" to continue processing or "n" to stop processing.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database backup
////////////////////////////////////

+-----+
| All of the stored data will be saved in an external file. |
| [Notes] |
| Prepare a directory for storing the data to be saved. |
+-----+

Do you want to continue with processing? [y/n] ==> y

```

- Enter the name of the data storage directory the data will be saved in.
Using an absolute pathname, enter the name of the directory in which to store save data.



Note

If the data has already been saved in the directory the processing is not performed.
Delete the save data in the directory or specify another directory, and then retry processing.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database backup
////////////////////////////////////

Enter the absolute path name of the directory
for storing the data to be saved.

Enter ==> /storage/backdir

```

- To continue with database backup processing, enter a final confirmation.
Enter "y" to continue with database backup processing or "n" to stop it.
If "y" is entered, the window display returns that of step 2.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database backup
////////////////////////////////////

Directory containing the saved data : /storage/backdir

Do you want to continue with processing? [y/n] ==> y

```

5. Database backup copies are created.
Database backup copies are created, and execution results are displayed on the window as necessary. An example of such execution results is shown below.

```
//////// AdvancedCopy Manager database backup //////////  
  
=====
```

DB data backup will start.

```
=====
```

....
Unloading of data is complete. (base)
...
Unloading of data is complete. (backup)
.
Unloading of data is complete. (repl)

```
=====
```

Backup of DB data is complete.

```
=====
```

Database backup ended normally.

#

9.2.1.2 Database restoration

This chapter describes restoring data that has been saved during Database backup to a database collectively.



Note

- Data currently stored in a database will be lost in this processing because it will be overwritten by save data.
- To start the database restoration, log in as a root user.
- Use the location specified at Storage Management Server installation.



Note

- When the database restoration is normally completed, and save a database after restoration (refer to Saving a database).

Restore a database as follows:

1. Start database restore processing.
Enter the following command to start database restore processing:

```
# /opt/swstorage/bin/stgdbrestore
```

2. Confirm to continue processing.
Enter "y" to continue processing or "n" to stop processing.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database restore
////////////////////////////////////

+-----+
| All of the saved data will be restored to database. |
| [Notes] |
| Check the directory containing the saved data. |
+-----+

Do you want to continue with processing? [y/n] ==> y

```

3. Enter the name of the data storage directory where the data has been saved.
Using an absolute pathname, enter the name of the directory in which the data is saved.



Note

If any part of saved data in the directory is missing, processing is not performed because data consistency may not be maintained.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database restore
////////////////////////////////////

Enter the absolute path name of the directory
in which the saved data is stored.

Enter ==> /storage/backdir

```

4. To continue with database restore processing, enter the final confirmation.
Enter "y" to continue with database restore processing or "n" to stop it.
If "n" is entered, the window display returns to that of step 2.

```

////////////////////////////////////
AdvancedCopy Manager Storage management server ( kiku )
Database restore
////////////////////////////////////

Directory containing the saved data : /storage/backdir

Do you want to continue with processing? [y/n] ==> y

```


5. Database restore processing is performed.
Database restore processing is performed, and execution results are displayed on the window as necessary. Sample results are shown below.

```
//////// AdvancedCopy Manager database restore //////////  
  
=====  
DB data will be restored.  
=====  
  
....  
Loading of data is complete. (base)  
....  
Updating of the optimal information is complete. (base)  
...  
Loading of data is complete. (backup)  
...  
Updating of the optimal information is complete. (backup)  
.  
Loading of data is complete. (repl)  
.  
Updating of the optimal information is complete. (repl)  
  
=====  
DB data has been completely restored.  
=====  
  
Database restore processing ended normally.  
  
#
```

9.2.2 Collecting maintenance information

9.2.2.1 Collecting information using a Web client

Collect information as follows:

1. Start the Java Plug-in control panel.
Start the Java Plug-in control panel as follows:
Select [Settings] - [Control Panel] - [Java Plug-in].
2. Configure startup settings of the Java console.
On the Java control panel, access the [Basics] tag, mark the [Display Java Console] check box, click the [Apply] button, and exit the Java Plug-in control panel.
3. Start the Web client of AdvancedCopy Manager.
4. The Java console will be started and a message will be displayed. Save the message to a file, and attach the file to your report.

9.2.2.2 Collecting error survey information

Log into the Storage Management Server and the Storage Server. Collect the following information. (When the Storage Management Server is also the Storage Server, collect resources from both the Storage Management Server and Storage Server.)

1. When an error occurs during backup management

Table: Resources required when an error occurs during backup management

Type	Storage Management Server	Storage Server
System log	Must be collected.	Must be collected.
Trace log	Acquire the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log	Acquire the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log
Backup management list	Need not be collected.	Acquire the files under the following directory: /etc/opt/FJSVswsts (Note)
Common information	Acquire the files under the following directory: /var/opt/FJSVswstf/cluster (Note) /var/opt/FJSVswstf/cmdevs (Note) /var/opt/FJSVswstf/daemon (Note) /var/opt/FJSVswstf/log (Note) /etc/opt/swstorage (Note)	Acquire the files under the following directory: /var/opt/FJSVswstf (Note) /etc/opt/swstorage (Note)

Note: When cluster operation is performed, the backup management list and the common information are located on the shared disk, where a symbolic link is set.

When collecting the information, also collect the data on the shared disk as follows.

```
# cd /etc/opt
# tar - cvfh /tmp/FJSVswsts_nodel.tar FJSVswsts swstorage
```

2. When an error occurs during replication management

Table: Resources required when an error occurs during replication management

Type	Storage Management Server	Storage Server
System log	Must be acquired.	Must be acquired.
Trace log	Get the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log	Get the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log
Replication management list	Need not be collected.	Get the files under the following directory: /etc/opt/FJSVswsrp (Note)
Common information	Get the files under the following directory: /var/opt/FJSVswstf/cluster (Note) /var/opt/FJSVswstf/cmdevs (Note) /var/opt/FJSVswstf/daemon (Note) /var/opt/FJSVswstf/log (Note) /etc/opt/swstorage (Note)	Get the files under the following directory: /var/opt/FJSVswstf (Note) /etc/opt/swstorage (Note)

Note: When cluster operation is performed, the replication management list and the common information are located on the shared disk, where a symbolic link is set. When collecting the information, also collect the data on the shared disk as follows.

```
# cd /etc/opt
# tar -cvfh /tmp/FJSVswsrp_nodel.tar FJSVswsrp swstorage
```

9.2.3 Troubleshooting a failure when accessing a repository database

This chapter describes how to remediate access failure to a repository.

If the problem is resolved while executing the following procedures, subsequent procedures need not be performed.

Perform this procedure on the Storage Management Server.

1. Check whether the RDB daemons are still running.

[Check method]

Execute the following command to check for any process related to the RDB daemons.

```
# ps -ef | grep RDBSWSTF | grep -v grep
```

[Required action]

If no process related to the three RDB daemons exists, retry processing after restarting (start after stopping) the daemons. For an explanation on restarting the daemons, see "Starting and stopping the RDB daemons."

2. Check that there is sufficient free space as required to update a repository database.

[Check method]

Execute the following command to check the usage ratio of space required to update a repository.

```
# /opt/swstorage/bin/stgdbloginf
```

[Required action]

If the usage ratio is 100%, save the database space according to "Saving a database". (Consequently, there should be sufficient free space required to update a repository.) After using the database save method, restart (start after stopping) the RMI daemon. For an explanation on restarting the daemon, see "Starting and stopping the RMI daemon". Then, perform this step again.

3. Check whether the database save process is in progress.

[Check method]

Execute the following command to check for any process related to the database save command.

```
# ps -ef | grep stgdbdmp | grep -v grep
```

[Required action]

If any process related to the database save command exists, retry processing after waiting for the end of the database save command.

4. Check whether the capacity of repository is insufficient.

Check method

In the log file `/var/opt/FJSVswstf/log/RDBSWSTF.log` (in cluster operation, they are `/var/opt/FJSVswstf/logic-node-name/log/RDBSWSTF.log`), search for the strings "JYP5019E" or "JYP5045E" in any message taking the form "rdb: ERROR: qdgXXXXX-"

Required action

When a character sequence exists, please extend repository space with reference to "Troubleshooting for insufficient free space in a repository".

Then, Retry processing.

5. Check whether an I/O error or any other error has occurred in the database space.

Check method

Check the `/var/opt/FJSVswstf/log/RDBSWSTF.log` file, and beginning from the last line, search for any message with "rdb: ERROR: qdgXXXXX-" in its contents (also check the messages displayed at the same time). Then, search for a string taking the form of "qdgXXXXX," and check for it in Table 9.1.

Required action

If "qdgXXXXX" is in the table, examine the target according to the error description corresponding to the qdg messages in Table 9.1, and determine if there is a problem. If a problem is found, take corrective action as appropriate to solve the problem, and specify the appropriate settings. Then, recover the database space by using the database recovery method.

After the database recovery command ends normally, acquire the latest save data by using the database save method.

Then, restart (start after stopping) the AdvancedCopy Manager daemons. For an explanation on restarting the daemons, see "Starting and stopping the AdvancedCopy Manager daemons".

Retry processing.



Note

If the database recovery command is executed with the value "0" specified for option "-m", perform the following tasks after the command ends normally:

- Execute the resource consistency command specified with option "-x" (see "Resource adjustment command (swstsrsemctch)") on all Storage Servers in a backup operation.
- Perform the resources adjustment command (see "Resource adjustment command (swsrprecoverres)") using option "-r" on all the Storage Servers that are performing replication using the resources adjustment command.



Note

If an error such as an I/O error occurs in a database space, a file required for analyzing the cause of the error may be created in DB file directory/SWSTFDB/core. If the corresponding recovery ends normally, delete the file in this directory.

6. Collect the files in `/var/opt/FJSVswstf/log`, and contact a Fujitsu SE.

9.3 Troubleshooting for a hardware error, etc. occurring during backup

This chapter describes what action to take for a hardware error during a backup using AdvancedCopy Manager.

9.3.1 Overview

If a hardware error occurs during backup operation, the following symptoms are generated:

- The backup execution status display command (swstbackstat) displays "failed" in the Status column.
- The synchronous backup operation status display command (swstsyncstat) displays "failed" in the Status column.
- The restoration execution status display command (swstreststat) displays "failed" in the Status column.
- The history information display command (swsthistdisp) displays "failed" in the Status column.
- The tracking status display command (swstrkstat) displays "failed" in the Status column.
- Code swst0634, swst0719, or swst0740 is displayed during command execution.

If the execution status display command and history information display command display "failed" in the Status column, a hardware error has occurred during physical copying, and the copy process has failed.

If swst0634, swst0719, or swst0740 is displayed during command execution and the same error occurs even if the command is retried, a hardware error has occurred, causing AdvancedCopy to fail.

If a hardware error occurs during remote copying, the following symptoms may be generated:

- The backup execution status display command (swstbackstat) displays "halt" in the Status column.
- The synchronous backup operation status display command (swstsyncstat) displays "halt" in the Status column.
- The restoration execution status display command (swstreststat) displays "halt" in the Status column.
- The history information display command (swsthistdisp) displays "halt" in the Status column.

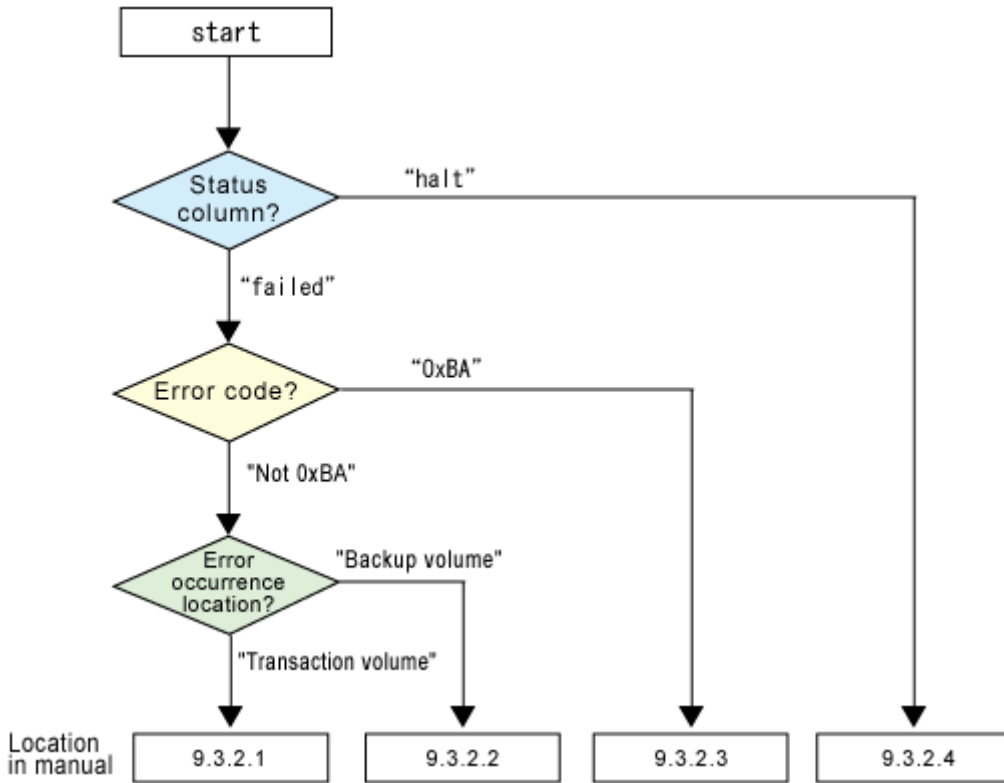
If the execution status display command and history information display command display "halt" in the Status column, a hardware error has occurred during physical copying, and the remote copy process has failed.

If these symptoms are generated, a hardware error may have occurred in the transaction volume or backup volume. Check the hardware status, and if a hardware error is found, remediate the cause of the error, and retry processing.

9.3.2 Troubleshooting

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

Figure: Troubleshooting flow (for errors during backup)



Note

- Refer to "Overview" for details of the "status column" and "fault location".
 - Use ETERNUSmgr to check the copy process error codes. Use the following method to check the error codes:
 - On the [Display status] menu, click [AdvancedCopy status display] in the status display.
 - At [Session status], click the "Number of active sessions" link for the relevant copy type.
 - Refer to the value in the "Error code" column of the relevant copy process.
- The following table shows the meanings of the error codes.

[Table: Meanings of error codes]

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a) QuickOPC has not yet performed physical copying and tracking is in progress b) EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a transaction volume when a) or b) applies, the disk array unit automatically changes the copy processing to the error suspend state. This prevents restart of QuickOPC or EC/REC resume and prevents the backup volume from being overwritten with invalid transaction volume data.
Other than 0xBA	An error other than the above occurred.

Error code 0xBA is returned only for the following disk array units:

- ETERNUS4000/ETERNUS8000 (firmware version V11L30-0000 or later)
- ETERNUS6000 (firmware version V31L40-0000 or later)

For disk array units other than the above, the event indicated by error code 0xBA does not occur. (When the above a) or b) apply, the copy status does not change even if a bad sector occurs in the copy source volume.)

9.3.2.1 Troubleshooting for a hardware error, etc. on a transaction volume

When a hardware error occurs in an operating volume, remediate the error according to the following procedures.

1. If an error occurred during physical copying, cancel the process during which the error occurred.
 - If an error occurred during backup (OPC) physical copy: History information deletion command (swsthistdel)
 - If an error occurred during synchronous processing (EC): Backup synchronous processing cancel command (swstcancelsync)
 - If an error occurred during restore (OPC) physical copy: Restore cancellation command (swstcancelrest)
 - If an error occurred during tracking processing (QuickOPC): Tracking cancel command (swstcanceltrk)
 -
2. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat), and history information display command (swsthistdisp) to verify that no other errors have occurred.
3. Remediate the hardware error on the transaction volume.
4. Execute the restoration execution command (swstrestore) to restore the transaction volume.



Note

- The backup history information for which copy failed cannot be used to restore the volume.
- If there is no normal (status = "succeeded") backup history information, the volume cannot be restored.

9.3.2.2 Troubleshooting a hardware error on a backup volume

When a hardware error occurs in backup volume, remediate the error according to the following procedures.

1. Cancel the process during which the error occurred.
 - If an error occurred during backup (OPC) physical copy: History information deletion command (swsthistdel)
 - If an error occurred during synchronous processing (EC): Backup synchronous processing cancel command (swstcancelsync)
 - If an error occurred during restoration (OPC) physical copy: Restore cancellation command (swstcancelrest)
 - If an error occurred during tracking processing (QuickOPC): Tracking cancel command (swstcanceltrk)
 -
2. If the process cannot be canceled by using the command, use ETERNUSmgr/GRmgr to cancel it.
3. Execute resource match command (swstsrsemth)
4. Cancel the process during which the error occurred. At this point, the execution status display commands (swstbackstat, swstreststat) and history information display command (swsthistdisp) display "succeeded" in the Status column. However, because the copy processing is suspended, be sure to cancel the commands. If an error occurred in the synchronous processing (EC), the command has already been canceled, so no response is required.
 - If an error occurred during backup (OPC) physical copy: History information deletion command (swsthistdel)

- If an error occurred during restoration (OPC) physical copy: Restore cancellation command (swstcancelrest)
5. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat) and history information display command (swsthistdisp) to verify that no other errors are found.
 6. Use the device configuration command (swstdevinforeset) to delete the backup volume in which the error occurred.
 7. Then, use the device configuration command (swstdevinforeset) to register a new backup volume. If the backup volume in which the error occurred is repaired and reused, execute the command to collect or display information for a specific device from the GUI client and re-save the information in the backup volume.
 8. Re-attempt the process in which the error occurred.

9.3.2.3 Troubleshooting if a bad sector occurred in the transaction volume

If a bad sector occurred in the transaction volume, use the following procedure to restore the transaction volume:

1. Cancel the copy processing for which the bad sector occurred.
 - If the bad sector occurred during the suspend state of synchronous processing (EC): Backup synchronous processing cancel command (swstcancelsync)
 - If the bad sector occurred during QuickOPC tracking: Tracking cancel command (swstcanceltrk)
 - Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat) and the history information display command (swsthistdisp) to check for other errors.
2. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the transaction volume, from the restoration methods below, and perform restoration.
 - Restoration method 1
If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.
 - Restoration method 2
If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special-purpose tool (for example, the UNIX dd command) to write to the area.
 - Restoration method 3
Use the restore command (swstrestore) to restore the transaction volume from a backup volume. (If the backup volume for the copy processing for which the bad sector occurred contains backup history information, restoration is also possible from that backup volume.)



Note

The transaction volume cannot be restored if there is no backup history information.

9.3.2.4 Troubleshooting for an error (halt) on a remote copy process

1. Clear the hardware error.
2. The suspended copy processing is re-tried.

9.4 Troubleshooting a Hardware Error or Other Error during Replication

This chapter describes the corrective action for hardware or other error occurring during AdvancedCopy Manager replication.

9.4.1 Overview

If a hardware error occurs during replication operation, the following symptoms are generated:

- The operation status display command (swsrpstat) displays "failed" or "?????" in the Status column.
- Code swsrp2606 is displayed during command execution.
- Code swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution.

If the operation status display command displays "failed" in the Status column, and swsrp2606 is displayed during command execution, a hardware error has occurred during physical copying, and the copy processing has failed.

If swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution, and the same error occurs even if the command is re-executed, a hardware error has occurred, causing AdvancedCopy to fail.

If a hardware error occurs during remote copying, the following symptoms may be generated:

- The operation status display command (swsrpstat) displays "halt" in the Status column.
- Code swsrp2648 is displayed during command execution.

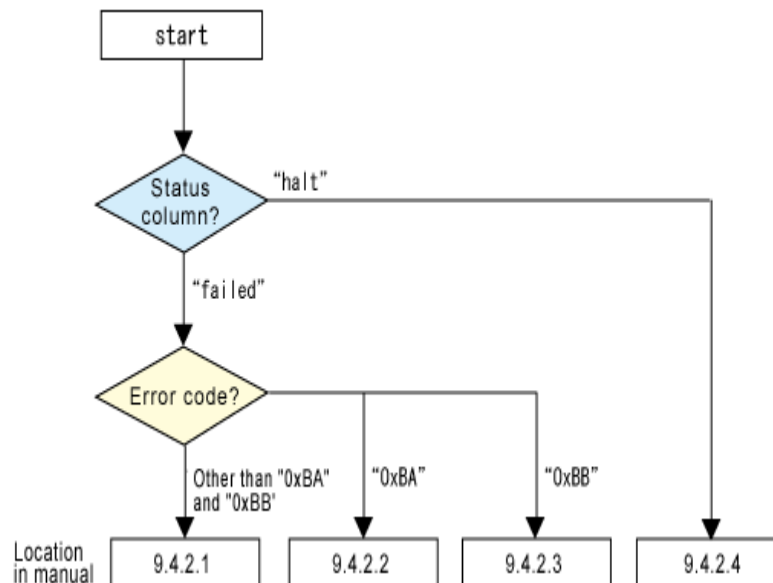
If the operation status display command displays "halt" in the Status column, and swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy processing has failed.

If these symptoms are generated, a hardware error may have occurred in the original or replica volume. Check the hardware status, and if a hardware error is found, remediate the error and re-try the command.

9.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure: Troubleshooting flow (when an error occurs during replication)





Note

- Refer to "Overview" for details of the "status column".
If the status column is "?????", check if ETERNUSmgr/GRmgr copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt").
If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
In other cases, another cause (Storage Server, switch, and so on) is likely, so contact your Fujitsu SE.
- The following two methods can be used to check error codes:
 1. The operation status display command (swsrpstat) with the -0 option.
 2. ETERNUSmgr:
 - On the [Display status] menu, click [AdvancedCopy status display] in the status display.
 - At [Session status], click the "Number of active sessions" link for the relevant copy type.
 - Refer to the value in the "Error code" column of the relevant copy process.

The following table shows the meanings of the error codes.

[Table: Meanings of error codes]

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the copy source volume. a) QuickOPC has not yet performed physical copying and tracking is in progress b) EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a copy source volume when a) or b) applies, the disk array unit automatically changes the copy processing to the error suspend state. This prevents restart of QuickOPC or EC/REC resume and prevents the copy destination volume from being overwritten with invalid copy source volume data.
0xBB	A capacity shortage occurred for the Snap Data Volume or the Snap Data Pool.
Other than 0xBA and 0xBB	An error other than the above occurred.

Error codes 0xBA and 0xBB are returned only for the following disk array units:

- ETERNUS4000/ETERNUS8000 (firmware version V11L30-0000 or later)
- ETERNUS6000 (firmware version V31L40-0000 or later)

For disk array units other than the above, the events indicated by error code 0xBA and 0xBB are identified by the following methods:

[Table: Error code events]

Event	Identification method
Events indicated by 0xBA	These events do not occur. In cases a) and b) above, the copy status does not change even if a bad sector occurs at the copy source volume.

Event	Identification method
Events indicated by 0xBB	Use ETERNUSmgr to check the capacity already used on the SDV in order to identify whether or not the physical capacity has been exceeded. <ul style="list-style-type: none"> ● On the [Display status] menu, click [Volume list] in the status display. ● Click the SDV link for the relevant volume in the "Volume type" column ● Refer to the value shown in the "Capacity already used" column. If this event applies, refer to " Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs ".

9.4.2.1 Troubleshooting for a hardware error on a replication volume

When a hardware error occurs in duplicate volume, remediate the error according to the following procedures.

1. Use the replication cancel command (swsrpcancel) to cancel the processing in which the error occurred. If the process cannot be canceled from the operator server when inter-server replication is performed, cancel it from a non-operator server.
2. If the process cannot be canceled by using the command, use ETERNUSmgr/GRmgr to cancel it.
3. Execute the resource adjustment command (swsrprecoverres)
4. Execute the operation status display command (swsrpstat) to verify that no other errors are found.
5. Use the replication volume information deletion command (swsrpdelvol) to delete the replication volume in which the error occurred.
6. Use the replication volume information setting command (swsrpsetvol) to register a new replication volume. If the replication volume in which the error occurred is repaired and reused, execute [Collect or reflect the information for a specific device] from the GUI client and store the information again in the replication volume.
7. Re-try the process during which the error occurred.

9.4.2.2 Troubleshooting if a bad sector occurred in the copy source volume

If a bad sector occurred in the copy source volume, use the following procedure to restore the copy source volume:

1. Use the replication cancellation command (swsrpcancel) to cancel the processing for which the error occurred.

If inter-server replication was being performed and cancellation is not possible from the active server, cancel the processing from the inactive server.

If the processing cannot be cancelled using commands, use ETERNUSmgr to cancel it.
2. Execute the operation status display command (swsrpstat) to check for other errors.
3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the copy source volume, from the restoration methods below, and perform restoration.
 - Restoration method 1
 - If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.
 - Restoration method 2
 - If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special-purpose tool (for example, the UNIX dd command) to write to the area.
 - Restoration method 3
 - Use the replica creation command (swsrpmake) to restore the data from the copy destination volume. (Restoration is also possible from the copy destination volume of the copy process for which the bad sector occurred.)

9.4.2.3 Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs

Snap Data Volume capacity shortages occur when a Snap Data Pool is not used, and Snap Data Pool capacity shortages occur when a Snap Data Pool is used.

The recovery methods to use if a Snap Data Volume or Snap Data Pool capacity shortage has occurred are described below.

Recovery method for Snap Data Volume capacity shortages

The recovery method if a capacity shortage has occurred for the Snap Data Volume is described below.

- Use the replication cancellation command (`swsrpcancel`) to cancel processing for which the error occurred.
- If inter-server replication was being performed and cancellation is not possible from the active server, cancel the process from the inactive server.
- If the process cannot be cancelled using commands, use `ETERNUSmgr`.

The following are possible causes of a capacity shortage occurring for the Snap Data Volume:

- An inaccurate estimation was made of the physical capacity required for the Snap Data Volume.
 - a. The estimation for capacity was accurate however an unexpected amount of updates were carried out when there were no SnapOPC/SnapOPC+ sessions running, and this used all of the space available to the volume.

The status of the Snap Data Volume can be checked using the Snap Data Volume operation/reference command (`swstsdv`) with the "stat" subcommand.

If an inaccurate estimation was made, re-calculate the capacity for the Snap Data Volume and then re-create the Snap Data Volume.

If the estimation was correct and the space was used unexpectedly, use `ETERNUSmgr`, or the Snap Data Volume operation/reference command (`swstsdv`) with the "init" subcommand, to initialize the Snap Data Volume.

Note that, after the volume is re-created or initialized, disk partitions (slices) must be re-created.

Recovery method for Snap Data Pool capacity shortages

The recovery method if a capacity shortage has occurred for the Snap Data Pool is described below.

- Use the replication cancellation command (`swsrpcancel`) to cancel the processing for which the error occurred.
- If inter-server replication was being performed and cancellation is not possible from the active server, cancel the process from the inactive server.
- If the process cannot be cancelled using commands, use `ETERNUSmgr`.

The following are possible causes of a capacity shortage occurring for the Snap Data Pool:

- a. An inaccurate estimation was made of the physical capacity required for the Snap Data Pool.
- The estimation for capacity was accurate however an unexpected amount of updates were carried out when there were no SnapOPC/SnapOPC+ sessions running, and this used all of the space available to the volume.

The status of the Snap Data Pool can be checked using the Snap Data Volume operation/reference command (`swstsdv`) with the "poolstat" subcommand.

If an inaccurate estimation was made for the Snap Data Pool, re-calculate and increase the capacity for the Snap Data Pool, and then re-create the Snap Data Volume.

If the capacity is correct, use `ETERNUSmgr`, or the Snap Data Volume operation/reference command (`swstsdv`) with the "init" subcommand, to initialize the Snap Data Volume.

Note that, after the Snap Data Volume is re-created or initialized, disk partitions (slices) must be re-created.

9.4.2.4 Troubleshooting for an error (halt) on a remote copy processing

The method to restart REC (Resume) depends on the REC Recovery mode.

[For Automatic Recovery mode]

1. Remove the cause of the blockage (halt) of all paths.
2. REC is restarted (Resume) automatically from the ETERNUS disk array.

[For Manual Recovery mode]

1. Remove the cause of the blockage (halt) of all paths.
2. Use the replica create command (swsrpmake) to forcibly suspend the REC that is in halt status.

```
[For volume units]
swsrpmake -j <copy-source-volume-name> <copy-destination-volume-name >
[For group units]
swsrpmake -j -Xgroup <group-name>
```

3. Use the replica start command (swsrpstartsync) to restart (Resume) REC. (The -t option must be specified restart REC after a forcible suspend.)

```
[For volume units]
swsrpstartsync -t <copy-source-volume-name > <copy-destination-volume-name >
[For group units]
swsrpstartsync -t -Xgroup <group-name>
```

9.5 Changing the Operating Environment

Server information package change operations changes server information as a batch while maintaining consistency between the server information in systems managed by AdvancedCopy Manager. Therefore, the daemons and transactions of all Storage Servers in the systems that include Storage Management Servers and Storage Management Server transactions must be running.



Note If the server information change command (`stgxfwcmmodsrv`) is used to change the IP address, etc.

Do not execute backup management or replication management commands in any AdvancedCopy Manager Storage Server managed by a Storage Management Server that executes the server information change command (`stgxfwcmmodsrv`) as the command may terminate abnormally. If the server information change command (`stgxfwcmmodsrv`) terminates abnormally, take the action indicated in the error message to perform recovery.

If a backup management or replication management command is accidentally executed while the server information change command (`stgxfwcmmodsrv`) is executing, resulting in the backup management or replication management command terminating abnormally, wait until the server information change command (`stgxfwcmmodsrv`) terminates normally, then re-execute the backup management or replication management command.

9.5.1 Changing the IP address of a Storage Management Server

Change the IP address of a Storage Management Server as follows:

If a physical IP address only needs to be changed and the Storage Management Server uses a logical IP address, perform the following from step 5 onward only. Otherwise, perform all steps.

1. Check whether transactions on the Storage Management Server where the IP address is to be changed are also used for Storage Server transactions.
If it is also used for Storage Server transactions and replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. On the Storage Management Server, change the system IP address.
3. On the Storage Management Server, restart the AdvancedCopy Manager daemon. For information on restarting a daemons, see "Starting and Stopping a Daemons".
This step is not necessary if the system was restarted in Step 1.
4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command with the `-f` option specified to change the IP address. Refer to "Server information change command (`stgxfwcmmodsrv`)" for details on the server information change command.
5. Restart all AdvancedCopy Manager daemons on the Storage Management Server. Refer to "Starting and stopping daemons" for details.
6. Use the environment information display command to check that the IP address used for GUI client connection is correct. If required, execute the GUI connection information configuration command to change the IP address used for GUI client connection. Refer to "Environment information display command (`stgenvdisp`)" and "GUI connection information configuration command (`stgguiipset`)" for details of these commands.
7. If the replication management functions are used, reconstruct the replication management environment (perform the "Configuring the original volume and replica volume" task and subsequent tasks).



Point

The IP address used for GUI client connection will need to be changed in Step 6 in the following cases:

- If multiple network cards are installed in the Storage Management Server, and the IP address used for communication with Storage Servers (the IP address specified during database creation when the Storage Management Server was installed) is different from the IP address specified when using a GUI client
- If the previous case does not apply, but the GUIclient connection information configuration command (`stgguiipset`) is executed to explicitly set the IP address to be used for a GUI client connection.



Note

For information regarding change in a cluster operation, see "Changing the IP address of a Storage Management Server transaction".

9.5.2 Changing the IP address of a Storage Server

Change the IP address of a Storage Server as follows:

1. If the replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings. Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. On a target Storage Server, stop the AdvancedCopy Manager daemons. For more information on stopping a service, see "Starting and Stopping a Daemons".
3. On the target Storage Server, change the IP address.
4. On the target Storage Server, restart the AdvancedCopy Manager daemons. For more information on starting a daemons, see "Starting and Stopping a Daemons".
5. Create a server information change instruction file on the Storage Management Server, then execute the server information change command with the `-f` option specified to change the IP address. Refer to "Server information change command(`stgxfwcmmodsrv`)," for details on the server information change command.
6. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).



Note

For information regarding change in a cluster operation, see "Changing the IP address of a Storage Server transaction".

9.5.3 Changing the port number of a Storage Management Server or Storage Server

Change the port number of a Storage Management Server as follows:

1. If replication management functions were used at the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. The port number of the communication daemon (stgxfws) of AdvancedCopy Manager indicated by /etc/services at the Storage Management Server or Storage Server is changed.
3. On the target Storage Management Server, restart the AdvancedCopy Manager daemons. For information on restarting daemons, see "Starting and Stopping a Daemons".
4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command with the -f option specified to change the port number. Refer to "Server information change command(stgxfwcmmodsrv)," for details on the server information change command.
5. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).



Note

For information about change in a cluster operation, see "Changing the port number of a Storage Management Server transaction or Storage Server transaction".

9.5.4 Changing the server name of a Storage Management Server or Storage Server

Change the server name of a Storage Management Server or Storage Server as follows:

1. If replication management functions were used at the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. Create a server information change instruction file on the Storage Management Server.
3. Execute the server information change command (stgxfwcmmodsrv) with the -f option (specify the created file) to change the server name. Refer to "Server information change command (stgxfwcmmodsrv)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system of the Storage Management Server for details of the server information change command.
4. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).
- 5.



Note

For information about change in a cluster operation, see "Changing the server name of a Storage Management Server transaction or Storage Server transaction".

9.5.5 Changing the device configuration

Changing the device configuration refers to the following tasks:

- Mount name change
- Change from File System operation to RawDevice operation
- Capacity change of partitions (mainly for re-creation of LUN mapping)
- Start position for change of partitions (mainly for re-creation of LUN mapping)



Note

For backup management, the backup volume and the transaction volume must be the same size. For more information, see "Size of a Logical Disk" in "General notes."

9.5.5.1 Backup management

Use the following procedure to change the device configuration. This process is executed for all volumes on the disk where the volume whose device configuration is to be changed is located.

1. Check whether there is a transaction volume on the target disk that needs to be backed up. If it does, delete the transaction volume. For information on deleting a transaction volume, see "Deleting a transaction volume".
2. Check whether a backup volume exists in the target disk. If it does, delete the backup volume. For information on deleting a backup volume, see "Deleting a backup volume".
3. Change the device configuration. If the logical drive in the primary partition or extended partition has been deleted, restart the system.
4. Because the updated device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "Fetching device information on a Storage Server," for details on changing the device information.
5. Reconfigure a deleted transaction volume or backup volume again in the backup operation. Refer to "Setting the operation type for a device," for details on adding a transaction volume or backup volume.



Point

If the device configuration is changed (step 3) before the transaction volume and backup volume are deleted (steps 1 and 2), any history information relating to these volumes cannot be deleted and synchronized backup processing cannot be cancelled, possibly disabling the deletion of the transaction volume and/or backup volume.

In this case, set the emergency operation mode, and delete history information or cancel synchronized backup processing.

For details on the emergency operation mode, see "history information deletion command (swsthistdel)" and "synchronized backup processing cancel command (swstcancelsync)".

9.5.5.2 Replication management

Change the device configuration as shown below.

When executed, this processing applies to all the volumes on a disk on which a volume whose device configuration to be changed is located.

1. Check whether there are any replication volumes on the target disk. If there are, delete them. For information about deleting a replication volume, see "Deleting an original volume or replica volume".
2. Change the device configuration. If the logical drive in the primary partition or extended partition has been deleted, restart the system.
3. Because the updated device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "Fetching device information from a Storage Server" for details on changing the device information.

4. Reconfigure a deleted replica volume again in the replication operation. Refer to "Setting the original volume and replica volume," for details on adding the replica volume.



Point

If the device configuration is changed (step 2) before the replication volumes are deleted (steps 2), replication processing cannot be cancelled, thereby possibly disabling deletion of the replication volumes.

In this case, set the emergency operation mode, and cancel replication processing.

For details on the emergency operation mode, see the section describing the replication cancellation command (swsrpcancel).

9.5.6 Changing the IP address for web client connection of a Storage Management Server

The Storage Management Server is equipped with two or more network cards. In order to distinguish between the IP address used to communicate with other Storage Servers which was specified when the Storage Management Server was originally configured, and the IP address used by the GUI client to communicate with a Storage Server, the IP address used for the web client connection is changed using a web client GUI connection information configuration command.

Please refer to GUI connection information setting command and "GUI connection information setting command (stguiipset)."

9.5.7 Change of deletion/password of the user who specified it as the repository access user

When a "repository access user" specified in the setup of repository at the time that AdvancedCopy manager was installed is deleted in the OS or, when the password for the specified user name is changed in the OS, information regarding this "repository access user" must be set up again using the repository access user change command.

Please refer to "Repository access user change command (stguserset)" about a repository access user change command.



Note

For information about change in a cluster operation, see "Deleting a repository accessible user or changing a repository accessible user's password".

9.5.8 Changing the configuration in a cluster environment

This section describes how to make a change to the configuration in a cluster operation.

9.5.8.1 Changing the IP address of a Storage Management Server transaction

Change the IP address of a Storage Management Server transaction by taking the following steps:

1. Check if the target Storage Management Server transaction is also used for Storage Server transactions.
If it is also used for Storage Server transactions and replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings. Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. Stop the Storage Management Server transaction.
For details on how to stop it, see the relevant cluster software manual.
3. Change the resource IP address.
For details on how to change an IP address resource, see the relevant cluster software manual.
4. Check whether the Storage Management Server transaction is operating.
If the transaction is not running, start up the Storage Management Server transaction. For details on how to start it up, see the relevant cluster software manual.
5. On the node where the Storage Management Server transaction is running, create a server information change instruction file, then execute the server information change command with the `-f` option specified to change the IP address. Refer to "Server information change command (stgxfwcmmodsrv)" for details on the server information change command.
6. Restart the Storage Management Server transaction.
For details on how to stop and start it, see the relevant cluster software manual.
7. At the node where the Storage Management Server transaction is operating, use the environment information display command to check that the IP address used for GUI client connection is correct. If required, use the GUI client connection information configuration command to change the IP address used for GUI connections.
Refer to the "Environment information display command (stgenvdisp)" and the "GUI client connection information configuration command (stgguiipset)" for details of these commands.
8. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).



Point

The IP address used for GUI connections will need to be changed in Step 6 in the following cases:

- If multiple network cards are installed in servers performing the role of a Storage Management Server, and the IP address used for communication with Storage Servers (the IP address specified during cluster setup for the Storage Management Server transactions) is different from the IP address specified when using GUI client
- If the previous case does not apply, but the GUI client connection information configuration command (stgguiipset) is executed to explicitly set the IP address to be used for GUI connections.



Note

The IP address displayed by the cluster configuration command executed to delete the cluster environment of the Storage Management Server transaction is not the new IP address specified, but is the IP address specified by the cluster configuration command.

9.5.8.2 Changing the IP address of a Storage Server transaction

Change the IP address of a Storage Server transaction by taking the following steps:

1. If replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.

2. Stop the Storage Server transaction.
For details on how to stop it, see the relevant cluster software manual.
3. Change the resource IP address.
For details on how to change an IP address resource, see the relevant cluster software manual.
4. Restart the Storage Server transaction.
For details on how to start it up, see the relevant cluster software manual.
5. Create a server information change instruction file at the Storage Management Server that manages the Storage Server transactions, then execute the server information change command with the `-f` option specified to change the IP address. Refer to “Server information change command (stgxfwcmmodsrv)” for details on the server information change command.
6. If the replication management functions are used, reconstruct the replication management environment (perform the “Setting copy source volume and copy destination volume” task and subsequent tasks).

9.5.8.3 Changing the port number of a Storage Management Server transaction or Storage Server transaction

Change the port number of a Storage Management Server transaction by taking the following steps:

1. If replication management functions were used by the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to “Deleting a copy source or copy destination volume” for the method for deleting the copy source or copy destination volume settings.
2. Stop the target Storage Management Server transaction or Storage Server transaction.
For details on how to stop it, see the relevant cluster software manual.
3. On the primary node and secondary node of the target Storage Management Server transaction or Storage Server transaction, change the port number of the AdvancedCopy Manager communication daemon (stgxfws_logical-node-name) specified in `/etc/services`.
4. Restart the target Storage Management Server transaction or Storage Server transaction.
For details on how to start it up, see the relevant cluster software manual.
5. Create a server information change instruction file. If the target is a Storage Management Server transaction, create the file at the node where the Storage Management Server transaction is running. If the target is a Storage Server transaction, create the file at the Storage Management Server that manages the Storage Server transaction. Then, execute the server information change command with the `-f` option specified to change the port number. Refer to “Server information change command (stgxfwcmmodsrv)” for details on the server information change command.
6. If the replication management functions are used, reconstruct the replication management environment (perform the “Setting copy source volume and copy destination volume” task and subsequent tasks).

9.5.8.4 Changing the server name of a Storage Management Server transaction or Storage Server transaction

Change the server name of a Storage Management Server transaction by taking the steps below.

1. If replication management functions were used by the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to “Deleting a copy source or copy destination volume” for the method for deleting the copy source or copy destination volume settings.

2. Create a server information change instruction file. If the target is a Storage Management Server transaction, create the file on the Storage Management Server transaction operating node. If the target is a Storage Server transaction, create the file on the Storage Management Server that manages the Storage Server transaction.
3. Execute the server information change command (stgxfwcmmodsrv) with the -f option (specify the created file) to change the server name.
Refer to "Server information change command (stgxfwcmmodsrv)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system of the Storage Management Server for details of the server information change command.
4. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

9.5.8.5 Deleting a user's repository access or changing a user's repository access password

Make a change to a user's repository access by taking the following steps:

1. Check whether the target Storage Management Server transaction is operating.
If the transaction is not operating, start up the Storage Management Server transaction.
For details on how to start it up, see the relevant cluster software manual.
2. Make a change to a user's repository access.
For details on how to make a change to a repository accessible user, see "Deleting a repository accessible user or changing a repository accessible user's password".

9.5.8.6 Changing the logical node name

Change the logical node name of a Storage Management Server transaction or Storage Server transaction by taking the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.
If the transaction is not operating, start the Storage Management Server transaction or Storage Server transaction.
For details on how to start it up, see the relevant cluster software manual.
2. For a Storage Management Server transaction, check whether it also functions as a Storage Server transaction.
When it also functions as a Storage Server transaction, go to Step 3.
Otherwise, go to Step 4.
3. Delete the configuration of the Storage Server transaction.
When using the backup management function, delete the transaction volume and backup volume. For details on how to delete a transaction volume/backup volume, see "Deleting a device" in this manual.
When it is defined as an original or replica volume by using the replication control function, delete the original/replica volume configuration. For details on how to delete an original/replica volume configuration, see "Deleting an original volume or replica volume".
4. Save the AdvancedCopy Manager data.
For a Storage Management Server transaction, save the following data:
 - Repository
Make a backup of the repository.
For details on how to make a backup of the repository, see "Making a backup of a database".
 - Authentication management list
On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
For details on how to make a backup of an authentication function list, see "Making a backup of an authentication list".
 - Web browser client files
Make a backup of the screen files.
On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:

- Pre-processing/post-processing scripts
Save the pre-processing and post-processing scripts for backup management and replication control.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".

5. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete `/etc/opt/swstorage/logical-node-name/swnode.ini` on the node operating the transaction.
6. Delete the cluster environment of the target transaction.
For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Linux" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

7. Create the cluster environment of the target transaction.
For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- For the "-n" option of the cluster setup command, specify the name of the new logical node.
- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 32 in "Details of the steps for customization" on PRIMECLUSTER for Linux).

8. Start the target server transaction.
For details on how to start it up, see the relevant cluster software manual.
9. Restore the AdvancedCopy Manager data.

For a Storage Management Server transaction, restore the following data:

- Repository
Restore the repository.
For details on how to restore a repository, see "Restoring a database".
- Authentication management list
On the node on which the Storage Management Server transaction is running, restore the authentication management list.
For details on how to restore an authentication management list, see "Restoring an authentication list".
- Web Browser client files
Restore the Web Browser client files.
On the node on which the Storage Management Server transaction is running, restore the files under `/opt/swstorage/java/data` by the directory. Also restore `/etc/opt/FJSVswssc/data/security/root.ini` on both nodes.

In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:

- Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.

For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".

10. Change the server name.
Perform the steps in "Changing the server name of a Storage Management Server transaction or Storage Server transaction".
11. To use the backup management or replication control function, rebuild the backup management or replication control environment, respectively (for backup management, perform the "Configuring the environment for a backup operation server" task and subsequent tasks, and for replication management, perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).
12. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.7 Changing the service name

Change the name of an AdvancedCopy Manager transaction by taking the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.

If the is not operating, start the Storage Management Server transaction or Storage Server transaction.

For details on how to start it up, see the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

For a Storage Management Server transaction, save the following data:

- Repository

Make a backup of the repository.

For details on how to make a backup of the repository, see "Making a backup of a database".

- Authentication management list

On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.

For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".

- Web Browser client files

Make a backup of the Web Browser client files.

On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), save the following data:

- AdvancedCopy Manager management file

On the node operating the transaction, save /etc/opt/swstorage/logical-node-name/swnode.ini.

In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:

- Backup management list

Make a backup of the backup management list.

For details on how to make a backup of a backup management list, see "Making a backup of backup management list".

- Pre-processing/post-processing scripts

Save the pre-processing and post-processing scripts for backup management and replication control.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information

For details on the policy file path, see "Preliminaries" in this manual.

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete /etc/opt/swstorage/logical-node-name/swnode.ini on the node operating the transaction.

4. Delete the cluster environment of the target transaction.

For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Linux" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".
5. On the cluster system, change the name of the userApplication.
For details on how to change the name of a userApplication, see the relevant cluster software manual.
 6. Create the cluster environment of the target transaction.
For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 32 in "Details of the steps for customization" on PRIMECLUSTER for Linux).
 - Do not change any information other than the name of a transaction by using the cluster setup command.
7. Start the target transaction.
For details on how to start it up, see the relevant cluster software manual.
 8. Restore the AdvancedCopy Manager data.
 - a) For a Storage Management Server transaction, restore the following data:
 - Repository
Restore the repository.
For details on how to restore a repository, see "Restoring a database".
 - Authentication management list
On the node on which the Storage Management Server transaction is running, restore the authentication management list.
For details on how to restore an authentication management list, see "Restoring an authentication list".
 - Screen files
Restore the screen files.
On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
 - b) Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), restore the following data:
 - AdvancedCopy Manager management file
On the node operating the transaction, restore /etc/opt/swstorage/logical-node-name/swnode.ini.
 - c) In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:
 - Backup management list
Restore the backup management list.
For details on how to restore a backup management data set, see "Restoring the backup management list".
 - Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.
 - When using the replication control function, restore the environment by using the resource adjustment command (swsrprecoverres).
Specify the "-r" option for the resource adjustment command. For details on the resource adjustment command, see "Resource adjustment command (swsrprecoverres)".
 - d) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
 - Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".

9. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.8 Changing a shared disk for shared data

Changing a shared disk for AdvancedCopy Manager shared data (e.g., name of a mount point of a physical disk or shared disk) by taking the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.

If the transaction is not operating, start the Storage Management Server transaction or Storage Server transaction.

For details on how to start it up, see the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

For a Storage Management Server transaction, save the following data:

- Repository

Make a backup of the repository.

For details on how to make a backup of the repository, see "Making a backup of a database".

- Authentication management list

On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.

For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".

- Web Browser client files

Make a backup of the Web Browser client files.

On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), save the following data:

- AdvancedCopy Manager management file

On the node operating the transaction, save

/etc/opt/swstorage/<logical-node-name>/swnode.ini.

In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:

- Backup management list

Make a backup of the backup management list.

For details on how to make a backup of a backup management list, see "Making a backup of backup management list".

- Pre-processing/post-processing scripts

Save the pre-processing and post-processing scripts for backup management and replication control.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information

For details on the policy file path, see "Preliminaries".

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete /etc/opt/swstorage/<logical-node-name>/swnode.ini on the node running the transaction.

4. Delete the cluster environment of the target transaction.

For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Linux" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

5. Create the cluster environment of the target transaction.
For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- To change the name of a mount point, specify the new mount point name in the `-m` option of the cluster setup command.
 - To change a physical disk, specify the new physical disk when you mount it.
 - Change the configuration of a shared disk in the cluster system.
 - Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 32 in "Details of the steps for customization" on PRIMECLUSTER for Linux).
6. Start the target transaction.
For details on how to start it up, see the relevant cluster software manual.
 7. Restore the AdvancedCopy Manager data.
 - e) For a Storage Management Server transaction, restore the following data:
 - Repository
Restore the repository.
For details on how to restore a repository, see "Restoring a database".
 - Authentication management list
On the node on which the Storage Management Server transaction is running, restore the authentication management list.
For details on how to restore an authentication management list, see "Restoring an authentication list".
 - Web Browser client files
Restore the Web Browser client files.
On the node on which the Storage Management Server transaction is running, restore the files under `/opt/swstorage/java/data` by the directory. Also restore `/etc/opt/FJSVswssc/data/security/root.ini` on both nodes.
 - f) Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), restore the following data:
 - AdvancedCopy Manager management file
On the node operating the transaction, restore `/etc/opt/swstorage/<logical-node-name>/swnode.ini`.
 - g) In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:
 - Backup management list
Restore the backup management list.
For details on how to restore a backup management list, see "Restoring the backup management list".
 - Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.
 - When using the replication control function, restore the environment by using the resource adjustment command (`swsrprecoverres`).
Specify the `-r` option for the resource adjustment command. For details on the resource adjustment command, see "Resource adjustment command (`swsrprecoverres`)".
 - h) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
 - Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".
 8. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.9 Changing the repository shared disk

Change the shared disk for the AdvancedCopy Manager repository by taking the following steps:

1. Check whether the target Storage Management Server transaction is operating.
If the transaction is not operating, start up the Storage Management Server transaction.
For details on how to start it up, see the relevant cluster software manual.
2. Save the AdvancedCopy Manager data.
Save the following data:
 - Repository
Make a backup of the repository.
For details on how to make a backup of the repository, see "Making a backup of a database".
 - Authentication management list
On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".
 - Web Browser client files
Make a backup of the Web Browser client files.
On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
 - AdvancedCopy Manager management file
On the node operating the transaction, save /etc/opt/swstorage/logical-node-name/swnode.ini.

When the Storage Management Server transaction also functions as a Storage Server transaction, save the following data:

- Backup management list
Make a backup of the backup management list.
For details on how to make a backup of a backup management list, see "Making a backup of backup management list".
- Pre-processing/post-processing scripts
Save the pre-processing and post-processing scripts for backup management and replication control.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".

3. Delete the cluster environment of the target transaction.
For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Linux" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

4. Create the cluster environment of the target transaction.
For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".



Note

- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 32 in "Details of the steps for customization" on PRIMECLUSTER for Linux).

5. Start the target transaction.
For details on how to start it up, see the relevant cluster software manual.

6. Restore the AdvancedCopy Manager data.
 - a) Restore the following data:
 - Repository
Restore the repository.
For details on how to restore a repository, see "Restoring a database".
 - Authentication management list
On the node on which the Storage Management Server transaction is running, restore the authentication management list.
For details on how to restore an authentication management list, see "Restoring an authentication list".
 - Web Browser client files
Restore the Web Browser client files.
On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
 - AdvancedCopy Manager management file
On the node running the transaction, restore /etc/opt/swstorage/<logical-node-name>/swnode.ini.
 - b) When the Storage Management Server transaction also functions as a Storage Server transaction, restore the following data:
 - Backup management list
Restore the backup management list.
For details on how to restore a backup management list, see "Restoring the backup management list".
 - Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.
 - When using the replication control function, restore the environment by using the resource adjustment command (swsrprecoverres).
Specify the "-r" option for the resource adjustment command. For details on the resource adjustment command, see "Resource adjustment command (swsrprecoverres)".
 - c) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
 - Policy file for package backup of the management information
For details on the policy file path, see "Preliminaries".
7. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

Chapter 10 Commands

This chapter describes using commands.



Note

Set the following paths in the PATH environment variable to execute the commands.

- /usr/sbin
- /usr/bin

10.1 Command list

The commands are classified as follows:

Backup management commands

Environment definition commands

Table: Backup management environment definition command list

Function	Command name	Explanation
Storage server configuration information setting command	swstsvrset	Sets the configuration information of a Storage Server.
Storage server configuration information display command	swstsvrdisp	Displays the configuration information of a Storage Server.
Device information setting command	swstdevinfofet	Sets the usage type of a device.
Device use status display command	swstdevdisp	Displays the information of a device.
Backup policy setting command	swstbkpolset	Sets a backup policy.
Backup policy display command	swstbkpoldisp	Displays a backup policy that has been set.
Backup policy deletion command	swstbkpoldel	Deletes a backup policy that has been set.

Operation commands

Table: Backup management operation command list

Function	Command name	Explanation
Backup execution command	swstbackup	Performs the synchronous high-speed backup or snapshot fast backup.
Backup execution status display command	swstbackstat	Displays the backup progress status.
Restore execution command	swstrestore	Performs restoration.
Restore cancellation command	swstcancelrest	Cancels the execution of restoration.
Restore execution status display command	swstreststat	Displays the execution status of restoration.
History information display command	swsthistdisp	Displays the history information that has been backed up.
History information deletion command	swsthistdel	Deletes the history information that has been backed up.
Backup synchronous processing start command	swststartsync	Starts backup synchronous processing.
Backup synchronous processing cancel command	swstcancelsync	Aborts backup synchronous processing.
Backup synchronous processing progress display command	swstsyncstat	Displays the progress of the backup synchronous processing.
Execution status display command	swstexecstat	Displays the execution status of a command executed on a transaction volume.
Tracking cancel command	swstcanceltrk	Stops tracking processing.
Tracking execution status display command	swsttrkstat	Displays the execution status of tracking processing.

Maintenance commands

Table: Backup management maintenance command list

Function	Command name	Explanation
Resource adjustment command	swstsrsemth	Recovers the consistency of information in a backup management file.
Resource backup command	swstresback	Backs up a backup management file
Resource restore command	swstresrst	Restores a backup management file

Configuration management commands

Table: Configuration management command list

Function	Command name	Explanation
Management server information change command	stgcmmodnode	Changes the server information of the Storage Management server
Repository access user change command	stguserst	Use this command to change the username or password used to access the repository.
GUI connection information setting command	stgguipset	Use this command if multiple network cards are installed in the Storage Management Server and the IP address used for communication with Storage servers is operated separately from the IP address specified when the GUI client is used.
Server information addition command	stgxfwcmaddsrv	This command adds information of a storage server newly managed by AdvancedCopy Manager.
Server information change command	stgxfwcmmodsrv	This command changes the information of a storage server managed by AdvancedCopy Manager.
Server information deletion command	stgxfwcmdeletesrv	This command deletes the information of a storage server currently managed by AdvancedCopy Manager.
Device information fetch/reflect command	stgxfwcmsetdev	This command collects the information of the device most recently detected by the server and displays the differences compared with the information managed by AdvancedCopy Manager.
Device information deletion command	stgxfwcmdeledev	This command deletes the information of a device currently managed by AdvancedCopy Manager.
Server information display command	stgxfwcmdispsrv	This command displays the information of a server managed by AdvancedCopy Manager.
Device information display command	stgxfwcmdispdev	This command displays the information of a device managed by AdvancedCopy Manager.

Function	Command name	Explanation
Partition information display command	stgxfwcmdisppat	This command displays the information of the partitions that comprise a device managed by AdvancedCopy Manager.
Environment information display command	stgenvdisp	Displays the environment values set for AdvancedCopy Manager
Management information batch backup server registration/deletion command	stgmgrinfofet	Registers servers for execution of package backup of management information
Management information batch backup command	stgmgrinfobkup	Backs up Storage server and Storage Management server management information
Management information batch backup status display command	stgmgrinfodisp	Displays the execution status of the management information package backup command
SDX object management unit configuration command	stgxfwcmsetsdx	Sets the management unit for SDX objects handled by AdvancedCopy Manager

Replication management commands

Environment definition commands

Table: Replication management environment definition command list

Function	Command name	Explanation
Replication volume information setting command	swsrpsetvol	Sets the information about a replication volume.
Replication volume information display command	swsrpvoinfo	Displays the information about a replication volume.
Replication volume information deletion command	swsrpdelvol	Deletes replication volume information that has been set.
REC transfer buffer information display command	swsrprebuffstat	Displays information for the REC transfer buffer.
REC transfer buffer settings change command	swsrprebuffset	Changes the settings for the REC transfer buffer.

Operation commands

Table: Replication management operation command list

Function	Command name	Explanation
Replication start command	swsrpstartsync	Starts replication when the synchronous type replication function is performed.
Replica creation command	swsrpmake	Creates replication when the snapshot type and the synchronous type replication functions are performed.
Use status display command	swsrpstat	Displays the status of replication operation
Replication cancel command	swsrpcancel	Cancels the replication processing when the snapshot type and the synchronous type replication functions are performed.
Synchronous processing mode change command	swsrpchsyc	Changes the operation mode of inter-box synchronization.
Synchronous processing reverse command	swsrprevsync	Reverses the copying direction of synchronization in suspend status.

Maintenance commands

Table: Replication management maintenance command list

Function	Command name	Explanation
Resource adjustment command	swsrprecoverres	Recovers the consistency of the information in the replication management file

Daemon start and stop commands

Table: Daemon start and stop command list

Function	Command name	Explanation
Communication daemon start and stop	stgfwcom	Starts and stops communication daemons
RMI daemon start and stop	stgrmicom	Starts and stops RMI daemons
RDB daemon start and stop	stgdbcom	Starts and stops RDB daemons
Authentication daemon start and stop	rc.smfwsec	Starts and stops authentication daemons
AdvancedCopy Manager daemon start and stop	startacm stopacm	Starts and stops AdvancedCopy Manager daemons

SnapOPC /SnapOPC+ support commands

Table: SnapOPC/SnapOPC+ support command list

Function	Command name	Explanation
Update size measurement command	swstestupdate	Uses the pseudo session setting function to measure the physical size of a Snap Data Volume
Snap Data Volume operation/reference command	swstsdv	Subcommands can be specified to initialize a Snap Data Volume, display the status of a Snap Data Volume, or display the status of a Snap Data Pool.

10.2 Backup Management Commands

This section describes operations using backup management commands.



Note

Only a root user can execute all the commands of backup management. When command execution is carried out by other users, a message "swst0601 This Command cannot be run. This is because the user is not a root user." is displayed and then, an error end.



Note

Backup operations in Logical Unit (disk) units is not supported. If a Logical Unit (disk) is specified in the device information configuration command (swstdevinfo), an error occurs.



Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

[Table: Operating environment when executing backup management commands]

Command	Operating environment of AdvancedCopy Manager
swstbackstat	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstbackup	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows and is in EC operation, the daemons and services of the storage server must be operating.
swstbkpodel	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstbkpoldisp	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstbkpolset	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstcancelrest	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstcancelsync	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows and is in EC operation, the daemons and services of the storage server must be operating.
swstcanceltrk	When this command is executed with the -h option specified on the storage management server, the daemons/services of the storage management server and target storage server must be active.

Command	Operating environment of AdvancedCopy Manager
swstdevdisp	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: ● -h option specified, or ● No device name specified
swstdevinfo	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstexecstat	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: ● -h option specified, or ● No device name specified
swsthistdel	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsthistdisp	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: ● -h option specified, or ● No device name specified
swstresback	-
swstresrst	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows, the daemons and services of the storage server must be operating. To execute this command with the -x option specified, the daemons and services of the storage management server must be operating.
swstrestore	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstreststat	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: ● -h option specified, or ● No device name specified
swstsrsemch	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows, the daemons and services of the storage server must be operating. To execute this command with the -x option specified, the daemons and services of the storage management server must be operating.
swststartsync	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows, the daemons and services of the storage server must be operating.
swstsvrdisp	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swstsvrset	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.

Command	Operating environment of AdvancedCopy Manager
swstsyncstat	To execute this command on a storage management server with either of the following parameter designations, the daemons and services of the storage management server and target storage server must be operating: <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstrkstat	When this command is executed in the following format on the storage management server, the daemons/services of the storage management server and target storage server must be active: <ul style="list-style-type: none"> ● -h option is specified, or ● No device name is specified.



Note In cluster operation

In cluster operation, execute a command by taking the following steps:

- 1) If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=logical-node-name
# export SWSTGNODE
```

- 2) Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Cluster operation commands

Command	Environment variable	Command execution node	Remarks
swstsvrset	Required	Cluster active server	
swstsvrdisp	Required	Cluster active server	
swstdevinfo	Required	Cluster active server	
swstdevdisp	Required	Cluster active server	
swstbkpolset	Required	Cluster active server	
swstbkpoldisp	Required	Cluster active server	
swstbkpoldel	Required	Cluster active server	
swstbackup	Required	Cluster active server	
swstbackstat	Required	Cluster active server	
swstrestore	Required	Cluster active server	
swstcancelrest	Required	Cluster active server	
swstreststat	Required	Cluster active server	

Command	Environment variable	Command execution node	Remarks
swsthistdisp	Required	Cluster active server	
swsthistdel	Required	Cluster active server	
swststartsync	Required	Cluster active server	
swstcancelsync	Required	Cluster active server	
swstsyncstat	Required	Cluster active server	
swstexecstat	Required	Cluster active server	
swstcanceltrk	Required	Cluster active server	
swsttrkstat	Required	Cluster active server	
swstsrsemth	Required	Cluster active server	
swstresback	Required	Cluster active server	
swstresrst	Required	Cluster active server	



Note

When the display commands that have disp or stat at the end of the command name are executed at the Storage Management Server, the content displayed depends on whether or not the -h option and the device name are specified. See the following table for details.

[Table: Contents displayed by the Storage Management Server display commands]

-h option	Device name specification	Displayed content
No	No	All information of all Storage Servers registered to the backup management function is displayed.
	Yes	The information of only the specified device in the Storage Management Server is displayed.
Yes	No	All information of the Storage Server specified in the -h option is specified.
	Yes	The information of only the specified device in the Storage Server specified in the -h option is displayed.

10.2.1 Environment definition commands

This chapter describes environment definition commands for backup management.

10.2.1.1 Storage server configuration information configuration command (swstsvrset)

This command sets configuration information of a storage server. Execute this command to declare that the Storage Server that executed the command is subject to the backup operation.

a. Specification

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstsvrset

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstsvrset [-h Server]
```

b. Description of options

Option	Description
-h	Specifies the name of a storage server to be subject to the backup operation. This option is valid only on a storage management server. If this option is omitted, the storage server on which the command is entered will be subject to the processing.

c. End status

```
= 0: Normal end
> 0: Abnormal end
```

d. Execution example

Set configuration information of a storage server.

```
# /opt/FJSVswsts/bin/swstsvrset
swstsvrset completed
#
```

Set configuration information of a storage server (job1) from a storage management server.

```
# /opt/FJSVswsts/bin/swstsvrset - h job1
swstsvrset completed
#
```



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpodel)
- Backup execution command (swstbackup)
- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- Device information configuration command (swstdevinfo)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)
- Resource match command (swstsrsemch)

10.2.1.2 Storage server configuration information display command (swstsvrdisp)

This command displays configuration information of a storage server, which has been set using the storage server configuration information configuration command (swstsvrset).

a. Specification

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstsvrdisp

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstsvrdisp [-h Server]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option is valid only on a storage management server.

c. End status

= 0: Normal end
> 0: Abnormal end

d. Execution example

Display configuration information of a storage server (Work1).

```
# /opt/FJSVswsts/bin/swstsvrdisp
Storage-Server = Work1
#
```

The following information will be displayed.

Title	Description
Storage-Server	Displays a storage server name.

10.2.1.3 Device information configuration command (swstdevinfofet)

Configure a volume that has been allocated to the disk array unit ETERNUS storage system, as a transaction or backup volume.

A transaction volume refers to a volume that stores work data to be backed up.

A backup volume refers to a volume used to store a backup of this transaction data.

When using transaction volumes to back up data, see "Deciding a backup target" in "Backup Operations (Normal Transaction Volumes)" for information about the transaction volume. See "Preparing a backup volume" in "Backup Operations (Normal Transaction Volumes)" for information about the backup volume.

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstdevinfofet -t | -b | -o Device-Name

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstdevinfofet [-h Server] -t | -b | -o Device-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option is valid only on a storage management server.
-t	Register the specified device as a transaction volume. Cannot be specified at the same time as the -b and -o options.
-b	Register the specified device as a backup volume. Cannot be specified at the same time as the -t and -o options.
-o	Deregister the specified device if it has been registered as a work or backup volume. Cannot be specified at the same time as the -t and -b options.

c. Description of operand

Operand	Description
Device-Name	Specify a device name. Specify the name of a block device.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Register a device (/dev/sdb6) as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/sdb6
swstdevinfofet completed
#
```

Register a device (/dev/sdb6) as a backup volume.

```
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/sdb6
swstdevinfofet completed
#
```

Deregister a device (/dev/sdb6) that has been registered as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfofet -o /dev/sdb6
swstdevinfofet completed
#
```



Note

No device can be registered as a transaction volume if:

- Another device with the same logical volume information (box identifier, OLU number, EXTENT start position, and EXTENT size) has already been registered as a transaction volume.
- The space of the device to be registered overlaps the space of an already registered transaction or backup volume.
- It is a Logical Unit (disk).



Note

No device can be registered as a backup volume if:

- Another device with the same logical volume information (box identifier, OLU number, EXTENT start position, and EXTENT size) has already been registered as a backup volume.
- The space of the device to be registered overlaps the space of an already registered transaction or backup volume.
- The device to be configured is already mounted.
- The device is an SDX object (slice).
- When the device which it is going to configured is registered as a replication destination volume of replication management.
- When the device which it is going to configured is registered as replication source volume of the duplicate volume information in which the bidirectional copy of replication management is possible.
- It is a Logical Unit (disk).



Note

You must delete related backup history information before:

- Changing a backup volume to a transaction volume
- Canceling the configuration of a backup volume



Note

You must delete a backup policy specified on a transaction volume before:

- Changing a transaction volume to a backup volume
- Canceling the configuration of a transaction volume



Note

The following changes are not possible unless the related synchronous processing (EC session) is cancelled:

- Changing a configuration of a suspended transaction volume
- Changing a configuration of a suspended backup volume



Note

To perform the following changes, the related tracking processing (OPC session) must be canceled in advance.

- Changing the configurations of a transaction volume in tracking processing
- Changing the configurations of a backup volume in tracking processing



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpoldel)
- Backup execution command (swstbackup)

- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource match command (swstsrsemth)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.1.4 Device usage status display command (swstdevdisp)

This command displays information of a transaction or backup volume or any other definable device, which has been set using the device information configuration command (swstdevinfofet).

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstdevdisp [-h Server] [-t] [-b [-u]] [-o] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-t	Displays information on a device that has been set as a transaction volume. Displays device information on all the transaction volumes if the device name in an operand is omitted.
-b	Displays a device that has been set as a backup volume. Displays device information on all the backup volumes if the device name in an operand is omitted.
-u	Changes the display format of the Device-Mode field.
-o	Displays all the devices other than those set as a work or backup volume. Displays all the devices other than those set as a transaction or backup volume if the device name in an operand is omitted.

Information on a device that has been set as a transaction volume will be displayed if all of the t, b, and o options are omitted.

c. Description of operand

Operand	Description
Device-Name	Specify a device name. Specify the name of a block device. Displays device information on all the transaction volumes if this operand, as well as the options, is omitted. In the case of a SDX object, specify the name of a partition.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Display the usage statuses of the registered devices.

```
# /opt/FJSVswsts/bin/swstdevdisp - tb
Server Device      Size      Device-Mode  Mount-Point (Method) Backup-Engine
```

Work2	/dev/sdb6	1.0 Gbyte Transaction	/mnt/tran1 (ext2)	AdvancedCopy
Work2	/dev/sdb5	1.0 Gbyte Transaction	---- (----)	AdvancedCopy
Work2	/dev/sdb6	1.0 Gbyte Backup (used)	---- (----)	AdvancedCopy
Work2	/dev/sdb3	1.0 Gbyte Backup (free)	---- (----)	AdvancedCopy
Work2	/dev/sdb6	2.0 Gbyte Backup (free)	---- (----)	AdvancedCopy
Work2	/dev/sdb3	2.0 Gbyte Backup (free)	---- (----)	AdvancedCopy
:				
#				

The following information will be displayed.

Title	Description
Server	Displays a storage server name.
Device	Displays a AdvancedCopy Manager device name.
Size	Displays the size of a partition allocated to a device.
Device-Mode	<p>Displays a character string by which a device can be identified.</p> <ul style="list-style-type: none"> ● "Transaction": Represents a transaction volume. ● "Backup": Represents a backup volume. ● "Other": Represents a device that can be registered as a work or backup volume. <p>A backup volume is indicated as "Backup (used)" if it is being used or "Backup (free)" if it is not used. During the backup process with -suspend or -T specified, the backup volume remains in use after history information is deleted.</p> <p>When the -u option is specified, "Backup (used-S)" is displayed for a backup volume in the suspend status for which history information was deleted, or "Backup (used-T)" is displayed for a backup volume in the tracking status for which history information was deleted.</p>
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Backup-Engine	<p>Displays the operation type.</p> <ul style="list-style-type: none"> ● "AdvancedCopy": Backup operation using AdvancedCopy Manager



Note

This command cannot be used to display volume sizes to the byte. Refer to "Notes" under "Configuring the device operation type" for the information relating to displaying and checking the number of bytes in a volume.

10.2.1.5 Backup policy configuration command (swstbkpolset)

This command sets a backup policy (numbers of preservation generations and interval days). The number of preservation generations refers to the number how many generations of backup that data should be kept.

The number of interval days refers to the number of days after the execution of backup that the next backup should be performed.



Note

Even if the number of interval days is specified, AdvancedCopy Manager does not automatically perform backup.



Note

When you specify a backup policy, there must be as many backup volumes required by the specified backup policy. To view information on the number of backup volumes required to perform the backup operation of a regular transaction volume, see "Preparing a backup volume".

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSSwsts/bin/swstbkpolset [-i Interval-Days] [-s Save-Number] [Device-Name]

[To be executed on a storage management server]

# /opt/FJSSwsts/bin/swstbkpolset [-h Server] [-i Interval-Days] [-s
Save-Number] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-i	Specifies the number of interval days. You can specify a value between 1 and 366. If this option is omitted during initial registration, 30 will be set. If this option is omitted during update, the existing value will be inherited.
-s	Specifies the number of preservation generations. You can specify a value between 1 and 31. If this option is omitted during initial registration, 2 will be set. If this option is omitted during update, the existing value will be inherited.

c. Description of operand

Operand	Description
Device-Name	Specify an AdvancedCopy Manager device name. If the device name is omitted, the backup policy will be set for all the transaction volumes.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

To set 3 as the save number of a transaction volume as a backup policy:

```
# /opt/FJSSwsts/bin/swstbkpolset -s 3
/dev/sdg3 swstbkpolset completed
/dev/sdg4 swstbkpolset completed
#
```



Note

Change of the number of preservation generations can be performed if there "there is less history information across the generation timeframe than "the number of preservation generations to set up."



Note

Ordinary transaction volumes must be backed up to ordinary backup volumes.
If the transaction volume is a GDS logical volume, the backup destination must be a backup volume of a GDS logical volume.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."



Note

No backup policy can be set if:

- There are less backup volumes than the specified number of preservation generations.
- An option for a greater number of preservation generations than allowable is used.
- An option for specifying more interval days than allowable
- When the replication control function or tape backup function uses the target transaction volume.
- When the specified device is a LU (disk) unit



Note

This command can be executed only while none of the following commands is executed.

- Resource match command (swstsrsemth)
- Device information configuration command (swstdevinfofet)
- Storage server configuration information configuration command (swstsvrset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)



Note

If GDS SDX objects are to be used, refer to information regarding "Allowable SDX object configurations and associated conditions of use."

10.2.1.6 Backup policy display command (swstbkpoldisp)

This command displays a backup policy that has been set for a transaction volume.

a. Specification method

```

[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstbkpoldisp [Device-Name]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstbkpoldisp [-h Server] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.

c. Description of operand

Operand	Description
Device-Name	Specify an AdvancedCopy Manager device name. Specify the name of a block device. If the device name is omitted, a backup policy for a transaction volume with a registered backup policy will be displayed. In the case of a SDX object, specify the name of a partition.

d. End status

= 0: Normal end

> 0: Abnormal end

e. Execution example

To display the backup policies of a transaction volume (/dev/sdg3):

```
# /opt/FJSVswsts/bin/swstbkpoldisp /dev/sdg3
Server Device      Interval-Days Save-Number Mount-Point (Method)
Work2 /dev/sdg3 30          2          /mnt1      (ext2)
#
```

The following information will be displayed.

Title	Description
Server	Displays a storage server name.
Device	Displays a device name.
Interval-Days	Displays a number of interval days.
Save-Number	Displays a number of preservation generations.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point will be displayed inside the parentheses.

10.2.1.7 Backup policy deletion command (swstbkpoldel)

This command deletes a backup policy that has been set.

If the transaction volume to be deleted has backup history information, delete the backup history information and then execute this command.

a. Specification method

[To be executed on a storage server]

```
# /opt/FJSVswsts/bin/swstbkpoldel Device-Name
```

[To be executed on a storage management server]

```
# /opt/FJSVswsts/bin/swstbkpoldel [-h Server] Device-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.

c. Description of operand

Operand	Description
Device-Name	Specify a AdvancedCopy Manager device name. Specify the name of a block device. The partition name is specified for the SDX object.

d. End status

= 0: Normal end

> 0: Abnormal end

e. Execution example

To delete the backup policies of a transaction volume (/dev/sdg3):

```
# /opt/FJSVswsts/bin/swstbkpdel /dev/sdg3
/dev/sdg3 swstbkpdel completed
#
```



Note

No backup policy can be deleted if:

- The transaction volume to be deleted has backup history information.
- A transaction volume whose backup policies are to be deleted has already started backup synchronous processing.
- When the replication control function or tape backup function uses the target transaction volume



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2 Operation commands

This chapter describes operation commands for backup management.

10.2.2.1 Backup execution command (swstbackup)

The behavior of the swstbackup command, changes according to various processing states of the copy during execution.

- When synchronous processing (EC) is not performed
Snapshot processing (OPC) is performed and relevant history information, such as the timestamp and backup volume of a copy destination, is registered into backup history information. This type of Backup is referred to as a snapshot type high-speed backup.
- When synchronous processing (EC) is performed
The state of synchronous processing is checked and, in the case of an equivalency maintenance state, backup synchronous processing is suspended. Information, such as the timestamp and backup volume of a copy destination, is simultaneously registered into backup history file. This type of Backup is referred to as a synchronous high-speed backup. A fatal error is generated when an equivalency maintenance state can not be reached.

To use the Suspend/Resume function for synchronous high-speed backup, execute the backup command with `-suspend` specified, and suspend backup synchronous processing.

The backup is established and access to the backup volume is granted immediately after command execution.

AdvancedCopy Manager executes a backup pre-processing Shell script (OpcBackup.pre) before executing backup and then a backup post-processing Shell script (OpcBackup.post) after executing backup. You can customize these Shell script to suit your operational needs. For more information, see "Pre-processing and Post-processing of Backup and Restoration".

a. Specification method

```
[To be executed on a storage server]
# /opt/FJSVswsts/bin/swstbackup [-suspend|-T] Device-Name [-Xdevmap Device-Map-File]

[To be executed on a storage management server]
# /opt/FJSVswsts/bin/swstbackup [-h Server] [-suspend¥-T] Device-Name [-Xdevmap
Device-Map-File]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-Xdevmap	Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, the target backup volume will be automatically selected. To execute this command remotely using the -h option, specify a device map file (of a storage server) using an absolute pathname. A file name specified in Device-Map-File must not include any special or reserved characters.
-suspend	This results in synchronous high-speed backup using the Suspend/Resume function.
-T	Specifies that the differential snapshot high-speed backup be executed. This option cannot be specified during synchronous processing. This option is valid only for copying within a cabinet when the disk array supports the QuickOPC function. For the snapshot high-speed backup without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be always specified to perform a backup operation using differential snapshots.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d. End status

```
= 0: Normal end
> 0: Abnormal end
```

e. Execution example

/dev/sdg3 is backed up.

```
# /opt/FJSVswsts/bin/swstbackup /dev/sdg3
/dev/sdg3 swstbackup completed
#
```



Note

To preserve data integrity, this command performs the backup only after inhibiting access to both transaction and backup volumes from all other processes. Thus, drive letters, logical volume names or device labels of devices are unassigned. This command terminates with an error if a drive letter, logical volume name or device label of a transaction volume is assigned or if:

- The mount point has directories to which other volumes are also mounted.
- The volume has a file in use.



Note

When the ‘-bind’ option in the mount command is specified to mount part of the file hierarchy of the transaction volume at another mount point, use backup manager’s authority to unmount the transaction volume.



Note

Do not execute the backup execution command in a state where another volume is mounted at the mount point of the target volume.
For such a state, unmount the other volume before executing the backup execution command.



Note

To mount a transaction volume from a server other than the server on which this command is entered, unmount the transaction volume, using the authority of the backup administrator. If the transaction volume must not be unmounted, create backup copies with the following procedure:

1. Execute the sync command to synchronize the transaction volume and file system.
2. Execute this command.
3. Execute the fsck command for the backup volume, and check the file system.



Note

You cannot perform backup in the following cases where:

(In these cases, check the corresponding “System Administrator’s Response” in the message displayed.)

- No backup policy has been specified for the specified transaction volume.
- The Backup executed one generation earlier was unsuccessful.
- Restore has been executed for the target transaction volume.
- Synchronous backup processing is performed in a transaction volume or log group to be processed, but the state of equivalence is not reached.
- The mount point of a transaction volume set at registration has been changed.
- A device containing SynfinityFILE resources consisting of multiple transaction volumes is mounted.
- Restoration is being executed using backup history information that will cause a generation overflow.
- No unused backup volume to be used as the copying destination could be acquired.
- Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed.
- A backup volume defined as the copy destination is mounted.
- When the replication control function or tape backup function uses the target transaction volume
- When the replication control function or tape backup function uses the target backup volume
- When the replication control function or tape backup function uses backup records exceeding the number of preservation generations
- When the “-T” option is specified during the operation in which SDX objects are backed up in units of logical volumes



Note

In the following circumstances, a destination backup volume cannot be specified and backup will not be performed.

- When the backup volume specified by the device map file (or operand of the “-t” option) cannot be used because it has been specified as a paired backup volume with another operating volume and either of the following conditions is not satisfied.
 1. The specified backup volume is in an intact state.
 2. The partition size of operating volume and backup volume is the same.
- When the description about the object operating volume of a device map file is incorrect (refer to “Preparing a device map file”).

- When a device name used in the device map file name contains any special or reserved characters.



Point

If existing backup history information conforms to the expected number of saved generations specified by the backup policy configuration command (swstbkpolset), then history information on the oldest generation is automatically deleted from the backup history information during the backup process, and the backup volume is cleared. However, if “-suspend” or “-T” options are specified for the backup history information, then the backup volume with the Suspend or tracking statuses is not cleared and the backup volume remains in use.



Note

The transaction volume on which the backup command is executed, one other transaction volume, and the suspended or tracking backup volume cannot be specified as backup destinations in the device map file.



Note

See “General notes”, for notes on executing backup.



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)



Note

For details on how to use SDX objects of GDS, refer to “Configuration and conditions of unsupported SDX objects,” and “Notes on SDX object operations (backup management).”



Note

The pre-processing and post-processing scripts are not executed when the mirror partition of the SDX object is TEMP.

10.2.2.2 Backup execution status display command (swstbackstat)

This command displays the completion status of backup that is being performed using the backup execution command (swstbackup).



Note

Do not use the OPC stop function of ETERNUSmgr/GRmgr while executing the snap shot type high speed backup. When the OPC stop function of ETERNUSmgr/GRmgr is used, it is displayed in this command regardless of the success or failure of an actual backup as succeeded.

a. Specification method

```
[To be executed on a storage server]
# /opt/FJSVswsts/bin/swstbackstat [Device-Name]

[To be executed on a storage management server]
# /opt/FJSVswsts/bin/swstbackstat [-h Server] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the backup execution statuses of all the transaction volumes will be displayed.

d. End status

```
= 0: Normal end
> 0: Abnormal end
```

e. Execution example

Display the actual copying execution status.

```
# /opt/FJSVswsts/bin/swstbackstat
Server Transaction-Disk Backup-Disk Status Execute
Work1 /dev/sdb3 /dev/sdd3 succeeded ----
Work1 /dev/sdb4 /dev/sdd4 executing 70%
Work1 /dev/sdb5 /dev/sdd5 executing 30%
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a storage server name.
Transaction-Disk	Displays the device name of a transaction volume.
Backup-Disk	Displays a backup volume name. If no backup has been collected, "----" will be displayed.
Status	Displays a backup completion status using one of the following character strings. <ul style="list-style-type: none"> ● "----": No backup has been collected (no history exists). ● "succeeded": Backup has been completed. ● "executing": Copying using OPC is in progress. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.



Note

If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".



Note

If "gds-error" is the status displayed in the Status field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If snapshot backup is in progress, execute the history information deletion command (swsthistdel) described in to delete the backup history information.
- If restoration is in progress, execute the resource match command (swstrsematch), and perform restoration again.

10.2.2.3 Restore execution command (swstrestore)

The data which exists in backup history information is restored by using OPC.



Note

Restoration of each individual file cannot be performed because copying between devices will be performed.

When the restore execution command is executed, AdvancedCopy Manager performs the restore pre-processing Shell script (OpcRestore.pre) before copying data using OPC and then the restore post-processing Shell script (OpcRestore.post) after copying data using OPC. You can customize these Shell script. For more information, see "Pre-processing and Post-processing for Backup and Restoration".



Point

You can restore data to any device other than a transaction volume. When you do so, the device must not be registered as a transaction volume and the device must have the same space size as the specified transaction volume.

Restoration GDS logical volume to a device other than that of the original transaction volume cannot be performed.

- a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstrestore [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] [-Xgds-softcopy] Device-Name

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstrestore [-h Server] [-g Generation-No | -v Version-No]
[-r Restore-Device-Name] [-Xgds-softcopy] Device-Name
```

- b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-g	Specifies the relative generation number of data to be restored. Check the relative generation number using the history information display command (swsthistdisp).

Option	Description
-v	Specifies the absolute generation number of data to be restored. Check the absolute generation number using the history information display command (swsthistdisp).
-r	Specifies a restore destination device name to restore data to any other device than a transaction volume.
-Xgds-softcopy	Performs restoration by software-copy for restoration in linkage with GDS Snapshot. If this option is not specified, restoration is performed with OPC.

Note: If neither the -g or -v option is specified, the latest information out of information under history management will be restored.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Restore data with relative generation number 2 (For information on the relative generation number, see data displayed using the history information display command (swsthistdisp)).

```
# /opt/FJSVswsts/bin/swstrestore -g 2 /dev/sdb6
/dev/sdb6 swstrestore completed
#
```

If the Suspend/Resume function is used for the backup operation on the transaction volume, the suspend synchronous processing is deleted and the restore command is executed. For information on the suspend synchronous processing, see the data displayed by the backup synchronous processing execution status display command (swstsyncstat). Execute the backup synchronous processing cancel command (swstcancelsync) to cancel the synchronous processing.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 /dev/sdd6 suspend ----
Work2 /dev/sdb6 /dev/sde5 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync -all /dev/sdb6
/dev/sdb6 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 ---- ---- ----
# /opt/FJSVswsts/bin/swstrestore /dev/sdb6
/dev/dsk/sdb6 swstrestore completed
#
```



Point

On a transaction volume on which a file system has been constructed, restore a specific file as follows:

1. Mount a backup volume. Check the backup volume by executing the Backup History List view/History information display command (swsthistdisp).
2. Copy the file to be restored by executing, for example, the cp command.

3. Unmount the backup volume.



Note

If a transaction volume is mounted from a server other than the server on which this command is entered, execute this command after unmounting the transaction volume, using the authority of the backup administrator.



Note

When the “-bind” option in the mount command is specified to mount part of the file hierarchy of the transaction volume at another mount point, use the backup administrator’s authority to unmount the transaction volume.



Note

Do not execute the restore execution command in a state where another volume is mounted at the mount point of the target volume.

In this case, unmount the other volume before executing the restore execution command.



Note

You cannot perform restoration or recovery in the following circumstances.

In these instances, perform as instructed by the [System Administrator’s Response] in the displayed message.

- Both a relative and absolute generation numbers have been specified.
- A device registered as a transaction volume has been specified in a parameter in the “-r” option.
- When a device registered as a backup volume has been specified in a parameter in the “-r” option, the device has been registered in the backup registration information of a certain transaction volume. If you restore data to a backup volume without registered backup data, and the backup volume is used to back up a certain transaction volume, then data will be overwritten. It is recommended never to specify a backup volume as a restore destination device.
- You perform restoration immediately after performing backup (the physical copying using OPC is in progress) (except when the combination of transaction volume and backup volume is the same for backup and restoration). In this case, perform restoration after the physical copying using OPC is completed. Alternatively, on a transaction volume on which a file system has been constructed, perform restoration according to the method described in the previous Points (when restoring a specific file at a transaction volume on which a file system has been constructed).
- If the SynfinityFILE file system is already mounted before restoration of devices of the SynfinityFILE file system consisting of multiple partitions, unmount the SynfinityFILE file system, and then restore all devices that make up the SynfinityFILE file system.
- A transaction volume currently in use with synchronous backup processing is specified.
- Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume to be restored has been changed.
- The mount point set at registration of a transaction volume has been changed.
- An SDX object has been specified in a parameter in the “-r” option.
- The “-Xgds-softcopy” option is specified for a device that is not a GDS logical volume.
- A GDS logical volume is specified as the restoration destination volume of an ordinary transaction volume.
- When the replication control function or tape backup function uses the target transaction volume
- When the replication control function or tape backup function uses the device specified in the “-r” option



Note

The suspended or backup volume cannot be used as the restore destination volume.



Note

The restore command cannot be executed on a transaction volume during the synchronous processing (during copying by EC, under the equivalency maintain status, in the Suspend state).

If the following error occurs during restore processing, then execute the backup synchronous processing cancel command (swstcancelsync) (with the -all option specified) to cancel all of the synchronous processing of the transaction volume, and execute the restore command.

- swst0639 Command cannot be run because a copy is running; or
- swst0634 OPC cannot be run. Error code=26 (SCSI command busy).



Note

See "General notes", for notes on executing restore.



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfoet)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."

10.2.2.4 Restore cancellation command (swstcancelrest)

This command cancels OPC-based restoration.

If you have executed the restore execution command (swstrestore) and while data is copied using OPC, an abnormality due to a hardware error is detected. Then, remove the cause of the hardware error and perform restoration again using the restore execution command (swstrestore).

Check whether an abnormality has occurred using the restore execution status display command (swstreststat).



Note

If you cancel OPC-based restoration using this command, the transaction volume will be in an incomplete status and can no longer be used because part of the data has already been copied. Perform restoration again using the restore execution command (swstrestore).

If the transaction volume is a GDS logical volume and restoration is cancelled, the state of the transaction volume becomes INVALID. In such cases, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)," and restore the logical volume.

a. Specification method

```
[To be executed on a storage server]
# /opt/FJSVswsts/bin/swstcancelrest [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] [-emergency] Device-Name
```

```
[To be executed on a storage management server]
# /opt/FJJSwsts/bin/swstcancelrest [-h Server] [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] [-emergency] Device-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-g	Specifies the relative generation number of data being restored. This option cannot be specified at the same time as the -v option. Check the relative generation number using the restore execution status display command (swstreststat).
-v	Specifies the absolute generation number of data being restored. This option cannot be specified at the same time as the -g option. Check the absolute generation number using the restore execution status display command (swstreststat).
-r	Specifies the device name if data is restored to any other device than a transaction volume. Check the device name using the restore execution status display command (swstreststat).
-emergency	Emergency operation mode is available for operations. In such cases, OPC sessions are neither confirmed nor cancelled.

Note: The restoration of the latest history information will be canceled if neither the -g or -v option is specified.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d. End status

= 0: Normal end
> 0: Abnormal end

e. Execution example

Cancel restore processing of a transaction volume (/dev/sdb6).

```
# /opt/FJJSwsts/bin/swstcancelrest -g 1 /dev/sdb6
/dev/sdb6 swstcancelrest completed.
#
```

Restoration of the latest history information on the transaction volume (/dev/sdb6) is cancelled in emergency operation mode.

```
# /opt/FJJSwsts/bin/swstcancelrest -emergency /dev/sdb6
/dev/sdb6 swstcancelrest completed.
#
```



Note

You cannot cancel restoration if:

- The history specified in the “-g” or “-v” option does not exist.
- Restoration is not performed on the device specified in the “-r” option.
- Restoration is not performed from the specified history. In this case, processing is terminated with an information message “swst0303 Restoration for specified restoration device is not performed”. The end status is a normal end.

- When the replication control function or tape backup function uses the target transaction volume



Note

However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr or GRmgr must be used to cancel these sessions.



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Resource match command (swstsrsetch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.5 Restore execution status display command (swstreststat)

This command displays the execution status of restoration.



Note

Do not use the OPC stop function of ETERNUSmgr/GRmgr while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUSmgr/GRmgr, this command displays "succeeded" whether or not the restoration has actually been successful.

- a. Specification method

```
[To be executed on a storage server]
# /opt/FJSVswsts/bin/swstreststat [-g Generation-No | -v Version-No] [-Xgds-softcopy]
[Device-Name]

[To be executed on a storage management server]
# /opt/FJSVswsts/bin/swstreststat [-h Server] [-g Generation-No | -v Version-No]
[-Xgds-softcopy] [Device-Name]
```

- b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-g	Specifies the relative generation number of data whose restore execution status should be displayed.
-v	Specifies the absolute generation number of data whose restore execution status should be displayed.
-Xgds-softcopy	Displays the restore execution status of a GDS logical volume. Use this option to check the copy status when restoration using the software-copy function of GDS is in progress. When the option is specified, the Status field display when copying is completed is "----", which is the same as before copying started.

Note: The restore execution statuses of all the history will be displayed if both the -g and -v options are omitted.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device. If this operand is omitted, the restore execution statuses of all the transaction volumes will be displayed.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Display the restore processing status of transaction volumes.

```
# /opt/FJSVswsts/bin/swstreststat
Server Transaction-Disk Generation Version Backup-Disk Restore-Device Status
Execute
Work2 /dev/sdb3 1 10 /dev/sdd3 /dev/sdc3 executing
75%
Work2 /dev/sdb4 ---- ---- ---- ----
----
Work2 /dev/sdb5 2 12 /dev/sdd5 ---- succeeded
----
Work2 /dev/sdb6 3 13 /dev/sdd6 /dev/sdc6 executing
75%
:
#
```

The following information will be displayed.

Title	Description
Server	Displays a storage server name.
Transaction-Disk	Displays the device name of a transaction volume.
Generation	Displays the relative generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no history being restored exists.
Version	Displays the absolute generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no history being restored exists.
Backup-Disk	Displays the name of a backup volume from which data should be copied and restored. "----" will be displayed if restoration is not in progress.
Restore-Device	Displays a restore target device name unless data is copied and restored to a transaction volume. "----" will be displayed if restoration is not in progress or data is restored to a transaction volume.
Status	Displays an execution status. <ul style="list-style-type: none"> ● "----": No copying using OPC is in progress. ● "executing": Copying using OPC is in progress. ● "succeeded": Copying using OPC has been completed. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.



If "failed" is displayed in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".



Note

If no generation number has been specified in the “-v” or “-g” option, the restore execution statuses of all the history will be displayed. If, at this time, restoration is not in progress from any of the history, “----” will be displayed in all the information fields other than “Server” and “Transaction-Disk”.



Note

If “gds-error” is the status displayed in the Status field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If snapshot-type backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- If restoration is in progress, execute the resource match command (swstsrsemth), and perform restoration again.

10.2.2.6 History information display command (swsthistdisp)

This command displays history information that has been backed up.

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swsthistdisp [Device-Name]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swsthistdisp [-h Server] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the backup history information of all the transaction volumes will be displayed.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Display the backup history information of all the transaction volumes.

```
# /opt/FJSVswsts/bin/swsthistdisp
Server=StrgSV01 Device=/dev/sdb6 Mount-Point=/mnt/Tran1 (ext2)
Generation Version Backup-Date Backup-Device Status Execute
1 10 2000/11/12 22:00 /dev/sdd6 succeeded ----
```

```
2          9          2000/11/11 22:00 /dev/sdf6    succeeded ----
:
#
```

Display the backup history information of transaction volumes in operation with SP-series devices.

```
# /opt/FJSVswsts/bin/swsthstdisp
Server=StrgSV01 Device=/dev/sdc5 Mount-Point=/mnt/Tran1 (ext2)
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a storage server name.
Device	Displays a device name.
Mount-Point	Displays the mount point name of the device and the file system type in parentheses.
Generation	Displays a relative generation number. This item will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a timestamp at which backup has been completed. This item will not be displayed if no backup history information exists.
Backup-Device	Displays the name of a backup volume to which data has been backed up. This item will not be displayed if no backup history information exists.
Status	Displays an actual copying execution status using one of the following character strings. <ul style="list-style-type: none"> ● "succeeded": Copying using OPC has been completed. ● "executing": Copying using OPC is in progress. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally. This item will not be displayed if no backup history information exists.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.



Note

If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".



Note

If "gds-error" is the status displayed in the "Status" field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- If restoration is in progress, execute the resource match command (swstsrsemch), and perform restoration again.

10.2.2.7 History information deletion command (swsthistdel)

This command deletes backup history information.

The backup volume of the deleted history is released and turns into empty backup volume.



Note

If the history information display command (swsthistdisp) displays "failed" in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".

a. Specification method

```
[To be executed on a storage server]

# /opt/FJVSswsts/bin/swsthistdel -g Generation-No | -v Version-No | -z [-emergency]
Device-Name

[To be executed on a storage management server]

# /opt/FJVSswsts/bin/swsthistdel [-h Server] -g Generation-No | -v Version-No | -z
[-emergency] Device-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-g	Specifies the relative generation number of backup history information to be deleted. This option cannot be specified at the same time as the -v or -z. Check the relative generation number using the history information display command (swsthistdisp).
-v	Specifies the absolute generation number of backup history information to be deleted. This option cannot be specified at the same time as the -g or -z. Check the absolute generation number using the history information display command (swsthistdisp).
-z	Specifies to delete all the backup history information. This option cannot be specified at the same time as the -g or -v.
-emergency	Emergency operation mode is available for operations. In such cases, OPC sessions are neither confirmed nor cancelled.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device.

- d. End status
= 0: Normal end
> 0: Abnormal end

e. Execution example

Delete the backup history of absolute generation number 10 in a transaction volume (/dev/sdb6).

```
# /opt/FJSVswsts/bin/swsthistdel -v 10 /dev/sdb6
/dev/sdb6 swsthistdel completed
#
```

The history information of relative generation number 1 of the transaction volume (/dev/sdb6) is deleted in emergency operation mode.

```
# /opt/FJSVswsts/bin/swsthistdel -g 1 -emergency /dev/sdb6
/dev/sdb6 swsthistdel completed
#
```



Note

You cannot delete backup history information if:

- The backup history information specified in the “-g” or “-v” option does not exist.
- The specified backup history information is used in restoration.
- When the replication control function or tape backup function uses the target transaction volume
- When the replication control function or tape backup function uses the target backup volume



Note

However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr or GRmgr must be used to cancel these sessions.



Point

Deleting the suspended history information does not cancel the synchronous processing (EC session).

Deleting the tracking history information does not cancel the tracking processing (OPC session).



Point

In synchronous high-speed backup with “-suspend” specified, the backup volume remains in use even after the history information is deleted.

In differential snapshot high speed backup with “-T” specified, the backup volume remains in use even after the history information is deleted.



Note

If the history information is deleted while the OPC physical copy has not been completed in a backup operation mode other than the differential snapshot high-speed backup, physical copying of the deleted history is interrupted. In this case, the data in the backup volume is incomplete (copy stopped part way through). The backup volume is put in the unused state upon deletion of the history information and becomes ready to use at the subsequent backup.

In the differential snapshot high speed backup mode, the physical copying of the deleted history is continued even after the history information on the incomplete OPC physical copy is deleted. Even after deletion of the history information, the backup volume is in the busy state and becomes ready to use at the subsequent backup of the relevant transaction volume.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.8 Backup synchronous processing start command (swststartsync)

This command starts backup synchronous processing (starts disk-to-disk copy using EC).

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swststartsync [-Xgds-softcopy | -Xgds-selectcopy] Device-Name
[-Xdevmap Device-Map-File]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swststartsync [-h Server] [-Xgds-softcopy | -Xgds-selectcopy]
Device-Name [-Xdevmap Device-Map-File]
```

b. Description of options

Option	Description
-h	Specify the name of a Storage server. This option can be specified only on the Storage management server.
-Xgds-softcopy	Specifies the start of backup synchronous processing of an SDX object and use of the software-copy function instead of the advanced copy function. If you specify this option to start differential copying when the advanced copy function is being used, advanced copy processing stops and software-copy processing starts.
-Xgds-selectcopy	You can specify the option when the function in linkage with GDS Snapshot is being used.

Option	Description
-Xdevmap	Specifies a target backup volume to perform the backup synchronous processing. In the operand, specify a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, the target backup volume will be automatically selected. To execute this command on a remote basis using the -h option, specify a device map file (of a storage server) using an absolute pathname. A file name specified in Device-Map-File must not include any national character.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d. End status

- = 0: Normally end
- > 0: Abnormally end

e. Execution example

Start synchronous backup processing of a transaction volume (/dev/sdb6).

```
# /opt/FJSVswsts/bin/swststartsync /dev/sdb6
/dev/sdb6 swststartsync completed.
#
```

Backup synchronous processing of a logical volume (/dev/sfdsk/CLS01/dsk/VOL01) of an SDX object is started. The copy processing method is software-copy.

```
# /opt/FJSVswsts/bin/swststartsync -Xgds-softcopy /dev/sfdsk/CLS01/dsk/VOL01
/dev/sfdsk/CLS01/dsk/VOL01 swststartsync completed.
#
```



Note

When you execute the backup synchronous processing start command for a transaction volume or log group to which the backup synchronous processing is being executed, the message, "swst0301 Backup synchronous processing is being executed." (For a log group, the message ID is swst0302) is displayed and execution terminates normally.



Note

You cannot start backup synchronous processing in the following cases. In any of the cases below, take an action according to the "System administrator response" message.

- When specifying a device that does not support the EC function.
- When the backup volumes that are required to start backup synchronous processing cannot be obtained.
- When specifying a device that is being restored by OPC.
- When mounting the backup volume to which data is copied.
- The "-Xgds-softcopy" option is specified for a device that is not a GDS logical volume. Alternatively, the "-Xgds-selectcopy" option is specified for a device that is not a GDS logical volume.
- When the replication control function or tape backup function uses the target transaction volume



Point

If the command is issued for a transaction volume that has a backup volume with suspended synchronous processing, the synchronous processing will be resumed for that backup volume. Otherwise, the synchronous processing (full copy) starts.



Point

Even if already in use, the transaction volume where the synchronous processing started and the suspended backup volume can be used as backup destinations.



Note

Except for the transaction volume where the synchronous processing started and the suspended backup volume, transaction volumes cannot be specified as backup destinations in the device map file.



Note

Backup synchronous processing with the output destination backup volume specified cannot be started in the following circumstances:

- The backup volume specified in the device map file cannot be used as the backup volume to be paired with the transaction volume. This means that either of the following conditions is not satisfied:
 - 1) The specified backup volume is in the unused state.
 - 2) The transaction volume and backup volume have the same partition size.
- The target transaction volume is incorrectly described in the device map file (Refer to "Describing a device map file").
- Any special or foreign characters, operators or reserved words are used in the in the device map file names.
- An ordinary volume is specified as the transaction volume and a GDS logical volume as the backup volume.
- A GDS logical volume is specified as the transaction volume and an ordinary volume as the backup volume.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."



Note

When any of the following commands is running, this command cannot be executed:

- Resource match command (swstsrsemth)
- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.9 Backup synchronous processing cancel command (swstcancelsync)

The backup synchronous processing during copying by EC or under the equivalency maintenance status may be canceled.

The synchronous processing can be canceled with the backup volume during copying by EC, under the equivalency maintain status, or while the Suspend state is set. Specifying cancellation of all of the synchronous processing cancels all of the backup synchronous processing including those in the Suspended state.

If the system detects an error while backup synchronous processing is being executed, the copying being performed at that time terminates abnormally. In such a case, use this command to cancel the backup synchronous processing. Use the backup synchronous processing progress display command (swstsyncstat) to check for the error.

a. Specification method

```
[To be executed on a storage server]

# /opt/FJJSwsts/bin/swstcancelsync [-emergency] [-bd Backup-Device-Name | -all]
Device-Name

[To be executed on a storage management server]

# /opt/FJJSwsts/bin/swstcancelsync [-h Server] [-emergency] [-bd Backup-Device-Name
| -all] Device-Name
```

b. Description of options

Option	Description
-h	Specify the name of a Storage server. This option can be specified only with a Storage management server.
-emergency	Emergency operation mode is available for operations. In such cases, EC sessions are neither confirmed nor cancelled.
-bd	The synchronous processing on a specific backup volume can be cancelled. To do so, specify the backup volume name in an operand. The backup volume name and -all option cannot be specified together.
-all	All of the synchronous processing of the transaction volume can be specified to be cancelled. This specification and the -bd option cannot be specified together.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.
Backup-Device-Name	Specify the copy destination backup volume name. Specify the block device name for the specified device.

d. End status

- = 0: Normally end
- > 0: Abnormally end

e. Execution example

Cancel synchronous backup processing of a transaction volume (/dev/sdb6).

```
# /opt/FJJSwsts/bin/swstcancelsync /dev/sdb6
/dev/sdb6 swstcancelsync completed.
#
```

Backup synchronous processing of transaction volume (/dev/sdb6) is cancelled in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/sdb6
/dev/sdb6 swstcancelsync completed.
#
```

The backup synchronous processing of the backup volume (/dev/sdd6) can be specified to be canceled from the transaction volume (/dev/sdb6).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 /dev/sdc6 suspend ----
Work2 /dev/sdb6 /dev/sdd6 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/sdb6 - bd /dev/sdd6
/dev/sdb6 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 /dev/sdc6 suspend ----
#
```

All of the backup synchronous processing of the transaction volume (/dev/sdb6) can be specified to be cancelled.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 /dev/sdc6 suspend ----
Work2 /dev/sdb6 /dev/sdd6 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/sdb6 - all
/dev/sdb6 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdb6 ---- ---- ----
#
```



Note

However, EC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an EC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr, GRmgr, GDS, or similar must be used to cancel these sessions.



Note

You cannot perform cancel processing of synchronous backup processing in the following cases

- When the replication control function or tape backup function uses the target transaction volume



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."



Note

This command cannot be executed when any of the following commands is running:

- Resource match command (swstsrsemth)
- Device information configuration command (swstdevinfoet)
- Storage server configuration information configuration command (swstsvrset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.10 Backup synchronous processing progress display command (swstsyncstat)

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintenance status, in the suspended status).

If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstsyncstat [Device-Name]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstsyncstat [-h Server] [Device-Name]
```

b. Description of options

Option	Description
-h	Specify the name of a Storage server. This option can be specified only with the Storage management server.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device. When you omit the device name, the system displays the status of backup synchronous processing for all of the transaction volumes.

d. End status

- = 0: Normally end
- > 0: Abnormally end

e. Execution example

Display the synchronous backup processing status of a transaction volume (/dev/sdb6).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute
Work1 /dev/sdb6 /dev/sdd5 suspend ----
Work1 /dev/sdb6 /dev/sdd6 executing 75%
#
```

Display the synchronous backup processing status of all business volumes.

```
# /opt/FJSVswsts/bin/swstsyncstat
Server Transaction-Disk Backup-Disk Status Execute
Work1 /dev/sdb3 /dev/sdd1 suspend ----
Work1 /dev/sdb3 /dev/sdd3 executing 75%
Work1 /dev/sdb3 /dev/sdd4 suspend ----
Work1 /dev/sdb5 /dev/sdd5 equivalent 100%
Work1 /dev/sdb6 /dev/sdd6 failed ----
Work1 /dev/sdb4 ---- ---- ----
#
```

Display information about a transaction volume (/dev/sdb5) in operation with SP-series devices.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/sdb5
Server Transaction-Disk Backup-Disk Status Execute
Work2 /dev/sdc5 ---- ---- ----
#
```

The table below lists the meaning of each title.

Title	Description
Server	Indicates the name of the Storage server.
Transaction-Disk	Indicates the name of the transaction volume.
Backup-Disk	Indicates the name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	Indicates the status of backup synchronous processing: <ul style="list-style-type: none"> ● "----": Backup synchronous processing is not being executed. ● "executing": Backup synchronous processing is being executed but equivalency maintain status has not been established. ● "equivalent": Equivalency maintain status is established. ● "suspend": Suspend status is established. ● "failed": Backup synchronous processing was abnormally terminated. ● "nosession": No session exists (inconsistent resource information). ● "halt": Backup synchronous processing is being halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Indicates the progress of the backup synchronous processing as a percentage (0 to 100%). "----" is displayed when the status is Suspend and at times not during the backup synchronous processing.



Note

If "failed" or "halt" is indicated as the status of the backup synchronous processing (in the "Status" field), a hardware failure is considered. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".



Note

If "nosession" is indicated as the status of the backup synchronous processing (in the "Status" field), resource information having inconsistency is considered. Use the resource match command (swstsrsemth) to remove the inconsistency from the resource information.



Note

If "gds-error" is the status displayed in the Status field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- If restoration is in progress, execute the resource match command (swstsrsemth), and perform restoration again.

10.2.2.11 Execution status display command (swstexecstat)

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC/EC will be displayed if OPC/EC is being executed.

a. Specification method

```
[To be executed on a storage server]
# /opt/FJSVswsts/bin/swstexecstat [-j] [Device-Name]

[To be executed on a storage management server]
# /opt/FJSVswsts/bin/swstexecstat [-h Server] [-j] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-j	Specifies to display information in another format.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the execution statuses of all the transaction volumes will be displayed. The partition name is specified for the SDX object.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Display the execution statuses of transaction volumes.

```
# /opt/FJSVswsts/bin/swstexecstat
Server Device    Last-Backup-Date Interval Status Mount-Point (Method) Execute
Work1 /dev/sdb3 2000/12/11 12:20 OK      IDLE  /usr1 (ext2)      ----
Work1 /dev/sdb4 2000/12/10 12:20 DELAY=1 IDLE  /usr2 (ext2)      sync (22%)
Work1 /dev/sdb5 2000/12/09 12:20 DELAY=2 IDLE  /usr3 (ext2)      snapshot (45%)
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a storage server name.
Device	Displays a AdvancedCopy Manager device name.
Last-Backup-Date	Displays the last backup timestamp. * Displays the time when the backup execution command was accepted.
Interval	Displays how many days have passed after the specified number of interval days since the last backup timestamp has been exceeded. This item will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.
Status	Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. <ul style="list-style-type: none"> ● Backup policy setting command (swstbkpolset) ● Backup policy deletion command (swstbkpoldel) ● Backup execution command (swstbackup) ● Restore execution command (swstrestore) ● History information deletion command (swsthistdel) ● Backup synchronous processing start command (swststartsync) ● Backup synchronous processing cancel command (swstcancelsync) ● Restore cancellation command (swstcancelrest)
Mount-Point (Method)	Displays the mount point name of a transaction volume and FS type in parentheses.
Execute	Displays the name of a command being executed or the copying progress ratio. <ul style="list-style-type: none"> ● "----": Neither a command or OPC/EC is being executed. ● "swststartsync": Backup synchronous processing start command is being executed. ● "swstcancelsync": Backup synchronous processing cancel command is being executed. ● "swstbackup": The backup execution command is being processed. ● "swstrestore": The restore execution command is being processed. ● "swstcancelrest": The restore cancellation command is being processed. ● "swstbkpolset": The backup policy configuration command is being processed. ● "swstbkpoldel": The backup policy deletion command is being processed. ● "swsthistdel": The history information deletion command is being processed. ● "swstcanceltrk": The tracking cancel command is being processed. ● "sync(xxx)": How far the EC operation has progressed. ● "sync(failed)": EC has been abnormally terminated. ● "sync(halt)": EC has been halt status. ● "snapshot(xxx)": Progress ratio of backup using OPC ● "snapshot(failed)": Backup using OPC has abnormally terminated. ● "snapshot(halt)": Backup using OPC has been halt status. ● "restore(xxx)": Progress ratio of restoration using OPC ● "restore(failed)": Restoration using OPC has abnormally terminated. ● "restore(halt)": Restoration using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.

If multiple processes are performed on transaction volumes (for example, when the backup synchronous processing start command is issued while a real copy of the snap shot backup is being performed), the display in the Execute field conforms to the following rule:

- The display of a command name takes priority if both copying and command execution are in progress.
- When a disk copy of the snap shot backup and a disk copy of the backup synchronous processing are being performed simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. A disk copy for restoration is not performed during disk copy of the snap shot backup or backup synchronous processing due to a restriction of the ETERNUS storage system.

The execution example of using the "-j" option is as follows:

```
# /opt/FJSVswsts/bin/swstexecstat - j
Server Device      Execute-Date      Status Mount-Point (Method) Execute
Work1 /dev/sdb3 2000/12/11 12:20 IDLE /usr1 (ext2)      ----
Work1 /dev/sdb4 2000/12/10 12:20 IDLE /usr2 (ext2)      sync (22%)
Work1 /dev/sdb5 2000/12/09 12:20 IDLE /usr3 (ext2)      snapshot (45%)
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a storage server name.
Device	Specifies an AdvancedCopy Manager device name.
Execute-Date	Displays the command execution time.
Status	<p>Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed.</p> <ul style="list-style-type: none"> ● Backup policy setting command (swstbkpolset) ● Backup policy deletion command (swstbkpoldel) ● Backup execution command (swstbackup) ● Restore execution command (swstrestore) ● History information deletion command (swsthistdel) ● Backup synchronous processing start command (swststartsync) ● Backup synchronous processing cancel command (swstcancelsync) ● Restore cancellation command (swstcancelrest)
Mount-Point (Method)	Displays the mount point name of a transaction volume and FStype in parentheses.

Keyword	Description
Execute	<p>Displays the name of a command being executed or the copying progress ratio.</p> <ul style="list-style-type: none"> ● "----": Neither a command or OPC/EC is being executed. ● "swststartsync": Backup synchronous processing start command is being executed. ● "swstcancelsync": Backup synchronous processing cancel command is being executed. ● "swstbackup": The backup execution command is being processed. ● "swstrestore": The restore execution command is being processed. ● "swstcancelrest": The restore cancellation command is being processed. ● "swstbkpolset": The backup policy configuration command is being processed. ● "swstbkpoldel": The backup policy deletion command is being processed. ● "swsthistdel": The history information deletion command is being processed. ● "swstcanceltrk": The tracking cancel command is being processed. ● "sync(xxx%)": How far the EC operation has progressed. ● "sync(failed)": EC has been abnormally terminated. ● "sync(halt)": EC has been halt status. ● "snapshot(xxx%)": Progress ratio of backup using OPC ● "snapshot(failed)": Backup using OPC has abnormally terminated. ● "snapshot(halt)": Backup using OPC has been halt status. ● "restore(xxx%)": Progress ratio of restoration using OPC ● "restore(failed)": Restoration using OPC has abnormally terminated. ● "restore(halt)": Restoration using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.



Point

During synchronous high-speed backup with "-suspend" specified, no operation ("----") is indicated in the Execute field.



Note

If "sync (failed)", "snapshot(failed)", or "restore(failed)", "sync (halt)", "snapshot(halt)" or "restore(halt)" is displayed in the "Execute" field, a hardware error may have occurred. After removing the cause of the hardware error, do as follows:

- For "sync (failed)"
Execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If "snapshot(failed)" is displayed
Delete backup history information using the history information deletion command (swsthistdel).
- If "restore(failed)" is displayed
Cancel restoration using the restore cancellation command (swstcancelrest).



Note

If "gds-error" is the status displayed in the "Status" field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- If restoration is in progress, execute the resource match command (swstsrsemth), and perform restoration again.

10.2.2.12 Tracking cancel command (swstcanceltrk)

This command stops tracking processing.

a. Specification method

```
[To execute on the storage server]
# /opt/FJJSwsts/bin/swstcanceltrk [-copy | -emergency] Device-Name (-bd
Backup-Device-Name | -all)
[To execute on the storage management server]
# /opt/FJJSwsts/bin/swstcanceltrk -h Server-Name [-copy | -emergency] Device-Name
(-bd Backup-Device-Name | -all)
```

b. Options

Option	Description
-h	Specifies a storage server name. This option can be specified only on the storage management server.
-copy	Specifies that physical copying, if active, should also be stopped (the OPC session should be canceled). This option cannot be specified for a backup volume that has already been a backup history. For a volume whose copy destination volume has been a backup history, delete the history information in advance using the history information deletion command (swsthistdel).
-emergency	Specifies that the command should operate in emergency operation mode. The command does not check tracking processing and does not stop tracking processing and the OPC session.
-bd	Stops tracking processing for the specified backup volume. Specify the target backup volume name as an operand. This option cannot be specified together with the -all option.
-all	Stops the entire tracking processing specified for the transaction volumes. This option cannot be specified together with the -bd option.

c. Operand

Operand	Description
Device-Name	Specifies a device name. Specify a block device name.

d. End status

= 0: Normal end
> 0: Abnormal end

e. Example

The following example stops the tracking processing that was specified for the backup volume (/dev/sdd6) from the transaction volume (/dev/sdb6)

```
# /opt/FJJSwsts/bin/swstcanceltrk /dev/sdb6 -bd /dev/sdd6
/dev/sdb6 swstcanceltrk completed.
#
```

The following example stops tracking processing and physical copying that were specified for the transaction volume (/dev/sdb6).

```
# /opt/FJSVswsts/bin/swstrkstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status   Execute Update
job2  /dev/sdb6      /dev/sdd6   executing 33%   -----
# /opt/FJSVswsts/bin/swstcanceltrk - copy /dev/sdb6 -bd /dev/sdd6
/dev/sdb6 swstcanceltrk completed.
#
```



Note

If the command is executed in emergency operation mode, no OPC session is canceled. A session that is not managed remains if the command is entered during tracking. The session must be canceled using ETERNUSmgr, GRmgr, or GDS.



Note

Tracking processing cannot be stopped under the following conditions. In this case, take action according to "System administrator response" provided in the message displayed.

- The tracking processing is not performed for the specified copy source and destination volumes.



Note

This command cannot be executed while the following command is executed:

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinforeset)
- Resource matching command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.13 Tracking status display command (swstrkstat)

This command displays the status of tracking processing.

When multiple types of tracking processing exist for one transaction volume, the command displays the statuses of all types of tracking processing.

a. Specification method

```
[To execute on the storage server]
# /opt/FJSVswsts/bin/swstrkstat [Device-Name]
[To execute on the storage management server]
# /opt/FJSVswsts/bin/swstrkstat [-h Server] [Device-Name]
```

b. Options

Option	Description
-h	Specifies a storage server name. This option can be specified only on the storage management server.

c. Operands

Operand	Description
Device-Name	Specifies a device name. Specify a block device name. If this operand is omitted, the command displays the statuses of tracking processing for all transaction volumes.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

The following example displays the status of tracking processing of a transaction volume (/dev/sdb6):

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/sdb6
Server Transaction-Disk Backup-Disk Status Execute Update
job1 /dev/sdb6 /dev/sdd6 tracking ---- 12%
#
```

The following example displays the status of tracking processing of all transaction volumes:

```
# /opt/FJSVswsts/bin/swsttrkstat
Server Transaction-Disk Backup-Disk Status Execute Update
job1 /dev/sdb3 /dev/sdd3 nosession ---- ----
job1 /dev/sdb4 /dev/sdd4 executing 75% ----
job1 /dev/sdb5 /dev/sdd5 failed ---- ----
job1 /dev/sdb6 /dev/sdd6 tracking ---- 12%
job1 /dev/sdc1 ---- ---- ---- ----
:
#
```

The displayed data is explained below.

Title	Description
Server	Displays a storage server name.
Transaction-Disk	Displays a transaction volume name.
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----": Not in progress of tracking "executing": In progress of physical copying and tracking "tracking": In progress of tracking "failed": Physical copying or tracking terminated abnormally. "nosession": No session exists. (Resource information is inconsistent.)
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.



Note

When the execution status (status displayed in the "Status" column) is "failed," a hardware problem is assumed. Remediate the problem and then retry the differential snapshot backup.



Note

When the execution status (status displayed in the "Status" column) is "nosession," the resource information is probably inconsistent. Use the resource matching command (swstsrsemth) to remove any inconsistencies from the resource information.

10.2.3 Maintenance commands

This chapter describes maintenance commands for backup management.

10.2.3.1 Resource match command (swstsrsemth)

This command performs recovery to make resource information consistent as a result of a system failure etc.

a. Specification method

```
[To be executed on a storage server]

# /opt/FJSVswsts/bin/swstsrsemth [-x]

[To be executed on a storage management server]

# /opt/FJSVswsts/bin/swstsrsemth [-x] [-h Server]
```

b. Description of operands

Operand	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-x	Gets consistency with a repository. Specify this option if the consistency between a backup management files and a repository comes to be inconsistent.

c. Execution example

```
# /opt/FJSVswsts/bin/swstsrsemth
swstsrsemth completed
#
```



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpdel)
- Backup execution command (swstbackup)
- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource match command (swstrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.3.2 Resource backup command (swstresback)

This command copies backup management files to a specified directory.

a. Specification method

```
/opt/FJSVswsts/bin/swstresback Backup-Directory
```

b. Description of operand

Operand	Description
Backup-Directory	Specifies the name of a directory to which resource control information should be saved.

c. Execution example

Create backup copy of the backup management files in /home/backup.

```
# /opt/FJSVswsts/bin/swstresback /home/backup
swstresback completed
#
```



Note

You cannot perform backup if:

- The specified directory does not exist.
- Copying of data to the specified directory failed because of insufficient free space, etc.



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpoldel)
- Backup execution command (swstbackup)
- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource match command (swstsrsetch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.3.3 Resource restore command (swstresrst)

Backup management files are restored from the specified directory.

a. Specification method

```
# /opt/FJSVswsts/bin/swstresrst Backup-Directory
```

b. Description of operand

Operand	Description
Backup-Directory	Specify the name of the directory to which to save the backup management files.

c. Execution example

Create backup copy of the backup management files in /home/backup.

```
# /opt/FJSVswsts/bin/swstresrst /home/backup
swstresrst completed
#
```



Note

Before the backup management files can be restored by this command, the storage server configuration information configuration command (swstsvrset) must be executed.



Note

You cannot perform restoration if:

- The specified directory does not exist.
- No backup management files exist in the specified directory.
- Copying of data from the specified directory for restoration failed because of insufficient free space, etc.



Note

This command can be executed only while none of the following commands are running.

- Storage server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfo)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpdel)
- Backup execution command (swstbackup)
- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.3 Configuration Management Commands

This section explains the operation of the configuration management commands which manage the information of the servers and their devices for backup management or replication management.



Note Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

[Table: Operating environment when executing configuration management commands]

Command	Operating environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a storage management server (storage management server daemon), the storage management server (storage management server daemon) must be running.
stguseraset	In cluster operation, the storage management server daemon must be running.
stgguiipset	In cluster operation, the storage management server daemon must be running.
stgxfwcmaddsrv	The storage management server (storage management server daemon) and target storage server (storage server daemon) must be running.
stgxfwcmmodsrv	The storage management server (storage management server daemon) and target storage server (storage server daemon) must be running.
stgxfwcmdeletesrv	The storage management server (storage management server daemon) must be running.
stgxfwcmsetdev	The storage management server (storage management server daemon) and target storage server (storage server daemon) must be running.
stgxfwcmdeledev	The storage management server (storage management server daemon) and target storage server (storage server daemon) must be running.
stgxfwcmdispdrv	The storage management server (storage management server daemon) must be running.
stgxfwcmdispdev	The storage management server (storage management server daemon) must be running.
stgxfwcmdispdrvpat	The storage management server (storage management server daemon) must be running.
stgenvdisp	This command is executable when both storage management server (storage management server daemon) and storage server (storage server daemon) are not running. Note that when the cluster service (named differently in respective cluster systems) is not running in cluster operation, this command cannot display certain information.
stgmgrinfoaset	The package-backup-of-the-management-information execution server must be running.
stgmgrinfobkup	The storage management server (storage management server daemon), package-backup-of-the-management-information execution server, and package-backup-of-the-management-information target servers must be running.
stgmgrinfodisp	The package-backup-of-the-management-information execution server must be running.
stgxfwcmsetsdx	Storage server transactions must be running for cluster operations.
stgxfwcmsetmode	Storage server transactions must be running for cluster operations.



Note

In cluster operation

In cluster operation, execute a command by taking the following steps:

- 1) If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=logical-node-name
# export SWSTGNODE
```

2) Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Cluster operation commands

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Active cluster server	
stgguiipset	Not required	Active cluster server	Executable only on storage management server transaction
stguserset	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmaddsrv	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmmodsrv	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmdelsrv	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmsetdev	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmdeldev	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmdispsrv	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmdispdev	Not required	Active cluster server	Executable only on storage management server transaction
stgxfwcmdisppat	Not required	Active cluster server	Executable only on storage management server transaction
stgenvdisp	Not required	Active cluster server	
stgmgrinfobkup	Required	Active cluster server	
stgmgrinfodisp	Required	Active cluster server	
stgmgrinfofet	Required	Active cluster server	
stgxfwcmsetsdx	Required	Active cluster server	
stgxfwcmsetmode	Required	Active cluster server	—

10.3.1 Management server information change command (stgcmmodnode)

This command changes the server change information of the Storage management server. Concretely, execute this command for the following purposes:

- To change the IP address of the Storage management server or the PORT number (stgxfws) used by the communication daemon
Follow the procedure below:
 1. Change server information by executing this command on the Storage management server.
 2. Change server information of the Storage management server by executing this command on every Storage server. This command must be executed on all Storage servers managed by the Storage management server.
- To change the server name of the Storage management server
Follow the procedure below:
 1. Change the server name from the GUI client of the Storage management server.
 2. Change the server name of the Storage management server by executing this command on every Storage server. This command must be executed on all Storage servers managed by the Storage management server.

This command has the following two functions:

- Displays storage management server information specified on the storage server on which this command is currently executed
- Changes storage management server information.

Refer to the following for the change procedure which uses this command.

- "Changing the IP address of a storage management server"
- "Changing the port number of a storage management server"
- "Changing the server name of a storage management server"

a. Specification method

```
# /opt/FJSVswstf/bin/stgcmmodnode [-i IP-address] [-p PORT number] [-n server name]
```

b. Description of options

Option	Description
None	Displays the server information currently managed.
-i	Specifies the IP address of a storage management server to change the IP address of the storage management server.
-p	Specifies the port number of a storage management server to change the port number of the storage management server.
-n	Specifies the server name of a storage management server to change the server name of the storage management server. This option cannot be specified if this command is executed on a storage management server.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

Display server information.

```
# /opt/FJSVswstf/bin/stgcmmodnode
swstf2413 IP Address = 10.10.10.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
#
```

Change the IP address of a storage management server to 10.12.13.14.

```
# /opt/FJSVswstf/bin/stgcmmnode -i 10.12.13.14
swstf2401 Storage Management Server registry updated.
```



Note

Note the follow points regarding this command.

- To execute this command, the AdvancedCopy Manager daemons must be stopped.
- This command can be executed only by root users.
- As the PORT number of a storage management server, you can specify a value between 1024 and 65535.
- You must specify the same value as the value specified on the storage management server. An error will occur if an invalid value is specified.
- After successful execution, you must restart the AdvancedCopy Manager daemons.

10.3.2 Repository access user change command (stguseret)

This command changes a user name and/or password used to access a repository. This command must be executed on the Storage management server.



Point

We recommend that you use a high root user instead of the general user frequently used for password changes for security reasons

The change in the user-name and the password is executed according to the following procedures.

1. Close the GUI client of AdvancedCopy Manager.
2. Execute Repository access user change command (stguseret).
3. Stop RMI daemons.
4. Start RMI daemons.

a. Specification method

```
# /opt/swstorage/bin/stguseret user-name password
```

b. Description of options

Option	Description
User name	Specifies a user name to be used for repository access. Specify a username, of up to 18 bytes, that is specifiable under the operating system.
Password	Specifies a user password to be used for repository access. Specify a password, of up to 18 bytes, that is specifiable under the operating system.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

Change the user name and the password to be used for repository access to a1234 and Yfd1fz3, respectively.

```
# /opt/swstorage/bin/stguseret a1234 Yfd1fz3
Password for accessing the repository has been registered.
```



Note

The following lists notes on this command.
— This command can be executed only by root users.

10.3.3 GUI connection information configuration command (stguiipset)

The Storage management server is equipped with two or more network cards. This allows multiple IP address to be associated with a single storage management server. The storage management server uses the IP address allocated in the initial AdvancedCopy manager configuration to manage the hosted storage servers in addition to using a secondary IP address which used to allow communication by a GUI client with any storage servers managed by the Storage management server. This command must be executed at the Storage Management Server.

This command has the following 2 functions.

- Display or set up the IP address for web client GUI for connection to the Storage management server
- Change the IP address for web client GUI connection of a Storage management server.

The change in IP address for GUI connection of a Storage management server is executed according to the following procedures.

1. Close the GUI client of AdvancedCopy Manager .
2. Execute GUI connection information configuration command (stguiipset).
3. Stop RMI daemons.
4. Start RMI daemons.

a. Specification method

```
# /opt/FJSVswstf/bin/stguiipset [-i IP address]
```

b. Description of options

Option	Description
None	Displays the IP address for GUI connection currently managed.
-i	The IP address for GUI connection to change is specified.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

The IP address for the present GUI connection is displayed.

```
# /opt/FJSVswstf/bin/stguiipset
IP Address = 10.10.10.10
```

The IP address for GUI connection of a Storage management server is changed into 10.12.13.14.

```
# /opt/FJSVswstf/bin/stguiipset - i 10.12.13.14
swstf2401 Renewal of the registry on a Storage management server was completed normally.
```



Note

The following lists notes on this command.

- This command can be executed only by root users.

10.3.4 Server information addition command (stgxfwcmaddsrv)

This command adds Storage server information for servers to be managed by AdvancedCopy Manager. It is necessary to execute this command on the Storage management server.

- a. Specification method

```
# /opt/FJJSVswstf/bin/stgxfwcmaddsrv [-n Server-Name] -i IP-Address -p PORT-Number
```

- b. Description of options

Option	Description
-n	Specifies the name of the storage server to be added. The name must be less than 255 bytes(*2) and a unique server name for AdvancedCopy Manager in order for it to manage the server. <ul style="list-style-type: none"> ● Non-cluster operation: Host name recognized by the operating system ● Cluster operation: AdvancedCopy Manager logical node name specified during cluster setup
-i	Specify the IP address of the Storage server to be added by IPv4 format. Specify a physical IP address if the Storage server is managed as a physical server. Specify a logical IP address if the IP address is made redundant and managed (as a logical server), like under the cluster environment.
-p	Specify the port number that is set on the Storage server side to communicate with the Storage server to be added. (Value from 1,024 to 65,535) Under the cluster environment, specify the port number that is allocated to the service name stgxfws_? (*1).

(*1) Logical node name of AdvancedCopy Manager specified during cluster setup

(*2) The usable characters are: 1-byte alphanumeric characters, minus sign (-), underscore (_), number sign (#), and period (.), with the first character being a 1-byte alphanumeric character. A 2-byte character causes an error.

- c. End status

= 0: Normal end
> 0: Abnormal end

- d. Execution example

Add a server by using host name.

```
# /opt/FJJSVswstf/bin/stgxfwcmaddsrv -i 10.10.10.10 -p 1226
stgxfwcmaddsrv completed
#
```

Add a logical server using the server name specified during cluster setup is performed. (Logical IP address: 10.10.10.20; port number allocated to stgxfws_logical-node-name: 1227)

```
# /opt/FJJSVswstf/bin/ stgxfwcmaddsrv -n Server1 -i 10.10.10.20 -p 1227
stgxfwcmaddsrv completed
#
```



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please use the location specified at the time of product installation.
- Because a Storage management server and a logical server for a Storage management server transaction are added during database setup and cluster setup, they are not added by this command.
- When processing takes a long time, a period (.) is displayed until processing is completed.



Note

This command cannot be executed when the following commands are being executed:

- Server information change command (stgxfwcmmodsrv)
- Server information deletion command (stgxfwcmdellsrv)
- Device information collection/display command (stgxfwcmsetdev)
- Device information deletion command (stgxfwcmdelev)



Note

This command cannot be executed when the following operations are being performed by using the GUI client:

- Addition of server
- Change of server
- Deletion of server
- Acquisition and display of Information on All Devices
- Acquisition and display of Information on Specific Device
- Deletion of device information

10.3.5 Server information change command (stgxfwcmmodsrv)

This command changes the following server information managed by AdvancedCopy Manager. It is necessary to execute this command on the Storage management server.

- Storage server IP address
- Storage server port number
- Server name of Storage management server
- Server name of Storage server

Also, use this when installing the tape server function on the target server later.

Alternatively, a server information change instruction file can be specified to change server information as a batch while maintaining consistency between multiple items of information for multiple servers within a management system.

The following server information can be changed:

- Storage Management server IP address
- Storage server IP address
- Storage Management server port number
- Storage server port number
- Server name of Storage Management server
- Server name of Storage server



Note

This command cannot change the following server information, because it is changed by using the management server information change command (stgcmmodnode)

- IP address of Storage management server
- Port number of Storage management server



Note

When the server information is changed by using this command, the hardware configuration information must be changed in advance. Refer to the procedure given in "Changing the operating Environment" to execute the processing.

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server-Name [-s New-Server-Name] [-i
New-IP-Address] [-p New-Port-Number] | [-f
Server-information-change-instruction-filename [-y]]
```

b. Description of options

Options	Description
-n	Specify a server name that is currently being managed.
-s	Specify a new server name within 255 bytes. The usable characters are: 1-byte alphanumeric characters, minus sign (-), underscore (_), number sign (#), and period (.), with the first character being a 1-byte alphanumeric character. A 2-byte character causes an error. Specify concurrently with the -n option.
-i	Specify the IP address of the Storage server to be added by IPv4 format. Specify a physical IP address if the Storage server is managed as a physical server. Specify a logical IP address if the IP address is made redundant and managed (as a logical server), like under the cluster environment. Specify concurrently with the -n option.
-p	Specify a port number required for postchange communication. (Value from 1024 to 65535) Under the cluster environment, specify the port number that is allocated to service name stgxfws_? (*1). For non-cluster operations, specify the port number assigned to service name stgxfws. Specify concurrently with the -n option.
-f	Specify the absolute path of the server information change instruction file. The -y option is the only option that can be specified at the same time.
-y	Specifies that processing will continue if there are multiple servers in the management system and if an error occurs at one specific server. Remove the cause of the error at the server where it occurred, then make the required change separately for this server. Specify at the same time as the -f option.

(*1) Logical node name of AdvancedCopy Manager specified during cluster setup

a. Coding method for the server information change instruction file

- In one line, enter the server name of a currently managed server, the information class to be changed, and the new value, delimited by spaces or tabs.
- The information classes to be changed are as follows:
S: Server name
I: IP address
P: Port number
- If multiple information classes, such as the IP address and the port number, need to be changed for the same server, enter the IP address change specification and the port number change specification on separate lines.

[Coding example]

```
Manager    I  10.10.20.10
Server1    I  10.10.20.20
Server1    P  9888
Server2    S  DstServer
```

c. End status

= 0: Normal end

> 0: Abnormal end

d. Execution example

The IP address of a Storage server (server name: Server1) is changed to 10.20.30.40.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server1 -i 10.20.30.40
stgxfwcmmodsrv completed
#
```

The server name of a Storage server (server name: Server1) is changed to Agent5.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server1 -s Agent5
stgxfwcmmodsrv completed
#
```

A server information change instruction file is specified to change server information as a batch.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -f /acm/modfile
stgxfwcmmodsrv completed
#
```

A server information change instruction file is specified to change server information as a batch even if an error occurs at a specific server.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -f /acm/modfile - y

swstf2459 Resource adjustment command terminated abnormally. Server name=[Server1]
swsrp0625 This command cannot be executed because execution of other AdvancedCopy
Manager commands is in progress.

stgxfwcmmodsrv completed, excluding the server where the error occurs
#
```



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please use in the location specified at the time of product installation.



Note

The following notes apply to changing the Storage Management server information (except when the `-f` option is specified):

- Use the management server information change command (`stgcmmodnode`) to change the IP address and port number, then restart the various AdvancedCopy Manager daemons.
- After Storage Management server information is changed, execute the management server information change command (`stgcmmodnode`) at the managed servers to set the changed Storage Management server information.



Note

The following notes apply to changing Storage server information:

- Stop the various AdvancedCopy Manager daemons before changing the IP address. Then, change the IP address in the software that provides the system or logical IP address and restart the AdvancedCopy Manager daemons.
- Stop the various AdvancedCopy Manager daemons before changing the port number. Then, change the port number in the system and restart the AdvancedCopy Manager daemons.



Note

The following notes apply when the `-f` option is specified:

- The server name or IP address that is to be changed cannot be in use by another server that is currently managed.
- The Storage Management server that executes this command and the AdvancedCopy Manager services and Storage server transactions at all Storage servers managed by Storage Management server transactions must be running.
- Backup management commands and replication management commands must not be executed on any Storage servers managed by the Storage Management server that executes this command and the Storage Management server transactions, as the commands may terminate abnormally.
- If the server information change command terminates abnormally, perform recovery as indicated in the error message.
- The backup management or replication management commands may terminate abnormally if they are running, or are accidentally executed, during execution of the server information change command. If this occurs, re-execute the backup management or replication management commands after normal termination of the server information change command.



Note

The following notes apply when the `-y` option is specified:

- If this option is specified, processing will be forcibly continued if a communication or other error occurs for some servers. Therefore, data integrity and reliability of the overall system cannot be maintained. This option is not usually specified and should only be used when absolutely necessary due to problems at some servers.
- Take the action indicated in the error message displayed for the affected server. Prompt action to remedy the error is required as normal operations can not be resumed until appropriate action is taken.



Note

This command cannot be executed when the following commands are being executed:

- Server information addition command (stgfwcmaddsrv)
- Server information deletion command (stgxfwcmdelsrv)
- Device information collection/display command (stgxfwcmsetdev)
- Device information deletion command (stgxfwcmdeldev)



Note

This command cannot be executed when the following operations are being performed in the initial window by using the Web client screen:

- Addition of server
- Change of server
- Deletion of server
- Acquisition and display of Information on All Devices
- Acquisition and display of Information on Specific Device
- Deletion of device information

10.3.6 Server information deletion command (stgxfwcmdelsrv)

This command deletes the Storage server information that AdvancedCopy Manager is currently managing. It is necessary to execute this command on the Storage management server.

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmdelsrv -n Server-Name
```

b. Description of options

Options	Description
-n	Specify the Storage server name to be deleted.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

A Storage server's (server name: Server1) information is deleted.

```
# /opt/FJSVswstf/bin/stgxfwcmdelsrv -n Server1
stgxfwcmdelsrv completed
#
```



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please use the location specified at the time of installation.
- The Storage management server information cannot be deleted.
- When processing takes a long time, a period (.) is displayed until processing is completed.



Note

This command cannot be executed when the following commands are being executed:

- Server information addition command (stgxfwcmaddsrv)
- Server information change command (stgxfwcmmodsrv)
- Device information collection/display command (stgxfwcmsetdev)
- Device information deletion command (stgxfwcmdelev)



Note

This command cannot be executed when the following operations are being performed by using the GUI client:

- Addition of server
- Change of server
- Deletion of server
- Acquisition and Reflection of Information on All Devices
- Acquisition and Reflection of Information on Specific Device
- Deletion of device information

10.3.7 Device information collection/display command (stgxfwcmsetdev)

This command collects the latest device information detected by the server and displays a comparison of the difference with information managed by AdvancedCopy Manager. It can also be used to compare any differences for specified devices with saved AdvancedCopy Manager management information. This command must be executed on the Storage management server.

The device information currently saved in AdvancedCopy Manager and the device information detected are compared, stored, deleted, and updated, and may be used in the following instances:

- When AdvancedCopy Manager is started
- When device information being managed by AdvancedCopy Manager is changed

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmsetdev -n Server-name [-d Device-Name] [-f File-Name | -y ]
```

b. Description of options

Options	Description
-n	Specify the server name whose device information is to be collected or reflected.
-d	Specify the device name whose information is to be collected or reflected. If this specification is omitted, all devices of the specified server are assumed to be specified.
-f	Use the absolute path to specify the file name to which the difference between the device information managed currently and the device information collected is output. The device difference information is only output to the file, no display is provided. This option cannot be specified with the -y option.
-y	The difference between the device information managed by AdvancedCopy Manager and the latest device information detected is displayed as is in the management information with no comment about that difference. This option cannot be specified with the -f option.

c. End status

- = 0: Normal end
- > 0: Abnormal end

- d. Execution example
The information for each device of a server (server name: Server1) is collected or reflected.

```
# /opt/FJSVswstf/bin/stgxfwcmsetdev -n Server1
>Device detected
  1:/dev/sdf0
  2:/dev/sdf1
  3:/dev/sdf2
  4:/dev/sdf6 (/storage-2)
>Specify device to be added. [* or ?-? or ?,? or q]
2,4

>Device not detected
  1:/dev/sdm0 (/aaa)
  2:/dev/sdml

>Specify a device requested to be deleted. [* or ?-? or ?,? or q]
*
>Information of the following device has changed. The information will be changed.
  1:/dev/sdf4
>Do you want to continue the processing? [y or n] y
stgxfwcmsetdev completed
#
```

The information for a specific device (device name: /dev/sdl0) managed by the server (server name: Server1) is collected or reflected.

```
# /opt/FJSVswstf/bin/stgxfwcmsetdev -n Server1 -d /dev/sdl0
> The following device information has been changed. This information is updated.
  1:/dev/sdl0 (/zzz)
> Do you want to continue the processing? [y or n] y
stgxfwcmsetdev completed
#
```



Point

The following message is displayed if the number of devices either detected or not detected is high:

```
“- hit Enter for more or s to select - “
```

Press the Enter key to continue to display more devices.

To interrupt the display and request either an addition or a deletion, press the “s” key.



Point

Use the following operand syntax to request addition or deletion:

- Enter “*” to specify all.
- A range may be specified using integer values separated with a hyphen (Example: 1-3).
- A comma may be used to specify an enumeration. (Example: 2, 4)
- A combination of range and enumeration specifications can be used. (Example: 1-3, 5)
- Entering nothing is permissible.
- Use the option “q” to stop the process.



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please use the location specified at the time of product installation.
- Obtaining disk information for HP-UX servers with GPT disks using AdvancedCopy Manager is not possible
- When processing takes a long time, a period (.) is displayed until processing is completed.



Note

The following message may be displayed when attempting to add a specified device. It is indicating that you are attempting to register a device in the GR cabinet which may have invalid settings. Ensure that any such settings are correct before continuing the process. This message is also displayed when the “-y” option is specified.

```
>The setting of license or the table size is not done, or the table size is insufficient,
to the cabinet where the partition that makes up the following device exists.
>Continue? [y or n]
```



Note

The following message may be displayed when a device requested to be added is specified. In this case, check the following before continuing the processing: whether the device is to be subjected to duplicated registration when two or more logical servers running on the same physical server are managed. This message is also displayed when the -y option is specified.

```
> The partitions that comprise the following device are already managed.
> Do you want to continue the processing? [y or n]
```



Note

The amount of time required to process this command is proportional to the total number of devices defined on the specified server when the device information is collected. When there are a large number of devices, execute the command while CPU and I/O loads are low. As a guide, it takes about 0.5 second for one device (partition) in a no load state.



Note

This command cannot be executed when the following commands are being executed:

- Server information addition command (stgxfwcmaddsrv)
- Server information change command (stgxfwcmmodsrv)
- Server information deletion command (stgxfwcmdelsrv)
- Device information deletion command (stgxfwcmdeldev)



Note

This command cannot be executed when the following operations are being performed by using the GUI client:

- Addition of server
- Change of server
- Deletion of server
- Acquisition and Display of Information on All Devices
- Acquisition and Display of Information on Specific Device

- Deletion of device information

10.3.8 Device information deletion command (stgxfwcmdeldev)

This command deletes the device information currently being managed by AdvancedCopy Manager. This command must be executed on a Storage management server.

The device information collection/display command (stgxfwcmsetdev) compares the device information currently being managed and the device information detected before it executes the processing. However, this command deletes the device information irrespective of whether the device information currently being managed is detected.

- a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmdeldev -n Server-Name -d Device-Name
```

- b. Description of options

Options	Description
-n	Specify the server name that is managing the device to be deleted.
-d	Specify the device name to be deleted.

- c. End status

= 0: Normal end

> 0: Abnormal end

- d. Execution example

The device (/dev/sdn7) information for a Storage server (server name: Server1) is deleted.

```
# /opt/FJSVswstf/bin/stgxfwcmdeldev -n Server1 -d /dev/sdn7
stgxfwcmdeldev completed
#
```



Note

The following provides notes on this command:

- The following provides notes on this command:
- Please perform in the locale specified at the time of product installation.
- When processing takes a long time, a period (.) is displayed until processing is completed.



Note

This command cannot be executed when the following commands are being executed:

- Server information addition command (stgxfwcmaddsrv)
- Server information change command (stgxfwcmmodsrv)
- Server information deletion command (stgxfwcmdelsrv)
- Device information collection/display command (stgxfwcmsetdev)



Note

This command cannot be executed when the following operations are being performed by using the GUI client:

- Addition of server
- Change of server
- Deletion of server
- Acquisition and Display of Information on All Devices

- Acquisition and Display of Information on Specific Device
- Deletion of device information

10.3.9 Server information display command (stgxfwcmdisprv)

This command displays the server information managed by AdvancedCopy Manager. This command must be executed on the Storage management server.

- a. Specification method

```
# /opt/FJVSWSWSTF/bin/stgxfwcmdisprv [-n Server-Name ]
```

- b. Description of options

Options	Description
-n	Specify the server name whose information is to be displayed. If this specification is omitted, the information for all servers managed by AdvancedCopy Manager is displayed.

- c. End status

= 0: Normal end
> 0: Abnormal end

- d. Execution example

The information for all servers is displayed.

```
# /opt/FJVSWSWSTF/bin/stgxfwcmdisprv
Server  Server-Type      Tape OS-Type OS-Version      Version  IP-Address
Port-Number
Manager Management-Server --   Linux  2.4.9-e.8enterp V10.0L60 10.10.10.10 1226
Server1 Server              --   Linux  2.4.9-e.8enterp V10.0L60 10.10.10.20 1226
```

The information for a Storage server (server name: Server1) is displayed.

```
# /opt/FJVSWSWSTF/bin/stgxfwcmdisprv -n Server1
Server  Server-Type Tape OS-Type OS-Version      Version  IP-Address  Port-Number
Server1 Server      --   Linux  2.4.9-e.8enterp V10.0L60 10.10.10.20 1226
```

The contents to be displayed are as follows:

Title	Description
Server	A server name is displayed.
Server-Type	A server type is displayed. "Management-server": Storage management server "Server": Storage server
Tape	"Y" indicated for a tape server.
OS-Type	An operating system type is displayed.
OS-Version	An operating system version is displayed.
Version	The version of this product is displayed.
IP-Address	The IP address for communication with the server is displayed.
Port-Number	The port number for communication with the server is displayed.



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please perform in the locale specified at the time of product installation.
- When processing takes a long time, a period (.) is displayed until processing is completed.

10.3.10 Device information display command (stgxfwcmdispdev)

This command displays device information for servers managed by AdvancedCopy Manager which includes:

- a list of the device which use the same specified device copy area
- a specified device,
- devices which exists in the same, logical group.

This command must be on the Storage management server.



Note

The command displays the information based on information registered in AdvancedCopy Manager. Therefore, when the configuration has been changed and there is a device not registered in a logical group, and it is registered afterwards, the correct information is not be displayed. In this case, re-attempt the acquisition of device information about the device not previously registered and the device which performs the "Acquisition/display of information on all devices".

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server-Name [-d Device-Name [-sm|-grp]]
```

b. Description of options

Options	Description
-n	Specify the server name that manages the device whose information is to be displayed.
-d	Specify the device name whose information is to be displayed. If this option is omitted, the information for all devices managed by the specified server is displayed.
-sm	With the -d option also specified, this option specifies that a list of the devices using the same copy area as the specified device be displayed.
-grp	The list of the device which exists in the same logical group as a specified device is displayed by specifying it simultaneously with -d option. this option - The device type of the specified device can be specified for d option only for LVM/VxVM.

c. End status

= 0: Normal end
> 0: Abnormal end

d. Execution example

The information for a device (/dev/sd10) of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/sd10
S Device      Block-Device Mount-Point File-System Device-Type Size(MB)
  /dev/sd10 /dev/sd10    /zzz          ext2          Normal      407
```

The information for each device of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1
S Device                               Block-Device           Mount-Point
File-System Device-Type Size (MB)
 /dev/sd10                             /dev/sd10             /boot                 ext2
Normal      141
 /dev/sdu0                             /dev/sdu0             ---                   ---
Normal      407
* /dev/sdu1                             /dev/sdu1             ---                   ---
Normal      407
 /dev/sdu2                             /dev/sdu2             ---                   ---
Normal      28
D /dev/sfdsk/Class2/rdsk/Vol201 /dev/sfdsk/Class2/dsk/Vol201 /ACMMnt/Vol201 ext3
SDX         304
 /dev/sfdsk/Class2/rdsk/Vol202 /dev/sfdsk/Class2/dsk/Vol202 /ACMMnt/Vol202 ext3
SDX         400
U /dev/sfdsk/Class2/rdsk/Vol203 /dev/sfdsk/Class2/dsk/Vol203 /ACMMnt/Vol203 ext3
SDX         512
 /dev/sfdsk/Class2/rdsk/Vol204 /dev/sfdsk/Class2/dsk/Vol204 /ACMMnt/Vol204 ext3
SDX         608
```

Device (/dev/vx/rdsk/dg1/vol1) of server (Server1) is displayed and device information which uses the same copy area is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/vx/rdsk/dg1/vol1 - sm
Device                               Mount-Point
/dev/vx/rdsk/dg1/vol1 /storagedata
/dev/vx/rdsk/dg1/vol2 ---
/dev/vx/rdsk/dg1/vol3 /zzz
#
```

Device information which exists in the same logical group as device (/dev/vx/rdsk/dg1/vol1) of server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/vx/rdsk/dg1/vol1 - grp
Device                               Mount-Point
/dev/vx/rdmp/clt0d0s2 ---
/dev/vx/rdmp/clt0d1s2 ---
/dev/vx/rdsk/dg1/vol1 /storagedata
/dev/vx/rdsk/dg1/vol2 ---
/dev/vx/rdsk/dg1/vol3 /zzz
/dev/vx/rdsk/dg1/vol4 ---
#
```

The following contents are displayed. Note that "SDX" or "SDX object" in the table are SynfinityDISK or PRIMECLUSTER Global Disk Services (GDS) terms.

Title	Description
S	<p>The status of each device is indicated. The following is displayed according to the device status:</p> <ul style="list-style-type: none"> *: Device not set up (The AdvancedCopy license configuration may be undefined, cache table size may be unspecified, or cache table may be too small in the cabinet containing this device.) D: Device deletion error U: Device update error

Title	Description
Device	(For Solaris server) A RAW device name is displayed. (Windows server) A device name managed internally by AdvancedCopy Manager is displayed. The name is displayed in the g?d? format and g?d?p? format. g?: Disk array number (0 if the device is not installed in the ETERNUS storage system) d?: Disk number (*1) p?: Partition number (*2) In the case of the SDX object, the name is displayed in the disk class name or mirror volume name g?d?p? format. Disk class name: Disk class name of SDX object Mirror volume name: Mirror volume name of SDX object (HP-UX server) A RAW device name or a volume group name under LVM is displayed. (Linux server) When a RAW device has been created, its name is displayed; otherwise, a block device name is displayed. (AIX server) A RAW device name or a volume group name under LVM is displayed.
Block-Device	(Solaris server) A block device name is displayed. (Windows server) The name is displayed in the disk? and disk?p? format. disk?: Disk number displayed by disk administrator p?: Partition number (*2) (HP-UX server) A block device name or a volume group name under LVM is displayed. (Linux server) A block device name is displayed. (AIX server) A block device name or a volume group name under LVM is displayed.
Mount-Point	(Solaris server, HP-UX server, AIX server and Linux server) A mount point name is displayed. (Windows server) A drive character is displayed.
File-System	A file system name is displayed.
Device-Type	A device type is displayed. Normal/SDX(slice)/LVM/VxVM/SDX(volume)
Size(MB)	The capacity (in megabytes) allocated to a device is displayed.

(*1) A number given uniquely on the disk array. This number differs from the disk number on the disk administrator.

(*2) The sequential number of a partition on the disk. The partition indicates the following contents of the disk administrator. The number is given by counting up from the left to the right on the disk administrator.

- In the case of the primary partition, the partition is that entire partition.
- In the case of the extended partition, the partition is a logical drive in that partition.



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please perform in the locale specified at the time of product installation.
- When processing takes a long time, a period (.) is displayed until processing is completed.

10.3.11 Partition information display command (stgxfwcmdisppat)

This command displays the information for the partitions that comprise a device managed by AdvancedCopy Manager. This command must be executed on the Storage management server.

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmdisppat -n Server-Name -d Device-Name
```

b. Description of options

Options	Description
-n	Specify the server name that manages a device whose information is to be displayed.
-d	Specify a device name whose information is to be displayed.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

The partition information for a device (/dev/sd10) of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdisppat -n Server1 -d /dev/sd10
Partition Identifier Physical-Disk Disk-Type LU-Number
/dev/sd10 /dev/sd10 --- GR 10
#
```

The following contents are displayed. Note that "SDX" or "SDX object" in the table are SynfinityDISK or PRIMECLUSTER Global Disk Services (GDS) terms.

Title	Description
Partition	<p>(Solaris server) A RAW device name is displayed. In the case of slice units of an SDX object, the name is displayed in the RAW device name c?t?d? format.</p> <p>(Windows server) When the device is installed in the ETERNUS storage system, the same contents as displayed for Device of the device information display command (stgxfwcmdispdev) are displayed. When the device is not installed in the ETERNUS storage system, the name is displayed in the following formats: For MBR disks: S?p? format. S?: Signature (8-digit hexadecimal number) p?: Partition number (*1) For GPT disks: G?p? format. G?: DiskId of disk (32-digit hexadecimal number) p?: Partition number (*1)</p> <p>(HP-UX server) A RAW device name or a volume group name under LVM is displayed.</p> <p>(Linux server) When a RAW device has been created, its name is displayed; otherwise, a block device name is displayed. In the case of slice units of an SDX object, it displays in either of the formats below. Refer to "PRIMECLUSTER GDS SDX objects" for details. - RAW device name: The udev device name indicated by the sdxinfor DEVNAME value - RAW device name: The sdxinfor DEVNAME value</p> <p>(AIX server) A RAW device name or a volume group name under LVM is displayed.</p>

Title	Description
Identifier	(Solaris server) A block device name is displayed. In the case of slice units of an SDX object, the name is displayed in the block device name c?t?d? format. (Windows server) A device name managed internally by AdvancedCopy Manager is displayed. The same contents as Device of the device information display command (stgxfwcmdispdev) are displayed. (HP-UX server) A block device name or a volume group name under LVM is displayed. (Linux server) A block device name is displayed. In the case of slice units of an SDX object , it displays in either of the formats below. Refer to "PRIMECLUSTER GDS SDX objects" for details. - Block device name: The udev device name indicated by the sdinfo DEVNAME value - Block device name: The sdinfo DEVNAME value (AIX server) A block device name or a volume group name under LVM is displayed.
Physical-Disk	(Solaris server, HP-UX server, Linux server, and AIX server) "----" is always displayed. (Windows server) A physical device name is displayed. The same contents as Block-Device of the device information display command (stgxfwcmdispdev) are displayed.
Disk-Type	When the device is installed in the ETERNUS storage system, "GR" is displayed. When the device is not installed in the ETERNUS storage system, "----" is displayed.
LU-Number	When the device is installed in the ETERNUS storage system, a logical unit number is displayed. When the device is not installed in the ETERNUS storage system, "----" is displayed.

(*1) The sequential number of a partition on the disk. The partition indicates the following contents of the disk administrator. The number is given by counting up from the left to the right on the disk administrator.

- In the case of the primary partition, the partition is that entire partition.
- In the case of the extended partition, the partition is a logical drive of that partition.



Note

The following provides notes on this command:

- Only the root user can execute this command.
- Please use the location specified at the time of product installation.
- When processing takes a long time, a period (.) is displayed until processing is completed.

10.3.12 Environment information display command (stgenvdisp)

This command displays values of environment configuration in AdvancedCopy Manager.



Note

- To display cluster information, execute the command from an active node (server). Executing the command from a standby node displays only partial information.
- To display cluster information while a transaction is stopped, set the shared disk containing the AdvancedCopy Manager shared data of the transaction to the online state or mount the shared disk, and then execute the command.
- When this command is executed in a cluster environment, the environment variable (SWSTGNODE) need not be set.

- Only users with root authority can execute this command.

a. Specification method

```
# /opt/FJSVswstf/bin/stgenvdisp [-n transaction-logical-node-name]
```

b. Description of options

Option	Description
-n	<p>Specifies the logical node name (logical node name specified in the cluster setup command) of the transaction.</p> <ul style="list-style-type: none"> ● In a cluster environment If this option is specified, information on only the specified transactions is displayed. Otherwise, information on all transactions is displayed. ● In a non-cluster environment This option cannot be specified. If the option is specified, then message swstf6001 is displayed and processing ends. If this option is not specified, information is displayed.

c. End status

= 0: Normal end
> 0: Abnormal end

d. Execution example

Information in a non-cluster environment is displayed.
[For the storage management server]

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type           : Management server
Manager IP address   : 10.10.10.10
Repository user      : acm
DB file              : /acmdb/dbfile
RDB dictionary       : /acmdb/rdbdic
RDB log file         : /acmdb/rdblog
Database space       : /acmdb/dbsp
Database size        : 65MB
IP address for GUI   : 10.10.10.10
Communication        : 1226
Remote access        : 9851
Exclusive control    : 9852
Authentication feature : 4660
-----
Version              : 13.3
Language             : JAPANESE
Code                 : EUC
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt
#
```

[For the storage server]

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type      : Server
Manager IP address : 10.10.10.10
Communication    : 1226
-----
Version         : 13.3
Language        : JAPANESE
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt
#
```

Information on all transactions in a cluster environment (PRIMECLUSTER) is displayed.

[For the storage management server]

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type      : Management server
Cluster system   : PRIMECLUSTER
Node type        : Primary
Node name        : nodemgr
Service name     : manager_service
Mount point      : /acmmgrdisk
Resource Type    : Procedure
IP by cluster setup : 10.10.10.10
Manager IP address : 10.10.10.10
Repository user  : acm
DB file          : /ACMMnt/Vol202/DBFile
RDB dictionary   : /ACMMnt/Vol203/DBDic
RDB log file     : /ACMMnt/Vol204/DBLog
Database space   : /ACMMnt/Vol205/DBSpa
Database size    : 65MB
IP address for GUI : 10.10.10.10
Communication    : 11000
Remote access    : 9851
Exclusive control : 9852
Authentication feature : 4660
-----
Server type      : Server
Node name        : Local-Service
Manager IP address : 10.10.10.10
Communication    : 1226
-----
Version         : 13.3
Language        : JAPANESE
Code            : EUC
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt
#
```

[For the storage server]

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type          : Server
Cluster system      : PRIMECLUSTER
Node type           : Primary
Node name           : nodeagt1
Service name        : agent_service1
Mount point         : /acmagt1disk
Resource Type       : CmdLine
Manager IP address  : 10.10.10.10
Communication       : 11000
-----
Server type          : Server
Cluster system      : PRIMECLUSTER
Node type           : Secondary
Node name           : nodeagt2
Service name        : agent_service2
Mount point         : /acmagt2disk
Manager IP address  : 10.10.10.10
Communication       : 12000
-----
Server type          : Server
Node name           : Local-Service
Manager IP address  : 10.10.10.10
Communication       : 1226
-----
Version             : 13.3
Language            : JAPANESE
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt
#
```

The contents of displayed information are described below.

Title	Description
Server type	The server type is displayed as follows: Management server: Storage management server or storage management server transaction Server: Storage server of storage server transaction
Cluster system	The type of cluster system is displayed as follows: SynfinityCluster or PRIMECLUSTER: SynfinityCluster or PRIMECLUSTER VERITAS Cluster Server: VERITAS Cluster Server SynfinityCluster: SynfinityCluster PRIMECLUSTER: PRIMECLUSTER MC/ServiceGuard: MC/ServiceGuard MSCS: MSCS or WSFC HACMP: High Availability Cluster Multi-Processing SunCLUSTER: SunCLUSTER
Node type	The node type is displayed as follows: Primary: Primary node Secondary: Secondary node
Node name	The logical node name is displayed. Local-Service indicates a local transaction.
Service name	The transaction name is displayed.
Cluster name	The cluster name is displayed.
Mount point	The mount point for AdvancedCopy Manager shared data is displayed.
Disk resource	The name of the shared disk resource used for AdvancedCopy Manager shared data is displayed.
Drive	The drive letter used for AdvancedCopy Manager shared data is displayed.
Volume group	The volume group name is displayed.

Title	Description
Network name	The name of the network for AdvancedCopy Manager is displayed.
External connection	The external connection network name is displayed.
Subnet mask	The subnet mask is displayed.
IP address resource	IP address resource information is displayed.
IP by cluster setup	The logical IP address specified in the cluster configuration command is displayed. However, note that the displayed IP is not the active logical IP address if the IP address of either the storage management server transaction or storage server transaction is changed during operation.
Manager IP address	The IP address of the storage management server is displayed. However, if no server is added, then "???" is displayed.
Repository user	The name of the user accessing the repository is displayed.
DB log file	[Windows Edition only] The name of the DB log file storage destination folder is displayed.
DB dictionary file	[Windows Edition only] The name of the DB dictionary file storage destination folder is displayed.
Repository database	[Windows Edition only] The name of the repository DB storage destination folder is displayed.
DB file	[Solaris Edition] The name of the DB file system device or directory is displayed. [Linux Edition] The DB file directory name is displayed.
RDB dictionary	[Solaris Edition] The RDB dictionary raw device name is displayed. [Linux Edition] The RDB dictionary directory name is displayed.
RDB log file	[Solaris Edition] The name of the RDB log file raw device or directory is displayed. [Linux OE Edition] The RDB log file directory name is displayed.
Database space	[Solaris Edition] The name of the raw device containing the repository data storage DB is displayed. [Linux Edition] The name of the directory containing the repository data storage DB is displayed.
Database size	[Windows Edition and Linux Edition only] The database size is displayed.
IP address for GUI	The GUI connection IP address is displayed.
Communication	The communication service/daemon port number (service name in the services file: stgxfws) is displayed. In a cluster environment, the transaction communication service/daemon port number (service name in the services file: stgxfws_logical-node-name) is displayed.
Remote access	The remote access service/daemon port number (service name in the services file: rmiswstf) is displayed.
Exclusive control	The exclusive control service/daemon port number (service name in the services file: semswstf) is displayed.
Authentication feature	The authentication feature service/daemon port number (service name in the services file: smaclmgr) is displayed.
Repository	The repository service/daemon port number (service name in the services file: rdaswstf) is displayed.
Resource Type	[Solaris and Linux only] Displays the resource type. Procedure: Procedure resource CmdLine: Command line resource

Title	Description
Network Resource	[Solaris only] Displays the name of the logical hostname resource or the name of the shared address resource.
Program install directory	Displays the program directory specified during installation.
Fixed configuration directory	Displays the environment settings directory specified during installation.
Modifying configuration directory	Displays the transactions directory specified during installation.
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type. JAPANESE: Domestic edition ENGLISH: International edition
Code	[Solaris and Linux only] Displays the encoding specified during installation.



Note

- "???" is displayed for any information that cannot be displayed because of an error.
- Some items may not be displayed depending on the server type (storage management server/storage server) or cluster type.

10. 3. 13 Management information package backup server registration/deletion command (stgmgrinfo set)

The command registers the management information package backup execution server (the server on which the management information package backup command (stgmgrinfo bkup) is executed). The command deletes the management information package backup execution server. The command displays information about the management information package backup execution server.

a. Specification method

```
program-directory%bin%stgmgrinfo set [-del | -d directory-name -c storage-management-server-encoding]
```

b. Description of options

Option	Description
None	Displays information about the management information package backup execution server.
-del	Deletes the management information package backup execution server.
-d	Specify the full path to the directory where the backup data is to be stored. Only alphanumeric characters and underscores can be used in the directory name.
-c	Specify the encoding designated when the storage management server was installed. Specify either of the following: ASCII : ASCII

c. End status

- =0: Normal end
- >0: Abnormal end

d. Execution example

Register the management information package backup execution server (the path to the directory where backup data is to be stored is D:¥stgbkupdata, and the encoding used on the storage management server is ASCII):

```
/opt/FJSVswstf/bin/stgmgrinfo set -d /stgbkupdata -c ASCII
swstf3000 The server which performs package backup of the management information on
AdvancedCopy Manager was registered.
#
```

Delete the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfo set - del
swstf3001 The server which performs package backup of the management information on
AdvancedCopy Manager was deleted. Delete a directory. Directory=/stgbkupdata
#
```

Display information about the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfo set
Directory      : /stgbkupdata
Manager code   : ASCII
#
```



Note

The following notes apply to this command:

- Only a root user or an account which belongs to the administrators group can execute this command.
- To change the backup data storage directory, first use the “-del” option to delete the current directory, then register a new backup data storage directory.
- Register only one storage server as the management information package backup execution server.
- Set the name of the logical node in the SWSTGNODE environment variable when the storage server registered as the management information package backup execution server is in a cluster system.
- Create the directory specified in the “-d” option in advance.

10.3.14 Management information package backup command (stgmgrinfobkup)

This command makes backups of the management information stored on the storage servers and storage management server.

a. Specification method

```
program-directory¥bin¥stgmgrinfobkup [-n server-name] [-t backup-type]
```

b. Description of options

Option	Description
-n	Makes backups of the management information stored on the specified server. If this option is not specified, the management information on all storage servers (including the storage management server) is backed up.
-t	Specifies the types of data that is to be backed up. Specify one of the values listed below. Do not specify more than one value in the -t option: DBData : Database RegiData : Registry MgrInfoData : Policy file for management information package backup AuthData : Authentication management list BkupData : Backup management ReplData : Replication management TapeData : Tape backup management backup If this option is not specified, backups are made as defined in the policy file. For details on the policy file, refer to the section "Preliminaries".

c. End status

=0: Normal end
>0: Abnormal end

d. Execution example

Make backups of the management information on all the storage servers as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00,
Server name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:05:00, Server name=acm02
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Make backups of the management information on storage server acm01 as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Makes backups of the registries on all of the storage servers.

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -t RegiData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00,
Server name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:05:00, Server name=acm02
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Make a backup of backup management located on storage server acm01:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01 -t BkupData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```



Note

The following notes apply to this command:

- Only a root user or an account which belongs to the administrators group can execute this command.
- Be sure to check the information (a message indicating completion or an error) displayed by this command.
- This command can be executed only on the management information package backup execution server.
- Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.
- Do not execute other AdvancedCopy Manager commands or Web GUI commands while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a Web GUI command is running.
- Do not execute this command again if it is already running.
- To save backup data to a tape or similar medium, save all files and directories under the backup data storage directory.
- Registry backups are made only when RegiData is specified in the “-t” option. A registry backup will not be made if the “-t” option is not specified.
- A backup of the policy file for management information package backup is made only when MgrInfoData is specified in the “-t” option. No backup is made when the “-t” option is not specified. Additionally, specify the name of the management information package backup execution server in the -n option.
- Backup is not possible for any management information on storage servers with Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier.

10.3.15 Management information package backup status display command (stgmgrinfodisp)

This command displays the execution status of the management information package backup command (stgmgrinfobkup).

a. Specification method

```
program-directory¥bin¥stgmgrinfodisp [-n server-name]
```

b. Description of options

Option	Description
-n	Specifies the name of the server where the backup status is to be displayed. If this option is not specified, the status of backups on the storage server for which the management information package backup command was executed is displayed.

c. End status

- =0: Normal end
- >0: Abnormal end

d. Information displayed

The types of information listed below are displayed. If no backups are made when the management information package backup command is executed or if the management information package backup command terminates with an error, no data is displayed.

Item	Description
Server	Server name
RegiData	TimeStamp for when the management information package backup command created a backup of a registry (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
DBData	TimeStamp for when the management information package backup command created a backup of the database (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
AuthData	TimeStamp for when the management information package backup command created a backup of the authentication management list (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
BkupData	TimeStamp for when the management information package backup command created a backup of the backup management (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
ReplData	TimeStamp for when the management information package backup command created a backup of replication management (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	TimeStamp for when the management information package backup command created a backup of the policy file for management information package backup (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
TapeData	TimeStamp for when a backup of tape backup management was made by package backup using the management information command (with package backup of the management information command executed) yy/mm/dd hh:mm:ss

e. Execution example

Display information about all storage servers:

```
# /opt/FJSVswstf/bin/stgmgrinfodisp
Server:      acm01
  DBData:    04/08/02 16:11:26
  AuthData:  04/08/02 16:32:00
  RegiData:  04/08/01 09:00:00
  ReplData:  04/08/02 16:32:22
Server:      acm02
  RegiData:  04/08/01 09:00:00
  BkupData:  04/08/03 16:00:00
#
```

Display information about storage server acm01:

```
# /opt/FJSVswstf/bin/stgmgrinfodisp -n acm01
Server:      acm01
  DBData:    04/08/02 16:11:26
  AuthData:  04/08/02 16:32:00
  RegiData:  04/08/01 09:00:00
  ReplData:  04/08/02 16:32:22
#
```



Note

The following notes apply to this command:

- Only a root user or an account which belongs to the administrators group can execute this command.
- This command can be executed only on the management information package backup execution server.
- Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.

10. 3. 16 SDX object management unit configuration command (stgxfwcmsetsdx)

The unit of operation of the SDX object treated with AdvancedCopy Manager (Refer to the "Units of SDX object operations") is set. Moreover, the unit of operation of a present SDX object is displayed.

a. Specification method

```
# /opt/FJSVswstf/bin/stgxfwcmsetsdx [-slice | -volume ]
```

b. Description of options

Option	Description
none	The unit of present of the SDX object management is displayed.
-slice	The unit of management of the SDX object treated with AdvancedCopy Manager is set to the unit of the slice.
-volume	The unit of management of each logical volume of the SDX object treated with AdvancedCopy Manager is set.

c. End status

- =0: Normal end
- >0: Abnormal end

d. Execution example

The unit of present of the SDX object management in non-cluster environment is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmsetsdx
Volume (SWSTGNODE=null)
```

The display form is 'Unit of management (SWSTGNODE = <configuration value>).'

- Unit of management
- Slice in case of each slice.
- Volume in case of each logical volume.

One of these values are used value-environment variable SWSTGNODE is set. The value is Null when environment variable SWSTGNODE is not set.

The unit of the SDX object of the Storage management server service (The logical node name: aserv) is set to the unit of the slice.

```
# SWSTGNODE=aserv; export SWSTGNODE
# /opt/FJSVswstf/bin/stgxfwcmsetsdx - slice
stgxfwcmsetsdx completed (SWSTGNODE=aserv)
```



Note

The following lists notes on this command.

- This command can be executed only by root users.
- When the cluster is operated, each Storage server service is set.

10.3.17 Information collection mode configuration command (stgxfwcmsetmode)

This command sets the collection mode for information collected by the server. It also displays the collection mode that is currently set.

b. Method

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -udev {on | off | disp}
or
# /opt/FJSVswstf/bin/stgxfwcmsetmode -udev_gds {on | off | disp}
```

c. Description of options

Option	Description
-udev	For ordinary devices, specifies whether to use the device generated by udev. Refer to "Ordinary devices" for details. The following values can be specified: on: The device generated by udev is used. off: The device generated by udev is not used. disp: Checks whether the the device generated by udev is to be used or not. — udev: on The device is used. — udev: off The device is not used.
-udev_gds	For PRIMECLUSTER GDS SDX objects (only when operating in slice units), specifies whether to use the device generated by udev. Refer to "PRIMECLUSTER GDS SDX objects" for details. The following values can be specified: on: The device generated by udev is used. off: The device generated by udev is not used. disp: Checks whether the device generated by udev is to be used or not. — udev: on The device is used. — udev: off The device is not used.

e. End status

=0: Normal end
>0: Abnormal end

d. Execution example

To specify that the device generated by udev is not used:

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -udev off
stgxfwcmsetmode completed (SWSTGNODE=nodemgr)
#
```

To check whether the device generated by udev is to be used or not:

```
# /opt/FJSVswstf/bin/ stgxfwcmsetmode -udev disp
udev : on (SWSTGNODE=null)
#
```



Note

The following notes apply to this command:

- If this command is used to change the set value at a time when information concerning managed devices exists, a message indicating that device information has been changed may be posted the next time device information is collected or displayed. Therefore, the backup management and replication management definition information must be deleted before the setting is changed.
- If this command is executed in an environment where udev is not installed, the command returns an error.

10.4 Replication Management Command

This section describes operations using Replication Management Commands.



Note

Only a root user can execute all the commands of replication management. When command execution is carried out by other users, a message "swsrp0601 This Command cannot be run. This is because the user is not a root user." is displayed, and the command aborts.



Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

[Table: Operating environment when executing replication management commands]

Command	Operating environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows and is in EC operation, the daemons and services of the copy destination storage server must be operating (except when the -m option or -t option is specified). For inter-server replication in EC equivalency status, the associated server must be operating (except when the -m option is specified).
swsrpchsnc	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsrpdelvol	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. For inter-server replication, the daemons and services of the storage server in communication must be operating (except when the -d option is specified).
swsrprebuffstat	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsrprebuffset	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsrpmake	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows and is engaged in intra-server replication and EC operation, the daemons and services of the storage server must be operating. For inter-server replication, the daemons and services of the storage server in communication must be operating (except when the -m option or -t option is specified).
swsrprecoverres	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows, the daemons and services of the storage server must be operating. To specify the -r option, the daemons and services of the storage management server must be operating.

Command	Operating environment of AdvancedCopy Manager
swsrprevsync	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsrpsetvol	To execute this command on a storage server, the daemons and services of the storage management server must be operating. To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. For inter-server replication, the daemons and services of the storage server in communication must be operating.
swsrpstartsync	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating. When the storage server runs on Windows, the daemons and services of the storage server must be operating. For inter-server replication, the associated server must be operating (except a case where the -m option is specified).
swsrpstat	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.
swsrpvoinfo	To execute this command on a storage management server with the -h option specified, the daemons and services of the storage management server and target storage server must be operating.



Note In cluster operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=logical-node-name
# export SWSTGNODE
```

2. Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Cluster operation commands

Command	Environment variable	Command execution node	Remarks
swsrpsetvol	Required	Cluster active server	
swsrpvoinfo	Required	Cluster active server	
swsrpdelvol	Required	Cluster active server	
swsrprebuffstat	Required	Cluster active server	
swsrprebuffset	Required	Cluster active server	
swsrpstartsync	Required	Cluster active server	
swsrpmake	Required	Cluster active server	

Command	Environment variable	Command execution node	Remarks
swsrpstat	Required	Cluster active server	
swsrpcancel	Required	Cluster active server	
swsrpchsync	Required	Cluster active server	
swsrprevsync	Required	Cluster active server	
swsrprecoverres	Required	Cluster active server	

10.4.1 Environment definition commands

This chapter describes environment definition commands for replication management.

10.4.1.1 Replication volume information configuration command (swsrpsetvol)

This command sets the replication source volume/s and replication destination volume/s that will be used in a replication operation. Execute this command to declare that the replication operation will be performed using the specified replication volumes.

a. Specification method

```
[To be executed on a storage server]
For replication on a server
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xvtoc] Original-Volume-Name
Replica-Volume-Name
For replication between servers
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] -o (ORG|REP|BOTH) [-Xvtoc]
Original-Volume-Name Replica-Volume-Name
[To be executed on a storage management server]
For replication on a server
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] [-Xgroup Group-Name] [-Xvtoc]
Original-Volume-Name Replica-Volume-Name
For replication between servers
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup
Group-Name] [-Xvtoc] Original-Volume-Name Replica-Volume-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a storage server on which the replication will occur. This option is valid only on a storage management server. If this option is omitted, the storage server on which the command is entered will be the target of the processing.
-u	Specifies the direction of copying. If this option is specified, copying from a replication source volume to a replication destination volume is performed only in this direction. Copying from a replication destination volume to a replication source volume is prohibited. If this option is omitted, copying between the replication source and replication destination volumes interactively is bidirectional.

Option	Description
-o	<p>Specifies the operation server.</p> <p>Specify one of the following for this operand:</p> <p>ORG: Sets the replication source server as the operation server.</p> <p>REP: Sets the replication destination server as the operation server.</p> <p>BOTH: Sets both the copy-source server and copy-destination server as operation servers.</p> <ul style="list-style-type: none"> ● On the server that is not specified as the operation server, only the following commands can be executed for a replication volume: ● Replication volume information display command (swsrpvoinfo) ● Operation status display command (swsrpstat) ● Replication cancellation command (swsrpcancel) (The forcible stop option is required.) <p>Specifying BOTH in the operand enables the execution of all commands on both the copy-source server and copy-destination server. Note that the BOTH option is usable when the versions of both servers are 11.0/V11.0L10 or later.</p> <p>This option is valid only for replication between servers.</p>
-n	<p>If this option is omitted, replication volume information cannot be set when the sizes of the replication source volume and replication destination volume are different.</p> <p>When this option is specified, the sizes of the replication source volume and replication destination volume are not checked. Use this option when volume sizes are different (for example, for replication between different OSs).</p> <p>When the volume sizes of the replication source volume and replication destination volume are different, copying is performed as follows:</p> <p>The address at which copying starts is the first sector of the replication destination volume.</p> <p>The copy data size is the size of the smaller volume.</p> <p>Therefore, make the copy destination volume size the same or larger than the copy source volume size.</p> <p>This option cannot be used for SDX object logical volumes (GDS Snapshot function linkage function).</p>
-Xgroup	<p>Specifies that the copy source and copy destination volumes be registered in a group.</p> <p>If the specified group does not exist, a new group is created. Otherwise, the specified copy source and copy destination volumes are added to an existing group.</p> <p>The characters that can be used for the group name are single-byte alphanumeric characters, the minus sign (-), underscore (_), hash sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.</p>
-Xvtoc	<p>If this option is not specified, Solaris slices that include VTOC cannot be set as replication source volumes or replication destination volumes.</p> <p>Specification of this option avoids checking to see whether or not replication source and replication destination volumes include VTOC.</p> <p>This option is specified for the following replication source and replication destination volumes:</p> <ul style="list-style-type: none"> ● Under Solaris, VTOC-labeled disk slices that contain VTOC ● Under Solaris, a VTOC-labeled disk second slice that indicates the entire disk <p>This option is ignored if it is set for volumes other than the above.</p>

c. Description of operands

Operand	Description
Original-Volume-Name	Specifies a replication source volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."
Replica-Volume-Name	Specifies a replication destination volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Set replication volume information by specifying volume/dev/sdb3 of storage server SRC-SV as the replication source volume and volume /dev/sdb3 of storage server TARG-SV as the replication destination volume. In addition, specify one-way copying for the copy direction and specify the replication source server (SRC-SV) as the operation server. The example below shows the command executed on SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/sdb3 /dev/sdb3@TARG-SV
swsrpsetvol completed
#
```

When the same settings are made from TARG-SV, the example is as follows (be careful with the volume name):

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/sdb3@SRC-SV /dev/sdb3
swsrpsetvol completed
#
```



Note

Replication volume information cannot be set if:

- Replication volume information has already been set.
- The specified replication source volume and replication destination volume are set as the replication destination volume and the replication source volume.
- The n option is not specified when the sizes of the replication source volume and the replication destination volume are different.
- Two volumes that have the same cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) as the cabinet information of the specified two volumes have already been set as replication volumes.
- The replication destination volume has been registered as a backup volume of the backup management function.
- The replication source volume has been registered as a backup volume of the backup management function and bi-directional copying is specified as a replication volume attribute.
- The specified replication destination volume and replication source volume are volumes belonging to other servers (at least one volume must be a volume on the local server).
- If the replication source volume and the replication destination volume are located on another disk array device, the remote copy function of the disk array device is not correctly set.
- Communication with the storage management server fails.
- Communication with a destination server fails for replication between servers.



Note

When the physical information on volumes (case information on partition size, a drive character, and disk array equipment) is changed using functions such as ETERNUEmgr, GRmgr, or GDS which OS management tools (fdisk command etc.) and disk array equipment offer, it is necessary to re-configure the duplicate volume information associated with the changed volume, according to the following procedures:

1. Delete the replication volume information by the replication volume information deletion command (swsrpdelvol).
2. In a GUI client, "information acquisition / reflection" of all devices are performed. Or device information collection / reflection command (stgxfwcmsetdev) is executed in a Storage management server.
3. Reset the replication volume information by the replication volume information configuration command (swsrpsetvol).



Note

When you use a replication destination volume by mounting or by allocating a drive letter after creating a replication, the size of the replication destination volume must exactly match the size of the replication destination volume to the byte. If you do not use a replication destination volume (for example, when you need copy data, you restore it to the replication source volume and then use it), the size of the replication destination volume can be larger than the size of the replication source volume.



Note

Group configurations cannot be made in the following cases:

- When the group configuration conditions are not met
- When both servers involved in inter-server replication are not running version 13.0 or later



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (replication management)."



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Synchronous processing start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Replication cancellation command (swsrpcancel)
- Synchronization node change command (swsrpchsyc)
- Synchronization reverse command (swsrprevsync)
- Resource adjustment command (swsrprecoverres)

10.4.1.2 Replication volume information display command (swsrpvoinfo)

This command displays the replication volume information registered by the replication volume configuration command (swsrpsetvol).

a. Specification method

```

[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrpvoinfo [-L] [Original-Volume-Name]
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrpvoinfo -h Server-Name [-L] [Original-Volume-Name]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option is valid only on a storage management server.
-L	Specifies that information be displayed using the extended format. Refer to the table in the execution example for information about the items that are displayed when this option is specified. The items that are displayed when this option is specified may be expanded to support new functions provided by future versions.

c. Description of operands

Operand	Description
Original-Volume-Name	Specifies a replication source volume name. For the volume names of other servers, use the format "volume-name@storage-server-name." Displays all the replication volume information for the specified replication source volume. If this operand is omitted, all the replication volume information existing on the storage server on which this command is executed is displayed.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Direct that all the replication volume information on a storage management server be displayed on storage server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpvoinfo -h SRC-SV
Server Original-Volume Size Replica-Volume Size Copy
Op-Server
SRC-SV /dev/sdb3@SRC-SV 4.0Gbyte /dev/sdb3@TARG-SV 4.0Gbyte uni-direction
original
SRC-SV /dev/sdc3@SRC-SV 4.0Gbyte /dev/sdc3@TARG-SV 5.0Gbyte bi-direction
original
SRC-SV /dev/sdd3@SRC-SV 9.1Gbyte /dev/sdd3@TARG-SV 9.1Gbyte bi-direction
replica
SRC-SV /dev/sde3@SRC-SV 7.5Gbyte /dev/sde3@TARG-SV 7.5Gbyte bi-direction both
#
```

The following information will be displayed.

Title	Description
Server	Displays a storage server name.
Original-Volume	Displays a replication source volume name.
Size	Displays the volume size.
Replica-Volume	Displays a replication destination volume name.
Copy	Displays the copying direction. uni-directional: One-way copying from a replication source volume to a replication destination volume is allowed. bi-directional: Bidirectional copying is allowed.
Op-Server	Displays the operation server of a pair of replication volumes. original: The replication source server is the operation server. replica: The replication destination server is the operation server. both: Sets both the copy-source server and copy-destination server as operation servers.



Note

Replication volume information cannot be displayed if:

- The specified volume is not set as a replication source volume



Note

This command cannot be executed while the following command is running:

- Resource adjustment command (swsrprecoverres)

10.4.1.3 Replication volume information deletion command (swsrpdelvol)

Delete the replication volume information that has been set.

If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrpdelvol -h Server-Name [-e] [-d] Original-Volume-Name
Replica-Volume-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option is valid only on a storage management server.
-e	Emergency operation mode is available for operations. Specifies deleting replica volume information, without checking the execution state of an advanced copy. Use this option, only when it is clear that the advanced copy is not executed. Deletes replication volume information without confirming the release of the master-proxy relationship of an SDX object when the function in linkage with GDS Snapshot is used.
-d	Specifies that no communication take place between the linked servers in replication between servers. When this option is specified, replication volume information is deleted without communication taking place between the linked servers. Use the option only when recovery of one of the linked servers cannot be expected. The option is valid only for replication between servers. The option can be used on the server not specified as the operation server.

c. Description of Operand

Operand	Description
Original-Volu me-Name	Specifies a replication source volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."
Replica-Volum e-Name	Specifies a replication destination volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."

d. End status

```
= 0: Normal end
> 0: Abnormal end
```

e. Execution example

Delete replication volume information on storage server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpdelvol /dev/sdb3 /dev/sdb3@TARG-SV
swsrpdelvol completed
#
```



Note

Replication volume information cannot be deleted if:

- The specified replication source volume and the replication destination volume are not set as replication volumes.
- The copy processing (synchronization processing and snapshot processing) is performed between replication volumes.
- For server-to-server replication, the storage server that executed the command is not the operation server of the replication volume.
- Communication with a storage management server fails.
- For server-to-server replication, communication with a destination server fails.
- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr, GRmgr, or GDS must be used to cancel these sessions.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (replication management)."



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Synchronous processing start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Replication cancellation command (swsrpcancel)
- Synchronization node change command (swsrpchsinc)
- Synchronization reverse command (swsrprevsync)
- Resource adjustment command (swsrprecoverres)

10.4.1.4 REC transfer buffer information display command (swsrprecbuffstat)

Displays information for the transfer buffer used by ETERNUS when REC is performed in Consistency mode.

a. Specification method

```
[To be executed on a storage server]
swsrprecbuffstat [-Xaltpath] Volume-Name
[To be executed on a storage management server]
swsrprecbuffstat -h Server [-Xaltpath] Volume-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a storage server. You can use this option only for a storage management server.
-Xaltpath	When replication volume is applying per logic volume by the SDX object, an alternative path is specified as an operand in the form of the following. /dev/sfdsk/(class name)/dsk/(volume name):(DEVNAM value for sdinfo) or /dev/sfdsk/(class name)/dsk/(volume name):(by-id name of DEVNAM value for sdinfo) or /dev/sfdsk/(class name)/dsk/(volume name):(by-path name of DEVNAM value for sdinfo)

c. Description of operands

Operand	Description
Volume-Name	Specifies the name of a volume that has been registered as a replication volume. You can only specify volumes that are connected to the Storage server where the command is executed. When replication volume is applying per logic volume by the SDX object, it is necessary to use the -Xaltpath option and to specify an alternative path.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Display information for the transfer buffer used by the REC, where the copy source volume is /dev/sda1@Server1 and the copy destination volume is /dev/sdb1@Server1, and replication is performed within the storage server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sda1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12%BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sdb1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Display information for the transfer buffer used by the REC in an environment where replication is being performed between storage server "Server1" and storage server "Server2". Additionally, the copy source volume is /dev/sda1@Server1 and the copy destination volume is /dev/sdk1@Server2:

```
[Command executed on storage server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sda1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12%BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0%BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#

[Command executed on storage server "Server2"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sdk1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2 SEND 5% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Display information for the transfer buffer used by the REC if a cabinet where the copy source volume /dev/sda1@Server1 resides has been configured to make remote copies to multiple cabinets, and replication is being performed between storage server "Server1" and storage server "Server2":

```
[Command executed on storage server "Server1"]
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/sda1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2 RECV 0% BBBBXXXXXXXXXXXXXXXXXXXXXXXXXXXX
3 SEND 4% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
4 RECV 0% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
5 SEND 10% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
6 RECV 0% EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
7 SEND 3% FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
8 SEND 5% GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
#
```

Display information for the transfer buffer used by the REC, where the copy source volume is /dev/sfdsk/class1/dsk/volume1@Server1 and the copy destination volume is /dev/sfdsk/class2/dsk/volume1@Server2, and replication is being performed between storage server "Server1" and storage server "Server2":
(The SDX object is in a two-cabinet mirror configuration.)

```
[Command executed on storage server "Server1"]
# /opt/FJSVswsrp/bin/swsrprebuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sda1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBXXXXXXXXXXXXXXXXXXXXXXXXXXXX
2 RECV 0% BBBBXXXXXXXXXXXXXXXXXXXXXXXXXXXX
# /opt/FJSVswsrp/bin/swsrprebuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdb1
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use Rate RemoteBoxID
1 SEND 11% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
2 RECV 0% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
#

[Command executed on storage server "Server2"]
# /opt/FJSVswsrp/bin/swsrprebuffstat -Xaltpath /dev/sfdsk/class2/dsk/volume1:sdk1
BoxID = BBBBXXXXXXXXXXXXXXXXXXXXXXXXXXXX
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2 SEND 4% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprebuffstat -Xaltpath /dev/sfdsk/class2/dsk/volume1:sd11
BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use Rate RemoteBoxID
1 RECV 0% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
2 SEND 5% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
#
```

The following information will be displayed.

Title	Description
BoxID	The box identifier for the cabinet connected to the server where the command was executed.
ID	The ID for the transfer buffer.
Use	The attribute (usage) for the transfer buffer.

Title	Description
	SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data
Rate	The usage rate of the transfer buffer as a percentage. If the usage is SEND: Displays the usage rate of the transfer buffer as a percentage. This will never be 0%, even if REC is not being performed in asynchronous Consistency mode. If the usage is RECV : "0%" will always be displayed. "----" will be displayed if the transfer buffer cannot be used.
RemoteBoxID	The box identifier for the cabinet performing a remote copy.



Point

The device name on a cabinet to display information can be specified as `-Xaltpath`.



Note

Information is displayed only for cabinets that contain replication volumes for the server where the command was executed.

If inter-cabinet replication is being performed between servers, then the command must be executed on both servers involved in the replication in order to check information for the transfer buffers in both cabinets.



Note

It will take a short period for changes to REC transfer buffer settings to take effect, during which time the buffer may become unusable (the "Rate" field will be displayed as "----"). In this case, wait about one minute and then execute the command again.



Note

This command cannot be executed while the following command is running:
Resource adjustment command (`swsrprecoverres`)

10.4.1.5 REC transfer buffer configuration change command (`swsrprebuffset`)

This function changes the settings for the transfer buffer used by ETERNUS when REC is performed in Consistency mode.

Refer to "ETERNUSmgr User's Guide Setup / Maintenance" about the configuration method of REC transfer buffer.

a. Specification method

```
[To be executed on a storage server]
swsrprebuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} [-Xaltpath] Volume-Name
[To be executed on a storage management server]
swsrprebuffset -h Server -Xbuffid buffer-id -Xbuffuse {SEND|RECV} [-Xaltpath]
Volume-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a storage server. You can use this option only for a storage management server.
-Xbuffid	Specifies the ID for the transfer buffer.
-Xbuffuse	Specifies the usage for the transfer buffer. SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data

Option	Description
-Xaltpath	When replication volume is applying per logic volume by the SDX object, an alternative path is specified as an operand in the form of the following. /dev/sfdsk/(class name)/dsk/(volume name):(DEVNAM value for sdxinfo) or /dev/sfdsk/(class name)/dsk/(volume name):(<i>by-id name of DEVNAM value for sdxinfo</i>) or /dev/sfdsk/(class name)/dsk/(volume name):(<i>by-path name of DEVNAM value for sdxinfo</i>)

c. Description of operands

Operand	Description
Volume-Name	Specifies the name of a volume that has been registered as a replication volume. You can only specify volumes that are connected to the Storage server where the command is executed. When replication volume is applying per logic volume by the SDX object, it is necessary to use the -Xaltpath option and to specify an alternative path.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Change the attributes for the transfer buffer used by the REC where the copy source volume is /dev/sdb1@Server1 and the copy destination volume is /dev/sda1@Server1, and replication is being performed within the storage server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/sda1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 1 -Xbuffuse RECV /dev/sda1@Server1
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/sda1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/sdb1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 1 -Xbuffuse SEND /dev/sdb1@Server1
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/sdb1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 SEND 3% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Change the attribute for the transfer buffer where the copy source volume is /dev/sdal@Server1, and replication is being performed between storage server "Server1" and storage server "Server2".

```
[Command executed on storage server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sdal@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND /dev/sdb1@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 2 -Xbuffuse RECV /dev/sdb1@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/sdb1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 4%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```

Change the attributes for the transfer buffer used by the REC where the copy source volume is /dev/sfdsk/class1/dsk/volume1@Server1 and the copy destination volume is /dev/sfdsk/class2/dsk/volume1@Server2, and replication is being performed between storage server "Server1" and storage server "Server2":
(The SDX object is in a two-cabinet mirror configuration.)

```
[Command executed on storage server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdal
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdb1
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use Rate RemoteBoxID
1 SEND 11% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV -Xaltpath
/dev/sfdsk/class1/dsk/volume1:sdal
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV -Xaltpath
/dev/sfdsk/class1/dsk/volume1:sdb1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdal
/dev/sfdsk/class1/dsk/volume1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdb1
/dev/sfdsk/class1/dsk/volume1@Server1
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use Rate RemoteBoxID
1 RECV 0%  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

[Command executed on storage server "Server2"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sd1
/dev/sfdsk/class2/dsk/volume1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class2/dsk/volume1:sd11
/dev/sfdsk/class2/dsk/volume1@Server2
```

```

BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use Rate RemoteBoxID
1 RECV 0% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 1 -Xbuffuse SEND -Xaltpath
/dev/sfdsk/class1/dsk/volume1:sdk1 /dev/sfdsk/class2/dsk/volume1@Server2
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 1 -Xbuffuse SEND -Xaltpath
/dev/sfdsk/class2/dsk/volume1:sd11 /dev/sfdsk/class2/dsk/volume1@Server2
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class1/dsk/volume1:sdk1
/dev/sfdsk/class2/dsk/volume1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 SEND 1% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath /dev/sfdsk/class2/dsk/volume1:sd11
/dev/sfdsk/class2/dsk/volume1@Server2
BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use Rate RemoteBoxID
1 SEND 1% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
#

```



Point

The device name for which information is to be displayed can be specified as -Xaltpath.



Note

Configurations for dedicated REC buffers must be made in advance. Change configurations while there are no asynchronous Consistency mode sessions in either the ACTIVE or ERROR SUSPEND state. It will take a short period for changes to buffer settings to take effect, during which time the transfer buffer will become unusable. Do not perform REC operations during this time.



Note

- This command cannot be executed while any of the following commands are running:
- Replication volume information configuration command (swsrpsetvol)
 - Replication volume information deletion command (swsrpdelvol)
 - Synchronous processing start command (swsrpstartsync)
 - Replication creation command (swsrpmake)
 - Operation status display command (swsrpstat)
 - Replication cancellation command (swsrpcancel)
 - Synchronization mode change command (swsrpchsinc)
 - Synchronization reverse command (swsrprevsync)
 - Resource adjustment command (swsrprecoverres)

10.4.2 Operation commands

This chapter describes operation commands for replication management.

10.4.2.1 Synchronous processing start command (swsrpstartsync)

Start the synchronous type replication processing (copying between disks by EC and REC). Copy all the specified replication destination and replication source volumes (start of the synchronization processing), or copy (restart of the synchronization processing) updated data (difference). Use this command at the start of operation or when you want to reflect updated data (difference) from the equivalency maintenance state.

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrpstartsync [ [ -y [ -a | -v ] | -k | -i ] [-g] [-m] [ -Xskip |
-Xremain ] | -Xgds-softcopy | -Xgds-selectcopy ] [-t] [-Xgds-slice-skipchk]
From-Volume-Name To-Volume-Name
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrpstartsync -h Server-Name [ [ -y [ -a | -v ] | -k | -i ] [-g]
[-m] [ -Xskip | -Xremain ] | -Xgds-softcopy | -Xgds-selectcopy ] [-t]
[-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[if executed on a storage server: group specification]
/opt/FJSVswsrp/bin/swsrpstartsync [-y [-a | -v] | -k | -i] [-g] [-m] [-Xskip | -Xremain]
[-t] [-Xgds-slice-skipchk] [-Xreverse] -Xgroup Group-Name
[if executed on a storage management server: group specification]
/opt/FJSVswsrp/bin/swsrpstartsync -h Server-Name [-y [-a | -v] | -k | -i] [-g] [-m]
[-Xskip | -Xremain] [-t] [-Xgds-slice-skipchk] [-Xreverse] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	This option is valid only on a storage management server. This option can be specified only on a storage management server.
-y	Specifies synchronization in synchronous write mode. This option is valid only when total copy is started for inter-box replication. Not specifying the -y, -k, and -i option sets asynchronous write mode. Synchronization in intra-box replication is always handled in synchronous write mode.
-a	Specifies the start of split mode for inter-box synchronization in Automatic Split mode. This option is valid only when total copy is started for inter-box replication. Specify this option together with the -y option. Specifying the -y option without the -a option or -v option sets Automatic Split mode.
-v	Specifies the start of split mode for inter-box synchronization in Manual Split mode. This option is valid only when total copy is started for inter-box replication. Specify this option together with the -y option. Specifying the -y option without the -a option or -v option sets Automatic Split mode. You must specify this option when specifying synchronization mode (-y option) on a box that does not support Automatic Split mode.
-k	Specifies the setting of transfer mode for inter-box synchronization in Stack mode. This option is valid only when total copy is started for inter-box replication. Not specifying the -y, -k, or -i option sets asynchronous write mode. You cannot use this option when operating SDX objects in units of logical volumes.
-i	Specifies the setting of transfer mode for inter-box synchronization in Consistency mode. This option is valid only when total copy is started for inter-box replication. Not specifying the -y, -k, or -i option sets asynchronous write mode.
-g	Specifies the setting of recovery mode for inter-box synchronization in Manual Recovery mode. This option is valid only when total copy is started for inter-box replication. Not specifying this option sets Automatic Recovery mode.
-m	For server-to-server replication, this specifies that communication processing with non-operation servers is not performed. When this option is specified, volume status check processing and the pre-processing for the replication destination volume of a non-operation server are not performed. This option is valid only during server-to-server replication.

Option	Description
-t	Specifies that pre-processing for the replication destination volume is not performed. Use this option if any of the following conditions apply: <ul style="list-style-type: none"> ● AdvancedCopy Manager does not perform pre-processing or post-processing for the replication destination volume, and independent pre-processes and post-processes are inserted before and after AdvancedCopy Manager commands. ● Replication destination pre-processing and post-processing are judged to be unnecessary (for example, for databases constructed on RAW devices). ● Synchronous processing (REC) between cabinets is restarted after a forcible suspend.
-Xgds-softcopy	Specifies the start of synchronous processing of an SDX object and use of the software-copy function instead of the advanced copy function. If you specify this option to start differential copying when the advanced copy function is being used, the advanced copy processing stops and software-copy processing starts. You can specify the option when the function is used with GDS Snapshot is being used. The option is applicable only to SDX objects. The option cannot be specified together with -y or -Xgds-selectcopy.
-Xgds-selectcopy	Specifies the start of synchronous processing without a specified copy type, such as copying with the disk array unit (OPC/EC) or software-copy. GDS selects the type of copying to be started. You can specify the option when the function in linkage with GDS Snapshot is being used. The option is applicable only to SDX objects. The option cannot be specified together with -Xgds-softcopy.
-Xgroup	Specifies that synchronous processing be started for each group.
-Xreverse	Specifies that synchronous processing be started for each group in the reverse direction (from replica volumes to original volumes).
-Xskip	Specifies that synchronous processing be suspended using the initial copy skip function. This option is valid only when total copy is started for inter-box replication. This option is not supported when GDS Snapshot linkage is being used.
-Xremain	Enables data that has been updated to the copy destination during replication established status when synchronous processing is restarted. This option is valid only when inter-box replication is restarted. This option is used to reflect to the copy destination volume only those parts of the copy source volume that have been updated, after synchronous processing has been started by specifying the - Xskip option and backup data has been copied from the tape medium to the copy destination volume. This option is not supported when GDS Snapshot linkage is being used.
-Xgds-slice -skipchk	Skips the SDX object status check processing that is usually performed as part of the copy destination pre-processing if SDX objects are operated in slice units. If this option is specified for a stopped volume, the -t option must also be specified.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies a replication source volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a replication destination volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Start replication from /dev/sdb3 of a storage management server to /dev/sdb3@TARG-SV of storage server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/sdb3 /dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV,TO=/dev/sdb3@TARG-SV swsrpstartsync completed
#
```

Start replication for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
#
```



Note

Replication cannot be started if:

- The specified replication source volume and replication destination volume are not set as replication volumes.
- A replication source volume is specified as the copy volume and a replication destination volume is specified as the copied material volume, and one-way copy is set as the copy attribute of the replication volume.
- Volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed after operation starts. In this case, operation cannot continue for the corresponding volume. Stop the replication operation for the corresponding volume, and then delete and reset the replication volume information.
- For server-to-server replication, the storage server on which the command is executed is not the operation server of the replication volume.
- For server-to-server replication, communication with a destination server fails.
- Replication cannot be started as a result of the preceding advanced copy function.
- When option “-g” is specified, except for a remote copy.
- The “-Xgds-softcopy” or “-Xgds-selectcopy” option is specified when the function in linkage with GDS Snapshot is not being used.
- The “-a” or “-g” option is specified when the function is used with GDS Snapshot is being used.
- When the backup management function or tape backup function uses a specified source/destination volume
- Either the copy source volume or the copy destination volume is a Snap Data Volume.



Note

If the “-Xgroup” option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.



Note

When the replication to be performed satisfies to either of the following conditions, please perform drive character release or unmount of copy source volume before executing a command.

- When a replication is performed between different OS's
- When the sizes of replication source volume and replication destination volume differ
- When the file systems of replication source volume and replication destination volume differ

When performing neither drive character release nor unmount in the above-mentioned case, post-processing of the copy source volume at the time of replica creation, an error occurs.



Point

You cannot change synchronization mode when synchronization is resumed. When synchronization is resumed, you must specify the “-y”, “-a”, “-v”, “-k”, “-””, and “-g” options as follows:

- Specify only the options that match the mode of synchronization to be resumed, or
- Do not specify any of the options.



Note

The processing of this command varies according to the status of the synchronization processing of the specified replication source and replication destination volumes.

Status of synchronization processing	Processing
Unmount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is displayed and normally end
Equivalency maintain status	Informational message (swsrp2401) is displayed and normally end
Replication established status (halt status)	Start of incremental copy



Note

Before starting the replication, run the replication pre-processing script for the replication destination volume. The contents of this script can be customized. For more information, see “Pre-processing and Post-processing of Replication”. If you do not want to implement the pre-processing script, use the -t option. If replication is started with the -Xgroup option specified, the replication pre-processing script is not executed for the copy destination volume. Therefore, pre-processing must be executed for all copy destination volumes in the group before this command is executed.



Note

Before starting replication that targets a Logical Unit (disk), execute pre-processing and post-processing for the Logical Unit (disk). Refer to “Pre-processing and Post-processing of Replication” for details.



Note

To protect processing that accesses a replication destination volume, set the copy destination volume before starting replication so that other processes cannot access it. To do so, cancel the drive letter of the replication destination volume or execute unmount. If you cannot cancel the drive letter of the replication destination volume or execute unmount because of the situations described below, this command fails and terminates.

- There is a directory in which other volumes are mounted under the mount point.
- A file on the volume is being used. In addition, if the replication destination volume is being used from a server other than the server on which this command is entered, the replication-operation administrator must disable access to the replication destination volume by cancellation of the share configuration, unmounting, or some other method.



Note

See “General notes”, for notes on starting replication.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (replication management)."



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)

10.4.2.2 Replication creation command (swsrpmake)

When synchronization processing (EC) is not performed, start snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) to create a replication volume.

When synchronization processing is performed, check whether the status of the processing is equivalency maintenance state. If the status is equivalency maintenance state, suspend the synchronization processing and create a replication volume. The status where synchronization processing is suspended is referred to as the replication established status. After this command is executed, the replication volume (replication destination volume) can be accessed. The behavior of this command could differ depending on the status of the advanced copy and the following should be noted:

- When synchronous processing is not performed
The command starts snapshot processing and creates replication volumes.
This form of replication is called snapshot replication.
- When synchronous processing is performed
The command checks the state of synchronous processing. If the synchronous processing is in the equivalency maintenance state, the command suspends the processing in order to create a replication volume. This form of replication is called synchronous replication. The state in which synchronous processing is suspended is called the copy established state.

In either case, the copy destination volume is made accessible after this command is executed. This command executes the replication pre-processing and post-processing scripts before a replication is created. For details of these scripts, see "Pre-processing and Post-processing of Replication".

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrpmake [-f] [-t] [-m] ([-j|-T|-Xconcur|-C | -P])
[-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-f] [-t] [-m] ([-j|-T|-Xconcur|-C | -P])
[-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[if executed on a storage server: group specification]
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse]
-Xgroup Group-Name
[if executed on a storage management server: group specification]
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P])
[-Xreverse] -Xgroup Group-Name
```

a. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-m	For server-to-server replication, specifies that communication processing with the non-operation server is not performed. When this option is specified, volume status check processing and pre-processing and post processing are not performed for the non-operation server volume. If the command is executed from the copy destination server and the Xconcur option is specified, this option cannot be specified. This option is valid only during server-to-server replication.
-f	Specifies that the pre-processing and post processing for a replication source volume are not performed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and unique pre-processing and post-processing scripts are inserted before and after, respectively, the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-t	Specifies that the pre-processing and post processing for a replication destination volume are not performed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-j	Specifies that copy processing be forcibly suspended even if the execution status of copying is "sync: Total copy or incremental copy is being performed" or "halt: Hard suspend status" in synchronization processing of inter-cabinet replication. This option can be used only for inter-cabinet replication. If used for intra-cabinet replication, an error occurs. When this option is specified, integrity of the data in the destination volume is not guaranteed. Also, when this option is specified, pre-processing and post-processing for the source and destination volumes are not performed. When restarting synchronous processing (REC) between cabinets, execute the replication start command (swsrpstartsync) with the -t option specified.
-T	Specifies that differential snapshot processing be executed. This option cannot be specified while synchronous processing is performed. This option is valid only for a replication within a cabinet and when the disk array supports the QuickOPC function. For a snapshot replication without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be specified to perform the replication operation using differential snapshots.
-Xgroup	Specifies that operation statuses are displayed by the group.
-Xreverse	Specifies that a replication be created for each group in the reverse direction (from replica volumes to original volumes).
-Xconcur	Specifies that a replication be created using the concurrent suspension function. This option is not supported when GDS Snapshot linkage is being used.
-C	Specifies that a SnapOPC start. This option is only valid with intra-cabinet replications and for disk array devices that support the SnapOPC function. In order to execute a SnapOPC, the copy destination volume must be a Snap Data Volume.

Option	Description
-P	Specifies that a SnapOPC+ start. This option is only valid with intra-cabinet replications and for disk array devices that support the SnapOPC function. In order to execute a SnapOPC+, the copy destination volume must be a Snap Data Volume. An error occurs in the following cases: <ul style="list-style-type: none"> ● If the same SnapOPC+ session exists at the copy source volume and the copy destination volume ● If the total number of SnapOPC+ sessions at the copy source volume exceeds 8 sessions
-Xgds-slice-sk ipchk	Skips the SDX object status check processing that is usually performed as part of the copy source and copy destination pre-processing if SDX objects are operated in slice units. If this option is specified for a stopped volume, the -f option and the -t option must also be specified.

b. Description of operands

Operand	Description
From-Volume-Name	Specifies a replication source volume. Specifies the replication source volume or the replication destination volume that was set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a replication destination volume. Specifies the replication source volume or the replication destination volume that was set with the replication volume information configuration command (swsrpsetvol).

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

The Storage management server instructs Storage server: SRC-SV to create a copy of /dev/sdb3 in /dev/sdb3@TARG-SV.

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/sdb3 /dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV,TO=/dev/sdb3@TARG-SV swsrpmake completed
#
```

Creates a copy for the group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
#
```



Note

When the --bind option in the mount command is specified to mount part of the file hierarchy of the copy source or copy destination volume at another mount point, use backup manager's authority to set the copy source or copy destination volume to the unmounted state.



Note

Do not execute the replication creation command in a state where another volume is mounted at the mount point of the target volume.
For such a state, unmount the other volume before executing the replication creation command.



Note

Replication cannot be created if:

- The specified replication source and replication destination volumes are not set as replication volumes.
- The synchronization processing from the specified replication source volume to the replication destination volume is not in the equivalency maintain status.
- After operation starts, physical volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed. In this case, operation for the corresponding volume cannot continue. Stop the replication operation for the volume, and then delete and set the replication volume information.
- A replication source volume or a replication destination volume has multiple mount points.
- If a replication source volume is an SDX object (SynfinityDISK), the status of the SDX object does not match the following:
 1. The mirror volume is ACTIVE or STOP.
 2. The mirror partition status is ACTIVE or TEMP.
 3. The SDX disk status is ENABLE.

* When the mirror partition is TEMP, a reproduction former volume is not preprocessed.
- For server-to-server replication, the storage server on which the command is executed is not the operation server of the replication volume.
- For server-to-server replication, communication with a destination server fails.
- The “-j”, “-T” or “-C” option is specified when the function is used with GDS Snapshot is being used.
- When the backup management function or tape backup function uses a specified source/destination volume



Note

If the “-Xgroup” option is specified, processing will be terminated without creating a copy if the operation statuses of the replication volumes being processed include both snapshot replication and synchronous replication.

Additionally, if the “-Xgroup” option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.



Note

When the replication to perform corresponds to either of the following conditions, please perform drive character release or unmount of copy place volume before executing a command.

- When a replication is performed between different OS's
- When the sizes of replication source volume and replication destination volume differ
- When the file systems of replication source volume and replication destination volume differ

When performing neither drive character release nor unmount in the above-mentioned case, post-processing of the destination volume at the time of replica creation results in an error.



Point

Before a replication is created, the replication pre-processing and post-processing scripts for the replication source volume are executed (for synchronized replication, only pre-processing script is executed). After the replication has been created, the replication post-processing script for the replication source volume and replication destination volume is executed. These scripts can be customized for operational reasons. For more information, see "Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing and post-processing scripts, use the "-f" option and the "-t" option.

If a replica is created with the -Xgroup option specified, the replication pre-processing and post-processing scripts are not executed for the copy source volume/copy destination volume. Therefore, execute pre-processing for all copy source volumes/copy destination volumes in the group before this command is executed.

(However, for synchronous replication, pre-processing for the copy destination volume is executed when replication starts, so it need not be executed.)

In addition, post-processing must be executed after this command is executed.



Point

If this command is executed during execution of snapshot processing, stop the copy processing in progress and start the snapshot processing again.



Point

To protect the data, set the replication source volume before creating a replication so that other processes cannot access the volume. To do so, cancel the drive letter of the replication source volume or execute unmount. This command will abort if you cannot cancel the drive letter of the replication source volume or execute an unmount because of the circumstances described below:

- While there is a directory in which other volumes are mounted using the same mount point.
- While a file on the volume is being used. If the replication source volume is being used from a server other than the server on which this command is entered, the backup-operation administrator must disable access to the replication source volume by removing the share configuration, unmounting. If for whatever reason you do not want to remove the shared configuration of the replication source volume or execute unmount, see "Pre-processing and Post-processing of Replication" and note the following.
 - When the replication source volume is being used by backup management, unmount may not be possible. If so, "swsrp2613 An error occurred on the pre-processing script at replication creation. Error code = 2" is displayed.
 - For replication pre-processing, execute the UNIX sync command to synchronize volumes and the file system.
- In replication post-processing, execute the <fsck> command to check the file system at the copy destination.



Note

See "General notes", for notes on creating replication.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (replication management)."



Point

Before replication is performed in snapshot replication, this command option prevents other processes from accessing the replication destination volume to protect the process that is accessing the volume. The command accomplishes this by locking or unmounting the replication destination volume. In cases as described below where the replication destination volume cannot be locked or unmounted the command terminates with an error:

- The mount point has a directory for mounting another volume.
- The volume has a file that is currently in use. If the replication destination volume is being used by a server that is not the server where the command was entered, prevent the replication destination volume from being accessed by canceling share configurations or performing unmounting for the replication process, using administrator's authority.



Note

For Snap Data Volumes, only SnapOPCs/SnapOPC+ can be executed. Additionally, when data is restored from a Snap Data Volume, there must be a SnapOPC session between the copy source volume and the copy destination volume (the Snap Data Volume).



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)



Point

If this command is executed during snapshot processing, snapshot processing is newly started. See the following table for details of copy operation:

<u>Operation status</u> (Display by swsrpstat - L)	<u>-T option</u> <u>specificat</u> <u>ion</u>	<u>Copy operation</u>
Copy is not executed. (Status is "----" and Trk also is "----".)	No	Ordinary snapshot processing is started.
Copy is not executed. (Status is "----" and Trk also is "----".)	Yes	Differential snapshot processing is started.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	No	Copying in progress is terminated and ordinary snapshot processing is newly started.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	Yes	Copying in progress is terminated and differential snapshot processing is newly started.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	No	Copying in progress is terminated and ordinary snapshot processing is newly started.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	Yes	Differential snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	No	Tracking processing is terminated and ordinary snapshot processing is newly started.

<u>Operation status</u> (Display by <code>swwrpstat - L</code>)	<u>-T option</u> <u>specificat</u> <u>ion</u>	<u>Copy operation</u>
Tracking is in progress. (Status is "----" and Trk is "on".)	Yes	Differential snapshot processing is restarted.

10.4.2.3 Operational status display command (`swwrpstat`)

This command displays the operation status of the specified volume. If a volume is not specified, the operational status of each replication volumes is displayed.

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swwrpstat [-L] [-E] [-H] [-O] [Original-Volume-Name]
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swwrpstat -h Server-Name [-L] [-E] [-H] [-O] [Original-Volume-Name]
[if executed on a storage server: group specification]
/opt/FJSVswsrp/bin/swwrpstat [-L] [-E] [-O] -Xgroup Group-Name
[if executed on a storage management server: group specification]
/opt/FJSVswsrp/bin/swwrpstat -h Server-Name [-L] [-E] [-O] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-L	Specifies display in extended format. For the items displayed by this option, see the table in the execution example. Note that the items displayed by this option may be subject to change in a future release.
-E	This option will display the operational status in the opposite direction only (from the copy destination to the copy source). In case this option is not set, the operation status in the normal direction (from the copy source to the copy destination) will always be displayed when a bi-directional OPC physical copy is taking place. In case this option is set, the operational status in the normal direction will not be displayed. Only the operational status in the opposite direction will be displayed. This option can be used to check the operational status of an OPC session performed in an opposite direction in case a QuickOPC/SnapOPC session in the normal direction exists.
-Xgroup	Specifies that operation statuses are displayed by the group. In case this option is set, all the operational statuses about the specified group will be displayed.
-H	Changes the Status field display method used when a REC enters a hard suspend (halt) status. If this option is specified, then "halt(sync)" will be displayed when hard-suspend status occurs during a total copy or a differential copy. "halt(equivalent)" will be displayed when hard-suspend status occurs during an equivalency maintenance state. Note that hard-suspend status will still be displayed as "halt" even if this option is specified for ROPC or GDS Snapshot linkage.

Option	Description
-0	<p>Changes the Status field display method used when in error-suspended (failed) status. If this option is specified, the display is as follows:</p> <ul style="list-style-type: none"> ● If there is a bad sector: "failed(badsector)" ● If there is a Snap Data Volume or Snap Data Pool capacity shortage: "failed(overflow)" <p>In other cases: "failed(other)"</p> <p>* However, when linked with GDS Snapshot, only "failed" is displayed when an error suspend status occurs even if "-0" is specified.</p> <p>The following OS do not support this option:</p> <ul style="list-style-type: none"> ● Red Hat Enterprise Linux AS (v.3 for x86) ● Red Hat Enterprise Linux ES (v.3 for x86)

c. Description of operands

Operand	Description
Original-Volume-Name	<p>Specifies a replication source volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."</p> <p>Displays all operation statuses for the specified replication source volume. If this operand is omitted, all the operation statuses of the storage server on which this command is executed are displayed.</p>

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

Direct that all the replication operation statuses for storage server SRC-SV be displayed on the storage management server.

```
# /opt/FJSVswsrp/bin/swsrpstat -h SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular replicated ----
SRC-SV /dev/sdc3@SRC-SV /dev/sdc3@TARG-SV ---- ----
SRC-SV /dev/sdd3@SRC-SV /dev/sdd3@TARG-SV reverse snap 45%
#
```

From storage management server to storage server: Instruct SRC-SV to display the status of all replication operations (with the -L option specified).

```
# /opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L
Server Original-Volume Replica-Volume Direction Status
Execute Trk Update Rcv Split Xfer Snap-Gen
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular replicated ----
---- auto ---- async ----
SRC-SV /dev/sdc3@SRC-SV /dev/sdb3@TARG-SV ---- ----
on 6% ---- ----
SRC-SV /dev/sdd3@SRC-SV /dev/sdb3@TARG-SV reverse snap 45%
off ---- ----
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular copy-on-write(inactive) ----
off 0% ---- ---- 1
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular copy-on-write(inactive) ----
off 5% ---- ---- 2
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular copy-on-write(active) ----
off 6% ---- ---- 3
#
```

The following information will be displayed.

Title	Description
Server	Displays a storage server name.
Original-Volume	Displays a replication source volume name.
Replica-Volume	Displays a replication destination volume name.
Direction	<p>Displays the copy direction.</p> <ul style="list-style-type: none"> ● regular: Copying from the replication source to the replication destination is being performed. ● reverse: Copying from the replication destination to the replication source is being performed. ● ----: Copying is not performed.
Status	<p>Displays the progress.</p> <ul style="list-style-type: none"> ● ---- : Copying is not being performed. ● sync : Total copy or incremental copy is being performed. ● equivalent : Equivalency maintain status ● replicated : Replication established status ● copy-on-write: SnapOPC processing is being performed. ● copy-on-write(active): SnapOPC+ processing is being performed (latest Snap generation). ● copy-on-write(inactive): SnapOPC+ processing is being performed (an earlier Snap generation). ● failed : Error suspend status ● failed(badsector): Bad sector at the copy source ● failed(overflow): Snap Data Volume or Snap Data Pool capacity shortage ● failed(other): An error suspend status other than failed(badsecor) or failed(overflow) ● halt : Hard suspend status ● halt(sync): Hard suspend status (hard suspend status has been entered during a REC total copy or differential copy) ● halt(equivalent): halt(equivalent): Hard suspend status (hard suspend status has been entered during an REC equivalency maintenance state) ● snap : OPC or QuickOPC processing is being performed. ● ????? : Copy situation cannot be acquired. ● Gds-error: Copy using GDS terminated abnormally.
Execute	<p>Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed. Displays the rate of copying progress as a percentage. When copying is not being performed, "----" is displayed.</p>
Trk	<p>Displays whether tracking processing is in progress.</p> <p>on : Tracking processing is in progress.</p> <p>off : Tracking processing is in progress.</p> <p>----: Snapshot processing is not performed.</p> <p>Always displays "----" when the GDS Snapshot linkage function is enabled.</p>

Title	Description
Update	<p>Displays the percentage of data that has been updated since the last copy was created, in the following cases.</p> <p>For SnapOPC+, displays the percentage of data updated since the previous Snap generation</p> <ul style="list-style-type: none"> ● When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not executed) ● When the Status column is "copy-on-write" (that is, when a SnapOPC is being performed) ● When the Status column is "copy-on-write(active)" (that is, when SnapOPC+ processing (the latest Snap generation) is in progress) ● When the Status column is "copy-on-write(inactive)" (that is, when SnapOPC+ processing (an earlier Snap generation) is in progress) <p>In all other cases, "----" is displayed.</p> <p>Always displays "----" when the GDS Snapshot linkage function is enabled.</p>
Rcv	<p>Indicates recovery mode for inter-box synchronization.</p> <p>auto: Automatic Recovery mode.</p> <p>manual: Manual Recovery mode.</p> <p>----: Synchronous duplication (REC) is not performed between boxes.</p>
Split	<p>Indicates split mode for inter-box synchronization.</p> <p>auto: Automatic Split mode.</p> <p>manual: Manual Split mode.</p> <p>----: Synchronous duplication (REC) is not performed between boxes.</p>
Xfer	<p>Indicates transfer mode in inter-box synchronization.</p> <p>sync: Synchronous mode.</p> <p>async: Asynchronous mode.</p> <p>stack: Stack mode.</p> <p>consist: Consistency mode.</p> <p>----: Synchronous duplication (REC) is not performed between boxes.</p>
Snap-Gen	<p>Displays the Snap generation number (1 to 8) if SnapOPC+ is being performed.</p> <p>If SnapOPC+ is not being performed, "----" is displayed.</p> <p>A Snap generation number of 1 indicates the oldest generation, and each time the number increases it becomes the latest generation.</p>



Note

- If the execution status (displayed in the Status field) is "failed", "halt", or "????", refer to "Troubleshooting for a hardware error, etc. occurring during replication" and take the required action.
- If the execution status (displayed in the Status field) is "gds-error":
- A GDS error probably occurred. Remove the cause of the GDS error, then use the replication cancellation command (swsrpcancel) to stop the replication operation.



Note

The operation status cannot be displayed if:

- The volumes are not set as replication volumes.



Note

This command cannot be executed while the following command is running:

- Resource adjustment command (swsrprecoverres)

10.4.2.4 Replication cancellation command (swsrpcancel)

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

a. Specification method

```
[To be executed on a storage server]
/opt/FJJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce]
[-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[To be executed on a storage management server]
/opt/FJJSVswsrp/bin/swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m]
[-b])|[-T]|[-Xforce] [-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[if executed on a storage server: group specification]
/opt/FJJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b] | [-T]|[-Xforce]) [-Xreverse]
-Xgroup Group-Name
[if executed on a storage management server: group specification]
/opt/FJJSVswsrp/bin/swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b] |
[-T]|[-Xforce]) [-Xreverse] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be specified only on a storage management server.
-c	Specifies that copy processing be canceled from servers other than the operation server if the operation server becomes unavailable (due to system failure, etc). If this option is used, copy processing is stopped without executing pre-processing and post-processing. This option cannot be specified on the operation server.
-m	For server-to-server replication, specifies that communication processing with non-operation servers is not performed. When this option is specified, volume status check processing and pre-processing and post-processing for the replication destination volume of a non-operation server are not performed. This option is valid only during server-to-server replication.
-f	When stopping the synchronous processing under the equivalency maintenance status, specify that pre-processing and post-processing for the copy source volume not be executed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device)..
-t	When stopping the synchronous processing under the equivalency maintenance status, specify that post-processing for the copy destination volume not be executed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-b	Specifies that the inter-cabinet copy operation in the halt status be stopped. For replication on a server, the copying is cancelled for both cabinets. For replication between servers, the copying is cancelled only for the cabinet connected to the server on which this command was executed. Use the option only for a copy operation in the halt status and whose recovery cannot be expected. The option is valid only for a copy operation in the halt status. The option can be used on the server not specified as the operation server. If this option is specified together with the -Xgroup option, copy processing is only stopped for sessions in the group whose status is halt.

Option	Description
-T	Specifies that differential snapshot processing be terminated. This option terminates only tracking processing but does not terminate snapshot processing (OPC physical copying) in progress. This option releases the OPC session if snapshot processing (OPC physical copying) is complete. This option can be used only while physical copying or tracking is in progress. This option cannot be used for the logical volume of an SDX object. If this option is specified together with the -Xgroup option, only tracking processing within the group is stopped.
-Xgroup	Specifies that copy processing be stopped for each group.
-Xreverse	Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) be stopped.
-Xgds-slice-skipchk	Skips the SDX object status check processing that is usually performed as part of the copy source and copy destination pre-processing. This takes place if SDX objects are operated in slice units and the synchronization processing for equivalency maintenance state is stopped. If this option is specified for a stopped volume, the -f option and the -t option must also be specified.
-Xforce	Specification of this option enables a SnapOPC+ session to be stopped forcibly. Forced stoppage of SnapOPC+ stops the specified Snap generation and all earlier Snap generations. This option can be specified even if there is only one Snap generation. This option is specific to SnapOPC+. If this option is specified at the same time as the -Xgroup option, the SnapOPC+ sessions within the group are stopped, and the Snap generation and all earlier Snap generations within the group are stopped.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies a copy source volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a copy destination volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

On the storage management server, direct that copying from /dev/sdb3 to /dev/sdb3@TARG-SV be stopped for storage server SRC-SV.

```
#/opt/FJSVswsrp/bin/swsrpcancel -h SRC-SV /dev/sdb3 /dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV,TO=/dev/sdb3@TARG-SV swsrpcancel completed
#
```

Stops copy processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
#
```




Note

Following execution with the “-b” option specified in replication on a server, the command stops normally when cancellation of the copying succeeds in either of the cabinets.



Note

Copy processing cannot be performed if:

- The specified replication source volume and replication destination volume are not set as replication volumes.
- The copy processing is not performed for the specified replication source and replication destination volumes.
- For server-to-server replication, the storage server on which the command is executed is not the operation server of the replication volume.
- For server-to-server replication, communication with a destination server fails.
- When the backup management function or tape backup function uses a specified source/destination volume



Note

If the -Xgroup option is specified, processing will be performed for each active replication volume, but processing will be terminated without canceling replication in the following case:

- If no replication volumes have been copied
- When you execute “-b” option specifying it to no existence of the copy processing in the state of halt in the group.
- When you execute “-T” option specifying it to no existence of the tracking processing of QuickOPC in the group.

Additionally, if the “-Xgroup” option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.



Note

When SnapOPC+ sessions are stopped, they must be stopped in sequence from the oldest Snap generation.

If the second and subsequent generations are to be forcibly stopped, specify the -Xforce option. However, note that the specified Snap generation and all earlier Snap generations will be stopped.

If the -Xforce option is specified at the same time as the -Xgroup option, the SnapOPC+ sessions within the group are stopped, and the Snap generation and all earlier Snap generations within the group are stopped.



Note

The volume information for the specified volume is not checked (match information of the volume information in the management list with the actual physical information). The Operation is cancelled automatically using the volume information in the management list.



Point

The following processing is performed depending on the operation status of the specified replication source volume and replication destination volume.

Operation status	Processing
Reverse copy direction	Suspends the processing.
Not operating yet	Suspends the processing.
Total or incremental copy is performed	Suspends synchronization processing. The replication destination volume cannot be used.
Equivalency maintain status	Suspends synchronization processing. The replication destination volume can be used as a copy
Replication established status	Suspends synchronization processing. The replication destination volume can be used as a copy
Snapshot processing is being performed	Stops the snapshot processing. The replication destination volume cannot be used.



Point

Pre-processing and post-processing for a replication source and replication destination volumes are performed only when the status of synchronization processing is equivalency maintain.



Note

Synchronization processing cannot be stopped in equivalency maintenance status if:

- A replication source volume or a replication destination volume has multiple mount points.
- When a replication source volume is an SDX object (SynfinityDISK), the status of the SDX object is not one of the following:
 1. The mirror volume is ACTIVE or STOP.
 2. The mirror partition status is ACTIVE or TEMP.
 3. The SDX disk status is ENABLE.

* Pre-processing is not performed when the mirror slice is TEMP.



Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (replication management)."



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)



Point

When the -T option is not specified, command processing varies depending on the operation status of the source and destination volumes.

<u>Operation status</u> <u>(Display by swsrpstat -L)</u>	Processing
Reverse copy	Processing is interrupted.
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Synchronous processing is terminated. The destination volume cannot be used.
Equivalency maintenance status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.
Snapshot processing complete status and tracking processing in progress (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

When the -T option is specified, command processing varies depending on the operation status of the source and destination volumes.

<u>Operation status</u> <u>(Display by swsrpstat -L)</u>	Processing
Reverse copy	Processing is interrupted.
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Processing is interrupted.
Equivalency maintenance status (Status is "equivalent".)	Processing is interrupted.
Replica created status (Status is "replicated".)	Processing is interrupted.
Snapshot processing is in progress and tracking processing is not in progress. (Status is "snap" and Trk is "off")	Processing is interrupted.
Snapshot processing is in progress and tracking processing is progress. (Status is "snap" and Trk is "on".)	Only tracking processing is terminated. Snapshot processing (physical copying) is continued. The destination volume can be used as a replica.
Snapshot processing complete status and tracking processing in progress. (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

10.4.2.5 Synchronization mode change command (swsrpchsnc)

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrpchsnc [-F (Sync|Async|Stack|Consist)] [-R (Auto|Manual)] [-S (Auto|Manual)] From-Volume-Name To-Volume-Name

[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrpchsnc -h Server-Name [-F (Sync|Async|Stack|Consist)] [-R (Auto|Manual)] [-S (Auto|Manual)] From-Volume-Name To-Volume-Name

[if executed on a storage server: group specification]
```

```

/opt/FJSVswsrp/bin/swsrpchsnc [-F (Sync|Async|Stack|Consist)] [-R (Auto|Manual)] [-S
(Auto|Manual)] [-Xreverse] -Xgroup Group-Name

[if executed on a storage management server: group specification]
/opt/FJSVswsrp/bin/swsrpchsnc -h Server-Name [-F (Sync|Async|Stack|Consist)] [-R
(Auto|Manual)] [-S (Auto|Manual)] [-Xreverse] -Xgroup Group-Name

```

b. Description of options

Option	Description
-h	Specifies the name of a storage server. You can use this option only for a storage management server.
-F	Changes the transfer mode. You can specify one of the following parameters in the operand: Sync: Changes to Synchronous mode. Async: Changes to Asynchronous (sequential transfer) mode. Stack: Changes to Stack mode. Consist: Changes to Consistency mode. Changing the transfer mode requires this option. You can only specify the -S option together with the -F Sync option. Specifying the -F Sync option to change the transfer mode from a non-synchronous mode to the synchronous mode without specifying the -S option sets the automatic split mode.
-R	Changes the recovery mode. You can specify either of the following parameters in the operand: Auto: Changes to Automatic Recovery mode. Manual: Changes to Manual Recovery mode. Changing the recovery mode requires this option.
-S	Changes the split mode. You can specify either of the following parameters in the operand: Auto: Changes to Automatic Split mode. Manual: Changes to Manual Split mode. Changing the split mode requires this option. To specify this option, you must also specify -F Sync or the transfer mode of the current synchronization must be synchronous mode.
-Xgroup	Changes the operation mode of inter-box synchronous processing for each group (transfer mode, recovery mode, or split mode).
-Xreverse	Specifies that the operation mode of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) be changed.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies the name of a source volume. Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume. Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

From storage management server to storage server: Instruct SRC-SV to change the transfer mode for inter-box synchronization between /dev/sdb3@SRC-SV and /dev/sdb3@TARG-SV from Consistency mode to Asynchronous mode.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV - L /dev/sdb3@SRC-SV
Server Original-Volume  Replica-Volume  Direction Status Execute Trk  Rcv  Split
Xfer Snap-Gen
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular  sync  99%  ---- auto ----
consist ----
:
#/opt/FJSVswsrp/bin/swsrpchsnc - h SRC-SV - F Async /dev/sdb3@SRC-SV
/dev/sdb3@TARG-SV
FROM=/dev/sdb3@SRC-SV, TO=/dev/sdb3@TARG-SV swsrpchsnc completed
:
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV - L /dev/sdb3@SRC-SV
Server Original-Volume  Replica-Volume  Direction Status Execute Trk  Rcv
Split Xfer Snap-Gen
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular  equivalent 100%  ---- auto ----
async ----
#
```

Specify that the transfer mode of inter-box synchronous processing for group "GRP1" be changed from consistency mode to asynchronous mode.

```
# /opt/FJSVswsrp/bin/swsrpchsnc -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsnc completed
#
```



Note

You cannot change the operational mode of inter-box synchronization in the following circumstances:

- The specified original/replica volume has not been configured as a replica volume.
- None of the "-F", "-R", and "-S" options have been specified.
- In inter-server replication, the storage server on which you execute the command is not the operation server for the replica volume.
- Synchronization from the specified source volume to the destination volume is not secured.
- Synchronization from the specified source volume to the destination volume is in error-suspended status (with "failed" indicated for Status by the operating status display command (swsrpstat)) or hard-suspended status (with "halt" Status in the status display).
- The disk array in which the specified original/replica volume is placed does not support the operation mode change function.
- A change is made to a logical disk configuration that AdvancedCopy Manager does not support.



Note

If the "-Xgroup" option is specified, the synchronous processing for all replication volumes being processed is changed to the same operation mode. However, the operation mode cannot be changed if any of the replication volumes meets the conditions above. Additionally, if the "-Xgroup" option is specified, replication volumes are processed in order, but processing is aborted if an error occurs.



Note

If the REC operating mode is changed when in equivalency maintenance status, after the operating mode is changed, the user must wait until the equivalency maintenance status is attained again.



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)

10.4.2.6 Synchronization reverse command (swsrprevsync)

This command reverses the copying direction of synchronization in suspended status. This command is unusable with a logical volume of an SDX object.

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrprevsync From-Volume-Name To-Volume-Name

[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name

[if executed on a storage server: group specification]
/opt/FJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup Group-Name

[if executed on a storage management server: group specification]
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name [-Xreverse] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a storage server. You can only use this option for a storage management server.
-Xgroup	Changes the direction of synchronous processing for each group.
-Xreverse	Specifies that the direction of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) be inverted.

c. Description of operands

Option	Description
From-Volume-Name	Specifies the name of a source volume (as the destination in the reverse direction). Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume (as the source in the reverse direction). Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Execution example

From storage management server to storage server: Instruct SRC-SV to reverse the copying direction of synchronization between /dev/sdb3@SRC-SV and /dev/sdb3@TARG-SV.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV /dev/sdb3@SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV reverse replicated ----
#/opt/FJSVswsrp/bin/swsrprevsync /dev/sdb3@TARG-SV /dev/sdb3@SRC-SV
FROM=/dev/sdb3@SRC-SV,TO=/dev/sdb3@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /dev/sdb3@SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/sdb3@SRC-SV /dev/sdb3@TARG-SV regular replicated ----
#
```

Change the direction of synchronous processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
#
```



Note

The direction of synchronization cannot be reverse in any of the following circumstances:

- The specified original/replica volume has not been configured as a replica volume.
- Unidirectional copying has been specified in the copying attribute for the replica volume.
- In inter-server replication, the storage server on which you execute the command is not the operation server for the replica volume.
- Replication has not been established in synchronization from the specified source volume to the destination volume.
- The disk array in which the specified original/replica volume is hosted does not support the reverse function.
- A change is made to a logical disk configuration that AdvancedCopy Manager does not support.



Note

If the "-Xgroup" option is specified, the direction of synchronous processing for all replication volumes being processed is changed. However, the direction of synchronous processing cannot be changed if any of the replication volumes meets the conditions above.

Additionally, if the "-Xgroup" option is specified, replication volumes are processed in order, but processing is aborted if an error occurs.



Note

If the "-Xgroup" option is specified, processing is not performed for those sessions in the group where the direction has already been changed.



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)

10.4.3 Maintenance commands

This chapter describes the maintenance commands for replication management.

10.4.3.1 Resource adjustment command (swsrprecoverres)

This command executes recovery to make replication management information consistent if a system failure or other problem has made the replication management information inconsistent.

a. Specification method

```
[To be executed on a storage server]
/opt/FJSVswsrp/bin/swsrprecoverres [-r] [-p]
[To be executed on a storage management server]
/opt/FJSVswsrp/bin/swsrprecoverres -h Server-Name [-r] [-p]
```

b. Description of options

Option	Description
-h	Specifies a storage server name. This option can be used only on a storage management server.
-r	Specify this option when an incorrect status exists in the replication management files (for example, the replication volume information configuration command (swsrpsetvol) or the replication volume information deletion command (swsrpdelvol) that update the replication management files terminate suddenly because of a forced stop or a system failure, or the replication management files has been deleted by mistake). When this option is specified, the following processing to re-create the replication management files is performed. Replication management information in the storage management server repository is downloaded to the storage server, and the replication volume information is restored. The disk array device is queried, and the execution information for the synchronization processing is restored.
-p	Specifies not to perform any post-processing that has not been performed. This option can be used when the replication creation command (swsrpmake) processing aborts suddenly because of a forced stop or system failure.

c. End status

= 0: Normal end
> 0: Abnormal end

d. Execution example

Perform resource adjustment.

```
#!/opt/FJSVswsrp/bin/swsrprecoverres
swsrprecoverres completed
#
```



Note

The resource adjustment processing cannot be performed if:

- Communication with a storage management server fails and the “-r” option is specified.
- The “-r” option is not specified when this command is executed after processing by the replication volume information configuration command (swsrpsetvol) and the replication volume information deletion command (swsrpdelvol) has been forcibly terminated.



Note

The consistency of resource information is restored only for the storage server on which this command is executed. When a resource inconsistency occurs during processing related to replication between servers, this command must be executed both on the storage server on which the processing was performed and on the storage server with which communication is being made.



Note

When this command is executed for a replication source or destination volume, and the replication creation command (swsrpmake) closes before processing is complete, replication post-processing is executed if it is set up to run unattended.



Note

This command cannot be executed while any of the following commands is running:

- Replication volume information configuration command (swsrpsetvol)
- Replication volume information display command (swsrpvoinfo)
- Replication volume information deletion command (swsrpdelvol)
- Synchronous processing start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Operation status display command (swsrpstat)
- Replication cancellation command (swsrpcancel)
- Synchronization node change command (swsrpchsinc)
- Synchronization reverse command (swsrprevsinc)
- Resource adjustment command (swsrprecoverres)

10.5 Start/Stop Daemon Commands

AdvancedCopy Manager daemons can be started in the following manner.



Note

A note on this command is as follows:

- Confirm that the SWSTGNODE environment variable is not defined.
- Execute this command using the same LANG environment variable that of the code system used by the system.
- Only a root user can execute this command.
- For cluster operation, refer to "Starting and Stopping Daemons".

10.5.1 Starting and stopping the communication daemon

- Starting the communication daemon
Enter the following command to stop the communication daemon:

```
# /opt/FJJSVswstf/bin/stgfwcom start
```

- Stopping the communication daemon
Enter the following command to stop the communication daemon:

```
# /opt/FJJSVswstf/bin/stgfwcom stop
```

10.5.2 Starting and stopping the RMI daemon

- Starting the RMI daemon
Enter the following command to start the RMI daemon:

```
# /opt/FJJSVswstf/bin/stgrmicom start
```

- Stopping the RMI daemon
Enter the following command to stop the RMI daemon:

```
# /opt/FJJSVswstf/bin/stgrmicom stop
```

The authentication daemon runs only on the Storage management server.

10.5.3 Starting and stopping the RDB daemon

- Starting the RDB daemon
Enter the following command to start the RDB daemon:

```
# /opt/FJJSVswstf/bin/stgdbcom start
```

- Stopping the RDB daemon

Enter the following command to stop the RDB daemon:

```
# /opt/FJSVswstf/bin/stgdbcom stop
```

The authentication daemon runs only on the Storage management server.

10.5.4 Starting and stopping the authentication daemon

- Starting the authentication daemon

Enter the following command to start the authentication daemon:

```
# /opt/FJSVswssc/bin/rc.smfwsec start
```

- Stopping the authentication daemon

Enter the following command to stop the authentication daemon:

```
# /opt/FJSVswssc/bin/rc.smfwsec stop
```

The authentication daemon is available only on the Storage management server.

10.5.5 Starting and stopping AdvancedCopy Manager daemons

The daemons listed below are started and stopped together:

Server type	Storage server	Storage management server
Daemon name	Communication daemon	Communication daemon RMI daemon RDB daemon Authentication daemon

- Starting a AdvancedCopy Manager daemon

Enter the following command to start a AdvancedCopy Manager daemon:

```
# /opt/swstorage/bin/startacm
```

- Stopping a AdvancedCopy Manager daemon

Enter the following command to stop a AdvancedCopy Manager daemon:

```
# /opt/swstorage/bin/stopacm
```

10.6 SnapOPC/SnapOPC+ Support

This section explains the commands that can be used to execute SnapOPC/SnapOPC+.



Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

[Table: Operating environment when executing SnapOPC/SnapOPC+ support commands]

Command	Operating environment of AdvancedCopy Manager
swstestupdate	-
swstd	-



Note

In cluster operation

In cluster operation, execute a command by taking the following steps:

- 1) If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For bsh, specify the environment variable as follows:

```
# SWSTGNODE= logical-node-name
# export SWSTGNODE
```

- 2) Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Cluster operation commands

Command	Environment variable	Command execution node	Remarks
swstestupdate	Not required	Cluster active server	-
swstdsv	Not required	Cluster active server	-

10.6.1 Update volume measurement command (swstestupdate)

This command measures the physical capacity of Snap Data Volumes using the pseudo SnapOPC session setup function.

- a. Specification method

```
[When starting update volume measurements (setting up a pseudo session)]
/opt/FJSVswsts/bin/swstestupdate start Volume-Name

[When looking up the update volume (displaying the status of the pseudo session)]
/opt/FJSVswsts/bin/swstestupdate status Volume-Name

[When finishing update volume measurements (canceling the pseudo session)]
/opt/FJSVswsts/bin/swstestupdate stop Volume-Name
```

b. Description of operands

Operand	Description
Volume-Name	Specifies the volume name. Specify a copy source volume that is used with SnapOPC /SnapOPC+ operations. GDS logical volumes cannot be specified.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Execution example

Measure the update volume for /dev/sda1:

```
(Start taking measurements by starting a pseudo session)
#/opt/FJSVswsts/bin/swstestupdate start /dev/sda1
/dev/sda1 swstestupdate completed

(First measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/sda1
Volume-Name Update
/dev/sda1 644333

(Second measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/sda1
Volume-Name Update
/dev/sda1 1045000

(Stop taking measurements by canceling the pseudo session)
# /opt/FJSVswsts/bin/swstestupdate stop /dev/sda1
/dev/sda1 swstestupdate completed
#
```

The following information will be displayed:

Title	Description
Volume-Name	Displays the volume name.
Update	Displays the amount of data (the number of blocks) that has been updated since measurements started (1 block = 512 bytes). Displays "----" if there is no pseudo session. Displays "failed" if the pseudo session is error-suspended.



Note

The amount of data updated cannot be measured in the following cases:

- When the specified volume does not exist.
- When the disk array device does not support the SnapOPC /SnapOPC+ function.
- When the pseudo session has already been set up (when the "start" option is specified).
- When the pseudo session does not exist (when the "stop" option is specified).

10.6.2 Snap Data Volume operation/reference command (swstdsv)

This command can be used to initialize a Snap Data Volume, display the Snap Data Volume status, or to display the Snap Data Pool status.



Note

This command cannot be used with the following operating systems:

- Red Hat Enterprise Linux AS (v.3 for x86)
- Red Hat Enterprise Linux ES (v.3 for x86)

When executing this command, specify the following subcommands in accordance with the desired operation.

Table: Subcommand list

Subcommand	Function
init	Snap Data Volume initialization
stat	Snap Data Volume status display
poolstat	Snap Data Pool status display



Note

If a capacity shortage has occurred for a Snap Data Volume, the access path and the ETERNUS disk array logical unit number (LU-Number) can be used to enable operations. However, when a Snap Data Volume is in the capacity shortage state, if the "stat" subcommand is specified with the intention of checking the LU-Number of the Snap Data Volume for which the capacity shortage occurred, access to that volume results in an error. The command terminates abnormally, and the LU-Number cannot be checked. Therefore, if the LU-Number is to be used, the Snap Data Volume LU-Number must be checked in advance and remembered.

Snap Data Volume initialization

Specify "init" in the subcommand to initialize a Snap Data Volume.



Note

Execute Snap Data Volume initialization before SnapOPC/SnapOPC+ is started.



Point

Initialization of a Snap Data Volume discards all data in the Snap Data Volume. Therefore, the following procedures are recommended.

(When operations are performed from the logical volume manager, access paths must be prepared in advance and LU-Numbers must be collected.)

- 1) If the Snap Data Volume contains data that is still needed, use OS commands or similar to save data in advance.
- 2) Initialize the disk management information.
When operations are performed from the logical volume manager, set the targeted Snap Data Volume (physical disk) such that it is not managed by the logical volume manager.
- 3) Use this command to initialize the Snap Data Volume.

When operations are performed from the logical volume manager, use access paths to perform initialization.

a. Format

```
/opt/FJSVswsts/bin/swstdsv init Volume-Name  
or  
/opt/FJSVswsts/bin/swstdsv iniit - G Access-Path-Name LU-Number
```

b. Description of options

Option	Description
-G	Specifies the access path (Access-Path-Name). Refer to "Creating an access path" for details of access paths.

c. Description of operands

Operands	Description
Volume-Name	Specifies the volume name of the Snap Data Volume (AdvancedCopy Manager device name) that is to be initialized. If partitions (slices) have been specified, Logical Units (disks) in the partitions (slices) are initialized.
LU-Number	Specifies the ETERNUS disk array logical unit number. Specify a decimal number.

d. End status

= 0 : Normal end
> 0 : Abnormal end

e. Example

Initialize the Snap Data Volume (/dev/sdf1)

```
# /opt/FJSVswsts/bin/swstsdv init /dev/sdz
swstsdv init completed
#
```

If a capacity shortage has occurred, use the access path (/dev/sdt) to initialize the volume of LU-Number (117).

```
# /opt/FJSVswsts/bin/swstsdv init - G /dev/sdt 117
swstsdv init completed
#
```

Snap Data Volume status display

Specify "stat" in the subcommand to display the Snap Data Volume logical capacity, physical capacity, the size of the area in use and the size of the unused area.

f. Format

```
/opt/FJSVswsts/bin/swstsdv stat Volume-Name
or
/opt/FJSVswsts/bin/swstsdv stat - G Access-Path-Name LU-Number
```

g. Description of option

Option	Description
-G	Specifies the access path (Access-Path-Name). Refer to "Creating an access path" for details of access paths.

h. Description of operands

Operands	Description
Volume-Name	Specifies the volume name of the Snap Data Volume (AdvancedCopy Manager device name). If partitions (slices) have been specified, information of the Logical Units (disks) in the partitions (slices) is displayed.
LU-Number	Specifies the ETERNUS disk array logical unit number. Specify a decimal number.

i. End status

= 0 : Normal end
> 0 : Abnormal end

- j. Example
 Display the status of Snap Data Volume (/dev/sdz).

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/sdz
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 117 (0x75)
Rate Logical(sector) Physical(sector) Used(sector_ Copy(sector) Host(sector)
Pool(sector)
0% 8388608 1045876 0 0 0 0
```

Use the access path (/dev/sdt) to display the status of LU-Number (117).

```
# /opt/FJSVswsts/bin/swstsdv stat - G /dev/sdt 117
BoxID = 00e4000m3#####E450S20A####KD4030639004##
LUN = 117 (0x75)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector)
Pool(sector)
0% 8388608 1048576 0 0 0 0
```

The following table shows the content displayed.

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number used at the ETERNUS disk array. The format of the display is "<decimal number>(<hexadecimal number>)".
Rate	The Snap Data Volume usage rate is displayed as a percentage.
Logical	The Snap Data Volume logical capacity is displayed. The display unit is the number of sectors.
Physical	The Snap Data Volume physical capacity is displayed. The display unit is the number of sectors.
Used	The size of the Snap Data Volume area in use is displayed. The display unit is the number of sectors. The capacity displayed includes both the size used for Copy(*) and the size used for the host(*).
Copy	The size of the Snap Data Volume area in use for Copy(*), out of the total area used, is displayed. The display unit is the number of sectors.
Host	The size of the Snap Data Volume area in use for the host(*), out of the total area used, is displayed. The display unit is the number of sectors.
Pool	The size of the area in use in the Snap Data Pool allocated to the Snap Data Volume is displayed. The display unit is the number of sectors.

*) Area in use for Copy: This is the size used for updates performed while SnapOPC/SnapOPC+ is running.

Area in use for Host: This is the size used for updates performed at the Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Snap Data Pool status display

Specify "poolstat" in the subcommand to display the total capacity of the Snap Data Pool, the size of the used area and the size of the unused area.

k. Format

```
/opt/FJSVswsts/bin/swstdsv poolstat -G Volume-Name
```

l. Description of option

Option	Description
-G	Specifies the ETERNUS disk array volume (Volume-Name). However, if a Snap Data Volume or similar for which a capacity shortage has occurred is specified, the command terminates abnormally. In this case, specify an access path or similar for which a capacity shortage has not occurred. Refer to "Creating an access path" for details of access paths.

m. End status

= 0 : Normal end

> 0 : Abnormal end

n. Example

Specify the access path (/dev/sdt) to display the status of the Snap Data Pool.

```
# /opt/FJSVswsts/bin/swstdsv poolstat -G /dev/sdt
BoxID = 00E4000M3#####E450S20A####KD40306390004##
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
Normal    10% 20971520      2097152      0           2097152      18874368
Encrypted 0%   20971520      0             0             0           20971520
```

The following table shows the content displayed.

Title	Description
BoxID	Displays the Box ID.
Pool-Type	Displays the Snap Data Pool type. Normal: Normal (not encrypted) Encrypted: Encrypted
Rate	Displays the Snap Data Pool usage rate (%).
Total	Displays the total capacity of the Snap Data Pool. The display unit is the number of sectors.
Used	The size of the Snap Data Pool area in use is displayed. The display unit is the number of sectors. The capacity displayed includes both the size used for Copy(*) and the size used for the host(*).
Copy	The size of the Snap Data Pool area in use for Copy(*), out of the total area used, is displayed. The display unit is the number of sectors.
Host	The size of the Snap Data Pool area in use for the host(*), out of the total area used, is displayed. The display unit is the number of sectors.
Free	Displays the size of the unused are in the Snap Data Pool. The display unit is the number of sectors.

*) Area in use for Copy: This is the size used for updates performed while SnapOPC/SnapOPC+ is running.

Area in use for Host: This is the size used for updates performed at the Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Chapter 11 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

11.1 Notes on Backup and Replication Operation

This chapter provides notes on the backup and replication operation.

11.1.1 General notes

This chapter provides general notes on the backup and replication operation.

Storage Server locale

The locale (software localisation information) of the internal code system (the code system specified when AdvancedCopy Manager is installed on the Storage Management Server) used by AdvancedCopy Manager must be installed on all Storage Servers.

Action is required if there are differences between the language environments (LANG) of the Storage Management Server and the Storage Servers. The following table shows the actions required for various combinations:

Table: Storage Management Server and Storage Server language environment combinations

Storage Management Server	Storage Server	Action required
Windows (SJIS)	Windows (SJIS)	None
	Solaris (EUC)	Install the SJIS package on the Storage Server.
	HP-UX (EUC)	Install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None
	AIX (EUC)	Add the SJIS language environment on the Storage Server.
In accordance with the Solaris locale setting (standard: EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)
	Solaris (EUC)	None (if the code is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	HP-UX (EUC)	None (if LANG is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None (if LANG is the same). If the Management Server is EUC, add the EUC language environment.
	AIX (EUC)	None (if LANG is the same). If the Management Server is SJIS, add the SJIS language environment.
Linux (EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)
	Solaris (EUC)	None
	HP-UX (EUC)	None
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	Add the EUC language environment on the Storage Server.
	AIX (EUC)	None

Storage Management Server	Storage Server	Action required
Linux (UTF8)	Windows (SJIS)	None
	Solaris (EUC)	Add the UTF8 language environment on the Storage Server.
	HP-UX (EUC)	Add the UTF8 language environment on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	Add the UTF8 language environment on the Storage Server.
	AIX (EUC)	Add the UTF8 language environment on the Storage Server.

Depending on the action required, install the SUNWjpc SJIS package. After the appropriate package is installed, re-execute the "Update information of all devices at the Storage Server" operation at the GUI client.

Exclusion from Backup or Replication Targets

The following devices must not be subject to the backup or replication operation.

- Device on which AdvancedCopy Manager has been installed
- Device on which the resource files of AdvancedCopy Manager exists
- Logical volume of LVM(Logical Volume Manager) or volume group

Data integrity with data in a volume

Table: Data integrity with data in a volume

Data in transaction volume	Maintenance of data integrity	Operation
Oracle database space being used	Linkage with Oracle is required.	Use a sample script designed for linkage with Oracle. For details, refer to Backup operations in conjunction with Oracle (Sample shell script).
Symfoware database space under operation	AdvancedCopy Manager command links with Symfoware to maintain the integrity.	Refer to "Backup Operation (Symfoware)."
File system	A AdvancedCopy Manager command unmounts the file system to maintain the integrity.	See "Pre-processing and Post-processing of Backup and Restoration" and "Pre-processing and Post-processing of Replication".
Other than the above	The data integrity must be maintained in operations.	Take appropriate action, such as stopping transactions during execution of backup or replication.

Fetching of Device Information

Before starting the backup or replication operation, fetch device information managed by all the Storage Servers by using the GUI client of AdvancedCopy Manager. The time taken to complete this operation depends on the total number of devices defined on the selected Storage Servers. If many devices are involved, perform this operation while the CPU load or I/O load is low.

As a guide, about 0.5 seconds are required per device (partition) under a no-load condition.

Simultaneous execution limit

An upper limit (maximum value) applies to the number of Advanced Copy sessions in one LU (Logical Unit) that can be executed simultaneously. Ensure the number of volumes in one LU is the same or less than the maximum number of copy sessions per LU.

If a greater number of volumes than the maximum number of copy sessions per LU needs to be created in the LU for operational reasons, operations must be designed to prevent simultaneous execution of more than the maximum number of Advanced Copy sessions to volumes in the same LU.

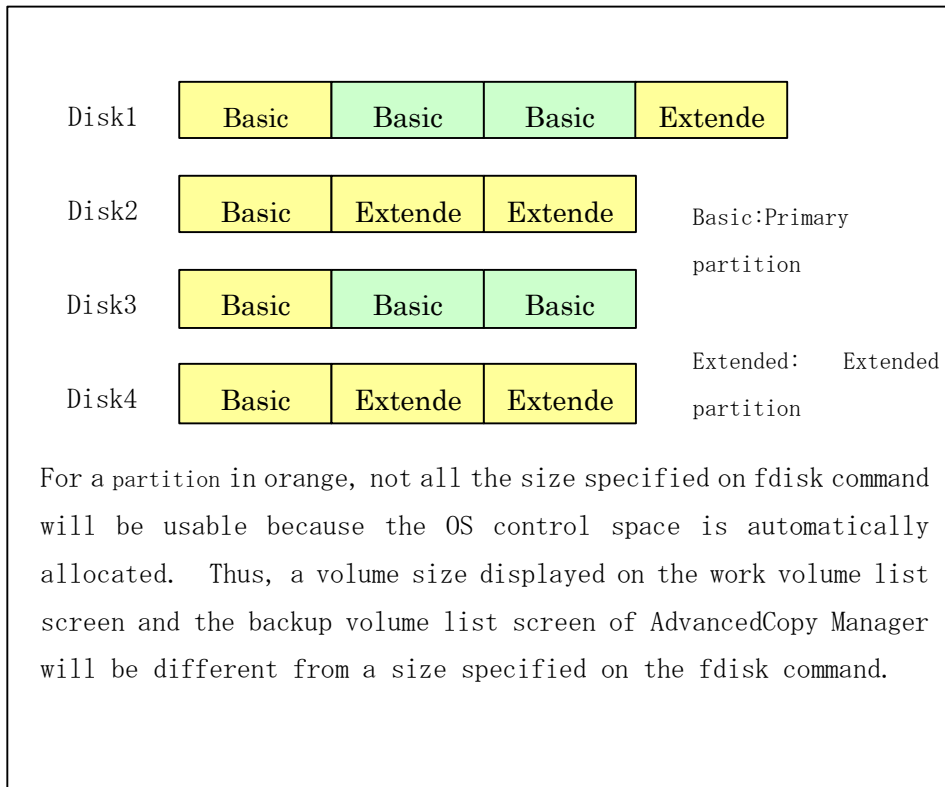
Refer to the disk array unit SA/SE Handbook for the maximum number of copy sessions per LU.

Size of a Partition

A transaction volume and a backup volume must have the same size. However, not all of the size specified by the fdisk command will be usable for the following disks because the OS control space is automatically allocated.

- Primary partition in the beginning of a disk (the leftmost on the fdisk command)
- All the extended partitions

Figure: Partition size



Thus, configure a transaction/backup volume as follows:

- If a business volume is the primary partition at the beginning (the leftmost on the fdisk command) or any extended partition, define a backup volume also on a primary partition at the beginning or on an extended partition.
- If a business volume is on a primary partition not in the beginning, define a backup volume also on a primary partition not in the beginning.

Combine only a transaction volume and a backup volume in the same color as shown in the above figure for a backup pair and make sure that the capacity of the original volume/replica volume are a combination of the same colors as in the above figure when you perform replication.



Point

To prevent an operational error, it is recommended that you define all the partitions on a GR unit to be managed by AdvancedCopy Manager as extended partitions.

If you cannot define all as extended partitions, it is recommended that you use the same configuration for a partition for both business volume and backup volume. Refers to the relationship demonstrated between Disks 2 and 4 in the above figure.



Note

To back up a PRIMECLUSTER GDS volume

To backup a GDS volume, specify the sector size to set a backup volume size that matches the GDS volume.

Create the backup volume as follows:

- 1) Find out the accurate size and number of the GDS volumes to be backed up. The accurate size is obtained by multiplying the number of blocks output by the following command by 512 bytes.

```
sdxinfo -o volume-name
```

In the following example, 425984 is output as the number of blocks. Therefore, the size is 218103808 bytes (425984 blocks x 512).

```
# sdxinfo -o v1
OBJ   NAME   CLASS  GROUP  SKIP JRM 1STBLK  LASTBLK  BLOCKS  STATUS
-----
volume v1      cl     gl     off on    65536  491519  425984  ACTIVE
```

- 2) Use the parted command to check that the disk format of the backup volume is msdos. If the format is not msdos, execute `"/sbin/parted <device name> mklabel msdos"` to format as msdos.
- 3) Find out the number of bytes in each sector of the disk where the backup volume is to be created. In the following example, "sectors of 512 bytes" indicates that the size of each sector is 512 bytes.

```
# /sbin/sfdisk -uS -l /dev/sdp
Disk /dev/sdp: 1017 cylinders, 133 heads, 62 sectors/track
Units = sectors of 512 bytes, counting from 0

Device Boot      Start         End      #sectors  Id System
/dev/sdp1            0           -            0  0 Empty
/dev/sdp2            0           -            0  0 Empty
/dev/sdp3            0           -            0  0 Empty
/dev/sdp4            0           -            0  0 Empty
```

The following error is returned if the disk does not have an msdos disk label:
" sfdisk: ERROR: sector 0 does not have an msdos signature"

Use the fdisk command or the parted command in advance to create an msdos disk label on the targeted disk.

Example: Use the # parted command to create an msdos disk label.

```
# /sbin/parted /dev/sdp mklabel msdos
```

- 4) Calculate the number of sectors in the backup volume being created.

```
218103808 bytes / 512 bytes = 425984 sectors
```

However, the partition descriptor is located in the first sector of a logical volume, so this sector cannot be used. Therefore, add one sector to the number of sectors obtained in this calculation.

```
425984 sectors + 1 = 425985 sectors
```

Thus, the number of sectors to create is 425985.

- 5) Use the `fdisk` command to create the files to be input. Since files need to be created as logical partitions in extension partitions in a backup volume, files like the following are created:

```
# cat ./sdp-partition.dat
,,E
;
;
;
,128,L
,425985,L
,425985,L
,425985,L
```

The first logical partition (`/dev/sdp5`) cannot be made the same size as the other logical partitions for reasons related to partition descriptors.

Therefore, the first logical partition is created to be the appropriate size (in this case, 128 sectors) and is not used as part of the backup volume.

- 6) Use the `fdisk` command to create the partitions.

```
# /sbin/fdisk -uS --force /dev/sdp < ./sdp-partition.dat
Checking that no-one is using this disk right now ...
OK

Disk /dev/sdp: 1017 cylinders, 133 heads, 62 sectors/track
Old situation:
Units = sectors of 512 bytes, counting from 0

   Device Boot   Start    End  #sectors  Id System
/dev/sdp1            0      -         0  0 Empty
/dev/sdp2            0      -         0  0 Empty
/dev/sdp3            0      -         0  0 Empty
/dev/sdp4            0      -         0  0 Empty

New situation:
Units = sectors of 512 bytes, counting from 0

   Device Boot   Start    End  #sectors  Id System
```



```

/dev/sdp1      1  8386181  8386181  5  Extended
/dev/sdp2      0      -      0  0  Empty
/dev/sdp3      0      -      0  0  Empty
/dev/sdp4      0      -      0  0  Empty
/dev/sdp5      2    129    128  83  Linux
/dev/sdp6     131  426114  425984  83  Linux
/dev/sdp7     426116  852099  425984  83  Linux
/dev/sdp8     852101 1278084  425984  83  Linux

Warning: partition 5 does not end at a cylinder boundary

Successfully wrote the new partition table

Re-reading the partition table ...

If you created or changed a DOS partition, /dev/foo7, say, then use dd(1)
to zero the first 512 bytes: dd if=/dev/zero of=/dev/foo7 bs=512 count=1
(See fdisk(8).)

```

Use the created /dev/sdp6, /dev/sdp7, and /dev/sdp8 as the backup volume.

Mirroring in GDS

For cabinet-to-cabinet mirroring, both systems of the mirroring must be backed up if restoration is required by OPC in the event of a cabinet failure. In these cases, the size of the backup volume must be a physical volume size, not logical volume size.

Mounting of disks from other servers

Before backup/restoration or replication of a volume that can be mounted from multiple servers, cancel all mounting from the other servers.

For disks that need not be mounted from other servers, prevent multiple servers from detecting or accessing the same partition by setting up hardware, such as devices in the ETERNUS storage system and Fibre Channel switches, accordingly.

Notes on copy operations targeted at file systems

For a copy operation targeted at a file system, unmount the relevant volume to prevent data access and maintain the data integrity.

If backup/restoration and replication are performed without unmounting the volume, an error occurs since a volume in use cannot be unmounted.

Note the following about processing where unmounting is enabled:

- Another application is not using the volume. If another application is using it, suspend the application temporarily.
- Users are not using the volume. If users are using it, prohibit them from using it temporarily.
- Another volume is not mounted on the volume. If it is mounted, unmount it temporarily.
- The volume is not shared with NFS sharing. If it is shared, unshare it temporarily.

Unmounting is required only during command execution. Normal operations can be resumed after command execution.

Notes on executing Logical Unit (disk unit) copy

Logical Unit (disk unit) copy can be used for replication operations.

Note the following points when executing Logical Unit (disk unit) copy:

- Environment for using Logical Unit (disk unit) copy
 - Logical Unit (disk unit) copy cannot be used for GPT disk formats if the Storage server runs under the following operating systems:
 - Red Hat Enterprise Linux AS (v.3 for x86)
 - Red Hat Enterprise Linux ES (v.3 for x86)
- Tape backup

Refer to "System volume backup and restore" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide tape backup edition" for details of the tape backup function.

- Copying between servers
 - Both servers must be version 13.1 or later.
- Copying between Logical Units (disks) of different sizes
 - When copying between Logical Units (disks) that are different sizes, the physical copy matches the size of the smaller Logical Unit (disk). If the copy direction is from the smaller Logical Unit (disk) to the larger Logical Unit (disk), part of the area on the larger disk is not physically copied to, and data from before the copy operation remains on the larger disk. If this remaining area contains the Logical Unit (disk) management information, partitioning tools may identify the disk format incorrectly. Therefore, format the copy destination Logical Unit (disk) before copying to it.
- Notes when executing copy
 - If replication source volume/replication destination volume areas for replication management, and transaction volume/backup volume areas for backup management are duplicated, do not execute replication management and backup management operations concurrently for the volumes that have duplicated areas.
 - Execute copy operations when the partitions included in the Logical Unit (disk) are in the unmounted state. If copy is executed when the partitions are in the mounted state, the partitions included in the copy destination disk may not be able to be made consistent as a file system.
- SDX objects
 - Logical Unit (disk unit) copying cannot be used for SDX objects.

Notes on executing copy between different operating systems

Copies can be made between different operating systems by using replication operations.

Use the following combinations to execute copy between different operating systems:

Table: Combinations for executing copy between different operating systems

		Copy destination	
		Partition	Logical Unit (disk)
Copy source	Partition	Y	N
	Logical Unit (disk)	Y	N

Y: Possible

N: Not possible



Note

SnapOPC+ cannot be used with the following operating systems:

- Red Hat Enterprise Linux AS (v.3 for x86)
- Red Hat Enterprise Linux ES (v.3 for x86)

If SnapOPC+ is to be used for executing copy operations between different operating systems, perform copy between operating systems that can use SnapOPC+.

Supported disk formats

The following disk formats are supported:

Table: Supported disk formats

Support OS	Disk format	
	GPT	MBR
Red Hat Enterprise Linux AS (v. 3 for x86) Red Hat Enterprise Linux ES (v. 3 for x86)	N	R
Red Hat Enterprise Linux AS (v. 4 for x86) Red Hat Enterprise Linux ES (v. 4 for x86) Red Hat Enterprise Linux (v. 5 for x86)	Y	R
Red Hat Enterprise Linux AS (v. 4 for EM64T) Red Hat Enterprise Linux ES (v. 4 for EM64T) Red Hat Enterprise Linux (v. 5 for EM64T)	Y	R
Red Hat Enterprise Linux AS (v. 4 for Itanium) Red Hat Enterprise Linux (v. 5 for Intel Itanium)	R	Y

R: Supported (recommended)

Y: Supported

N: Not supported

Operations that use the device names (by-id and by-path) generated by the udev facility

Note the following points if AdvancedCopy Manager operations use device names generated by the udev facility.

The device names used when a file system is mounted must be the same as the device names used by AdvancedCopy Manager.

- If AdvancedCopy Manager operations use by-id, use by-id to mount the file system.
- If AdvancedCopy Manager operations use by-path, use by-path to mount the file system.
- If the udev name is used for replication between servers, the AdvancedCopy Manager version must be the same as on the other server.
- If the other server has the following operating systems, the udev name cannot be used for replication between servers:
 - HP-UX
 - AIX

Notes on use of the -m option

For inter-server replication, the -m option can be used in the following commands to prevent communication with the inactive server:

- Replication start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Replication cancel command (swsrpcancel)

In order to avoid potential problems resulting from volume pre-processing and post-processing being omitted at the inactive server, one of the following conditions must be met if the -m option is specified:

1. The inactive server is shut down.
2. Pre-processing and post-processing is executed manually for the inactive server volume.
3. The target volume is a RAW device (Oracle, etc.), that does not require pre-processing and post-processing, rather than a file system.

Copy processing performance of Advanced Copy

The AdvancedCopy copy processing is performed by the disk array unit. Therefore, direct any questions concerning copy processing performance to the support department of the disk array unit.

Mount by Label

In the case where a source volume has a filesystem label and where the following conditions hold, Advanced Copy can cause the status where multiple volumes with the same label exist in one system.

- a. Backup/restore or replication within a server is employed.
- b. Replication between servers is employed and a volume in the destination server has the same label as a source volume.

When there are multiple volumes with the same label, processing such as mount may not work correctly.

To avoid this phenomenon, specify not a label but a device (e.g. `/dev/sda1`) for `/etc/grub.conf` and `/etc/fstab`.

11.1.2 Notes on the snapshot high-speed backup

This chapter provides notes on the snapshot high-speed backup.

Number of Required Backup Volumes

The snapshot high-speed backup requires as many backup volumes as the number of specified generations. Thus, the snapshot backup is disabled if:

- All the specified number of generations have been backed up, and
- No new volume that can be used as a backup volume exists.

Continuous Backup

Performing the snapshot high-speed backup continuously with the same transaction volume specified will perform the backup operation in parallel.

Performing the snapshot high-speed backup continuously more often than the number of preservation generations will cancel the backup operations starting from the oldest one. In other words, you cannot simultaneously perform the backup operation more often than the specified number of generations.

11.1.3 Notes on synchronous high-speed backup

This chapter includes some notes on synchronous high-speed backup.

Backup processing

The backup execution command (`swstbackup`) cannot be executed before the transaction and backup volumes have attained equivalency maintenance state.

Backup policy settings

Backup policies can be set if the number of registered backup volumes is enough for snapshot high-speed backup operation even if the number is not enough for synchronous high-speed backup operation. In this event, high-speed backup may not be possible.

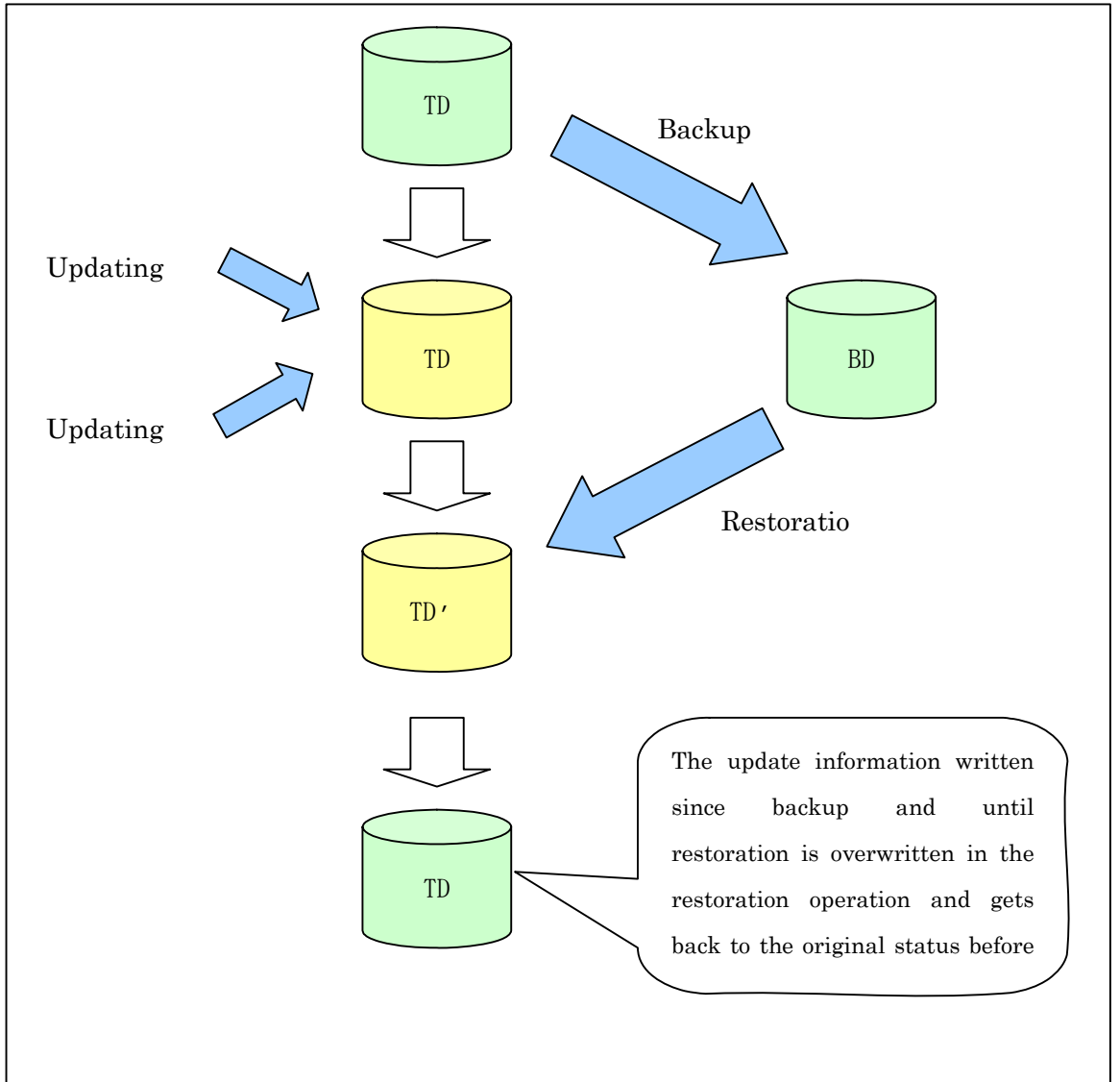
11.1.4 Notes on restoration

This section provides notes on restoration.

Timing of Restoration

If data on a transaction volume has been rewritten since the latest backup data is collected to a backup volume and until restoration is performed, the rewritten data shall not be guaranteed.

Figure: Notes on restoration of AdvancedCopy Manager



11.1.5 Notes on SDX object operations (backup management)

Note the following about the backup operation of SDX objects.

Device information setting command (swstdevinfo set)

Note the following about operation with an SDX object in units of logical volumes:

- An SDX object cannot be set as a transaction volume for operation of an SP-series product.
- A volume in a disk group to which the transaction volume belongs cannot be registered as a backup volume.
- A volume in a single disk to which the transaction volume belongs cannot be registered as a backup volume.
- A volume in a disk group to which an associated backup volume belongs cannot be registered as the transaction volume.
- A volume in a single disk to which an associated backup volume belongs cannot be registered as the transaction volume.

Backup synchronous processing start command (swststartsync)

Note the following about operation with an SDX object in units of logical volumes.

Backup synchronous processing of a GDS transaction volume cannot be started in the following circumstances:

- The volume structure of the transaction volume is changed.
- The transaction volume is set as a proxy object.
- A backup volume cannot be stopped.
- The slices that make up the transaction volume include a temporarily separated slice or a slice being copied.

In the case of any of the above, you should take appropriate action according to the [System administrator's action] for the error message as displayed.

Backup synchronous processing with EC cannot be started in the following circumstances:

- An SDX object that does not support the EC function is specified.
- All available backup volumes are in a mirroring structure.
- The transaction volume belongs to a mirror group connected to any subordinate group.
- An SDX object is in the root class.

In these cases, only software-copy with GDS is available. To use the software-copy function of GDS, specify the "-Xgds-softcopy" option.

If a backup volume satisfies any of the following conditions, it is not selected as the backup destination because it cannot be used as a proxy object of the transaction volume. Even if it is specified as the backup destination, it cannot be used.

- The backup volume is not the same class as the transaction volume.
- The slices that make up the backup volume include a temporarily separated slice or a slice that is being copied.
- The backup volume is set as the master object associated with another proxy of GDS.
- The backup volume is mounted.
- The backup volume is a logical volume whose size is different from that of the transaction volume.
- The backup volume is in a mirroring structure (excluding cases where "-Xgds-softcopy" or "-Xgds-selectcopy" is specified).
- No disk is connected directly to the backup volume (excluding cases where "-Xgds-softcopy" or "-Xgds-selectcopy" is specified).

Backup synchronous processing cancel command (swstcancelsync)

Note the following points about use with an SDX object in units of logical volumes.

The backup volume enters the invalid data state (INVALID) if synchronous processing is cancelled in the following circumstances during the backup of an SDX object:

- When the synchronous processing is not in the equivalency maintenance state or copy established state

Restart synchronous processing or snapshot processing again, and the volume should enter the stop state (STOP), which will automatically clear the data invalid state.

To use an alternative method to restore the state, refer to Section F.1.3, "Errors Related to Volume States", in the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Linux)" and take appropriate action.

Backup execution command (swstbackup)

Note the following points about use with an SDX object in units of logical volumes.

Backup of a GDS transaction volume cannot be performed in the following circumstances:

- The volume structure of the transaction volume is changed.
- The transaction volume is set as a proxy object.
- A backup volume cannot be stopped.
- The slices that make up the transaction volume include a temporarily separated slice or a slice being copied.
- An SDX object that does not support the OPC function is specified.
- All available backup volumes are in a mirroring structure.
- The transaction volume belongs to a mirror group connected to any subordinate group.
- An SDX object is in the root class.

In the case of any of the above, you should take appropriate action according to the [System administrator's action] for the error message as displayed.

If a backup volume satisfies any of the following conditions, it is not selected as the backup destination because it cannot be used as a proxy object of the transaction volume even if it is specified as the backup destination.

- The backup volume is not the same class as the transaction volume.
- The slices that make up the backup volume include a temporarily separated slice or a slice being copied.
- The backup volume is set as the master object associated with another proxy of GDS.
- The backup volume is mounted.
- The backup volume is a logical volume whose size is different from that of the transaction volume.
- The backup volume is in a mirroring structure.
- No disk is connected directly to the backup volume.

Backup with the output destination backup volume specified cannot be performed in the following circumstances:

- An ordinary volume is specified as the transaction volume and a GDS logical volume as the backup volume.
- A GDS logical volume is specified as the transaction volume and an ordinary volume as the backup volume.

Note the following about operation with an SDX object in units of slices.

Backup cannot be performed in the following circumstances:

- An SDX object does not satisfy the following conditions:
- The state of the mirror volume is ACTIVE.
- The state of the SDX disk is ENABLE.
- The state of the mirror slice is ACTIVE or TEMP.

In the case of any of the above, you should take appropriate action according to the [System administrator's action] for the error message as displayed.

- Note that pre-processing and post-processing scripts will not be executed if the state of the SDX object slice is TEMP.

Restore execution command (swstrestore)

Note the following about operation with an SDX object in units of logical volumes.

A GDS transaction volume cannot be restored in the following circumstances:

- In restoration to a transaction volume, the backup volume is not the proxy object of the transaction volume.
- In restoration to a transaction volume, the transaction volume cannot be stopped.
- In restoration to a transaction volume, the target backup volume cannot be stopped.

In the case of any of the above, you should take appropriate action according to the [System administrator's action] for the error message as displayed.

Restoration with OPC cannot be performed for a GDS transaction volume in the following circumstances:

- A GDS logical volume that does not support the OPC function is specified.
- The backup volume belongs to a mirror group connected to any subordinate group.
- An SDX object is in the root class.

In these cases, only software-copy is available. To use the software-copy function of GDS, specify the “-Xgds-softcopy” option.

If the restore execution command (swstrestore) using the software-copy function of GDS is suspended, such as for a forced termination, the started software-copy processing continues. In this case, wait for the software-copy processing to finish, and then execute the resource match command (swstrsrmntch).

Note the following about operation with an SDX object in units of slices.

If the transaction volume is a slice of an SDX object and it is not a single volume, restoration using this command cannot be performed. This is because advanced copy cannot be performed on a mirror volume.

For restoration to the transaction volume of an SDX object, follow the procedure below.

1. Confirm the backup volume by using the backup history list view/history information display command (swsthistdisp).
2. For restoration, use the “dd” command to copy data to the volume.

11.1.6 Notes on SDX object operations (replication management)

Note the following about the replication operation of SDX objects.

Replication volume information setting (swsrpsetvol)

Note the following about operation with an SDX object in units of logical volumes.

Replication volume information for the replication operation of an SDX object cannot be set in the following circumstances:

- An SDX object and slice, or an SDX object and a volume of another OS are specified.
- A logical volume and the n option are specified.
- The original volume and replica volume belong to different classes.
- The original volume and replica volume belong to the same group; alternatively, in operation of single volumes, they belong to the same single disk.

Replication volume information deletion (swsrpdelvol)

Note the following about operation with an SDX object in units of logical volumes.

If the original volume and replica volume are bound, or if they are separated when a copy session exists, the replication volume information cannot be deleted.

Replication start command (swsrpstartsync)

Note the following about operation with an SDX object in units of logical volumes.

If any of the following is true, the replication start command in the replication operation of an SDX object cannot be executed:

- The copy source volume and copy destination volume are in the master-proxy relationship when synchronous processing is started.
- The copy source volume and copy destination volume have not been separated from their master-proxy relationship when synchronous processing is resumed.
- The copy source volume and copy destination volume belong to different classes when synchronous processing is started.
- The copy source volume and copy destination volume belong to the same disk group or single disk.
- The copy source volume satisfies any of the following conditions:
 - The volume contains any temporarily separated slice or slice that is being copied.
 - The copy source volume is a proxy object when synchronous processing is started.
 - Copy processing with another volume is in progress.

- The copy destination volume satisfies any of the following conditions:
 - The volume is in a mirroring structure and the “-Xgds-softcopy” or “-Xgds-selectcopy” option is not specified when synchronous processing is started. The volume cannot be stopped.
 - The volume is a master volume when synchronous processing is started.
 - The volume contains any temporarily separated slice or slice that is being copied.
 - The volume is a proxy of another master.
- The hardware copy function is not available (excluding cases when “-Xgds-softcopy “ or “-Xgds-selectcopy “ is specified). The typical causes are:
 - EC/REC of the disk array unit is not properly set.
 - The copy source volume belongs to a mirror group connected to any subordinate group.
 - The copy destination volume is in a mirroring structure.
 - The volume is in the root class.

In the replication operation of an SDX object registered with the replication function, do not use the “sdxproxy” command directly to change the state of the SDX object. Otherwise, the “sdxproxy” command may create an inconsistency between the management information of the replication function and the actual object state. In this case, use the replication cancellation command (swsrpcancel) described in Section 10.3.2.4 to cancel the replication operation.

Note the following about operation with an SDX object in units of slices.

Note the following for the replication operation of an SDX object:

Replication cannot be started in the following cases:

- The copy destination volume is an SDX object and the status of the SDX object is not as follows:
 - Mirror volume is either ACTIVE or STOP
 - Mirror slice status is either ACTIVE or STOP
- If the copy destination volume is an SDX object that is not a single volume, replication using this command cannot be performed. Therefore, if either the original volume or replica volume is an SDX object that is not a single volume, you can perform replication only from an SDX object to a non-SDX object.
- To copy data to a volume that is an SDX object but not a single volume, use the “dd” command.

Replication creation command (swsrpmake)

Note the following about operation with an SDX object in units of logical volumes.

If any of the following is true, replication in the replication operation of an SDX object cannot be created:

- The copy source volume and copy destination volume are in the master-proxy relationship in snapshot replication.
- The copy source volume and copy destination volume belong to different classes in snapshot replication.
- The copy source volume and copy destination volume belong to the same disk group or a single disk in snapshot replication.
- The copy source volume satisfies any of the following conditions:
 - The volume contains any temporarily separated slice or slice that is being copied, in snapshot replication.
 - The copy source volume is a proxy object in snapshot replication.
 - Copy processing with another volume is in progress.
- The copy destination volume satisfies any of the following conditions:
 - The volume is in a mirroring structure in snapshot replication.
 - The volume could not be stopped in snapshot replication.
 - The volume is a master volume in snapshot replication.
 - The volume contains any temporarily separated slice or slice that is being copied, in snapshot replication.
 - The volume is a proxy of another master in snapshot replication.

- The OPC/ROPC function is not available for snapshot replication. The typical causes are:
 - OPC/ROPC of the disk array unit is not properly set.
 - EC/REC in the equivalency maintenance state or suspended state is between the specified copy source volume and another proxy. However, advanced copy can be set in units of mirror slices, which makes it possible to set advanced copy for as many copy destination volumes as the number of mirror slices of the copy source volume at the same time. Therefore, this error occurs as the result of an attempt to set advanced copy for a greater number of copy source volumes than the number of mirror slices.
 - The copy source volume belongs to a mirror group connected only to some subordinate groups but not directly to a disk. The copy source volume belongs to a mirror group connected to any subordinate group.
 - The copy destination volume is in a mirroring structure.
 - The volume is in the root class.

In the replication operation of an SDX object registered with the replication function, do not use the “sdxproxy” command directly to change the state of the SDX object. Otherwise, the “sdxproxy” command may create an inconsistency between the management information of the replication function and the actual object state. In this case, use the replication cancellation command (swsrpcancel) described in Section 10.3.2.4 to cancel the replication operation.

Note the following about operation with an SDX object in units of slices.

Replication cannot be performed in the following circumstances:

- The copy source volume is an SDX object for replication of an SDX object, and the SDX object is not in the following states:
 - The state of the mirror volume is either ACTIVE or STOP.
 - The state of the mirror slice is either ACTIVE or TEMP.
- The copy destination volume is an SDX object, and the SDX object is not in the following states:
 - The state of the mirror volume is either ACTIVE or STOP.
 - The state of the mirror slice is either ACTIVE or STOP.
- If the copy destination volume is an SDX object that is not a single volume for the replication operation for an SDX object, replication using this command cannot be performed. Therefore, if either the original volume or replica volume is an SDX object that is not a single volume, you can perform replication only from an SDX object to a non-SDX object.
- To copy data to a volume that is an SDX object but not a single volume, use the dd command.

Note that preprocessing of the copy source volume is not performed if the state of the slice of the SDX object is TEMP.

Replication cancellation command (swsrpcancel)

Note the following about operation with an SDX object in units of logical volumes.

If any of the following is true, replication in the replication operation of an SDX object cannot be cancelled:

- The pair of the target replication volume used for replication cancellation is in the equivalency maintenance state, and copy processing between the copy source volume and another volume is in progress.

If replication cancellation is executed at either of the following times during the replication operation of an SDX object, the copy destination volume enters the invalid data state (INVALID):

- When snapshot replication is neither in the equivalency maintenance state nor copy established state
- When data copy processing of snapshot processing is in progress

Restart synchronous processing or snapshot processing, and the volume will enter the stop state (STOP), which will automatically clear the data invalid state.

To restore the state using an alternative method, refer to Section F.1.3, “Errors Related to Volume Statuses”, in the “PRIMECLUSTER(TM) Global Disk Services User’s Guide (Solaris(TM) Operating Environment)”, and take appropriate action.

Note the following about operation with an SDX object in units of slices.

Synchronous processing in the equivalency maintenance state cannot be stopped in the following circumstances:

- The copy source volume is an SDX object, and the SDX object is in any of the following states:
 - The state of the mirror volume is either ACTIVE or STOP.
 - The state of the mirror slice is either ACTIVE or TEMP.
 - The state of the SDX disk is ENABLE.

If the mirror slice is in the TEMP state, pre-processing of the original volume is not performed.

- The file system is mounted in an environment where the copy source volume or copy destination volume makes up a SafeFILE of a multi-volume structure. In such cases, unmount the file system, and process all of the volumes that make up the SafeFILE.

11.1.7 Notes on cluster operation

Note the following general points on cluster operation:

- Do not make a SWSTGNODE registration that configures an environment variable to the entire system.
- AdvancedCopy Manager does not monitor daemons of an active server. If the daemon of a transaction stops for some reason, AdvancedCopy Manager does not automatically restart it, so you must restart it manually. Moreover, the stopping of an active server daemon of AdvancedCopy Manager does not cause the userApplication to fail over. For details on the daemons of AdvancedCopy Manager active servers and how to start these daemons, see "Starting and Stopping Daemons".

For a Storage Server daemon (or Storage Management Server daemon) operating together with a daemon in a scalable operation, note the following points that do not apply to regular operation or cluster operation:

- For a Storage Management Server transaction, note that the logical IP address you specify in the cluster setup command must be the logical IP address of the Storage Management Server transaction. Specifying the physical IP address or logical IP address of a server in scalable operation will result in incorrect setting.
- Do not register any userApplication resource of a transaction in scalable operation as a userApplication cluster resource of a Storage Server transaction (Storage Management Server transaction).
-
- On the input screen shown in "Registering a new Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide", enter the logical IP of the Storage Server transaction in the IP address field. Entering a physical IP or logical IP of a server in scalable operation will result in incorrect setting.
- On the input screen shown in "Registering a new Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide", enter the port number that was registered when the Storage Server transaction was customized and dedicated to the active server communication daemon (stgxfws_logical-node-name) in the port number field. Entering a port number other than that dedicated to the active server communication daemon will result in incorrect setting.
- Refer to "Device management" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide", add a transaction volume and backup volume for the transaction in scalable operation to be placed in backup/replication operation
- You can make a backup or replication on a node operating a Storage Server transaction (Storage Management Server transaction) if it is the active node. You cannot make a backup or replication on any standby node of a Storage Server transaction (Storage Management Server transaction).
- If a transaction (in scalable operation) running on a node operating a Storage Server transaction (Storage Management Server transaction) stops for some reason, you must manually switch the Storage Server transaction (Storage Management Server transaction) over to a node running in scalable operation. Storage Server transactions (Storage Management Server transactions) are not linked with scalable operation transactions, thus stopping scalable operation transactions does not cause a Storage Server transaction (or Storage Management Server transaction) to fail over.

11.1.8 Notes on backup operation in cluster operation

SynfinityCLUSTER or PRIMECLUSTER

For backup operation in a cluster system, note the following points that do not apply to regular operation:

- If failover occurs while running a backup command, you must secure consistency by using the resource match command (swstsrsemth) as a recovery measure.
- You must perform backup operation on the active server of the userApplication because AdvancedCopy Manager is placed in the userApplication and operates as part of said userApplication.
You cannot make a backup from a standby node or another userApplication.

PRIMECLUSTER

PRIMECLUSTER 4.0A20 or earlier

Note the following points if a file system has been created on a transaction volume and the file system has been registered as a cluster resource:

- Change the backup pre-processing so that the transaction volume is not unmounted. Refer to "Pre-processing of backup" for information about changing backup pre-processing.
- It is not possible to restore data using the restore execution command (swstrestore) during transaction operations. To restore data on the volume, either copy the data using the "dd" command, or mount the backup volume and copy the necessary data. Alternatively, perform the procedure described in "Making a backup and restoration during stoppage of a userApplication".

PRIMECLUSTER 4.0A30 or later

If a file system has been created on a transaction volume, and the file system has been registered as a cluster resource, use the following procedure to back up and restore data. Perform snapshot backups and restorations using the following procedure:

4. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

5. Execute the backup or restoration.

```
# /opt/FJSVswsts/bin/swstbackup Device-Name
Device-Name swstbackup completed
#
```

6. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

Execute synchronized backups using the following procedure.

1. Start synchronous processing.

```
# /opt/FJSVswsts/bin/swststartsync Device-Name
Device-Name swststartsync completed
#
```

2. Check equivalency maintenance state.
3. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

4. Execute the backup.

```
# /opt/FJSVswsts/bin/swstbackup Device-Name
Device-Name swstbackup completed
#
```

5. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

11.1.8.1 Making a backup and restoration during stoppage of a userApplication

When a userApplication to which AdvancedCopy Manager belongs is operating, backup operation is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for backup operation, thus disabling backup operation. Likewise, if the userApplication has been stopped, the environment is not ready and disables backup operation. However, only when the userApplication has been stopped is backup operation enabled by temporarily arranging the minimum essentials.



Note

- When transactions in scalable operation are handled together, only stop userApplications in scalable operation; do not stop userApplications for Storage Server (or Storage Management Server) transactions.
Enabling backup operation disks (transaction volume and backup volume to operate) allows you to perform backup operation in the same way as for regular operations.
If a backup operation disk cannot be enabled, you cannot perform backup operation while user Applications in scalable operation are stopped.
- If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), backup operation is disabled:
 - Shared disk for AdvancedCopy Manager shared data
 - Backup operation disk (transaction volume/backup volume to operate)
- The following operations are not allowed in backup operation:
 - Backup/restoration through GUI
 - Manipulation for backup operation from a Storage Management Server (host specification with the “-h” option)
 - Addition or deletion of a transaction volume/backup volume, or change in policy
- To execute a display command for backup management to a Storage Management Server transaction that also functions as a Storage Server transaction, you must specify options for the command. For details on the display command for backup management, see the “Commands for Backup Management”.
- Perform backup operation while a userApplication is stopped by taking the following steps:
 1. Confirm that the userApplication has been stopped on both nodes.
For details on how to stop a userApplication, see the PRIMECLUSTER manual.
 2. Log in to the node on which you want to make a backup through telnet, for example. You cannot use the logical IP address. Directly use a node that is operable by using the physical IP address.
 3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.

When the transaction volume is a file system, mount it.



Note

- Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.
- 4. Perform backup operation.
You can perform backup operation in the same way as for regular operations for cluster operation.
You can use the restore execution command (swstrestore) to perform restoration.
- 5. Release all the shared disks you enabled in Step 3.
Unmount the file systems you mounted.
Stop (set offline) the shared disk.
- 6. Start (set online) the userApplication.
Start the userApplication, if necessary.
For details on how to start a userApplication, see the PRIMECLUSTER manual.

11.1.9 Notes on replication operation in cluster operation

SynfinityCLUSTER or PRIMECLUSTER

For replication operation in a cluster system, note the following points that do not apply to regular operation:

- If failover occurs while running a replication command, you must secure consistency by using the resource adjustment command (swsrprecoverres) as a recovery measure.
- You must perform replication operation on the active system of the userApplication because AdvancedCopy Manager is placed in the userApplication and operates as part of said userApplication.
You cannot perform replication from a standby node or another userApplication.

PRIMECLUSTER

PRIMECLUSTER 4.0A20 or earlier

Note the following points if a file system has been created on a copy source volume and the file system has been registered as a cluster system resource.

- Change the pre-processing and post-processing for replication so that the copy source volume is not unmounted.
- Set up a RAW partition on the copy destination volume.
- Data cannot be restored from the copy destination volume to the copy source volume using the replication creation command (swsrpmake) during transaction operations. To restore data on the volume, either copy the data using the “dd” command, or mount the copy destination volume and copy the necessary data. Alternatively, perform the procedure described in “Making a replication during stoppage of a userApplication”.

PRIMECLUSTER 4.0A30 or later

Note the following points if a file system has been created on a copy source volume and the file system has been registered as a cluster system resource.

- Set up a RAW partition on the copy destination volume.

Execute snapshot replications using the following procedure.

1. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

2. Execute the replication.

```
# /opt/FJSVswsrp/bin/swsrpmake From-Volume-Name To-Volume-Name  
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed  
#
```

3. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication  
#
```

Execute synchronized replication using the following procedure.

1. Start synchronous processing.

```
# /opt/FJSVswsrp/bin/swsrpstartsync From-Volume-Name To-Volume-Name  
FROM=From-Volume-Name TO=To-Volume-Name swsrpstartsync completed  
#
```

2. Check equivalency maintenance state.

3. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication  
#
```

4. Execute the replication.

```
# /opt/FJSVswsrp/bin/swsrpmake From-Volume-Name To-Volume-Name  
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed  
#
```

5. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication  
#
```

11.1.9.1 Making a replication during stoppage of a userApplication

When a userApplication to which AdvancedCopy Manager belongs is operating, replication operation is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for replication operation, thus disabling replication operation. Likewise, if the userApplication has been stopped, the environment is not ready and disables replication operation.

However, only when the userApplication has been stopped is replication operation enabled by temporarily arranging the minimum essentials.



Note

- When transactions in scalable operation are handled together, only stop userApplications in scalable operation; do not stop userApplications for storage (management) server transactions.
Enabling replication operation disks (source volume/destination volume to operate) allows you to perform replication operation in the same way as for regular operations. If a replication operation disk cannot be enabled, you cannot perform replication operation while a userApplications in scalable operation is stopped.
- If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), replication operation is disabled.
 - Shared disk for AdvancedCopy Manager shared data
 - Replication operation disks (source volume/destination volume to operate)
- The following operations are not allowed in replication operation:
 - Manipulation for replication operation from a Storage Management Server (host specification with the “-h” option)
 - Addition or deletion of an original/replica volume
 - Inter-server replication without the “-m” option specified
- To execute a display command for replication management to a Storage Management Server transaction that also functions as a Storage Server transaction, you must specify options for the command. For details on the display command for replication management, see the “Commands for Replication Management”.

Perform replication operation during stoppage of a userApplication by taking the following steps:

1. Confirm that the userApplication has been stopped on both nodes.
For details on how to stop a userApplication, see the PRIMECLUSTER manual.
2. Log in to the node on which you want to perform replication operation through telnet, for example.
You cannot use the logical IP address. Directly use a node that is operable by using the physical IP address.
3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.
When the original volume and replica volume have been mounted as file systems for operation, mount the volumes.



Note

- Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.
4. Perform replication operation.
You can perform replication operation in the same way as for regular operations for cluster operation.
You can also perform restoration from the replica volume to the original volume.
 5. Release all the shared disks you enabled in Step 3.
Unmount the file systems you mounted.
Stop (set offline) the shared disk.
 6. Start (set online) the userApplication.
Start the userApplication, if necessary.
For details on how to start a userApplication, see the PRIMECLUSTER manual.

11.1.10 Notes on using ETERNUS VS900 (virtualization switch)

This section gives notes on performing copy involving virtual disks created using ETERNUS VS900.

Copy function

EC/REC are the only copy functions that can be used with ETERNUS VS900. Therefore, use the replication function to perform synchronous replication for copying virtual disks. Since ETERNUS VS900 does not support the OPC function, backup functions (which use OPC when restoring) cannot be used.

REC operating mode

ETERNUS VS900 can use the following operating modes (transfer mode, Recovery mode, and Split mode):

Table: Operating modes

Operating mode types	Usable operating modes
Transfer mode	Only the synchronous mode
Recovery mode	Only the Manual Recovery mode
Split mode	Only the Automatic Split mode

Thus, the operating mode options that can be specified in the replication start command (`swsrpstartsync`) differ from those for an ETERNUS disk array.

Table: Transfer mode options

Option	ETERNUS disk array	ETERNUS VS900
-i (Consistency mode specification)	Possible	Not possible
-k (Stack mode specification)	Possible	Not possible
-y (synchronous mode specification)	Possible	Possible (Note)
None of -i, -k, or -y options specified	Possible (operates in asynchronous mode)	Not possible

Table: Recovery mode options

Option	ETERNUS disk array	ETERNUS VS900
-g (Manual Recovery mode specification)	Possible	Possible (Note)
-g option not specified	Possible (operates in Automatic Recovery mode)	Not possible

Table: Split mode options

Option	ETERNUS disk array	ETERNUS VS900
-a (Automatic Split mode specification)	Possible	Possible
-v (Manual Split mode specification)	Possible	Not possible
-a and -v options not specified	Possible (operates in Automatic Split mode)	Possible (operates in Automatic Split mode)

Note: In ETERNUS VS900, the Transfer mode and Recovery mode must be specified explicitly. Accordingly, specify the following format to start/restart REC when executing the synchronous processing start command (`swsrpstartsync`). The "-a" option can be omitted.

```
swsrpstartsync -y -a -g From-Volume-Name To-Volume-Name
```

However, since the REC operating modes (transfer mode, Recovery mode, and Split mode) that can be used with ETERNUS VS900 are fixed, the synchronous processing mode change command (`swsrpchsnc`) cannot be used to change the operating modes.

EC/REC reversal

EC/REC reversal cannot be performed with ETERNUS VS900

Displaying and changing REC transfer buffer information

ETERNUS VS900 does not have a REC transfer buffer. Therefore, the following commands cannot be executed for the ETERNUS VS900:

- REC transfer buffer information display command (swsrprebuffstat)
- REC transfer buffer configuration change command (swsrprebuffset)

Appendix A Pre-processing and Post-processing of Backup and Restoration

This appendix describes shell scripts used for pre-processing and post-processing of backup and restoration.

Note that a shell script described in this appendix has different linefeed positions due to the formatting of this manual.

A.1 Overview

Shell scripts used for pre-processing and post-processing of backup or restoration are started before and after backup or restoration when a backup or restore execution command is executed. These shell scripts describe processing required by AdvancedCopy Manager to back up or restore a transaction volume.

This chapter describes the setup of pre-processing and post-processing.

A.2 Pre-processing and Post-processing of Backup

Backup using AdvancedCopy Manager must be performed basically while access to a transaction volume from other processes is inhibited.

Normally, the pre-processing acquires the mount status of a transaction volume using the transaction volume name and then performs the following processing:

Transaction volume status	Preprocessing
Mounted	Unmount a transaction volume. (*1)
Unmounted	Take no action.

*1 If the transaction volume cannot be unmounted, however, customize the shell script for pre-processing is customized accordingly. For information on this customization, see the section on "When you do not want to unmount a transaction volume."

Tasks performed in the post-processing are generally determined by what has been done in the pre-processing.

Preprocessing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If no transaction volume has been mounted since the start of system operation (e.g., a transaction volume used as a database), neither pre- nor post-processing is performed.

If special pre-processing or post-processing is required, you need to add the additional instructions to the shell script.

When customizing a script, strictly observe the following rules regarding error code:

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

If post-processing was failed, execute the Resource match command because the consistency of resource information may be incomplete.

A.2.1 Pre-processing of backup

The name of the shell script for pre-processing before backup processing is as follows.

In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcBackup.pre
```

In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcBackup.pre
```

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Preprocessing of backup processing
8: #
9: #       Argument: $1 Device name of transaction disk
10: #           $2 Mount point of transaction disk
11: #           $3 Device name of backup disk
12: #
13: #   Error number
14: #       2: Argument error
15: #       10: umount error
16: #       13: Illegal mount type (bind/stack mount)
17:
18:
19: # Argument check
20: case $# in
21: 1)
22:   ;;
23: 2)
24:   ;;
25: 3)
26:   ;;
27: *)
28:   exit 2
29:   ;;
30: esac
31:
32: device="`echo $1`"
33: mount_point="`echo $2`"
34: bk_device="`echo $3`"
35:
36: # Determination postprocessing file name
37:
38: if [ "$SWSTGNODE" != "" ]
39: then
40:   swstg_node="/`echo $SWSTGNODE`"
41: else
42:   swstg_node=""
43: fi
44:
45: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
46:
47: if [ "`echo $device | /bin/grep "/dev/sd`" != "" ]
48: then
49:   # /dev/sd? -> sd?
50:   dev="`echo $device | /bin/sed "s/¥/dev¥//`"
51: elif [ "`echo $device | /bin/grep "/dev/FJSV`" != "" ]
52: then
53:   # /dev/FJSVmphd/dsk/implb?s? -> implb?s?
54:   # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
55:   dev="`echo $device | /bin/cut -d/ -f5`"
56: elif [ "`echo $device | /bin/grep "/dev/sfdsk/`" != "" ]
57: then
58:   if [ "`echo $device | /bin/grep ":"`" != "" ]
59:   then
60:     devnam="`echo $device | /bin/cut -d: -f2`"
61:     # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?

```

```

62:         dev="`echo $device | /bin/sed "s/¥/dev¥/sfdisk¥//""`"
63:         dev="`echo $dev | /bin/sed "s/¥/disk¥//_/"`"
64:         dev="`echo $dev | /bin/sed "s/:/_/"`"
65:         device="`echo $device | /bin/cut -d: -f1`"
66:         if [ "`echo $devnam | /bin/grep "/dev/disk/by-id/"`" != "" ]
67:         then
68:             # /dev/sfdisk/class/dsk/volume:/dev/disk/by-id/<device> ->
class_volume__by_id<device>
69:             dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-id¥//_by-id/_/"`"
70:             elif [ "`echo $devnam | /bin/grep "/dev/disk/by-path/"`" != "" ]
71:             then
72:                 # /dev/sfdisk/class/dsk/volume:/dev/disk/by-path/<device> ->
class_volume__by_path<device>
73:                 dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-path¥//_by-path/_/"`"
74:             fi
75:         else
76:             # /dev/sfdisk/class/dsk/volume -> _gds_class_volume
77:             dev="_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdisk¥//""`"
78:             dev="`echo $dev | /bin/sed "s/¥/disk¥//_/"`"
79:         fi
80:         elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ]
81:         then
82:             # "/dev/disk/by-id/<device>" -> "_by-id<device>"
83:             dev="_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//""`"
84:             elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
85:             then
86:                 # "/dev/disk/by-path/<device>" -> "_by-path<device>"
87:                 dev="_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//""`"
88:             else
89:                 exit 0
90:         fi
91:         post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
92:         fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
93:         bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
94:
95:         if [ "$mount_point" != "" ]
96:         then
97:
98:             # When device cannot be unmounted
99:             #
100:            # if [ "$device" = "/dev/sdX" -o "$device" = "/dev/sdY" ]
101:            # then
102:            #     if [ "$bk_device" != "" ]
103:            #     then
104:            #         echo $bk_device > $bd_file
105:            #     fi
106:            #     /bin/awk "¥$2==¥$mount_point¥" {print ¥$3}" /proc/mounts > $fstype_file
107:            #     /bin/sync
108:            #     /bin/sync
109:            #     /bin/sync
110:            #     echo "fsck" > $post_file
111:
112:            # When device can be unmounted
113:            #
114:            # else
115:            #     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 2 | /bin/grep
"$mount_point¥$"/usr/bin/wc -w ` != 1 ]; then
116:            #         # stack mount (multi device on $mount_point)
117:            #         /bin/mount > $err_log_path/$dev.umount 2>&1
118:            #         exit 13
119:            #     fi
120:            #     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 1 | /bin/grep
"$device¥$"/usr/bin/wc -w ` != 1 ]; then

```

```

121:             # bind mount (device has multi mount point)
122:             /bin/mount > $err_log_path/$dev.umount 2>&1
123:             exit 13
124:         fi
125:
126:         /bin/awk "¥$2==¥"$mount_point¥" {print ¥$3}" /proc/mounts > $fstype_file
127:         /bin/umount $mount_point 2>/dev/null
128:         if [ $? != 0 ]
129:         then
130:             retry_count=3
131:             sleep_time=1
132:             result_flag=1
133:
134:             while [ $retry_count -gt 0 ]
135:             do
136:                 /bin/umount $mount_point > $err_log_path/$dev.umount 2>&1
137:                 if [ $? != 0 ]
138:                 then
139:                     retry_count=`expr $retry_count - 1`
140:                     /bin/sleep $sleep_time
141:                 else
142:                     /bin/rm -f $err_log_path/$dev.umount
143:                     result_flag=0
144:                     break
145:                 fi
146:             done
147:
148:             if [ $result_flag != 0 ]
149:             then
150:                 /sbin/fuser -vu $mount_point> $err_log_path/$dev.fuser 2>&1
151:                 /bin/ps -ef > $err_log_path/$dev.ps 2>&1
152:
153:                 exit 10
154:             fi
155:         fi
156:         echo "mount" > $post_file
157:
158: # fi
159:
160: # When device was not mounted
161: #
162: else
163:     echo "none" > $post_file
164: fi
165:
166: exit 0

```

A. 2. 2 Post-processing of backup

The name of the shell script for post-processing before backup processing is as follows.
In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcBackup.post
```

In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcBackup.post
```


Post-processing shell script when performing backup

```

1:  #!/bin/sh
2:
3:  # AdvancedCopy Manager
4:  # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
5:
6:  #
7:  #   Post-processing of backup processing
8:  #
9:  #           Argument: $1 Device name of transaction disk
10: #                   $2 Mount point of transaction disk
11: #
12: #   Error number
13: #           2: Argument error
14: #           11: mount error
15: #           12: fsck error
16:
17: # Argument check
18: case $# in
19:  1)
20:  ;;
21:  2)
22:  ;;
23:  *)
24:  exit 2
25:  ;;
26: esac
27:
28: device="`echo $1`"
29: mount_point="`echo $2`"
30:
31: # Determination of post-processing file name
32:
33: if [ "$SWSTGNODE" != "" ]
34: then
35: swstg_node="`echo $SWSTGNODE`"
36: else
37: swstg_node=""
38: fi
39:
40: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
41:
42: if [ "`echo $device | /bin/grep "/dev/sd`" != "" ]
43: then
44: # /dev/sd? -> sd?
45: dev="`echo $device | /bin/sed "s/¥/dev¥//`"
46: elif [ "`echo $device | /bin/grep "/dev/FJSV`" != "" ]
47: then
48: # /dev/FJSVmphd/dsk/implb?s? -> implb?s?
49: # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
50: dev="`echo $device | /bin/cut -d/ -f5`"
51: elif [ "`echo $device | /bin/grep "/dev/sfdsk/`" != "" ]
52: then
53: if [ "`echo $device | /bin/grep ":"`" != "" ]
54: then
55:     # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
56:     dev="`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//`"
57:     dev="`echo $dev | /bin/sed "s/¥/dsk¥/_/`"
58:     dev="`echo $dev | /bin/sed "s/:/_/`"
59:     device="`echo $device | /bin/cut -d: -f1`"
60: else

```

```

61:         # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
62:         dev="_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"
63:         dev="`echo $dev | /bin/sed "s/¥/dsk¥//_/"`"
64:     fi
65:     elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ]
66:     then
67:         # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
68:         dev="_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//""`"
69:     elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
70:     then
71:         # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
72:         dev="_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//""`"
73:     else
74:         exit 0
75:     fi
76:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
77:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
78:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
79:
80:     # Confirmation of post-processing
81:     if [ ! -r $post_file ]
82:     then
83:         exit 0
84:     fi
85:     post="`/bin/cat $post_file`"
86:
87:     # Confirmation of FStype
88:     if [ ! -r $fstype_file ]
89:     then
90:         fs=""
91:     else
92:         fs="`/bin/cat $fstype_file`"
93:     fi
94:
95:     # No processing
96:     if [ "$post" = "none" ]
97:     then
98:         /bin/rm -rf $post_file 2> /dev/null
99:         /bin/rm -rf $fstype_file 2> /dev/null
100:     exit 0
101: fi
102:
103: # mount processing
104: if [ "$post" = "mount" ]
105: then
106:     if [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ¥
107:         -o "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
108:     then
109:         cdevice="/dev/`/usr/bin/readlink $device | /bin/sed "s/..¥/..¥//""`"
110:         Result="`/bin/df -l | /bin/grep "$cdevice " | /bin/awk 'END {print NR}'`"
111:     else
112:         Result="`/bin/df -l | /bin/grep "$device " | /bin/awk 'END {print NR}'`"
113:     fi
114:     if [ "$Result" != "1" ]
115:     then
116:         if [ ! -r $fstype_file ]
117:         then
118:             /bin/mount $device $mount_point 2> /dev/null
119:         else
120:             Result1="`echo $fs | /bin/awk 'END {print NR}'`"
121:             if [ "$Result1" != "1" ]
122:             then

```

```

123:                                     /bin/mount $device $mount_point 2> /dev/null
124:                                     else
125:                                     /bin/mount -t $fs $device $mount_point 2> /dev/null
126:                                     fi
127:     fi
128:     if [ $? != 0 ]
129:     then
130:         retry_count=3
131:         sleep_time=1
132:         result_flag=1
133:
134:         while [ $retry_count -gt 0 ]
135:         do
136:             if [ ! -r $fstype_file ]
137:             then
138:                 /bin/mount $device $mount_point >
139: $err_log_path/$dev.mount 2>&1
140:             else
141:                 Result1="`echo $fs | /bin/awk 'END {print NR}'`"
142:                 if [ "$Result1" != "1" ]
143:                 then
144:                     /bin/mount $device $mount_point >
145: $err_log_path/$dev.mount 2>&1
146:                 else
147:                     /bin/mount -t $fs $device
148: $mount_point > $err_log_path/$dev.mount 2>&1
149:                 fi
150:             fi
151:             if [ $? != 0 ]
152:             then
153:                 retry_count=`expr $retry_count - 1`
154:                 /bin/sleep $sleep_time
155:             else
156:                 /bin/rm -f $err_log_path/$dev.mount
157:                 result_flag=0
158:                 break
159:             fi
160:         done
161:         if [ $result_flag != 0 ]
162:         then
163:             exit 11
164:         fi
165:     fi
166:     /bin/rm -rf $post_file 2> /dev/null
167:     /bin/rm -rf $fstype_file 2> /dev/null
168:     exit 0
169: fi
170: # fsck processing
171: if [ "$post" = "fsck" ]
172: then
173:     if [ -r $bd_file ]
174:     then
175:         bk_device="`/bin/cat $bd_file`"
176:         fsck_dev="`echo $bk_device `"
177:         if [ ! -r $fstype_file ]
178:         then
179:             /sbin/fsck -c $fsck_dev > /dev/null 2>&1
180:         else
181:             if [ "$fs" = "" ]

```

```

182:         then
183:             /sbin/fsck -c $fsck_dev > /dev/null 2>&1
184:         else
185:             if [ "$fs" = "sfxfs" ]
186:             then
187:                 /sbin/sfxadm $fsck_dev > /dev/null 2>&1
188:                 /sbin/fsck -p -t $fs $fsck_dev > /dev/null 2>&1
189:             else
190:                 /sbin/fsck -p -t $fs $fsck_dev > /dev/null 2>&1
191:             fi
192:         fi
193:     fi
194:     if [ $? != 0 ]
195:     then
196:         if [ "$fs" = "" ]
197:         then
198:             result="/sbin/fsck -p $fsck_dev `"`
199:         else
200:             result="/sbin/fsck -p -t $fs $fsck_dev `"`
201:         fi
202:         fsck_rc=$?
203:         if [ $fsck_rc != 0 ] && [ $fsck_rc != 1 ]
204:         then
205:             echo "$result" > $err_log_path/$dev.fsck
206:             exit 12
207:         fi
208:     fi
209: fi
210: /bin/rm -rf $post_file 2> /dev/null
211: /bin/rm -rf $fstype_file 2> /dev/null
212: /bin/rm -rf $bd_file 2> /dev/null
213: exit 0
214: fi
215:
216: exit 0

```

A.2.3 Customizing the shell script

The method of customizing the shell script for backup pre- and post-processing is explained below.

When you do not want to unmount a transaction volume

Edit the script to delete the comment characters ("#") on the 90th to 100th, 104th, and 148th lines for a transaction volume that you do not want to unmount, and specify the target device in the if statement on the 90th line.

Make sure that any special editing of this script has not changed the line numbers quoted above or label the lines to be modified in these circumstances clearly.

Do not update the file system of the transaction volume in the period from execution of the sync command on the 97th line to backup post-processing. Otherwise, the backed-up file system may be incomplete or execution of the fsck command in the backup post-processing may result in an error.

This operation is possible only when the file system is one of the following two:

- ext2
- ext3

The pre-processing by the customized scripts is as follows:

State of transaction volume	preprocessing
It is mounted.	Updating to operating volume is deterred.

The post-processing by the customized scripts is as follows:

preprocessing	post-processing
If Update to operating volume was prevented.	Restore capacity to update operating volume. Matching of the backup volume is checked.



Note

If a SDX object is operated in slice units, do not specify slice name (/dev/sfdsk/(class name)/dsk/(volume name):(sdxinfo DEVNAM value)) in Line 90. Instead, specify logical volume name (/dev/sfdsk/(class name)/dsk/(volume name)).

A.3 Pre-processing and Post-processing of Restoration

In AdvancedCopy Manager, restore processing must be performed while transaction volumes are unmounted.

Thus, in pre-processing, the mount state of the transaction volume is determined using its name and the following processing is then performed:

Transaction volume status	Preprocessing
Mounted	Unmount the transaction volume.
Unmounted	Take no action.

Post-processing tasks will be determined by what has occurred in pre-processing

Preprocessing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If special pre-processing or post-processing is required, you need to add the instructions as appropriate to the shell script.

When customizing a script, strictly observe the following rules regarding error code:

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

If post-processing was failed, execute the Resource match command because the consistency of resource information may be incomplete.

A.3.1 Pre-processing of restoration

The name of the shell script for pre-processing before restore processing is as follows.

In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.pre
```

In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.pre
```

Pre-processing shell script when performing restoration

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
5:
6: #
7: #   Prep-rocessing of restoration processing
8: #
9: #           Argument: $1 Device name of transaction disk
10: #                   $2 Mount point of transaction disk
11: #
12: #           Error number
13: #                   2: Argument error
```

```

14: #                10: umount error
15: #                13: Illegal mount type (bind/stack mount)
16:
17:
18: # Argument check
19: case $# in
20: 1)
21: ;;
22: 2)
23: ;;
24: *)
25: exit 2
26: ;;
27: esac
28:
29: device=`echo $1`
30: mount_point=`echo $2`
31:
32: # Determination of post-processing file name
33:
34: if [ "$SWSTGNODE" != "" ]
35: then
36: swstg_node="/`echo $SWSTGNODE`"
37: else
38: swstg_node=""
39: fi
40:
41: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
42:
43: if [ "`echo $device | /bin/grep "/dev/sd`" != "" ]
44: then
45: # /dev/sd? -> sd?
46: dev=`echo $device | /bin/sed "s/¥/dev¥//"`
47: elif [ "`echo $device | /bin/grep "/dev/FJSV`" != "" ]
48: then
49: # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
50: # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
51: dev=`echo $device | /bin/cut -d/ -f5`
52: elif [ "`echo $device | /bin/grep "/dev/sfdsk/`" != "" ]
53: then
54: if [ "`echo $device | /bin/grep ":"`" != "" ]
55: then
56: # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
57: dev=`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//"`
58: dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/"`
59: dev=`echo $dev | /bin/sed "s/:/_/"`
60: device=`echo $device | /bin/cut -d: -f1`
61: else
62: # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
63: dev=`_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//"`
64: dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/"`
65: fi
66: elif [ "`echo $device | /bin/grep "/dev/disk/by-id/`" != "" ]
67: then
68: # "/dev/disk/by-id/<device>" -> "_by-id<device>"
69: dev=`_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//"`
70: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/`" != "" ]
71: then
72: # "/dev/disk/by-path/<device>" -> "_by-path<device>"
73: dev=`_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//"`
74: else
75: exit 0

```

```

76: fi
77: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
78: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
79:
80: if [ "$mount_point" != "" ]
81: then
82:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 2 | /bin/grep
    "$mount_point%" | /usr/bin/wc -w ` != 1 ]; then
83:         # stack mount (multi device on $mount_point)
84:         /bin/mount > $err_log_path/$dev.umount 2>&1
85:         exit 13
86:     fi
87:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 1 | /bin/grep
    "$device%" | /usr/bin/wc -w ` != 1 ]; then
88:         # bind mount (device has multi mount point)
89:         /bin/mount > $err_log_path/$dev.umount 2>&1
90:         exit 13
91:     fi
92:
93:
94: # When device can be unmounted
95: #
96: #     df -ln $mount_point | cut -f2 -d: | cut -f2 -d' ' > $fstype_file
97: /bin/awk "¥$2=¥"$mount_point%" {print ¥$3}" /proc/mounts > $fstype_file
98: /bin/umount $mount_point 2> /dev/null
99: if [ $? != 0 ]
100: then
101:     retry_count=3
102:     sleep_time=1
103:     result_flag=1
104:
105:     while [ $retry_count -gt 0 ]
106:     do
107:         /bin/umount $mount_point > $err_log_path/$dev.umount 2>&1
108:         if [ $? != 0 ]
109:         then
110:             retry_count=`expr $retry_count - 1`
111:             /bin/sleep $sleep_time
112:         else
113:             /bin/rm -f $err_log_path/$dev.umount
114:             result_flag=0
115:             break
116:         fi
117:     done
118:
119:     if [ $result_flag != 0 ]
120:     then
121:         /sbin/fuser -vu $mount_point > $err_log_path/$dev.fuser 2>&1
122:         /bin/ps -ef > $err_log_path/$dev.ps 2>&1
123:
124:         exit 10
125:     fi
126: fi
127: echo "mount" > $post_file
128:
129: # When device was not mounted
130: #
131: else
132: echo "none" > $post_file
133: fi
134:
135: exit 0

```


Restore processing is not possible on a mounted transaction volume that cannot be unmounted.
Specify a device at the restore destination.

A. 3.2 Post-processing of restoration

The name of the shell script for post-processing after restore processing is as follows.
In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.post
```

In the case of non-cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.post
```

```
1:  #!/bin/sh
2:
3:  # AdvancedCopy Manager
4:  # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
5:  #
6:  #   Post-processing of restoration processing
7:  #
8:  #           Argument: $1 Device name of transaction disk
9:  #                               $2 Mount point of transaction disk
10: #
11: #           Error number
12: #                   2: Argument error
13: #                   11: mount error
14: #
15: # Argument check
16: case $# in
17:  1)
18:   ;;
19:  2)
20:   ;;
21:  *)
22:   exit 2
23:   ;;
24: esac
25:
26: device=`echo $1`
27: mount_point=`echo $2`
28:
29: # Determination of post-processing file name
30:
31: if [ "$SWSTGNODE" != "" ]
32: then
33: swstg_node="/`echo $SWSTGNODE`"
34: else
35: swstg_node=""
36: fi
37:
38: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
39:
40: if [ "`echo $device | /bin/grep "/dev/sd`" != "" ]
41: then
```

```

42: # /dev/sd? -> sd?
43: dev=`echo $device | /bin/sed "s/¥/dev¥//"`
44: elif [ "`echo $device | /bin/grep "/dev/FJSV"" != "" ]
45: then
46: # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
47: # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
48: dev=`echo $device | /bin/cut -d/ -f5`
49: elif [ "`echo $device | /bin/grep "/dev/sfdsk/" != "" ]
50: then
51: if [ "`echo $device | /bin/grep ":" != "" ]
52: then
53:     # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
54:     dev=`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//"`
55:     dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/"`
56:     dev=`echo $dev | /bin/sed "s/:/_/"`
57:     device=`echo $device | /bin/cut -d: -f1`
58: else
59:     # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
60:     dev=`_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//"`
61:     dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/"`
62: fi
63: elif [ "`echo $device | /bin/grep "/dev/disk/by-id/" != "" ]
64: then
65: # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
66: dev=`_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//"`
67: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/" != "" ]
68: then
69: # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
70: dev=`_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//"`
71: else
72: exit 0
73: fi
74: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
75: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
76:
77: # Confirmation of post-processing
78: if [ ! -r $post_file ]
79: then
80: exit 0
81: fi
82: post=`/bin/cat $post_file`
83:
84: # Confirmation of FStype
85: if [ ! -r $fstype_file ]
86: then
87: fs=""
88: else
89: fs=`/bin/cat $fstype_file`
90: fi
91:
92: # No processing
93: if [ "$post" = "none" ]
94: then
95: /bin/rm -rf $post_file 2> /dev/null
96: /bin/rm -rf $fstype_file 2> /dev/null
97: exit 0
98: fi
99:
100: # mount processing
101: if [ "$post" = "mount" ]
102: then
103: if [ "`echo $device | /bin/grep "/dev/disk/by-id/" != "" ¥

```

```

104:         -o "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
105:     then
106:         cdevice="/dev/`/usr/bin/readlink $device | /bin/sed "s/..¥/..¥//"`"
107:         Result="/bin/df -l | /bin/grep "$cdevice " | /bin/awk 'END {print NR}'`"
108:     else
109:         Result="/bin/df -l | /bin/grep "$device " | /bin/awk 'END {print NR}'`"
110:     fi
111:     if [ "$Result" != "1" ]
112:     then
113:         if [ ! -r $fstype_file ]
114:         then
115:             /bin/mount $device $mount_point 2> /dev/null
116:         else
117:             Result1="/bin/echo $fs | /bin/awk 'END {print NR}'`"
118:             if [ "$Result1" != "1" ]
119:             then
120:                 /bin/mount $device $mount_point 2> /dev/null
121:             else
122:                 /bin/mount -t $fs $device $mount_point 2> /dev/null
123:             fi
124:         fi
125:         if [ $? != 0 ]
126:         then
127:             retry_count=3
128:             sleep_time=1
129:             result_flag=1
130:
131:             while [ $retry_count -gt 0 ]
132:             do
133:                 if [ ! -r $fstype_file ]
134:                 then
135:                     /bin/mount $device $mount_point >
136: $err_log_path/$dev.mount 2>&1
137:                 else
138:                     Result1="/bin/echo $fs | /bin/awk 'END {print NR}'`"
139:                     if [ "$Result1" != "1" ]
140:                     then
141:                         /bin/mount $device $mount_point >
142: $err_log_path/$dev.mount 2>&1
143:                     else
144:                         /bin/mount -t $fs $device
145: $mount_point > $err_log_path/$dev.mount 2>&1
146:                     fi
147:                 fi
148:                 if [ $? != 0 ]
149:                 then
150:                     retry_count=`expr $retry_count - 1`
151:                     /bin/sleep $sleep_time
152:                 else
153:                     /bin/rm -f $err_log_path/$dev.mount
154:                     result_flag=0
155:                     break
156:                 fi
157:             done
158:             if [ $result_flag != 0 ]
159:             then
160:                 exit 11
161:             fi
162:         fi
163:     /bin/rm -rf $post_file 2> /dev/null

```

```
163: /bin/rm -rf $fstype_file 2> /dev/null
164: exit 0
165: fi
166:
167: exit 0
```

Appendix B Sample Shell Script for Oracle Integration Backup Operations

This appendix describes sample scripts for AdvancedCopy Manager.

A sample script allows you to back up data on a transaction volume by using AdvancedCopy Manager.



Point

This section explains how the sample shell script is created for the backup management function. This script can be used as a reference template and modified accordingly for use with the replication management function, when copying Oracle databases.

B.1 Overview

Use AdvancedCopy Manager to back up a transaction volume.

AdvancedCopy Manager provides some sample shell scripts for backup processing. The systems administrator must modify the sample shell scripts by modifying them accordingly for their specific operating environment before applying them to live backup operations.

Sample scripts provided for AdvancedCopy Manager are created assuming that the following versions of Oracle are used. If you use any other version, the scripts need to be modified for those versions as required.

- Oracle8i Release 8.1.x

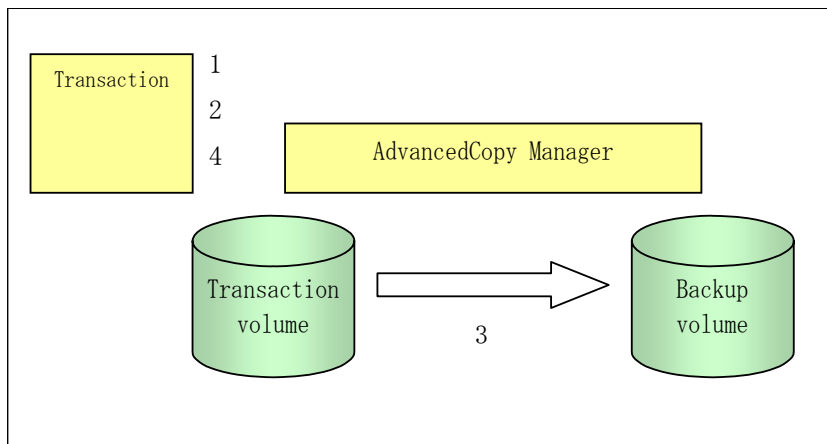
B.2 Backup and Restoration of a Transaction volume

B.2.1 Backup procedure

The following shows an overview of the backup procedure.

1. Checking the work operational status
Check whether any applications are accessing the transaction volume/s.
2. Stoppage of live operational processing
For any live work in progress in 1, ensure the contents of each transaction volume are consistent.
3. Disk backup
Create backup copies of transaction volumes by using the backup function of AdvancedCopy Manager.
4. Resumption of live operational processing
For any live work in progress in 1, restart live processing

Figure: Backup method

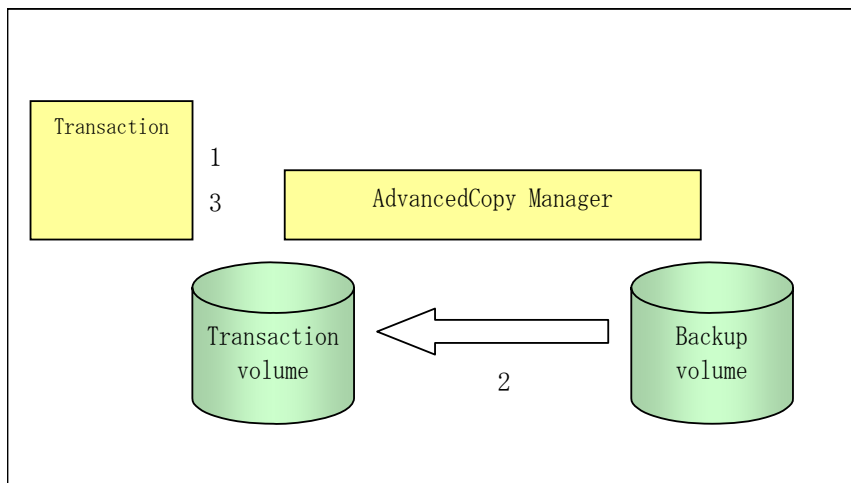


B.2.2 Restoration procedure

The following shows an overview of performing restoration from a backup tape.

1. Checking the work operational status
Check that all live operational processing is stopped. If live operational processing is in operation, completely stop all live operational processing.
2. Restore
Use the restoration function of AdvancedCopy Manager to perform restoration from the backup volume to the transaction volume.
3. Restart live operational processing.

Figure: Restore method



B.3 Sample Shell Scripts

B.3.1 Overview of sample shell scripts

The sample shell scripts provided by AdvancedCopy Manager are summarized below. These sample shell scripts are stored in the `/etc/opt/FJSVswsts/samp` directory.

Table: Sample shell scripts

No.	Type	Script name	Associated transaction	Associated resource type
1	Collection of DB information	swst_or_iv	Oracle transaction	-
2	Backup	swst_or_fs_bk	Oracle transaction, general file transaction	File system
3	Backup	swst_or_rd_bk	Oracle transaction	Raw device

Collecting DB information

swst_or_iv outputs the information of an Oracle database. This script outputs:

Output file names and their contents are as follows:

- spdata.lst: List of table space names and storage destinations
- spdata.srt: Sorted results of spdata.lst using the storage destination as the key
- spdata.bgn: Command in the following format:
tablespace: Table-space-name begin backup:
- spdata.end: Command in the following format:
tablespace: Table-space-name end backup:
- spcont.lst: Control file information of an Oracle database
- splog.lst: Log file information of an Oracle database

The above files are used as references for creating shell scripts used for backup processing.

a. Start

```
swst_or_iv
```

b. Usage example

```
# swst_or_iv  
swst_or_iv completed.
```

c. Result example

```
spdata.lst  
  
TABLESPACE-NAME          DEVICE-NAME  
-----  
  
ORA10                    /ora1/ora0.dbf  
  
ORA20                    /ora2/ora0.dbf  
  
RBS                      /oracle/ora/oradata/rbs01.dbf  
  
SYSTEM                  /oracle/ora/oradata/system01.dbf  
  
TEMP                    /oracle/ora/oradata/temp01.dbf
```



```

TOOLS                /oracle/ora/oradata/tools01.dbf
USERS                /oracle/ora/oradata/users01.dbf

spdata.bgn

alter tablespace ORA10 begin backup;

alter tablespace ORA20 begin backup;

alter tablespace RBS begin backup;

alter tablespace SYSTEM begin backup;

alter tablespace TEMP begin backup;

alter tablespace TOOLS begin backup;

alter tablespace USERS begin backup;

spdata.end

alter tablespace ORA10 end backup;

alter tablespace ORA20 end backup;

alter tablespace RBS end backup;

alter tablespace SYSTEM end backup;

alter tablespace TEMP end backup;

alter tablespace TOOLS end backup;

alter tablespace USERS end backup;

spcont.lst

NAME                TYPE      VALUE
-----
control_files       string  /oracle/ora/oradata/control

splog.lst

NAME                TYPE      VALUE
-----
log_archive_dest    string  /oracle/ora/oradata/archive

```

d. Processing outline

```

#!/bin/sh
reterr() --- An error message is output before an error is returned.
sqldata()
{
sqlplus AAA/BBB <<!
SELECT --- Acquire Oracle table space information.

```

```

}
sqllog()
{
sqlplus AAA/BBB <<!
show --- Acquire Oracle log information.
}
sqlcont()
{
sqlplus AAA/BBB <<!
show --- Acquire Oracle control information.
}

# main()

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Acquisition of Oracle table space information
sqldata() invocation --- Acquire Oracle table space information

# 2) Acquisition of Oracle log information
sqllog() invocation --- Acquire Oracle log information

# 3) Acquisition of Oracle control information
sqlcont() invocation --- Acquire Oracle control information

exit 0

```

File system backup

The “swst_or_fs_bk” script runs AdvancedCopy Manager to back up an Oracle database on the file system and business data using general files.

Live data is copied to the backup volumes of AdvancedCopy Manager. These scripts apply to steps 2 to 4 in “Backup procedure.”

a. Start

```
swst_or_fs_bk {-a | -i} <mount-point-name>
```

b. Explanation of operands

```

-a Specify when processing using an Oracle database is active. The start of backup processing is declared to the Oracle server.
-i Specify when processing using an Oracle database is stopped or the file is a general file. The start of backup processing is not declared to the Oracle server.
mount-point-name Specifies the name of the mount point targeted for backup.

```

c. Example of using swst_or_fs_bk

```

While business is active, back up /gyoumu_db in which an Oracle database is located.
# swst_or_fs_bk -a /gyoumu_db
swst_or_fs_bk completed. ( /gyoumu_db -> /dev/sdb2 at 23:00 on 1999.11.01 )

```

d. Processing outline of swst_or_fs_bk

```
#!/bin/sh
usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
chkmp() --- Check for a mount point
get_mp_blk() --- Conversion from a mount point to a device
getfs() --- Conversion from a mount point to a file system type
sqlbegin()
{
  sqlplus AAA/BBB <<!
  alter system switch logfile;
  alter system flush shared_pool;
  alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.
}
sqlend()
{
  sqlplus AAA/BBB <<!
  alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.
}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy
Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and mount point check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $UDBLK --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
BDBLK="`getbd $UDBLK`" --- Fetch a backup volume as a character device.
BDDATE="`getdate $UDBLK`" --- Fetch the backup date.
BDTIME="`gettime $UDBLK`" --- Fetch the backup time.

exit 0
```

Raw device backup

The script "swst_or_rd_bk" runs AdvancedCopy Manager to back up live data of an Oracle database on a raw device.

Live data is copied to work disks prepared by users.

These scripts apply to steps 2 to 4 in "Backup procedure."

a. Start

```
swst_or_rd_bk {-a | -i} <raw device name> <block device name>
```

b. Explanation of operands

```
-a: Specify when live processing using an Oracle database is active. The start of backup processing is declared to the Oracle server.
-i: It specifies, when the live processing which used the Oracle database is stopping, and the start of backup processing is not declared to Oracle Server.
device name: Specify the name of the raw device partition targeted for backup.
```

c. Example of using swst_or_rd_bk

```
While business is active, back up /dev/sdb0 in which an Oracle database is located.
# swst_or_rd_bk -a /dev/raw/raw1 /dev/sdb6
swst_or_rd_bk completed. ( /dev/sdb6 -> /dev/sdb2 at 23:01 on 1999.11.01 )
```

d. Processing outline of swst_or_rd_bk

```
#!/bin/sh

usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
sqlbegin()
{
  sqlplus AAA/BBB <<!
  alter system switch logfile;
  alter system flush shared_pool;
  alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.
}
sqlend()
{
  sqlplus AAA/BBB <<!
  alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.
}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and raw device check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
```

```

sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $SRC --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
DSTBLK="`getbd $SRC`" --- Fetch a backup volume.
BKDATE="`getdate $SRC`"
BKTIME="`gettime $SRC`"

exit 0

```

B. 3.2 Applying the sample shell scripts

DB information collection

Sample shell script update

Modify the following statements of "swst_or_iv" for the specific live operational environment.

The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Acquisition of Oracle table space information
- 2) Acquisition of Oracle log information
- 3) Acquisition of Oracle control information

The statements 1) to 3) above change Oracle account information.

These scripts can operate only on live transaction servers of AdvancedCopy Manager.

File system backup

AdvancedCopy Manager setup

Set up backup volumes so that the mount point targeted for backup is backed up correctly in AdvancedCopy Manager.

The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Modify the following statements of "swst_or_fs_bk" for the specific live operational environment.

The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Notification issued to Oracle of the start of backup
- 3) Notification issued to Oracle of the stopping of backup

The statements 1) and 3) above refer to the "spdata.bgn" and "spdata.end" files created by "swst_or_iv".

These scripts can operate only on transaction servers of AdvancedCopy Manager.

Raw device backup

AdvancedCopy Manager setup

Set up backup volumes so that the raw device targeted for backup is backed up correctly in AdvancedCopy Manager.

The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Modify the following statements of `swst_or_rd_bk` for the specific live operational environment.

The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Notification issued to Oracle of the start of backup
- 3) Notification issued to Oracle of the stopping of backup

The statements 1) and 3) above refer to the files “`spdata.lst`”, “`spdata.srt`”, “`spdata.bgn`”, “`spdata.end`”, “`splog.lst`” and “`spcont.lst`” files created by “`swst_or_iv`”.

These scripts can operate only on transaction servers of AdvancedCopy Manager.

Recording and managing the backup volume name and processing time

After executing the shell script, a backup volume name and the processing time are displayed. This information is needed if a restoration is required to be performed. Therefore, the backup volume name and processing time displayed after execution of a shell script must be recorded accordingly.

B.3.3 Restore Method

File system

Use the restore function of AdvancedCopy Manager for restore processing.

Raw device

Use the restore function of AdvancedCopy Manager for restore processing.

B.3.4 Notes about using the sample shell scripts

Oracle resource location

Store Oracle data files, and files other than data files, on separate disks or in separate partitions.

Backup operation of Oracle resources

1. Initialization parameter file
 - a. Every time a change occurs, the `cp` command of the OS is executed for backup.
2. Control files
 - a. It is recommended that mirroring is used with Oracle.
 - b. If a change is made in the DB environment, use the following command to create a trace file. If a control file is destroyed, execute the SQL statement in the trace file to recover the control file.

```
Alter database backup control file to trace;
```
3. Data files
 - a. The recommended location of data files is on a raw device.
 - b. To store a data file on the file system, disable the automatic extended function of the data file (AUTOEXTEND OFF). Then, customization of the sample shell script is required to prevent unmounting during context processing.
 - c. Create backup copies in AdvancedCopy Manager.
 - d. The range of table spaces targeted for backup must be within the unit of synchronous backup processing (begin backup/end backup) in Oracle and the unit of backup in AdvancedCopy Manager. For example, if backup copies must be created in units of LUNs in AdvancedCopy Manager, place one table space in one LUN.
 - e. Archive all of the latest logs by executing the following command after backing up all table spaces in the system.

```
alter system archive log current;
```

4. REDO files

- a. It is recommended to mirror online REDO log files and archive log files using Oracle or the OS.
- b. No online REDO log file needs to be backed up.



Note

For online backup operations the target Oracle database must use an archive log.

Recovery of Oracle databases

After the Oracle database has stopped, restore the database, and restart it. To recover the database to the latest state, use the recovery function of Oracle.

Appendix C Pre-processing and Post-processing of Replication

This chapter explains the shell scripts that perform the pre-processing and post-processing of replication in AdvancedCopy Manager.

C.1 Overview

The shell scripts that perform the pre-processing and post-processing of replication start before and after replication (copy) processing.

These shell scripts contain processing code required by AdvancedCopy Manager for the copy source volume and copy destination volume.

This chapter describes the setup of pre-processing and post-processing.



Note

If replication is performed in group units, the replication pre-processing and post-processing scripts are not started. Therefore, replication pre-processing and post-processing must be performed manually when replication is performed in group units.

C.2 Pre-processing and Post-processing of Replication

The replication pre-processing and post-processing in AdvancedCopy Manager needs to be performed for both the replication source volume and the replication destination volume. However, the purpose for each is different.

- Pre-processing and post-processing for a replication source volume
The purpose of the processing is to freeze the replication source data in a state in which consistency is temporarily ensured. Replication source data is frozen temporarily in pre-processing, and after the replication has been created, the frozen status is released in post-processing.
- Pre-processing and post-processing for a replication destination volume
The purpose of the processing is to prevent any application from accessing a replication destination volume during replication (copy) processing. In pre-processing, replication data for the destination is placed in access-disabled status, and after the replication has been created, this status is released in post-processing.

Specific processing performed in pre-processing and post-processing varies according to the data on the volume. The next section describes the pre-processing and post-processing of a file system and a database.

C.2.1 Pre-processing and post-processing for a file system

The pre-processing and post-processing for a file system is typically the unmounting and remounting of the file system. (For Windows, the processing consists of allocating and canceling a drive letter.) The pre-processing and post-processing for the replication source volume ensure the integrity of the replication source data. The pre-processing and post-processing for the replication destination volume are performed to make access from other processes during synchronization processing and snapshot copying impossible. If no volume is mounted, the pre-processing and post-processing are not performed.

If the replication destination volume is a Logical Unit (disk), the post-processing for the replication destination disk notifies the OS that the management information (partition table, etc.) of the replication destination disk has been updated.

The implementation status of the pre-processing and post-processing for a file system is shown below. This table shows whether pre-processing and post-processing are performed depending on the command type. It also shows the copy status upon execution of the command.

Table: Pre-processing and post-processing for a file system

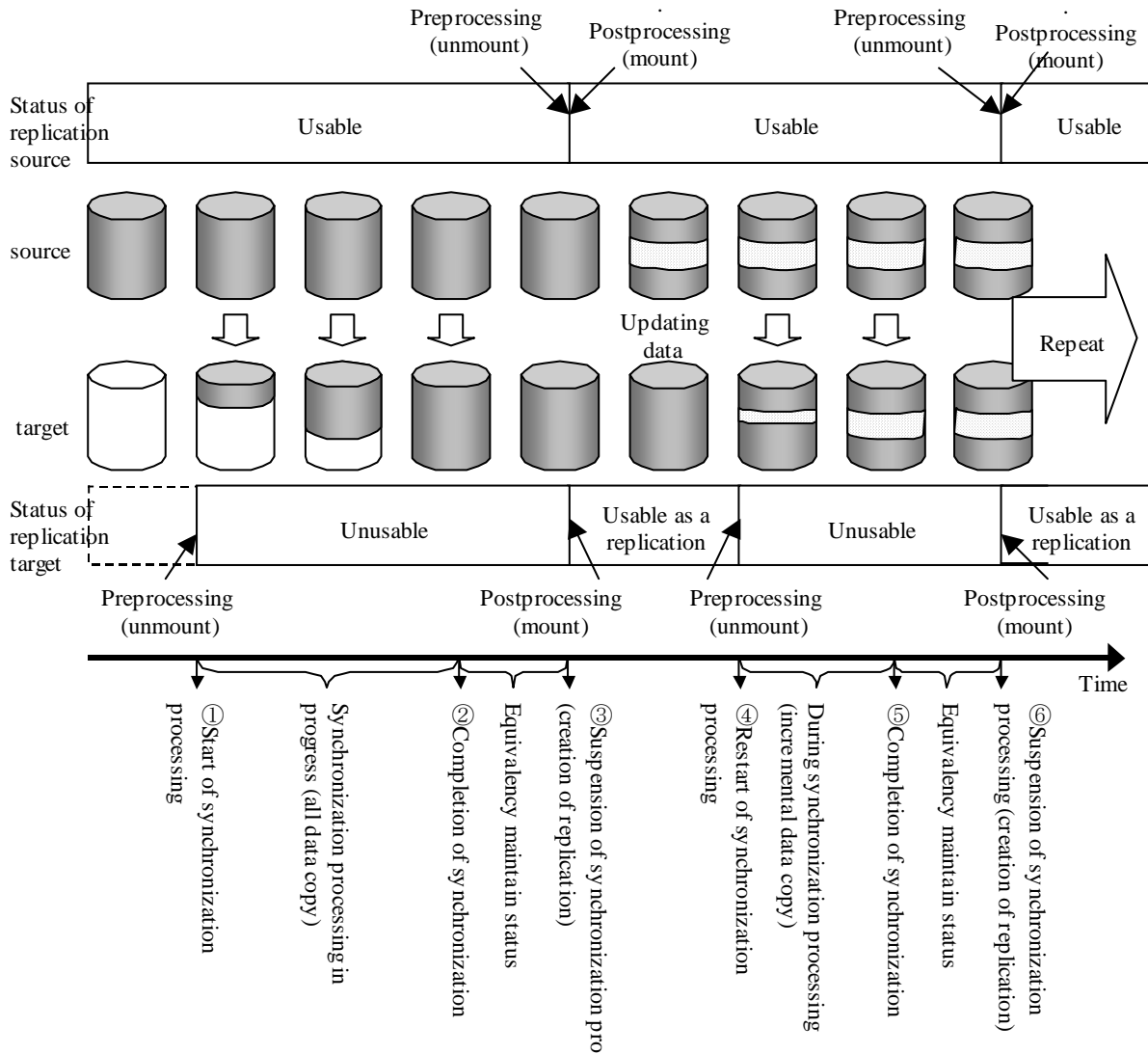
Command	Copy status	Source/target	Preprocessing	Post-processing
Replication start command (swsrpstartsync)	uncopy or replication establishment	Source	X	X
		target	0--*1	X
Replication making command (for synchronous replication) (swsrpmake)	equivalence maintenance	Source	0	0
		target	X	0--*2
Replication cancellation command (swsrpcancel)	equivalence maintenance	Source	0	0
		target	X	0--*2
	Replication establishment	Source	X	X
		target	X	X
	copying	Source	X	X
		target	X	X
Replication making command (for snapshot replication) (swsrpmake)	uncopy	Source	0	0
		target	0	0

0 : executed, X : not executed

The post-processing for the pre-processing performed in (1) is performed in (2). In the post-processing in (2), re-mount is performed for the mount point where unmount was performed in the pre-processing in (1).

The pre-processing and post-processing for a file system can be customized. The processing is started in accordance with the table above when a replication management command is executed. For replication between servers, these scripts are executed by remote execution by TCP/IP in the pre-processing and post-processing of a volume that is not connected. The operation image before and after processing is shown below.

Figure: Synchronized replication processing



If additional instructions are to be performed over and above the standard pre-processing and post-processing that is required, the scripts must be customized accordingly with the required statements.

When customizing a script, strictly observe the following rules regarding error code:

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

AdvancedCopy Manager does not support any functions for the pre-processing and post-processing of a database. You will need to perform your own pre-processing and post-processing before and after the execution of an AdvancedCopy Manager command.

C.2.2 Pre-processing when replication is executed

The replication source volume (RepSrcPre.js) and the replication destination volume (RepDstPre.js) are prepared for a pre-processing script, and it is stored using the following directory path. Please customize the script according to your specific requirements.

In the case of non-cluster operation

```
/etc/opt/FJSVswsrp/sh directory subordinate
```

In the case of cluster operation

```
/etc/opt/FJSVswsrp/<logic node name>/sh directory subordinate
```

RepSrc.pre (copy source volume script)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Preprocessing of Replication(Source) processing
8: #
9: #       Argument: $1 Device name of Source disk
10: #           $2 Mount point of Source disk
11: #
12: #       Error number
13: #           2: Argument error
14: #           10: umount error
15: #           13: Illegal mount type (stack/bind mount)
16:
17: # Argument check
18: case $# in
19: 2)
20:     ;;
21: *)
22:     exit 2
23:     ;;
24: esac
25:
26: device=$1
27: mount_point=$2
28:
29: # Determination postprocessing file name
30: if [ ``echo $device | /bin/grep "/dev/sd"`` != "" ]
31: then
32:     # /dev/sd? -> sd?
33:     dev="`echo $device | /bin/sed "s/¥/dev¥//""`"
34: elif [ ``echo $device | /bin/grep "/dev/FJSV"`` != "" ]
35: then
36:     # /dev/FJSVmphd/dsk/implb?s? -> implb?s?
37:     # /dev/FJSVmphd/dsk/mphd?s? -> mpbd?s?
38:     dev="`echo $device | /bin/cut -d/ -f5`"
39: elif [ ``echo $device | /bin/grep "/dev/sfdsk/"`` != "" ]
40: then
41:     if [ ``echo $device | /bin/grep ":"`` != "" ]
42:     then
43:         devnam="`echo $device | /bin/cut -d: -f2-`"
44:         # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
45:         dev="`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"
46:         dev="`echo $dev | /bin/sed "s/¥/dsk¥/_/""`"
47:         dev="`echo $dev | /bin/sed "s:/_/"`"
48:         device="`echo $device | /bin/cut -d: -f1`"
49:         if [ ``echo $devnam | /bin/grep "/dev/disk/by-id/"`` != "" ]
50:         then
51:             # /dev/sfdsk/class/dsk/volume:/dev/disk/by-id/<device> ->
class_volume__by_id_<device>
52:             dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-id¥/_by-id/_/""`"
53:         elif [ ``echo $devnam | /bin/grep "/dev/disk/by-path/"`` != "" ]
54:         then
55:             # /dev/sfdsk/class/dsk/volume:/dev/disk/by-path/<device> ->
class_volume__by_path_<device>
56:             dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-path¥/_by-path/_/""`"
57:         fi
58:     else
59:         # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
60:         dev="_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"

```

```

61:         dev="`echo $dev | /bin/sed "s/¥/disk¥//_/"`"
62:     fi
63: elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ]
64: then
65:     # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
66:     dev="_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//_"`"
67: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
68: then
69:     # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
70:     dev="_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//_"`"
71: else
72:     exit 0
73: fi
74: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
75: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
76:
77: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
78:
79: if [ "$mount_point" != "" ]
80: # When device was mounted
81: #
82: then
83:
84:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 2 | /bin/grep
85:     "`$mount_point¥$"/usr/bin/wc -w` != 1 ]; then
86:         # stack mount (multi device on $mount_point)
87:         /bin/mount > $err_log_path/$dev.ount 2>&1
88:         exit 13
89:     fi
90:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 1 | /bin/grep
91:     "`$device¥$"/usr/bin/wc -w` != 1 ]; then
92:         # bind mount (device has multi mount point)
93:         /bin/mount > $err_log_path/$dev.ount 2>&1
94:         exit 13
95:     fi
96:     /bin/awk "¥$2==¥"$mount_point¥" {print ¥$3}" /proc/mounts > $fstype_file
97:     /bin/umount $mount_point 2>/dev/null
98:
99:     if [ $? != 0 ]
100:     then
101:         retry_count=3
102:         sleep_time=1
103:         result_flag=1
104:
105:         while [ $retry_count -gt 0 ]
106:         do
107:             /bin/umount $mount_point > $err_log_path/$dev.ount 2>&1
108:             if [ $? != 0 ]
109:             then
110:                 retry_count=`expr $retry_count - 1`
111:                 /bin/sleep $sleep_time
112:             else
113:                 /bin/rm -f $err_log_path/$dev.ount
114:                 result_flag=0
115:                 break
116:             fi
117:         done
118:
119:         if [ $result_flag != 0 ]
120:         then

```

```
121:          /sbin/fuser -vu $mount_point> $err_log_path/$dev.fuser 2>&1
122:          /bin/ps -ef > $err_log_path/$dev.ps 2>&1
123:          exit 10
124:      fi
125:  fi
126:
127:      echo "mount,$mount_point" > $post_file
128:
129: # When device was not mounted
130: #
131: else
132:     echo "none" > $post_file
133: fi
134:
135: exit 0
```

RepDst.pre (copy destination volume script)


```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Pre-processing of Replication(Destination) processing
8: #
9: #       Argument: $1 Device name of Destination disk
10: #           $2 Mount point of Destination disk
11: #
12: #       Error number
13: #           2: Argument error
14: #           10: umount error
15: #           13: Illegal mount type (bind/stack mount)
16:
17: # Argument check
18: case $# in
19: 2)
20:     ;;
21: *)
22:     exit 2
23:     ;;
24: esac
25:
26: device=$1
27: mount_point=$2
28:
29: # Determination post-processing file name
30: if [ "`echo $device | /bin/grep "/dev/sd"" != "" ]
31: then
32:     # /dev/sd? -> sd?
33:     dev="`echo $device | /bin/sed "s/¥/dev¥//""`"
34: elif [ "`echo $device | /bin/grep "/dev/FJSV"" != "" ]
35: then
36:     # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
37:     # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
38:     dev="`echo $device | /bin/cut -d/ -f5`"
39: elif [ "`echo $device | /bin/grep "/dev/sfdsk/"" != "" ]
40: then
41:     if [ "`echo $device | /bin/grep ":""" != "" ]
42:     then
43:         devnam="`echo $device | /bin/cut -d: -f2-`"
44:         # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
45:         dev="`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"
46:         dev="`echo $dev | /bin/sed "s/¥/dsk¥/_/""`"
47:         dev="`echo $dev | /bin/sed "s/:/_/""`"
48:         device="`echo $device | /bin/cut -d: -f1`"
49:         if [ "`echo $devnam | /bin/grep "/dev/disk/by-id/"" != "" ]
50:         then
51:             # /dev/sfdsk/class/dsk/volume:/dev/disk/by-id/<device> ->
class_volume_by_id_<device>
52:             dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-id¥/_by-id/_/""`"
53:         elif [ "`echo $devnam | /bin/grep "/dev/disk/by-path/"" != "" ]
54:         then
55:             # /dev/sfdsk/class/dsk/volume:/dev/disk/by-path/<device> ->
class_volume_by_path_<device>
56:             dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-path¥/_by-path/_/""`"
57:         fi
58:     else
59:         # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
60:         dev="_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"

```

```

61:         dev="`echo $dev | /bin/sed "s/¥/disk¥//_/"`"
62:     fi
63: elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ]
64: then
65:     # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
66:     dev="_by-id`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//_"`"
67: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
68: then
69:     # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
70:     dev="_by-path`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//_"`"
71: else
72:     exit 0
73: fi
74: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
75: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
76:
77: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
78:
79: if [ "$mount_point" != "" ]
80: # When device was mounted
81: #
82: then
83:
84:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 2 | /bin/grep
    "`$mount_point¥$"/usr/bin/wc -w` != 1 ]; then
85:         # stack mount (multi device on $mount_point)
86:         /bin/mount > $err_log_path/$dev.umont 2>&1
87:         exit 13
88:     fi
89:     if [ ` /bin/cat /proc/mounts | /bin/cut -d' ' -f 1 | /bin/grep
    "`$device¥$"/usr/bin/wc -w` != 1 ]; then
90:         # bind mount (device has multi mount point)
91:         /bin/mount > $err_log_path/$dev.umont 2>&1
92:         exit 13
93:     fi
94:
95:     /bin/awk "¥$2==¥"$mount_point¥" {print ¥$3}" /proc/mounts > $fstype_file
96:
97:     /bin/umount $mount_point 2>/dev/null
98:
99:     if [ $? != 0 ]
100: then
101:         retry_count=3
102:         sleep_time=1
103:         result_flag=1
104:
105:         while [ $retry_count -gt 0 ]
106: do
107:             /bin/umount $mount_point > $err_log_path/$dev.umont 2>&1
108:             if [ $? != 0 ]
109: then
110:                 retry_count=`expr $retry_count - 1`
111:                 /bin/sleep $sleep_time
112:             else
113:                 /bin/rm -f $err_log_path/$dev.umont
114:                 result_flag=0
115:                 break
116:             fi
117:         done
118:
119:         if [ $result_flag != 0 ]
120: then

```

```

121:                /sbin/fuser -vu $mount_point> $err_log_path/$dev.fuser 2>&1
122:                /bin/ps -ef > $err_log_path/$dev.ps 2>&1
123:                exit 10
124:            fi
125:        fi
126:
127:        echo "mount, $mount_point" > $post_file
128:
129:        # When device was not mounted
130:        #
131:    else
132:        echo "none" > $post_file
133:    fi
134:
135:    exit 0

```

C.2.3 Post-processing when replication is executed

The replication source volume (RepSrcPost.js) and the replication destination volume (RepDstPost.js) are prepared for a post-processing script, and it is stored in the following directory subordinates. Please customize a script according to your specific requirements. In the case of non-cluster operation

```
/etc/opt/FJSVswsrp/sh directory subordinate
```

In the case of cluster operation

```
/etc/opt/FJSVswsrp/<logic node name>/sh directory subordinate
```

RepSrc.post (copy source volume script)

C.2.4 Customizing the shell script

The method of customizing the shell script for replication pre- and post-processing is explained below.

If you do not want to unmount the copy source volume

If you do not want to unmount the mounted copy source volume, then customize the script while referring to "Pre-processing and Post-processing of Backup."

This is possible only in the following file system:

- ext2
- ext3

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Post-processing of Replication(Source) processing
8: #
9: #       Argument: $1 Device name of Source disk
10: #
11: #   Error number
12: #           2: Argument error
13: #           11: mount error
14:
15: # Argument check
16: case $# in
17: 1)
18:     ;;
19: *)
20:     exit 2
21:     ;;
22: esac
23:
24: device=$1
25:
26: # Determination of post-processing file name
27: if [ "`echo $device | /bin/grep "/dev/sd"" != "" ]
28: then
29:     # /dev/sd? -> sd?
30:     dev=`echo $device | /bin/sed "s/¥/dev¥//""`
31: elif [ "`echo $device | /bin/grep "/dev/FJSV"" != "" ]
32: then
33:     # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
34:     # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
35:     dev=`echo $device | /bin/cut -d/ -f5`
36: elif [ "`echo $device | /bin/grep "/dev/sfdsk/"" != "" ]
37: then
38:     if [ "`echo $device | /bin/grep ":""" != "" ]
39:     then
40:         devnam=`echo $device | /bin/cut -d: -f2-`
41:         # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
42:         dev=`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`
43:         dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/""`
44:         dev=`echo $dev | /bin/sed "s:/_/_/""`
45:         device=`echo $device | /bin/cut -d: -f1`
46:         if [ "`echo $devnam | /bin/grep "/dev/disk/by-id/"" != "" ]
47:         then
48:             # /dev/sfdsk/class/dsk/volume:/dev/disk/by-id/<device> ->
class_volume__by_id<device>
49:             dev=`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-id¥/_by-id/_/""`
50:             elif [ "`echo $devnam | /bin/grep "/dev/disk/by-path/"" != "" ]
51:             then
52:                 # /dev/sfdsk/class/dsk/volume:/dev/disk/by-path/<device> ->
class_volume__by_path<device>
53:                 dev=`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-path¥/_by-path/_/""`
54:             fi
55:         else
56:             # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
57:             dev=`_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`
58:             dev=`echo $dev | /bin/sed "s/¥/dsk¥/_/""`
59:         fi
60:     elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"" != "" ]

```

```

61: then
62:   # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
63:   dev="_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//"`"
64: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
65: then
66:   # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
67:   dev="_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//"`"
68: else
69:   exit 0
70: fi
71: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
72: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
73:
74: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
75:
76: # Confirmation of postprocessing
77: if [ ! -r $post_file ]
78: then
79:   exit 0
80: fi
81: post="`/bin/cat $post_file | /bin/cut -d',' -f1`"
82: mount_point="`/bin/cat $post_file | /bin/cut -d',' -f2`"
83:
84: # Confirmation of FStype
85: if [ ! -r $fstype_file ]
86: then
87:   fs=""
88: else
89:   fs="`/bin/cat $fstype_file`"
90: fi
91:
92: # No processing
93: if [ "$post" = "none" ]
94: then
95:   /bin/rm -rf $post_file 2> /dev/null
96:   /bin/rm -rf $fstype_file 2> /dev/null
97:   exit 0
98: fi
99:
100: # mount processing
101: if [ "$post" = "mount" ]
102: then
103:   if [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ¥
104:     -o "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
105:   then
106:     cdevice="/dev/`usr/bin/readlink $device | /bin/sed "s/..¥/..¥//"`"
107:     Result="`/bin/df -l | /bin/grep "$cdevice " | /bin/awk 'END {print NR}'`"
108:   else
109:     Result="`/bin/df -l | /bin/grep "$device " | /bin/awk 'END {print NR}'`"
110:   fi
111:   if [ "$Result" != "1" ]
112:   then
113:     if [ ! -r $fstype_file ]
114:     then
115:       /bin/mount $device $mount_point 2> /dev/null
116:     else
117:       Result1="`echo $fs | /bin/awk 'END {print NR}'`"
118:       if [ "$Result1" != "1" ]
119:       then
120:         /bin/mount $device $mount_point 2> /dev/null
121:       else
122:         /bin/mount -t $fs $device $mount_point 2> /dev/null

```

```

123:         fi
124:     fi
125:     if [ $? != 0 ]
126:     then
127:         retry_count=3
128:         sleep_time=1
129:         result_flag=1
130:
131:         while [ $retry_count -gt 0 ]
132:         do
133:             if [ ! -r $fstype_file ]
134:             then
135:                 /bin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
136:             else
137:                 Result1="`echo $fs | /bin/awk 'END {print NR}'`"
138:                 if [ "$Result1" != "1" ]
139:                 then
140:                     /bin/mount $device $mount_point >
141: $err_log_path/$dev.mount 2>&1
142:                 else
143:                     /bin/mount -t $fs $device $mount_point >
144: $err_log_path/$dev.mount 2>&1
145:                 fi
146:             fi
147:             if [ $? != 0 ]
148:             then
149:                 retry_count=`expr $retry_count - 1`
150:                 /bin/sleep $sleep_time
151:             else
152:                 /bin/rm -f $err_log_path/$dev.mount
153:                 result_flag=0
154:                 break
155:             fi
156:         done
157:         if [ $result_flag != 0 ]
158:         then
159:             exit 11
160:         fi
161:     fi
162:     /bin/rm -rf $post_file 2> /dev/null
163:     /bin/rm -rf $fstype_file 2> /dev/null
164:     exit 0
165: fi
166:
167: exit 0

```

RepDst.post (copy destination volume script)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Post-processing of Replication(Destination) processing
8: #
9: #       Argument: $1 Device name of Destination disk
10: #
11: #   Error number
12: #       2: Argument error
13: #       11 mount error
14:
15: # Argument check
16: case $# in
17: 1)
18:   ;;
19: *)
20:   exit 2
21:   ;;
22: esac
23:
24: device=$1
25:
26: # Determination of post-processing file name
27: if [ "`echo $device | /bin/grep "/dev/sd"" != "" ]
28: then
29:   # /dev/sd? -> sd?
30:   dev="`echo $device | /bin/sed "s/¥/dev¥//""`"
31: elif [ "`echo $device | /bin/grep "/dev/FJSV"" != "" ]
32: then
33:   # /dev/FJSVmphd/dsk/implb?s? -> implb?s?
34:   # /dev/FJSVmphd/dsk/mphd?s? -> mphe?s?
35:   dev="`echo $device | /bin/cut -d/ -f5`"
36: elif [ "`echo $device | /bin/grep "/dev/sfdsk/"" != "" ]
37: then
38:   if [ "`echo $device | /bin/grep ":"`" != "" ]
39:   then
40:     devnam="`echo $device | /bin/cut -d: -f2`"
41:     # /dev/sfdsk/class/dsk/volume:sd? -> class_volume_sd?
42:     dev="`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"
43:     dev="`echo $dev | /bin/sed "s/¥/dsk¥/_/""`"
44:     dev="`echo $dev | /bin/sed "s/:/_/""`"
45:     device="`echo $device | /bin/cut -d: -f1`"
46:     if [ "`echo $devnam | /bin/grep "/dev/disk/by-id/"" != "" ]
47:     then
48:       # /dev/sfdsk/class/dsk/volume:/dev/disk/by-id/<device> ->
class_volume__by_id_<device>
49:       dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-id¥/_by-id_/""`"
50:     elif [ "`echo $devnam | /bin/grep "/dev/disk/by-path/"" != "" ]
51:     then
52:       # /dev/sfdsk/class/dsk/volume:/dev/disk/by-path/<device> ->
class_volume__by_path_<device>
53:       dev="`echo $dev | /bin/sed "s/¥/dev¥/disk¥/by-path¥/_by-path_/""`"
54:     fi
55:   else
56:     # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
57:     dev="`_gds_`echo $device | /bin/sed "s/¥/dev¥/sfdsk¥//""`"
58:     dev="`echo $dev | /bin/sed "s/¥/dsk¥/_/""`"
59:   fi
60: elif [ "`echo $device | /bin/grep "/dev/disk/by-id/"" != "" ]

```

```

61: then
62:   # "/dev/disk/by-id/<device>" -> "_by-id-<device>"
63:   dev="_by-id_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-id¥//""`"
64: elif [ "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
65: then
66:   # "/dev/disk/by-path/<device>" -> "_by-path-<device>"
67:   dev="_by-path_`echo $device | /bin/sed "s/¥/dev¥/disk¥/by-path¥//""`"
68: else
69:   exit 0
70: fi
71: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
72: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
73:
74: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
75:
76: # Confirmation of postprocessing
77: if [ ! -r $post_file ]
78: then
79:   exit 0
80: fi
81: post=`/bin/cat $post_file | /bin/cut -d',' -f1`"
82: mount_point=`/bin/cat $post_file | /bin/cut -d',' -f2`"
83:
84: # Confirmation of FStype
85: if [ ! -r $fstype_file ]
86: then
87:   fs=""
88: else
89:   fs=`/bin/cat $fstype_file`"
90: fi
91:
92: # No processing
93: if [ "$post" = "none" ]
94: then
95:   /bin/rm -rf $post_file 2> /dev/null
96:   /bin/rm -rf $fstype_file 2> /dev/null
97:   exit 0
98: fi
99:
100: # mount processing
101: if [ "$post" = "mount" ]
102: then
103:   # df -l $device > /dev/null 2>&1
104:   # if [ $? != 0 ]
105:   if [ "`echo $device | /bin/grep "/dev/disk/by-id/"`" != "" ¥
106:     -o "`echo $device | /bin/grep "/dev/disk/by-path/"`" != "" ]
107:   then
108:     cdevice="/dev/`/usr/bin/readlink $device | /bin/sed "s/.¥/.¥//""`"
109:     Result=`/bin/df -l | /bin/grep "$cdevice " | /bin/awk 'END {print NR}'`"
110:   else
111:     Result=`/bin/df -l | /bin/grep "$device " | /bin/awk 'END {print NR}'`"
112:   fi
113:   if [ "$Result" != "1" ]
114:   then
115:     if [ ! -r $fstype_file ]
116:     then
117:       /bin/mount $device $mount_point 2> /dev/null
118:     else
119:       Result1=`echo $fs | /bin/awk 'END {print NR}'`"
120:       if [ "$Result1" != "1" ]
121:       then
122:         /bin/mount $device $mount_point 2> /dev/null

```



```

123:         else
124:             /bin/mount -t $fs $device $mount_point 2> /dev/null
125:         fi
126:     fi
127:     if [ $? != 0 ]
128:     then
129:         retry_count=3
130:         sleep_time=1
131:         result_flag=1
132:
133:         while [ $retry_count -gt 0 ]
134:         do
135:             if [ ! -r $fstype_file ]
136:             then
137:                 /bin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
138:             else
139:                 Result1="`echo $fs | /bin/awk 'END {print NR}'`"
140:                 if [ "$Result1" != "1" ]
141:                 then
142:                     /bin/mount $device $mount_point >
143:                     $err_log_path/$dev.mount 2>&1
144:                     /bin/mount -t $fs $device $mount_point >
145:                     $err_log_path/$dev.mount 2>&1
146:                 fi
147:             fi
148:             if [ $? != 0 ]
149:             then
150:                 retry_count=`expr $retry_count - 1`
151:                 /bin/sleep $sleep_time
152:             else
153:                 /bin/rm -f $err_log_path/$dev.mount
154:                 result_flag=0
155:                 break
156:             fi
157:         done
158:         if [ $result_flag != 0 ]
159:         then
160:             exit 11
161:         fi
162:     fi
163: fi
164: /bin/rm -rf $post_file 2> /dev/null
165: /bin/rm -rf $fstype_file 2> /dev/null
166: exit 0
167: fi
168:
169: exit 0

```


Appendix D System Volume Backup Operation

For information on how to make a backup of and restore a system volume by using AdvancedCopy Manager, see "System volume backup operation" in the "ETERNUS SF *AdvancedCopy Manager Operator's Guide for Tape Backup Option*".

Appendix E Backup Operations Using Power-Saving

E.1 Overview

Under the power-saving operation, the ETERNUS disk array eco mode functionality is used. The processing time of a specific disk drive (RAID group unit) is managed according to the schedule, and the disk drive's motor is stopped if there is no access to the disk for a certain period of time (the period can be set at 10 minutes, 20 minutes, 30 minutes, 40 minutes, 50 minutes and 60 minutes). In this way, power-saving can be achieved.

If there is an access to the disk when the motor has stopped, the disk drive is started again and the access is enabled in one to three minutes' time.

Moreover, if the number of operations of the disk drive in one day exceeds the set range (one to five times can be set), the number of access is judged to be high. In this situation, the echo mode is not applied, and the operation will continue.

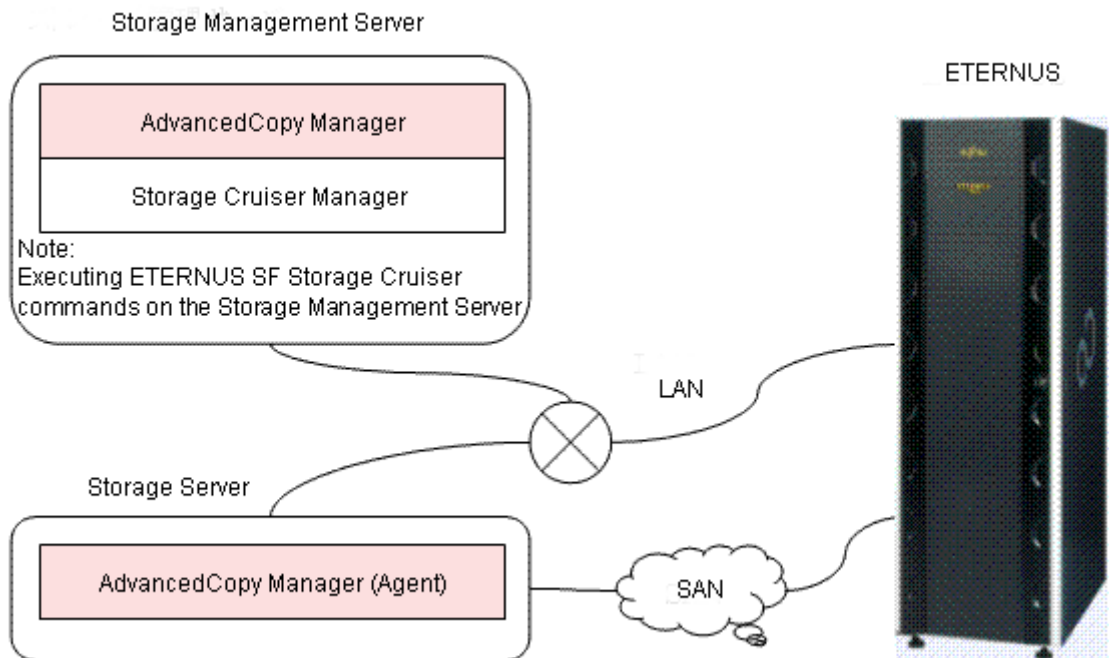
It is possible to save power consumption under the following operations.

- Backup management
 - Snapshot type high-speed backup (OPC) with no access to the backup volume for a long period of time.
 - Suspend/Resume functionality of synchronous type high-speed backup (EC, REC) with a long suspend time.
- Replication management
 - Snapshot type high-speed replication (OPC) with no access to the copied volume as the backup destination for a long period of time.
 - Suspend/Resume functionality of synchronous type high-speed replication with a long suspend time.

E.2 Structure

This section explains the overview of the structure.

Diagram: Overview of structure



E.3 Operating Environment

This section explains the operating environment of the backup operation under the power-saving mode.

Device	Description
Storage Management Server	<ul style="list-style-type: none"> ● Required operating systems <ul style="list-style-type: none"> — [Windows] <ul style="list-style-type: none"> Microsoft(R) Windows(R) 2000 Server SP4 or later Microsoft(R) Windows(R) 2000 Advanced Server SP4 or later Microsoft(R) Windows Server(R) 2003, Standard Edition SP1, SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition SP1, SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition SP2 Microsoft(R) Windows Server(R) 2008 Standard(x86) Microsoft(R) Windows Server(R) 2008 Enterprise(x86) Microsoft(R) Windows Server(R) 2008 Datacenter(x86) — [Solaris] <ul style="list-style-type: none"> Solaris 8 Solaris 9 Solaris 10 — [Linux] <ul style="list-style-type: none"> Red Hat Enterprise Linux 5 (for Intel Itanium) ● Required software <ul style="list-style-type: none"> ETERNUS SF Storage Cruiser 13.3 (Operation control server functionality) <p>Note 1) For installation and setup of ETERNUS SF Storage Cruiser 13.3, refer to ETERNUS SF Storage Cruiser 13.3 manual.</p>
Storage Server	<ul style="list-style-type: none"> ● Required operating system <ul style="list-style-type: none"> Operating systems supported by AdvancedCopy Manager 13.3 ● Required software <ul style="list-style-type: none"> None
ETERNUS disk array	<p>ETERNUS2000 disk array device model 100 or higher ETERNUS4000 disk array device model 300 or higher ETERNUS8000 disk array device model 700 or higher</p> <p>Note: Firmware that can control eco mode software is required.</p>

E.4 Environment settings

E.4.1 Procedure for environment settings

This section explains the procedure for environment settings.

- E. 4.2 Settings for an ETERNUS Disk Array
- E. 4.3 Settings for AdvancedCopy Manager
- E. 4.4 Settings for ETERNUS SF Storage Cruiser

E.4.2 Settings for an ETERNUS Disk array

To use the eco mode, it is required to set the device eco mode, create the eco mode schedule, and then set the eco mode scheduling for the RAID group.

For details about how to make settings for an ETERNUS disk array, refer to the ETERNUSmgr manual.

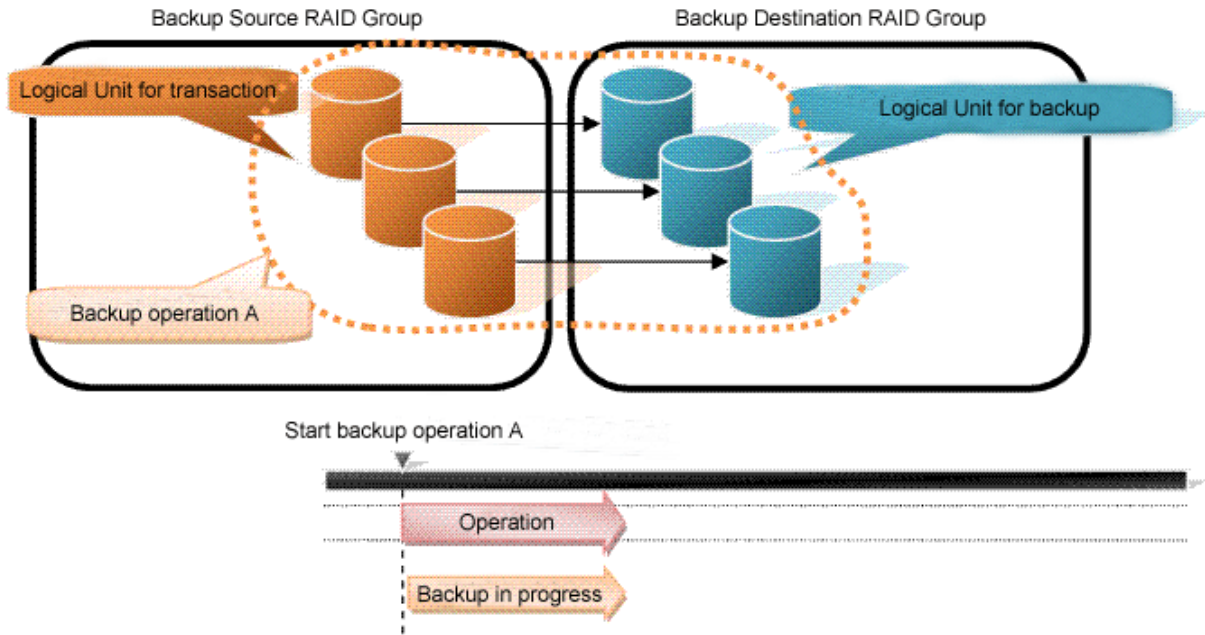
- Creating a RAID group and Logical Unit

The eco mode is applied and the RAID group is created.

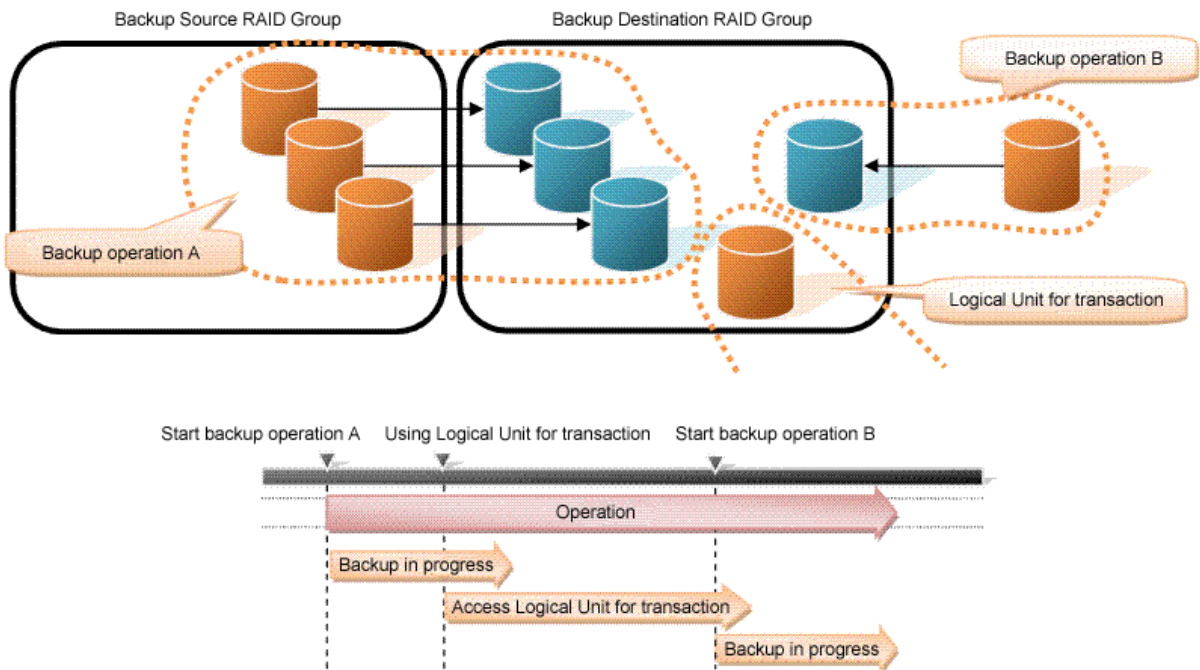
A RAID group that is to store the data to be backed up (hereafter called "backup source RAID group") and a RAID group that is to store the backup data (hereafter called "backup destination RAID group") are created. A logical Unit is allocated to each RAID group.

To effectively reduce power consumption, the backup destination RAID group sets a Logical Unit for each backup that is performed simultaneously. Other Logical Units should not be included in the backup destination RAID group.

The example below illustrates the procedure to simultaneously back up three Logical units (Backup operation A). There are no Logical Units other than the ones for backup operation A in the backup destination RAID group. Therefore, a disk drive can be stopped, except when a backup is running.

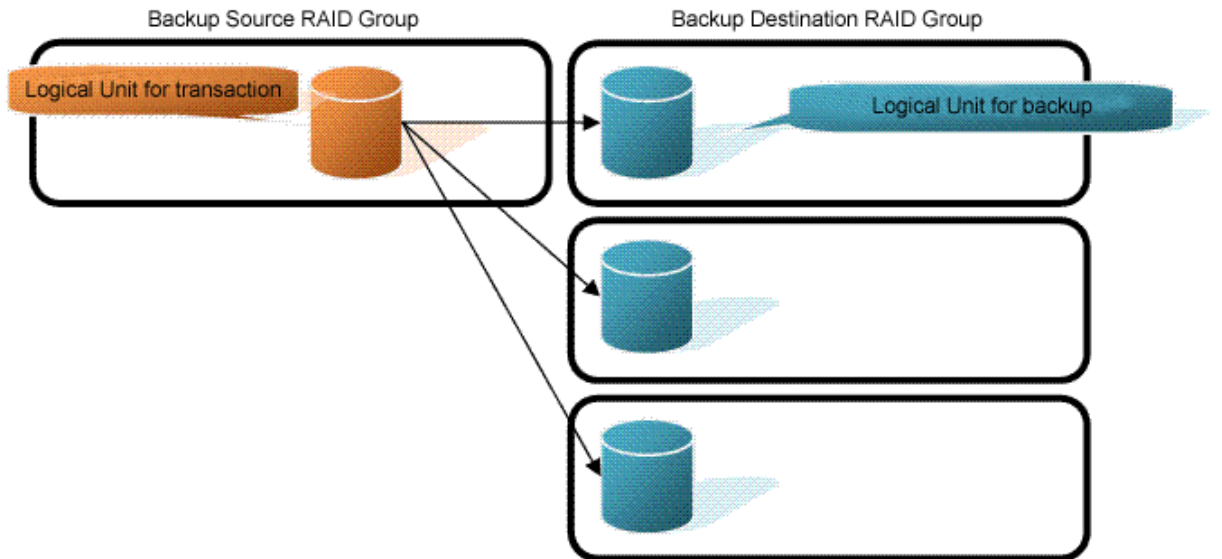


The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, a disk drive cannot be stopped, although backup operation A is ended if Logical Units for backup operation B and for business are running.



Point

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.



Note

A Snap Data Volume and a Snap Data Pool should not be included in a backup destination RAID group.

The RAID group disk drive which includes a Snap Data Volume and a Snap Data Pool does not reach a stop status.

- Settings in the eco mode
This describes the setting details of the eco mode that supports RAID group.
For more details about the settings, refer to the ETERNUSmgr manual.

Figure: Eco mode common settings

Setting items	Details of settings
Eco mode settings	Starting the eco mode
Host I/O monitoring time (10, 20, 30, 40, 50, 60 minutes)	Any
Limit of the number of starts/stops in one day (1 to 5 times)	Any

Figure: Backup source RAID group - Eco mode settings

Setting items	Details of settings
Eco mode schedule ON/OFF	OFF

Figure: Backup destination RAID group - Eco mode settings

Setting items	Details of settings
Eco mode schedule ON/OFF	ON
Eco mode schedule	Software control

E. 4. 3 Settings for AdvancedCopy Manager

AdvancedCopy Manager needs to be set that same as when applying the eco mode or using RAID group.

- Using the backup operation

Set the following

- 1) The Logical Unit in backup source RAID group or a partition (slice) is set in the business volume.
- 2) The Logical Unit in backup destination RAID group or a partition (slice) is set in the backup volume.
- 3) A device map file is prepared

A device map file needs to be prepared, as the target business volume performs a backup using the backup volume of backup destination RAID group.

For details about device map file, refer to "Preparation of device map file".

- Using the replication operation

Set the following

- 1) A Logical Unit in a backup source RAID group or a partition (slice) is set in the copy source volume.
- 2) A Logical Unit in a backup destination RAID group or a partition (slice) is set in the copy destination volume.

E. 4. 4 Settings for ETERNUS SF Storage Cruiser

An ETERNUS SF Storage Cruiser command is used for the power-saving operation. Therefore, ETERNUS SF Storage Cruiser needs to be set. For details, refer to ETERNUS SF Storage Cruiser manual.

E. 5 Operation

This section explains the procedure for the power-saving operation.
This procedure is to be followed for the Storage Management Server.

- E. 5.1 Starting the disk drive
- E. 5.2 Performing AdvancedCopy Manager operations
- E. 5.3 Stopping the disk drive

E. 5.1 Starting the disk drive

A RAID group disk drive is started using ETERNUS SF Storage Cruiser disk control command.
It is possible to wait for the start time of the disk drive by specifying the `-sync` option.

[Example of how to specify]

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr EternusIP -raid RaidGroup
-sync
```

- EternusIP : ETERNUS disk array IP address
- RaidGroup : RAID group number to be used for backup destination

For details about the command, refer to ETERNUS SF Storage Cruiser manual.

E. 5.2 Performing AdvancedCopy Manager operations

Backup, restoration and replication are performed using AdvancedCopy Manager commands.
For details, refer to the description of each operation in this manual.

E. 5.3 Stopping the disk drive

Stopping of a RAID group disk drive is scheduled using the disk control command of the ETERNUS SF Storage Cruiser. This command returns control after the end of the stopping schedule of the disk drive.

[Example of how to specify]

```
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr EternusIP -raid RaidGroup -s
```

- EternusIP : ETERNUS disk array IP address
- RaidGroup : RAID group number to be used for the backup destination

For details about the command, refer to the ETERNUS SF Storage Cruiser manual.



Point

A RAID group disk will stop after completing the physical copy of OPC while the copy is being performed.



Note

Depending on the status of the back up destination RAID group, a disk drive may not stop.

For details, refer to the ETERNUS SF Storage Cruiser manual.