



J2SZ-0200-04ENZO (A)

ETERNUS SF AdvancedCopy Manager V13.3

Operator's Guide (AIX)



FUJITSU



Preface

Purpose

This manual describes the functionality of 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 describes the overview of ETERNUS SF AdvancedCopy Manager.

Chapter 2 Starting and Stopping a Daemons

This chapter describes how to start and stop a daemon provided by ETERNUS SF AdvancedCopy Manager.

Chapter 3 Security Operation Using Authentication Feature

This chapter describes how to manage security in ETERNUS SF AdvancedCopy Manager.

Chapter 4 Backup Operations

This chapter describes how to perform backups.

Chapter 5 Backup Using the Suspend/Resume Function

This chapter describes how to use the Suspend/Resume function in the backup operation.

Chapter 6 Backup Operation using the QuickOPC Function

This chapter describes how to use the QuickOPC function in the backup operation.

Chapter 7 Replication

This chapter describes the replication operation.

Chapter 8 Operational Maintenance

This chapter describes maintaining a database, performing troubleshooting, and other maintenance methods.

Chapter 9 Commands

This chapter describes commands available in ETERNUS SF AdvancedCopy Manager.

Chapter 10 Notes on Operations

This chapter provides additional notes on the operations.

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

This appendix details shell scripts used for pre-processing and post-processing for backup and restoration.

Appendix B Replication Pre-processing and Post-processing

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

Appendix C Sample Shell Script for Backup Operations

This appendix describes sample shell scripts for backup operations for ETERNUS SF AdvancedCopy Manager.

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 Fujitsu ETERNUS storage systems.

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Chapter 1 Overview of AdvancedCopy Manager

This chapter provides an overview of AdvancedCopy Manager.

1.1 What is AdvancedCopy Manager?

AdvancedCopy Manager is a product that provides data storage backup and recovery management in an open system and incorporates the following three features.

1.1.1 High-speed backup (24-hour basis)

An ETERNUS disk array function of Fujitsu ETERNUS Storage Systems, called Advanced Copy Function (OPC/EC), is used to back up data quickly. The advanced copy function provides fast data copy regardless of data volume, and can maintain a fixed backup time even if the amount of data to be backed up increases. This dramatically reduces the duration for which the application must be stopped to perform backup.

With the remote copy function in the Fujitsu ETERNUS storage system, backup operations to disk array devices at remote locations is also possible.

When using a shell script for DBMS linkage as explained below, high-speed copying can be performed without interruption to live operational processing:

- Oracle
- DB2

If other databases or a general file system are being used, downtime or interruption to normal throughput is still significantly reduced.

1.1.2 High-speed replication

An ETERNUS disk array hardware function (advanced copy function) enables data to be used for a variety of purposes, and also allows you to take a copy of the data in case it becomes corrupted.

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

When using some databases, as listed below, high-speed copying can be performed without interruption to live operation.

- Oracle
- DB2

1.1.3 Online database backup

By using AdvancedCopy Manager, an Oracle or DB2 database can be backed up without stopping the database engine. Please refer to the following for the backup method for Oracle databases "Sample Shell script for Backup Operations" for more information.



Point

A sample script for copying Oracle databases is shown in "Sample Shell Script for Backup Operations."

1.2 Product Configuration of AdvancedCopy Manager

1.2.1 Function system

The AIX version of AdvancedCopy Manager consists of the following functions:

Table: Functions

Function name	Description
AIX version Agent of AdvancedCopy Manager	Operates on the Storage Management Server, and two or more Storage Servers are managed. Backup management 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 run on the user's local machine in the same way as any other application, to monitor and manage the AdvancedCopy Manager environment with a connection to the Storage Management Server.

The AdvancedCopy Manager server type depends on the operating environment:

- Storage Server

The Storage Server is a server which executes the backup and replication operations that AdvancedCopy Manager offers. The Agent is installed on the Storage Server. If a Storage Server is also to be used as the Storage Management Server then both the Manager and the Agent will need to be installed. The Agent installation is included as part of the Manager installation.

- Storage Management Server

The Storage Management Server manages the Storage Servers. Only one Storage Management Server can be set in the system.

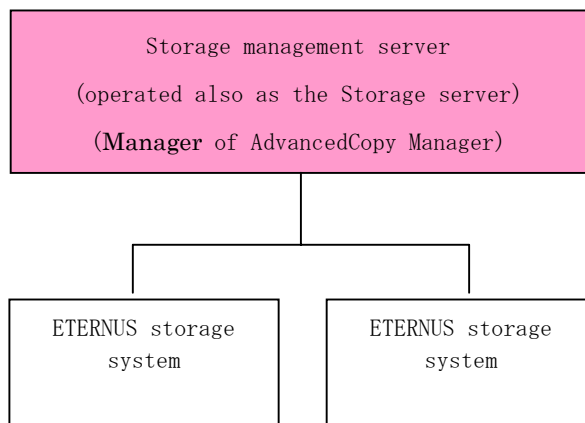
The Manager is installed on the Storage Management Server.

Three AdvancedCopy Manager configuration scenarios are possible and their environments are described below:

- When only one Storage Server is installed

In this operating environment, only the Manager of AdvancedCopy Manager needs to be installed (the Manager includes the Agent functionality).

Figure: When only one Storage Server is installed



- When two or more Storage Servers are installed

When two or more servers are available, configure only one of them as the Storage Management Server, or set up a new server with no connection to the Fujitsu ETERNUS storage system as the Storage Management Server. Each scenario is explained below.

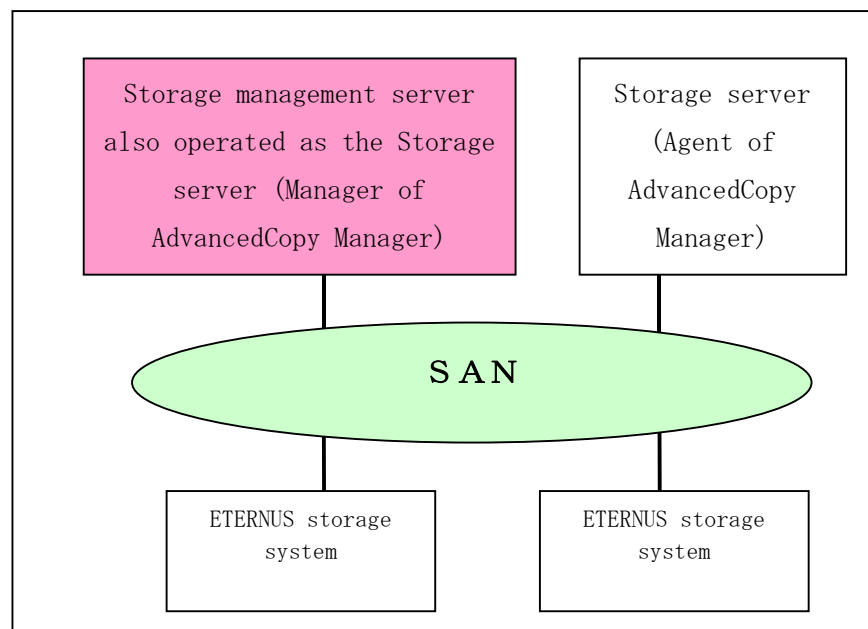
 - a) When the Storage Server is also operated as a Storage Management Server

In this scenario, one of the servers functions as a Storage Management Server. The Storage Management Server has a repository where the information on operating and managing all Storage Servers is stored.

When many Storage Servers exist, they all compete for access to the repository. This will affect other applications running on to the same server. Therefore, it is recommended that the Storage Management Server be installed on a dedicated server.

The following diagram illustrates the configuration of the Storage Server when it is also operating as the Storage Management Server.

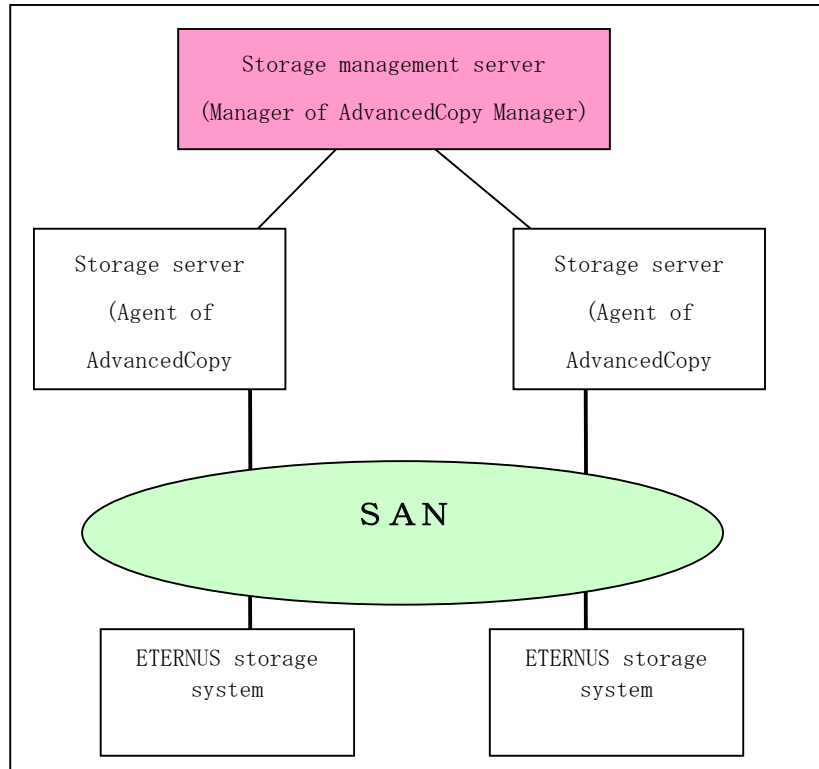
Figure: When the Storage Server is also operated as a Storage Management Server



- b) Setting up a dedicated Storage Management Server

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

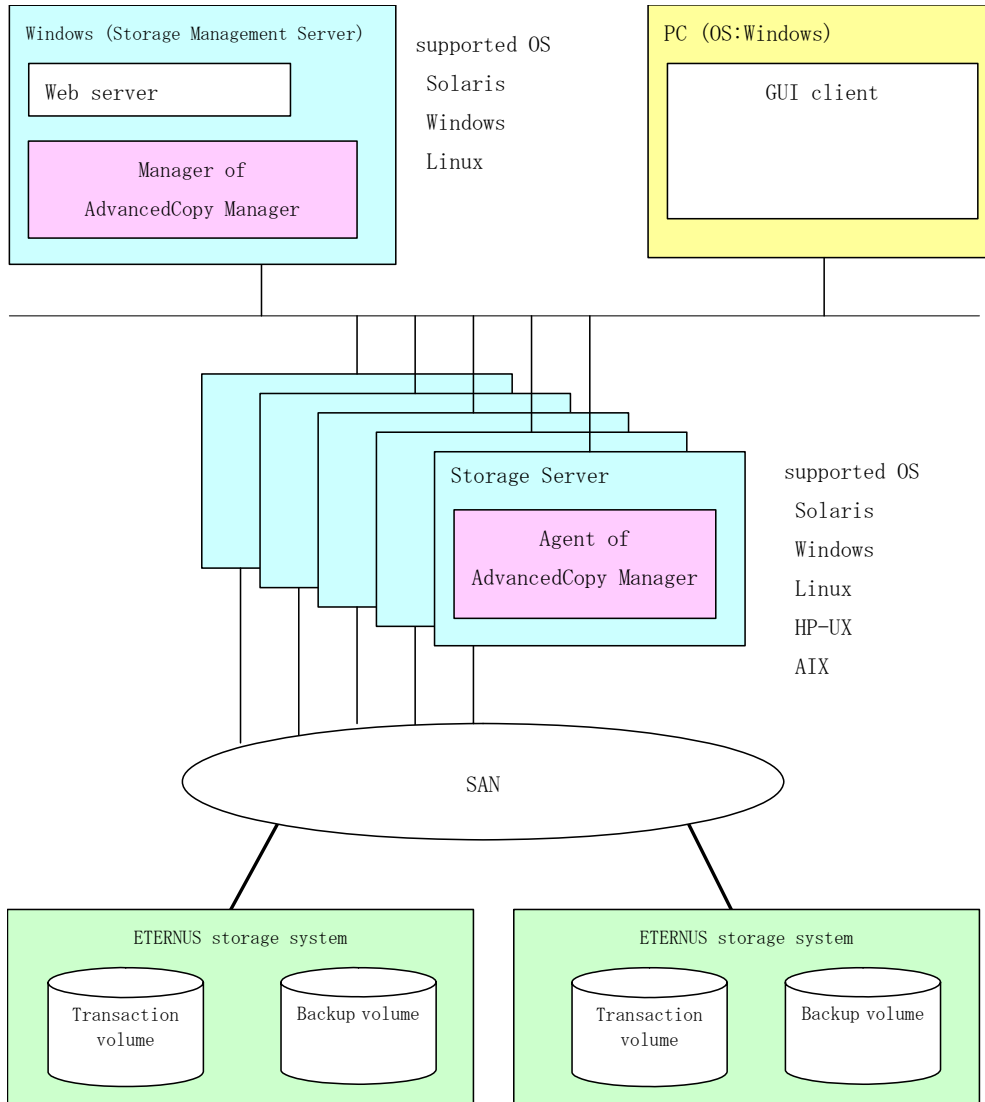
Figure: When a dedicated Storage Server is a Storage Management Server



1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

Figure: System configuration used when the Storage Management Server runs on Windows



1.2.3 Combinations of products

The following combinations of product levels of the 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. x	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	V10.0Lxx	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lxx	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	V10.0Lxx	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lxx	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 a difference in functionality between some product revision levels. Installation of the Manager and Agent which operate at the same revision level is recommended.
- The following restrictions apply to combinations of Manager and Agent products at different revision levels:
 - If the Manager is a newer level than the Agent
Connection 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
Connection is not possible
- Versions 10. x, 11. x, V10.0Lxx, V11.0Lxx in "Table: Combinations of products" are the original versions of Softek AdvancedCopy Manager.

1.3 Function Overview of AdvancedCopy Manager

1.3.1 What is the backup function

The backup function provides support for high-speed backup by using the One Point Copy (OPC), Remote One Point Copy (ROPC), Equivalent Copy (EC), and Remote Equivalent Copy (REC) functions of a Fujitsu ETERNUS Storage System.

The following sub-sections provide more information on the backup function.

High-speed backup operation

The advanced copy functions of the disk array unit (such as the OPC and EC functions) are used to perform high-speed backup between volumes regardless of volume capacities. This function greatly reduces the operational impact of a backup operation.

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

Policy management function

The policy management function manages the number of backup preservation generations and the number days that should elapse between backups of a volume (it indicates the delay if the specified interval is exceeded).

Storage configuration management function

The storage configuration management function manages the configurations of both source volumes (to be backed up) and destination volumes (to which a backup should be saved).

In AdvancedCopy Manager, a volume to be backed up is called a transaction volume and a volume to which a backup should be saved is called a backup 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 backup management information caused by a system or other type of failure.

1.3.2 What is the replication function

The replication function manages data replication using the One Point Copy (OPC), Remote One Point Copy (ROPC), Equivalent Copy (EC), and Remote Equivalent Copy (REC) functions of the Fujitsu ETERNUS Storage Systems.

Features of the replication function include the following:

High-speed replication operation

The advanced copy functions of the disk array unit (the OPC and EC functions) are used to perform high-speed replication between volumes regardless of volume capacities. This function greatly reduces the operational impact of a replication.

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

Consistency recovery function

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

Main differences with backup function

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

However, the replication function can replicate data between two volumes.

1.3.3 Authentication feature function

The GUI client provided by AdvancedCopy Manager can be used to manage the users who have access to the system. This allows you to set up secure operations that specify the functions each user can access. For more information, refer to "Security Operation Using the Authentication Feature".

1.3.4 GUI Client

The following environmental setup and employment functionality is available using the GUI client:

- Security management
Operational restrictions for users can be set up using the GUI.
- Backup management
AdvancedCopy Manager Backup management tasks (such as definition of a server or a device, backup, restoration, etc.) can be performed using the Web GUI.
- Replication management
AdvancedCopy Manager replication management tasks (such as defining volumes and executing replications) can be performed using the GUI.

A GUI client can be used for accessing a 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 and replication management tasks may also be performed by executing the relevant commands at a command prompt as well as the GUI client.

For more information on the GUI client, see "GUI Client" in "ETERNUS SF AdvancedCopy Manager GUI 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 or replication management. A valid advanced copy license and a suitable cache table size need to be set up. The settings required for the advanced copy functions differ according to each hardware device, so it will be necessary to confirm the device type with a Fujitsu systems engineer (SE) and map relevant functionality before use.

- 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

1.4.2 Software requirements

1.4.2.1 Agent of AdvancedCopy Manager

Table; Software requirements for Agent

Product name	Requirement	Remarks
AIX 5L V5.1, AIX 5L V5.2, AIX 5L V5.3	Required	Support OS
High Availability Cluster Multi-Processing 5.1 VERITAS Cluster Server 5.0	Conditionally required	For cluster operation with Agent of AdvancedCopy Manager
VERITAS Volume Manager 4.0, 5.0	Conditionally required	When a logical volume of VERITAS Volume Manager is the target of the operation performed.

1.5 Managing a Device on AdvancedCopy Manager

1.5.1 Normal devices

The following devices are supported for backup management and replication management:

- sd driver resources

1.5.2 Volumes under the control of Logical Volume Manager (LVM)

AdvancedCopy Manager can back up or replicate volumes under the control of LVM (referred to as LVM volumes in this document) in the following units:

- Volume group
- Physical disk that constitutes a volume group

For information on the backup and replication of LVM volumes, see "LVM Volume Operation".

1.5.2.1 Backup/replication in units of volume groups

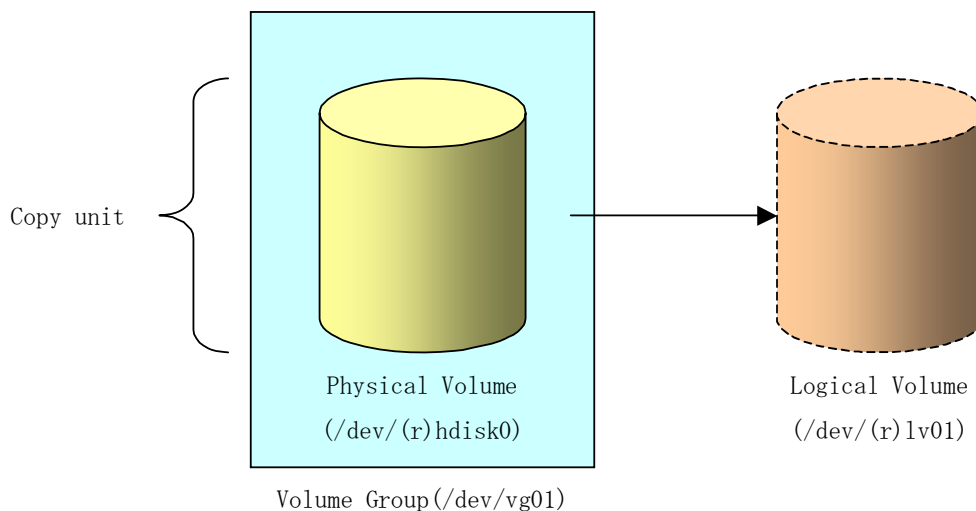
In the case of LVM volumes, volumes are managed in units of volume groups containing logical volumes.

AdvancedCopy Manager copies each physical disk that constitutes a volume group.

An LVM volume that can be operated in units of logical volumes must satisfy the following conditions:

- One volume group contains only one physical disk, and logical volumes are configured so that one physical disk includes n logical volumes.

Figure: Supported configuration



LVM allows multiple logical volumes to be defined on a physical disk (a logical volume is referred to as LU: Logical Unit). The boundaries of logical volumes can be defined regardless of the boundaries of physical disks.

A configuration in which one volume group contains multiple logical volumes is also supported. For operation, please note the following:

- A logical volume for which a file system was constructed must be unmounted before backup

or replication, and remounted after backup or replication.

1.5.2.2 Physical disks that constitute a volume group

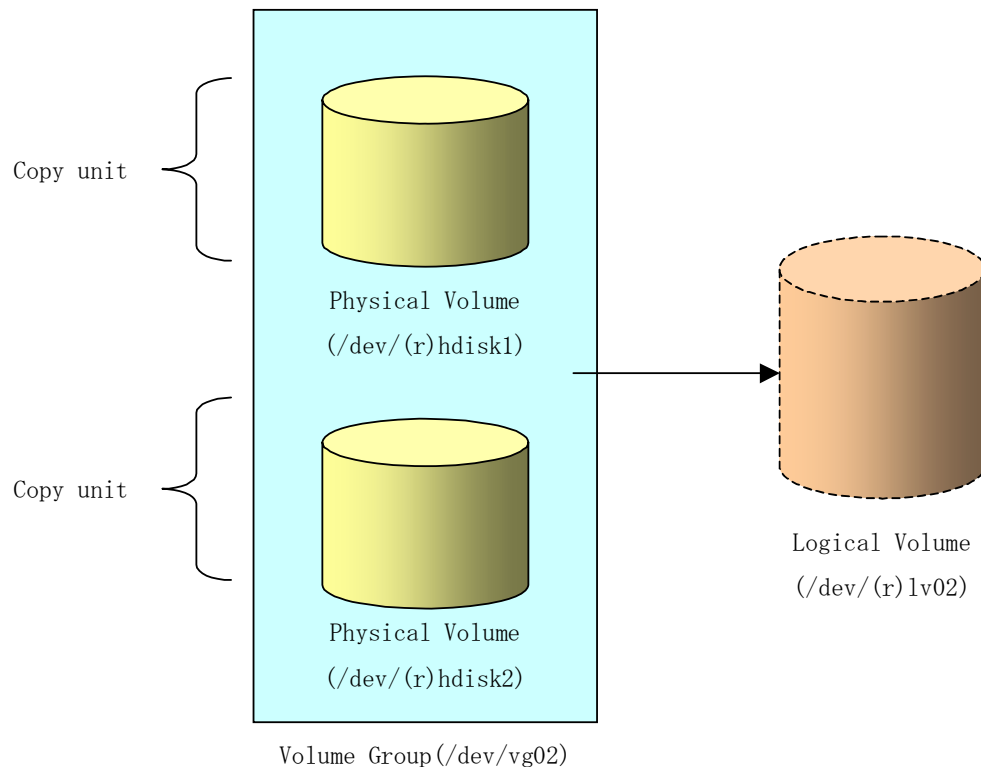
In this case, the individual physical disks that constitute a volume group in which a logical volume exists are used as management units.

Use this type of operation when a volume group has a configuration that is not supported for operation in units of volume groups.



For operations in a cluster configuration, the device name (`/dev/(r)hdisk#`) of the physical disks that comprise a volume group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

Figure: Configuration that is not supported for operation in units of volume groups



Copying for backup or replication must be performed while maintaining the integrity of an entire volume group.

1.5.3 Volumes under the control of VxVM (VERITAS Volume Manager)

AdvancedCopy Manager can back up or replicate VxVM volumes in the following units:

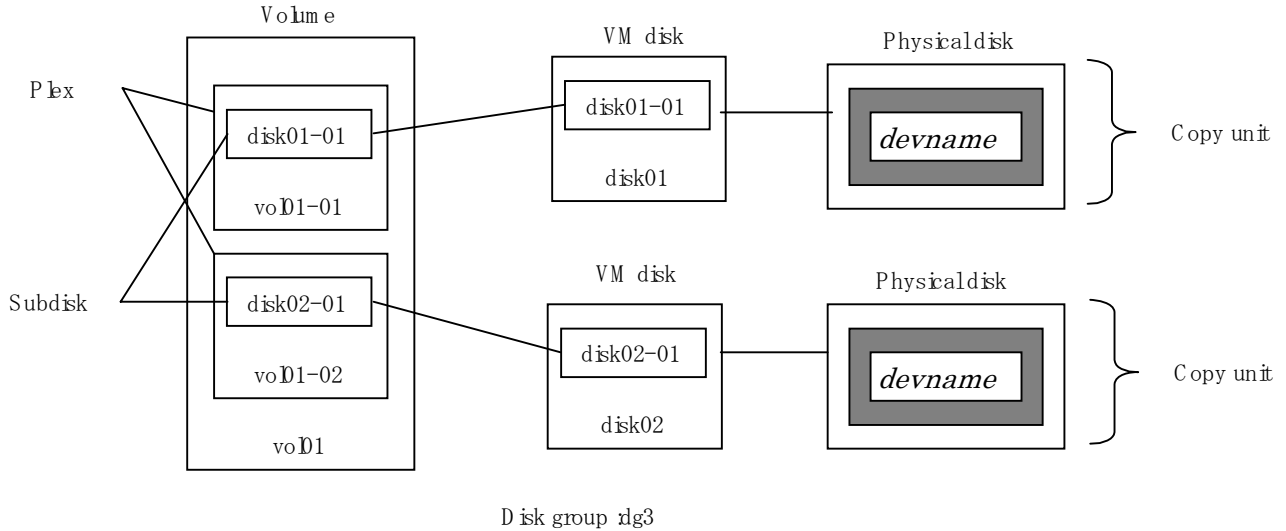
- Physical disks that constitute a disk group

For information on the backup or replication of VxVM volumes, see "VxVM Volume Operation".

1.5.3.1 Physical disks that constitute a disk group

The VM disks (physical disks) on which a subdisk used by a logical volume exists are used as the management units.

Figure: [Configuration not supported for operation in units of logical volumes]



Since AdvancedCopy Manager copies an entire VM disk, it copies not only the shared area that is a subdisk but also the occupied area containing VxVM-internal configuration information. When backup or replication is performed, therefore, the integrity of VxVM configuration information must be maintained during copying.

Specify a device name as follows:

`/dev/vx/dmp/hdisk#`



Note

Operation under the naming convention based on the enclosure is not supported.



Note

For operations in a cluster configuration, the device name (`/dev/(r)hdisk#`) of the physical disks that comprise a disk group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

Chapter 2 Starting and Stopping Daemons

This chapter provides information on how to activate and stop daemons provided by AdvancedCopy Manager.

For more information on how to activate and stop the daemons, refer to "Start/Stop Daemon Commands."

2.1 Daemons that Configure AdvancedCopy Manager

The Agent of AdvancedCopy Manager is configured with the following daemons:

Table: Types of daemons that run in the Agent of AdvancedCopy Manager

Daemon type	Description
The communication daemon	Communicates with the Storage Management Server and other Storage Servers

In cluster operation, the following daemon runs Storage Server transactions:

Table: Type of daemon composing storage server transactions

Daemon type	Description
Transaction-intended communication daemon	Daemon handling communication with Storage Management Servers and other Storage Servers



Note

The following daemon cannot run a Storage Server transaction in cluster operation:

- Communication daemon (local daemon)

2.2 Starting Daemons

Normally, AdvancedCopy Manager daemons are automatically activated. However, if activation fails or the daemon is stopped, activate the daemon on each server by executing the following command:

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



Note

- Before executing the startacm command, make sure that environment variable SWSTGNODE is not set.

In cluster operation, the cluster system activates the daemon automatically.



Note

To start the daemon independently of some AdvancedCopy Manager transactions for any reason, follow the steps described below.

You must start the daemon for each AdvancedCopy Manager transaction (including storage local transactions). Take the following steps for the respective transactions:

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

```
# ps -ef | grep stgxfws
```

Confirm that command execution does not display:

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

If the above message 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, refer to "Start/Stop Daemon Commands".

2.3 Stopping Daemons

Normally, daemons are automatically stopped when the system stops.

To stop a daemon on a Storage Management Server or a Storage Server, execute the following command on the server:

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



Note

- Before executing the stopacm command, make sure that environment variable SWSTGNODE is not set.

In cluster operation, stop the daemon from the cluster system. For the stop procedure, see the relevant cluster software manual.



Note

To stop a daemon independently of certain AdvancedCopy Manager transactions, follow the steps described below.

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

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

```
# ps -ef | 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 the 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".

Chapter 3 Security Operation Using Authentication Feature

AdvancedCopy Manager controls the users who can access the backup management and replication management functions. To achieve this, a security operation is enabled which specifies users who can perform these functions. For details, refer to "Security Operation Using Authentication Feature" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for Windows, Solaris or Linux.

Chapter 4 Backup Operations

This chapter provides details on backup operations performed by AdvancedCopy Manager.

The AIX version of AdvancedCopy Manager's Agent enables the backup operation described in this chapter by linking with AdvancedCopy Manager's Manager running under Windows, Solaris or Linux.

For information on the relationships between the configurations of supported devices and the copy operation, refer to "Devices supported by ETERNUS SF 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 (ie, the OPC or EC functions) of a disk array unit.

Backup that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of a Fujitsu 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.

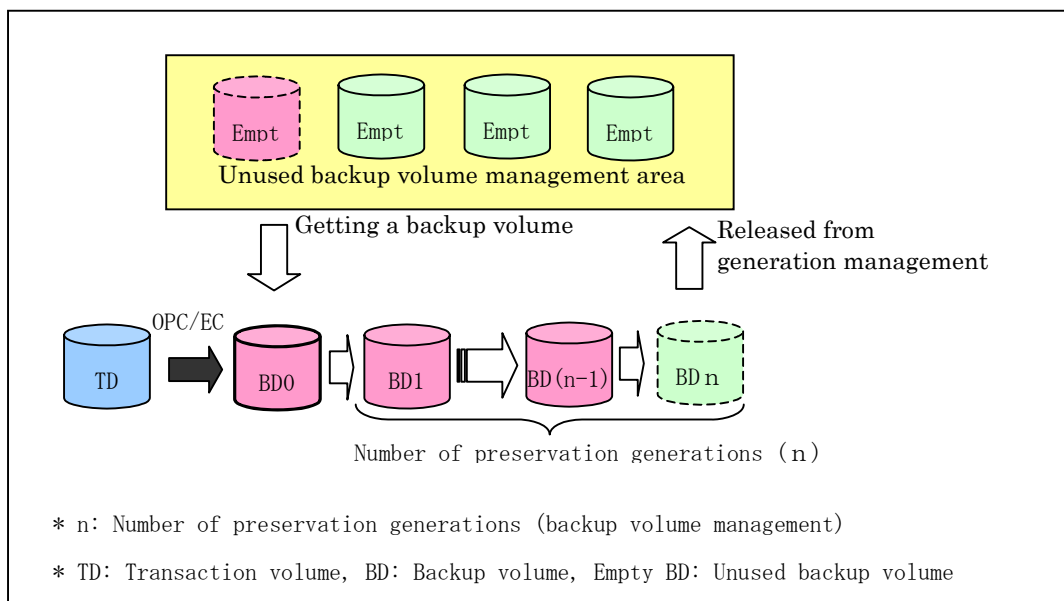
Automatic snapshot backup can be scheduled without first estimating the time required because it does not require synchronous backup processing. However, when the save number is 1, a state may occur in which there is no backup data, because a snapshot backup deletes the history prior to copy processing.

As synchronized high-speed backup deletes the history after backup processing is complete, 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. Synchronized high-speed backup also requires synchronized backup processing before the backup execution command is entered. Therefore, 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.

AdvancedCopy Manager automatically manages and selects a medium to be used for backup (ie, 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



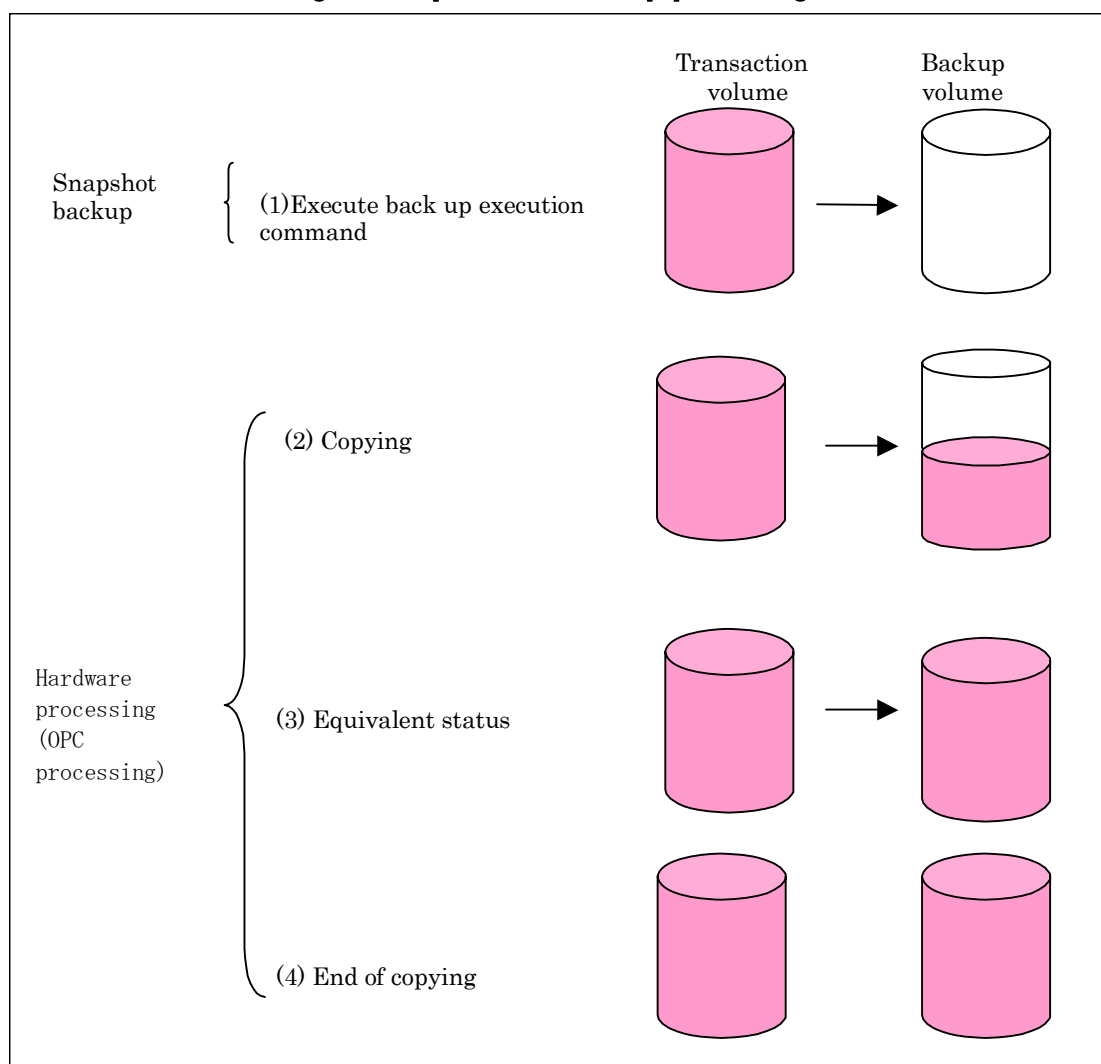
4.1.1 Snapshot backup processing

The OPC (One Point Copy) /ROPC (Remote One Point Copy) function of the disk array unit Fujitsu 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 following figure). The following processing will be performed:
 - If backup volumes under generation management exist for all the generations, the oldest backup volume will be assumed as 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 acquired unused backup volume ((2) to (4) in the following figure).
3. Backup carrier information will be set.

Figure: Snapshot fast backup processing



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

Using the QuickOPC function in the snapshot high-speed backup, physically copying only the difference in the data 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, refer to "Backup 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 is limited to disk array devices within the same Storage Server that support ROPC.

4.1.1.1 Snapshot backup processing of Volume Group

When the transaction volume is a volume group, copy processing by OPC/ROPC function of disk array equipment Fujitsu ETERNUS storage system is performed to the physical whole disk corresponding to the volume group. Therefore, when two or more logical volumes exist in a volume group, the data of all logical volumes is backed up.

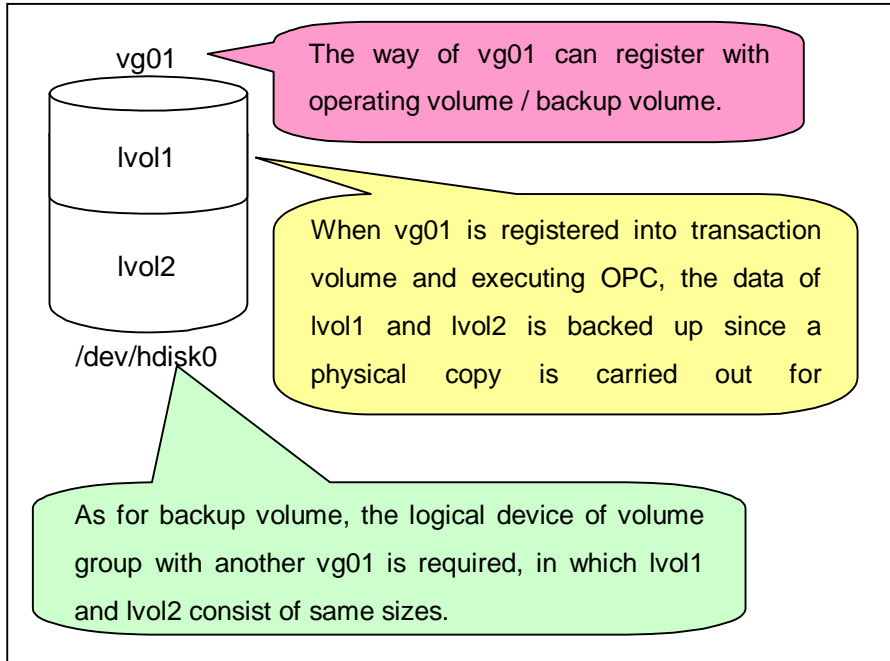


Note

When using a volume group for backup operation, you need to be careful about the following points.

- When the transaction volume is a volume group, construct the logical disk which equals the transaction volume, in a volume group that is different from the transaction group, and register into the backup volume the volume group whose physical disk is the same size (refer to Figure 4.3).
- When matching and operating the transaction and backup volumes, the correspondence file of transaction volume and backup volume, called a "device map file", is created. A "Device map" is especially required if you are backing up in a volume group unit.
- In backup processing, since the LVM configuration information on the backup volume will be rewritten for the LVM information on the transaction volume, LVM configuration information is restored in the processing after backup. For more information on this, refer to "Notes on restoration".
- When backing up a volume group, using the Administrator authority, correct the script used for pre-processing and post-processing of backup to unmount/mount all logical volumes. For more information, refer to "Pre-processing and Post-processing of Backup and Restoration".
- When two or more physical disks exist in the volume group which registered with the transaction volume, backup produces an error.

Figure: Transaction volume and backup volume for two or more logical disks



4. 1. 2 Synchronized high-speed backup processing

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

Synchronized high-speed backup performs processing as follows:

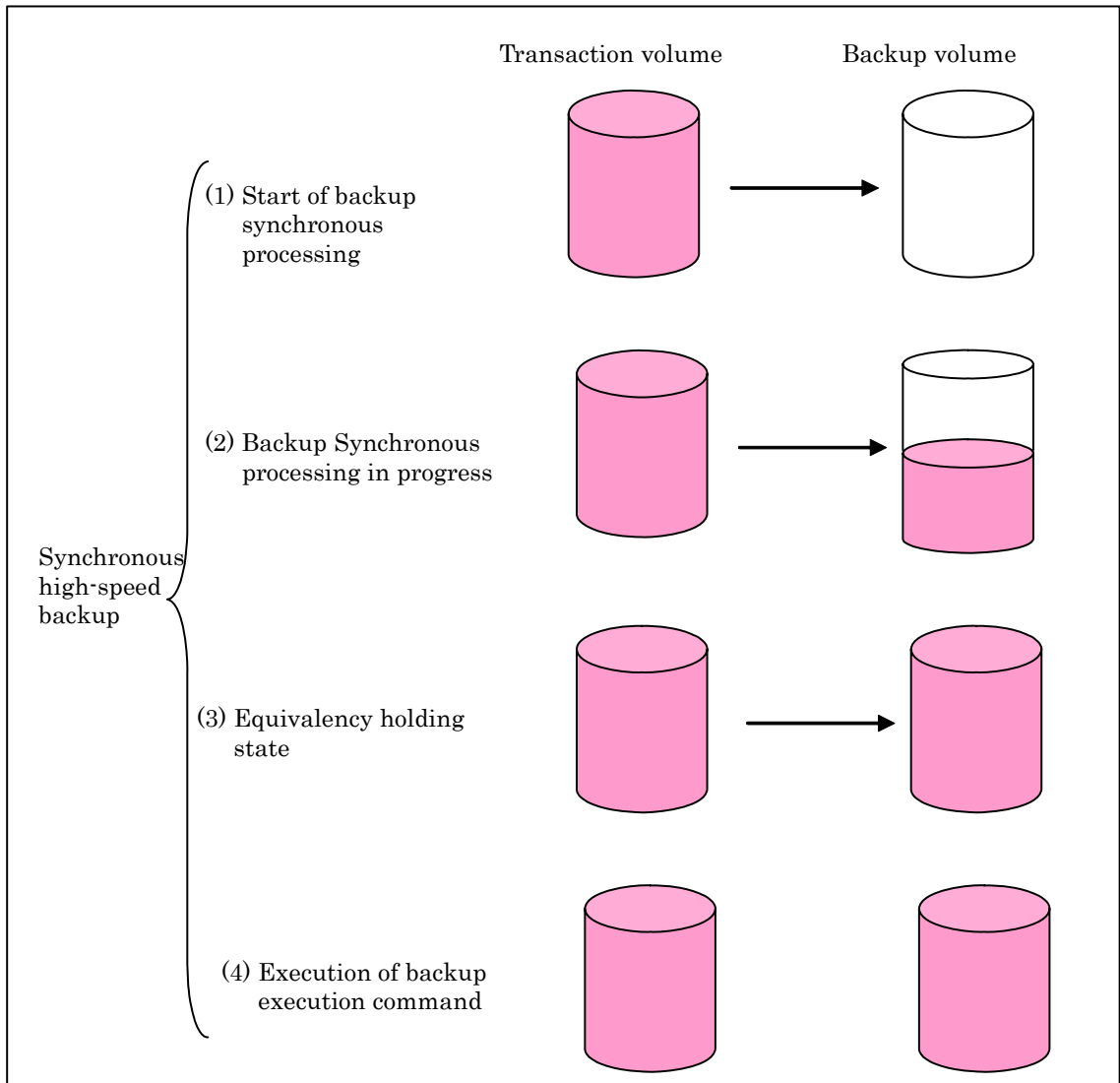
1. Execute the backup synchronous processing start command (`swststartsync`) ((1) in the following figure). An unused backup volume having the same capacity as the transaction volume is selected from the unused backup management area, and the synchronized backup processing starts.
2. The transaction and backup volumes are both placed in equivalency maintenance status. From this point on, equivalence between the transaction volume and backup volume is maintained. This status is referred to as equivalency maintain status (refer to (3) in the following figure).
3. Execute the backup execution command (`swstbackup`) (refer to (4) in the following figure). The backup synchronization processing stops and the backup history information is set.
4. If the backup data exceeds the number of generations when backup has been completed, the oldest backup volume is treated as an unused backup volume.



Note

The backup execution command cannot be executed before the transaction and backup volumes have become equivalent.

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. 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, refer to "Backup Using the Suspend/Resume Function."



Note

- If all the generations of backup volumes are currently being 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 REC is limited to disk array devices within the same Storage Server that support ROPC/REC.

4.1.2.1 Synchronized high-speed backup processing of Volume Group

When the transaction volume is a volume group, copy processing by the EC and REC functions is performed to the physical whole disk corresponding to the volume group. Therefore, when two or more logical volumes exist in a volume group, the data of all logical volumes is backed up.



Note

If using a volume group for backup operation, care must be taken with the following points.

- When the transaction volume is a volume group, construct the logical disk whose size equals the transaction volume, in a volume group different from the transaction group, and register into backup volume the volume group whose physical disk is the same size.
- When matching and operating the transaction and backup volumes, the correspondence file of transaction volume and backup volume, called a "device map file", is created. A "Device map" is especially required if you are backing up in a volume group unit.
- During backup processing, since the LVM configuration information on backup volume will be rewritten for the LVM information on the transaction volume, LVM configuration information is restored in the processing after backup. For more information on this, refer to "Notes on restoration".
- When backing up a volume group, using the Administrator authority, correct the script used for pre-processing and post-processing of backup to unmount /mount all logical volumes. For more information on this, refer to "Pre-processing and Post-processing of Backup and Restoration".
- When two or more physical disks exist in the volume group which is registered with a transaction volume, the backup operation results in an error.

4.1.3 Restoration processing

This section describes restoring data on AdvancedCopy Manager.

The restoration operation refers to restoring data from a backup volume to a transaction volume using backup carrier management information.

Data restore from a backup volume refers to using 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.

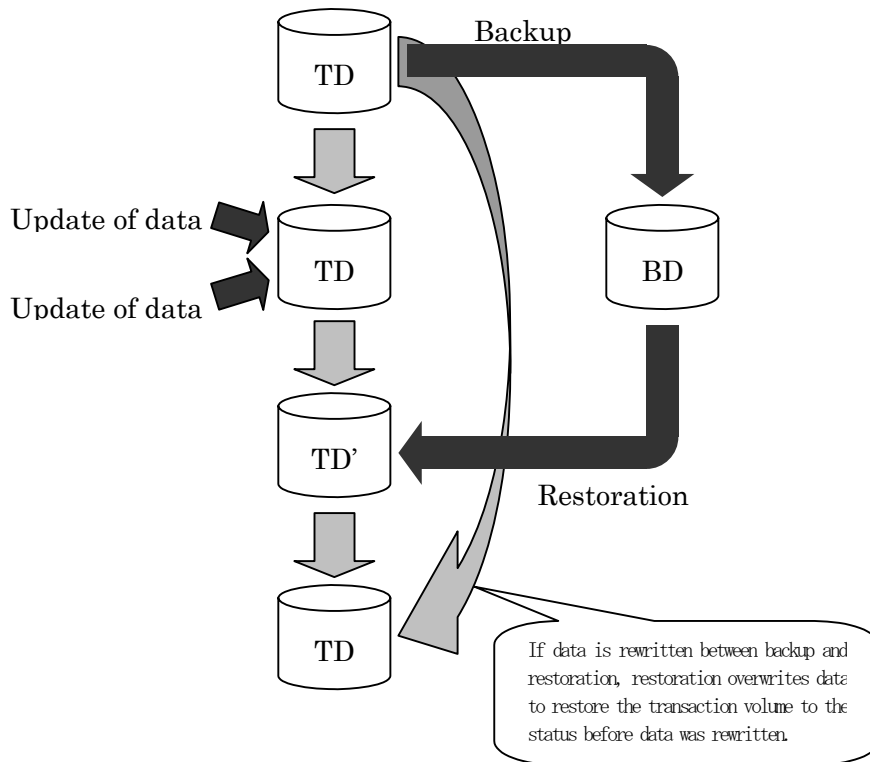
Restoration processing is performed to the transaction volume that was the backup source. However, it is also possible to change the restoration destination.



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

4.1.3.1 Restoration processing of Volume Group

When the transaction volume is a volume group, copy processing by the OPC/ROPC function is performed to the whole physical disk corresponding to the volume group. Therefore, when two or more logical volumes exist in a volume group, the data of all logical volumes is backed up as illustrated in the following figure.

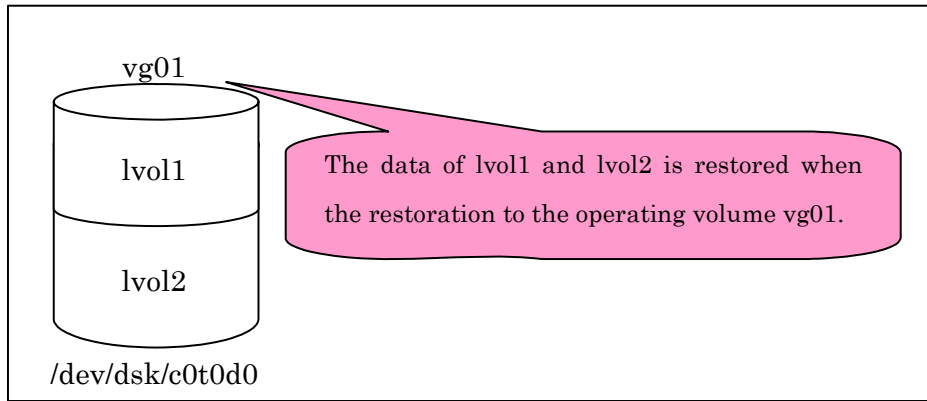


Note

If using a volume group for backup operation, care should be taken with the following points.

- When restoring a volume group, using the Administrator authority, correct the script used for pre-processing and post-processing of backup to unmount/mount all logical volumes. For more information, refer to "Pre-processing and Post-processing of Backup and Restoration".

Figure: Restoration for two or more logical disks



4.2 Operation Design

This section describes how to configure a backup system in AdvancedCopy Manager.

When configuring a backup system, you will need to consider the following issues:

- Selecting a server on which the backup operation should be performed
- Selecting a backup target
- Configuring 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

The backup operation can be performed on one of the following servers.

- Storage Management Server
Multiple Storage Servers are managed and operated centrally. A Storage Management Server can also serve as a Storage Server.

Note that a Storage Management Server has to be operating in the Windows, Solaris or Linux version of AdvancedCopy Manager.

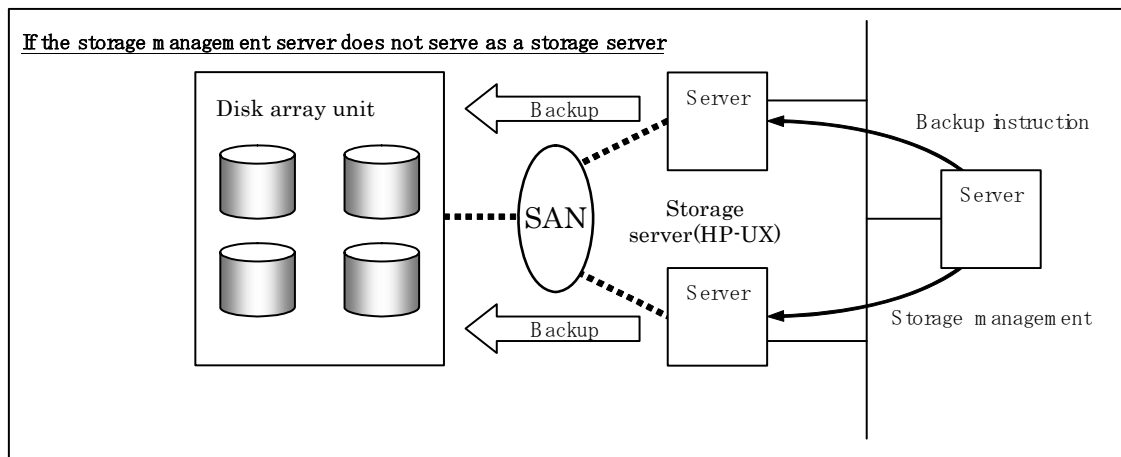
- Storage Server
The AIX version of AdvancedCopy Manager can be used to operate a Storage Server.



Note

The location of the internal code system (i.e., the code system specified when installing AdvancedCopy Manager on the Storage Management Server) used by AdvancedCopy Manager must be installed on all Storage Servers.

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



4.2.2 Selecting a backup target

The backup/restoration unit of the AIX AdvancedCopy Manager is a physical disk (LU: Logical Unit). But in the case of the physical disk which constitutes LVM (Logical Volume Manager), it is managed and operated according to the volume group. The disk which is managed and operated is called a transaction volume. A transaction volume to be backed up must be placed on the disk array unit Fujitsu ETERNUS storage system.

For information on setting up a transaction volume, refer to "Setting the operation type for a device".



Note

The following should be noted when using a volume group as the transaction volume:

- Do not register two or more physical disks into one volume group.



Note

Do not back up the systems disk, or the disk on which AdvancedCopy Manager is installed.



Note

Refer to the "General notes" for points to consider when deciding on a candidate volume for backup. An example of a point to consider is the following:

- Exclusion from Backup or replication Targets

4.2.3 Configuring a backup policy

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

The number of preservation generations

The number of preservation generations refers to the maximum number of generations of backup data that should be kept.

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 and the oldest generation has already been deleted, there may not be as many generations of backup data as required. If this happens, you should immediately perform backup again to create the required number of generations of backup data.

When performing snapshot type high-speed backup, using only one preservation generation, we recommend you also back up data to a tape.

A synchronous high-speed backup operation releases the oldest generation from generation management after backup of the latest generation is completed. Therefore, the required number of backup volumes that must always be kept in history information is the number of preservation generations plus 1.

Interval days

The interval days refers to the number of days between backups.

A message indicating that backup is overdue is displayed if a period longer than the specified interval has passed since the last backup date.

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

For information on setting a backup policy, refer to "Setting backup policies".

4.2.4 Preparing a backup volume

This section describes how to prepare the backup volume.

In AdvancedCopy Manager, the disk in which the transaction data used is stored is called the transaction volume. A backup volume must be placed on the disk array unit Fujitsu ETERNUS storage system.

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

Table: Number of backup volumes required

Backup	Number of required backup volumes
Snapshot fast backup	Number of backup generations
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 if there are newly registered transaction volumes

Backup	Number of required backup volumes
Snapshot fast backup	Total number of backup generations in the registered backup policies + number of generations in the new backup policy being set
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

For information on configuring a backup volume, refer to "Setting the operation type for a device



Note

The following should be noted when using a volume group as a backup volume:

- Do not register two or more physical disks into one volume group.
- Create a logical disk so that it does not consist of two or more physical disks.
- It needs to be the same physical size as the transaction volume. In addition, if the backup and transaction volumes are volume groups, they must be in different volume groups. However, these volume groups must have the same configuration.



Note

When selecting backup volumes, do not select systems disks where the operating system resides or where AdvancedCopy Manager is installed.



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.
- Since data flows only from the INIT side to TARG 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 equal to the number of preservation generations, the backup operation can be carried out by saving the backup volumes to a secondary medium, such as a tape.

To achieve this, follow the procedure below:

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

If the history information is deleted, the restore execution command cannot be used to restore data from the period beginning from the time of deletion until the time 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

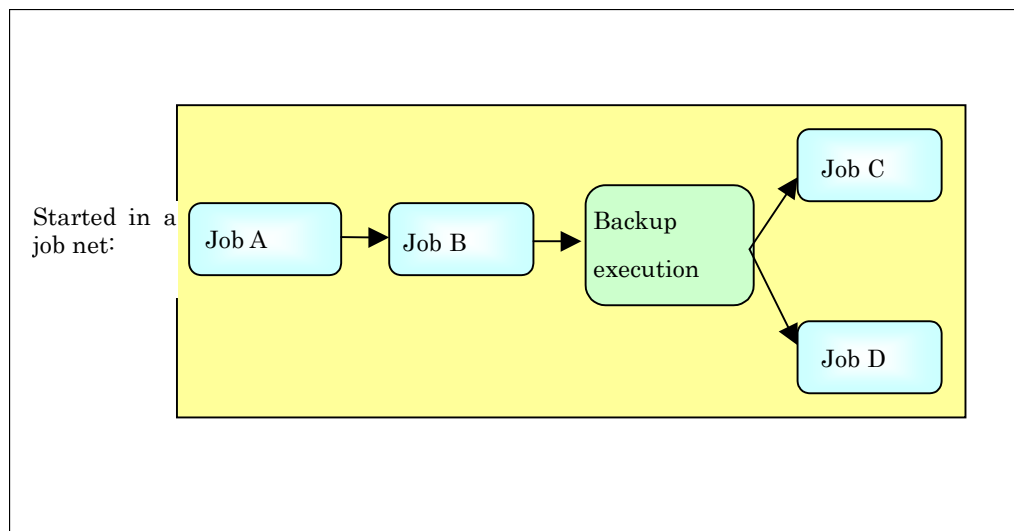
The backup operation of AdvancedCopy Manager can be automated using SystemWalker/OperationMGR, etc.

Automatic snapshot fast backup

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

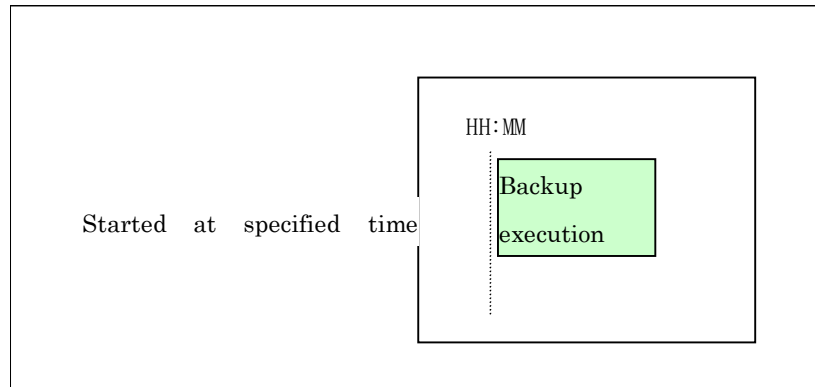
- Start the backup command in a job net of a batch job every time that a backup should be collected.

Figure: Started in a job net



- Start the backup command at the specified time.

Figure: Started at specified time



Automatic synchronized high-speed backup

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

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

Starting the synchronized backup processing start command

Estimate the time required for the synchronized backup processing, then execute the synchronized backup 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 equivalency maintenance status when backup is executed.

The time between the start of synchronized backup processing and the transition to equivalency maintenance status depends on the capacity of the volume to be copied.

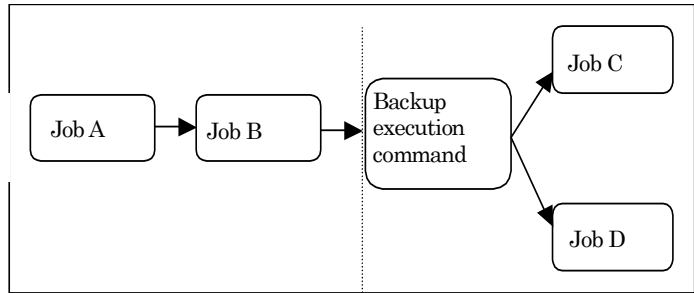
Starting the backup execution command

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

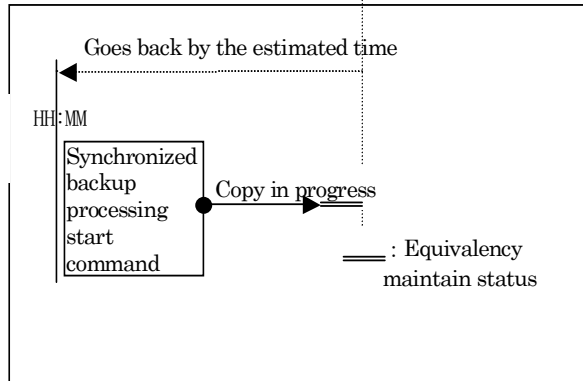
- Start the backup execution command in a job net of a batch job at the same time that the backup data is to be collected.

Figure: Started in a job net

Start the backup execution command in a job net:



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



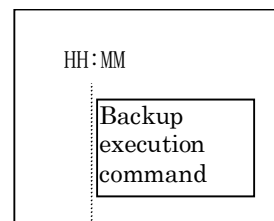
Note

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 synchronized backup processing start command by subtracting the estimated time from the start time of the backup execution command.

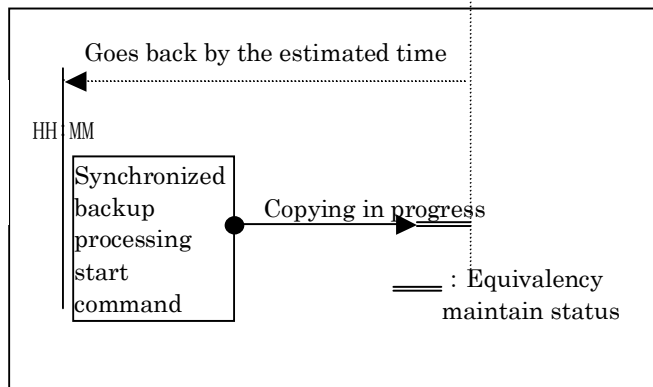
- Start the backup execution command with the time specified.

Figure: Started at a specified time

Start the backup execution command with the time specified:



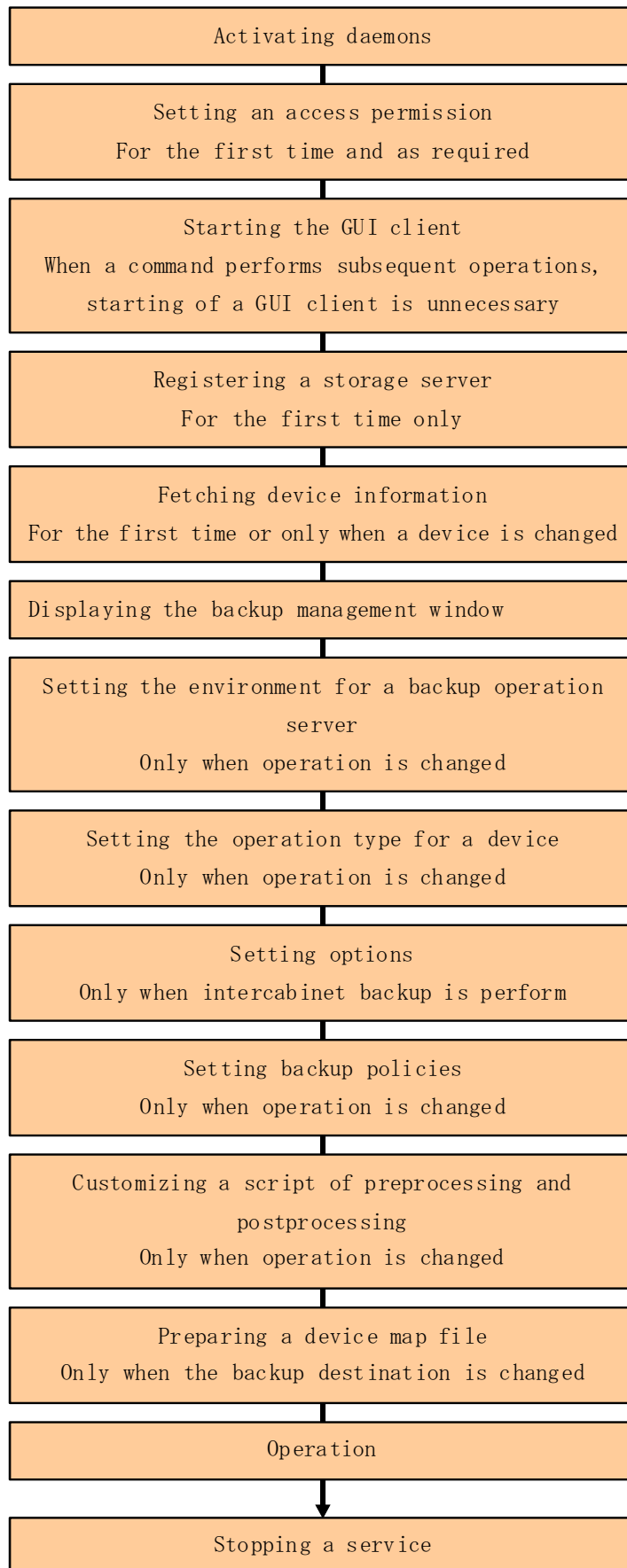
Start the synchronized backup processing start command with the time specified:



4.3 Flow of Operation

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

Figure: Flow of backup operations on a regular transaction volume



4.4 Preparing to start backup

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

4.4.1 Activating daemons

Before starting a backup operation, daemons on the Storage Management Server and Storage Servers must be activated. Normally, they are automatically activated when the system starts. If starting a daemon fails for any reason, or if a daemon is stopped once it has started, it is necessary to start a daemon for each server. Refer to "Starting and Stopping Daemons" for additional information.

4.4.2 Setting an access permission

When performing backup from a backup management screen, access permission is set up for each operation of the backup management screen. For details on how to set permissions, refer to "Security Operation Using Authentication Feature" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for Windows, Solaris or Linux.

When performing backup using a command, the setup of access permission is not required.

4.4.3 Starting the GUI client

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

If all operations are performed from commands, this operation is not required.

4.4.4 Registering a Storage Server

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

For the operation method using commands, refer to the server information addition command (stgxfwcmaddsrv) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.

4.4.5 Fetching device information on 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 User's Guide".

For the operation method using commands, refer to the device information collection/reflection command (stgxfwcmsetdev) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.



Note

Device information on a Storage Server must be temporarily stored in 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 for this operation is proportional to the total number of devices defined on the Storage Server. If the number of devices is large, perform this operation while the CPU load and I/O load on the system are low. As a guide, each operation takes about 0.5 seconds per device (partition) when there is no load on the system.
- No information will be obtained for a volume group is inactive when the operation is executed. When a backup is in progress a volume group which is registered as a backup volume will become inactive, so it would not be detected by this operation. Do not issue an instruction to delete a volume in use.

4.4.6 Setting the environment for a backup operation server

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

For the operation method using commands, refer to the [Storage Server configuration information setting 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 Setting 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:

- Defining the volume to be backed up as a transaction volume.
- Preparing backup volumes. Prepare as many volumes, each with the same size as the transaction volume, as required for the backup type, and define them as the backup volumes:

Table: Number of required backup volumes

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

This processing can be performed using either GUI operations or command operations. For the operation method using the GUI, refer to "Setting the volume type" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For the operation method using commands, refer to the device information setting command (swstddevinfoset).



Note

The size of the backup volume must be equal, to the byte, to that of the transaction volume.



Note

In order to use a volume group as a transaction volume, it is necessary to create a logical disk as follows:

- Do not register two or more physical disks into one volume group.
- Create a logical disk so that one logical disk does not consist of two or more physical disks.



Note

Do not set as backup targets nor include in backup volumes the disks that store the system and the disks that installed AdvancedCopy Manager.



Note

To change the configuration of a disk registered as the transaction volume or backup volume, take the following steps. First, delete the registered configuration, then change the configuration. Next, try to fetch the device information on the Storage Server. Lastly, register the information by executing the device information setting command (swstdevinforeset).



Note

For a volume group registered as a backup volume, manually unmount all logical volumes in the volume group before performing this operation.



Point

You can check which volumes have been registered as follows:

- Checking by using a GUI client
You can view information on a transaction volume or on a backup volume from the GUI client. For more information, refer to "ETERNUS SF AdvancedCopy Manager User's Guide".
- Checking using a command
You can view information on a registered transaction volume or backup volume using the device usage status display command (swstdevdisp).



Note

When the registered contents are checked (using either the GUI client or the command), the value displayed on the "Size" column is the physical disk size. When a volume group is registered, this column also displays the physical disk size of the volume group.

4.4.8 Configuration options

It will be necessary to set a number of options when performing backup to a backup volume in a cabinet that is different from the cabinet containing the transaction volume. 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 and ROPC functions.
- 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 sets of two or more.
- In a backup operation involving a disk array device that does not support the ROPC function, only the REC function can be used. In this case, you cannot back up data to a backup volume in a cabinet that does not contain a transaction volume, since the backup operation uses the ROPC function during restore.

Create the following files to set the 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) The logical node name of AdvancedCopy Manager specified during setting up of a cluster.

Create code in the files as follows:

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



Note

- If the option settings file is changed after operation starts, backup may not be able to continue. For this reason, do not change the option settings file after the start of operation.
- To change the option settings file, you must recreate the backup policy.

4.4.9 Setting backup policies

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

- The number of preservation generations
This refers to how many generations of backup data should be retained.
- Interval days
This refers to the number of days between one backup and the next. If the specified number of days is exceeded, you will be prompted to perform backup in the GUI client of AdvancedCopy Manager.

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

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

For the operation method 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 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, refer to "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, the number can be set by default provided the number of backup volumes that are required for snapshot fast backup have already been registered. In this case, however, it may not be possible to execute synchronized high-speed backup.



Point

You can check the volumes that have been defined in the following ways:

- Using a GUI client
For more information on viewing backup policy information, refer to "Setting a backup policy" in the "ETERNUS SF AdvancedCopy Manager User's Guide".
- Using a command
You can view information on a defined backup policy using the backup policy display command (swstbkpoldisp).

4.4.10 Customizing a script of Pre-processing and Post-processing

In AdvancedCopy Manager, backup or restore processing must be performed while transaction volumes are unmounted. Therefore, when backup or restore is executed, mount and unmount processing of the transaction volume is done using the pre-processing and post-processing scripts.

AIX AdvancedCopy Manager implements the transaction volume unmount/mount operation by customizing pre-processing and post-processing scripts. If a pre-processing script terminates with an error during execution of backup/restoration, backup/restore processing is not performed.

For details of the pre-processing and post-processing scripts, refer to "Pre-processing and Post-processing of Backup and Restoration."

When the operation corresponds to either of the following situations, it is necessary to customize the scripts that are used for pre-processing and post-processing of backup.

- The backup target is a volume group
- To describe special processing

For information about the customization method, refer to "Pre-processing and Post-processing of Backup and Restoration".



Point

When AdvancedCopy Manager is upgraded

The scripts may be updated in an upgraded version of AdvancedCopy Manager.

Therefore, you should customize the scripts again after upgrading rather than continuing to use the script from the previous version.

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 registered backup volumes.

If a specified backup volume is to be used to back up a given transaction volume, a "Device map file" (i.e., a file defining the correspondence between transaction and backup volumes) must be created.

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



Point

To manage multiple backup generations, multiple device map files must be prepared. The device map file which can be used when backing up or starting synchronous processing should meet either of the following requirements:

- An unused backup volume is specified, or
- The backup volume used by the historic data deleted by this backup is specified

You should ensure that you configure and use the device map file appropriately, depending on how you are using the backup system with two or more backup volumes.

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

In such cases, the device map file that is subsequently specified at the start of synchronous backup processing is the device map 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

# Volume Group
/dev/vg01                   /dev/vg02 # A comment can also be entered in this section.
/dev/vg03                   /dev/vg04
:
:
```

The following are the rules for creating a device map file.

- Describe a transaction volume and a corresponding target backup volume in one line. Separate a transaction volume name and an output destination backup volume name with one or more space or tab characters. One or more space or tab characters may be included between the beginning of a line and a transaction volume name or between the end of an output destination backup volume name and the end of a line (a new line character).
- A blank line (space or tab characters) may be included in a file.
- The portion of text from the symbol "#" to the end of a line is used as a comment.
- You cannot specify more than one target backup volume for one work disk in one device map file. In such a case, the information in the first line encountered will be valid. While the whole device map file will be read, lines after the first line will be ignored.
- A device map file may include descriptions of transaction volumes other than the processing target. (Refer to the description example provided at the beginning of this section.)

4.5 Operation

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

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

AdvancedCopy Manager has two kinds of backup operation, as follows.

- Snapshot fast backup
- Synchronous high-speed backup

4.5.1 Performing the snapshot high-speed backup

Snapshot high-speed backup can be performed using either GUI operations or command operations. For the operation method using the GUI, refer to "Executing snapshot fast backup" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For the operation method 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 executed using commands.



Note

When the QuickOPC function is used for snapshot high-speed backup, the operation listed below cannot be performed from the GUI client.

- Execute the tracking cancel command (swstcanceltrk).

4.5.2 Performing synchronized high-speed backup

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

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

For the operation method using commands, perform backup synchronization processing for the transaction volumes that are to be backed up, then perform backup. Refer to the following for command details:

- To start backup synchronization processing: backup synchronous processing start command (swststartsync)
- To check the status of backup synchronized processing: backup synchronous processing progress display command (swstsyncstat)
- To execute backup: the [backup execution command \(swstbackup\)](#)
- To check the backup status: [Backup execution status display command \(swstbackstat\)](#)



Note

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



Note

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

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

4.5.3 Performing restoration

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

4.5.3.1 Restoring an entire volume

All the data in a volume that has been backed up in the snapshot fast backup can be restored using either GUI operations or commands.

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

For the operation method using commands, refer to the restore execution command (swstrestore). Note that the restore execution status display command (swstreststat) can be used to check the restore status.



Note

Stop transactions before executing restore for an ordinary file system.



Note

For the restoration of a volume group, you are recommended to read "Restoration processing of Volume Group".



Note

Changing the restoration target volume to a volume other than the backup source transaction volume requires a different procedure. For more information, refer to "Notes on restoration."

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 the backup volume. A special procedure is necessary to place the backup volume in the mount. When the backup volume is placed in the mount, reference should be made to the normal restoration procedure. For this procedure, refer to "Notes on restoration." Check the backup volume using the history list view or by executing the history information display command (swsthistdisp).
2. Copy the individual files to be restored by using the cp command.
3. Unmount the backup volume.

4.5.4 Managing a backup history

Display backup history information to check on information such as backup volume names and the backup dates of backup data for a transaction volume that is under generation management.



Point

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

4.5.4.1 Displaying a backup history

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

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

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

For the operation method using commands, refer to the history information deletion command (swsthistdel).

4.6 Changing the Configuration information

You will need to change the configuration of AdvancedCopy Manager if any changes are made to a Storage Server or a device used in the backup. This section describes how to perform these changes.

4.6.1 Adding a device

After a device is added to any Storage Server, incorporate it in the backup operation as follows. This processing can be performed using either GUI operations or command operations. For the operation method using the GUI, refer to "Adding a new device" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

If commands are to be used to add a device, perform the following procedures:

1. Use the device information collection/reflection command (stgxfwcmsetdev) of the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running to collect information concerning the newly added device and display it in management information.
2. Use the device information setting command (swstdevinfofet) to set the operation 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.



Note

- 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 "Action required when access to repository fails" 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 details.

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 "Action required when the repository is too small" for details.

4.6.2 Deleting a device

This section describes how to delete different device types.

4.6.2.1 Deleting a transaction volume

Transaction volume deletion processing can be performed using either GUI operations or command operations.

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

To use commands to delete a transaction volume, follow the steps shown below.

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 of the transaction volume that is to be deleted.



Point

It is essential that these tasks are performed before the transaction volume that is to be deleted is removed.

4.6.2.2 Deleting a backup volume

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

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

If commands are to be used to delete a backup volume, follow the steps as shown below.

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 already defined backup policy may no longer be met (e.g., if the number of backup volumes is less than the number of preservation generations). In such a case, the backup can no longer be continued. To avoid such a situation, be sure to check existing backup policies before deleting a backup volume.

If an insufficient number of backup volumes will remain, first register a backup volume and then delete 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 (swstdevinfoset) to delete the device information of the backup volume that is to be deleted.



Point

It is essential that these tasks are performed before the backup volume that is to be deleted is removed.

4.6.3 Adding a Storage Server

The processing for adding a Storage Server to the backup 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 User's Guide".

For the operation method using commands, refer to the server information addition command (stgxfwcmaddsrv) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.

The processes required for adding a Storage Server are described below.

1. Register the Storage Server. For more information, refer to "Registering a Storage Server".
2. Fetch 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 operation 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 "Action required when access to repository fails" for details on 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 details.
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 "Action required when the repository is too small" for details.

1.

4.6.4 Deleting a Storage Server

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

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

For the operation method using commands, refer to the Server information deletion command (stgxfwcmdelsrv) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.



Point

It is essential that these tasks are performed before the transaction volume that is to be deleted is removed.

To delete a Storage Server, follow the steps listed below.

1. Delete the backup history for all the transaction volumes on the Storage Server that is being deleted. For more information, refer to "Deleting a backup history".
2. Delete the backup policy for all the transaction volumes on the Storage Server to be deleted. Backup policy deletion processing can be performed using either GUI operations or command operations. For the operation method using the GUI, refer to "Deleting a backup policy" in the "ETERNUS SF AdvancedCopy Manager User's Guide". For the operation method using commands, refer to the backup policy deletion command (swstbkpoldel).
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, stop daemons on the Storage Server. Normally, they are automatically stopped when the system stops.

It is also possible to individually stop a daemon if required. For more details on this, refer to "Starting and Stopping Daemons".



Note

- When the daemons stop, all functions of AdvancedCopy Manager running on the Storage Server stop.
- Stop daemons on a Storage Management Server only after checking that all the Storage Servers that it manages are stopped.

4.8 LVM Volume Operation

The backup of LVM volumes can be classified into the following two modes depending on the volume group configuration:

- Backup operation in units of volume groups
- Backup operation in units of physical disks (LU: Logical Unit)



Note

Before starting this operation, be sure to understand the basic operation of ordinary volumes.

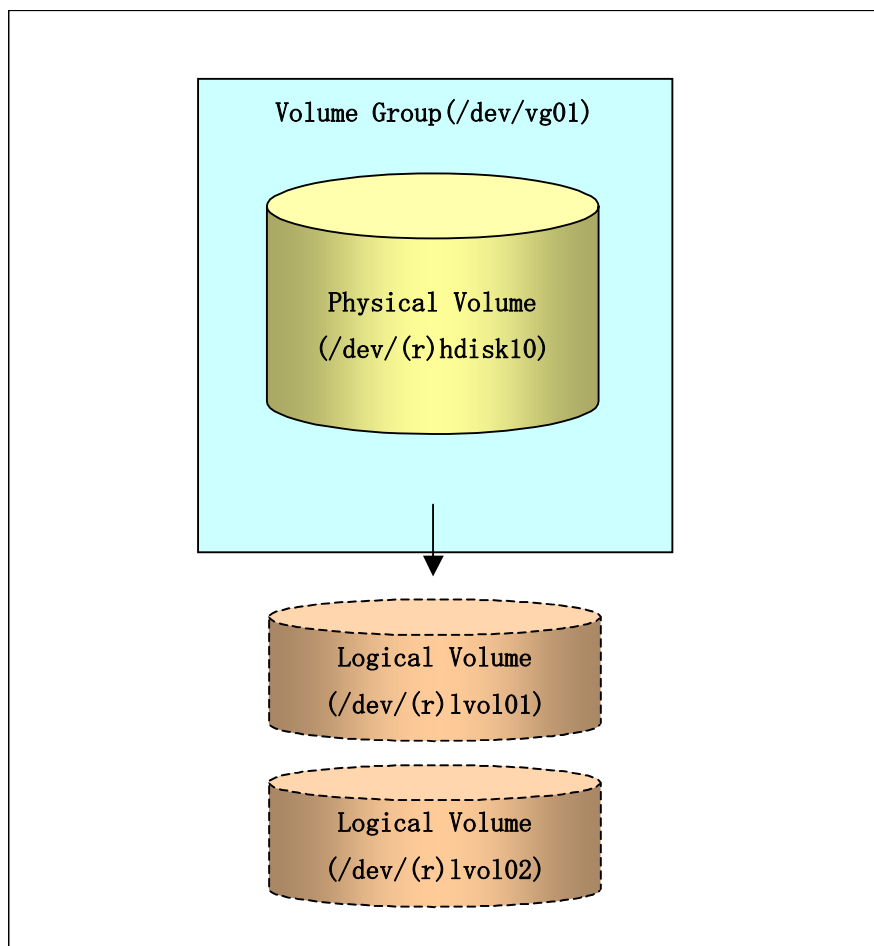
4.8.1 Backup operation in volume group units

Provided that all volume group configurations satisfy the following conditions, backup can be performed in units of volume groups.

- One volume group has only one physical disk, and logical volumes are configured so that one physical disk includes n logical volumes.

If the above conditions are not satisfied, backup must be performed in units of physical disks.

Figure: Example of configuration in which backup can be performed in volume group units

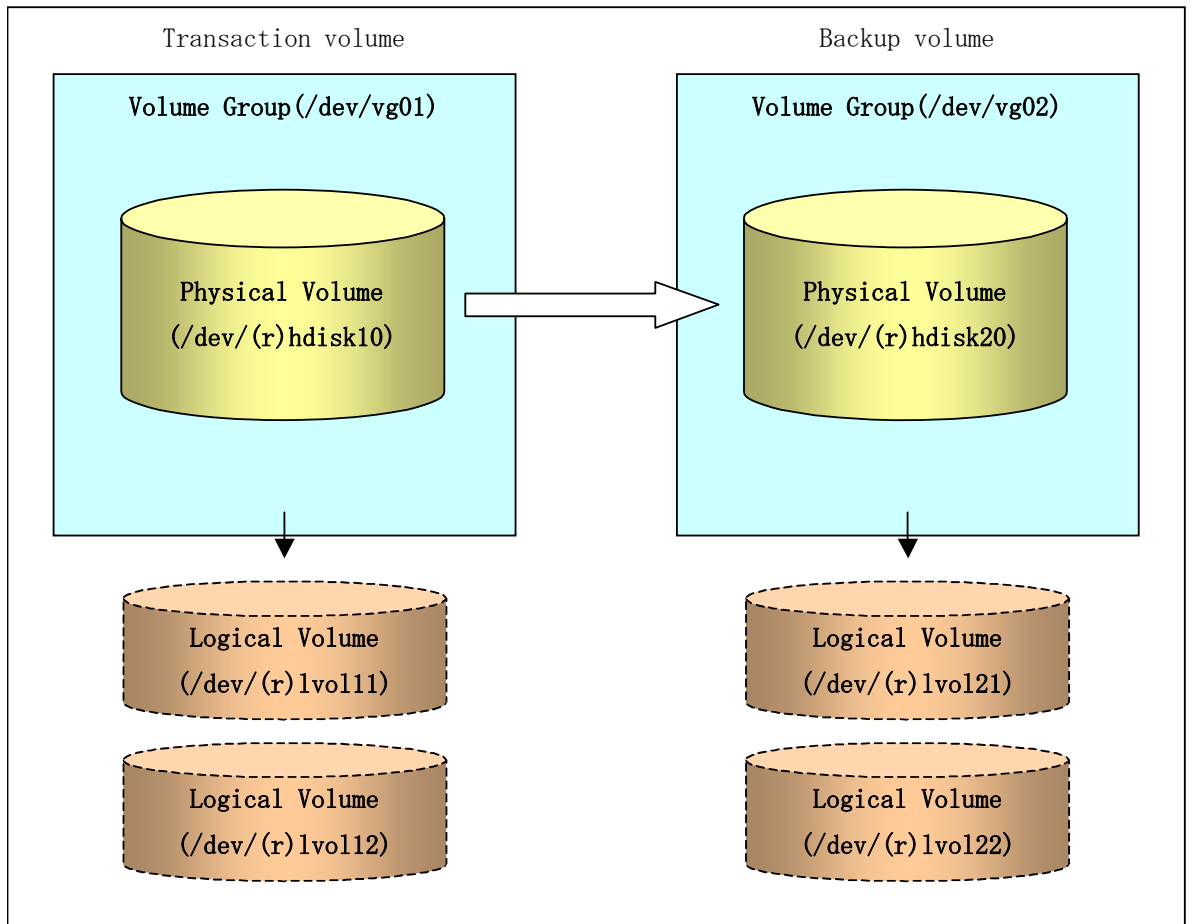


4.8.1.1 Operation design

Take note of the following conditions regarding the design of volume groups when designing volume groups for use as transaction volumes or backup volumes:

- All physical disks must be the same size.
The configurations of all logical volumes must be the same.

Figure: Transaction volumes and backup volumes



4.8.1.2 Preparations

4.8.1.2.1 Setting the transaction volume and backup volume

When setting the transaction volume and backup volume, specify their volume groups.

Example:

```
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/vg01
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/vg02
swstdevinfofet completed
#
```

4.8.1.2.2 Customizing the pre-processing and post-processing scripts

If a volume group is to be backed up, the pre-processing and post-processing scripts must be customized.

Refer to "Pre-processing and Post-processing for Backup and Restoration" for information on the customization procedure.



Note

If backup is attempted without customization of the scripts, pre-processing results in an error and backup cannot be performed.

4.8.1.3 Backup in units of volume groups

When a transaction volume is a volume group, copy processing covers the entire physical disk corresponding to the volume group. Therefore, if the volume group contains multiple logical volumes, data on all the logical volumes is backed up.

Example of a snapshot backup

```
# /opt/FJSVswsts/bin/swstbackup /dev/vg01
/dev/vg01 swstbackup completed
#
```

Example of a synchronous backup

```
# /opt/FJSVswsts/bin/swststartsync /dev/vg01
/dev/vg01 swststartsync completed
(After state of equivalency upkeep)
# /opt/FJSVswsts/bin/swstbackup /dev/vg01
/dev/vg01 swstbackup completed
#
```



Note

When using a volume group for backup, note the following:

- Configure the same logical disk as the transaction volume in a volume group separate from the transaction volume, and configure a volume group with the same physical disk size as the backup volume. To perform backup by associating transaction volumes with backup volumes, create a correspondence file called a “device map file” that defines the correspondence between transaction volumes and backup volumes. The “device map” specification is especially recommended when performing backup in units of volume groups.
- During backup processing, the LVM configuration information of the backup volume is overwritten by the LVM information of the transaction volume. Therefore, the correct LVM configuration information must be restored by backup post-processing. For details of this, refer to Pre-processing and Post-processing of Backup and Restoration.
- A file system may be configured on a logical volume. In this case, modify the backup pre-processing and post-processing scripts, using an account with Administrator authority, so that all the logical volumes in the volume group are unmounted/mounted. For details of this, refer to Pre-processing and Post-processing of Backup and Restoration.
- When the backup volume is a volume group, do not deactivate the backup volume with the `vgchange(1M)` command during synchronous processing (EC/REC). If the backup volume is deactivated during synchronous processing, not only can the backup volume not be activated again, the operations for stopping synchronous processing (backup command, synchronous processing cancel command) are also disabled. If the backup volume is mistakenly deactivated, forcibly stop synchronous processing such as by using `GRmgr/ETERNUSmgr`, and then reactivate the backup volume.

4.8.1.4 Restoration in units of volume groups

When a transaction volume is a volume group, copy processing covers the entire physical disk corresponding to the volume group. Therefore, if the volume group contains multiple logical volumes, data on all the logical volumes is restored.

Example of restoration

```
# /opt/FJSVswsts/bin/swstrestore /dev/vg01
/dev/vg01 swstrestore completed
#
```



Note

When using a volume group for restoration, note the following:

- A file system may be configured on a logical volume. In this case, modify the backup pre-processing and post-processing scripts, using an account with Administrator authority, so that all logical volumes are unmounted and mounted, respectively. For details, refer to "Pre-processing and Post-processing of Backup and Restoration".

4.8.2 Backup operation in units of physical disks

When the volume group configuration does not satisfy the conditions for operating in units of volume groups, backup can be performed by operating in units of physical disks.

When backup is performed on units of physical disks, volume group integrity must be maintained and, therefore, all the physical disks in the volume group must be operated synchronously.



Point

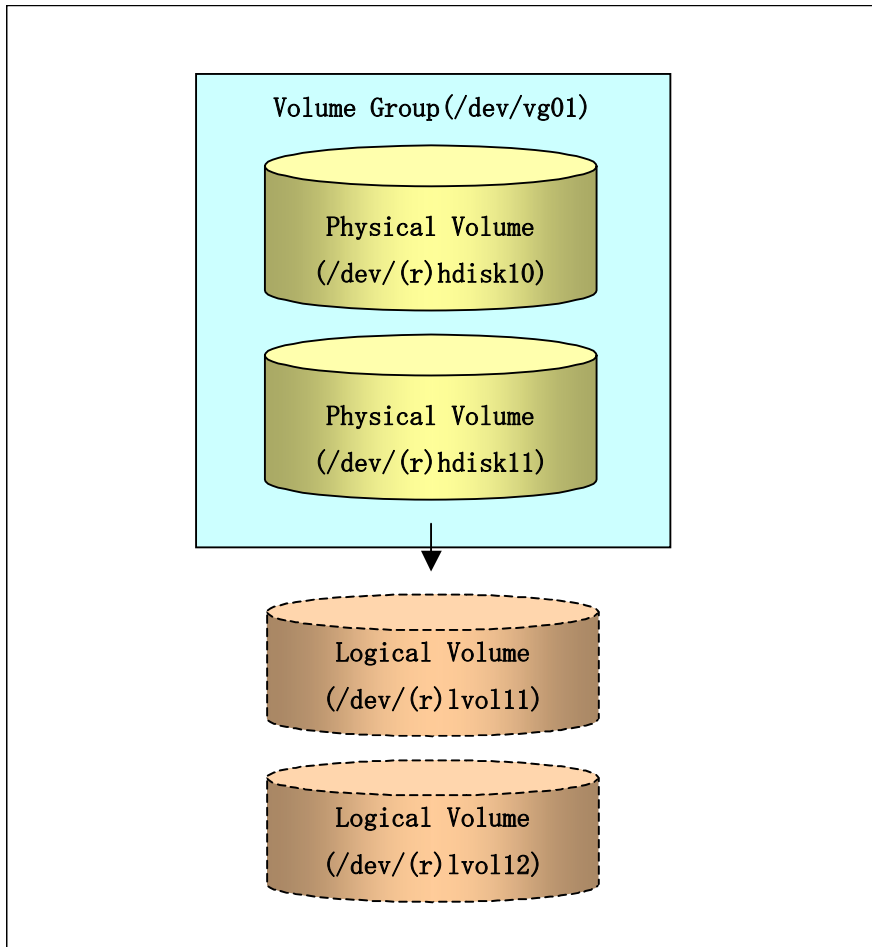
Refer to "Device information display command (stgxfwcmdispdev)", or the "Confirmation of devices in the same logical group" in an "ETERNUS SF AdvancedCopy Manager User's Guide" for details of how to determine which physical volumes should be operated synchronously.



Note

For operations in a cluster configuration, the device name (/dev/(r)hdisk#) of the physical disks that comprise a volume group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

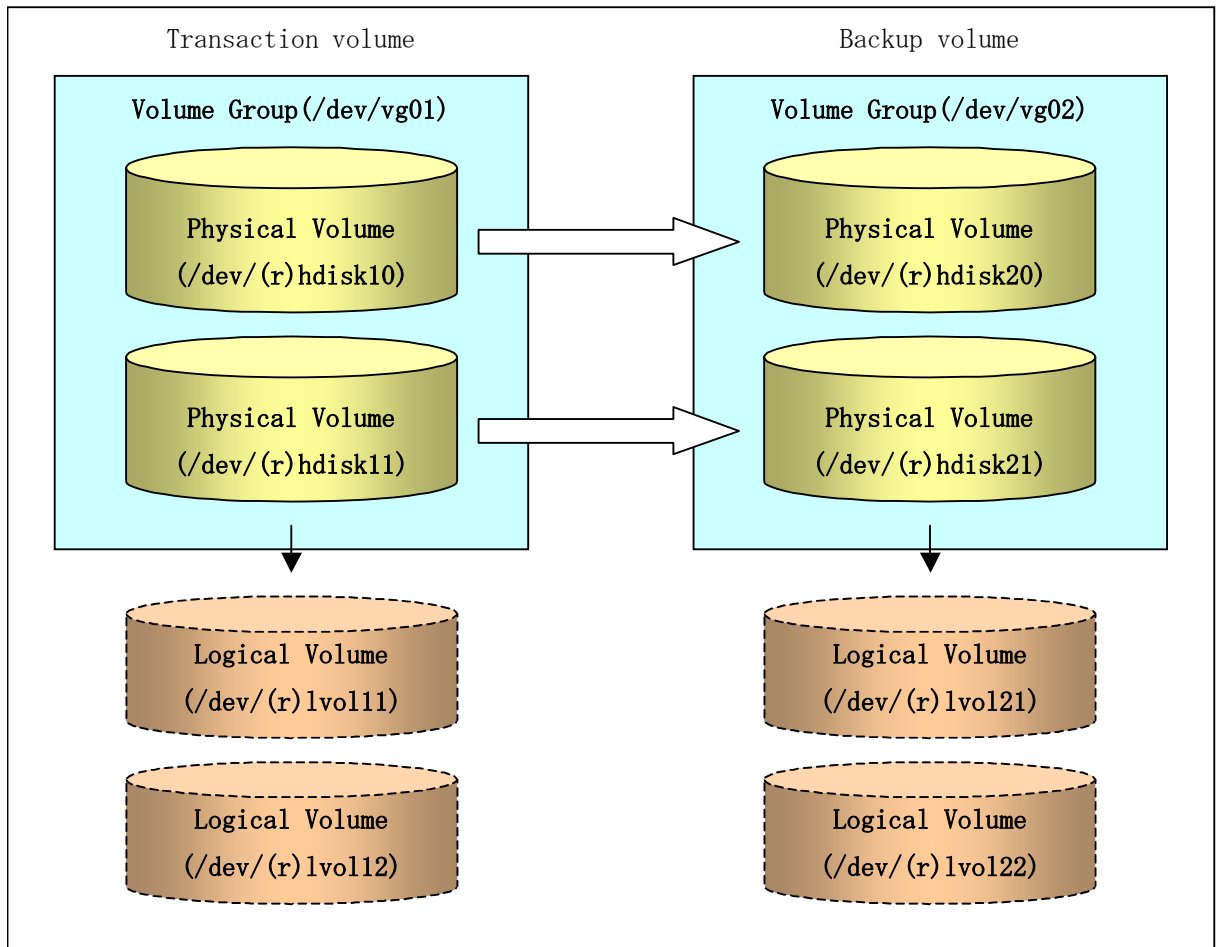
Figure: Sample configuration for operation in units of physical disks



4.8.2.1 Operation design

In order to use the replica volume after replication if the original volume is a volume group, the replica volume must have the same logical volume configuration as the original volume, and must be a volume group of the same physical size.

Figure: Transaction volumes and Backup volumes



4.8.2.2 Preparations

4.8.2.2.1 Configuring the transaction volume and backup volume

When configuring the transaction and backup volumes, specify all of the disks in the volume group.

Example:

```
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/hdisk10
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/hdisk11
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/hdisk20
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/hdisk21
swstdevinfofet completed
#
```

4.8.2.2 Preparing a device map file

In the case of a backup of an LVM volume, a device map file must be created. This is necessary because a backup volume with the same volume structure as the transaction volume must be specified.

[Example of a device map file]

```
# Transaction volume      Backup volume
/dev/hdisk10              /dev/hdisk20
/dev/hdisk11              /dev/hdisk21
```

For details on the device map file, refer to "Preparing a device map file."

4.8.2.3 Backup in units of physical disks

In this case, perform the operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing or post-processing work for each volume group before and after (respectively) the backup. Disable pre-processing and post-processing when operating individual physical disks.

Example of snapshot backup

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstbackup /dev/hdisk10 -Xdevmap /acm/devmap.txt
/dev/hdisk10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/hdisk11 -Xdevmap /acm/devmap.txt
/dev/hdisk11 swstbackup completed
#
(Perform post-processing for the transaction and backup volumes.)
```

Example of synchronous backup

```
(Perform preprocessing for the backup volume.)
# /opt/FJSVswsts/bin/swststartsync /dev/hdisk10 -Xdevmap /acm/devmap.txt
/dev/hdisk10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/hdisk11 -Xdevmap /acm/devmap.txt
/dev/hdisk11 swststartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the transaction volume.)
# /opt/FJSVswsts/bin/swstbackup /dev/hdisk10
/dev/hdisk10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/hdisk11
/dev/hdisk11 swstbackup completed
#
(Perform post-processing for the transaction and backup volumes.)
```

The table below summarizes the pre-processing and post-processing work to be performed before and after backup.

Table: Pre- and Post-processing for backup

	Pre-processing	Post-processing
Transaction volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 	<ol style="list-style-type: none"> 1. If file systems are included, remount the volumes that were unmounted by pre-processing.
Backup volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 3. Deactivate the volume group. 	Post-processing is not required.

Deactivate the volume group

Deactivate the volume group as follows:

```
# /usr/sbin/varyoffvg vg02
#
```

4.8.2.4 Restoration in units of physical disks

Perform this operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing or post-processing work for each volume group before and after (respectively) the restoration operation. Disable pre-processing and post-processing when operating individual physical disks.

Example of restoration

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstrestore /dev/hdisk10
/dev/hdisk10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/hdisk11
/dev/hdisk11 swstrestore completed
#
(Pperform post-processing for the transaction and backup volumes.)
```

The table below summarizes the pre-processing and post-processing work to be performed before and after restoration.

Table: Pre- and Post-processing of restoration

	Pre-processing	Post-processing
Backup volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the volume group. 	<ol style="list-style-type: none"> 1. Post-processing is not required.
Restoration destination volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 3. Deactivate the volume group. 	<ol style="list-style-type: none"> 1. Activate the volume group 2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Deactivate the volume group

Deactivate the volume group as follows:

```
# /usr/sbin/varyoffvg vg01  
#
```

Activate the volume group

Activate the volume group as follows:

```
# /usr/sbin/varyonvg vg01  
#
```

4.9 VxVM Volume Operation

VxVM volumes are backed up in units of the physical disks that constitute each VxVM volume. When the backup is performed in units of physical disks, disk group integrity must be maintained, and therefore all the physical disks in the disk group must be operated synchronously.



Point

Refer to "Device information display command (stgxfwcmdispdev)", or the "Confirmation of devices in the save logical group" in an "ETERNUS SF AdvancedCopy Manager User's Guide" for the method used to check the physical volume which should take synchronization.



Note

Before starting this operation, be sure to understand the basic operation of ordinary volumes.



Note

Snapshot backup is recommended in operations on units of physical disks. In the case of synchronized backup, a command (for example, the VxVM command) which results in disk access to a copy destination disk during copy cannot be executed.



Note

For operations in a cluster configuration, the device name (/dev/(r)hdisk#) of the physical disks that comprise a disk group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

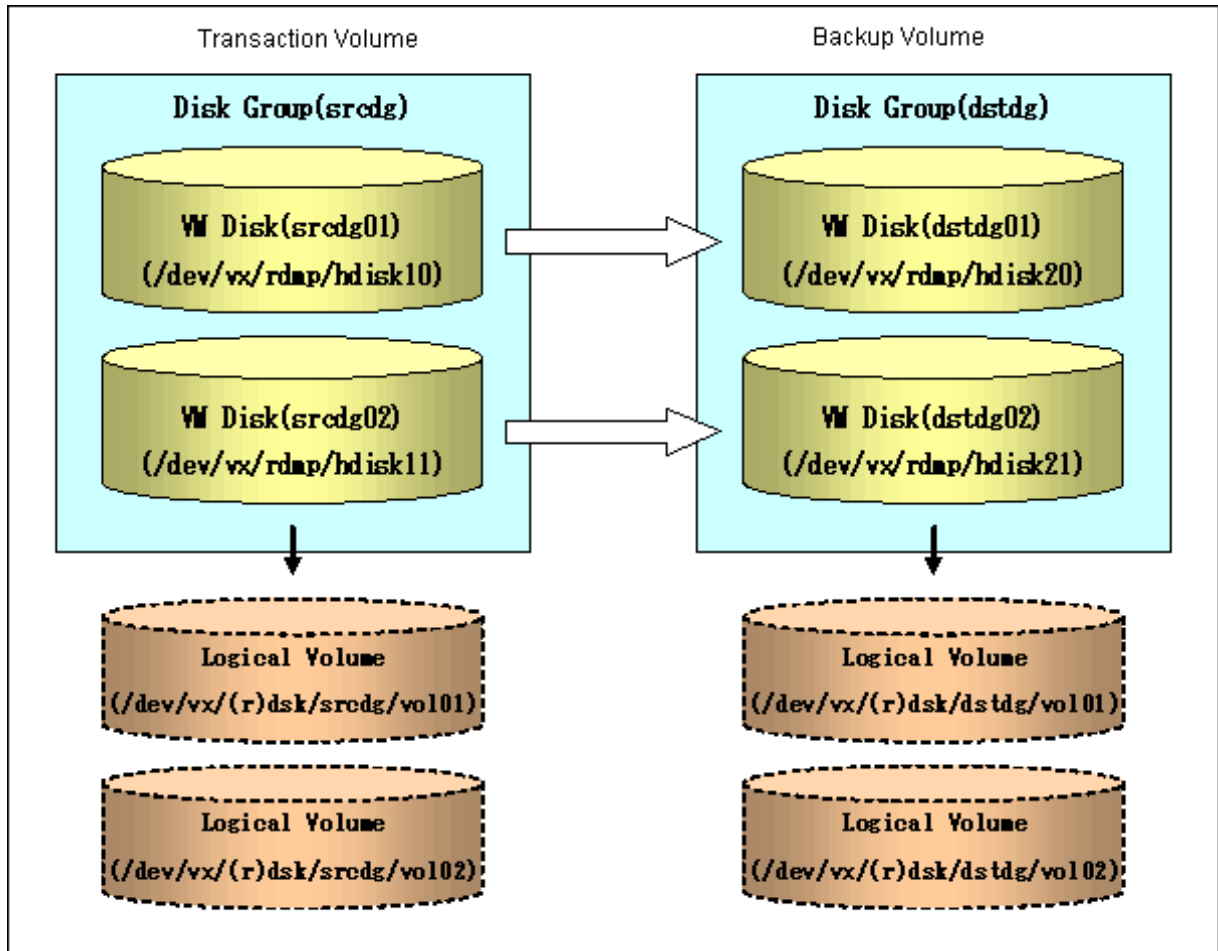
4.9.1 Operation design

You will need to design the disk groups that are to be used as transaction volumes or backup volumes.

Observe the following conditions when designing the disk groups:

- The number, sizes, and types of VM disks must be the same.
- The configurations of logical volumes must be the same.

Figure: Transaction volumes and Backup volumes



4.9.2 Preparations

4.9.2.1 Confirming the disk group configuration information file

The disk group must be reconfigured in backup post-processing. Confirm that a volume group configuration information file has been saved.

```
/etc/vx/cbr/bk/<disk group name>.<disk group ID>
```

4.9.2.2 Configuring the transaction volume and backup volume

When configuring the transaction volume and backup volume, specify all disks in the volume group.

Example:

```
# /opt/FJSVswsts/bin/swstdevinfo -t /dev/vx/dmp/hdisk10
swstdevinfo completed
# /opt/FJSVswsts/bin/swstdevinfo -t /dev/vx/dmp/hdisk11
swstdevinfo completed
# /opt/FJSVswsts/bin/swstdevinfo -b /dev/vx/dmp/hdisk20
swstdevinfo completed
# /opt/FJSVswsts/bin/swstdevinfo -b /dev/vx/dmp/hdisk21
swstdevinfo completed
#
```


4.9.2.3 Preparing a device map file

For the backup of a VxVM volume, a device map file must be created. This is because a backup volume with the same volume structure as the transaction volume must be specified.

[Example of a device map file]

# Transaction volume	Backup volume
/dev/vx/dmp/hdisk10	/dev/vx/dmp/hdisk20
/dev/vx/dmp/hdisk11	/dev/vx/dmp/hdisk21

For details on the device map file, refer to "Preparing a device map file."

4.9.3 Backup

Perform this operation by synchronizing all physical disks in the disk group.

Perform the required pre-processing or post-processing work for each volume group before and after (respectively) the backup. Disable pre-processing and post-processing when operating individual physical disks.

Example of snapshot backup

(Perform pre-processing for the transaction and backup volumes.)
/opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/hdisk10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/hdisk10 swstbackup completed
/opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/hdisk11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/hdisk11 swstbackup completed
#
(Perform post-processing for the transaction and backup volumes.)

Example of synchronous backup

(Perform pre-processing for the backup volumes.)
/opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/hdisk10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/hdisk10 swststartsync completed
/opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/hdisk11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/hdisk11 swststartsync completed
(State of equivalency upkeep)
(Perform preprocessing for the transaction volumes.)
/opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/hdisk10
/dev/vx/dmp/hdisk10 swstbackup completed
/opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/hdisk11
/dev/vx/dmp/hdisk11 swstbackup completed
#
(Perform post-processing for the transaction and backup volumes.)

The table below summarizes the pre-processing and post-processing work to be performed before and after backup.

Table: Pre- and Post-processing of backup

	Pre-processing	Post-processing
Transaction volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Import a disk group, if the disk group is not imported. 	<ol style="list-style-type: none"> 1. If file systems are included, mount the volumes that were unmounted during pre-processing.
Backup volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Export the disk group. 4. A disk group subordinate's physical disk is set to offline. 	<ol style="list-style-type: none"> 1. The physical disk set to offline with pre-processing is set to online. 2. Reconfigure the disk group 3. If file systems are included, remount the volumes that were unmounted during pre-processing.

Reconfiguring the disk group

Reconfigure the disk group as follows:

1. Pre-commit analysis for restoration

```
# /etc/vx/bin/vxconfigrestore -p dstdg
Diskgroup dstdg configuration restoration started .....

Installing volume manager disk header for hdisk20 ...
Installing volume manager disk header for hdisk21 ...
-
dstdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.

Run:
  vxconfigrestore -c dstdg ==> to commit the restoration.
  vxconfigrestore -d dstdg ==> to abort the restoration.
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c dstdg
Committing configuration restoration for diskgroup dstdg ....

dstdg's diskgroup configuration restoration is committed.
#
```



Note

In the case of a cluster system, when a disk group or a mount resource has been defined, instead of using the import/export command for the disk group use the online/offline process, and instead of using the file system mount/unmount commands use the online/offline processing.



Note

When exchanging a system disk, there are cases where conflicting backup configuration information may exist.
In such cases, the disk group ID after executing the above command needs to be set instead of the disk group.



Note

After this operation, if the volumes within a disk group need to be run in synchronous mode in the background, then depending on the volume configuration, it may take some time for synchronous processing to complete.
It is possible to use the volumes during this time.

4.9.4 Restoration

Perform this operation by synchronizing all physical disks in the disk group.
Perform the required pre-processing or post-processing work for each disk group before and after the restoration operation (respectively). Disable pre-processing and post-processing when operating individual physical disks.

Example of restoration

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/hdisk10
/dev/vx/dmp/hdisk10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/hdisk11
/dev/vx/dmp/hdisk11 swstrestore completed
#
(Perform post-processing for the transaction and backup volumes.)
```

The table below summarizes the pre-processing and post-processing work to be performed before and after restoration.

Table: Pre and Post processing of restoration

	Pre-processing	Post-processing
Backup volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the disk group. 2. Import a disk group, when the disk group is not imported. 	Post-processing is not required.
Restoration destination volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Export the disk group. 4. A disk group subordinate's physical disk is set to offline. 	<ol style="list-style-type: none"> 1. The physical disk set to offline with pre-processing is set to online. 2. Reconfigure the disk group 3. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring the disk group

Reconfigure the disk group as follows:

1. Restoration pre-commit analysis

```
# /etc/vx/bin/vxconfigrestore -p srcdg
Diskgroup srcdg configuration restoration started .....

Installing volume manager disk header for hdisk10 ...
Installing volume manager disk header for hdisk11 ...
-
srcdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.

Run:
  vxconfigrestore -c srcdg ==> to commit the restoration.
  vxconfigrestore -d srcdg ==> to abort the restoration.
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c srcdg
Committing configuration restoration for diskgroup srcdg ....

srcdg's diskgroup configuration restoration is committed.
#
```



Note

When exchanging a system disk, there are cases where conflicting backup configuration information may exist.

In such cases, the disk group ID after executing the above command needs to be set instead of the disk group.



Note

After this operation, if the volumes within a disk group need to be run in synchronous mode in the background, then, depending on the volume configuration it may take some time for synchronous processing.

It is also possible to use the volumes during this time.

Chapter 5 Backup Using the Suspend/Resume Function

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

5.1 Overview

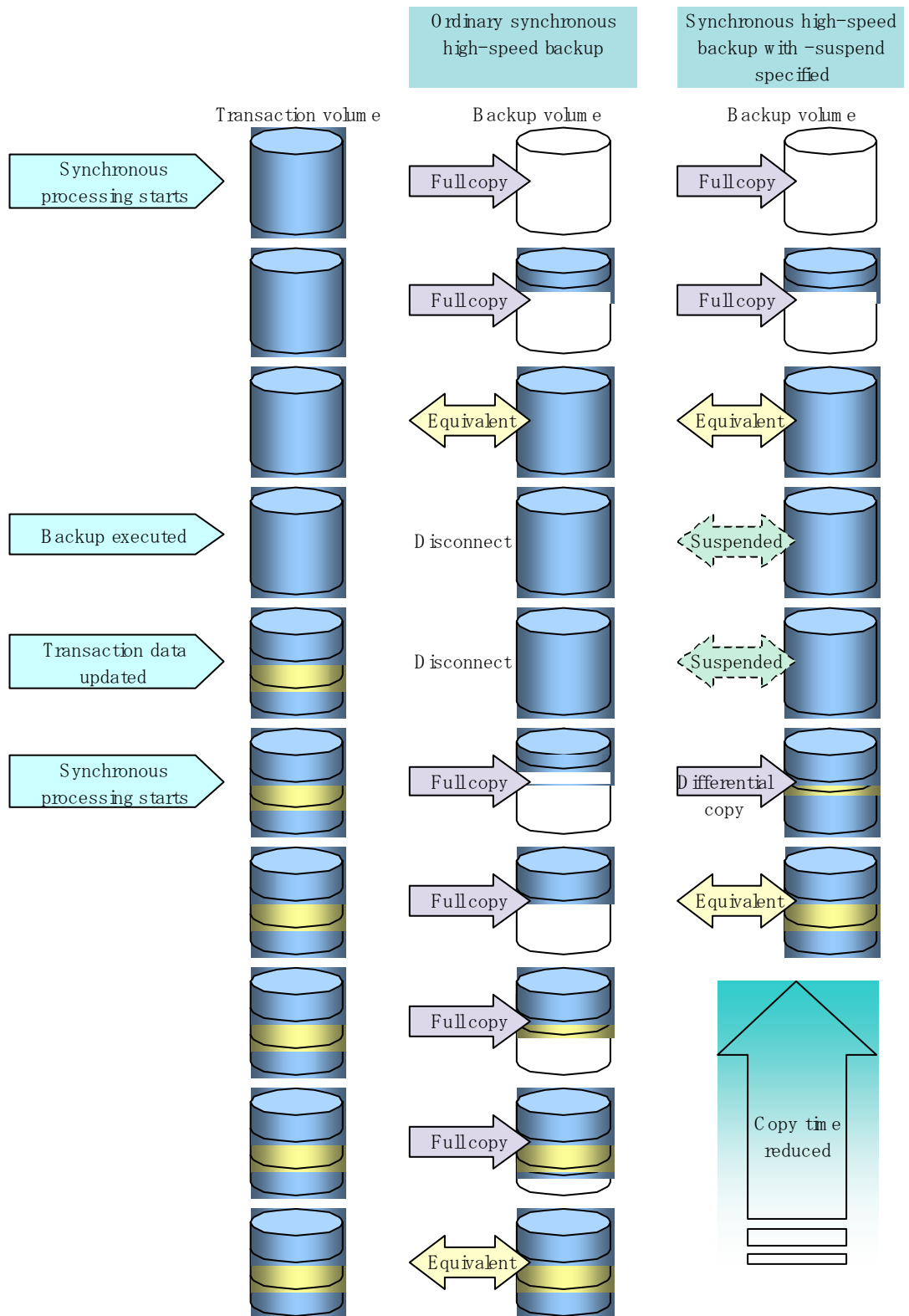
The Suspend/Resume function sets Suspend/Resume for the equivalency maintenance status using Equivalent Copy (EC). Using this function for differential copying from the Suspend state enables higher-speed synchronous backup operation.

AdvancedCopy Manager provides two backup functions: snapshot high-speed backup and synchronous high-speed backup. In snapshot high-speed backup, One Point Copy (OPC) is used to create a backup. In synchronous high-speed backup, EC is used to create a backup. The Suspend/Resume function can be thought of as 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 using the Suspend/Resume function, when the backup execution start command is executed with `-suspend` specified, EC is suspended, the backup process is completed, and the EC session status is saved. 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 shortened.

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



5.2 Backup Operation Design

Notes about synchronous high-speed backup using the Suspend/Resume function and backup operation design are provided below, as well as information related to backup management operation design (refer to "Operation Design" for more details).

Transaction volume

Register the backup source device used for storing transaction data 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 is executed with `-suspend` option specified, 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.



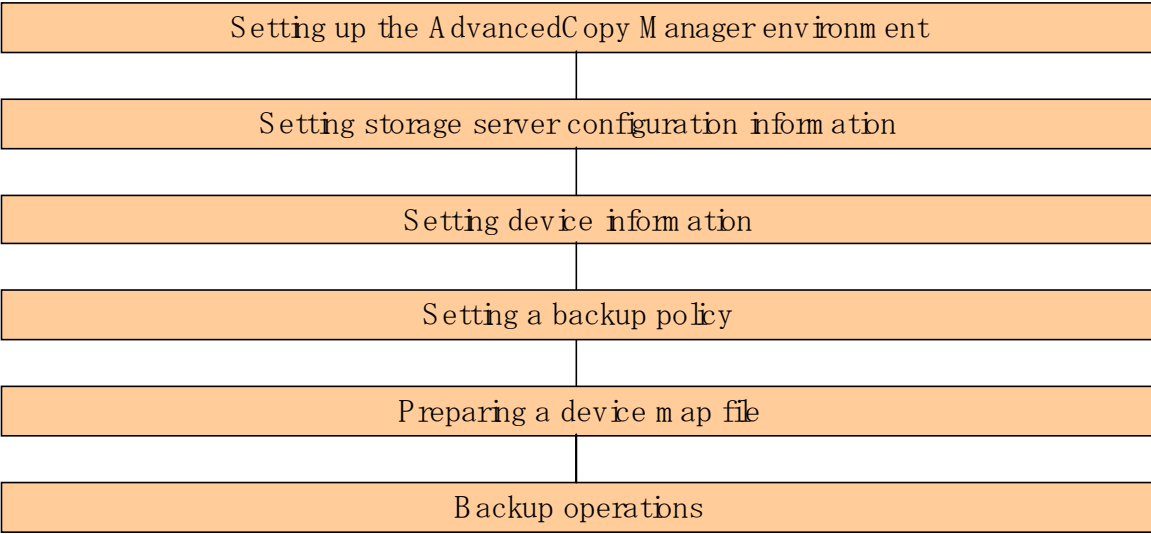
Point

For the backup process that uses the Suspend/Resume function, each transaction volume requires as many backup volumes as the saved generation number + 1.

5.3 Flow of Operations

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

Figure: Flow of backup operations using Suspend/Resume function



5.4 Preparations

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

5.4.1 Setting up the AdvancedCopy Manager environment

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

5.4.2 Setting Storage Server configuration information

Set the configuration information on the Storage Server processing the backup operations. This process can be executed using the GUI and command operations. For details on the operation using the GUI, refer to "Storage Server Configuration Information Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide". For details on the operation using the command, refer to the Storage_Server configuration information configuration command ([swstsvrset](#)). It is also possible to use the [Storage server configuration information display command \(swstsvrdisp\)](#) to refer to the Storage Server configuration information that was set.

5.4.3 Setting device information

Setting device information involves registering a transaction volume as the backup source and a backup volume as the backup destination. This process can be executed using the GUI and command operations. For details on the operation using the GUI, refer to "Volume Type Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide". For details on registering the transaction volume/backup volume for using the command, refer to the [Device information configuration command \(swstdevinfo\)](#). It is also possible to use the [Device usage status display command \(swstdevdisp\)](#) to refer to the volume information that was registered.



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.

5.4.4 Setting a backup policy

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

This process can be executed using the GUI and command operations.

For details on the operation using the GUI, refer to "Backup Policy Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For details on the operation using the command, refer to the following:

- Backup policy settings: Backup policy configuration command (swstbkpolset)
- Checking the backup policy that was set: Backup policy display command (swstbkpoldisp)
- Deletion of the backup policy: Backup policy deletion command (swstbkpoldel)

5.4.5 Preparing a device map file

In its backup operations, AdvancedCopy Manager automatically selects, from a group of devices registered as backup volumes, a device that has the same capacity as the transaction volume. It then uses the selected device as the backup destination.

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 with priority and is used as the backup destination.

To conveniently recognize 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 operation with the backup destination specified.



Point

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

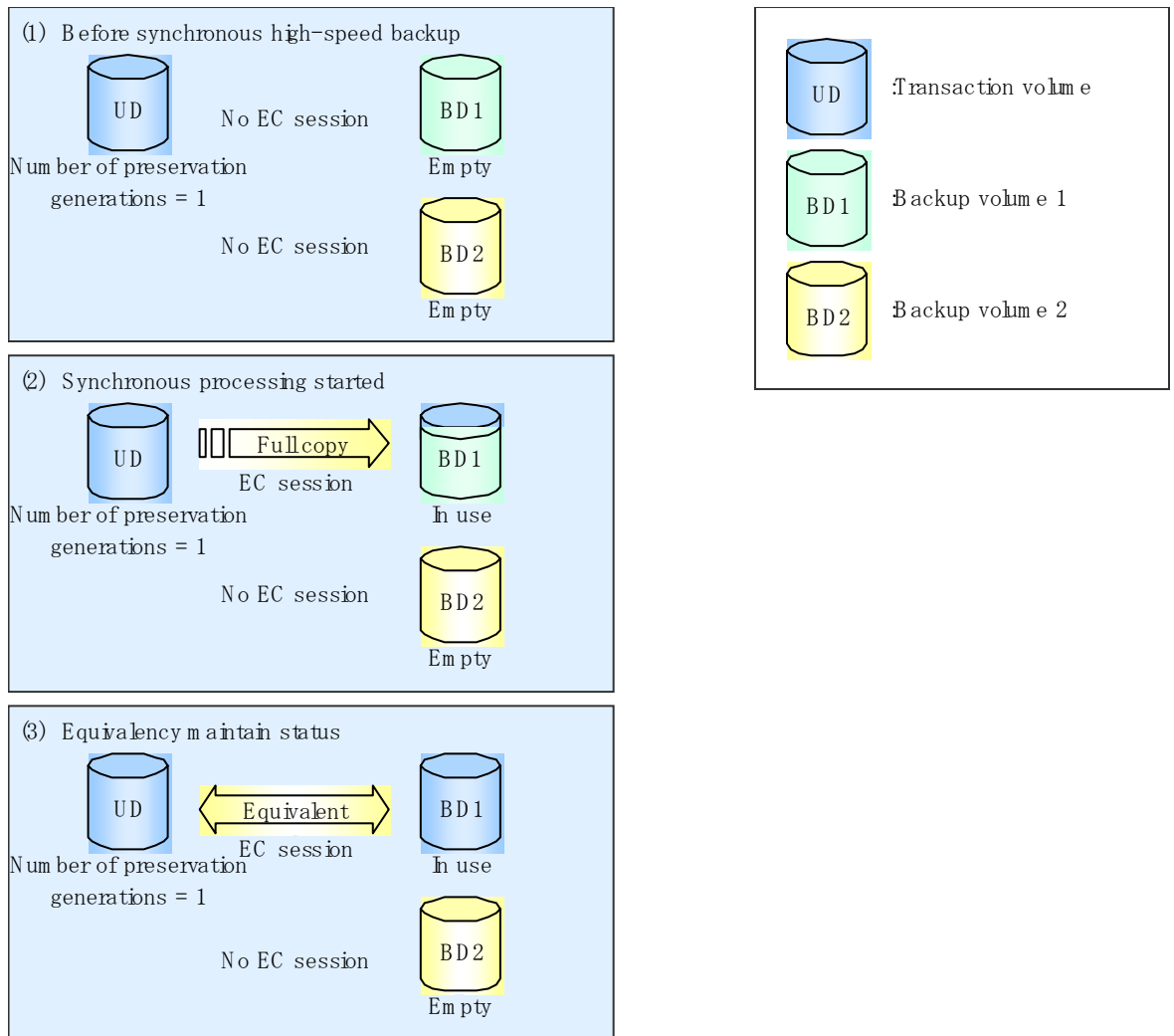
5.5 Backup Operations

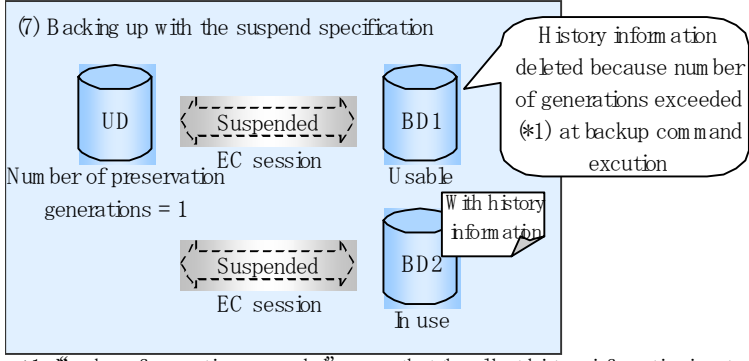
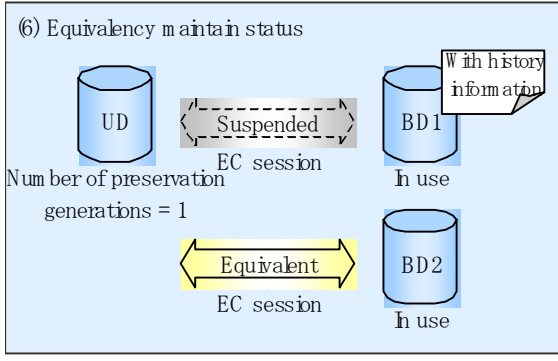
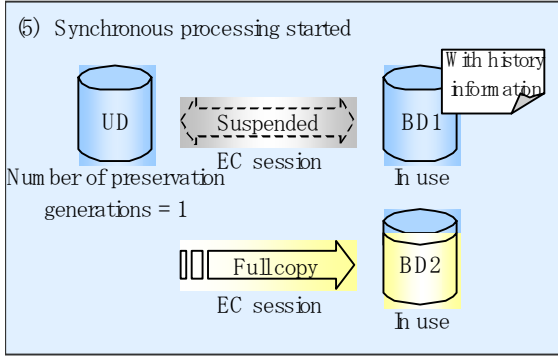
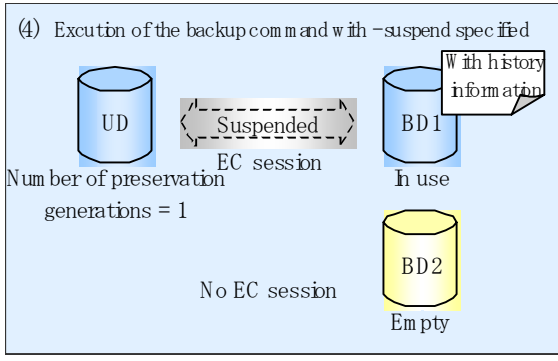
For synchronous high-speed backup using the Suspend/Resume function, execute the backup execution command (swstbackup), with `-suspend` specified, after the synchronous processing has started and the equivalency maintenance status is set. Then suspend the synchronous processing. After that, when history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

Note that synchronous high-speed backup that uses the Suspend/Resume function can be operated from the GUI client. Refer to "Executing Synchronous High-Speed Backup" in the "ETERNUS SF AdvancedCopy Manager User's Guide" for details.

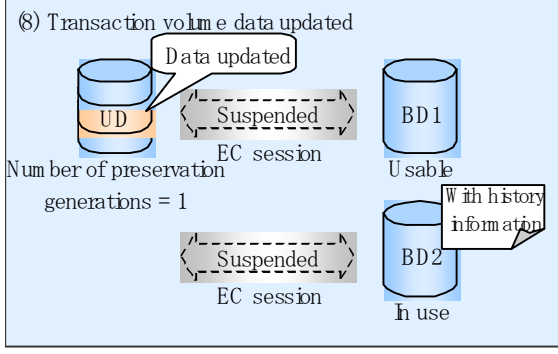
The flow of synchronous high-speed backup operations using the Suspend/Resume function is shown below.

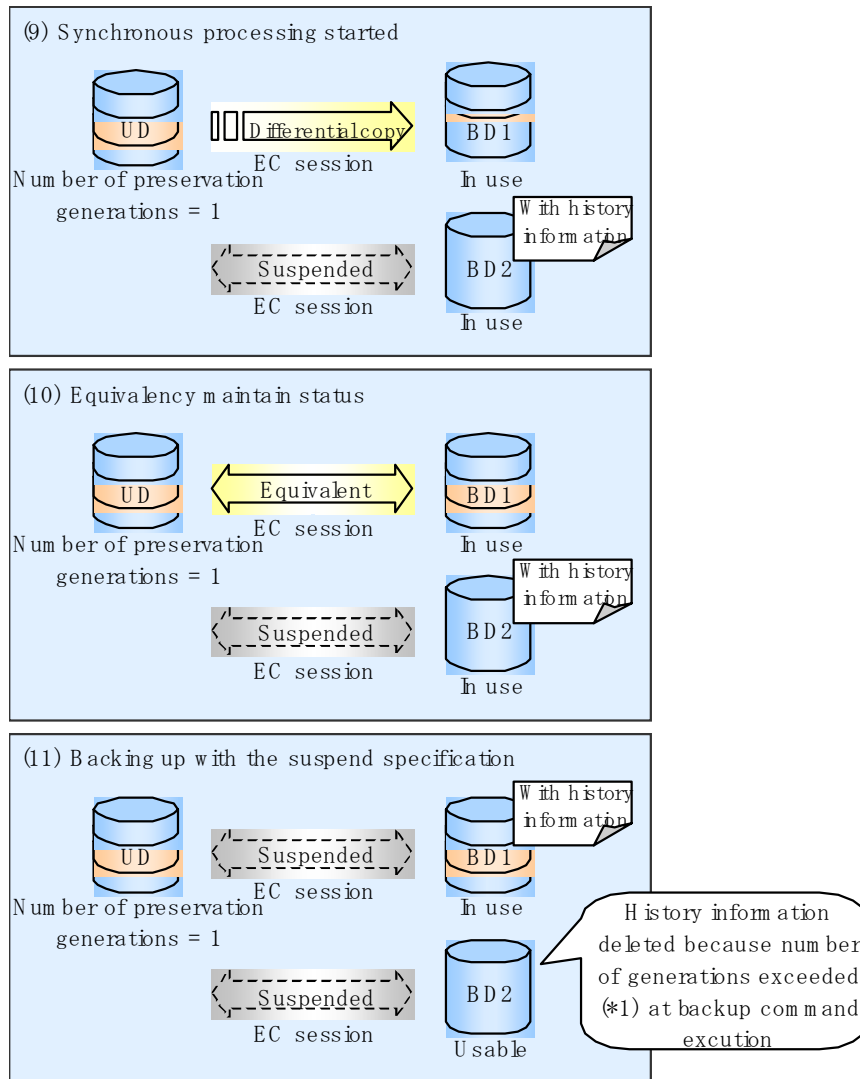
Figure: Synchronous high-speed backup operations using the Suspend/Resume function





*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.





5.5.1 Starting synchronous processing

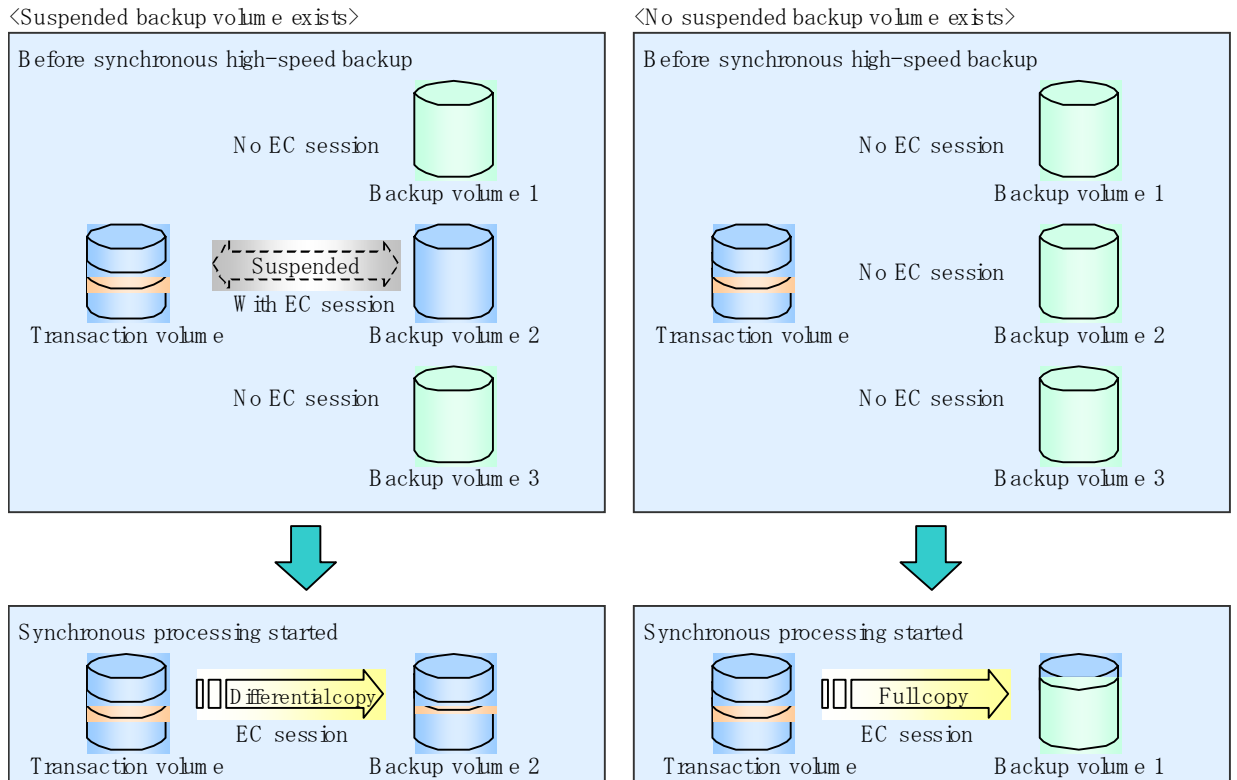
For synchronous high-speed backup, execute the synchronous processing start command (swststartsync) to start the synchronous processing. If there is a suspended backup volume at the start of the synchronous processing, then the following devices are selected first, and EC resumes (that is, differential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

- The backup volume from which history information is deleted because the number of generations has been exceeded, or
- The suspended backup volume without history information

If there is no suspended backup volume at the start of the synchronous processing, EC (i. e., 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).

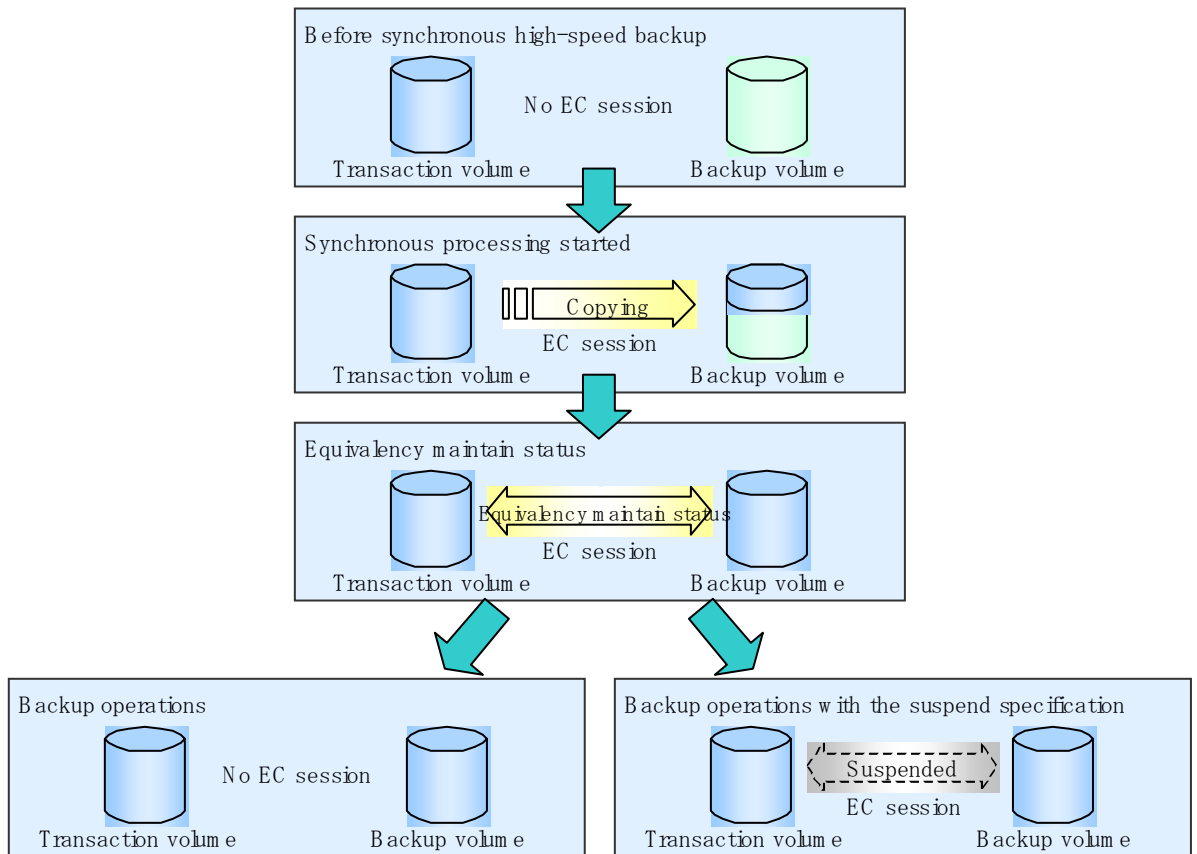
5.5.2 Backing up

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 the 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



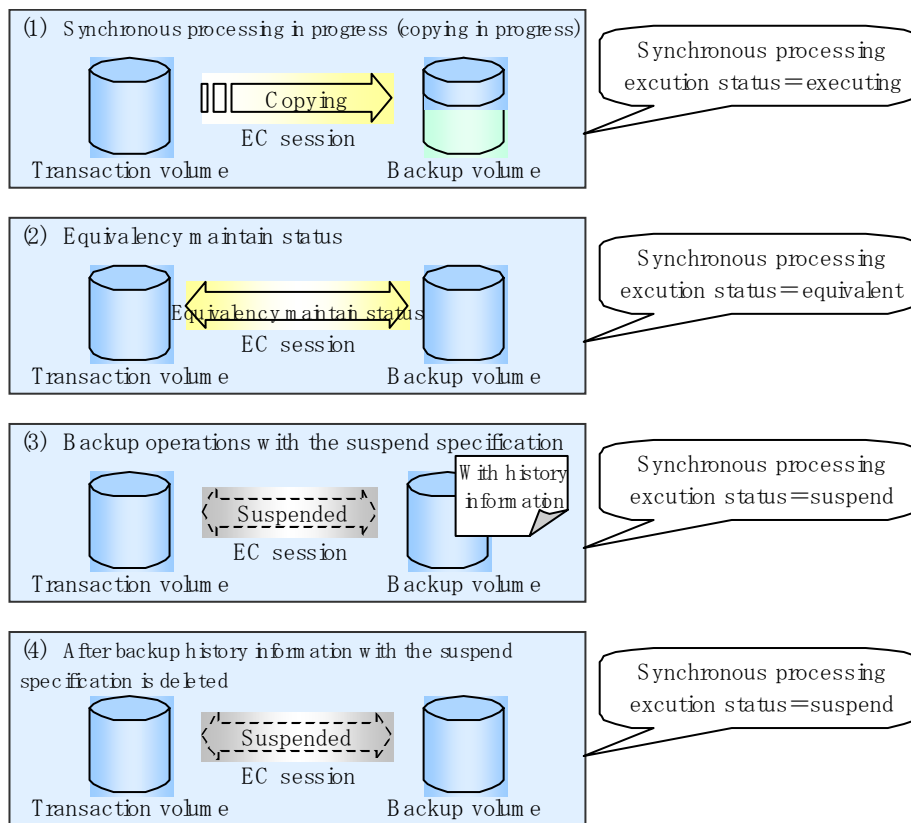
5.5.3 Displaying the synchronous processing execution status

To check the status of synchronous high-speed backup that uses the Suspend/Resume function, execute the synchronous processing progress display command (`swstsyncstat`). 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 (ie, copying) is 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



5.5.4 Canceling synchronous processing

To cancel synchronous processing (that is, an 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 (ie, copying) is 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, the EC session in the synchronous processing status or in the equivalency maintenance status is cancelled.

If one transaction volume has multiple synchronous processing (ie, multiple 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

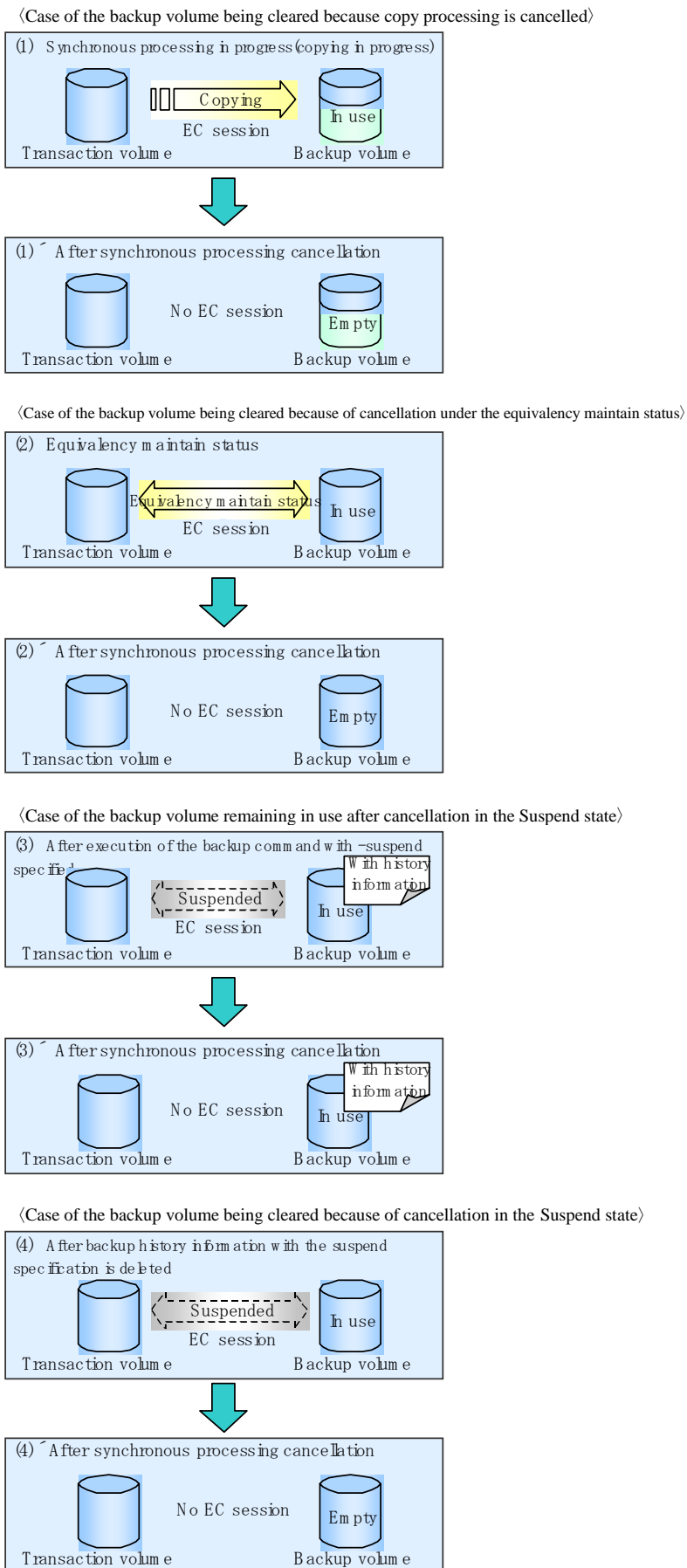
- The backup volume and all synchronous processing cannot both be specified simultaneously.



Point

- Cancelling the suspended synchronous processing that has history information does not delete the history information.
- Cancelling the 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 the synchronous processing is cancelled are shown below.

Figure: Operational states caused by synchronous processing cancellation



5.5.5 History management

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

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

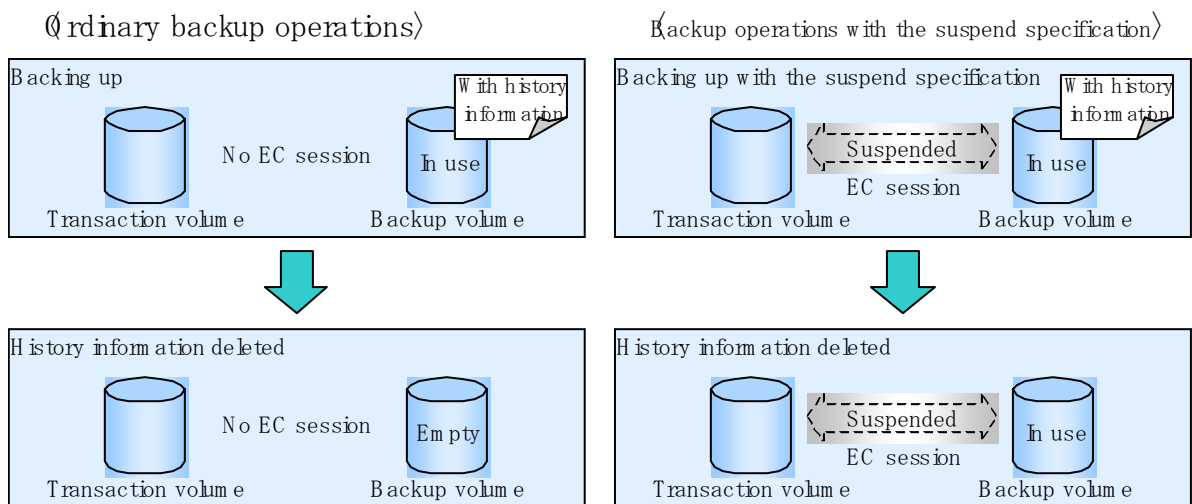


Point

- 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



5.5.6 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

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

Chapter 6 Backup Operation by the QuickOPC Function

This chapter provides details of the backup operation using the QuickOPC. The old name for this function was "Differential OPC".

6.1 Overview

For a snapshot high-speed backup using One Point Copy (OPC), the entire transaction volume must be copied to the backup volume every time the backup is started. However, as long as the same transaction volume and backup volume are used, the entire transaction volume need not be physically copied every time OPC is run. 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 copies 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).

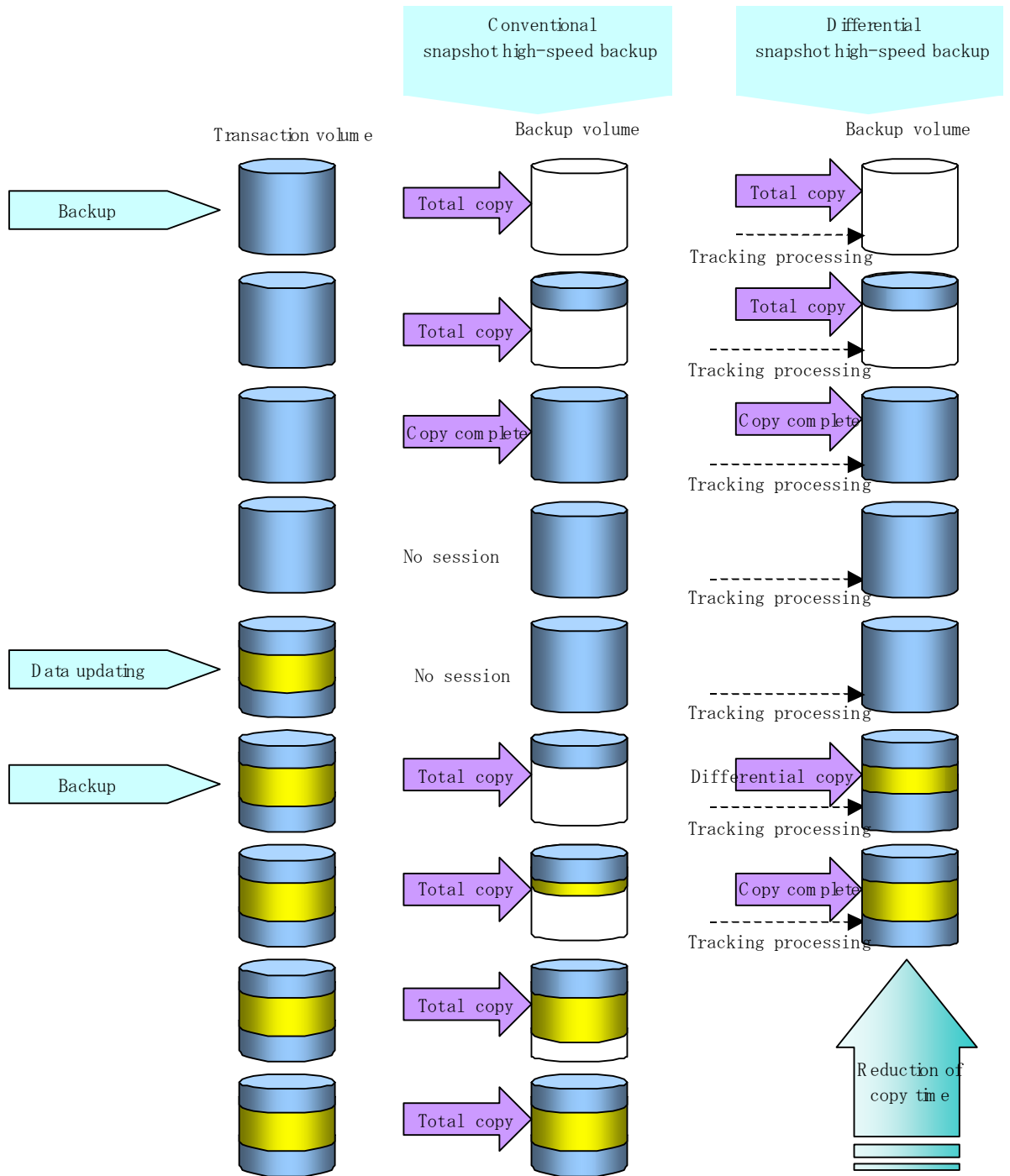
The QuickOPC function also cannot be used for backing up SDX objects in units of logical volumes.



Point

When the QuickOPC function is used, the hardware records the changes 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



6.2 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

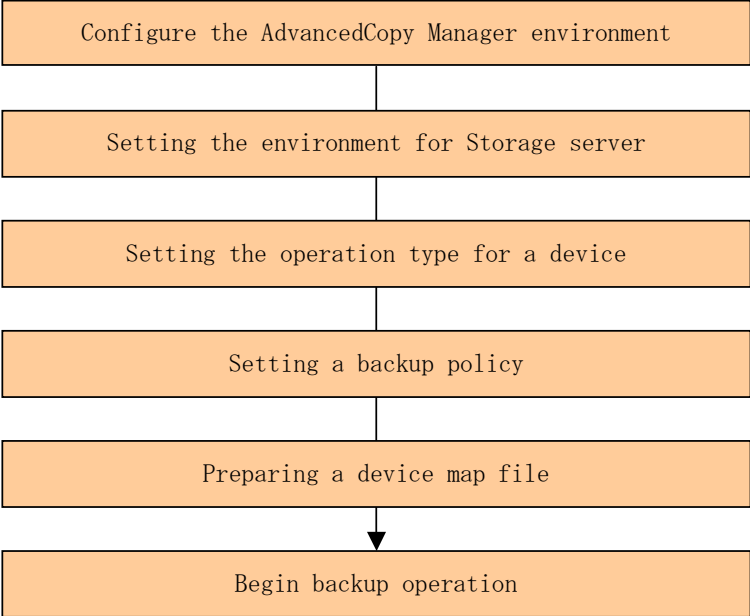
Note the following for the backup policy decision and backup volume preparation:

- In a backup operation using the QuickOPC function, an OPC session remains active 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.

6.3 Operation Flow

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

Figure: Flow of backup operations when the QuickOPC function is used



6.4 Preparation

This section provides details of the preparation for a backup operation using the QuickOPC function.

6.4.1 Configuring the AdvancedCopy Manager environment

For the sequence of processes from the installation to the operating environment configuration, see the "ETERNUS SF AdvancedCopy Manager Installation Guide" and "ETERNUS SF AdvancedCopy Manager Operations Guide".

6.4.2 Setting the environment for Storage Server

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

This process can be executed using the GUI and command operations.

For details on the operation using the GUI, refer to "Storage Server Configuration Information Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For details on the operation using the command, refer to the Storage Server configuration information configuration command (swstsvrset). It is also possible to use the Storage Server configuration information display command (swstsvrdisp) to refer to the Storage Server configuration information that was set.

6.4.3 Setting 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 executed using the GUI and command operations.

For details on the operation using the GUI, refer to "Volume Type Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For details on registering the transaction volume/backup volume for using the command, refer to the Device information configuration command (swstdevinfoset). It is also possible to use the Device usage status display command (swstdevdisp) to refer to the volume information that was registered.

Volumes in the tracking state can be checked using the Tracking status display command (swstrkstat).



Note

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

6.4.4 Setting a backup policy

When a backup policy is set, you will need to register as many usable backup volumes as are required to perform the operation in accordance with the specified backup policy.

This process can be executed using the GUI and command operations.

For details on the operation using the GUI, refer to "Backup Policy Settings" in the "ETERNUS SF AdvancedCopy Manager User's Guide".

For details on the operation using the command, refer to the following::

- Backup policy settings: Backup policy configuration command (swstbkpolset)
- Checking the backup policy that was set: Backup policy display command (swstbkpoldisp)
- Deletion of the backup policy: Backup policy deletion command (swstbkpoldel)

6.4.5 Preparing a device map file

In its backup operations, AdvancedCopy Manager automatically selects, from a group of devices registered as backup volumes, a device that has the same capacity as the transaction volume. If a backup volume in the tracking state exists when AdvancedCopy Manager looks for a backup volume for the snapshot high-speed backup, it selects the backup volume in the tracking state in preference to any others and uses it as the backup destination.

A device map file can be used to conveniently recognize the backup destination. This file defines the correspondence between a transaction volume and backup volume and 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.



Point

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

6.5 Operation

6.5.1 Executing backup

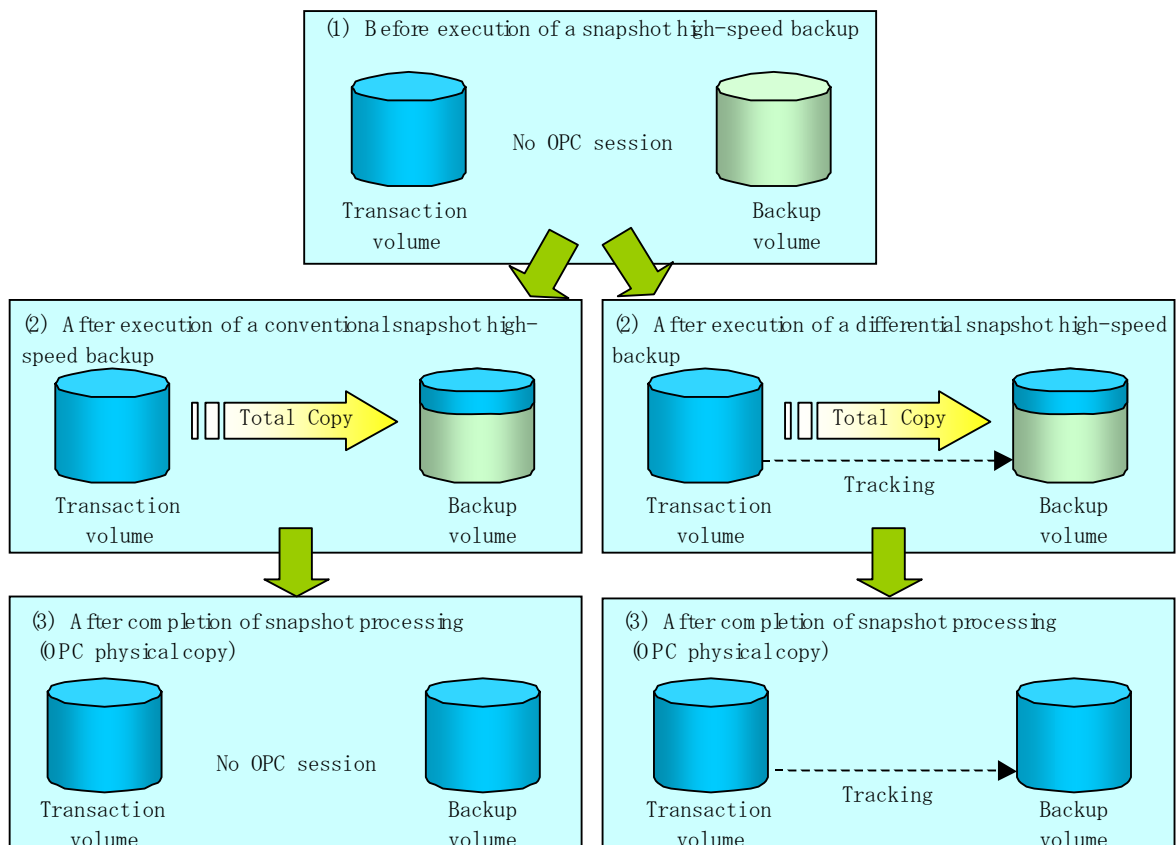
Execute the differential snapshot high-speed backup by specifying the `-T` option in the backup execution command (`swstbackup`).

Executing the backup command by specifying the `-T` option starts the QuickOPC. When the QuickOPC starts, the physical copy and tracking processing begins. When the physical copy is complete, only tracking processing is active. When the backup command is later executed by specifying the `-T` option, only data that has changed since the previous OPC was started is actually copied.

Note that differential snapshot high-speed backup can be operated from the GUI client. Refer to "Executing snapshot-type high-speed backup" in the "ETERNUS SF AdvancedCopy Manager User's Guide" for details of Web screens.

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

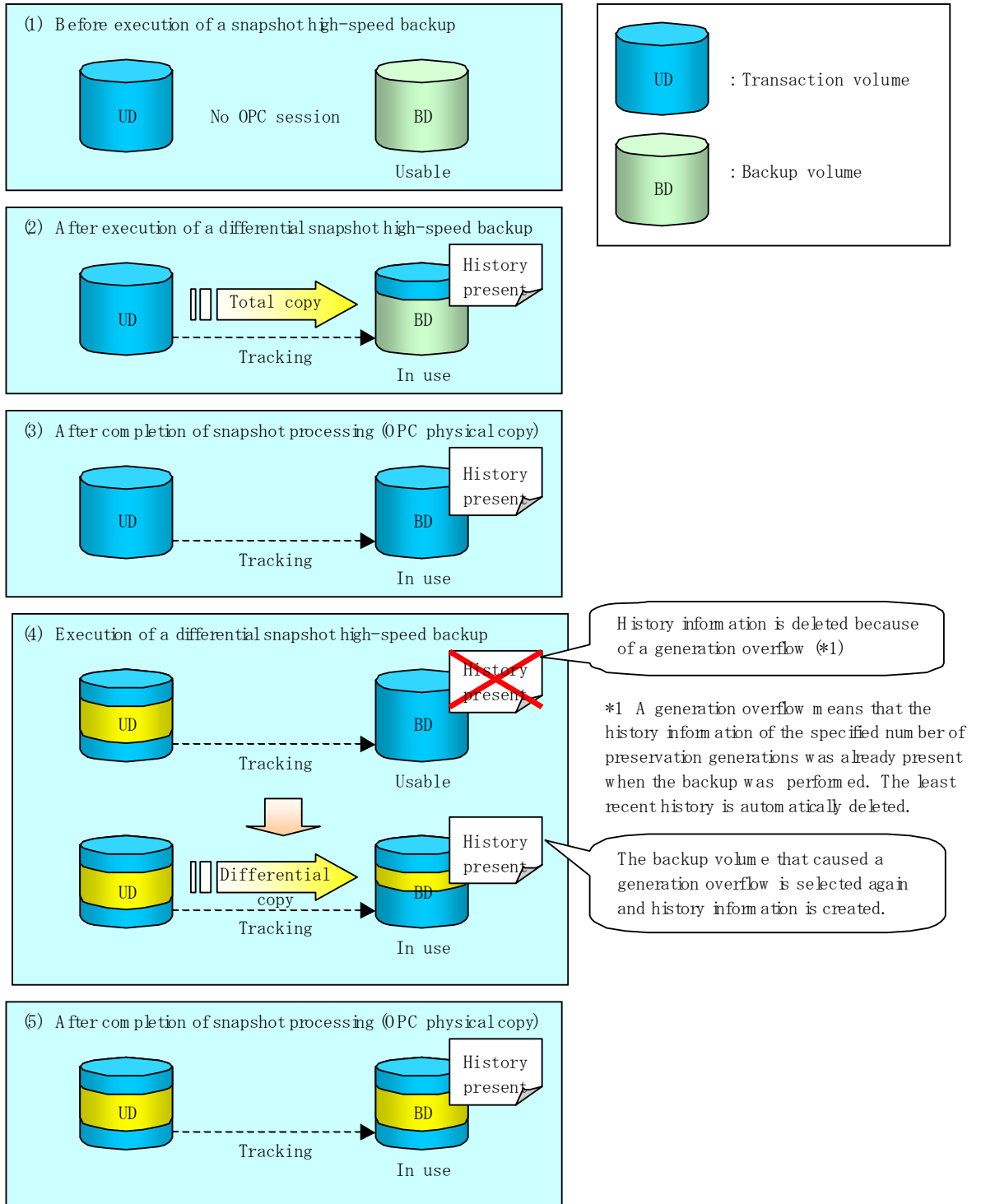
Figure: Conventional snapshot high-speed backup and differential snapshot high-speed backup



After the history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without 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 to start the differential data copy. The physical copy can thus be completed in a short period because data is only copied if it has changed since the previous time OPC was started.

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



6.5.2 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).

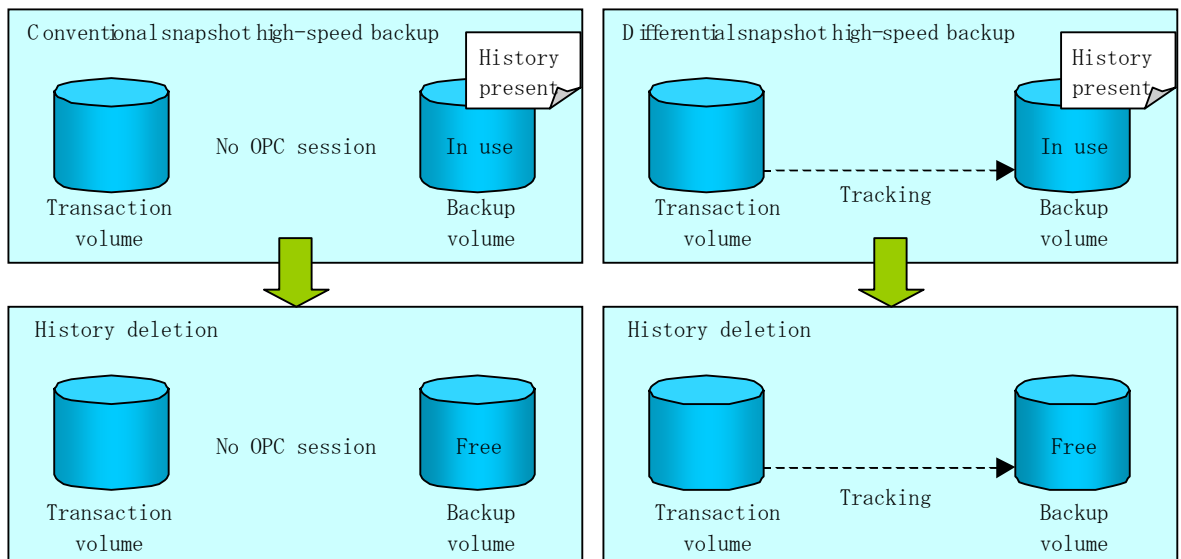
Even if the history information created by the differential snapshot high-speed backup is deleted, the tracking state is not released (that is, the physical copy, if it is being executed, is not stopped).

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 use 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.

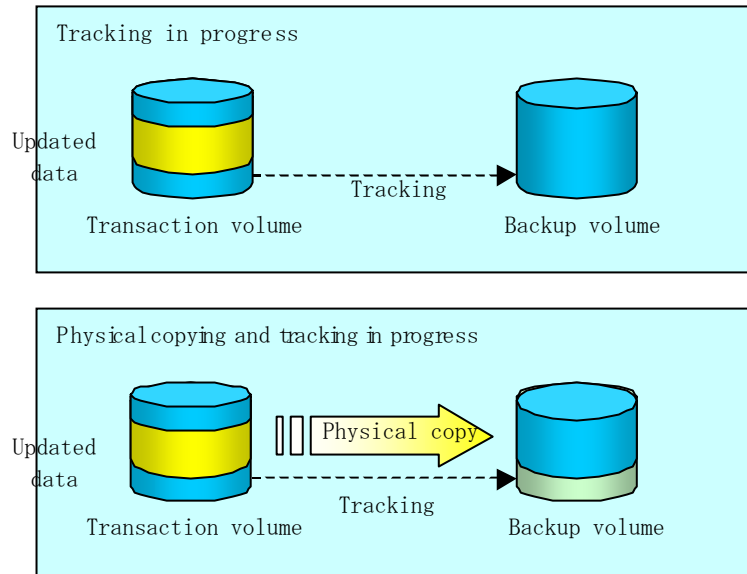
Figure: Comparison of history deletion between snapshot high-speed backup and differential snapshot high-speed backup



6.5.3 Restoration

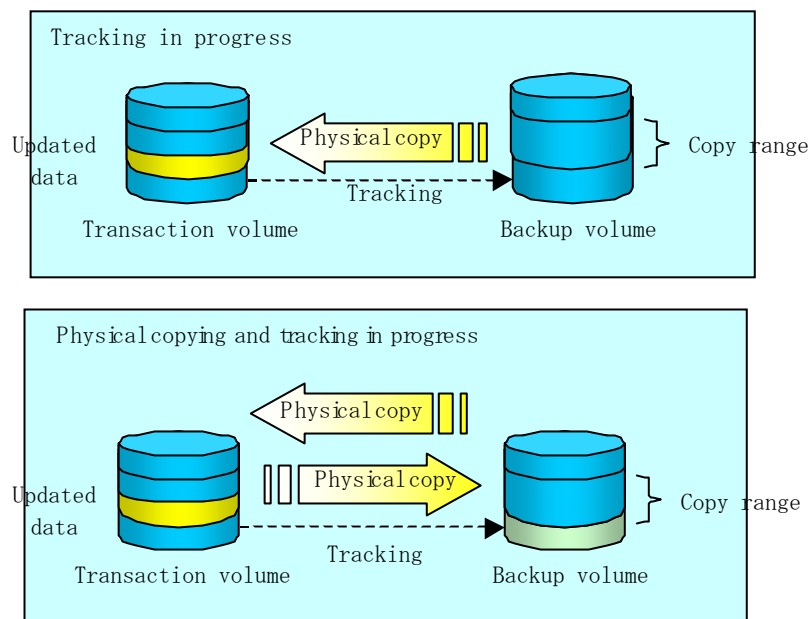
This section explains how to use the Restore execution command (swstrestore) for restoration. In the differential snapshot high-speed backup, tracking processing from the transaction volume to the backup volume is performed.

Figure: Tracking of differential snapshot high-speed backup operations



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. The copying time can be reduced for the restoration, as well as for the backup, because OPC for restoration physically copies only the data that has been updated after the backup.

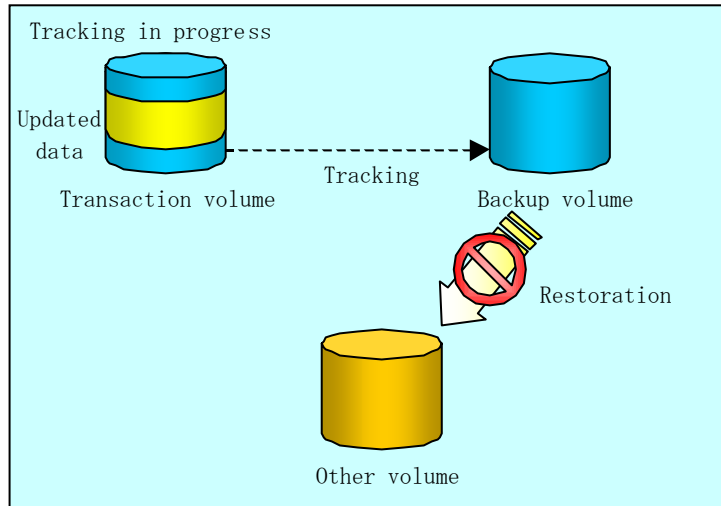
Figure: Restoration from backup volume to transaction volume



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

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

Figure: Restoration to another volume



Note

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

6.5.4 Canceling restoration

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



Point

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

6.5.5 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 an OPC session that is not in tracking is excluded from the display. For an OPC session in tracking, the amount of data that has been updated after execution of the QuickOPC (logical copy) is displayed as a percentage in the Update column.

6.5.6 Stopping tracking processing

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



Point

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 7 Replication

This chapter provides details of AdvancedCopy Manager replication in an AIX system. The AIX version of AdvancedCopy Manager's Agent enables the replication operation described in this chapter by linking with AdvancedCopy Manager's Manager running under Windows, Solaris or Linux.

In this chapter, the unit for backup and restoration in an AIX system is a physical disk (LU: Logical Unit), but the unit for management and operation is a volume group.

7.1 Overview

This chapter explains the AdvancedCopy Manager replication function.

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

Snapshot replication is replication that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of a Fujitsu ETERNUS storage system disk array unit. 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 in time can be used for different purposes. It can be used either independently of or in combination with the backup function.

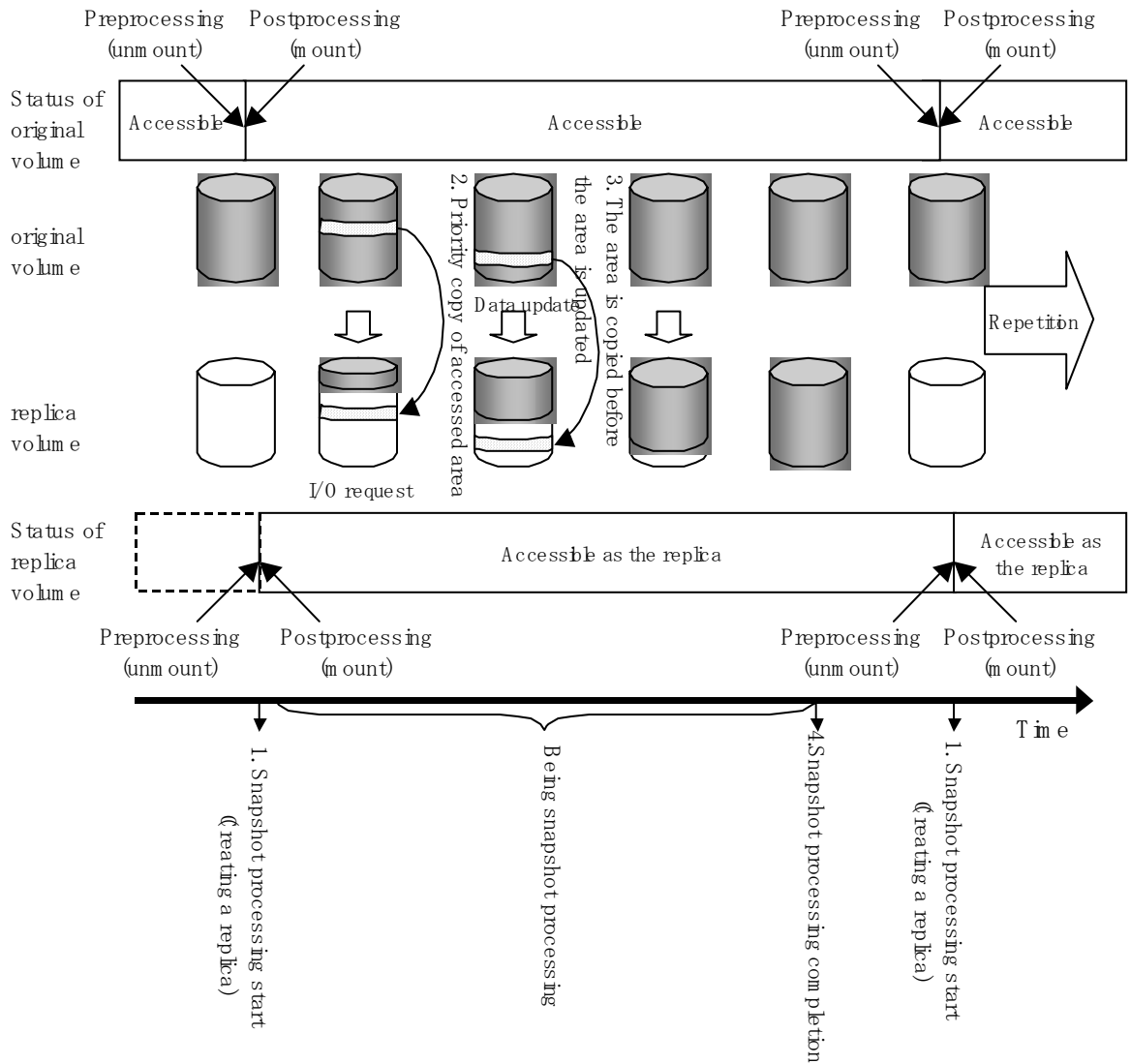
7.1.1 Snapshot replication processing

Replicas are created by copying from a source volume to a replica volume using the OPC or ROPC function of a Fujitsu 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 source volume to the replica volume is executed with the replication creation command (swsrpmake). The replication creation command dismounts or mounts the source volume. This processing determines the original data. For details, refer to "Pre-processing and Post-processing of Replication". (See steps 1 to 4 in Figure).
2. If the user wants to recreate a replica, only the replication creation command (swsrpmake) is required. If the previous snapshot processing is in progress, it is stopped and a new snapshot process 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 Fujitsu ETERNUS storage system disk array unit.



Note

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

7.1.1.1 Snapshot replication types

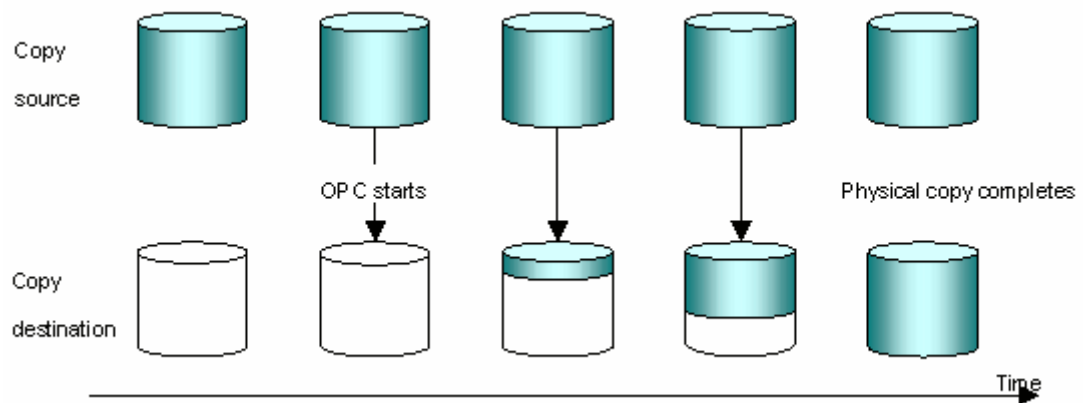
The following types of snapshot replication are available, depending on the AdvancedCopy Manager functions used:

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

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



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

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

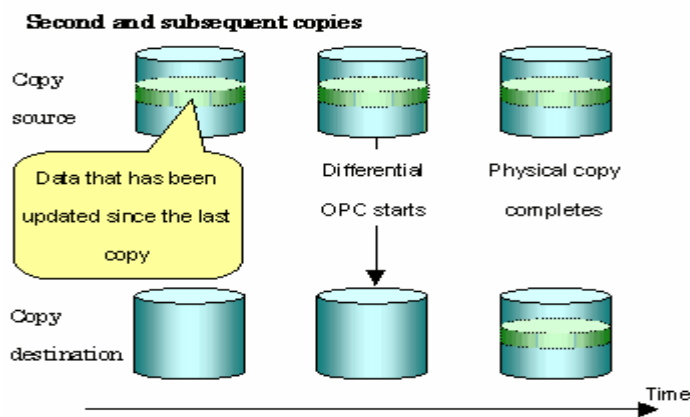
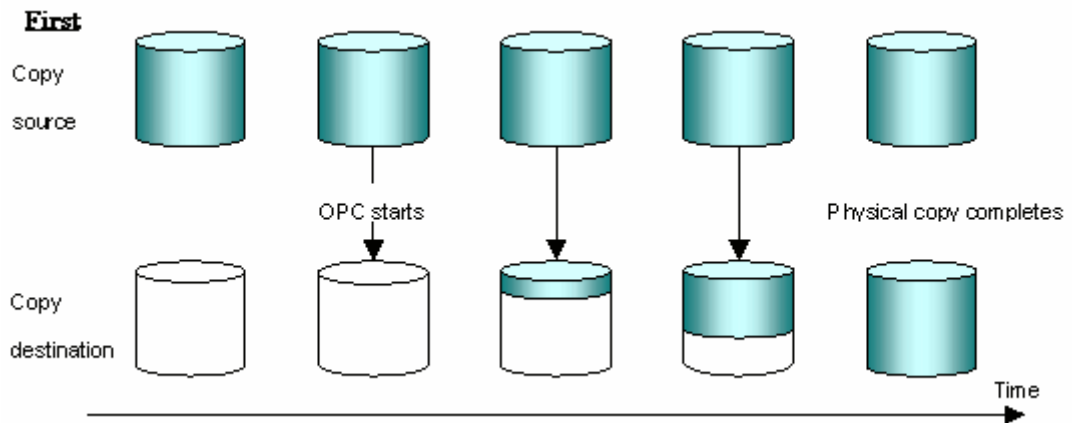
QuickOPC Snapshot type replication

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

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

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

Figure: QuickOPC replication



Point

The copy destination disk area must be the same size as, 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 snapshot replication, it is necessary to use an ETERNUS disk array that supports the function.

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.



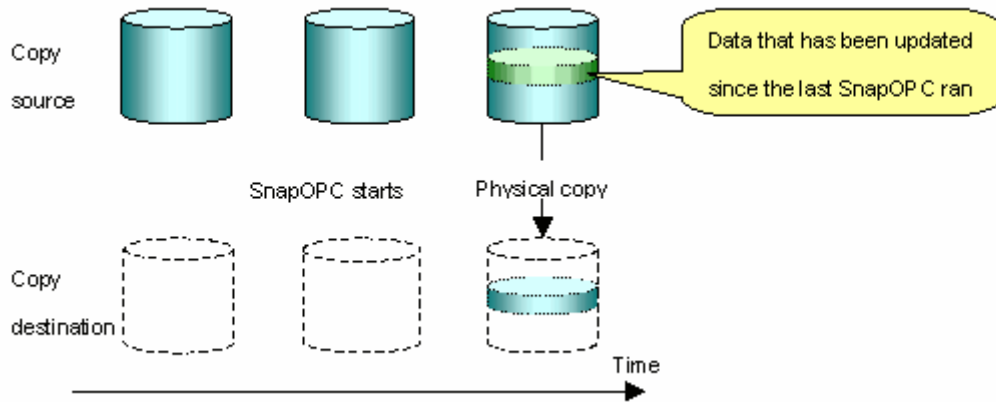
Point

Hardware using the QuickOPC function records the updates made to the copy source or destination after the completion of OPC logical copying. The status in which the hardware records and displays 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 after a certain point in time (a 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.



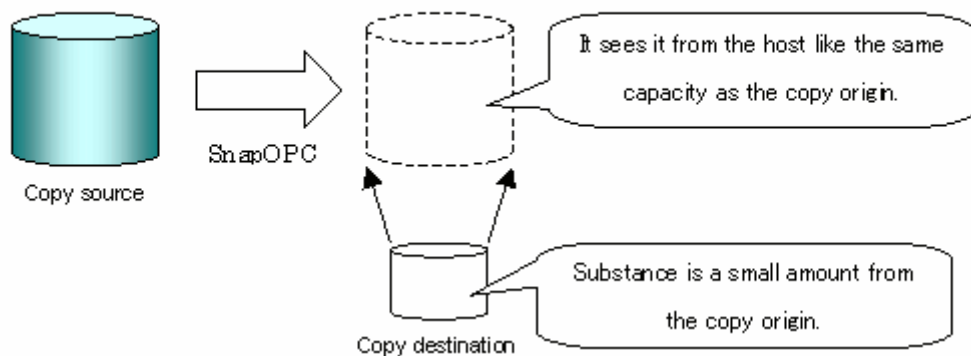
Note

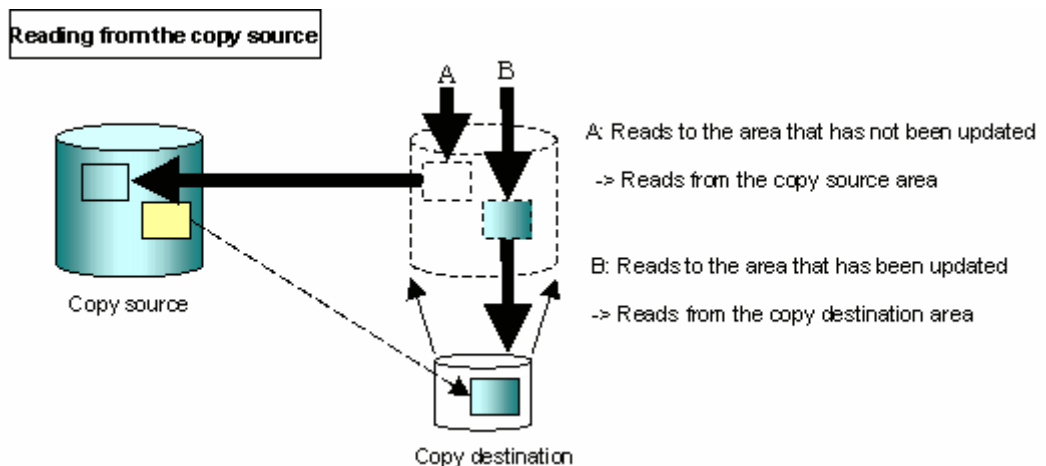
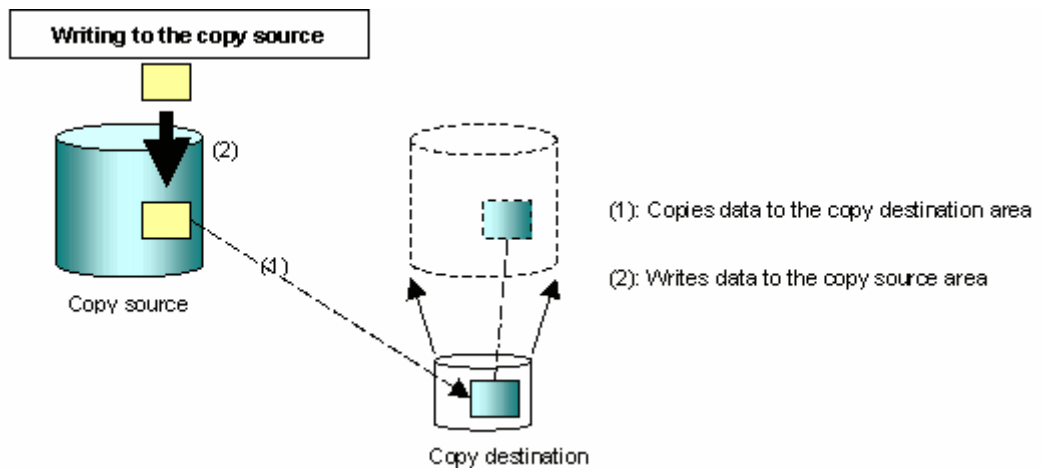
SnapOPC can only be used for replication (OPC) within a cabinet, not for inter-cabinet replication (ROPC).

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

Figure: SnapOPC mechanism

Mechanism of SnapOPC





Snapshot type replications that use SnapOPC are referred to as "SnapOPC snapshot type replications".

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

- 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.

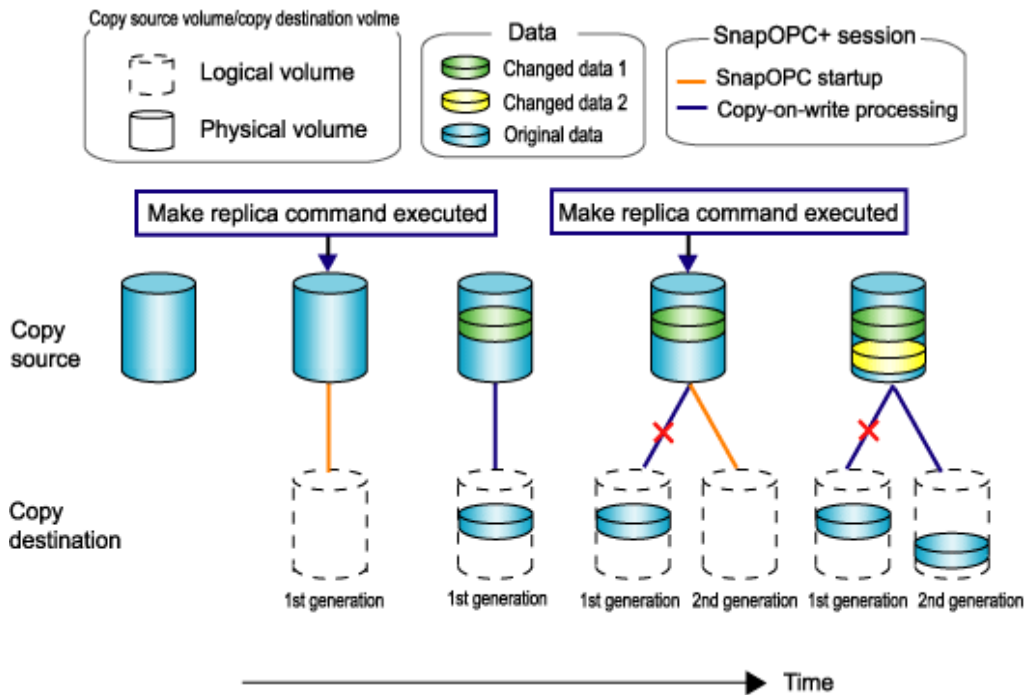
These points suggest that SnapOPC should be used in temporary areas for tape backups, for systems where access performance is not an important consideration.

SnapOPC+ type replication

When data is updated the SnapOPC+ function copies only the unchanged parts of the original data set. This pre-updated data is saved 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 unchanged parts of the original data is copied from the copy source to the copy destination (copy-on-write processing).
4. When the next copy destination volume is created, 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 starts again.
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 original data (unchanged data immediately prior to the update) and for hardware management. Using SnapOPC+ means that the saved data area is kept to a minimum.

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

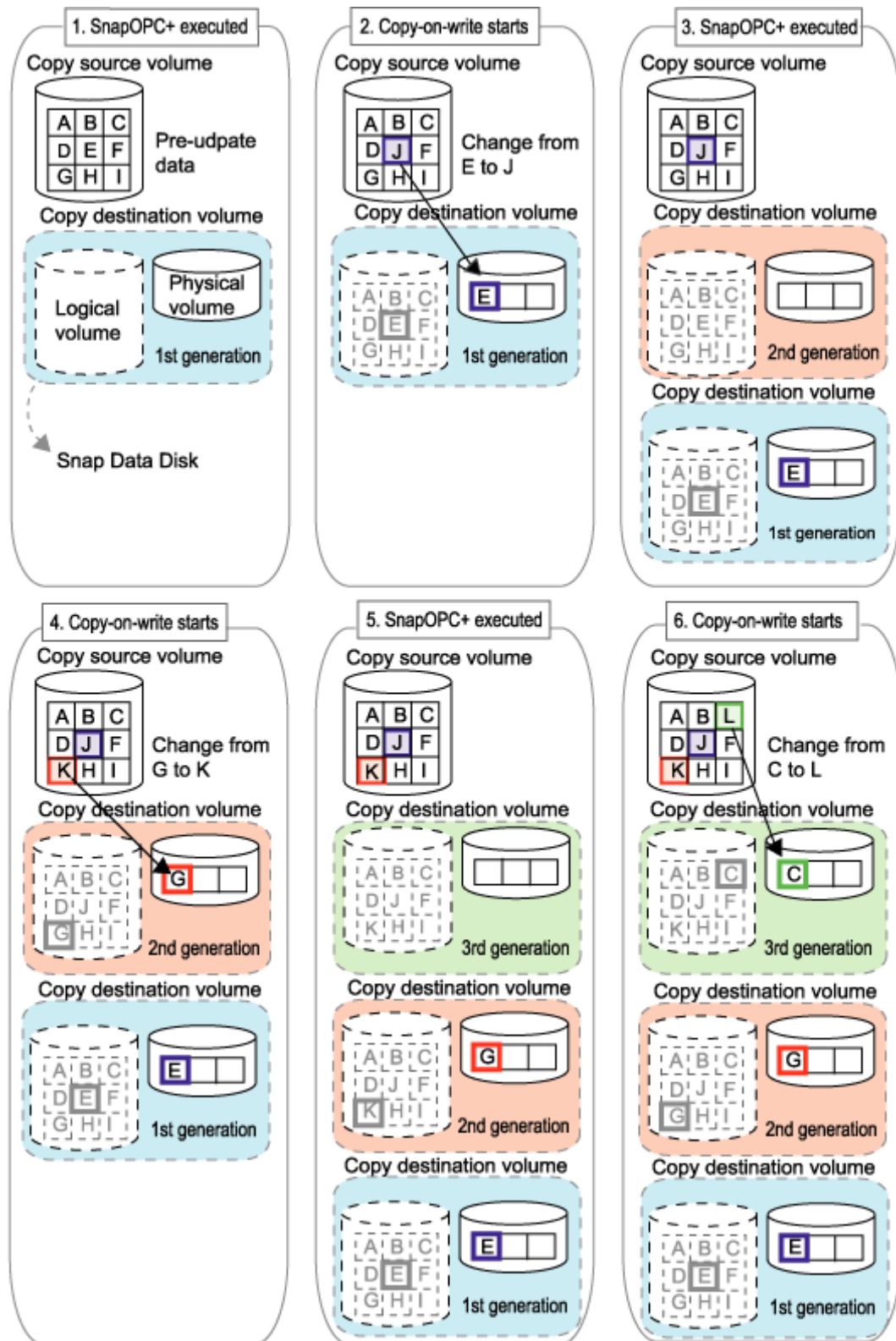


Note

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 demonstrates how SnapOPC+ is used 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 functionality and features of SnapOPC+, it is assumed that SnapOPC+ will be used as a backup for the recovery of minor errors, such as operator mistakes and software errors. To be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all data using OPC/QuickOPC/EC/REC.

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

Table: List of functional 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	Y	R 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	N	Y
Maximum number of sessions(*)	8	8
Restoration using the replication function	Y	N
Recommended usage	<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.

Y = Yes

N = No

R = Recommended

7.1.1.2 Snap Data Volume extension function

This functionality extends the physical capacity of the Snap Data Volume as additional area is allocated from the Snap Data Pool when data is updated and the capacity of the Snap Data Volume is exceeded. This functionality is set in advance.

If there is no need to extend the area of the Snap Data Volume it can be used without setting up a Snap Data Pool.

Snap Data Volume

The SnapOPC/SnapOPC+ copy destination volume is called the “Snap Data Volume”. Of this copy destination volume (Snap Data Volume), the capacity that can be seen in the host is called the “logical capacity”, and the capacity that has been physically configured is called the “physical capacity”.

Set the size of the logical capacity to be equal to or greater than the size of the copy source capacity. Control information is set for the Physical capacity (including a conversion table) to manage the backup data and the storage capacity for backup data. This information requires 0.1% of the logical capacity..



Note

When there is insufficient capacity in the Snap Data Volume access to the source volume is not possible. Refer to [“Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs”](#) .

Snap Data Pool

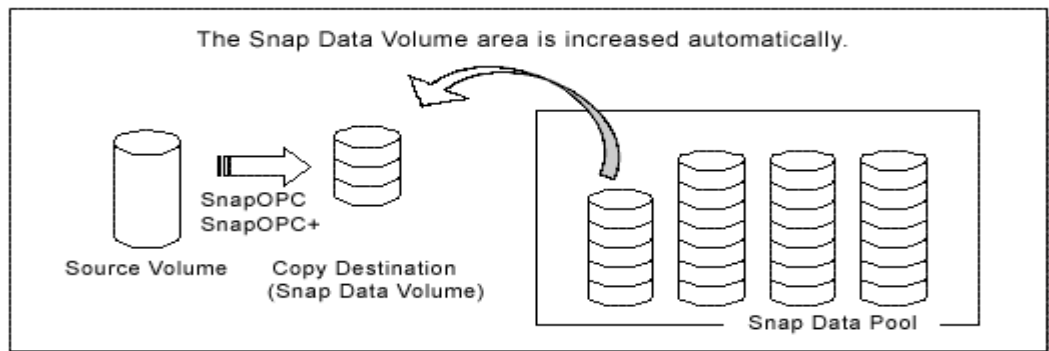
In ETERNUS it is possible to set up a Snap Data Pool as part of the Snap Data Volume group. When there is insufficient capacity in the Snap Data Volume and a Snap Data Pool has been set up, space is automatically allocated to the Snap Data Volume from the Snap Data Pool as it is needed.



Note

When there is insufficient capacity in the Snap Data Pool access to the copy destination (Snap Data Volume) is not possible, refer to [“Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs”](#) .

Figure: Snap Data Volume extension



7.1.2 Synchronized replication processing

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

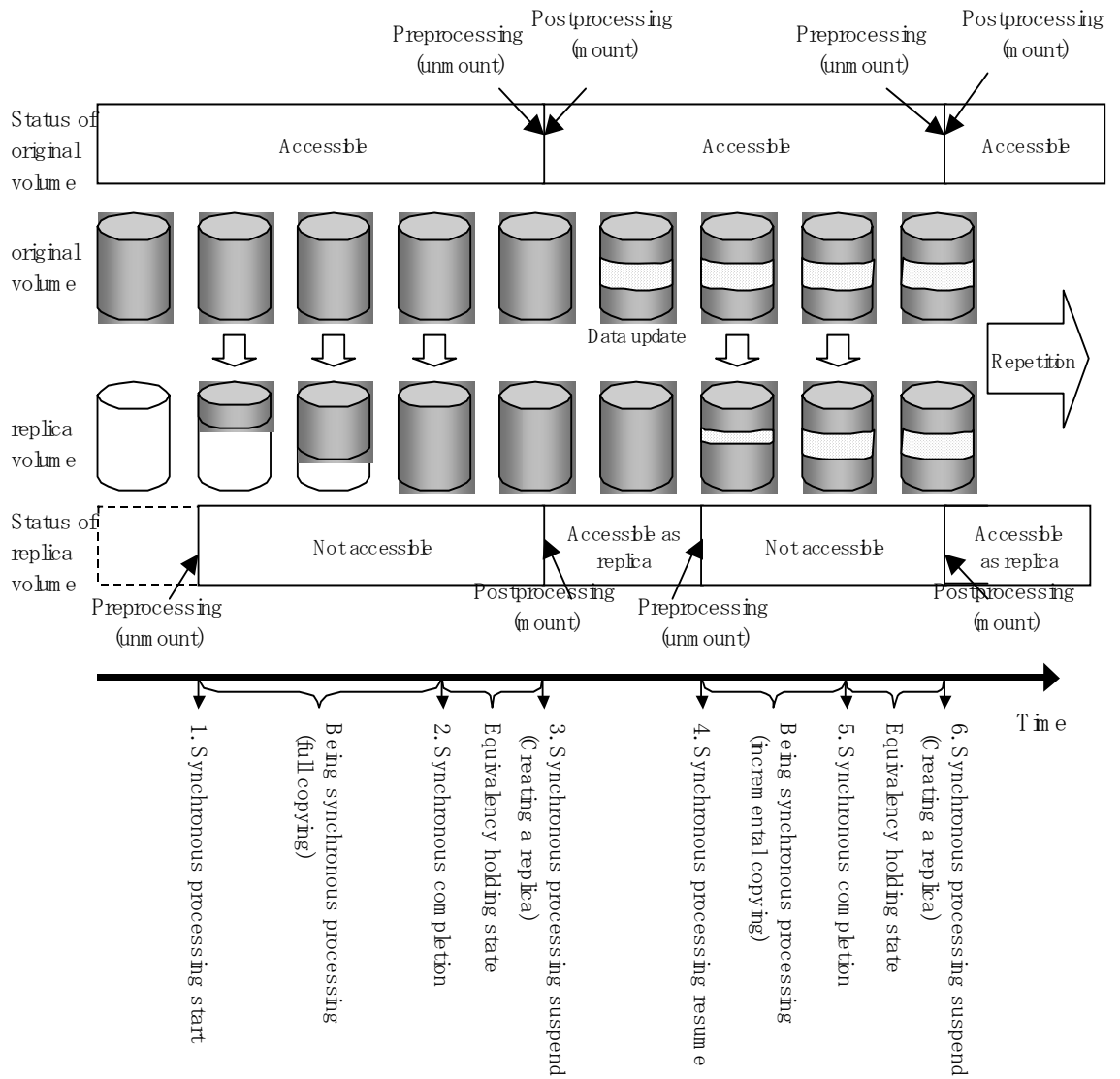
Synchronized replication uses two methods to create a copy: full copying and incremental copying. In the case of full copying, the source volume is completely copied. In incremental copying, only the data that has been updated since the last replication is copied.

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

The following steps define the procedure for synchronized replication:

1. Full copying starts at the start of synchronized processing from the source volume to the replica volume, using the synchronous processing start command (swsrpstartsync). see ((1) in the following figure).
2. Full copying is complete. The source volume and replica volume both enter the equivalency maintenance status. From this point on, updates in the source volume are sequentially reflected in the replica volume, so that data equivalence is always maintained (this is the equivalency maintenance state). (States in (2) and (3) in the following figure)
3. Synchronized processing is temporarily stopped, using the replication creation command (swsrpmake), to create a copy of the source volume. The replication creation command unmounts or mounts the source volume. This processing determines the original data (for details, refer to "Pre-processing and Post-processing of Replication"). After execution of the replication creation command, the replica volume can be accessed (this is the 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 source volume that has been updated since the previous copy was made. Refer to Step 4 in Figure 7.2. When the replica volume has been updated after the previous copy is made, the contents of the update of the replica volume are cleared. ((4) in the following Figure)
5. When the incremental data has been copied, the status returns to the equivalency maintenance state again. Refer to the states 5 and 6 in the following figure.
6. When this status has been set, the copy is recreated with the replication creation command. ((6) in the following figure).

Figure: Synchronized replication processing



Note

- To use the EC or REC function in synchronized replication, disk array devices must support the EC or REC function.
- The [replication creation command](#) (swsrpmake) cannot be executed unless both the source volume and replica volume have the equivalency maintenance status.

7.2 Operation Design

This section explains the operation of AdvancedCopy Manager replication.

Configure replication using the following procedure:

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

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

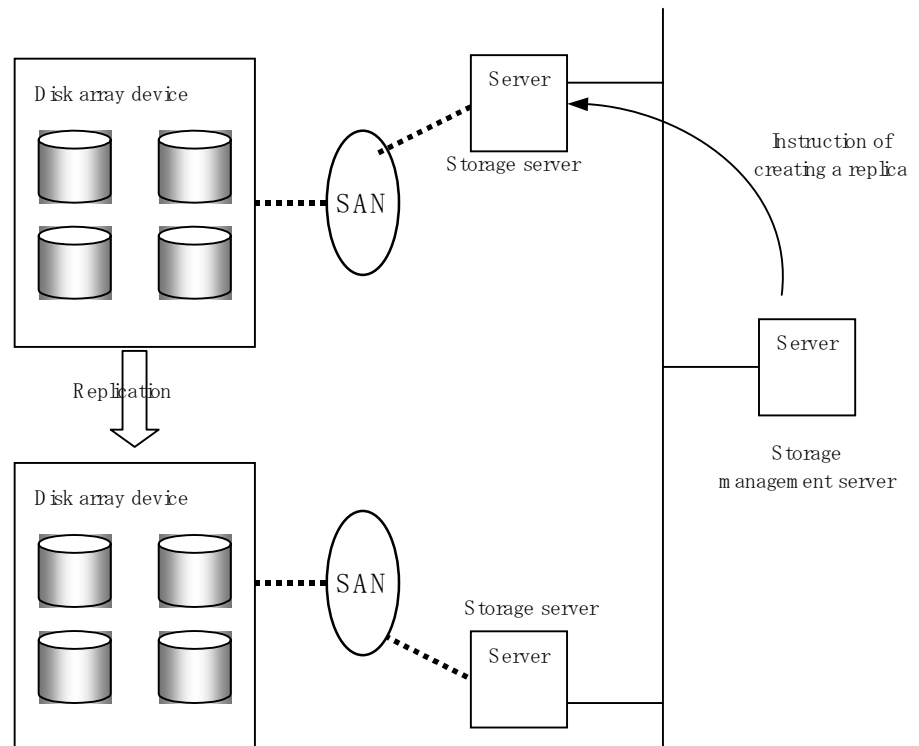
7.2.1 Determining the server that performs replication

Determine the server that performs replication.

The following servers are used to perform replication:

- Storage Management Server
Multiple Storage Servers are unified and operated centrally. The Storage Management Server can also be used as a Storage Server.
However, a Storage Management Server must run under a Windows, Solaris or Linux OS.
- Storage Server
AdvancedCopy Manager operations are performed.
AdvancedCopy Manager can run under the AIX OS in this case.

Figure: Configuration of the servers that perform replication





Note

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

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

7.2.2 Determining a replication target

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



Point

- The source volume is the volume on which the data to be copied is stored.
- The replica volume is the volume on which a copy of the data on the source volume is stored.

Determine the following attributes to be assigned to the source volume and replica volumes:

1. Copy direction

Determine the direction of copying. Specify one of the following directions:

- bi-directional: Copying is bidirectional between the original volume and replica volume.
- uni-directional: Data is copied only from the original (source) volume to the replica volume. During this operation, copying from the replica to the source volume is disabled.

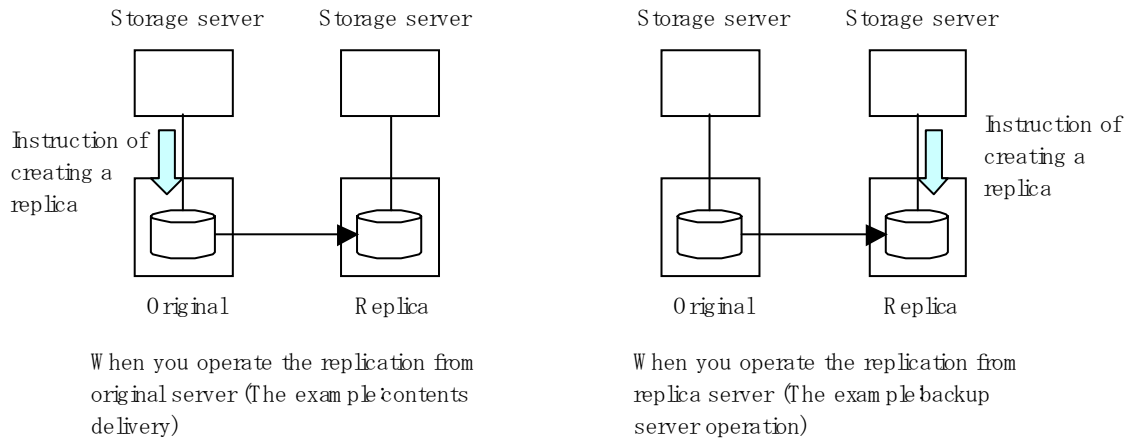
2. Operational servers (used only for server-to-server replication)

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

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

It is possible to create a group by arranging multiple source volumes and destination volumes. In addition, the operation for multiple source volumes and destination volumes can be performed in a 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 operational server. An original server or a replica server is 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 operation release function.



Note

Replication is not supported for the system disk or the disk where AdvancedCopy Manager is installed.



Note

Refer to the section “Exclusion from Backup or replication Targets” in “General notes”, for notes on determining a replication target.

7.2.2.1 Notes on the replication volume

There are points to be aware of for the different combinations of source volume and replica volume that can be used for replication operation.

The disk size of an source volume and a replica volume

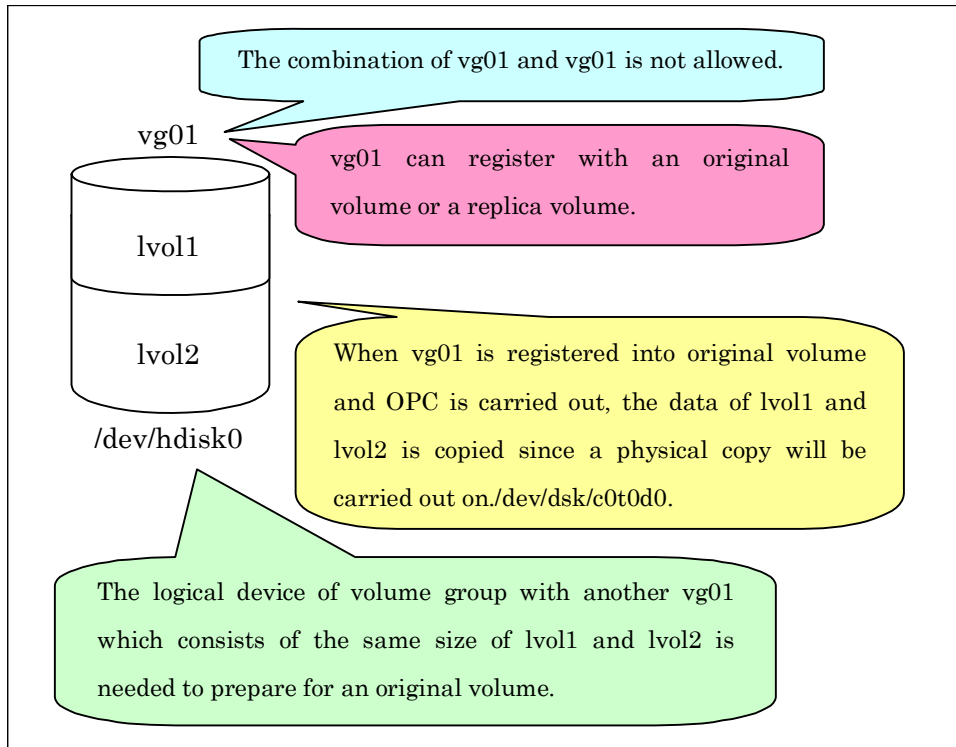
When the size of the physical disk (or one which constitutes a logical disk when this has been specified) of an source volume differs from that of a replica volume, ensure that the replica volume is at least as large as the source volume, otherwise some data will be lost in the replication.

Using a volume group for an source volume or a replica volume

If the source volume is a volume group, then when using the replica volume after replication, the replica volume needs to be a volume group with the same logical volume configuration as the source volume, and with same physical disk size (Figure 7.5).

In addition, when the configuration of the volume group cannot be supported by AdvancedCopy Manager, it cannot be registered with a replication management function. For details about logical disk configurations which cannot be supported, refer to “Managing a Device on AdvancedCopy Manager”.

Figure: Source volume and replica volume for two or more logical disks

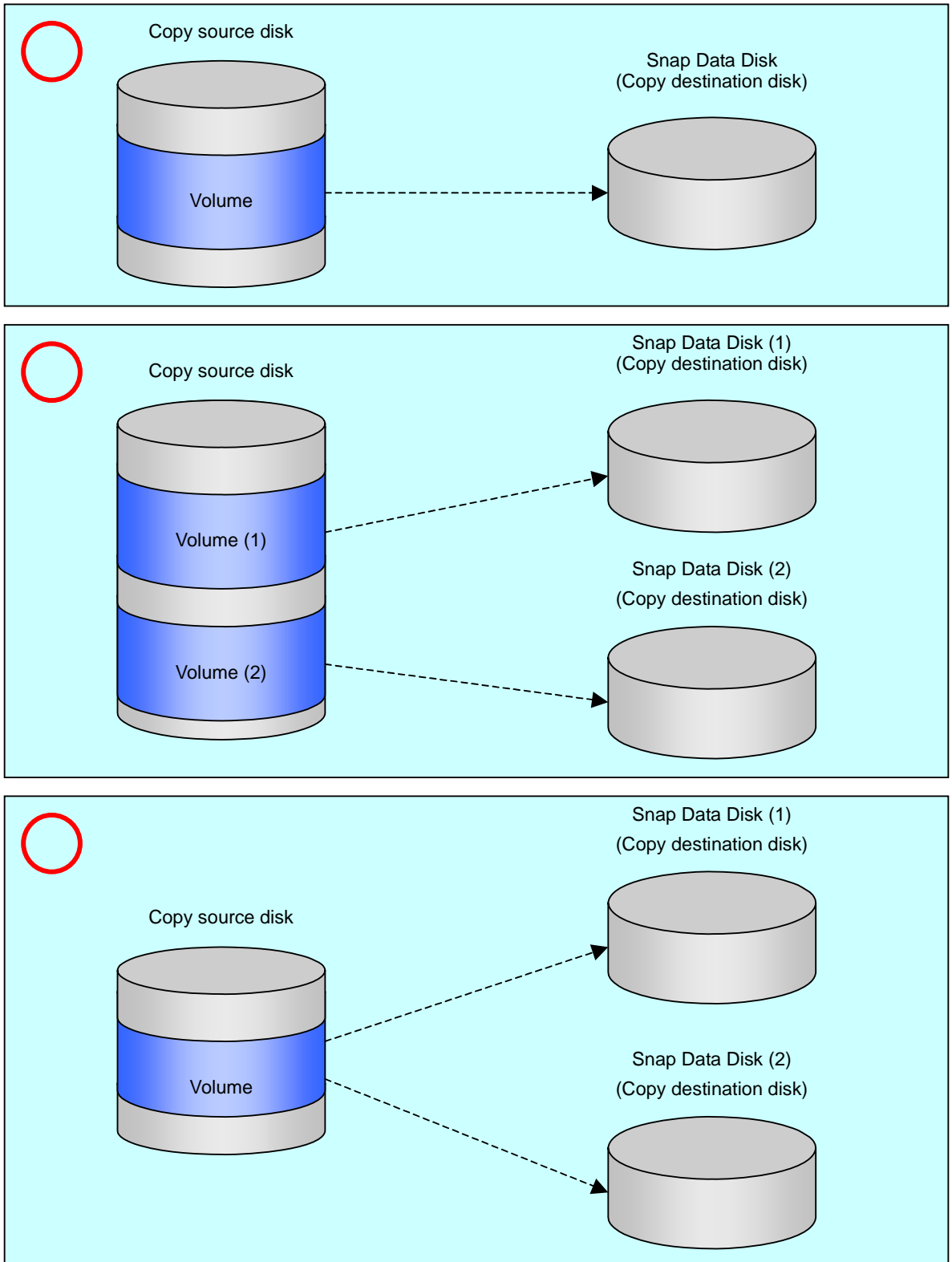


7.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication

7.2.3.1 Notes on session settings

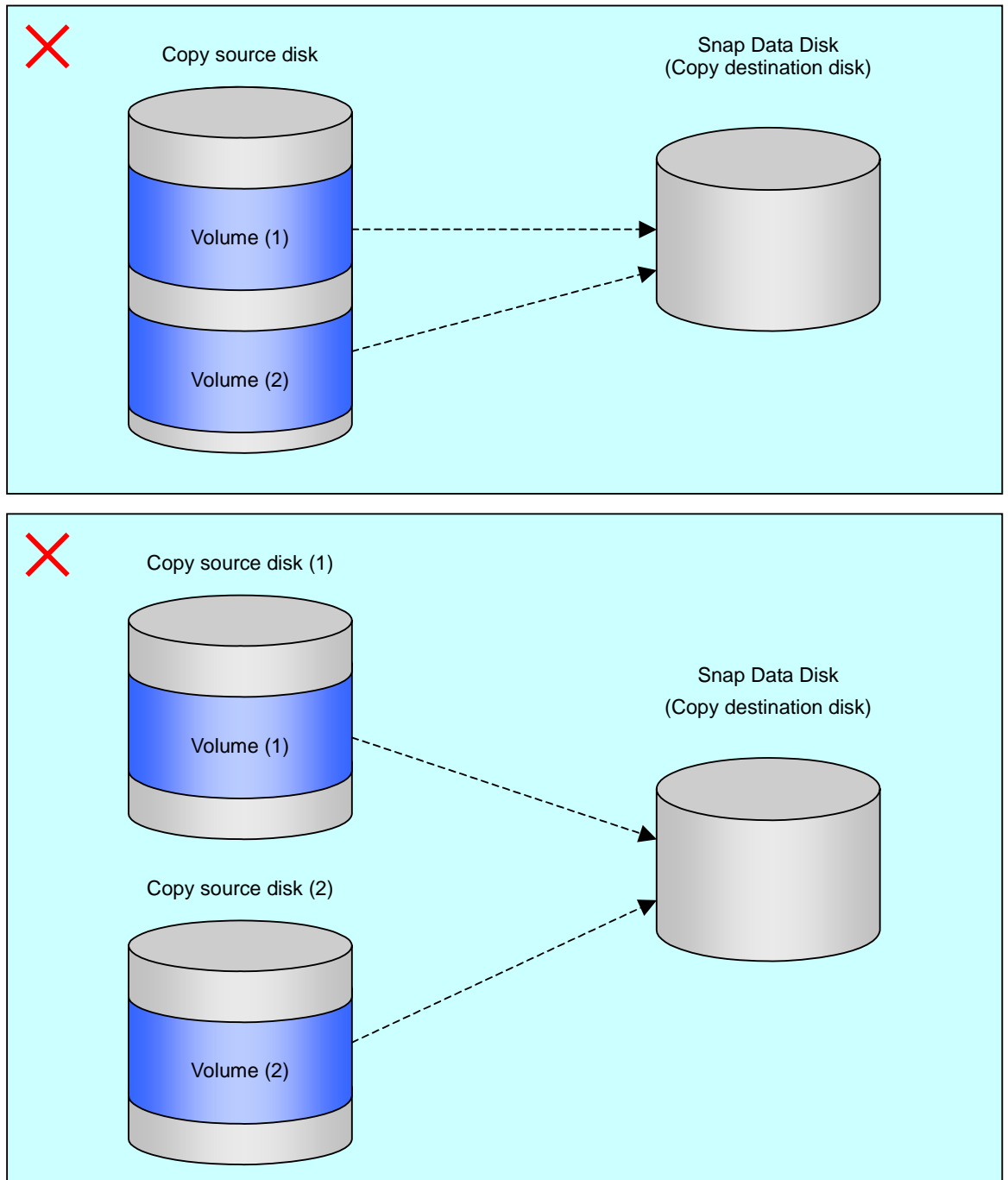
Only one session can be set up for each Snap Data Volume, which is the SnapOPC/SnapOPC+ copy destination disk.

Figure: If one session is set for the Snap Data Volume



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

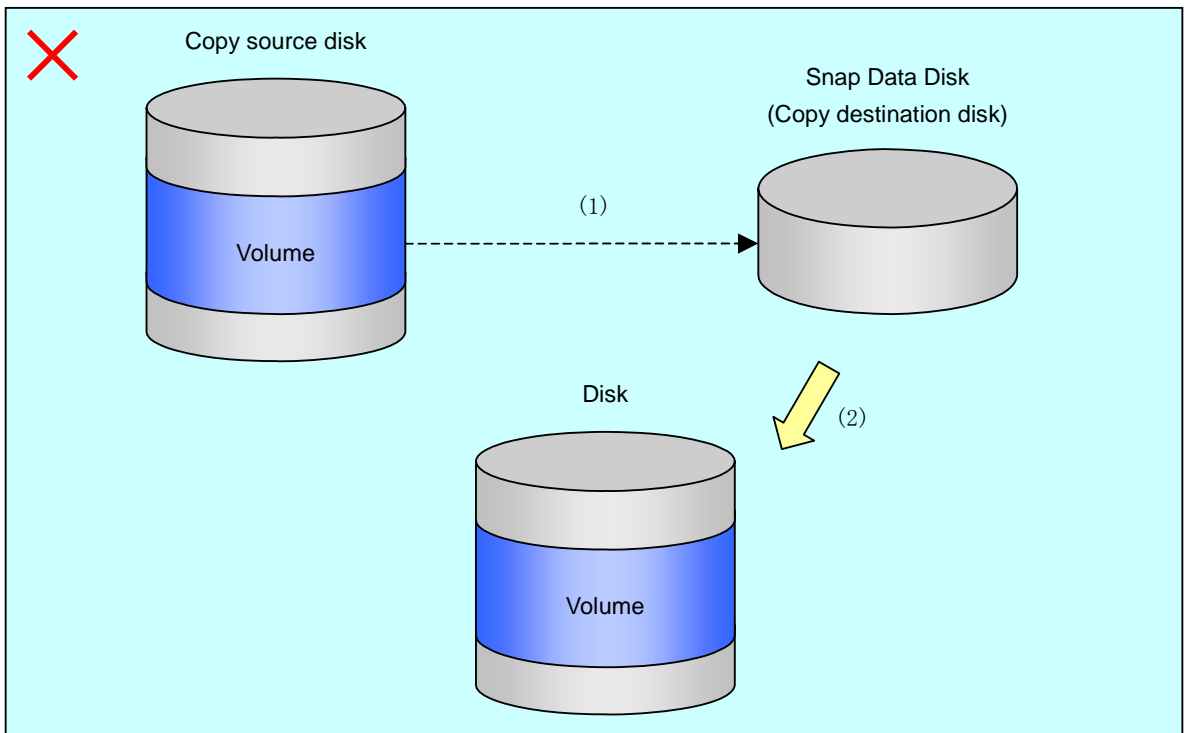
Figure: If multiple sessions are set for the Snap Data Volume



The following restrictions apply:

- It is not possible to copy from the Snap Data Volume to a disk other than the copy source disk while SnapOPC is running.
- It is not possible to copy from the Snap Data Volume to a different disk while SnapOPC+ is running.

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



7.2.3.2 Creating a Snap Data Volume

Create a Snap Data Volume by performing the following steps:

1. Calculate the physical capacity of 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:

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

Strictly speaking, both the number of blocks that have been updated on the Snap Data Volume before the SnapOPC/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/hdisk10
/dev/hdisk10 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/hdisk10
Volume-Name      Update
/dev/hdisk10 644333
#
```

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

```
# /opt/FJSVswsts/bin/swstestupdate stop /dev/hdisk10
/dev/hdisk10 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.

Connect the created Snap Data Volume to 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 the updates to the copy destination volume as much as possible, to avoid unnecessarily filling up the Snap Data Volume.

7.2.3.3 Creating a Snap Data Pool

The Snap Data Pool is created using ETERNUSmgr.

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 an estimate, and the Snap Data Pool capacity must be modified to suit operating conditions.)

7.2.3.4 Snap Data Volume and Snap Data Pool monitoring

When there is insufficient capacity for the Snap Data Volume and the Snap Data Pool, access to the copy destination volume is not possible. That is, in this state it is impossible to read from or write to the copy destination volume. With SnapOPC+ it is not possible to write to the copy destination or to previous generations.

For this reason, monitoring must be performed to ensure the capacity of both the Snap Data Volume and Snap Data Pool is sufficient at all times during normal operations.

- Using a Snap Data Volume without a Snap Data Pool
Specify "stat" as the subcommand for the Snap Data Volume operation/reference command ([swstsdv](#)) to regularly monitor the capacity of the Snap Data Volume.
- Using a Snap Data Pool
Specify "poolstat" as the subcommand for the Snap Data Volume operation/reference command ([swstsdv](#)) to regularly monitor the capacity of the Snap Data Pool.
If the usage rate of an area of the Snap Data Pool exceeds 50%, regardless of whether the data is encrypted or not, consider increasing the capacity and also the frequency of monitoring the capacity.
If the rate exceeds 70% increase the capacity immediately.

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

Where there is insufficient capacity in the Snap Data Volume or Snap Data Pool access to the copy destination (Snap Data Volume) is not possible.

Access to the Snap Data Volume is also impossible in the following circumstances:

- After the Snap Data Volume is initialized
- After disk management information is initialized

Therefore, it is recommended that you reserve a volume (access path) that is separate from the Snap Data Volume.

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

The following operations are possible using the access path:

- [Snap Data Volume initialization](#)
- [Snap Data Volume status display](#)
- [Snap Data Pool status display](#)

7.2.3.5 Cluster Operations

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

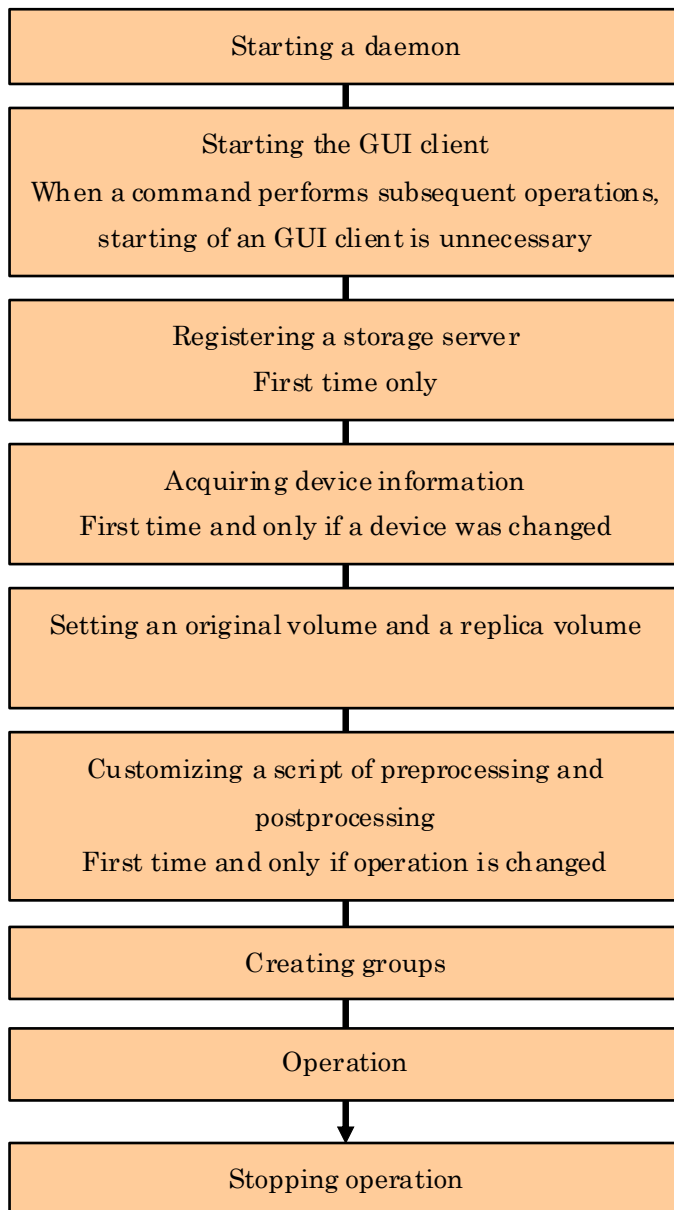
For cluster operations, use one of the following methods to prevent the Snap Data Volume from being used as a shared disk:

- 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.

7.3 Flow of Operations

The following figure shows the flow of the replication operations.

Figure: Flow of replication operations



7.4 Preparations

The following preparations are required before replication can start.

7.4.1 Starting a daemon

Before replication is started, the AdvancedCopy Manager daemon must be started on the Storage Management Server and Storage Server. In general, the daemon is automatically started at system startup.

However, if the daemon does not start correctly for any reason, or if a demon has stopped, it is necessary to start a demon for each server. For information about starting the Daemons, refer to "Starting and Stopping Daemons".

7.4.2 Starting the GUI client

To start the GUI client refer to "Starting the GUI client" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details.

The GUI client is not used for command-only operations.

7.4.3 Registering a Storage Server

Use the Storage Management Server to register the Storage Server that is to be managed. When the Storage Server is operated as a Storage Management Server it is not necessary to register a server.

The Storage Server can be registered using the GUI or command operations.

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

For information on using commands, refer to the server information addition command (stgxfwcmaddsrv) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.

7.4.4 Fetching device information from 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 GUI User's Guide."

For information on using commands, refer to the device information collection/reflection command (stgxfwcmsetdev) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" of the OS on which the Storage Management Server is running.



Note

Device information on a Storage Server must be temporarily stored to 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 "Action required when access to the repository fails" in the ETERNUS SF AdvancedCopy Manager Operation Manual, for the method for details on 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 large, perform this operation while the CPU load and I/O load are low. As a guideline, each operation takes about 0.5 s per device (or partition) under no-load conditions.
- For a device that is part of an LVM, a volume group and a logical device are fetched, but the physical device which constitutes a logical device is not.
- No information will be obtained for a volume group is inactive when the operation is executed. When a backup is in progress a volume group which is registered as a backup volume will become inactive, so it would not be detected by this operation. Do not issue an instruction to delete a volume in use.

7.4.5 Setting the source volume and replica volume

Use the replication volume information setting command (swsrpsetvol) to set the source volume and replica volume that will be used in the replication. The information on the registered source 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 in the format "volume-name@storage-server-name."

7.4.6 Customizing Pre-processing and Post-processing scripts

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.

AIX AdvancedCopy Manager implements the transaction volume unmount/mount operation using customized pre-processing and post-processing scripts. If a pre-processing script ends with an error during execution of backup/restoration, backup/restore processing is not performed. For details of the pre-processing and post-processing script, refer to "Pre-processing and Post-processing of Replication."

When the operation corresponds to either of the following, it is necessary to customize the script used for replication pre-processing and post-processing when :

- When the replication target is a volume group.
- You want to avoid the unmount/mount processing of the volume where a file system is constructed, for operational reasons
- In order to describe special processing in the pre-processing and post-processing scripts.

For information about the customizing the scripts, refer to "Pre-processing and Post-processing of Replication".



Point

When AdvancedCopy Manager is upgraded

The script may be updated after an AdvancedCopy Manager upgrade.

Therefore, you should re-customize the script after upgrade rather than reusing the script from the previous version.



Note

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

It is also necessary to deactivate a volume group (LVM) before it is used as a replication destination. It is then necessary to reconfigure the volume group after the copy is created.

Refer to "The reconfiguration of the volume group" in "Replication operation of each physical disk" for the re-configuration of the volume group.

It is also necessary to configure a disk group before a VxVM volume is used as a replication destination. It is necessary to reconfigure the disk group after the copy is created.

Refer to "The reconfiguration of the disk group" of "VxVM Volume Operation" for information on the usage and the reconfiguration of a disk group.

7.4.7 Creating groups

7.4.7.1 Conditions for the replication volumes that makes up the group

The replication volumes that make up the group (the source volume and the destination volume pairs) must meet the following conditions:

1. The source servers and destination servers must all match.
2. The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the "Op-Server" and "Copy" columns obtained by executing the replication volume information display command (swsrpvolinfo).
3. The replication volume information being registered must not be registered in any other group.
4. Source volumes and destination volumes must not be duplicated within the group.

Figure: Condition 1

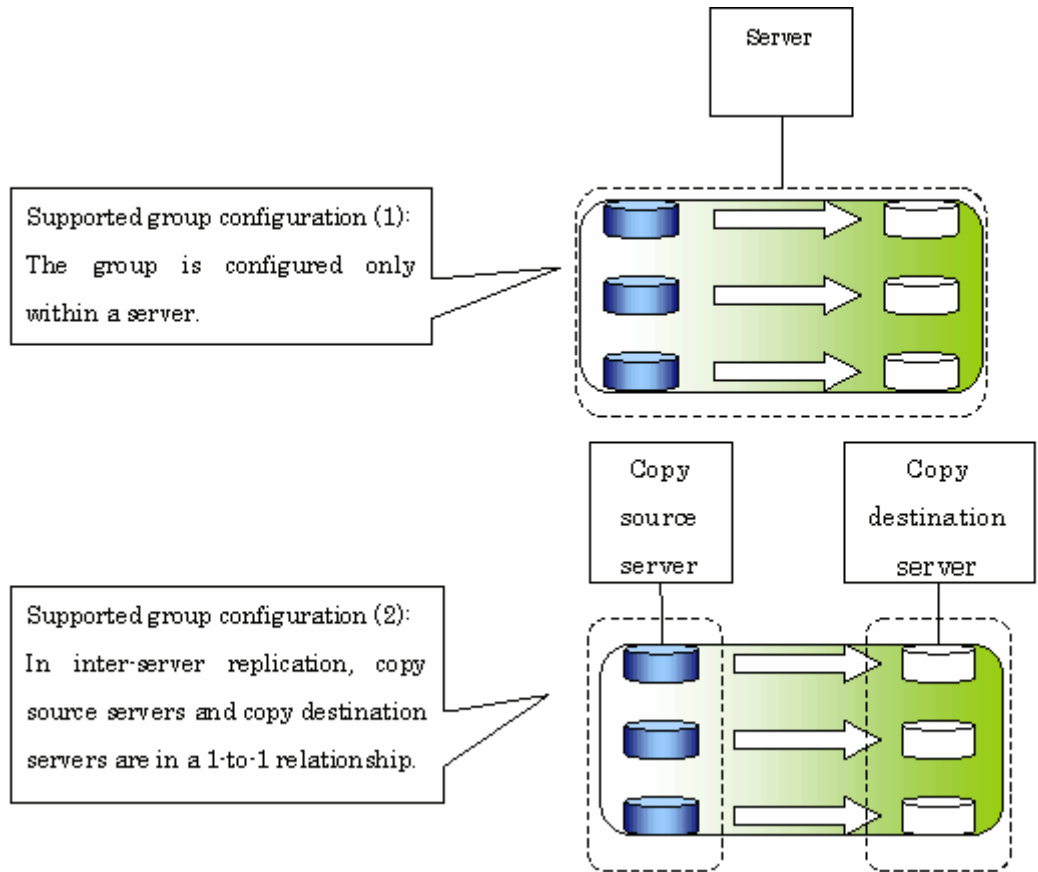


Figure: Condition 2

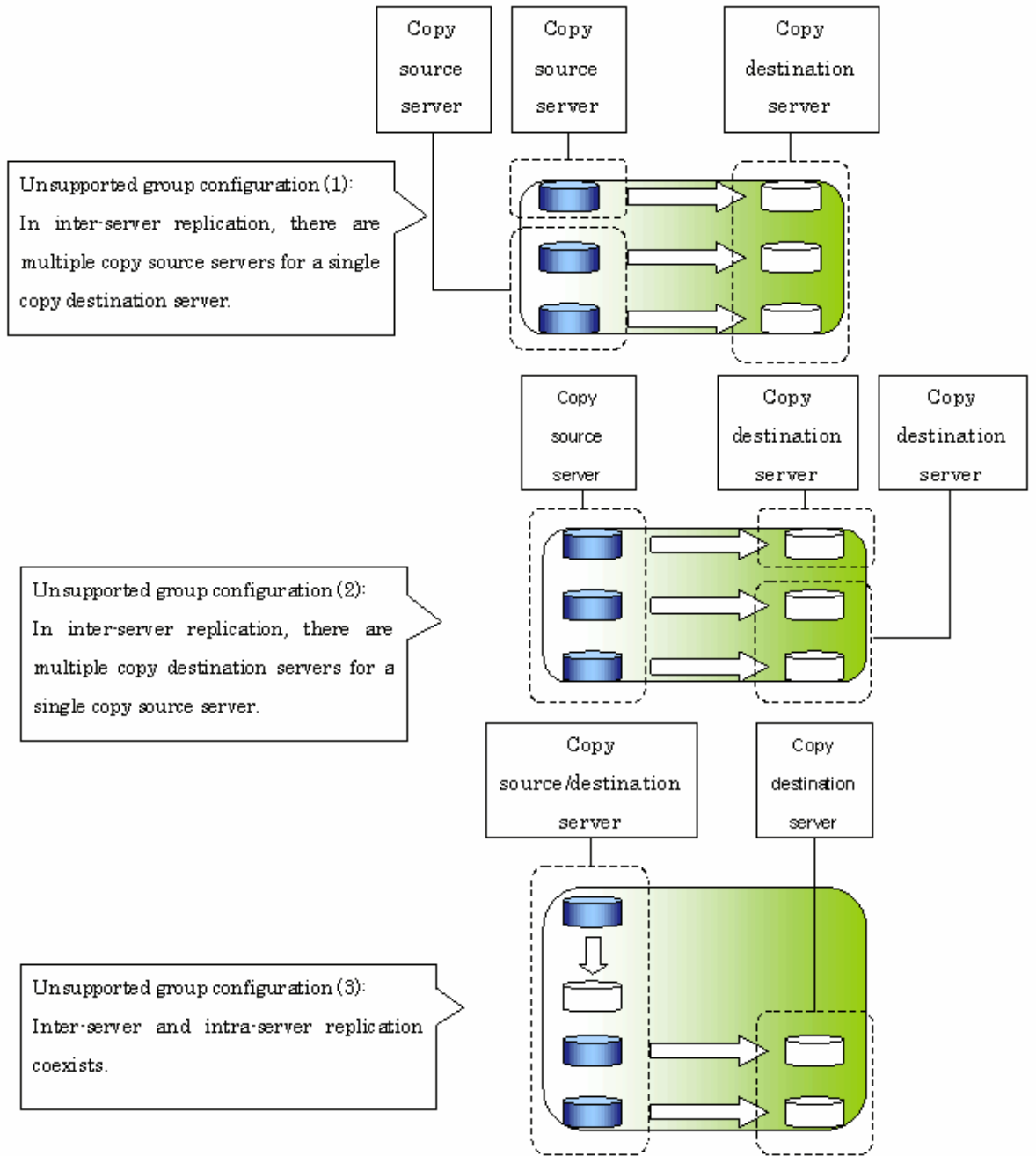


Figure: Condition 3

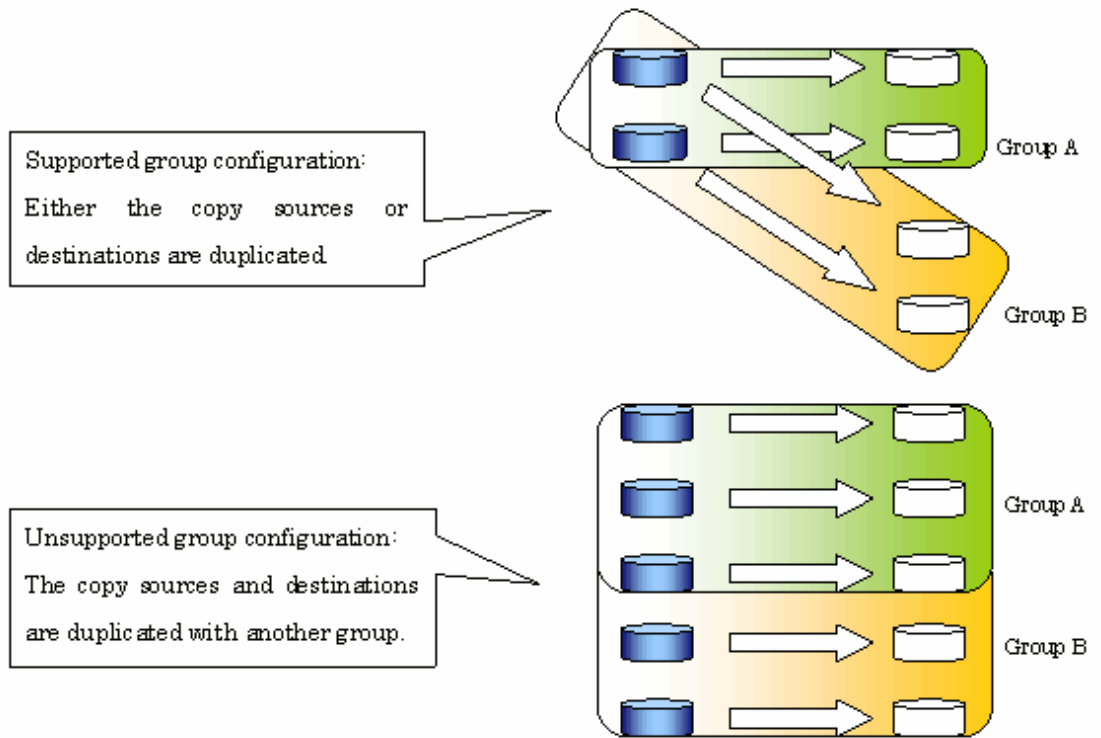
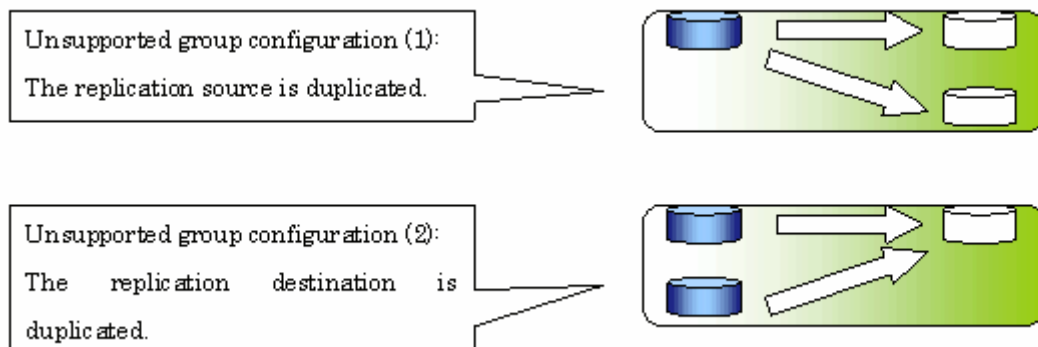


Figure: Condition 4



7.4.7.2 How to create groups

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

[Example]

Two groups (GRP1) consisting of a source volume and a replica volume are created.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/hdisk10@SRC /dev/hdisk20@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/hdisk11@SRC /dev/hdisk21@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpvoinfo -L
Server Original-Volume  Size      Replica-Volume  Size      Copy      Op-Server
Group
SRC    /dev/hdisk10@SRC    4.0Gbyte /dev/hdisk20@TARG-1  4.0Gbyte bi-direction both
GRP1
SRC    /dev/hdisk11@SRC    4.0Gbyte /dev/hdisk21@TARG-1  4.0Gbyte bi-direction both
GRP1
#
```

7.5 Operations

This section explains AdvancedCopy Manager replication.

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

This section explains operation using commands. Refer to "Replication Management Functions" of the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for information about operation using the GUI client.

7.5.1 Executing snapshot replication

Use the replication creation command (swsrpmake) to perform snapshot replication. Refer to "Snapshot replication processing" for an explanation of snapshot replication.)

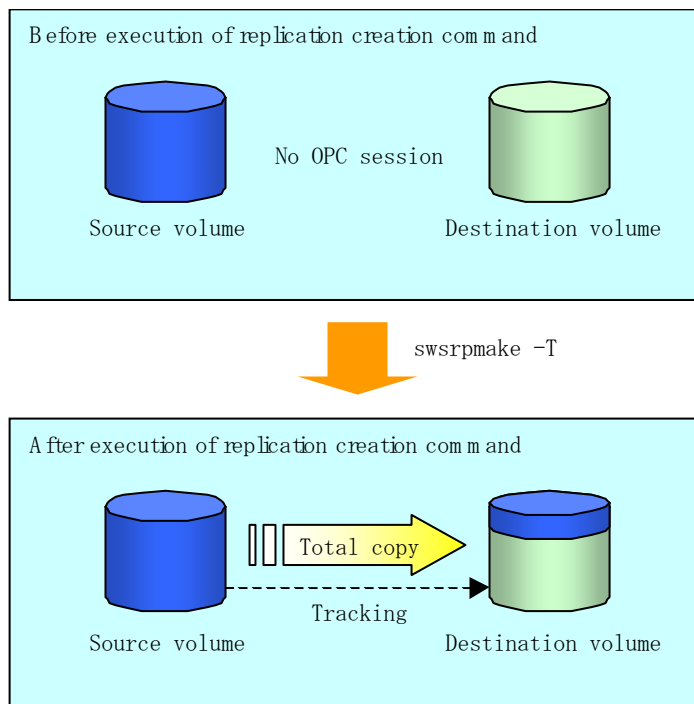
The operation status of a physical copy can be checked by executing the operation status display command (swsrpstat).

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 (ie, OPC physical copying), and tracks the processing from the source volume to the destination volume.

Figure: When executing the replication creation command (first time)

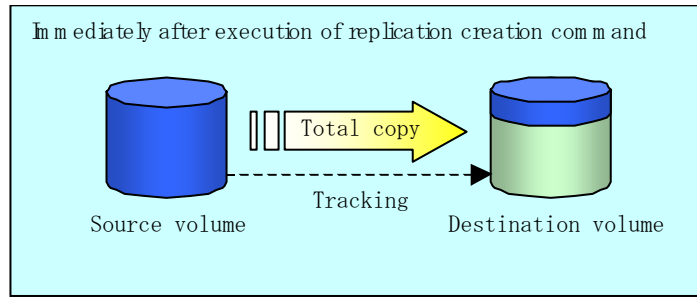


To check the execution status of physical copying, use the operation status display command (swsrpstat) in the same way as for an ordinary snapshot replication.

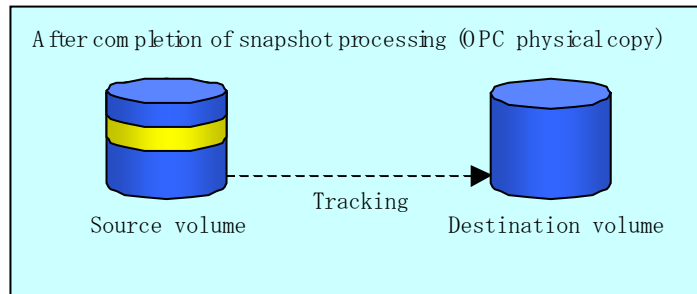
After snapshot processing (OPC physical copy) is complete, only the tracking processing is active.

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

Figure: When snapshot processing is completed

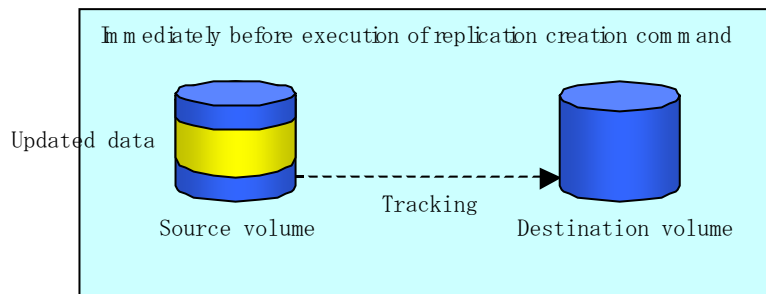


Completion of snapshot processing
(OPC physical copy)

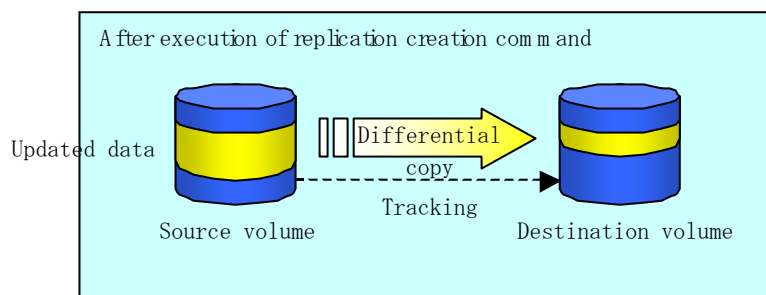


Entering the replication creation command (swsrpmake) with the -T option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a short period of time.

Figure: When executing the replication creation command (second time)



swsrpmake -T



If you need to perform a restoration while tracking processing is being executed, you must perform a restoration by OPC (to achieve this, execute swsrpmake without the -T option). The replication using QuickOPC is performed as follows:

```
[backup (replication creation)]
swsrpmake -T <original volume name> <replica volume name>

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

Although a restoration is executed with OPC, not all the data but only the data that has been updated since the previous replication (this can be obtained from the 'Update' column of swsrpstat) is copied. Therefore, in replication using QuickOPC, physical copies for backup and restoration are completed in a short period of time.

To check the restore execution status, execute the Operation status display command (swsrpstat) with the -E option specified.

SnapOPC type replication

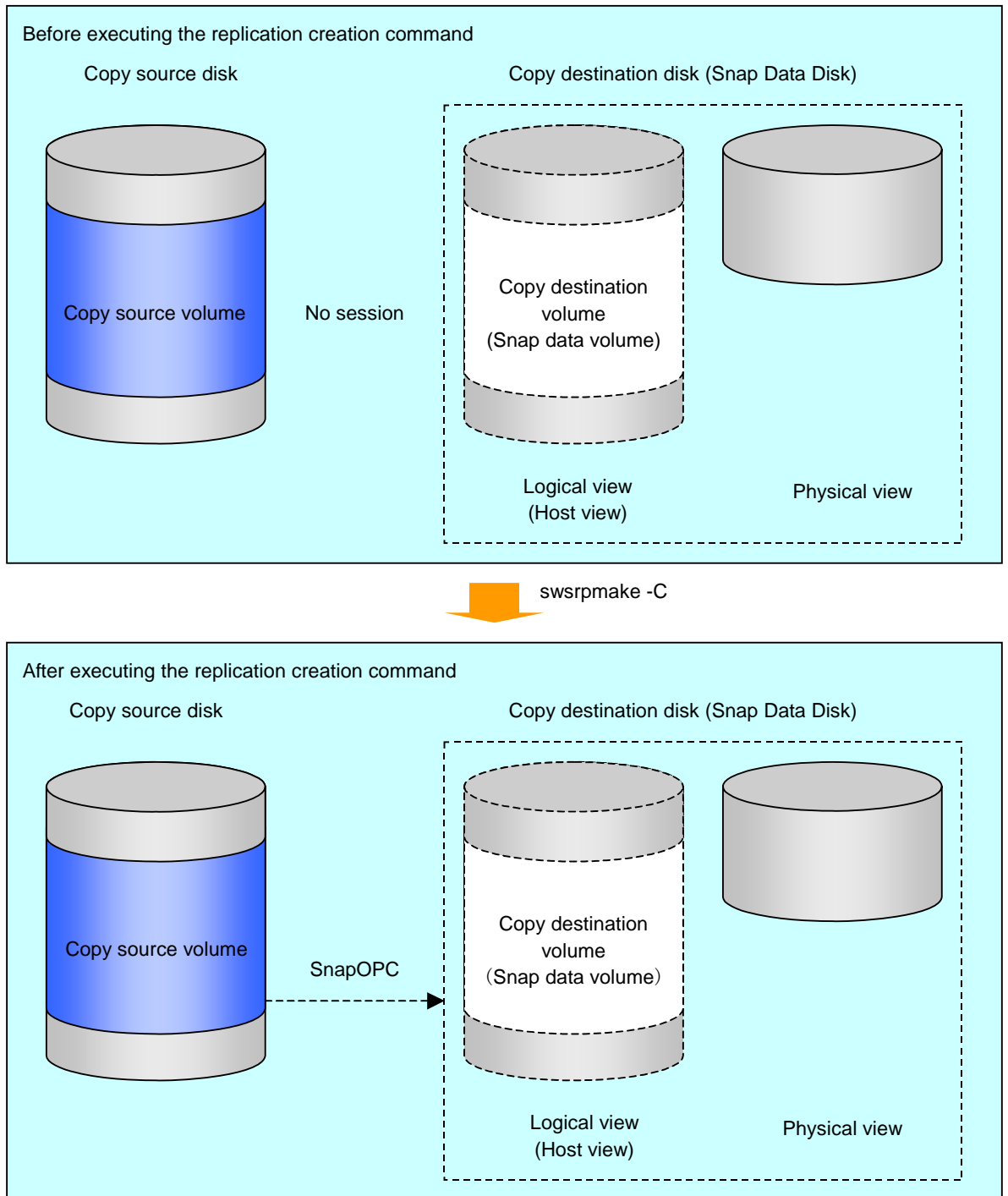
Execute SnapOPC type replications with the -C option specified in the replication creation command (swsrpmake).

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

[Example]

```
# /opt/FJSVswsrp/bin/swsrpmake -C /dev/hdisk10 /dev/hdisk20
FROM=/dev/hdisk10@SV1,T0=/dev/hdisk20@SV1 swsrpmake completed
#
```

Figure: When executing the replication creation command



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 source or destination since the SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure: When updating the original volume

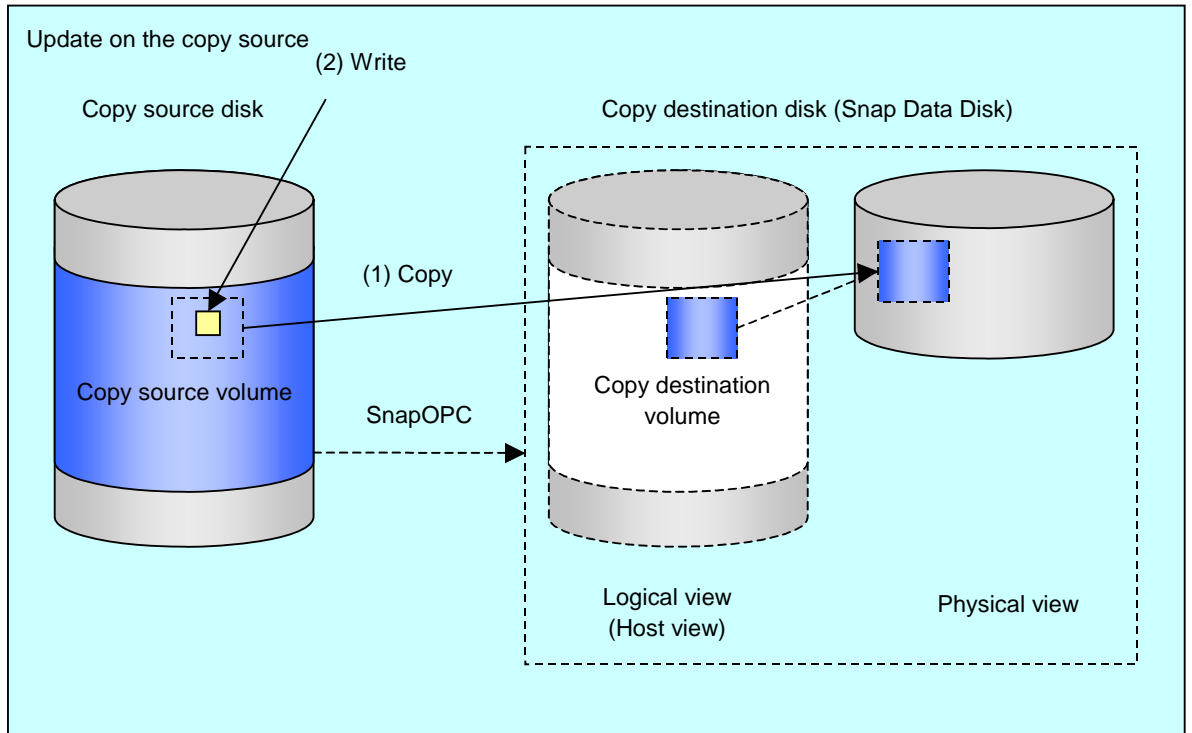
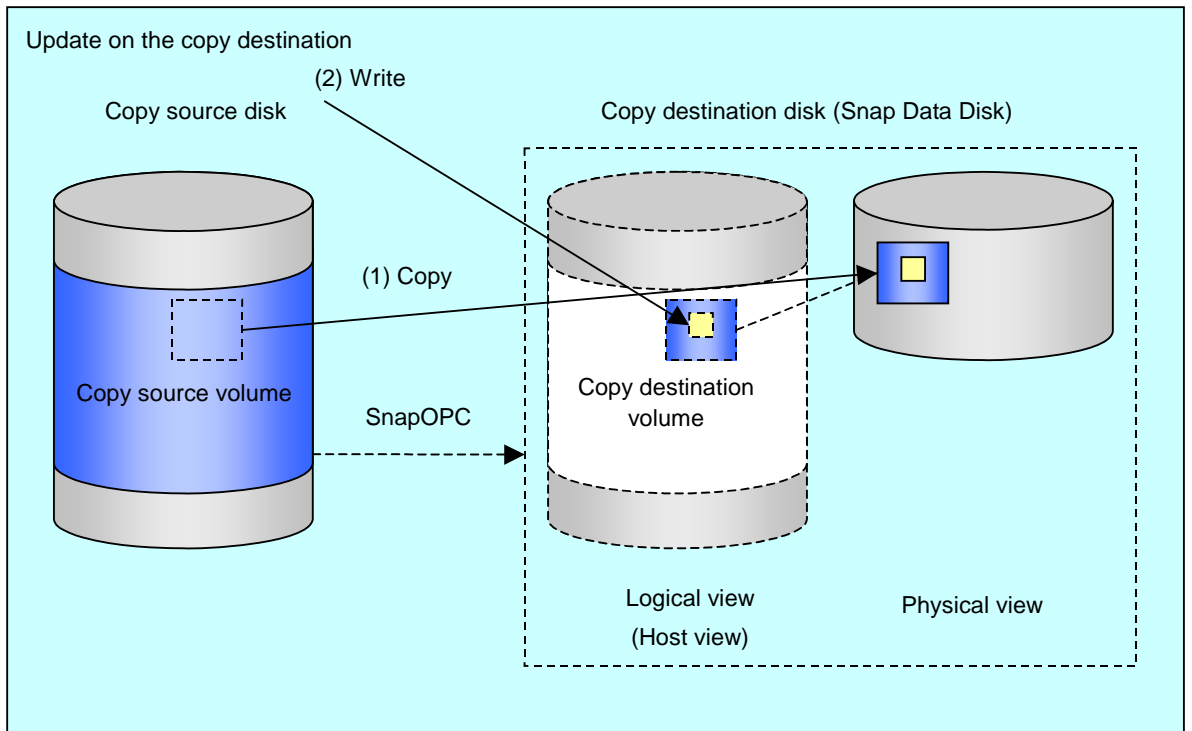


Figure: When updating the copy destination volume



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

The following example shows the execution of the operation status display command 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.

[Example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/hdisk10
Server Original-Volume  Replica-Volume  Direction Status          Execute Trk  Update Rcv
Split Xfer  Snap-Gen
SV1    /dev/hdisk10@SV1 /dev/hdisk20@SV1 regular  copy-on-write ----   off  0%    ----
----  ----  ----
#
```

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



Note

When there is insufficient capacity in the Snap Data Volume or Snap Data Pool, the SnapOPC status changes to the error suspend status of 'failed' and replication volumes cannot be accessed (used).

The SnapOPC status can be seen in the 'status' column of the operation status display command (swsrpstat).

[Example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/hdisk10
Server Original-Volume  Replica-Volume  Direction Status Execute Trk  Update Rcv
Split Xfer  Snap-Gen
SV1    /dev/hdisk10@SV1 /dev/hdisk20@SV1 regular  failed ----   off  ----  ----
----  ----  ----
#
```

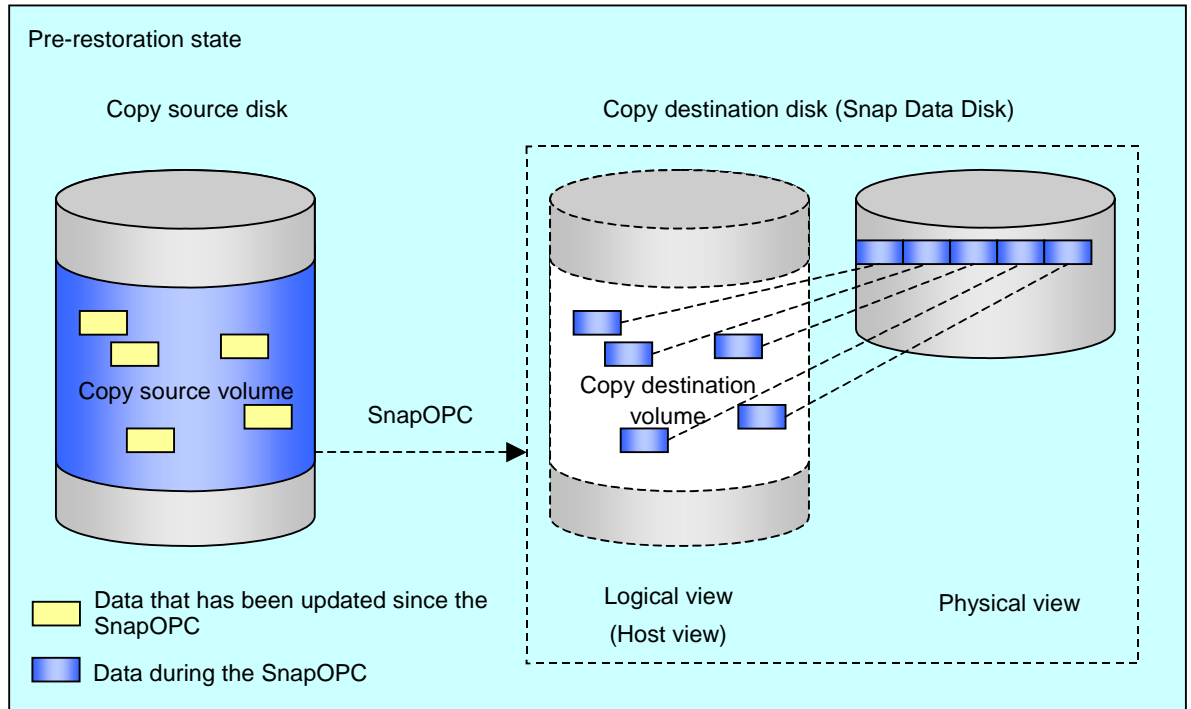
If SnapOPC is in the error suspend state of "failed", refer to "[Action required if a Snap Data Volume or Snap Data Pool capacity shortage occurs](#)".

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

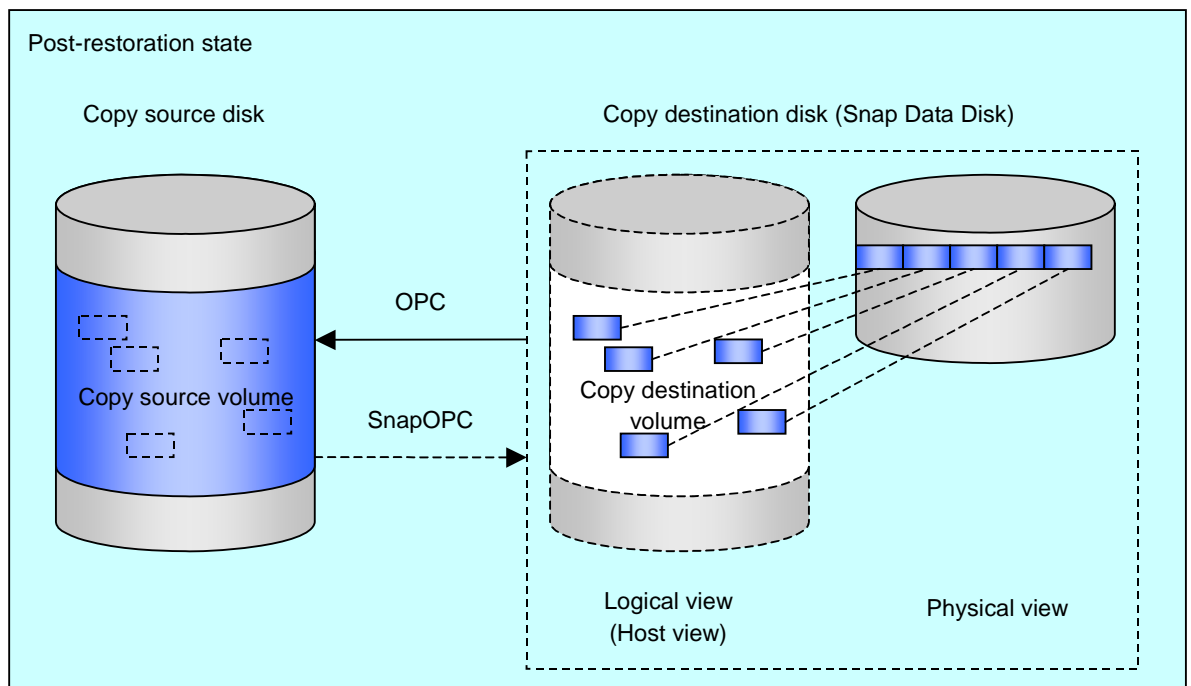
```
# /opt/FJSVswsrp/bin/swsrpmake /dev/hdisk10 /dev/hdisk20
FROM=/dev/hdisk10@SV1,T0=/dev/hdisk20@SV1 swsrpmake completed
#
```

When restore is executed, (ordinary) OPC from the replication destination volume to the replication source volume starts, and the SnapOPC session from the replication source volume to the replication destination volume continues unchanged. 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 executing restore



swsrpmake



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

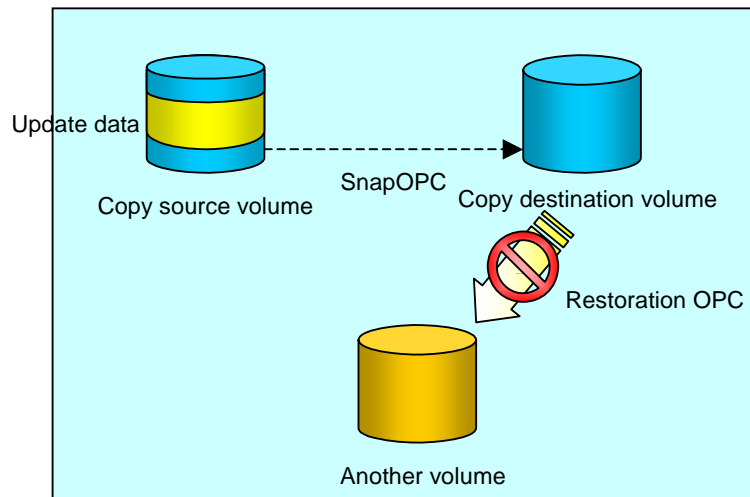
```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/hdisk10
Server Original-Volume Replica-Volume Direction Status Execute
SV1 /dev/hdisk10@SV1 /dev/hdisk20@SV1 reverse snap 80%
#
```



Note

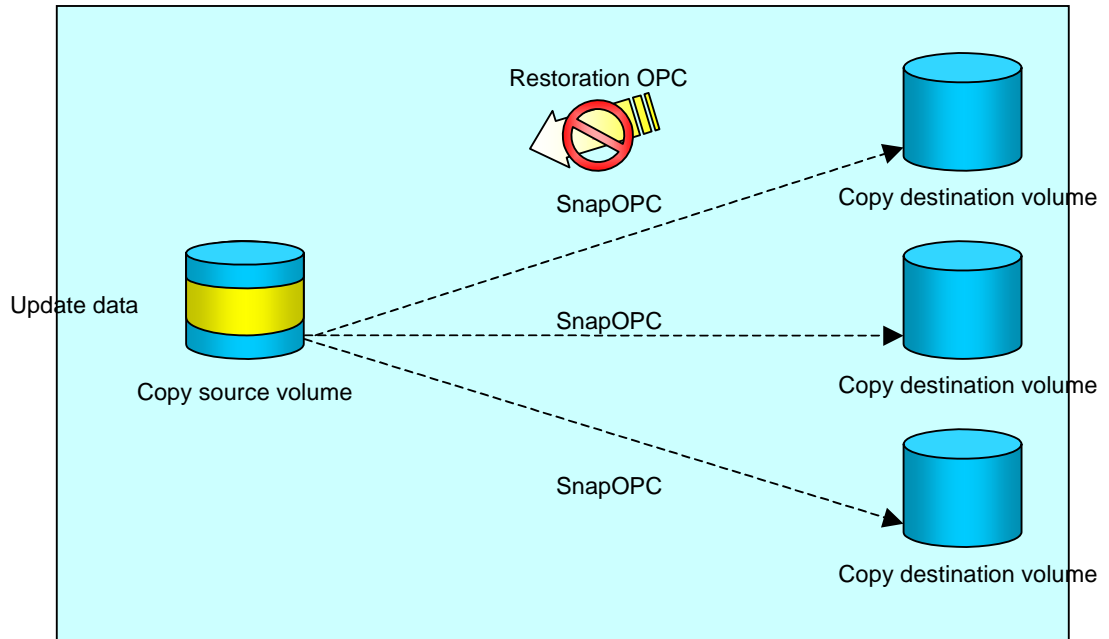
- If a SnapOPC is being performed between the copy source volume and the copy destination volume, restorations to volumes other than the copy source volume cannot be executed. To restore to a volume other than the copy source volume, operating system copy functions (such as the cp command or the copy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

Figure: When restoring to a volume other than the copy source volume



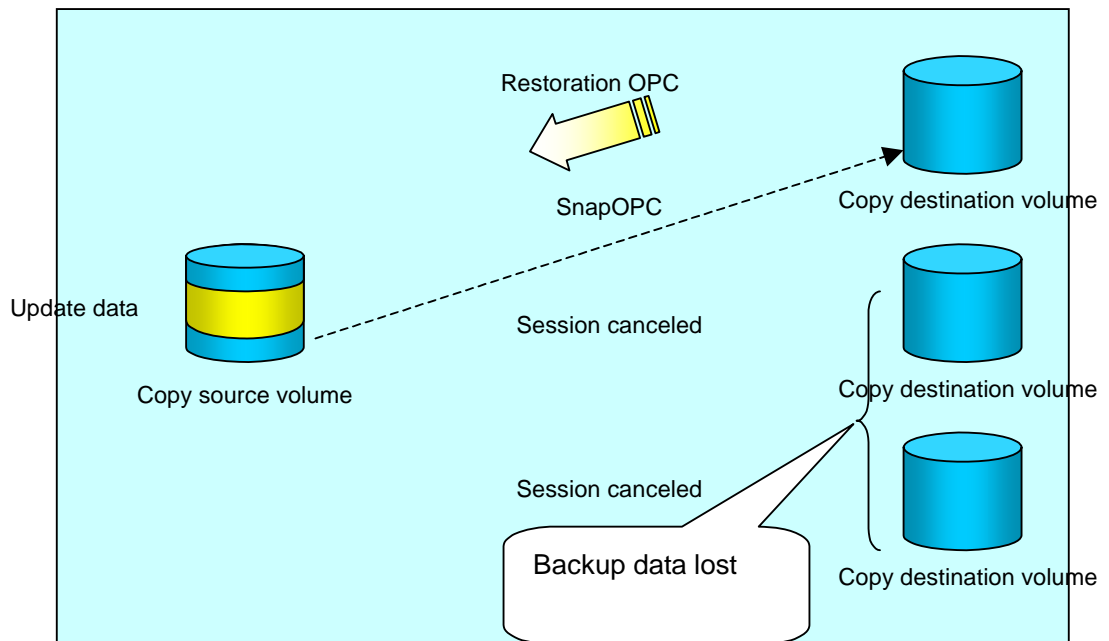
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure: If SnapOPC is performed in relation to multiple copy destination volumes



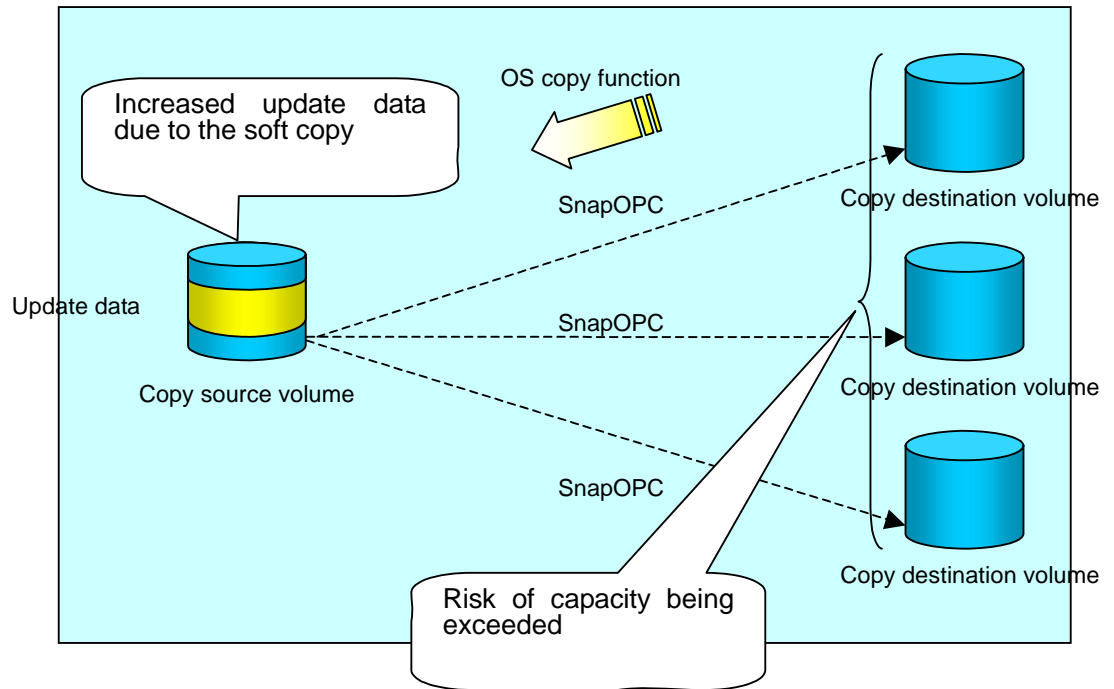
In this case, restoration using an OPC can be performed by canceling the other SnapOPCs. However, the backup data on the destination volumes whose SnapOPC sessions were canceled will be lost.

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 functions, the amount of updated data on the source volume will increase, and there is a risk of a capacity shortage for the SnapOPC volume.

Figure: Restoration without cancelling SnapOPC sessions



SnapOPC+ replication

Execute the replication creation command (swsrpmake) with the `-P` option to perform SnapOPC+ replication. This 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/FJVSwsrp/bin/swsrpmake -P /dev/vg01 /dev/vg01@TARG-SV
FROM=/dev/vg01@SRC-SV,TO=/dev/vg01@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 same 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/FJSSwsrp/bin/swsrpmake -P /dev/vg01 /dev/bg01@TARG-SV
FROM=/dev/vg01@SRC-SV,TO=/dev/bg01@TARG-SV swsrpmake completed
#
```

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

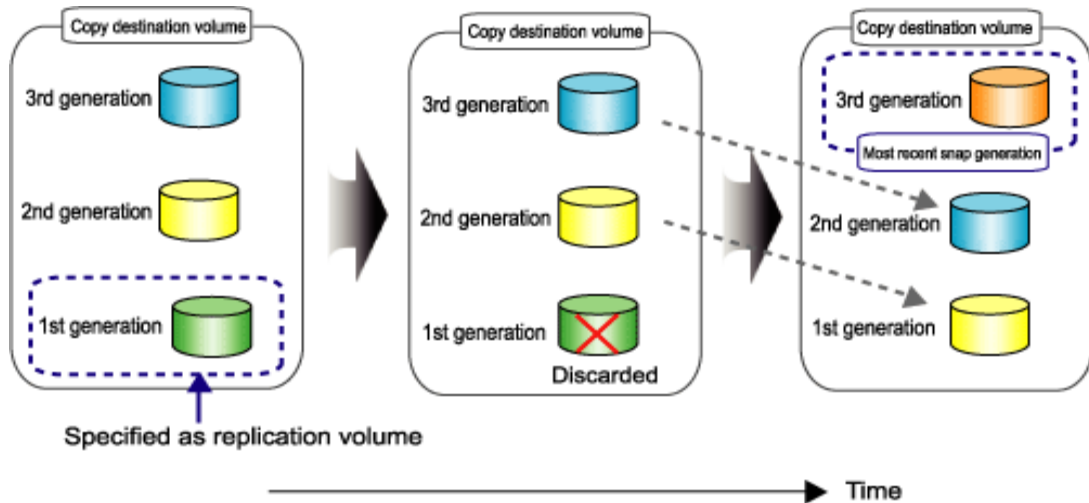
Each time there is a new copy destination volume, a snap generation number is assigned, up to a maximum of 8 generations.



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 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 status of SnapOPC+ replication can be checked using the [operating 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/vg01@SRC-SV /dev/bg01@TARG-SV regular copy-on-write(inactive) ---- off
0% ---- ---- ---- 1
SRC-SV /dev/vg01@SRC-SV /dev/bg02@TARG-SV regular copy-on-write(active) ---- off 5%
---- ---- ---- 2
#
```



Note

When there is insufficient capacity in the Snap Data Volume or the Snap Data Pool, the SpanOPC+ status changes to the error suspend status of 'failed', and this applies to SnapOPC+ operations carried out immediately beforehand, their status will change to 'failed' as well. Replication volumes with this status cannot be accessed (used). The status of SnapOPC+ replication can be checked in the Status column of the [operating 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/vg01@SRC-SV /dev/vg02@TARG-SV regular failed ---- off ---- ----
---- ---- ----
#
```

If the snapOPC+ execution status becomes error-suspended ("failed"), refer to "[Action required if 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]

7.5.2 Executing synchronized replication

Perform synchronized replication by using 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 state 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 source volume.
3. To copy the updated (incremental) data, restart synchronized processing with the synchronous processing start command (swsrpstartsync).

7.5.2.1 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 such a way that 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.

7.5.2.2 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 operation 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

Transfer mode provides the REC data transmission modes described below.

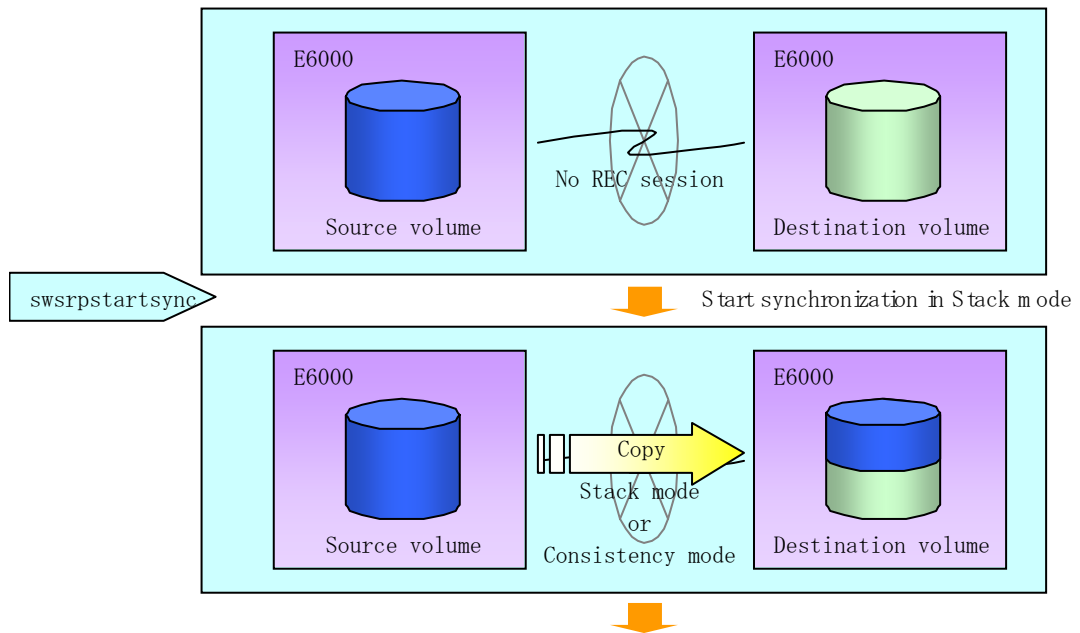
Table: Transfer mode types

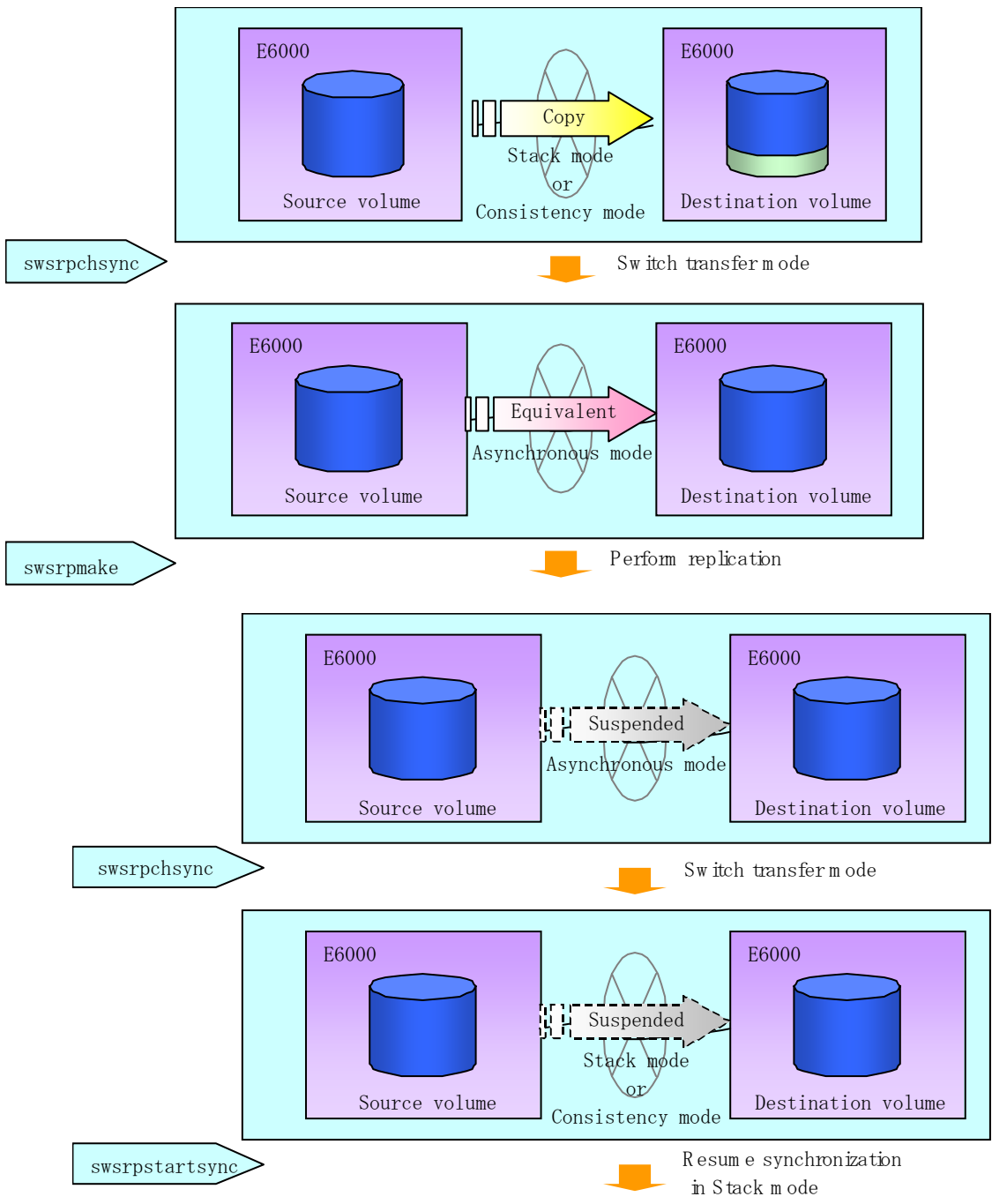
Mode	Description
Synchronous	<p>When a write operation to a source volume occurs, this transfer mode returns the completion of the write operation to the host after copying is completed.</p> <p>In synchronous transfer mode, the performance of a write response depends on the performance of the network between the systems. Thus, any deterioration in network performance adversely affects the performance of a write response.</p>
Asynchronous (sequential transfer)	<p>This transfer mode starts sending data to a destination volume immediately after a response is made to a write operation on the source volume. The order of write operations is thus secured.</p> <p>If the volume of updates made to the source volume is excessive compared to transmission performance between the boxes, data to be copied remains stored, and write operations to the host are queued until the data is partially copied. To use asynchronous mode, the network must have at least the same performance as the update speed to the source volumes.</p>

Mode	Description
Stack	This mode stores (or stacks) data in the source system to be transferred and copies the data at irregular intervals to lower the speed of data transferred to the destination system. Updated data on the source volume is transferred to the destination volume at irregular intervals, and so 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 execution command (swsrpmake), and synchronization mode change command (swsrpchsnc). Use the operation status display command (swsrpstat) to check the execution status. The figures below show how synchronous replication operation is performed in Stack mode or Consistency mode.

Figure: Synchronous replication flow (for Stack mode/Consistency mode)





Note

If the equivalency maintenance REC operating mode is changed, after changing the operating mode, the user must wait until the equivalency status is attained.

Recovery mode

Recovery mode includes two methods of restarting the copying after recovery from an inter-box path error (if this occurs the session will be in halt status).

Table: Recovery mode types

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. You should manually resume copying. This mode is used, for example, when operating a standby database.

Split mode

Split mode includes two modes for performing a 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: Split mode types

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.
Manual Split	This split mode rejects write operations to source volumes (it 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.

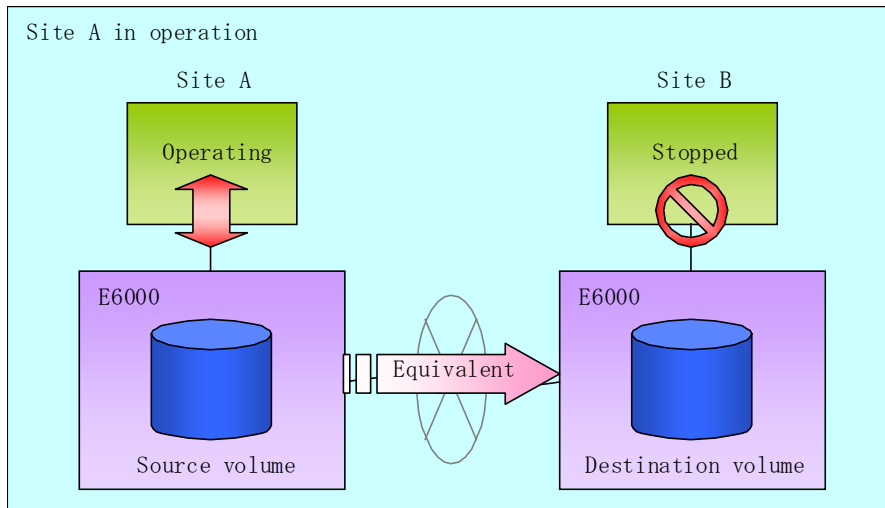
Copy direction reversal

The copy direction reverser allows you to smoothly switch between different sites.

The following figures show an example of how to switch the copy direction:

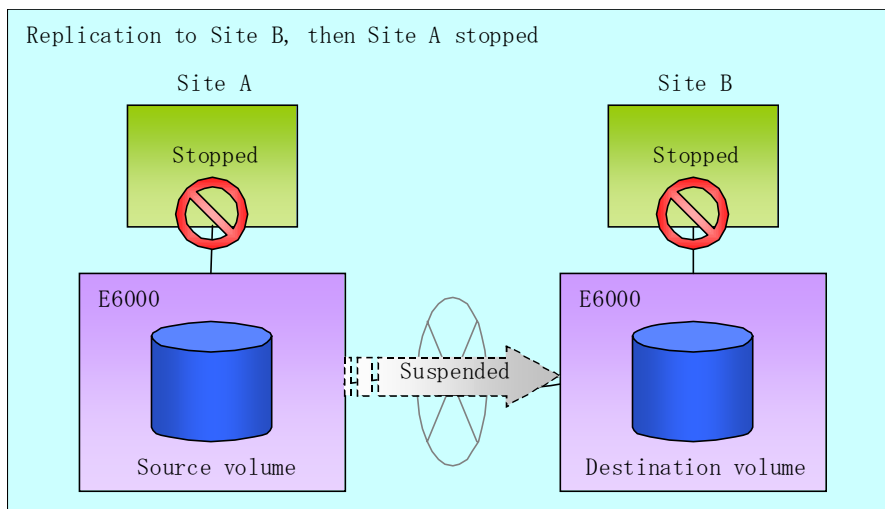
1. Assume that Site A is operating and REC is operating from Site A to Site B.

Figure: When REC performed from Site A to Site B



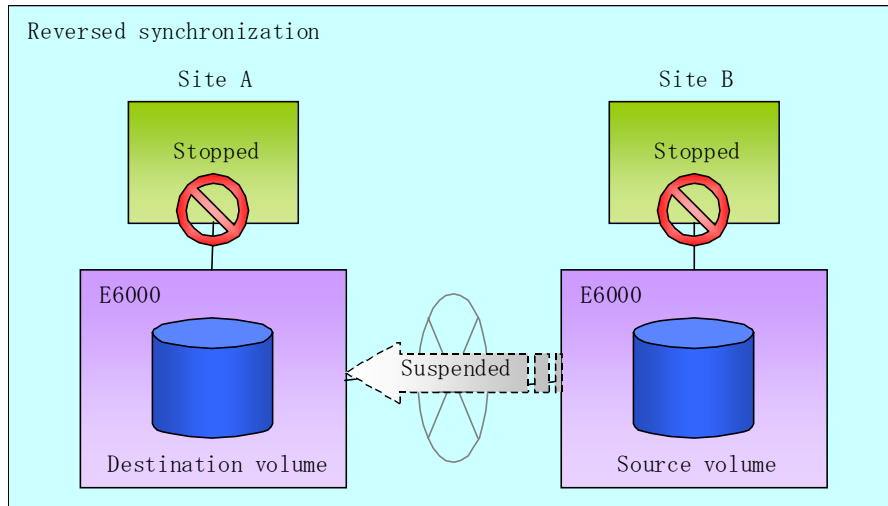
2. To switch the sites, execute the replication execution command to make a replication to Site B. Then, stop operating Site A.

Figure: When the replication creation command is used to create a replica at Site B



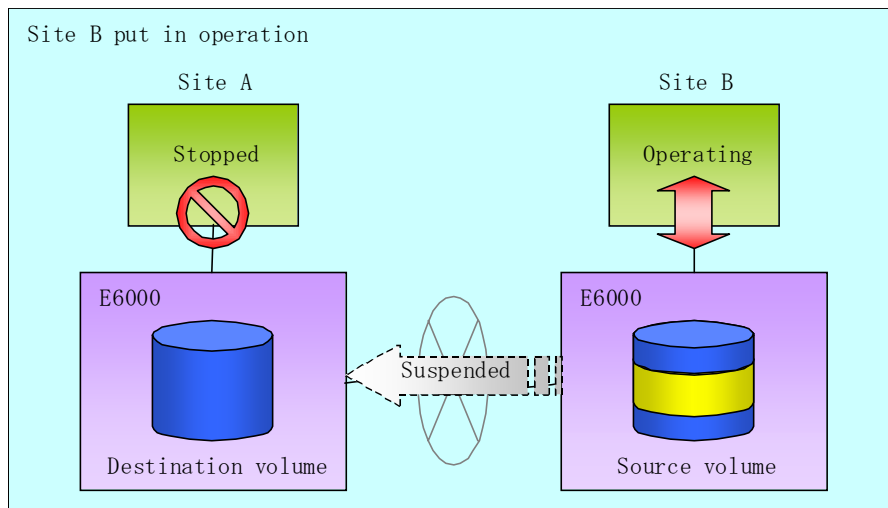
- Execute the synchronization reverse command to reverse the copy direction.

Figure: When the synchronization reverse command is executed



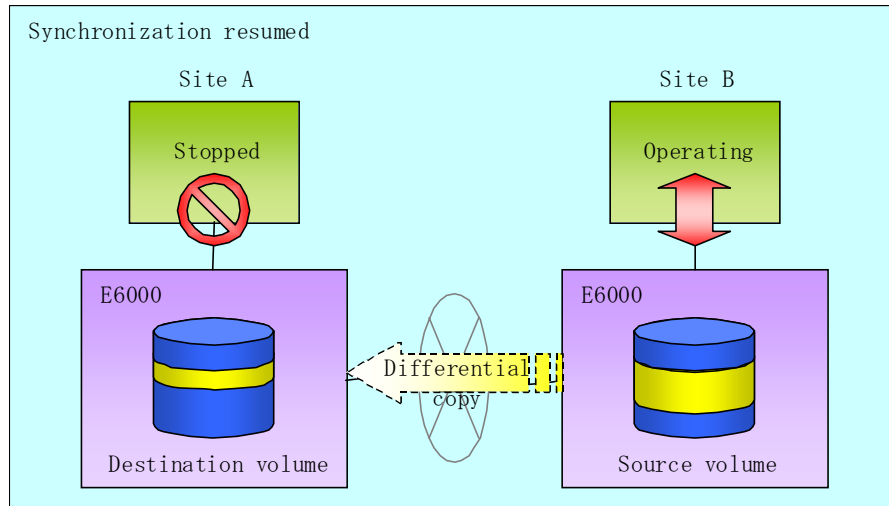
- Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure: When Site B operation is started (synchronization suspend status)



- Start (or 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 resumed)



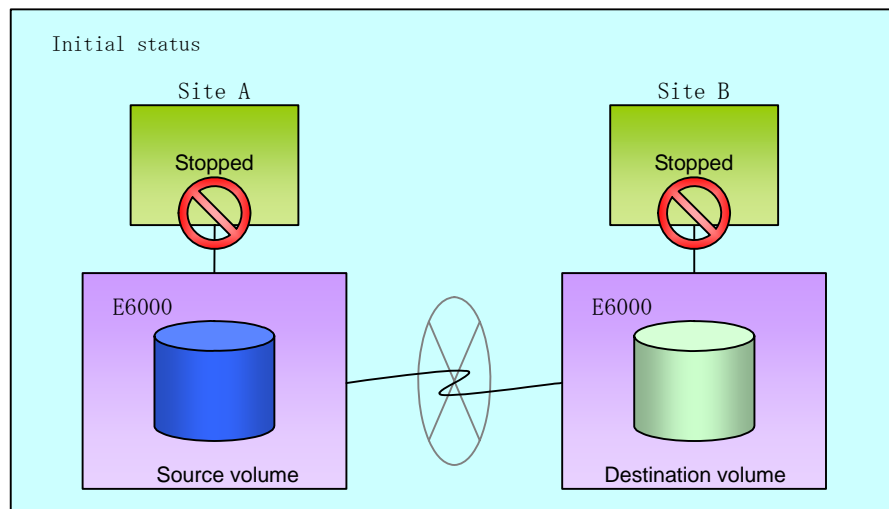
7.5.2.2.1 Initial copy skip function

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:

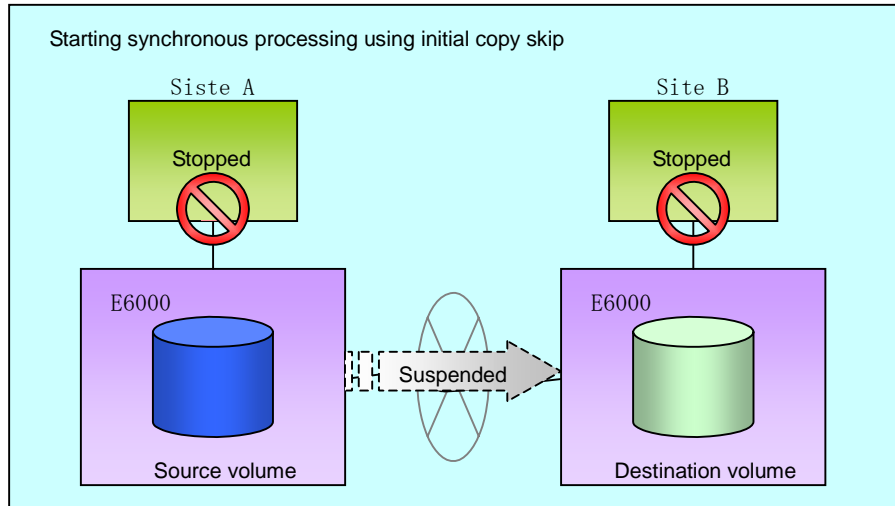
1. Suppose that operations at Site A have stopped.

Figure: When operations have been stopped at Site A



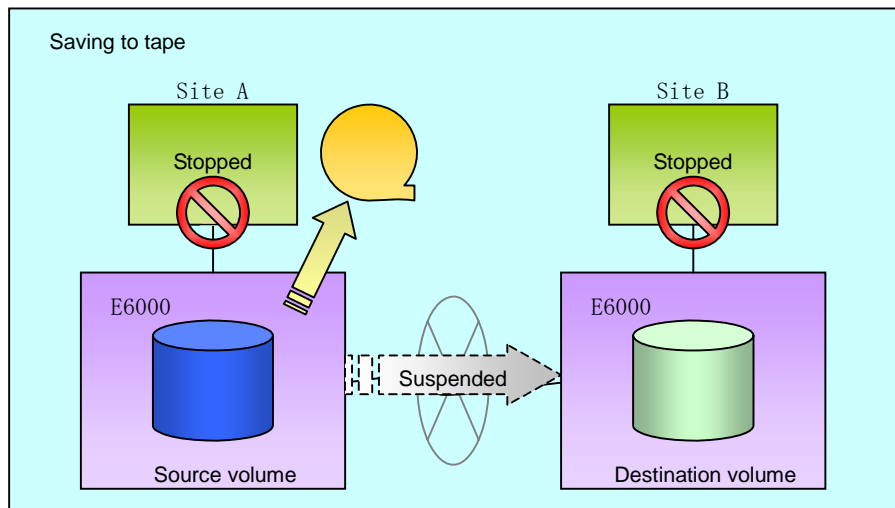
2. Next, synchronous processing begins, using the initial copy skip function. At this point, an REC session is set up, and the status is Replication Established. Data is not copied to the destination volume.

Figure: When synchronization started by initial copy skip function



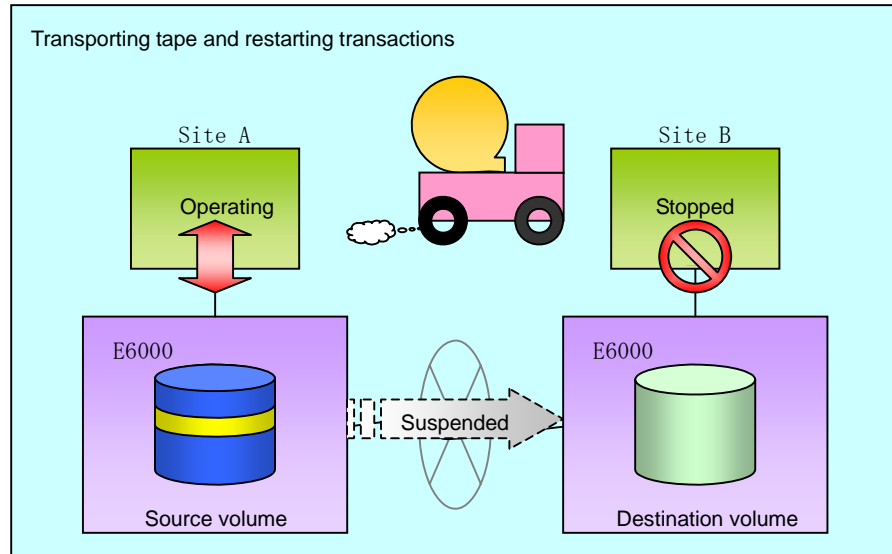
3. Next, the data on the source volume is backed up to tape.

Figure: When the copy source data is backed up to tape



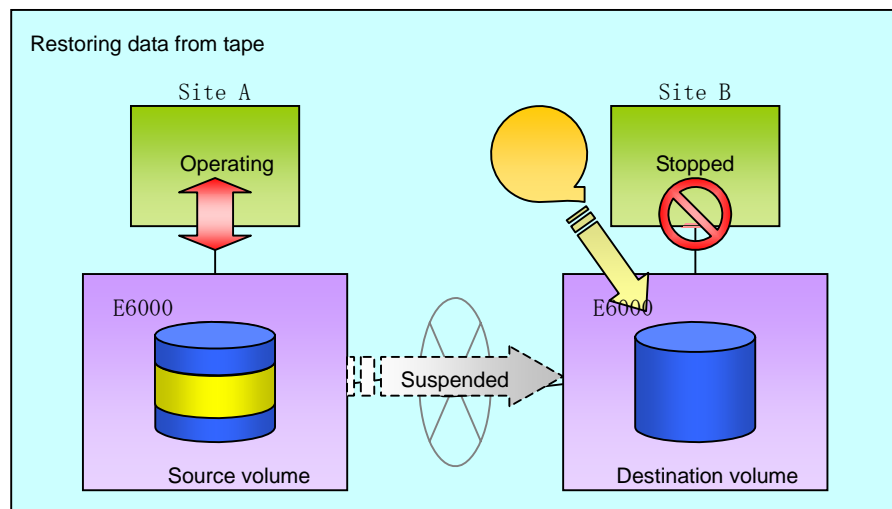
4. The tape medium is sent to Site B, and jobs at Site A restart.

Figure: When operations restarted at Site A



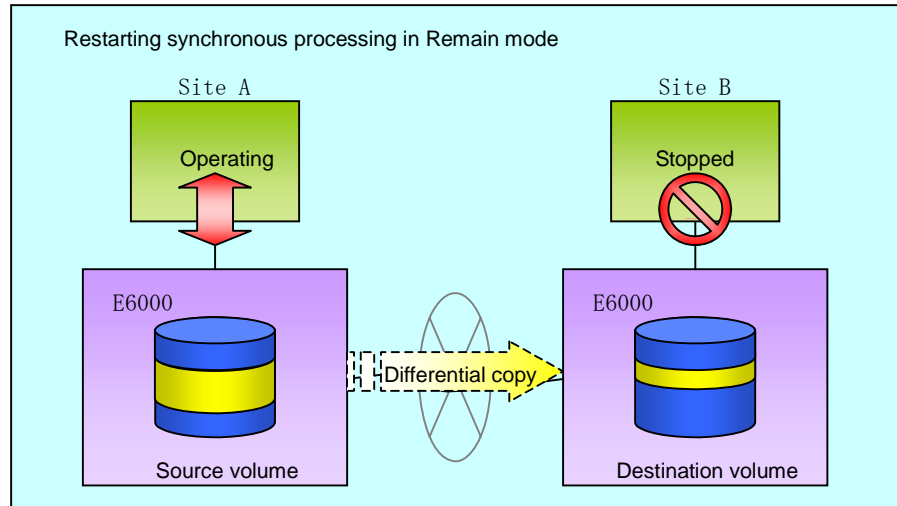
5. The data on the tape medium is restored to the destination volume. At this point, the data on the destination volume is the same as the data on the source volume that existed before operations restarted.

Figure: When tape restored to 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 source volume is reflected on the destination volume. If Remain mode is not used, all data on the copy source volume is copied.

Figure: When synchronization restarted in Remain mode



7.5.2.3 Concurrent suspension function

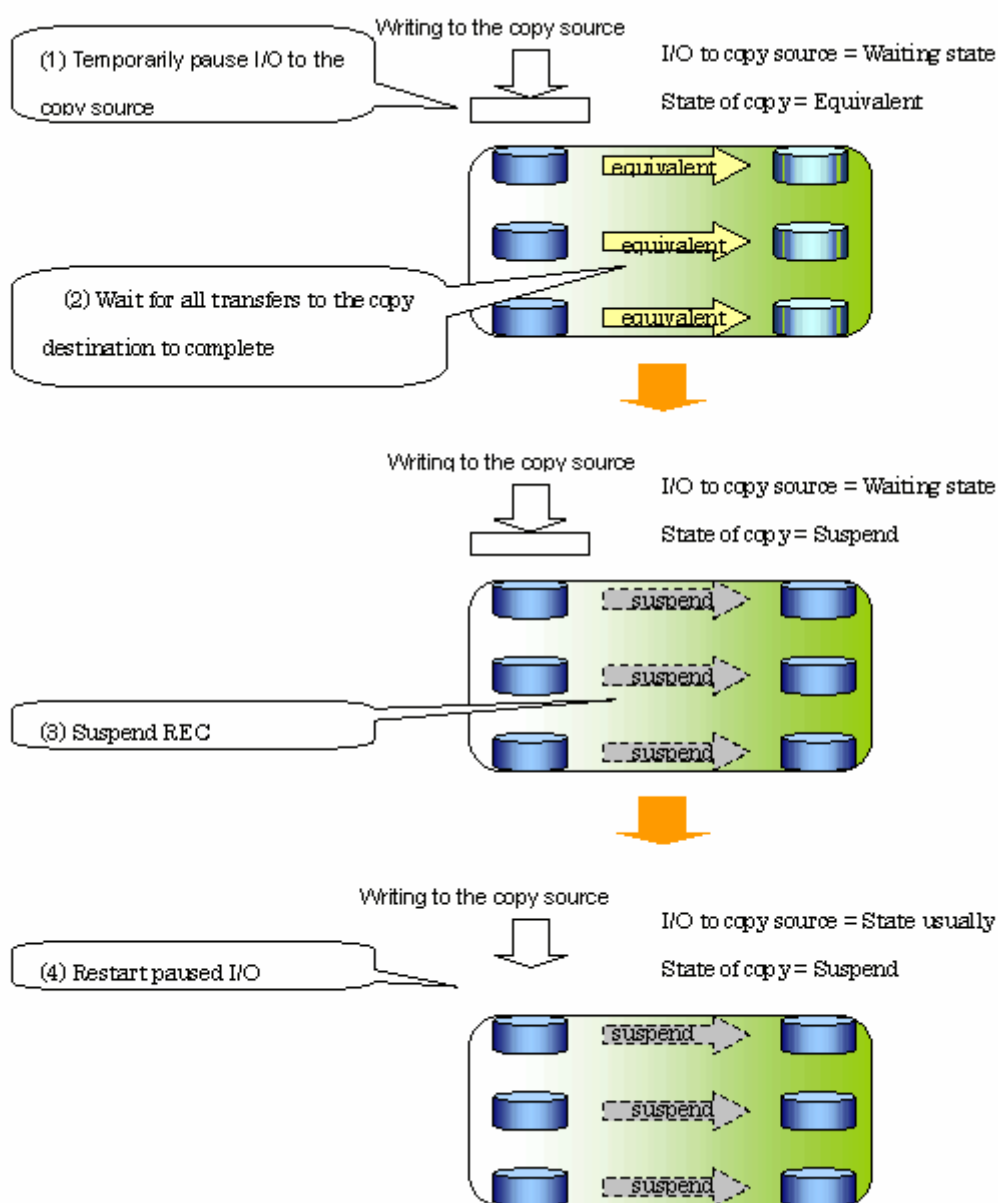
The concurrent suspension function simultaneously suspends multiple EC/REC sessions for disk array systems.

By using this function, a copy with consistency can be easily taken.

For example, it is useful for a database consisting of multiple volumes.

The behavior that takes place within a disk array system is shown below.

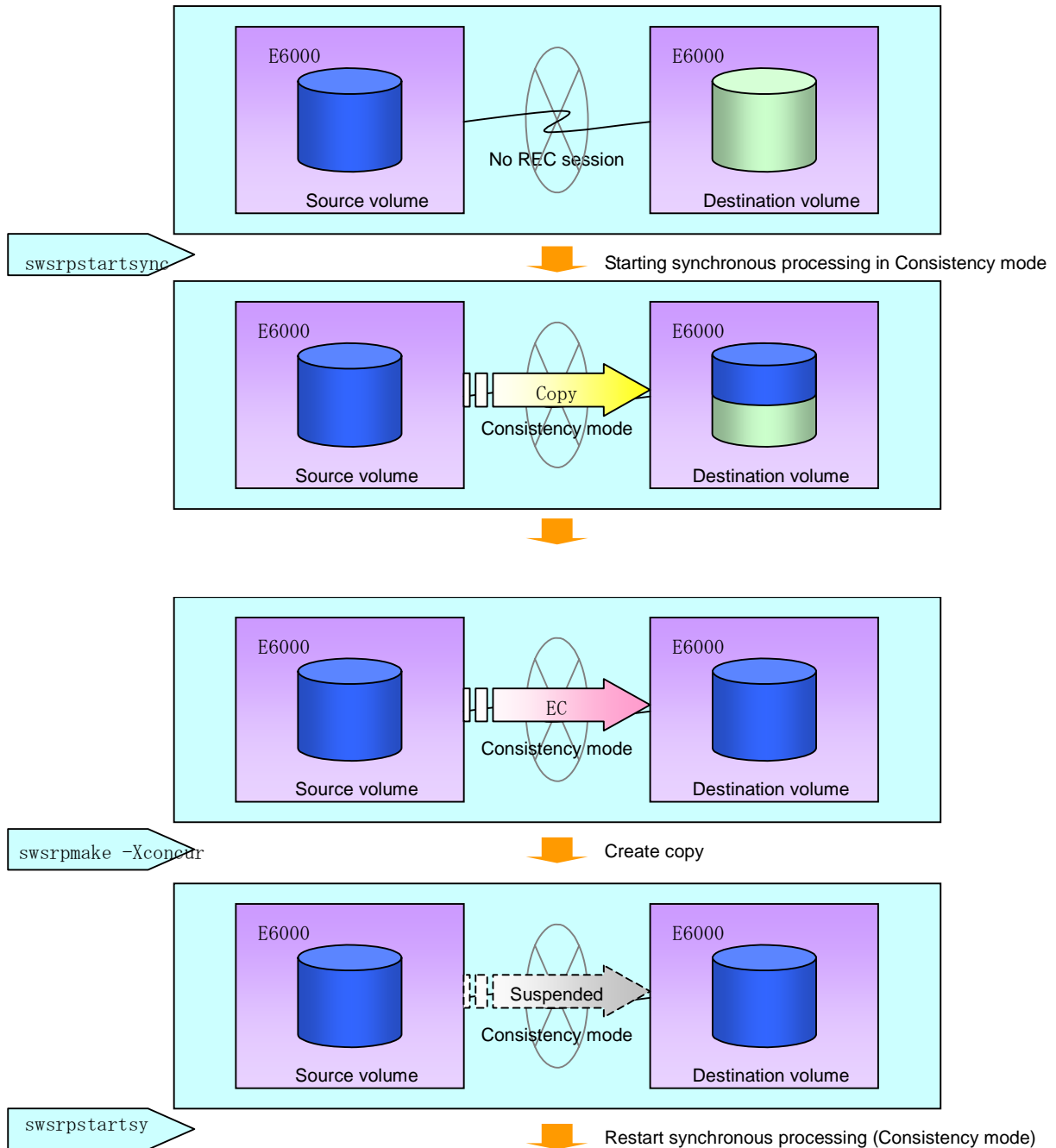
Figure: Internal operation of disk array unit



Replication using the concurrent suspension function is performed by specifying the `-Xconcur` option for the replication creation command (`swsrpmake`).

Additionally, 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). Accordingly, the operating procedure used when concurrent suspension is executed in Consistency mode is the same as the procedure for both asynchronous and synchronous modes.

Figure: Consistency mode



7.5.3 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 with bi-direction copying by using the replication volume information setting command (`swsrpsetvol`).

Restoration can be executed according to the following procedures:

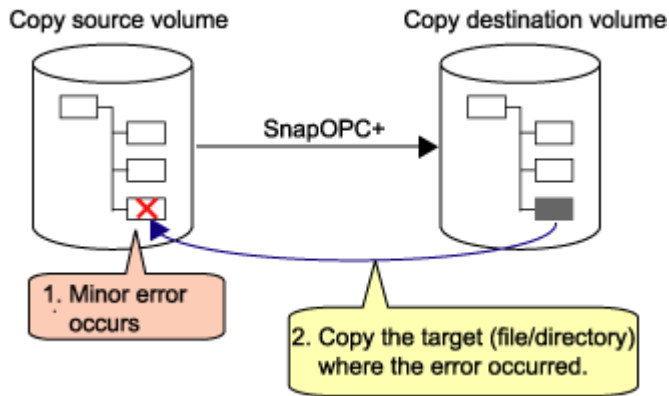
1. Execute the replication cancellation command (`swsrpcancel`) when the target volume for restoration has an EC session.
2. Execute the replication creation command (`swsrpmake`). The specification of a source volume and a replica volume is reversed when the replication is executed. The replication creation command is executed, specifying neither the `-T` option nor the `-C` option, in the backup operation that uses QuickOPC/SnapOPC.



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+

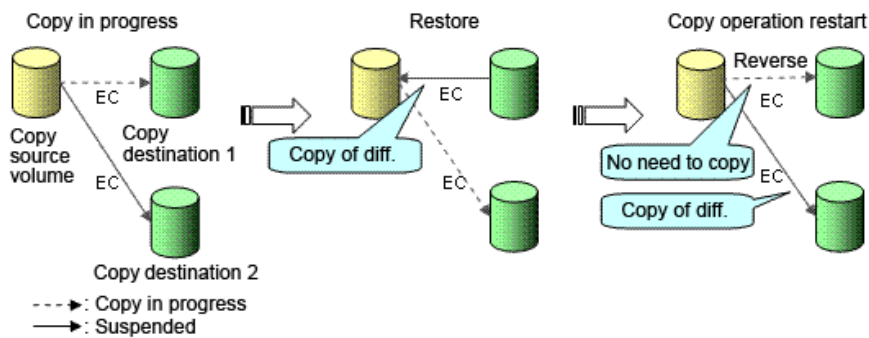


7.5.4 Executing synchronous-type reversal

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. Therefore, 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



7.6 Changing the Setting Information

When a Storage Server or device required in the replication has been changed, the information set in AdvancedCopy Manager must be changed. This section explains how to make these changes.

7.6.1 Changing a source volume or replica volume

To change the attributes (e.g., copy direction, operation servers of server-to-server replication) of the source volume and replica volume, delete the registered information with the replication volume information deletion command (swsrpdelvol) and then execute the replication volume information setting command (swsrpsetvol) again.

7.6.2 Deleting a source volume or replica volume

To delete the source volume or replica volume that has been set, use the replication volume information deletion command (swsrpdelvol).

7.6.3 Changing the device information of a source or replica volume

When making device information and configuration changes for a source / replica volume, the device configuration is changed after deletion processing of the source / replica volume, and the setting of the volume is performed.

Be sure to perform the following before changing the size of a source / replica volume or making a configuration change. If this is not done, the deletion of the source/ replica volume after a device configuration change may not be possible.

1. Perform deletion processing on the original / replica volume to be changed. For details, refer to "Deleting a source volume or replica volume".
2. Change the device configuration.
3. Perform the additional processing of a device. For more information, refer to "Fetching device information from a Storage Server".
4. Perform the setting of the new information in the source / replica volume.

7.7 Stopping Replication processing

To stop replication processing that is in progress, or to change synchronized replication to snapshot 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 \(`swsrpcancel`\)](#). This will stop the specified snap generation as well as all earlier snap generations.

If the `-Xforce` option and the `-Xgroup` option are specified simultaneously, the SnapOPC+ sessions within the group are stopped, as well as all prior snap generations within the group.

When stopping replication, stop the demon on the Storage Server. Usually, it stops automatically at the time of a stop of a system.

It is also possible to stop an individual demon by a certain reason. For details, refer to "Starting and Stopping Daemons".



Note

When the daemon stops, all functions of AdvancedCopy Manager running on the Storage Server are stopped.

Before stopping the Storage Management Server daemon, make sure that operations on all Storage Servers under management have stopped.

7.8 LVM Volume Operation

The replication of LVM volumes can be classified into the following two modes depending on the volume group configuration:

- Replication in units of volume groups
- Replication in units of physical disks (LU: Logical Unit)



Note

Before starting this operation, ensure that you understand the basic operation of ordinary volumes.

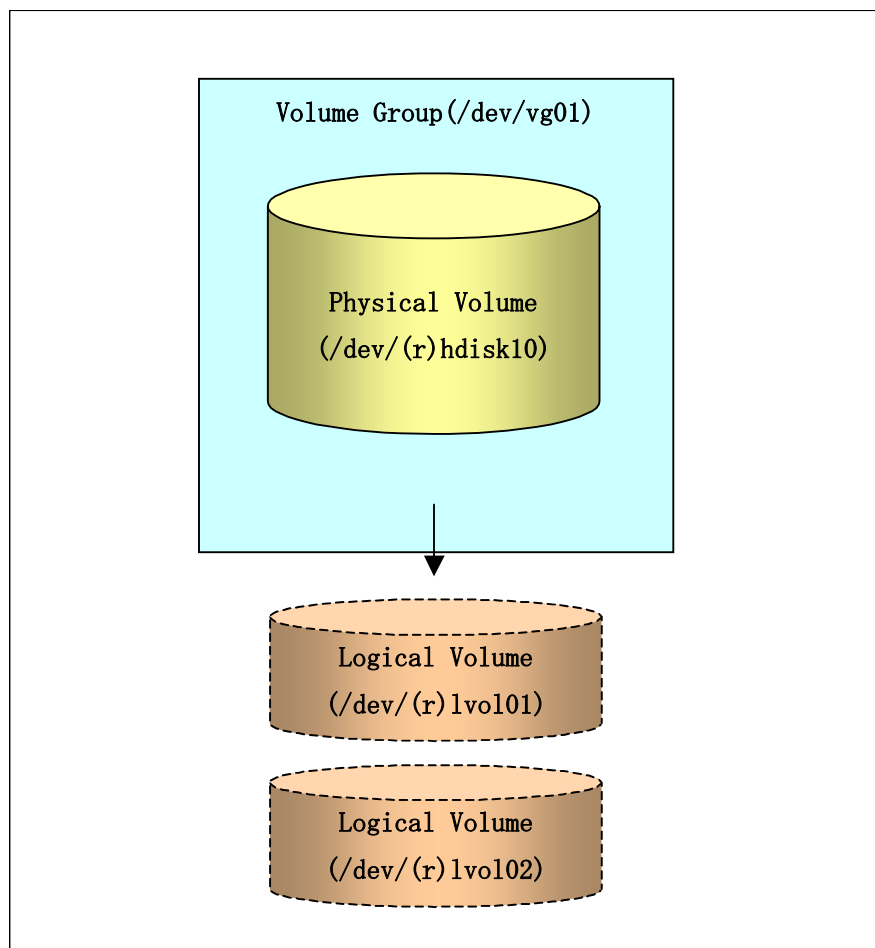
7.8.1 Replication operation in units of volume groups

Provided that all volume group configurations satisfy the following conditions, the replication can be performed in units of volume groups.

- One volume group has only one physical disk, and logical volumes are configured so that one physical disk includes n logical volumes.

If the above conditions are not satisfied, replication must be performed in units of physical disks.

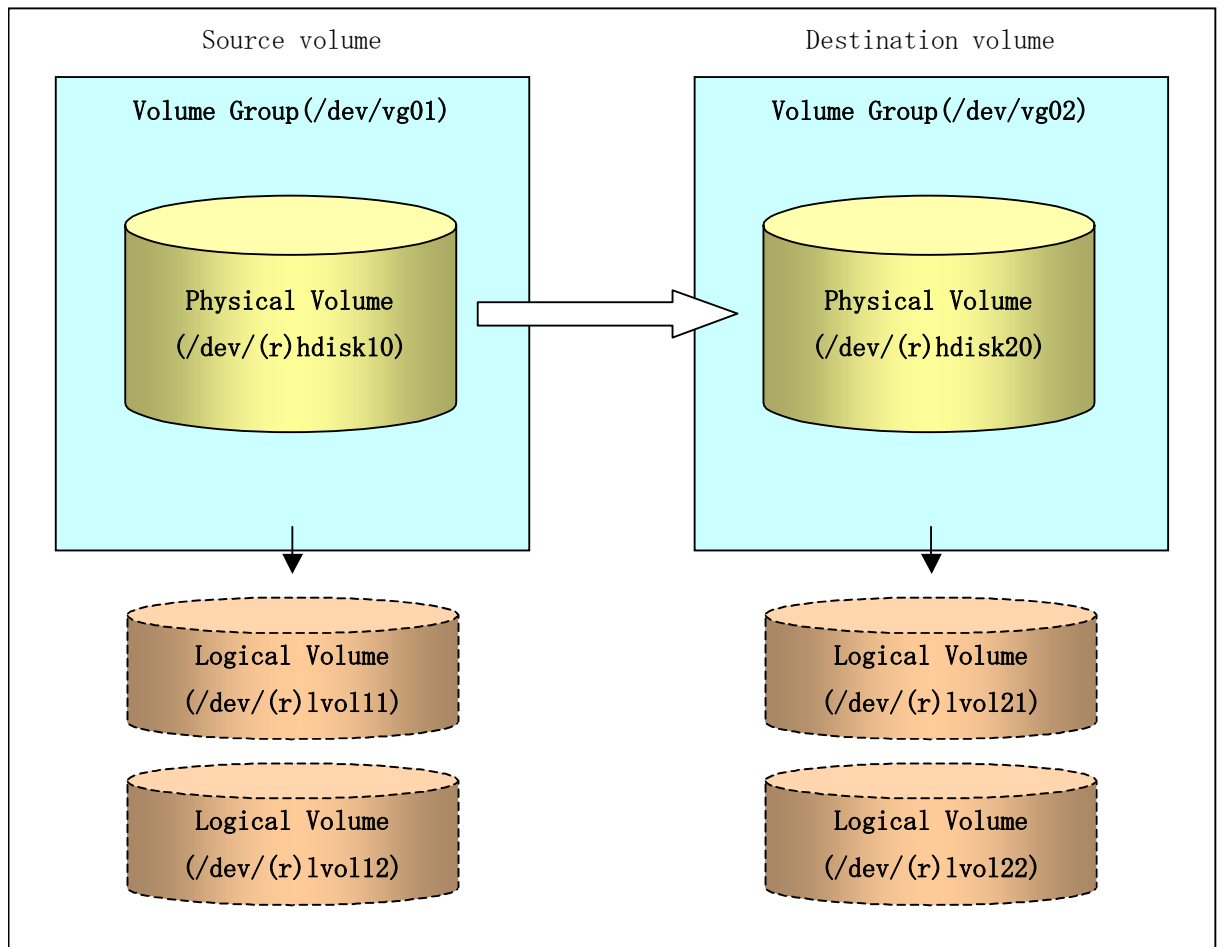
Figure: Example of configuration in which replication can be performed in units of volume groups



7.8.1.1 Operation design

Ensure that the following conditions are met when designing volume groups for use as source or replica volume groups:

- All physical disks must have the same size.
- The configurations of all logical volumes must be the same.



7.8.1.2 Preparations

7.8.1.2.1 Setting the source volume and replica volume

When setting the source volume and replica volume, specify their volume groups.

Example:

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vg01 /dev/vg02
swsrpsetvol completed
#
```

7.8.1.2.2 Customizing the pre-processing and post-processing scripts

If a volume group is to be replicated, the pre-processing and post-processing scripts must be customized.

Refer to “Pre-processing and Post-processing for Replication” for information on the customization procedure.



Note

If replication is attempted without customization of the scripts, preprocessing for the source volume causes an error, so that replication cannot be achieved.

7.8.1.3 Replication in units of volume groups

Execute replication with a volume group specified.

Example of snapshot replication

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpmake completed
#
```

Example of synchronous replication

```
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpstartsync completed
(After state of equivalency upkeep)
# /opt/FJSVswsrp/bin/swsrpmake /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpmake completed
#
```

7.8.2 Replication in units of physical disks

When the volume group configuration does not satisfy the conditions for operation in units of volume groups, replication can be performed by operation in units of physical disks. When backup is performed in units of physical disks, volume group integrity must be maintained and, therefore, all physical disks in the volume group must be operated synchronously.



Point

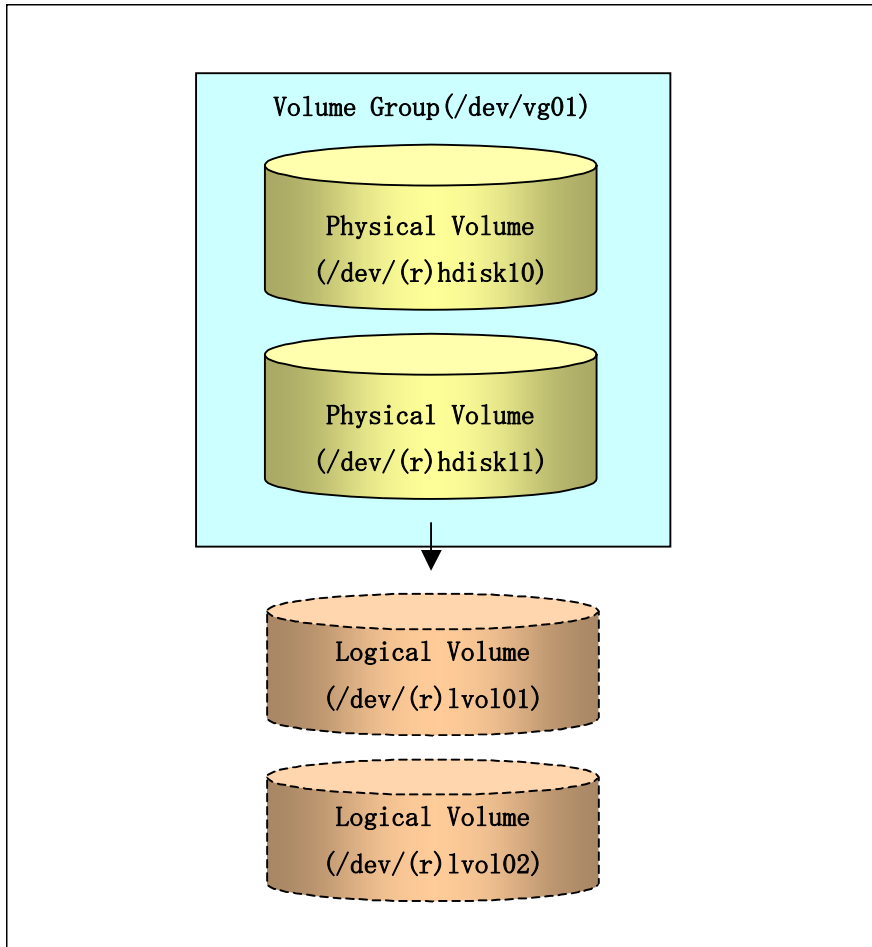
Refer to “Device information display command (stgxfwcmdispdev)”, or to “Confirmation of devices in the same logical group” in the “ETERNUS SF AdvancedCopy Manager GUI Operator’s Guide” for information on how to check the physical volumes that require synchronous operations.



Note

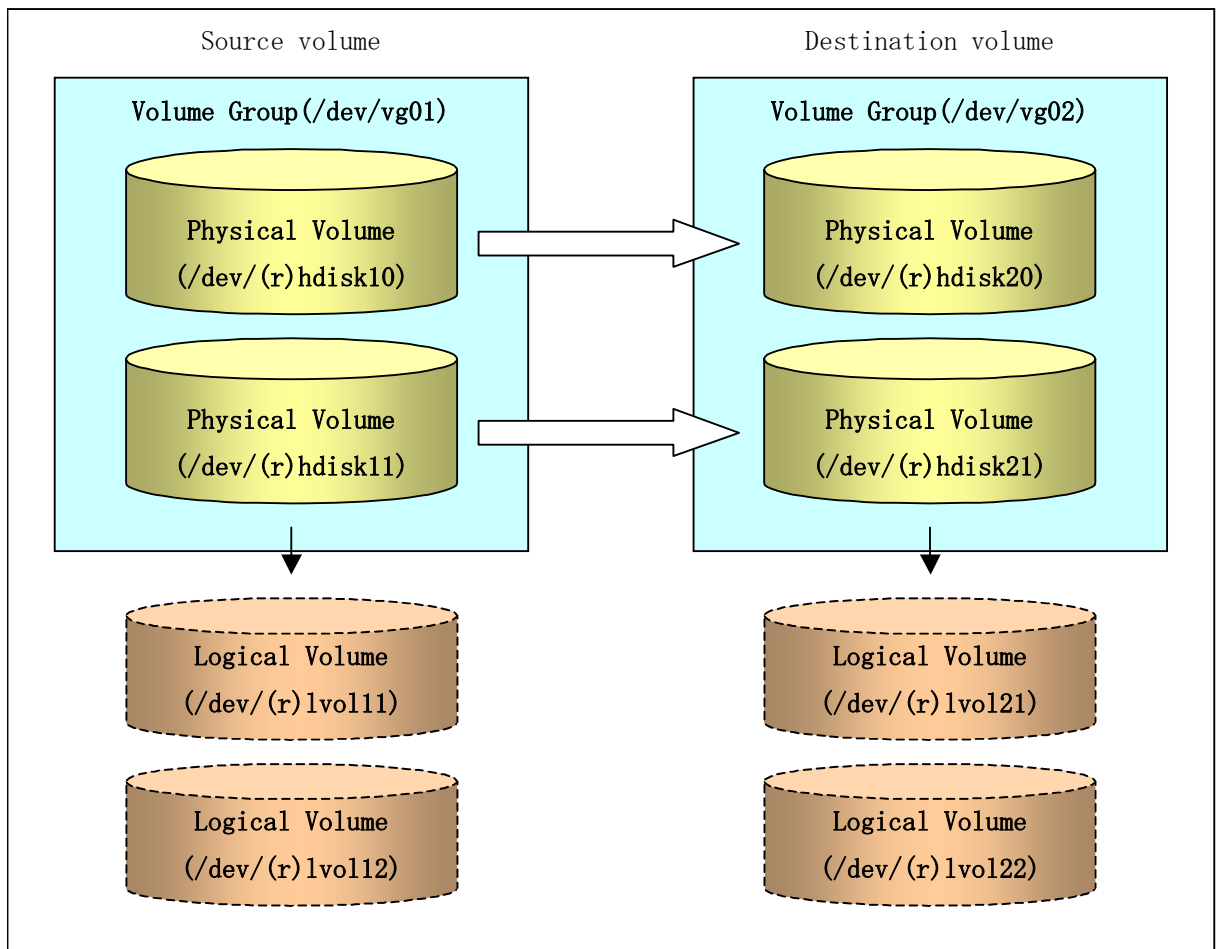
For operations in a cluster configuration, the device name (/dev/(r)hdisk#) of the physical disks that comprise a volume group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

Figure: Sample configuration for operation in units of physical disks



7.8.2.1 Operation design

To use the replica volume after replication in a situation where a source volume is a volume group, the replica volume must have the same logical volume configuration as the source volume and must be a volume group of the same physical size.



7.8.2.2 Preparations

7.8.2.2.1 Setting the source and replica volumes

When setting the source and replica volumes, specify all of the physical disks in the volume group.

Example:

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/hdisk10 /dev/hdisk20
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/hdisk11 /dev/hdisk21
swsrpsetvol completed
#
```

7.8.2.3 Replication in units of physical disks

Perform the operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing and post-processing work for each volume group before and after (respectively) replication operation. Disable pre-processing and post-processing when operating individual physical disks.

Example of snapshot replication

```
(Perform preprocessing for the source and target volumes.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/hdisk10 /dev/hdisk20
FROM=/dev/hdisk10@SV1, TO=/dev/hdisk20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/hdisk11 /dev/hdisk21
FROM=/dev/hdisk11@SV1, TO=/dev/hdisk21@SV1 swsrpmake completed
#
(Perform postprocessing for the source and target volumes.)
```

Example of synchronous replication

```
(Perform preprocessing for the target volume.)
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/hdisk10 /dev/hdisk20
FROM=/dev/hdisk10@SV1, TO=/dev/hdisk20@SV1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/hdisk11 /dev/hdisk21
FROM=/dev/hdisk11@SV1, TO=/dev/hdisk21@SV1 swsrpstartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the source volume.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/hdisk10 /dev/hdisk20
FROM=/dev/hdisk10@SV1, TO=/dev/hdisk20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/hdisk11 /dev/hdisk21
FROM=/dev/hdisk11@SV1, TO=/dev/hdisk21@SV1 swsrpmake completed
#
(Perform postprocessing for the source and target volumes.)
```

The table below summarizes the pre-processing and post-processing work to be performed before and after replication.

Table: Pre and Post processing of replication

	Pre-processing	Post-processing
Source volume	<ol style="list-style-type: none">1. Ensure data integrity by preventing access to all logical volumes in the volume group.2. If file systems are included, unmount all file systems in the volume group.	<ol style="list-style-type: none">1. If file systems are included, remount the volumes that were unmounted by pre-processing.
Target volume	<ol style="list-style-type: none">1. Prevent access to all logical volumes in the volume group.2. If file systems are included, unmount all file systems in the volume group.3. Deactivate the volume group	<ol style="list-style-type: none">1. Reconfigure the volume group2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Deactivate the volume group

Deactivate the volume group as follows:

```
# /usr/sbin/varyoffvg vg02
#
```

Reconfiguring the volume group

Reconfigure the volume group as follows:

1. Use the `chdev` command to temporarily remove the target volume from LVM.

```
# /usr/sbin/chdev -l hdisk20 -a pv=clear  
# /usr/sbin/chdev -l hdisk21 -a pv=clear
```

2. Use the `exportvg` command to export the target volume.

```
# /usr/sbin/exportvg vg02
```

3. Create the logical volume list file in following format.

```
lv011:lv011  
loglv11:loglv11  
lv012:lv012  
loglv12:loglv12
```

4. Use the `recreatevg` command to rewrite the LVM management information in the target volume.

```
# /usr/sbin/recreatevg -l <logical volume list file> -L /fs -y vg02 hdisk20 hdisk21
```

5. Use the `chfs` command to change the mount point.

```
# /usr/sbin/chfs -m /mnt21 /fs/mnt11  
# /usr/sbin/chfs -m /mnt22 /fs/mnt12
```

7.9 VxVM Volume Operation

VxVM volumes are replicated in units of physical disks that constitute each VxVM volume. When the replication is performed in units of physical disks, disk group integrity must be maintained and, therefore, all the physical disks in the disk group must be operated synchronously.



Point

Refer to “Device information display command (stgxfwcmdispdev)”, or to “Confirmation of devices in the same logical group” in the “ETERNUS SF AdvancedCopy Manager GUI User’s Guide” for the method used to check whether the physical volume requires synchronization.



Note

Before starting this operation, ensure that you understand the basic operation of ordinary volumes.



Note

Snapshot backup is recommended for operation in units of physical disks. In the case of synchronized backup, the command (VxVM command etc.), which disk access produces to a copy destination disk during a copy, cannot be executed.



Note

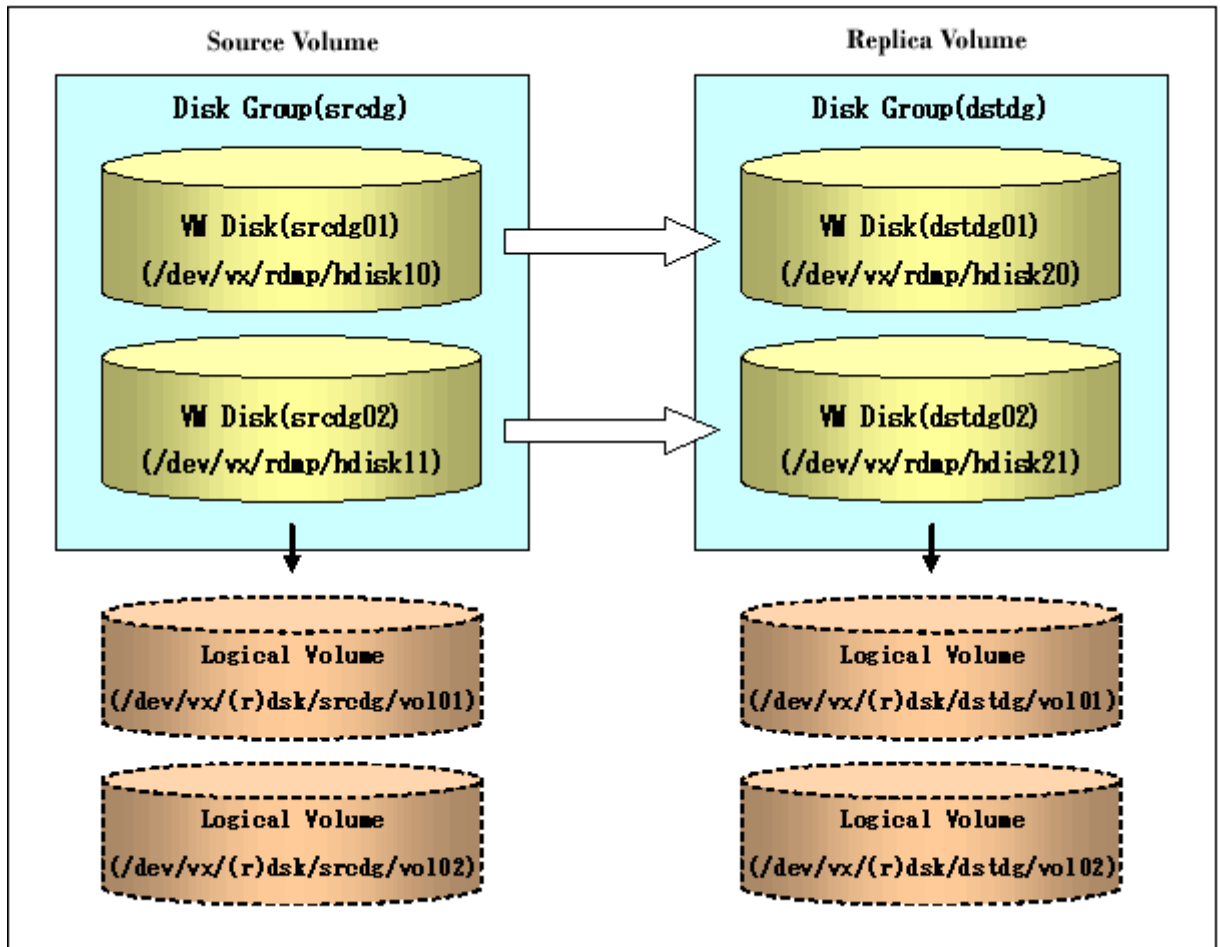
For operations in a cluster configuration, the device name (/dev/(r)hdisk#) of the physical disks that comprise a disk group must be the same at all servers comprising the cluster, and all the ETERNUS disks indicated by the device name must be the same.

7.9.1 Operation design

Design the disk groups of the source and replica volumes. Observe the following conditions when designing the disk groups:

- The number, sizes, and types of VM disks must be the same.
- The configurations of logical volumes must be the same.

Figure: Copy source volume and copy destination volume



7.9.2 Preparations

7.9.2.1 Confirming the disk group configuration information file

The disk group must be reconfigured in replication post-processing. Confirm that a volume group configuration information file has been saved.

```
/etc/vx/cbr/bk/<disk group name>.<disk group ID>
```

7.9.2.2 Setting the source and replica volumes

When setting the source and replica volumes, specify all of the disks in the volume group.

Example of setting original and replica volumes

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vm/dmp/hdisk10 /dev/vm/dmp/hdisk20
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vm/dmp/hdisk11 /dev/vm/dmp/hdisk21
swsrpsetvol completed
#
```

7.9.3 Replication

Perform the operation of synchronizing all physical disks in the disk group.
 Perform the required pre-processing and post-processing work for each volume group before and after (respectively) the replication. Disable pre-processing and post-processing when operating individual physical disks.

Example of snapshot backup

```
(Perform preprocessing for the source and target volumes.)
# /opt/FJVSwsrp/bin/swsrpmake -f -t /dev/vm/dmp/hdisk10 /dev/vm/dmp/hdisk20
FROM=/dev/vm/dmp/hdisk10@SV1, TO=/dev/vm/dmp/hdisk20@SV1 swsrpmake completed
# /opt/FJVSwsrp/bin/swsrpmake -f -t /dev/vm/dmp/hdisk11 /dev/vm/dmp/hdisk21
FROM=/dev/vm/dmp/hdisk11@SV1, TO=/dev/vm/dmp/hdisk21@SV1 swsrpmake completed
#
(Perform postprocessing for the source and target volumes.)
```

Example of synchronous replication

```
(Perform preprocessing for the target volume.)
# /opt/FJVSwsrp/bin/swsrpstartsync -t /dev/vm/dmp/hdisk10 /dev/vm/dmp/hdisk20
FROM=/dev/vm/dmp/hdisk10@SV1, TO=/dev/vm/dmp/hdisk20@SV1 swsrpstartsync completed
# /opt/FJVSwsrp/bin/swsrpstartsync -t /dev/vm/dmp/hdisk11 /dev/vm/dmp/hdisk21
FROM=/dev/vm/dmp/hdisk11@SV1, TO=/dev/vm/dmp/hdisk21@SV1 swsrpstartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the source volume.)
# /opt/FJVSwsrp/bin/swsrpmake -f -t /dev/vm/dmp/hdisk10 /dev/vm/dmp/hdisk20
FROM=/dev/vm/dmp/hdisk10@SV1, TO=/dev/vm/dmp/hdisk20@SV1 swsrpmake completed
# /opt/FJVSwsrp/bin/swsrpmake -f -t /dev/vm/dmp/hdisk11 /dev/vm/dmp/hdisk21
FROM=/dev/vm/dmp/hdisk11@SV1, TO=/dev/vm/dmp/hdisk21@SV1 swsrpmake completed
#
(Perform postprocessing for the source and target volumes.)
```

The table below summarizes the pre-processing and post-processing work to be performed before and after replication.

Table: Replication pre-processing and post-processing

	Pre-processing	Post-processing
Source volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 3. Import the disk group, when the disk group is not imported for replication within the server. 	<ol style="list-style-type: none"> 1. If file systems are included, remount the volumes that were unmounted by pre-processing.

	Pre-processing	Post-processing
Target volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 3. Deport the disk group. 4. A disk group subordinate's physical disk is set to offline. 	<ol style="list-style-type: none"> 1. The physical disk set to offline with pre-processing is set to online. Reconfigure the volume group 2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring the disk group (for replication within the server)

Reconfigure the disk group as follows:

1. Pre-commit analysis for restoration

```
# /etc/vx/bin/vxconfigrestore -p dstdg
Diskgroup dstdg configuration restoration started .....

Installing volume manager disk header for hdisk20 ...
Installing volume manager disk header for hdisk21 ...
-
dstdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.

Run:
  vxconfigrestore -c dstdg ==> to commit the restoration.
  vxconfigrestore -d dstdg ==> to abort the restoration.
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c dstdg
Committing configuration restoration for diskgroup dstdg ....

dstdg's diskgroup configuration restoration is committed.
#
```

Reconfiguring the disk group (for replication between servers)

1. Import the disk group srcdg on the master server as disk group dstdg on the target server.

```
# /usr/sbin/vxdg -C -n dstdg import srcdg
#
```



Note

When the disk group name is the same in both the source server and the destination server, the `-n` option is not specified.

2. Execute recovery processing for the volume in the disk group `dstdg` on the target server.

```
# vxrecover -g dstdg -sb
#
```

3. Because `udid` of the copy destination disk is not an adjustment since VxVM5.0, this is restored.

```
# vxdisk updateudid hdisk20 hdisk21
```



Note

In case of a cluster system, when a disk group or a mount resource has been defined, use the online/offline process instead of the disk group import/deport command.

If a mount point is defined as a cluster system resource, use the mount resource online/offline process instead of the file system in the case of the disk group, and mount/unmount process..



Note

When performing a system disk exchange, there are cases when conflicting backup configuration information may exist.

In such cases, the disk group ID after executing the above command needs to be set instead of the disk group.



Note

After this operation, in case the volumes within a disk group are needed to be run in synchronous mode in the background, then, depending on the volume configuration, synchronous processing may take some time.

It is also possible to use the volumes during this time.

Chapter 8 Operational Maintenance

This chapter explains how to maintain databases and how to respond to possible problems.

8.1 Maintaining a database

AdvancedCopy Manager uses different types of repository and management information as operation information. In this chapter, these types of information are referred to as databases. The databases contain important information and it is recommended that they be backed up periodically. Note that the databases referred to here differ from databases used for transactions, such as ORACLE databases.

The following table lists instances when the acquisition timing is needed.

Table: Databases on a Storage Server

Type	When a backup should be created	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.
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.
The volume configuration information(Backing up a backup management list)	When you change the configuration of the volume group when the volume group is targeted	Preserving the volume configuration information	Refer to Preserving the volume configuration information
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 files 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.

Type	When a backup should be created	Backup method (reference)	Size
The volume configuration information (Replication management list)	When you change the configuration of the volume group when the volume group is targeted	Preserving the volume configuration information	Refer to Preserving the volume configuration information
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.



Point

You can create 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.

8.1.1 Making individual backup of databases

8.1.1.1 Maintaining a backup management list

This section provides information on the maintenance of a backup management list. A backup management list is maintained on the server that performs the backup.

8.1.1.1.1 Backing up a backup management list

For more information on backing up a backup management list, refer to "Resource backup command (swstresback)."

Backup data size of backup management list

Check the size of the file contained in the subdirectory of the following directory:

```
/etc/opt/FJSVswsts/data
```

In a cluster environment, check the size of the file contained in the subdirectory of the following directory.

```
/etc/opt/FJSVswsts/<logic node name>/data
```



Point

When you reuse a directory that has previously been used to store the data, the size of this directory must be three times greater than the size indicated above.

8.1.1.1.2 Restoring a backup management list

For information on restoring the backup management list, refer to "Resource restore command (swstresrst)."

8.1.1.1.3 Preserving the volume configuration information

AIX AdvancedCopy Manager uses transaction volumes and backup volumes as volume groups. If LVM volume management information is lost, volumes cannot be backed up or restored correctly. When a volume group is created, it is recommended volume configuration information be backed up using the `savevg` command in preparation for a system crash. For information on the `savevg` command, refer to the AIX manuals.

8.1.1.2 Maintaining a replication management list

This section describes the maintenance of a replication management list.

8.1.1.2.1 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, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

"Saving a database" in "ETERNUS SF AdvancedCopy Manager Operator's Guide"



Point

Operation information for replication management is saved in a repository.

It is recommended that a replication management list be backed up when operation information for replication management is changed with the replication volume information setting command (`swsrpsetvol`) or with the replication volume information deletion command (`swsrpdelvol`).

8.1.1.2.2 Restoring a replication management list

Perform the following steps to restore a replication management list:

1. Restore the repository to the Storage Management Server. For information about restoring a repository, refer to "Recovering a database" in "ETERNUS SF AdvancedCopy Manager Operator's Guide" version that is applicable to the OS of the Storage Management Server. Specify 0 for 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, refer to "Resource adjustment command."



Point

When the procedure above is performed, operation information for replication management of a repository is copied to a Storage Server, where it is available for use.

When the operation information for replication management in the repository does not need to be changed and only the operation information for replication management on the Storage Server is incorrect for some reason, perform the procedure above.

8.1.1.2.3 Preserving the volume configuration information

AIX AdvancedCopy Manager uses source and replica volumes as volume groups. If LVM volume management information is lost, correct operations cannot be achieved. When a volume group is created, it is recommended volume configuration information be backed up using the `savevg` command in preparation for a system crash. For information on the `savevg` command, refer to the AIX manuals.

8.1.1.3 Maintaining a database

For information about maintaining a database used by a Storage Management Server, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

"Maintaining a database" in "ETERNUS SF AdvancedCopy Manager Operator's Guide"

8.1.1.4 Maintaining an authentication management list

For information about maintaining an authentication management, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

"Maintaining an authentication management list" in "ETERNUS SF AdvancedCopy Manager Operator's Guide"

8.1.1.5 Maintaining a registry

This section describes how to maintain a registry. Perform this procedure on a Storage Management Server or a Storage Server.

8.1.1.5.1 Backing up a registry

Back up the following files 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/Logic node name/swnode.ini
```

b. Example

Save it in the `/backup` directory.

```
# cp /etc/opt/swstorage/swnode.ini /backup
```

Capacity of backup data of registry

Confirm the size of the file backed up.

8.1.1.5.2 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/Logic node name/swnode.ini
```

b. Example

Restore the following file saved in the /backup directory:

```
# cp /backup/swnode.ini /etc/opt/swstorage
```

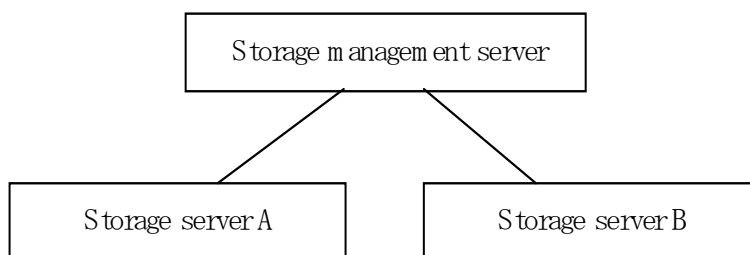
8.1.2 Making a package backup of databases

This section describes the function for making a backup of management information (e.g., databases) for AdvancedCopy Manager from just one Storage Server, Storage Management Server, or tape server.

With a package backup of management information, you can make a backup of management information for all Storage Servers, Storage Management Servers, and tape servers from just one Storage Server, Storage Management Server, or tape server. Executing a package backup of management information runs backup commands (making backups of backup management resources and databases) for the databases of other Storage Servers, Storage Management Servers, and tape servers, and collects the backup data and management information created by these backup commands.

The servers on which you can execute a package backup of management information are called the package-backup-of-the-management-information execution servers. The servers whose data is to be backed up are called the package-backup-of-the-management-information target servers.

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 that is handled in a package backup of management information.

Table: Type of Management Information for backup by Management Information Package Backup

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 information	Policy file
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 in this case, back up each management information component individually as described in "Maintaining a database" in the operator's guide applicable to the Storage Server.

8.1.2.1 Preliminaries

Before creating 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 information on the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" applicable to 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” applicable to 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 information on the backup data size, refer to “Maintaining a database” in the “ETERNUS SF AdvancedCopy Manager Operator’ s Guide” applicable to 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:
 - 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
 - Size 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

For information on the size of each component of backup data, refer to “Maintaining a database” in the “ETERNUS SF AdvancedCopy Manager Operator’ s Guide” applicable to the operating system running on the management information package backup target server.
 - 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, refer to “Maintaining Databases” in the “ETERNUS SF AdvancedCopy Manager Operator’ s Guide for Tape Backup Option” .
4. Check the size of the working 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 created. 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" applicable to 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" applicable to 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 (the 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" applicable to the operating system running on the management information package backup target server.
 - The size required for tape management information is 2.2 times the size of the backup of tape management information.
For details on the size of tape management information, refer to "Maintaining Databases" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".
 - The working 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: Policy file

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	Cluster	/etc/opt/FJSVswstf/<logical-node-name >/stgmgrinfo_policy.ini
Linux		
AIX		



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 corresponding management information package backup target servers. In addition, for database backups, backup management (ie, 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 save the backup data in an archive file.

Table: Contents of settings for policy file

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape Server
Server name	DBData	Specifies whether to create a backup of the database. Yes: Create a backup of the database. No: Do not create backup of the database. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	A	C	C
	AuthData	Specifies whether to create a backup of the authentication feature. Yes: Create a backup of the authentication feature. No: Do not create backup of the authentication feature. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	A	C	C
	BkupData	Specifies whether to create a backup of the backup management. Yes: Create a backup of the backup management. No: Do not create backup of the backup management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "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 create a backup of the replication management. Yes: Create a backup of replication management. No: Do not create backup of replication management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	B	B	C
	TapeData	Specifies whether to create a backup of tape backup management information. Yes: Create a backup of tape backup management information. No: Do not create a backup of tape backup management information. Note that failing to specify "Yes" with the correct capitalization ("Y" in uppercase and "es" in lowercase) or failing to specify the key implicitly sets the value to "No."	C	C	B

A: Specifiable

B: Specifiable only when the applicable function is operating on the server

C: Unspecifiable

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 named 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.

8.1.2.2 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 and data types

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 in accordance with with data backup timing to create 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 create a backup of the policy file.

Normal-use operations

The operations under normal use are as follows:

3. 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 a server is 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 Storage Server that has been added.
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 a server is 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 a server name is 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 with 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 create 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 create a backup of the policy file.

8.1.2.3 Restore operations

This section describes how to use the backup data created by the 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 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 registry backup to the following directory:
directory-determined-in-step1/<server-whose-registry-to-be-restored>/RegiData
3. Transfer the registry backup that was 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" applicable to 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:
directory-determined-in-step1/< storage-management-server-name>/RegiData
3. Transfer the backup of the database that was 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. 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" applicable to 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 (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 authentication management list to the following directory:
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. 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, who is the owner.

5. 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" applicable to 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 this 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:
directory-determined-in-step1/<server-whose-list/file-to-be-restored>/BkupData/FJ
SVswsts
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. 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" applicable to 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 the backup management pre-processing/post-processing scripts and tape-copy pre-processing/post-processing scripts

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 this server, copy the backups of the backup management pre-processing/post-processing scripts and tape-copy pre-processing/post-processing scripts to the following directory:
directory-determined-in-step1/<server-whose-scripts-to-be-restored>/BkupData/Scripts
3. Transfer the backups of the backup management pre-processing/post-processing scripts and tape-copy pre-processing/post-processing scripts copied in step 2 to the target server in binary mode.
4. Transfer the backups of the backup management pre-processing/post-processing scripts and tape-copy 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" applicable to the operating system running on the target server.

5. 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, who is the owner.

Restoring locking specification files for backup 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 this server, copy the backups of the locking specification files for backup management to the following directory:
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" .

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 this server, copy the backups of the pre-processing and post-processing scripts for replication management to the following directory:
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. To find this directory, refer to "Pre-processing and post-processing of replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" applicable to the operating system running on the target server.
5. 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 this server, copy the backups of the locking specification files for replication management to the following directory:
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".

Restoring a policy file for management information package backup

1. Execute the management information package backup server registration/deletion command (stgmgrinfo~~set~~) on the management information package backup execution server to determine which directory contains the backup data.
2. On this server, copy the policy file located in the following directory to the policy file for the management information package backup command:
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 "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~~set~~) to check the directory that contains the backup data.
2. On this server, copy the backup data of the tape management information from the directory indicated below:
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. 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, refer to "Restoring the tape management information" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for the Tape Backup Option".

8.2 Troubleshooting

8.2.1 Troubleshooting for insufficient free space in a repository

For information about what to do if there is insufficient free space in a repository used by a Storage Management Server, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

"Troubleshooting for insufficient free space in a repository" in "ETERNUS SF AdvancedCopy Manager Operator's Guide"

8.2.2 Collecting maintenance information

8.2.2.1 Collecting information using a Web GUI

Collect information as follows:

1. Start the Java Plug-in control panel
Select [Settings] - [Control Panel] - [Java Plug-in].
2. Create the 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 GUI of AdvancedCopy Manager.
4. The Java console will be started and a message will be displayed. Save the message to a file, and then attach the file to your report.

8.2.2.2 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: Fault investigation data used when fault occurred in the 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 (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. Therefore, 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: Fault investigation data used when fault occurred in the 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	Replication management list	Get the files under the following directory: /etc/opt/FJSVswsrp (Note)
Common information	Get the files under the following directory: /var/opt/FJSVswstf (Note)	Get the files under the following directory: /var/opt/FJSVswtf (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. Therefore, 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
```

8.2.3 Troubleshooting for a failure in accessing a repository database

For information about how to find the cause of a failure in accessing a repository database and the steps to take when this occurs, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

“Troubleshooting for a failure in accessing a repository database” in “ETERNUS SF AdvancedCopy Manager Operator’s Guide”

8.3 Troubleshooting for a hardware error, etc. occurring during backup

This section describes what to do for a hardware error, etc. occurring during a backup using AdvancedCopy Manager.

8.3.1 Overview

If a hardware error occurs during backup, the following symptoms may be displayed:

- The backup execution status display command (swstbackstat) displays "failed" in the Status column.
- The synchronous backup 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 processing has failed.

If swst0634, swst0719, or swst0740 is output 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 displayed:

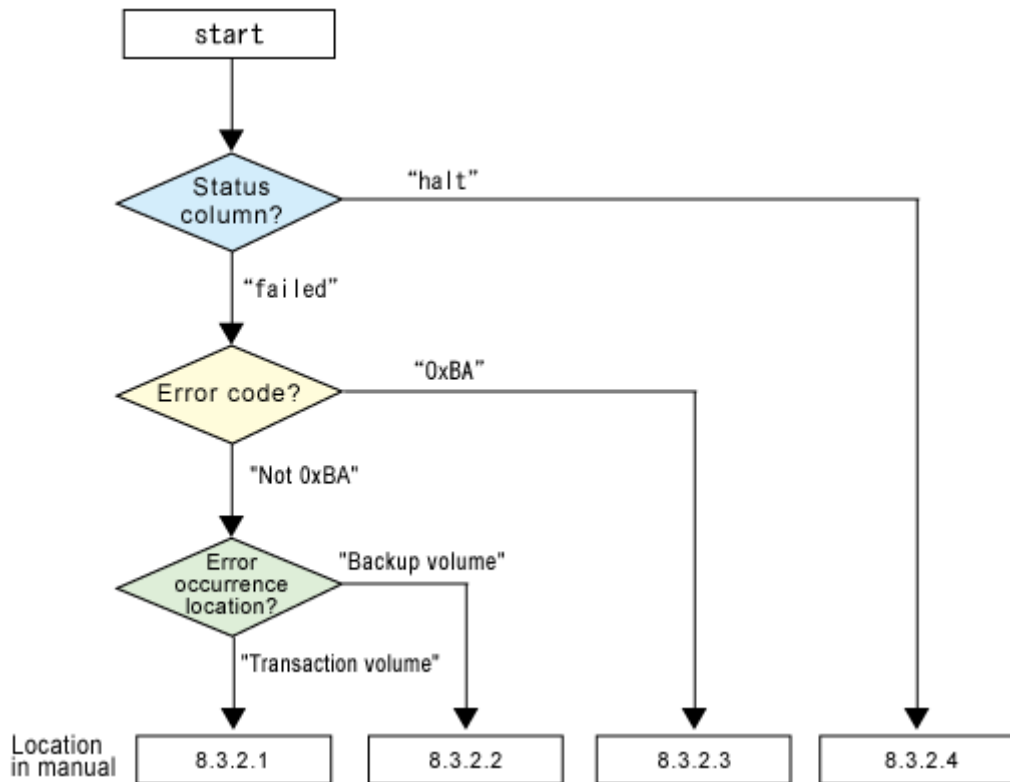
- The backup execution status display command (swstbackstat) displays "halt" in the Status column.
- The synchronous backup status display command (swstsyncstat) displays "halt" in the Status column.
- The restoration execution status display command (swstreststat) displays "halt" in the Status column.
- 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 processing 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, remove the cause of the error, then re-execute the processing.

8.3.2 Troubleshooting

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



Note

- Refer to "Overview" for details of the "status column" and "error occurrence 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	<p>If a) or b) below applies, a bad sector was created in the transaction volume.</p> <p>a) QuickOPC has not yet performed physical copying and tracking is in progress</p> <p>b) EC/REC is in the suspend status (replication established status)</p> <p>Note:</p> <p>If a bad sector is created in a transaction volume when a) or b) applies, the disk array device 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.</p>
Other than 0xBA	An error other than the above occurred.

Error code 0xBA is returned only for the following disk array devices:

- ETERNUS4000/ETERNUS8000 (firmware version V11L30-0000 or later)
- ETERNUS6000 (firmware version V31L40-0000 or later)

For disk array devices 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.)

8.3.2.1 Troubleshooting for a hardware error, etc. on a transaction volume

When a hardware fault occurs in a transaction volume, perform the following to repair the fault.

1. If an error occurred during physical copying, cancel the processing in which the error occurred, using one of the following commands:
 - 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. Fix the hardware error in the transaction volume.
4. Execute the restoration execution command (swstrestore) to restore the transaction volume.



Note

- The backup history information for which a copy process failed cannot be used to restore the volume.

If there is no normal (status = "succeeded") backup history information, the volume cannot be restored.

8.3.2.2 Troubleshooting for a hardware error, etc. on a backup volume

When a hardware fault occurs in backup volume, perform the following to repair the fault:

1. Cancel the processing in which the error occurred, using one of the following commands:
 - 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 processing cannot be canceled using the command, use ETERNUSmgr/ "GRmgr" to cancel it.
3. Execute the resource match command (swstsrsemch)
4. Cancel the processing in which the error occurred. At this point, the execution status display commands (swstbackstat, swstreststat) and history information display command (swsthistdisp) will display "succeeded" in the Status column. However, because the copy processing is suspended, ensure that the commands are cancelled. 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 information setting command (swstdevinfofet) to delete the backup volume in which the error occurred.
7. Use the device information setting command (swstdevinfofet) to register a new backup volume. If the backup 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 backup volume.
8. Re-execute the processing in which the error occurred.

8.3.2.3 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): History information deletion command (swsthistdel)
 - If the bad sector occurred during QuickOPC tracking: Restore cancellation command (swstcancelrest)
2. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat) and the history information display command (swsthistdisp) 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 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.)



The transaction volume cannot be restored if there is no backup history information.

8.3.2.4 Troubleshooting for an error (halt) on a remote copy processing

1. Fix the hardware error.
2. Re-execute the suspended copy processing.

8.4 Troubleshooting for a Hardware Error or Other Error Occurring during Replication

This section describes the corrective action to take when a hardware or other type of error occurs during AdvancedCopy Manager replication.

8.4.1 Overview

If a hardware error occurs during a replication, the following symptoms are displayed:

- The operation status display command (swsrpstat) displays "failed" or "?????" in the Status column.
- Code swsrp2606 is output 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 displayed:

- The operation status display command (swsrpstat) displays "halt" in the Status column.
- Code swsrp2648 is displayed during command execution.

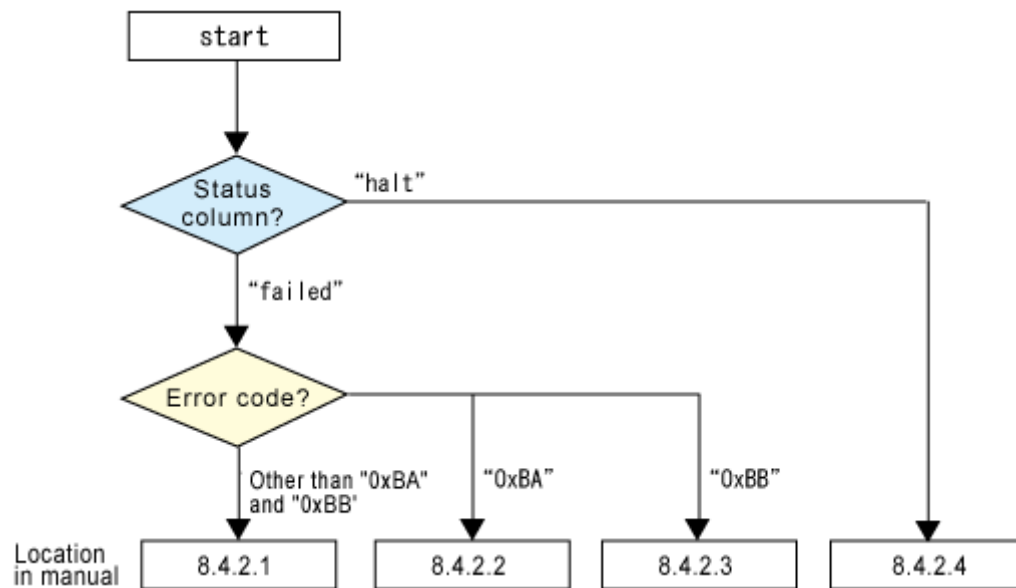
If the operation status display command displays "halt" in the Status column, and swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy processing has failed.

If any of these symptoms are generated, a hardware error may have occurred in the source or replica volume. Check the hardware status, and if a hardware error is found, fix the cause of the error and re-execute the command.

8.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure: Troubleshooting flow when a hardware or similar fault occurs



Note

1. 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 the error codes:
 - The operation status display command (swsrpstat) with the "-0" option.
ETERNUSmgr
 1. On the [Display status] menu, click [AdvancedCopy status display] in the status display.
 2. At [Session status], click the "Number of active sessions" link for the relevant copy type.
 3. Refer to the value in the "Error code" column of the relevant copy process.

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 device 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 transaction 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 devices:

- ETERNUS4000/ETERNUS8000 (firmware version V11L30-0000 or later)
- ETERNUS6000 (firmware version V31L40-0000 or later)

For disk array devices 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.
Events indicated by 0xBB	Use ETERNUSmgr to check the capacity already used on the Snap Data Volume in order to identify whether or not a physical capacity shortage has occurred. <ul style="list-style-type: none"> ● On the [Display status] menu, click [Volume list] in the status display. ● Click the Snap Data Volume 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".

8.4.2.1 Troubleshooting for a hardware error on a replication volume

When a hardware error occurs in a duplicate volume, repair the problem according to the following procedures:

1. Use the operation cancel command (swsrpcancel) to cancel the processing in which the error occurred. If the processing cannot be canceled from the operational server when inter-server replication is performed, cancel it from a non-operational server.

2. If the processing cannot be canceled 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 have occurred.
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-execute the processing in which the error occurred.

8.4.2.2 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.)

8.4.2.3 Troubleshooting when a Snap Data Volume or Snap Data Pool capacity shortage occurs

Shortages in capacity for a Snap Data Volume occur when a Snap Data Pool is not used and shortages can also occur for Snap Data Pools.

The recovery methods for capacity shortages with a Snap Data Volume or Snap Data Pool are described below.

Recovery method for Snap Data Volume capacity shortages

The recovery method for a capacity shortage in a Snap Data Volume is described below.

- Use the replication cancellation command (swsrpcancel) to cancel the job with the error.
- 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 for a Snap Data Volume:

- c. An inaccurate estimate of the space needed was made for the Snap Data Volume
- d. The estimation was adequate however more updates than were expected took place when there were no SnapOPC/SnapOPC+ sessions running and the space was taken up.

Check the status of the volume and determine the space being used with the Snap Data Volume operation/reference command (swstsdv) and the "stat" subcommand.

If insufficient capacity has been allocated for the volume, as in the first case above, re-calculate the capacity and then re-create the Snap Data Volume.

If the capacity is correct, as in the second case above, use ETERNUSmgr or the Snap Data Volume operation/reference command (swstsdv) with the "init" subcommand to initialize the volume.

Note that, after re-creating or initializing the Snap Data Volume, disk partitions (slices) must be re-created.

Recovery method for Snap Data Pool capacity shortages

The recovery method for a capacity shortage in a Snap Data Pool is described below.

- Use the replication cancellation command (swsrpcancel) to cancel the job with the error.
- 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 for a Snap Data Pool:

- a. An inaccurate estimate of the space needed was made for the Snap Data Pool
- b. The estimation was adequate however more updates than were expected took place on the Snap Data Volume when there were no SnapOPC/SnapOPC+ sessions running and the space was taken up.

Check the status of the pool and determine the space being used with the Snap Data Volume operation/reference command (swstsdv) with the "poolstat" subcommand.

If insufficient capacity has been allocated for the pool, as in the first case above, re-calculate the capacity and then re-create the Snap Data Pool.

If the capacity is correct, as in the second case above, use ETERNUSmgr or the Snap Data Volume operation/reference command (swstsdv) with the "init" subcommand to initialize the volume.

Note that, after re-creating or initializing the Snap Data Volume, disk partitions (slices) must be re-created.

8.4.2.4 Troubleshooting for an error (halt) on a remote copy processing

The REC restart (Resume) method differs for different REC Recovery modes.

[For Automatic Recovery mode]

1. Remove the cause that made all paths close (halt).
2. The ETERNUS disk array will automatically restart (Resume) REC.

[For Manual Recovery mode]

1. Remove the cause that made all paths close (halt).
2. Use the Replication creation command (swsrpmake) to forcibly suspend the REC halt status.

```
[For volume units]
swsrpmake -j <replication source volume name > <replication destination volume name
>
[For group units]
swsrpmake -j -Xgroup <group name>
```

3. Use the Replication start command (swsrpstartsync) to restart (Resume) the REC. (The -t option must be specified if REC is being restarted after a forcible suspend.)

```
[For volume units]
swsrpstartsync -t <replication source volume name> <replication destination volume
name>
[For group units]
swsrpstartsync -t -Xgroup <group name>
```

8.5 Changing the Operating Environment

Change operations performed by a server information package make changes to 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 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 commands or replication management commands at the Storage Management Server that executes the server information change command (stgxfwcmmodsrv) or at any Storage Servers managed by Storage Management Server transactions either before or during execution of the server information change command (stgxfwcmmodsrv).

If these commands are executed, commands may terminate abnormally. If the server information change command (stgxfwcmmodsrv) terminates abnormally, perform recovery by taking the action indicated in the error message. If backup management or replication management commands are accidentally executed before or during execution of the server information change command, and if the backup management or replication management commands terminated abnormally, wait until the server information change command terminates normally, then re-execute the backup management or replication management commands.

8.5.1 Changing the IP address of a Storage Management Server

For information about changing the IP address of a Storage Management Server, refer to the version of the following manual that is applicable to the OS of the Storage Management Server: "Changing the IP address of a Storage Management Server" in "ETERNUS SF AdvancedCopy Manager Operator's Guide"

8.5.2 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 the Storage Server 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 offer 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 (stgxfwcmmodsrv) with the -f option specified to change the IP address.

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 on performing the change when using cluster operation, refer to "Changing the IP address of a Storage Server transaction".

8.5.3 Changing the port number of a Storage Management Server or Storage Server

For information concerning changing the port number of a Storage Management Server, refer to "Changing the port number of a Storage Management Server or Storage Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" version that is applicable to the OS of the Storage Management Server.

Change the port number of a Storage Server as follows:

1. When copy source/copy destination volumes are defined in the storage management server or in the storage server using replication management function, volume settings for copy source/copy destination must be deleted. For how to delete the settings of copy source/copy destination, refer to "Copy source/Copy destination volume deletion."
2. On the target Storage Server, change the port number of the communications daemon (stgxfws).
3. On the target Storage Server, start the daemons of AdvancedCopy Manager. For more information on starting a daemon, refer to "Starting and Stopping 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)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" applicable to the OS running the Storage Management Server for details of the server information change command.
5. When using replication management function, a replication management environment must be reconstructed. The work after "copy source volume/copy destination volume settings" must be implemented.



Note

For information on performing the change when using cluster operation, refer to "Changing the port number of a Storage Server transaction".

8.5.4 Changing the server name of a Storage Management Server or Storage Server

For information about changing the server name of a Storage Management Server, refer to the version of the following manual that is applicable to the OS of the Storage Management Server: "Changing the server name of a Storage Management Server or Storage Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide"

Change the server name of a 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 with the "-f" option specified (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" relevant to the OS running 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).



Note

For information about performing this change when using cluster operation, refer to "Changing the server name of a Storage Server transaction".

8.5.5 Changing the device configuration

Changing the device configuration refers to any of the following:

- Mount name change
- Change from File System operation to RawDevice operation
- Capacity change of partitions (mainly for the re-creation of LUN mapping)
- Start position for change of partitions (mainly for the re-creation of LUN mapping)

8.5.5.1 Backup management

Change the device configuration by using the following procedure. This processing is executed for all volumes on the disk containing the volume whose device configuration is to be changed.

1. Check whether there is a transaction volume on the target disk that needs to be backed up. If there is, delete the transaction volume. For more information on deleting a transaction volume, refer to "Deleting a transaction volume".
2. Check whether a backup volume exists in the target disk. If it does, delete the backup volume. For more information on deleting a backup volume, refer to "[Deleting a backup volume](#)".
3. Change the device configuration.

4. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing. Refer to "Fetching device information on a Storage Server" for details on changing the device information.
5. Reset the deleted transaction volume or backup volume in the backup. Refer to "Setting the operation type for a device," for details on adding the transaction volume or backup volume.



Point

When the device configuration is changed (step 3) before attempting to delete a transaction volume or backup volume (steps 1 and 2), the transaction volume or backup volume sometimes cannot be deleted because the pertinent history information cannot be deleted or backup synchronization cannot be canceled. If this problem occurs, delete the history information or cancel backup synchronization in emergency operation mode.

For details on emergency operation mode, refer to the descriptions in "History information deletion command (swsthistdel)" and "Backup synchronous processing cancel command (swstcancelsync)".

8.5.5.2 Replication management

Change the device configuration as shown below. This processing applies to all the volumes on a disk whose device configuration is to be changed.

1. Check whether there are any replication volumes on the target disk. If there are, delete them. For information about this, see "Deleting a source volume or replica volume."
2. Change the device configuration.
3. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing. Refer to "Fetching device information from a Storage Server," for details about changing the device information.
4. Reset a deleted replica volume in the replication. Refer to "Setting the source volume and replica volume," for details about adding the replica volume.



Point

If the device configuration (in step 2 above) is changed before the replication volumes are deleted (step 1), the replication volumes sometimes cannot be deleted because replication cannot be canceled. If this problem occurs, delete the replicated volume in emergency operation mode.

For details on emergency operation mode, refer to the description in "Replication volume information deletion command (swsrpdelv)." ."

8.5.6 Changing the IP address for GUI connection of a Storage Management Server

For information about changing the server name of a Storage Management Server, refer to the version of the following manual that is applicable to the OS of the Storage Management Server: "Changing the IP address for GUI connection of a Storage Management Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide"

8.5.7 Change of password or deletion of the repository access user

For information about this, refer to the version of the following manual that is applicable to the OS of the Storage Management Server:

“Change of password or deletion of the repository access user” in the “ETERNUS SF AdvancedCopy Manager Operator’s Guide”

8.5.8 Changing the employment environment in cluster employment

This section describes how to make a change to the operational configuration in cluster operation.

8.5.8.1 Changing the IP address of a Storage Server transaction

Change the IP address of a Storage Server transaction by performing 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 Server transaction.
For details on how to stop it, refer to the relevant cluster software manual.
3. Change the IP address resource.
For details on how to change an IP address resource, refer to the relevant cluster software manual.
4. Start the Storage Server transaction.
For details on how to start it up, refer to the relevant cluster software manual.
5. Create a server information change instruction file on 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)” in the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” relevant to the OS running the Storage Management Server for details of 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

The IP address displayed by the cluster setup command when executed to delete the cluster environment of the Storage Server transaction is not the IP address newly specified, but the IP address specified by the cluster setup command.

8.5.8.2 Changing the port number of a Storage Server transaction

Change the port number of a Storage Server transaction by performing 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 target Storage Server transaction.
For details on how to stop it, refer to the relevant cluster software manual.
3. On the primary node and secondary node, change the port number of the transaction-intended communication daemon (stgxfws_<logical node name>) specified in /etc/services.
4. Start the target Storage Server transaction.
For details on how to start it, refer to the relevant cluster software manual.
5. Create a server information change instruction file on 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 port number. Refer to "Server information change command (stgxfwcmmodesrv)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS running the Storage Management Server for details of 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).

8.5.8.3 Changing the server name of a Storage Server transaction

Change the server name of a Storage Server transaction by performing 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 on the Storage Management Server that manages the Storage Server transactions.
3. Execute the server information change command with the "-f" option specified (specify the created file) to change the server name. Refer to "Server information change command (stgxfwcmmodesrv)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS running 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).

8.5.8.4 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, refer to the relevant cluster software manual.

2. Delete the configuration of the Storage Server transaction.

When using the backup management function, delete the transaction volume and backup volume. For details of how to do this, refer to "Deleting a device".

When it is defined as a source or replica volume by using the replication control function, delete the source/replica volume setting. For details of how to do this, refer to "Deleting a source volume or replica volume".

3. Save the AdvancedCopy Manager data.

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 server that executes 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 about the policy file path, refer to "Preliminaries".

4. 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.
5. Delete the cluster environment of the target transaction.

For details on how to delete a cluster environment, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a cluster environment".



Note

- Do not perform the following operation in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

- Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for AIX"
- Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for AIX"

6. Create the cluster environment of the target transaction.

For details on how to create a cluster environment, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a 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:

- Step 18 in "Details of the steps for customization" on MC/ServiceGuard for AIX
 - Step 18 in "Details of the steps for customization" on VERITAS Cluster Server for AIX
7. Start the target transaction.
For details on how to start it up, refer to the relevant cluster software manual.
 8. Restore the AdvancedCopy Manager data.
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 about the policy file path, refer to "Preliminaries".
 9. Change the server name.
For a Storage Server transaction, perform the procedure in "Changing the server name of a Storage Server transaction".
 10. To use the backup management or replication control function, rebuild the backup management or replication control environment. (Perform the "Setting the environment for a backup operation server" task and subsequent tasks.)
 11. 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 (stgmgrinfo~~set~~) to register the server.

8.5.8.5 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 transaction is not operating, start the Storage Management Server transaction or Storage Server transaction.
For details about how to start it, refer to the relevant cluster software manual.
2. Save the AdvancedCopy Manager data.
In the Storage Server transaction or Storage Management Server transaction that also functions as a 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.
 - Backup management list
Make a backup of the backup management list.
For details about how to make a backup of a backup management list, refer to "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 server that executes 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 about the policy file path, refer to "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 operating the transaction.
4. Delete the cluster environment of the target transaction.
For details about how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a cluster environment".



Note

- Do not perform the following operation in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a cluster environment":
 - Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for AIX"
 - Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for AIX"
5. On the cluster system, change the name of the userApplication.
For details on how to change do this, refer to the relevant cluster software manual.
 6. Create the cluster environment of the target transaction.
For details on how to do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a 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.
 - Step 18 in "Details of the steps for customization" on MC/ServiceGuard for AIX
 - Step 18 in "Details of the steps for customization" on VERITAS Cluster Server for AIX
 - 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, refer to the relevant cluster software manual.
 8. Restore the AdvancedCopy Manager data.
 - a) In the Storage Server transaction or Storage Management Server transaction that also functions as a 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`.
 - Backup management list
Restore the backup management list.
For details on how to do this, refer to "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 this command, refer to "Resource adjustment command (swsrprecoverres)".
 - b) 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 about the policy file path, refer to "Preliminaries".
9. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the Management information package backup server registration/deletion command (stgmgrinforeset) to register the server.

8.5.8.6 Changing a shared disk for shared data

Change a shared disk that is used for AdvancedCopy Manager shared data (e. g., the name of the 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, refer to the relevant cluster software manual.
2. Save the AdvancedCopy Manager data.
In the Storage Server transaction or Storage Management Server transaction that also functions as a 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.
 - Backup management list
Make a backup of the backup management list.
For details about how to do this, refer to "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 about the policy file path, refer to "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 operating the transaction.
4. Delete the cluster environment of the target transaction.
For details about how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a cluster environment".



Note

- Do not perform the following operation in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a cluster environment".
 - Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for AIX"

- Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for AIX"
5. Create the cluster environment of the target transaction.
For details about how to do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for a 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.
 - Step 18 in "Details of the steps for customization" on MC/ServiceGuard for AIX
 - Step 18 in "Details of the steps for customization" on VERITAS Cluster Server for AIX
6. Start the target transaction.
For details on how to start it, refer to the relevant cluster software manual.
7. Restore the AdvancedCopy Manager data.
- a) In the Storage Server transaction or Storage Management Server transaction that also functions as a 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`.
 - Backup management list
Restore the backup management list.
For details about how to do this, refer to "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 about this, refer to "Resource adjustment command (`swsrprecoverres`)".
 - b) 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 about the policy file path, refer to "Preliminaries".
8. For the `package-backup-of-the-management-information` execution server of AdvancedCopy Manager, execute the management information backup server registration/deletion command (`stgmgrinfo`) to register the server.

Chapter 9 Commands

This chapter provides information on using commands.

9.1 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	swstdevinfo	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.

Function	Command name	Explanation
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 status of tracking processing.

Maintenance commands

Table: Backup management maintenance command list

Function	Command name	Explanation
Resource adjustment command	swstsrsemctch	Recovers the consistency of information in a backup management file.
Resource backup command	swstresback	Backs up backup management files
Resource restore command	swstresrst	Restores backup management files

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	stguserset	This command is executed from the Storage Management Server.
GUI connection information setting command	stgguiipset	This command is executed from the Storage Management Server.
Server information addition command	stgxfwcmaddsrv	This command is executed from the Storage Management Server.
Server information change command	stgxfwcmmodsrv	This command is executed from the Storage Management Server.
Server information deletion command	stgxfwcmdelsrv	This command is executed from the Storage Management Server.
Device information fetch/reflect command	stgxfwcmsetdev	This command is executed from the Storage Management Server.
Device information deletion command	stgxfwcmdeldev	This command is executed from the Storage Management Server.
Server information display command	stgxfwcmdispsrv	This command is executed from the Storage Management Server.
Device information display command	stgxfwcmdispdev	This command is executed from the Storage Management Server.

Function	Command name	Explanation
Partition information display command	stgxfwcmdisppat	This command is executed from the Storage Management Server.
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 batch 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 batch backup command

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	swsrpchsync	Changes the operation mode of inter-box synchronization.

Function	Command name	Explanation
Synchronous processing reverse command	swsrprevsync	Reverses the copying direction of synchronization in suspended 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/stop commands

Table: Daemon start/stop command list

Function	Command name	Explanation
Communication daemon start and stop	stgfwcom	Starts and stops communication daemons
AdvancedCopy Manager daemon start and stop	startacm stopacm	Starts and stops AdvancedCopy Manager

SnapOPC/SnapOPC+ support commands

Table: SnapOPC/SnapOPC+ command list

Function	Command name	Explanation
Update size measurement command	swstestupdate	Uses the pseudo-SnapOPC session setting function to measure the physical size of a Snap Data Volume
<u>Snap Data Volume operation/reference command</u>	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.

9.2 Backup Management Commands

This section describes operations using backup management commands. These commands can only be executed by the root user.



Note

If other users attempt to execute backup management commands, the message "swst0601 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 operating environment requirements for different commands.

Table: Operating environment required for command execution

Command	Operating environment of AdvancedCopy Manager
swstbackstat	The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations: <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.
swstbkpoldel	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	The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations: <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	<p>The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations:</p> <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstdevinfo	<p>To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be operating.</p> <p>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.</p>
swstexecstat	<p>The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations:</p> <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swsthistdel	<p>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.</p>
swsthistdisp	<p>The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations:</p> <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstresback	-
swstresrst	<p>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.</p> <p>When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating.</p> <p>To execute this command with the -x option specified, the daemons and services of the Storage Management Server must be operating.</p>
swstrestore	<p>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.</p>
swstreststat	<p>The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations:</p> <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstrsemth	<p>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.</p> <p>When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating.</p> <p>To execute this command with the -x option specified, the daemons and services of the Storage Management Server must be operating.</p>
swststartsync	<p>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.</p> <p>When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating.</p>

Command	Operating environment of AdvancedCopy Manager
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.
swstsyncstat	The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command on a Storage Management Server with either of the following parameter designations: <ul style="list-style-type: none"> ● -h option specified, or ● No device name specified
swstrkrstat	When this command is executed on the Storage Management Server in either of the following formats, 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 the 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, notes whether environment variables must be configured, and specifies the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table: Commands for cluster operation

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	

Command	Environment variable	Command execution node	Remarks
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	
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 their 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 specified	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 displayed.

-h option	Device name specified	Displayed content
	Yes	The information of only the specified device in the Storage Server specified in the -h option is displayed.

9.2.1 Environment definition commands

This section describes environment definition commands for backup management.

9.2.1.1 Storage Server configuration information setting command (swstsvrset)

This command sets configuration information of a Storage Server. Execute this command to declare that this Storage Server is subject to the backup operation.

a. Format

```
[To be executed on a Storage Server]

# /opt/FJVSswsts/bin/swstsvrset

[To be executed on a Storage Management Server]

# /opt/FJVSswsts/bin/swstsvrset [-h Server]
```

b. Description of options

Option	Description
-h	Specifies the name of the 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. Example

Set the configuration information for a Storage Server.

```
# /opt/FJVSswsts/bin/swstsvrset
swstsvrset completed
#
```

Set the configuration information for a Storage Server (job1) from a Storage Management Server.

```
# /opt/FJVSswsts/bin/swstsvrset -h job1
swstsvrset completed
#
```



Note

This command can not be executed if any of the following commands are running.

- Storage Server configuration information setting command (swstsvrset)
- Backup policy setting 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)
- Device information setting command (swstdevinfofet)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)
- Resource match command (swstsrsemch)

9.2.1.2 Storage Server configuration information display command (swstsvrdisp)

This command displays configuration information for a Storage Server, which has been set using the Storage Server configuration information setting command (swstsvrset).

a. Format

```
[To be executed on a Storage Server]

# /opt/FJVSswsts/bin/swstsvrdisp

[To be executed on a Storage Management Server]

# /opt/FJVSswsts/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. Example

Display the configuration information of a Storage Server (job1).

```
# /opt/FJSVswsts/bin/swstsvrdisp
Storage-Server = job1
#
```

The following information will be displayed:

Title	Description
Storage-Server	Displays a Storage Server name.

9.2.1.3 Device information setting command (swstdevinfofet)

Set a volume that has been allocated to the disk array unit Fujitsu ETERNUS storage system, as a transaction or backup volume.

A transaction volume refers to a volume that stores working data to be backed up.

A backup volume refers to a volume used to store a backup of this transaction data.

a. Format

```
[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 transaction 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.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

Register a device (/dev/vg01) as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoaset -t /dev/vg01
swstdevinfoaset completed
#
```

Register a device (/dev/vg02) as a backup volume.

```
# /opt/FJSVswsts/bin/swstdevinfoaset -b /dev/vg02
swstdevinfoaset completed
#
```

Deregister a device (/dev/vg04) that has been registered as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoaset -o /dev/vg04
swstdevinfoaset 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.



Note

A device cannot 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 set up is already mounted. However, when setting a volume group as backup volume, the check of whether the logical volume in a volume group is mounted is not carried out. If you set a volume group as a backup volume, unmount the logical volume beforehand.
- The device to be set up is registered as a replication destination volume of replication management.
- The device to be set up is registered as a replication source volume of the duplicate volume information in which bidirectional copy is possible in replication management.



Note

If using a volume group as a transaction volume:

- Do not register two or more physical disks into one volume group.
- Create a logical disk so that it does not consist of two or more physical disks.



Note

If using a volume group as a backup volume:

- Do not register two or more physical disks into one volume group.
- Create a logical disk so that it does not consist of two or more physical disks.
- The backup volume must be the same physical size as the transaction volume. In addition, the backup volume's logical disk must be in a different volume group to the transaction volume but it must have the same configuration as the transaction volume.



Note

You must delete related backup history information before:

- Changing a backup volume to a transaction volume
- Canceling the setting 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 setting of a transaction volume



Note

In order to make a configuration change to a transaction volume or a backup volume, delete the setting, then re-register.



Note

The following changes are not possible unless the related synchronous processing (EC session) is cancelled:

- Changing a setting of a suspended transaction volume
- Changing a setting of a suspended backup volume



Note

To perform the following changes, the related tracking processing (OPC session) must be cancelled in advance:

- Changing the settings of a transaction volume in tracking processing
- Changing the settings of a backup volume in tracking processing



Note

This command can only be executed if none of the following commands is running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Backup policy setting 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 (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.1.4 Device usage status display command (swstdevdisp)

This command displays information about a transaction or backup volume or any other definable device, which has been set using the device information setting command (swstdevinfo).

a. Format

```
[To be executed on a Storage Server]

# /opt/FJJSwsts/bin/swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]

[To be executed on a Storage Management Server]

# /opt/FJJSwsts/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 transaction 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	Specifies a device name. Displays device information on all the transaction volumes if this operand and the associated options are omitted.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

To display the usage statuses of the registered devices:

```
# /opt/FJSVswsts/bin/swstdevdisp -t -b
Server Device          Size          Device-Mode  Mount-Point (Method)
Backup-Engine
job2 /dev/vg00          1.0 Gbyte Transaction  ---- (----)
AdvancedCopy
job2 /dev/vg01          2.0 Gbyte Transaction  ---- (----)
AdvancedCopy
job2 /dev/vg02          1.0 Gbyte Backup (used) ---- (----)          AdvancedCopy
job2 /dev/vg03          1.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
job2 /dev/vg04          2.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
job2 /dev/vg05          1.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
:
#
```

The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Device	Displays an AdvancedCopy Manager device name.
Size	Displays the size of a partition allocated to a device. In the case of a volume group, the display also shows the size of the physical disk on which a logical disk is defined.
Device-Mode	Displays text by which a device can be identified: <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 transaction or backup volume. 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. 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.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses. However, AIX does not display mount points. Therefore, "---- (----)" is always displayed.
Backup-Engine	Displays the operation type. <ul style="list-style-type: none"> ● "AdvancedCopy": Backup operation using AdvancedCopy Manager



Note

This command cannot display volume sizes to the byte. Refer to the notes under "Setting the device usage type" for details of how to display and check sizes in bytes.

9.2.1.5 Backup policy setting command (swstbkpolset)

This command sets a backup policy (i. e., specifies the numbers of preservation generations and interval days).

The number of preservation generations means how many generations of backup data should be kept.

The number of interval days means the number of days after the execution of a backup that the next backup should be performed.



Note

Even if the number of interval days is specified, AdvancedCopy Manager does not automatically create a backup.



Note

When you specify a backup policy, there must be as many backup volumes in operation as specified in the policy. To view information on the number of backup volumes required to perform the backup, refer to "Preparing a backup volume".

a. Format

```
[To be executed on a Storage Server]

# /opt/FJSVswsts/bin/swstbkpolset [-i Interval-Days] [-s Save-Number] [Device-Name]

[To be executed on a Storage Management Server]

# /opt/FJSVswsts/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 as the default. 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 as the default. 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. When a device name is omitted, a backup policy is set up to all transaction volumes.

d. End status

= 0: Normal end

> 0: Abnormal end

e. Example

To set 3 as the number of preservation generations for a transaction volume (/dev/vg01):

```
# /opt/FJSVswsts/bin/swstbkpolset -s 3 /dev/vg01
/dev/vg01 swstbkpolset completed
#
```



Note

You can change the number of preservation generations as long as the history information count at the time is equal to or less than the number of preservation generations to be specified.



Note

No backup policy can be set if:

- There are not as many backup volumes as the specified number of preservation generations.
- The specified number of preservation generations is greater than the maximum allowed.
- The specified number of interval days is greater than the maximum allowed.
- The replication control function or tape backup function uses the target transaction volume



Note

This command can not be executed while any of the following commands is running:

- Resource match command (swstsrsemth)
- Device information setting command (swstdevinfo)
- Storage Server configuration information setting command (swstsvrset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.1.6 Backup policy display command (swstbkpoldisp)

This command displays a backup policy that has been set for a transaction volume.

a. Format

```
[To be executed on a Storage Server]

# /opt/FJJSVswsts/bin/swstbkpoldisp [Device-Name]

[To be executed on a Storage Management Server]

# /opt/FJJSVswsts/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. If the device name is omitted, a backup policy for a transaction volume with a registered backup policy will be displayed.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

To display the backup policies of a transaction volume (/dev/vg01):

```
# /opt/FJJSVswsts/bin/swstbkpoldisp /dev/vg01
Server Device      Interval-Days Save-Number Mount-Point (Method)
job2  /dev/vg01 30          3          ---- (----)
#
```

The following information will be displayed.

Title	Description
Server	Displays the Storage Server name.
Device	Displays the device name.
Interval-Days	Displays the number of interval days.
Save-Number	Displays the 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. However, AIX does not display mount points. Therefore, "---- (----)" is always displayed.

9.2.1.7 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. Format

[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
<i>Device-Name</i>	Specify an AdvancedCopy Manager device name.

d. End status

= 0: Normal end

> 0: Abnormal end

e. Example

To delete the backup policies of a transaction volume (/dev/vg01):

```
# /opt/FJSVswsts/bin/swstbkpoldel /dev/vg01  
/dev/vg01 swstbkpoldel completed  
#
```



Note

A backup policy cannot 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.
- The replication control function or tape backup function uses the target transaction volume



Note

This command can not be executed while any of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Resource match command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2 Operation commands

This section describes operation commands for backup management.

9.2.2.1 Backup execution command (swstbackup)

When using this command, the operation changes according to the different states of the advanced copy that is being executed.

- When synchronous processing (EC) is not performed
Snapshot processing (OPC) is performed and the processing information, such as the date and backup volume of a copy target, is registered into backup history information. This is called 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 time and backup volume of a copy target, is simultaneously registered into backup history information. Backup of such a form is called synchronous high-speed backup. Note that it aborts when an equivalency maintenance state is not reached.
To use the Suspend/Resume function for synchronous high-speed backup, execute the backup command with `-suspend` specified, and suspend backup synchronous processing.

In either case, a backup is established and access to the backup volume is available immediately after the command execution.

AdvancedCopy Manager executes a pre-processing Shell script (`OpcBackup.pre`) before executing backup and then a post-processing Shell script (`OpcBackup.post`) after executing backup. For more information on customizing these Shell scripts, refer to "Pre-processing and Post-processing of Backup and Restoration".

a. Format

```
[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 by the backup function. 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 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. If this option is not specified, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must always be specified to perform a backup using differential snapshots.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

To back up a business volume (/dev/vg01):

```
# /opt/FJSVswsts/bin/swstbackup /dev/vg01
/dev/vg01 swstbackup completed
#
```



Note

To guarantee the data, this command prevents other processes from accessing the transaction and backup volumes before commencing the backup. Thus, the drive letters of devices are not assigned. This command terminates with an error if a drive letter of a transaction volume is assigned or if:

- The mount point has directories to which other volumes are to be mounted.
- The volume has a file in use.



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.



Note

When setting a volume group as a transaction volume, and backing up or restoring it, modify the pre-processing and post-processing script for backup (using an Administrator account) so that unmount/mount of all logical devices is carried out.



Note

You cannot perform backup in the following cases. In these cases, perform the action described in the [System Administrator's Response] message that will be output.

- No backup policy has been specified for the specified transaction volume.
- The backup that was executed one generation earlier was unsuccessful.
- Restore is being executed for the transaction volume targeted for processing.
- Synchronous backup processing is being performed but the transaction volume has not yet reached equivalency maintenance status.
- Restoration is being executed using backup history information that will cause a generation overflow.
- No unused backup volume could be acquired to use as the copying destination.
- Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- A volume group is inactive state in the volume group specification.
- The replication control function or tape backup function uses the target transaction volume
- The replication control function or tape backup function uses the target backup volume
- The replication control function or tape backup function uses backup records exceeding the number of preservation generations



Note

You cannot perform backup if:

- The backup volume specified by the device map file (in the “to” column) cannot be used in a pair with the transaction volume. This occurs if:
 - 1- The specified backup volume is in use.
 - 2- The partition sizes of the transaction volume and the backup volume are different.
- The device map file contains an error (refer to “Preparing a device map file”).
- The device map file name includes a national character.



Point

At this time, if existing backup history information satisfies the condition of the number of saved generations specified by the backup policy setting command, then 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` is specified for the backup history information, then a backup volume with the Suspend or tracking state is not cleared and 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

Refer to "General notes" for additional information on executing backup.



Note

This command can only be executed while none of the following commands are running:

- Storage Server configuration information setting command (`swstsvrset`)
- Device information setting command (`swstdevinfo`)
- Resource match command (`swstrsemch`)
- Resource backup command (`swstresback`)
- Resource restore command (`swstresrst`)

9.2.2.2 Backup execution status display command (`swstbackstat`)

This command displays the completion status of a backup that is being performed using the backup execution command (`swstbackup`).



Note

Do not use the OPC stop function of GRmgr/ETERNUSmgr while executing the snapshot high speed backup. If the function is used, it will display "succeeded", regardless of whether or not the backup was actually successful.

a. Format

```
[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. 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. Example

Display the actual copying execution status.

```
# /opt/FJSVswsts/bin/swstbackstat
Server Transaction-Disk Backup-Disk Status Execute
job1 /dev/vg00 /dev/vg02 succeeded ----
job1 /dev/vg01 ---- ---- ----
:
#
```

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 (ie, 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 halted.
Execute	Displays how much has been copied in percentage terms if the status is "executing", otherwise displays "----".



Note

You cannot display the backup processing status if:

- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.



Note

If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. For more information, refer to "Troubleshooting for a hardware error, etc. occurring during backup".

9.2.2.3 Restore execution command (swstrestore)

The data that exists in backup history information is restored 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 executes the restore pre-processing Shell script (OpcRestore.pre) copies data using OPC, then executes the restore post-processing Shell script (OpcRestore.post). For information on customizing these scripts, refer to "Pre-processing and Post-processing for Backup and Restoration".



Point

You can restore data to a device that is not a transaction volume. When you do so, the device must not be registered as a transaction volume and must have the same size as the specified transaction volume. To restore data on a volume other than a transaction volume, refer to "Notes on restoration."

- a. Format

```
[To be executed on a Storage Server]

# /opt/FJSVswsts/bin/swstrestore [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] 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] 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).
-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 device other than a transaction volume.

Note: If neither the -g or -v option is specified, the latest history management information will be restored.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

Restore data with relative generation number 2 (For information on the relative generation number, refer to the data displayed using the history information display command (swsthistdisp)).

```
# /opt/FJSVswsts/bin/swstrestore -g 2 /dev/vg01
/dev/vg01 swstrestore completed
#
```

If the Suspend/Resume function is used for the backup on the transaction volume, the suspended synchronous processing is deleted and the restore command is executed. For information on the suspended synchronous processing, refer to 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/vg01
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg01 /dev/vg02 suspend ----
job2 /dev/vg01 /dev/vg03 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync -all /dev/vg01
/dev/vg01 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg01
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg01 ---- ---- ----
# /opt/FJSVswsts/bin/swstrestore /dev/vg01
/dev/vg01 swstrestore completed
#
```



Point

On a transaction volume on which a file system has been constructed physically, 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). For the procedure for mounting the backup volume, refer to "Notes on restoration."
- 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

You cannot perform restoration in the following cases. In these cases, perform the action described in the [System Administrator's Response] message that will be output.

- Both relative and absolute generation numbers have been specified.
- A device registered as a transaction volume has been specified in a parameter with the `-r` option.
- A device registered as a backup volume has been specified in a parameter with 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. You are recommended never to specify a backup volume as a restore destination device.
- You perform restoration immediately after starting backup (ie, while the actual copying using OPC is still in progress). In this case, perform restoration after the actual 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 Point above.
- A transaction volume performing 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 that was specified during transaction volume registration has been changed.
- Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
- The replication control function or tape backup function uses the target transaction volume
- The replication control function or tape backup function uses the device specified in the `-r` option



Note

The suspended or tracking 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, in the equivalency maintenance state, or the Suspend state).

If either of the following errors occur 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 then execute the restore command.

swst0639 This Command cannot be run. This is because a copy is currently running.

or

swst0634 OPC cannot be run. Error code=26. (SCSI command busy)



Note

Refer to "General notes" for additional information on executing restorations.



Note

This command can only be executed while none of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfofet)
- Resource match command (swstsrsemctch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.4 Restore cancellation command (swstcancelrest)

This command cancels OPC-based restoration. If a hardware error is detected while data is being copied using OPC, 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 incomplete and can no longer be used because part of the data has already been copied. Perform restoration again using the restore execution command (swstrestore).

a. Format

[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/FJSVswsts/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).

Option	Description
-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 device other 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 cancelled 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. Example

Cancel restore processing of a transaction volume (/dev/vg01).

```
# /opt/FJSVswsts/bin/swstcancelrest -g 1 /dev/vg01
/dev/vg01 swstcancelrest completed.
#
```

Restoration of the latest history information on the transaction volume (/dev/vg02) is cancelled in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelrest -emergency /dev/vg02
/dev/vg02 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 after this message is a normal end.)
- Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
- The replication control function or tape backup function uses the target transaction volume



Note

OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or the halt state, then unmanaged sessions remain. In this event, GRmgr or ETERNUSmgr must be used to cancel these sessions.



Note

This command can only be executed while none of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Resource match command (swstsrsem)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.5 Restore execution status display command (swstreststat)

This command displays the execution status of a restoration.



Note

Do not use the OPC stop function of GRmgr/ETERNUSmgr while the snapshot fast backup is in progress. If the function is used, it will display "succeeded", regardless of whether or not the restoration was actually successful.

a. Format

```
[To be executed on a Storage Server]

# /opt/FJSVswsts/bin/swstreststat [-g Generation-No | -v Version-No] [Device-Name]

[To be executed on a Storage Management Server]

# /opt/FJSVswsts/bin/swstreststat [-h Server] [-g Generation-No | -v Version-No]
[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 is to be displayed.
-v	Specifies the absolute generation number of data whose restore execution status is to be displayed.

Note: The restore execution statuses of all the histories will be displayed if both the -g and -v options are omitted.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. 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. Example

Display the restore execution status of transaction volumes.

```
# /opt/FJSVswsts/bin/swstreststat
Server Transaction-Disk Generation Version Backup-Disk      Restore-Device  Status
Execute
job2  /dev/vg01      1      10      /dev/vg10      /dev/vg20
executing 75%
job2  /dev/vg02      ----      ----      ----      ----      ----
----
job2  /dev/vg03      2      12      /dev/vg11      ----
succeeded ----
job2  /dev/vg04      3      13      /dev/vg12      /dev/vg21
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 backup history 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 backup history 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.
Execute	If the status is "executing" then displays how much has been copied in percentage terms, otherwise displays "----".



Note

If "failed" is displayed in the Status field, a hardware error may have occurred. For more information, 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

- You cannot display the restore processing status in the following case:
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

9.2.2.6 History information display command (swsthistdisp)

This command displays history information that has been backed up.

a. Format

```
[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. 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. Example

Display the backup history information of all the transaction volumes.

```
# /opt/FJSVswsts/bin/swsthistdisp
Server=StrgSV01 Device=/dev/vg01 Mount-Point=---- (----)
Generation Version Backup-Date      Backup-Device  Status  Execute
1           10      2000/11/12 22:00 /dev/vg02      succeeded ----
2           9       2000/11/11 22:00 /dev/vg03      succeeded ----
:
#
```

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. However, AIX does not display mount points, therefore "---- (----)" is always displayed.
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 date 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. This item will not be displayed if no backup history information exists.
Execute	If the status is "executing" then displays how much has been copied in percentage terms, otherwise displays "----". This item will not be displayed if no backup history information exists.



Note

You cannot perform processing of displaying history information in the following cases:

- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.



Note

If "failed" or "halt" is displayed in the Status field, a hardware error may have occurred. For more information, refer to "Troubleshooting for a hardware error, etc. occurring during backup".

9.2.2.7 History information deletion command (swsthistdel)

This command deletes backup history information.

The backup volume of the deleted history is released and it 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. For more information, refer to "Troubleshooting for a hardware error, etc. occurring during backup".

a. Format

[To be executed on a Storage Server]

```
# /opt/FJJSwsts/bin/swsthistdel -g Generation-No | -v Version-No | -z [-emergency]
Device-Name
```

[To be executed on a Storage Management Server]

```
# /opt/FJJSwsts/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 that all the backup history information is to be deleted. This option cannot be specified at the same time as the -g or -v.
-emergency	An emergency operation mode is available. 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. Example

Delete the backup history of absolute generation number 10 in a transaction volume (/dev/vg01).

```
# /opt/FJSVswsts/bin/swsthistdel -v 10 /dev/vg01
/dev/vg01 swsthistdel completed
#
```

The history information of relative generation number 1 of the transaction volume (/dev/vg02) is deleted in emergency operation mode.

```
# /opt/FJSVswsts/bin/swsthistdel -g 1 -emergency /dev/vg02
/dev/vg02 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 being used in restoration.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- The replication control function or tape backup function uses the target transaction volume
- The replication control function or tape backup function uses the target backup volume



Note

OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session in the error suspended state or the halt state, then unmanaged sessions remain. In this event, GRmgr or ETERNUSmgr 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 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 (ie, copy has stopped part of the way through). The backup volume is put in the unused state upon deletion of the history information and becomes ready for use in the next 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 the deletion of the history information, the backup volume is in the busy state and becomes ready for use in the next backup of the relevant transaction volume.



Note

This command can not be executed while any of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfofet)
- Resource match command (swstsrsemctch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.8 Backup synchronous processing start command (swststartsync)

This command starts backup synchronous processing (starts disk-to-disk copy using EC).

a. Format

```
[To be executed on a Storage Server]

# /opt/FJJSwsts/bin/swststartsync Device-Name [-Xdevmap Device-Map-File]

[To be executed on a Storage Management Server]

# /opt/FJJSwsts/bin/swststartsync [-h Server] 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.
-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 characters.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name.

d. End status

- = 0: Normally terminated
- > 0: Abnormally terminated

e. Example

Start synchronous backup processing of a transaction volume (/dev/vg01).

```
# /opt/FJSVswsts/bin/swststartsync /dev/vg01
/dev/vg01 swststartsync completed.
#
```



Note

When you execute the backup synchronous processing start command for a transaction volume to which the backup synchronous processing is being executed, the message, "swst0301 Backup synchronous processing is already in progress." is output (the command is terminated normally).



Note

You cannot start backup synchronous processing in the following cases. In any of the cases below, perform the action specified in the "System administrator response" message.

- When specifying a device that does not support the EC function.
- When the backup volumes 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.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- When the replication control function or tape backup function uses the target transaction volume



Point

If a suspended backup volume is the transaction volume at the start of the synchronous processing, then the suspended backup volume is selected as the backup destination with the highest priority, and the synchronous processing restarts (ie, differential copy starts). Otherwise, the synchronous processing (i.e., 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 the 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

This command cannot be executed if any of the following commands are running:

- Resource match command (swstsrsemctch)
- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfofet)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.9 Backup synchronous processing cancel command (swstcancelsync)

The backup synchronous processing may be canceled during copying by EC or under the equivalency maintenance status.

The synchronous processing can be canceled with the backup volume during copying by EC, under the equivalency maintenance 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 will terminate abnormally. If this occurs, use this command to cancel the backup synchronous processing. Use the backup synchronous processing progress display command (swstsyncstat) to check for the error.

a. Format

```
[To be executed on a Storage Server]

# /opt/FJSVswsts/bin/swstcancelsync [-emergency] [-bd Backup-Device-Name | -all]
Device-Name

[To be executed on a Storage Management Server]

# /opt/FJSVswsts/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. Note that the backup volume name and the -all option cannot be used together.

Option	Description
-all	All of the synchronous processing of the transaction volume can be specified to be cancelled. Note that this option and the -bd option cannot be specified together.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name.
Backup-Device-Name	Specify the device name for the copy destination backup volume name.

d. End status

- = 0: Normally terminated
- > 0: Abnormally terminated

e. Example

Cancel synchronous backup processing of a transaction volume (/dev/vg01).

```
# /opt/FJSVswsts/bin/swstcancelsync /dev/vg01
/dev/vg01 swstcancelsync completed.
#
```

Backup synchronous processing of transaction volume (/dev/vg02) is cancelled in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/vg02
/dev/vg02 swstcancelsync completed.
#
```

Cancel the backup synchronous processing of the backup volume (/dev/vg04) from the transaction volume (/dev/vg06).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg04
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg04 /dev/vg05 suspend ----
job2 /dev/vg04 /dev/vg06 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/vg04 -bd /dev/vg06
/dev/vg04 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg04
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg04 /dev/vg05 suspend ----
#
```

Cancel all of the backup synchronous processing of the transaction volume (/dev/vg07).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg07
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg07 /dev/vg08 suspend ----
job2 /dev/vg07 /dev/vg09 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/vg07 -all
/dev/vg07 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg07
Server Transaction-Disk Backup-Disk Status Execute
job2 /dev/vg07 ---- ---- ----
#
```



Note

You cannot cancel synchronous backup processing in the following cases:

- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- When the replication control function or tape backup function uses the target transaction volume



Note

However, EC sessions are neither confirmed nor cancelled by execution in the emergency operation mode. If an EC session is in the error suspended state or the halted state, then unmanaged sessions remain. In this event, GRmgr or ETERNUSmgr must be used to cancel these sessions.



Note

This command can not be executed when any of the following commands is running:

- Resource match command (swstsrsemth)
- Device information setting command (swstdevinfo)
- Storage Server configuration information setting command (swstsvrset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.10 Backup synchronous processing progress display command (swstsyncstat)

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintenance state or in the suspended state).

If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.

a. Format

```
[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	Specifies 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. If 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 terminated
- > 0: Abnormally terminated

e. Example

Display the synchronous backup processing status of a transaction volume (/dev/vg01).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/vg01
Server Transaction-Disk Backup-Disk Status Execute
job1 /dev/vg01 /dev/vg02 suspend ----
job1 /dev/vg01 /dev/vg03 executing 75%
#
```

Display the synchronous backup processing status of all business volumes.

```
# /opt/FJSVswsts/bin/swstsyncstat
Server Transaction-Disk Backup-Disk Status Execute
job1 /dev/vg01 /dev/vg05 suspend ----
job1 /dev/vg01 /dev/vg06 executing 75%
job1 /dev/vg01 /dev/vg07 suspend ----
job1 /dev/vg02 /dev/vg08 equivalent 100%
job1 /dev/vg03 /dev/vg09 failed ----
job1 /dev/vg04 ---- ---- ----
#
```

The table below lists the meaning of each title.

Title	Description
Server	The name of the Storage Server.
Transaction-Disk	The name of the transaction volume.
Backup-Disk	The name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	The current backup synchronous processing status: <ul style="list-style-type: none"> ● "----": Backup synchronous processing is not being executed. ● "executing": Backup synchronous processing is being executed but equivalency maintenance status has not been established. ● "equivalent": Equivalency maintenance 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 has the halt status.
Execute	The progress of the backup synchronous processing as a percentage (0 to 100%). "----" is displayed when the status is Suspend when the backup synchronous processing is not executing.



Note

You cannot display the status of the synchronous processing in the following case:

- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.



Note

If the status is "failed" or "halt", a hardware failure may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup" for more information.



Note

If the status is "nosession", there may be resource information inconsistency. Use the resource match command (swstsrsemth) to remove the inconsistency from the resource information.

9.2.2.11 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. Format

```
[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. If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

Display the execution statuses of transaction volumes.

```
# /opt/FJSVswsts/bin/swstexecstat
Server Device    Last-Backup-Date Interval Status Mount-Point (Method) Execute
job1 /dev/vg01 2000/12/11 12:20 OK        IDLE  ---- (----)      ----
job1 /dev/vg02 2000/12/10 12:20 DELAY=1 IDLE  ---- (----)      sync(22%)
job1 /dev/vg03 2000/12/09 12:20 DELAY=2 IDLE  ---- (----)
snapshot(45%)
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a Storage Server name.
Device	Displays an AdvancedCopy Manager device name.
Last-Backup-Date	Displays the date and time when the last backup execution command was accepted.
Interval	If more than the specified number of days have passed since the last backup then the number of days overdue will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.

Keyword	Description
Status	<p>Indicates 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"> ● <u>Backup policy setting command (swstbkpolset)</u> ● <u>Backup policy deletion command (swstbkpoldel)</u> ● <u>Backup execution command (swstbackup)</u> ● <u>Restore execution command (swstrestore)</u> ● <u>History information deletion command (swsthistdel)</u> ● <u>Backup synchronous processing start command (swststartsync)</u> ● <u>Backup synchronous processing cancel command (swstcancelsync)</u> ● <u>Restore cancellation command (swstcancelrest)</u>
Mount-Point (Method)	<p>Displays the mount point name of a transaction volume, with the file system type in parentheses. However, AIX does not display mount points. Therefore, "---- (----)" is always displayed.</p>
Execute	<p>Displays the name of a command being executed or the copying progress percentage.</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 setting 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 halted. ● "snapshot(xxx)": Progress ratio of backup using OPC ● "snapshot(failed)": Backup using OPC has abnormally terminated. ● "snapshot(halt)": Backup using OPC has been halted. ● "restore(xxx)": Progress ratio of restoration using OPC ● "restore(failed)": Restoration using OPC has abnormally terminated. ● "restore(halt)": Restoration using OPC has been halted.

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 snapshot backup is being handled), the display in the Execute field conforms to the following rules:

- The display of a command name takes priority if both copying and command execution are in progress.
- When a disk copy of the snapshot backup and a disk copy of the backup synchronous processing are being handled simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. (A disk copy for restoration cannot be performed during disk copy of the snapshot backup or backup synchronous processing due to a restriction of the Fujitsu ETERNUS storage system.)

The "-j" option can be used as in the following example:

```
# /opt/FJSVswsts/bin/swstexecstat -j
Server Device      Execute-Date      Status Mount-Point (Method) Execute
job1 /dev/vg01 2000/12/11 12:20 IDLE ---- (----) ----
job1 /dev/vg02 2000/12/10 12:20 IDLE ---- (----) sync (22%)
job1 /dev/vg03 2000/12/09 12:20 IDLE ---- (----) snapshot (45%)
:
#
```

The following information will be displayed.

Keyword	Description
Server	A Storage Server name.
Device	An AdvancedCopy Manager device name.
Execute-Date	The command execution time.
Status	<p>Indicates whether any of the following commands are being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed.</p> <ul style="list-style-type: none"> ● <u>Backup policy setting command (swstbkpolset)</u> ● <u>Backup policy deletion command (swstbkpoldel)</u> ● <u>Backup execution command (swstbackup)</u> ● <u>Restore execution command (swstrestore)</u> ● <u>History information deletion command (swsthistdel)</u> ● <u>Backup synchronous processing start command (swststartsync)</u> ● <u>Backup synchronous processing cancel command (swstcancelsync)</u> ● <u>Restore cancellation command (swstcancelrest)</u>
Mount-Point (Method)	Displays the mount point name of a transaction volume, with the file system type in parentheses. However, AIX does not display mount points. Therefore, "---- (----)" is always displayed.

Keyword	Description
Execute	<p>Displays the name of a command being executed or the copying progress percentage.</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 setting 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%)": The progress of the EC operation. ● "sync(failed)": EC has been abnormally terminated. ● "sync(halt)": EC has been halted. ● "snapshot(xxx%)": Progress ratio of backup using OPC ● "snapshot(failed)": Backup using OPC has abnormally terminated. ● "snapshot(halt)": Backup using OPC has been halted. ● "restore(xxx%)": Progress ratio of restoration using OPC ● "restore(failed)": Restoration using OPC has abnormally terminated. ● "restore(halt)": Restoration using OPC has been halted.



Point

During synchronous high-speed backup with `-suspend` specified, no operation ("----") is indicated in the Execute field.



Note

You cannot perform display the execution status in the following case:

- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.



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 fixing the cause of the hardware error:

- 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).

9.2.2.12 Tracking cancel command (swstcanceltrk)

This command stops tracking processing.

a. Format

```
[To execute on the Storage Server]
# /opt/FJVSswsts/bin/swstcanceltrk [-copy | -emergency] Device-Name (-bd
Backup-Device-Name | -all)
[To execute on the Storage Management Server]
# /opt/FJVSswsts/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 only be specified on the Storage Management Server.
-copy	Specifies that physical copying, if active, should also be stopped (ie, the OPC session should be canceled). This option cannot be specified for a backup volume that has already contains a backup history. For a volume whose copy destination volume contains 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 or 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 used with the -all option.
-all	Stops the entire tracking processing specified for the transaction volumes. This option cannot be used 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 that was specified for the backup volume (/dev/vg8) from the transaction volume (/dev/vg3)

```
# /opt/FJSVswsts/bin/swstcanceltrk /dev/vg03 -bd /dev/vg08
/dev/vg03 swstcanceltrk completed.
#
```

The following example stops the tracking and physical copying that were specified for the transaction volume (/dev/vg3).

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/vg03
Server Transaction-Disk Backup-Disk Status      Execute Update
job2  /dev/vg03          /dev/vg03  executing 33%      -----
# /opt/FJSVswsts/bin/swstcanceltrk -copy /dev/vg03 -bd /dev/vg08
/dev/vg03 swstcanceltrk completed.
#
```



Note

If the command is executed in emergency operation mode, no OPC session is cancelled. A session that is not managed remains if the command is entered during tracking. The session must be cancelled using GRmgr, ETERNUSmgr, or GDS.



Note

Tracking processing cannot be stopped if tracking processing is not performed for the specified copy source and destination volumes. In this case, take action according to "System administrator response" provided for the message output.



Note

This command can not be executed if any of the following commands are being executed:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Resource matching command (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.2.13 Tracking status display command (swsttrkstat)

This command displays the status of tracking processing.

When multiple types of tracking processing are running on one transaction volume, the command displays the statuses of all types of tracking processing.

a. Format

```
[To execute on the Storage Server]
# /opt/FJSVswsts/bin/swsttrkstat [Device-Name]
[To execute on the Storage Management Server]
# /opt/FJSVswsts/bin/swsttrkstat [-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. 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 of a transaction volume (/dev/vg3):

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/vg03
Server Transaction-Disk Backup-Disk Status Execute Update
job1 /dev/vg03 /dev/vg08 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/vg03 /dev/vg08 nosession ---- ----
job1 /dev/vg04 /dev/vg09 executing 75% ----
job1 /dev/vg05 /dev/vg10 failed ---- ----
job1 /dev/vg06 /dev/vg11 tracking ---- 12%
job1 /dev/vg07 ---- ---- ---- ----
:
#
```

The displayed data is explained below.

Title	Description
Server	A Storage Server name.
Transaction-Disk	A transaction volume name.
Backup-Disk	A backup volume name. Displays "----" when the volume is not in the tracking status.
Status	The execution status. "----": No tracking is in progress "executing": Physical copying and tracking is in progress "tracking": Tracking is in progress "failed": Physical copying or tracking terminated abnormally. "nosession": No session exists (ie, the resource information is inconsistent).
Execute	The copy progress as a percentage is displayed when the status is "executing".. "----" is displayed when the status is "tracking".
Update	The amount of updated data after logical copying as a percentage when the status is "tracking". "----" is displayed when the status is "executing".



Note

When the execution status (displayed in the "Status" column) is "failed", a hardware problem has occurred. After fixing the problem, re-execute the differential snapshot backup.



Note

When the execution status (displayed in the "Status" column) is "nosession," the resource information is probably inconsistent. Use the resource matching command (swstrsemth) to remove any inconsistencies.



Note

The execution status of tracking processing cannot be displayed under the following conditions:

- When the transaction volume or backup volume is a logical volume, and the volume configuration of the logical volume has been changed to one that is not supported by AdvancedCopy Manager.
- When the transaction volume or backup volume is a volume group, and the volume group is not active.

9.2.3 Maintenance commands

This section describes maintenance commands for backup management.

9.2.3.1 Resource match command (swstsrsemth)

This command recovers resource information if a system failure, etc. has caused inconsistencies.

a. Format

```
[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	Achieves consistency with a repository. Specify this option if a backup management file and a repository become inconsistent.

c. Example

```
# /opt/FJSVswsts/bin/swstsrsemth
swstsrsemth completed
#
```



Note

This command can not be executed if any of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Backup policy setting 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 (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.3.2 Resource backup command (swstresback)

This command backs up a backup management file to a specified directory.

a. Format

```
# /opt/FJSSwsts/bin/swstresback Backup-Directory
```

b. Description of operand

Operand	Description
Backup-Directory	Specifies the name of a directory to which a backup management files should be saved.

c. Example

Create a backup copy of the backup management files in /home/backup.

```
# /opt/FJSSwsts/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 fails, for example because of insufficient free space.



Note

This command can not be executed while any of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfoaset)
- Backup policy setting 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 (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.2.3.3 Resource restore command (swstresrst)

The backup management files are restored from the specified directory.

a. Format

```
# /opt/FJSVswsts/bin/swstresrst Backup-Directory
```

b. Description of operand

Operand	Description
Backup-Directory	Specifies the directory in which to save the backup management files.

c. Example

Restore backup copy of the backup management files from /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 setting 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, for example because of insufficient free space.



Note

This command can not be executed while any of the following commands are running:

- Storage Server configuration information setting command (swstsvrset)
- Device information setting command (swstdevinfo)
- Backup policy setting 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 (swstsrsemch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

9.3 Configuration Management Commands

This section explains the configuration management commands. These commands manage the information on a server device which performs backup and replication, or the node for operation in a cluster environment.



Note Operating environment for command execution

The table below lists the operating environment requirements for each command:

Table: Operating environment required for command execution

Command	Operating environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a Storage Management Server (Storage Management Server transaction), the Storage Management Server (Storage Management Server transaction) must be operating.
stgenvdisp	This command is executable when both Storage Management Server (Storage Management Server transaction) and Storage Server (Storage Server transaction) are not operating. Note that when the cluster service (which is named differently in respective cluster systems) is not in cluster operation, this command cannot display certain information.
stgmgrinfoset	The package-backup-of-the-management-information execution server must be operating.
stgmgrinfobkup	The Storage Management Server (Storage Management Server transaction), package-backup-of-the-management-information execution server, and package-backup-of-the-management-information target servers must be operating.
stgmgrinfodisp	The package-backup-of-the-management-information execution 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, indicates whether environment variables must be configured, and specifies the nodes on which commands are executable.

Table: Commands for cluster operation

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Cluster active server	
stgenvdisp	Not required	Cluster active server	
stgmgrinfobkup	Required	Cluster active server	

Command	Environment variable	Command execution node	Remarks
stgmgrinfodisp	Required	Cluster active server	
stgmgrinfoset	Required	Cluster active server	

9.3.1 Management server information change command (stgcmmodnode)

This command can be used to change the following information on a Storage Management Server:

- 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 the server information by executing this command on the Storage Management Server.
 - 2) Change the 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.

a. Format

```
# /opt/FJJSvswstf/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. 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/stgcmmodnode -i 10.12.13.14
swstf2401 Storage Management Server registry updated.
```



Note

Additional information about this command:

- This command can only be executed by root users.
- The PORT number of a Storage Management Server can be between 1024 and 65535.
- This command must specify the same value as the one specified on the Storage Management Server. An error will occur if an invalid value is specified.
- If this command is executed, restart the AdvancedCopy Manager daemons.

9.3.2 Repository access user change command (stguserset)

The repository access user change command (stguserset) is executed by the Storage Management Server.

For more information refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.3 GUI connection information setting command (stgguiipset)

The GUI connection information setting command (stgguiipset) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.4 Server information addition command (stgxfwcmaddsrv)

The server information addition command (stgxfwcmaddsrv) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.5 Server information change command (stgxfwcmmodsrv)

The server information change command (stgxfwcmmodsrv) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.6 Server information deletion command (stgxfwcmdelsrv)

The server information deletion command (stgxfwcmdelsrv) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.7 Device information collection/reflection command (stgxfwcmsetdev)

The device information collection/reflection command (stgxfwcmsetdev) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.8 Device information deletion command (stgxfwcmdeldev)

The device information deletion (stgxfwcmdeldev) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.9 Server information display command (stgxfwcmdispsrv)

The server information display command (stgxfwcmdispsrv) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.10 Device information display command (stgxfwcmdispdev)

The device information display command (stgxfwcmdispdev) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.11 Partition information display command (stgxfwcmdisppat)

The partition information display command (stgxfwcmdisppat) is executed by the Storage Management Server.

For more information, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

9.3.12 Environment information display command (stgenvdisp)

This command displays the environment settings in AdvancedCopy Manager.



Note

- To output cluster operation information, execute the command from an active node. Executing the command from a standby node displays only partial information. To output cluster operation information while a transaction is stopped, either set the shared disk containing the AdvancedCopy Manager shared data of the transaction to the online state, or mount the shared disk, 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. Format

```
# /opt/FJSVswstf/bin/stgenvdisp [-n transaction-logical-node-name]
```

b. Description of options

Option	Description
-n	Displays the logical node name (as specified in the cluster setup command) of the transaction. <ul style="list-style-type: none">● In a cluster environment If this option is specified, only information on only the selected transactions is displayed. Otherwise, information on all transactions is displayed. <ul style="list-style-type: none">● In a non-cluster environment This option cannot be specified, otherwise message swstf6001 is displayed and processing ends.

c. End status

= 0: Normal end

> 0: Abnormal end

d. Example

Information in a non-cluster environment is displayed.

```
# /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 (High Availability Cluster Multi-Processing) is displayed.

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type           : Server
Cluster system       : HACMP
Node type            : Primary
Node name            : nodeagt1
Service name         : agent_service1
Mount point          : /acmagtdisk
IP by cluster setup  : 10.10.10.10
Manager IP address   : 10.10.10.10
Communication         : 11000
-----
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
#
```


Information on all transactions in a cluster environment (VERITAS Cluster Server) is displayed.

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type           : Server
Cluster system       : VERITAS Cluster Server
Node type            : Primary
Node name            : nodeagt1
Service name         : agent_service1
Mount point          : /acmagt1disk
Manager IP address   : 10.10.10.10
Communication        : 11000
-----
Server type           : Server
Cluster system       : VERITAS Cluster Server
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              : 13.2
Language             : JAPANESE
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt #
```

The displayed information is 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 package
Cluster system	The types of cluster system are as follows: SynfinityCluster or PRIMECLUSTER: SynfinityCluster or PRIMECLUSTER VERITAS Cluster Server: VERITAS Cluster Server SynfinityCluster: SynfinityCluster PRIMECLUSTER: PRIMECLUSTER MC/ServiceGuard: HP MC/ServiceGuard MSCS: Microsoft Cluster Server or WSFC HACMP: IBM High Availability Cluster Multi-Processing
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.

Title	Description
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.
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 setting 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.

Title	Description
Communication	The communication service/daemon port number (the 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 (the service name in the services file: rmiswstf) is displayed.
Exclusive control	The exclusive control service/daemon port number (the service name in the services file: semswstf) is displayed.
Authentication feature	The authentication feature service/daemon port number (the 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	[For Solaris and Linux] Displays the resource type Procedure: Procedure resource CmdLine: Command line resource
Network Resource	[Solaris only] Displays the name of the logical host name 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 whenever information cannot be displayed because of an error.
- Some items may not be output, depending on the cluster type.

9.3.13 Management information package backup server registration/deletion command (stgmgrinfo set)

This command can be used to register, delete or display information about the management information package backup execution server (the server on which the management information package backup command (stgmgrinfo backup) is executed).

The command deletes the management information package backup execution server or displays information about the server.

a. Format

```
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 the following: If ASCII was specified: ASCII

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Example

Register the management information package backup execution server (assuming that 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 ASCIIswstf3000 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

Additional information about 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.

9.3.14 Management information package backup command (stgmgrinfobkup)

This command makes backups of the management information stored on the Storage Servers and Storage Management Server.

a. Format

```
program-directory/bin/stgmgrinfobkup [-n server-name] [-t backup-type]
```

b. Description of options

Option	Description
-n	Creates 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. The available options are listed below. Do not specify more than one value in the <code>-t</code> 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 created as defined in the policy file. For details on the policy file, refer to "Preliminaries".

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Example

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.
#
```

Backup 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.
#
```

Backup 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.
#
```

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

Additional information about 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 (ie, the message indicating completion or an error) that is output by this command.
- This command can only be executed on the management information package backup execution server.
 - When the management information package backup execution server is in a cluster system, set the name of the logical node in the SWSTGNODE environment variable.
- Do not execute other AdvancedCopy Manager commands or GUI commands while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a GUI command is running.
- Do not execute this command again if it is already running.
- To save backup data to a tape or similar external 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.

9.3.15 Management information package backup status display command (stgmgrinfodisp)

This command displays the execution status of the management information package backup command (stgmgrinfobkup).

a. Format

```
program-directory/bin/stgmgrinfodisp [-n server-name]
```

b. Description of options

Option	Description
-n	Specifies the name of the server for which the backup status is to be displayed. If this option is not specified, the statuses of backups on all Storage Servers managed by the Storage Management Server are displayed.

c. End status

- = 0: Normal end
- > 0: Abnormal end

d. Output information

The types of information output are listed below. If no backups are created when the management information package backup command is executed or if the management information package backup command ends in error, no data is output.

Item	Description
Server	The server name
RegiData	The date and time at which the management information package backup command created a backup of a registry (ie, date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
DBData	The date and time at which the management information package backup command created a backup of the database (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
AuthData	The date and time at which the management information package backup command created a backup of the authentication management list (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
BkupData	The date and time at which the management information package backup command created a backup of the backup management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
ReplData	The date and time at which the management information package backup command created a backup of replication management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	The date and time at which 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	The date when a backup of tape backup management was made by package backup using the management information command (ie, the date and time that the management information package backup of the management information command was executed) yy/mm/dd hh:mm:ss

e. Example

Output 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
Server:      tape
  RegiData:  05/08/01 09:00:00
  TapeData:  05/08/03 16:00:00
#
```

Output 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

Additional information about this command:

- Only a root user or an account which belongs to the Administrators group can execute this command.
- This command can only be executed on the management information package backup execution server.
 - When the management information package backup execution server is in a cluster system, set the name of the logical node in the SWSTGNODE environment variable.

9.4 Replication Management Command

This section describes operations using Replication Management Commands. It is necessary to execute the command of replication management by the root user.



Note

Only a root user can execute all the commands of replication management. If commands are executed 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 environments in which to execute the respective commands.

Table: Operating environment required for command execution

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 maintenance status, the associated server must be operating (except when the -m option is specified).
swsrpchsyc	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 communicating Storage Servers 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 communicating Storage Servers must be operating (except when the -m option or -t option is specified).

Command	Operating environment of AdvancedCopy Manager
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.
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 communicating Storage Servers 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, indicates whether environment variables must be configured, and specifies the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table: Commands for cluster operation

Command	Environment variable	Command execution node	Remarks
swsrpsetvol	Required	Cluster active server	

Command	Environment variable	Command execution node	Remarks
swsrpvolinfo	Required	Cluster active server	
swsrpdelvol	Required	Cluster active server	
swsrprecbuffstat	Required	Cluster active server	
swsrprecbuffset	Required	Cluster active server	
swsrpstartsync	Required	Cluster active server	
swsrpmake	Required	Cluster active server	
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	

9.4.1 Environment definition commands

This section describes environment definition commands for replication management.

9.4.1.1 Replication volume information setting command (swsrpsetvol)

This command sets the source and destination volumes that will be used in a replication. Execute this command to declare that the replication will be performed using the specified replication volumes.

a. Format

<pre>[To be executed on a Storage Server] For replication on a server /opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xgroup <i>Group-Name</i>] <i>Original-Volume-Name</i> <i>Replica-Volume-Name</i> For replication between servers /opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] -o (ORG REP BOTH) [-Xgroup <i>Group-Name</i>] <i>Original-Volume-Name</i> <i>Replica-Volume-Name</i> [To be executed on a Storage Management Server] For replication on a server /opt/FJSVswsrp/bin/swsrpsetvol -h <i>Server-Name</i> [-n] [-u] [-Xgroup <i>Group-Name</i>] <i>Original-Volume-Name</i> <i>Replica-Volume-Name</i> For replication between servers /opt/FJSVswsrp/bin/swsrpsetvol -h <i>Server-Name</i> [-n] [-u] -o (ORG REP BOTH) [-Xgroup <i>Group-Name</i>] <i>Original-Volume-Name</i> <i>Replica-Volume-Name</i></pre>

b. Description of options

Option	Description
-h	<p>Specifies the name of a Storage Server subject to the replication. This option is valid only on a Storage Management Server.</p> <p>If this option is omitted, the Storage Server on which the command is entered will be the target of the command.</p>
-u	<p>Specifies the direction of copying.</p> <p>If this option is specified, copying can only be performed from a replication source volume to a replication destination volume. Copying from a replication destination volume to a replication source volume is prohibited.</p> <p>If this option is omitted, copying between the replication source and replication destination volumes is bidirectional.</p>
-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> <p>On the server that is not specified as the operation server, only the following commands can be executed for a replication volume:</p> <ul style="list-style-type: none"> ● 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 sizes of the source and destination volumes 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>
-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>Specifies a group name.</p> <p>The characters that can be used for the group name are single-byte alphanumeric characters, the minus sign (-), underscore (_), number sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.</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. Example

Set replication volume information by specifying volume/dev/vg01 of Storage Server SRC-SV as the replication source volume and volume /dev/vg02 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 following example shows the command executed on SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/vg01 /dev/vg02@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/vg01@SRC-SV /dev/vg02
swsrpsetvol completed
#
```



Note

Replication volume information cannot be set if:

- Replication volume information has already been set.
- The specified replication source volume is already set as the replication destination volume, or the replication destination volume is already set as 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 (ie, 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 by the backup management function.
- The replication source volume has been registered as a backup volume by 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).
- The replication source volume and the replication destination volume are located on another disk array device and 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.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.



Note

When using a volume group as a source volume or replica volume:

- Be sure to specify the pairs of a volume group as a source volume and replica volume. Note that this does not work between platforms.
- The same volume group cannot be registered as a source volume and replica volume.
- When registering a volume group as a source volume and replica volume, make the logical disk configurations the same.



Note

Note the following points about creating copy source volumes and copy destination volumes on Solaris system:

- When creating multiple volumes (slices) on the same disk, volume areas must not overlap.
- When using a physical disk on Solaris, create volumes (slices) so that VTOC is not contained in them.
- Specify each volume defined in units of slices as a copy source volume or a copy destination volume. Do not specify any volume defined as an entire disk.



Note

When you change physical information on volumes (ie, partition size, drive letter, and cabinet information on a disk array device) using such functions as an OS management tool (for example, Disk Administrator) or GRmgr/ETERNUSmgr provided by the disk array device, you need to reset the registered replication volume information associated with the changed volumes, by following these steps:

- 1) Delete the replication volume information using the replication volume information deletion command (swsrpdelvol).
- 2) In the GUI client, "information acquisition / reflection" of all devices is performed, otherwise the device information acquisition / reflection command (stgxfwcmsetdev) is executed in a Storage Management Server.
- 3) Reset the replication volume information using the replication volume information setting 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 settings 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

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Synchronous processing start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Replication cancellation command (swsrpcancel)
- Synchronization mode change command (swsrpchsyc)
- Synchronisation reverse command (swsrprevsync)
- Resource adjustment command (swsrprecoverres)

9.4.1.2 Replication volume information display command (swsrpvoinfo)

This command displays the replication volume information registered by the replication volume information setting command (swsrpsetvol).

a. Format

```
[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 example following 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. 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/vg01@SRC-SV 4.0Gbyte /dev/vg01@TARG-SV 4.0Gbyte uni-direction
original
SRC-SV /dev/vg02@SRC-SV 4.0Gbyte /dev/vg02@TARG-SV 5.0Gbyte bi-direction
original
SRC-SV /dev/vg03@SRC-SV 9.1Gbyte /dev/vg03@TARG-SV 9.1Gbyte bi-direction
replica
SRC-SV /dev/vg04@SRC-SV 7.5Gbyte /dev/vg04@TARG-SV 7.5Gbyte bi-direction
both
#
```

The following information will be displayed.

Title	Description
Server	A Storage Server name.
Original-Volume	A replication source volume name.
Size	The volume size.

Title	Description
	Additionally, in the case of a volume group, displays the size of the physical disk on which the logical disk exists.
Replica-Volume	A replication destination volume name.
Copy	The copying direction. uni-direction: One-way copying from a replication source volume to a replication destination volume is allowed. bi-direction: Bidirectional copying is allowed.
Op-Server	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.
Group [only if the -L option has been specified]	The group name. "----" is displayed if the copy source and destination volumes are not registered in a group.



Note

Replication volume information cannot be displayed if:

- The specified volume has not been set as a replication source volume



Note

This command cannot be executed while the following command is running:

- Resource adjustment command (swsrprecoverres)

9.4.1.3 Replication volume information deletion command (swsrpdelvol)

This command deletes 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. Format

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpdelvol [-e] Original-Volume-Name Replica-Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpdelvol -h Server-Name [-e] 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. This deletes replica volume information, without checking the execution state of an advanced copy. Use this option, only when it is clear that the advanced copy has not executed.
-d	Specifies that no communication takes 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-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. Example

Delete replication volume information on Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpdelv /dev/vg01 /dev/vg01@TARG-SV
swsrpdelv 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.
- Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
- If a logical volume is deleted, or if changes are made to its configuration that cannot be supported by AdvancedCopy Manager, replica volume information cannot be deleted. In this case, perform processing of (A) or (B) shown below.
 - (A): Specify the `-e` option and execute the command, after checking that an advanced copy is not processing out in the replica volume to be deleted (if an advanced copy is processing, stop the advanced copy with disk array equipment, or perform (B)).
 - (B): Execute the command after re-creating the logical volume with a configuration that AdvancedCopy Manager can support, or after returning the logical volume configuration to its original state.
- If emergency operation mode is used, OPC sessions are neither confirmed nor cancelled. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, GRmgr or ETERNUSmgr must be used to cancel these sessions.



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (`swsrpsetvol`)
- Replication volume information deletion command (`swsrpdelvol`)
- Synchronous processing start command (`swsrpstartsync`)
- Replication creation command (`swsrpmake`)
- Replication cancellation command (`swsrpcancel`)
- Synchronization mode change command (`swsrpchsycn`)
- Synchronisation reverse command (`swsrprevsync`)
- Resource adjustment command (`swsrprecoverres`)

9.4.1.4 REC transfer buffer information display command(`swsrprebuffstat`)

This command displays information for the transfer buffer used by ETERNUS when REC is performed in Consistency mode.

a. Format

```
[To be executed on a Storage Server]
swsrprebuffstat Volume-Name
[To be executed on a Storage Management Server]
swsrprebuffstat -h Server 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.

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. Specify the AdvancedCopy Manager device name as the volume name.

d. End status

=0:Normal end
>0:Abnormal end

e. Example

Display information for the transfer buffer used by the REC, where the copy source volume is /dev/hdisk10@Server1 and the copy destination volume is /dev/hdisk11@Server1, and replication is performed within the Storage Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/hdisk11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

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/hdisk10@Server1 and the copy destination volume is /dev/hdisk20@Server2:

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#

# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk20@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2 SEND 5% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Display information for the transfer buffer used by the REC if a cabinet where the copy source volume /dev/hdisk10@Server1 resides has been set up 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/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
3 SEND 4% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
4 RECV 0% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
5 SEND 10% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
6 RECV 0% EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
7 SEND 3% FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
8 SEND 5% GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
#
```

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. SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data

Title	Description
Rate	<p>The usage rate of the transfer buffer as a percentage.</p> <p>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.</p> <p>If the usage is RECV : "0%" will always be displayed.</p> <p>"----" will be displayed if the transfer buffer cannot be used.</p>
RemoteBoxID	The box identifier for the cabinet performing a remote copy.



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 time 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)

9.4.1.5 REC transfer buffer settings change command (swsrprebuffset)

This command changes the settings of the transfer buffer used by ETERNUS when REC is performed in Consistency mode.

Refer to "ETERNUSmgr User's Guide Setup / Maintenance" for information about the setting method of the REC transfer buffer.

a. Format

[To be executed on a Storage Server]
swsrprebuffset -Xbuffid <i>buffer-id</i> -Xbuffuse {SEND RECV} <i>Volume-Name</i>
[To be executed on a Storage Management Server]
swsrprebuffset -h <i>Server</i> -Xbuffid <i>buffer-id</i> -Xbuffuse {SEND RECV}
<i>Volume-Name</i>

b. Description of options

Option	Description
-h	<p>Specifies the name of a Storage Server.</p> <p>You can use this option only for a Storage Management Server.</p>
-Xbuffid	Specifies the ID for the transfer buffer.

Option	Description
-Xbuffuse	Specifies the usage of the transfer buffer. SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data

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 the replication volume is applying per logical 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. Example

Change the attributes of the transfer buffer used by the REC where the copy source volume is /dev/hdisk10@Server1 and the copy destination volume is /dev/hdisk11@Server1, and replication is being performed within the Storage Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV /dev/hdisk10@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND /dev/hdisk11@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprebuffstat /dev/hdisk11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 SEND 3% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```


Change the attributes of the transfer buffer where the copy source volume is /dev/hdisk10@Server1, and replication is being performed between Storage Server "Server1" and Storage Server "Server2".

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrpbufstat /dev/hdisk10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 1 -Xbuffuse SEND /dev/hdisk11@Server1
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrpbufset -Xbuffid 2 -Xbuffuse RECV /dev/hdisk11@Server1
swsrpbufset completed
# /opt/FJSVswsrp/bin/swsrpbufstat /dev/hdisk11@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 4% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```



Note

Settings for dedicated REC buffers must be made in advance. Change the settings while there are no asynchronous Consistency mode sessions in either the ACTIVE or ERROR SUSPEND state. It will take a short time 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 setting 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 (swsrpchsync)
- Synchronization reverse command (swsrprevsync)
- Resource adjustment command (swsrprecoverres)

9.4.2 Operation commands

This section describes operation commands for replication management.

9.4.2.1 Synchronous processing start command (swsrpstartsync)

This command starts the synchronous type replication processing (copying between disks by EC and REC).

It will copy all the data from the source volume to the destination volume at the start of the synchronization process, or if run as a restart of the synchronization process it will just copy updated data to the destination volume. Use this command at the start of operation or when you want to reflect updated data (differences) from the equivalency maintenance state.

a. Format

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpstartsync [ -y [ -a | -v ] | -k | -i ] [-g] [-m] [ -Xskip
| -Xremain ] [-t] 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 ] [-t] 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] 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] 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 options 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.

Option	Description
-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 options 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 options 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 option 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.
-t	Specifies that pre-processing for the replication destination volume is not performed. Use this option only if any one of the following conditions applies: <ul style="list-style-type: none"> • If AdvancedCopy Manager does not perform pre-processing and post-processing of the replication destination volume, and if independent pre-processing and post-processing is incorporated before and after AdvancedCopy Manager commands • If replication destination pre-processing and post-processing can be judged to be unnecessary (for example, for a database constructed on a RAW device) • If inter-cabinet synchronous processing (REC) is being restarted after a forced suspend
-Xreverse	Specifies that synchronous processing must be started for each group in the reverse direction (from replica volumes to original volumes).
-Xskip	Specifies that synchronous processing must be suspended using the initial copy skip function. This option is valid only when total copy is started for inter-box replication.
-Xremain	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.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies a replication source volume name. This is the source volume or the destination volume set with the replication volume information setting command (swsrpsetvol).
To-Volume-Name	Specifies a replication destination volume name. This is the source volume or the destination volume set with the replication volume information setting command (swsrpsetvol).

d. End status

= 0: Normal end

> 0: Abnormal end

e. Example

Start replication from /dev/vg01 of a Storage Management Server to /dev/vg01 @TARG-SV of Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/vg01 /dev/vg01@TARG-SV
FROM=/dev/vg01@SRC-SV,TO=/dev/vg01@TARG-SV swsrpstartsync completed
#
```

Start replication for group "GRP1".

```
# swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
#
```



Note

Replication cannot be started if:

- The specified replication source volume and replication destination volume have not been set as replication volumes.
- A replication source volume is specified as the copy source volume and a replication destination volume is specified as the copy destination 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, the operation cannot continue for the corresponding volume. Stop the replication 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.
- Changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager.
- 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 corresponds to any of the following conditions, perform drive letter release or unmount of the copy source volume before executing a command.

- When a replication is performed between different OSs
- When the sizes of replication source volume and replication destination volume differ
- When the file systems of the replication source volume and the replication destination volume differ

In the above-mentioned cases, if neither drive letter release nor unmount have been performed, post-processing of the copy source volume at the time of duplicate creation serves as an error.



Point

You cannot change synchronization mode when synchronization is resumed.

When synchronization is resumed, you must specify the `-y`, `-a`, `-v`, `-k`, `-i`, 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 destination volumes.

Table: Processing differences with the synchronization state

Status of synchronization processing	Processing
Unmount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is displayed and the command ends normally
Equivalency maintenance status	Informational message (swsrp2401) is displayed and the command ends normally
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. For information on customizing this script, refer to "Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing script, use the `-t` option.



Note

To protect processing that accesses a replication destination volume, set the copied material volume before starting replication so that other processes cannot access it. To do this, 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 on 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 setting, unmounting, or some other method.
- When setting a volume group which consists of two or more logical disks as a source volume, and replicating it, make all logical devices unmount/mount using the Administrator's authority.



Note

Refer to "General notes" in this manual for information on starting replication



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)

9.4.2.2 Replication creation command (swsrpmake)

When synchronization processing (EC) is not being performed, this command will start snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) to create a replication volume.

When synchronization processing is being performed, check whether the processing is in the equivalency maintenance state. If so, suspend the synchronization processing and create a replication volume. The status in which synchronization processing is suspended is referred to as the replication established status. After this command is executed, the replication volume (ie, the replication destination volume) can be accessed.

This command executes the replication pre-processing and post-processing scripts before a replica is created. For details of these scripts, refer to "Pre-processing and Post-processing of Replication".

a. Format

```
[To be executed on a Storage Server]
/opt/FJJSVswsrp/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/FJJSVswsrp/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/FJJSVswsrp/bin/swsrpmake [-f] [-t] [-m] ([-j|-T | -Xconcur | -C | -P]) [-Xreverse]
-Xgroup Group-Name
[if executed on a Storage Management Server: group specification]
/opt/FJJSVswsrp/bin/swsrpmake -h Server-Name [-f] [-t] [-m] ([-j|-T | -Xconcur | -C
| -P]) [-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.
-m	For server-to-server replication, specifies that communication processing with the non-operational server is not performed. When this option is specified, volume status check processing, pre-processing and post-processing are not performed for the non-operational server volume. This option is valid only during server-to-server replication.
-f	Specifies that pre-processing and post-processing are not performed for a replication source volume. Use this option 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. It can also be used 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 are not performed for a replication destination volume. Use this option when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command. It can also be used 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 will 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". This option can only be used for inter-cabinet replication: if attempted for intra-cabinet replication, an error will occur. When this option is specified, the data in the destination volume is not guaranteed. Additionally, when this option is specified, pre-processing and post-processing for the source and destination volumes are not performed. To restart inter-cabinet synchronous processing (REC), execute the replication start command (swsrpstartsync) with the -t option specified.

Option	Description
-T	Specifies that differential snapshot processing will 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 using differential snapshots.
-Xgroup	Specifies that operation statuses are displayed by the group.
-Xreverse	Specifies that a replication will be created for each group in the reverse direction (ie, from replica volumes to original volumes).
-Xconcur	Specifies that a replication will be created using the concurrent suspension function. This option is not supported when GDS Snapshot linkage is being used.
-C	Specifies that a SnapOPC will be started. This option is only valid for 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.
-P	Specifies that a SnapOPC+ will be started. This option is only valid for 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.

c. 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 setting 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 setting command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

The Storage Management Server instructs Storage Server SRC-SV to create a copy of /dev/vg01 in /dev/vg01@TARG-SV.

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/vg01 /dev/vg01@TARG-SV
FROM=/dev/vg01@SRC-SV,TO=/dev/vg01@TARG-SV swsrpmake completed
#
```

Creates a copy for the group "GRP1".

```
# swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
#
```



Note

Replication cannot be performed 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 maintenance status.
- After operation starts, physical volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed. In this case, the operation for the corresponding volume cannot continue. Stop the replication for the volume, and then delete and reset the replication volume information.
- A replication source volume or a replication destination volume has multiple mount points.
- 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.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- A volume group is inactive in the volume group specification.
- The backup management function or tape backup function uses a specified source or 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-type replication and synchronous-type 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 corresponds to either of the following conditions, perform drive letter release or unmount of the copy source volume before executing a command:

- When a replication is performed between different OSs
- 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

In the above-mentioned cases, if neither drive letter release nor unmount have been performed, post-processing of the copy source volume at the time of duplicate creation will produce an error.



Note

In the operation mode involving activation of the replica volume group, the post-processing script for the replica volume may take longer for command processing because the LVM management information is rewritten (recreatevg).



Point

Before a replica is created, the replication pre-processing and post-processing scripts for the source volume are executed (for synchronized replication, only pre-processing script is executed). After the replica has been created, the post-processing script for the replication source volume and replication destination volume is executed. For information on customizing these scripts, refer to "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.



Point

If this command is executed during 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. If you cannot cancel the drive letter of the replication source volume or execute unmount because of the situations described below, this command will fail and terminate:

- 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 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 cancellation of the share setting, unmounting, or some other method. If for whatever reason you do not want to remove the share setting of the replication source volume or execute unmount or some other method, refer to "Pre-processing and Post-processing of Replication" and note the following.
 - When setting a volume group which consists of two or more logical disks as a source volume, and replicating it, make all logical devices unmount/mount using the Administrator's authority.
 - 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" will be output.
 - 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

For Snap Data Volumes, only SnapOPC/SnapOPC+ can be executed; OPCs and QuickOPCs cannot 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

Refer to "General notes" for notes on creating replicas.



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (swsrpsetvol)
- Replication volume information deletion command (swsrpdelvol)
- Resource adjustment command (swsrprecoverres)



Point

If this command is executed during snapshot processing, snapshot processing is re-started. Refer to the following table for details of copy operation:

Table: Copy operations if commands are executed during snapshot processing

<u>Operation status</u> (Display by <code>swsrpstat -L</code>)	<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 that is in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	Yes	Copying that is in progress is terminated and differential snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	No	Copying that is in progress is terminated and ordinary snapshot processing is restarted.
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 restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	Yes	Differential snapshot processing is restarted.

9.4.2.3 Operation status display command (`swsrpstat`)

This command displays the operation status of the specified volume. If a volume is not specified, the operation status of each replication volume is displayed.

a. Format

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpstat [-L] [-E] [-H] [-O] [Original-Volume-Name]
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpstat -h Server-Name [-L] [-E] [-H] [-O]
[Original-Volume-Name]
[if executed on a Storage Server: group specification]
/opt/FJSVswsrp/bin/swsrpstat [-L] [-E] [-O] -Xgroup Group-Name
[if executed on a Storage Management Server: group specification]
/opt/FJSVswsrp/bin/swsrpstat -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.

Option	Description
-L	Specifies that display will be in extension format. For the items displayed by this option, refer to the table in the following example. Note that the items displayed by this option may be subject to change in a future release.
-E	An option which, when set, will display the operational status in the opposite direction only (from the copy destination to the copy source). If this option is not set, the operation status will always be displayed in the normal direction (from the copy source to the copy destination) when a bi-directional OPC physical copy is taking place. This option can be used to check the operational status of an OPC session performed in the opposite direction if a QuickOPC/SnapOPC session in the normal direction exists.
-Xgroup	Specifies that the operation statuses are displayed by the group. If this option is set, all the operational statuses relating to 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.
-0	Changes the Status field display method used when in error suspend (failed) status. If this option is specified, the display is as follows: <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)" ● In other cases: "failed(other)"

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 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.

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

Direct that all the replication statuses for Storage Server SRC-SV be displayed on the Storage Management Server.

```
#swwsrpstat -h SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/vg01@SRC-SV /dev/vg01@TARG-SV regular replicated ----
SRC-SV /dev/vg02@SRC-SV /dev/vg02@TARG-SV ---- ---- ----
SRC-SV /dev/vg02@SRC-SV /dev/vg03@TARG-SV reverse snap 45%
#
```

From Storage Management Server to Storage Server: Instruct SRC-SV to display the status of all replications (with the -L option specified).

```
# /opt/FJSVswsrp/bin/swwsrpstat -L
Server Original-Volume Replica-Volume Direction Status
Execute Trk Update Rcv Split Xfer Snap-Gen
SRC-SV /dev/vg01@SRC-SV /dev/vg01@TARG-SV regular replicated ----
---- auto ---- async ----
SRC-SV /dev/vg02@SRC-SV /dev/vg02@TARG-SV ---- ---- ----
on 6% ---- ---- ---- ----
SRC-SV /dev/vg03@SRC-SV /dev/vg03@TARG-SV reverse snap 45%
off ---- ---- ---- ----
SRC-SV /dev/vg01@SRC-SV /dev/vg01@TARG-SV regular copy-on-write(inactive) ----
off 0% ---- ---- ---- 1
SRC-SV /dev/vg01@SRC-SV /dev/vg02@TARG-SV regular copy-on-write(inactive) ----
off 5% ---- ---- ---- 2
SRC-SV /dev/vg01@SRC-SV /dev/vg03@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	Displays the copy direction. <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 being performed.

Title	Description
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 maintenance 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 (ie, the hard suspend status has been entered during a REC total copy or differential copy) ● halt(equivalent): Hard suspend status (ie, the hard suspend status has been entered during an REC equivalency maintenance state) ● snap : OPC or QuickOPC processing is being performed. ● ????? : Copy status cannot be determined.
Execute	<p>Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed.</p>
Trk	<p>Displays whether tracking processing is in progress.</p> <p>on : Tracking processing is in progress.</p> <p>off : Tracking processing is not in progress.</p> <p>----: Snapshot processing is not being performed.</p> <p>Always displays "----" when the GDS Snapshot linkage function is enabled.</p>
Update	<p>Displays the percentage of data that has been updated since the last copy was created, in any of the following cases. 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>

Title	Description
Rcv	Indicates recovery mode for inter-box synchronization. auto: Automatic Recovery mode. manual: Manual Recovery mode. ----: Synchronous duplication (REC) is not performed between boxes.
Split	Indicates split mode for inter-box synchronization. auto: Automatic Split mode. manual: Manual Split mode. ----: Synchronous duplication (REC) is not performed between boxes.
Xfer	Indicates transfer mode in inter-box synchronization. sync: Synchronous mode. async: Asynchronous mode. stack: Stack mode. consist: Consistency mode. ----: Synchronous duplication (REC) is not performed between boxes.
Snap-Gen	Displays the Snap generation number (1 to 8) if SnapOPC+ is being performed. If SnapOPC+ is not being performed, "----" is displayed. A Snap generation number of 1 indicates the oldest generation, and each time the number increases it becomes the latest generation.



Note

If the execution status (displayed in the Status field) is "failed", "halt", or "?????", refer to "Troubleshooting for a hardware error, etc. occurring during backup" and take the required action.



Note

The operation status cannot be displayed if:

- The volumes have not been set as replication volumes.
- Changes have been made to the logical disk configuration which cannot be supported AdvancedCopy Manager.



Note

This command cannot be executed while the following command is running:

- Resource adjustment command (swsrprecoverres)

9.4.2.4 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 and when you want to stop replication processing.

a. Format

```
[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] [-Xgds-slice-skipchk]
[-m] [-b])|[-T] |[-Xforce]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 only be specified 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 (eg, due to system failure). 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, this option specifies that communication processing is not performed with non-operation servers. 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, specifies that pre-processing and post-processing for the copy source volume is not to be executed. 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. It can also be used 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 in the equivalency maintenance status, this option specifies that post-processing for the copy destination volume will not be executed. Use this option when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command. It can also be used when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

Option	Description
-b	<p>Specified to stop inter-cabinet copy processing with the halt status. 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.</p> <p>The option is valid only for a copy operation in the halt status, and should only be performed if the operation is not expected to be recoverable. This option can be used only when the copy processing status is halt. This option can be used on a 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.</p>
-T	<p>Specifies that differential snapshot processing will be terminated. This option only terminates tracking processing and does not terminate snapshot processing (OPC physical copying). 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, and 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.</p>
-Xgroup	<p>Specifies that copy processing will be stopped for each group.</p>
-Xreverse	<p>Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) will be stopped.</p>
-Xgds-slice-skipchk	<p>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.</p>
-Xforce	<p>This option enables a SnapOPC+ session to be forcibly stopped and the specified Snap generation and all earlier Snap generations are stopped. 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.</p>

c. Description of operands

Operand	Description
From-Volume-Name	<p>Specifies a copy source volume name. This is the replication source volume or the replication destination volume set with the replication volume information setting command (swsrpsetvol).</p>
To-Volume-Name	<p>Specifies a copy destination volume name. This is the replication source volume or the replication destination volume set with the replication volume information setting command (swsrpsetvol).</p>

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

On the Storage Management Server, direct that copying from /dev/vg01 to /dev/vg01@TARG-SV is stopped for Storage Server SRC-SV.

```
#/opt/FJSVswsrp/bin/swsrpcancel -h SRC-SV /dev/vg01 /dev/vg01@TARG-SV
FROM=/dev/vg01@SRC-SV,TO=/dev/vg01@TARG-SV swsrpcancel completed
#
```

Stops copy processing for group "GRP1".

```
# swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
#
```



Note

This command ends normally if succeeding in the copy termination processing of the case either specification or the execution of b option by the replication in the server.



Note

Copy processing cannot be performed if:

- The specified source and destination volumes are not set as replication volumes.
- The copy processing is not performed for the specified replication source and 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.
- Changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager.
- The backup management function or tape backup function uses a specified source or 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 cases:

- If no replication volumes have been copied
- If you execute the -b option when no instance of copy processing is currently in the halt state in the group.
- if you execute the -T option when no tracking processing of QuickOPC is currently occurring 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

In the operation mode involving activation of the replica volume group, the post-processing script for the replica volume may take longer to process because the LVM management information is rewritten (recreatevg).



Note

The volume information for the specified volume is not checked (ie, there is no check to match the volume information in the management list and the actual physical information). The operation is canceled unconditionally 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.

Table: Processing for operational statuses

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 maintenance 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 maintenance.

If replication is canceled before the equivalency maintenance status is achieved, the replica volume is placed in the incomplete state and, in the case of a file system, the replica volume cannot be mounted.

If the processing target is a volume group, the operation may be customized so that the pre-processing and post-processing scripts for the replica volume are used to mount and unmount the volume. If replication is canceled before the equivalency maintenance state is achieved under these conditions, take action as follows:

- To start synchronous processing
Execute the replication start command (swsrpstartsync) with the -t option specified.
- To execute replication
Execute the replication creation command (swsrpmake) with the -t option specified.
After replication is completed, mount the replica volume.



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting 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.

Table: Processing when -T option is not specified

<u>Operational status</u> (Displayed with swsrpstat -L)	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.

Table: Processing when -T option is specified

<u>Operation status</u> <u>(Display by swsrpstat -L)</u>	<u>Processing</u>
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 (ie, 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.

9.4.2.5 Synchronization mode change command (swsrpchsnc)

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

a. Format

```
[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. 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.
-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. 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) will be changed.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies the name of a source volume. This is the source volume or replica volume configured by the replication volume information set command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume. This is the source volume or replica volume configured by the replication volume information set command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

From Storage Management Server to Storage Server: Instruct SRC-SV to change the transfer mode for inter-box synchronization between /dev/vg03@SRC-SV and /dev/vg03@TARG-SV from Consistency mode to Asynchronous mode.

```
#!/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/vg03@SRC-SV
Server Original-Volume  Replica-Volume  Direction Status Execute Trk  Rcv  Split
Xfer
SRC-SV /dev/vg03@SRC-SV /dev/vg03@TARG-SV regular  sync  99%  ---- auto ----
consist
:
#!/opt/FJSVswsrp/bin/swsrpchsnc -h SRC-SV -F Async /dev/vg03@SRC-SV
/dev/vg03@TARG-SV
FROM=/dev/vg03@SRC-SV, TO=/dev/vg03@TARG-SV swsrpchsnc completed
:
#!/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/vg03@SRC-SV
Server Original-Volume  Replica-Volume  Direction Status      Execute Trk  Rcv
Split Xfer
SRC-SV /dev/vg03@SRC-SV /dev/vg03@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.

```
# swsrpchsnc -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsnc completed
#
```



Note

In any of the following cases, you cannot change the operation mode of inter-box synchronization:

- The specified source/replica volume has not been configured as a replica volume.
- None of the -F, -R, and -S options are 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 has error-suspended status (with "failed" indicated by the operating status display command (swsrpstat)) or hard-suspended status (with "halt" indicated by the operating status display command (swsrpstat)).
- The disk array in which the specified source/replica volume is placed does not support the operation mode change function.
- Changes have been made to the logical disk configuration that AdvancedCopy Manager does not support.
- The specified volume group is inactive.



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 one or more replication volumes meet any of the conditions above.

Additionally, if the `-Xgroup` option is specified, replication volumes are processed in order, but processing will be terminated immediately 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 equivalence maintenance status is attained.



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (`swsrpsetvol`)
- Replication volume information deletion command (`swsrpdelvol`)
- Resource adjustment command (`swsrprecoverres`)

9.4.2.6 Synchronization reverse command (`swsrprevsync`)

This command reverses the copying direction of synchronization when in suspended status.

Note that this command cannot be used to handle a logical volume of an SDX object.

a. Format

```
[To be executed on a Storage Server]
/opt/FJJSVswsrp/bin/swsrprevsync From-Volume-Name To-Volume-Name

[To be executed on a Storage Management Server]
/opt/FJJSVswsrp/bin/swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name

[if executed on a Storage Server: group specification]
/opt/FJJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup Group-Name

[if executed on a Storage Management Server: group specification]
/opt/FJJSVswsrp/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) will be inverted.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies the name of a source volume (as the destination in the reverse direction). This is the source volume or replica volume configured by the replication volume information set command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume (as the source in the reverse direction). This is the source volume or replica volume configured by the replication volume information set command (swsrpsetvol).

d. End status

- = 0: Normal end
- > 0: Abnormal end

e. Example

From Storage Management Server to Storage Server: Instruct SRC-SV to reverse the copying direction of synchronization between /dev/vg03@SRC-SV and /dev/vg03@TARG-SV.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV /dev/vg03@SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/vg03@SRC-SV /dev/vg03@TARG-SV reverse replicated ----
#/opt/FJSVswsrp/bin/swsrprevsync /dev/vg03@TARG-SV /dev/vg03@SRC-SV
FROM=/dev/vg03@SRC-SV,TO=/dev/vg03@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /dev/vg03@SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute
SRC-SV /dev/vg03@SRC-SV /dev/vg03@TARG-SV regular replicated ----
#
```

Change the direction of synchronous processing for group "GRP1".

```
# swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
#
```



Note

In any of the following cases, you cannot reverse the direction of synchronization:

- The specified source/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 source/replica volume is placed does not support the reverse function.
- Changes have been made to the logical disk configuration that AdvancedCopy Manager does not support.
- The specified volume group is inactive.



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 one or more replication volumes meet any of the conditions above.

Additionally, if the `-Xgroup` option is specified, replication volumes are processed in order, but processing will be terminated immediately 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 are running:

- Replication volume information setting command (`swsrpsetvol`)
- Replication volume information deletion command (`swsrpdelvol`)
- Resource adjustment command (`swsrprecoverres`)

9.4.3 Maintenance commands

This section describes the maintenance commands for replication management.

9.4.3.1 Resource adjustment command (`swsrprecoverres`)

This command executes recovery to make replication management information consistent if a system failure or other problem has made the information inconsistent.

a. Format

<p>[To be executed on a Storage Server] <code>/opt/FJSVswsrp/bin/swsrprecoverres [-r] [-p]</code></p> <p>[To be executed on a Storage Management Server] <code>/opt/FJSVswsrp/bin/swsrprecoverres -h <i>Server-Name</i> [-r] [-p]</code></p>
--

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be used only on a Storage Management Server.

Option	Description
-r	Specify this option when an incorrect status exists in the replication management files (for example, when the replication volume information setting command (swsrpsetvol) or the replication volume information deletion command (swsrpdelvol) terminates suddenly because of a forced stop or a system failure, or when the replication management files have been deleted by mistake). When this option is specified, the following processing is performed to re-create the replication management files. 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 already been performed. This option can be used when the replication creation command (swsrpmake) processing terminates suddenly because of a forced stop or system failure.

- c. End status
= 0: Normal end
> 0: Abnormal end

- d. 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 setting command (swsrpsetvol) and the replication volume information deletion command (swsrpdelvol) has been forcibly terminated.

The -r option is specified and the command terminates with an error when changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager.



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 volume or replication destination volume and the replication creation command (swsrpmake) closes before processing is complete, replication post-processing is executed if it is set to run unattended.



Note

This command cannot be executed while any of the following commands are running:

- Replication volume information setting command (swsrpsetvol)
- Replication volume information display command (swsrpvoinfo)
- Replication volume information deletion command (swsrpdelvol)
- Synchronous processing start command (swsrpstartsync)
- Replication creation command (swsrpmake)
- Replication status display command (swsrpstat)
- Replication cancellation command (swsrpcancel)
- Synchronization mode change command (swsrpchsinc)
- Synchronisation reverse command (swsrprevsync)
- Resource adjustment command (swsrprecoverres)

9.5 Start/Stop Daemon Commands

This section describes the ways in which AdvancedCopy Manager daemons can be started.



Note

Additional information about this command:

- Confirm that environment variable SWSTGNODE is not set.
- Execute this command with the same locale as the LANG environment variable used by the system.
- Only a root user can execute this command.
- For cluster operation, refer to “Starting and Stopping Daemons”

9.5.1 Starting and stopping the communication daemon

- Starting the communication daemon

Enter the following command to stop the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom start
```

- Stopping the communication daemon

Enter the following command to stop the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom stop
```

9.5.2 Starting and stopping AdvancedCopy Manager daemons

The daemons listed below are started and stopped together:

Table: Daemons started and stopped as a batch

Server type	Storage Server
Daemon name	Communication daemon

* For details on how to start a daemon of a Storage Management Server, refer to the “ETERNUS SF AdvancedCopy Manager Operator’s Guide” applicable to the OS of the Storage Management Server.

- Starting an AdvancedCopy Manager daemon

Enter the following command to start an AdvancedCopy Manager daemon:

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

- Stopping an AdvancedCopy Manager daemon

Enter the following command to stop an AdvancedCopy Manager daemon:

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

9.6 SnapOPC/SnapOPC+ Support Commands

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 for SnapOPC/SnapOPC+ support commands

Command	Operating environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-



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, refer to the Remarks column.

Table: Commands for cluster operation

Command	Environment variable	Command execution node	Remarks
swstestupdate	Not required	Cluster active server	-
swstsdv	Not required	Cluster active server	-

9.6.1 Update volume measurement command (swstestupdate)

This command measures the physical capacity of Snap Data Volumes using the pseudo SnapOPC session setup function.

a. Format

```
[When starting update volume measurements (setting up a pseudo SnapOPC session)]
/opt/FJSVswsts/bin/swstestupdate start Volume-Name
[When looking up the update volume (displaying the status of the pseudo SnapOPC
session)]
/opt/FJSVswsts/bin/swstestupdate status Volume-Name

[When finishing update volume measurements (canceling the pseudo SnapOPC 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. Example

Measure the update volume for /dev/hdisk10:

```
(Start taking measurements by starting a pseudo SnapOPC)
#/opt/FJSVswsts/bin/swstestupdate start /dev/hdisk10
/dev/hdisk10 swstestupdate completed

(First measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/hdisk10
Volume-Name Update
/dev/hdisk10 644333

(Second measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/hdisk10
Volume-Name Update
/dev/hdisk10 1045000

(Stop taking measurements by canceling the pseudo SnapOPC)
# /opt/FJSVswsts/bin/swstestupdate stop /dev/hdisk10
/dev/hdisk10 swstestupdate completed
#
```

The following information will be displayed:

Title	Description
Volume-Name	The volume name.
Update	The amount of data that has been updated since measurements started (shown as the number of blocks, where 1 block = 512 bytes). Displays "----" if there is no pseudo SnapOPC session. Displays "failed" if the pseudo SnapOPC 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 (ie, when the "start" option is specified).
- When the pseudo session does not exist (ie, when the "stop" option is specified).

9.6.2 Snap Data Volume operation/reference command (swstsdv)

This command can be used to initialize a Snap Data Volume and to display the status of the Snap Data Volume or Snap Data Pool. The following subcommands can be used with this command.

Table: Subcommand list

Subcommand	Function
init	<u>Snap Data Volume initialization</u>
stat	<u>Snap Data Volume status display</u>
poolstat	<u>Snap Data Pool status display</u>



Note

If there is insufficient capacity in a Snap Data Volume, the access path and the ETERNUS disk array logical unit number (LU-Number) can be used to enable operations.

Once a volume reaches this state (has insufficient capacity) the "stat" subcommand cannot be used to retrieve the LU-Number (the command will terminate abnormally), therefore it is recommended that a record be kept of all LU-Numbers for Snap Data Volumes.

Snap Data Volume initialization

Use the "init" subcommand to initialize a Snap Data Volume.



Note

Initialize the Snap Data Volume before SnapOPC/SnapOPC+ is started.



Point

Initialization of a Snap Data Volume discards all data in the 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 recorded.)

- 1) If the Snap Data Volume contains data that is still needed, use OS commands or similar to save the data before initializing the volume.
- 2) Initialize the disk management information.
When operations are performed from the logical volume manager, set the targeted Snap Data Volume (physical disk) so 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/FJVSswsts/bin/swstdsv init Volume-Name
or
/opt/FJVSswsts/bin/swstdsv init -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/vg51).

```

# /opt/FJVSswsts/bin/swstdsv init /dev/vg51
swstdsv init completed
#
```

If a capacity shortage has occurred, use the access path (/dev/vg31) to initialize the volume of LU-Number (201).

```

# /opt/FJVSswsts/bin/swstdsv init -G /dev/vg31 201
swstdsv init completed
#
```

Snap Data Volume status display

Specify "stat" in the subcommand to display the Snap Data Volume's logical capacity, physical capacity, the size of the area in use and the amount of available space.

f. Format

```

/opt/FJVSswsts/bin/swstdsv stat Volume-Name
or
/opt/FJVSswsts/bin/swstdsv stat -G Access-Path-Name LU-Number
```

g. Description of option

Option	Description
--------	-------------

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) that is to be initialized. If partitions (slices) have been specified, information about 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/vg51).

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/vg51
BoxID = 00E4000M3#####E450S20A#####KD4030639004##
LUN = 201 (0xC9)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector)
Pool(sector)
0% 8388608          1048576          0          0          0          0
```

Use the access path (/dev/vg31) to display the status of LU-Number (201).

```
# /opt/FJSVswsts/bin/swstsdv stat -G /dev/vg31 201
BoxID = 00E4000M3#####E450S20A#####KD4030639004##
LUN = 201 (0xC9)
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's 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

Title	Description
	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 available space.

k. Format

```
/opt/FJSVswsts/bin/swstsdv 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/vg31) to display the status of the Snap Data Pool.

```
# /opt/FJSVswsts/bin/swstsdv poolstat -G /dev/vg31
BoxID = 00E4000M3#####E450S20A####KD4030639004##
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.

Title	Description
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 10 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

10.1 Notes on Backup and Replication Operation

This section provides information on backup and replication.

10.1.1 General notes

This section provides general information on backup and replication.

Storage Server locale

The internal code system (the "locale", language value, as specified when AdvancedCopy Manager is installed on the Storage Management Server) used by AdvancedCopy Manager must also be used when AdvancedCopy Manager is installed on all Storage Servers associated with the Storage Management Server.

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: Response measures when a language environment (LANG) is different

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.

Storage Management Server	Storage Server	Action required
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
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.

In addition, if inter-server replication is executed, the code system at the replication source server must be installed on the replication destination server at the same locale.

Backup and Replication Exclusions

The following devices must not be subject to backup or replication.

- The device on which the system is stored
- The device on which AdvancedCopy Manager has been installed
- The device on which the resource files of AdvancedCopy Manager reside

Table: Consistency of data in volumes

Data in transaction volumes	Data consistency	Action to take
File system	An AdvancedCopy Manager command unmounts the file system to maintain data integrity.	Refer to 'Pre-processing and Post-processing of Backup and Restoration' and 'Pre-processing and Post-processing of Replication'.
Other than above	Data integrity must be maintained in operations.	Take appropriate action, such as stopping transactions during execution of backup or replication.

Fetching Device Information

Before starting the backup or replication operation, fetch the device information that is managed by all the Storage Servers using the GUI client of AdvancedCopy Manager. The time taken to complete this operation will be proportional to 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 on the system is low.

As a guide, about 0.5 seconds are required per device (i.e., disk) when there is no load on the system.

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.

Notes for multipath configurations

When the device has a multipath configuration, a path switch is not carried out automatically, even if one of the two paths is blocked.

When one of the two paths is blocked, please perform backup or replication again after taking the following steps:

1. Execute the following command on an available device to switch the path:

```
/usr/sbin/lspv hdisk*
```

2. Execute the backup or replication command again.

Mounting of disks from other servers

Before backing up, restoring or replicating a volume that can be mounted from multiple servers, cancel mounting from the other servers.

For disks that need not be mounted from other servers, prevent multiple servers from detecting or accessing the same logical disk by setting up hardware, such as devices in the Fujitsu ETERNUS storage system and fiber channel switches, accordingly.

Notes on copy operations targeted at file systems

For a copy operation targeted at a file system, unmount the applicable volume to prevent data access and maintain the data integrity.

If backup, restore or replication are performed without unmounting the volume, an error occurs since a volume in use cannot be unmounted.

Note the following conditions under which unmounting is enabled:

- Another application is not using the volume. If another application is using it, suspend the application temporarily.
- The volume is not in use. If users are accessing the volume, prohibit them from using it temporarily.
- Another volume is not mounted under the volume. If it is mounted, unmount it temporarily.
- The volume is not shared using NFS sharing. If it is shared, unshare it temporarily.

Unmounting is required only during command execution. Operation can be resumed after command execution.

Notes when copying between different OS

The replication operation can be used for copying between different OS.

Use the combinations shown below to copy between different OSs.

Table: Combinations for copying between different OS

		Replication destination	
		Slice	Logical Unit (disk)
Replication source	Slice	Y	N
	Logical Unit (disk)	Y	N

Y: Possible, N: Not Possible

Notes when using the `-m` option

The `-m` option can be specified in the following commands in order to avoid performing communication processing with non-operating servers during inter-server replication:

- Replication start command (`swsrpstartsync`)
- Replica create command (`swsrpmake`)
- Replication cancel command (`swsrpcancel`)

If the `-m` option is specified, any one of the following conditions must be met in order to avoid problems arising through not performing pre-processing and post-processing at non-operating servers:

1. The non-operating server is shut down.
2. Separate pre-processing and post-processing is executed manually for the volumes on the non-operating server.
3. The target volumes are RAW devices (Oracle, etc., which do not require pre-processing and post-processing), rather than file systems.

Copy processing performance of Advanced Copy

Since the copy processing for Advanced Copy is performed by the disk array unit, please direct enquiries concerning the copy processing performance to your disk array device support department.

Server restart after backup replication

When restart the server after executing backup or replication, the backup volume will be disabled because its status will change from "active" to "defined." Furthermore, the backup volume may be newly detected by another device name. In this case, the backup management/replication management command will become one of the following errors.

- `swst3603`
- `swst3605`
- `swst3606`
- `swsrp3603`
- `swsrp3605`
- `swsrp3606`

When this occurs, the newly detected device must be deleted and the backup volume that can no longer be detected must be recovered.

Please follow the steps below:

(The examples below explain the cases where the transaction volume is described as `vg02` created in `hdisk2`, the backup volume is described as `vg04` created in `hdisk4`, and the newly detected device name is described as `hdisk17`.)

1. Unmount all volumes in the transaction disk

```
# umount /mnt/vg02
```

2. Deactivate the volume group of the transaction disk

```
# varyoffvg vg02
```

3. Check the disk status

```
# lspv
hdisk0    005f74da1705160e    rootvg    active
hdisk1    005f74da6688a970    None
hdisk2    005f74da8a1b6e2f    vg02      active
hdisk3    005f74da70e35fc7    vg03      active
hdisk5    005f74da8af5069d    None
hdisk16   005f74da6fd209eb    vg16      active
hdisk17   005f74da8a1b6e2f    vg02      active ← The backup volume detected with a
new name.
```

4. Delete the disk definition newly detected

```
# rmdev -l hdisk17 -d
hdisk17 is deleted
```

5. Activate the volume group of the transaction disk

```
# varyonvg vg02
```

6. Mount all the volumes in the transaction disk

```
# mount /mnt/vg02
/dev/lv00 log is recreated
```

7. Status of the transaction disk is activated.

```
# mkdev -l hdisk4
hdisk4 can be used
```

8. Check if the backup volume can be activated for use

```

# lspv
hdisk0    005f74da1705160e    rootvg    active
hdisk1    005f74da6688a970    None
hdisk2    005f74da8a1b6e2f    vg02      active
hdisk3    005f74da70e35fc7    vg03      active
hdisk4    005f74da8a2d04e0    vg04
hdisk5    005f74da8af5069d    None
hdisk16   005f74da6fd209eb    vg16      active

```

10.1.2 Notes on the snapshot high-speed backup

This section provides notes on the snapshot high-speed backup.

Number of Required Backup Volumes

Snapshot high-speed backup requires as many backup volumes as the number of specified backup 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.

Simultaneous Backup

Performing the snapshot high-speed backup simultaneously with the same transaction volume specified will perform two backups in parallel.

However, performing the snapshot high-speed backup simultaneously more often than the number of preservation generations will cancel the backups starting from the oldest one. In other words, you cannot perform more simultaneous backups than the specified number of generations.

10.1.3 Notes on synchronous high-speed backup

This section provides notes on synchronous high-speed backup.

Backup processing

The backup command cannot be executed until the transaction and backup volumes are in the equivalency maintenance state.

Backup policy settings

Backup policies can still be set up if the number of registered backup volumes is enough for snapshot-type high-speed backup, even if the number is not enough for synchronous high-speed backup. In this case, synchronized backup will not be possible.

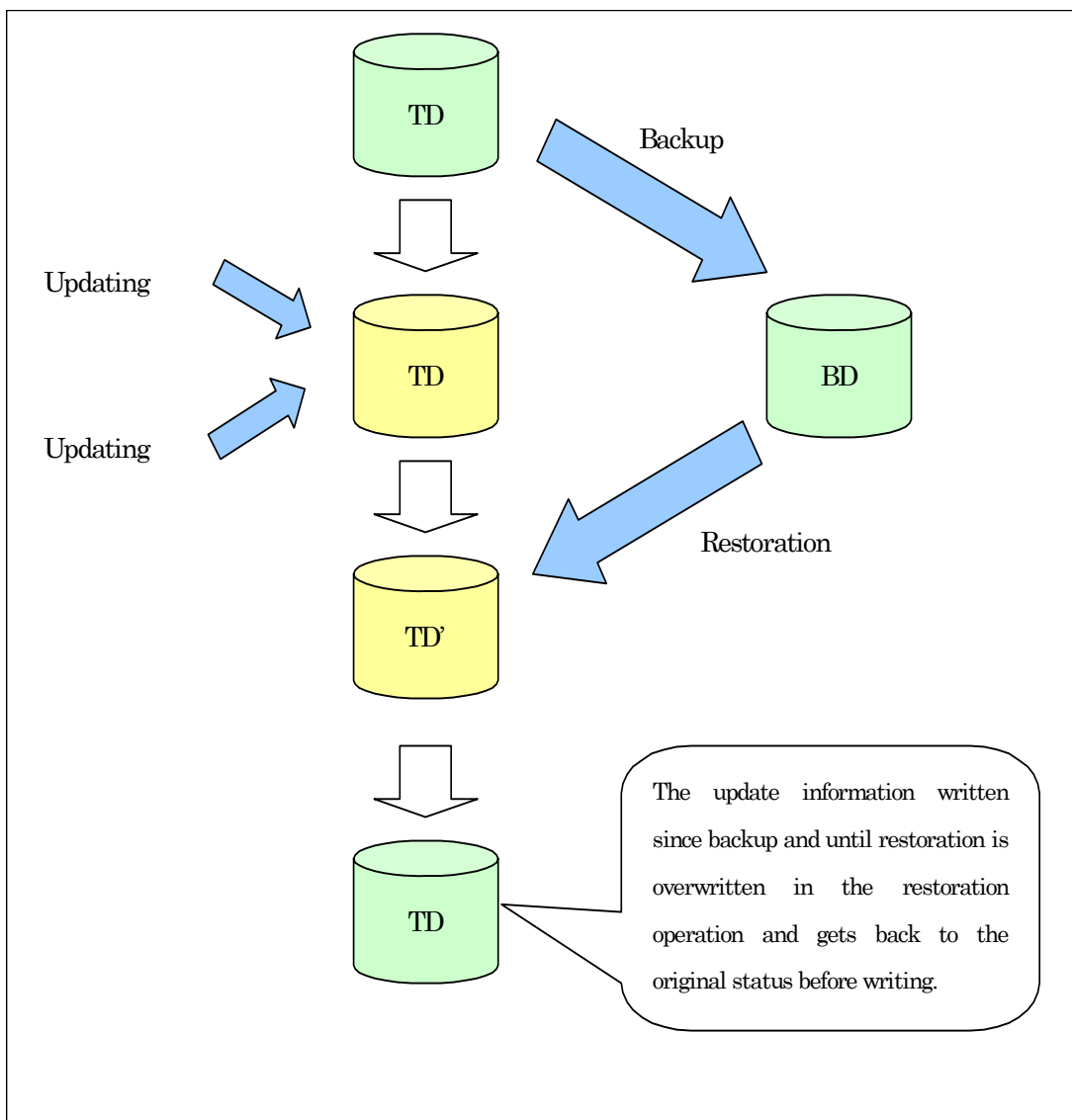
10.1.4 Notes on restoration

This section provides information on the restoration operation.

Timing of Restoration

If data on a transaction volume has been updated since the latest backup, then if a restore is performed from the backup volume, recently updated data will be over-written.

Figure: Notes on restoration of AdvancedCopy Manager



TD: Transaction volume

BD: Backup volume

Procedure which mounts backup volume

AIX uses LVM to manage all devices. Therefore, executing backup rewrites the LVM management information in the backup volume with that in the transaction volume. As a result, the backup volume cannot be activated and the logical volume of the backup volume cannot be mounted. To mount the backup volume, the LVM management information in the backup volume must be rewritten. However, this operation is not recommended because it results in an inability to use the normal procedure to restore the transaction volume. If circumstances require mounting of the backup volume, the procedure given below can be used to mount the backup volume. Follow the procedure very carefully; otherwise, transaction data may be destroyed. For information on each command, refer to the AIX manuals. Also, see the following section: "Restoration procedure after LVM management information in the backup volume is rewritten".

1. Using, for example, the `lspv` command, specify the physical volume name of the backup volume.

```
# /usr/sbin/lspv
hdisk0      0004f10aa92e686c    rootvg
hdisk1      0004f10alc7879c5    vg01
```

In the above example, the volume group name of the backup volume is `vg01`, and the physical volume name is `hdisk1`.

2. Use the `chdev` command to temporarily remove the backup volume from LVM.

```
# /usr/sbin/chdev -l hdisk1 -a pv=clear
```

3. Use the `exportvg` command to export the backup volume.

```
# /usr/sbin/exportvg vg01
```

4. Use the `recreatevg` command to rewrite the LVM management information in the backup volume.

```
# /usr/sbin/recreatevg -y vg01 hdisk1
```

5. Executing the `recreatevg` command changes the logical volume name in the volume group. Use the `lsvg` command to confirm the new logical volume name.

```
# /usr/sbin/lsvg -l vg01
vg01:
LV NAME          TYPE      LPs   PPs   PVs   LV STATE      MOUNT POINT
fslv01           jfs       2     2     1     closed/syncd  N/A
```

6. Mount a file system by specifying the logical volume name confirmed in step 5. Unmount the logical volume before the next time that backup is performed. If the logical volume in the backup volume is mounted, backup fails.

Restoration procedure after the LVM management information for the backup volume is rewritten

Rewriting the LVM management information in the backup volume makes it inconsistent with that in the transaction volume and prevents use of the normal procedure to restore the backup volume. In such cases, follow the procedure given below to restore it. Follow the procedure very carefully; otherwise, transaction data may be destroyed. For information on each command, refer to the AIX manuals.

7. Refer to "Pre-processing and Post-processing of Backup and Restoration" and edit the post-processing script for restoration.
8. Execute restore processing. The transaction volume is now inactive because of the action taken in step 1.

9. Using, for example, the `lspv` command, display the physical volume name of the transaction volume.

```
# /usr/sbin/lspv
hdisk0      0004f10aa92e686c    rootvg
hdisk1      0004f10a1c7879c5    vg01
```

In the above example, the volume group name of the transaction volume is `vg01`, and the physical volume name is `hdisk1`.

10. Use the `chdev` command to temporarily remove the transaction volume from LVM.

```
# /usr/sbin/chdev -l hdisk1 -a pv=clear
```

11. Use the `exportvg` command to export the transaction volume.

```
# /usr/sbin/exportvg vg01
```

12. Use the `recreatevg` command to rewrite the LVM management information in the transaction volume.

```
# /usr/sbin/recreatevg -y vg01 hdisk1
```

13. Executing the `recreatevg` command changes the logical volume name in the volume group. Use the `lsvg` command to confirm the new logical volume name.

```
# /usr/sbin/lsvg -l vg01
vg01:
LV NAME          TYPE      LPs  PPs  PVs  LV STATE      MOUNT POINT
fslv01           jfs       2    2    1    closed/syncd  N/A
```

14. Mount a file system by specifying the logical volume name confirmed in step 7.

Procedure for restoration to a volume other than a transaction volume

When a backup volume is restored to a volume other than a transaction volume, the pre-processing and post-processing scripts for restoration are not executed. This operation also makes the LVM management information in the backup volume inconsistent with that in the restoration destination volume. In this case, the LVM management information must be rewritten. For these reasons, to restore a backup volume to a volume other than a transaction volume, follow the procedure given below. Follow the procedure very carefully; otherwise, transaction data may be destroyed. For information on each command, refer to the AIX manuals.

1. Unmount all logical volumes in the volume group of the restoration destination volume.
2. Use the `varyoffvg` command to deactivate the volume group of the restoration destination volume. The execution example shown below uses a volume group named `vg01` for the restoration destination volume.

```
# /usr/sbin/varyoffvg vg01
```

3. Execute restoration for the restoration destination volume. For the procedure, see "Performing restoration".

- Using, for example, the `lspv` command, display the physical volume name of the restoration destination volume.

```
# /usr/sbin/lspv
hdisk0      0004f10aa92e686c    rootvg
hdisk1      0004f10alc7879c5    vg01
```

In the above example, the volume group name of the restoration destination volume is `vg01`, and the physical volume name is `hdisk1`.

- Use the `chdev` command to temporarily remove the restoration destination volume from LVM.

```
# /usr/sbin/chdev -l hdisk1 -a pv=clear
```

- Use the `exportvg` command to export the restoration destination volume.

```
# /usr/sbin/exportvg vg01
```

- Use the `recreatevg` command to rewrite the LVM management information in the restoration destination volume.

```
# /usr/sbin/recreatevg -y vg01 hdisk1
```

- Executing the `recreatevg` command changes the logical volume name in the volume group. Use the `lsvg` command to confirm the new logical volume name.

```
# /usr/sbin/lsvg -l vg01
vg01:
LV NAME          TYPE      LPs   PPs   PVs   LV STATE      MOUNT POINT
fslv01           jfs       2     2     1     closed/syncd  N/A
```

- Mount a file system by specifying the logical volume name confirmed in step 8.

10.1.5 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 composing a transaction. If the daemon stops for some reason, AdvancedCopy Manager does not automatically restart it, so you must restart it manually. The stopping of a transaction-oriented daemon of AdvancedCopy Manager does not cause the package to fail over.

For details on the daemons composing AdvancedCopy Manager transactions and how to start these daemons, refer to "Starting and Stopping Daemons".

10.1.6 Notes on backup operation in cluster operation

VERITAS Cluster Server

For backup 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 ensure consistency by using the resource adjustment command as a recovery measure.
- To use synchronous high-speed backup, do not register a backup to any cluster transaction.
- You must perform backups on the active system of the service group because AdvancedCopy Manager is placed into the service group and operates as part of the service group. You cannot make a backup from a standby node or another service group.
- To perform backup/restore using AdvancedCopy Manager, you usually need to unmount transaction volumes beforehand and mount the volumes later.

If the mount points of transaction volumes have been registered to a cluster transaction, set the mount point resource online or offline from the cluster transaction instead of mounting or unmounting the volumes. Alternatively, modify the backup/restore pre-processing and post-processing scripts so that the transaction volumes are set offline or online instead of being unmounted or mounted.

Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed.

For details and examples on the pre-processing and post-processing scripts, see "Backup/Restore Pre-processing/Post-processing". For details on the commands used to set resources offline and online, see the relevant cluster system manual.

10.1.6.1 Backup and restoration during package stoppage

VERITAS Cluster Server

When a service group to which AdvancedCopy Manager belongs is operating, backup is enabled only on the active node. The standby node environment is not ready to provide the necessary resources, thus disabling backup operation. Likewise, if the service group has been stopped, the environment is not ready and backup is disabled.

However, backup operation is re-enabled only when the service group has been stopped by temporarily arranging the minimum resources.



Note

- Backup is disabled if either of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system):
 - Shared disk for AdvancedCopy Manager shared data
 - Backup operation disk (transaction volume/backup volume to operate)
- The following operations are not allowed in a backup:
 - Backup/restoration using the Web GUI
 - Manipulation of the backup operation from a Storage Management Server (host specification with the -h option)
 - Addition or deletion of a transaction volume/backup volume, or a change in policy
- In order 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 "Commands for Backup Management" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide".

If the service group has been stopped, perform a backup by taking the following steps:

1. Confirm that the service group has been stopped on both nodes.
For details on how to stop a service group, see the VERITAS Cluster Server manual.
2. Log in to the node on which you want to make a backup, for example through telnet.
You cannot use the logical IP address. Directly use a node that is accessible via 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 the backup.
You can perform the backup in the same way as for regular operations in a cluster system.
You can use the restore command to perform a restore.
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 service group.
Start the service group, if necessary.
For details on how to start a service group, see the VERITAS Cluster Server manual.

10.1.7 Notes on replication operation in a cluster system

VERITAS Cluster Server

For replication 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 ensure consistency by using the resource adjustment command as a recovery measure.
- When you use synchronous replication, do not register any destination volume to a cluster transaction.
- You must perform replication operations on the active system of the service groups because AdvancedCopy Manager is placed in the service groups and operates as part of the service groups.
You cannot perform replication from a standby node or another service group.
- To perform replication, you must unmount original/source volumes beforehand and mount the volumes later for some commands.

If the mount points of original/source volumes have been registered to a cluster transaction, set the mount point resources online or offline from the cluster transaction instead of mounting or unmounting the volumes. Alternatively, modify the unmount and mount processes in the replication pre-processing and post-processing scripts to offline and online processes, respectively.

Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed.

For details and examples of the types of commands that require the volumes to be unmounted and mounted, and the pre-processing and post-processing scripts, see "Pre-processing and Post-processing of Replication". For details of the commands used to set resources online and offline, see the relevant cluster system manual.

10.1.7.1 Replication during package stoppage

VERITAS Cluster Server

When a service group to which AdvancedCopy Manager belongs is operating, replication is enabled only on the active node. The standby node environment is not ready to provide the necessary resources, thus disabling replication operation. Likewise, if the service group has been stopped, the environment is not ready and it disables replication. However, replication is re-enabled only when the service group has been stopped by temporarily arranging the minimum essential resources.



Note

- If either of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), replication is disabled:
 - Shared disk for AdvancedCopy Manager shared data
 - Replication disks (source volume/destination volume)
- The following are not allowed in replication operations:
 - Manipulation for a replication from a Storage Management Server (host specification with the `-h` option)
 - Addition or deletion of a source/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 "Commands for Replication Management".

Perform replication during stoppage of the service group by following the steps below.

1. Confirm that the service group has been stopped on both nodes.
For details on how to stop a service group, see the VERITAS Cluster Server manual.
2. Log in to the node on which you want to perform replication operation, for example through telnet.
You cannot use the logical IP address. Directly use a node that is accessible via 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 source 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, not from both nodes.
4. Perform replication.
You can perform replication in the same way as for regular operations in a cluster system.
You can also perform a restore 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 service group.
Start the service group, if necessary.

For details on how to start a service group, see the VERITAS Cluster Server manual.

10.1.8 Notes on using ETERNUS VS900 (virtualization switch)

Points to take note of regarding the copying of virtual disks created in ETERNUS VS900 are explained in this section.

Copy function

EC/REC is the only type of copy function that can be used in ETERNUS VS900. For this reason, copy virtual disks using the synchronous-type replication of the replication function. The OPC function is not supported in ETERNUS VS900. Therefore, the backup function (that uses OPC for restore) cannot be used.

REC operation modes

Operation modes (ie, Transfer mode, Recovery mode, Split mode) that can be used in ETERNUS VS900 are shown in the table below.

Table: Operation modes

Operation mode type	Operation mode that can be used
Transfer mode	Synchronous mode only
Recovery mode	Manual Recovery mode only
Split mode	Automatic Split mode only

Accordingly, the options for the Operation mode that can be specified in the replication start command (swsrpstartsync) are different from the ETERNUS disk array.

Table: Transfer mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-i (Consistency mode specified)	Operation is possible	Operation is not possible
-k (Stack mode specified)	Operation is possible	Operation is not possible
-y (Synchronous mode specified)	Operation is possible	Operation is possible (*)
None of -i, -k, or -y options specified	Operation is possible (in Asynchronous mode)	Operation is not possible

Table: Recovery mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-g (Manual Recovery mode specified)	Operation is possible	Operation is possible (*)
-g option not specified	Operation is possible (in Automatic Recovery mode)	Operation is not possible

Table: Split mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-a (Automatic Split mode specified)	Operation is possible	Operation is possible
-v (Manual Split mode specified)	Operation is possible	Operation is not possible
-a and -v options not specified	Operation is possible (in Automatic Split mode)	Operation is possible (in Automatic Split mode)

(*) 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 replication start command (swsrpstartsync). The “-a” option can be omitted.

```
swsrpstartsync -y -a -g From-Volume-Name To-Volume-Name
```

The REC Operation modes that can be used in ETERNUS VS900 (transfer mode, Recovery mode, Split mode) are fixed, however, therefore the Operation mode cannot be modified using the synchronous processing mode modification command (swsrpchsyc).

EC/REC reversal

EC/REC reversal cannot be executed in ETERNUS VS900.

Displaying/modifying REC transfer buffer information

There is no REC transfer buffer in ETERNUS VS900. For this reason, the following commands cannot be executed for ETERNUS VS900:

- REC transfer buffer information display command (swsrprecbuffstat)
- REC transfer buffer settings modification command (swsrprecbuffset)

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

This appendix provides information on shell scripts used for backup and restore pre-processing and post-processing in AIX AdvancedCopy Manager.

A.1 Overview

Shell scripts used for pre-processing and post-processing are started before and after backup or restoration when the backup execution command or restore execution command is executed. These shell scripts describe processing required by AdvancedCopy Manager to back up or restore a transaction volume.

The method to configure the pre- and post-processing settings and customizing the shell script is explained in this chapter.

A.2 Pre-processing and Post-processing of Backup

Backup using AdvancedCopy Manager must be performed while other processes are prevented from accessing the transaction volume.

For this reason, the transaction volume is unmounted during pre-processing.

Post-processing is determined according to the operations performed during pre-processing.

Table: Pre and Post processing for transaction volume

Initial Transaction Volume Status	Pre-processing	Post-processing
Mounted	Unmount the transaction volume	Remount the transaction volume
Unmounted	Take no action	Take no action

If special pre-processing or post-processing is required, you need to add the required processing to a shell script.

When customizing a script, strictly observe the following rules regarding error codes.

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

For backing up a volume group that includes the logical volume in which the file system has been built, see "Backup a volume group". The pre-processing and post-processing scripts have to be customized to execute unmount/mount processing for all logical volumes across which the file system exists.



Note

If post-processing fails, execute the Resource match command (swstsrsemch) because the resource information may be inconsistent.

A.2.1 Backup Pre-processing

The name of the shell script for pre-processing before a backup 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
```

The shell script contents are as follows

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
5:
6: #
7: #   Pre-processing of backup processing
8: #
9: #       Argument: $1 Device or VG name of transaction disk
10: #           $2 Reserve
11: #           $3 Device or VG name of backup disk
12: #
13: #       Error number
14: #           2: Argument error
15: #           10: umount error
16: #           50: varyoff error
17: #           99: Script not customize
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=$1
33: bk_device=$3
34:
35: if [ "$SWSTGNODE" != "" ]
36: then
37:     swstg_node="/`echo $SWSTGNODE`"
38: else
39:     swstg_node=""
40: fi
41:
42: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
43:
44: # Determination of post-processing file name
45: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
46: then
47:     dev_type="lvm_pv"
48:     # /dev/hdisk? -> hdisk?
49:     dev=`echo $device | /usr/bin/awk -F/ ' { print $3 } '`
50:
51: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"" != "" ]
52: then
53:     dev_type="vxvm_pv"
54:     # /dev/vx/dmp/device -> device

```

```

55:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
56:
57: elif [ "`echo $device | /usr/bin/grep "/dev/"`" != "" ]
58: then
59:     dev_type="lvm_vg"
60:     # /dev/VG_Name -> VG_Name
61:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
62:
63: else
64:     # Other Volume
65:     exit 0
66: fi
67:
68: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
69:
70: # When the transaction disk is a volume group #####
71: if [ "$dev_type" = "lvm_vg" ]
72: then
73:
74:     # Devices are volume group and script not customize
75:     exit 99
76:
77:     # When devices of volume group can be unmounted
78:     # Specify the name of volume group to unmount
79:     if [ "$device" = "/dev/vgXX" ]
80:     then
81:         echo "mount" > $post_file
82:
83:         # Unmount all logical volumes of the volume group
84:         mount_point="/XX"
85:         /usr/sbin/umount $mount_point 2>/dev/null
86:         if [ $? != 0 ]
87:         then
88:             retry_count=3
89:             sleep_time=1
90:             result_flag=1
91:
92:             while [ $retry_count -gt 0 ]
93:             do
94:                 /usr/sbin/umount $mount_point >
$err_log_path/$dev.umount 2>&1
95:                 if [ $? != 0 ]
96:                 then
97:                     retry_count=`expr $retry_count - 1`
98:                     /usr/bin/sleep $sleep_time
99:                 else
100:                    /usr/bin/rm -f $err_log_path/$dev.umount
101:                    result_flag=0
102:                    break
103:                fi
104:            done
105:
106:            if [ $result_flag != 0 ]
107:            then

```

```

108:                /usr/sbin/fuser -cu $mount_point>
$err_log_path/$dev.fuser 2>&1
109:                /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
110:
111:                exit 10
112:            fi
113:        fi
114:
115: #                mount_point="/XX"
116: #                /usr/sbin/umount $mount_point 2>/dev/null
117: #                if [ $? != 0 ]
118: #                then
119: #                    /usr/sbin/umount $mount_point > $err_log_path/$dev.umount
2>&1
120: #                    if [ $? != 0 ]
121: #                        retry_count=3
122: #                        sleep_time=1
123: #                        result_flag=1
124: #
125: #                        while [ $retry_count -gt 0 ]
126: #                        do
127: #                            /usr/sbin/umount $mount_point >
$err_log_path/$dev.umount 2>&1
128: #                            if [ $? != 0 ]
129: #                            then
130: #                                retry_count=`expr $retry_count - 1`
131: #                                sleep $sleep_time
132: #                            else
133: #                                rm -f $err_log_path/$dev.umount
134: #                                result_flag=0
135: #                                break
136: #                            fi
137: #                        done
138: #
139: #                        if [ $result_flag != 0 ]
140: #                        then
141: #                            /usr/sbin/fuser -cu $mount_point>
$err_log_path/$dev.fuser 2>&1
142: #                            /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
143: #
144: #                            exit 10
145: #                        fi
146: #                    fi
147: #                fi
148: #            fi
149:
150: # varyoff the backup volume.
151: # BKVOL=`/usr/bin/basename $bk_device`
152: # ACTIVE_VGS=`/usr/sbin/lsvg -o`
153: # for i in $ACTIVE_VGS
154: # do
155: #     if [ "$BKVOL" = "$i" ]
156: #     then
157: #         /usr/sbin/varyoffvg $i 2> /dev/null

```

```

158:                if [ $? != 0 ]
159:                then
160:                    /usr/sbin/varyoffvg $i >
161:                    $err_log_path/$dev.varyoffvg 2>&1
162:                if [ $? != 0 ]
163:                then
164:                    exit 50
165:                else
166:                    /usr/bin/rm -f $err_log_path/$dev.varyoffvg
167:                fi
168:                break
169:            fi
170:        done
171:
172: # When the transaction disk is a VxVM physical volume #####
173: elif [ "$dev_type" = "vxvm_pv" ]
174: then
175:     # Nothing is done to VxVM physical volume.
176:     echo "none" > $post_file
177:
178: # When the transaction disk is a LVM physical volume #####
179: elif [ "$dev_type" = "lvm_pv" ]
180: then
181:     # Nothing is done to LVM physical volume.
182:     echo "none" > $post_file
183:
184: fi
185: exit 0

```

A. 2. 2 Backup Post-processing

The name of the shell script for backup post-processing is as follows.

- In the case of non-cluster operation

```
/etc/opt/FJJSVswsts/sh/OpcBackup.post
```

- In the case of cluster operation

```
/etc/opt/FJJSVswsts/<logic node name>/sh/OpcBackup.post
```

The shell script contents are as follows

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
5:
6: #
7: #   Post-processing of backup processing
8: #
9: #           Argument: $1 Device or VG name of transaction disk
10: #           $2 Reserve
11: #
12: #           Error number
13: #           2: Argument error
14: #           11: mount error
15:
16: # Argument check
17: case $# in
18: 1)
19:     ;;
20: 2)
21:     ;;
22: *)
23:     exit 2
24:     ;;
25: esac
26:
27: device=$1
28:
29: if [ "$SWSTGNODE" != "" ]
30: then
31:     swstg_node="/`echo $SWSTGNODE`"
32: else
33:     swstg_node=""
34: fi
35:
36: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
37:
38: # Determination of post-processing file name
39: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
40: then
41:     dev_type="lvm_pv"
42:     # /dev/hdisk? -> hdisk?
43:     dev=`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
44:
45: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/" != "" ]
46: then
47:     dev_type="vxvm_pv"
48:     # /dev/vx/dmp/device -> device
49:     dev=`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
50:
51: elif [ "`echo $device | /usr/bin/grep "/dev/" != "" ]
52: then
53:     dev_type="lvm_vg"
54:     # /dev/VG_Name -> VG_Name

```

```

55:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
56:
57: else
58:     # Other Volume
59:     exit 0
60: fi
61:
62: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
63:
64: # Confirmation of post-processing
65: if [ ! -r $post_file ]
66: then
67:     exit 0
68: fi
69: post="/usr/bin/cat $post_file"
70:
71: # mount processing
72: if [ "$post" = "mount" ]
73: then
74:
75: # When devices of volume group can be unmounted
76: # Specify the name of volume group to mount
77:
78:     if [ "$device" = "/dev/vgXX" ]
79:     then
80:         mount_error=0
81:
82:         # Mount all logical volumes of the volume group
83:         lvname="/dev/XXXXX"
84:         lv_mount_point="/XX"
85:         mount_status=`/usr/sbin/mount | /usr/bin/nawk -v lv=${lvname}
'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'`
86:         if [ $mount_status = "not_mounted" ]
87:         then
88:             /usr/sbin/mount $lvname $lv_mount_point 2> /dev/null
89:             if [ $? != 0 ]
90:             then
91:                 retry_count=3
92:                 sleep_time=1
93:                 result_flag=1
94:
95:                 while [ $retry_count -gt 0 ]
96:                 do
97:                     /usr/sbin/mount $lvname $lv_mount_point >
$err_log_path/$dev.mount 2>&1
98:                     if [ $? != 0 ]
99:                     then
100:                         retry_count=`expr $retry_count - 1`
101:                         /usr/bin/sleep $sleep_time
102:                     else
103:                         /usr/bin/rm -f
$err_log_path/$dev.mount
104:                         result_flag=0
105:                         break

```

```

106:                                     fi
107:                                     done
108:
109:                                     if [ $result_flag != 0 ]
110:                                     then
111:                                         mount_error=1
112:                                     fi
113:                                 fi
114:                            fi
115:
116: #                                lvname="/dev/XXXXX"
117: #                                lv_mount_point="/XX"
118: #                                mount_status=`usr/sbin/mount | /usr/bin/nawk -v lv=${lvname}
'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'`
119: #                                if [ $mount_status = "not_mounted" ]
120: #                                then
121: #                                    /usr/sbin/mount $lvname $lv_mount_point 2> /dev/null
122: #                                    if [ $? != 0 ]
123: #                                    then
124: #                                        retry_count=3
125: #                                        sleep_time=1
126: #                                        result_flag=1
127: #
128: #                                        while [ $retry_count -gt 0 ]
129: #                                        do
130: #                                            /usr/sbin/mount $lvname $lv_mount_point >
$err_log_path/$dev.mount 2>&1
131: #                                            if [ $? != 0 ]
132: #                                            then
133: #                                                retry_count=`expr $retry_count - 1`
134: #                                                /usr/bin/sleep $sleep_time
135: #                                            else
136: #                                                rm -f $err_log_path/$dev.mount
137: #                                                result_flag=0
138: #                                                break
139: #                                            fi
140: #                                        done
141: #
142: #                                        if [ $result_flag != 0 ]
143: #                                        then
144: #                                            mount_error=1
145: #                                        fi
146: #                                    fi
147: #                                fi
148:
149:                            if [ $mount_error != 0 ]
150:                            then
151:                                exit 11
152:                            fi
153:                        fi
154: fi
155:
156: /usr/bin/rm -rf $post_file 2> /dev/null
157: 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.

Volume group backup

When backing up the volume group containing the logical volume used to build the file system, insert a comment character (“#”) into line 75 of the pre-processing script (OpcBackup.pre) to remove the exit statement.

- Remove the comment from lines 79-148 of the pre-processing script (OpcBackup.pre), as well as from lines 78-153 of the post-processing script (OpcBackup.post). Correct the description in a comment so that unmount/mount processing is carried out on all the logical volumes across which the file system exists. Change the parts shown as “X” to match the actual environment. If more than one logical volume is being processed, repeat lines 115-147 of the pre-processing script (OpcBackup.exe) and lines 116-147 of the post-processing script (PpcBackup.post) once for each additional logical volume.



Note

Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.



Note

If the backup volume is a volume group, deactivate the backup volume during backup pre-processing.



Note

Correct the parameters and options of the OS commands (such as the mount command and the fsck command), appropriately for their use.

Cluster operation on VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required when performing cluster operations using VERITAS Cluster Server, and when the mount point of the transaction volume is registered in the cluster transaction.

Change unmount/mount processing in the pre-processing and post-processing scripts into offline/online processing of the mount point resource.

Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/ unmount until after the process that sets the volumes online or offline has completed

The examples below show how the pre-processing and post-processing scripts are modified.

[Example] Changing the unmount processing of the backup pre-processing script (OpcBackup.pre)
[lines 85, 94, 116, 119 and 127]

(Before change)	/usr/sbin/umount \$mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name -sys system-name

[Example] Adding unmount wait processing to the backup pre-processing script (OpcBackup.pre)

[lines 114 and 148]

(addition)	<pre> mount_status="mounted" while [\$mount_status = "mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=/dev/XXXXX 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

[Example] Changing the mount processing of the backup post-processing script (OpcBackup.post)

[lines 88, 97, 121 and 130]

(Before change)	/usr/sbin/mount \$lvname \$lv_mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name -sys <i>system-name</i>

[Example] Adding mount wait processing to the backup post-processing script (OpcBackup.post)

[lines 115 and 148]

(addition)	<pre> mount_status="not_mounted" while [\$mount_status = "not_mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=\$lvname 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

A. 3 Restoration Pre-processing and Post-processing

In AdvancedCopy Manager, restore processing must be performed while transaction volumes are unmounted, so the transaction volume is unmounted in pre-processing.

Post-processing is determined according to the operations performed in pre-processing.

Table: Pre- and Post-processing for a transaction volume

Initial Transaction Volume Status	Pre-processing	Post-processing
Mounted	Unmount the transaction volume	Remount the transaction volume
Unmounted	Take no action	Take no action

If special pre-processing or post-processing is required, you need to add it to the shell script.

When customizing a script, strictly observe the following rules regarding error codes.

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

When restoring a file system in a volume group, refer to "Restore a volume group", and customize the pre-processing and post-processing scripts so that the unmount/mount command is carried out for all the logical volumes across which a file system exists.



Note

If post-processing fails, execute the Resource match command (swstsrsemch) because the resource information may be inconsistent.

A. 3.1 Restoration Pre-processing

The name of the shell script for pre-processing before a restore is as follows.

- In the case of non-cluster operation

```
/etc/opt/FJJSwsts/sh/0pcRestore.pre
```

- In the case of cluster operation

```
/etc/opt/FJJSwsts/<logical node name>/sh/0pcRestore.pre
```

The shell script contents are as follows

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
5:
6: #
7: #   Pre-processing of restore processing
8: #
9: #           Argument: $1 Device or VG name of transaction disk
10: #                $2 Reserve
11: #
12: #           Error number
13: #                2: Argument error
14: #                10: umount error
15: #                50: varyoff error
16: #                99: Script not customize
17:
18: # Argument check
19: case $# in
20: 1)
21:     ;;
22: 2)
23:     ;;
24: *)
25:     exit 2
26:     ;;
27: esac
28:
29: device=$1
30:
31: if [ "$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: # Determination of post-processing file name
41: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
42: then
43:     dev_type="lvm_pv"
44:     # /dev/hdisk? -> hdisk?
45:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
46:
47: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/" != "" ]
48: then
49:     dev_type="vxvm_pv"
50:     # /dev/vx/dmp/device -> device
51:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
52:
53: elif [ "`echo $device | /usr/bin/grep "/dev/" != "" ]
54: then

```

```

55:     dev_type="lvm_vg"
56:     # /dev/VG_Name -> VG_Name
57:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 } `'"
58:
59: else
60:     # Other Volume
61:     exit 0
62: fi
63:
64: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
65:
66: # When the transaction disk is a volume group #####
67: if [ "$dev_type" = "lvm_vg" ]
68: then
69:
70:     # Devices are volume group and script not customize
71:     exit 99
72:
73:     # When devices of volume group was mounted
74:     # Specify the name of volume group to unmount
75:     if [ "$device" = "/dev/vgXX" ]
76:     then
77:         echo "mount" > $post_file
78:
79:         # Unmount all logical volumes of the volume group
80:         mount_point="/XX"
81:         /usr/sbin/umount $mount_point 2>/dev/null
82:         if [ $? != 0 ]
83:         then
84:             retry_count=3
85:             sleep_time=1
86:             result_flag=1
87:
88:             while [ $retry_count -gt 0 ]
89:             do
90:                 /usr/sbin/umount $mount_point >
91: $err_log_path/$dev.umount 2>&1
92:                 if [ $? != 0 ]
93:                 then
94:                     retry_count=`expr $retry_count - 1`
95:                     /usr/bin/sleep $sleep_time
96:                 else
97:                     /usr/bin/rm -f $err_log_path/$dev.umount
98:                     result_flag=0
99:                     break
100:                 fi
101:             done
102:             if [ $result_flag != 0 ]
103:             then
104:                 /usr/sbin/fuser -cu $mount_point>
105: $err_log_path/$dev.fuser 2>&1
106:                 /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1

```

```

107:             exit 10
108:         fi
109:     fi
110:
111: #             mount_point="/XX"
112: #             /usr/sbin/umount $mount_point 2>/dev/null
113: #             if [ $? != 0 ]
114: #             then
115: #                 retry_count=3
116: #                 sleep_time=1
117: #                 result_flag=1
118: #
119: #                 while [ $retry_count -gt 0 ]
120: #                 do
121: #                     /usr/sbin/umount $mount_point >
122: # $err_log_path/$dev.umount 2>&1
123: #                     if [ $? != 0 ]
124: #                     then
125: #                         retry_count=`expr $retry_count - 1`
126: #                         sleep $sleep_time
127: #                     else
128: #                         rm -f $err_log_path/$dev.umount
129: #                         result_flag=0
130: #                         break
131: #                     fi
132: #                 done
133: #
134: #                 if [ $result_flag != 0 ]
135: #                 then
136: #                     /usr/sbin/fuser -cu $mount_point>
137: # $err_log_path/$dev.fuser 2>&1
138: #                     /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
139: #                 fi
140: #             fi
141:         fi
142:
143: # varyoff the transaction volume.
144: ACTIVE_VGS=`/usr/sbin/lsvg -o`
145: for i in $ACTIVE_VGS
146: do
147:     if [ "$dev" = "$i" ]
148:     then
149:         /usr/sbin/varyoffvg $i 2> /dev/null
150:         if [ $? != 0 ]
151:         then
152:             /usr/sbin/varyoffvg $i >
153: # $err_log_path/$dev.varyoffvg 2>&1
154:             if [ $? != 0 ]
155:             then
156:                 exit 50
157:             else
158:                 /usr/bin/rm -f $err_log_path/$dev.varyoffvg

```

```

2>&1
158:             fi
159:             fi
160:             break
161:         fi
162:     done
163:
164: # When the transaction disk is a VxVM physical volume #####
165: elif [ "$dev_type" = "vxvm_pv" ]
166: then
167:     # Nothing is done to VxVM physical volume.
168:     echo "none" > $post_file
169:
170: # When the transaction disk is a LVM physical volume #####
171: elif [ "$dev_type" = "lvm_pv" ]
172: then
173:     # Nothing is done to LVM physical volume.
174:     echo "none" > $post_file
175:
176: fi
177:
178: 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 Restoration Post-processing

The name of the shell script for post-processing after a restore is as follows.

- In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.post
```

- In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.post
```

The shell script contents are as follows

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
5:
6: #
7: #   Post-processing of restore processing
8: #
9: #           Argument: $1 Device or VG name of transaction disk
10: #                $2 Reserve
11: #
12: #   Error number
13: #           2: Argument error
14: #           11: mount error
15: #           51: varyon error
16:
17: # Argument check
18: case $# in
19: 1)
20:     ;;
21: 2)
22:     ;;
23: *)
24:     exit 2
25:     ;;
26: esac
27:
28: device=$1
29:
30: if [ "$SWSTGNODE" != "" ]
31: then
32:     swstg_node="/`echo $SWSTGNODE`"
33: else
34:     swstg_node=""
35: fi
36:
37: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
38:
39: # Determination of postprocessing file name
40: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
41: then
42:     dev_type="lvm_pv"
43:     # /dev/hdisk? -> hdisk?
44:     dev=`echo $device | /usr/bin/awk -F/ ' { print $3 } '`
45:
46: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/" != "" ]
47: then
48:     dev_type="vxvm_pv"
49:     # /dev/vx/dmp/device -> device
50:     dev=`echo $device | /usr/bin/awk -F/ ' { print $5 } '`
51:
52: elif [ "`echo $device | /usr/bin/grep "/dev/" != "" ]
53: then
54:     dev_type="lvm_vg"

```



```

55:     # /dev/VG_Name -> VG_Name
56:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
57:
58: else
59:     # Other Volume
60:     exit 0
61: fi
62:
63: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
64:
65: if [ "$dev_type" = "lvm_vg" ]
66: then
67:     # varyon the transaction volume
68:     /usr/sbin/varyonvg $dev 2> /dev/null
69:     if [ $? != 0 ]
70:     then
71:         /usr/sbin/varyonvg $dev > $err_log_path/$dev.varyonvg 2>&1
72:         if [ $? != 0 ]
73:         then
74:             exit 51
75:         else
76:             /usr/bin/rm -f $err_log_path/$dev.varyonvg
77:         fi
78:     fi
79: fi
80:
81: # Confirmation of post-processing
82: if [ ! -r $post_file ]
83: then
84:     exit 0
85: fi
86: post="`/usr/bin/cat $post_file`"
87:
88: # mount processing
89: if [ "$post" = "mount" ]
90: then
91:
92: # When devices of volume group was mounted
93: # Specify the name of volume group to mount
94:
95:     if [ "$device" = "/dev/vgXX" ]
96:     then
97:         mount_error=0
98:
99:         # Mount all logical volumes of the volume group
100:         lvname="/dev/XXXXX"
101:         lv_mount_point="/XX"
102:         mount_status=`/usr/sbin/mount | /usr/bin/nawk -v lv=${lvname}
'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}`
103:         if [ $mount_status = "not_mounted" ]
104:         then
105:             /usr/sbin/mount $lvname $lv_mount_point 2> /dev/null
106:             if [ $? != 0 ]
107:             then

```

```

108:         retry_count=3
109:         sleep_time=1
110:         result_flag=1
111:
112:         while [ $retry_count -gt 0 ]
113:         do
114:             /usr/sbin/mount $lvname $lv_mount_point >
115:             $err_log_path/$dev.mount 2>&1
116:             if [ $? != 0 ]
117:             then
118:                 retry_count=`expr $retry_count - 1`
119:                 /usr/bin/sleep $sleep_time
120:             else
121:                 /usr/bin/rm -f
122:                 $err_log_path/$dev.mount
123:                 result_flag=0
124:                 break
125:             fi
126:         done
127:
128:         if [ $result_flag != 0 ]
129:         then
130:             mount_error=1
131:         fi
132:     fi
133: fi
134:
135: #         lvname="/dev/XXXXX"
136: #         lv_mount_point="/XX"
137: #         mount_status=`/usr/sbin/mount | /usr/bin/nawk -v lv=${lvname}
138: #         'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'`
139: #         if [ $mount_status = "not_mounted" ]
140: #         then
141: #             /usr/sbin/mount $lvname $lv_mount_point 2> /dev/null
142: #             if [ $? != 0 ]
143: #             then
144: #                 retry_count=3
145: #                 sleep_time=1
146: #                 result_flag=1
147: #
148: #                 while [ $retry_count -gt 0 ]
149: #                 do
150: #                     /usr/sbin/mount $lvname $lv_mount_point >
151: #                     $err_log_path/$dev.mount 2>&1
152: #                     if [ $? != 0 ]
153: #                     then
154: #                         retry_count=`expr $retry_count - 1`
155: #                         /usr/bin/sleep $sleep_time
156: #                     else
157: #                         rm -f $err_log_path/$dev.mount
158: #                         result_flag=0
159: #                         break
160: #                     fi
161: #                 done

```

```

158: #
159: #             if [ $result_flag != 0 ]
160: #             then
161: #                 mount_error=1
162: #             fi
163: #         fi
164: #     fi
165:
166:         if [ $mount_error != 0 ]
167:         then
168:             exit 11
169:         fi
170:     fi
171: fi
172:
173: /usr/bin/rm -rf $post_file 2> /dev/null
174: exit 0

```

A. 3.3 Customizing the shell script

The method of customizing the shell script for restore pre- and post-processing is explained below.

Restore a volume group

When restoring a file system that is part of a logical volume in a volume group, insert a comment character (“#”) into line 130 of the pre-processing script (OpcRestore.pre) to remove the exit statement.

- Remove the comment character from lines 75-141 of the pre-processing script (OpcRestore.pre), and also from lines 95-170 of the post-processing script (OpcRestore.post). Correct the description in the comment so that unmount/mount processing is carried out on all the logical volumes used to build the file system. Modify the parts shown as “X” to match the actual environment. If more than one logical volume is being processed, repeat lines 111-140 of the pre-processing script (OpcRestore.exe) and lines 133-164 of the post-processing script (OpcRestore.post) once for each additional logical volume.
- When the backup volume is mounted, the LVM management information in the backup volume is rewritten and the normal procedure cannot be used to restore the volume. In such cases, convert lines 65 to 79 and 95 to 170 in the post-processing script (OpcRestore.post) into comments (“#”). Furthermore, an additional step is required after restoration is completed. Refer to “Notes on restoration” for more information.



Note

Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.



Note

Correct the parameters and options of the OS commands (such as the mount command and the fsck command), appropriately for their use.

Cluster operations on VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required when performing cluster operations on VERITAS Cluster Server, and when the mount point of the transaction volume is registered in the cluster transaction.

Change unmount/mount processing in the pre-processing and post-processing scripts into offline/online processing of the mount point resource.

Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed

The examples below show how the pre-processing and post-processing scripts are modified.

[Example] Changing the unmount processing of the restore pre-processing script (OpcRestore.pre)

[lines 81, 90, 112 and 121]

(Before change)	/usr/sbin/umount \$mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name -sys system-name

[Example] Adding unmount wait processing to the restore pre-processing script (OpcRestore.pre)

[lines 110 and 141]

(addition)	<pre>mount_status="mounted" while [\$mount_status = "mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=\$lvname 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}` done</pre>
------------	--

[Example] Changing mount processing of the restore post-processing script (OpcRestore.post)

[lines 105, 114, 138 and 147]

(Before change)	/usr/sbin/mount \$lvname \$lv_mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name -sys system-name

[Example] Adding mount wait processing to the restore post-processing script (OpcRestore.post)

[lines 132 and 165]

(addition)	<pre>mount_status="not_mounted" while [\$mount_status = "not_mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=\$lvname 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}` done</pre>
------------	--

Appendix B Replication Pre-processing and Post-processing

This chapter explains the shell scripts that perform the replication pre- and post-processing in AdvancedCopy Manager.

B.1 Overview

The shell scripts that perform the replication pre- and post-processing start before and after the replication (copy) processing.

These shell scripts contain code required by AdvancedCopy Manager for the copy source volume and copy destination volume.

The method of configuring the pre- and post-processing settings and customizing the shell script is explained in this chapter.



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.

B.2 Replication Pre-processing and Post-processing

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 of each is different:

- Pre-processing and post-processing for a replication source volume
This is intended to freeze the replication source data in a state in which consistency is temporarily ensured. In pre-processing, source data is temporarily frozen, and after the replication is complete, the frozen data is released in post-processing.
- Pre-processing and post-processing for a replication destination volume
This is intended to prevent any application from accessing a destination volume during replication (copy) processing. In pre-processing, replication data for the destination is given an access-disabled status. This status is released in post-processing, after the replication is complete.

The specific tasks performed in pre-processing and post-processing differ according to the contents of the volume. The next section describes the pre-processing and post-processing of a file system.

B.2.1 Pre-processing and post-processing for a file system

The pre-processing script should unmount the file system and the post-processing script should mount it. (For Windows, the processing consists of allocating and canceling a drive letter). This processing will ensure the integrity of the replication source data by preventing access by other processes during synchronization processing and snapshot copying. If no volume is mounted and inactivate, the pre-processing and post-processing are not performed.

When the replication target volume is a physical disk, 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	Pre-processing	Post-processing
Replication start command (swsrpstartsync)	Copy not started or replication establishment	Source	No	No
		Destination	Yes--*1	No
Replication creation command (for synchronous replication) (swsrpmake)	equivalency maintenance	Source	Yes	Yes
		Destination	No	Yes --*2
Replication cancellation command (swsrpcancel)	equivalency maintenance	Source	Yes	Yes
		Destination	No	Yes --*2
	Replication establishment	Source	No	No
		Destination	No	No
	copying	Source	No	No
		Destination	No	No

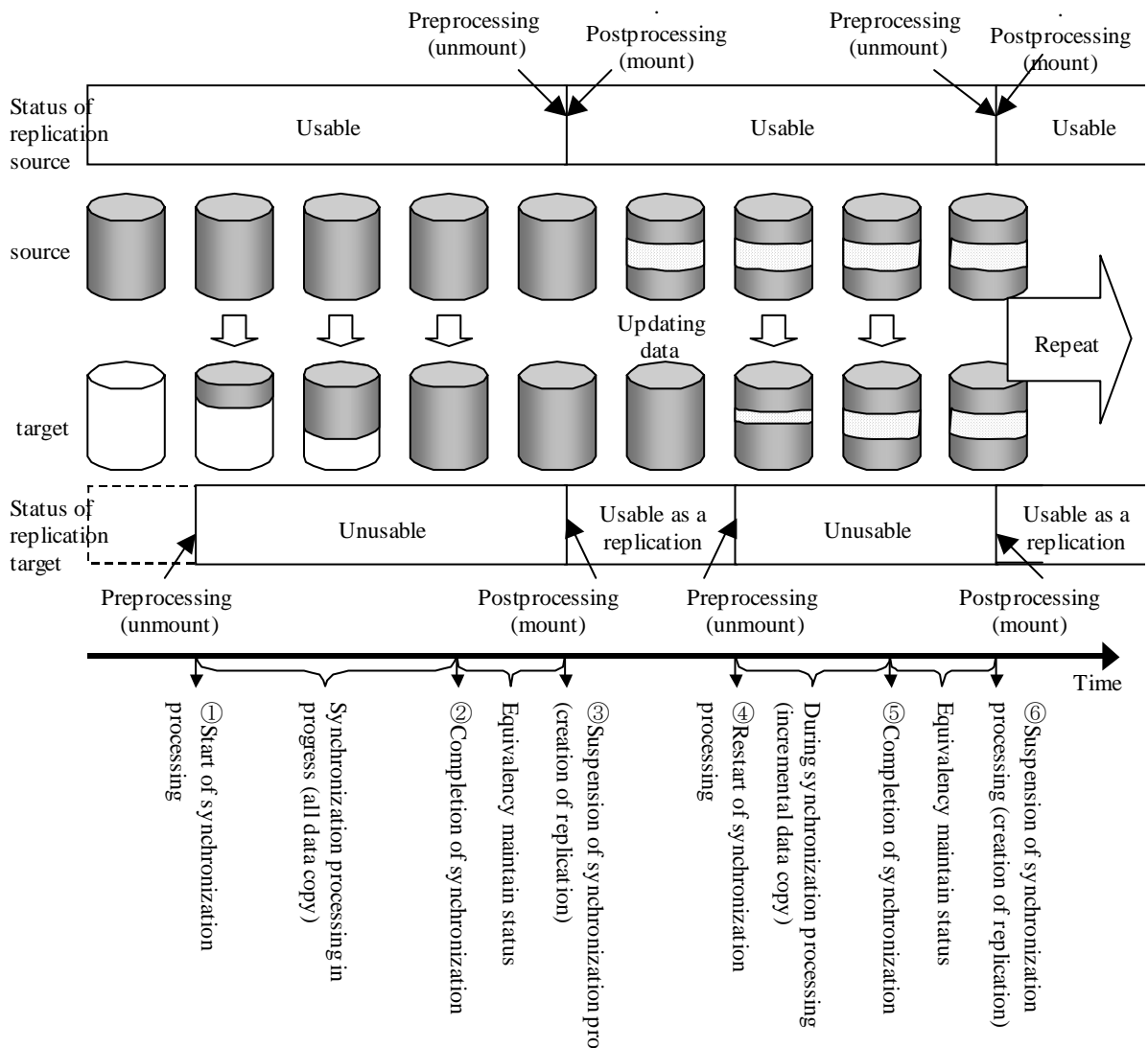
Command	Copy status	Source/target	Pre-processing	Post-processing
Replication creation command (for snapshot replication) (swsrpmake)	Copy not started	Source	Yes	Yes
		Destination	Yes	Yes

Yes: executed
No : 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 using TCP/IP in the pre-processing and post-processing of a volume that is not connected. The operation image of before and after processing is shown in the figure below.

Figure: Snapshot replication processing of snapshot



If processing other than the standard pre-processing and post-processing is, customize the scripts.

When customizing a script, strictly observe the following rules regarding error codes.

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

When the replication target is a volume group that includes a logical volume in which the file system has been built, refer to "When the replication target is a volume group". The pre-processing and post-processing scripts have to be customized to execute unmount/mount processing for all logical volumes in which the file system has been built.



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.

B.2.2 Pre-processing when replication is executed

The pre-processing scripts for the replication source volume (RepSrcPre.js) and the replication destination volume (RepDstPre.js) are stored in the following directory. Customize the scripts according to the processing 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, 2004-2007
5:
6: #
7: #   Pre-processing of Replication(Source) processing
8: #
9: #       Argument: $1 Device name of Source disk
10: #           $2 Reserve
11: #
12: #       Error number
13: #           2: Argument error(system error)
14: #           10: umount error
15: #           99: Script not customize
16:
17: # Argument check
18: case $# in
19: 2)
20:     ;;
21: *)
22:     exit 2
23:     ;;
24: esac
25:
26: device=$1
27:
28: # Determination of postprocessing file name
29: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"``" != "" ]
30: then
31:     dev_type="lvm_pv"
32:     # /dev/hdisk? -> hdisk?
33:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
34:
35: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp"``" != "" ]
36: then
37:     dev_type="vxvm_pv"
38:     # /dev/vx/dmp/device -> device
39:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
40:
41: elif [ "`echo $device | /usr/bin/grep "/dev/"``" != "" ]
42: then
43:     dev_type="lvm_vg"
44:     # /dev/VG_Name -> VG_Name
45:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
46:
47: else
48:     # Other Volume
49:     exit 0
50: fi
51: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
52:
53: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
54:

```

```

55: # When the Source disk is a volume group #####
56: if [ "$dev_type" = "lvm_vg" ]
57: then
58:
59:     # Devices are volume group and script not customize
60:     exit 99
61:
62:     # When devices of volume group can be unmounted
63:     # Specify the name of volume group to unmount
64:     if [ "$device" = "/dev/vgXX" ]
65:     then
66:         echo "mount" > $post_file
67:
68:         # Unmount all logical volumes of the volume group
69:         mount_point="/XX"
70:         /usr/sbin/umount $mount_point 2>/dev/null
71:         if [ $? != 0 ]
72:         then
73:             retry_count=3
74:             sleep_time=1
75:             result_flag=1
76:
77:             while [ $retry_count -gt 0 ]
78:             do
79:                 /usr/sbin/umount $mount_point >
$err_log_path/$dev.umount 2>&1
80:                 if [ $? != 0 ]
81:                 then
82:                     retry_count=`expr $retry_count - 1`
83:                     /usr/bin/sleep $sleep_time
84:                 else
85:                     /usr/bin/rm -f $err_log_path/$dev.umount
86:                     result_flag=0
87:                     break
88:                 fi
89:             done
90:
91:             if [ $result_flag != 0 ]
92:             then
93:                 /usr/sbin/fuser -cu $mount_point>
$err_log_path/$dev.fuser 2>&1
94:                 /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
95:                 exit 10
96:             fi
97:         fi
98:
99:         #
100:        #
101:        #
102:        #
103:        #
104:        #
105:        #
106:        #

```

```

107: #                while [ $retry_count -gt 0 ]
108: #                do
109: #                    /usr/sbin/umount $mount_point >
110: #                    $err_log_path/$dev.umount 2>&1
111: #                if [ $? != 0 ]
112: #                then
113: #                    retry_count=`expr $retry_count - 1`
114: #                    sleep $sleep_time
115: #                else
116: #                    rm -f $err_log_path/$dev.umount
117: #                    result_flag=0
118: #                    break
119: #                fi
120: #            done
121: #            if [ $result_flag != 0 ]
122: #            then
123: #                /usr/sbin/fuser -cu $mount_point>
124: #                $err_log_path/$dev.fuser 2>&1
125: #                /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
126: #                exit 10
127: #            fi
128: #        fi
129:
130: # When the Source disk is a VxVM physical volume #####
131: elif [ "$dev_type" = "vxvm_pv" ]
132: then
133:     # Nothing is done to VxVM physical volume.
134:     echo "none" > $post_file
135:
136: # When the Source disk is a LVM physical volume #####
137: elif [ "$dev_type" = "lvm_pv" ]
138: then
139:     # Nothing is done to LVM physical volume.
140:     echo "none" > $post_file
141: fi
142:
143: exit 0

```

- RepDst.pre (copy destination volume script)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
5:
6: #
7: #   Pre-processing of Replication(Destination) processing
8: #
9: #       Argument: $1 Device name of Destination disk
10: #           $2 Reserve
11: #
12: #       Error number
13: #           2: Argument error
14: #           10: umount error
15: #           50: varyoffvg error
16: #           99: Script not customize
17:
18: # Argument check
19: case $# in
20: 2)
21:     ;;
22: *)
23:     exit 2
24:     ;;
25: esac
26:
27: device=$1
28:
29: # Determination of post-processing file name
30: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
31: then
32:     dev_type="lvm_pv"
33:     # /dev/hdisk? -> hdisk?
34:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
35:
36: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/" != "" ]
37: then
38:     dev_type="vxvm_pv"
39:     # /dev/vx/dmp/device -> device
40:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
41:
42: elif [ "`echo $device | /usr/bin/grep "/dev/" != "" ]
43: then
44:     dev_type="lvm_vg"
45:     # /dev/VG_Name -> VG_Name
46:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
47:
48: else
49:     # Other Volume
50:     exit 0
51: fi
52:
53: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
54:

```

```

55: /usr/bin/rm -rf $post_file 2> /dev/null
56:
57: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
58:
59: # When the Destination disk is a volume group #####
60: if [ "$dev_type" = "lvm_vg" ]
61: then
62:
63:     # Devices are volume group and script not customize
64:     exit 99
65:
66:     # When devices of volume group can be unmounted
67:     # Specify the name of volume group to unmount
68:     if [ "$device" = "/dev/vgXX" ]
69:     then
70:         printf "mount," > $post_file
71:
72:         # Unmount all logical volumes of the volume group
73:         mount_point="/XX"
74:         /usr/sbin/umount $mount_point 2>/dev/null
75:         if [ $? != 0 ]
76:         then
77:             retry_count=3
78:             sleep_time=1
79:             result_flag=1
80:
81:             while [ $retry_count -gt 0 ]
82:             do
83:                 /usr/sbin/umount $mount_point >
$err_log_path/$dev.umount 2>&1
84:                 if [ $? != 0 ]
85:                 then
86:                     retry_count=`expr $retry_count - 1`
87:                     /usr/bin/sleep $sleep_time
88:                 else
89:                     /usr/bin/rm -f $err_log_path/$dev.umount
90:                     result_flag=0
91:                     break
92:                 fi
93:             done
94:
95:             if [ $result_flag != 0 ]
96:             then
97:                 /usr/sbin/fuser -cu $mount_point>
$err_log_path/$dev.fuser 2>&1
98:                 /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
99:                 exit 10
100:            fi
101:        fi
102:
103: #         mount_point="/XX"
104: #         /usr/sbin/umount $mount_point 2>/dev/null
105: #         if [ $? != 0 ]
106: #         then

```

```

107: #                retry_count=3
108: #                sleep_time=1
109: #                result_flag=1
110: #
111: #                while [ $retry_count -gt 0 ]
112: #                do
113: #                    /usr/sbin/umount $mount_point >
114: #                $err_log_path/$dev.umount 2>&1
115: #                    if [ $? != 0 ]
116: #                    then
117: #                        retry_count=`expr $retry_count - 1`
118: #                        sleep $sleep_time
119: #                    else
120: #                        rm -f $err_log_path/$dev.umount
121: #                        result_flag=0
122: #                        break
123: #                    fi
124: #                done
125: #
126: #                if [ $result_flag != 0 ]
127: #                then
128: #                    /usr/sbin/fuser -cu $mount_point>
129: #                $err_log_path/$dev.fuser 2>&1
130: #                    /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
131: #                    exit 10
132: #                fi
133: #            fi
134: #
135: #            # varyoff destination volume group
136: #            ACTIVE_VGS=`/usr/sbin/lsvg -o`
137: #            for i in $ACTIVE_VGS
138: #            do
139: #                if [ "$dev" = "$i" ]
140: #                then
141: #                    /usr/sbin/varyoffvg $i 2> /dev/null
142: #                    if [ $? != 0 ]
143: #                    then
144: #                        /usr/sbin/varyoffvg $i >
145: #                    $err_log_path/$dev.varyoffvg 2>&1
146: #                        if [ $? != 0 ]
147: #                        then
148: #                            exit 50
149: #                        fi
150: #                    fi
151: #                    printf "varyon" >> $post_file
152: #                    break
153: #                fi
154: #            done
155: #            # When the Destination disk is a VxVM physical volume #####
156: #            elif [ "$dev_type" = "vxvm_pv" ]
157: #            then

```

```

158:         # Nothing is done to VxVM physical volume.
159:         echo "none," > $post_file
160:
161: # When the Destination disk is a LVM physical volume #####
162: elif [ "$dev_type" = "lvm_pv" ]
163: then
164:         # Nothing is done to LVM physical volume.
165:         echo "none," > $post_file
166:
167: fi
168:
169: exit 0

```

B.2.3 Post-processing when replication is executed

The post-processing scripts for the replication source volume (RepSrcPost) and the replication destination volume (RepDstPost) are stored in the following directory. This script can be customized according to the processing 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)


```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
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 | /usr/bin/grep "/dev/hdisk"`" != "" ]
28: then
29:     dev_type="lvm_pv"
30:     # /dev/hdisk? -> hdisk?
31:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
32:
33: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
34: then
35:     dev_type="vxvm_pv"
36:     # /dev/vx/dmp/device -> device
37:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }`"
38:
39: elif [ "`echo $device | /usr/bin/grep "/dev/"`" != "" ]
40: then
41:     dev_type="lvm_vg"
42:     # /dev/VG_Name -> VG_Name
43:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }`"
44:
45: else
46:     # Other Volume
47:     exit 0
48: fi
49: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev". spre"
50:
51: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
52:
53: # Confirmation of postprocessing
54: if [ ! -r $post_file ]

```

```

55: then
56:     exit 0
57: fi
58:
59: post="/usr/bin/cat $post_file"
60:
61: # mount processing
62: if [ "$post" = "mount" ]
63: then
64:
65: # When devices of volume group can be unmounted
66: #Specify the name of volume group to mount
67:
68:     if [ "$device" = "/dev/vgXX" ]
69:     then
70:         mount_error=0
71:         # Mount all logical volumes of the volume group
72:         lvname="/dev/XX"
73:         lv_mount_point="/XX"
74:         mount_status=`/usr/sbin/mount | /usr/bin/nawk -v
lv=${lvname} 'lv==$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print
"not_mounted";}'`
75:         if [ $mount_status = "not_mounted" ]
76:         then
77:             /usr/sbin/mount $lvname $lv_mount_point 2> /dev/null
78:             if [ $? != 0 ]
79:             then
80:                 retry_count=3
81:                 sleep_time=1
82:                 result_flag=1
83:
84:                 while [ $retry_count -gt 0 ]
85:                 do
86:                     /usr/sbin/mount $lvname $lv_mount_point
> $err_log_path/$dev.mount 2>&1
87:                     if [ $? != 0 ]
88:                     then
89:                         retry_count=`expr $retry_count - 1`
90:                         /usr/bin/sleep $sleep_time
91:                     else
92:                         /usr/bin/rm -f
$err_log_path/$dev.mount
93:                         result_flag=0
94:                         break
95:                     fi
96:                 done
97:
98:                 if [ $result_flag != 0 ]
99:                 then
100:                    mount_error=1
101:                fi
102:            fi
103:        fi
104:

```

```

105: #          lvname="/dev/XX"
106: #          lv_mount_point="/XX"
107: #          mount_status=`/usr/sbin/mount | /usr/bin/nawk -v
lv=${lvname} 'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print
"not_mounted";}'`
108: #          if [ $mount_status = "not_mounted" ]
109: #          then
110: #              /usr/sbin/mount $lvname $lv_mount_point 2>/dev/null
111: #              if [ $? != 0 ]
112: #              then
113: #                  retry_count=3
114: #                  sleep_time=1
115: #                  result_flag=1
116: #
117: #                  while [ $retry_count -gt 0 ]
118: #                  do
119: #                      /usr/sbin/mount $lvname
$lv_mount_point > $err_log_path/$dev.mount 2>&1
120: #                      if [ $? != 0 ]
121: #                      then
122: #                          retry_count=`expr $retry_count - 1`
123: #                          /usr/bin/sleep $sleep_time
124: #                      else
125: #                          rm -f $err_log_path/$dev.mount
126: #                          result_flag=0
127: #                          break
128: #                      fi
129: #                  done
130: #
131: #                  if [ $result_flag != 0 ]
132: #                  then
133: #                      mount_error=1
134: #                  fi
135: #              fi
136: #          fi
137:
138: #          if [ $mount_error != 0 ]
139: #          then
140: #              exit 11
141: #          fi
142: #      fi
143: fi
144:
145: /usr/bin/rm -rf $post_file 2> /dev/null
146: exit 0

```

- RepDst.post (Copy destination volume script)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2004-2007
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: #           53: chdev error
15: #           54: exportvg error
16: #           56: recreatevg error
17: #           52: chfs error
18:
19: # Reconstruct volume group function.
20: ReconstructVG ()
21: {
22:
23:     # delete PV temporarily.
24:     /usr/sbin/chdev -l $pvname -a pv=clear > /dev/null 2>&1
25:     if [ $? != 0 ]
26:     then
27:         /usr/sbin/chdev -l $pvname -a pv=clear >
28:         $err_log_path/$dev.chdev 2>&1
29:         if [ $? != 0 ]
30:         then
31:             return 53
32:         else
33:             /usr/bin/rm -f $err_log_path/$dev.chdev
34:         fi
35:     fi
36:
37:     # export destination volume group
38:     /usr/sbin/exportvg $dev > /dev/null 2>&1
39:     if [ $? != 0 ]
40:     then
41:         /usr/sbin/exportvg $dev > $err_log_path/$dev.exportvg 2>&1
42:         if [ $? != 0 ]
43:         then
44:             return 54
45:         else
46:             /usr/bin/rm -f $err_log_path/$dev.exportvg
47:         fi
48:     fi
49:
50:     # recreate destination volume group
51:     prefix="/fs"
52:     /usr/sbin/recreatevg -l $conv_file -L $prefix -y $dev $pvname >
53:     /dev/null 2>&1
54:     if [ $? != 0 ]

```

```

53:         then
54:             /usr/sbin/recreatevg -l $conv_file -L $prefix -y $dev $pvname
> $err_log_path/$dev.recreatevg 2>&1
55:             if [ $? != 0 ]
56:             then
57:                 return 56
58:             else
59:                 /usr/bin/rm -f $err_log_path/$dev.recreatevg
60:             fi
61:         fi
62:
63:         return 0
64: }
65:
66: # Mount Logical Volume function
67: MountLV ()
68: {
69:     mount_status=`/usr/sbin/mount | /usr/bin/nawk -v lv=${lvname}
'lv==${1}{flag=1; exit;} END{if(flag==1) print "mounted"; else print
"not_mounted";}'`
70:     if [ $mount_status = "not_mounted" ]
71:     then
72:         /usr/sbin/mount $lvname $dst_mount_point 2> /dev/null
73:         if [ $? != 0 ]
74:         then
75:             retry_count=3
76:             sleep_time=1
77:             result_flag=1
78:
79:             while [ $retry_count -gt 0 ]
80:             do
81:                 /usr/sbin/mount $lvname $dst_mount_point >
$err_log_path/$dev.mount 2>&1
82:                 if [ $? != 0 ]
83:                 then
84:                     retry_count=`expr $retry_count - 1`
85:                     /usr/bin/sleep $sleep_time
86:                 else
87:                     /usr/bin/rm -f $err_log_path/$dev.mount
88:                     result_flag=0
89:                     break
90:                 fi
91:             done
92:
93:             if [ $result_flag != 0 ]
94:             then
95:                 exit 11
96:             fi
97:         fi
98:     fi
99: }
100:
101: # Change mount point function
102: ChangeMountPoint ()

```

```

103: {
104:     /usr/sbin/chfs -m $dst_mount_point $prefix$src_mount_point >
/dev/null 2>&1
105:     if [ $? != 0 ]
106:     then
107:         /usr/sbin/chfs -m $dst_mount_point $prefix$dst_mount_point >
/dev/null 2>&1
108:         if [ $? != 0 ]
109:         then
110:             /usr/sbin/chfs -m $dst_mount_point
$prefix$dst_mount_point > $err_log_path/$dev.chfs 2>&1
111:             if [ $? != 0 ]
112:             then
113:                 exit 52
114:             else
115:                 /usr/bin/rm -f $err_log_path/$dev.chfs
116:             fi
117:         fi
118:     fi
119: }
120:
121: #####
122: #
123: # RepDst.post Main process.
124: #
125: #####
126:
127: # Argument check
128: case $# in
129: 1)
130:     ;;
131: *)
132:     exit 2
133:     ;;
134: esac
135:
136: device=$1
137:
138: # Determination of post-processing file name
139: if [ "`echo $device | /usr/bin/grep "/dev/hdisk"" != "" ]
140: then
141:     dev_type="lvm_pv"
142:     # /dev/hdisk? -> hdisk?
143:     dev="`echo $device | /usr/bin/awk -F/ ' { print $3 }'`"
144:
145: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/" != "" ]
146: then
147:     dev_type="vxvm_pv"
148:     # /dev/vx/dmp/device -> device
149:     dev="`echo $device | /usr/bin/awk -F/ ' { print $5 }'`"
150:
151: elif [ "`echo $device | /usr/bin/grep "/dev/" != "" ]
152: then
153:     dev_type="lvm_vg"

```

```

154:      # /dev/VG_Name -> VG_Name
155:      dev="`echo $device | /usr/bin/awk -F/ ' { print $3 } `'"
156:
157: else
158:     # Other Volume
159:     exit 0
160: fi
161: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
162: conv_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".tmp"
163:
164: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
165:
166: # Confirmation of postprocessing
167: if [ ! -r $post_file ]
168: then
169:     exit 0
170: fi
171: # When the Destination disk is a volume group #####
172: if [ "$dev_type" = "lvm_vg" ]
173: then
174:
175:     post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
176:     vg_status="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
177:
178:     if [ "$vg_status" = "varyon" ]
179:     then
180:         if [ "$device" = "/dev/vgXX" ]
181:         then
182:             pvname="hdiskXX"
183:
184:             # decide conversion of LV name
185:             /usr/bin/rm -rf $conv_file 2> /dev/null
186:             echo "SrcLvXXXX:DstlvXXXX" >> $conv_file
187:             echo "DstlvXXXX:DstlvXXXX" >> $conv_file
188: #             echo "SrcLvXXXX:DstlvXXXX" >> $conv_file
189: #             echo "DstlvXXXX:DstlvXXXX" >> $conv_file
190:
191:             # Reconstruct Volume Group
192:             ReconstructVG
193:             result=$?
194:             if [ $result != 0 ]
195:             then
196:                 exit $result
197:             fi
198:
199:             # delete tmpfile
200:             /usr/bin/rm -rf $conv_file 2> /dev/null
201:         fi
202:     fi
203:
204:     if [ "$device" = "/dev/vgXX" ]
205:     then
206:
207:         # decide new mount point

```

```

208:         lvname="/dev/XX"
209:         src_mount_point="/XX"
210:         dst_mount_point="/XX"
211:
212:         if [ "$vg_status" = "varyon" ]
213:         then
214:             # Change mount point
215:             ChangeMountPoint
216:         fi
217:
218:         if [ "$post" = "mount" ]
219:         then
220:             # Mount all logical volumes of the volume group
221:             MountLV
222:         fi
223:
224: #         lvname="/dev/XX"
225: #         src_mount_point="/XX"
226: #         dst_mount_point="/XX"
227: #
228: #         if [ "$vg_status" = "varyon" ]
229: #         then
230: #             # Change mount point
231: #             ChangeMountPoint
232: #         fi
233: #
234: #         if [ "$post" = "mount" ]
235: #         then
236: #             # Mount all logical volumes of the volume group
237: #             MountLV
238: #         fi
239:
240:     fi
241: fi
242:
243: /usr/bin/rm -rf $post_file 2> /dev/null
244: exit 0
245:

```


B.2.4 Customizing the shell script

The method of customizing the shell script for replication pre- and post-processing is explained below.

When the replication target is a volume group

When replicating a file system which is part of a logical volume in a volume group, the processing scripts will need to be modified as follows:

- Modify the coding in lines 64 to 128 of the replication source volume pre-processing script and in lines 68 to 142 of the replication source volume post-processing script such that `dismount` and `mount` processing is performed for all the logical volumes comprising the file system. (Change the parts marked “X” to match the actual environment. Also, remove the comment characters from lines 99–127 of the source volume pre-processing script (`RepSrc.pre`), and from lines 105–136 of the source volume post-processing script (`RepSrc.post`). If more than two logical volumes are being processed then repeat lines 99–127 of `RepSrc.pre` and lines 105–136 of `RepSrc.post`, once for each additional logical volume.
- Modify the coding in lines 68 to 133 of the replication destination volume pre-processing script and in lines 180 to 201 and lines 204 to 240 of the replication destination volume post-processing script such that `dismount` and `mount` processing is performed for all the logical volumes comprising the file system. Change the parts marked “X” to match the actual environment. Also, remove the comment characters from lines 103–131 of the destination volume pre-processing script (`RepDst.pre`), and lines 188–189 and 224–238 of the destination volume post-processing script (`RepDst.post`). If more than two logical volumes are being processed then repeat lines 103–131 of `RepDst.pre` and lines 188–189 and 224–238 of `RepDst.post`, once for each additional logical volume.

The procedure for editing the destination volume post-processing script is given below:

Specify the physical volume name of the destination volume on line 182.

Specify the correspondence between the logical volume names of the source volume and destination volume in quotation marks on line 186. Use “logical volume name of source volume:logical volume of destination volume” as the format. If the source volume includes multiple logical volumes, specify the correspondence for each logical volume. This must be specified even when the logical volume is not mounted. Specify the logical volume name of the destination volume in quotation marks on line 187, in the format “logical volume name of destination volume:logical volume name of destination volume”. If the destination volume contains multiple logical volumes, specify all of the logical volume names on line 187. This must be specified even when the logical volume is not mounted.

Specify the volume name of the destination volume on line 208.

On line 209, specify the mount point of the logical volume of the source volume specified on line 208.

On line 210, specify the mount point of the logical volume of the destination volume specified on line 208.

After making the necessary corrections to the script, convert the exit statements on line 60 of the source volume pre-processing script and line 64 of the destination volume pre-processing script (`RepDst.pre`) into comments (“#”).

If the volume group to be replicated includes a logical volume for which no file system has been built, make the above corrections and then convert the statements on lines 212 to 217 of the destination volume post-processing script (`RepDst.post`) into comments (“#”).



Note

Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.



Note

Modify the parameters and options of the OS commands (such as the mount command and the fsck command), appropriately for their use.



Note

If the operation involves activation of the destination volume group, the destination volume post-processing script rewrites (recreatevg) the LVM management information. This processing may take a long time.

Cluster operation using VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required when performing cluster operations using VERITAS Cluster Server, and when the mount point of the original/source volume is registered in the cluster transaction.

Change unmount/mount processing in the pre-processing and post-processing scripts into offline/online processing of the mount point resource.

Please note that once the offline/online command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example] Changing the unmount processing of the source volume pre-processing script (RepSrc.pre)

[lines 70, 79, 100, and 109]

(Before change)	/usr/sbin/umount \$mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name -sys system-name

[Example] Adding unmount wait processing to the source volume pre-processing script (RepSrc.pre)

[lines 98 and 128]

(addition)	<pre> mount_status="mounted" while [\$mount_status = "mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=/dev/XXXXX 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

[Example] Changing the unmount processing of the destination volume pre-processing script (RepDst.pre)

[lines 74, 83, 104 and 113]

(Before change)	/usr/sbin/umount \$mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name -sys system-name

[Example] Adding unmount wait processing to the destination volume pre-processing script (RepDst.pre)

[lines 102 and 132]

(addition)	<pre> mount_status="mounted" while [\$mount_status = "mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=/dev/XXXXX 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

[Example] Changing the mount processing change of the source volume post-processing script (RepSrc.post)

[lines 77, 86, 110 and 119]

(Before change)	/usr/sbin/mount \$lvname \$lv_mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name -sys system-name

[Example] Adding mount wait processing to the source volume post-processing script (RepSrc.post)

[lines 104 and 137]

(addition)	<pre> mount_status="not_mounted" while [\$mount_status = "not_mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=\$lvname 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

[Example] Changing the mount processing of the destination volume post-processing script

[lines 72 and 81]

(Before change)	/usr/sbin/mount \$lvname \$lv_mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name -sys system-name

[Example] Adding mount wait processing to the destination volume post-processing script

[line 99]

(addition)	<pre> mount_status="not_mounted" while [\$mount_status = "not_mounted"] do mount_status=`/usr/sbin/mount /usr/bin/nawk -v lv=\$lvname 'lv==\$1{flag=1; exit;} END{if(flag==1) print "mounted"; else print "not_mounted";}'` done </pre>
------------	---

Appendix C Sample Shell Script for Backup Operations

This appendix provides information on sample scripts for AdvancedCopy Manager. A sample script allows you to back up data on a transaction volume using AdvancedCopy Manager.



Point

This chapter explains how the sample shell script is created for the backup management function. By using it as a reference when creating similar scripts for the replication management function, you can copy Oracle or DB2 databases.

C.1 Overview

Use AdvancedCopy Manager to back up a transaction volume.

AdvancedCopy Manager provides some sample shell scripts for backup processing. The backup administrator must modify the sample shell scripts according to their specific requirements and then apply them to backup operations.

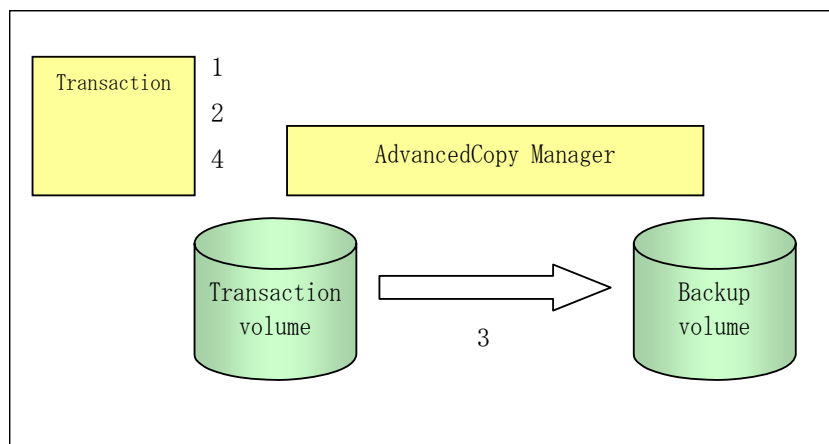
C.2 Backup and Restoration of a Transaction volume

C.2.1 Backup procedure

The following is an overview of the backup procedure:

1. Check the work operation status
Check whether processing is in progress or not.
2. Stop processing
If the transaction volume is in use, stop all update processes to make the transaction volume consistent and ready for backup.
3. Disk backup
Create backup copies of transaction volumes by using the backup function of AdvancedCopy Manager.
4. Restart processing
Restart any processing that was in progress in Step 1.

Figure: Backup method

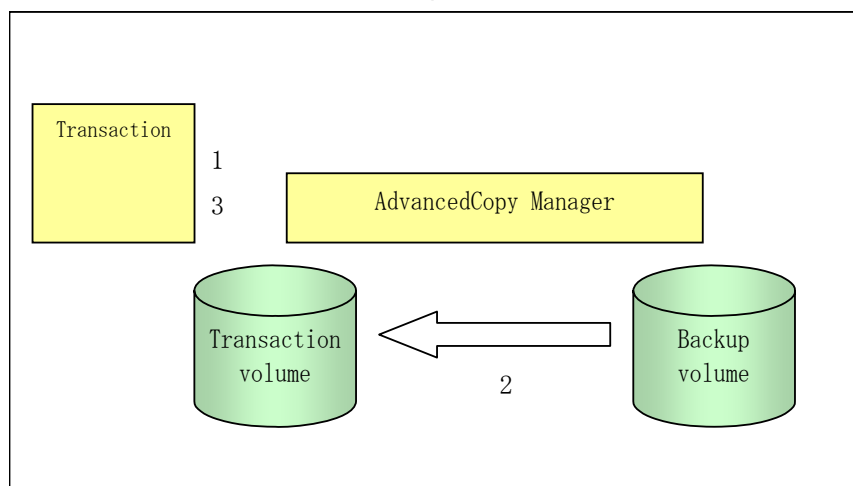


C.2.2 Restore procedure

The following is an overview of performing restore from a backup tape:

1. Checking the work operation status
If work is in progress, completely stop the processing.
2. Restore
Use the restore function of AdvancedCopy Manager to restore from the backup volume to the transaction volume.
3. Restart processing

Figure: Restore method



C.3 Sample Shell Scripts for Oracle

Sample scripts provided for AdvancedCopy Manager are created assuming that the following version of Oracle is used. If you use any other version, correct the sample scripts as required.

- Oracle 9i (V 9.2.0.1.0)

C.3.1 Overview of sample shell scripts for Oracle

The sample shell scripts provided are summarized below. These scripts are stored in the `/etc/opt/FJVSwsts/samp` directory.

Table: Sample shell script for Oracle

No.	Type	Script name	Associated transaction	Associated resource type
1	Collection of DB information	swst_or_iv	Oracle transaction	-
2	Backup	swst_or_rd_bk	Oracle transaction	Raw device



Note

When a database exists on a file system, backup cannot be performed if the database is in use.

Collecting DB information

swst_or_iv outputs information about an Oracle database. The output file names and their contents are:

- spdata.lst: List of table space names and storage destinations
- spdata.bgn: Command in the following format:
Alter tablespace Table-space-name begin backup;
- spdata.end: Command in the following format:
Alter tablespace Table-space-name end backup;
- spcont.lst: Oracle database control file information
- splog.lst: Oracle database log file information
- spreadolog.lst: REDO Log file information of an Oracle database

Use the database information above as a reference for creating shell scripts for backup processing.

a. Format

```
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
ACMSTS1         /dev/rlvol136001

```

```
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;
alter tablespace ACMSTS1 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;
alter tablespace ACMSTS1 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
```

```
spredolog.lst
```

```
GROUP#      MEMBER
```

```
-----
```

```
-----
```

```
3          /work/u01/app/oracle/oradata/acmtest1/redo03.log
2          /work/u01/app/oracle/oradata/acmtest1/redo02.log
1          /work/u01/app/oracle/oradata/acmtest1/redo01.log
```

d. Processing outline

```

#!/bin/sh
reterr() --- An error message is output before an error is returned.
sqldata()
{
sqlplus /nolog <<!
connect / as sysdba
SELECT --- Acquire Oracle table space information.
}
sqllog()
{
sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle log information.
}
sqlcont()
{
sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle control information.
}

```

```

}
sqlredolog()
{
sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle REDO log 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

# 4) Acquisition of Oracle REDO log information
sqlredolog() invocation --- Acquire Oracle REDO log information

exit 0

```

File System Backup

swst_or_vg_bk, run using AdvancedCopy Manager, backs up live data using an Oracle database on a raw device.

Live data is copied to work disks prepared by users.

These scripts correspond to steps 2 to 4 in "Backup procedure."

a. Start

```
swst_or_vg_bk {-a | -i} <volume group name>
```

b. Explanation of operands

```

-a: Specify when an Oracle database is online. The start of backup processing is
declared to the Oracle server.
-i: Specify when an Oracle database is stopped or the file is a general file. The start
of backup processing is not declared to the Oracle server.
volume group name: Specify the name of the volume group targeted for backup.

```

c. Example using swst_or_vg_bk

```

While processing is active, back up /dev/vg01 in which an Oracle database is located.
# swst_or_vg_bk -a /dev/vg01
swst_or_vg_bk completed. (/dev/vg01 -> /dev/vg02 at 23:01 on 2005.10.01 )

```

d. Processing outline of swst_or_vg_bk

```
#!/bin/sh

usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
get_chr_blk() --- Conversion from a character device to a block device
get_blk_chr() --- Conversion from a block device to a character device
sqlbegin()
{
sqlplus /nolog <<!
connect / as sysdba
alter system switch logfile;
alter system flush shared_pool;
alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.
}
sqlend()
{
sqlplus /nolog <<!
connect / as sysdba
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
```

C.3.2 Applying the sample shell scripts for Oracle

DB information collection

Sample shell script update

Update the procedures below of `swst_or_iv` according to actual operations. 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

Procedures 1) to 3) change Oracle account information.

These scripts can operate only on business servers of AdvancedCopy Manager.

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

Update the procedures below of `swst_or_vg_bk` according to actual operations. 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

Procedures 1) and 3) refer to `spdata.lst`, `spdata.bgn`, `spdata.end`, `splog.lst`, `spredolog.lst`, and `spcont.lst`, created by `swst_or_iv`.

These scripts can operate only on business servers of AdvancedCopy Manager.

Recording and managing the backup volume name and processing time

After executing a shell script, a backup volume name and the processing time are output in a message. This information is needed for restoration, so it must be recorded and managed.

C.3.3 Restore Method

Use the restore function of AdvancedCopy Manager for restore processing.

C.3.4 Notes about using the sample shell scripts for Oracle

Oracle resource location

Store Oracle data files and files other than data files on separate disks or in separate slices.

Backup of Oracle resources

Note the following when performing this function:

1. Initialization parameter file
 - a. Every time a change occurs, back up this file using the `cp` command of the OS is executed for backup.
2. Control files
 - a. You are recommended to use mirroring using Oracle.
 - b. If a change is made in the DB environment, use the following command to create a trace file:

```
alter database backup control file to trace;
```

If a control file is destroyed, execute the SQL statement `recover control file` in the trace file to recover the control file.

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). 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. You are recommended to mirror the 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 an Oracle database has stopped, restore the database, and restart it. To recover the database to its latest state, use Oracle's recovery function.

C.4 Sample Shell Scripts for DB2

Sample scripts provided for AdvancedCopy Manager are created assuming that the following version of DB2 is used. If you use any other version, correct the sample scripts as required.

- DB2 (v8.1.1.64)

C.4.1 Overview of sample shell scripts for DB2

The sample shell scripts provided are summarized below. These scripts are stored in the /etc/opt/FJVSswsts/samp directory.

Table: Sample shell script for DB2

No.	Type	Script name	Associated transaction	Associated resource type
1	Collection of DB information	swst_db2_iv	DB2 transaction	-
2	Backup	swst_db2_vg_bk	DB2 transaction	Raw device



Note

When a database exists on a file system, it cannot back up during starting of the business which uses the database.

Collecting DB information

swst_db2_iv outputs information about an DB2 database. The output file names and their contents are:

- spdata.lst: List of table space names and storage destinations
- spdata.srt: Sorted results of spdata.lst using the storage destination as the key

Use the database information above as a reference for creating shell scripts for backup processing.

a. Format

```
swst_db2_iv
```

b. Usage example

```
# swst_db2_iv
swst_db2_iv completed.
```

c. Result example

```
spdata.lst
TABLESPACE-NAME      DEVICE-NAME
-----
SYSCATSPACE
/work/ACM_DB2/db2inst1/database/db2inst1/NODE0000/SQL00001/SQLT0000.0
TEMPSPACE1
/work/ACM_DB2/db2inst1/database/db2inst1/NODE0000/SQL00001/SQLT0001.0
USERSPACE1
/work/ACM_DB2/db2inst1/database/db2inst1/NODE0000/SQL00001/SQLT0002.0
ACM34                 /dev/rlvol34001
SYSTOOLSPACE
/work/ACM_DB2/db2inst1/database/db2inst1/NODE0000/SQL00001/SYSTOOLSPACE
```

d. Processing outline

```
#!/bin/sh
reterr() --- An error message is output before an error is returned.
sqldata()
{
db2 list tablespaces ----- Acquisition of table space
name and table space ID
db2 list tablespace containers for <table space ID> --- Acquisition of device name
}

# main()

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin

# 1) Acquisition of DB2 table space information
    db2 connect to acmtest1 --- Connect the DB2
    sqldata
    db2 terminate ----- Terminate the DB2

exit 0
```

Backup

swst_db2_vg_bk, run using AdvancedCopy Manager, backs up processing data using an DB2 database on a raw device.

Processing data is copied to work disks prepared by users.

These scripts correspond to steps 2 to 4 in "Backup procedure."

a. Start

```
swst_db2_vg_bk {-a | -i} <volume group name>
```

b. Explanation of operands

```
-a: Specify when a DB2 database is online. The start of backup processing is declared to the Oracle server.
-i: Specify when a DB2 database is stopped or the file is a general file. The start of backup processing is not declared to the Oracle server.
volume group name: Specify the name of the volume group targeted for backup.
```

c. Example of using swst_db2_vg_bk

```
While processing is active, back up /dev/vg01 in which an DB2 database is located.
# swst_db2_vg_bk -a /dev/vg01
swst_db2_vg_bk completed. (/dev/vg01 -> /dev/vg02 at 23:01 on 2005.10.01 )
```

d. Processing outline of swst_db2_vg_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()
{
db2 set write suspend for db --- Suspend the DB2 database.
sync
}
sqlend()
{
db2 set write resume for db ---- Resume the DB2 database.
}
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) Suspend
if [ "-a" operand specification ]
then
db2 connect to <database name>
sqlbegin() ----- Suspend the database.
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $SRC --- Copy the disk.

# 3) Resume
if [ "-a" operand specification ]
then
sqlend() --- I/O of DB2 is put into the state of suspend.
db2 terminate ----- Terminate the database.
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
```

C.4.2 Applying the sample shell scripts for DB2

DB information collection

Sample shell script update

Update the procedures below of swst_db2_iv according to for actual operations. The following numbers correspond to those in the scripts:

- 0) Environmental variable setting
- 1) Acquisition of DB2 table space information

These scripts can only operate on business servers of AdvancedCopy Manager.

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

Update the procedures below of `swst_db2_vg_bk` to adjust them for actual operations. The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Notification issued to DB2 of the start of backup
- 3) Notification issued to DB2 of the stopping of backup

The above procedures 1) and 3) refer to the `spdata.lst` file created by `swst_db2_iv`.

These scripts can only operate on business servers of AdvancedCopy Manager.

Recording and managing the backup volume name and processing time

After executing a shell script, a backup volume name and the processing time are output in a message. This information is needed for restoration, so it must be recorded and managed.

C.4.3 Restore Method

Use the restore function of AdvancedCopy Manager for restore processing.

C.4.4 Notes about using the sample shell scripts for DB2

DB2 resource location

Store DB2 data files and files other than data files on separate disks or in separate slices.

Backup operation of DB2 resources

Note the following when performing this function:

1. Database
 - a. Back up using the `BACKUP DATABASE` command of DB2.
`db2 => backup database DB name to target;`
[Database structure]
 - Drive/directory : The drive or directory specified by the `CREATE DATABASE` command
 - DB2 instance name : The owner name of a DB2 instance
 - Partition number of a database
 - Database ID
 - Default log directory of a database
 - Catalog table space
 - Temporarily table space
 - User table space
2. User table space
 - a. The user table space should be created on a RAW device rather than at file system level. In the case of table space, the table space container is also a part of the backup, and hence please use the provided sample shell scripts.
 - b. The backup operation is performed using AdvancedCopy Manager.
 - c. The table spaces targeted for backup should be selected within the AdvancedCopy Manger's backup unit.
For example, if the unit of backup of AdvancedCopy Manger is a LUN, then 1 table space should lie on 1 LUN.

Recovery of DB2 databases

After the DB2 database has stopped, restore the database, and restart it. To recover the database to its latest state, use DB2's recovery function.



Note

When performing the restore, please use the following order

- 1) Database
- 2) User table space