ETERNUS SF
AdvancedCopy Manager 14.1

Operator's Guide

HP-UX

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:

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 and Setup Guide
  Describes the installation procedure.

- ・ ETERNUS SF AdvancedCopy Manager Operator's Guide
  Describes the operating procedures.

- ・ ETERNUS SF AdvancedCopy Manager GUI User's Guide
  Describes the operating procedures for the GUI client.

- ・ ETERNUS SF AdvancedCopy Manager Message Guide
  Explains the messages output by ETERNUS SF AdvancedCopy Manager and the associated troubleshooting.

- ・ ETERNUS SF AdvancedCopy Manager Operator's Guide for Cluster Environment
  Describes the installation and customization procedures in a cluster environment.

- ・ ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Server Option
  Describes the operating procedures for tape backup.

- ・ ETERNUS SF AdvancedCopy Manager Operator's Guide for Copy Control Module
  Describes the operating procedures for the ETERNUS SF AdvancedCopy Manager Copy Control Module.

- ・ ETERNUS SF AdvancedCopy Manager Glossary

  Describes the terminology used in ETERNUS SF AdvancedCopy Manager manuals.

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 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 Server(R) 2008 R2 Standard, Microsoft(R) Windows Server(R) 2008 R2 Enterprise, Microsoft(R) Windows Server(R) 2008 R2 Datacenter are abbreviated as "Windows Server 2008 R2".

- ・ Microsoft(R) Windows(R) XP Professional and Microsoft(R) Windows(R) XP Home Edition are abbreviated as "Windows XP".

- ・ Windows Vista(R) Home Basic, Windows Vista(R) Home Premium, Windows Vista(R) Business, Windows Vista(R) Enterprise and Windows Vista(R) Ultimate are abbreviated as "Windows Vista".

- ・ Windows(R) 7 Home Basic, Windows(R) 7 Home Premium, Windows(R) 7 Professional, Windows(R) 7 Enterprise and Windows(R) 7 Ultimate are abbreviated as "Windows 7".

- ・ 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".

- ・ ETERNUS DX60/DX80/DX90, ETERNUS DX400 series, ETERNUS DX8000 series, ETERNUS2000, ETERNUS4000, ETERNUS8000, ETERNUS3000, ETERNUS6000, and ETERNUS GR series are referred to as "ETERNUS disk storage systems".

- ・ The Web GUI of ETERNUS DX series, ETERNUSmgr, and GRmgr are referred to as "ETERNUS Web GUI".

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Contents

Chapter 1 Overview of AdvancedCopy Manager

This chapter describes the 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 features.

- 1.1.1 High-speed backup (24-hour basis)
- 1.1.2 Non-stop backup [database]
- 1.1.3 High-speed replication

1.1.1 High-speed backup (24-hour basis)

The ETERNUS disk storage systems hardware function (Advanced Copy Function) 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.

In addition, since operations management is linked to the following DBMSs, high-speed backup can be performed without interruption to live operational processing:

- Oracle

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

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

1.1.2 Non-stop backup [database]

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

- For Oracle: "B.3 Sample Scripts for Oracle"

1.1.3 High-speed replication

The ETERNUS disk storage systems hardware function (Advanced Copy Function) enables data to be used for purposes other than the original purpose and replicated data (copy) to be collected as a protection against data corruption.
With the remote copy function in ETERNUS disk storage systems, copying operations to ETERNUS disk storage systems at remote locations are also possible.

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

- Oracle

 Point
. . . .
As an example for copying some databases, the script created for replication is shown in "Appendix B Sample Script for Backup Operations".
. . . .

1.2 Product Configuration of AdvancedCopy Manager

1.2.1 Function system

AdvancedCopy Manager consists of the following three functions:

Table 1.1 Functions

Function name	Description
Agent module of AdvancedCopy Manager	Operates on the Storage Server with which the storage device is connected. Backup management and replication management are performed. This (Agent) can be managed by an instance of AdvancedCopy Manager running on the Solaris OE, the Windows, or the Linux operating systems.
AdvancedCopy Manager GUI client	The GUI client can be run on a user's local machine in the same way as any other application, to monitor and/or manage the AdvancedCopy Manager environment by connecting 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 operation and the replication operation that AdvancedCopy Manager offers. The Agent component of AdvancedCopy Manager is installed on the Storage Server. If a Storage Server is also to be used as the Storage Management Server then the Manager, as well as 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 and only one Storage Management Server can be set in the system. The Management module of AdvancedCopy Manager is installed on the Storage Management Server.

Three different operating scenarios for the AdvancedCopy Manager are shown below:

・ When only one Storage Server is installed
 In this operating environment, only the Management module of AdvancedCopy Manager needs to be installed (Management module of AdvancedCopy Manager includes the Agent functions of AdvancedCopy Manager).

 Figure 1.1 When only one Storage Server is installed
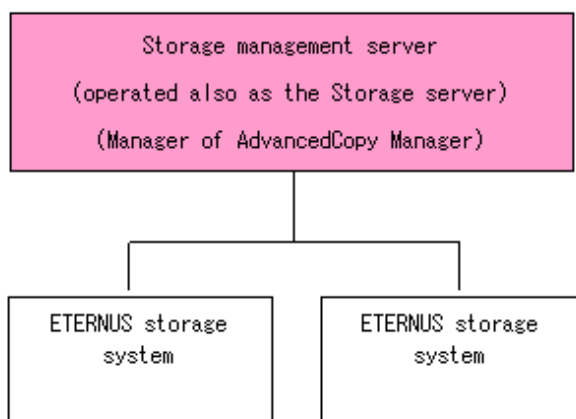
・ When two or more Storage Servers are installed
 When two or more AdvancedCopy Manager servers are available, set only one of them up as the Storage Management Server or set up a new server with no ETERNUS disk storage systems connected as the Storage Management Server. Each environment is explained below.

 a. When the Storage Server is operated as a Storage Management Server
 One of the servers functions as a Storage Management Server. The Storage Management Server has a repository where the

information on operating and management of all Storage Servers is stored.

When many Storage Servers exist, they all compete for access to the repository. To ensure overall performance and other applications running on the same server are not adversely affected, the Storage Management Server functionality should be installed on a dedicated server, or on a server on which the load of other applications is relatively low.

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

Figure 1.2 When the Storage Server is also operated as a Storage Management Server
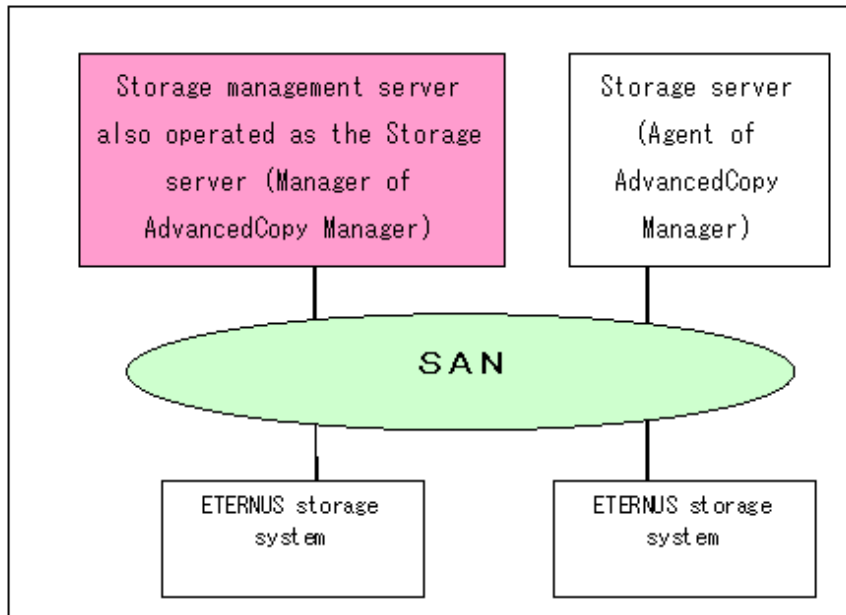
b. Setting up the special Storage Management Server
   This setup comprises two or more Storage Servers with a dedicated Storage Management Server.

Figure 1.3 When a dedicated Storage Server is a Storage Management Server
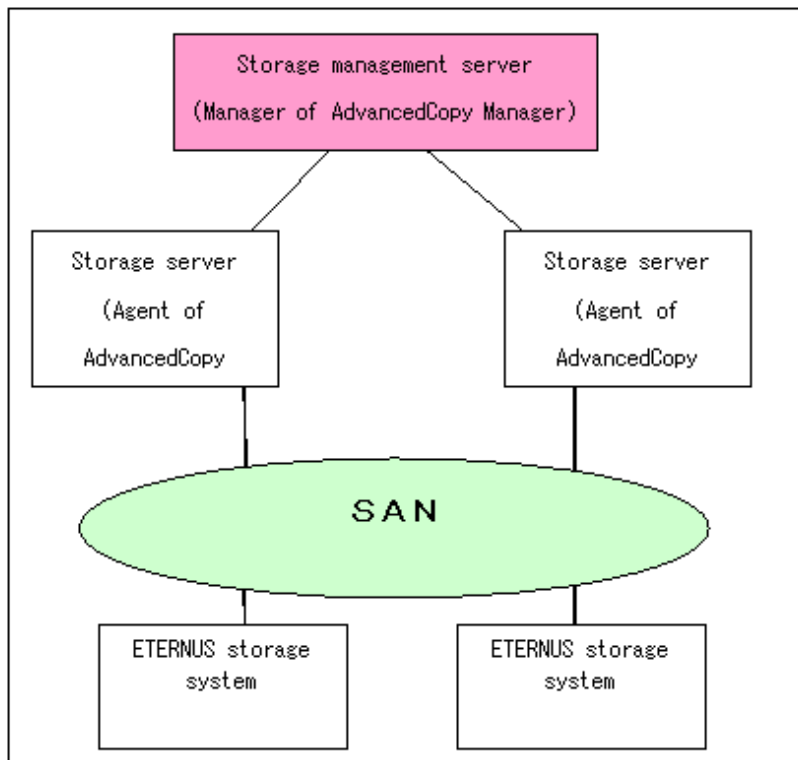
1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

Figure 1.4 System configuration of Storage Management Server and two or more Storage Servers
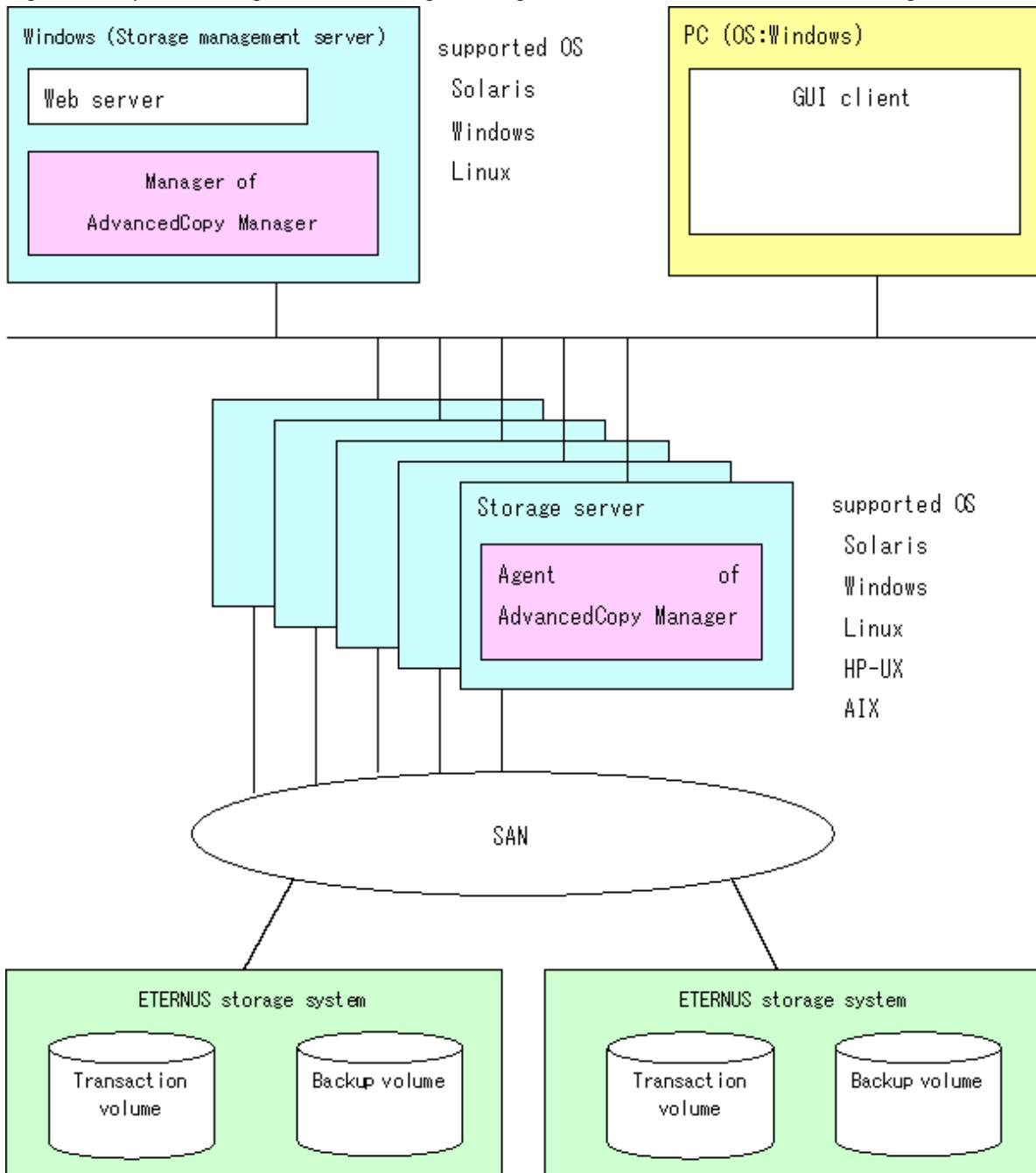
1.2.3 Combining the Agent and Manager

The following product level combinations are possible when using different levels of the AdvancedCopy Manager Agent and Manager. The Manager of AdvancedCopy Manager is supported by the Solaris, Linux and Windows operating systems. The Agent of AdvancedCopy Manager is supported by the Solaris, Linux, Windows, AIX and HP operating systems. For details, refer to "Software Conditions" corresponding to each operating system in the "ETERNUS SF AdvancedCopy Manager Operator's Guide".

In addition, it is not possible to combine different levels of Manager and GUI client. Always use the same level.

Table 1.2 Combining the AdvancedCopy Manager Agent and Manager

		Version level of Agent (Storage Server)			
		10.x (V10.0Lxx)	11.x (V11.0Lxx)	13.x	14.x
Version level of Manager (Storage Management Server)	10.x (V10.0Lxx)	A	C	C	C
	11.x (V11.0Lxx)	B	A	C	C
	13.x	B	B	A	C
	14.x	B	B	B	A

Note: 10.x(V10.0Lxx) and 11.x(V11.0Lxx) in the table are the Softek AdvancedCopy Manager version. From 13.x, the name "Softek" changes to "ETERNUS SF" to become ETERNUS SF AdvancedCopy Manager.
A: Connection possible
B: Connection possible (however, functions supported by the Storage Server version or later cannot be used)
C: Connection not possible

Note

・ There is a difference in functionality between some product revision levels. Installation of the manager and agent of 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 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 not possible

1.3 Function Overview of AdvancedCopy Manager

1.3.1 What is the backup function?

The backup function of AdvancedCopy Manager provides operation management for high-speed backup by using the OPC (One Point Copy), EC (Equivalent Copy), and REC (Remote Equivalent) function of ETERNUS disk storage systems.

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

High-speed backup operation

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

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

Policy management function

The policy management function manages the number of preservation generations of backup and the number of interval days in which backup should be performed (displays the delay when displaying information for a volume to be backed up).

Storage configuration management function

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

On AdvancedCopy Manager, a volume to be backed up is called a transaction volume; 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.

History information management function

The history information management function manages, out of the information that has been backed up in the past, the information in preservation generations as history.

Consistency recovery function

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

1.3.2   What is the replication function?

The replication function of AdvancedCopy Manager provides operation management of replications by using the OPC (One Point Copy), EC (Equivalent Copy), and REC (Remote Equivalent) function of a Fujitsu Storage Systems ETERNUS.
As a result, the following replication operations become possible.

High-speed replication operation

The advanced copy function (OPC/EC function) of the ETERNUS disk storage systems is used to perform high-speed replication between volumes regardless of volume capacities. This function greatly reduces the impact of a replication operation.

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

Consistency recovery function

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

Main differences with backup function

In backup function, policy management and history management are possible, but they are not possible in replication function.
In replication function, replication between two volumes is possible.

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. Refer to "Chapter 3 Security Operation Using Authentication Feature" for more information.

1.3.4   GUI Client

The GUI client can be used to perform environmental setup and employment functions for AdvancedCopy Manager. The main functions are as follows.

- Security management
  Operational restrictions of users of AdvancedCopy Manager can be performed using the GUI interface.

- Backup management
  AdvancedCopy Manager Backup management tasks (such as definition of a server or a device, backup, restoration, etc.) can be performed using the GUI interface.

- Replication management
  AdvancedCopy Manager replication management tasks (such as defining volumes and executing replications) can be performed using the GUI interface.

A GUI client can be used to access the client screen of 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 management and replication management can also be performed at the command line as well as the GUI client.
For more information, see "GUI Client" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

1.3.5 Copy Control Module

When the ETERNUS SF AdvancedCopy Manager Copy Control Module is used, it is possible to perform back up from the server where the Copy Control Module was installed, using the Advanced Copy function of ETERNUS disk storage systems.
As a result, the Agent of AdvancedCopy Manager need not be installed.
For details, refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Copy Control Module".

1.4 Operating Environment of AdvancedCopy Manager

1.4.1 Hardware requirements

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

- ・ ETERNUS DX60/DX80/DX90

- ・ ETERNUS DX410/DX440

- ・ ETERNUS DX8100/DX8400/DX8700

- ・ ETERNUS2000 (model 100 or higher)

- ・ ETERNUS4000 (model 100 or higher)

- ・ ETERNUS8000

- ・ ETERNUS3000 (model 100 or higher)

- ・ ETERNUS6000

- ・ ETERNUS GR720/GR730/GR740/GR820/GR840

Point

When executing the Advanced Copy function of ETERNUS DX60/DX80/DX90, it is necessary to register the Advanced Copy license to the License Manager.
For the registration procedure of the Advanced Copy license, refer to "About ETERNUS SF License Manager" in the "ETERNUS SF AdvancedCopy Manager Installation and Setup Guide".

1.4.2 Software requirements

1.4.2.1 Agent of AdvancedCopy Manager

Table 1.3 Software requirements for Agent of AdvancedCopy Manager

Product name	Requirement	Remarks
HP-UX 11.00 HP-UX 11i v1 HP-UX 11i v2 (PA-RISC) HP-UX 11i V2.0 (Itanium) HP-UX 11i v3 (Itanium)	Required	Support OS
MC/ServiceGuard A.11.13 Serviceguard A.11.17 VERITAS Cluster Server 5.0	Conditionally required	For cluster operation with the Agent of AdvancedCopy Manager
VERITAS Volume Manager 3.5 VERITAS Volume Manager 5.0	Conditionally required	When a logical volume of VERITAS Volume Manager is the target of the operation performed.

The version level of software is different depending on the system environment at the installation destination. Refer to the manual etc. of the relating software for details

1.5 Managing a Device on AdvancedCopy Manager

When using AdvancedCopy Manager, you should register the block type devices to operate.

1.5.1 Normal devices

The following devices are supported for backup and replication management:

・ sd driver resources

Note that the following device is not supported for management by HP-UX 11i v2.0 (Itanium) or later:

・ GPT disk

Note
. . . .

A new device format is supported from HP-UX 11i v3. Refer to the OS documentation for details.

Devices with new format

```
/dev/(r)disk/disk# (# is the disk instance number)
```

Devices with conventional format

```
/dev/(r)dsk/c#t#d# (c# is the controller instance number, t# is the target number, and d# is the
LUN number
```

・ When HP-UX 11i v3 is used as a Storage Server, AdvancedCopy Manager gives priority to using new format devices. If devices with conventional formats are used with AdvancedCopy Manager, the information collection mode must be changed before device information is collect or reflected to avoid the use of a new format device. Refer to stgxfwcmsetmode (Information collection mode setting command) for details.

・ Devices with the same format as the AdvancedCopy Manager information collection mode must be set for the physical disks comprising ordinary devices and LVMs, and the physical disks comprising VxVM.
For example, If the AdvancedCopy Manager information collection mode is "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

・ Disks that are larger than 2TB cannot be used with AdvancedCopy Manager. Therefore, operate AdvancedCopy Manager with disks that are less than 2TB.

. . . .

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, refer to the "LVM Volume Operation" sections in the chapters on "4.8 LVM Volume Operation" and "7.8 LVM Volume Operation".

🔰 Note
. . . .

・ Do not set LVM physical volume groups. If set, LVM device information cannot be fetched correctly.

・ New device names are supported from HP-UX 11i v3. Refer to "1.5.1 Normal devices" for details. The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise LVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.

  For example, If the AdvancedCopy Manager information collection mode is "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

・ Disks that are larger than 2TB cannot be used with AdvancedCopy Manager. Therefore, operate AdvancedCopy Manager with disks that are less than 2TB.

. . . .

1.5.2.1 Backup/replication in units of volume groups

LVM volumes are volumes which 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 1.5 Support configuration
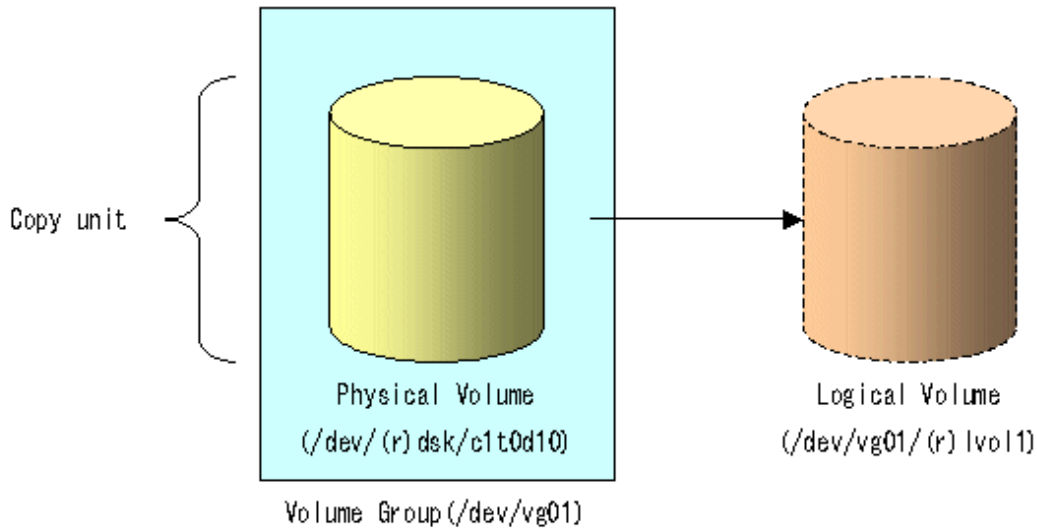
LVM allows multiple logical volumes to be defined on a single physical disk (a logical volume is referred to as LU: Logical Unit). The boundaries of logical volumes can be defined independently of the boundaries of the host physical disk.

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 can be performed and remounted after the backup or replication has completed.

Note

When capturing information concerning devices under a Storage Server, the information concerning the physical disks that comprise a volume group need not be captured.

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 operations in units of volume groups.

Note

For operations in a cluster configuration, the device name 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 1.6 Configuration that is not supported for operation in units of volume groups
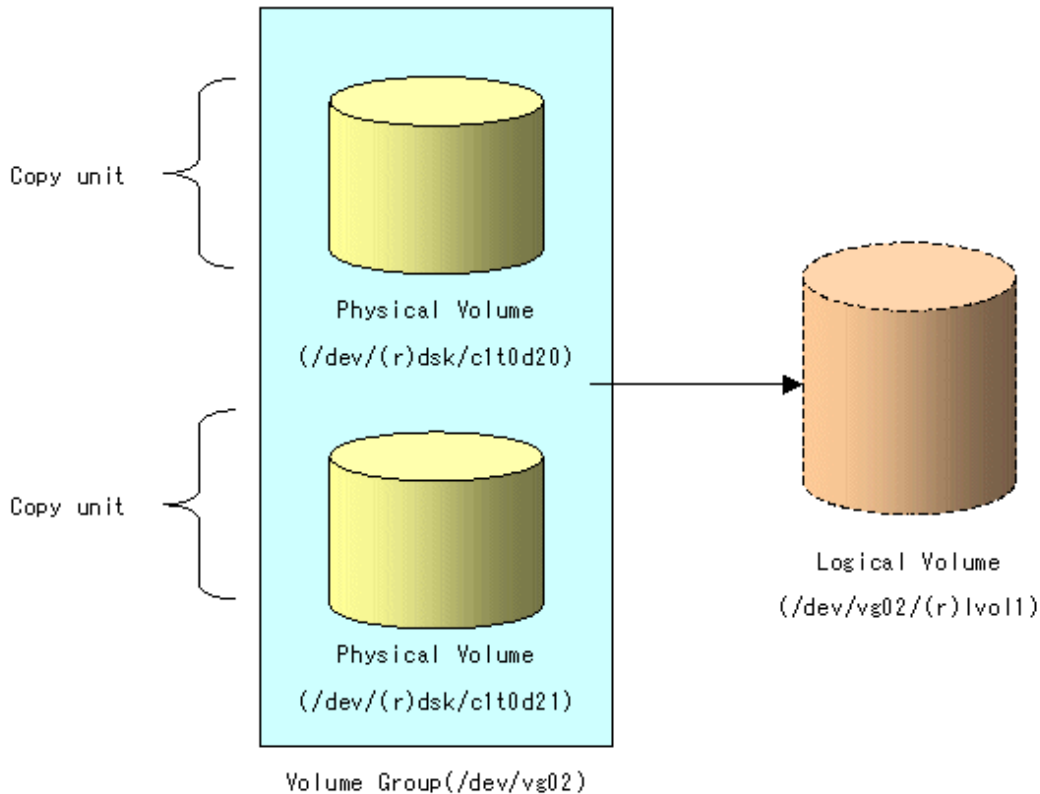
Copying during backup or replication must be performed while maintaining the integrity of an entire volume group.

1.5.3   Volumes under control of VERITAS Volume Manager (VxVM)

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

- ・ Physical disk that constitutes a volume group

For details on backup of a subordinate volume of VxVM, refer to the section titled "4.9 VxVM Volume Operation". For details on replication of a subordinate volume of VxVM, refer to the section titled "7.9 VxVM Volume Operation."

📒 Note

. . . .

- ・ New device names are supported from HP-UX 11i v3. Refer to 1.5.1 Normal devices" for details. Physical disks that comprise VxVM can use only conventional format devices (/dev/(r)dsk/c#t#d#) and they cannot use new format devices (/dev/(r)disk/disk#). Therefore, if VxVM is used, the AdvancedCopy Manager information collection mode must be set to conventional format devices. Refer to stgxfwcmsetmode (Information collection mode setting command) for details of information collection modes.

- ・ The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.

  For example, If the AdvancedCopy Manager information collection mode is "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

- ・ Disks that are larger than 2TB cannot be used with AdvancedCopy Manager. Therefore, operate AdvancedCopy Manager with disks that are less than 2TB.

. . . .

1.5.3.1 Physical disks that constitute a disk group

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

Figure 1.7 Example of VxVM configuration
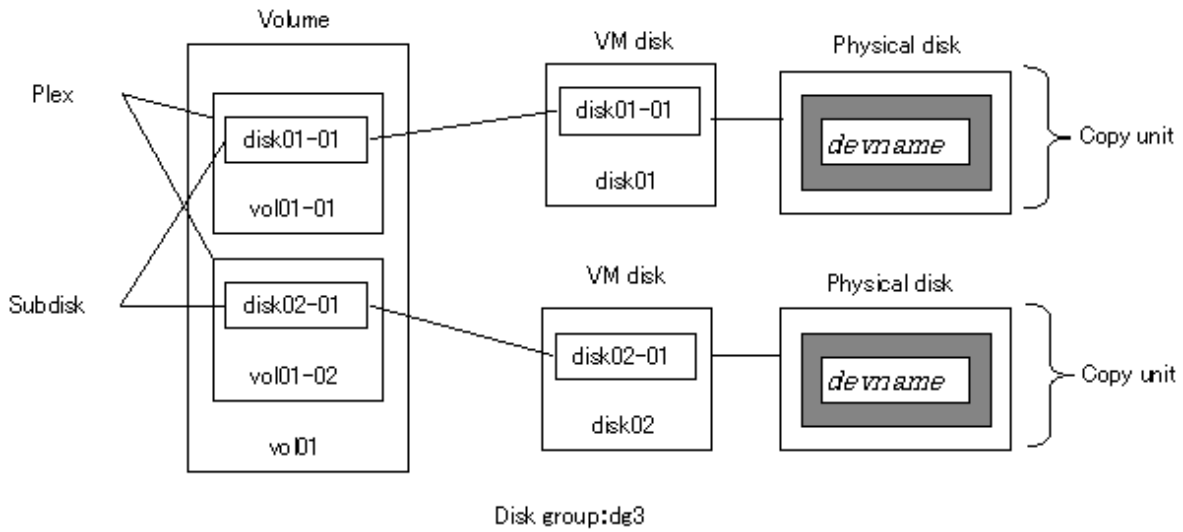
Since AdvancedCopy Manager copies an entire VM disk, not only the shared area that is a sub-disk but also the public region containing VxVM-internal configuration information is copied.
When backup or replication is performed, therefore, the integrity of VxVM configuration information must be maintained during copying.

Specify a device name as follows:

・ /dev/vx/dmp/c#t#d#

Note
. . . .
Operations are not supported under naming convention operations based on enclosures in VxVM.
. . . .

Note
. . . .
For operation in a cluster configuration, the device name of the physical disks that comprise the volume group must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the device name must be the same.
. . . .

Chapter 2 Starting and Stopping Daemons

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

For more information on how to activate and stop the daemons described in this chapter, see "9.5 Start/Stop Daemon Commands."

2.1 Daemons that Configure AdvancedCopy Manager

Agent of AdvancedCopy Manager is configured with the following daemons:

Table 2.1 Types of daemons that configure Agent of AdvancedCopy Manager

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

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

Table 2.2 Type of daemon using for storage server transactions

Daemon type	Description
The transaction-intended communication daemon	Communicates with the Storage Management Server and other storage servers

Note
. . . .

The following daemon cannot be used for a Storage Server transaction:

・ Communication daemon (local daemon)
. . . .

2.2 Starting a Daemon

A daemon must be running on both a Storage Management Server and a Storage Server.

If for whatever reason a daemon stops, the daemon must restarted on each server.

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

Note
. . . .

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

・ If the message below is displayed when trying to start the daemon, then stop it and start it again :
"Symfoware/RDB for AdvancedCopy Manager failed to start !!(version missing)"
. . . .

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

📑 **Note**

. . . .

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

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

1. Execute the following command on the command line:

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

    Confirm that command execution does not display:

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

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

2. For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.

3. Start the communication daemon.
   For the startup command, see "9.5.1 Starting and stopping the communication daemon".

. . . .

2.3 Stopping a Daemon

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

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

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

📑 **Note**

. . . .

・ Before executing the stopadacm command, confirm that the SWSTGNODE environment variable is not defined.

. . . .

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

📑 **Note**

. . . .

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

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

1. Execute the following command on the command line:

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

    Confirm that command execution displays:

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

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

2. For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.

3. Stop the communication daemon.

   For the stop command, see "9.5.1 Starting and stopping the communication daemon".

Chapter 3 Security Operation Using Authentication Feature

AdvancedCopy Manager provides access control for users who need to perform any of the backup management or replication management functions.

To achieve this, a security feature is enabled which specifies the range of functionality for each users

For details of this, see "Security Operation Using Authentication Feature" in "ETERNUS SF AdvancedCopy Manager Operator's Guide the following operating environments:

- ・ Windows edition

- ・ Solaris edition

- ・ Linux edition.

Chapter 4 Backup Operation

This chapter provides details of the backup operation performed by AdvancedCopy Manager AdvancedCopy Manager backups are created in units of partitions.

The backup operation using the HP-UX version of AdvancedCopy Manager's Agent as described in this chapter can be used with AdvancedCopy Manager's Manager component running under other OS environments such as Windows, Solaris or Linux.

For information on the relationships between the configurations of supported devices and the copy operation, see "1.5 Managing a Device on AdvancedCopy Manager".

4.1 Overview

This chapter describes the Backup and Restore functions of AdvancedCopy Manager.

AdvancedCopy Manager performs high-speed backup of volumes of ETERNUS disk storage systems, regardless of volume capacities, using the advanced copy functions, OPC and EC.

Backup that uses the One Point Copy (OPC) function is called "snapshot fast backup", while backup that uses the Equivalent Copy (EC) function is called "synchronized high-speed backup".

Automatic snapshot backup can be scheduled without first estimating the time required, because it does not use 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 where backup data does not exist, even though the generation number is 1, but synchronized high-speed backup does requires one more backup volume generation than is required by 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 to allow enough time for synchronized processing to finish first. Synchronized backup processing is then started based on the estimated time, and the backup execution command is entered after equivalency maintained status has been achieved.

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

AdvancedCopy Manager also manages the backup carriers and generations, and allows you to restore data from the latest or previous generations of backed up data.

Figure 4.1 Managing a backup volume
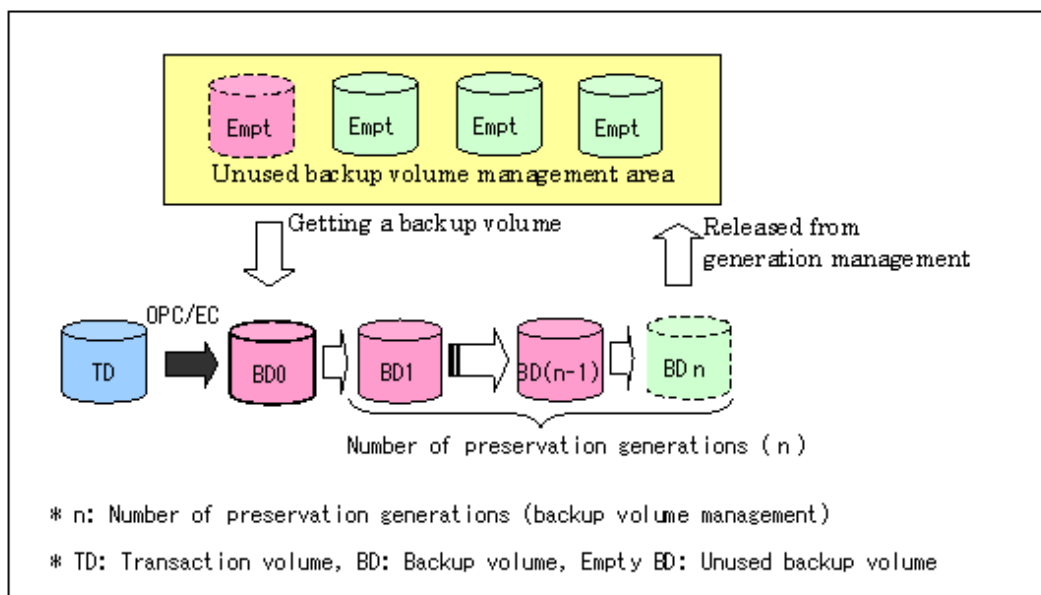
4.1.1　Snapshot backup processing

The OPC(One Point Copy) function of ETERNUS disk storage systems is used to copy data from a transaction volume to an unused backup volume.

To perform a snapshot fast backup, take the following steps:

1. Execute swstbackup (Backup execution command) ((1) in the figure below). The following processing will be performed:

   - If backup volumes under generation management exist for all the generations, the oldest backup volume will be assumed to be unused.

   - An unused backup volume will be selected from the unused backup volume management area.

2. Data on the transaction volume will be copied to the selected unused backup volume ((2) to (4) in the following figure).

3. Backup carrier information will be set.

Figure 4.2 Snapshot fast backup processing
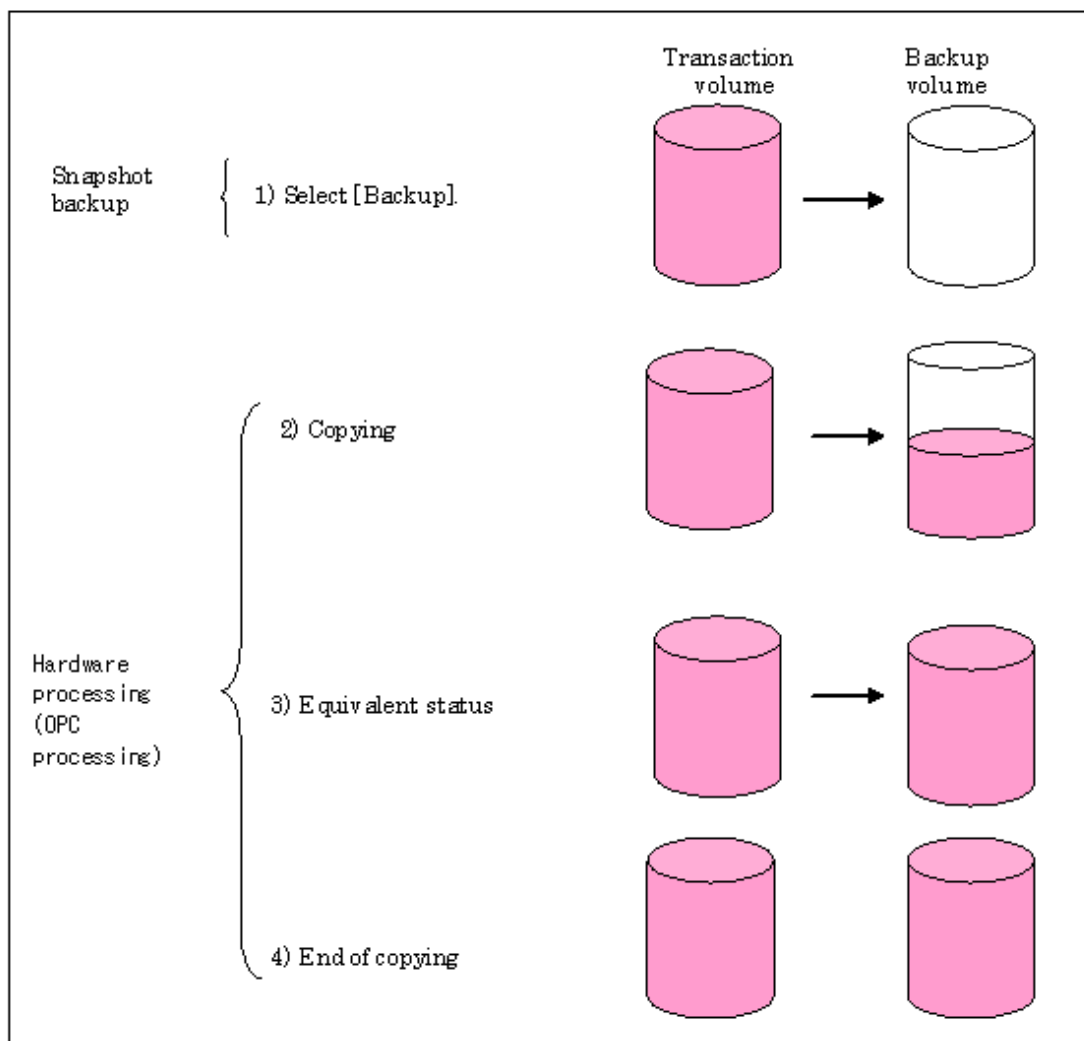
The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC function of ETERNUS disk storage systems.
The QuickOPC function of the snapshot high-speed backup creates a snapshot image by only copying the data updated since the start of previous backup. This reduces the time for physical copying significantly.

For information on the QuickOPC function, see "Chapter 6 Backup Operation by the QuickOPC Function."

> 📓 **Note**
> ··
> If all the generations of backup volumes are 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.
> ··

4.1.1.1 Snapshot backup processing of a Volume Group

When the transaction volume is a volume group, copy processing by the OPC/ROPC functions of ETERNUS disk storage systems is performed for the entire physical disk comprising the volume group. Therefore, when two or more logical volumes exist in a volume group, the data contained in all logical volumes is backed up (refer to the following figure).

> 📓 **Note**
> ··
> When using a volume group for backup operation, care needs to be taken with the following points:
>
> - When the transaction source volume is a volume group, construct a logical disk whose size matches that of the transaction volume, in a volume group different from the transaction group, and register this volume group whose physical disk size is the same as the transaction volume as the backup volume.
>
> - A "4.4.10.1 Describing a device map file" is created to describe the pairing of matching transaction and backup volumes. For details, refer to "4.4.10 Preparing a device map file". A "Device map" is mandatory if you are backing up using 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, see "Appendix A Pre-processing and Post-processing of Backup and Restoration".
>
> - When backing up a volume group using an account with Administrator authority for backup, modify the scripts used for backup pre-processing and post-processing to unmount/mount all logical volumes in the volume group. For more information, see "Appendix A 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 will results in an error.
>
> Figure 4.3 Transaction volume and backup volume for two or more logical disks
>
>
>
> ··
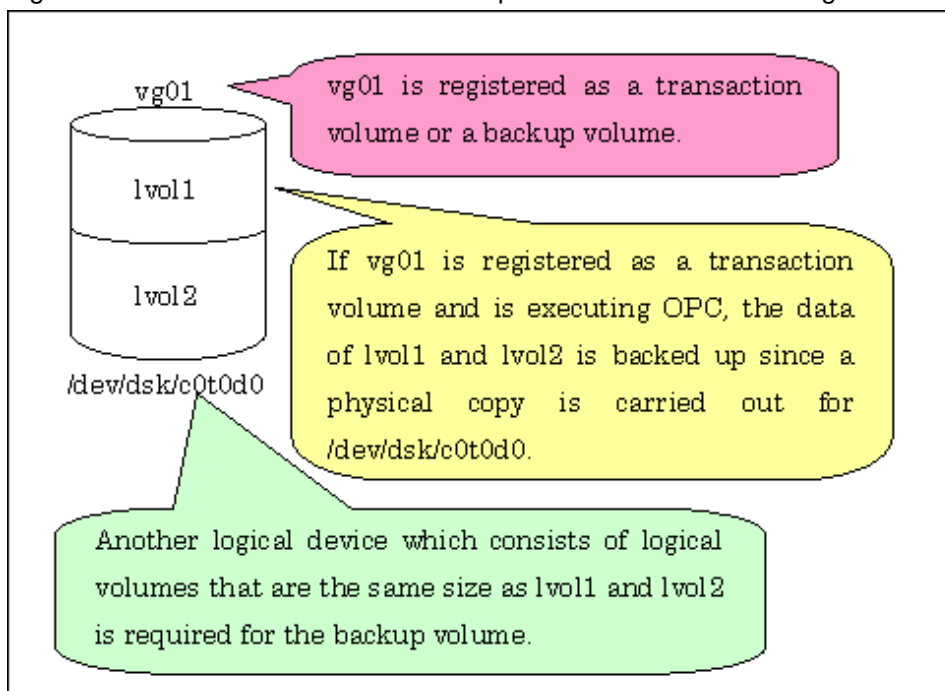
4.1.2 Synchronized high-speed backup processing

The EC(Equivalent Copy)/REC(Remote Equivalent Copy) function of ETERNUS disk storage systems is used to copy data from a transaction volume to an unused backup volume.

To perform synchronized high-speed backup, take the following steps:

1. Execute swststartsync (Backup synchronous processing start command) ((1) in the following figure), the transaction volume and an unused backup volume with the same capacity are selected from the unused backup volume management area and synchronized backup processing is started.

2. The transaction and backup volumes reach an equivalent state. From this point on, equivalence between the transaction volume and backup volume is maintained. This status is referred to as equivalency maintenance status ((3) in the following figure).

3. Execute swstbackup (Backup execution command) ((4) in the figure below). The backup synchronization processing stops and the backup history information is set.

4. When the generation number of the newly backed up data exceeds the number of generations of backup history being kept, the oldest backup volume is treated as an unused backup volume.

🛈 Note

· ·

swstbackup (Backup execution command) cannot be executed before the transaction and backup volumes have become equivalent.

· ·

Figure 4.4 Backup using the synchronized high-speed backup function
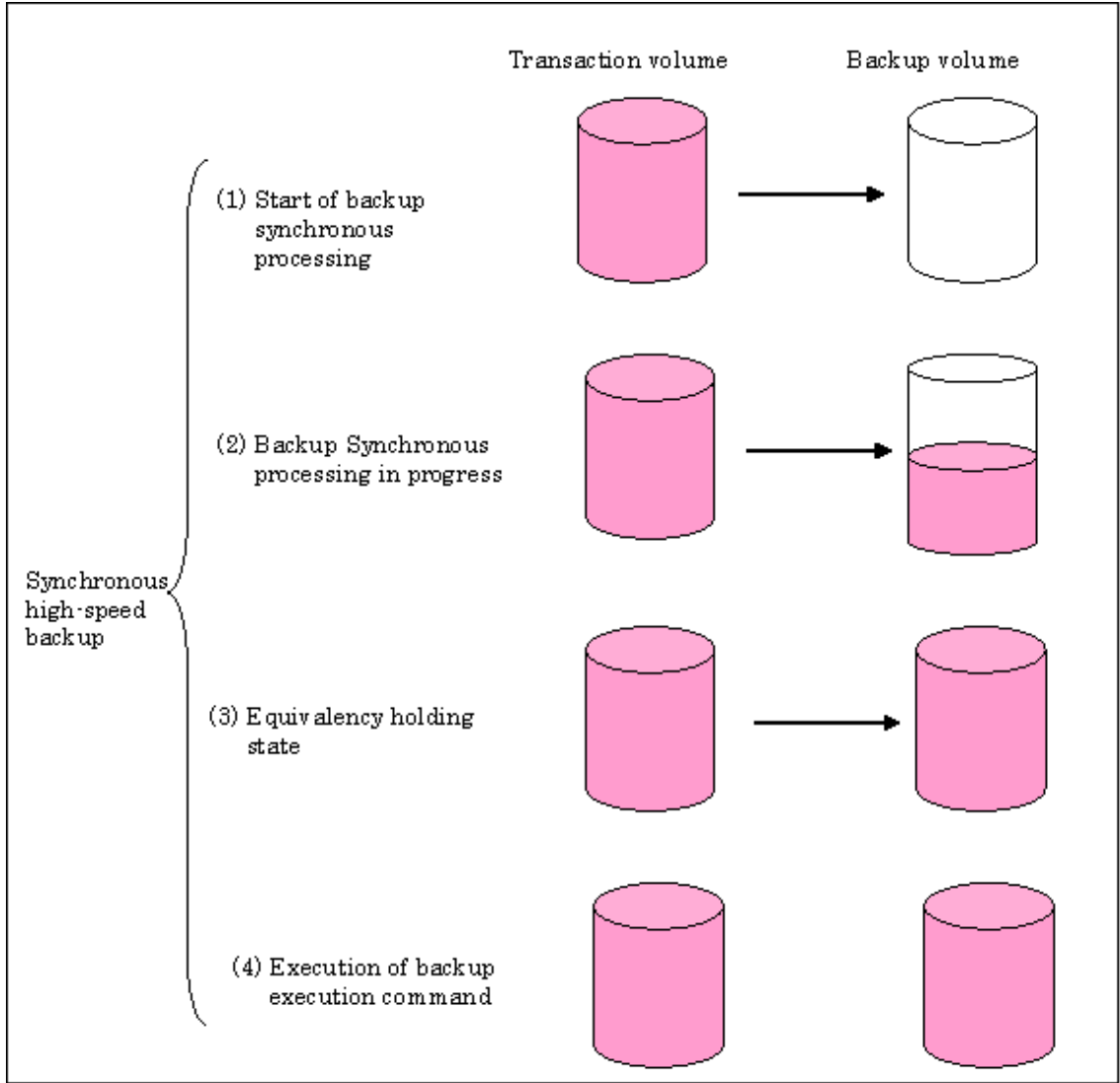
During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. The synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

For information on the Suspend/Resume function, see Chapter 5 Backup Process That Uses the Suspend/Resume Function.

 Note

If all generations of backup volumes are 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.

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 of ETERNUS disk storage systems is performed to the physical entire disk comprising the volume group. Therefore, when two or more logical volumes exist in a volume group, the data contained in all logical volumes is backed up.

Note

When using a volume group for backup operation, care needs to be taken with the following points:

- When the transaction source volume is a volume group, construct a logical disk whose size matches that of the transaction volume, in a volume group different from the transaction group, and register this volume group whose physical disk size is the same as the transaction volume as the backup volume.

- A "4.4.10.1 Describing a device map file" is created to describe the pairing of matching transaction and backup volumes. For details, refer to "4.4.10 Preparing a device map file". A "Device map" is mandatory if you are backing up using 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, see "Appendix A Pre-processing and Post-processing of Backup and Restoration".

- When backing up a volume group using an account with Administrator authority for backup, modify the scripts used for backup pre-processing and post-processing to unmount/mount all logical volumes in the volume group. For more information, see "Appendix A 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 will results in an error.

- In the case where the backup volume is a volume group, do not execute the vgchange (1M) command while executing synchronous processing (EC/REC). If the backup volume becomes deactivated during the execution of synchronous processing, it will not be possible to reactivate it. In addition, it will not be possible to stop synchronous processing, the backup execution command, the backup synchronous processing cancel command, etc. If accidentally deactivated, use ETERNUS Web GUI or similar, to forcibly stop synchronous processing, and then activate the backup volume.

4.1.3 Restoring Data

This section describes how data is restored in 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 ETERNUS disk storage systems 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.

Note that data will be restored to a transaction volume that was the backup source. However, you can change the restore destination.

Note

Data updated between the last backup and a subsequent restoration will be lost as the transaction volume is overwritten by the backup volume.

Figure 4.5 Notes on restore operations in AdvancedCopy Manager
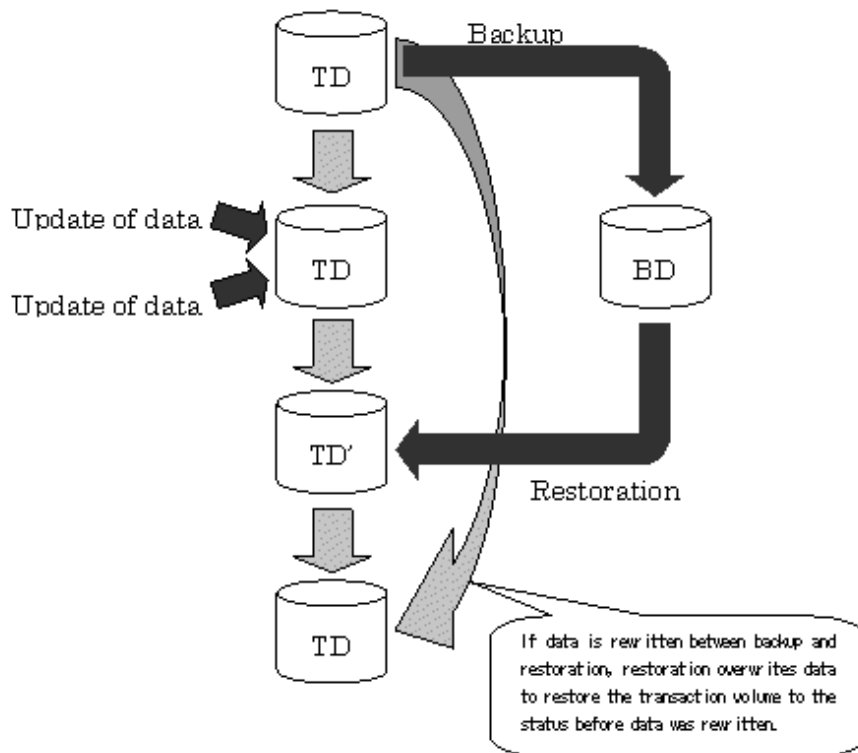
TD: Transaction volume
BD: Backup volume

4.1.3.1   Restoration processing of Volume Group

When a transaction volume is a volume group, copy processing by the OPC and ROPC functions of ETERNUS disk storage systems is performed to the entire physical disk comprising the volume group. Therefore, when two or more logical volumes exist in a volume group, the data contained in all logical volumes is backed up.

📑 Note

. . . .

When using a volume group for backup operation, care should be taken with the following point:
When restoring a volume group, using an account with Administrator authority for backup, correct the script used for backup pre-processing and post-processing to unmount/mount all logical volumes. For more information, see "Appendix A Pre-processing and Post-processing of Backup and Restoration".

Figure 4.6 Restoration for two or more logical disks
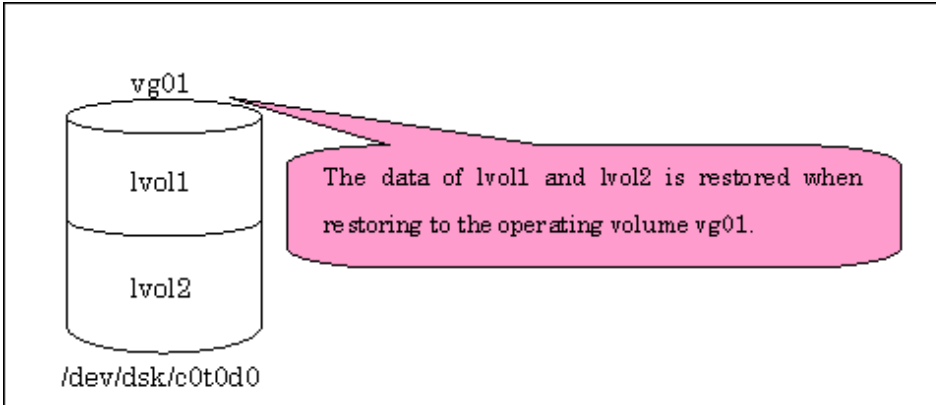
4.2 Operation Design

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:

- 4.2.1 Selecting a server on which backups are performed
- 4.2.2 Selecting a backup source
- 4.2.3 Configuring a backup policy
- 4.2.4 Preparing a backup volume
- 4.2.5 Preparing the automatic backup operation

4.2.1 Selecting a server on which backups are performed

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

Storage Management Server

Multiple Storage Servers are unified and managed centrally. The Storage Management Server can also operate as a Storage Server.

A Storage Management Server can also serve as a Storage Server.
Note that AdvancedCopy Manager running on a Storage Management Server must run in either a Windows, Solaris or Linux OS environment.

Storage Server

AdvancedCopy Manager operations can be performed on the Storage Server.

The HP-UX version of AdvancedCopy Manager can also be used to operate a Storage Server.

🛈 Note

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

Figure 4.7 Configuration of servers on which the backup operation should be performed
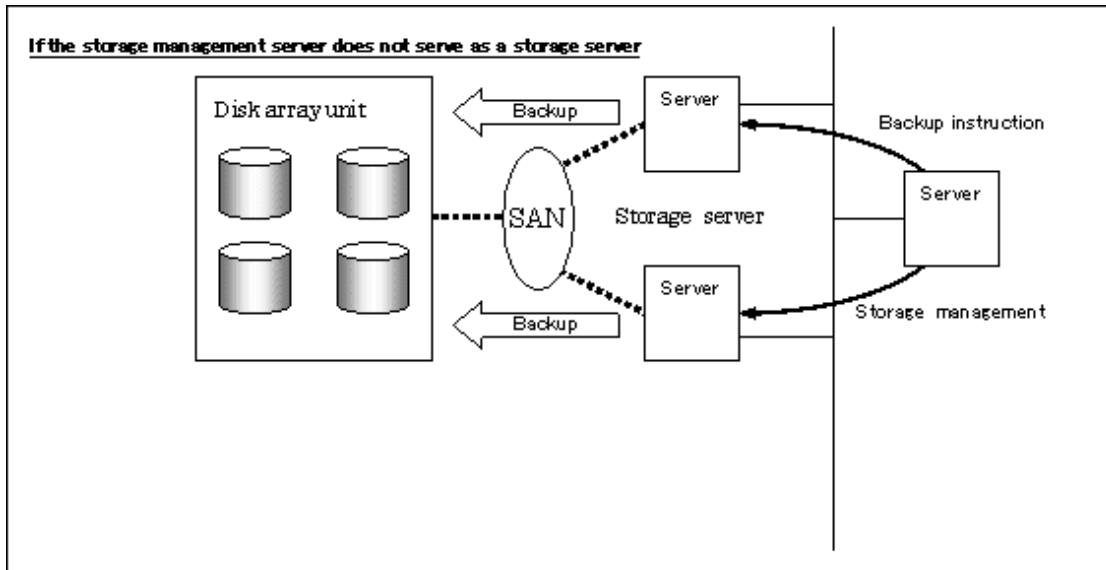
4.2.2 Selecting a backup source

The backup/restoration unit of the HP-UX AdvancedCopy Manager is a physical disk (LU: Logical Unit). However, in the case of a physical disk which constitutes the LVM (Logical Volume Manager), it is managed and operated as a volume group. This disk is called a transaction volume (source).

A transaction volume to be backed up must reside on the ETERNUS disk storage systems.

For the supported units, refer to "1.5 Managing a Device on AdvancedCopy Manager".

For information on setting up a transaction volume, see "4.4.7 Setting the operation type for a device".

Note

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

- ・ The following should be noted when using a volume group as operating volume:

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

- ・ Refer to the "10.1.1 General notes" for points to consider when deciding on a candidate volume for backup. Some points to consider include but may not be limited to:

    - 10.1.1.2 Backup and Replication Exclusions

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 generation management. If a system failure or any other failure occurs while the backup is running, the oldest generation may have already been released and there may not be as many generations of backup data as required. Therefore, Fujitsu recommends that you re-execute backup immediately 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 is equal to the maximum number of backup generations + 1.

Interval days

Interval days refers to the time interval (in days) between successive backups.

A notification that backup is overdue is displayed if a period longer than the specified interval has passed since the last backup date, but a backup will not performed automatically in this instance even if you have specified the interval days between backups.

For information on setting a backup policy, see "4.4.8 Setting backup policies".

4.2.4 Preparing a backup volume

This section describes how to prepare the backup volume.

The backup unit of AdvancedCopy Manager is a disk. In AdvancedCopy Manager, the device which stores the transaction data used as the candidate for backup is called the transaction volume.

A destination backup volume must be placed on the same ETERNUS disk storage systems.

The number of backup volumes is determined by whether snapshot fast backup or synchronized high-speed backup is performed:

Table 4.1 Number of backup volumes required for backup operations

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 4.2 Number of backup volumes required for backup operations (if a backup policy has been set)

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, see "4.4.7 Setting the operation type for a device".

Note

・ Do not configure AdvancedCopy Manager to backup a system disk or a disk where AdvancedCopy Manager is installed.

・ 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 volume so that it does not span two or more physical disks.

  - The backup volume must be the same physical size as 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.

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

To do this, follow the procedure below:

1. Start backup synchronization.

2. Confirm the equivalency maintain status.

3. Execute backup.

4. Save the backup volumes to secondary media.

5. Delete history information.

6. Return to step 1.

Be aware that, if any history information is deleted for any reason, the restore execution command cannot be used to restore data from the period beginning with the time of deletion until the time the next backup is completed inclusive. In this event, the data must be restored directly from the secondary media where applicable.
. . . .

4.2.5 Preparing the automatic backup operation

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

Automatic snapshot fast backup

Automatic snapshot fast backup can be executed by using one of the following two methods:

・ Start the backup command as part of a batch job.

Figure 4.8 Start in a job net
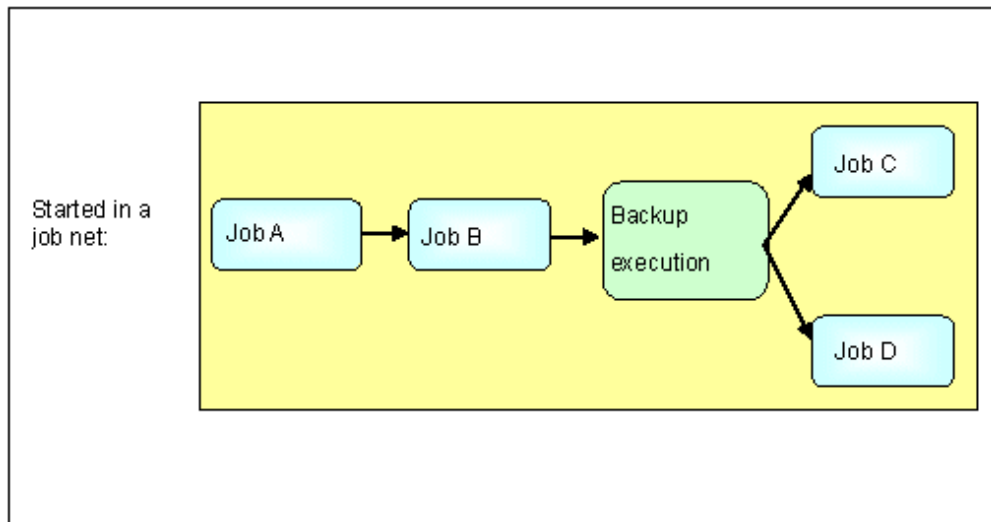
- Start the backup command at the specified time.

Figure 4.9 Start at a specified time
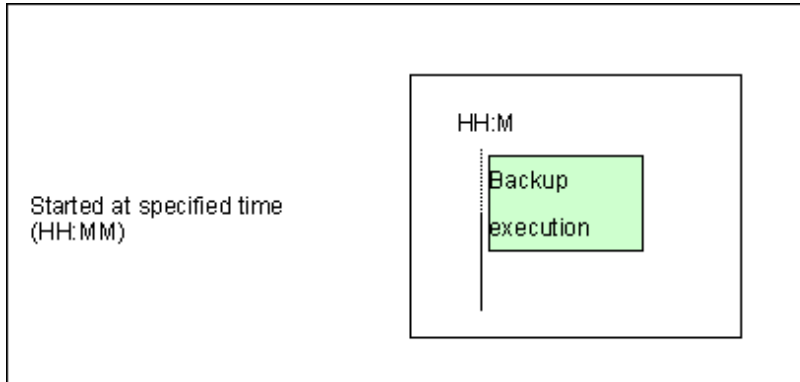
Automatic synchronized high-speed backup

For synchronized high-speed backup, the transaction and backup volumes must have maintained equivalency 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 expected time required for the synchronized backup processing.

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 maintained equivalency status when backup is executed.

The time between the start of synchronized backup processing and the transition to maintenance equivalency 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 as part of a batch job.

Figure 4.10 Start in a job net
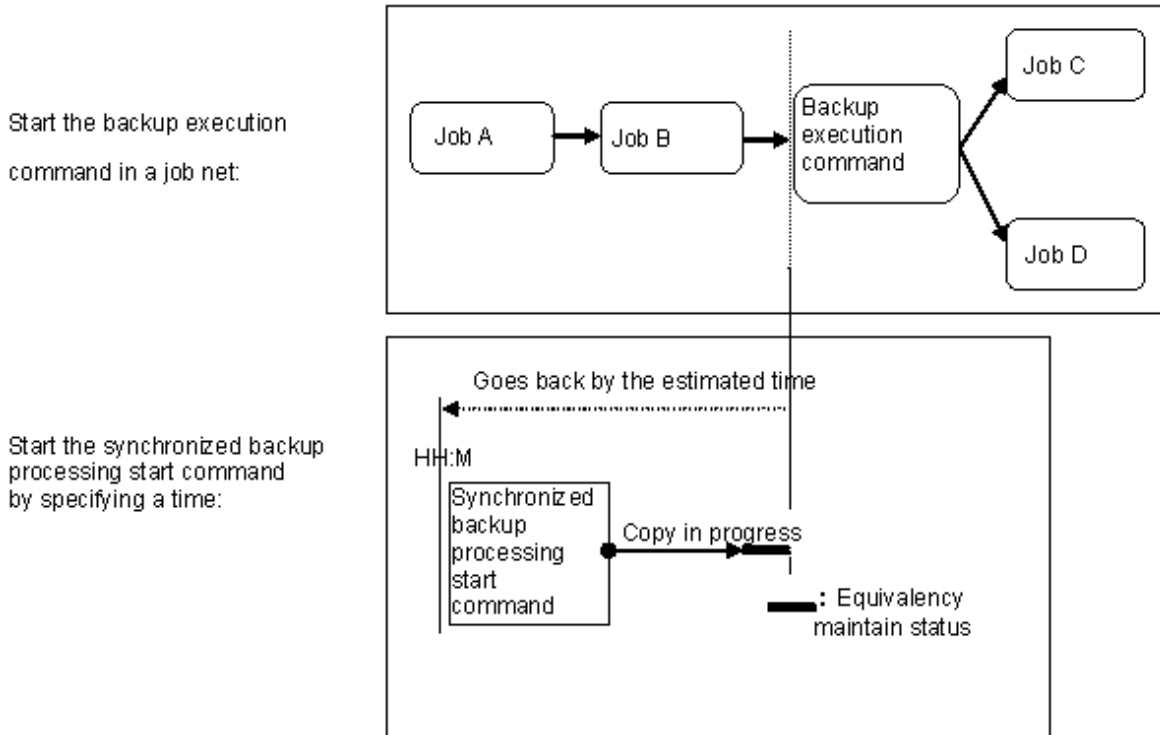
Note

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 4.11 Start at a specified time
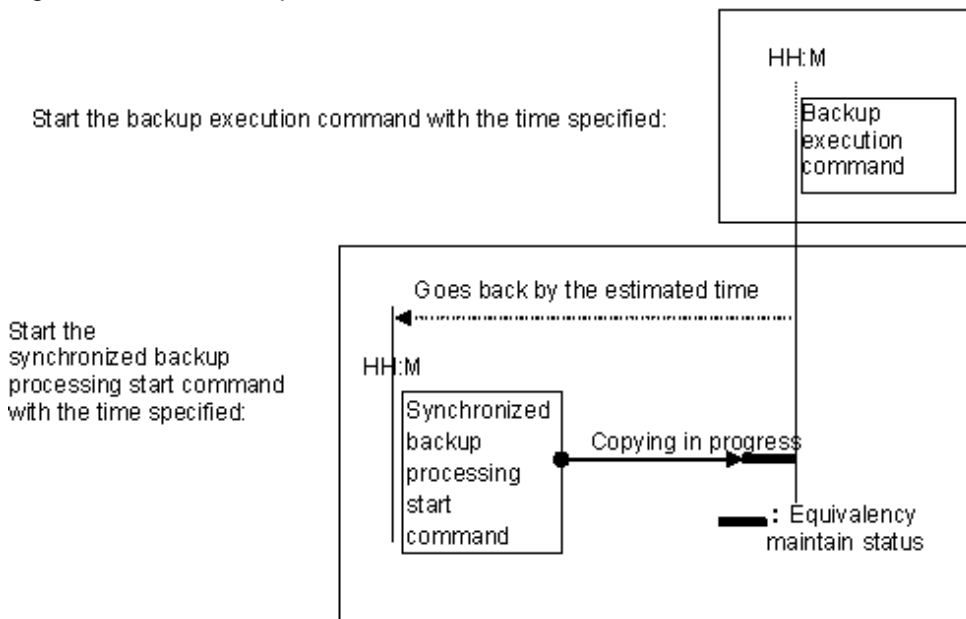
4.3 Flow of Operation

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

Figure 4.12 Flow of backup operation on a regular transaction volume

Activating daemons

Configuring access permission For the first time and as required

Starting the GUI client When a command performs subsequent operations, starting of an initial screen is unnecessary

Registering a Storage Server For the first time only

Fetching device information on a Storage Server For the first time or only when a device is changed

Configuring the environment for a backup operation server Only when operation is changed

Configuring the operation type for a device Only when operation is changed

Configuration options Only when inter-box backup is performed

Configuring backup policies Only when operation is changed

Customizing pre-processing and post-processing scripts Only when the operation is changed

Preparing a device map file Only when the backup destination is changed

Operation

Stopping a service

4.4 Preparing to Start the Backup

This section describes the preparations that are required to perform the backup operation.

4.4.1 Activating daemons

Before the backup operation is started, the daemons of AdvancedCopy Manager must be started on both the Storage Management Server and the Storage Servers. Normally, these daemons are automatically started up when the system is started. If the startup fails the system for some reason or if the daemons has been stopped, you will need to start the composing daemons on each server.

For information on starting a daemon, see "Chapter 2 Starting and Stopping Daemons".

4.4.2 Setting an access permission

When performing backup from a backup management screen, access permission is set up for each operation of a 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, access permission is not required.

4.4.3 Starting the GUI client

Start the GUI client. For details of this, refer to "Starting the AdvancedCopy Manager Workbench" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide". If using commands only, this operation is not required.

4.4.4 Registering a Storage Server

The Storage Management Server registers the Storage Server that is to be managed. When the Storage Server is also operated as a Storage Management Server, the server does not need to be registered.

The process of registering the Storage Server can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Register a New Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

For the operation method using commands, refer to stgxfwcmaddsrv (Server information addition command) 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 process can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Manage Devices" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

🔔 Note

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- ・ As part of replication management, device information on a Storage Server must first be stored in the repository.
  There may not be sufficient area available for updating the repository if information is to be obtained for devices under two or more

Storage Servers. Check if the area required when updating the repository is available before obtaining the device information. If there is insufficient area, allocate the required area, then obtain` the device information.

For the procedure, refer to the version of the following manual that applies to the operating system of the Storage Management Server:

- "ETERNUS SF AdvancedCopy Manager Operator's Guide", step 2 of "Action required when access to repository fails"

・ The time taken to add new devices is in proportion to the total number of devices defined in the selected Storage Server. For this reason, if a large number of devices have been defined, execute the process only when the CPU load on the system is low. As a guide, each operation takes about 0.5 seconds per device (ie, partition) with no load.

4.4.6　Configuring the environment for a backup operation server

Configuring the environment for a backup server can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Modify Storage server Information" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide". For information on the operation method using commands, refer to swstsvrset (Storage Server configuration information setting command).

When performing backup using commands only, the Storage Server configuration information setting command must be executed at the time that operations start.

Point

If the Storage Management Server is combined with the Storage Server, these environment settings are also required for the Storage Management Server.
If the Storage Server environment setup has already been carried out, this process is not required.

4.4.7　Setting the operation type for a device

Set up the volume type for a device that is connected to the Storage Server.

The setting of the operation type is explained below. This involves:

・ Defining the volume to be backed up as a transaction volume.

・ Preparing backup volumes. Prepare the number of volumes shown below in accordance with the operation type, each volume having the same partition size as the transaction volume, and define them as backup volumes.

Table 4.3 Number of backup volumes required for backup operations

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

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

For information on the operation method using commands, refer to swstdevinfoset (Device information setting command).

Note

・ A logical volume of LVM cannot be registered as transaction volume or backup volume. Register it in a volume group.

・ 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 span two or more physical disks.

- In order to set up a volume as a transaction volume, there are some points which should be taken into consideration. For more details, see "10.1.1 General notes".

- To change the configuration of a partition that has been registered as either a transaction volume or a backup volume, take the following steps:

    1. Delete the registered configuration, and then change the configuration.

    2. Attempt to 4.4.5 Fetching device information on a Storage Server.

    3. Register the information by executing swstdevinfoset (device information command).

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

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

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

- When the registered contents are checked by the GUI client or by 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.

Point

You can check the volumes that have been registered as follows:

- Using the GUI client to check volumes
  Transaction volume information or back up volume information can be referred to from the GUI client. For details, refer to the "ETERNUS SF AdvancedCopy Manager GUI User's Guide."

- Checking by executing a Command at the Command line.
  You can view information for a registered transaction volume or backup volume. Refer to "swstdevdisp (Device usage status display command)"

4.4.8 Setting backup policies

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

- Preservation generations

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

- Interval days

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

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

For information on the operation method using commands, refer to swstbkpolset (Backup policy setting command)

Note

- Even if the number of interval days has been specified, AdvancedCopy Manager does not automatically invoke the backup when the date for the next backup is reached. This value is used only to prompt the user to perform backup when the number of backup interval days is exceeded.

- When you set a backup policy, there must be as many registered backup volumes as required to perform backup according to the specified backup policy. For information on the necessary number of backup volumes, see "4.2.4 Preparing a backup volume".

- Even though the number of backup volumes required for the backup may not have been registered when backup policies for synchronized high-speed backup were set, this number can be set by default provided the number of backup volumes required for snapshot fast backup has been previously registered. Otherwise, it may not be possible to execute synchronized high-speed backup.

🅿 Point

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

- Checking in a GUI client
  You can check backup policy on the transaction volume list view. For more information on the window, refer to "View Volume Information" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

- Checking using a command
  You can view information on a defined backup policy. Refer to swstbkpoldisp (Backup policy display command).

4.4.9   Customizing pre-processing and post-processing

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

Pre-processing and Post-processing scripts for Backup need to be customized.

- For operational reasons, to avoid unmount and mount processing of transaction volumes that comprise a file system

- The backup target is a volume group

- To add special pre-processing and post-processing to the corresponding scripts.

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

🅿 Point

When AdvancedCopy Manager is upgraded

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

4.4.10   Preparing a device map file

When using AdvancedCopy Manager to back up data, a backup volume with the same capacity as a transaction volume is automatically selected from the available registered backup volumes.

If a specific backup volume is to be used to back up a given transaction volume, a "Device map file" must be created. A "Device map file " is a file defining the relationship between the transaction and a specific backup volume.

A device map file may be created anywhere on the Storage Server that performs backup. If you specify this file while performing a backup, the relationship as defined in the device map file is automatically recognized for that backup operation.

To manage multiple generations of backups using defined transaction volume to backup volume relationships, multiple device map files must be prepared.
The device map file used when backing up or starting synchronous processing should meet either of the following requirements:

- Either an unused backup volume must be specified, or

- A backup volume detailed in the history information that was deleted by this backup must be specified

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

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

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

4.4.10.1   Describing a device map file

The following provides an example of a device map file:

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

# Normal Disks
/dev/dsk/c1t1d1         /dev/dsk/c1t1d21
/dev/dsk/c1t1d2         /dev/dsk/c1t1d22
/dev/dsk/c1t1d3         /dev/dsk/c1t1d23

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

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

- Describe a transaction volume name and a corresponding target backup volume name in one line. Separate the transaction volume name and backup volume name with one or more space or tab characters.
  One or more space or tab characters may be used as delimiters between the beginning of a line and a transaction volume name or between the end of a target backup volume name and the end of a line (new line character).

- A blank line (Space or tab characters) may be included in a file.

- Anything after the symbol "#" is a comment. If the comment uses more than a single line, then each line must be preceded by a "#" character.

- You cannot specify more than one backup volume for the same transaction volume in one device map file. If you do, only the first occurrence is valid. While the device map file will still be read, subsequent occurrences will be ignored.

- A device map file may include descriptions of transaction volumes other than the processing target. Refer to the description example provided in the beginning of this chapter.

4.5 Operation

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

Before performing the backup operation, configure the environment settings that are required for the backup according to "4.4 Preparing to Start the Backup".

There are two kinds of backup in AdvancedCopy Manager:

・ Snapshot type high-speed backup

・ Synchronous high-speed backup

4.5.1   Performing snapshot high-speed backup

Snapshot high-speed backup can be carried out using GUI operations or commands.
For information on the operation method using GUI, refer to "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
For information on the operation method using commands, refer to swstbackup (Backup execution command)

It is also possible to use swstbackstat (Backup execution status display command) to check the backup status.

Note

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

・ Execute the backup command with the "-T" option specified swstcanceltrk (Tracking cancel command).

4.5.2   Performing synchronized high-speed backup

Synchronous high-speed backup can be carried out using either GUI operations or commands.
For information on the operation method using GUI, refer to "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
If operating with commands, perform the backup synchronous process, then carry out the backup for the transaction volume that you need to backup. For details on commands, refer to the following:

・ Starting backup synchronous process: swststartsync (Backup synchronous processing start command)

・ Checking the status of backup synchronous process: swstsyncstat (Backup synchronous processing progress status command)

・ Executing backup: swstbackup (Backup execution command)

・ Checking backup status: swstbackstat (Backup execution status display command)

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 while backup is processing.

・ When the "Chapter 5 Backup Process That Uses the Suspend/Resume Function" is used for synchronous high-speed backup, the operations listed below cannot be performed from the GUI client.

  Enter the appropriate command for operation.

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

4.5.3 Restoring Data

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

4.5.3.1 Restoring an entire volume

All of the data from a volume that has been saved with the snapshot high-speed backup can be restored using either GUI operations or commands. For information on the operation method using GUI, refer to "Restore" on "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
For information on the operation method using commands, refer to swstrestore (Restore execution command)
To check restore status, use swstreststat (Restore execution status display command)

![Note icon] **Note**
. . . .

- ・ If restoring for a general file system, stop operations.

- ・ Notes about the restoration of a volume group are available in this chapter at "Restoration processing of Volume Group".
. . . .

4.5.3.2 Restoring an individual file

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

1. Mount backup volume. Check backup volume by the history list view or by executing swsthistdisp (History information display command).

2. Copy files to restore using the cp command.

3. Unmount backup volume.

4.5.4 Managing a backup history

Backup history information can be displayed to check information such as the backup volume names and backup date of backup data under generation management in a specific transaction volume.

![Point icon] **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

Backup history can be displayed using either GUI operations or commands. For information on the operation method using GUI, refer to "Display Backup Policy and History" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
For information on the operation method using commands, refer to swsthistdisp (History information display command)

4.5.4.2 Deleting a backup history

Backup history can be deleted using either GUI operations or commands. For information on the operation method using GUI, refer to "Delete Backup history" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
For information on the operation method using commands, refer to swsthistdel (History information deletion command).

4.6 Changing the setting information

It will be necessary to change the configuration of AdvancedCopy Manager if changes are made to the configuration of a Storage Server or a device associated with a storage server used in the backup. 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 into the backup as described below.

This process can be carried out using either GUI operations or commands. For information on the operation method using GUI, refer to "Configure a Device for Use with Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

For information on adding a device using commands, refer to the following steps:

1. Use stgxfwcmsetdev (Device information collection/reflection command) in the"ETERNUS SF AdvancedCopy Manager User's Guide" for the OS of the Storage Management server to acquire information for the newly added device, and accept management information.

2. Use swstdevinfoset (Device information setting command) to set up the operation type of the added device.

3. If the added device was defined as a transaction volume, use swstbkpolset (Backup policy setting command) to set up 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 the OS of the Storage Management server 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 obtaining the device information. If there is insufficient area, free an area, then obtain the device information.

  For the procedure, refer to the version of the following manual that applies to the OS of the Storage Management Server:

  - "ETERNUS SF AdvancedCopy Manager Operator's Guide", step 2 of "Action required when access to repository fails"

- The repository (directory for the DB space that stores repository data) may be too small when a device is added. Re-estimate the repository size before adding a device. Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for the 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 the details.

4.6.2 Deleting a device

This section describes how to delete different types of devices.

4.6.2.1 Deleting a transaction volume

To delete a transaction volume, follow the steps described below.

The process of deleting a transaction volume can be carried out using either GUI operations or commands. For information on the operation method using GUI, refer to "Remove a Transaction Volume" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

1. Use swsthistdel (History information deletion command) to delete the backup history.

2. Use swstbkpoldel (Backup policy deletion command) to delete the backup policy.

3. Use swstdevinfoset (Device information setting command) to delete the device information for the deleted transaction volume.

P Point
. . . .

Ensure that all of the steps are complete before removing the transaction volume for deletion.
. . . .

4.6.2.2 Deleting a backup volume

The process of deleting a backup volume can be carried out using either GUI operations or commands. For information on the operation method using GUI, refer to "Remove a Backup Volume" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

1. If deleting the backup volume, ensure that you first use swstbkpoldisp (Backup policy display command) to check for a previously defined backup policy.

Note
. . . .

When a backup policy is deleted, it may result in a previously defined backup policy for an existing transaction volume no longer being valid (for example, if the number of backup volumes is less than the number of preservation generations defined in the policy). As a result, that backup operations may not be able to continue. If there is no space in the backup volume, first register an alternative backup volume to replace the volume to be deleted, and then delete the target backup volume.
. . . .

2. Use swsthistdel (History information deletion command) to delete the backup history, removing the relevant volume from the backup history. If there is no backup history, proceed to the next step.

3. Use swstdevinfoset (Device information setting command) to delete the device information for the deleted backup volume.

P Point
. . . .

Ensure that all of the steps are complete before removing the bakup volume for deletion.
. . . .

4.6.3 Adding a Storage Server

The process of adding a Storage Server to the backup operation can be carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Register a New Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

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

1. Register a Storage Server. For more information, refer to "4.4.4 Registering a Storage Server"

2. Fetch all the information on the devices connected to the newly added Storage Server. For more information on this, refer to "4.4.5 Fetching device information on a Storage Server".

3. Set the environment information for the Storage Server. For more information on this, refer to "4.4.6 Configuring the environment for a backup operation server".

4. Set the operation type for the device for which information has been fetched in Step 2. For more information on this, refer to "4.4.7 Setting the operation type for a device".

5. Configure a backup policy for all the transaction volumes registered in Step 4. For more information on this, refer to "4.4.8 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 the OS of the Storage Management server 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.

For the procedure, refer to the version of the following manual that applies to the OS of the Storage Management Server:

- "ETERNUS SF AdvancedCopy Manager Operator's Guide", step 2 of "Action required when access to repository fails"

・ The repository (directory for the DB space that stores repository data) may be too small when a Storage Server is added. Re-estimate the repository size before adding a Storage Server. Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for the 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.

4.6.4 Deleting a Storage Server

The process of deleting a Storage Server can be carried out either using GUI operations or commands. For information on the operation method using GUI, refer to "Delete the Registration of a Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

Point

Ensure that all of the steps are complete before removing the Storage Server that is to be deleted.

The required steps for deleting a Storage Server are described below.

1. Delete the backup history of all transaction volumes on the Storage Server to be deleted. For more information, refer to 4.5.4.2 Deleting a backup history.

2. Delete the backup policy of all transaction volumes on the Storage Server to be deleted.

The process of deleting a backup policy can be carried out using either GUI operations or commands. For information on the operation method using GUI, refer to "Delete Backup Policy" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

For information on the operation method using commands, refer to "swstbkpoldel (Backup policy deletion command)".

3. Delete the volume type that was registered using "4.4.7 Setting the operation type for a device" for the device connected to the Storage Server

4. Delete the Storage Server.

4.7 Stopping the Operation

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

You can stop a specific daemon if you need to do so for some reason. For more information, see Chapter 2 Starting and Stopping Daemons.

Note

・ When all daemons have stopped, all functions of AdvancedCopy Manager running on the Storage Server will stop.

・ Stop daemons on a Storage Management Server only after ensuring that all the Storage Servers that it manages have also been stopped.

4.8 LVM Volume Operation

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

・ Backup operation units of volume groups

・ Backup operation in units of physical disks (LU: Logical Unit)

Note

Before starting this operation, you need 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 operation 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 operation must be performed in units of physical disks.

Figure 4.13 Example of a configuration in which backup operation can be performed in volume group units
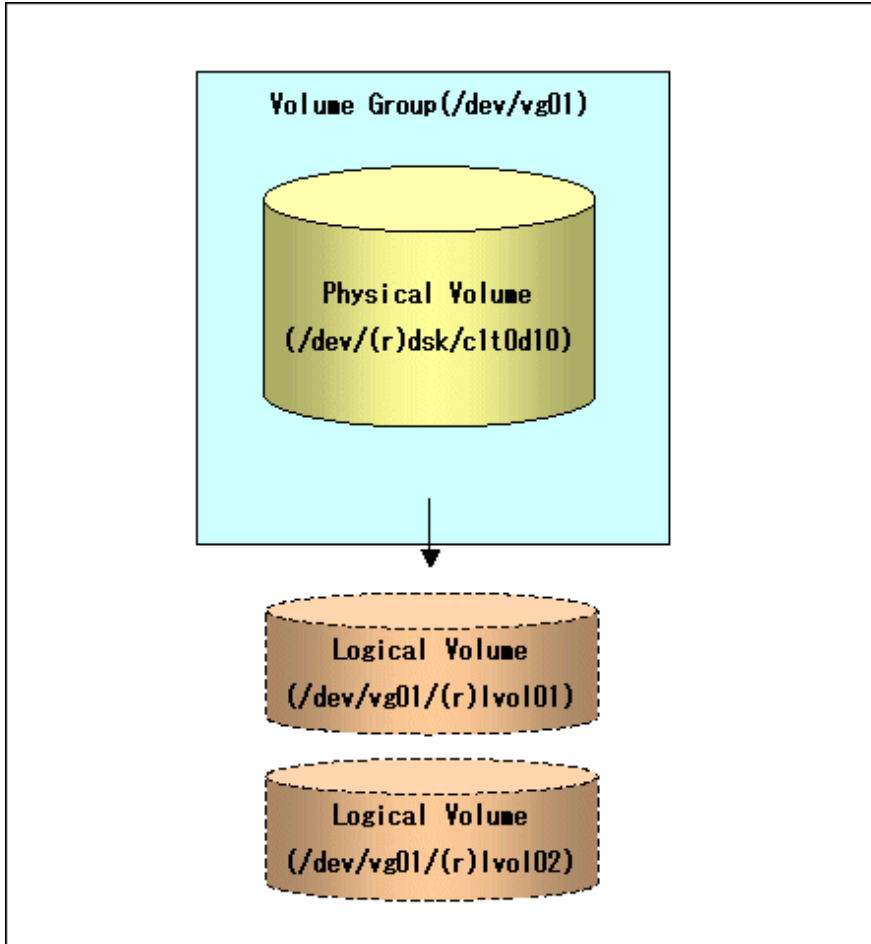
4.8.1.1 Operation design

Take note of the following conditions regarding volume groups when configuring 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 4.14 Transaction volume and backup volume
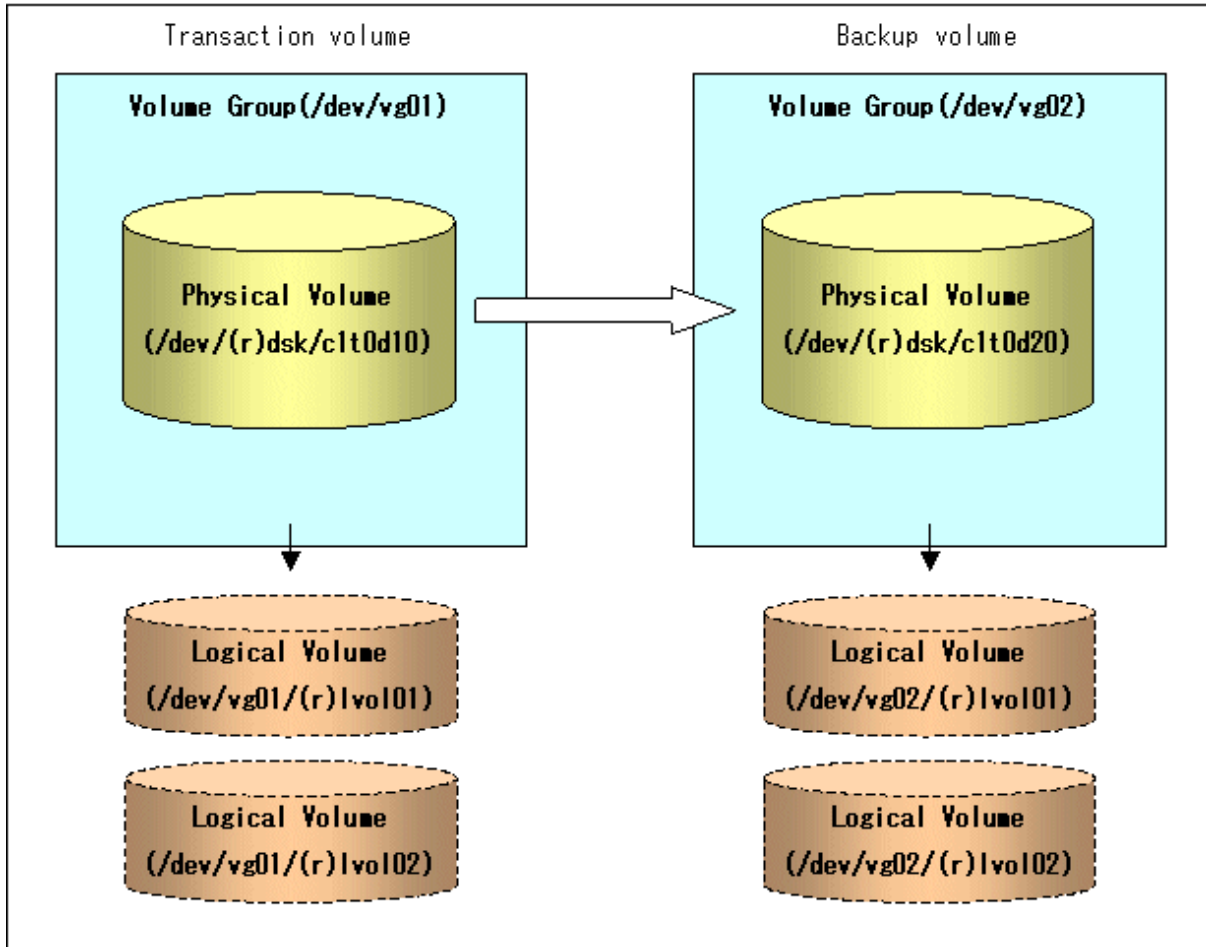
4.8.1.2 Preparations

4.8.1.2.1 Saving the volume group configuration information file

The standard post-processing script restores a volume group configuration information file from the following location. Confirm that a volume group configuration information file has been saved.

```
/etc/lvmconf/<volume-group-name>.conf
```

Note

Backup cannot be performed if a volume group configuration information file has not been saved. In this case, post-processing will result in an error if backup is executed.
Customize the post-processing script if volume group configuration information has been saved to another file.

4.8.1.2.2 Configuring the transaction volume and backup volume

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

Example:

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

4.8.1.2.3 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 accordingly.

See "Appendix A Pre-processing and Post-processing of 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 part of 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 operation, you should take note of 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 the backup by associating transaction volumes with backup volumes, create an association file called "4.4.10 Preparing a device map file" that defines the relationship between the transaction volume and the backup volume. For details, refer to "4.4.10 Preparing a device map file". The "device map" specification is required when performing backup in units of volume groups.
>
> ・ During backup processing, the LVM configuration information for the backup volume is overwritten by the LVM information from the transaction volume. Therefore, it is critical that the original LVM configuration information for the backup volume must be restored by backup post-processing. For details, see "Appendix A Pre-processing and Post-processing of Backup and Restoration".
>
> ・ A file system may be configured on a logical volume. In this case, modify both the backup pre-processing and post-processing scripts, and execute the backup using an account with Administrator authority, so that all the logical volumes in the volume group are unmounted or mounted respectively. For details, see "Appendix A 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 (that is, while running the EC or REC functions).
>
> If the backup volume is deactivated during synchronous processing, not only can the backup volume not be activated again, but the functions for stopping synchronous processing (eg, the backup command and the synchronous processing cancel command) are also disabled. If the

backup volume is deactivated in error, forcibly stop synchronous processing by using functions like ETERNUS Web GUI, and then reactivate the backup volume.

. . . .

4.8.1.4　Restoration in units of volume groups

When a transaction volume is part of 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, and execute the backup using an account with Administrator authority, so that all logical volumes are unmounted and mounted, respectively.

- ・ For details, see "Appendix A 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 of operation in units of volume groups, backup 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. Therefore, all the physical disks in the volume group must be operated synchronously.

🅿 Point
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Refer to "stgxfwcmdispdev (Device information display command)", or the "View Devices Using the Same Copy Area or the Same Logical Group" in the "ETERNUS SF AdvancedCopy Manager User's Guide" for details of how to determine which physical volumes should be operated synchronously.

. . . .

🛈 Note
. . . .

For operation in a cluster configuration, the device name (/dev/(r)dsk/c#t#d#) of the physical disks that comprise the volume group must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the device name must also be the same.

. . . .

Figure 4.15 Sample configuration for operation in units of physical disks
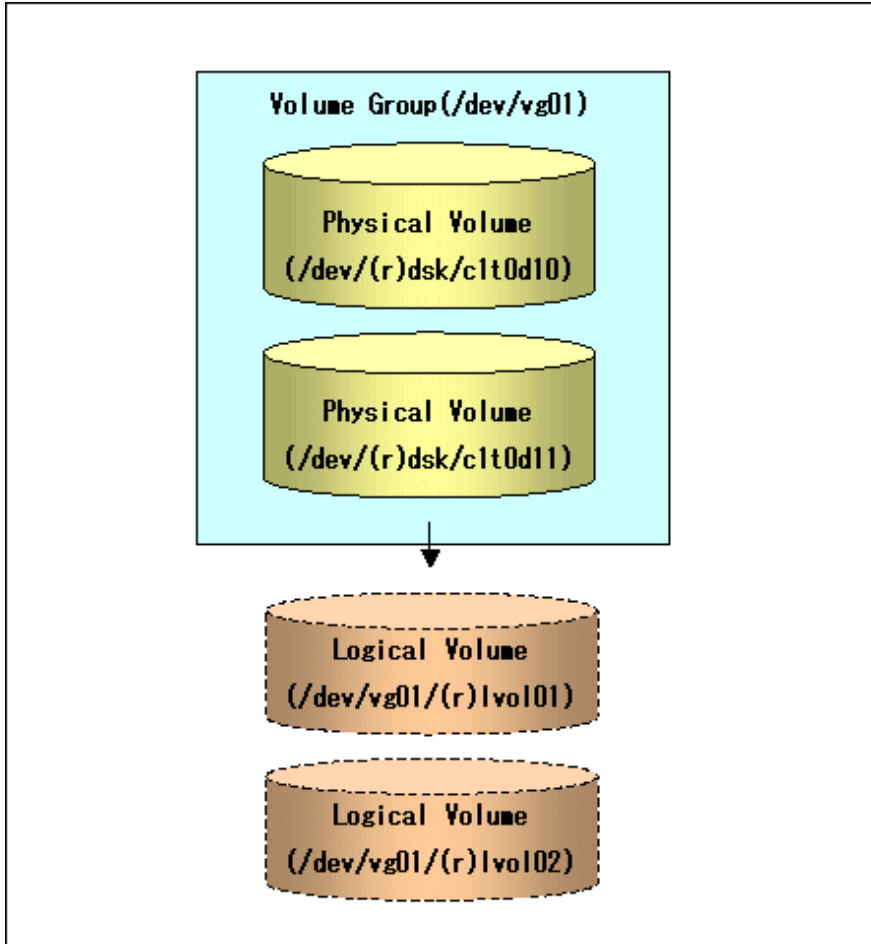
4.8.2.1   Operational configuration

In order to use a 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 4.16 Transaction volume and backup volume
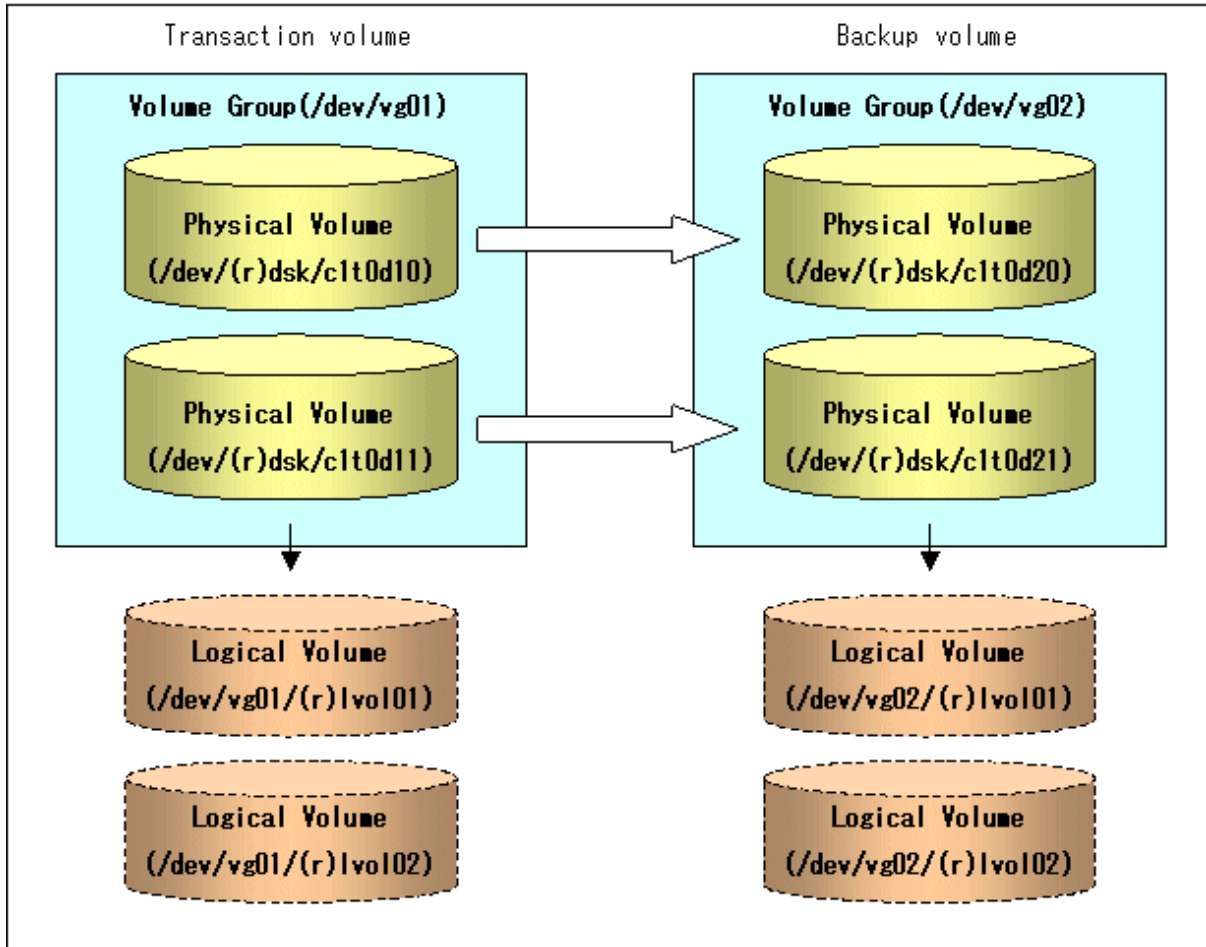
4.8.2.2   Preparations

4.8.2.2.1   Saving the volume group configuration information file

The volume group configuration information file must be restored during backup post-processing.

Confirm that the volume group configuration file has been saved. It is usually saved to the following location:

```
/etc/lvmconf/<volume-group-name>.conf
```

4.8.2.2.2   Configuring the transaction volume and backup volume

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

Example:

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/dsk/c1t0d10
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/dsk/c1t0d11
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d20
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d21
```

```
swstdevinfoset completed
#
```

4.8.2.2.3   Example of a device map file

In the case of a backup of an LVM 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/dsk/c1t0d10              /dev/dsk/c1t0d20
/dev/dsk/c1t0d11              /dev/dsk/c1t0d21
```

For details on device map files, refer to "4.4.10 Preparing a device map file".

4.8.2.3   Backup in units of physical disks

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/dsk/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d11 swstbackup completed
#
(Perform post-processing for the transaction and backup volumes.)
```

Example of synchronous backup

```
(Perform pre-processing for the backup volume.)
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d11 swststartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the transaction volume.)
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d10
/dev/dsk/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d11
/dev/dsk/c1t0d11 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 4.4 Backup pre-processing and post-processing

	Pre-processing	**Post-processing**
Transaction volume	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.	If file systems are included, remount the volumes that were unmounted by pre-processing.
Backup volume	1. Prevent access to all logical volumes in the volume group.	1. Reconfigure the volume group

	Pre-processing	**Post-processing**
	2. If file systems are included, unmount all file systems in the volume group.	2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring the volume group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

```
# /usr/sbin/vgchange -a n /dev/vg02
#
```

2. Restore volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

3. Reactivate the volume group.

```
[When cluster operation is enabled]
# /usr/sbin/vgchange -c y /dev/vg02
# /usr/sbin/vgchange -a e /dev/vg02

[When cluster operation is disabled]
# /usr/sbin/vgchange -a y /dev/vg02
#
```

Reconfigure shared mode volume groups using the following procedure:

1. Stop the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a n /dev/vg02
#
```

2. Restore the volume group configuration information (on the node where the volume group was created).

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

3. Mark the volume group as shareable (on the node where the volume group was created).

```
# /usr/sbin/vgchange -S y -c y /dev/vg02
#
```

4. Start the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a s /dev/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 the restoration respectively. Disable pre-processing and post-processing when using individual physical disks.

Example of restoration

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d10
/dev/dsk/c1t0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d11
/dev/dsk/c1t0d11 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 4.5 Restoration processing

	Pre-processing	**Post-processing**
Backup volume	Ensure data integrity by preventing access to all logical volumes in the volume group.	Post-processing is not required.
Restoration destination volume	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.	1. Reconfigure the volume group 2. If file systems are included, remount the volumes that were unmounted during pre-processing.

Reconfiguring the volume group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

```
# /usr/sbin/vgchange -a n /dev/vg01
#
```

2. Restore the volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/c1t0d10
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/c1t0d11
#
```

3. Reactivate the volume group.

```
[When cluster operation is enabled]
# /usr/sbin/vgchange -c y /dev/vg01
# /usr/sbin/vgchange -a e /dev/vg01

[When cluster operation is disabled]
# /usr/sbin/vgchange -a y /dev/vg01
#
```

Reconfigure shared mode volume groups using the following procedure:

1. Stop the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a n /dev/vg01
#
```

2. Restore volume group configuration information (on the node where the volume group was created).

```
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/c1t0d10
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/c1t0d11
#
```

3. Mark the volume group as shareable (on the node where the volume group was created).

```
# /usr/sbin/vgchange -S y -c y /dev/vg01
#
```

4. Start the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a s /dev/vg01
#
```

4.9 VxVM Volume Operation

This section describes the backup operation for volumes under VERITAS Volume Manager (VxVM).

4.9.1 Backup operation in units of physical disks

If a VxVM volume is the backup target, execute backup in the physical disk units that comprise the VxVM volume.
Since disk group consistency needs to be maintained, all the physical disks in the disk group must be synchronized for the backup operation.

P Point

Refer to "stgxfwcmdispdev (Device information display command)", or the "Confirmation of devices in the save logical group" of "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for information on how to check the physical volume/s which should be synchronized.

Note

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

- Snapshot backup is recommended for backing up in units of physical disks. In the case of synchronized backup, commands that access the destination volume, such as VxVM commands cannot be used during full copy or differential copy.

- For operation in a cluster configuration, the device name (/dev/(r)dsk/c#t#d#) of the physical disks that comprise the disk group must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the device name must be the same.

- From HP-UX 11i v3, new device names are supported. For details, refer to "1.5 Managing a Device on AdvancedCopy Manager". A physical disk made up of VxVM can only use legacy devices (/dev/(r)dsk/c#t#d#) and cannot use new devices (/dev/(r)disk/disk#). As a result, when VxVM is used, the AdvancedCopy Manager information collection mode must be set to legacy devices. For details on the information collection mode, refer to stgxfwcmsetmode (Information collection mode setup command).

- Normal devices, physical disks made up of LVM and physical disks made up of VxVM must be set to the same device format as the AdvancedCopy Manager information collection mode.

  [Example]

  If the AdvancedCopy Manager information collection mode is "legacy device", normal devices, physical disks made up of LVM and physical disks made up of VxVM must all be legacy devices.

4.9.1.1 Operational configuration

Configure disk groups that are to be used as transaction volumes or backup volumes.

Observe the following conditions when configuring 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 4.17 Transaction volume and backup volume
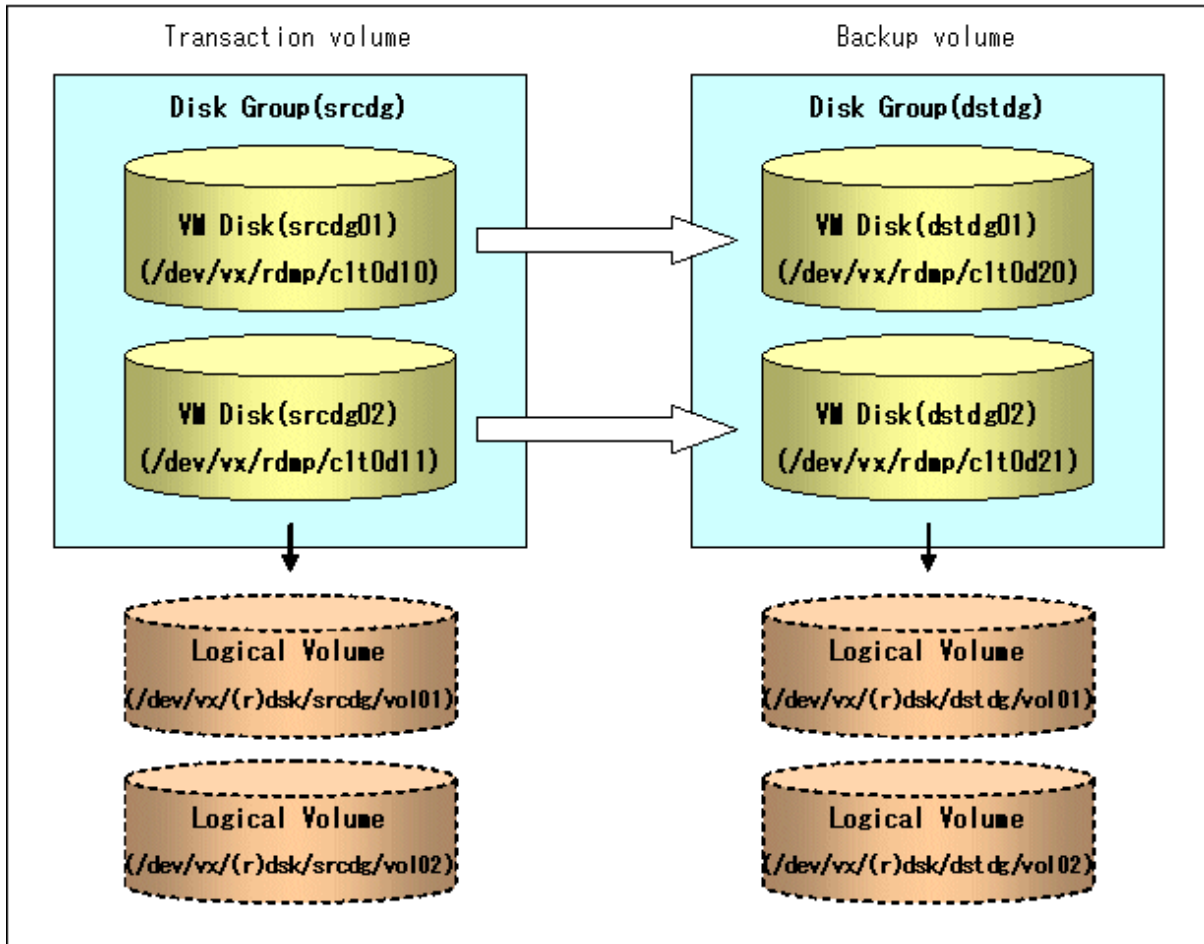
4.9.1.2   Preparations

4.9.1.2.1   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 in the following format.

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

4.9.1.2.2   Setting the transaction volume and backup volume

When configuring the transaction and backup volumes, all disks in the volume group must be specified.

Example:

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/vx/dmp/c1t0d10
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/vx/dmp/c1t0d11
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d20
swstdevinfoset completed
```

```
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d21
swstdevinfoset completed
#
```

4.9.1.2.3 Preparing a device map file

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

Example of a device map file

```
# Transaction volume name       Output destination backup volume name
/dev/vx/dmp/c1t0d10             /dev/vx/dmp/c1t0d20
/dev/vx/dmp/c1t0d11             /dev/vx/dmp/c1t0d21
```

For details on the device map file, refer to "4.4.10 Preparing a device map file."

4.9.1.3 Backup

Before performing backup operation, all physical disks in the disk group must be synchronized.

Perform the required pre-processing and/or post-processing work for each volume group. Disable pre-processing and post-processing when operating individual physical disks.

Example of snapshot backup

```
(Pre-processing performed for the transaction volume / backup volume)
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11 swstbackup completed
#
(Post-processing performed for the transaction volume / backup volume)
```

Example of synchronous backup

```
(Pre-processing performed for the backup volume)

# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11 swstsstartsync completed
(After equivalency maintenance status)
(Pre-processing performed for the transaction volume)
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d10
/dev/vx/dmp/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11
/dev/vx/dmp/c1t0d11 swstbackup completed
#
(Post-processing performed for the transaction volume / backup volume)
```

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

Table 4.6 Pre-processing and post-processing for backup

	Pre-processing	**Post-processing**
Transaction volume	1. Secure data integrity by stopping access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group.	1. If file systems are included, mount the volumes that were unmounted during preprocessing.

	Pre-processing	**Post-processing**
	3. Import the disk group, when the disk group is not imported.	
Backup volume	1. Stop access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Deport the disk group. 4. A disk group subordinate's physical disk is set to offline.	1. The physical disk set to offline with preprocessing is set to online. 2. Reconfigure the disk group 3. If file systems are included, remount the volumes that were unmounted during preprocessing.

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 c1t0d20 ...
   Installing volume manager disk header for c1t0d21 ...
   -
   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/deport command for the disk group use the online/offline process.
If a mount point is defined as a cluster resource, instead of using the file system mount/unmount commands use the mount resource online/offline processing.

・ When performing a system disk exchange, there are cases when conflicting backup configuration information may exist.
In such cases, the disk group ID needs to be reset after executing the above command.

・ After this operation, where the volumes within a disk group are required to be run in synchronous mode in background, synchronous processing may take some time depending on the volume configuration.
It is also possible to use the volumes during this time.

4.9.1.4　Restoration

All physical disks in the disk group must firstly be synchronized to perform this operation.

Perform the required pre-processing or post-processing work for each disk group as necessary. Disable pre-processing and post-processing when using individual physical disks.

Example of restoration

```
(Pre-processing performed for the transaction volume / backup volume)
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/c1t0d10
/dev/vx/dmp/c1t0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/c1t0d10
/dev/vx/dmp/c1t0d10 swstrestore completed
#
(Post-processing performed for the transaction volume / backup volume)
```

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

Table 4.7 Pre-processing and post-processing for restoration

	Pre-processing	**Post-processing**
Backup volume	1. Secure data integrity by stopping access to all logical volumes in the disk group. 2. Import the disk group, when the disk group is not imported.	Post-processing is not required.
Restoration destination volume	1. Stop access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Deport the disk group. 4. A disk group subordinate's physical disk is set to offline.	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 preprocessing.

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 c1t0d10 ...
Installing volume manager disk header for c1t0d11 ...
-
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

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

・ When performing a system disk exchange, there are cases when conflicting backup configuration information may exist.
In such cases, the disk group ID needs to be reset after executing the above command.

・ After this operation, where the volumes within a disk group are required to be run in synchronous mode in background, synchronous processing it may take some time depending on the volume configuration.
It is also possible to use the volumes during this time.

Chapter 5 Backup Process That Uses the Suspend/ Resume Function

This chapter provides details of 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.

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.

With ordinary synchronous high-speed backup, the synchronous processing start command starts copying usingthe EC function, then 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 of this, the preparation time of the backup is shortened.

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

Figure 5.1 Comparison between ordinary synchronous high-speed backup and synchronous high-speed backup using the Suspend/Resume function
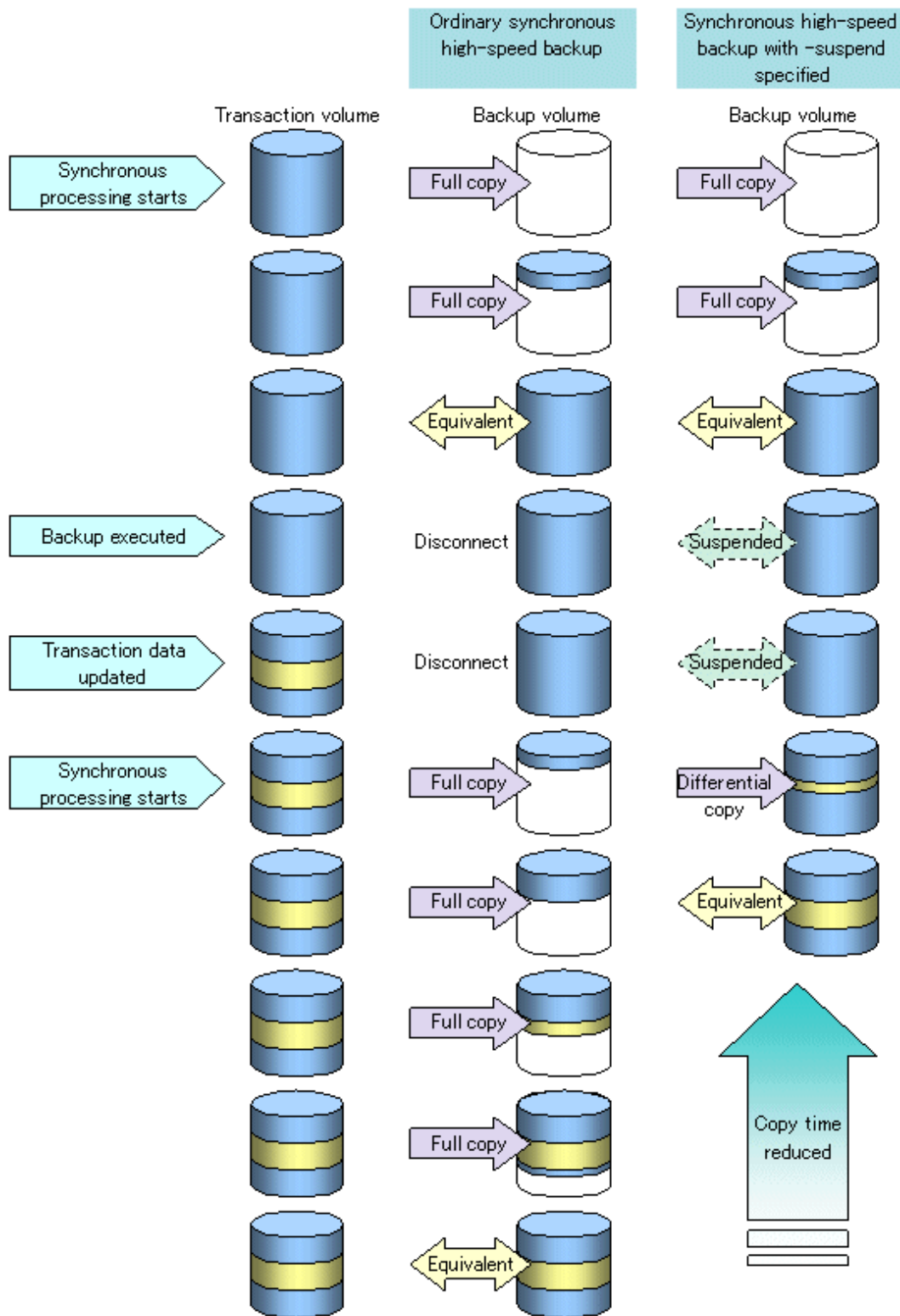
5.2 Backup Operation Design

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 (see "4.2 Operation Design").

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

🅿 Point
. . . .
In 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 5.2 Flow of backup operations using Suspend/Resume function
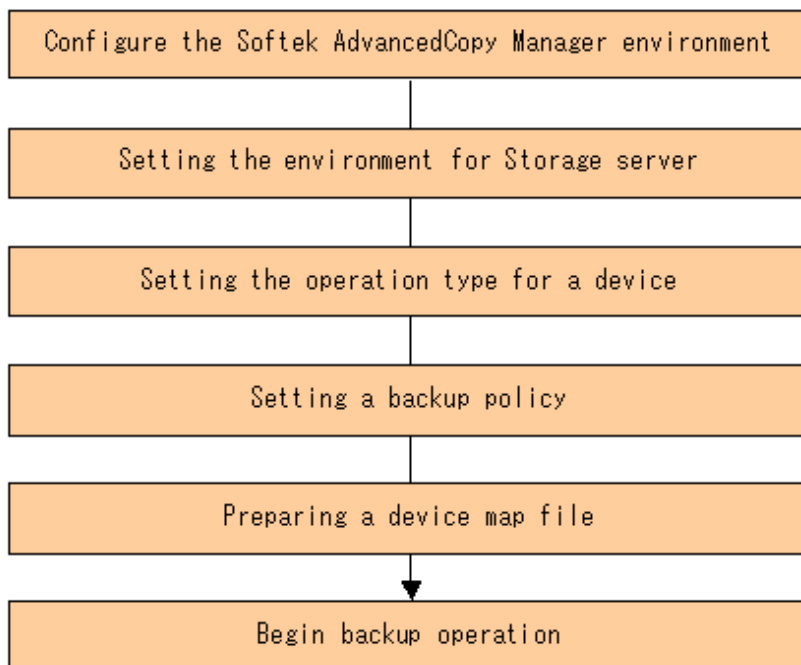
5.4 Preparations

This section describes how to prepare 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 the "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 carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Set up of Storage Server configuration information" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

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 carried out using either GUI operations or commands. For information on the operation method using GUI, refer to "Set up of volume type" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

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 are necessary for the backup, according to the specified backup policy.

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

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

・ Backup Policy Setup: swstbkpolset (Backup policy setting command)

- Check Backup Policy that has been set up: swstbkpoldisp (Backup policy display command)

- Backup Policy Deletion: swstbkpoldel (Backup policy deletion command)

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, its corresponding device is selected first, and is used as the backup destination.

To conveniently monitor backup destination devices, create a "4.4.10 Preparing 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 swstbackup (Backup execution command) after the synchronous processing has started and the equivalency maintenance status has been set.

Then suspend the synchronous processing.

When history information is deleted because the number of generations has been exceeded or when swsthistdel (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 using the Suspend/Resume function can also be operated from a GUI client. Refer to "Perform a Snapshot backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details of the GUI client.

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

Figure 5.3 Synchronous high-speed backup operations using the Suspend/Resume function

(1) Before synchronous high-speed backup

TD — No EC session — BD1 Empty

Number of preservation generations = 1

No EC session — BD2 Empty

(2) Synchronous processing started

TD — Full copy → EC session — BD1 In use

Number of preservation generations = 1

No EC session — BD2 Empty

(3) Equivalency maintain status

TD ← Equivalent → EC session — BD1 In use

Number of preservation generations = 1

No EC session — BD2 Empty

Transaction volume
Backup volume 1
Backup volume 2

(4) Execution of the backup command with -suspend specified

TD — Suspended EC session — BD1 (In use) With history information

Number of preservation generations =1

No EC session — BD2 (Empty)

(5) Synchronous processing started

TD — Suspended EC session — BD1 (In use) With history information

Number of preservation generations =1

Full copy EC session — BD2 (In use)

(6) Equivalency maintain status

TD — Suspended EC session — BD1 (In use) With history information

Number of preservation generations =1

Equivalent — BD2 (In use)

(7) Backing up with the suspend specification

TD — Suspended EC session — BD1 (Usable)

History information deleted because number of generations exceeded (*1) at backup command execution

Number of preservation generations =1

Suspended EC session — BD2 (In use) With history information

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

(8) Transaction volume data updated

Data updated

TD — Suspended EC session — BD1 (Usable)

Number of preservation generations =1

Suspended EC session — BD2 (In use) With history information

(9) Synchronous processing started

TD | Differential copy → BD1
EC session | In use
Number of preservation generations =1
With history information
Suspended ← BD2
EC session | In use

(10) Equivalency maintain status

TD ← Equivalent → BD1
EC session | In use
Number of preservation generations =1
With history information
Suspended ← BD2
EC session | In use

(11) Backing up with the suspend specification

With history information
TD ← Suspended → BD1
EC session | In use
Number of preservation generations =1
History information deleted because number of generations exceeded (*1) at backup command execution
Suspended ← BD2
EC session | Usable

5.5.1   Starting synchronous processing

For synchronous high-speed backup, execute swststartsync (Backup synchronous processing start command) 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 (i.e., the Resume function causes differential copying to start).

- ・ 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 5.4 Backup volume selection at the start of synchronous processing
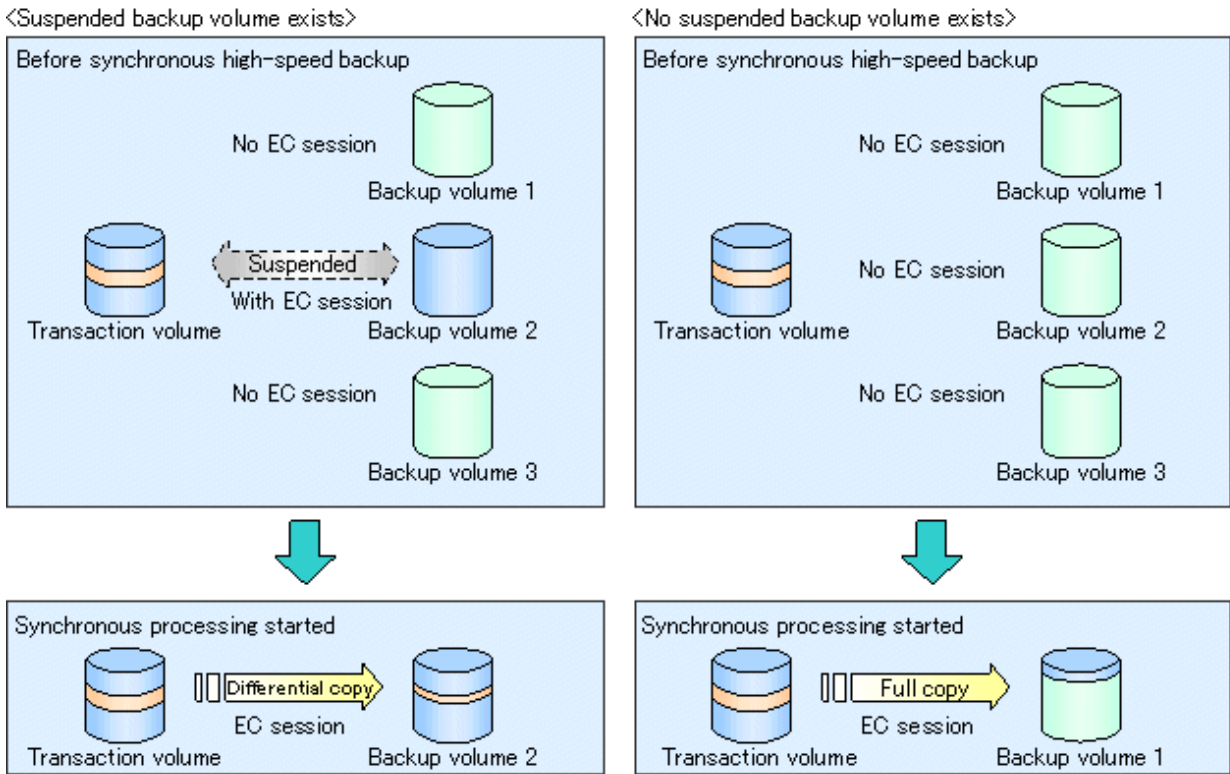
Note

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 swstsyncstat (Synchronous processing progress display command).

5.5.2 Backing up

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

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

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

Figure 5.5 Ordinary backup operations and backup operations with the suspend specification
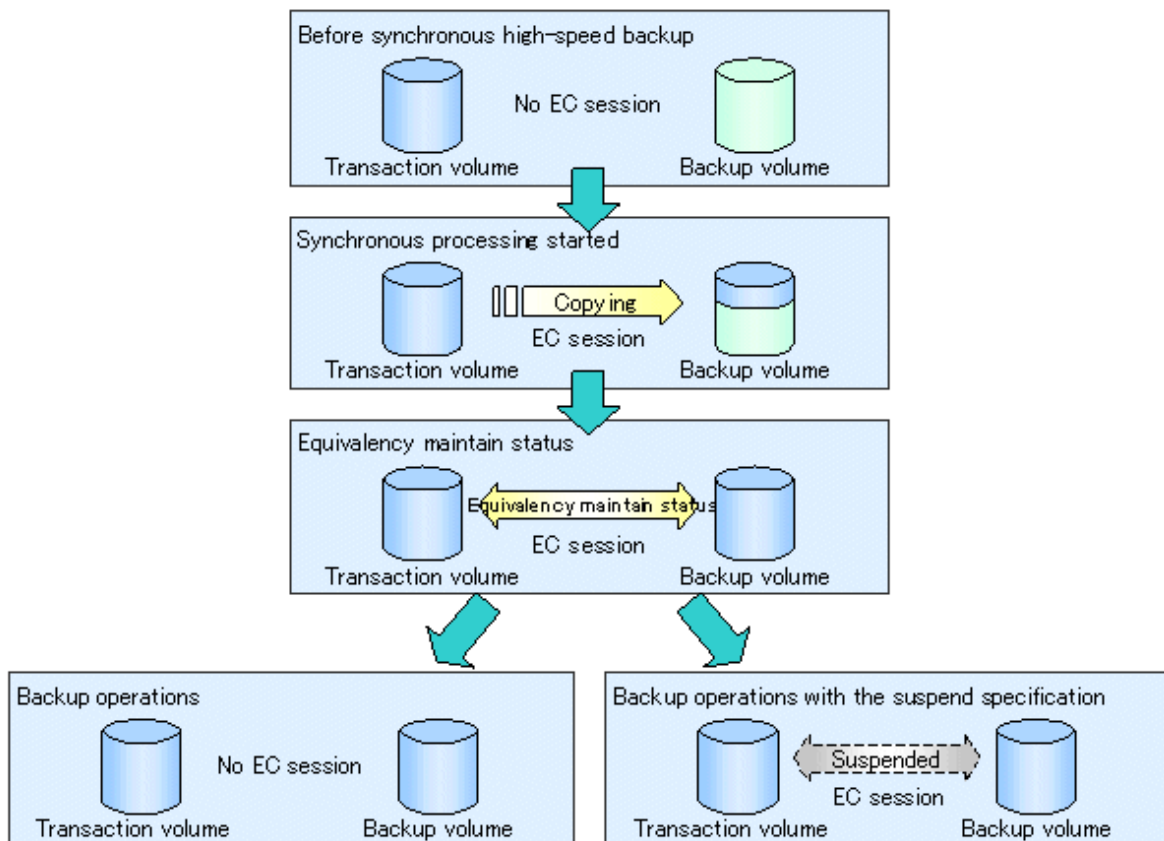
5.5.3 Displaying the synchronous processing execution status

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

- equivalent: equivalency maintenance status

- suspend: suspended processing

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

Figure 5.6 Ordinary backup operations and backup operations with the suspend specification
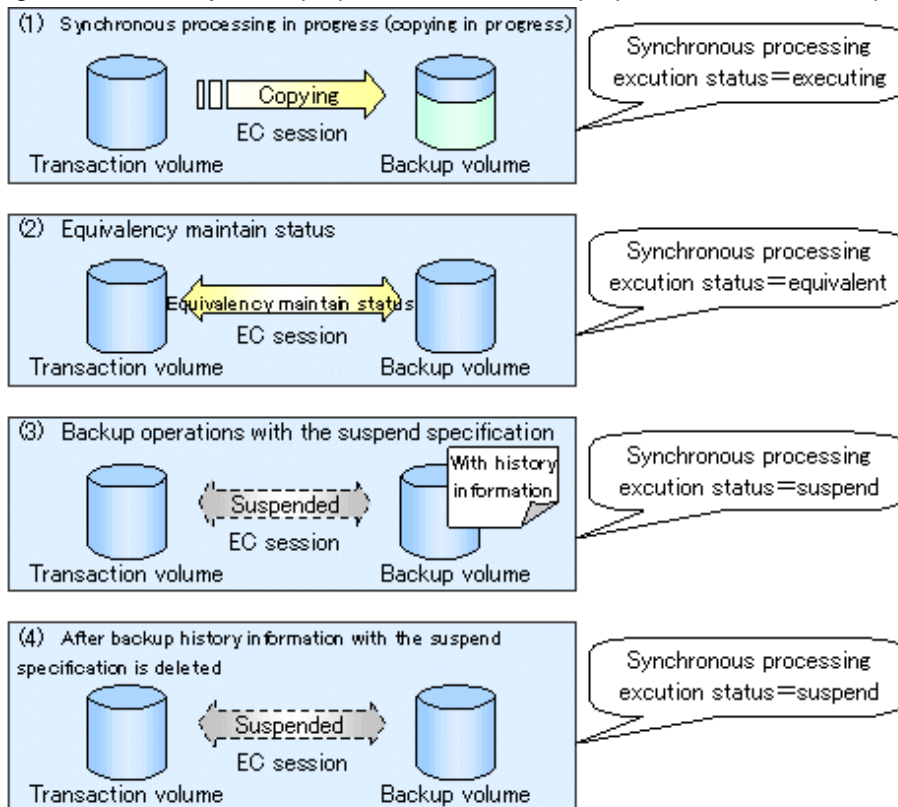
5.5.4 Canceling synchronous processing

To cancel synchronous processing (during an EC session), execute swstcancelsync (Synchronous processing cancel command). The statuses of the different types of synchronous processing cancelled are explained below.

- executing: synchronous processing (i.e., copying) is in progress

- equivalent: equivalency maintenance status

- suspend: suspended processing

After the backup command with "-suspend" operand 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 in progress (i.e., running multiple EC sessions), then only the EC sessions mapped 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 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 synchronous processing (in the Suspend state) that has history information leaves the backup volume in the used state.

A range of operational states when synchronous processing is cancelled are shown below:

Figure 5.7 Operational states in synchronous processing caused by cancellation

⟨Case of the backup volume being cleared because copy processing is cancelled⟩

(1) Synchronous processing in progress(copying in progress)

Transaction volume — Copying EC session → In use Backup volume

(1)′ After synchronous processing cancellation

Transaction volume   No EC session   Empty   Backup volume
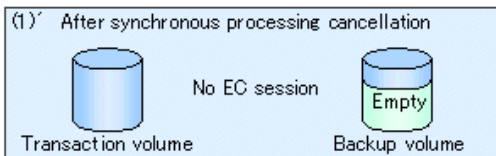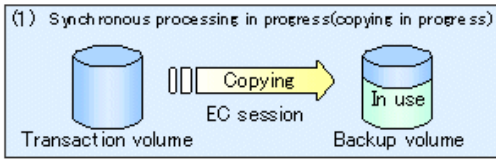
⟨Case of the backup volume being cleared because of cancellation under the equivalency maintain status⟩

(2) Equivalency maintain status

Transaction volume ← Equivalency maintain status EC session → In use Backup volume

(2)′ After synchronous processing cancellation

Transaction volume   No EC session   Empty   Backup volume
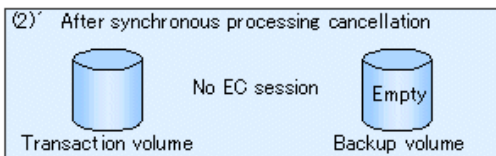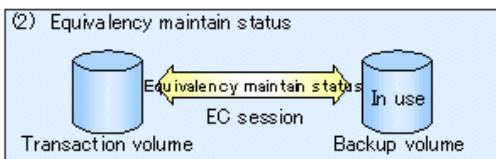
⟨Case of the backup volume remaining in use after cancellation in the Suspend state⟩

(3) After execution of the backup command with –suspend specified

Transaction volume — Suspended EC session — In use (With history information) Backup volume

(3)′ After synchronous processing cancellation

Transaction volume   No EC session   In use (With history information)   Backup volume

⟨Case of the backup volume being cleared because of cancellation in the Suspend state⟩

(4) After backup history information with the suspend specification is deleted

Transaction volume — Suspended EC session — In use Backup volume

(4)′ After synchronous processing cancellation

Transaction volume   No EC session   Empty   Backup volume

5.5.5 History management

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

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

P 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 swstdevdisp (Device use status display command).

- 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 5.8 Deleting ordinary backup history information and backup history information with the suspend specification
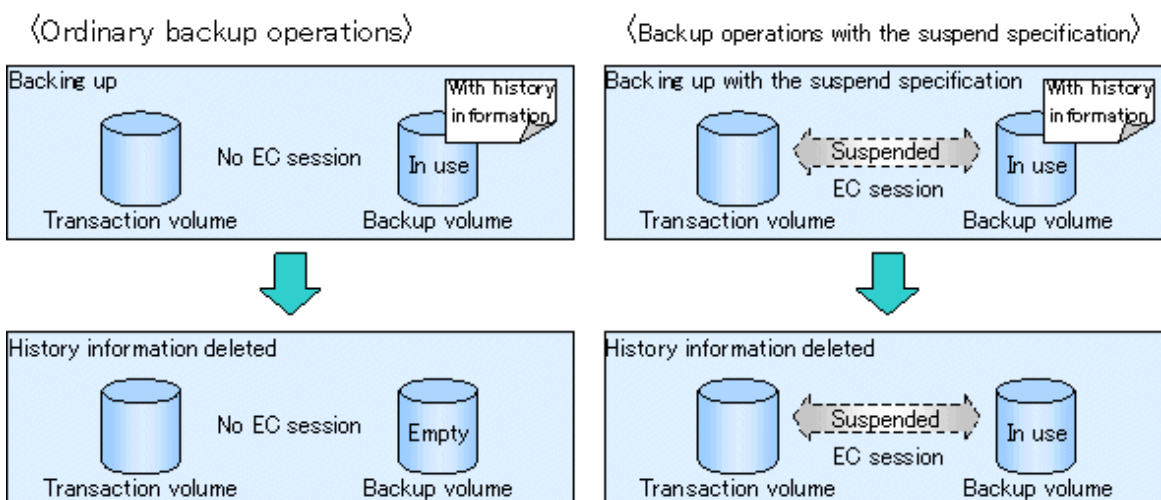
5.5.6 Restoring

Before restoration, swstcancelsync (Synchronous processing cancel command) 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 swstsyncstat (Synchronous processing progress display command).

To restore data from a backup volume, execute swstrestore (Restore execution command).

To cancel restoration or to delete management information associated with restoration that ended abnormally, execute swstcancelrest (Restore cancellation command).

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 function.

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

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

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

🇬 Note
. . . .

To implement the differential snapshot high-speed backup using the QuickOPC function, ETERNUS disk storage systems that support the QuickOPC function is required.

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

Figure 6.1 Comparison between conventional snapshot high-speed backup and differential snapshot high-speed backup
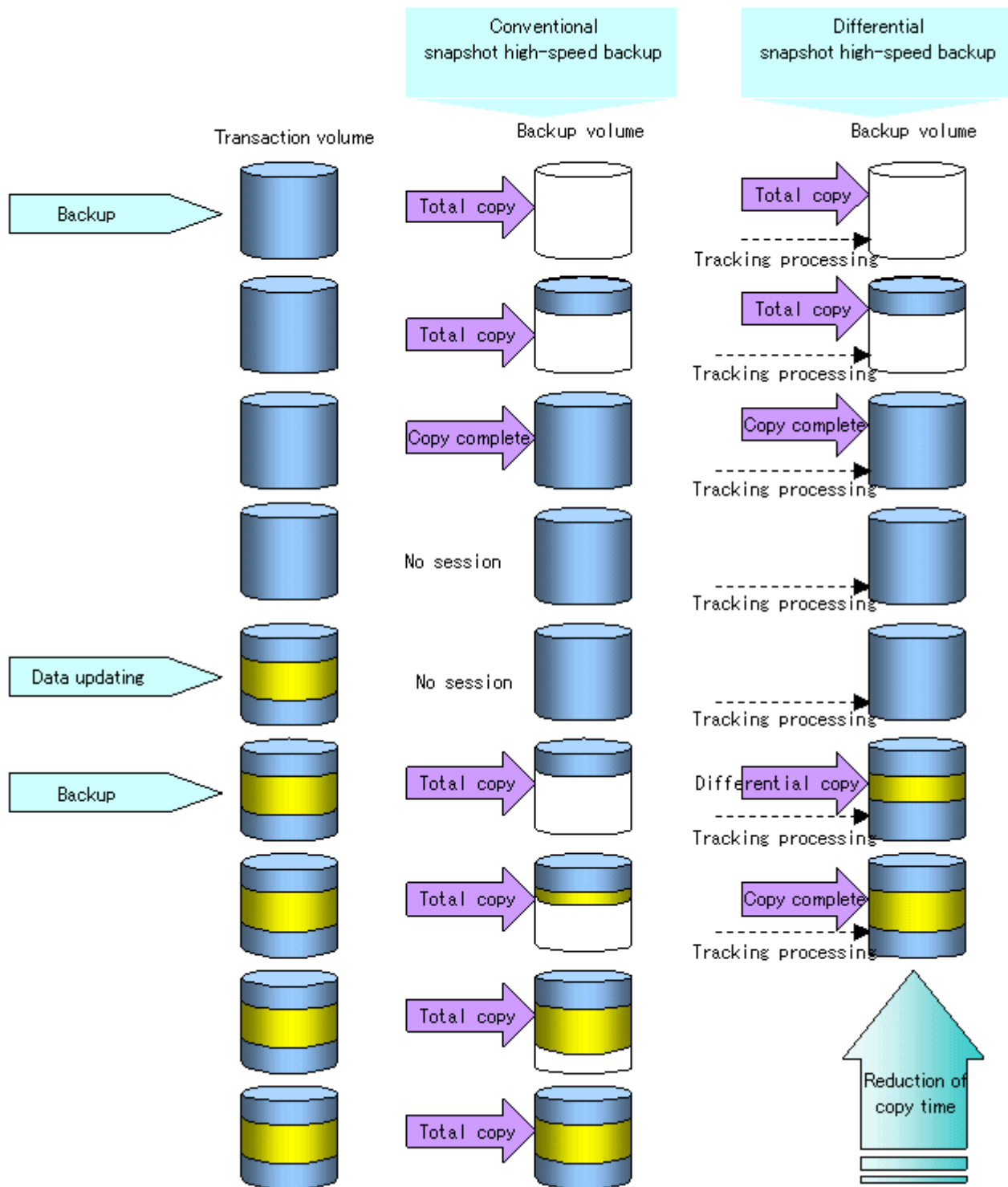
6.2 Configuring Backup Operation

Configure the differential snapshot high-speed backup using the QuickOPC function using information provided in the section relating to 4.2 Operation Design for backup management with consideration to the following notes:

> **Note**
> ⋯⋯⋯
>
> Consider the following when making decisions on the backup policy configuration 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. Operators should 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.
>
> - Operators must 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 6.2 Flow of backup operations using the QuickOPC function
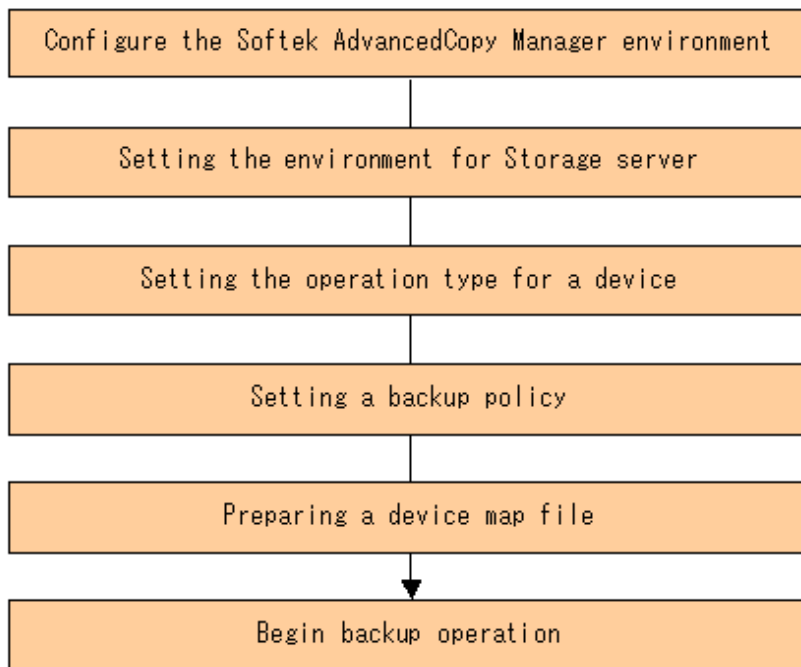
6.4 Preparation

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

6.4.1 Configuring the AdvancedCopy Manager environment

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

6.4.2 Setting the environment for Storage Server

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

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

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

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

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

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

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, where relevant histories have been deleted, in the suspend or tracking state.

6.4.4 Setting a backup policy

When a backup policy is set, you 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 carried out using GUI operations or commands. For information on the operation method using GUI, refer to "Set Backup Policy" in the "ETERNUS SF AdvancedCopy Manager GUI Usage Guide".

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

・ Backup Policy Setup: swstbkpolset (Backup policy setting command)

・ Check Backup Policy that has been set up: swstbkpoldisp (Backup policy display command)

・ Backup Policy Deletion: swstbkpoldel (Backup policy deletion command)

6.4.5 Preparing a device map file

In the backup, AdvancedCopy Manager automatically selects a device which has the same capacity as the target transaction volume as a backup volume from a group of registered devices.

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 other and uses it as the backup destination.

When it is necessary to recognize a specific backup destination device for any reason a "4.4.10 Preparing a device map file" that defines the relationship between a transaction volume and backup volume must be created in advance. By specifying the 4.4.10 Preparing a device map file when starting the backup, the backup can always be performed because the backup destination has already been specified.

🄿 Point
. . . .

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

6.5 Operation

6.5.1 Invoking backup

Invoke the differential snapshot high-speed backup by specifying the "-T" option in swstbackup (Backup execution command).

When the QuickOPC starts, the physical copy and tracking processing begins. When the physical copy is complete, only tracking processing is active. When this backup command is executed by specifying the "-T" option, only new data or data which has changed from the point in time that OPC was started previously is actually copied.

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

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

Figure 6.3 Conventional snapshot high-speed backup and differential snapshot high-speed backup
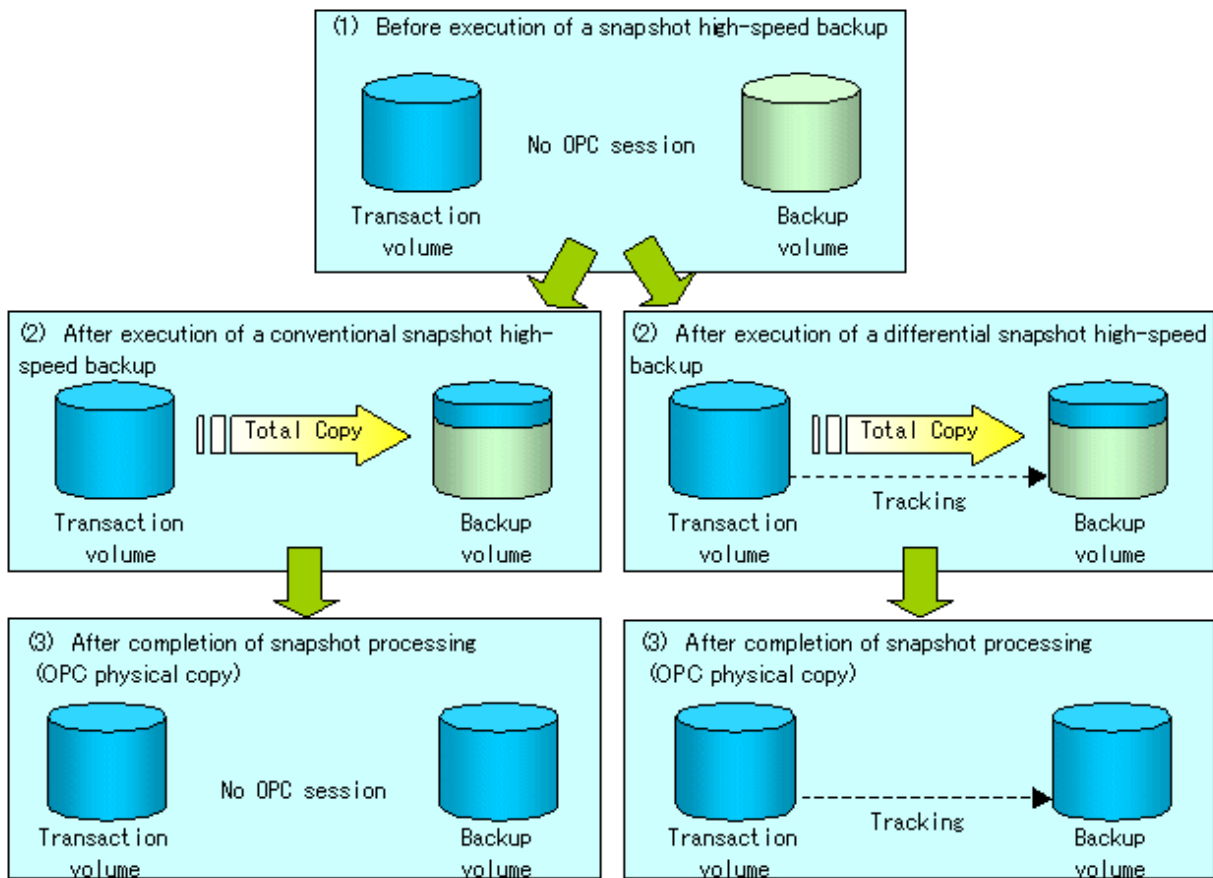
After history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history information is selected to start the differential data copy. The physical copy can thus be completed in a short period because only the difference in data from where OPC was started previously is copied.

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

Figure 6.4 Flow of differential snapshot high-speed backup operation
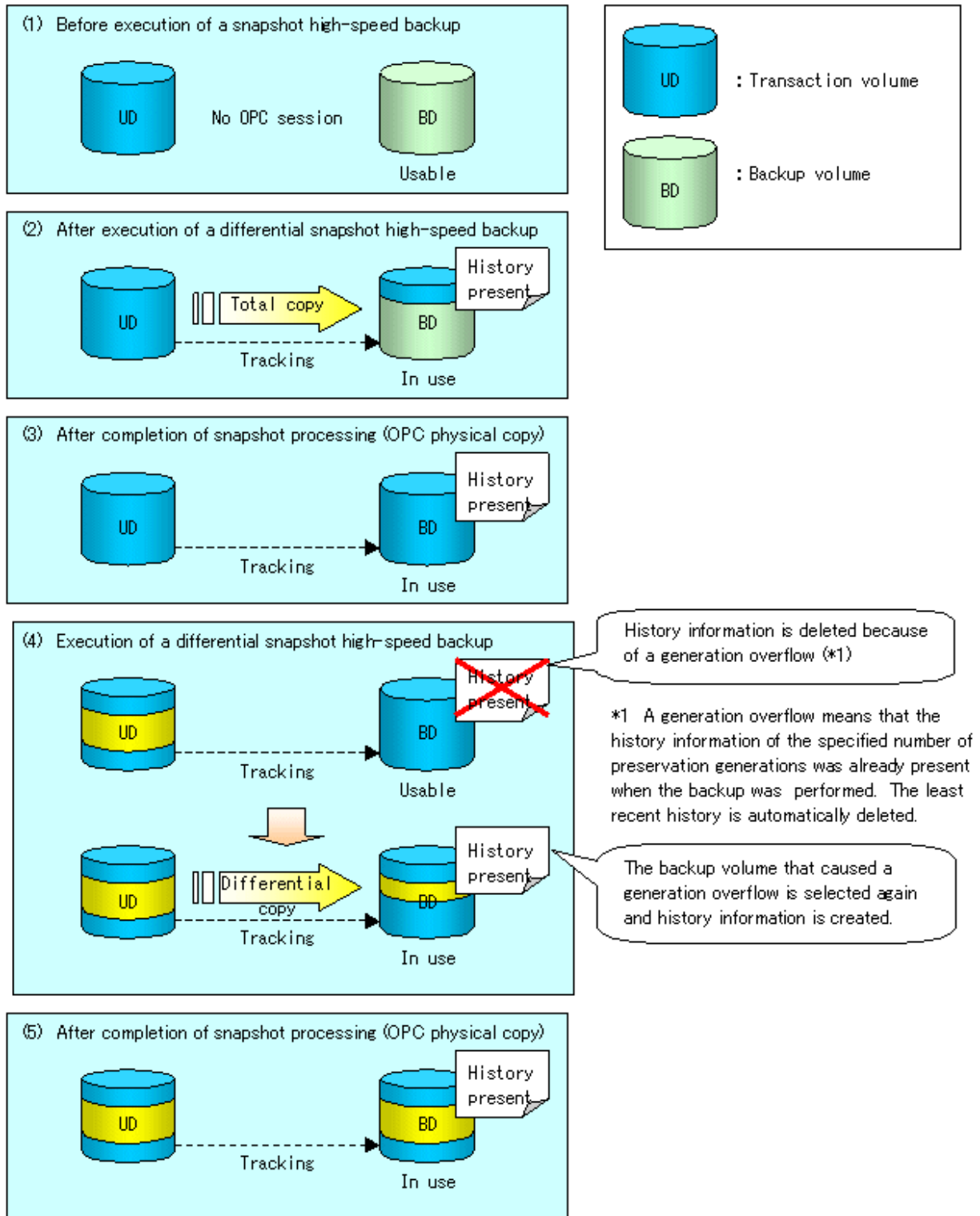
6.5.2   History management

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

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

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 still being executed, is not yet completed or 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 swstdevdisp (Device use status display command). In the differential snapshot high-speed backup, however, the backup volume is not released even after the history information is deleted and "Backup (used)" is displayed in the Device-Mode column by swstdevdisp (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 6.5 Comparison of history deletion between snapshot high-speed backup and differential snapshot high-speed backup
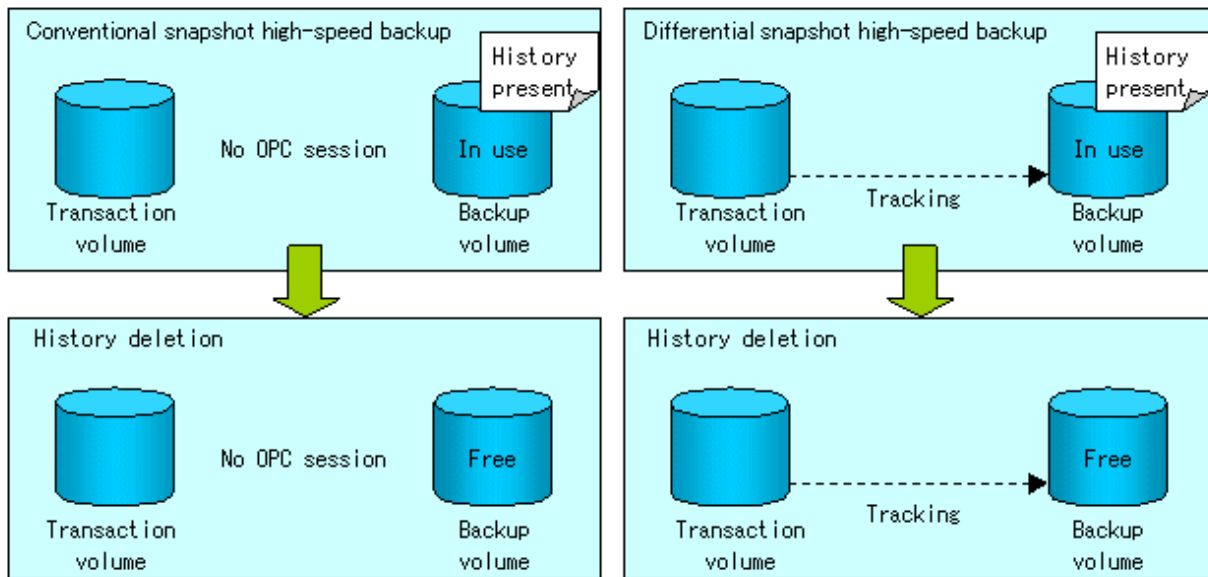
6.5.3 Restoration

The section explains how to use swstrestore (Restore execution command) for restoration.

In a differential snapshot high-speed backup, tracking processing from the transaction volume to the backup volume is performed.

Figure 6.6 Tracking of differential snapshot high-speed backup operations
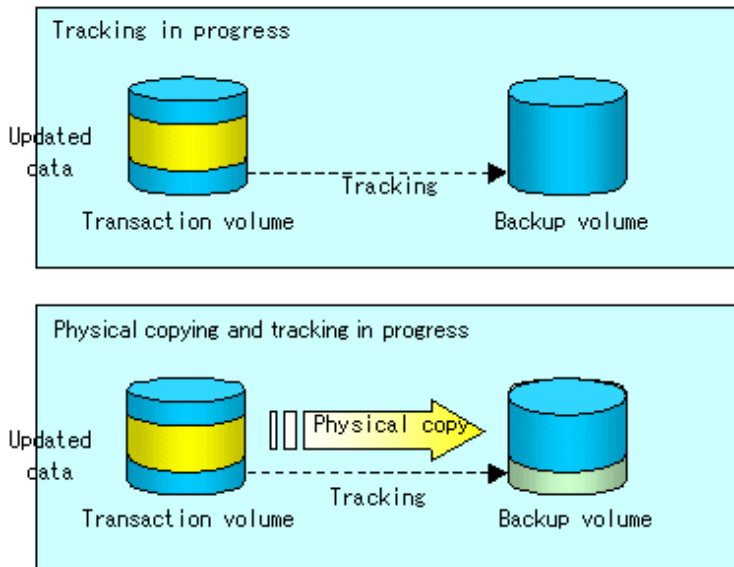
When restoration is executed, normal OPC from the backup volume to the transaction volume is started while the tracking state from the transaction volume to the backup volume is maintained.

Because OPC for restoration physically copies only the data that has been updated after the backup, the time taken for the physical copy can be reduced for the restoration, as well as for the backup.

Figure 6.7 Restoration from backup volume to transaction volume
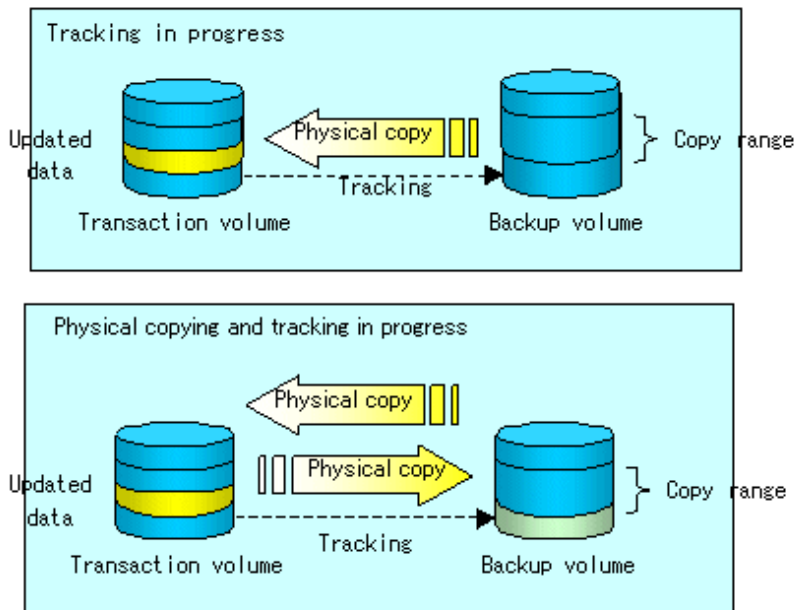
While tracking processing is performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes is required, the following operational steps must be performed in advance:

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 swstcanceltrk (Tracking cancel command).

Figure 6.8 Restoration to another volume
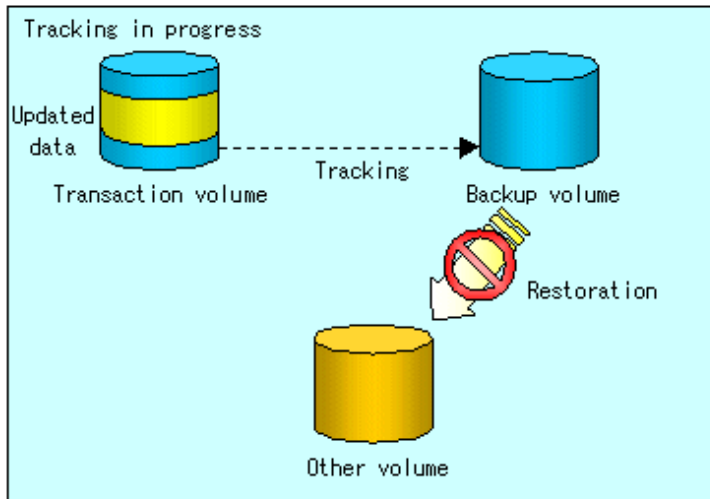
🛑 Note

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 swstcancelrest (Restore cancellation command) 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 swsttrkstat (Tracking status display command).

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

6.5.6 Stopping tracking processing

Use swstcanceltrk (Tracking cancel command) to stop tracking processing.

🅿 Point

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

Chapter 7 Replication

This chapter provides details of AdvancedCopy Manager replication in an HP-UX system.

The HP-UX version of AdvancedCopy Manager's Agent enables the replication described in this chapter by linking with AdvancedCopy Manager's Manager running under the Windows, Solaris or Linux Operating Systems.

In addition, the replication unit in the HP-UX system is a physical disk (LU: Logical Unit). However, in the case of a physical disk which constitutes an LVM (a Logical Volume Manager), it is managed and operated by each volume group.

7.1 Overview

This chapter explains the operation of the replication function.

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

Snapshot replication is the term used for the replication function that uses the One Point Copy (OPC) function of ETERNUS disk storage systems.

Synchronized Replication is where either the Equivalent Copy (EC) or Remote Equivalent Copy (REC) functions are used.

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

Snapshot replication copies from a source volume to a destination volume using the OPC function of ETERNUS disk storage systems.

The snapshot replication performs the following two types of processing:

1. When a copy is created, the snapshot processing (OPC) from the source volume to the replica volume is executed with swsrpmake (Replication creation command).

    swsrpmake (replication creation command) dismounts or mounts the original volume.

    This process determines the scope of original data (for details, refer to Appendix C Pre-processing and Post-processing of Replication). Refer to steps (1). to (4). in the figure below.

2. If the user wants to recreate a replica, only swsrpmake (Replication creation command) is required. If the previous snapshot processing is in progress, it is stopped and a new snapshot process is started.

Figure 7.1 Snapshot replication processing
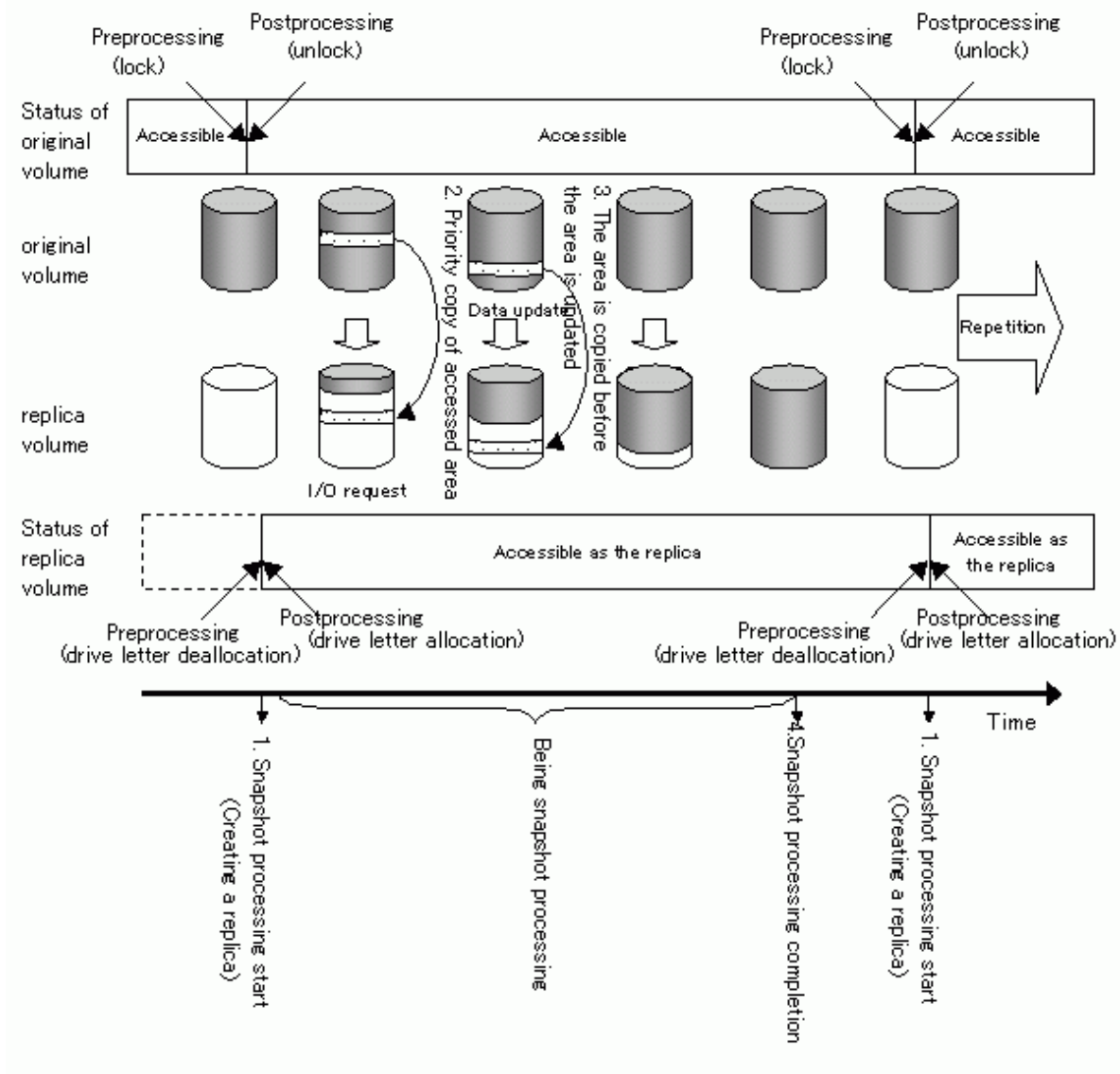
Snapshot replication is completed when the replication creation command is issued. The actual data is internally copied by the OPC function of ETERNUS disk storage systems.

7.1.1.1 Types of snapshot replication

The following types of snapshot replication are available, depending on the AdvancedCopy functions in use:

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

Ordinary snapshot replication

Ordinary snapshot replication copies all the data at a certain point in time (logical copy) to the copy destination disk area.

Figure 7.2 Ordinary snapshot replication
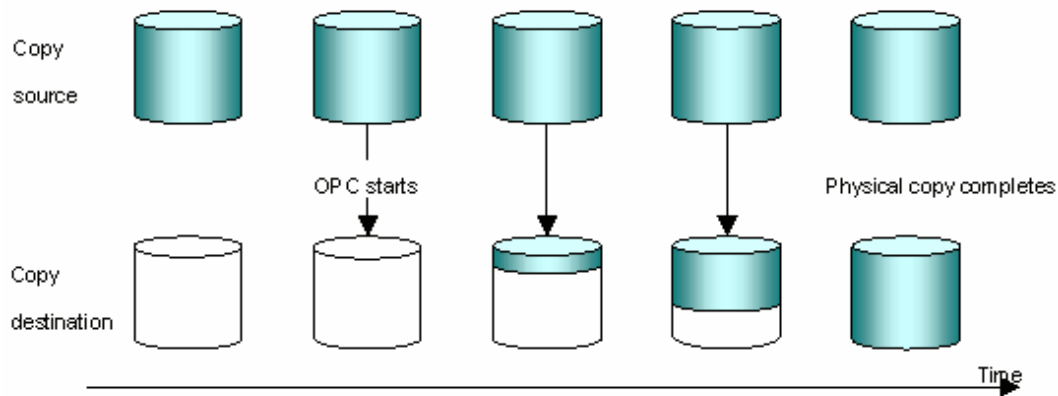
🅿 Point

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The area at the copy destination disk must be the same size or larger than the copy source disk area.
The copying time is the time taken to copy all the data.

. . . .

QuickOPC replication

If the ETERNUS disk array unit supports the QuickOPC function, QuickOPC replication can be performed.
The initial replication copies all the data at a certain point in time (logical copy) to the copy destination disk area.
Subsequent replications copy only the data that has been updated since the previous replication.
This enables large reductions in the time taken for physical copying.

Figure 7.3 QuickOPC replication
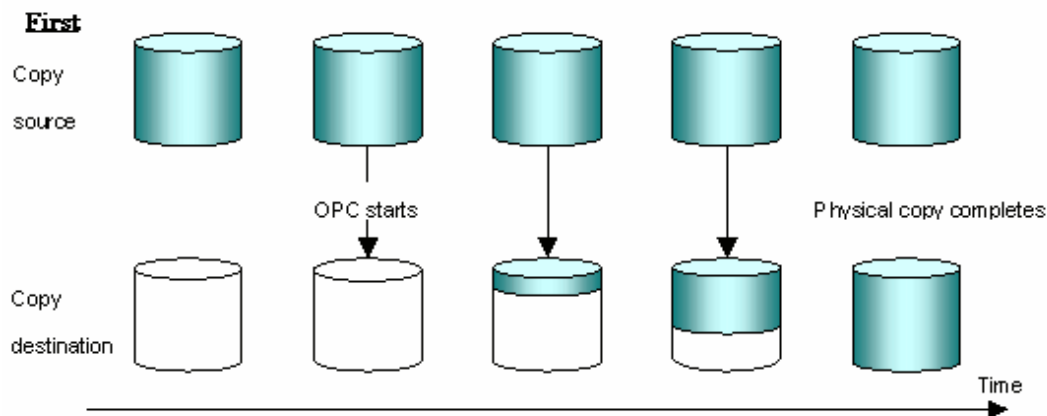
Second and subsequent copies
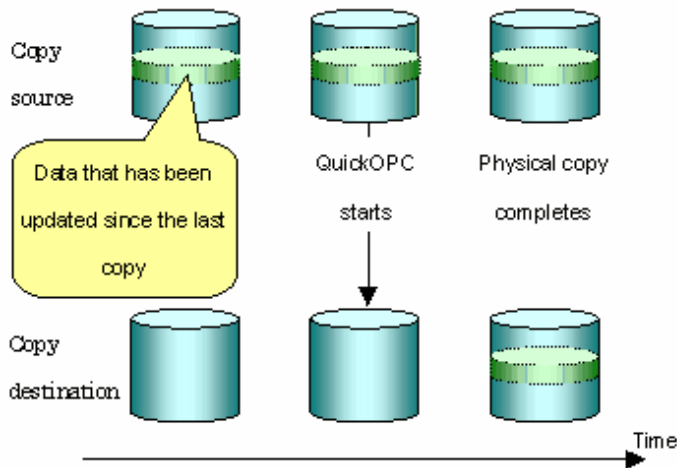
Point

The area at the copy destination disk must be the same size or larger than the copy source disk area.
The copying time for subsequent replications is the time taken to copy the differential data.

Note

To execute QuickOPC replication, it is necessary to use an ETERNUS disk array that supports the QuickOPC function.
The QuickOPC function 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 in the copy source disk area after a certain point in time (a logical copy) to be copied to the destination disk area.

Figure 7.4 SnapOPC replication

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.

The SnapOPC copy destination disk is called "Snap Data Volume".

Figure 7.5 SnapOPC mechanism

In some ways, SnapOPC is superior to conventional OPC, 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 source to the destination occurs inside SnapOPC, the access performance of the copy source is sometimes reduced, 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 become invalid 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 changed, the SnapOPC+ function copies only the original data of the changed data set, and saves it in snap generation units.

The following figure shows the processing flow of the SnapOPC+ function.

Figure 7.6 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 original data of the changed data at the copy source is copied to the copy destination (copy-on-write processing).

4. When the next copy destination volume is created, the copy-on-write processing is stopped.

5. Then, a SnapOPC+ session is set between the copy source volume and the new copy destination volume, and copy-on-write processing is performed.

6. Each time a copy destination volume is created, a snap generation number is assigned to that volume.

   (Snap generation numbers are assigned in sequence from 1 to 8, starting with the oldest.)

Since SnapOPC+ copy-on-write processing is performed only between the copy source volume and the latest copy destination volume, there is no effect on access performance to the copy source volume even when the number of copy destination volumes increases.
In addition, space at the copy destination volume is required only for the amount of original data (for data updated immediately prior) and for hardware management. Thus, use of SnapOPC+ enables the saved data area to be kept to the minimum area required.
Snapshot replication that uses SnapOPC+ is called SnapOPC+ replication.

🅟 Point

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It is recommended to set the Snap Data Pool using the ETERNUS Web GUI when using SnapOPC+. For details, refer to "Snap Data Volume extension functionality".

. . . .

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

Figure 7.7 1:3 replication operations using SnapOPC+
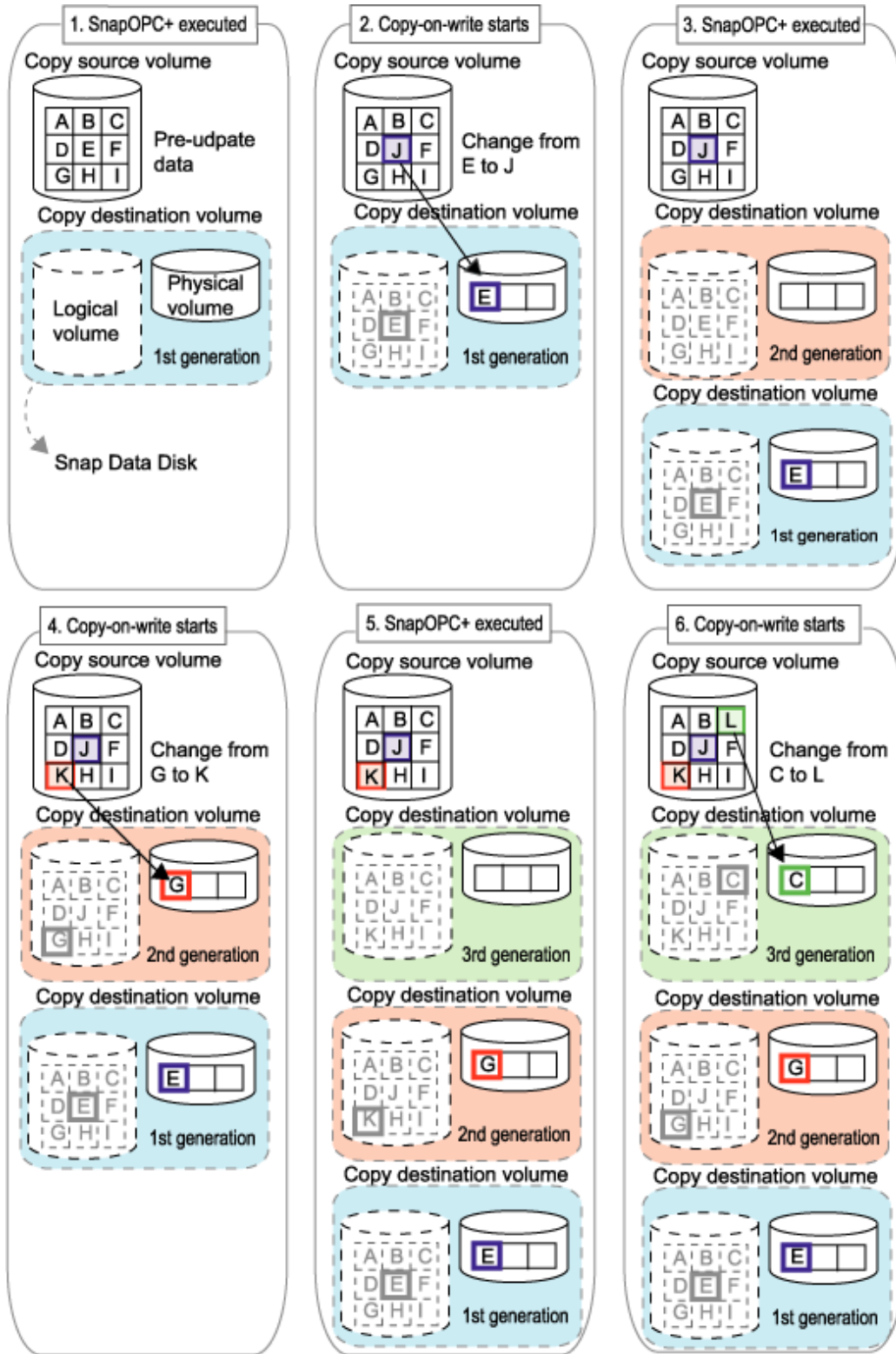
Due to the mechanism and features of SnapOPC+, it is assumed that it will be used as a backup to enable recovery from minor errors, such as operator mistakes and software errors. In order to be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all data by means of OPC/QuickOPC/EC/REC.

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

Table 7.1 List of function differences between SnapOPC and SnapOPC+

Function	SnapOPC	SnapOPC+
Copy method	Copy-on-write method	Copy-on-write method
Copy time (logical copy duration)	Instant	Instant
Copy destination volume type	Snap Data Volume	Snap Data Volume
1:N operation	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(Note1)	8	8
Restoration using the replication function	Y	Y(Note2)
Usefulness	・ Tape backup temporary area ・ Backup of file servers or similar that have a small amount of updates	・ Tape backup temporary area ・ Backup of file servers or similar that have a small amount of updates

Note 1 : The maximum number of sessions is the maximum number of sessions that can be set for one copy source volume.
Note 2 : Only available when using ETERNUS disk storage systems that support restoration using replication.

Y = Yes
N = No
R = Recommended

7.1.1.2   Snap Data Volume and Snap Data Pool

Snap Data Volume

The Snap OPC/SnapOPC+ copy destination volume is called "Snap Data Volume". Regarding this copy destination volume (Snap Data Volume), the capacity that can be seen in the host is called "logical capacity", and the capacity that has been physically configured is called "physical capacity".
The setting for logical capacity is equal to or greater than for the copy source capacity.
Physical capacity has control information (a conversion table) for managing backup data, as well as capacity for the storage of backup data. The capacity for this control information is 0.1% that of logical capacity.

Note

When there is insufficient Snap Data Volume capacity, it is not possible to access source volume (Snap Data Volume).
When there is insufficient capacity, refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Snap Data Pool

In ETERNUS, it is possible to set a Snap Data Pool, which is part of the Snap Data Volume group functionality.

When there is insufficient Snap Data Volume capacity and a Snap Data Pool is set, some area is added from the Snap Data Pool automatically.

Note

....

When there is insufficient Snap Data Pool capacity, it is not possible to access the copy destination (Snap Data Volume).
When there is insufficient capacity, refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

....

Figure 7.8 Image of Snap Data Volume extension
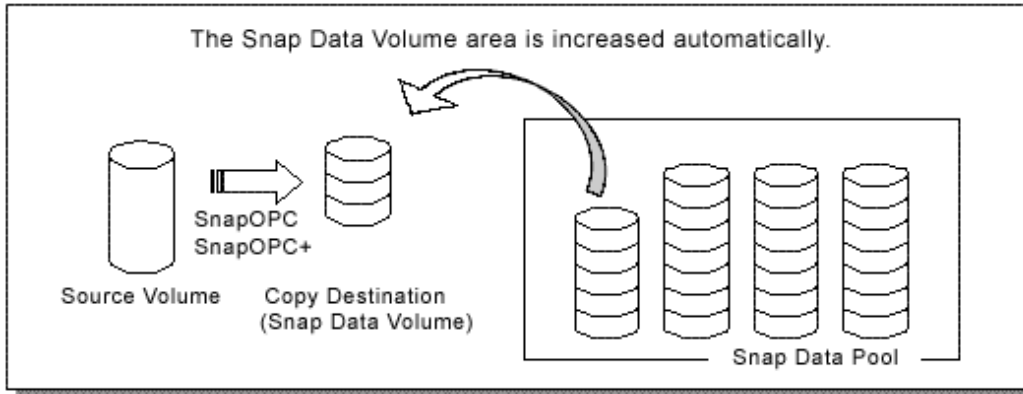
7.1.2   Synchronized replication processing

Replicas are created by copying from the source volume to the replica volume using the EC or REC function of ETERNUS disk storage systems.

Synchronized replication uses two methods to create a copy: full copying and incremental copying. In the case of full copying, all of the source volume is completely copied. In the case of 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
  Use this method to create copies in the future once a previous replica exists.
  Copies are created by reflecting the data that has been updated after an initial copy has been made (full copying and incremental copying).

The procedure for synchronized replication incorporates the following steps:

1. Full copying starts when synchronized processing that has been invoked using swsrpstartsync (Synchronous processing start command) starts copying from the source volume to the replica volume. Refer to step (1) in the figure below

2. Full copying is completed when the source volume and replica volume both attain the equivalency maintenance status. From this point on, updates in the source volume are subsequently reflected in the replica volume, so that data equivalence is always maintained (this is called an equivalency maintenance state). Refer to the states in steps (2) and (3) in the figure below

3. Synchronized processing is temporarily stopped with swsrpmake (Replication creation command) to create a copy of the source volume.

   The replication creation command dismounts or mounts the original volume.

   This processing determines the scope of original data (for details of this, refer to "Appendix C Pre-processing and Post-processing of Replication". After execution of the replication creation command, the replica volume can be accessed (copy established status). Refer to the states in steps (3) and (4) in the figure below

4. To create another copy, the synchronized processing that has been temporarily stopped is restarted with the synchronous processing start command. In the case of this copy, the only data copied to the replica volume is the data on the source volume that has been updated since the previous copy was made. Refer to step (4) in the figure below

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

5. When the incremental data has been copied, the status returns to the equivalency maintenance state. Refer to the states in steps (5) and (6) in the figure below.

6. When this status has been set, the copy is re-created with the replication creation command. Refer to step (6) in the figure below.

Figure 7.9 Synchronized replication processing
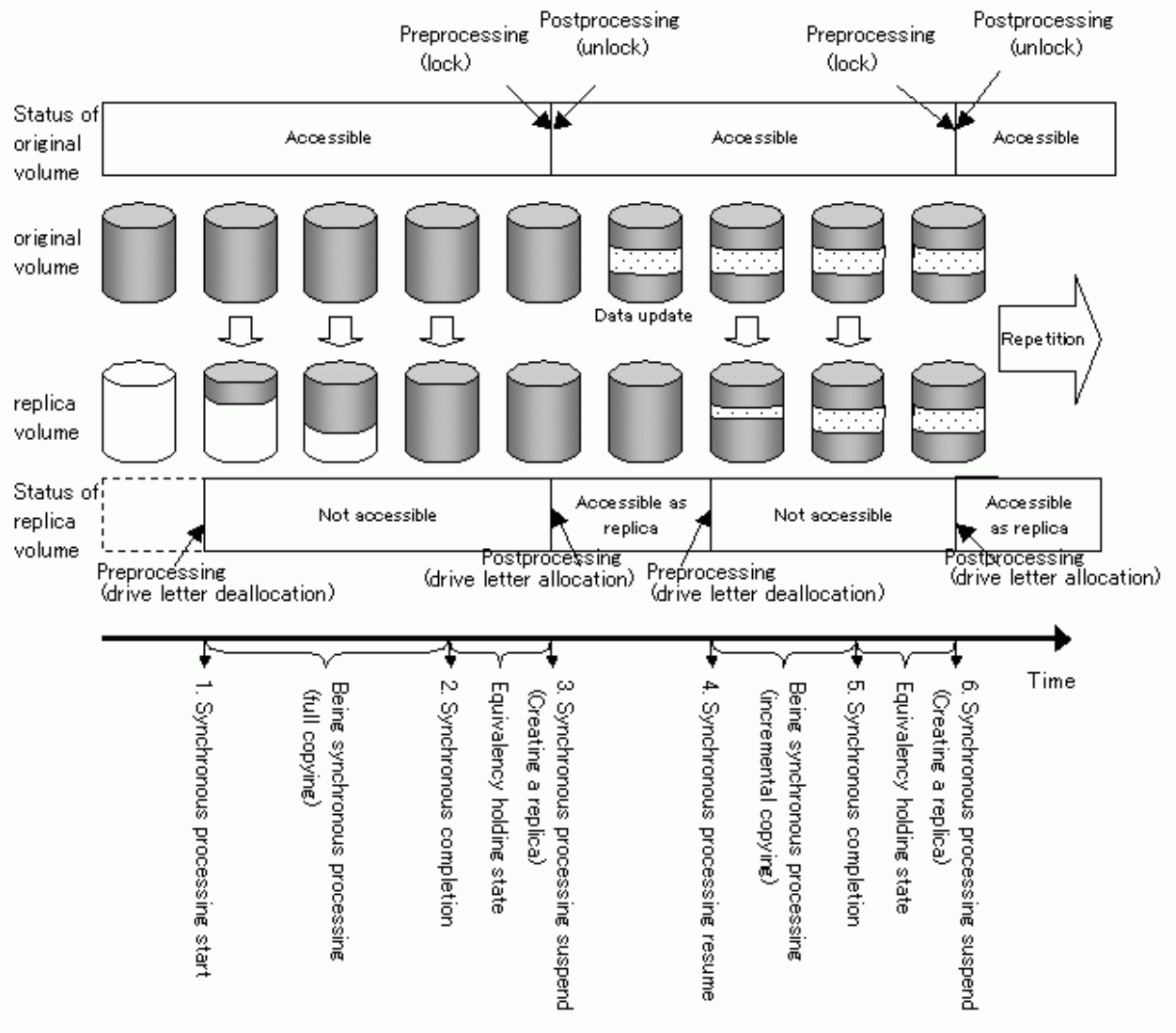
Note

- When using the EC or REC function in synchronized replication, ETERNUS disk storage systems must support the EC or REC function.

- swsrpmake (Replication creation command) cannot be executed unless both the source volume and replica volume are in an equivalent state.

Note

If the backup volume is part of a volume group, do not execute the vgchange (1M) command under synchronous processing (EC/REC) execution. If the backup volume becomes deactivated during the execution of synchronous processing, it is not only impossible to make

it active again but it will be in a state such that operations including stopping synchronous processing, the backup execution command, and the backup synchronous processing cancel command, cannot be performed.

When you have accidentally deactivated the backup volume, reactivate it after performing a forced stop of the synchronous processing using GRmgr etc.

7.2 Configuration

This section explains the operation of replication.

Configure replication using the following procedure:

- 7.2.1 Determining the server that performs replication.

- 7.2.2 Determining a replication target.

Refer to "7.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication", when SnapOPC/SnapOPC+ snapshot replication is 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 requires AdvancedCopy Manager to run under the Windows, Solaris or Linux operating systems.

Storage Server

AdvancedCopy Manager operations are performed.

AdvancedCopy Manager can run under the HP-UX OS in this case.

Figure 7.10 Configuration of the servers that perform replication
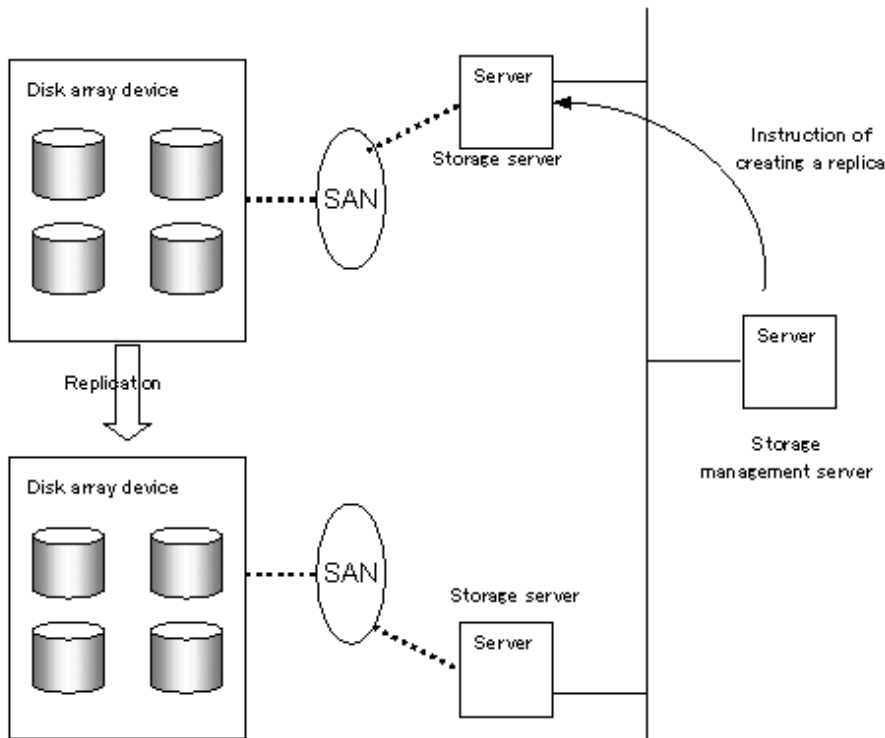
> **Note**
> ....
>
> The following requirements apply when system-to-system replication is performed using the REC function of ETERNUS disk storage systems:
>
> ・ The REC function must be installed in both systems.
>
> ・ Both systems must already be connected to each other using an FC remote adapter (FCRA).
> This is a connection that uses an FCRA, in which data flows only from the Initiator side to the Target side. For bi-directional copying, at least two FCRA connections are required.
> ....

7.2.2 Determining a replication target

Determine the source and replica volumes 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 is stored.
> ....

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

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

   bi-directional

   Data can be copied in either direction between source volume and replica volume.

uni-directional

Data can only be copied from the source volume to the replica volume. During this operation, copying from the replica to the original 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 source server or 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 "7.4.7 Creating groups".

Figure 7.11 Servers used in performing replication
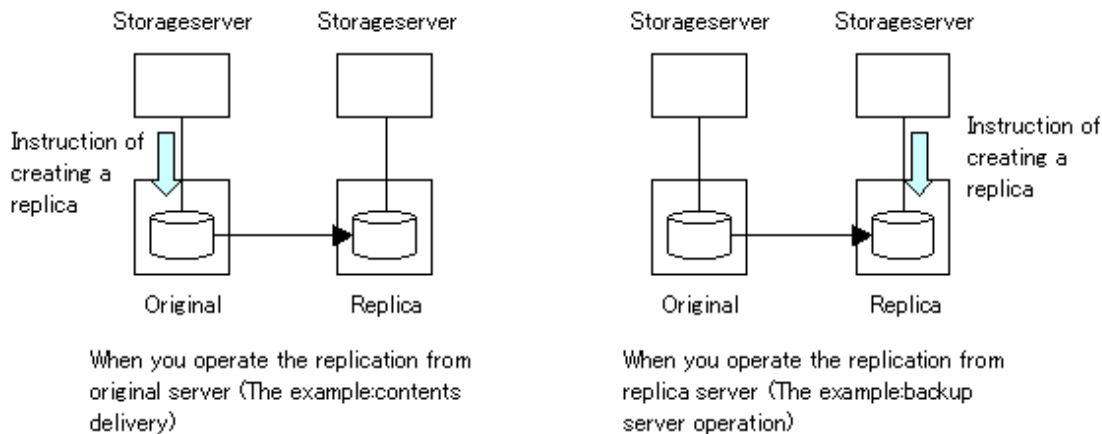
In this manual, a Storage Server used to perform replication is called the operational server. An original server or replica server is specified as the operational server.
An operational server can perform all of the replication functions. In contrast, any other type of server can use only the information display function and operational release function.

Note

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

・ In order to set up a volume as a source volume, there are some points which should be taken into consideration. For details, please refer to "10.1.1 General notes", for notes on determining a replication target.

   - 10.1.1.2 Backup and Replication Exclusions

7.2.2.1 Notes on the replication volume

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

The disk size of a 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 a source volume or a replica volume

When the source volume is a volume group, then when using the replica volume after replication, the replica volume needs to be a volume group of the same logical volume configuration as the source volume, and with the same physical disk size.

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 "1.5 Managing a Device on AdvancedCopy Manager".

Figure 7.12 Source volume and replica volume for two or more logical disks
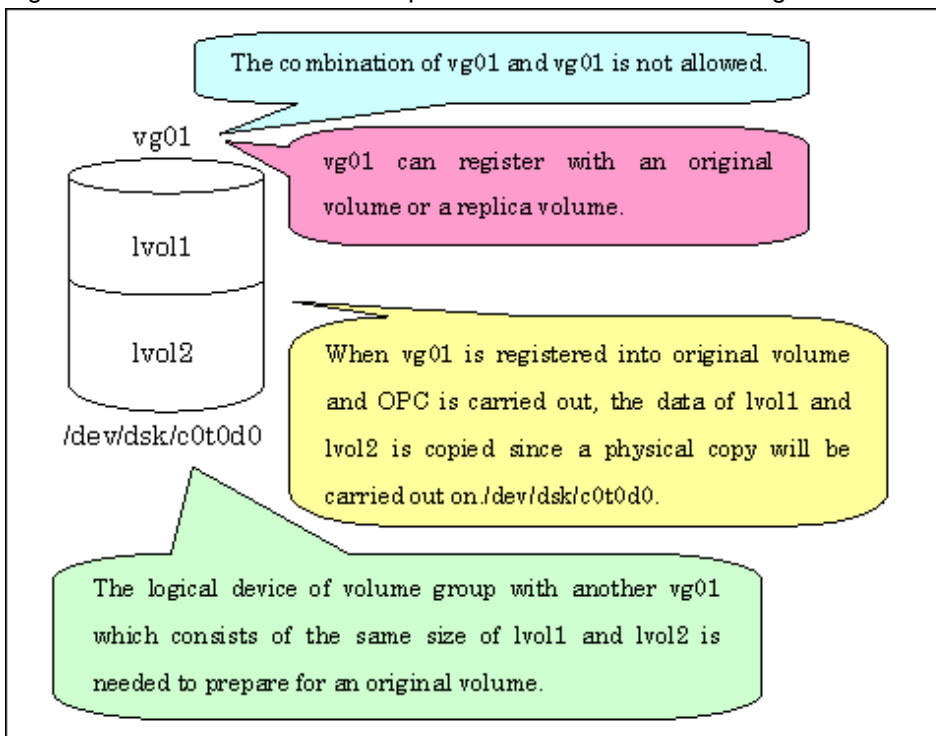
7.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication

7.2.3.1 Notes on session configurations

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

Figure 7.13 If one session is set for the Snap Data Volume
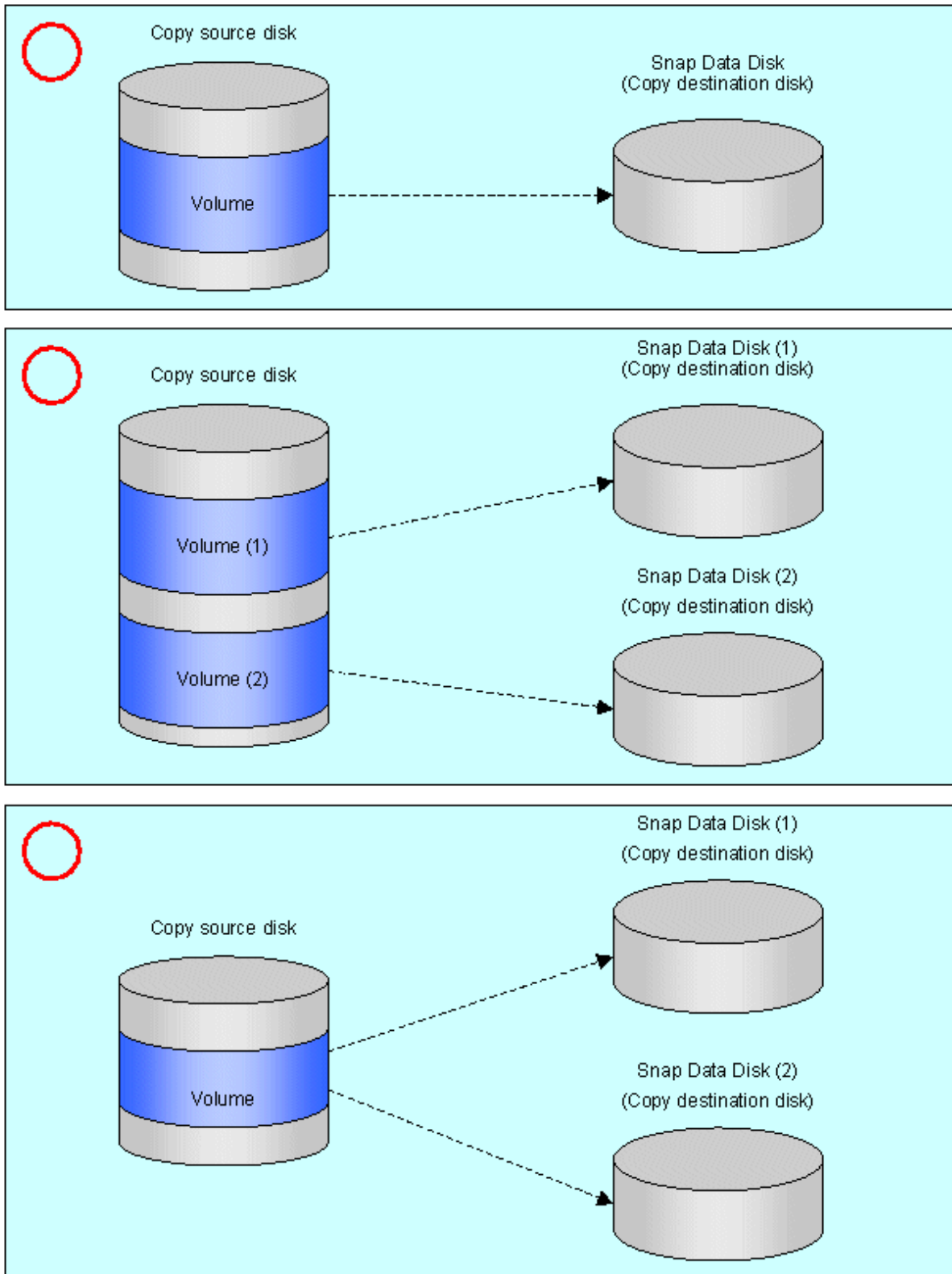
Accordingly, multiple sessions cannot be set up for a single Snap Data Volume, as shown in the following figure:

Figure 7.14 If multiple sessions are set for the Snap Data Volume
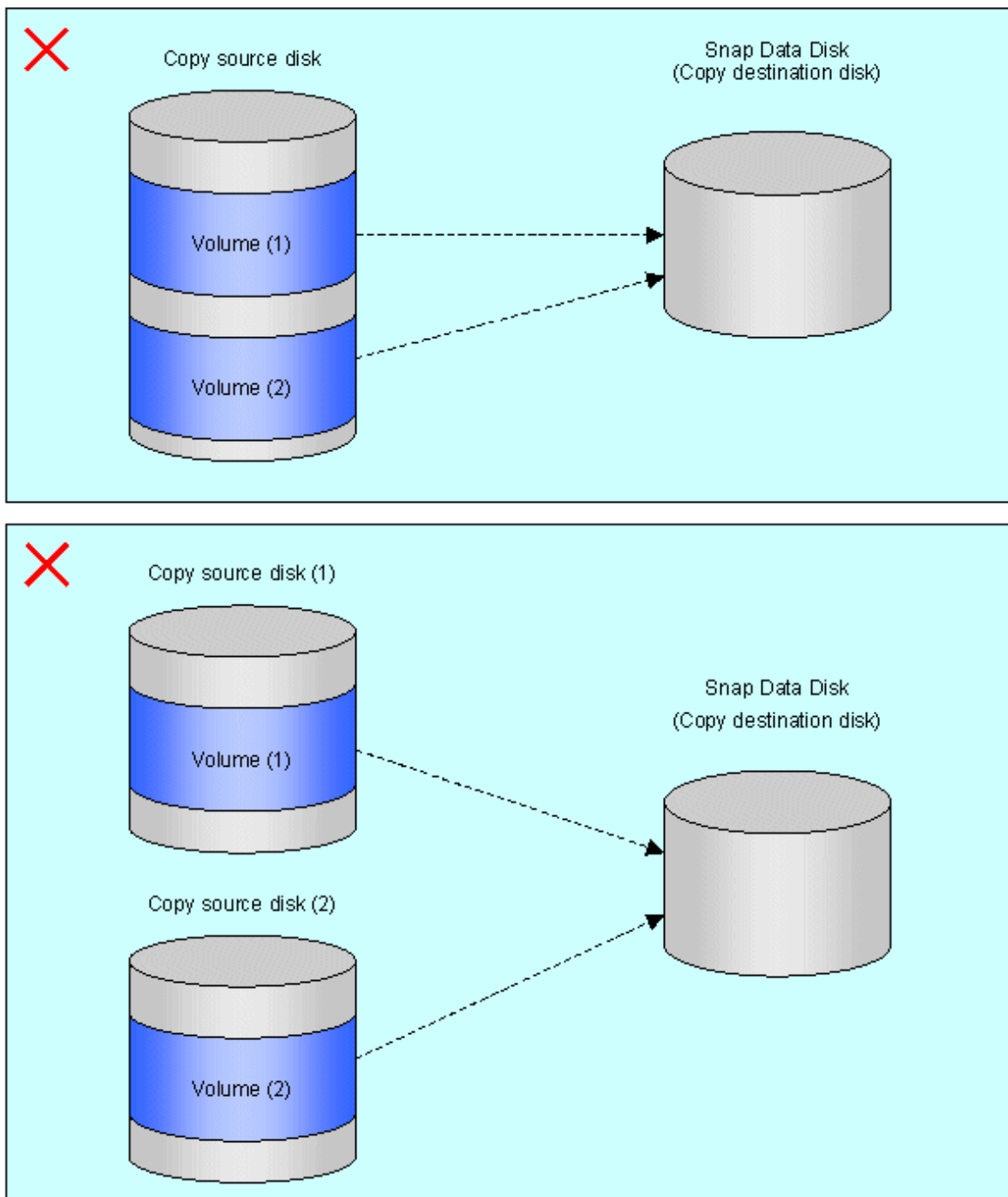
The following additional restrictions apply:

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

Figure 7.15 If copying from the Snap Data Volume to a disk other than the copy source
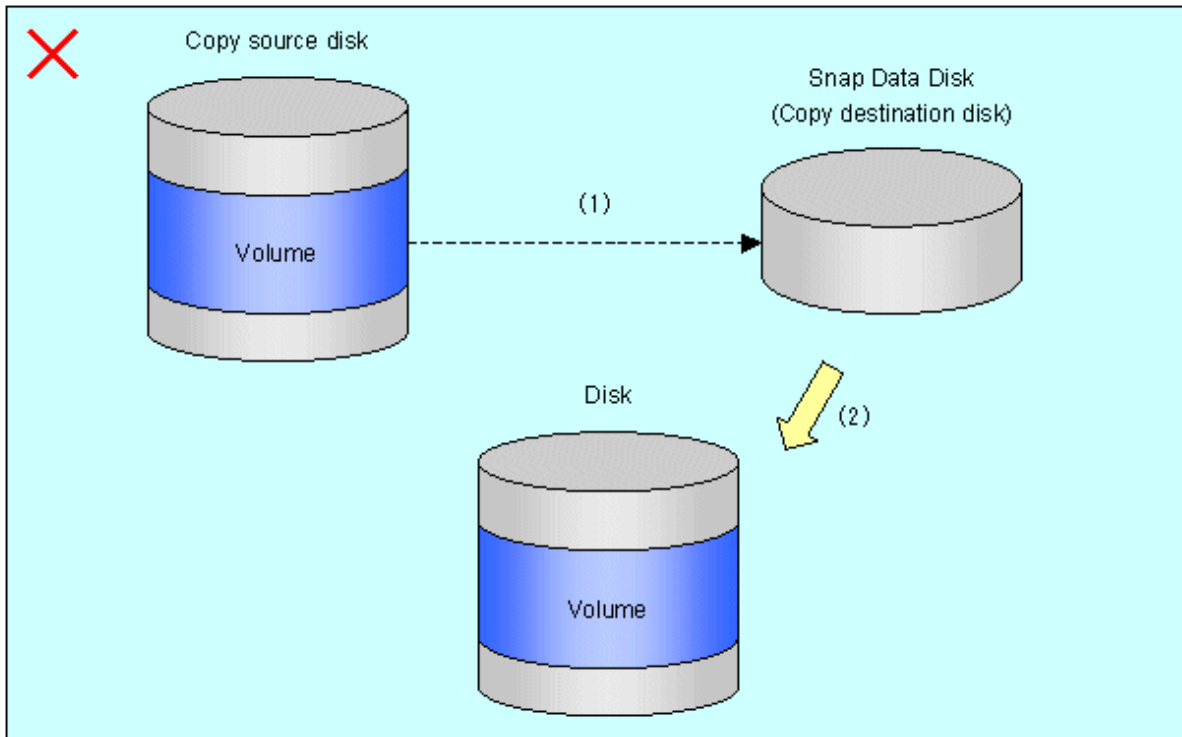
7.2.3.2 Creating a Snap Data Volume

Create a Snap Data Volume by performing the following steps:

1. Calculate the physical capacity for the Snap Data Volume.

2. Define and initialize the Snap Data Volume.

3. Connect to the host.

4. Create partitions and file systems.

Calculate the physical capacity for the Snap Data Volume.

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

  Physical capacity = (number of updated blocks for the copy source volume) x (safety factor)

Strictly speaking, both the number of blocks that have been updated on the Snap Data Volume and the management area used by the hardware (about 0.1% of the logical capacity) should also be taken into account before the SnapOPC/SnapOPC+ is taken, 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 swstestupdate (update amount measurement command).

Make this measurement using the following procedure:

1. Start measuring the update amount by configuring a pseudo session on the copy source volume.

```
# /opt/FJSVswsts/bin/swstestupdate start /dev/dsk/c1t1d1
/dev/dsk/c1t1d1 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/dsk/c1t1d1
Volume-Name      Update
/dev/dsk/c1t1d1 644333
#
```

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

```
# /opt/FJSVswsts/bin/swstestupdate stop /dev/dsk/c1t1d1
/dev/dsk/c1t1d1 swstestupdate completed
#
```

 Note
....
SnapOPC/SnapOPC+ cannot be implemented during the setup of a pseudo session.
....

Define and initialize the Snap Data Volume.

Define and initialize the Snap Data Volume using ETERNUS Web GUI. 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 device (the Server Connection Guide) for information on this procedure.

Create partitions and file systems.

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

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

7.2.3.3 Creating a Snap Data Pool

The Snap Data Pool is created using ETERNUS Web GUI.
Note the following points when creating the Snap Data Pool.

 Note
....
・ In the basic operation, copying is completed inside the Snap Data Volume capacity estimated/calculated as appropriate for the copying capacity. The Snap Data Pool is only an auxiliary area; when copying, always make sure that area is added from the Snap Data Pool to the Snap Data Volume.

・ Estimate the updated amount for each copy source volume, and then decide the Snap Data Volume and the Snap Data Pool capacity. If an advance estimate is difficult, it is recommended that the Snap Data Volume capacity + the Snap Data Pool capacity is between 30-50% of the total copy source capacity (since this is only a recommended value, the Snap Data Pool capacity must be changed in accordance with the operation status).
....

7.2.3.4   Snap Data Volume/Snap Data Pool monitoring

When there is insufficient Snap Data Volume or Snap Data Pool capacity, it is not possible to access copy destination volume (the Snap Data Volume) (this status makes it impossible to read copy destination data or write data to the copy destination). In SnapOPC+, it is not possible to write the copy destination or copy destination generations before it.

For this reason, monitoring must be performed so that the Snap Data Volume or the Snap Data Pool capacity is not insufficient at the time of operations.

- Using only the Snap Data Volume (when the Snap Data Pool is not set)
  Specify "stat" as swstsdv (Snap Data Volume operation/reference command) subcommand, and regularly monitor whether there is insufficient Snap Data Volume capacity.

- Using the Snap Data Pool (when the Snap Data Pool is set)
  Specify "poolstat" as swstsdv (Snap Data Volume operation/reference command) subcommand, and regularly monitor whether there is insufficient Snap Data Pool capacity.

  If there is an area in the Snap Data Pool for which the usage rate exceeds 50%, regardless of encryption, consider increasing the Snap Data Pool. Additionally, increase the Snap Data Pool monitoring frequency.

  If there is an area in the Snap Data Pool for which the usage rate exceeds 70%, regardless of encryption, increase the Snap Data Pool immediately.

When there is insufficient Snap Data Volume or Snap Data Pool capacity, refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Creating an access path

When there is insufficient Snap Data Volume or Snap Data Pool capacity, it is not possible to access copy destination volume (Snap Data Volume).
In the following cases, it is not possible to access the Snap Data Volume copy destination volume either:

- Access to the Snap Data Volume after the Snap Data Volume initialization

- Access to the Snap Data Volume after the Disk management information initialization

For this reason, it is recommended that you reserve a volume (access path) that is separate from the Snap Data Volume.
The volume that is used as the access path is created on the same ETERNUS disk array as the Snap Data Volume. Since this is not used in the storage of data, there is no problem even if there is little capacity. Any size can be used for the creation of the access path.

The following operations can be executed 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 Volume as shared disks in cluster systems. This is to avoid the danger of the cluster system failing over when the physical capacity of the Snap Data Disk is insufficient.
In 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.

Figure 7.16 Flow of replication operations
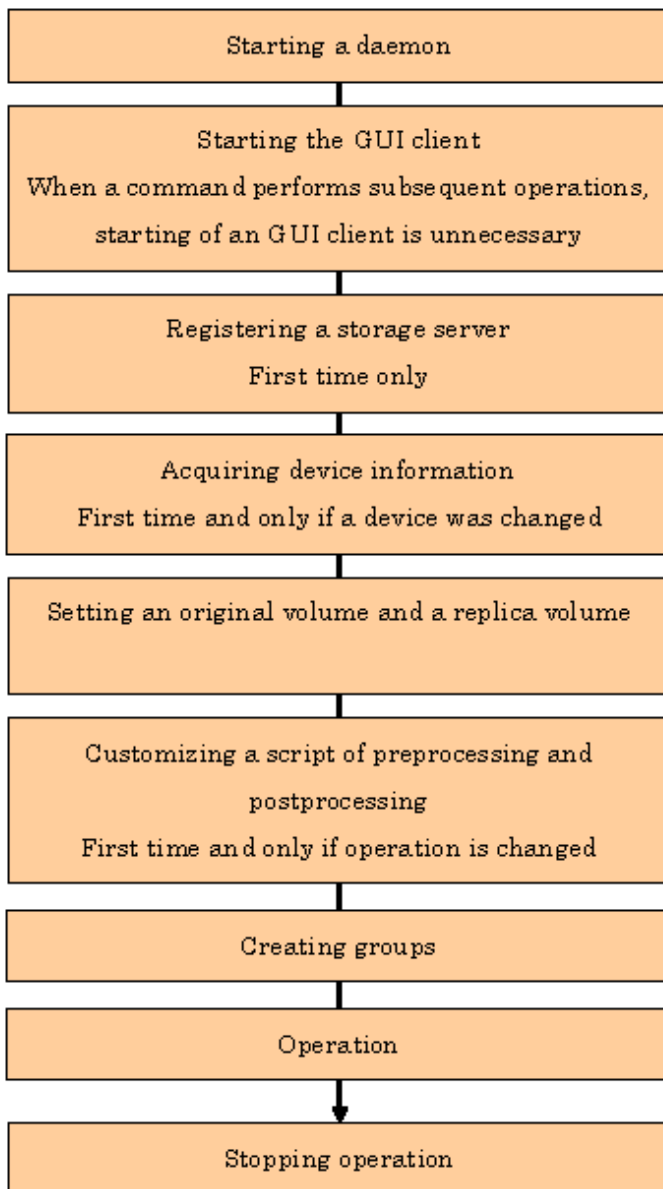
7.4 Preparations
=====

This section describes the preparations that are required before performing replication.

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. Normally, the daemon is configured to be automatically invoked at system startup.

However, if a daemon fails to start for some reason or has stopped, both servers must restart their respective daemons. For information about starting daemons, refer to "Chapter 2 Starting and Stopping Daemons".

7.4.2 Starting the GUI Client

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

There is no need to perform this operation for command-only operations.

7.4.3 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, it is not necessary to register a server.

The process of registering the Storage Server can be executed using either GUI or command operations.

For details on the operation method using the GUI, refer to "Register a New Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

For information on using commands, refer to stgxfwcmaddsrv (server information addition command). 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 process can be executed using either GUI or command operations.

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

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

Note

・ Device information on the Storage Server must briefly be stored in the repository.
The area required when updating the repository may not be available when information concerning devices under multiple Storage Servers is fetched. Therefore, check if there is sufficient area for updating the repository before fetching the device information. If there is insufficient area, allocate the required area before fetching the device information.

  Refer to the edition of the following manual that is applicable to the OS of the Storage Management Server for the procedure:

    - Step 2, "Response to repository access failure" in "ETERNUS SF AdvancedCopy Manager Operation Manual".

・ 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 both low. As a guideline, each operation takes about 0.5 seconds per device (or partition) under no-load conditions.

・ In relation to 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.

7.4.5 Configuring the source volume and replica volume

Use swsrpsetvol (Replication volume information configuration command) 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 swsrpvolinfo (Replication volume information display command).

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

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

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

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

Replication pre-processing and post-processing need to be customized when operational requirements change.

For example:

- ・ When replication target is a volume group.

- ・ For specific operational requirements, you want to avoid the unmount/mount processing of the volume where a file system is constructed

- ・ If you want to add special pre-processing or post-processing

Refer to Appendix C Pre-processing and Post-processing of Replication for information on the customization.

🛈 Note
. . . .

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

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 "7.8.2 Replication in units of physical disks" for information on the reconfiguration of a 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 "7.8.2 Replication in units of physical disks" and "Reconfiguring the disk group (for replication between servers)" of "7.9 VxVM Volume Operation" for information on the usage and the reconfiguration of a disk group.
. . . .

ⓟ Point
. . . .

When AdvancedCopy Manager is upgraded

The script may need to be updated after an upgrade of AdvancedCopy Manager.
Therefore, you should check the script after any upgrade to ensure it is compatible with newer versions.
. . . .

7.4.7　Creating groups

7.4.7.1　Conditions for the replication volumes that make up the group

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

・ The source servers and destination servers must have matching attributes such as size and device configuration.
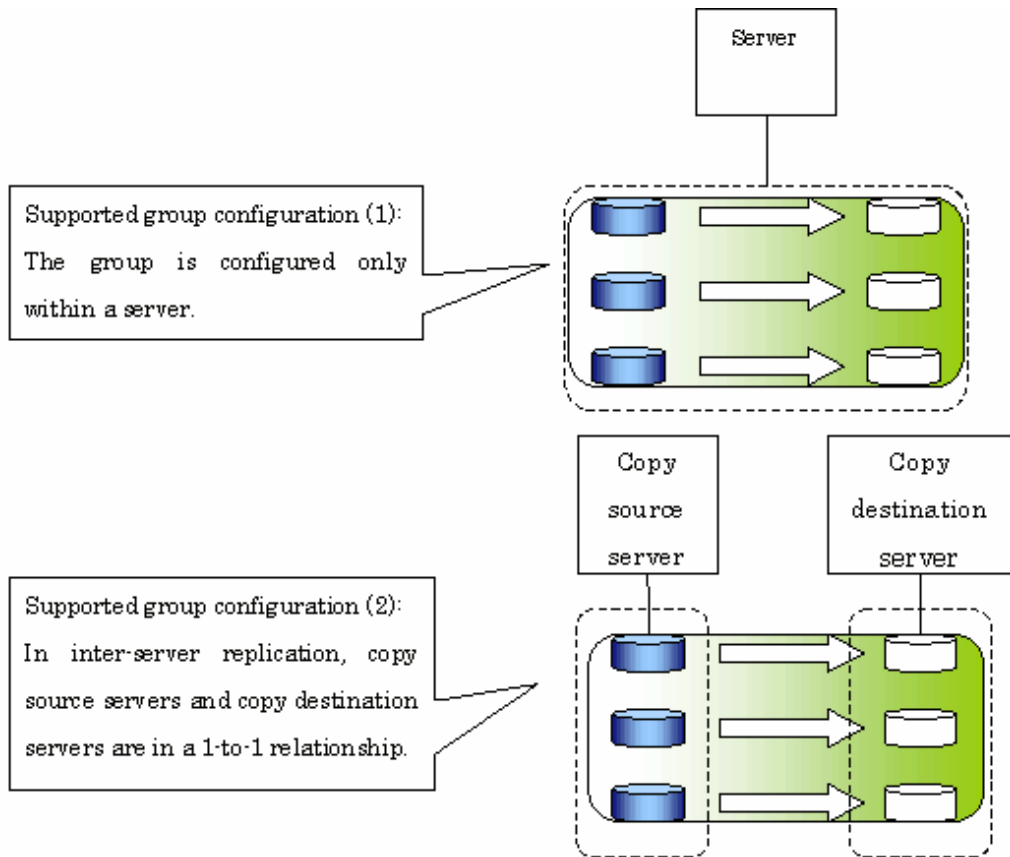
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the "Op-Server" and "Copy" columns obtained by executing swsrpvolinfo (Replication volume information display command).
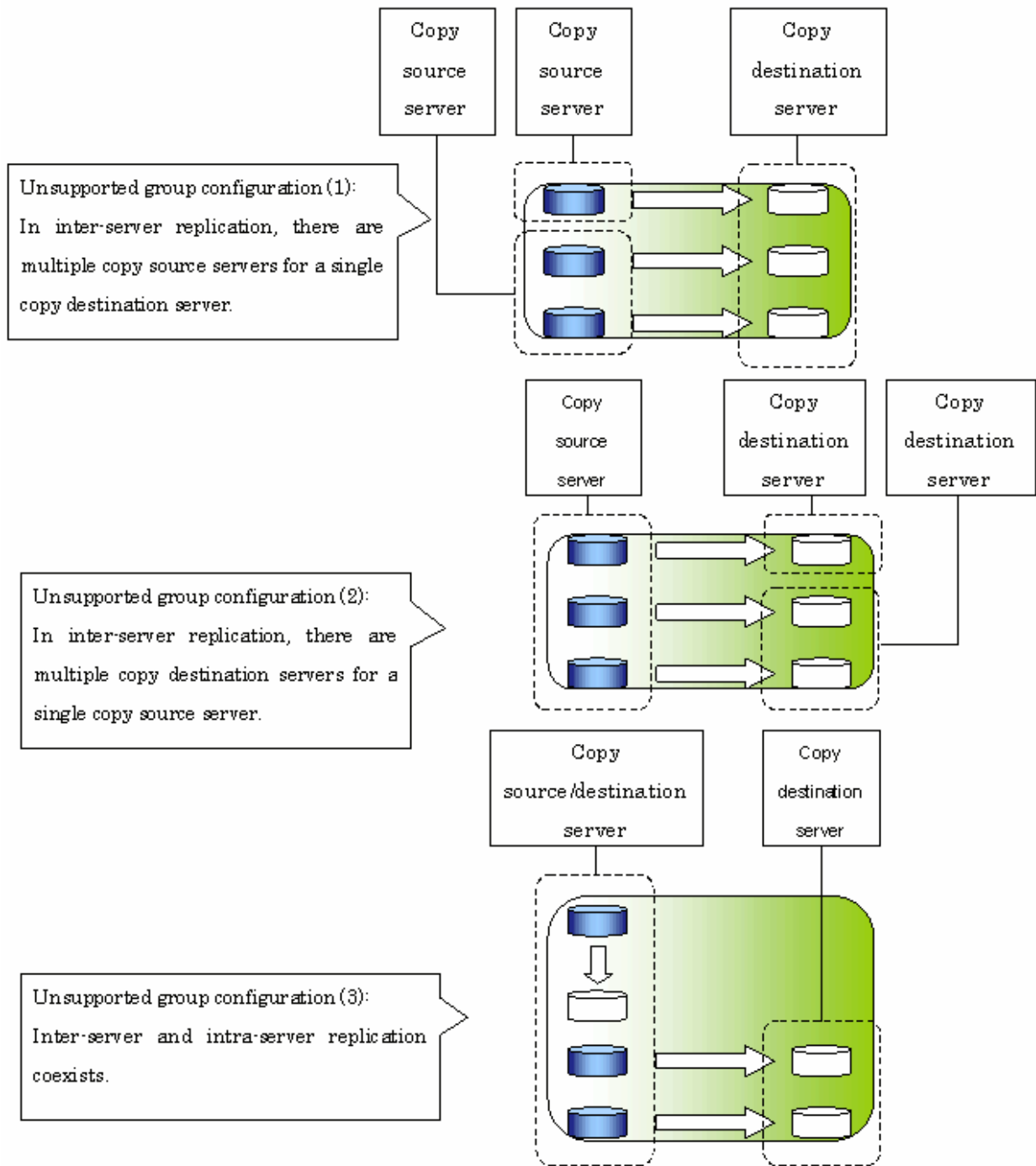
・ The replication volume information being registered must not be registered in any other group.

Supported group configuration:
Either the copy sources or destinations are duplicated.

Unsupported group configuration:
The copy sources and destinations are duplicated with another group.
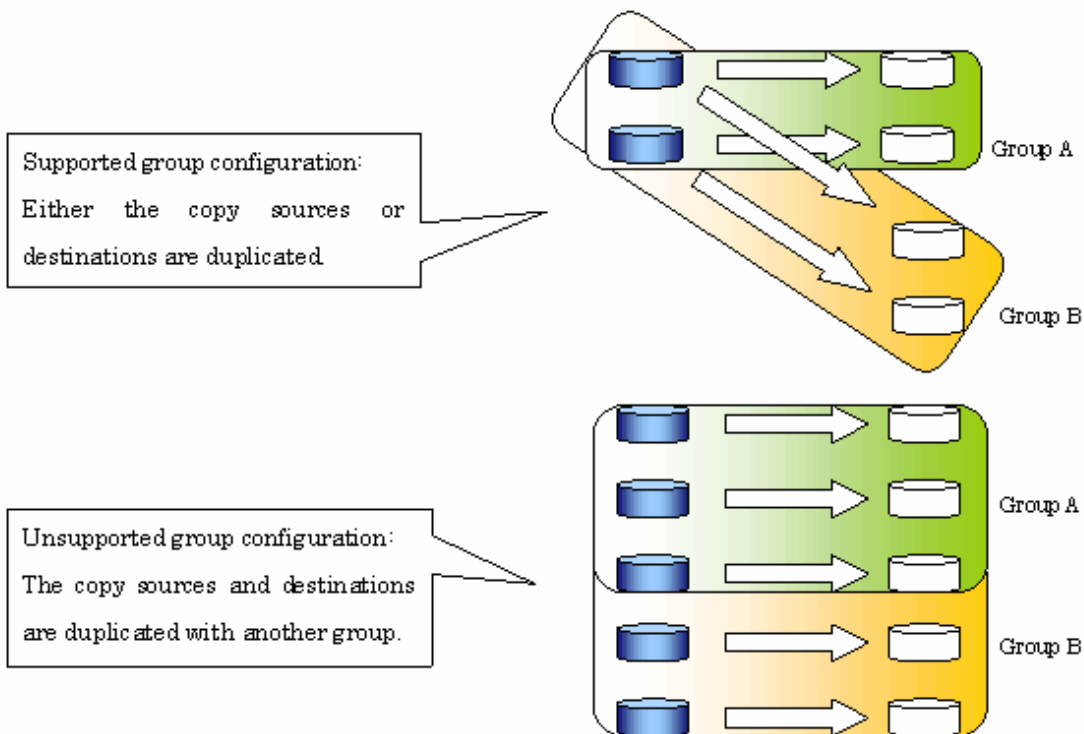
Group A

Group B

・ Source volumes and destination volumes must not be duplicated within the group.

Unsupported group configuration (1):
The replication source is duplicated.

Unsupported group configuration (2):
The replication destination is duplicated.
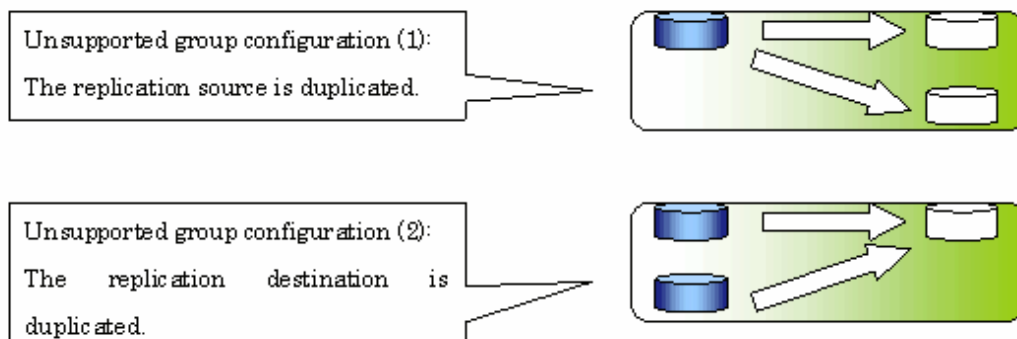
7.4.7.2 How to create groups

Groups are created using swsrpsetvol (Replication volume information configuration command).
Information for created groups can be displayed using swsrpvolinfo (Replication volume information display command).

Example

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

```
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/dsk/c1t2d10@SRC /dev/dsk/
c1t2d20@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/dsk/c1t2d11@SRC /dev/dsk/
c1t2d21@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpvolinfo -L
Server Original-Volume    Size    Replica-Volume       Size    Copy
Op-Server Group
```

```
SRC    /dev/dsk/c1t2d10@SRC 4.0Gbyte /dev/dsk/c1t2d20@TARG-1 4.0Gbyte bi-
direction both      GRP1
SRC    /dev/dsk/c1t2d11@SRC 4.0Gbyte /dev/dsk/c1t2d21@TARG-1 4.0Gbyte bi-
direction both      GRP1
#
```

7.5 Operations

Before performing replication, refer to "7.4 Preparations" to set up the environment required for replication.

This section describes the operation by command. Refer to "Perform Replication" 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 swsrpmake (Replication creation command) to perform snapshot replication.
Refer to "7.1.1 Snapshot replication processing" for an explanation of snapshot replication.

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

QuickOPC replication

Execute QuickOPC replication by specifying the "-T" option in swsrpmake (Replication creation command).
If no OPC session exists when the replication creation command is executed, the command starts snapshot processing (ie, OPC physical copying), and tracks processing from the source volume to the destination volume.

Figure 7.17 When replication creation command is executed (first time)
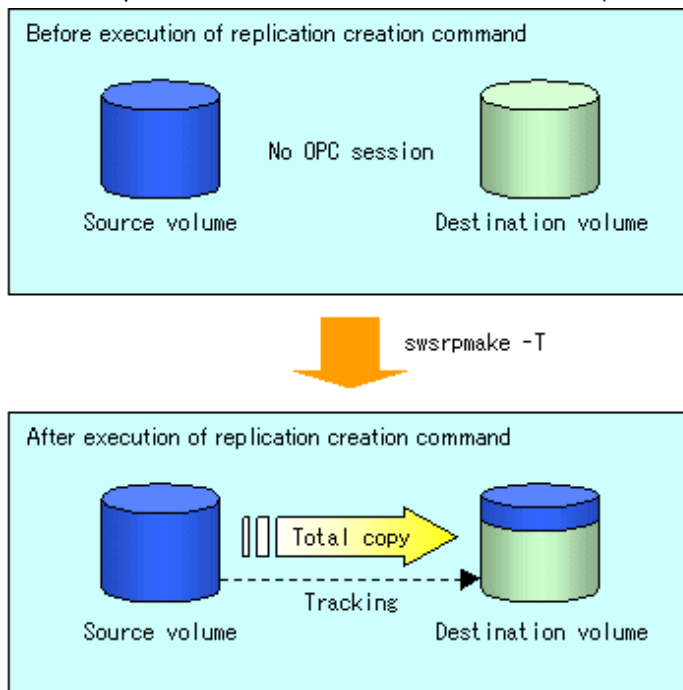
To check the execution status of physical copying, use swsrpstat (Operation status display command) in the same way as for an ordinary snapshot replication.
After snapshot processing (ie OPC physical copy) is complete, only tracking processing is active.
To check the tracking status, use swsrpstat (Operation status display command) with the "-L" option specified.

Figure 7.18 When snapshot processing is completed
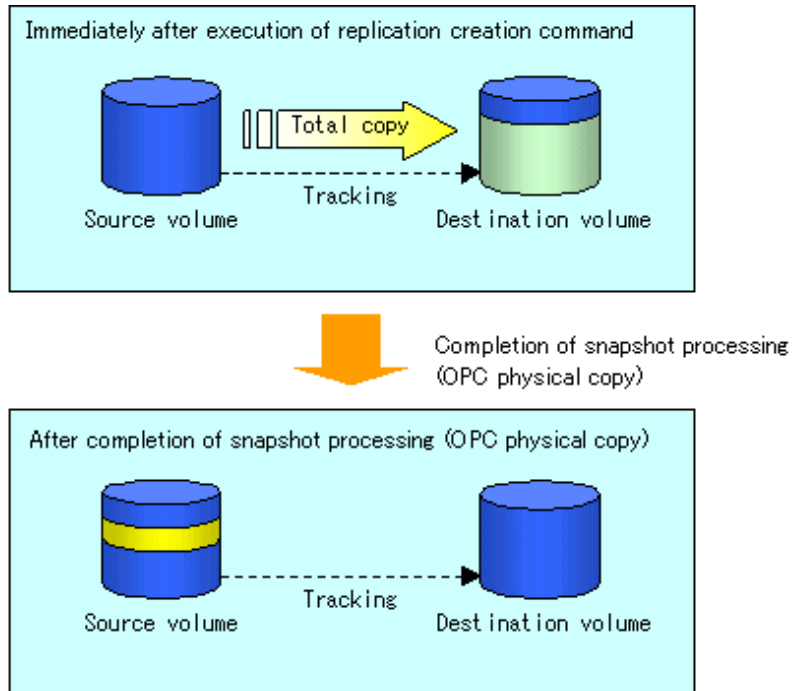
Entering swsrpmake (Replication creation command) with the "-T" option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

Figure 7.19 When replication creation command is executed (second time)
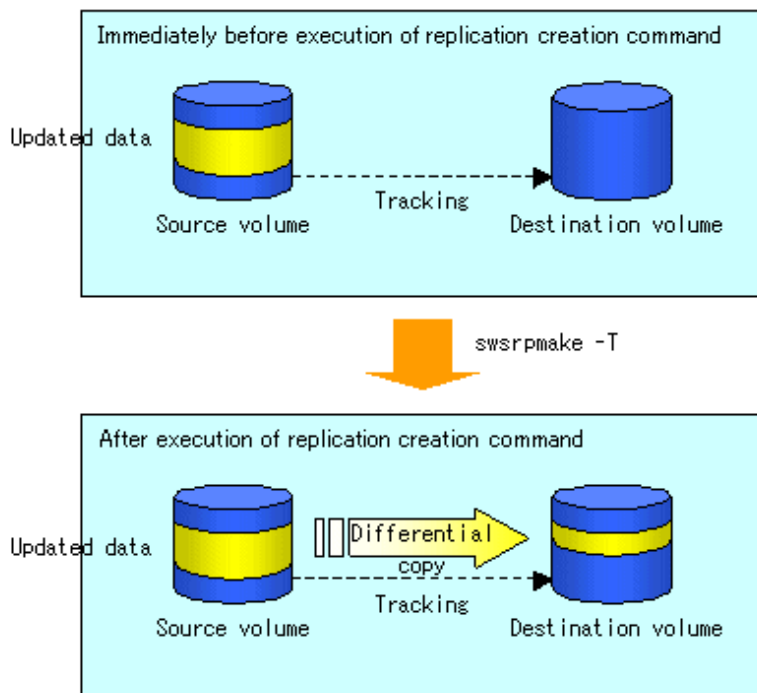
When you want to perform a restoration while tracking processing is being executed, you need to perform a restoration by OPC (to achieve this, you need to execute the replication creation command without the -T option). QuickOPC cannot be executed in the reverse direction while tracking processing is being executed. The replication using QuickOPC is done as follows:

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

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

Although a restoration is executed with OPC, only the data that has been updated since the previous replication (it can be obtained from the 'Update' column of swsrpstat) is copied.

Therefore, in replication using QuickOPC, not only a physical backup but also restoration is completed in a short period of time.

The restore execution status can be checked by executing swsrpstat (Operation status display command) with the -E option specified.

SnapOPC type replication

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

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/dsk/c1t1d1 /dev/dsk/c1t1d2
FROM=/dev/dsk/c1t1d1@SV1,TO=/dev/dsk/c1t1d2@SV1 swsrpmake completed
#
```

Figure 7.20 When the replication creation command is executed
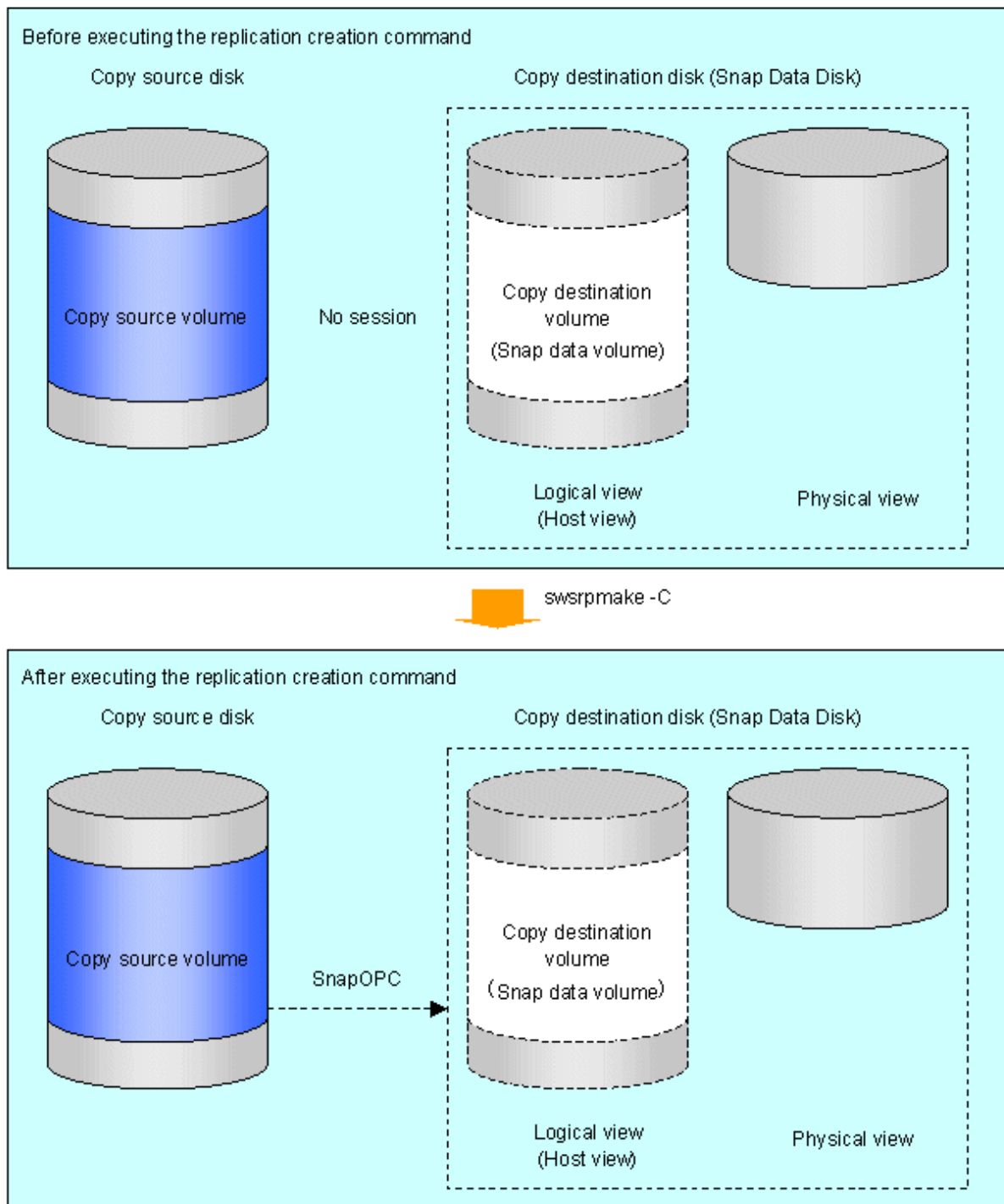
Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the source volume, but instead copy only the data that has been updated on the source or destination since SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure 7.21 When the copy source volume is updated
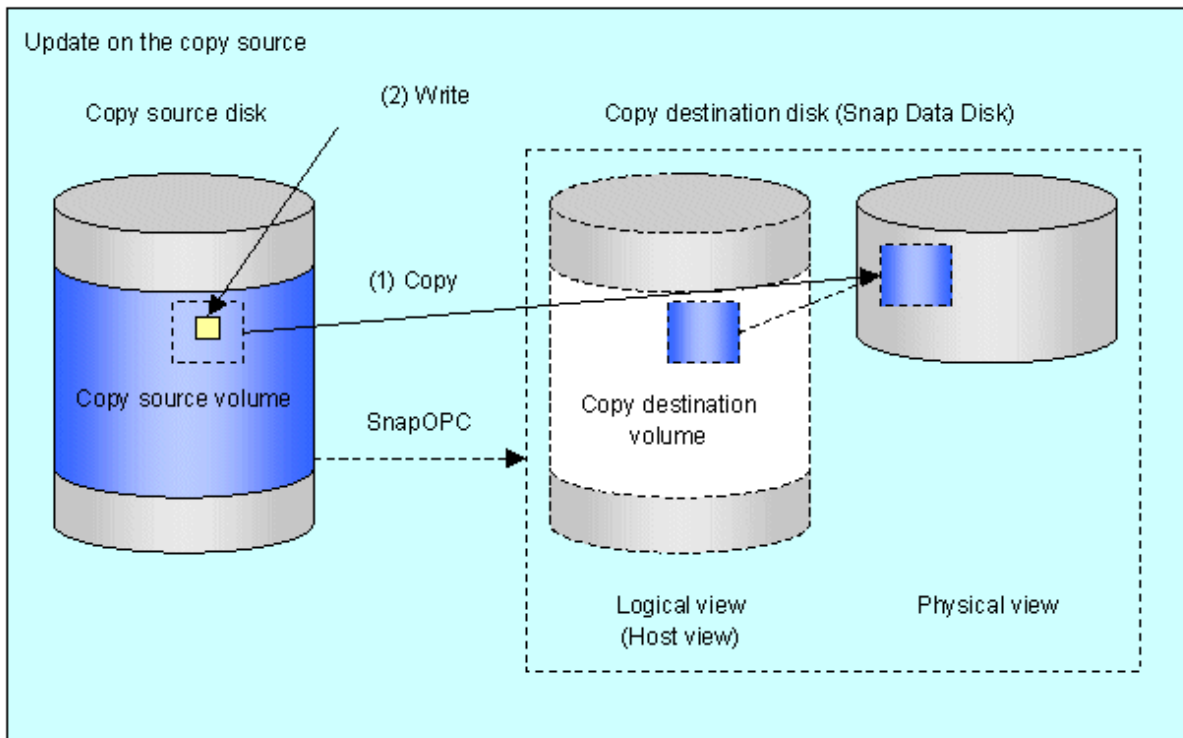
Figure 7.22 When the copy destination volume is updated
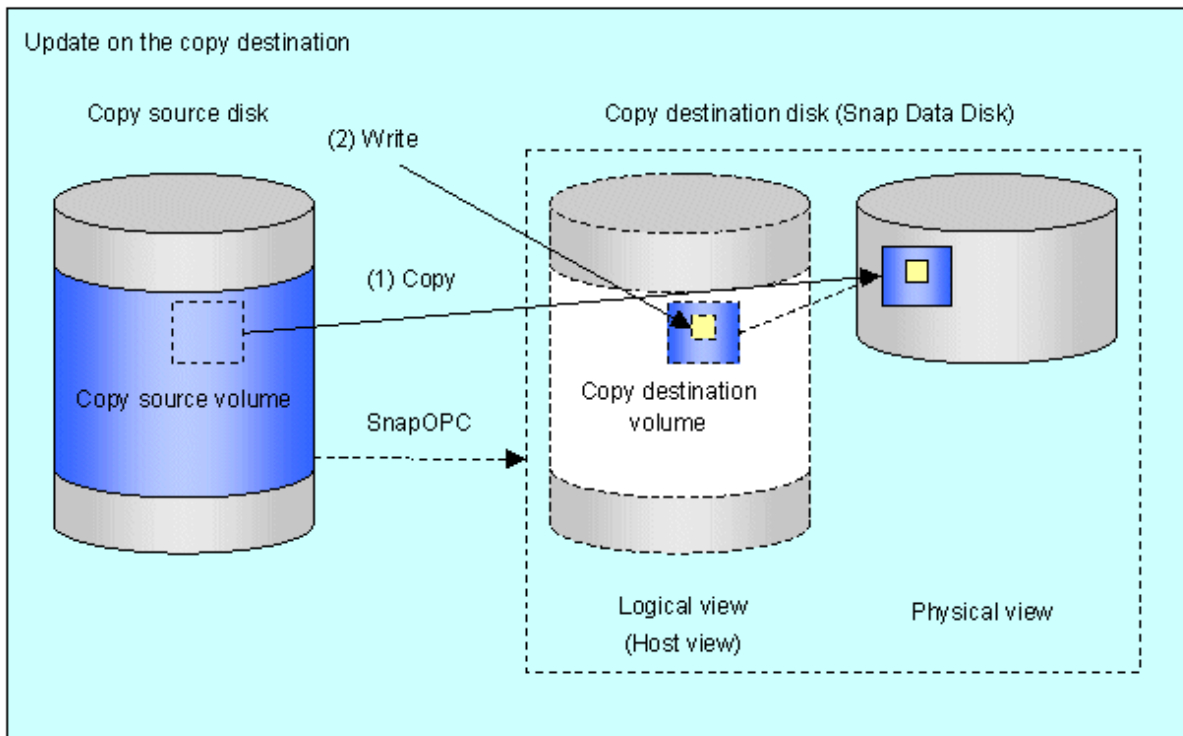
Note: The units for host I/O and storage device copies are different (512 bytes for host I/O and 8 kilobytes for storage device copies), and therefore data copies also occur when the copy destination is updated.

The status of SnapOPC sessions can be checked using swsrpstat (Operation status display command).
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/dsk/c1t1d1
Server Original-Volume    Replica-Volume      Direction Status        Execute Trk  Update Rcv
Split Xfer Snap-Gen
SV1   /dev/dsk/c1t1d1@SV1 /dev/dsk/c1t1d2@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 Snap Data Volume or Snap Data Pool capacity, the SnapOPC+ execution status changes to error suspend status ("failed"), and replication volume cannot be used.
The SnapOPC execution status can be checked in swsrpstat (Operation status display command) output result Status column.

Example

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/dsk/c1t1d1
Server Original-Volume    Replica-Volume       Direction Status Execute Trk  Update Rcv  Split Xfer
Snap-Gen
SV1   /dev/dsk/c1t1d1@SV1 /dev/dsk/c1t1d2@SV1 regular   failed ----    off  ----   ---- ----
----
#
```

When the SnapOPC execution status is error suspend status ("failed"), refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".
・・

Perform restorations from Snap Data Volume by running an OPC using swsrpmake (Replication creation command).

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t1d2 /dev/dsk/c1t1d1
FROM=/dev/dsk/c1t1d2@SV1,TO=/dev/dsk/c1t1d1@SV1 swsrpmake completed
#
```

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

Figure 7.23 When restoration is executed
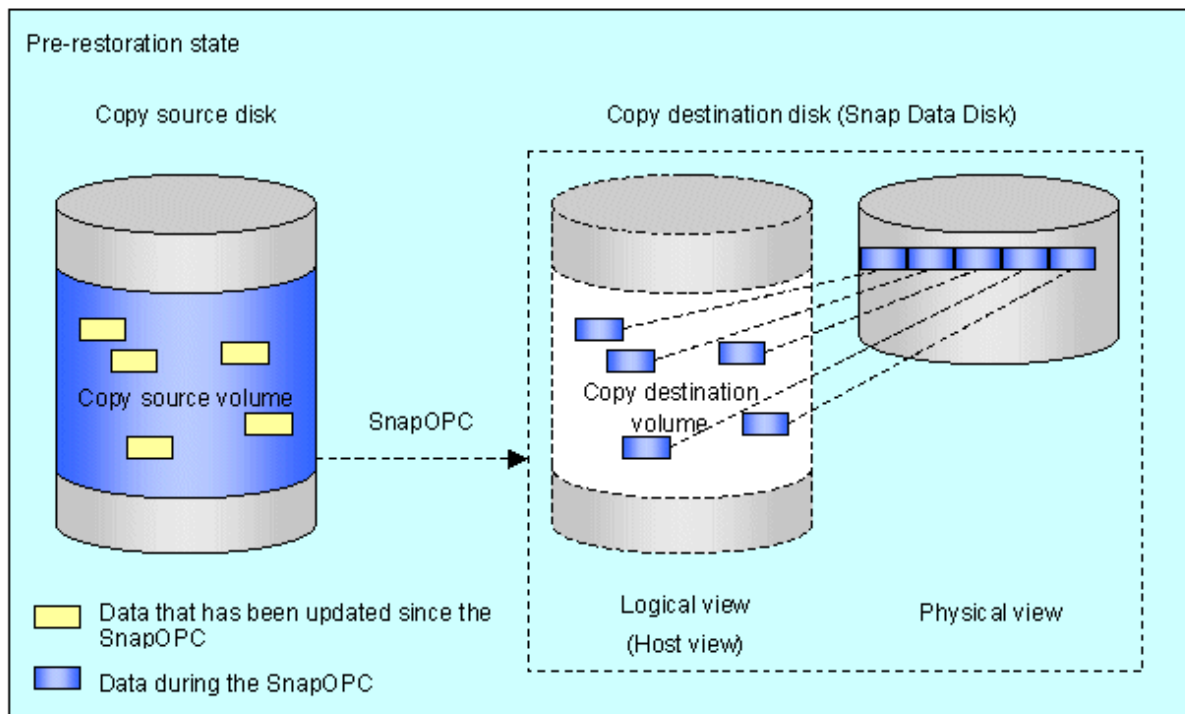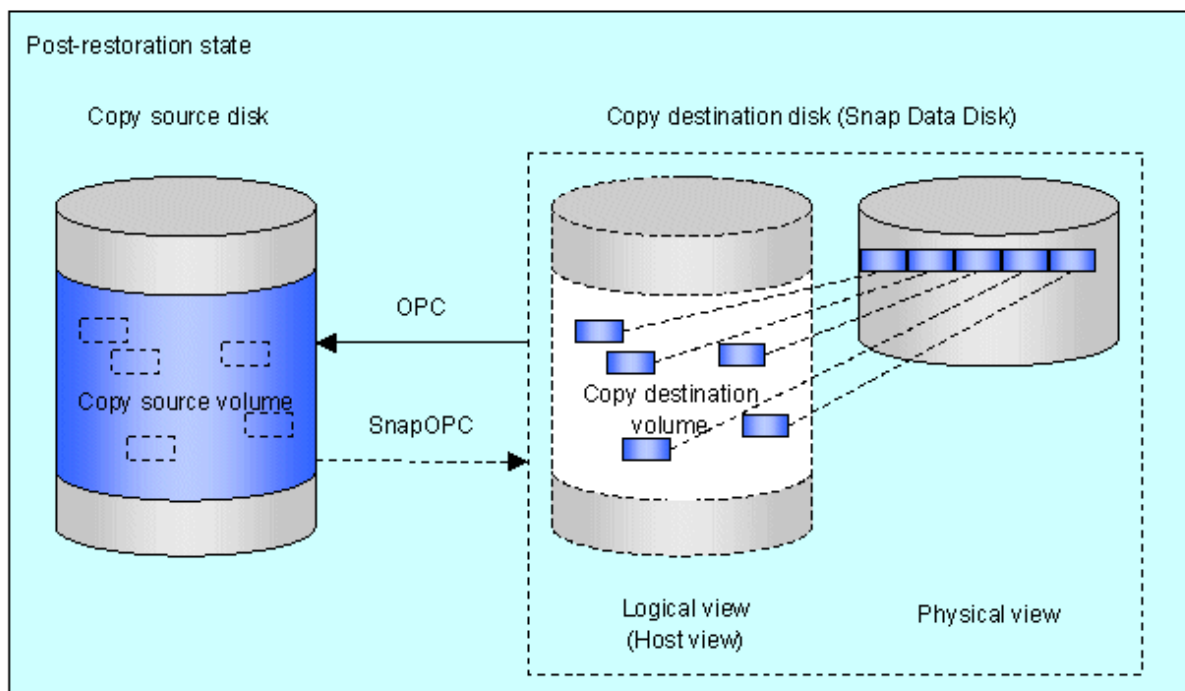
The execution status of restorations can be checked by specifying the -E option with swsrpstat (Operation status display command).

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/c1t1d1
Server Original-Volume     Replica-Volume      Direction Status Execute
SV1    /dev/dsk/c1t1d1@SV1 /dev/dsk/c1t1d2@SV1 reverse   snap   80%
#
```

Note

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

Figure 7.24 When restoring to a volume other than the copy source volume
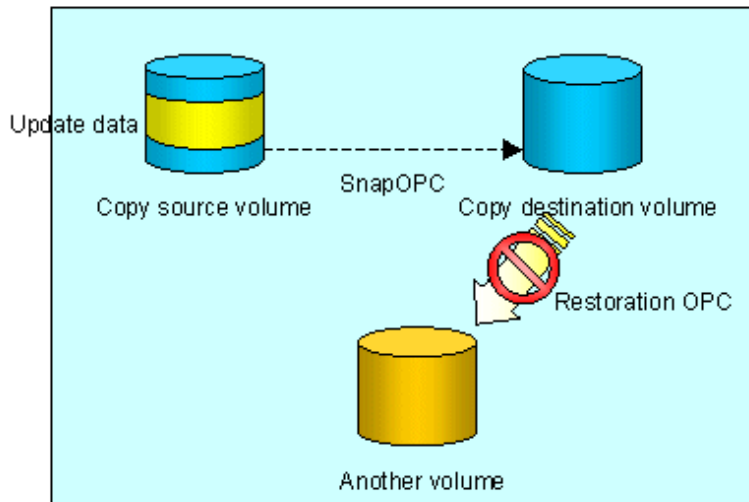
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure 7.25 [When SnapOPC is performed for multiple copy destination volumes]
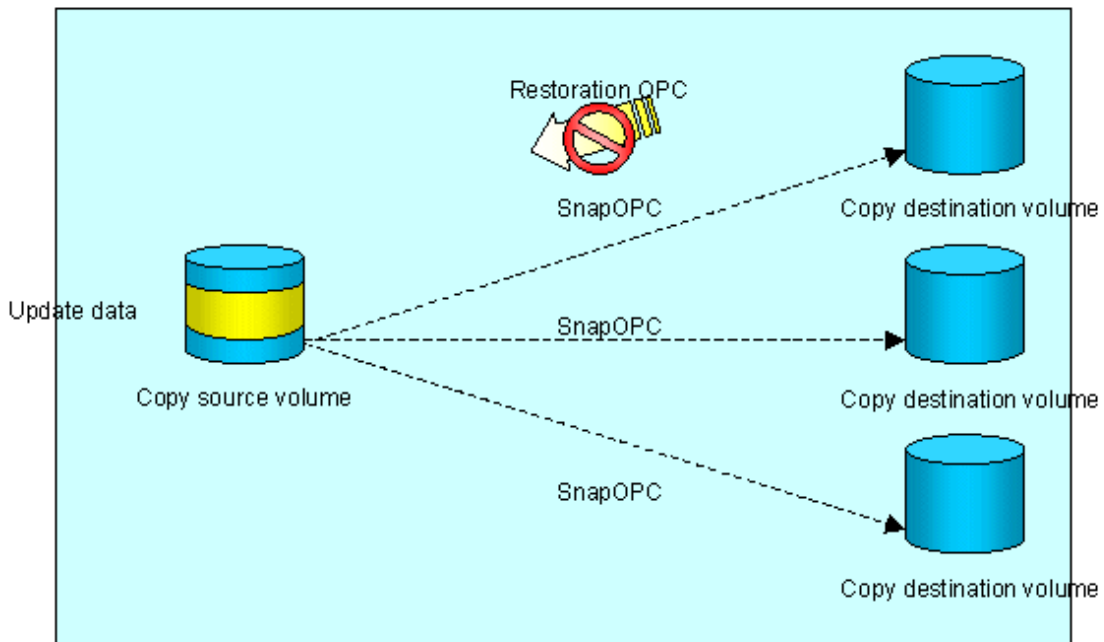
In this case, restoration using an OPC can be performed by canceling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were canceled will be lost.

Figure 7.26 [When SnapOPC session cancelled to perform restoration]
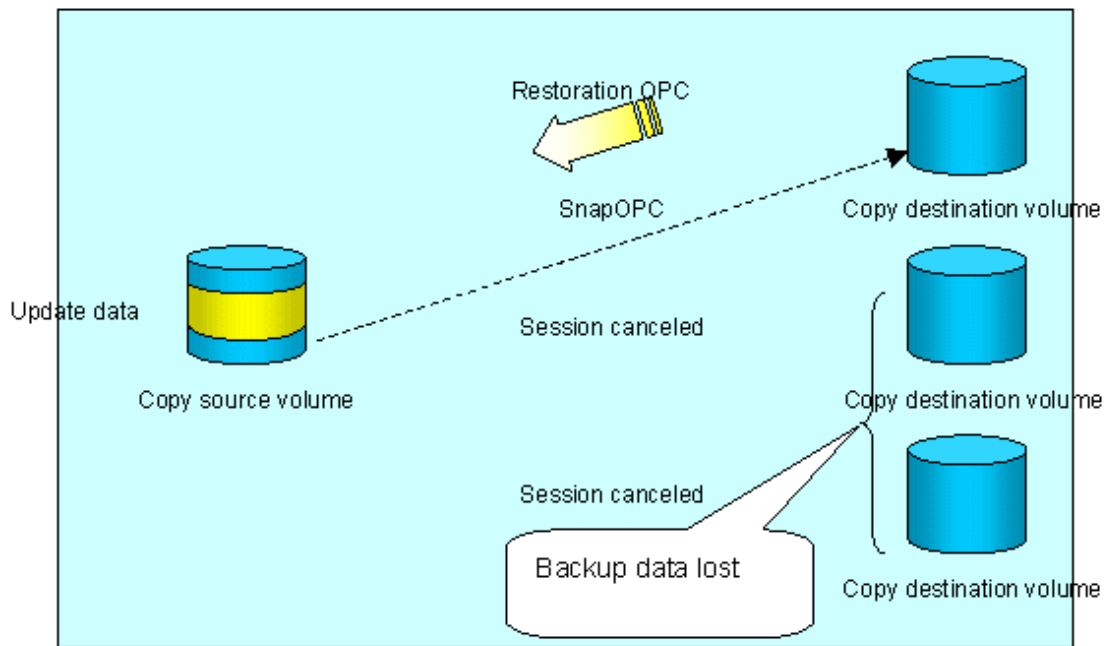
To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration.

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 that the capacity of the SnapOPC volume will be insufficient.

Figure 7.27 [When performing restoration without cancelling SnapOPC session]
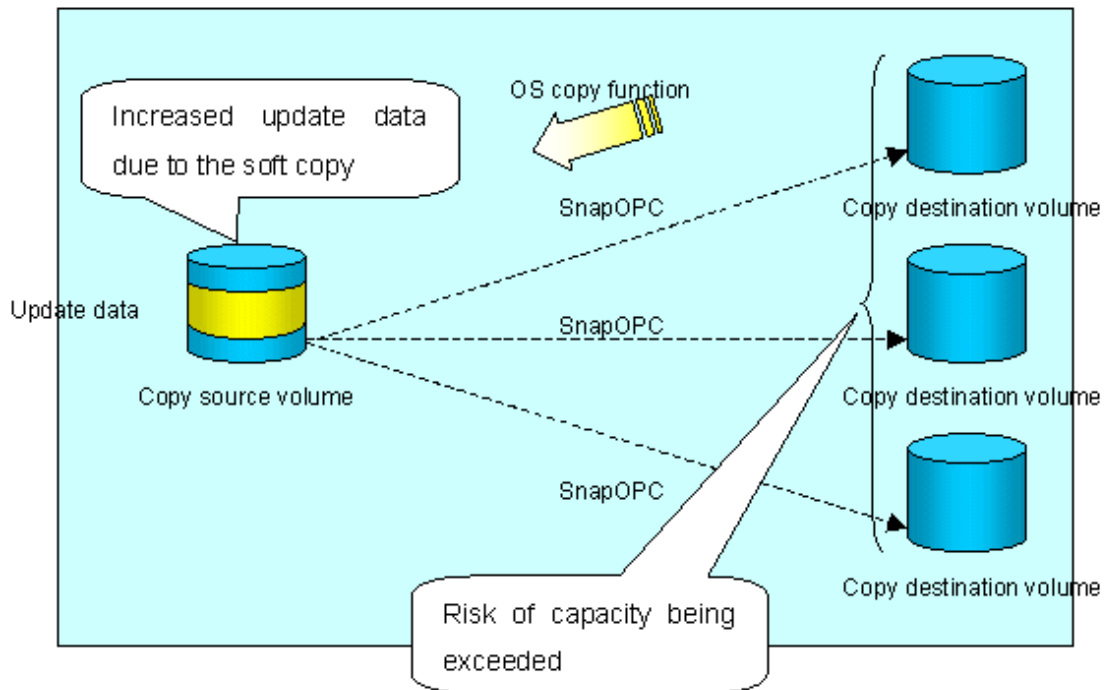
SnapOPC+ replication

Execute swsrpmake (Replication creation command) using the -P option to perform SnapOPC+ replication. This sets a SnapOPC+ session between the copy source volume and the copy destination volume. After the 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 using the -P option is shown below.

Execution example

```
# /opt/FJSVswsrp/bin/swsrpmake -P /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1
FROM=/dev/dsk/c1t1d0@SV1,TO=/dev/dsk/c1t1d1@SV1 swsrpmake completed
#
```

At this time, the (logically copied) copy destination volume is saved as a snap generation number.
The next time this command is executed with a different copy destination volume 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 using the -P option for the newly specified copy destination volume is shown below.

Execution example

```
# /opt/FJSVswsrp/bin/swsrpmake -P /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1
FROM=/dev/dsk/c1t1d0@SV1,TO=/dev/dsk/c1t1d2@SV1 swsrpmake completed
#
```

This time, the (logically copied) copy destination volume is saved as snap generation number 2.
Similarly, each time there is a new copy destination volume, a snap generation number is assigned, up to a maximum of 8 generations.

📖 Note

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when the replication creation command is executed, the 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 7.28 When the oldest snap generation number is specified as the replication volume
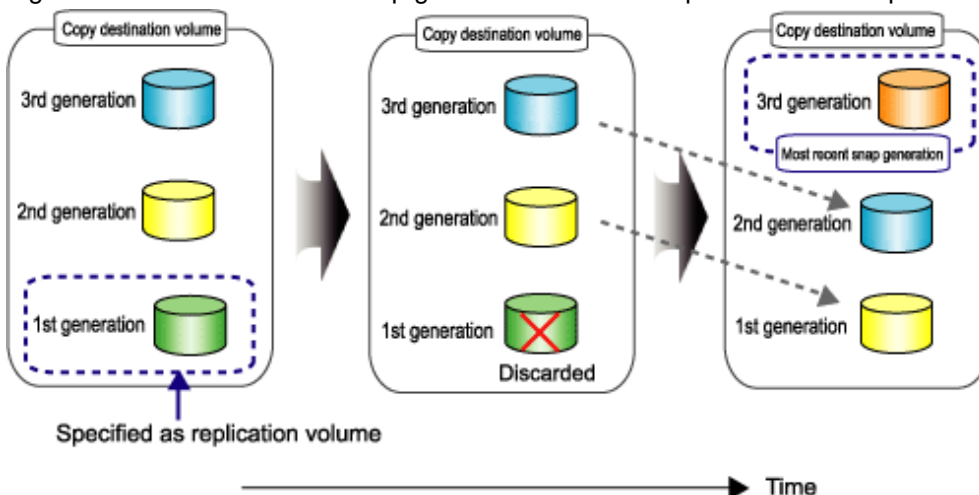
The operation status of SnapOPC+ replication can be checked by executing swsrpstat (Operation status display command) using the -L option.
For the most recent snap generation, "copy-on-write(active)" is displayed in the Status column. For past snap generations, "copy-on-

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 /dev/dsk/c1t1d0
Server Original-Volume    Replica-Volume      Direction Status                Execute Trk Update
Rcv  Split Xfer Snap-Gen
SV1   /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1 regular   copy-on-write(inactive) ----   off 0%
---- ---- ---- 1
SV1   /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1 regular   copy-on-write(active)  ----    off 5%
---- ---- ---- 2
#
```

📖 Note

. . . .

When there is insufficient Snap Data Volume or Snap Data Pool capacity, the SnapOPC+ execution status changes to error suspend status ("failed"), and the execution status of SnapOPC+ that was executed before it will also change to error suspend status ("failed"). Replication volume of error suspend status ("failed") cannot be used.

The SnapOPC+ execution status can be checked in swsrpstat (Operation status display command) output result Status column.

Execution example

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/dsk/c1t1d0
Server Original-Volume    Replica-Volume      Direction Status Execute Trk Update Rcv  Split Xfer
Snap-Gen
SV1   /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1 regular   failed ----    off ----   ---- ---- ----
----
SV1   /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1 regular   failed ----    off ----   ---- ---- ----
----
#
```

When the SnapOPC+ execution status is error suspend status ("failed"), refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

. . . .

To restore from a Snap Data Volume, use swsrpmake (9.4.2.2 swsrpmake (Replication creation command)to start OPC.

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t1d2@SV1 /dev/dsk/c1t1d0@SV1
FROM=/dev/dsk/c1t1d2@SV1,TO=/dev/dsk/c1t1d0@SV1 swsrpmake completed
#
```

The SnapOPC+ session from the replication source volume to the replication destination volume is maintained even if the replication creation command is executed.

Execution of restoration while maintaining the SnapOPC+ session reduces the physical copying time, because physical copying is performed only for data updated after the replica creation.

Figure 7.29 Restoration with SnapOPC+ session maintained
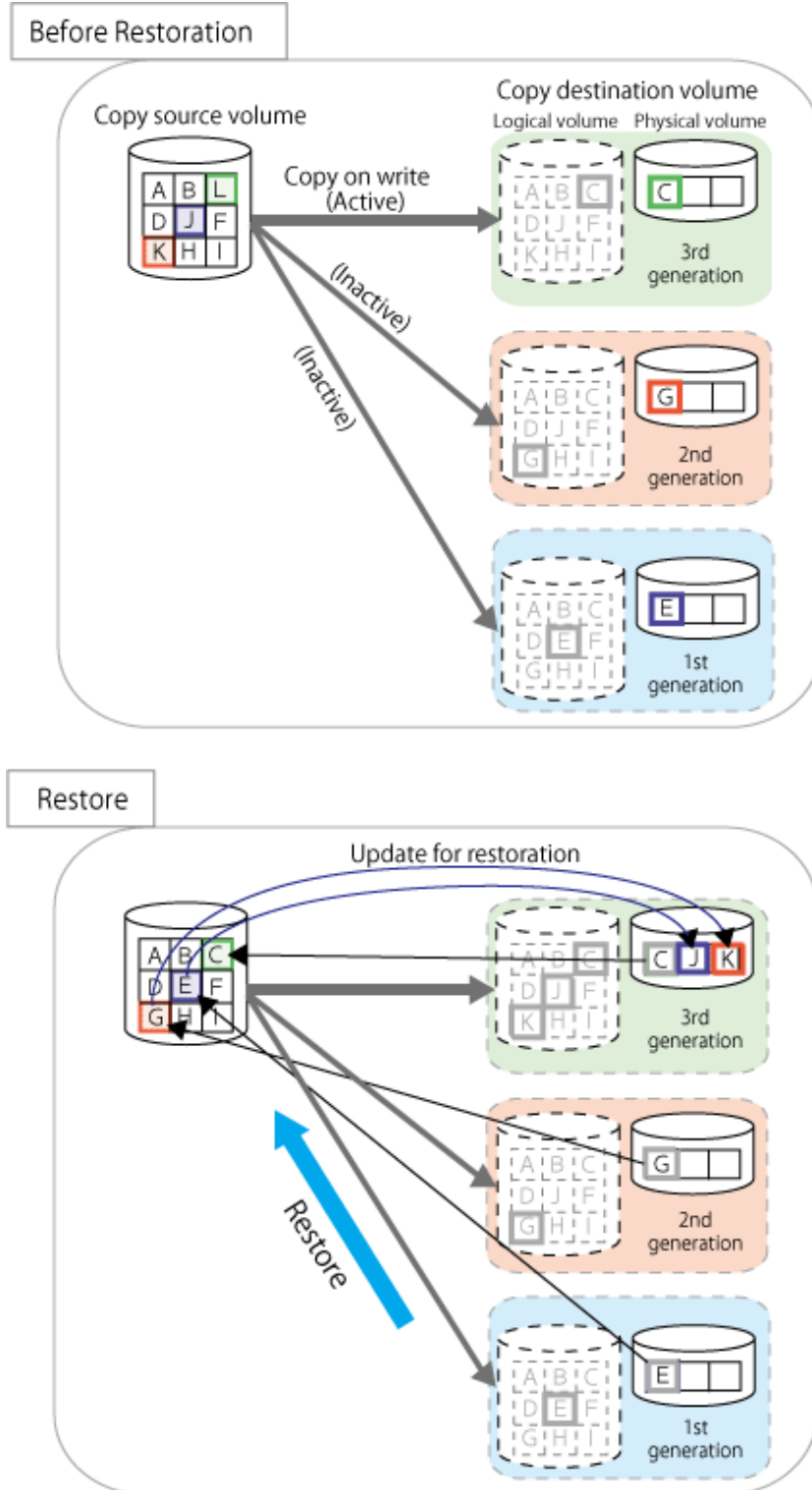
To check the restoration execution status, execute swsrpstat (Operation status display command) with the -E option.

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/c1t1d0
Server Original-Volume      Replica-Volume       Direction Status Execute
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1 ----       ----   ----
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1 reverse    snap   80%
#
```

Note

・・

Restoration may cause a Snap Data Pool to run low on free disk space, due to updates issued to the most recent snap data generation where the copy-on-write status is active. Make sure that there is enough free space in the Snap Data Pool usage area before performing restoration.

The most recent snap generation is the data written to the replication source volume by the restoration, updated by the previously existing data. The update amount to the most recent snap generation generated by the restoration is the total of the Copy usage amount for the restoration target snap generation and subsequent snap generations except for the most recent snap generation.

・・

An example of how to calculate the update amount when restoring from snap generation (Snap-Gen) 2 is displayed below.

Use the procedure below to check the update amount for restoration:

1. Use swsrpstat (Operation status display command) to check the device name of the restoration target and subsequent snap generations, except for the most recent snap generation (Snap-Gen 4 data in the example below).

```
# /opt/FJSVswrp/bin/swsrpstat -L /dev/dsk/c1t1d0
Server Original-Volume    Replica-Volume     Direction Status              Execute Trk
Update Rcv  Split Xfer Snap-Gen
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1 regular   copy-on-write(inactive) ----    off
8%     ---- ----  ---- 1
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1 regular   copy-on-write(inactive) ----    off
12%    ---- ----  ---- 2
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d3@SV1 regular   copy-on-write(inactive) ----    off
0%     ---- ----  ---- 3
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d4@SV1 regular   copy-on-write(active)   ----    off
3%     ---- ----  ---- 4
```

In this example, /dev/dsk/c1t1d2 and /dev/dsk/c1t1d3 are targeted.

2. Use the swstsdv (Snap Data Volume operation/reference command) with the "stat" subcommand to find the total copy usage amount for the device in the previous step.

If a Snap Data Pool is used, also add the Snap Data Pool usage capacity.

[/dev/dsk/c1t1d2 disk usage]

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/dsk/c1t1d2
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
100% 8388608         1048576          1048576      1048384      192          640
#
```

[/dev/dsk/c1t1d3 disk usage]

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/dsk/c1t1d3
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 111 (0x6F)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
4%   8388608         1048576          46928        16           46912        0
#
```

In this example, the quantity updated by the restoration is 1049040 (1048384+640+16) sectors.

To check the Snap Data Pool total capacity and the usage area capacity, use swstsdv (Snap Data Volume operation/reference command) with the "poolstat" subcommand.

If the Snap Data Volume is not encrypted, then check the capacity of the usage area and the total capacity where Pool-Type is Normal. Otherwise, check the capacity of the usage area and the total capacity where Pool-Type is encrypted.

```
# /opt/FJSVswsts/bin/swstsdv poolstat -G /dev/dsk/c1t1d0
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 disk usage in this example is 15% =~ (2097152 + 1049040) / 20971520 x 100

If the value obtained by adding the size of the Snap Data Pool usage area to the restoration update amount is less than the total capacity, then restoration is possible. However, in order to safely perform restoration, it is recommended to extend the Snap Data Pool if the disk usage after restoration is predicted to exceed 70%.

In addition, if the disk usage is expected to exceed 50%, then consider extending the Snap Data Pool after restoration and increasing the monitoring frequency of the Snap Data Pool.

For details on Snap Data Pool monitoring, refer to "7.2.3.4 Snap Data Volume/Snap Data Pool monitoring".

⚐ **Note**

If SnapOPC+ is being performed between the replication source volume and the replication destination volume, restoration cannot be performed to a volume other than the replication source volume.
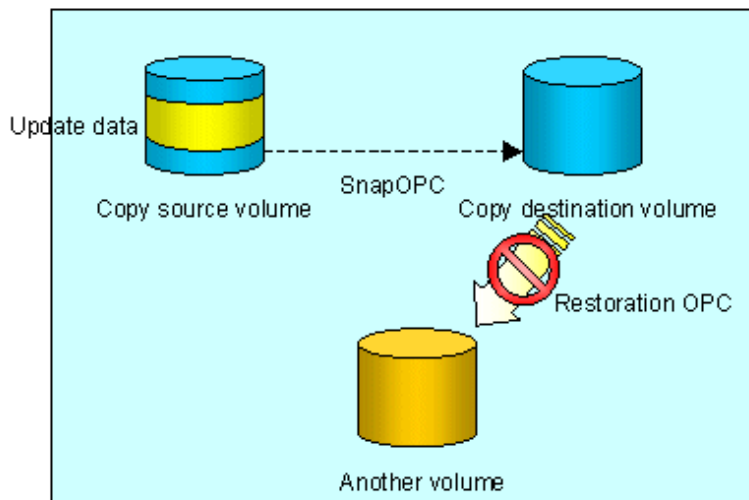
Ⓟ **Point**

As a precaution against hardware malfunctions with SnapOPC+, it is recommended to operate it in conjunction with making full copies using OPC/QuickOPC/EC(REC).
Only up to eight sessions can be set for one replication source volume, even if SnapOPC+ is used in conjunction with OPC/QuickOPC/EC(REC).

An example of performing QuickOPC on Sundays and SnapOPC+ on Mondays to Saturdays is displayed below.

Figure 7.30 Example of operation using SnapOPC+ and QuickOPC
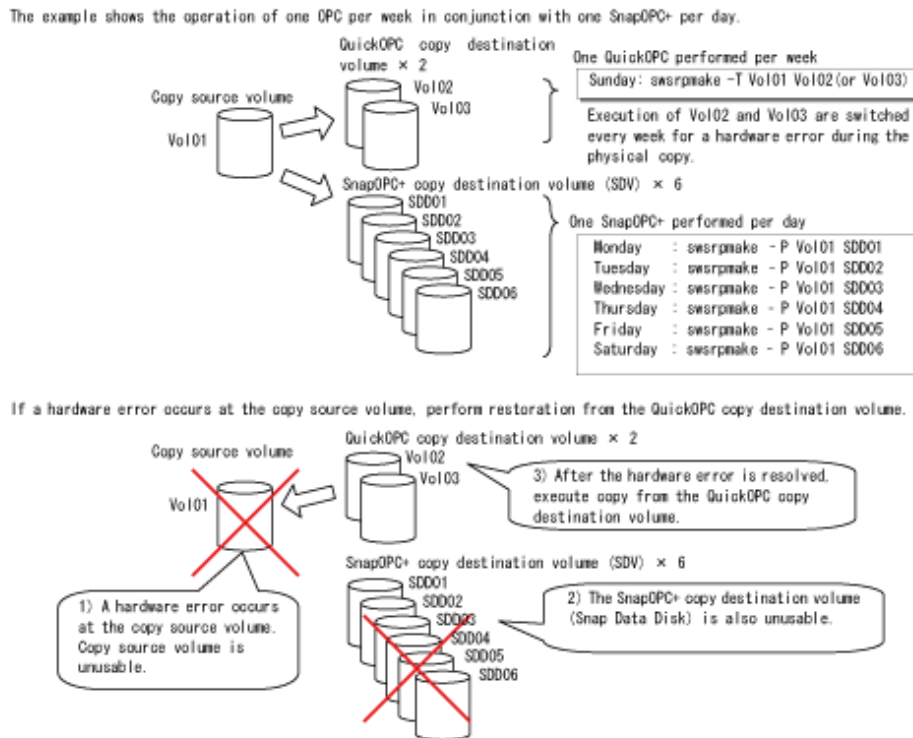
7.5.2 Executing synchronized replication

To perform synchronized replication, use the following procedure:

1. Start synchronized processing using swsrpstartsync (Synchronous processing start command). Use swsrpcancel (Replication cancellation command) to cancel synchronized processing that has already started.

2. After making sure that equivalency maintenance state has been established with swsrpstat (Operation status display command), temporarily stop synchronized processing with swsrpmake (Replication creation command) to create a replica of the source volume.

3. To copy the updated (ie, incremental) data, restart synchronized processing with swsrpstartsync (Synchronous processing start command).

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 ETERNUS disk storage systems.
The EC function operates in a mode in which a copy is made to a destination volume in synchronization through a write to a source volume (ie, in synchronous write mode).
It is also possible to reverse the copy direction from suspend status using the EC functionality.

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 ETERNUS disk storage systems.

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

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

Table 7.2 Transfer mode types

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

To perform a synchronous replication in Stack mode or Consistency mode, use swsrpstartsync (Replication start command), swsrpmake (Replication execution command), and swsrpchsync (Synchronization mode change command). To check the execution status, use swsrpstat (Operation status display command). The figures below show how synchronous replication is performed in Stack mode or Consistency mode.

Figure 7.31 Flow of synchronous replication (for Stack mode/Consistency mode)
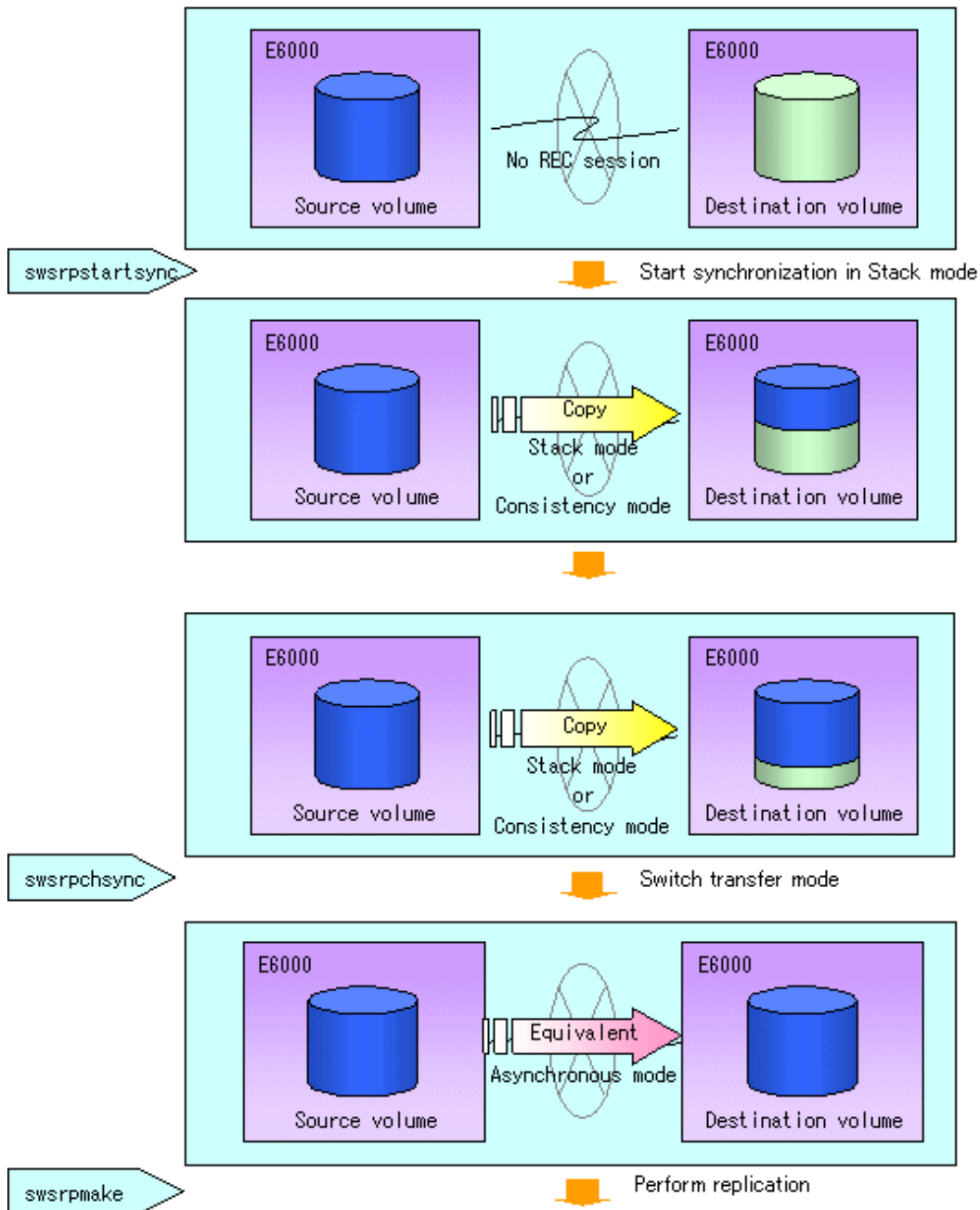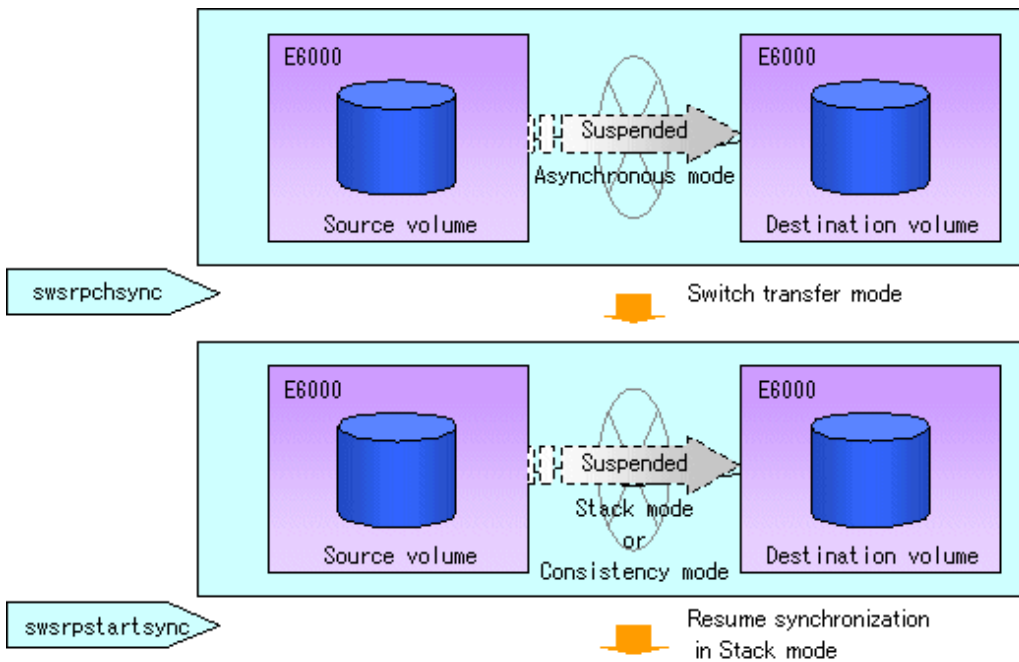
> 📝 **Note**
>
> ....
>
> If the equivalency maintenance status REC operating mode is changed, after the operating mode is changed, the user must wait until the equivalency maintenance status is attained.
>
> ....

Recovery mode

Recovery mode consists of two methods of restarting the copying after recovery is performed from an inter-box path error (e.g., halt status).

Table 7.3 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. 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 7.4 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 configurations.

Mode	Description
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 configurations.

Copy direction reverser

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 7.32 When REC performed from Site A to Site B
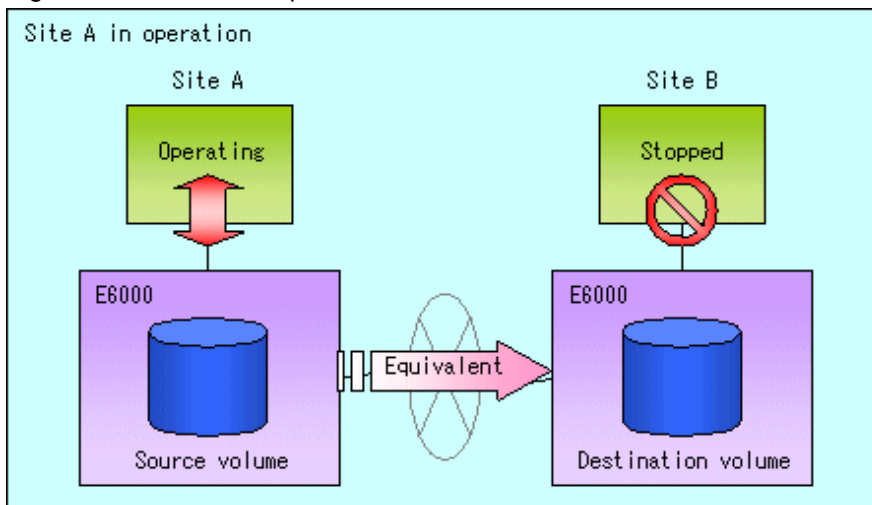
2. To switch the sites, execute swsrpmake (Replication creation command) to make a replication to Site B. Then, stop operating Site A.

   Figure 7.33 When replication creation command used to create a replica at Site B
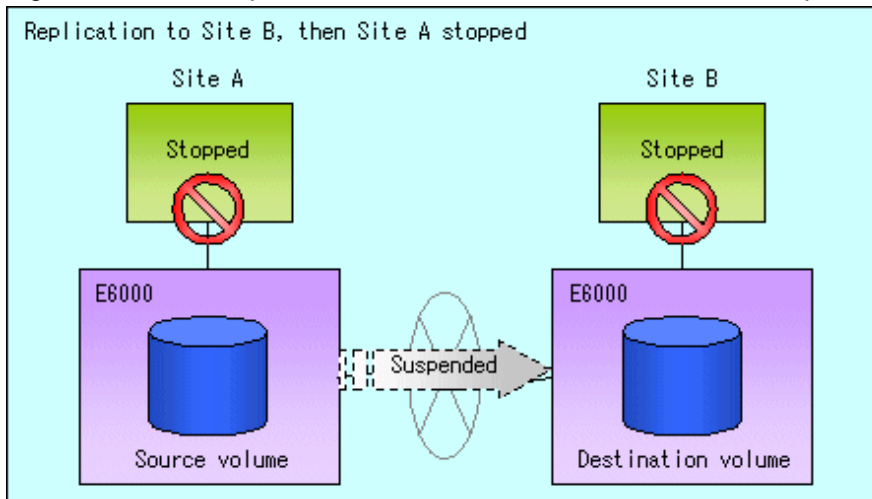
3. Execute swsrprevsync (Synchronization reverse command) to reverse the copy direction.

Figure 7.34 When the synchronization reverse command is executed
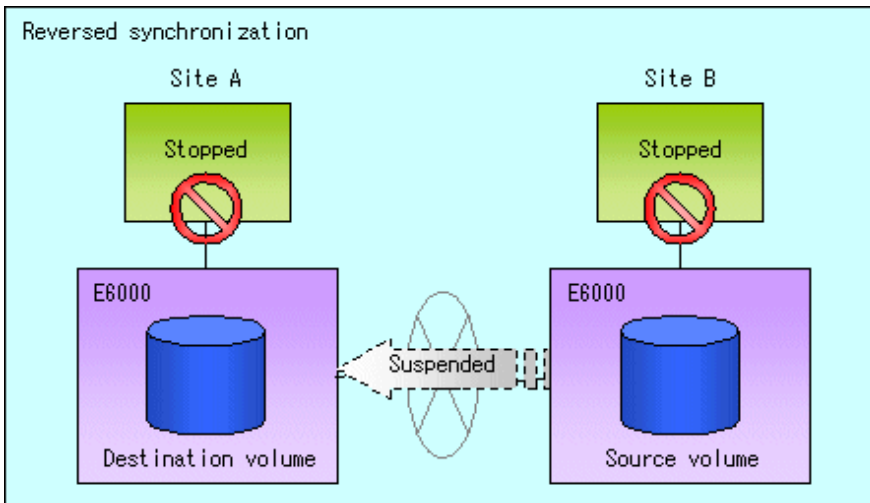
4. Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure 7.35 When operation is started at Site B (synchronization suspend state)
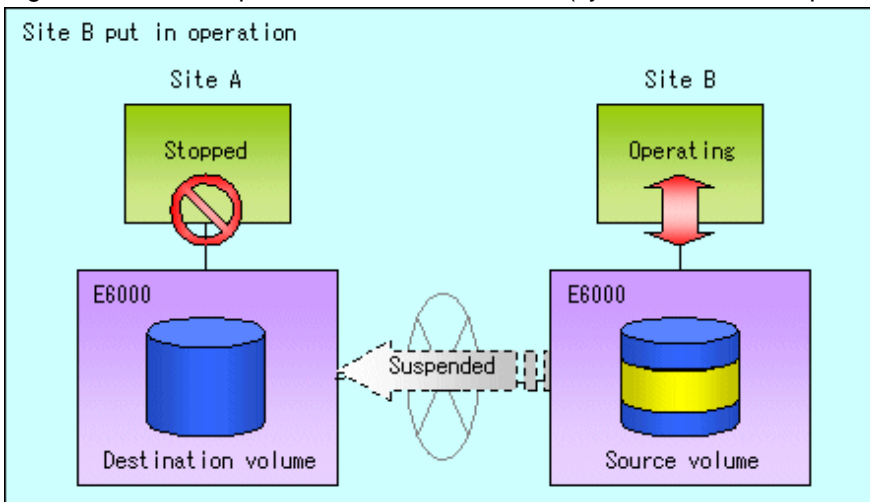
5. Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected in Site A with differential copies.

Figure 7.36 When operation is started at Site B (synchronization resumed)
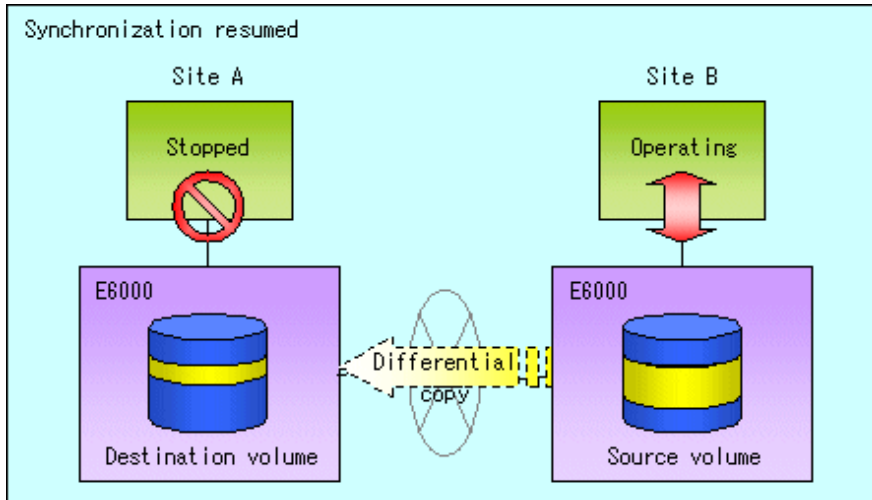
7.5.2.2.1 Initial copy skip function

The initial copy skip function is used when the initial copy cannot be executed because of 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 7.37 If operations at Site A have stopped
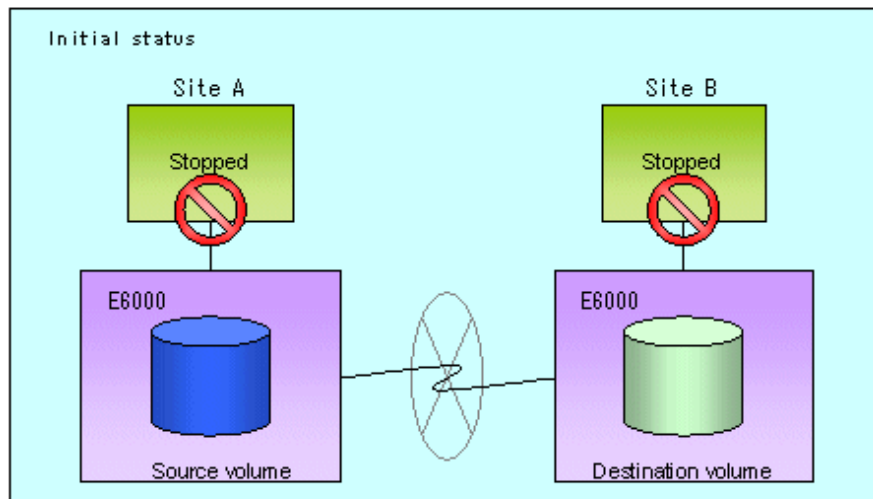
2. Next, synchronous processing begins, using the initial copy skip function. At this point, an REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

Figure 7.38 When synchronization is started by the initial copy skip function
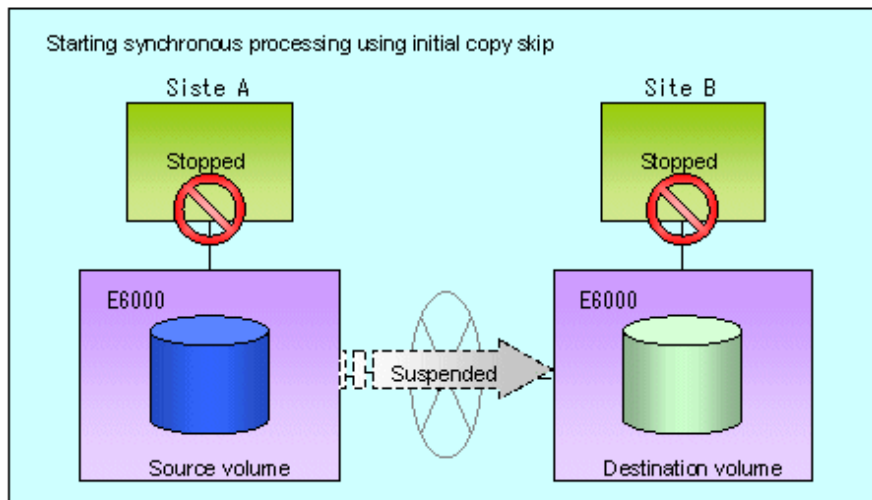
3. Next, the data on the copy source volume is backed up to tape.

Figure 7.39 When copy source data is backed up to tape
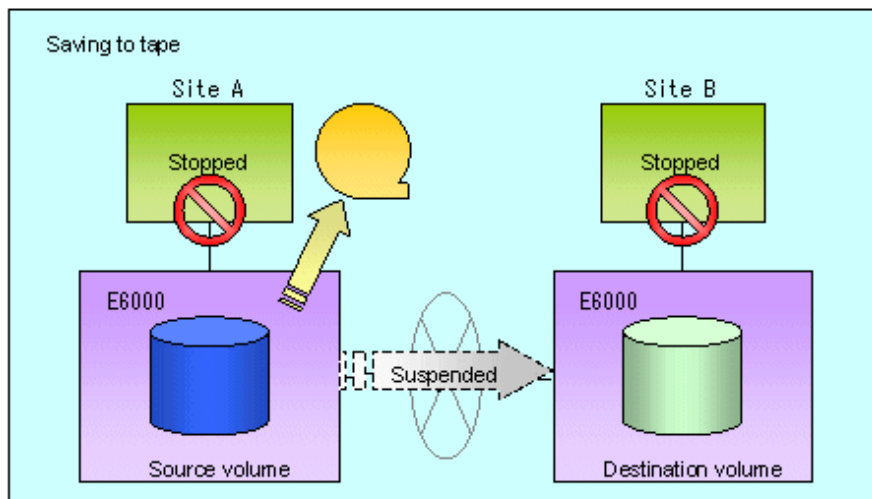
4. The tape medium is sent to Site B and jobs at Site A restart.

Figure 7.40 When Site A operations restart
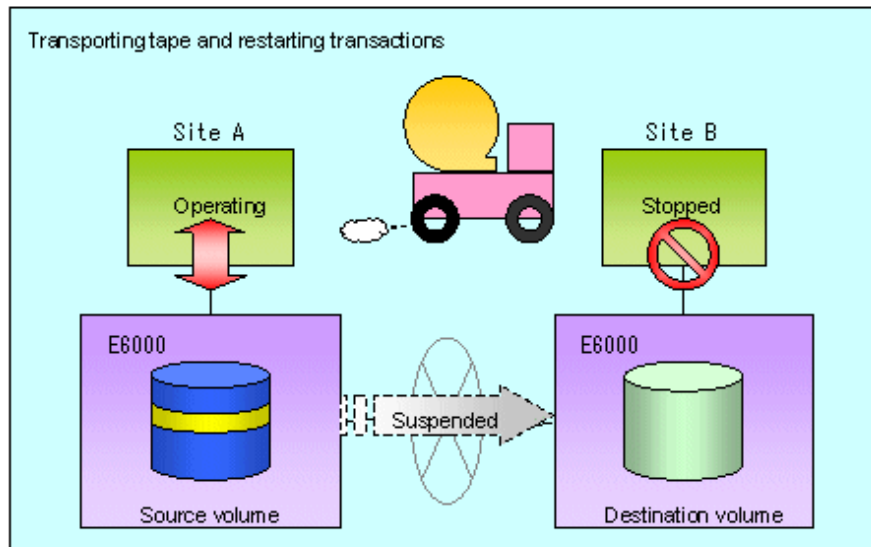
5. The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure 7.41 When data is restored from tape to the copy destination
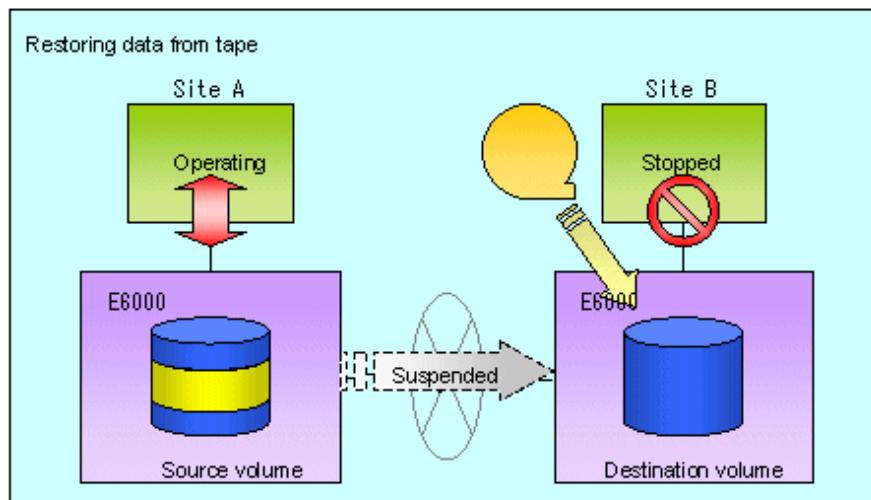
6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied. Execute swrepstartsync with -Xremain option to restart in Remain mode.

Figure 7.42 When synchronization is restarted in Remain mode
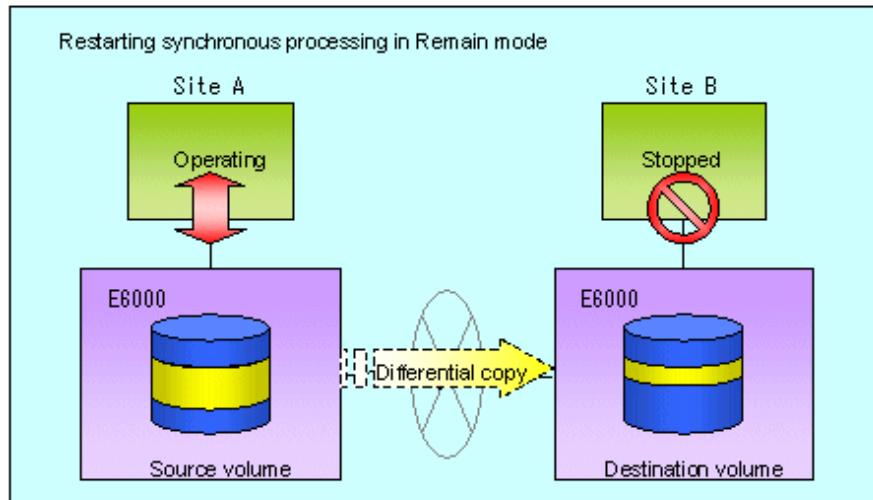
7.5.2.3 Concurrent suspension function

The concurrent suspension function simultaneously suspends multiple EC/REC sessions for ETERNUS disk storage systems.
By using this function, a copy with consistency can be easily taken.
For example, this is useful for a database composed of multiple volumes.
The behavior that takes places within the ETERNUS disk storage systems is shown below.

Figure 7.43 Internal operation of ETERNUS disk storage systems
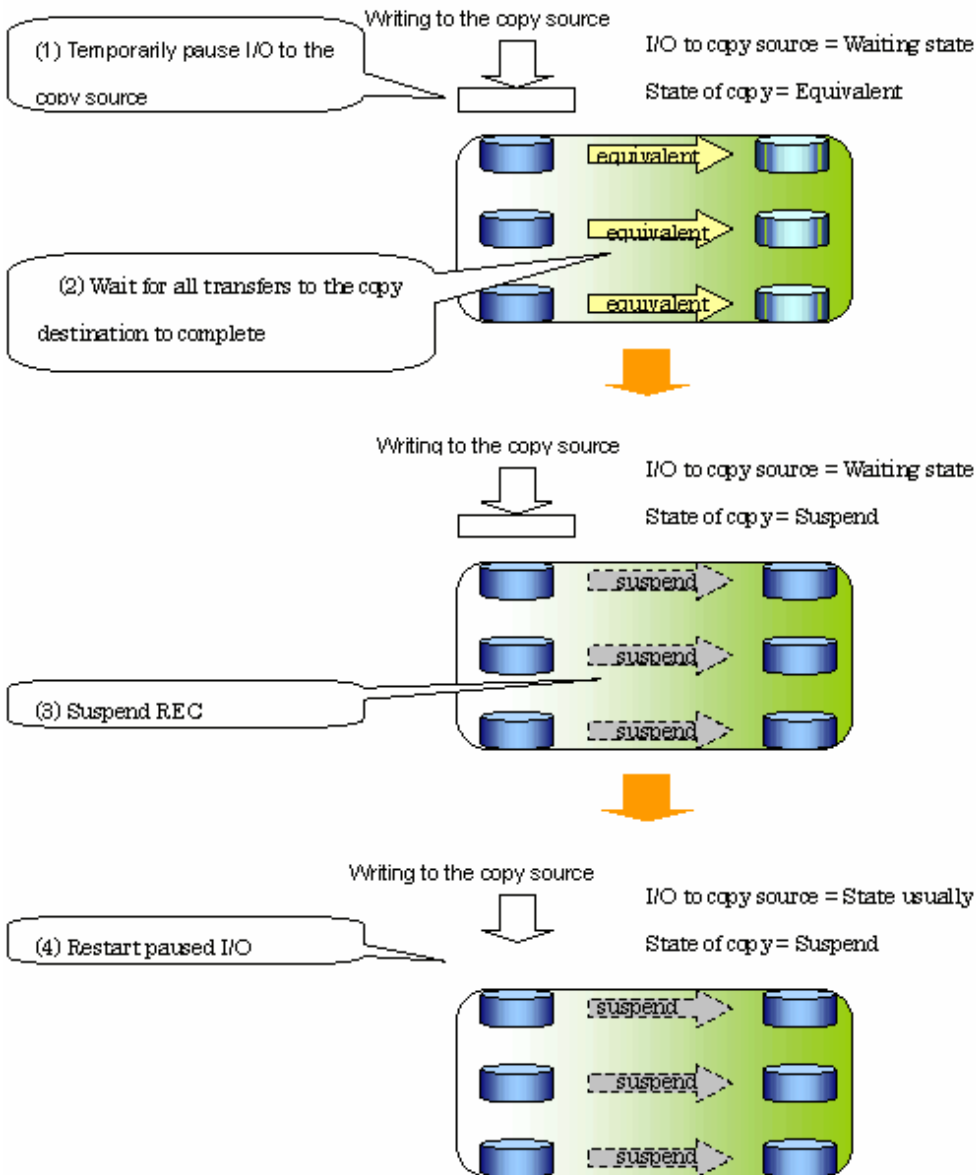
Replication using the concurrent suspension function is performed by specifying the -Xconcur option for swsrpmake (Replication creation command).

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 asynchronous mode and synchronous mode.

Figure 7.44 When Consistency mode used
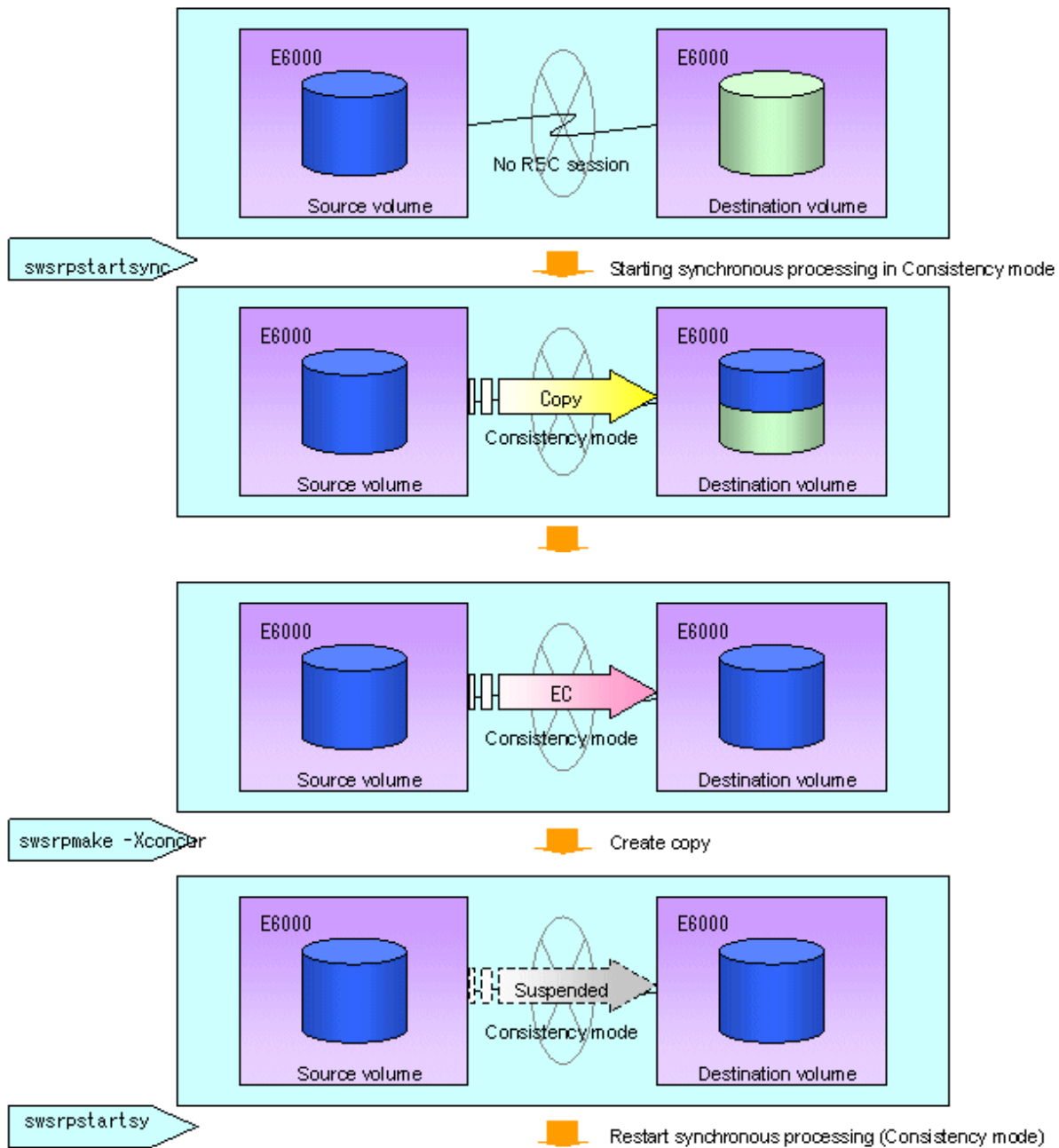
7.5.2.3.1 Changing the timeout value for the concurrent suspend function

Suspending may not be completed due to timeout caused by a too large amount of data or the poor quality of a communication link. The following message is shown if it timeout.

```
swsrp2709 Concurrent suspend failed. Session ID=[-], Reason=[timeout]
```

If this message is shown, change the value of timeout by creating a file which sets the timeout value. Create a file which sets the timeout value for the concurrent suspend function under the following name. The file must be created on the same server that contains the source volume.

In case of normal operation (non-clustered environment)

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

In case of operation in clustered environment

```
/etc/opt/FJSVswsrp/<logical node>/data/DEFAULT/check.ini
```

Table 7.5 File format of the check.ini

Section name	Key name	Value
[check]	ConcurCheckTimeout	Set the timeout value for the concurrent suspend function in units of seconds. Setting range: From 1 to 2147483647 sec Note: If you set a value beyond this range, the default value 60 sec will be applied.

Example

Setting the timeout value for the concurrent suspend function to 120 seconds.

```
[check]
ConcurCheckTimeout=120
```

If the setting file for the concurrent suspend function is not created, the default value (60 seconds) will be applied.

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-directional copying by using swsrpsetvol (Replication volume information configuration command).

Restoration can be executed according to the following procedures:

1. Execute swsrpcancel (Replication cancellation command) when the target volume for restoration has an EC session.

2. Execute swsrpmake (Replication creation command). The specification of an original volume and the replica volume is reversed at the time that the replication is executed. The replication creation command is executed without specifying the "-T" option, the "-C" option and the "-P" option of the backup operation that uses QuickOPC/SnapOPC/SnapOPC+.

📖 Note

It is not possible to perform restoration using replication if the ETERNUS disk storage systems do not support SnapOPC+ restoration. If restoration is required, copy the data from the copy destination volume manually.

Figure 7.45 Manual restoration with SnapOPC+
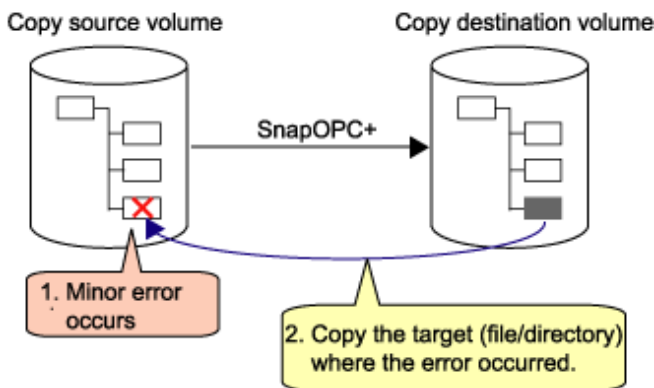
7.5.4 Execution of synchronization reversal

Using swsrprevsync (Synchronization reverse command) the physical copy amount can be greatly reduced and the AdvancedCopy time shortened for restore when there is a small amount of differential data.

Additionally, it is also possible to execute restore without cancelling other copy jobs in operations that match multiple copy jobs. Therefore, there is no need for overall copy after restore, so operations can be restarted with the load on ETERNUS kept to a minimum.

Figure 7.46 Example of EC reversal operation
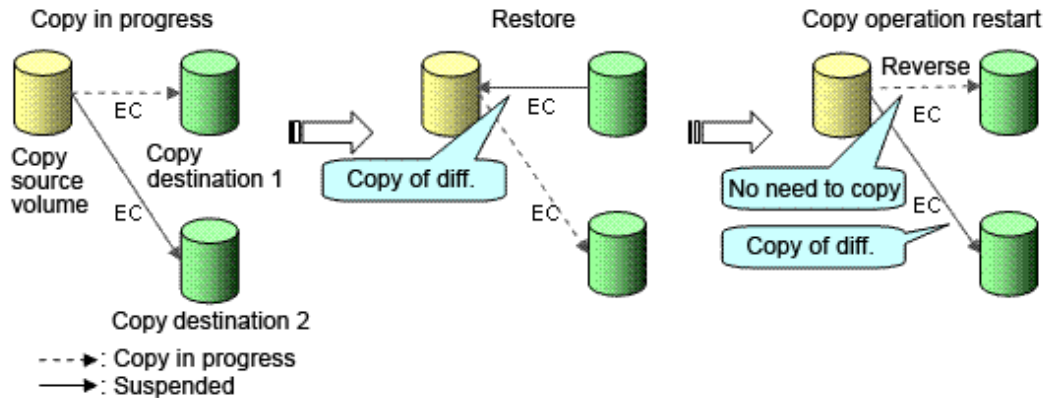
7.6 Changing the Configuration Information

When a Storage Server or device required for the replication operation has been changed, the information set in AdvancedCopy Manager must also be changed. This section explains how to change this information.

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 the replica volume, delete the information with swsrpdelvol (Replication volume information deletion command) and then execute swsrpsetvol (Replication volume information configuration command) again.

7.6.2 Deleting a source volume or replica volume

To delete the source volume or the replica volume that have been configured, use swsrpdelvol (Replication volume information deletion command).

7.6.3 Changing the device information of a source or replica volume

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

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

1. Perform deletion process for the device change on the source/replica volume. For details of this, refer to "7.6.2 Deleting a source volume or replica volume".

2. Change the device configuration.

3. Perform any additional steps may be required in the processing of a device. For more information on this, refer to "7.4.4 Fetching device information from a Storage Server".

4. Configure the source/replica volume with the new information.

7.7 Stopping the Operation

To stop replication processing that is in progress, or to change synchronized replication into snapshot replication, use swsrpcancel (Replication cancellation command).

Note

To stop replication processing by SnapOPC+, start with the oldest snap generation.
To forcibly stop the second or subsequent snap generations, use the -Xforce option with swsrpcancel (Replication cancellation command). This will stop the specified snap generation and all earlier snap generations.

If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

To stop replication operation, stop the daemon on the Storage Server. In general, the daemon stops when the system stops.
The daemon can be stopped independently if it needs to be stopped for some reason. For more information, see Chapter 2 Starting and Stopping Daemons".

Note

When the service stops, all functions of AdvancedCopy Manager running on the Storage Server are stopped.
Before stopping the Storage Management Server service, make sure that operations on all Storage Servers under management have been 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, you should understand the basic operation of ordinary volumes.

7.8.1 Replication 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 7.47 Example of configuration in which replication can be performed in units of volume groups
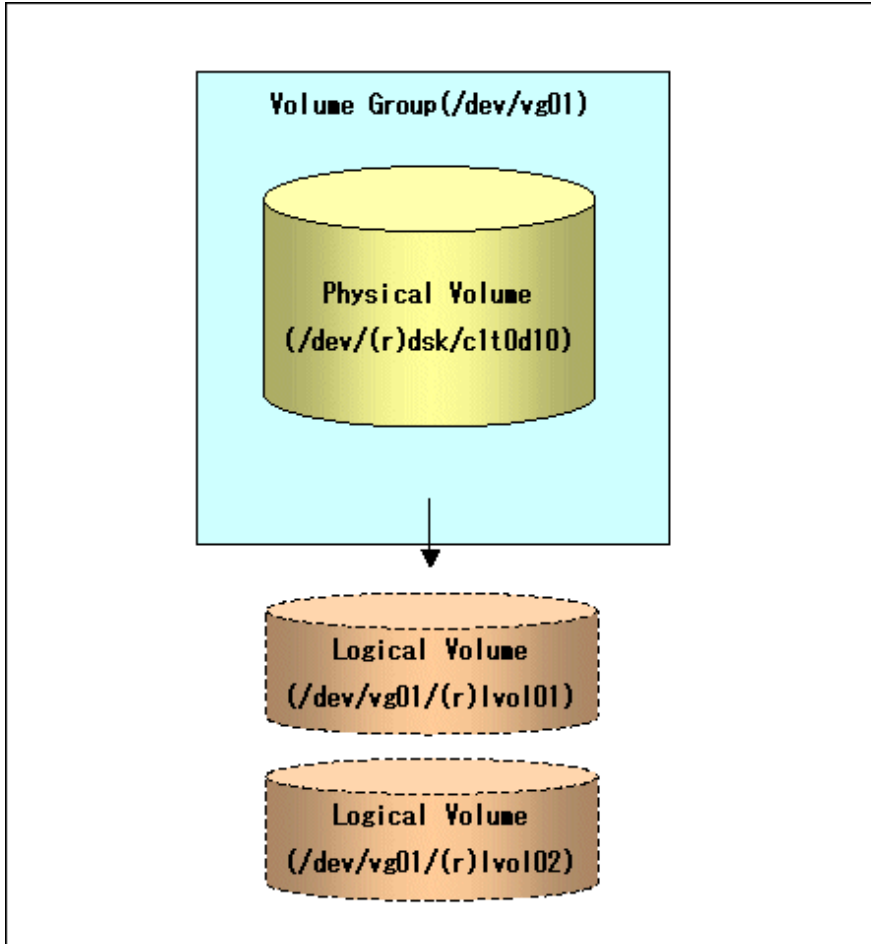
7.8.1.1 Operation design

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.
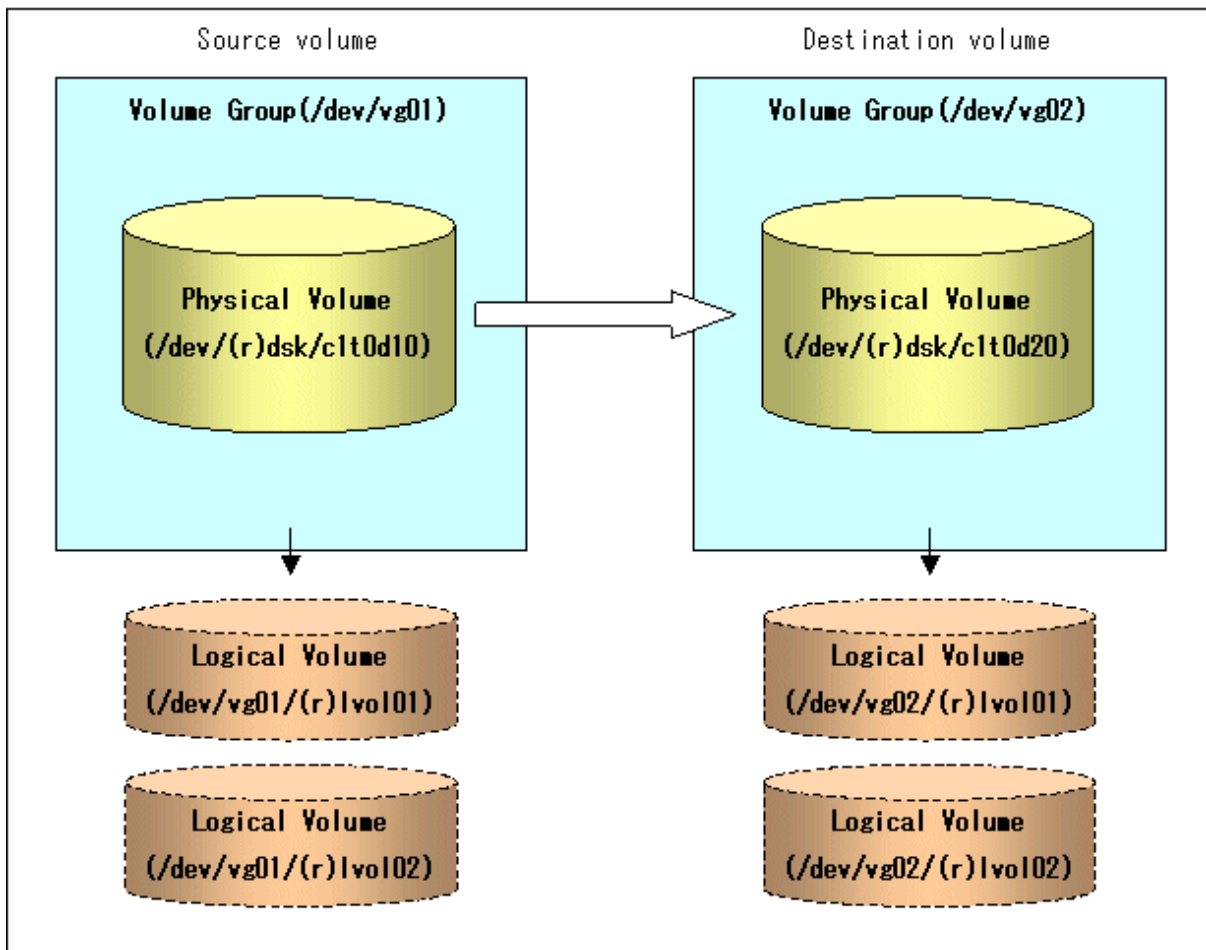
7.8.1.2 Preparations

7.8.1.2.1 Saving the volume group configuration information file

The standard post-processing script restores a volume group configuration information file from the following file. Confirm that a volume group configuration information file has been saved.

```
/etc/lvmconf/<volume-group-name>.conf
```

Note

Replication cannot be performed if a volume group configuration information file has not been saved. In this case, target volume post-processing will result in an error during replication.

Customize the post-processing script for the target volume if volume group configuration information has been saved to another file.

7.8.1.2.2 Configuring the source volume and the replica volume

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

Example

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

7.8.1.2.3 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 "Appendix C Pre-processing and Post-processing of Replication" for information on the customization procedure.

> 🛈 **Note**
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>
> If replication is attempted without customization of the scripts, pre-processing for the source volume causes an error, so that replication cannot be achieved.
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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.

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>
> Refer to "stgxfwcmdispdev (Device information display command)", or the "View Devices Using the Same Copy Area or the Same Logical Group" of the "ETERNUS SF AdvancedCopy Manager User's Guide" for the method of checking if the physical volume is suitable for synchronization
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> 🛈 **Note**
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>
> For operation in a cluster configuration, the device name (/dev/(r)dsk/c#t#d#) of the physical disks that comprise the volume group must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the device name must be the same.
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Figure 7.48 Sample configuration for operation in units of physical disks
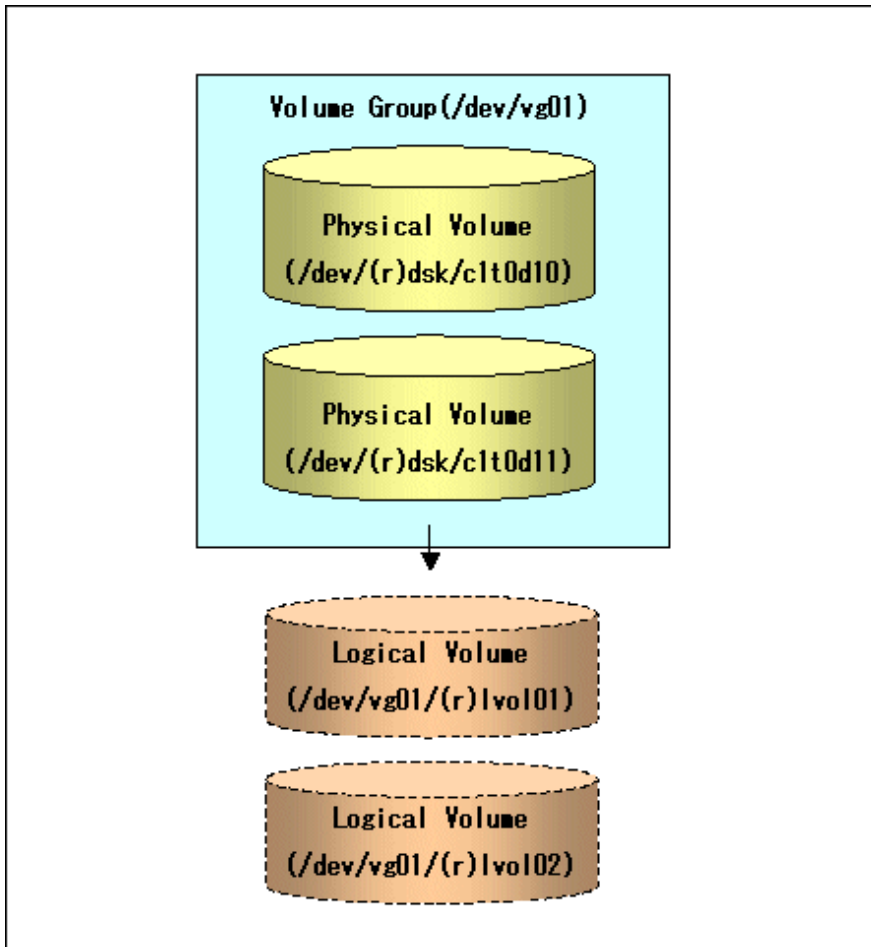
7.8.2.1　Operation design

To use the replica volume after replication in the situation when 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.
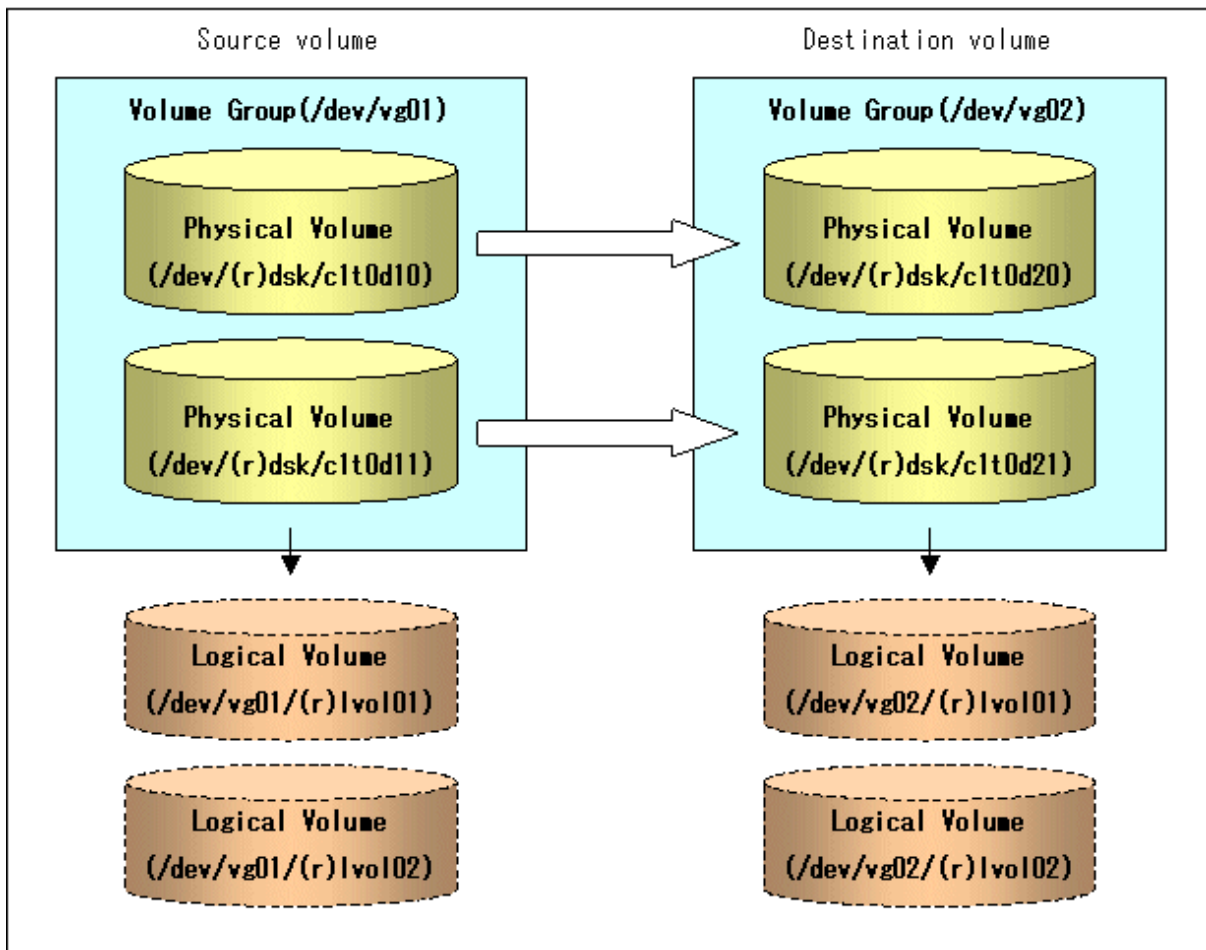
7.8.2.2 Preparations

7.8.2.2.1 Saving the volume group configuration information file

The volume group configuration information file must be restored during replication post-processing. Confirm that the volume group configuration file has been saved. It is usually saved to the following location:

```
/etc/lvmconf/<volume-group-name>.conf
```

7.8.2.2.2 Configuring the source and replica volumes

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

Example

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/dsk/c1t0d10 /dev/dsk/c1t0d20
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
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) the replication.
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/dsk/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@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/dsk/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@SV1 swsrpstartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the source volume.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@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 7.6 Pre and Post processing of replication

	Pre-processing	**Post-processing**
Source volume	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.	If file systems are included, remount the volumes that were unmounted by pre-processing.
Target volume	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.	1. Reconfigure the volume group 2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring the volume group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

```
# /usr/sbin/vgchange -a n /dev/vg02
#
```

2. Restore volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

3. Reactivate the volume group.

   [When cluster operation is enabled]
   # /usr/sbin/vgchange -c y /dev/vg02
   # /usr/sbin/vgchange -a e /dev/vg02

   [When cluster operation is disabled]
   # /usr/sbin/vgchange -a y /dev/vg02
   #

Reconfigure shared mode volume groups using the following procedure:

1. Stop the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a n /dev/vg02
#
```

2. Restore volume group configuration information (on the node where the volume group was created).

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

3. Mark the volume group as shareable (on the node where the volume group was created).

```
# /usr/sbin/vgchange -S y -c y /dev/vg02
#
```

4. Start the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a s /dev/vg02
#
```

7.9 VxVM Volume Operation

This section describes the replication operation for volumes under VERITAS Volume Manager (VxVM).

7.9.1 Replication operation in units of physical disks

When 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 replicated synchronously.

P Point

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

Note

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

- Snapshot backup is recommended for backing up in units of physical disks. In the case of synchronized backup, commands that access destination volumes, such as VxVM commands, cannot be executed during full copy or differential copy.

・ For operation in a cluster configuration, the device name (/dev/(r)dsk/c#t#d#) of the physical disks that comprise the disk group must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the device name must be the same.

・ New device names are supported from HP-UX 11i v3. Refer to "1.5.1 Normal devices" for details. Physical disks that comprise VxVM can use only conventional format devices (/dev/(r)dsk/c#t#d#) and they cannot use new format devices (/dev/(r)disk/disk#). Therefore, if VxVM is used, the AdvancedCopy Manager information collection mode must be set in conventional format devices. Refer to stgxfwcmsetmode (Information collection mode setting command) for details of information collection modes.

・ The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.

Example

If the AdvancedCopy Manager information collection mode is "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

7.9.1.1 Configuration

When configuring the disk groups of the original and replica volumes, you should note the following:

・ The number, sizes, and types of VM disks must be the same.

・ The configurations of logical volumes must be the same.

Figure 7.49 Copy source volume and copy destination volume
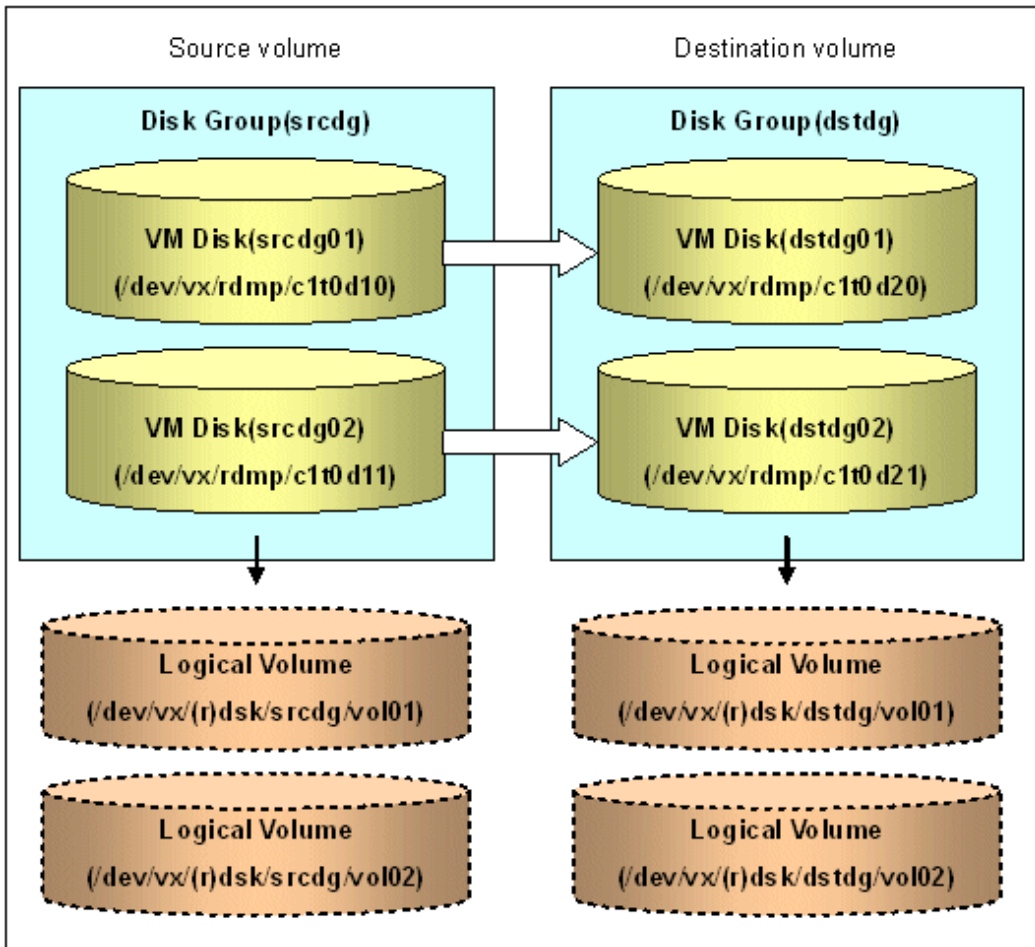
7.9.1.2 Preparations

7.9.1.2.1 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.

```
# /usr/sbin/vxprint -hvmps -g srcdg > /tmp/aaa
```

7.9.1.2.2 Configuring the original and replica volumes

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

Example of setting original and replica volumes

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
swsrpsetvol completed
#
```

7.9.1.3 Replication

Perform Replication by synchronizing all physical disks in the disk group.

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

Example of snapshot backup

```
(Perform preprocessing for the source and target volumes.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@SV2 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/vx/dmp/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@SV2 swsrpstartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the source volume.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@SV2 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 7.7 Replication pre-processing and post-processing

	Pre-processing	Post-processing
Source volume	1. Secure data integrity by stopping access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group.	If file systems are included, remount the volumes that were unmounted by pre-processing.
Target volume	1. Stop 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.	1. The physical disk set to offline with pre-processing is set to online. 2. Reconfigure the volume group 3. 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 c1t0d20 ...
Installing volume manager disk header for c1t0d21 ...
-
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 the server of the source and destination, 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 c1t0d20 c1t0d21
```

Note

・ In case of a cluster system, when a disk group 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 mount/unmount process.

・ When performing a system disk exchange, there are cases when multiple conflicting configuration information backups may exist for one disk group.
  In such cases, the disk group ID displayed after executing the above command needs to be set and executed instead of the disk group.

・ When the volumes within a disk group are required to be run in synchronous mode in the background and depending on the volume configuration it may take some time for synchronous processing to complete after this operation.
  It is also possible to use the volumes during this time.

Chapter 8 Operation Maintenance

This chapter provides information on how to maintain a database, perform troubleshooting, and change the operation information.

8.1 Maintenance of Database

AdvancedCopy Manager holds various repositories of management information on the usage of its functions. They are named generically and are referred to as a database in this chapter.

The databases are 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 backup of the database is needed.

Table 8.1 Databases on a Storage Server

Type	When a backup should be created	Backup method (references)	Size
Registry	A Storage Server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	8.1.1.5.1 Backing up a registry or 8.1.2 Making a package backup of databases	Refer to 8.1.1.5.1 Backing up a registry.
Backup management list	A backup transaction has been completed.	8.1.1.1.1 Backing up a backup management list or 8.1.2 Making a package backup of databases	Refer to 8.1.1.1.1 Backing up a backup management list.
Volume configuration information (Backup management)	When the configuration of the volume group has changed	8.1.1.1.3 Preserving the volume configuration information	Refer to 8.1.1.1.3 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 8.1.2 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 8.1.2 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.	8.1.1.2.1 Backing up a replication management list or 8.1.2 Making a package backup of databases	Refer to 8.1.1.2.1 Backing up a replication management list.
Volume configuration information (Replication management)	When the configuration of the volume group is changed	8.1.1.2.3 Preserving the volume configuration information	Refer to 8.1.1.2.3 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 8.1.2 Making a package backup of databases	Check the size of the pre-processing and post-processing script file for replication management.

Type	When a backup should be created	Backup method (references)	Size
Policy file for management information package backup	The policy file has changed.	Saving a database by using the copy command or 8.1.2 Making a package backup of databases	Check the size of the policy file for management information package backup.

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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.

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8.1.1 Making individual backups 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

A backup management list is backed up.

For details of this, refer to swstresback (Resource backup command).

Backup management list backup data size

Check the size of the file that the subdirectory of the following directory contains.

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

In the cluster environment, check the size of the file that the subdirectory of the following directory contains

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

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When you reuse a directory used before to save the data, the size of this directory must be capable of supporting repositories which have been allocated a size to cater for high growth. Rule of thumb would suggest that the file system in which these directories exist should be at least three times greater than the size returned in query above.

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8.1.1.1.2 Restoring a backup management list

A backup management list is restored.

For details of this, refer to swstresrst (Resource restore command).

8.1.1.1.3 Preserving the volume configuration information

When the transaction volume or backup volume is a volume group, the volume configuration information file "/etc/lvmconf/<volume_group_name>.conf" is required to restore the volume configuration information in the processing after backup and restoration.

In order to prepare for a system crash, ensure that you maintain the above mentioned file on another storage medium at the time of creating the volume group.

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Usually, a volume configuration information file "/etc/lvmconf/<volume_group_name>.conf" is automatically created at the time of vgcreate (1M) execution. If vgcfgbackup (1M) is used, a backup of the volume configuration information can be created by assigning arbitrary file names. For details of this, refer to the online manual or the man command.

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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 "Saving a database" relevant to the OS of the Storage Management Server.

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- ・ Operational 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 swsrpsetvol (Replication volume information configuration command), or with swsrpdelvol (Replication volume information deletion command).

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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 the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

   - If the Storage Management Server is Windows
     Select "RDB dictionary and DSI recovery (LOAD Mode)" as the recovery method.

   - If the Storage Management Server is Solaris or Linux
     Specify 0 for stgdbrcv -m option (recovery mode) as the recovery method.

2. On the Storage Server, execute swsrprecoverres (Resource adjustment command) with the -r option specified. For details of the resource adjustment command, refer to "swsrprecoverres (Resource adjustment command)".

P Point
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- ・ When step 1 above is performed, operational information for replication management of a repository is copied to a Storage Server, where it is then available for use.

・ When this 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 only step 2.

8.1.1.2.3 Preserving the volume configuration information

When the source volume or replica volume is a volume group, the volume configuration information file "/etc/lvmconf/<volume_group_name>.conf" is needed to restore the volume configuration information in the post-processing script.
In order to prepare for a system crash, ensure that you maintain the abovementioned file on another storage medium at the time of creating the volume group.

🅿 Point

Usually, a volume configuration information file "/etc/lvmconf/<volume_group_name>.conf" is automatically created at the time of vgcreate (1M) execution. If vgcfgbackup (1M) is used, a backup of volume configuration information can be created with arbitrary file names. For details of this, refer to the online manual or the man command.

8.1.1.3 Maintaining a database

For information about maintaining a database used by a Storage Management Server, refer to the "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.1.1.4 Maintaining an authentication management list

For information about maintaining an authentication management, refer to the "Maintaining an authentication management list" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.1.1.5 Maintaining a registry

This section describes the maintenance of a registry. Perform this procedure on a Storage Management Server or a Storage Server.

8.1.1.5.1 Backing up a registry

In a command prompt window, back up the following files using the copy command, etc.

File names

In the case of a non-cluster

```
/etc/opt/swstorage/swnode.ini
```

In the case of a cluster

```
/etc/opt/swstorage/Logical-node-name/swnode.ini
```

Example

Save it in the /backup directory.

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

Registry backup data size

Check the size of the file to be backed up.

8.1.1.5.2 Restoring a registry

In a command prompt window, use the copy command or another method to restore the following files.

File names

In the case of a non-cluster

```
/etc/opt/swstorage/swnode.ini
```

In the case of a cluster

```
/etc/opt/swstorage/Logical-node-name/swnode.ini
```

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 of making a backup of management information (e.g., databases) 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 server on which you can execute a package backup of management information is called the "package-backup-of-the-management-information execution server". The servers whose data is to be backed up are called the "package-backup-of-the-management-information target servers".

Figure 8.1 Storage Management Server and Storage Server
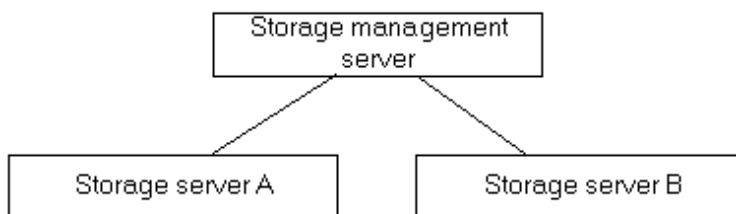
Example

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 backup execution server. The Storage Management Server, Storage Server A, and Storage Server B are the backup target servers. That is, Storage Server B operates as both the backup execution server and backup target server.

The following table shows the types of management information that is handled in a package backup of management information.

Table 8.2 Types of management information backed up by package backup of management information

Function	Type of data
Database	Database
Authentication feature	Authentication management list
Registry	Registry
Backup management	Backup management list, or backup management list and recovery control file Pre-processing and post-processing scripts Tape-copy pre-processing and post-processing scripts Transaction volume locking specification file for backups Backup volume locking specification file for backups Backup-restored volume locking specification file Tape-copy backup volume-locking file
Replication management	Pre-processing and post-processing scripts Copy-source volume locking specification file Copy-destination volume locking specification file
Package backup of management information	Policy file
Tape backup management	Tape management information

🛇 **Note**

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Storage Server management information created by Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier cannot be handled by the package backup of management information function. To create a backup, back up each management information component individually as described in "Maintaining a database" in the Operator's Guide applicable to the Storage Server.

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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 the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The required size for an authentication management list is the size of the authentication management list backup data.

   - For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The required size for the registries is the total of the data sizes of the registry backup data on the management information package backup target servers.

   - For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.

   - The required size for backup management is the total of the sizes below for each management information package backup target server:

For the size of each component of backup data, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the management information package backup target server.

- Size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 1.2

- Size of the pre-processing and post-processing scripts for backup management

- Sizes of the pre-processing and post-processing scripts for tape-copy

- Size of the transaction volume locking specification file for backups for backup management

- Size of the backup volume locking specification file for backups for backup management

- Size of the backup-restored volume locking specification file for backup management

- Size of the backup volume locking specification file for backups for tape copy

- The required size for replication management is the total of the following sizes for each management information package backup target server:

  - Size of the pre-processing and post-processing scripts for replication management

  - Size of the copy-source volume locking specification file for replication management

  - Size of the copy-destination volume locking specification file for replication management

- The required size for the policy file for package backup of management information is the size of the policy file backup.

  - The size required for tape management information is 1.2 times the size of backup of the tape management information.

  For details on the size of tape management information, 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 Operator's Guide for the operating system running on the Storage Management Server.

  - The required size for the authentication management list is the size of the authentication management list backup data.
    For the backup data size, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the Storage Management Server.

  - The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2
    For the backup data size, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the management information package backup target server.

  - The working directory does not require any space for registry, replication management, and policy file backups.

  - 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 the section titled "Maintaining Databases" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option.

5. Execute the stgmgrinfoset command as described in stgmgrinfoset (Management information package backup server registration/deletion command), 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 8.3 Management information package backup execution server and policy file paths

Management information package backup execution server		Policy file path
OS	Operation type	- 157 -
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**

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- Do not specify more than one Storage Server as a management information package backup execution server.

- When this 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.

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Table 8.4 Policy file format

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape Server
Server name	DBData	Specifies whether to make a backup of the database. Yes: Make a backup of the database. No: Do not make a backup of the database. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	A	C	C
	AuthData	Specifies whether to make a backup of the authentication feature. Yes: Make a backup of the authentication feature. No: Do not make a backup of the authentication feature. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	A	C	C
	BkupData	Specifies whether to make a backup of the backup management.	B	B	C

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape Server
		Yes: Make a backup of the backup management. No: Do not make a backup of the backup management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.			
	ReplData	Specifies whether to make a backup of the replication management. Yes: Make a backup of the replication management. No: Do not make a backup of the replication management. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	B	B	C
	TapeData	Specifies whether to make a backup of tape backup management information. Yes: Make a backup of tape backup management information. No: Do not make a backup of tape backup management information. Note that failing to specify "Yes" with the correct capitalization ("Y" in uppercase or "es" in lowercase) or failing to specify the key 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 stgmgrinfobkup (Management information package backup command) on the management information package backup execution server stores the backup data in the directory under the following structure:

Table 8.5 Directory structure for execution of management information package backup 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 stgmgrinfoset (Management information package backup server registration/deletion command).

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 stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make backups of the registries on all of the Storage Server.

2. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

Normal-use operations

The normal-use operations are as follows:

- Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server when you need to make backups of the target data.
  For the timing of the backups, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the applicable operating system.

Operations when a server is added or deleted

Operations when server added

1. On the management information package backup execution server, set up a policy for the added Storage Server in the policy file.

2. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the registry of the added Storage Server.

3. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

Operations when server deleted

1. On the management information package backup execution server, delete the information about the Storage Server that was deleted from the policy file.

2. In the backup data directory on the management information package backup execution server, delete the directory containing the name of the deleted Storage Server.

3. Execute stgmgrinfobkup (Management information package backup command) 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 containing 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 stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the registry of the renamed Storage Server.

5. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

8.1.2.3   Restoration operations

This section describes how to use the backup data created by stgmgrinfobkup (Management information package backup command) 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 stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the registry backup to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-registry-to-be-restored>\RegiData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-registry-to-be-restored>/RegiData
   ```

3. Transfer the registry backup 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 Operator's Guide for the operating system running on the target server.

Restoring a database

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the backup of the database to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<storage-management-server-name>\RegiData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<storage-management-server-name>/RegiData
   ```

3. Transfer the backup of the database 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. On the Windows version Storage Management Server, expand the database backup using the stgarcext (Backup data expansion command) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". On a Solaris/Linux-version Storage Management Server, expand the database backup by using the tar command supported by the operating system.

5. On the Storage Management Server, restore the database. For details on restoring a database, refer to "Restoring a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The backup data storage directory specified for database restoration is the directory expanded in step 4.

Restoring an authentication feature

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. In the management information package backup execution server, copy the backup of the authentication management list to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<storage-management-server-name>\AuthData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<storage-management-server-name>/AuthData
   ```

3. Transfer the backup of the authentication management list copied in step 2 to the Storage Management Server in binary mode.

4. On a Solaris/Linux-version Storage Management Server, change the access permission assigned to the backup of the authentication management list transferred in step 3 by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

5. On a Windows-version Storage Management Server, copy the backup of the authentication management list transferred in step 3 to -AdvancedCopy-Manager-program-directory\bin.

6. On the Storage Management Server, restore the authentication management list. For details on restoring the authentication management list, refer to "Restoring an authentication management list" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server. A definition output batch file and a definition output shell script are the backup data of the authentication management list handled in steps 4 and 5.

Restoring a backup management list, or backup management list and recovery control file

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) 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:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-list/file-to-be-restored>\BkupData\FJSVswsts
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-list/file-to-be-restored>/BkupData/FJSVswsts
   ```

3. Transfer the backup of the backup management list or the backups of the backup management list and the recovery control file copied in step 2 to the target server in binary mode.

4. Expand the backup of the backup management list or the backups of the backup management list and recovery control file transferred in step 3 on the target server. On a Windows-version server, expand the backup of the backup management list using the stgarcext (Backup data expansion command) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". On a Solaris/ Linux/HP-UX/AIX-version 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" for the operating system running on the target server. The Backup-Directory specified in the resource restoration command is the directory expanded in step 4.

Restoring the backup management pre-processing/post-processing scripts and tape-copy pre-processing/ post-processing scripts

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) 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 for backup management to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-scripts-to-be-restored>\BkupData\Scripts
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-scripts-to-be-restored>/BkupData/Scripts
   ```

3. Transfer the backups of the backup 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" for the operating system running on the target server.

5. On a Solaris/Linux/UP-UX/AIX-version server, change the access permission assigned to the pre-processing and post-processing scripts for backup management copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring locking specification files for backup management

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) 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:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-files-to-be-restored>\BkupData\data
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-files-to-be-restored>/BkupData/data
   ```

3. Transfer the backups of the locking specification files for backup management copied in step 2 to the target server in binary mode.

4. Copy the backups of the locking specification files for backup management transferred in step 3 to the target server. For the directory in which the locking specification files for backup management are used (that is, the directory to which the files are to be copied), refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring pre-processing and post-processing scripts for replication management

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) 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:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-scripts-to-be-restored>\ReplData\Scripts
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-scripts-to-be-restored>/ReplData/Scripts
   ```

3. Transfer the backups of the pre-processing and post-processing scripts for replication management copied in step 2 to the target server in binary mode.

4. Copy the backups of the pre-processing and post-processing scripts for replication management transferred in step 3 to the directory in which the scripts will be executed on the target server. For the directory in which the pre-processing and post-processing scripts for replication management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing of replication" in the Operator's Guide for the operating system running on the target server.

5. On a Solaris/Linux/UP-UX/AIX-version server, 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 stgmgrinfoset (Management information package backup server registration/deletion command) 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:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-files-to-be-restored>\ReplData\data
   ```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-files-to-be-restored>/ReplData/data
```

3. Transfer the backups of the locking specification files for replication management copied in step 2 to the target server in binary mode.

4. Copy the backups of the locking specification files for replication management transferred in step 3 to the target server. For the directory in which the locking specification files for replication management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring a policy file for management information package backup

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) 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:

Windows version:

```
directory-determined-in-step1\<server-whose-file-to-be-restored>\MgrInfoData
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-file-to-be-restored>/MgrInfoData
```

For information on the directory for the policy file for the management information package backup command, refer to step 6 in the section "8.1.2.1 Preliminaries".

Restoring the tape management information

1. On the package-backup-of-the-management-information execution server, execute stgmgrinfoset (Management information package backup server registration/deletion command) 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:

For the Windows version:

```
directory-checked-at-step-1\<name-of-the-target-server-of-restoration>\TapeData
```

For the Solaris/Linux/HP-UX/AIX version:

```
directory-checked-at-step-1/<name-of-the-target-server-of-restoration>/TapeData
```

3. Transfer the backup data of the tape management information copied in Step 2 to the target server in binary mode.

4. Expand the tape management information transferred in Step 3 on the target server. If the target server is the Solaris or Linux version, expand the tape management information by using the OS tar command.

5. On the target server, restore the tape management information. For details on how to restore it, refer to the section titled "Restoring the tape management information" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option.

8.2 Troubleshooting

8.2.1 Troubleshooting: Insufficient free space in a repository

For information about the actions to take if there is insufficient free space in a repository used by a Storage Management Server, refer to the "Troubleshooting for insufficient free space in a repository" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.2.2 Collecting maintenance information

8.2.2.1 Collecting error survey information

Login to the Storage Management Server or Storage Server and collect the data for each server using acmcapture (Troubleshooting data collection command).

Send the collected data to a Fujitsu system engineer (SE).

8.2.3 Troubleshooting: Failure in accessing a repository database

For information about how to find the cause of a failure in accessing a repository database and the actions to perform 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: Hardware error during backup

This section describes the actions to perform if a hardware error, etc. occurs during a backup using AdvancedCopy Manager.

8.3.1 Overview

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

・ swstbackstat (Backup execution status display command) displays "failed" in the Status column.

・ swstsyncstat (Backup synchronous processing progress display command) displays "failed" in the Status column.

・ swstreststat (Restoration execution status display command) displays "failed" in the Status column.

・ swsthistdisp (History information display command) displays "failed" in the Status column.

・ swsttrkstat (tracking status display command) 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 code swst0634, swst0719, or swst0740 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:

・ swstbackstat (Backup execution status display command) displays "halt" in the Status column.

・ swstsyncstat (Backup synchronous processing progress display command) displays "halt" in the Status column.

・ swstreststat (Restoration execution status display command) displays "halt" in the Status column.

・ swsthistdisp (History information display command) 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 any of these messages, statuses or symptoms is 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, fix 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.

Figure 8.2 Troubleshooting flow (for faults during backup)
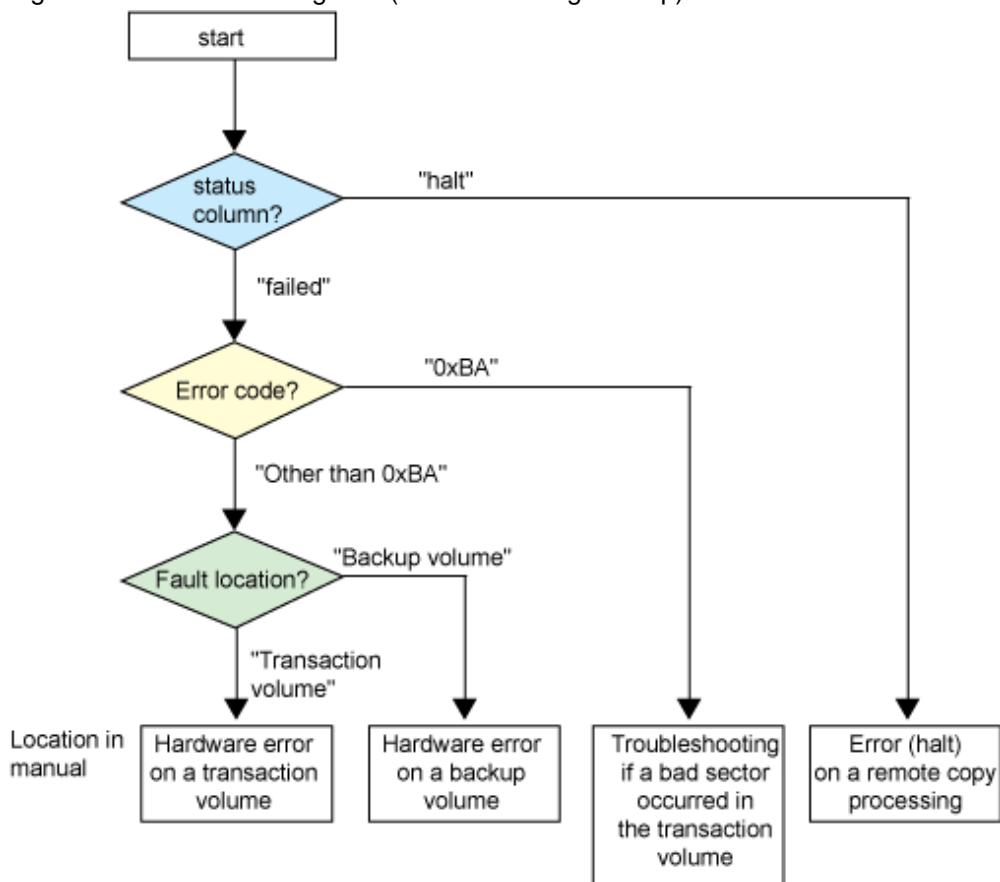
> ## Note
> ....
>
> ・ Refer to "Overview" for details of the "status column" and "fault location".
>
> ・ Use ETERNUS Web GUI to check the copy process error codes. Use the following method to check the error codes:
>
>   - On the [Display status] menu, click [AdvancedCopy status display] in the status 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 8.6 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 ETERNUS disk storage systems automatically change the copy processing to the error suspend state. This prevents a restart of QuickOPC or EC/REC resume and prevents the backup volume from being overwritten with invalid transaction volume data.

Error code	Meaning
Other than 0xBA	An error other than the above occurred.

Error code 0xBA is returned only for the following ETERNUS disk storage systems:

- ETERNUS4000 and ETERNUS8000 (firmware version V11L30-0000 or later)

- ETERNUS6000 (firmware version V31L40-0000 or later)

For ETERNUS disk storage systems 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 Hardware error on a transaction volume

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

1. If an error occurred during physical copying, cancel the processing in which the error occurred, with one of the following commands:

   - If an error occurred during backup (OPC) physical copy: swsthistdel (History information deletion command)

   - If an error occurred during synchronous processing (EC): swstcancelsync (Backup synchronous processing cancel command)

   - If an error occurred during restore (OPC) physical copy: swstcancelrest (Restore cancellation command)

   - If an error occurred during tracking processing (QuickOPC): swstcanceltrk (Tracking cancel command)

2. Execute the execution status display commands (swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command)) to verify that no other errors have occurred.

3. Fix the hardware error in the transaction volume.

4. Execute swstrestore (Restoration execution command) to restore the transaction volume.

Note

・ The backup history information for which a copy failed cannot be used to perform a restoration.

・ If there is no normal (that is, Status is "succeeded") backup history information, restoration is not possible.

8.3.2.2 Hardware error on a backup volume

When a hardware fault occurs in backup volume, perform repair work according to the following procedures.

1. Cancel the processing in which the error occurred, with one of the following commands:

   - If an error occurred during backup (OPC) physical copy: swsthistdel (History information deletion command)

   - If an error occurred during synchronous processing (EC): swstcancelsync (Backup synchronous processing cancel command)

   - If an error occurred during restoration (OPC) physical copy: swstcancelrest (Restore cancellation command)

   - If an error occurred during tracking processing (QuickOPC): swstcanceltrk (Tracking cancel command)

2. If the processing cannot be canceled using one of the above commands, use ETERNUS Web GUI to cancel it.

3. Execute swstsrsemtch (Resource adjustment command)

4. Cancel the processing in which the error occurred. At this point, the execution status display commands (swstbackstat (Backup execution status display command), swstreststat (Restoration execution status display command) and swsthistdisp (History information display command))

5. 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: swsthistdel (History information deletion command)

   - If an error occurred during restoration (OPC) physical copy: swstcancelrest (Restore cancellation command)

6. Execute the execution status display commands (swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command)) to verify that no other errors have occurred.

7. Use swstdevinfoset (Device information setting command) to delete the backup volume in which the error occurred.

8. Use swstdevinfoset (Device information setting command) to register a new backup volume. If the backup volume in which the error occurred is repaired and reused, execute the option [Collect or reflect the information for a specific device] from the GUI client, and store the information again in the backup volume.

9. 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): swstcancelsync (Backup synchronous processing cancel command)

   - If the bad sector occurred during QuickOPC tracking: swstcanceltrk (Tracking cancel command)

2. Use swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command) 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 methods below.

   - 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 swstrestore (Restoration execution command) to restore the transaction volume from a backup volume. (If the backup volume for the copy processing for which the bad sector occurred contains backup history information, restoration is also possible from that backup volume.)

Note

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

8.3.2.4 Error (halt) on a remote copy processing

When a hardware fault occurs in remote copy processing, perform repair work according to the following procedures.

1. Fix the hardware error.

2. Re-execute the suspended copy processing.

8.4 Hardware or Other Error 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 the replication, the following symptoms are displayed:

- swsrpstat (Operation status display command) 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:

- swsrpstat (Operation status display command) 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 messages, statuses or symptoms is 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 8.3 Troubleshooting flow (when a fault occurs during replication)
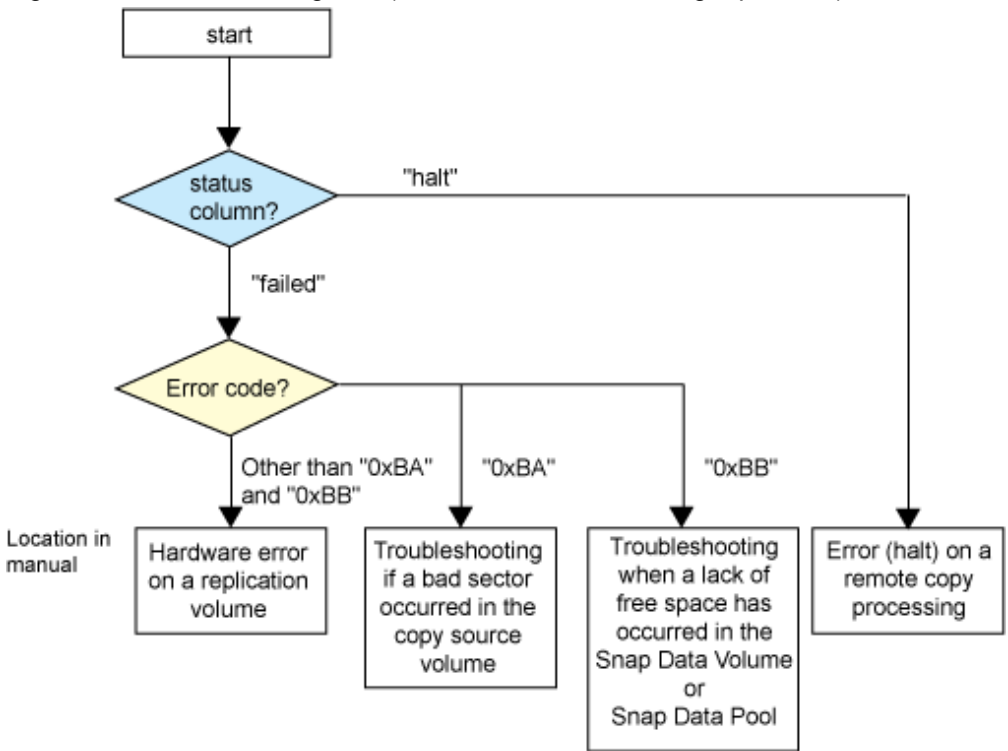
📝 **Note**

・ Refer to "Overview" for details of the "status column".
  If the status column is "?????", check if ETERNUS Web GUI 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 where another cause is likely (such as the Storage Server or switch etc) contact your Fujitsu SE.

・ Use ETERNUS Web GUI to check the error codes. Use the following two methods to check.

  - Checking with swsrpstat (Operation status display command) Specify "-0", then execute.

  - Checking with ETERNUS Web GUI

      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 8.7 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 ETERNUS disk storage systems automatically change the copy processing to the error suspend state. This prevents a restart of QuickOPC

Error code	Meaning
	or EC/REC resume and prevents the copy destination volume from being overwritten with invalid copy source volume data.
0xBB	A lack of free space has occurred in the Snap Data Volume or 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 ETERNUS disk storage systems:

- ETERNUS4000 and ETERNUS8000 (firmware version V11L30-0000 or later)

- ETERNUS6000 (firmware version V31L40-0000 or later)

For ETERNUS disk storage systems other than the above, the events indicated by error code 0xBA and 0xBB are identified by the following methods:

Table 8.8 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 ETERNUS Web GUI to check the capacity already used on the Snap Data Volume in order to determine whether or not a lack of free space has occurred. ・ On the [Display status] menu, click [Volume list] in the status display. ・ Click the link to Snap Data Volume in the "Volume type" column of the relevant volume. ・ Refer to the value shown in the "Capacity already used" column. If this event applies, refer to "8.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool"

8.4.2.1   Hardware error on a replication volume

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

1. Use swsrpcancel (Replication cancellation command) to cancel the processing in which the error occurred. If the processing cannot be cancelled from the operation server when inter-server replication is performed, cancel it from a non-operational server.

2. If the processing cannot be cancelled by using the command, use ETERNUS Web GUI to cancel it.

3. Execute swsrprecoverres (Resource adjustment command)

4. Execute swsrpstat (Operation status display command) to verify that no other errors have occurred.

5. Use swsrpdelvol (Replication volume information deletion command) to delete the replication volume in which the error occurred.

6. Use swsrpsetvol (Replication volume information configuration command) to register a new replication volume. If the replication volume in which the error occurred is repaired and reused, execute the option [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 swsrpcancel (Replication cancellation command) to cancel processing for which the error occurred.
   If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.
   If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

2. Execute swsrpstat (Operation status display command) 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 methods below.

   - 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 swsrpmake (Replication creation command) 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 lack of free space has occurred in the Snap Data Volume or Snap Data Pool

A Snap Data Volume lack of free space occurs when the Snap Data Pool is not being used, whereas a Snap Data Pool lack of free space occurs when the Snap Data Pool is being used.
The following section provides information on recovery when a lack of free space has occurred in either the Snap Data Volume or Snap Data Pool.

Recovery of insufficient free space in Snap Data Volume

When a lack of free space has occurred in the Snap Data Volume, follow these steps to undertake recovery:

・ Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command) command.

・ If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

・ If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The likely causes of a lack of free space in the Snap Data Volume are as follows:

a. The estimate of the physical size of the Snap Data Volume is not accurate.

b. The estimate of the physical size of the Snap Data Volume is accurate but, as a result of a large volume being updated in the Snap Data Volume when a SnapOPC/SnapOPC+ session does not exist, the physical capacity of the Snap Data Volume is being used up.

The usage status of the Snap Data Volume can be checked by specifying "stat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the physical size of the Snap Data Volume, and recreate the Snap Data Volume.
If "b." applies, use ETERNUS Web GUI or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, and then initialize the Snap Data Volume.
Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Volume.

Recovery of insufficient free space in Snap Data Pool

When a lack of free space has occurred in the Snap Data Pool, follow these steps to undertake recovery:

・ Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command).

・ If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

・ If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The following are likely causes of a lack of free space in the Snap Data Pool:

    a. The estimate of the size of the Snap Data Pool is not accurate.

    b. The estimate of the size of the Snap Data Pool is accurate but, as a result of a large volume being updated in the Snap Data Volume when a SnapOPC/SnapOPC+ session does not exist, the capacity of the Snap Data Pool is being used up.

The use status of the Snap Data Pool can be checked by specifying "poolstat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the size of the Snap Data Pool, and after increasing the size of the Snap Data Pool, recreate the Snap Data Volume.

If "b." applies, use ETERNUS Web GUI or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Pool.

8.4.2.4 Error (halt) on a remote copy processing

The REC restart (Resume) method differs for different REC Recovery modes.

For the Automatic Recovery mode

    1. Remove the cause that made all paths close (halt).

    2. ETERNUS disk array automatically restarts (Resume) REC.

For the Manual Recovery mode

    1. Remove the cause that made all paths close (halt).

    2. Use swsrpmake (Replication creation command) to forcibly suspend the REC that is in the 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 swsrpstartsync (Synchronous processing start command) 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

Server information batch change operations preserve the consistency of server information in systems managed by AdvancedCopy Manager. All Storage Server services and transactions in the systems that include a Storage Management Server and Storage Management transactions must be running when these changes are made.

> 📑 **Note**
> ....
>
> If the server information change command (stgxfwcmmodsrv) is used to change IP addresses, or similar
>
> Do not execute backup management commands or replication management commands at the Storage Management Server that executes stgxfwcmmodsrv (Server information change command), nor at any of the Storage Servers managed by Storage Management Server transactions, either before or during execution of stgxfwcmmodsrv (Server information change command).
>
> If executed, this command may terminate abnormally. If stgxfwcmmodsrv (Server information change command) terminates abnormally, implement recovery in accordance with the action indicated in the error message. If backup management or replication management commands are accidentally executed either before or during execution of the server information change command, and if the backup management and replication management commands terminate abnormally, wait until stgxfwcmmodsrv (Server information change command) terminates normally, then re-execute the backup management and 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 "Changing the IP address of a Storage Management Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.5.2 Changing the IP address of a Storage Server

Change the IP address of a Storage Server as follows:

1. If you have identified the Storage Server to be changed as a replication source or replication destination volume using a replication management function, delete the configuration of the source/replica volume by referring to "7.6.2 Deleting a source volume or replica volume" in the AdvancedCopy Manager Operator's Guide.

2. On a target Storage Server, stop the AdvancedCopy Manager daemons. For more information on stopping a service, see Chapter 2 Starting and Stopping Daemons.

3. On the Storage Server, change the system IP address.

4. On the target Storage Server, restart the AdvancedCopy Manager daemons. For more information on starting a daemons, see Chapter 2 Starting and Stopping Daemons.

5. After a server information change instruction file has been created, change the IP address by using the server information change command with the -f option specified on the Storage Management Server. For information on this, refer to "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the OS under which the Storage Management Server is running for the details.

6. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

> 📚 **See**
> ....
>
> For information about performing the above change in cluster operation, refer to "8.5.8.1 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 about 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. 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 "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. On the target Storage Server, change the port number of the AdvancedCopy Manager communications daemon (stgxfws).

3. On the target Storage Server, restart the daemons of AdvancedCopy Manager. For more information on restarting a daemon, refer to Chapter 2 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 "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SR AdvancedCopy Manager Operator's Guide" of the OS running the Storage Management Server for details of the server information change command.

5. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

See
. . . .
For information about performing the above change in cluster operation, refer to "8.5.8.2 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 "Changing the server name of a Storage Management Server or Storage Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

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 "7.6.2 Deleting a source volume or replica 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 to change the server name. Refer to "stgxfwcmmodsrv (Server information change command)" 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 "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

For information about performing the above change in a cluster operation, refer to "8.5.8.3 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 re-creation of LUN mapping)

- ・ Start position for change of partitions (mainly for 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 information on this, refer to 4.6.2.1 Deleting a transaction volume.

2. Check whether a backup volume exists in the target disk. If it does, delete the backup volume. For information on this, refer to 4.6.2.2 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 "4.4.5 Fetching device information on a Storage Server," for details on changing the device information.

5. Reset the deleted transaction or backup volume in the backup. Refer to "4.4.7 Setting the operation type for a device," for details on adding the transaction volume or backup volume.

 Point

If the device configuration is changed (in step 3 above) before the transaction and backup volumes are deleted (in steps 1 and 2), history information cannot be deleted, and synchronized backup processing cannot be cancelled. This could possibly prevent the deletion of the transaction and backup volumes.
In this case, set the emergency operational mode, and delete the history information or cancel synchronized backup processing.
For details of the emergency operational mode, refer to the section describing swsthistdel (History information deletion command) and swstcancelsync (Backup synchronous processing cancel command).

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, refer to 7.6.2 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 for AdvancedCopy Manager. Refer to "7.4.4 Fetching device information from a Storage Server," for details about changing the device information.

4. Reset a deleted replica volume in the replication operation. Refer to "7.4.5 Configuring the source volume and replica volume," for details about adding the replica volume.

Point

If the device configuration is changed (in step 2 above) before the replication volumes are deleted (in step 2), replication processing cannot be cancelled. This could possibly prevent the deletion of the replication volumes.
In this case, set the emergency operational mode, and cancel replication processing.
For details on the emergency operational mode, refer to the section describing swsrpcancel (Replication cancellation command).

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 "Changing the IP address for GUI connection of a Storage Management Server" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.5.7　Change of password or deletion of the user who was specified as the repository access user

For information about change of password or deletion of the user who was specified as the repository access user, refer to the "Change of deletion/password of the user who specified it as the repository access user" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server:

8.5.8　Changing the configuration in cluster operation

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 "7.6.2 Deleting a source volume or replica 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. On the Storage Management Server that manages the Storage Server transactions, create a server information change instruction file, then execute the server information change command with the -f option specified to change the IP address. Refer

to "stgxfwcmmodsrv (Server information change command)" 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 "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

> **⚠ Note**
> ....
> The IP address information displayed by the cluster unsetup command that is executed to delete the cluster environment of the Storage Server transaction is not the IP address that has been newly specified, but is 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 "7.6.2 Deleting a source volume or replica 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 "stgxfwcmmodsrv (Server information change command)" 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 "7.4.5 Configuring the source volume and replica 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 "7.6.2 Deleting a source volume or replica 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 "stgxfwcmmodsrv (Server information change command)" 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 "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

8.5.8.4 Changing the logical node name

Change the logical node name of a Storage Server transaction by performing the following steps:

1. If the transaction is not operating, start the Storage Server transaction.

   For details on how to start it up, 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 on how to do this, refer to "4.6.2 Deleting a device".
   When it is defined as a source or replica volume by using the replication control function, delete the source/replica volume configuration. For details on how to perform this, refer to "7.6.2 Deleting a source volume or replica volume".

3. Save the data.

   The Storage Server transaction, save the following data:

   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication control.

   For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

   - Policy file for package backup of the management information
     For details about the policy file path, refer to "8.1.2.1 Preliminaries".

4. For 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 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 cluster environment".

Note

Do not perform Step 1 (deleting the node) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for HP-UX" or "Deletion on VERITAS Cluster Server for HP-UX" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

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 cluster environment".

Note

   - For the -n option of the cluster setup command, specify the name of the new logical node.

   - Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment

     (particularly Step 25 in "Details of the steps for customization" on "MC/ServiceGuard for HP-UX" or Step 18 in "Details of the steps for customization" on VERITAS Cluster Server for HP-UX).

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, 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 "8.1.2.1 Preliminaries".

9. Change the server name.

    Perform the procedure described in "8.5.8.3 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. (For backup management, perform the "Display backup management screen" task and subsequent tasks. For replication control, perform the "Setting copy source volume and copy destination volume" 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 to register the server.

8.5.8.5   Changing the transaction name

Change the name of an AdvancedCopy Manager transaction by performing the following steps:

1. If the transaction is not operating, start the Storage Server transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

    In the 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 "8.1.1.1.1 Backing up a 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 "8.1.2.1 Preliminaries".

3. For a Storage Server transaction, delete /etc/opt/swstorage/logical-node-name/swnode.ini on the node operating the transaction.

4. Delete the cluster environment of the target transaction.
   For details on how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

📒 Note

....

Do not perform Step 1 (deleting the node) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for HP-UX" or "Deletion on VERITAS Cluster Server for HP-UX" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment.

....

5. On the cluster system, change the cluster package name.
   For details on how to 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 cluster environment".

. . . .

- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment

  (particularly Step 25 in "Details of the steps for customization" on MC/ServiceGuard for HP-UX or Step 18 in "Details of the steps for customization" on VERITAS Cluster Server for HP-UX)

- Do not change any information other than the name of a transaction by using the cluster setup command.

. . . .

7. Start the target transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

8. Restore the AdvancedCopy Manager data.

   In the 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 "8.1.1.1.2 Restoring a 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 swsrprecoverres (Resource adjustment command).
     Specify the "-r" option for the resource adjustment command. For details about this, refer to "swsrprecoverres (Resource adjustment command)".

   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 "8.1.2.1 Preliminaries".

9. For the "package backup of the management information" execution server of AdvancedCopy Manager, execute the "package backup of the management information" server registration/deletion command to register the 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., name of a mount point of a physical disk or shared disk) by performing the following steps:

1. Check whether the target Storage Server transaction is operating.
   If the transaction is not operating, start the Storage Server transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

   In the 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 "8.1.1.1.1 Backing up a 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 "8.1.2.1 Preliminaries".

3. For 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 cluster environment".

Note

Do not perform Step 1 (deleting the node) described in "Detailed steps for deletion" in "Deletion on MC/ServiceGuard for HP-UX" or "Deletion on VERITAS Cluster Server for HP-UX" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

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 cluster environment".

Note

- To change the name of a mount point, specify the new mount point name in the -m option of the cluster setup command.

- To change a physical disk, specify the new physical disk when you mount it.

- Change the configuration of a shared disk in the cluster system.

- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment

  (particularly Step 25 in "Details of the steps for customization" on "MC/ServiceGuard for HP-UX" or Step 18 in "Details of the steps for customization" on "VERITAS Cluster Server for HP-UX").

6. Start the target transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

7. Restore the AdvancedCopy Manager data.

   In the 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 restore do this, refer to "8.1.1.1.2 Restoring a 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 swsrprecoverres (Resource adjustment command). Specify the "-r" option for the resource adjustment command.

   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 "8.1.2.1 Preliminaries".

8. For the "package backup of the management information" execution server of AdvancedCopy Manager, execute the "package backup of the management information" server registration/deletion command to register the server.

Chapter 9 Commands

This chapter describes using commands.

Note

Set the following paths in the PATH environment variable to execute the commands.

- /usr/sbin

- /usr/bin

9.1 Command list

The commands are classified as follows:

Backup management commands

Environment definition commands

Table 9.1 List of environment definition commands for backup management

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	swstdevinfoset	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 9.2 List of operation commands for backup management

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.

Function	Command name	Explanation
Restore execution status display command	swstreststat	Displays the execution status of restoration.
History information display command	swsthistdisp	Displays the history information that has been backed up.
History information deletion command	swsthistdel	Deletes the history information that has been backed up.
Backup synchronous processing start command	swststartsync	Starts backup synchronous processing.
Backup synchronous processing cancel command	swstcancelsync	Aborts backup synchronous processing.
Backup synchronous processing progress display command	swstsyncstat	Displays the progress of the backup synchronous processing.
Execution status display command	swstexecstat	Displays the execution status of a command executed on a transaction volume.
Tracking cancel command	swstcanceltrk	Stops tracking processing.
Tracking execution status display command	swsttrkstat	Displays the status of tracking processing.

Maintenance commands

Table 9.3 List of maintenance commands for backup management

Function	Command name	Explanation
Resource adjustment command	swstsrsemtch	Recovers the consistency of information in a backup management file.
Resource backup command	swstresback	Backup backup management files
Resource restore command	swstresrst	Restores backup management files

Configuration management commands

Table 9.4 List of configuration management commands

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 CLIENT connection information configuration 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.

Function	Command name	Explanation
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.
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	stgmgrinfoset	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
Information collection mode setup command	stgxfwcmsetmode	This command is executed from the Storage Server.

Replication management commands

Environment definition commands

Table 9.5 List of environment definition commands for replication management

Function	Command name	Explanation
Replication volume information setting command	swsrpsetvol	Sets the information about a replication volume.
Replication volume information display command	swsrpvolinfo	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	swsrprecbuffstat	Displays information for the REC transfer buffer.
REC transfer buffer settings change command	swsrprecbuffset	Changes the settings for the REC transfer buffer.

Operation commands

Table 9.6 List of operation commands for replication management

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.
Synchronous processing reverse command	swsrprevsync	Reverses the copying direction of inter-box synchronization in suspended status.

Maintenance commands

Table 9.7 List of maintenance commands for replication management

Function	Command name	Explanation
Resource adjustment command	swsrprecoverres	Recovers the consistency of the information in the replication management file

Daemon start and stop commands

Table 9.8 Daemon start and 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 daemons

SnapOPC/SnapOPC+ support commands

Table 9.9 List of SnapOPC/SnapOPC+ support commands

Function	Command name	Explanation
Update size measurement command	swstestupdate	Uses the pseudo-session setting function to measure the physical size of a Snap Data Volume
Snap Data Volume operation/reference command	swstsdv	By specifying a subcommand, Snap Data Volume initialization/status display and Snap Data Pool status display are possible.

Troubleshooting data collection commands

Table 9.10 List of Troubleshooting data collection commands

Function	Command name	Explanation
Troubleshooting data collection command	acmcapture	This command collects troubleshooting data.

9.2 Backup Management Commands

This section describes operations using Backup Management Commands

Note

· ·

Only a root user can execute all the commands of backup management. When command execution is carried out by other users, a message "swst0601 This Command cannot be run. This is because the user is not a root user." is displayed and then, an error end.

· ·

Note

· ·

Operating environment for command execution

The table below lists the operating environment requirements for different commands.

Table 9.11 Operating environment for executing backup management commands

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, if the Storage Management Server has either of the following parameter designations: · -h option specified · 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, if the Storage Management Server has either of the following parameter designations: · -h option specified · 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.

Command	Operating environment of AdvancedCopy Manager
	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.
swstdevdisp	The daemons and services of the Storage Management Server and target Storage Server must be operating in order to execute this command, if the Storage Management Server has either of the following parameter designations: ・ -h option specified ・ No device name specified
swstdevinfoset	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be operating. To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstexecstat	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: ・ -h option specified, or ・ No device name specified
swsthistdel	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swsthistdisp	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: ・ -h option specified ・ No device name specified
swstresback	-
swstresrst	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating. To execute this command with the -x option specified, the daemons and services of the Storage Management Server must be operating.
swstrestore	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstreststat	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: ・ -h option specified ・ No device name specified

Command	Operating environment of AdvancedCopy Manager
swstsrsemtch	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating. To execute this command with the -x option specified, the daemons and services of the Storage Management Server must be operating.
swststartsync	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating.
swstsvrdisp	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstsvrset	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be operating. To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
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: ・ -h option specified ・ No device name specified
swsttrkstat	When this command is executed in either of the following formats on the Storage Management Server, the daemons/services of the Storage Management Server and target Storage Server must be active: ・ -h option is specified ・ No device name is specified.

Note

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. 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 9.12 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstsvrset	Required	Transaction operating node	-
swstsvrdisp	Required	Transaction operating node	-
swstdevinfoset	Required	Transaction operating node	-
swstdevdisp	Required	Transaction operating node	-
swstbkpolset	Required	Transaction operating node	-
swstbkpoldisp	Required	Transaction operating node	-
swstbkpoldel	Required	Transaction operating node	-
swstbackup	Required	Transaction operating node	-
swstbackstat	Required	Transaction operating node	-
swstrestore	Required	Transaction operating node	-
swstcancelrest	Required	Transaction operating node	-
swstreststat	Required	Transaction operating node	-
swsthistdisp	Required	Transaction operating node	-
swsthistdel	Required	Transaction operating node	-
swststartsync	Required	Transaction operating node	-
swstcancelsync	Required	Transaction operating node	-
swstsyncstat	Required	Transaction operating node	-
swstexecstat	Required	Transaction operating node	-
swstcanceltrk	Required	Transaction operating node	-
swsttrkstat	Required	Transaction operating node	-
swstsrsemtch	Required	Transaction operating node	-
swstresback	Required	Transaction operating node	-
swstresrst	Required	Transaction operation node	-

Note

In a Storage Management Server, when a display-type command that has 'disp' or 'stat' at the end of the command name is executed, the display contents will depend on the existence of the -h option and device name. For details, refer to the following table.

Table 9.13 Display contents of the display-type commands in Storage Management Server

-h option	Device name specified	Display contents
Does not exist	No	Displays all Storage Server information registered using the Backup management functionality.
	Yes	Displays only the specified Storage Management Server device information.
Exists	No	Displays all Storage Server information specified using the -h option.
	Yes	Displays only the specified device information for the Storage Server specified using the -h option.

9.2.1 Environment definition commands

This section describes the environment definition commands for backup management.

9.2.1.1 swstsvrset (Storage Server configuration information setting command)

NAME

swstsvrset - sets configuration information of a Storage Server

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstsvrset
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstsvrset [-h Server-Name]
```

DESCRIPTION

This command sets configuration information of a Storage Server. Execution of this command declares that the Storage Server on which the command is executed is a server that performs backup operations.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server to be subject to the backup operation. This option is valid only on a Storage Management Server.
If this option is omitted, the Storage Server on which the command is entered will be subject to the processing.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Set the configuration information of a Storage Server.

```
# /opt/FJSVswsts/bin/swstsvrset
swstsvrset completed
#
```

・ Set the configuration information of a Storage Server named job1 from a Storage Management Server.

```
# /opt/FJSVswsts/bin/swstsvrset -h job1
swstsvrset completed
#
```

NOTES

・ This command can only be executed if none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

9.2.1.2   swstsvrdisp (Storage Server configuration information display command)

NAME

swstsvrdisp - displays configuration information of a Storage Server

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstsvrdisp
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstsvrdisp [-h Server-Name]
```

DESCRIPTION

This command displays configuration information of a Storage Server that has been set using swstsvrset (Storage Server configuration information setting command).

The following information will be displayed:

Title	Description
Storage-Server	Displays a Storage Server name.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display configuration information of a Storage Server named Work1.

```
# /opt/FJSVswsts/bin/swstsvrdisp
Storage-Server  = Work1
#
```

9.2.1.3 swstdevinfoset (Device information setting command)

NAME

swstdevinfoset - sets the device information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstdevinfoset -t | -b | -o Device-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstdevinfoset [-h Server-Name] -t | -b | -o Device-Name
```

DESCRIPTION

Set a volume that has been allocated to the ETERNUS disk storage systems, as a transaction or backup volume.

A transaction volume refers to a volume that stores transaction data to be backed up. A backup volume refers to a volume used to store a backup of this transaction data.

OPTIONS

-h *Sever-Name*

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.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Register a device as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/dsk/c1t0d0
swstdevinfoset completed
#
```

・ Register a device as a backup volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d2
swstdevinfoset completed
#
```

・ Deregister a device that has been registered as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -o /dev/dsk/c1t0d0
swstdevinfoset completed
#
```

NOTES

・ A device cannot be registered as a transaction volume if:

   - Another device with the same cabinet information (box identifier, OLU number, EXTENT starting 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 working or backup volume.

   - The device exists in ETERNUS DX60, ETERNUS DX80 or ETERNUS DX90, and the license of its ETERNUS disk storage system is not registered in the License Manager.

・ A device cannot be registered as a backup volume if:

   - Another device with the same cabinet information (box identifier, OLU number, EXTENT starting 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 work or backup volume.

   - The device to be set up is already mounted. However, when configuring 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 in 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.

・ You must delete related backup history information before:

   - Changing a backup volume to a transaction volume

- Canceling the setting of a backup volume

・ 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

・ 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.

- Please note: that a volume group that is not active cannot be set as a transaction volume.

・ 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.

- Please note: a volume group that is not active cannot be set as a backup volume.

・ In order to make a configuration change to a transaction volume or a backup volume, delete the Configuration, and re-register.

・ The following changes are not possible unless the related synchronous processing (in an EC session) is cancelled:

- Changing a setting in a suspended transaction volume

- Changing a setting in a suspended backup volume

・ The related tracking processing (in an OPC session) must be canceled in advance to perform the following changes:

- Changing the settings of a transaction volume in tracking processing

- Changing the settings of a backup volume in tracking processing

・ This command can be executed only while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstbkpolset (Backup policy setting command)

- swstbkpoldel (Backup policy deletion command)

- swstbackup (Backup execution command)

- swstrestore (Restore execution command)

- swstcancelrest (Restore cancellation command)

- swststartsync (Backup synchronous processing start command)

- swstcancelsync (Backup synchronous processing cancel command)

- swsthistdel (History information deletion command)

- swstcanceltrk (Tracking cancel command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

9.2.1.4   swstdevdisp (Device usage status display command)

NAME

swstdevdisp - displays the device information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstdevdisp [-h Server-Name] [-t] [-b [-u]] [-o] [Device-Name]
```

DESCRIPTION

This command displays information about a transaction or backup volume or any other definable device, which has been set using swstdevinfoset (Device information setting command).

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager.
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 the logical disk is defined.
Device-Mode	Displays a character string by which a device can be identified: "Transaction": Represents a transaction volume. "Backup": Represents a backup volume. "Other": Represents a device that can be registered as a working 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.
Backup-Engine	Displays the operation type: "AdvancedCopy": Backup operation using AdvancedCopy Manager

OPTIONS

-h *Sever-Name*

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.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

Displays device information on all the transaction volumes if this operand and the associated options are omitted.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- 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/dsk/c1t0d0    1.0 Gbyte Transaction   /mnt/tran1 (vxfs)    AdvancedCopy
job2  /dev/vg01          2.0 Gbyte Transaction   ---- (----)          AdvancedCopy
job2  /dev/dsk/c1t0d2    1.0 Gbyte Backup (used) ---- (----)          AdvancedCopy
job2  /dev/dsk/c1t0d3    1.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
job2  /dev/vg02          2.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
job2  /dev/dsk/c1t0d7    1.0 Gbyte Backup (free) ---- (----)          AdvancedCopy
:
#
```

9.2.1.5   swstbkpolset (Backup policy setting command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

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-Name] [-i Interval-Days] [-s Save-Number] [Device-Name]
```

DESCRIPTION

This command sets a backup policy (the number of preservation generations and the number of interval days).
The number of preservation generations is the number of generations of backup data that should be kept at one time. The number of interval days means the number of days from the execution of one backup until the next backup should be performed.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-i *Interval-Days*

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 *Save-Number*

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.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If the device name is omitted, the backup policy will be set for all the transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ To set 3 as the save number of a transaction volume as a backup policy:

```
# /opt/FJSVswsts/bin/swstbkpolset -s 3 /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstbkpolset completed
#
```

NOTES

・ Even if the number of interval days is specified, AdvancedCopy Manager does not automatically create a backup.

・ When you specify a backup policy, there must be as many backup volumes in operation according to the specified backup policy. To view information on the number of backup volumes required to perform the backup operation of a regular transaction volume, refer to 4.2.4 Preparing a backup volume.

・ 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".

・ No backup policy can be set if:

　- There are not as many backup volumes as the specified number of preservation generations.

　- An option for more than the maximum number of preservation generations is specified.

- An option for more than the maximum interval days is specified.

- The replication control function or tape backup function uses the target transaction volume

- The specified device is an LU (disk unit).

· This command can only be executed while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

9.2.1.6   swstbkpoldisp (Backup policy display command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstbkpoldisp [Device-Name]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstbkpoldisp [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays a backup policy that has been set for a transaction volume.
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager.
Interval-Days	Displays a number of interval days.
Save-Number	Displays a number of preservation generations.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If the device name is omitted, a backup policy for a transaction volume with a registered backup policy will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display a backup policy of a transaction volume.

```
# /opt/FJSVswsts/bin/swstbkpoldisp /dev/dsk/c1t0d0
Server Device           Interval-Days Save-Number Mount-Point (Method)
job2   /dev/dsk/c1t0d0 30              3           /mnt/tran1 (vxfs)
#
```

9.2.1.7 swstbkpoldel (Backup policy deletion command)

NAME

swstbkpoldel - deletes the backup policy

SYNOPSIS

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-Name] Device-Name
```

DESCRIPTION

An existing backup policy can be deleted using this command.
Delete the backup history information of the transaction volume prior to the execution of this command.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ To delete the backup policies of a transaction volume.

```
# /opt/FJSVswsts/bin/swstbkpoldel /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstbkpoldel completed
#
```

NOTES

・ 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

・ This command can only be executed while none of the following commands are running:

    - swstsvrset (Storage Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

9.2.2   Operation commands

This section describes operation commands for backup management.

9.2.2.1   swstbackup (Backup execution command)

NAME

swstbackup - backup

SYNOPSIS

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-Name] [-suspend|-T] Device-Name [-Xdevmap Device-Map-
File]
```

DESCRIPTION

When using this command, the operation changes according to 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 of information, such as the TimeStamp and backup volume of a copy target, is registered into backup history information.

- When synchronous processing (EC) is performed
  The state of synchronous processing is checked and, in the case of an equivalent 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. A backup of this form is called synchronous high-speed backup. Note that it aborts when an equivalent maintenance state is not reached.To use the Chapter 5 Backup Process That Uses the Suspend/Resume Function for synchronous high-speed backup, execute the backup command with -suspend specified, and suspend backup synchronous processing.

In the above cases, a backup is established, and access to the backup volume is available immediately after the execution command.

AdvancedCopy Manager executes backup pre-processing and post-processing scripts before and after backup.

For information on customizing these scripts, refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration".

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-Xdevmap *Device-Map-File*

Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a 4.4.10.1 Describing a device map file in which a combination of a transaction volume and a target backup volume are 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 character.

-suspend

This results in synchronous high-speed backup using the Chapter 5 Backup Process That Uses 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 ETERNUS disk storage systems support the QuickOPC function.
If this option is not specified, ordinary snapshot processing (ie, OPC without using the QuickOPC function) is started. This option must always be specified to perform a backup operation using differential snapshots.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Back up a transaction volume

```
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstbackup completed
#
```

NOTES

- To preserve data integrity, this command performs the backup only after inhibiting access to both transaction and backup volumes from all other processes. Thus, drive letters, logical volume names or device labels of devices are unassigned. This command terminates with an error if a drive letter, logical volume name or device label of a transaction volume is assigned or if:

    - The mount point has directories to which other volumes are also mounted.

    - The volume has a file in use.

- To mount a transaction volume from a server other than the server on which this command is entered, unmount the transaction volume, using the authority of the backup administrator. If the transaction volume must not be unmounted, create backup copies with the following procedure:

    1. Execute the sync command to synchronize the transaction volume and file system.

    2. Execute this command.

    3. Execute the fsck command for the backup volume, and check the file system.

- 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.

- Backup cannot be executed in the following situations:

    - No backup policy has been specified for the specified transaction volume.

    - The backup that was executed one generation earlier was unsuccessful.

    - Restore is being performed to the transaction volume that is to be backed up.

    - Synchronous backup processing is performed in a transaction volume to be processed, but the state of equivalence is not reached;

    - Restoration is being executed using backup history information that will cause a generation overflow (this may occur when restoration is performed using the backup volume of the oldest history).

    - Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed.

    - No unused backup volume was available for use as the copying destination.

    - 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

    - The mount point of a transaction volume set at registration has been changed.

    - A backup volume defined as the copy destination is mounted.

    - 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.

- You cannot perform backup if:

    - The backup volume specified by the device map file cannot be paired with the transaction volume. This occurs if:

    - The specified backup volume is in use.

    - The transaction volume and the backup volume are not the same partition size.

    - The device map file contains an error (refer to 4.4.10.1 Describing a device map file).

- The device map file name includes a national character.

・ At this time, if existing backup history information satisfies the condition of the number of saved generations specified by swstbkpolset (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 the backup volume with the Suspend or tracking state is not cleared and the backup volume remains in use.

・ 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.

・ Refer to "10.1.1 General notes" for notes on executing backup.

・ This command can be executed only while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

9.2.2.2 swstbackstat (Backup execution status display command)

NAME

swstbackstat - displays the completion status of a backup

SYNOPSIS

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-Name] [Device-Name]
```

DESCRIPTION

This command displays the completion status of a backup that is being performed using swstbackup (Backup execution command).

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager 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: "----": 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.

Title	Description
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.
If this operand is omitted, the backup execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display the actual copying execution status.

```
# /opt/FJSVswsts/bin/swstbackstat
Server Transaction-Disk Backup-Disk     Status    Execute
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 succeeded ----
job1  /dev/vg01        ----            ----      ----
:
#
```

NOTES

- Do not use the OPC stop function of ETERNUS Web GUI while the snapshot fast backup is in progress. If you do use the OPC stop function of ETERNUS Web GUI, it will display "succeeded" whether or not the backup has actually been successful. If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "8.3 Troubleshooting: Hardware error during backup" for information about this.

- Backup execution status display cannot be executed in the following circumstances:

    - Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.

    - A volume group is inactive in the volume group specification.

9.2.2.3 swstrestore (Restore execution command)

NAME

swstrestore - restore

SYNOPSIS

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-Name [-g Generation-No | -v Version-No][-r Restore-
Device-Name] Device-Name
```

DESCRIPTION

The data that exists in backup history information is restored using OPC.
When this command is executed, AdvancedCopy Manager performs the restoration pre-processing and post-processing scripts before and after copying data using OPC. For more information on customizing these scripts, refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration."

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 the device must have the same amount of space available as the specified transaction volume.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-g *Generation-No*

Specifies the relative generation number of data to be restored.
Check the relative generation number using swsthistdisp (History information display command).

-v *Version-No*

Specifies the absolute generation number of data to be restored.
Check the absolute generation number using swsthistdisp (History information display command).

-r *Restore-Device-Name*

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 information from the information history management will be restored.

OPERANDS

Device-Name

Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Restore data with relative generation number 2. For information on the relative generation number, refer to data displayed using swsthistdisp (History information display command).

```
# /opt/FJSVswsts/bin/swstrestore -g 2 /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstrestore completed
#
```

・ If the Chapter 5 Backup Process That Uses the Suspend/Resume Function is used for the backup operation 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 swstsyncstat (Backup synchronous processing execution status display command). Execute swstcancelsync (Backup synchronous processing cancel command) to cancel the synchronous processing.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk Backup-Disk     Status     Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync -all /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk Status Execute
job2  /dev/dsk/c1t0d0  ----          ----    ----
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstrestore completed
#
```

NOTES

・ On a transaction volume on which a file system has been constructed, restore a specific file as follows:

1. Mount a backup volume. Check the backup volume by executing the Backup History List view/swsthistdisp (History information display command).

2. Copy the file to be restored by executing, for example, the cp command.

3. Unmount the backup volume.

・ 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.

・ Restoration or recovery cannot be executed in the following situations:

- When both relative and absolute generation numbers have been specified.

- When a device registered as a transaction volume has been specified in a parameter with the -r option.

- When 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. It is recommended that a backup volume should NEVER be specified as a restore destination device.

- When you perform restoration immediately after starting backup where the actual copying using OPC is still in progress, (except when the combination of transaction volume and backup volume is the same for backup and restoration). A restoration should always be performed 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 "In a transaction volume on which a file system has been constructed, restore a specific file" above.

- A transaction volume currently in use with synchronous backup processing is specified.

- When 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.

- When the replication control function or tape backup function uses the target transaction volume

- When the replication control function or tape backup function uses the device specified in the -r option

- The mount point set at registration of a transaction volume has been changed.

- Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.

- A volume group is inactive in the volume group specification.

- The suspended or tracking backup volume cannot be used as the restore destination volume.

- The restore command cannot be executed on a transaction volume during synchronous processing (eg, during copying by EC, under the equivalency maintained status, in the Suspend state).
  If the following errors occur during restore processing, then execute swstcancelsync (Backup synchronous processing cancel command) (with the -all option specified) to cancel all of the synchronous processing of the transaction volume, and execute the restore command:

  - "swst0639 This Command cannot be run. This is because a copy is currently running"

  - "swst0634 OPC cannot be run. Error code=26 (SCSI command busy)"

- Refer to "10.1.1 General notes" for notes on executing restore.

- This command can only be executed while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

9.2.2.4   swstcancelrest (Restore cancellation command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

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-Name][-g Generation-No | -v Version-No][-r Restore-
Device-Name] [-emergency] Device-Name
```

DESCRIPTION

This command cancels OPC-based restoration.

A hardware error will be displayed when swstrestore (Restore execution command) is executed while data is being copied using OPC. Fix the cause of the hardware error and repeat restoration using swstrestore (Restore execution command).

Check whether a fault occurred using swstreststat (restore execution status display command).

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-g *Generation-No*

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 swstreststat (restore execution status display command).

-v *Version-No*

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 swstreststat (restore execution status display command).

-r *Restore-Device-Name*

Specifies the device name if data is restored to any other device than a transaction volume.
Check the device name using swstreststat (restore execution status display command).

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

Note: The restoration of the latest history information will be canceled if neither the -g or -v option is specified.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Cancel restoration of the transaction volume

```
# /opt/FJSVswsts/bin/swstcancelrest -g 1 /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelrest completed.
#
```

・ Restoration of the latest history information on the transaction volume is cancelled in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelrest -emergency /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelrest completed.
#
```

NOTES

・ If you cancel OPC-based restoration using this command, the transaction volume will be in an incomplete state and can no longer be used because part of the data has already been overwritten by the copy process. Perform restoration again using swstrestore (Restore execution command).

- 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.

  - A volume group is inactive in the volume group specification.

  - When the replication control function or tape backup function uses the target transaction volume

- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended or halt state, then unmanaged sessions remain. In this case, ETERNUS Web GUI must be used to cancel these sessions.

- This command can only be executed while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

9.2.2.5   swstreststat (Restore execution status display command)

NAME

swstreststat - displays the execution status of restoration

SYNOPSIS

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-Name [-g Generation-No | -v Version-No] [Device-Name]
```

DESCRIPTION

This command displays the execution status of restoration.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager 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.

Title	Description
	"----" 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 restoration target device name unless data is copied and restored to a transaction volume. "----" will be displayed if restoration is not in progress, or if data is restored to a transaction volume.
Status	Displays the execution status: "----": 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 is in halt status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Sever-Name*

   Specifies a Storage Server name.
   This option can be specified only on a Storage Management Server.

-g *Generation-No*

   Specifies the relative generation number of data whose restore execution status is to be displayed.

-v *Version-No*

   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.

OPERANDS

Device-Name

   Specify an AdvancedCopy Manager device name.
   Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
   If this operand is omitted, the restore execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the restore execution statuses of transaction volumes.

```
# /opt/FJSVswsts/bin/swstreststat
Server Transaction-Disk Generation Version Backup-Disk     Restore-Device   Status    Execute
job2   /dev/dsk/c1t0d0  1          10      /dev/dsk/c1t0d8 /dev/dsk/c1t0d11 executing 75%
job2   /dev/dsk/c1t0d2  ----       ----    ----            ----             ----      ----
job2   /dev/dsk/c1t0d5  2          12      /dev/dsk/c1t0d9 ----             succeeded ---
```

```
job2    /dev/dsk/c1t0d6  3        13       /dev/dsk/c1t0d10 /dev/dsk/c1t0d12  executing 75%
:
#
```

NOTES

- Do not use the OPC stop function of ETERNUS Web GUI while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUS Web GUI, this command displays "succeeded" whether or not the restoration has actually been successful.

- If "failed" is displayed in the "Status" field, a hardware error may have occurred. Refer to "8.3 Troubleshooting: Hardware error during backup" for information about this.

- If no generation number has been specified in the -v or -g option, the restore execution statuses of all the histories will be displayed. If, at this time, restoration is not in progress from any of the histories, "----" will be displayed in all the information fields other than "Server" and "Transaction-Disk".

- In the following cases, restore execution status display processing cannot be executed:

    - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

    - A volume group is in an inactive state in volume group specification.

9.2.2.6   swsthistdisp (History information display command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

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-Name] [Device-Name]
```

DESCRIPTION

This command displays history information in relation to data that has been backed up.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager .
Mount-Point	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Generation	Displays a relative generation number. This item will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a TimeStamp reflecting when 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.

Title	Description
Status	Displays an actual copying execution status using one of the following character strings: "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 is in halt status. This item will not be displayed if no backup history information exists.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If this operand is omitted, the backup history information of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the backup history information of all the transaction volumes.

```
# /opt/FJSVswsts/bin/swsthistdisp
Server=StrgSV01 Device=/dev/dsk/c1t0d0  Mount-Point=/mnt/tran1 (vxfs)
Generation Version Backup-Date      Backup-Device    Status     Execute
1          10      2000/11/12 22:00 /dev/dsk/c1t0d2 succeeded ----
2          9       2000/11/11 22:00 /dev/dsk/c1t0d4 succeeded ----
  :
#
```

NOTES

・ If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "8.3 Troubleshooting: Hardware error during backup" for information about this.

・ In the following cases, history information display processing cannot be executed:

  - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

  - A volume group is in an inactive state in volume group specification.

9.2.2.7 swsthistdel (History information deletion command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swsthistdel -g Generation-No| -v Version-No | -z [-emergency] Device-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swsthistdel [-h Server-Name] -g Generation-No| -v Version-No | -z [-emergency]
Device-Name
```

DESCRIPTION

This command deletes backup history information.
The backup volume of the deleted history is released and becomes an empty backup volume.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can only be specified on a Storage Management Server.

-g *Generation-No*

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 swsthistdisp (History information display command).

-v *Version-No*

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 swsthistdisp (History information display command).

-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

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Delete a history with absolute generation number 10 of a transaction volume

```
# /opt/FJSVswsts/bin/swsthistdel -v 10 /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swsthistdel completed
#
```

・ The history information of relative generation number 1 of the transaction volume is deleted in the emergency operation mode.

```
# /opt/FJSVswsts/bin/swsthistdel -g 1 -emergency /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swsthistdel completed
#
```

NOTES

・ 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 currently being used in a restoration.

  - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

  - A volume group is in an inactive state in volume group specification.

  - When the replication control function or tape backup function uses the target transaction volume

  - When the replication control function or tape backup function uses the target backup volume

・ However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended or halt state, then unmanaged sessions remain. In this case, ETERNUS Web GUI must be used to cancel these sessions.

・ Deleting the suspended history information does not cancel the synchronous processing (in an EC session). Deleting the tracking history information does not cancel the tracking processing (in an OPC session).

・ 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.

・ If the history information is deleted while the OPC physical copy has not been completed in a backup operation mode other than the differential snapshot high-speed backup, physical copying of the deleted history is interrupted. In this case, the data in the backup volume is incomplete (ie, copy has stopped part 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 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.

・ This command can be executed only while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

9.2.2.8 swststartsync (Backup synchronous processing start command)

NAME

swststartsync - starts backup synchronous processing

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swststartsync Device-Name [-Xdevmap Device-Map-File]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swststartsync [-h Server-Name] Device-Name [-Xdevmap Device-Map-File]
```

DESCRIPTION

This command starts backup synchronous processing (ie, it starts disk-to-disk copy using EC).

Even if it is already in use, the transaction volume where the synchronous processing started s well as the suspended backup volume can be used as backup destinations.

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.

OPTIONS

-h *Sever-Name*

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 4.4.10.1 Describing 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, a 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.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

- To start the backup synchronous processing for a transaction volume

```
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swststartsync completed.
#
```

NOTES

- When you execute the backup synchronous processing start command for a transaction volume to which the backup synchronous processing is already being executed, the message, "swst0301 Backup synchronous processing is already in progress." is output and then the command is terminated normally.

- You cannot start backup synchronous processing in the following cases. In any of the cases below, perform the action according to the "System administrator response" message.

  - When specifying a device that does not support the EC function.

  - When the backup volumes required for starting the 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.

  - A volume group is inactive in the volume group specification

  - When the replication control function or tape backup function uses the target transaction volume.

- If the backup volume is a volume group, do not execute the vgchange (1M) command to deactivate the volume group under synchronous processing (EC/REC) execution. If this occurs and the backup volume is inactive then it cannot be reactivated. Additionally, it will not be possible to perform commands including those to stop synchronous processing, such as swstbackup (Backup execution command), and swstcancelsync (Backup synchronous processing cancel command). If it has been inactivated accidentally, make the backup volume active after stopping the synchronous processing using ETERNU Web GUI etc.

- 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 (ie, full copy) starts.

- This command cannot be executed when any of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

9.2.2.9 swstcancelsync (Backup synchronous processing cancel command)

NAME

swstcancelsync - cancels the backup synchronous processing

SYNOPSIS

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-Name] [-emergency] [-bd Backup-Device-Name | -all]
Device-Name
```

DESCRIPTION

The backup synchronous processing can be cancelled during copying by EC or under the equivalency maintained status.

The synchronous processing can be cancelled with the backup volume during copying by EC, under the equivalency maintained 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, copying in progress at that time terminates abnormally. In this case, use this command to cancel the backup synchronous processing. Use swstsyncstat (Backup synchronous processing progress display command) to check for the error.

OPTIONS

-h *Sever-Name*

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 *Backup-Device-Name*

The synchronous processing on a specific backup volume can be cancelled.
Specify the copy destination backup volume name. In the operand, specify the 1.5 Managing a Device on AdvancedCopy Manager for the specified device.
Note that the backup volume name and the -all option cannot be specified together.

-all

All of the synchronous processing of the transaction volume can be specified to be cancelled. Note that this specification and the -bd option cannot be used together.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Cancelling backup synchronous processing to a transaction volume

```
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed.
#
```

・ Cancelling backup synchronous processing of transaction volume in the emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed.
#
```

・ Cancelling backup synchronous processing of the backup volume from the transaction volume

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk    Status    Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0 -bd /dev/dsk/c1t0d2
/dev/dsk/c1t0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk    Status  Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend ----
#
```

・ Cancelling all of the backup synchronous processing of the transaction volume

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk    Status    Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0 -all
/dev/dsk/c1t0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk Status Execute
job2  /dev/dsk/c1t0d0  ----         ----   ----
#
```

NOTES

・ 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 halt state, then unmanaged sessions remain. In this event, ETERNUS Web GUI must be used to cancel these sessions.

・ You cannot cancel synchronous backup processing in the following case:

  - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

  - When a volume group is inactive in the volume group specification.

  - When the replication control function or tape backup function uses the target transaction volume

・ This command cannot be executed when any of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

9.2.2.10 swstsyncstat (Backup synchronous processing progress display command)

NAME

swstsyncstat - displays the execution status of the backup synchronous processing

SYNOPSIS

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-Name] [Device-Name]
```

DESCRIPTION

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintained status, or in the suspended status).
If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.
The table below lists the meaning of each title.

Title	Description
Server	Displays the name of the Storage Server.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Backup-Disk	Displays the name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	Displays the status of backup synchronous processing: "----": Backup synchronous processing is not being executed. "executing": Backup synchronous processing is being executed but equivalency maintained status has not been established. "equivalent": Equivalency maintained status is established. "suspend": Suspend status is established. "failed": Backup synchronous processing was abnormally terminated. "nosession": No session exists (eg, due to inconsistent resource information). "halt": Backup synchronous processing is in the halt status.
Execute	Displays the progress of the backup synchronous processing as a percentage (0 to 100%). "----" is displayed when the status is Suspend and at times when the backup synchronous processing is not running.

OPTIONS

-h *Sever-Name*

Specify the name of a Storage Server.
This option can be specified only with the Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
When you omit the device name, the system displays the status of backup synchronous processing for all of the transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- To display the status of backup synchronous processing to a transaction volume

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk     Status    Execute
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
#
```

- To display the status of backup synchronous processing for all of the transaction volumes:

```
# /opt/FJSVswsts/bin/swstsyncstat
Server Transaction-Disk Backup-Disk     Status     Execute
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d1 suspend    ----
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing  75%
job1  /dev/dsk/c1t0d0  /dev/dsk/c1t0d4 suspend    ----
job1  /dev/dsk/c1t0d1  /dev/dsk/c1t0d3 equivalent 100%
job1  /dev/dsk/c1t0d5  /dev/dsk/c1t0d7 failed     ----
job1  /dev/dsk/c1t0d6  ----             ----       ----
#
```

NOTES

- If "failed" or "halt" is indicated as the status of the backup synchronous processing (in the Status field), a hardware failure has possibly occurred. Refer to "8.3 Troubleshooting: Hardware error during backup" for more information about this.

- If "nosession" is indicated as the status of the backup synchronous processing (in the Status field)," resource information having inconsistency is a possible cause. Use 9.2.3.1 swstsrsemtch (Resource match command) to remove the inconsistency from the resource information.

- In the following cases, backup synchronous processing progress display command cannot be executed:

    - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

    - A volume group is in an inactive state in volume group specification.

9.2.2.11   swstexecstat (Execution status display command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

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 [-j] [-h Server-Name] [Device-Name]
```

DESCRIPTION

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.
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager
Last-Backup-Date	Displays the time when the last backup execution command was accepted.
Interval	Displays how many days have passed after the specified number of interval days since the last backup date has been exceeded. This item will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.
Status	Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. ・ swstbkpolset (Backup policy setting command) ・ swstbkpoldel (Backup policy deletion command) ・ swstbackup (Backup execution command) ・ swstrestore (Restore execution command) ・ swsthistdel (History information deletion command) ・ swststartsync (Backup synchronous processing start command) ・ swstcancelsync (Backup synchronous processing cancel command) ・ swstcancelrest (Restore cancellation command)
Mount-Point(Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Execute	Displays the name of a command being executed or the copying progress percentage. "----" : Neither a command nor OPC is being executed "swststartsync" : The backup synchronous processing start command is being executed "swstcancelsync" : The 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%)" : EC progress rate "sync(failed)" : EC has been abnormally terminated "sync(halt)" : EC is halt status "snapshot(xxx%)" : Progress rate of backup using OPC "snapshot(failed)" : Backup using OPC has abnormally terminated "snapshot(halt)" : Backup using OPC has been halted "restore(xxx%)" : Progress rate of restoration using OPC "restore(failed)" : Restoration using OPC has abnormally terminated "restore(halt)" : Restoration using OPC has been halted During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute field.

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 executions 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 is not performed during disk copy of the snapshot backup or backup synchronous processing due to a restriction of ETERNUS disk storage systems.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager
Execute-Date	Displays the command execution date and time (TimeStamp).
Status	Displays whether any of the following commands are being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. ・ swstbkpolset (Backup policy setting command) ・ swstbkpoldel (Backup policy deletion command) ・ swstbackup (Backup execution command) ・ swstrestore (Restore execution command) ・ swsthistdel (History information deletion command) ・ swststartsync (Backup synchronous processing start command) ・ swstcancelsync (Backup synchronous processing cancel command) ・ swstcancelrest (Restore cancellation command)
Mount-Point(Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Execute	Displays the name of a command being executed or the copying progress percentage. "----" : Neither a command nor OPC is being executed "swststartsync" : The backup synchronous processing start command is being executed "swstcancelsync" : The 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%)" : EC progress rate "sync(failed)" : EC has been abnormally terminated "sync(halt)" : EC is in halt status "snapshot(xxx%)" : Progress rate of backup using OPC "snapshot(failed)" : Backup using OPC has abnormally terminated "snapshot(halt)" : Backup using OPC has been halted "restore(xxx%)" : Progress rate of restoration using OPC "restore(failed)" : Restoration using OPC has abnormally terminated "restore(halt)" : Restoration using OPC has been halted During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute field.

OPTIONS

-h *Sever-Name*

    Specifies a Storage Server name.
    This option can be specified only on a Storage Management Server.

-j

    Specifies to display information in another format.

OPERANDS

Device-Name

    Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.
    If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display the execution statuses of transaction volumes.

```
# /opt/FJSVswsts/bin/swstexecstat
Server Device         Last-Backup-Date Interval Status Mount-Point (Method) Execute
job1   /dev/dsk/c1t0d0 2000/12/11 12:20 OK       IDLE   /mnt/trans1 (vxfs)   ----
job1   /dev/dsk/c1t0d5 2000/12/10 12:20 DELAY=1  IDLE   /mnt/usr1 (hfs)     sync(22%)
job1   /dev/dsk/c1t0d6 2000/12/09 12:20 DELAY=2  IDLE   /mnt/usr2 (ufs)     snapshot(45%)
:
#
```

- An example of using the "-j" option is as follows:

```
# /opt/FJSVswsts/bin/swstexecstat -j
Server Device         Execute-Date     Status Mount-Point (Method) Execute
job1   /dev/dsk/c1t0d0 2000/12/11 12:20 IDLE   /usr1 (ufs)          ----
job1   /dev/dsk/c1t0d2 2000/12/10 12:20 IDLE   /usr2 (ufs)          sync(22%)
job1   /dev/dsk/c1t0d5 2000/12/09 12:20 IDLE   /usr3 (ufs)          snapshot(45%)
:
#
```

NOTES

- If "sync (failed)", "snapshot(failed)", "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, perform the following:

  - For "sync (failed)"
    Execute 9.2.2.9 swstcancelsync (Backup synchronous processing cancel command) to cancel the backup synchronous processing.

  - If "snapshot(failed)" is displayed
    Delete backup history information using the swsthisdel (History information deletion command).

  - If "restore(failed)" is displayed
    Cancel restoration using 9.2.2.4 swstcancelrest (Restore cancellation command).

- In the following cases, execution status display command cannot be executed:
    - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
    - A volume group is in an inactive state in volume group specification.

9.2.2.12   swstcanceltrk (Tracking cancel command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstcanceltrk [-copy | -emergency] Device-Name (-bd Backup-Device-Name | -all)
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstcanceltrk -h Server-Name [-copy | -emergency] Device-Name (-bd Backup-
Device-Name | -all)
```

DESCRIPTION

This command stops tracking processing.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on the Storage Management Server.

-copy

Specifies that physical copying, if active, should also be stopped (the OPC session should be canceled).
This option cannot be specified for a backup volume that has already contained a backup history. For a volume whose copy destination volume has contained a backup history, delete the history information in advance using 9.2.2.7 swsthistdel (History information deletion command).

-emergency

Specifies that the command should operate in the 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 specified at the same time as the -all option.

-all

Stops the entire tracking processing specified for the transaction volumes. This option cannot be specified at the same time as the -bd option.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The following example stops the tracking processing that was specified for the backup volume from the transaction volume:

```
# /opt/FJSVswsts/bin/swstcanceltrk /dev/c1t0d3 -bd /dev/c1t0d8
/dev/c1t0d3 swstcanceltrk completed.
#
```

・ The following example stops tracking processing and physical copying that were specified for the transaction volume:

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/c1t0d3
Server Transaction-Disk  Backup-Disk Status    Execute Update
job2   /dev/c1t0d3       /dev/c1t0d3 executing 33%      -----
# /opt/FJSVswsts/bin/swstcanceltrk -copy /dev/c1t0d3 -bd /dev/c1t0d8
/dev/c1t0d3 swstcanceltrk completed.
#
```

NOTES

・ If the command is executed in emergency operation mode, no OPC session is canceled. A session that is not managed remains in operation if the command is entered during tracking. The session must be canceled using ETERNUS Web GUI.

・ Tracking processing cannot be stopped under the following condition. In this case, take action according to "System administrator response" provided for the message output.

　- When tracking processing is not performed for the specified copy source and destination volumes.

・ This command cannot be executed while one of the following commands is being executed:

　- swstsvrset (Storage Server configuration information setting command)

　- swstdevinfoset (Device information setting command)

　- swstsrsemtch (Resource matching command)

　- swstresback (Resource backup command)

　- swstresrst (Resource restore command)

9.2.2.13   swsttrkstat (Tracking status display command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swsttrkstat [Device-Name]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swsttrkstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the status of tracking processing.

When multiple types of synchronous processing are running on one transaction volume, the command displays the statuses of all types of tracking processing.

The displayed data is explained below.

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----": Not in the process of tracking "executing": In the process of physical copying and tracking "tracking": In the process of tracking "failed": Physical copying or tracking terminated abnormally. "nosession": No session exists. (eg, resource information is inconsistent.)
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on the Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If this operand is omitted, the command displays the statuses of tracking processing for all transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The following example displays the status of tracking processing of a transaction volume:

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/c1t0d3
Server Transaction-Disk Backup-Disk Status   Execute Update
job1   /dev/c1t0d3      /dev/c1t0d8 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/c1t0d3     /dev/c1t0d8  nosession ----    ----
job1  /dev/c1t0d4     /dev/c1t0d9  executing 75%     ----
job1  /dev/c1t0d5     /dev/c1t0d10 failed    ----    ----
job1  /dev/c1t0d6     /dev/c1t0d11 tracking  ----    12%
job1  /dev/c1t0d7     ----         ----      ----    ----
  :
#
```

NOTES

• When the execution status (ie, the value displayed in the "Status" column) is "failed," a hardware problem has occurred Fix cause of the problem and then re-execute the differential snapshot backup.

• When the execution status (ie, the value displayed in the "Status" column) is "nosession," the resource information is probably inconsistent. Use swstsrsemtch (Resource match command) to remove any inconsistencies from the resource information.

• The execution status of the tracking process cannot be displayed under the following conditions:

  - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

  - A volume group is in an inactive state in volume group specification.

9.2.3 Maintenance commands

This section describes the backup management maintenance commands.

9.2.3.1   swstsrsemtch (Resource match command)

NAME

swstsrsemtch - recovers resource information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsts/bin/swstsrsemtch [-x]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsts/bin/swstsrsemtch [-x] [-h Server-Name]
```

DESCRIPTION

This command recovers resource information if a system failure, etc. has made the resource information inconsistent.

OPTIONS

-h *Sever-Name*

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 files and a repository become inconsistent.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The following example recovers resource information:

```
# /opt/FJSVswsts/bin/swstsrsemtch
swstsrsemtch completed
#
```

NOTES

- This command can only be executed if none of the following commands are running:

    - swstsvrset (Storage Server configuration information setting command)

    - swstbkpolset (Backup policy setting command)

    - swstbkpoldel (Backup policy deletion command)

    - swstbackup (Backup execution command)

    - swstrestore (Restore execution command)

    - swstcancelrest (Restore cancellation command)

    - swststartsync (Backup synchronous processing start command)

    - swstcancelsync (Backup synchronous processing cancel command)

    - swstdevinfoset (Device information setting command)

    - swsthistdel (History information deletion command)

    - swstcanceltrk (Tracking cancel command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

    - swstsrsemtch (Resource match command)

9.2.3.2   swstresback (Resource backup command)

NAME

swstresback - backup of management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresback Backup-Directory
```

DESCRIPTION

A backup management file are backed up to the specified directory.

OPERANDS

Backup-Directory

Specifies the name of a directory to which the backup management file and the recovery control file will be saved.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Bacup of the backup management file.

```
# /opt/FJSVswsts/bin/swstresback /home/backup
swstresback completed
#
```

NOTES

・ You cannot perform backup if:

- The specified directory does not exist.

- Copying of data to the specified directory failed because of insufficient free space, etc.

・ This command can be executed only while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstbkpolset (Backup policy setting command)

- swstbkpoldel (Backup policy deletion command)

- swstbackup (Backup execution command)

- swstrestore (Restore execution command)

- swstcancelrest (Restore cancellation command)

- swststartsync (Backup synchronous processing start command)

- swstcancelsync (Backup synchronous processing cancel command)

- swstdevinfoset (Device information setting command)

- swsthistdel (History information deletion command)

- swstcanceltrk (Tracking cancel command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

- swstsrsemtch (Resource match command)

9.2.3.3   swstresrst (Resource restore command)

NAME

swstresrst - restore of backup management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresrst Backup-Directory
```

DESCRIPTION

A backup management file are restored from the specified directory.

OPERANDS

Backup-Directory

> The backup location directory name directed by swstresback (Resource backup command) is specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· Restore the resource management file.

```
# /opt/FJSVswsts/bin/swstresrst /home/backup
swstresrst completed
#
```

NOTES

· Before the backup management files can be restored by this command, swstsvrset (Storage Server configuration information setting command) must be executed

· You cannot perform restoration if:

  - The specified directory does not exist.

  - No backup management files exist in the specified directory.

  - Copying of data from the specified directory for restoration failed because of insufficient free space, or for some other reason.

· This command can be executed only while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstbkpolset (Backup policy setting command)

  - swstbkpoldel (Backup policy deletion command)

  - swstbackup (Backup execution command)

  - swstrestore (Restore execution command)

  - swstcancelrest (Restore cancellation command)

  - swststartsync (Backup synchronous processing start command)

  - swstcancelsync (Backup synchronous processing cancel command)

- swstdevinfoset (Device information setting command)

- swsthistdel (History information deletion command)

- swstcanceltrk (Tracking cancel command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

- swstsrsemtch (Resource match command)

9.3 Configuration Management Commands

This section explains the operation of the configuration management command. This manages the information on a server device which performs backup and replication, or is a candidate for being used for backup or replication.

Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 9.14 Operating environment for executing configuration management commands

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.
stgxfwcmsetmode	The Storage Server transaction 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 the environment variable SWSTGNODE. 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 need to be configured, and shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 9.15 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Transaction operating node	-
stgenvdisp	Not required	Transaction operating node	-
stgmgrinfobkup	Required	Transaction operating node	-
stgmgrinfodisp	Required	Transaction operating node	-
stgmgrinfoset	Required	Transaction operating node	-
stgxfwcmsetmode	Required	Transaction operating node	-

9.3.1   stgcmmodnode (Management server information change command)

NAME

stgcmmodnode - changes or displays Storage Management Server information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgcmmodnode [-i IP-Address] [-p PORT-Number] [-n Server-Name]
```

DESCRIPTION

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.

This command changes the following information on a Storage Management Server:

・ IP address of a Storage Management Server

・ PORT number used by a communication daemon that runs on a Storage Management Server

・ Server name of a Storage Management Server

Refer to the following for the change procedure which uses this command:

・ "8.5.1 Changing the IP address of a Storage Management Server"

・ "8.5.3 Changing the port number of a Storage Management Server or Storage Server"

・ "8.5.4 Changing the server name of a Storage Management Server or Storage Server"

OPTIONS

None

Displays the server information currently being managed.

-i *IP-Address*

Specifies the IP address of a Storage Management Server, to change the IP address of the Storage Management Server.

-p *PORT-Number*

Specifies the port number of a Storage Management Server, to change the port number of the Storage Management Server.

-n *Server-Name*

> 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.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ 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.
#
```

NOTES

・ This command can be executed only by root users.

・ For the PORT number of a Storage Management Server, you can specify a value between 1024 and 65535.

・ With this command, you must specify the same value as the one specified on a Storage Management Server. An error will occur in the operation if an invalid value is specified.

・ To execute this command, the AdvancedCopy Manager daemons must be stopped.
After successful execution, you must restart the AdvancedCopy Manager daemons.

9.3.2   stguserset (Repository access user change command)

The stguserset (Repository access user change command) is executed by the Storage Management Server.
For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.3   stgguiipset (GUI connection information setting command)

The stgguiipset (GUI connection information setting command) is executed by the Storage Management Server.
For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.4   stgxfwcmaddsrv (Server information addition command)

The stgxfwcmaddsrv (Server information addition command) is executed by the Storage Management Server.
For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.5　stgxfwcmmodsrv (Server information change command)

The stgxfwcmmodsrv (Server information change command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.6　stgxfwcmdelsrv (Server information deletion command)

The stgxfwcmdelsrv (Server information deletion command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.7　stgxfwcmsetdev (Device information collection/reflection command)

The stgxfwcmsetdev (Device information collection/reflection command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.8　stgxfwcmdeldev (Device information deletion command)

The stgxfwcmdeldev (Device information deletion command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.9　stgxfwcmdispsrv (Server information display command)

The stgxfwcmdispsrv (Server information display command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.10　stgxfwcmdispdev (Device information display command)

The stgxfwcmdispdev (Device information display command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.11　stgxfwcmdisppat (Partition information display command)

The stgxfwcmdisppat (Partition information display command) is executed by the Storage Management Server.

For more information refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

9.3.12　stgenvdisp (Environment information display command)

NAME

stgenvdisp - displays the values of the environment settings

SYNOPSIS

```
/opt/FJSVswstf/bin/stgenvdisp [-n Server-Name]
```

DESCRIPTION

This command displays the values of the environment settings in AdvancedCopy Manager.

The contents of the displayed information are described below.

Title	Description
Server type	The server type is displayed as follows: Management server: Storage Management Server or Storage Management Server transaction Server: Storage Server or Storage Server transaction
Cluster system	The type of cluster system is displayed as follows: SynfinityCluster or PRIMECLUSTER: SynfinityCluster or PRIMECLUSTER VERITAS Cluster Server: VERITAS Cluster Server SynfinityCluster: SynfinityCluster PRIMECLUSTER: PRIMECLUSTER MC/ServiceGuard: MC/ServiceGuard MSCS: MSCS or WSFC HACMP: High Availability Cluster Multi-Processing SunCLUSTER: SunCLUSTER
Node type	The node type is displayed as follows: Primary: Primary node Secondary: Secondary node
Node name	The logical node name is displayed. Local-Service indicates a local transaction.
Service name	The transaction name is displayed.
Cluster name	The cluster name is displayed.
Mount point	The mount point for shared data is displayed.
Disk resource	The name of the shared disk resource used for shared data is displayed.
Drive	The drive letter used for shared data is displayed.
Volume group	The volume group name is displayed.
Network name	The name of the network 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 address 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.

Title	Description
	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 Edition The RDB log file directory name is displayed.
Database space	Solaris Edition The name of the raw device containing the repository data storage DB is displayed. Linux Edition The name of the directory containing the repository data storage DB is displayed.
Database size	Windows Edition and Linux Edition only The database size is displayed.
IP address for GUI	The GUI connection IP address is displayed.
Communication	The communication service port number (the service name in the services file: stgxfws) is displayed. In a cluster environment, the transaction communication service port number (the service name in the services file: stgxfws_logical-node-name) is displayed.
Remote access	The remote access service port number (the service name in the services file: rmiswstf) is displayed.
Exclusive control	The exclusive control service port number (the service name in the services file: semswstf) is displayed.
Authentication feature	The authentication feature service port number (the service name in the services file: smaclmgr) is displayed.
Repository	Windows Edition and Solaris Edition only The repository service port number (the service name in the services file: rdaswstf) is displayed.
Resource Type	Solaris and Linux only Displays the resource type. Procedure: Procedure resource CmdLine: Command line resource
Network Resource	Solaris only Displays the name of the logical hostname resource or the name of the shared address resource.
Program install directory	Displays the program directory specified during installation.
Fixed configuration directory	Displays the environment settings directory specified during installation.
Modifying configuration directory	Displays the transactions directory specified during installation.
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type.

Title	Description
	JAPANESE: Domestic edition ENGLISH: International edition
Code	Solaris and Linux only Displays the encoding specified during installation.

OPTIONS

-n *Sever-Name*

Specifies the logical node name (logical node name specified in the cluster setup command) of the transaction.

In a cluster environment

If this option is specified, information on only the specified transactions is output. Otherwise, information on all transactions is output.

In a non-cluster environment

This option cannot be specified. If the option is specified, then message swstf6001 is output and processing ends. Otherwise, information is output.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ 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               : 14.1
  Language              : JAPANESE
  Program install directory       : /opt
  Fixed configuration directory   : /etc/opt
  Modifying configuration directory  : /var/opt
 #
```

・ Information on all transactions in a cluster environment (MC/ServiceGuard) is displayed.

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type           : Server
  Cluster system        : MC/ServiceGuard
  Node type             : Primary
  Node name             : nodeagt1
  Service name          : agent_service1
  Mount point           : /acmagt1disk
  Volume group          : vg01
  Subnet musk           : 255.255.255.0
  IP by cluster setup   : 10.10.10.10
  Manager IP address    : 10.10.10.10
  Communication         : 11000
 -----------------------------------------------------------------------
  Server type           : Server
  Cluster system        : MC/ServiceGuard
```

```
  Node type              : Secondary
  Node name              : nodeagt2
  Service name           : agent_service2
  Mount point            : /acmagt2disk
  Volume group           : vg02
  Subnet musk            : 255.255.255.0
  IP by cluster setup    : 10.10.10.10
  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                : 14.1
  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                : 14.1
  Language               : JAPANESE
  Program install directory        : /opt
  Fixed configuration directory    : /etc/opt
  Modifying configuration directory  : /var/opt
 #
```

NOTES

・ 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 and then execute the command.

・ When this command is executed in a cluster environment, the environment variable (SWSTGNODE) need not be set.

- ・ This command can be executed only by root users.

- ・ "????" is displayed for any information that cannot be displayed because of an error.

- ・ Some items may not be output, depending on the or cluster type.

9.3.13 stgmgrinfoset (Management information package backup server registration/deletion command)

NAME

stgmgrinfoset - registers. deletes or displays the management information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfoset [-del | -d Directory-Name -c storage-management-server-encoding]
```

DESCRIPTION

This command can be used to register, delete or display information about the management information package backup execution server(the server on which stgmgrinfobkup (Management information package backup command) is executed).

- ・ This command registers the management information package backup execution server

- ・ The command deletes the management information package backup execution server.

- ・ The command displays information about the management information package backup execution server.

OPTIONS

None

　Displays information about the management information package backup execution server.

-del

　Deletes the management information package backup execution server.

-d *Directory-Name*

　Specify the absolute 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 ASCII

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- ・ Register the management information package backup execution server.

　(assume that the path to the directory where backup data is to be stored is /stgbkupdata, and the encoding used on the Storage Management Server is ASCII):

```
# /opt/FJSVswstf/bin/stgmgrinfoset -d /stgbkupdata -c ASCII
swstf3000 The server which performs package backup of the management information on AdvancedCopy
Manager was registered.
#
```

・ Delete the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfoset -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/stgmgrinfoset
Directory   : /stgbkupdata
Manager code : ASCII
#
```

NOTES

・ This command can be executed only by root users.

・ 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　stgmgrinfobkup (Management information package backup command)

NAME

stgmgrinfobkup - backup the management information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfobkup [-n Server-Name] [-t Backup-Type]
```

DESCRIPTION

This command backup the management information stored on the Storage Server and the Storage Management Server.

OPTIONS

-n *Sever-Name*

Creates backups of the management information stored on the specified server.
If this option is not specified, the management information on all Storage Server (including the Storage Management Server) is backed up.

-t *Backup-Type*

 Specifies the types of data that are to be backed up. Specify one of the values listed below. Do not specify more than one value in the -t option:

 DBData : Database
 RegiData : Registry
 MgrInfoData : Policy file for management information package backup
 AuthData : Authentication management list
 BkupData : Backup management
 ReplData : Replication management
 TapeData : Tape backup management backup

 If this option is not specified, backups are created as defined in the policy file.For details on the policy file, refer to the section "8.1.2.1 Preliminaries".

EXIT STATUS

 =0:Completed successfully

 >0:Terminated abnormally

EXAMPLES

・ Back up the management information on all the Storage Server 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.
#
```

・ Back up the management information on Storage Server 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.
#
```

・ Back up the registries on all of the Storage Server.

```
# /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.
#
```

- Back up the backup management located on Storage Server

```
# /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.
#
```

NOTES

- This command can be executed only by root users.

- Be sure to check the information (ie, a message indicating completion or an error) that is output by this command.

- This command can be executed only on the management information package backup execution server.

- Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.

- Do not execute other AdvancedCopy Manager commands or 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 Server with Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier.

9.3.15 stgmgrinfodisp (Management information package backup status display command)

NAME

stgmgrinfodisp - displays the status of execution of the stgmgrinfobkup

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfodisp [-n server-name]
```

DESCRIPTION

This command displays the status of execution of stgmgrinfobkup (Management information package backup command).
The types of information listed below are output.
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, then no data is output.

Item	Description
Server	Server name

Item	Description
RegiData	Date and time at which the management information package backup command created a backup of a registry (ie, the date and time that the management information package backup command was executed) In yy/mm/dd hh:mm:ss format
DBData	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	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	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	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	Date and time at which the management information package backup command created a backup of the policy file for management information package backup (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
TapeData	Date when a backup of backup management to tape was made by package backup using the management information command ie, with package backup of the management information command executed) yy/mm/dd hh:mm:ss

OPTIONS

-n *Sever-Name*

Specifies the name of the server where the backup status is to be output.
If this option is not specified, the status of backups on the Storage Server for which the management information package backup command was executed is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Output the information about all the Storage Server:

```
# /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 the 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
 #
```

NOTES

・ This command can be executed only by root users.

・ This command can be executed only 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.

9.3.16 stgxfwcmsetmode (Information collection mode configuration command)

NAME

stgxfwcmsetmode - sets the collection mode for information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgxfwcmsetmode -leg {on | off | disp}
```

DESCRIPTION

This command sets the collection mode for information collected by the server.
It also displays the collection mode that is currently set.

This command must be executed from the Storage Server.

OPTIONS

-leg {on | off | disp}

This option sets whether information is collected using the new devices included with HP-UX 11iv3 or later (/dev/(r)disk/disk#) or legacy devices (/dev/(r)dsk/c#t#d#). For information on each device, refer to "1.5 Managing a Device on AdvancedCopy Manager". The values that can be specified are as follows:

on : Use a legacy device.
off : Use a new device.
disp : Check the current setup status.

Information output when disp is specified

leg : on Use a legacy device
leg : off Use a new device.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Set configuration so that a legacy device is used.

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -leg on
stgxfwcmsetmode completed (SWSTGNODE=nodemgr)
#
```

・ Check the current setup status.

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -leg disp
leg: on (SWSTGNODE=null)
#
```

NOTES

・ If this command is used to change the set value at a time when information concerning managed devices exists, a message indicating that device information has been changed may be posted the next time device information is collected or displayed. Therefore, the backup management and replication management definition information must be deleted before the setting is changed.

・ This command cannot be executed with HP-UX 11iv2 or earlier.

・ If no legacy devices exist, it is not possible to set the configuration so that legacy devices are used.

9.4 Replication Management Commands

This section describes operations using Replication Management Commands.

🛈 Note

Only a root user can execute all the commands of replication management. When command execution is carried out by other users, a message "swsrp0601 This Command cannot be run. This is because the user is not a root user." is displayed, and the command aborts.

🛈 Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 9.16 Operating environment when executing replication management commands

Command	Operating environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be operating.

Command	Operating environment of AdvancedCopy Manager
	When the Storage Server runs on Windows and is in EC operation, Windows services required by the copy destination Storage Server must be running (except when the -m option or -t option is specified). For inter-server replication in EC equivalency status, the associated server must be operating (except when the -m option is specified).
swsrpchsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpdelvol	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running (except when the -d option is specified).
swsrprecbuffstat	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrprecbuffset	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpmake	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows and is engaged in intra-server replication and EC operation, Windows services required by the Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running (except when the -m option or -t option is specified).
swsrprecoverres	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running. To specify the -r option, Windows services required by the Storage Management Server must be running.
swsrprevsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpsetvol	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running.
swsrpstartsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running.

Command	Operating environment of AdvancedCopy Manager
	For inter-server replication, the associated server must be running (except a case where the -m option is specified).
swsrpstat	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpvolinfo	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.

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. 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 shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 9.17 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swsrpsetvol	Required	Transaction operation node	-
swsrpvolinfo	Required	Transaction operation node	-
swsrpdelvol	Required	Transaction operation node	-
swsrprecbuffstat	Required	Transaction operation node	-
swsrprecbuffset	Required	Transaction operation node	-
swsrpstartsync	Required	Transaction operation node	-
swsrpmake	Required	Transaction operation node	-
swsrpstat	Required	Transaction operation node	-
swsrpcancel	Required	Transaction operation node	-
swsrpchsync	Required	Transaction operation node	-
swsrprevsync	Required	Transaction operation node	-
swsrprecoverres	Required	Transaction operation node	-

9.4.1 Environment definition commands

This section describes environment definition commands for replication management.

9.4.1.1 swsrpsetvol (Replication volume information setting command)

NAME

swsrpsetvol - sets the replication source volumes and replication destination volumes

SYNOPSIS

To be executed on a Storage Server

For replication on a server

```
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

For replication between servers

```
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u]  -o (ORG|REP|BOTH) [-Xgroup Group-Name] Original-
Volume-Name Replica-Volume-Name
```

To be executed on a Storage Management Server

For replication on a server

```
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] [-Xgroup Group-Name] Original-Volume-
Name Replica-Volume-Name
```

For replication between servers

```
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

This command sets the replication source volumes and replication destination volumes that will be used in a replication operation. Execute this command to declare that the replication operation will performed using the specified replication volumes.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server that is subject to the replication 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 the target of the processing.

-u

Specifies the direction of copying.
If this option is specified, copying is performed only in the direction from replication source volume to a replication destination volume. Copying from a replication destination volume to a replication source volume is prohibited.
If this option is omitted, copying between the replication source and replication destination volumes is bidirectional.

-o {ORG|REP|BOTH}

Specifies the operation server.
Specify one of the following for this operand:

ORG: Sets the replication source server as the operation server.
REP: Sets the replication destination server as the operation server.
BOTH: Sets both the copy-source server and copy-destination server as operation servers.
On the server that is not specified as the operation server, only the following commands can be executed for a replication volume:

- swsrpvolinfo (Replication volume information display command)

- swsrpstat (Operation status display command)

- swsrpcancel (Replication cancellation command) (The forcible stop option is required.)

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.

This option is valid only for replication between servers.

-n

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.

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).

When the volume sizes of the replication source volume and replication destination volume are different, copying is performed as follows:

The address at which copying starts is the first sector of the replication destination volume.

The copy data size is the size of the smaller volume.

Therefore, ensure that the size of the copy destination volume is the same size or larger than the size of the copy source volume.

-Xgroup *Group-Name*

Specifies that the copy source and copy destination volumes will be registered in a group.

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.

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.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.

For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume 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."

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Set replication volume information by specifying volume/dev/dsk/c1t2d0 of Storage Server SRC-SV as the replication source volume, and volume /dev/dsk/c1t2d0 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/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
swsrpsetvol completed
#
```

- When the same configuration is made from TARG-SV, the example is as follows (be careful with the volume name):

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0
swsrpsetvol completed
#
```

NOTES

・ Replication volume information cannot be set if:

- Replication volume information has already been set.

- The specified replication source volume and replication destination volume are already set as the replication destination volume and the replication source volume respectively.

- 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).

- If the replication source volume and the replication destination volume are located on another ETERNUS disk storage systems, the remote copy function of the ETERNUS disk storage systems 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 that cannot be supported by AdvancedCopy Manager.

- A volume group is inactive in the volume group specification.

- The replication source volume or the replication destination volume exists in ETERNUS DX60, ETERNUS DX80 or ETERNUS DX90, and the license of its ETERNUS disk storage system is not registered in the License Manager.

・ When using a volume group as a source volume or replica volume, the following applies:

- 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 configuration the same.

・ When you change physical information on volumes (ie, partition size, drive letter, and cabinet information on ETERNUS disk storage systems device using such functions as an OS management tool (format command etc) or ETERNUS Web GUI provided by ETERNUS Storage Server, 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 swsrpdelvol (Replication volume information deletion command)

2. In the GUI client, "information acquisition / Display" of all devices is performed, otherwise stgxfwcmsetdev (Device information collection / reflection command) is executed in a Storage Management Server.

3. Reset the replication volume information using swsrpsetvol (Replication volume information configuration command).

・ When you use a replication destination volume by mounting after a replication volume is created in another partition, 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.

・ Group configurations cannot be made in the following cases:

- When the group configuration conditions are not met

- When both servers involved in inter-server replication are not running version 13.0 or later

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

9.4.1.2   swsrpvolinfo (Replication volume information display command)

NAME

swsrpvolinfo - displays the replication volume information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrpvolinfo [-L] [Original-Volumue-Name]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrpvolinfo -h Server-Name [-L] [Original-Volume-Name]
```

DESCRIPTION

This command displays the replication volume information registered by swsrpsetvol (Replication volume information setting command).
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Original-Volume	Displays a replication source volume name.
Size	Displays the volume size. Additionally, in the case of a volume group, displays the size of the physical disk on which the logical disk exists.
Replica-Volume	Displays a replication destination volume name.
Copy	Displays 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	Displays the operation server of a pair of replication volumes. original: The replication source server is the operation server. replica: The replication destination server is the operation server. both: Sets both the copy-source server and copy-destination server as operation servers.
Group [Only when -L option is specified]	Displays the group name. "----"is displayed if the copy source and destination volumes are not registered in a group.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

-L

Specifies that information will 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 may be expanded to support new functions provided by future versions.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume 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.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Direct that all the replication volume information on a Storage Management Server is to be displayed on Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpvolinfo -h SRC-SV
Server Original-Volume        Size        Replica-Volume        Size        Copy        Op-
Server
SRC-SV /dev/dsk/c1t2d0@SRC-SV    4.0Gbyte /dev/dsk/c1t2d0@TARG-SV    4.0Gbyte uni-direction
original
SRC-SV /dev/dsk/c1t2d1@SRC-SV    4.0Gbyte /dev/dsk/c1t2d1@TARG-SV    5.0Gbyte bi-direction
original
SRC-SV /dev/dsk/c1t2d2@SRC-SV    9.1Gbyte /dev/dsk/c1t2d2@TARG-SV    9.1Gbte  bi-direction
replica
SRC-SV /dev/dsk/c1t2d3@SRC-SV    7.5Gbyte /dev/dsk/c1t2d3@TARG-SV    7.5Gbte  bi-direction  both
#
```

NOTES

- Replication volume information cannot be displayed if:

  - The specified volume has not been set as a replication source volume

- This command cannot be executed while the following command is running:

  - swsrprecoverres (Resource adjustment command)

9.4.1.3   swsrpdelvol (Replication volume information deletion command)

NAME

swsrpdelvol - delete the replication volume

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrpdelvol -h Server-Name [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

Delete the replication volume information that has been set.
If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

-e

Emergency mode is available for operations.
Specifies deleting replica volume information without checking the execution state of an advanced copy. Use this option only when it is clear that the advanced copy has not executed.

-d

Specifies that no communication should take place between the linked servers in replication between servers. When this option is specified, replication volume information is deleted without communication taking place between the linked servers.
Use the option only when recovery of one of the linked servers cannot be expected.
The option is valid only for replication between servers.
The option can be used on the server not specified as the operation server.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume 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."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Delete replication volume information on Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpdelvol /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
swsrpdelvol completed
#
```

NOTES

・ 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.

 - A volume group is inactive in the volume group specification.

 - However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUS Web GUI must be used to cancel these sessions.

・ 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 in the replica volume to be deleted (if an advanced copy is running, stop the advanced copy with ETERNUS disk storage systems, 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.

・ This command cannot be executed while any of the following commands are running:

 - swsrpsetvol (Replication volume information setting command)

 - swsrpdelvol (Replication volume information deletion command)

 - swsrpstartsync (Backup synchronous processing start command)

 - swsrpmake (Replication creation command)

 - swsrpcancel (Replication cancellation command)

 - swsrpchsync (Synchronization mode change command)

 - swsrprevsync (Synchronization reverse command)

 - swsrprecoverres (Resource adjustment command)

9.4.1.4　swsrprecbuffstat (REC transfer buffer information display command)

NAME

swsrprecbuffstat - displays information for the transfer buffer

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrprecbuffstat Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrprecbuffstat -h Server-Name Volume-Name
```

DESCRIPTION

This command displays information for the transfer buffer used by ETERNUS disk storage systems when REC is performed in Consistency mode.

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
Rate	The usage rate of the transfer buffer as a percentage. **If the usage is SEND** Displays the usage rate of the transfer buffer as a percentage. This will never be 0%, even if REC is not being performed in asynchronous Consistency mode. **If the usage is RECV** "0%" will always be displayed. "----" will be displayed if the transfer buffer cannot be used.
RemoteBoxID	The box identifier for the cabinet performing a remote copy.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

OPERANDS

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.

Specifies an 1.5 Managing a Device on AdvancedCopy Manager as the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display information for the transfer buffer used by the REC, and replication is performed within the Storage Server "Server1".

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

```
ID Use   Rate RemoteBoxID
1  SEND 25%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use   Rate RemoteBoxID
1  RECV 0%    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

・ 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".

[Command executed on Storage Server "Server1"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use   Rate RemoteBoxID
1  SEND 25%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```

[Command executed on Storage Server "Server2"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d20@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use   Rate RemoteBoxID
1  RECV 0%    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2  SEND 12%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

・ Display information for the transfer buffer used by the REC if a cabinet where the copy source volume is located 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/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use   Rate RemoteBoxID
1  SEND 25%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
3  SEND 12%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
4  RECV 0%    CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
5  SEND 12%   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
6  RECV 0%    EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
7  SEND 12%   FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
8  SEND 12%   GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
#
```

NOTES

・ 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.

・ 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.

・ This command cannot be executed while the following command is running:

  - swsrprecoverres (Resource adjustment command)

9.4.1.5   swsrprecbuffset (REC transfer buffer settings change command)

NAME

swsrprecbuffset - changes the settings of the transfer buffer

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrprecbuffset -h Server-Name -Xbuffid buffer-id -Xbuffuse {SEND|RECV} Volume-
Name
```

DESCRIPTION

This command changes the settings of the transfer buffer used by ETERNUS disk storage systems when REC is performed in Consistency mode.
For information about the setting method of REC transfer buffer, refer to "User's Guide Setup / Maintenance" of ETERNUS Web GUI.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

-Xbuffid *buffer-id*

Specifies the ID for the transfer buffer.

-Xbuffuse {SEND|RECV}

Specifies the usage for the transfer buffer.

SEND : Transfer buffer for sending data
RECV : Transfer buffer for receiving data

OPERANDS

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.

Specifies an 1.5 Managing a Device on AdvancedCopy Manager as the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Change the attributes for the transfer buffer used by the REC, and replication is being performed within the Storage Server "Server1"

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse RECV /dev/dsk/c1t2d10@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

・ Change the connected cabinet for the transfer buffer of the copy source volume , and replication is being performed between Storage Server "Server1" and Storage Server "Server2".

[Command executed on Storage Server "Server1"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 2 -Xbuffuse RECV /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```

NOTES

・ 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.

・ This command cannot be executed while any of the following commands are running:

    - swsrpsetvol (Replication volume information setting command)

    - swsrpdelvol (Replication volume information deletion command)

    - swsrpstartsync (Backup synchronous processing start command)

    - swsrpmake (Replication creation command)

9.4.2 Operation commands

This section describes operation commands for replication management.

9.4.2.1   swsrpstartsync (Synchronous processing start command)

NAME

swsrpstartsync - starts synchronous processing

SYNOPSIS

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
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-
Xreverse] -Xgroup Group-Name
```

To be 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] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

Start the synchronous 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.

OPTIONS

-h *Sever-Name*

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 (the -y option) on a box that does not support Automatic Split mode.

-k

Specifies the setting of transfer mode for inter-box synchronization in Stack mode. This option is valid only when total copy is started for inter-box replication.

Not specifying the -y, -k, or -i option sets asynchronous write mode.

-i

Specifies the setting of transfer mode for inter-box synchronization in Consistency mode. This option is valid only when total copy is started for inter-box replication.

Not specifying the -y, -k, or -i option sets asynchronous write mode.

-g

Specifies the setting of recovery mode for inter-box synchronization in Manual Recovery mode. This option is valid only when total copy is started for inter-box replication.

Not specifying this option sets Automatic Recovery mode.

-m

For server-to-server replication, this 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 if any of the following conditions apply:

- AdvancedCopy Manager does not perform pre-processing or post-processing for the replication destination volume, and independent pre-processes and post-processes are inserted before and after AdvancedCopy Manager commands.

- Replication destination pre-processing and post-processing are judged to be unnecessary (for example, for databases constructed on RAW devices).

- Synchronous processing (REC) between cabinets is restarted after a forcible suspend.

-Xgroup *Group-Name*

Specifies that synchronous processing must be started for each group.

-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

Enables data that has been updated to the copy destination during replication established status when synchronous processing is restarted.

This option is valid only when inter-box replication is restarted.

This option is used to reflect to the copy destination volume only those parts of the copy source volume that have been updated, after synchronous processing has been started using the -Xskip option and backup data has been copied from the tape medium to the copy destination volume.

OPERANDS

From-Volume-Name

Specifies a replication source volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a replication destination volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Start replication from /dev/dsk/c1t2d0 of a Storage Management Server to /dev/dsk/c1t2d0@TARG-SV of Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpstartsync completed
#
```

・ Start replication for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
#
```

NOTES

・ Replication cannot be started if:

- The specified source volume and destination volume have not been set as replication volumes.

- A replication source volume is specified as the copy volume and a replication destination volume is specified as the copied material volume, and one-way copy is set as the copy attribute of the replication volume.

- Volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed after operation starts. In this case, the operation cannot continue for the corresponding volume. Stop the replication operation for the corresponding volume, and then delete and reset the replication volume information.

- For server-to-server replication, the Storage Server on which the command is executed is not the operation server of the replication volume.

- For server-to-server replication, communication with a destination server fails.

- Replication cannot be started as a result of the preceding advanced copy function.

- Option -g is specified, except for a remote copy.

- Changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager.

- A volume group is inactive in the volume group specification.

- 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.

· If the "-Xgroup" option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

· When the replication to be performed satisfies either of the following two conditions, please perform unmount of the copy target 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 abovementioned cases, If dismount have been performed, post-processing of the copy target volume at the time of duplicate creation results in an error.

· 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.

· The processing of this command varies according to the status of the synchronization processing of the specified replication source and replication destination volumes.

Table 9.18 Differences in processing corresponding to synchronization status

Status of synchronization processing	Processing
Dismount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is output and the command ends normally
Equivalency maintain status	Informational message (swsrp2401) is output and the command ends normally
Replication established status (i.e., halt status)	Start of incremental copy

· Before starting the replication, run the replication pre-processing script for the replication destination volume. The contents of this script can be customized. For more information about this, refer to "Appendix C Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing script, use the -t option.

If replication is started with the -Xgroup option specified, the replication pre-processing script is not executed for the copy destination volume. Therefore, pre-processing must be executed for all copy destination volumes in the group before this command is executed.

· To protect processing that accesses a replication destination volume, set the replication destination volume before starting replication so that other processes cannot access it. To do so, execute a dismount command. If you cannot execute dismount resulting from any of the conditions described below, this command fails and terminates.

- There is a directory in which other volumes are mounted under the mount point.

- A file in 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 by some other method.

- When configuring 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.

· If the replica volume is a volume group, do not execute the vgchange (1M) command to deactivate the replica volume under synchronous processing (EC/REC) execution. If the replica volume is inactive during synchronous processing execution then it cannot be reactivated. Additionally, it will not be possible to perform commands including those to stop synchronous processing, swsrpmake

(Replication creation command) and swsrpcancel (Replication cancel command). If it has been inactivated accidentally, make the replica volume active after stopping the synchronous processing using ETERNUS Web GUI etc.

・ Refer to "10.1.1 General notes" for notes about starting replication.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecoverres (Resource adjustment command)

9.4.2.2   swsrpmake (Replication creation command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j | -T | -Xconcur | -C | -P]) From-Volume-Name To-
Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-m] [-f] [-t] ([-j | -T | -Xconcur | -C | -P]) From-
Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -Xgroup Group-
Name
```

To be executed on a Storage Management Server: group specification

```
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse]
-Xgroup Group-Name
```

DESCRIPTION

When synchronization processing (EC) is not performed, this command will start snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) to create a replication volume.

When synchronization processing is performed, check whether the status of the processing is 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 destination volume can be accessed.

This command executes the replication pre-processing and post-processing before a replication is created. For details of these processes, refer to "Appendix C Pre-processing and Post-processing of Replication".

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-m

For server-to-server replication, this specifies that communication processing is not performed with the non-operation server. When this option is specified, volume status check processing and pre-processing and post-processing are not performed for the non-operation

server volume.

This option cannot be specified if the command is executed from the copy destination server and the -Xconcur option is specified.

This option is valid only during server-to-server replication.

-f

Specifies that the pre-processing and post-processing are not performed for a replication source volume.
Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-t

Specifies that the pre-processing and post-processing are not performed for a replication destination volume.
Use this option only 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, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-j

Specifies that copy processing 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" in synchronization processing of intercabinet replication. This option can only be used for intercabinet replication; if attempted for intracabinet 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. When restarting synchronous processing (REC) between cabinets, execute swsrpstartsync (Replication start command) with the -t option specified.

-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 the ETERNUS disk storage systems and when the ETERNUS disk storage systems support the QuickOPC function.
For a snapshot replication without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be specified to perform the replication operation using differential snapshots.

-Xgroup *Group-Name*

Specifies that a replication will be created for each group.

-Xreverse

Specifies that a replication will be created for each group in the reverse direction (i.e., from replica volumes to original volumes).

-Xconcur

Specifies that a replication will be created using the concurrent suspension function.

If this option is used, the size of the copy destination volume must be the same or larger that that of the copy source volume.

-C

Specifies that SnapOPC will be started.
This option is only valid for intra-box replications and for ETERNUS disk storage systems that support the SnapOPC function.
In order to execute SnapOPC, the copy destination volume must be a Snap Data Volume.

-P

Specifies to start SnapOPC+.
This option is only valid with intra-cabinet replications and for ETERNUS disk storage systems that support the SnapOPC+ function.
In order to execute SnapOPC+, the copy destination volume must be a Snap Data Volume.
An error occurs in the following cases:

- The same SnapOPC+ session exists at the copy source volume and the copy destination volume.

- The total number of SnapOPC+ sessions for the copy source volume exceeds 8.

OPERANDS

From-Volume-Name

Specifies a replication source volume.

Specifies the replication source volume or the replication destination volume that was set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a replication destination volume.

Specifies the replication source volume or the replication destination volume that was set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The Storage Management Server instructs Storage Server SRC-SV to create a copy of /dev/dsk/c1t2d0 in /dev/dsk/c1t2d0@TARG-SV.

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/dsk/c1t0d2 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpmake completed
#
```

・ Creates a copy for the group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
#
```

NOTES

・ Replication cannot be created if:

- The specified replication source and replication destination volumes are not set as replication volumes.

- The synchronization processing from the specified replication source volume to the replication destination volume is not in the equivalency maintenance status.

- After operation starts, physical volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed. In this case, operation for the corresponding volume cannot continue. Stop the replication operation for the volume, and then delete and reset the replication volume information.

- A 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 replication destination volume cannot be locked

- The contents of the replication destination volume lock operation specification file are invalid

- The backup management function or tape backup function uses a specified source or destination volume

・ 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.

・ When the replication to be performed satisfies either of the following conditions, please perform dismount of the copy target 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

If dismount is performed in the abovementioned case, post-processing of the copy target volume at the time of duplicate creation produces an error.

・ 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).

・ Before a replica is created, the pre-processing for the source volume and destination volume are executed (for synchronized replication, only pre-processing is executed). After the replica has been created, the post-processing for the source volume and destination volume is executed. The contents of the script can be customized. For more information about this refer to, "Appendix C Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing and post-processing scripts, use the -f option and the -t option.

If a replica is created with the -Xgroup option specified, the replication, pre-processing and post-processing scripts are not executed for the copy source volume/copy destination volume. Therefore, execute pre-processing for all copy source volumes/copy destination volumes in the group before this command is executed.
(However, for synchronous replication, pre-processing for the copy destination volume is executed when replication starts, so it need not be executed.)
In addition, post-processing must be executed after this command is executed.

・ If this command is executed during execution of snapshot processing, stop the copy processing in progress and restart the snapshot processing.

・ To protect the data, set the replication source volume before creating a replica so that other processes cannot access the volume. To do so, execute dismount. If you cannot execute dismount 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 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, dismounting, or by using some other method. If for whatever reason you do not want to remove the share setting of the replication source volume, or execute dismount or use some other method, refer to "Appendix C Pre-processing and Post-processing of Replication" and note the following:

  - When setting a volume group which consists of two or more disks as a source volume, and replicating it, make all logical devices unmount/mount using the Administrator's authority.

  - 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.

- When the replication source volume is being used by backup management, dismount may not possible. In this case, "swsrp2613 An error occurred in the pre-processing script for creating a replica. Error Code = 2" is output.

However, since a replication may not be completely performed in the abovementioned procedure when using servers other than the server which supplies this command, we recommend that you perform a replication in an environment where the copied material volume is not used.

- For Snap Data Volume, only SnapOPC and SnapOPC+ can be executed.

  Additionally, when restoring data from a Snap Data Volume, note that there must be a SnapOPC session between the copy source volume and the copy destination volume (Snap Data Volume).

- If this command is executed during snapshot processing, snapshot processing is restarted.
  Refer to the following table for details of copy operation:

Table 9.19 Copy operation when command is executed during snapshot processing

Operation status (Display by swsrpstat -L)	-T option specification	Copy operation
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 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 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.

- Refer to "10.1.1 General notes" for notes on creating replication.

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecoverres (Resource adjustment command)

9.4.2.3 swsrpstat (Operation status display command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

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]
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrpstat [-L] [-E] [-O] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
/opt/FJSVswsrp/bin/swsrpstat -h Server-Name [-L] [-E] [-O] -Xgroup Group-Name
```

DESCRIPTION

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.

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. 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.
Status	Displays the execution status. ---- : Copying is not being performed. sync: Total copy or incremental copy is being performed. equivalent: Equivalency maintained status replicated: Replication established status copy-on-write: SnapOPC processing is being performed. copy-on-write(active): SnapOPC+ processing is being performed (most recent snap generation). copy-on-write(inactive): SnapOPC+ processing is being performed (past snap generation). failed: Error suspend status failed(badsector): There is a bad sector in the copy source failed(overflow): There is insufficient Snap Data Volume or Snap Data Pool capacity failed(other): The error suspend status is neither failed(badsector) or failed(overflow). halt: Hard suspend status halt(sync): Hard suspend status (hard suspend status has been entered during a REC total copy or differential copy) halt(equivalent): Hard suspend status (hard suspend status has been entered during an REC equivalency maintenance state) snap: OPC or QuickOPC processing is being performed. ?????: Failed to get copy status.
Execute	Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed.
Trk	Displays whether tracking processing is in progress. on: Tracking processing is in progress. off: Tracking processing is not in progress. ----: Snapshot processing is not being performed.
Update	Displays the percentage of data that has been updated since the last copy was created, in the cases shown below. For SnapOPC+, this displays the percentage of data that has been updated since the previous snap generation.

Title	Description
	・ When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not being executed).
	・ When the Status column is "copy-on-write" (that is, when SnapOPC processing is in progress)
	・ When the Status column is "copy-on-write(active)" (that is, when SnapOPC+ (most recent snap generation) is being performed)
	・ When the Status column is "copy-on-write(inactive)" (that is, when SnapOPC+ (past snap generation) is being performed)
	Displays "----" during physical copying or when tracking is not in progress.
Rcv	Indicates the Recovery mode for Inter-ETERNUS synchronization. auto: Automatic Recovery mode manual: Manual Recovery mode ----: Inter-ETERNUS synchronous replication (REC) is not performed.
Split	Indicates the Split mode for Inter-ETERNUS synchronization. auto: Automatic Split mode manual: Manual Split mode ----: Inter-ETERNUS synchronous replication (REC) is not performed using the Synchronous mode.
Xfer	Indicates the Transfer for Inter-ETERNUS synchronization. sync: Synchronous mode async: Asynchronous mode stack: Stack mode consist: Consistency mode ----: Inter-ETERNUS synchronous replication (REC) is not performed.
Snap-Gen	When SnapOPC+ is performed, displays the snap generation number (1 to 8). When SnapOPC+ is not performed, "----" is displayed. 1 is the oldest snap generation, and the snap generation number increases until the most recent generation is reached.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-L

Specifies that display will be in extension format.
For the items displayed by this option, refer to the table in the example following.
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.
In case this option is set, the operational status in the normal direction will not be displayed. Only the operational status in the opposite direction will be displayed.
This option can be used to check the operational status of an OPC session performed in the opposite direction if a QuickOPC/SnapOPC session in the normal direction exists.

-Xgroup *Group-Name*

> 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.

-O

> Changes the error suspend(failed)status Status field display method.
> If this option is specified, the display will be as follows:
> There is a bad sector: "failed(badsector)"
> When there is insufficient Snap Data Volume or Snap Data Pool capacity: "failed(overflow)"
> All other cases: "failed(other)"

OPERANDS

Original-Volume-Name

> Specifies a replication source volume name.
> For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
> Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume 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.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Direct that all the replication operation statuses for Storage Server SRC-SV be displayed on the Storage Management Server.

```
# /opt/FJSVswsrp/bin/swsrpstat -h SRC-SV
Server Original-Volume       Replica-Volume         Direction Status     Execute
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular   replicated ----
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV ----      ----       ----
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@TARG-SV reverse   snap       45%
#
```

- From Storage Management Server to Storage Server: Instruct SRC-SV to display the status of all replication operations (with the -L option specified).

```
# /opt/FJSVswsrp/bin/swsrpstat -L
Server Original-Volume       Replica-Volume         Direction Status                Execute
Trk  Update Rcv  Split Xfer  Snap-Gen
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular   replicated            ----
---- ----   auto ----  async ----
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV ----      ----                  ----
on   6%     ---- ---- ---- ----
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@TARG-SV reverse   snap                  45%
off  ----   ---- ---- ---- ----
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d1@TARG-SV regular   copy-on-write(inactive) ----
off  0%     ---- ---- ---- 1
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d2@TARG-SV regular   copy-on-write(inactive) ----
off  5%     ---- ---- ---- 2
```

```
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d3@TARG-SV regular   copy-on-write(active)   ----
off  6%       ---- ---- ---- 3
#
```

NOTES

- When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to "8.4 Hardware or Other Error during Replication" and take action.

- 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 by AdvancedCopy Manager.

  - A volume group is inactive in the volume group specification.

- This command cannot be executed while the following command is running:

  - swsrprecoverres (Resource adjustment command)

9.4.2.4   swsrpcancel (Replication cancellation command)

NAME

swsrpcancel - stops snapshot processing and synchronization processing

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] From-Volume-Name To-
Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] From-
Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] [-Xreverse] -Xgroup Group-
Name
```

To be executed on a Storage Management Server: group specification

```
/opt/FJSVswsrp/bin/swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] [-
Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-c

Specifies that the copy processing is forcibly stopped from a non-operation server when the operation server cannot be used because of a system failure. If this option is used, the copy processing is stopped without implementing 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 are not performed for the replication destination volume of a non-operation server.
This option is valid only during server-to-server replication.

-f

When stopping synchronous processing under the equivalency maintained status, specify that pre-processing and post-processing for the copy source volume is not 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, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-t

When stopping the synchronous processing under the equivalency maintained status, this specifies that post-processing for the copy destination volume will not be executed.
Use this option only 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, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-b

Specifies that the inter-cabinet copy operation in the halt status be stopped.
For replication on a single server, the copying is cancelled for both cabinets.
For replication between servers, the copying is cancelled only for the cabinet connected to the server on which this command was executed.
Use the option only for a copy operation in the halt status and whose recovery is not expected to be done successfully.
The option is valid only for a copy operation in the HALT status.
The option can be used on the server that is 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.

-T

Specifies that differential snapshot processing will be terminated.
This option only terminates tracking processing and does not terminate snapshot processing (OPC physical copying) when it is in progress. This option releases the OPC session if snapshot processing (i.e., OPC physical copying) is complete.
This option can only be used while physical copying or tracking is in progress.

If this option is specified together with the -Xgroup option, only tracking processing within the group is stopped.

-Xgroup *Group-Name*

Specifies that copy processing will be stopped for each group.

-Xreverse

Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) will be stopped.

-Xforce

Specification of this option forcibly stops a SnapOPC+ session.

Forcibly stopping SnapOPC+ stops the specified snap generation and all earlier snap generations.

This option can be specified even if there is only one snap generation.

This option is a SnapOPC+ fixed option.

If this option is specified at the same time as the -Xgroup option, the SnapOPC+ sessions in that group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

OPERANDS

From-Volume-Name

Specifies a copy source volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ On the Storage Management Server, direct that copying from /dev/dsk/c1t2d0 to /dev/dsk/c1t2d0@TARG-SV is stopped for Storage Server SRC-SV.

```
#/opt/FJSVswsrp/bin/swsrpcancel -h SRC-SV /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpcancel completed
#
```

・ Stops copy processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
#
```

NOTES

・ Following execution with the -b option specified in replication on a server, the command stops normally when cancellation of the copying succeeds in either of the cabinets.

・ Copy processing cannot be performed if:

- The specified replication source volume and replication destination volume have not been set as replication volumes.

- The copy processing is not performed for the specified replication source and replication destination volumes.

- For server-to-server replication, the Storage Server on which the command is executed is not the operation server of the replication volume.

- For server-to-server replication, communication with a destination server fails.

- - 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.

- - When the backup management function or tape backup function uses a specified source or destination volume

・ If the -Xgroup option is specified, processing will be performed for each active replication volume, but processing will be terminated without canceling replication in the following case:

- - If no replication volumes have been copied

- - When you execute "-b" option specifying a non existent copy in the "halt" state in the group.

- - When you execute "-T" option specifying a non existent copy in the tracking process of QuickOPC in the group.

Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

・ When stopping SnapOPC+ sessions, the oldest snap generation must be stopped first.
Specify the -Xforce option to forcibly stop the second and subsequent snap generations. However, note that this option stops the specified snap generation and all earlier snap generations.
If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

・ The volume information for the specified volume is not checked (check for matching of 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.

・ The following processing is performed depending on the operation status of the specified replication source volume and replication destination volume.

Table 9.20 Processing differences in accordance with operating status

Operation status	Processing
Reverse copy direction	Suspends the processing.
Not operating yet	Suspends the processing.
Total or incremental copy is performed	Suspends synchronization processing. The replication destination volume cannot be used.
Equivalency maintain status	Suspends synchronization processing. The replication destination volume can be used as a copy
Replication established status	Suspends synchronization processing. The replication destination volume can be used as a copy
Snapshot processing is being performed	Stops the snapshot processing. The replication destination volume cannot be used.

・ 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 status.

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 swsrpstartsync (Replication start command) with the "-t" option specified.

- - To execute replication
  Execute swsrpmake (Replication creation command) with the "-t" option specified. After replication is completed, mount the replica volume.

- When the -T option is not specified

  command processing varies depending on the operation status of the source and destination volumes.

Table 9.21 Processing when the -T option is not specified

Operation status (Display by 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 maintained 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 9.22 Processing when the -T option is specified

Operation status (Display by 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".)	Processing is interrupted.
Equivalency maintained 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.

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

9.4.2.5   swsrpchsync (Synchronization mode change command)

NAME

swsrpchsync - changes the operation mode

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrpchsync [-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/swsrpchsync -h Server-Name [-F {Sync|Async|Stack|Consist}] [-R{Auto|Manual}] [-
S {Auto|Manual}] From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrpchsync [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|
Manual}] [-Xreverse] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
/opt/FJSVswsrp/bin/swsrpchsync -h Server-Name [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-
S {Auto|Manual}] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

-F {Sync|Async|Stack|Consist}

Changes the transfer mode.
You can specify one of the following parameters in the operand:

Sync: Changes to Synchronous mode.
Async: Changes to Asynchronous (i.e., sequential transfer) mode.
Stack: Changes to Stack mode.
Consist: Changes to Consistency mode.

Changing the transfer mode requires this option.
You can only specify the -S option together with the -F Sync option.
Specifying the -F Sync option to change the transfer mode from a non-synchronous mode to the synchronous mode without specifying
the -S option sets the automatic split mode.

-R {Auto|Manual}

Changes the recovery mode.
You can specify either of the following parameters in the operand:

Auto: Changes to Automatic Recovery mode.
Manual: Changes to Manual Recovery mode.

Changing the recovery mode requires this option.

-S {Auto|Manual}

Changes the split mode.
You can specify either of the following parameters in the operand:

Auto: Changes to Automatic Split mode.
Manual: Changes to Manual Split mode.

Changing the split mode requires this option.
To specify this option, you must also specify -F Sync, or the transfer mode of the current synchronization must be synchronous mode.

-Xgroup *Group-Name*

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.

OPERANDS

From-Volume-Name

Specifies a copy source volume name.
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name.
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- From Storage Management Server to Storage Server: Instruct SRC-SV to change the transfer mode for inter-box synchronization between /dev/dsk/c1t2d3@SRC-SV and /dev/dsk/c1t2d3@TARG-SV from Consistency mode to Asynchronous mode.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume      Replica-Volume        Direction Status Execute Trk  Rcv  Split Xfer
Snap-Gen
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV regular   sync   99%    ---- auto ----
consist ----
:
#/opt/FJSVswsrp/bin/swsrpchsync -h SRC-SV -F Async /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV
FROM=/dev/dsk/c1t2d3@SRC-SV, TO=/dev/dsk/c1t2d3@TARG-SV swsrpchsync completed
:
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume      Replica-Volume        Direction Status    Execute Trk Rcv  Split
Xfer Snap-Gen
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV regular   equivalent 100%   ---- auto ----
async ----
#
```

- Specify that the transfer mode of inter-box synchronous processing for group "GRP1" be changed from consistency mode to asynchronous mode.

```
# /opt/FJSVswsrp/bin/swsrpchsync -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsync completed
#
```

NOTES

- In any of the following cases, you cannot change the operation mode of inter-box synchronization:

    - The specified original/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 is in error-suspended status (with "failed" indicated as the Status by swsrpstat (Operation status display command) or hard-suspended status (with "halt" indicated as the Status by swsrpstat (Operation status display command) .

    - The ETERNUS disk storage systems in which the specified original/replica volume is placed do not support the operation mode change function.

    - 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.

- 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 there is at least one replication volume that meets 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.

- If the REC operating mode is changed while in equivalency maintenance status, after the operating mode is changed, users must wait until the equivalency maintenance status is attained.

- This command cannot be executed while any of the following commands are running:

    - swsrpsetvol (Replication volume information setting command)

    - swsrpdelvol (Replication volume information deletion command)

    - swsrprecoverres (Resource adjustment command)

9.4.2.6   swsrprevsync (Synchronization reverse command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrprevsync From-Volume-Name To-Volume-Name
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
/opt/FJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command reverses the copying direction of synchronization when in suspended status.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can only use this option for a Storage Management Server.

-Xgroup *Group-Name*

Changes the direction of synchronous processing for each group.

-Xreverse

Specifies that the direction of synchronous processing that is being executed in reverse direction (i.e., from replica volumes to original volumes)will be inverted.

OPERANDS

From-Volume-Name

Specifies a copy source volume name. (as the destination in the reverse direction)
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name. (as the source in the reverse direction)
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- From Storage Management Server to Storage Server: Instruct SRC-SV to reverse the copying direction of synchronization between /dev/dsk/c1t2d3@SRC-SV and /dev/dsk/c1t2d3@TARG-SV.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume       Replica-Volume          Direction   Status      Execute
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV reverse     replicated ----
#/opt/FJSVswsrp/bin/swsrprevsync /dev/dsk/c1t2d3@TARG-SV /dev/dsk/c1t2d3@SRC-SV
FROM=/dev/dsk/c1t2d3@SRC-SV,TO=/dev/dsk/c1t2d3@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume       Replica-Volume          Direction   Status      Execute
```

```
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV regular    replicated ----
#
```

- Change the direction of synchronous processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
#
```

NOTES

- In any of the following cases, you cannot reverse the direction of synchronization:

  - The specified original/replica volume has not been configured as a replica volume.

  - Unidirectional copying has been specified in the copying attribute for the replica volume.

  - In inter-server replication, the Storage Server on which you execute the command is not the operation server for the replica volume.

  - Replication has not been established in synchronization from the specified source volume to the destination volume.

  - The ETERNUS disk storage systems in which the specified original/replica volume is placed do not support the reverse function.

  - 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.

- 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 there is at least one replication volume that meets 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.

- If the -Xgroup option is specified, processing is not performed for those sessions in the group where the direction has already been changed.

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecoverres (Resource adjustment command)

9.4.3 Maintenance commands

This section describes the maintenance commands for replication management.

9.4.3.1 swsrprecoverres (Resource adjustment command)

NAME

swsrprecoverres - executes recovery to make replication management information

SYNOPSIS

To be executed on a Storage Server

```
/opt/FJSVswsrp/bin/swsrprecoverres [-r] [-p]
```

To be executed on a Storage Management Server

```
/opt/FJSVswsrp/bin/swsrprecoverres -h Server-Name [-r] [-p]
```

DESCRIPTION

This command executes recovery to make replication management information consistent if a system failure or other problem has made the replication management information inconsistent.

OPTIONS

-h *Sever-Name*

   Specifies a Storage Server name.
   This option can be used only on a Storage Management Server.

-r

   Specify this option when an incorrect status exists in the replication management files. E.g., when swsrpsetvol (Replication volume information setting command) or swsrpdelvol (Replication volume information deletion command) that update the replication management files terminate suddenly because of a forced stop, a system failure or the replication management files have been deleted by mistake.
   When this option is specified, the following processing is performed to recreate 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 ETERNUS disk storage systems are queried, and the execution information for the synchronization processing is restored.

-p

   Specifies to not perform any post-processing that has not already been performed. This option can be used when swsrpmake (Replication creation command) processing terminates suddenly because of a forced stop or system failure.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Perform resource adjustment

```
#/opt/FJSVswsrp/bin/swsrprecoverres
swsrprecoverres completed
#
```

NOTES

・ 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 swsrpsetvol (Replication volume information setting command) and swsrpdelvol (Replication volume information deletion command) 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 or a volume group is inactive in the volume group specification.

・ 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.

・ If this command is executed for the copy source volume and the copy destination volume in the status where 9.4.2.2 swsrpmake (Replication creation command) is interrupted without completing its process and the remaining processing must be completed, the replication post-processing is executed.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpvolinfo (Replication volume information display command)

- swsrpdelvol (Replication volume information deletion command)

- swsrpstartsync (Backup synchronous processing start command)

- swsrpmake (Replication creation command)

- swsrpstat (Operation status display command)

- swsrpcancel (Replication cancellation command)

- swsrpchsync (Synchronization mode change command)

- swsrprevsync (Synchronization reverse command)

- swsrprecoverres (Resource adjustment command)

9.5 Start/Stop Daemon Commands

This section describes how to start and stop AdvancedCopy Manager daemons.

Note

Notes when using commands:

・ Confirm that the SWSTGNODE environment variable is not defined.

・ Execute this command using the same LANG environment variable that of the code system used by the system.

・ Only a root user can execute this command.

・ For cluster operation, refer to "Starting and Stopping Daemons".

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 9.23 Daemons started and stopped as a package

Server type	Storage Server
Daemon name	Communication daemon

* For details on how to start a service or daemon of a Storage Management Server, refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

Starting a AdvancedCopy Manager daemon

Enter the following command to start a AdvancedCopy Manager daemon:

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

Stopping a AdvancedCopy Manager daemon

Enter the following command to stop a AdvancedCopy Manager daemon:

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

9.6 SnapOPC/SnapOPC+ Support Commands

This section explains the commands 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 9.24 Operating environment when executing SnapOPC/SnapOPC+ support commands

Command	Operating environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-

Note

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. 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.

Table 9.25 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstestupdate	Not required	Transaction operation node	-
swstsdv	Not required	Transaction operating node	-

9.6.1 swstestupdate (Update volume measurement command)

NAME

swstestupdate - measures the physical capacity of a Snap Data Volume

SYNOPSIS

When starting update volume measurements (setting up a pseudo session)

```
/opt/FJSVswsts/bin/swstestupdate start Volume-Name
```

When looking up the update volume (displaying the status of the pseudo session)

```
/opt/FJSVswsts/bin/swstestupdate status Volume-Name
```

When finishing update volume measurements (canceling the pseudo session)

```
/opt/FJSVswsts/bin/swstestupdate stop Volume-Name
```

DESCRIPTION

This command measures the physical capacity of a Snap Data Volume using the pseudo session setting function.

When starting update volume measurements (setting up a pseudo session)

Specify "start" as the subcommand to start measure of the physical capacity of a Snap Data Volume.

When looking up the update volume (displaying the status of the pseudo session)

Specify "status" as the subcommand to display the physical capacity of a Snap Data Volume.
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 in the number of blocks (1 block = 512 bytes). Displays "----" if there is no pseudo session. Displays "failed" if the pseudo session is error-suspended.

When finishing update volume measurements (canceling the pseudo session)

Specify "stop" as the subcommand to stop measure of the physical capacity of a Snap Data Volume

OPERANDS

Volume-Name

- Specifies the volume name.
  Specify a copy source volume that is used with SnapOPC/SnapOPC+ operations

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Measure the update volume

```
(Start taking measurements by starting a pseudosession)
#/opt/FJSVswsts/bin/swstestupdate start /dev/dsk/c1t2d10
/dev/dsk/c1t2d10 swstestupdate completed

(First measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
```

```
Volume-Name     Update
/dev/dsk/c1t2d10 644333

(Second measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
Volume-Name     Update
/dev/dsk/c1t2d10 1045000

(Stop taking measurements by canceling the pseudosession)
# /opt/FJSVswsts/bin/swstestupdate stop /dev/dsk/c1t2d10
/dev/dsk/c1t2d10 swstestupdate completed
#
```

NOTES

- ・ The amount of data updated cannot be measured in the following cases:

    - When the specified volume does not exist.

    - When the ETERNUS disk storage systems device does not support the SnapOPC/SnapOPC+ function.

    - When the pseudo session has already been set up (i.e., when the "start" option is specified).

    - When the pseudo session does not exist (i.e., when the "stop" option is specified).

9.6.2 swstsdv (Snap Data Volume operation/reference command)

NAME

swstsdv - Initialize or display the Snap Data Volume

SYNOPSIS

Snap Data Volume initialization

```
/opt/FJSVswsts/bin/swstsdv init Volume-Name
/opt/FJSVswsts/bin/swstsdv init -G Access-Path-Name LU-Number
```

Snap Data Volume status display

```
/opt/FJSVswsts/bin/swstsdv stat Volume-Name
/opt/FJSVswsts/bin/swstsdv stat -G Access-Path-Name LU-Number
```

Snap Data Pool status display

```
/opt/FJSVswsts/bin/swstsdv poolstat -G Volume-Name
```

DESCRIPTION

Snap Data Volume initialization/status display and Snap Data Pool status display are all possible. Specify one of the following subcommands according to the contents you want to operate on, and then execute the subcommand.

Snap Data Volume initialization

Specify "init" as the subcommand to initialize the Snap Data Volume.
Initialize the Snap Data Volume when SnapOPC/SnapOPC+ is not running.
All the data in the Snap Data Volume is destroyed in the initialization of the Snap Data Volume. For this reason, the following procedure is recommended.
(Creation of the access path and collection of the LU-Number must be completed before logical volume manager operations.)

1. If there is necessary data in the Snap Data Volume, back it up in advance using the relevant OS command.

2. Initialize the disk management information.
   Set the target Snap Data Volume (physical disk) outside logical volume manager management when there is a logical volume manager operation.

3. Initialize the Snap Data Volume using this command.
   Initialize the information using the access path when there is a logical volume manager operation.

Snap Data Volume status display

Specify "stat" as the subcommand to display Snap Data Volume logical capacity, physical capacity, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number on the ETERNUS disk storage systems. The format used for the display is "<decimal>(<hexadecimal>)".
Rate	Displays the Snap Data Volume usage as a percentage (%).
Logical	Displays the Snap Data Volume logical capacity. The unit used for display is 'sector'.
Physical	Displays the Snap Data Volume physical capacity. The unit used for display is 'sector'.
Used	Displays the amount of Snap Data Volume used space. The unit used for display is 'sector'. The capacity for both Copy usage (Note) and Host usage (Note) is displayed.
Copy	For the space used in the Snap Data Volume, Copy usage (Note) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Volume, Host usage (Note) is displayed. The unit used for display is 'sector'.
Pool	Displays the Snap Data Pool usage allocated to the Snap Data Volume. The unit used for display is 'sector'.

Note:
Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.
Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Snap Data Pool status display

Specify "poolstat" as the subcommand to display the Snap Data Pool total amount, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
Pool-Type	Displays the Snap Data Pool type. Normal Encrypted
Rate	Displays the Snap Data Pool usage rate (%).
Total	Displays the Snap Data Pool total amount. The unit used for display is 'sector'.
Used	Displays the Snap Data Pool used space capacity. The unit used for display is 'sector'. The capacity for both Copy usage (Note) and Host usage (Note) is displayed.
Copy	For the space used in the Snap Data Pool, Copy usage (Note) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Pool, Host usage (Note) is displayed. The unit used for display is 'sector'.

Title	Description
Free	Displays the Snap Data Pool unused space capacity. The unit used for display is 'sector'.

Note:

Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.

Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

OPTIONS

Specific options of Snap Data Volume initialization(init)

-G *Access-Path-Name*

Specifies the access path (Access-Path-Name).
For details on access paths, refer to "Creating an access path"

Specific options of Snap Data Volume status display(stat)

-G *Access-Path-Name*

Specifies the access path (Access-Path-Name).
For details on access paths, refer to "Creating an access path"

Specific options of Snap Data Pool status display(poolstat)

-G *Access-Path-Name*

Specifies the ETERNUS disk storage systems volume (Volume-Name).
If a Snap Data Volume is specified with insufficient capacity however, an error occurs in the command. In this case, specify an access path for which there is sufficient capacity.
For details on access paths, refer to "Creating an access path"

OPERANDS

Specific operands of Snap Data Volume initialization(init)

Volume-Name

Specifies the volume name (AdvancedCopy Manager device name) of the Snap Data Volume to be initialized.
If a partition (slice) has been specified, the Logical Unit (disk) on which the partition (slice) exists is initialized.

LU-Number

Specifies the ETERNUS disk array logical unit number.
This value is specified as a decimal.

Specific operands of Snap Data Volume status display(stat)

Volume-Name

Specifies the Snap Data Volume volume name (AdvancedCopy Manager device name).
If a partition (slice) has been specified, the information about the Logical Unit (disk) on which the partition (slice) exists is displayed.

LU-Number

Specifies the ETERNUS disk storage systems logical unit number.
This value is specified as a decimal.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Snap Data Volume is initialized.

```
# /opt/FJSVswsts/bin/swstsdv init /dev/dsk/c39t0d5
swstsdv init completed
#
```

- The LU-Number (110) volume is initialized using the access path following insufficient capacity.

```
# /opt/FJSVswsts/bin/swstsdv init -G /dev/dsk/c39t0d1 110
swstsdv init completed
#
```

- The Snap Data Volume status is displayed.

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/dsk/c39t0d5
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 142 (0x8E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
0%   8388608         1048576          0            0            0            0
#
```

- The LU-Number (110) status is displayed using the access path.

```
# /opt/FJSVswsts/bin/swstsdv stat -G /dev/dsk/c39t0d1 110
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
0%   8388608         1048576          0            0            0            0
#
```

- The Snap Data Pool status is displayed by specifying the access path.

```
# /opt/FJSVswsts/bin/swstsdv poolstat -G /dev/dsk/c39t0d1
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
#
```

NOTES

- When there is insufficient Snap Data Volume capacity, operations are possible using the access path and ETERNUS disk array logical unit number (LU-Number).
  When there is insufficient Snap Data Volume capacity, however, and "stat" is specified in the subcommand and an attempt is made to check the LU-Number of the Snap Data Volume with insufficient Snap Data Volume capacity, an access error occurs when the attempt to access the Snap Data Volume with insufficient Snap Data Volume capacity is made. In this case, an error occurs in the command and it is not possible to check the LU-Number.
  For this reason, you must check the LU-Number in advance and remember it.

9.7 Troubleshooting data collection command

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

9.7.1 acmcapture (Troubleshooting data collection command)

NAME

acmcapture - Collection of AdvancedCopy Manager troubleshooting data

SYNOPSIS

```
/opt/FJSVswstf/bin/acmcapture dirname
```

DESCRIPTION

This command collects AdvancedCopy Manager troubleshooting data. Data is collected for all ACM components installed on the server where this command is executed.

Only the root user can execute this command.

Troubleshooting data file name

The collected data is stored in a file with the "acmcapture_HOSTNAME_YYYYMMDD_ttmmss.tar.Z" format under the directory specified for "dirname".

The name of the host where the command is executed is used for HOSTNAME. If characters other than alphanumerics and hyphens are used in the host name, then "NOHOSTNAME" is used as the host name. Values are truncated to 15 characters.

- ・ For YYYYMMDD, YYYY is the year, MM is the month, and DD is the day.

- ・ For ttmmss, tt is the hour, mm is minutes, and ss is seconds.

OPERANDS

dirname

Directory where the troubleshooting data is stored.
Specify a directory with plenty free space - 500MB or more is recommended. Regard 500MB as a rough guide, since the size of the troubleshooting data will vary depending on the system environment and conditions. If there is not enough free space, then this command will terminate abnormally without collecting troubleshooting data.
Specify an existing directory, otherwise this command will terminate abnormally without collecting troubleshooting data.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- ・ Collect data to the /tmp directory.

```
# /opt/FJSVswstf/bin/acmcapture /tmp
Executing........................................
Completed.
OUTPUT=/tmp/acmcapture_srv01_20090323_094614.tar.Z
```

NOTES

- ・ For systems with a cluster configuration, please mount the shared disk by either of node. to gather information on the shared disk. And execute this command. at both nodes.

・ Execute this command when other AdvancedCopy Manager commands are in the stopped state. Data collection may not be performed correctly if other AdvancedCopy Manager commands are 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 notes on backup and replication.

10.1.1 General notes

This section provides general notes on backup and replication.

10.1.1.1 Storage Server locale

The locale (software localisation information) of the internal code system (the code system specified when AdvancedCopy Manager is installed on the Storage Management Server) used by AdvancedCopy Manager must be installed on all Storage Servers.
Action is required if there are differences between the language environments (LANG) of the Storage Management Server and the Storage Servers. The following table shows the actions required for various combinations:

Table 10.1 Storage Management Server and Storage Server language environment combinations

Storage Management Server	Storage Server	Action required
Windows (SJIS)	Windows (SJIS)	None
	Solaris (EUC)	Install the SJIS package on the Storage Server.
	HP-UX (EUC)	Install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None
	AIX (EUC)	Add the SJIS language environment on the Storage Server.
In accordance with the Solaris locale setting (standard: EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)
	Solaris (EUC)	None (if the code is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	HP-UX (EUC)	None (if LANG is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None (if LANG is the same). If the Management Server is EUC, add the EUC language environment.
	AIX (EUC)	None (if LANG is the same). If the Management Server is SJIS, add the SJIS language environment.
Linux (EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)

Storage Management Server	Storage Server	Action required
	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.

10.1.1.2　Backup and Replication Exclusions

The following devices must not be backed up or replicated:

・ The device on which the system is stored

・ The device on which AdvancedCopy Manager has been installed

・ The device on which the management list of AdvancedCopy Manager resides

10.1.1.3　Replication between servers

If performing replication between servers that use the new device file names supported by HP-UX11iv3 or later (/dev/disk/diskN), the AdvancedCopy Manager on the other server must be version 13.4 or later.

10.1.1.4　Consistency of data on volumes

Table 10.2 Consistency of data on volumes

Data in transaction volume	Maintenance of data integrity	Operation
File system	An AdvancedCopy Manager command unmounts the file system to maintain the integrity.	Refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration", and "Appendix C Pre-processing and Post-processing of Replication".
Other than the above	The data integrity must be maintained in operations.	Take appropriate action, such as stopping transactions during execution of backup or replication.

10.1.1.5　Fetching Device Information

Before starting either the backup or replication operation, 4.4.5 Fetching device information on a Storage Server that is managed by all the Storage Servers using the GUI client of AdvancedCopy Manager. The time taken to complete this operation is proportional to the total number of devices defined on the selected storage servers. If many devices are involved, perform this operation while the CPU 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.

10.1.1.6 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 the backup or replication again after taking the following steps:

1. Execute the following command on an available device to switch the path:

   ```
   /usr/sbin/pvchange -s /dev/dsk/c*t*d*
   ```

   Be careful, as the system will stop if the commands are executed on a failed device

2. Execute the backup or replication command again.

10.1.1.7 Mounting of disks from other servers

Before backup/restoration or replication of a volume that can be mounted from multiple servers, cancel all mounting from the other servers.

For disks that need not be mounted from other servers, prevent multiple servers from detecting or accessing the same logical disk by setting up hardware, such as devices in the ETERNUS disk storage systems and Fibre Channel switches, accordingly.

10.1.1.8 Notes on copy operations targeted at file systems

For a copy operation targeted at a file system, unmount the relevant volume to prevent data access and maintain the data integrity.
If backup/restoration and replication are performed without unmounting the volume, an error occurs since a volume in use cannot be unmounted.

Note the following about processing where unmounting is enabled:

- Another application is not using the volume. If another application is using it, suspend the application temporarily.

- Users are not using the volume. If users are using it, prohibit them from using it temporarily.

- Another volume is not mounted on the volume. If it is mounted, unmount it temporarily.

- The volume is not shared with NFS sharing. If it is shared, unshare it temporarily.

Unmounting is required only during command execution. Normal operations can be resumed after command execution.

10.1.1.9 Notes on executing copy between different operating systems

Copies can be made between different operating systems by using replication operations.
Use the following combinations to execute copy between different operating systems:

Table 10.3 Combinations for executing copy between different operating systems

		Copy destination	
		slices	Logical Unit (disk)
Copy source	slices	Y	N
	Logical Unit (disk)	Y	ZN

Y: Possible
N: Not possible

10.1.1.10 Notes when using the -m option

When replication occurs between servers, the -m option can be specified in the following commands in order to avoid communication processing to non-operating servers:

- swsrpstartsync (Replication start command)

- swsrpmake (Replica create command)

- swsrpcancel (Replication cancel command)

When the -m option is specified, any one of the following conditions must apply in order to ensure that problems do not arise as a result of not performing volume pre-processing and post-processing at the non-operating server:

1. The non-operating server has been shut down.

2. Manual pre-processing and post-processing is performed for the volumes on the non-operating server.

3. The target volume is a RAW device (Oracle, etc., that does not need pre-processing and post-processing), rather than a file system.

10.1.1.11 Copy processing performance of Advanced Copy

The Advanced Copy processing is performed by the ETERNUS disk storage systems. Therefore, direct enquiries concerning copy processing performance to the support department for the ETERNUS disk storage systems.

10.1.1.12 Restart while executing synchronous processing

When a copy destination is a volume group and a restart is performed while executing the synchronous processing (EC/REC), the volume will become inactive. When the copy destination becomes inactive while the synchronous processing is being executed, it cannot be activated again. Moreover, the operation such as stopping the synchronous processing cannot be executed. If it is deactivated by mistake, the synchronous processing must be stopped forcibly using ETERNUS Web GUI and then the copy destination volume is activated.

10.1.2 Notes on snapshot high-speed backup

This section provides notes on snapshot backup operation.

Number of Required Backup Volumes

Snapshot high-speed backup requires as many backup volumes as the number of specified backup generations. Accordingly, snapshot backup is disabled if:

・ All the specified number of generations have been backed up, and

・ There is no new volume that can be used as a backup volume.

Simultaneous Backups

Performing snapshot high-speed backup simultaneously with the same transaction volume specified will perform two backups in parallel.
However, performing snapshot high-speed backup simultaneously more often than the number of preservation generations will cancel the backup operations 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.

The processing of the backup

swstbackup (Backup execution command) cannot be executed until the transaction and backup volumes are in an equivalent state.

Backup policy settings

A backup policy can still be set up if the number of registered volumes is enough for snapshot type high-speed backup, even if the number is not enough for synchronous high-speed backup. In this case, synchronous high-speed backup cannot be performed.

Volume group operation under synchronous processing

If the backup volume is a volume group, do not execute the vgchange (1M) command under synchronous processing (EC/REC) execution. If this occurs and the backup volume is inactive then it cannot be re-activated. Additionally, it will not be possible to perform commands including those to stop synchronous processing, execute backup and cancel backup synchronous processing. If accidentally inactivated, use ETERNUS Web GUI or similar to forcibly stop synchronous processing, and then activate the backup volume.

10.1.4 Notes on restoration

This section provides notes on restoring data.

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 overwritten.

Figure 10.1 Notes on restoration of AdvancedCopy Manager
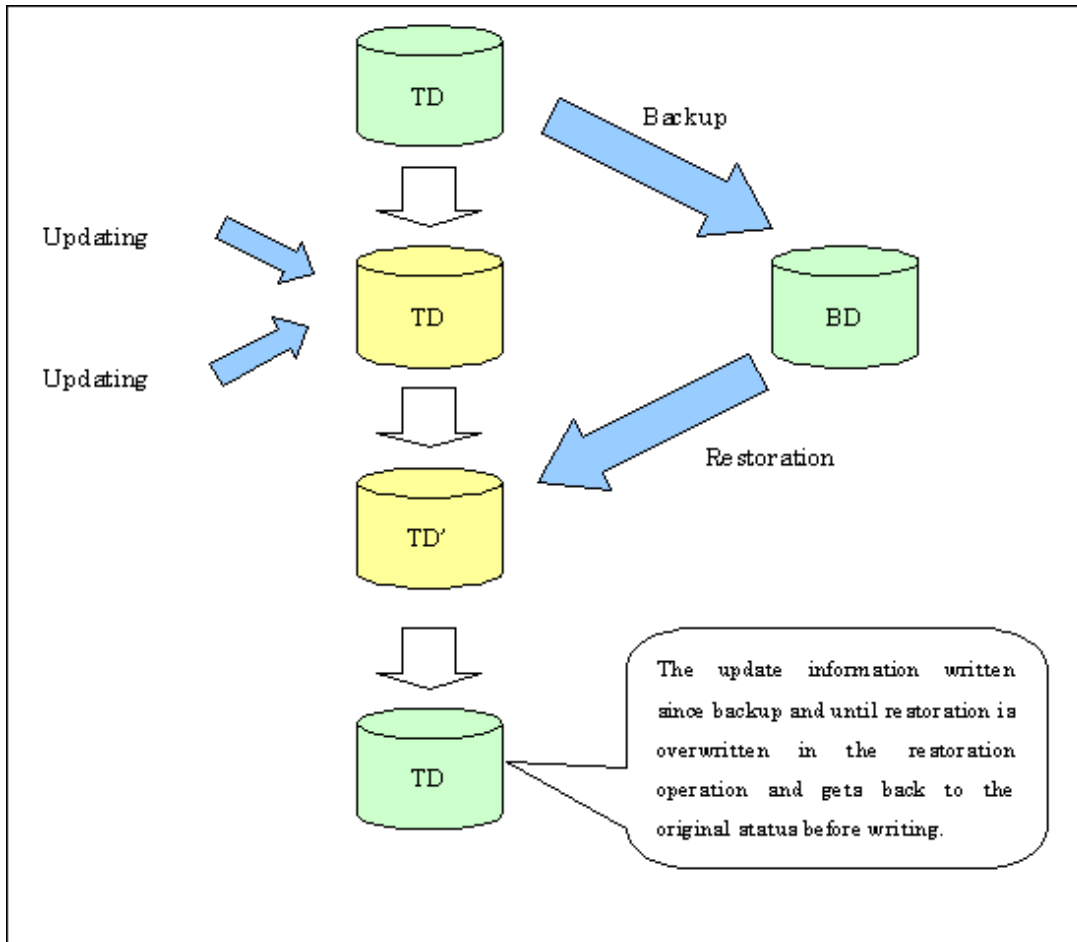
TD: Transaction volume
BD: Backup volume

10.1.5 Notes on synchronous replication

This section provides notes on synchronous replication.

Volume group operation under synchronous processing

If the replica volume is a volume group, do not execute the vgchange (1M) command under synchronous processing (EC/REC) execution. If this occurs and the replica volume is inactive then it cannot be reactivated. Additionally, it will not be possible to perform commands including those to stop synchronous processing, execute replication and cancel replication. If accidentally inactivated, use ETERNUS Web GUI or similar to forcibly stop synchronous processing, and then activate the copy destination volume.

10.1.6 Notes on cluster operation

Note the following general points on cluster operation:

・ Do not make a SWSTGNODE registration that configures an environment variable to the entire system.

・ AdvancedCopy Manager does not monitor daemons of an active server. If the daemon of a transaction stops for some reason, AdvancedCopy Manager does not automatically restart it, so you must restart it manually. Moreover, the stopping of an active server daemon of AdvancedCopy Manager does not cause the cluster to fail over.
For details on the daemons of AdvancedCopy Manager active servers and how to start these daemons, see "Chapter 2 Starting and Stopping Daemons".

10.1.7 Notes on backups in cluster operation

MC/ServiceGuard

For backups 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 swstsrsemtch (Resource match command) as a recovery measure.

・ You must define a volume group of backup volumes in "VOLUME GROUPS" on the transaction-oriented package control script.

Example:

```
VG[1]=vg02
```

・ In cluster operation, you must perform backups on the active system of the package because AdvancedCopy Manager is placed in the package and operates as part of the package.
You cannot make a backup from a standby node or another package.

If the backup volume belongs to a volume group and failover occurs while synchronization (EC/REC) is being handled, package startup is disabled because the backup volume cannot be activated on the standby node.
Therefore, you should perform OPC-based, snapshot type, high speed backups in a cluster environment.
If package startup is disabled during an EC-based, synchronous high speed backup, forcibly stop synchronization by using ETERNUS Web GUI or similar, and then start the package.

VERITAS Cluster Server

For backup operation in a cluster system, note the following points that do not apply to regular operation:

・ If failover occurs while running a backup command, you must ensure consistency by using swstsrsemtch (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 server of the service group because AdvancedCopy Manager is placed into the service group and operates as a part of it.
You cannot make a backup from a standby node or another service group.

・ To perform backup/restoration using AdvancedCopy Manager, you usually must unmount transaction volumes beforehand and mount the volumes later.
If the mount point 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/restoration pre-processing and post-processing scripts so that the transaction volumes are set offline or online instead of being unmounted or mounted.
Moreover, the Volume is immediately placed offline/online for a mount point resource whereas there will be a time delay when mount/unmount is used. Therefore, please add into the pre-processing script after the statement where the success or failure value of offline/online is returned, a "df" command with a sleep operand to function until mount/unmount is actually complete.
For details and examples on the pre-processing and post-processing scripts, see "Appendix A Pre-processing and Post-processing of Backup and Restoration". For details on the commands used to set resources offline and online, see the relevant cluster system manual.

10.1.7.1 Backup and restoration during the stoppage of a cluster

MC/ServiceGuard

When the package 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 package has been stopped, the environment is not ready and backup is disabled.

However, the backup operation is re-enabled only when the package has been stopped, by temporarily arranging the minimum resources.

📌 Note

・ If either of the following types of shared disks cannot be enabled (ie, be set online or mounted in a system), backup is disabled:

  - Shared disk for AdvancedCopy Manager shared data

  - Backup operation disk (transaction volume/backup volume to operate)

・ The following operations are not allowed in a backup:

  - Backup/restore using the GUI

  - Manipulation of a 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

・ If display-related commands are executed by Storage Management Server transactions or Storage Server transactions, options must be specified in the commands. Refer to "9.2 Backup Management Commands" for details of backup management display-related commands.

If the package has been stopped, perform a backup by taking the following steps:

1. Confirm that the package has been stopped on both nodes.
   For details on how to stop the package, see the MC/ServiceGuard 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 only one of the nodes, not both.

4. Perform the backup.
   You can perform the backup in the same way as for regular cluster operations.

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 package.
   Start the package, if necessary.
   For details on how to start the package, see the MC/ServiceGuard manual.

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 necessary resources) for backup operation, therefore backup is disabled. Likewise, if the service group has been stopped, the environment is not ready and disables backup operation.

However, backup is temporarily enabled when the service group is stopped.

Note

- If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), backup is disabled:

    - Shared disk for AdvancedCopy Manager shared data

    - Backup operation disk (transaction volume/backup volume to operate)

- The following operations are not allowed in backup:

    - Backup/restoration through GUI

    - Manipulation for backup operation from a Storage Management Server (host specification with the "-h" option)

    - Addition or deletion of a transaction volume/backup volume, or change in policy

- To execute a display command for backup management to a Storage Management Server transaction that also functions as a Storage Server transaction, you must specify options for the command. For details on the display command for backup management, refer to "9.2 Backup Management Commands".

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 (for example, using Telnet) to the node on which you want to make a backup.
   You cannot use the logical IP address. Use a node that is operable 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 environment.
   You can use swstrestore (Restore execution command) to perform restoration.

5. Release all the shared disks you enabled in Step 3.
   unmount the file systems you mounted.
   Stop (set offline) the shared disk.

6. Start (set online) the 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 replication in a cluster system

MC/ServiceGuard

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 swsrprecoverres (Resource adjustment command) as a recovery measure.

- You must define a volume group of backup volumes in "VOLUME GROUPS" on the transaction-oriented package control script.

    Example:

    ```
    VG[1]=vg02
    ```

- You must perform replication on the active system of the package because AdvancedCopy Manager is placed in the package and operates as part of the package.

  You cannot perform replication from a standby node or another package.

In addition, if the destination volume belongs to a volume group and failover occurs while synchronization (EC/REC) is being handled, package startup is disabled because the destination volume cannot be activated on the standby node.
Therefore, in a cluster environment you should use OPC based, snapshot type replications.
If package startup is disabled during EC-based synchronous replication, forcibly stop the synchronization by using ETERNUS Web GUI or similar, and then start the package.

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 swsrprecoverres (Resource adjustment command) as a recovery measure.

- When you use synchronous replication, do not register any destination volumes to a cluster transaction.

- You must perform replication on the active system of the service groups because AdvancedCopy Manager is placed in the service groups and operates as a part of it.
  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.
  Moreover, the Volume is immediately placed offline/online for a mount point resource whereas there will be a time delay when mount/unmount is used. Therefore, please add into the pre-processing script after the statement where the success or failure value of offline/online is returned, a "df" command with a sleep operand to function until mount/unmount is actually complete.
  For details and examples on the types of commands that require the volumes to be unmounted and mounted, and the pre-processing and post-processing scripts, see "Appendix C Pre-processing and Post-processing of Replication". For details on the commands used to set resources online and offline, see the relevant cluster system manual.

10.1.8.1   Replication during the stoppage of a cluster

MC/ServiceGuard

When the package 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. Likewise, if the package has been stopped, the environment is not ready and it disables replication.
However, replication is re-enabled only when the package 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 to operate)

- The following are not allowed in replication operations:

  - Manipulation for replication from a Storage Management Server (host specification with the "-h" option)

  - Addition or deletion of an original/replica volume

  - Inter-server replication without the "-m" option specified

- Command options must be specified if replication management display commands are executed for Storage Management Server transactions in conjunction with Storage Server transactions. Refer to "swsrprecoverres (Resource adjustment command)" for information concerning the replication management display commands.

Perform replication during stoppage of a package by taking the following steps:

1. Confirm that the package has been stopped on both nodes.
   For details on how to stop the package, see the MC/ServiceGuard manual.

2. Log in to the node on which you want to perform replication, 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 original volume and replica volume have been mounted as file systems for operation, mount the volumes.

   ## 📌 Note

   Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.

4. Perform the replication.

   You can perform the replication in the same way as for regular cluster operations.

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 package.

   Start the package, if necessary.

   For details on how to start the package, see the MC/ServiceGuard manual.

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 necessary resources) for replication, and replication is, therefore, disabled. Likewise, if the service group has been stopped, the environment is not ready and disables replication.
However, replication is temporarily enabled when the service group has been stopped.

📌 Note

- If any 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 operation disks (source volume/destination volume to operate)

- The following operations are not allowed in replication:

    - Manipulation for replication from a Storage Management Server (host specification with the "-h" option)

    - Addition or deletion of an original/replica volume

    - Inter-server replication without the "-m" option specified

- To execute a display command for replication management to a Storage Management Server transaction that also functions as a Storage Server transaction, you must specify options for the command. For details on the display command for replication management, see "9.4 Replication Management Commands".

Perform replication during stoppage of the service group by taking 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 (for example, through Telnet) to the node on which you want to perform replication.
   You cannot use the logical IP address. Use a node that is operable 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 original volume and replica volume have been mounted as file systems for operation, mount the volumes.

![Note icon] **Note**

. . . .

Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.

. . . .

4. Perform replication.
   You can perform replication in the same way as for regular operations in a cluster environment.
   You can also perform restoration from the replica volume to the original volume.

5. Release all the shared disks you enabled in Step 3.
   Unmount the file systems you mounted.
   Stop (set offline) the shared disk.

6. Start (set online) the service group.
   Start the service group, if necessary.
   For details on how to start a service group, see the VERITAS Cluster Server manual.

10.1.9 Notes on using ETERNUS VS900 (virtualization switch)

Note the following points about the copying of virtual disks created in ETERNUS VS900, as explained in this section.

Copy function

EC/REC is the only copy function that can be used in ETERNUS VS900. For this reason, you should copy virtual disks using the synchronous-type replication of the replication function.
OPC functionality is not supported in ETERNUS VS900. Therefore, the backup function (that uses OPC for restore) cannot be used.

REC operation modes

Operation modes (Transfer mode, Recovery mode, Split mode) that can be used in ETERNUS VS900 are shown in the table below.

Table 10.4 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 swsrpstartsync (Synchronous processing start command) are different from the ETERNUS disk array.

Table 10.5 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 10.6 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 10.7 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, transfer mode and Recovery mode must be explicitly specified.

Consequently, specify the following format to start or restart REC when executing the replication start command. "-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 swsrpchsync (Synchronization mode change command).

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:

- swsrprecbuffstat (REC transfer buffer information display command)

- swsrprecbuffset (REC transfer buffer settings change command)

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

This appendix provides information on pre-processing and post-processing of backup and restoration.

A.1 Overview

Pre-processing and post-processing of backup or restoration are started before and after backup or restoration when a backup or restore command is executed.

This processing is required by AdvancedCopy Manager to back up or restore a transaction volume.
This appendix describes the content and setup of pre-processing and post-processing.

A.2 Pre-processing and Post-processing of Backup

Backup using AdvancedCopy Manager must be performed basically while access to a transaction volume from other processes is inhibited.

Normally, the pre-processing acquires the mount status of a transaction volume using the transaction volume name and then performs the following processing:

Table A.1 Pre-processing for transaction volume

Transaction volume status	Preprocessing
Mounted	Unmount a transaction volume.(*1)
Unmounted	Take no action.

*1 If the transaction volume cannot be unmounted, however, customize the shell script for pre-processing is customized accordingly. For information on this customization, see the section on "When you do not want to unmount a transaction volume."

Tasks performed in the post-processing are generally determined by what has been done in the pre-processing.

Table A.2 Backup pre-processing and post-processing

Preprocessing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If no transaction volume has been mounted since the start of system operation (e.g., a transaction volume used as a database), neither pre- nor post-processing is performed.

If special pre-processing or post-processing is required, you need to add the additional instructions to the shell script.

When customizing a script, strictly observe the following rules regarding error codes:

Table A.3 Error code rules

Error code	Usage
0-99	Unusable (these are reserved for AdvancedCopy Manager)
100-255	Usable

Note

・ If pre-processing was failed, execute swstsrsemtch (Resource match command) because the consistency of resource information may be incomplete.

・ For backing up the volume group that includes the logical volume in which the file system has been built, refer to "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.

A.2.1   Pre-processing of backup

The name of a script file for pre-processing of 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
```

A.2.1.1   Pre-processing script for backup

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: #   Pre-processing of backup processing
 8: #
 9: #  Argument: $1 Device or VG name of transaction disk
10: #                 $2 Mount point of transaction disk
11: #                 $3 Device or VG name of backup disk
12: #
13: #  Error number
14: #                  2: Argument error
15: #                 10: umount error
16: #                 30: VG configuration file not found error
17: #                 99: Script not customize
18:
19:
20: # Argument check
21: case $# in
22: 1)
23:     ;;
24: 2)
25:     ;;
26: 3)
27:     ;;
28: *)
29:     exit 2
30:     ;;
31: esac
32:
33: device=$1
34: mount_point=$2
35: bk_device=$3
36:
37: # Determination postprocessing file name
38: if [ "$SWSTGNODE" != "" ]
39: then
40:     swstg_node="/`echo $SWSTGNODE`"
41: else
42:     swstg_node=""
43: fi
44:
```

```
 45: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
 46:
 47: # Device type check
 48: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
 49: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
 50: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
 51: if [ "$trans" != "" ]
 52: then
 53:     dev_type="physical"
 54:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
 55:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 56:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 57:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 58: elif [ "$vxpvtrans" != "" ]
 59: then
 60:     dev_type="vxvm_pv"
 61:     # /dev/vx/dmp/XXXX -> XXXX
 62:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
 63:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 64:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 65:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 66: elif [ "$lvmtrans" != "" ]
 67: then
 68:     dev_type="logical"
 69:     # /dev/XXXX -> XXXX
 70:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
 71:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 72:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 73:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 74: else
 75:     exit 0
 76: fi
 77:
 78: # Save VG name of backup disk
 79: bk_trans="`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
 80: bk_lvmtrans="`echo $bk_device | /usr/bin/grep "/dev/"`"
 81: bk_vxpvtrans="`echo $bk_device | /usr/bin/grep "/dev/vx/dmp/"`"
 82: if [ "$bk_trans" = "" -a "$bk_lvmtrans" != "" -a "$bk_vxpvtrans" = "" ]
 83: then
 84:     bk_vg_name="`echo $bk_device | /usr/bin/awk -F\/ '{ print $3 }'`"
 85:     cfg_file="/etc/lvmconf/"$bk_vg_name".conf"
 86:     if [ ! -r $cfg_file ]
 87:     then
 88:             exit 30
 89:     fi
 90:     echo $bk_device > $bd_file
 91: fi
 92:
 93: # When the transaction disk is a physical device ############################
 94: if [ "$dev_type" = "physical" ]
 95: then
 96:
 97:     if [ "$mount_point" != "" ]
 98:     then
 99: # When device cannot be unmounted --- 1
100: #
101: #       if [ "$device" = "/dev/dsk/cXtXdX" ]
102: #       then
103: #           if [ "$bk_device" != "" ]
104: #           then
105: #               echo $bk_device > $bd_file
106: #           fi
107: #           df -ln $mount_point 2>/dev/null | awk -F: '{ print $2 }' | awk '{ print $1 }' >
```

```
     $fstype_file
108: #         sync
109: #         sync
110: #         echo "fsck" > $post_file
111: #
112: # When device can be unmounted --- 2
113: #     else
114:           /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/
     awk '{ print $1 }' > $fstype_file
115:           /usr/sbin/umount $mount_point 2>/dev/null
116:         if [ $? != 0 ]
117:         then
118:             retry_count=3
119:             sleep_time=1
120:             result_flag=1
121:
122:             while [ $retry_count -gt 0 ]
123:             do
124:                 /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
125:                 if [ $? != 0 ]
126:                 then
127:                     retry_count=`expr $retry_count - 1`
128:                     /usr/bin/sleep $sleep_time
129:                 else
130:                     result_flag=0
131:                     break
132:                 fi
133:             done
134:
135:             if [ $result_flag != 0 ]
136:             then
137:                 /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
138:                 /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
139:
140:                 exit 10
141:             else
142:                 /usr/bin/rm -f $err_log_path/$dev.umount
143:             fi
144:         fi
145:         echo "mount" > $post_file
146: #     fi
147: # When device was not mounted --- 3
148: #
149:     else
150:        echo "none" > $post_file
151:     fi
152:
153: # When the transaction disk is a volume group ##############################
154: elif [ "$dev_type" = "logical" ]
155: then
156:
157: # Devices is volume group and script not customize
158:exit 99
159:
160: # When devices of volume group cannot be unmounted --- 4
161: #
162: #  # Specify the name of volume group not to unmount
163: #  if [ "$device" = "/dev/vgXX" ]
164: #  then
165: #      if [ "$bk_device" != "" ]
166: #      then
167: #          echo $bk_device > $bd_file
168: #      fi
```

```
169: #      sync
170: #      sync
171: #      echo "fsck" > $post_file
172: #  fi
173: #
174: # When devices of volume group can be unmounted --- 5
175: #
176: #  # Specify the name of volume group to unmount
177: #  if [ "$device" = "/dev/vgXX" ]
178: #  then
179: #      # Unmount all logical volumes of the volume group
180: #      mount_point="/XX"
181: #      /usr/sbin/umount $mount_point 2>/dev/null
182: #      if [ $? != 0 ]
183: #      then
184: #          retry_count=3
185: #          sleep_time=1
186: #          result_flag=1
187: #
188: #          while [ $retry_count -gt 0 ]
189: #          do
190: #
191: #              # $dev is volume group name
192: #
193: #              /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
194: #              if [ $? != 0 ]
195: #              then
196: #                  retry_count=`expr $retry_count - 1`
197: #                  sleep $sleep_time
198: #              else
199: #                  rm -f $err_log_path/$dev.umount
200: #                  result_flag=0
201: #                  break
202: #              fi
203: #          done
204: #
205: #          if [ $result_flag != 0 ]
206: #          then
207: #              /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
208: #              /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
209: #
210: #              exit 10
211: #          fi
212: #      fi
213: #      echo "mount" > $post_file
214: #  fi
215: #
216: # When devices of volume group was not mounted --- 6
217: #
218: #  # Specify the name of volume group to do nothing
219: #  if [ "$device" = "/dev/vgXX" ]
220: #  then
221: #      echo "none" > $post_file
222: #  fi
223: #
224: # When the transaction disk is a VxVM physical volume --- 7 ################
225: elif [ "$dev_type" = "vxvm_pv" ]
226: then
227:     # Nothing is done to VxVM PV.
228:     echo "none" > $post_file
229: fi
230:
231: exit 0
```

A.2.2　Post-processing of backup

The name of a script file for post-processing of a backup is as follows.

In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcBackup.post
```

In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcBackup.post
```

A.2.2.1　Post-processing script for backup

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: # Post-processing of backup processing
 8: #
 9: #        Argument: $1 Device or VG name of transaction disk
10: #                 $2 Mount point of transaction disk
11: #
12: #Error number
13: #              2: Argument error
14: #             11: mount error
15: #             31: vgcfgrestore error
16: #             12: fsck error
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: mount_point=$2
31:
32: # Determination of postprocessing file name
33:
34: if [ "$SWSTGNODE" != "" ]
35: then
36:    swstg_node="/`echo $SWSTGNODE`"
37: else
38:    swstg_node=""
39: fi
40:
41: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
42:
43: # Device type check
44: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
45: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
46: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
47: if [ "$trans" != "" ]
48: then
49:    dev_type="physical"
50:    dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
```

```
51:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
52:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
53:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
54: elif [ "$vxpvtrans" != "" ]
55: then
56:     dev_type="vxvm_pv"
57:     # /dev/vx/dmp/XXXX -> XXXX
58:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
59:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
60:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
61:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
62: elif [ "$lvmtrans" != "" ]
63: then
64:     dev_type="logical"
65:     # /dev/vgXX -> vgXX
66:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
67:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
68:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
69:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
70: else
71:     exit 0
72: fi
73:
74: # Confirmation of postprocessing
75: if [ ! -r $post_file ]
76: then
77:     exit 0
78: fi
79: post="`/usr/bin/cat $post_file`"
80:
81: # Confirmation of FStype
82: if [ ! -r $fstype_file ]
83: then
84:     fs=""
85: else
86:     fs="`/usr/bin/cat $fstype_file`"
87: fi
88:
89: # Restore VG Configuration
90: if [ -r $bd_file ]
91: then
92:     bk_device="`/usr/bin/cat $bd_file`"
93:     bk_trans="`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
94:     bk_lvmtrans="`echo $bk_device | /usr/bin/grep "/dev/"`"
95:     bk_vxpvtrans="`echo $bk_device | /usr/bin/grep "/dev/vx/dmp/"`"
96:     if [ "$bk_trans" = "" -a "$bk_lvmtrans" != "" -a "$bk_vxpvtrans" = "" ]
97:     then
98:         bk_vg_name="`echo $bk_device |/usr/bin/awk -F\/ '{ print $3 }'`"
99:         cfg_file="/etc/lvmconf/"$bk_vg_name".conf"
100:        if [ ! -r $cfg_file ]
101:        then
102:            exit 31
103:        fi
104:        bk_pv_rname="`/usr/sbin/vgcfgrestore -n $bk_device -l 2> /dev/null |/usr/bin/awk '{print
$1}' | /usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
105:        if [ "$bk_pv_rname" = "" ]
106:        then
107:            echo "NULL: /usr/sbin/vgcfgrestore -n $bk_device -l 2> /dev/null |/usr/bin/awk '{print
$1}' | /usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"" > $err_log_path/$dev.vgcfgrestore
108:            exit 31
109:        fi
110:        /usr/sbin/vgchange -a n $bk_device > /dev/null 2>&1
111:        reststatus=0
```

```
112:        for bk_pv_rname1 in $bk_pv_rname
113:        do
114:            /usr/sbin/vgcfgrestore -n $bk_device $bk_pv_rname1 > /dev/null 2>&1
115:            if [ $? != 0 ]
116:            then
117:              /usr/sbin/vgcfgrestore -n $bk_device $bk_pv_rname1 >> $err_log_path/$dev.vgcfgrestore
2>&1
118:            fi
119:            if [ $? = 0 ]
120:            then
121:                /usr/bin/rm -f $err_log_path/$dev.vgcfgrestore
122:                reststatus=1
123:                break
124:            fi
125:        done
126:        if [ "$SWSTGNODE" != "" ]
127:        then
128:            /usr/sbin/vgchange -c y $bk_device > /dev/null 2>&1
129:            /usr/sbin/vgchange -a e $bk_device > /dev/null 2>&1
130:        else
131:            /usr/sbin/vgchange -a y $bk_device > /dev/null 2>&1
132:        fi
133:        if [ $reststatus = 0 ]
134:        then
135:            exit 31
136:        fi
137:  fi
138: fi
139:
140: # No processing
141: # When device was not mounted --- 3
142: # When devices of volume group was not mounted --- 6
143: # When the transaction disk is a VxVM physical volume --- 7
144: if [ "$post" = "none" ]
145: then
146:    /usr/bin/rm -rf $post_file 2> /dev/null
147:    /usr/bin/rm -rf $fstype_file 2> /dev/null
148:    /usr/bin/rm -rf $bd_file 2> /dev/null
149:  exit 0
150: fi
151:
152: # mount processing
153: if [ "$post" = "mount" ]
154: then
155:
156:    # When device can be unmounted --- 2
157:    if [ "$dev_type" = "physical" ]
158:    then
159:        /usr/bin/df -l $device > /dev/null 2>&1
160:        if [ $? != 0 ]
161:        then
162:            if [ ! -r $fstype_file ]
163:            then
164:                /usr/sbin/mount $device $mount_point 2> /dev/null
165:            else
166:                if [ "$fs" = "" ]
167:                then
168:                    /usr/sbin/mount $device $mount_point 2> /dev/null
169:                else
170:                    /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
171:                fi
172:            fi
173:            if [ $? != 0 ]
```

```
174:          then
175:              retry_count=3
176:              sleep_time=1
177:              result_flag=1
178:
179:              while [ $retry_count -gt 0 ]
180:              do
181:                  if [ ! -r $fstype_file ]
182:                  then
183:                      /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
184:                  else
185:                      if [ "$fs" = "" ]
186:                      then
187:                          /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
188:                      else
189:                          /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount
2>&1
190:                      fi
191:                  fi
192:                  if [ $? != 0 ]
193:                  then
194:                      retry_count=`expr $retry_count - 1`
195:                      /usr/bin/sleep $sleep_time
196:                  else
197:                      /usr/bin/rm -f $err_log_path/$dev.mount
198:                      result_flag=0
199:                      break
200:                  fi
201:              done
202:
203:              if [ $result_flag != 0 ]
204:              then
205:                  exit 11
206:              fi
207:          fi
208:      fi
209: #  elif [ "$dev_type" = "logical" ]
210: #  then
211: #
212: #  When devices of volume group can be unmounted --- 5
213: #  # Specify the name of volume group to mount
214: #      if [ "$device" = "/dev/vgXX" ]
215: #      then
216: #          # Mount all logical volumes of the volume group
217: #          fs="hfs"
218: #          lvname="/dev/vgXX/XXXXX"
219: #          lv_mount_point="/XX"
220: #
221: #          /usr/bin/df -l $lvname > /dev/null 2>&1
222: #          if [ $? != 0 ]
223: #          then
224: #              /usr/sbin/mount -F $fs $lvname $lv_mount_point 2> /dev/null
225: #              if [ $? != 0 ]
226: #              then
227: #                  retry_count=3
228: #                  sleep_time=1
229: #                  result_flag=1
230:
231: #                  while [ $retry_count -gt 0 ]
232: #                  do
233: #                      /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount
2>&1
234: #                      if [ $? != 0 ]
```

```
235: #                 then
236: #                     retry_count=`expr $retry_count - 1`
237: #                     /usr/bin/sleep $sleep_time
238: #                 else
239: #                     rm -f $err_log_path/$dev.mount
240: #                     result_flag=0
241: #                     break
242: #                 fi
243: #             done
244: #
245: #             if [ $result_flag != 0 ]
246: #             then
247: #                 exit 11
248: #             fi
249: #         fi
250: #     fi
251: #   fi
252:
253:    fi
254:    /usr/bin/rm -rf $post_file 2> /dev/null
255:    /usr/bin/rm -rf $fstype_file 2> /dev/null
256:    /usr/bin/rm -rf $bd_file 2> /dev/null
257:    exit 0
258: fi
259:
260: # fsck processing
261: # When device cannot be unmounted              --- 1
262: # When devices of volume group cannot be unmounted --- 4
263: if [ "$post" = "fsck" ]
264: then
265:    if [ -r $bd_file ]
266:    then
267:        bk_device="`/usr/bin/cat $bd_file`"
268:        bk_trans="`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
269:        if [ "$bk_trans" != "" ]
270:        then
271:            if [ ! -r $fstype_file ]
272:            then
273:                /usr/sbin/fsck -y $bk_device > /dev/null 2>&1
274:            else
275:                if [ "$fs" = "" ]
276:                then
277:                    /usr/sbin/fsck -y $bk_device > /dev/null 2>&1
278:                else
279:                    /usr/sbin/fsck -y -F $fs $bk_device > /dev/null 2>&1
280:                fi
281:            fi
282:            if [ $? != 0 ]
283:            then
284:                if [ "$fs" = "" ]
285:                then
286:                    /usr/sbin/fsck -y $bk_device > $err_log_path/$dev.fsck 2>&1
287:                else
288:                    /usr/sbin/fsck -y -F $fs $bk_device > $err_log_path/$dev.fsck 2>&1
289:                fi
290:                if [ $? != 0 ]
291:                then
292:                    exit 12
293:                else
294:                    /usr/bin/rm -f $err_log_path/$dev.fsck
295:                fi
296:            fi
297: #     else
```

```
298: #          # Specify the name of volume group to fsck
299: #          if [ "$bk_device" = "/dev/vgXX" ]
300: #          then
301: #              fs="hfs"
302: #              lvname="/dev/vgXX/rXXXXX"
303: #
304: #              fsck -F $fs -y $lvname > /dev/null 2>&1
305: #              if [ $? != 0 ]
306: #              then
307: #                  if [ "$fs" = "" ]
308: #                  then
309: #                      fsck -y $lvname > $err_log_path/$dev.fsck 2>&1
310: #                  else
311: #                      fsck -y -F $fs $lvname > $err_log_path/$dev.fsck 2>&1
312: #                  fi
313: #                  if [ $? != 0 ]
314: #                  then
315: #                      exit 12
316: #                  else
317: #                      rm -f $err_log_path/$dev.fsck
318: #                  fi
319: #              fi
320: #          fi
321:          fi
322:      fi
323:      /usr/bin/rm -rf $post_file 2> /dev/null
324:      /usr/bin/rm -rf $fstype_file 2> /dev/null
325:      /usr/bin/rm -rf $bd_file 2> /dev/null
326:      exit 0
327: fi
328:
329: exit 0
```

A.2.3   Customizing the shell script

The method of customizing the shell script for backup pre- and post-processing is explained below.

When you do not want to unmount a transaction volume

If you do not want to unmount a mounted transaction volume, eliminate the comment characters ("#") in lines 101-110, 113 and 146 (in the case of a physical volume) or lines 163-172 (in the case of a volume group), and point to the target device in line 101 or line 163.

In addition, do not perform an update operation on a transaction volume file system after performing the sync command on line 108 or line 169 until backup post-processing. If a file system update is performed in the meantime, the backup is taken with a corrupted file system. In this case the fsck command executed by the post-processing may raise an error.

Backup a volume group

When you are backing up the volume group containing the logical volume used to build the file system, insert a comment character ("#") into line 158 of the pre-processing script (OpcBackup.pre) to remove the exit statement.

- Please remove the comment ("#") from lines 177-214 of the pre-processing script (OpcBackup.pre), as well as from lines 209, 210 and 214-251 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 180-212 of the pre-processing script (OpcBackup.exe) and lines 218-250 of the post-processing script (PpcBackup.post) once for each additional logical volume.

- If the operating volume was not unmounted in the pre-processing script then the fsck command will need to be executed (on all the logical volumes contained in the backup volume) in post-processing. Remove the comment ("#") in lines 297-320 of the post-processing script (OpcBackup.post), and correct the description in a comment so that fsck 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 309-319 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.
>
> ・ When the backup volume is a volume group, in order to enable use of the backup volume as LVM, volume group configuration information is restored using the vgcfgrestore command in the post-processing. The information is restored from the standard backup file "/etc/lvmconf/volume-group-name.conf". If volume group configuration information is backed up by another file, please customize the script.
>
>   In cluster operation, the respective nodes comprising the cluster must have volume group configuration information.
>
> ・ Correct the parameters and options, of the OS commands, such as the mount command and the fsck command, appropriately for their use.
>
> ・ For shared-mode volume groups:
>
>   When reconfiguring shared-mode volume groups, comment out line numbers 90-138, 144, 145 and 150 in the post-processing script (OpcBackup.post) to prevent the volume group from being reconfigured by the script.
>   Reconfigure the volume group by manually performing the following steps after the backup has been executed.
>
>   1. Stop the volume group (on all nodes involved in the transaction).
>
>    ```
>    # /usr/sbin/vgchange -a n <vg_name>
>    #
>    ```
>
>   2. Restore volume group configuration information on the node where the volume group was created.
>
>    ```
>    # /usr/sbin/vgcfgrestore -n <vg_name> <pv_path>
>    #
>    ```
>
>   3. Mark the volume group as shareable on the node where the volume group was created.
>
>    ```
>    # /usr/sbin/vgchange -S y -c y <vg_name>
>    #
>    ```
>
>   4. Start the volume group on all nodes involved in the transaction.
>
>    ```
>    # /usr/sbin/vgchange -a s <vg_name>
>    #
>    ```
>
> ....

File system name

Change the file system names on lines 217 and 301 of the post-processing shell script (OpcBackup.post) that is executed when backup is performed as appropriate for the operation.

Cluster operation by 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.
The mount point resource relating to the Volume is immediately offline/online whilst there will be a time delay before access is actually prevented when mount/unmount is used.
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)0

[lines 115,124,181,193rd]

(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)

line 145,213rd]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing the mount processing of the backup post-processing script (OpcBackup.post)

[lines 164,168,170,183,187,189,224,233rd]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $lvname $lv_mount_point`

(after change)	`/opt/VRTSvcs/bin/hares -online resource-name -sys system-name`

[Example]
Adding mount wait processing to the backup post-processing script (OpcBackup.post)

lines 209,252nd]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

A.3   Pre-processing and Post-processing of Restoration

In AdvancedCopy Manager, restore processing must be performed while transaction volumes are unmounted.

Thus, in pre-processing, the mount state of the transaction volume is determined using its name and the following processing is then performed:

Table A.4 Pre-processing for a transaction volume

Transaction volume status	Preprocessing
Mounted	Unmount the transaction volume.
Unmounted	Take no action.

Post-processing tasks will be determined by what has occurred in pre-processing

Table A.5 Pre-processing and post-processing for restoration

Preprocessing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If special pre-processing or post-processing is required, you need to add the instructions as appropriate to the shell script.

When customizing a script, strictly observe the following rules regarding error codes:

Table A.6 Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

Note

....

- ・ If the post-processing fails, the resource information may have inconsistencies. Execute swstsrsemtch described in Section, "swstsrsemtch (Resource match command)".

- ・ 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 logical volumes across which a file system exists.

....

A.3.1　Pre-processing of restoration

The name of a script file for pre-processing of a restoration is as follows.

In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.pre
```

In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.pre
```

A.3.1.1　Pre-processing script for restoration

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: #   Pre-processing of restoration processing
 8: #
 9: #         Argument: $1 Device or VG name of transaction disk
10: #                   $2 Mount point of transaction disk
11: #
12: #   Error number
13: #             2: Argument error (system error)
14: #            10: umount error
15: #            30: VG configuration file not found error
16: #            99: Script not customize
17:
18:
19: # Argument check
```

```
20: case $# in
21: 1)
22:     ;;
23: 2)
24:     ;;
25: *)
26:     exit 2
27:     ;;
28: esac
29:
30: device=$1
31: mount_point=$2
32:
33: # Determination of postprocessing file name
34:
35: if [ "$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: # Device type check
45: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
46: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
47: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
48: if [ "$trans" != "" ]
49: then
50:     dev_type="physical"
51:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
52:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
53:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
54: elif [ "$vxpvtrans" != "" ]
55: then
56:     dev_type="vxvm_pv"
57:     # /dev/vx/dmp/XXXX -> XXXX
58:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
59:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
60:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
61: elif [ "$lvmtrans" != "" ]
62: then
63:     dev_type="logical"
64:     # /dev/vgXX -> vgXX
65:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
66:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
67:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
68: else
69:     exit 0
70: fi
71:
72: # When the transaction disk is a physical device #############################
73: if [ "$dev_type" = "physical" ]
74: then
75:
76: # When device was mounted --- 1
77:     if [ "$mount_point" != "" ]
78:     then
79:         /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/awk
'{ print $1 }' > $fstype_file
80:         /usr/sbin/umount $mount_point 2> /dev/null
81:         if [ $? != 0 ]
```

```
82:        then
83:            retry_count=3
84:            sleep_time=1
85:            result_flag=1
86:
87:            while [ $retry_count -gt 0 ]
88:            do
89:                /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
90:                if [ $? != 0 ]
91:                then
92:                    retry_count=`expr $retry_count - 1`
93:                    /usr/bin/sleep $sleep_time
94:                else
95:                    /usr/bin/rm -f $err_log_path/$dev.umount
96:                    result_flag=0
97:                    break
98:                fi
99:            done
100:
101:            if [ $result_flag != 0 ]
102:
103:            then
104:                /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
105:                /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
106:
107:                exit 10
108:            fi
109:        fi
110:        echo "mount" > $post_file
111:
112: # When device was not mounted --- 2
113:    else
114:        echo "none" > $post_file
115:    fi
116:
117: # When the transaction disk is a volume group ##############################
118: elif [ "$dev_type" = "logical" ]
119: then
120:
121:    # Check VG configuration file exists
122:    vg_name="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
123:    cfg_file="/etc/lvmconf/"$vg_name".conf"
124:    if [ ! -r $cfg_file ]
125:    then
126:  exit 30
127:    fi
128:
129: # Devices is volume group and script not customize
130:    exit 99
131:
132: # When devices of volume group was mounted --- 3
133: #   # Specify the name of volume group to unmount
134: #   if [ "$device" = "/dev/vgXX" ]
135: #   then
136: #
137: # # Unmount all logical volumes of the volume group
138: # mount_point="/XX"
139: # /usr/sbin/umount $mount_point 2>/dev/null
140: # if [ $? != 0 ]
141: # then
142: #    retry_count=3
143: #    sleep_time=1
144: #    result_flag=1
```

```
145: #
146: #    while [ $retry_count -gt 0 ]
147: #    do
148: #        /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
149: #        if [ $? != 0 ]
150: #        then
151: #            retry_count=`expr $retry_count - 1`
152: #            sleep $sleep_time
153: #        else
154: #            rm -f $err_log_path/$dev.umount
155: #            result_flag=0
156: #            break
157: #        fi
158: #    done
159: #
160: #    if [ $result_flag != 0 ]
161: #
162: #    then
163: #        /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
164: #        /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
165: #
166: #        exit 10
167: #    fi
168: # fi
169: # echo "mount" > $post_file
170: #   fi
171:
172: # When devices of volume group was not mounted --- 4
173: #    # Specify the name of volume group to do nothing
174: #    if [ "$device" = "/dev/vgXX" ]
175: #    then
176: # echo "none" > $post_file
177: #    fi
178: #
179: # When the transaction disk is a VxVM physical volume --- 5 #################
180: elif [ "$dev_type" = "vxvm_pv" ]
181: then
182:     # Nothing is done to VxVM PV.
183:     #
184:     echo "none" > $post_file
185: fi
186: exit 0
```

Restore processing is not possible on a mounted transaction volume that cannot be unmounted. Specify a device at the restore destination.

A.3.2   Post-processing of restoration

The name of a script file for post-processing of a restoration 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
```

A.3.2.1 Post-processing script for restoration

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
```

```
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: #    Post-processing of restoration processing
 8: #
 9: #          Argument: $1 Device or VG name of transaction disk
10: #                         $2 Mount point of transaction disk
11: #
12: #  Error number
13: #                 2: Argument error
14: #                11: mount error
15: #                31: vfcfgrestore error
16: #                12: fsck error
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: mount_point=$2
31:
32: # Determination of postprocessing file name
33:
34: if [ "$SWSTGNODE" != "" ]
35: then
36:    swstg_node="/`echo $SWSTGNODE`"
37: else
38:    swstg_node=""
39: fi
40:
41: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
42:
43: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
44: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
45: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
46: if [ "$trans" != "" ]
47: then
48:    dev_type="physical"
49:    dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
50:    post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
51:    fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
52: elif [ "$vxpvtrans" != "" ]
53: then
54:    dev_type="vxvm_pv"
55:    # /dev/vx/dmp/XXXX -> XXXX
56:    dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
57:    post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
58:    fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
59: elif [ "$lvmtrans" != "" ]
60: then
61:    dev_type="logical"
62:    # /dev/vgXX -> vgXX
63:    dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
64:    post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
65:    fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
66: else
```

```
 67:     exit 0
 68: fi
 69:
 70: # Confirmation of postprocessing
 71: if [ ! -r $post_file ]
 72: then
 73:     exit 0
 74: fi
 75: post="`/usr/bin/cat $post_file`"
 76:
 77: # Confirmation of FStype
 78: if [ ! -r $fstype_file ]
 79: then
 80:     fs=""
 81: else
 82:     fs="`/usr/bin/cat $fstype_file`"
 83: fi
 84:
 85: # Restore VG Configuration
 86: if [ "$dev_type" = "logical" ]
 87: then
 88:     vg_name="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
 89:     cfg_file="/etc/lvmconf/"$vg_name".conf"
 90:     if [ ! -r $cfg_file ]
 91:     then
 92:             exit 31
 93:     fi
 94:     pv_rname="`/usr/sbin/vgcfgrestore -n $device -l 2> /dev/null | /usr/bin/awk '{print $1}' | /
usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
 95:     if [ "$pv_rname" = "" ]
 96:     then
 97:         echo "NULL: /usr/sbin/vgcfgrestore -n $device -l 2> /dev/null | /usr/bin/awk '{print $1}'
| /usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"" > $err_log_path/$dev.vgcfgrestore 2>&1
 98:         exit 31
 99:     fi
100:     /usr/sbin/vgchange -a n $device > /dev/null 2>&1
101:     reststatus=0
102:     for pv_rname1 in $pv_rname
103:     do
104:         /usr/sbin/vgcfgrestore -n $device $pv_rname1 > /dev/null 2>&1
105:         if [ $? != 0 ]
106:         then
107:             /usr/sbin/vgcfgrestore -n $device $pv_rname1 >> $err_log_path/$dev.vgcfgrestore 2>&1
108:         fi
109:         if [ $? = 0 ]
110:         then
111:             /usr/bin/rm -f $err_log_path/$dev.vgcfgrestore
112:             reststatus=1
113:             break
114:         fi
115:     done
116: if [ "$SWSTGNODE" != "" ]
117: then
118:     /usr/sbin/vgchange -c y $device > /dev/null 2>&1
119:     /usr/sbin/vgchange -a e $device > /dev/null 2>&1
120: else
121:     /usr/sbin/vgchange -a y $device > /dev/null 2>&1
122: fi
123: if [ $reststatus = 0 ]
124: then
125:     exit 31
126: fi
127: fi
```

```
128:
129: # No processing
130: # When device was not mounted --- 2
131: # When devices of volume group was not mounted --- 4
132: # When the transaction disk is a VxVM physical volume --- 5
133: if [ "$post" = "none" ]
134: then
135:     /usr/bin/rm -rf $post_file 2> /dev/null
136:     /usr/bin/rm -rf $fstype_file 2> /dev/null
137:     exit 0
138: fi
139:
140: # mount processing
141: if [ "$post" = "mount" ]
142: then
143:
144: # When device was mounted --- 1
145:     if [ "$dev_type" = "physical" ]
146:     then
147:         /usr/bin/df -l $device > /dev/null 2>&1
148:         if [ $? != 0 ]
149:         then
150:            if [ ! -r $fstype_file ]
151:            then
152:                /usr/sbin/mount $device $mount_point 2> /dev/null
153:            else
154:                if [ "$fs" = "" ]
155:                then
156:                    /usr/sbin/mount $device $mount_point 2> /dev/null
157:                else
158:                    /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
159:                fi
160:            fi
161:            if [ $? != 0 ]
162:            then
163:                retry_count=3
164:                sleep_time=1
165:                result_flag=1
166:
167:                while [ $retry_count -gt 0 ]
168:                do
169:                    if [ ! -r $fstype_file ]
170:                    then
171:                        /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
172:                    else
173:                        if [ "$fs" = "" ]
174:                        then
175:                            /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
176:                        else
177:                            /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount
2>&1
178:                        fi
179:                    fi
180:                    if [ $? != 0 ]
181:                    then
182:                        retry_count=`expr $retry_count - 1`
183:                        /usr/bin/sleep $sleep_time
184:                    else
185:                        /usr/bin/rm -f $err_log_path/$dev.mount
186:                        result_flag=0
187:                        break
188:                    fi
189:                done
```

```
190:
191:             if [ $result_flag != 0 ]
192:             then
193:                 exit 11
194:             fi
195:         fi
196:     fi
197: #  elif [ "$dev_type" = "logical" ]
198: #  then
199: #
200: # When devices of volume group was mounted --- 3
201: #     # Specify the name of volume group to mount
202: #     if [ "$device" = "/dev/vgXX" ]
203: #     then
204: #         # Mount all logical volumes of the volume group
205: #         fs="hfs"
206: #         lvname="/dev/vgXX/XXXXX"
207: #         lv_mount_point="/XX"
208: #
209: #         fsck -F $fs -y $lvname > /dev/null 2>&1
210: #         if [ $? != 0 ]
211: #         then
212: #             fsck -F $fs -y $lvname > $err_log_path/$dev.fsck 2>&1
213: #             if [ $? != 0 ]
214: #             then
215: #                 exit 12
216: #             else
217: #                 rm -f $err_log_path/$dev.fsck
218: #             fi
219: #         fi
220: #         /usr/bin/df -l $lvname > /dev/null 2>&1
221: #         if [ $? != 0 ]
222: #         then
223: #             /usr/sbin/mount -F $fs $lvname $lv_mount_point 2> /dev/null
224: #             if [ $? != 0 ]
225: #             then
226: #                 retry_count=3
227: #                 sleep_time=1
228: #                 result_flag=1
229: #
230: #                 while [ $retry_count -gt 0 ]
231: #                 do
232: #                     /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount
2>&1
233: #                     if [ $? != 0 ]
234: #                     then
235: #                         retry_count=`expr $retry_count - 1`
236: #                         /usr/bin/sleep $sleep_time
237: #                     else
238: #                         rm -f $err_log_path/$dev.mount
239: #                         result_flag=0
240: #                         break
241: #                     fi
242: #                 done
243: #
244: #                 if [ $result_flag != 0 ]
245: #                 then
246: #                     exit 11
247: #                 fi
248: #             fi
249: #         fi
250: #     fi
251:     fi
```

```
252:    /usr/bin/rm -rf $post_file 2> /dev/null
253:    /usr/bin/rm -rf $fstype_file 2> /dev/null
254:    exit 0
255: fi
256:
257: exit 0
```

A.3.3   Customizing the shell script

The method to customize the shell script for restore pre/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

- Eliminate the comment ("#") from lines 134-170 of the pre-processing script (OpcRestore.pre), and also from lines 197,198 and 202-250 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 138-168 of the pre-processing script (OpcRestore.exe) and lines 206-249 of the post-processing script (OpcRestore.post) once for each additional logical volume).

- If the operating volume was not unmounted in the pre-processing script, and if fsck is not being carried out to the backup volume, then the fsck command will need to be executed (to all the logical volumes contained in the backup volume) in post-processing

📌 Note
. . . .

- Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.

- When the transaction volume is a volume group, in order to enable use of the backup volume as LVM, volume group configuration information is restored using the vgcfgrestore command in the restore post-processing. In the above-mentioned script, volume configuration information is restored from the standard backup file "/etc/lvmconf/volume-group-name.conf". If volume group configuration information is backed up by another file, please customize the script.

  In cluster operation, the respective nodes comprising the cluster must have volume group configuration information.

- Please correct parameters, options, etc. of the OS command, such as the "mount" command and the "fsck" command, according to their employment.

- For shared-mode volume groups:

  When reconfiguring shared-mode volume groups, comment out line numbers 96-127, 133, 134 and 138 in the post-processing script (OpcBackup.post) to prevent the volume group from being reconfigured by the post-processing script.
  Reconfigure the volume group by manually performing the following steps after the Replication has been executed.

    1. Stop the volume group (on all nodes involved in the transaction).

        ```
        # /usr/sbin/vgchange -a n <vg_name>
        #
        ```

    2. Restore volume group configuration information (on the node where the volume group was created).

        ```
        # /usr/sbin/vgcfgrestore -n <vg_name> <pv_path>
        #
        ```

    3. Mark the volume group as shareable (on the node where the volume group was created).

        ```
        # /usr/sbin/vgchange -S y -c y <vg_name>
        #
        ```

4. Start the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a s <vg_name>
#
```

File system name

Change the file system name on line 205 of the post-processing shell script (OpcRestore.post) that is executed when restore is performed as appropriate for the operation.

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 script into offline/online processing of the mount point resource.

The mount point resource relating to the Volume is immediately offline/online whilst there will be a time delay before access is actually prevented when mount/unmount is used.

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 80,89,139,148th]

(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)

[line 110,169th]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing mount processing of the restore post-processing script (OpcRestore.post)

[lines 152,156,158,171,175,177,223,232nd]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $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)

[line 197,251st]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

Appendix B Sample 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 with AdvancedCopy Manager.

P Point

This section explains how the sample 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 databases.

B.1 Overview

Use AdvancedCopy Manager to back up a transaction volume.
AdvancedCopy Manager provides a sample scripts for backup. The manager of the backup operation should customize the sample scripts according to their specific requirements and apply them to the backup.

B.2 Backup and Restoration of a Transaction volume

B.2.1 Backup procedure

The following is an overview of the backup procedure:

1. Check the work operation status
   Check whether processing is in operation or not..

2. Declare the start of online backup
   If processing was found to be in operation in Step 1, declare the start of online backup for the database to stop updating the data files. This will make the slices that store transaction data ready for online backup.

3. Backup (copy) slices
   Backup (copy) the slices that store transaction data using the AdvancedCopy Manager backup function.

4. Declare the end of online backup
   If processing was found to be in operation in Step 1, declare the end of online backup for the database to resume updating the data files.

Figure B.1 Backup
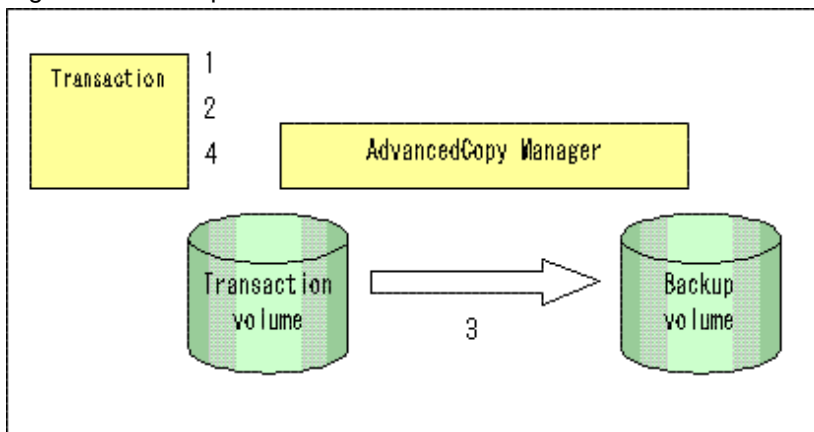
B.2.2　Restoration procedure

The following provides an overview of how to perform restoration from a backup disk.

　1.　Checking the processing stop status
　　　Check that processing has stopped. If processing is in operation, stop the processing completely.

　2.　Performing restoration from a backup disk
　　　Using the restoration function of AdvancedCopy Manager, restore data from a backup disk to the transaction volume.

Figure B.2 Performing restoration from a backup disk
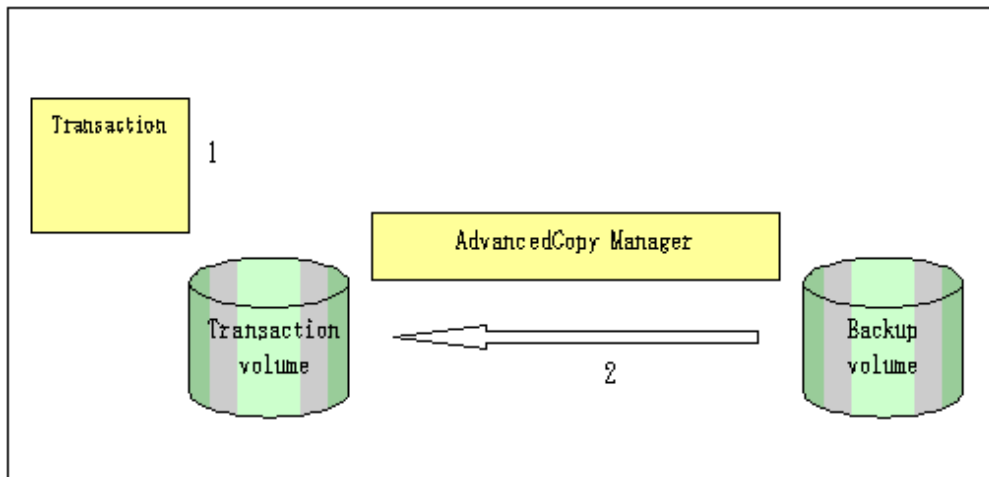
B.3　Sample Scripts for Oracle

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 10g (V 10.1.0.2.0)

B.3.1　Overview of sample scripts

The sample shell scripts provided are summarized below. These scripts are stored in the /etc/opt/FJSVswsts/samp directory.

Table B.1 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_fs_bk	Oracle transaction, general file transaction	File system
3	Backup	swst_or_rd_bk	Oracle transaction	Raw device

B.3.1.1　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

- spredolog.lst: REDO Log file information of an Oracle database

Use the database information above as a reference for creating shell scripts for backup processing.

Format

```
swst_or_iv
```

Usage example

```
# swst_or_iv
swst_or_iv completed.
```

Result example

```
spdata.lst
  TABLESPACE-NAME                                    DEVICE-NAME
------------------- --------------------------------------------------------------------
ACMTS1              /dev/vg170/rlvol170
SYSAUX             /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/sysaux01.dbf
SYSTEM             /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/system01.dbf
UNDOTBS1           /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/undotbs01.dbf
USERS              /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/users01.dbf
spdata.bgn
alter tablespace ACMTS1 begin backup;
alter tablespace SYSAUX begin backup;
alter tablespace SYSTEM begin backup;
alter tablespace UNDOTBS1 begin backup;
alter tablespace USERS begin backup;
spdata.end
alter tablespace ACMTS1 end backup;
alter tablespace SYSAUX end backup;
alter tablespace SYSTEM end backup;
alter tablespace UNDOTBS1 end backup;
alter tablespace USERS end backup;
spcont.lst
NAME                                TYPE        VALUE
----------------------------------- ----------- ------------------------------
control_files                       string      /var/adm/crash/u01/app/oracle/
                                                OraHome_1/oradata/acmtest1/con
                                                trol01.ctl, /var/adm/crash/u01
                                                /app/oracle/OraHome_1/oradata/
                                                acmtest1/control02.ctl, /var/a
                                                dm/crash/u01/app/oracle/OraHom
                                                e_1/oradata/acmtest1/control03
                                                .ctl
splog.lst
NAME                                TYPE        VALUE
----------------------------------- ----------- ------------------------------
db_recovery_file_dest               string      /var/adm/crash/u01/app/oracle/
                                                OraHome_1/flash_recovery_area
db_recovery_file_dest_size          big integer 2G
spredolog.lst
GROUP#        MEMBER
----------    ------------------------------------------------------------------------------
```

```
    3        /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo03.log
    2        /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo02.log
    1        /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo01.log
```

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
```

B.3.1.2   File system backup

swst_or_fs_bk, run using AdvancedCopy Manager, backs up processing data stored in an Oracle database on a file system.
Processing data is copied to the backup volumes of AdvancedCopy Manager. These scripts correspond to steps 2 to 5 in "B.3.2.1 DB information collection".

Start

```
swst_or_fs_bk  {-a | -i} <mount-point-name>
```

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.
mount-point-name:  Specify the name of the mount point targeted for backup.
```

Example using swst_or_fs_bk

While processing is active, back up /gyoumu_db in which an Oracle database is located.

```
#  swst_or_fs_bk  -a  /gyoumu_db
swst_or_fs_bk  completed. ( /gyoumu_db -> /dev/vg170 at 23:00 on 2005.10.01 )
```

Processing outline of swst_or_fs_bk

```
#!/bin/sh
usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
chkmp() --- Check for a mount point
get_mp_blk() --- Conversion from a mount point to a device
getfs() --- Conversion from a mount point to a file system type
sqlbegin()

{
sqlplus /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 mount point check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $VG --- Copy the disk.
Error handling
```

```
# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
BDBLK="`getbd $VG`" --- Fetch a backup volume as a character device.
BDDATE="`getdate $VG`"--- Fetch the backup date.
BDTIME="`gettime $VG`"--- Fetch the backup time.

exit 0
```

B.3.1.3 Raw device backup

swst_or_rd_bk is run using AdvancedCopy Manager to back up live data using an Oracle database on a raw device.
Live data is copied to work disks prepared by users.
These scripts apply to steps 2 to 5 in "B.3.2.1 DB information collection".

Start

```
swst_or_rd_bk  {-a | -i}  <device name>
```

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.
device name:  Specify the name of the raw device targeted for backup.
```

Example using swst_or_rd_bk

While the database is online, back up /dev/vg170 in which an Oracle database is located.

```
#  swst_or_rd_bk  -a  /dev/vg170
swst_or_rd_bk  completed. (/dev/vg170 -> /dev/vg171 at 23:01 on 2005.10.01 )
```

Processing outline of swst_or_rd_bk

```
#!/bin/sh

usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
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.
DST="`get_blk_chr $DSTBLK`"
BKDATE="`getdate $SRC`"
BKTIME="`gettime $SRC`"

exit 0
```

B.3.2 Applying the sample shell scripts

B.3.2.1 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.

B.3.2.2 File system backup

AdvancedCopy Manager setup

Set up backup volumes so that the mount point targeted for backup is backed up correctly in AdvancedCopy Manager.
The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Update the procedures below of swst_or_fs_bk to adjust them for 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 the spdata.bgn file and spdata.end file created by swst_or_iv.
These scripts can operate only on business servers of AdvancedCopy Manager.

B.3.2.3   Raw device backup

AdvancedCopy Manager setup

Set up backup volumes so that the raw device targeted for backup is backed up correctly in AdvancedCopy Manager.
The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Update the procedures below of swst_or_rd_bk to adjust them for 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 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.

B.3.3   Restore Method

B.3.3.1   File system

Use the restore function of AdvancedCopy Manager for restore processing.

B.3.3.2   Raw device

Use the restore function of AdvancedCopy Manager for restore processing.

B.3.4   Notes about using the sample shell scripts

Oracle resource location

Store Oracle data files and files other than data files on separate disks or in separate slices.

Backup of Oracle resources

Note the following when performing this function:

- Initialization parameter file

- Every time a change occurs, back up this file using the cp command of the OS is executed for backup.

- Control files

- You are recommended to use mirroring using Oracle.

- If a change is made in the DB environment, use the following command to create a trace file. If a control file is destroyed, execute the SQL statement in the trace file to recover the control file.

```
alter database backup control file to trace;
```

- Data files

  - The recommended location of data files is on a raw device.

  - 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.

  - Create backup copies in AdvancedCopy Manager.

  - 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.

  - 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;
```

- REDO files

  - You are recommended to mirror the online REDO log files and archive log files using Oracle or the OS.

  - 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.

Appendix C Pre-processing and Post-processing of Replication

The replication explains the replication pre-processing and post-processing that are performed in AdvancedCopy Manager.

C.1 Overview

The replication pre-processing and post-processing scripts are started before and after the replication (ie, the copy) processing.

AdvancedCopy Manager performs the processing required for a replication source volume and replication destination volume by executing these scripts.

This chapter describes the content and setup of pre-processing and post-processing.

Note

If replication is performed in group units, the replication pre-processing and post-processing scripts are not started. Therefore, replication pre-processing and post-processing must be performed manually when replication is performed in group units.

C.2 Pre-processing and Post-processing of Replication

The pre-processing and post-processing needs to be performed for both the replication source volume and the replication destination volume. The purpose of each is as follows.

- 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 applications from accessing the copy destination volume during replication. 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 executed during the pre-processing and post-processing differ according to the data contents of the volume. The next section explains the pre-processing and post-processing of the file system.

C.2.1 Pre-processing and post-processing for a file system

The pre-processing and post-processing for a file system is typically the unmounting and remounting of the file system. (For Windows, the processing consists of allocating and canceling a drive letter.) Pre-processing and post-processing of the replication source volume is performed in order to guarantee the replication source data by disabling access from other processes during execution of synchronous processing and snapshot copy.

If no volume is mounted, 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 at the time of the command execution.

Table C.1 Pre-processing and post-processing for a file system

Command	Copy status	Source/ Destination	Preprocessing	Post-processing
swsrpstartsync (Backup synchronous processing start command)	uncopy or replication establishment	Source	X	X
		Destination	O--*1	X
swsrpmake (Replication creation command)	equivalence maintenance	Source	O	O
		Destination	X	O--*2

| Command	Copy status		Source/ Destination	Preprocessing	Post-processing
swsrpcancel (Replication cancellation command)	equivalence maintenance		Source	O	O
			Destination	X	O--*2
	Replication establishment		Source	X	X
			Destination	X	X
	copying		Source	X	X
			Destination	X	X
swsrpmake (Replication creation command)	uncopy		Source	O	O
			Destination	O	O

O : executed,

X : not executed

The post-processing for the pre-processing executed in step (*1) is executed in step (*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 before and after processing is shown in the following figure.

Figure C.1 Synchronized replication processing
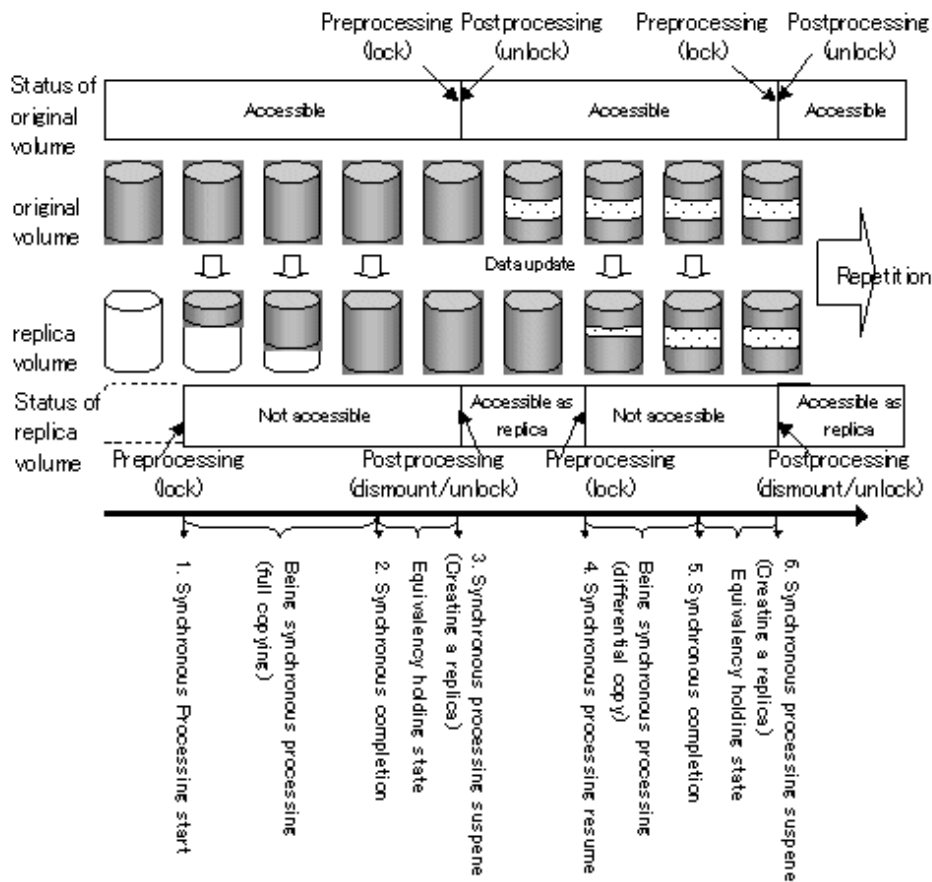
If processing other than the standard pre-processing and post-processing is required in the pre-processing and post-processing, customize the scripts.

When customizing a script, strictly observe the following rules regarding error codes:

Table C.2 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 "Replicate 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.

・ If the replication target volume cannot be unmounted, see "When you do not want to unmount the replication target volume" and customize the script for pre-processing.

・ AdvancedCopy Manager does not support pre-processing and post-processing of databases. Database pre-processing and post-processing must be executed uniquely before and after (respectively) the execution of the AdvancedCopy Manager command.

C.2.2 Pre-processing when replication is executed

The replication source volume script (RepSrcPre.js) and the replication destination volume script (RepDstPre.js) are prepared for a pre-processing script, and it is stored in the following directory subordinates. Please customize these 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
```

C.2.2.1   replication source volume pre-processing sample script (RepSrcPre.js)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: #    Pre-processing of Replication(Source) processing
 8: #
 9: #       Argument: $1 Device name of Source disk
10: #                 $2 Mount point of Source disk
11: #
12: #       Error number
13: #                 2: Argument error
14: #                10: umount error
15: #                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: mount_point=$2
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
32: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
33: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
34: if [ "$trans" != "" ]
35: then
36:    dev_type="physical"
37:    # /dev/dsk/c?t?d? -> c?t?d?
38:    dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
39:    post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
40:    fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43:    dev_type="vxvm_pv"
44:    # /dev/vx/dmp/XXXX -> XXXX
45:    dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
46:    post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
47:    fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50:    dev_type="logical"
51:    # /dev/vgXX -> vgXX
52:    dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
53:    post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
54: else
55:    exit 0
56: fi
57:
58: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
59:
60: # When the disk is a physical device ############################
61: if [ "$dev_type" = "physical" ]
62: then
63:
64:    if [ "$mount_point" != "" ]
65:    then
66: # When device cannot be unmounted --- 1
67: #      # Specify the name of volume group not to unmount
68: #      if [ "$device" = "/dev/dsk/cXtXdX" ]
69: #      then
70: #         sync
71: #         sync
72: #         echo "none" > $post_file
73: #
74: # When device can be unmounted --- 2
75: #      else
76:          /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/
awk '{ print $1 }' > $fstype_file
77:          /usr/sbin/umount $mount_point 2>/dev/null
78:
79:          if [ $? != 0 ]
80:          then
81:             retry_count=3
82:             sleep_time=1
83:             result_flag=1
84:
```

```
 85:                    while [ $retry_count -gt 0 ]
 86:                    do
 87:                        /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
 88:                        if [ $? != 0 ]
 89:                        then
 90:                            retry_count=`expr $retry_count - 1`
 91:                            /usr/bin/sleep $sleep_time
 92:                        else
 93:                            /usr/bin/rm -f $err_log_path/$dev.umount
 94:                            result_flag=0
 95:                            break
 96:                        fi
 97:                    done
 98:
 99:                    if [ $result_flag != 0 ]
100:                    then
101:                        /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
102:                        /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
103:                        exit 10
104:                    fi
105:            fi
106:            echo "mount,$mount_point" > $post_file
107: #     fi
108: # When device was not mounted --- 3
109:      else
110:          echo "none" > $post_file
111:      fi
112:
113: # When the disk is a volume group ################################
114: elif [ "$dev_type" = "logical" ]
115: then
116:
117: # Devices is volume group and script not customize
118:    exit 99
119:
120: # When devices of volume group cannot be unmounted --- 4
121: #
122: #  # Specify the name of volume group not to unmount
123: #  if [ "$device" = "/dev/vgXX" ]
124: #  then
125: #      sync
126: #      sync
127: #      echo "none" > $post_file
128: #  fi
129: #
130: # When devices of volume group can be unmounted --- 5
131: #
132: #  # Specify the name of volume group to unmount
133: #  if [ "$device" = "/dev/vgXX" ]
134: #  then
135: #      # Unmount all logical volumes of the volume group
136: #      mount_point="/XX"
137: #      /usr/sbin/umount $mount_point 2>/dev/null
138: #      if [ $? != 0 ]
139: #      then
140: #          retry_count=3
141: #          sleep_time=1
142: #          result_flag=1
143: #
144: #          while [ $retry_count -gt 0 ]
145: #          do
146: #              /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
147: #              if [ $? != 0 ]
```

```
148: #            then
149: #                retry_count=`expr $retry_count - 1`
150: #                sleep $sleep_time
151: #            else
152: #                rm -f $err_log_path/$dev.umount
153: #                result_flag=0
154: #                break
155: #            fi
156: #        done
157: #
158: #        if [ $result_flag != 0 ]
159: #        then
160: #            /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
161: #            /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
162: #            exit 10
163: #        fi
164: #    fi
165: #    echo "mount" > $post_file
166: #  fi
167: #
168: # When devices of volume group was not mounted --- 6
169: #
170: #  # Specify the name of volume group to do nothing
171: #  if [ "$device" = "/dev/vgXX" ]
172: #  then
173: #      echo "none" > $post_file
174: #  fi
175: #
176: # When Src devices is a VxVM physical device --- 7 ###########################
177: elif [ "$dev_type" = "vxvm_pv" ]
178: then
179:    # Nothing is done to VxVM PV.
180:    #
181:    echo "none" > $post_file
182:
183: fi
184:
185: exit 0
```

C.2.2.2   replication destination volume pre-processing sample script (RepDstPre.js)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 5:
 6: #
 7: #   Pre-processing of Replication(Destination) processing
 8: #
 9: #       Argument: $1 Device name of Destination disk
10: #                 $2 Mount point of Destination disk
11: #
12: #       Error number
13: #                 2: Argument error
14: #                10: umount error
15: #                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: mount_point=$2
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
32: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
33: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
34: if [ "$trans" != "" ]
35: then
36:     dev_type="physical"
37:     # /dev/dsk/c?t?d? -> c?t?d?
38:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
39:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
40:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43:     dev_type="vxvm_pv"
44:     # /dev/vx/dmp/XXXX -> XXXX
45:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
46:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
47:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50:     dev_type="logical"
51:     # /dev/vgXX -> vgXX
52:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
53:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
54:     conf_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".conf"
55: else
56:     exit 0
57: fi
58:
59:
60: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
61:
62:
63: # When the disk is a physical device ###########################
64: if [ "$dev_type" = "physical" ]
65: then
66:
67:     if [ "$mount_point" != "" ]
68:     then
69: # When device can be unmounted --- 2
70:         /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/awk
'{ print $1 }' > $fstype_file
71:         /usr/sbin/umount $mount_point 2>/dev/null
72:
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/umount $mount_point > $err_log_path/$dev.umount 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.umount
 88:                  result_flag=0
 89:                  break
 90:              fi
 91:          done
 92:
 93:          if [ $result_flag != 0 ]
 94:          then
 95:              /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
 96:              /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
 97:              exit 10
 98:          fi
 99:      fi
100:      echo "mount,$mount_point" > $post_file
101: #  fi
102: # When device was not mounted --- 3
103:    else
104:        echo "none" > $post_file
105:    fi
106:
107: # When the disk is a volume group #############################
108: elif [ "$dev_type" = "logical" ]
109: then
110:
111: # Devices is volume group and script not customize
112:    exit 99
113:
114: # When devices of volume group can be unmounted --- 5
115: #
116: #  # Specify the name of volume group to unmount
117: #  if [ "$device" = "/dev/vgXX" ]
118: #  then
119: #      # Unmount all logical volumes of the volume group
120: #      mount_point="/XX"
121: #      /usr/sbin/umount $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/umount $mount_point > $err_log_path/$dev.umount 2>&1
131: #              if [ $? != 0 ]
132: #              then
133: #                  retry_count=`expr $retry_count - 1`
134: #                  sleep $sleep_time
135: #              else
136: #                  rm -f $err_log_path/$dev.umount
137: #                  result_flag=0
138: #                  break
139: #              fi
140: #          done
141: #
142: #          if [ $result_flag != 0 ]
143: #          then
144: #              /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
145: #              /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
146: #              exit 10
147: #          fi
```

```
148: #        fi
149: #        echo "mount" > $post_file
150: #   fi
151: #
152: # When devices of volume group was not mounted --- 6
153: #
154: #   # Specify the name of volume group to do nothing
155: #   if [ "$device" = "/dev/vgXX" ]
156: #   then
157: #               echo "none" > $post_file
158: #   fi
159: #
160: # When Src/Dst devices is a VxVM physical volume --- 7 ######################
161: elif [ "$dev_type" = "vxvm_pv" ]
162: then
163:           # Nothing is done to VxVM PV.
164:           #
165:           echo "none" > $post_file
166:
167: fi
168:
169: exit 0
```

C.2.3 Post-processing when replication is executed

The replication source volume script (RepSrcPost.js) and the replication destination volume script (RepDstPost.js) are prepared for a post-processing script, which is stored in the following subdirectory. This script must 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
```

C.2.3.1 replication source volume post-processing sample script (RepSrcPost.js)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 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: # Device type check
27: # Determination postprocessing file name
28: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
29: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
30: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
31: if [ "$trans" != "" ]
32: then
33:     dev_type="physical"
34:     # /dev/dsk/c?t?d? -> c?t?d?
35:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
36:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
37:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
38: elif [ "$vxpvtrans" != "" ]
39: then
40:     dev_type="vxvm_pv"
41:     # /dev/vx/dmp/XXXX -> XXXX
42:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
43:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
44:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
45: elif [ "$lvmtrans" != "" ]
46: then
47:     dev_type="logical"
48:     # /dev/vgXX -> vgXX
49:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
50:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
51:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
52: else
53:     exit 0
54: fi
55:
56: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
57:
58: # Confirmation of postprocessing
59: if [ ! -r $post_file ]
60: then
61:     exit 0
62: fi
63: post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
64: mount_point="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
65:
66: # Confirmation of FStype
67: if [ ! -r $fstype_file ]
68: then
69:     fs=""
70: else
71:     fs="`/usr/bin/cat $fstype_file`"
72: fi
73:
74: # No processing
75: # When Src device cannot be unmounted                    --- 1
76: # When Src device was not mounted                        --- 3
77: # When Src devices of volume group cannot be unmounted --- 4
78: # When Src devices of volume group was not mounted      --- 6
79: # When Src devices is a VxVM physical device           --- 7
80: if [ "$post" = "none" ]
81: then
82:     /usr/bin/rm -rf $post_file 2> /dev/null
83:     /usr/bin/rm -rf $fstype_file 2> /dev/null
84:     exit 0
85: fi
86:
87: # mount processing
88: if [ "$post" = "mount" ]
```

```
 89: then
 90: # When Src device can be unmounted --- 2
 91:     if [ "$dev_type" = "physical" ]
 92:     then
 93:         /usr/bin/df -l $device > /dev/null 2>&1
 94:         if [ $? != 0 ]
 95:         then
 96:             if [ ! -r $fstype_file ]
 97:             then
 98:                 /usr/sbin/mount $device $mount_point 2> /dev/null
 99:             else
100:                 if [ "$fs" = "" ]
101:                 then
102:                     /usr/sbin/mount $device $mount_point 2> /dev/null
103:                 else
104:                     /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
105:                 fi
106:             fi
107:             if [ $? != 0 ]
108:             then
109:                 retry_count=3
110:                 sleep_time=1
111:                 result_flag=1
112:
113:                 while [ $retry_count -gt 0 ]
114:                 do
115:                     if [ ! -r $fstype_file ]
116:                     then
117:                         /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
118:                     else
119:                         if [ "$fs" = "" ]
120:                         then
121:                             /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
122:                         else
123:                             /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount
2>&1
124:                         fi
125:                     fi
126:                     if [ $? != 0 ]
127:                     then
128:                         retry_count=`expr $retry_count - 1`
129:                         /usr/bin/sleep $sleep_time
130:                     else
131:                         /usr/bin/rm -f $err_log_path/$dev.mount
132:                         result_flag=0
133:                         break
134:                     fi
135:                 done
136:
137:                 if [ $result_flag != 0 ]
138:                 then
139:                     exit 11
140:                 fi
141:             fi
142:     fi
143: # When devices of volume group can be unmounted --- 5
144: #  elif [ "$dev_type" = "logical" ]
145: #  then
146: #      #Specify the name of volume group to mount
147: #      if [ "$device" = "/dev/vgXX" ]
148: #      then
149: #          # Mount all logical volumes of the volume group
150: #          fs="hfs"
```

```
151: #          lvname="/dev/vgXX/XXXXX"
152: #          lv_mount_point="/XX"
153: #
154: #          /usr/bin/df -l $lvname > /dev/null 2>&1
155: #          if [ $? != 0 ]
156: #          then
157: #              /usr/sbin/mount -F $fs $lvname $lv_mount_point 2>/dev/null
158: #              if [ $? != 0 ]
159: #              then
160: #                  retry_count=3
161: #                  sleep_time=1
162: #                  result_flag=1
163: #
164: #                  while [ $retry_count -gt 0 ]
165: #                  do
166: #                      /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount
2>&1
167: #                      if [ $? != 0 ]
168: #                      then
169: #                          retry_count=`expr $retry_count - 1`
170: #                          /usr/bin/sleep $sleep_time
171: #                      else
172: #                          rm -f $err_log_path/$dev.mount
173: #                          result_flag=0
174: #                          break
175: #                      fi
176: #                  done
177: #
178: #                  if [ $result_flag != 0 ]
179: #                  then
180: #                      exit 11
181: #                  fi
182: #              fi
183: #          fi
184: #      fi
185:    fi
186:    /usr/bin/rm -rf $post_file 2> /dev/null
187:    /usr/bin/rm -rf $fstype_file 2> /dev/null
188:    exit 0
189: fi
190:
191: exit 0
```

C.2.3.2 replication destination volume post-processing sample script (RepDstPost.js)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 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: #               30: VG configuration file not found error
15: #               31: vgcfgrestore error
16: #               12: fsck error
17:
18: # Argument check
```

```
19: case $# in
20: 1)
21:     ;;
22: *)
23:     exit 2
24:     ;;
25: esac
26:
27: device=$1
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
32: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
33: vxpvtrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
34: if [ "$trans" != "" ]
35: then
36:     dev_type="physical"
37:     # /dev/dsk/c?t?d? -> c?t?d?
38:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
39:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
40:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43:     dev_type="vxvm_pv"
44:     # /dev/vx/dmp/XXXX -> XXXX
45:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $5 }'`"
46:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
47:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50:     dev_type="logical"
51:     # /dev/vgXX -> vgXX
52:     dev="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
53:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
54:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
55: else
56:     exit 0
57: fi
58:
59: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
60:
61: # Confirmation of postprocessing
62: if [ ! -r $post_file ]
63: then
64:     exit 0
65: fi
66: post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
67: mount_point="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
68:
69: # Confirmation of FStype
70: if [ ! -r $fstype_file ]
71: then
72:     fs=""
73: else
74:     fs="`/usr/bin/cat $fstype_file`"
75: fi
76:
77: # Restore VG Configuration
78: if [ "$dev_type" = "logical" ]
79: then
80:     vg_name="`echo $device | /usr/bin/awk -F\/ '{ print $3 }'`"
81:     cfg_file="/etc/lvmconf/"$vg_name".conf"
```

```
 82:    if [ ! -r $cfg_file ]
 83:    then
 84:        exit 30
 85:    fi
 86:    pv_rname="`/usr/sbin/vgcfgrestore -n $vg_name -l 2> /dev/null | /usr/bin/awk '{print $1}' | /
usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
 87:    if [ "$pv_rname" = "" ]
 88:    then
 89:        echo "/usr/sbin/vgcfgrestore -n $vg_name -l 2> /dev/null | /usr/bin/awk '{print $1}' | /
usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"" > $err_log_path/$dev.vgcfgrestore 2>&1
 90:        exit 31
 91:    fi
 92:    /usr/sbin/vgchange -a n $vg_name > /dev/null 2>&1
 93:    reststatus=0
 94:    for pv_rname1 in $pv_rname
 95:    do
 96:        /usr/sbin/vgcfgrestore -n $vg_name $pv_rname1 > /dev/null 2>&1
 97:        if [ $? = 0 ]
 98:        then
 99:            /usr/sbin/vgcfgrestore -n $vg_name $pv_rname1 > $err_log_path/$dev.vgcfgrestore 2>&1
100:            if [ $? = 0 ]
101:            then
102:                reststatus=1
103:                break
104:            fi
105:        fi
106:    done
107:    if [ "$SWSTGNODE" != "" ]
108:    then
109:        /usr/sbin/vgchange -c y $vg_name > /dev/null 2>&1
110:        /usr/sbin/vgchange -a e $vg_name > /dev/null 2>&1
111:    else
112:        /usr/sbin/vgchange -a y $vg_name > /dev/null 2>&1
113:    fi
114:    if [ $reststatus = 0 ]
115:    then
116:        exit 31
117:    fi
118: fi
119:
120: # No processing
121: if [ "$post" = "none" ]
122: then
123: # When Src device cannot be unmounted --- 1
124: #  if [ "$device" = "/dev/dsk/cXtXdX" ]
125: #  then
126: #      rdevice="`echo $device | sed "s/\/dsk\//\/rdsk\//"`"
127: #      src_fs=hfs
128: #      fsck -F $src_fs -y $rdevice > /dev/null 2>&1
129: #      if [ $? != 0 ]
130: #      then
131: #          exit 12
132: #      fi
133: #  fi
134: #
135: # When Src devices of volume group cannot be unmounted --- 4
136: #  if [ "$device" = "/dev/vgXX" ]
137: #  then
138: #      rdevice="/dev/vgXX/XXXXX"
139: #      src_fs=hfs
140: #      fsck -F $src_fs -y $rdevice > /dev/null 2>&1
141: #      if [ $? != 0 ]
142: #      then
```

```
143: #         exit 12
144: #     fi
145: # fi
146: # When Src/Dst device was not mounted --- 3
147: # When Src/Dst devices of volume group was not mounted --- 6
148: # When Src/Dst devices is a VxVM physical volume --- 7
149:    /usr/bin/rm -rf $post_file 2> /dev/null
150:    /usr/bin/rm -rf $fstype_file 2> /dev/null
151:    exit 0
152: fi
153:
154: # mount processing
155: if [ "$post" = "mount" ]
156: then
157:    if [ "$dev_type" = "physical" ]
158:    then
159: # When Dst device can be unmounted --- 2
160:        /usr/bin/df -l $device > /dev/null 2>&1
161:        if [ $? != 0 ]
162:        then
163:            if [ ! -r $fstype_file ]
164:            then
165:                    /usr/sbin/mount $device $mount_point 2> /dev/null
166:            else
167:                if [ "$fs" = "" ]
168:                then
169:                    /usr/sbin/mount $device $mount_point 2> /dev/null
170:                else
171:                    /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
172:                fi
173:            fi
174:            if [ $? != 0 ]
175:            then
176:                retry_count=3
177:                sleep_time=1
178:                result_flag=1
179:
180:                while [ $retry_count -gt 0 ]
181:                do
182:                    if [ ! -r $fstype_file ]
183:                    then
184:                        /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
185:                    else
186:                        if [ "$fs" = "" ]
187:                        then
188:                            /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
189:                        else
190:                            /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount
2>&1
191:                        fi
192:                    fi
193:                    if [ $? != 0 ]
194:                    then
195:                        retry_count=`expr $retry_count - 1`
196:                        /usr/bin/sleep $sleep_time
197:                    else
198:                        /usr/bin/rm -f $err_log_path/$dev.mount
199:                        result_flag=0
200:                        break
201:                    fi
202:                done
203:
204:                if [ $result_flag != 0 ]
```

```
205:            then
206:                exit 11
207:            fi
208:        fi
209:     fi
210: #  elif [ "$dev_type" = "logical" ]
211: #  then
212: # When Dst devices of volume group can be unmounted --- 5
213: #     # Specify the name of volume group to mount
214: #     if [ "$device" = "/dev/vgXX" ]
215: #     then
216: #         # Mount all logical volumes of the volume group
217: #         fs="hfs"
218: #         lvname="/dev/vgXX/XXXXX"
219: #         lv_mount_point="/XX"
220: #
221: #         /usr/bin/df -l $lvname > /dev/null 2>&1
222: #         if [ $? != 0 ]
223: #         then
224: #             /usr/sbin/mount -F $fs $lvname $lv_mount_point 2>/dev/null
225: #             if [ $? != 0 ]
226: #             then
227: #                 retry_count=3
228: #                 sleep_time=1
229: #                 result_flag=1
230: #
231: #                 while [ $retry_count -gt 0 ]
232: #                 do
233: #                     /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount
2>&1
234: #                     if [ $? != 0 ]
235: #                     then
236: #                         retry_count=`expr $retry_count - 1`
237: #                         /usr/bin/sleep $sleep_time
238: #                     else
239: #                         rm -f $err_log_path/$dev.mount
240: #                         result_flag=0
241: #                         break
242: #                     fi
243: #                 done
244: #
245: #                 if [ $result_flag != 0 ]
246: #                 then
247: #                     exit 11
248: #                 fi
249: #             fi
250: #         fi
251: #     fi
252:     fi
253:     /usr/bin/rm -rf $post_file 2> /dev/null
254:     /usr/bin/rm -rf $fstype_file 2> /dev/null
255:     exit 0
256: fi
257:
258: exit 0
```

C.2.4   Customizing the shell script

The method to customize the shell script for replication pre/post-processing is explained below.

When you do not want to unmount the replication target volume

· If you do not want to unmount a mounted volume, remove the comment characters ("#") from lines 68-72, 75 and 107 (in the case of a physical volume) or lines 123-128 (in the case of a volume group) in the pre-processing script (RepSrc.pre), and point to the target device in line 70 or 125. In addition, do not perform an update operation on a replication source volume file system after performing the sync command on line 68 or 125 until post-processing for original volume. If a file system update is performed in the meantime, the replica is extracted with an imperfect file system. In this case the fsck command which is carried out by the post-processing script (RepDst.post) may serve as an error.

· The replication source volume must be unmounted.

Replicate 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:

· Remove the comment ("#") from lines 133-166 in the source volume pre-processing script (RepSrc.pre), and lines 144-184 in the source volume post-processing script (RepSrc.post). Correct the description in a comment so that the unmount/mount processing is carried out for all logical volumes in which a file system is constructed. Change the sections indicated with an upper case "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 136-164 of the pre-processing script and lines 151-183 of the post-processing script once for each logical volume. Remove the comment ("#") from lines 117-150 in the destination volume pre-processing script (RepDst.pre), and lines 210, 211 and 214-251 in the destination volume post-processing script (RepDst.post). Correct the description in a comment so that the unmount/mount processing is carried out for all logical volumes in which a file system is constructed. Change the sections indicated with an upper case "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 120-149 of the pre-processing script and lines 218-250 of the post-processing script once for each logical volume.

· When not unmounting copied material volume, it is necessary to carry out fsck to all the logical volumes by which the file system in copy place volume was built with the post-processing script of copy place volume.

Insert a comment ("#") into line 118 of the source volume pre-processing script and line 112 of the destination pre-processing script.

🔰 Note
. . . .

· Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.

· When a destination volume is a volume group, in order to enable use of the volume for LVM, volume group configuration information is restored using the "vgcfgrestore" command in the restore post-processing. Volume configuration information is restored from the standard backup file "/etc/lvmconf/volume-group-name.conf". If volume group configuration information is backed up by another file the script will need to be customized.

· Modify the parameters and options of the OS commands (such as the mount command and the fsck command), appropriately for their use.

· For shared-mode volume groups:

When reconfiguring shared-mode volume groups, comment out lines 78-118, 121, 122 and 152 in the post-processing script (OpcBackup.post) to prevent the volume group from being reconfigured by the post-processing script.
Reconfigure the volume group by manually performing the following steps after the Replication has been executed.

1. Stop the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a n <vg_name>
#
```

2. Restore volume group configuration information (on the node where the volume group was created).

```
# /usr/sbin/vgcfgrestore -n <vg_name> <pv_path>
#
```

3. Mark the volume group as shareable (on the node where the volume group was created).

```
# /usr/sbin/vgchange -S y -c y <vg_name>
#
```

4. Start the volume group (on all nodes involved in the transaction).

```
# /usr/sbin/vgchange -a s <vg_name>
#
```

File system name

Change the file system names on line 150 of the replication source volume post-processing shell script (RepSrc.post) and lines 127, 139, and 217 of the replication destination volume post-processing shell script (RepDst.post) as appropriate for the operation.

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.
The mount point resource relating to the Volume is immediately offline/online whilst there will be a time delay before access is actually prevented when mount/unmount is used.
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 77, 87, 137 and 146]

(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 106 and 165]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing the unmount processing of the destination volume pre-processing script (RepDst.pre)

[lines 71, 81, 121 and 130]

(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 100 and 149]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing the mount processing of the source volume post-processing script (RepSrc.post)

[lines 98, 102, 104, 117, 121, 123, 157 and 166]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $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 143 and185]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing the mount processing of the destination volume post-processing script

[lines 165, 169, 171, 188, 190, 224 and 233]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $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

[lines 210 and 252]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

Appendix D Backup Operations Using Power-Saving

D.1 Overview

Under the power-saving operation, the ETERNUS disk storage systems Eco-mode functionality is used. The processing time of a specific disk drive (RAID group unit) is managed according to the schedule, and the disk drive's motor is stopped if there is no access to the disk for a certain period of time (the period can be set at 10 minutes, 20 minutes, 30 minutes, 40 minutes, 50 minutes and 60 minutes). In this way, power-saving can be achieved.

If there is an access to the disk after the motor has stopped, the disk drive is started again and the access is enabled in one to three minutes' time.

Moreover, the number of access is judged to be high if the number of operations of the disk drive in one day exceeds the set range (one to five times can be set). In this situation, the echo mode is not applied, and the operation will continue.

It is possible to save power consumption under the following operations.

- Backup management

    - Snapshot type high-speed backup (OPC) with no access to the backup volume for a long period of time.

    - Suspend/Resume functionality of synchronous type high-speed backup (EC, REC) with a long suspend time.

- Replication management

    - Snapshot type high-speed replication (OPC) with no access to the copied volume as the backup destination for a long period of time.

    - Suspend/Resume functionality of synchronous type high-speed replication with a long suspend time.

D.2 Structure

This section explains the overview of the structure.

Figure D.1 Overview of structure
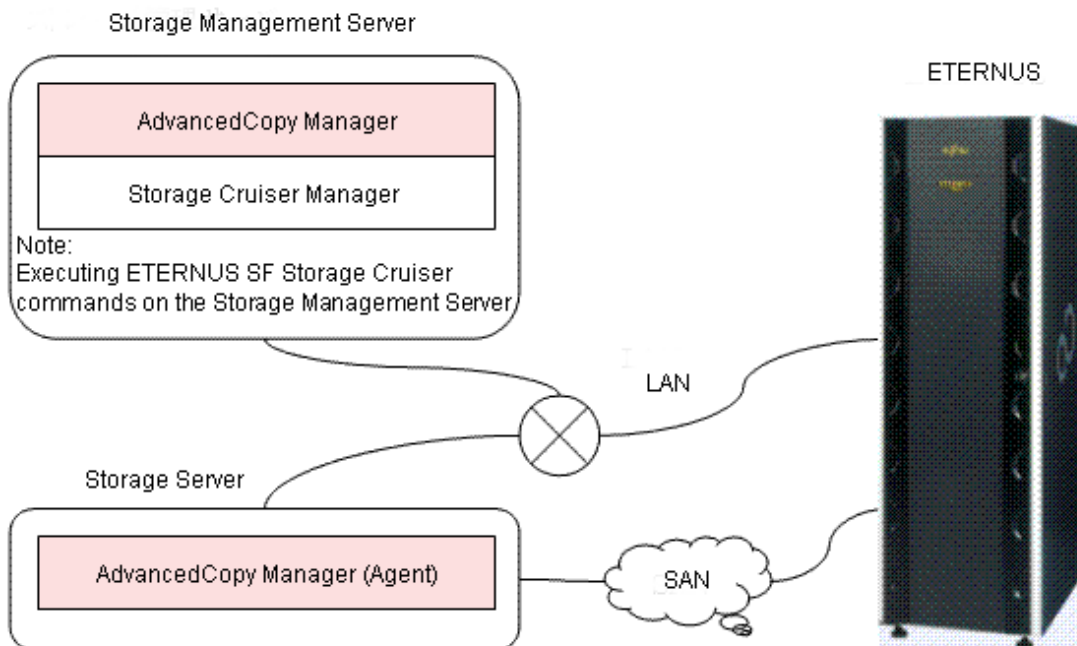
D.3　Operating Environment

This section explains the operating environment of the backup operation under the power-saving mode.

Device	Description
Storage Management Server	**Required operating systems** Operating systems that support both the Manager of AdvancedCopy Manager and ETERNUS SF Storage Cruiser 14.0 or later (the Operation Management Server (OMS) function). **Required software** ETERNUS SF Storage Cruiser 14.0 or later(Operation management server functionality) Note: For installation and setup of ETERNUS SF Storage Cruiser, refer to ETERNUS SF Storage Cruiser manual.
Storage Server	**Required operating system** Operating systems supported by AdvancedCopy Manager **Required software** None
ETERNUS disk storage systems	ETERNUS DX60/DX80/DX90 ETERNUS DX410/DX440 ETERNUS DX8100/DX8400/DX8700 ETERNUS2000 model 100 or higher ETERNUS4000 model 300 or higher ETERNUS8000 model 700 or higher Note: Firmware that can control Eco-mode software is required.

D.4　Environment Settings

D.4.1　Procedure for Configuring the Environment

This section describes how to configure the environment.

1. D.4.2 Settings for ETERNUS disk storage systems

2. D.4.3 Settings for AdvancedCopy Manager

3. D.4.4 Settings for ETERNUS SF Storage Cruiser

D.4.2　Settings for ETERNUS disk storage systems

To use the Eco-mode, it is required to set the device Eco-mode, create the Eco-mode schedule, and then set the Eco-mode scheduling for the RAID group.
For details on how to configure an ETERNUS disk storage systems, refer to the ETERNUS Web GUI manual.

Creating a RAID group and Logical Unit

The Eco-mode is applied and the RAID group is created.

A RAID group that is to store the data to be backed up (hereafter called "backup source RAID group") and a RAID group that is to store the backup data (hereafter called "backup destination RAID group") are created. A logical Unit is allocated to each RAID group.

To effectively reduce power consumption, the backup destination RAID group sets a Logical Unit for each backup that is performed simultaneously. Other Logical Units should not be included in the backup destination RAID group.

The example below illustrates the procedure to simultaneously back up three Logical units (Backup operation A). There are no Logical Units other than the ones for backup operation A in the backup destination RAID group. Therefore, a disk drive can be stopped, except when a backup is running.
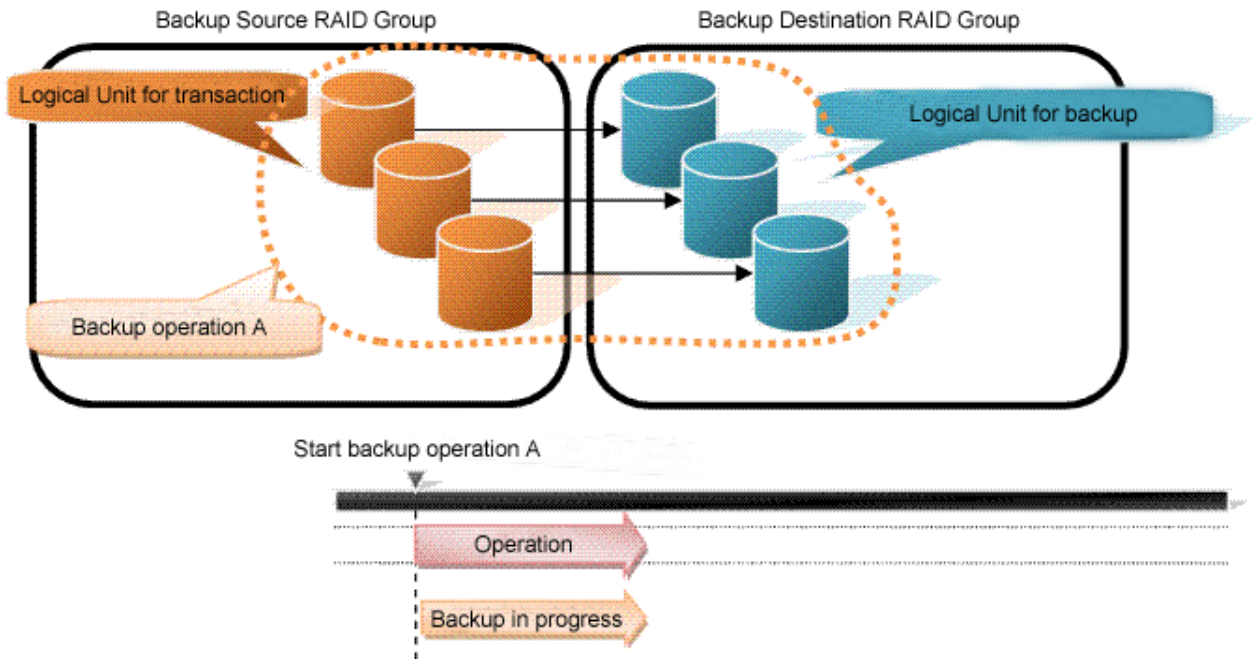

The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, a disk drive cannot be stopped, although backup operation A is ended if Logical Units for backup operation B and for business are running.
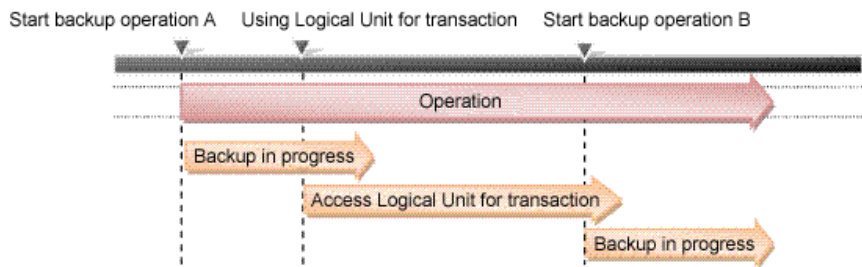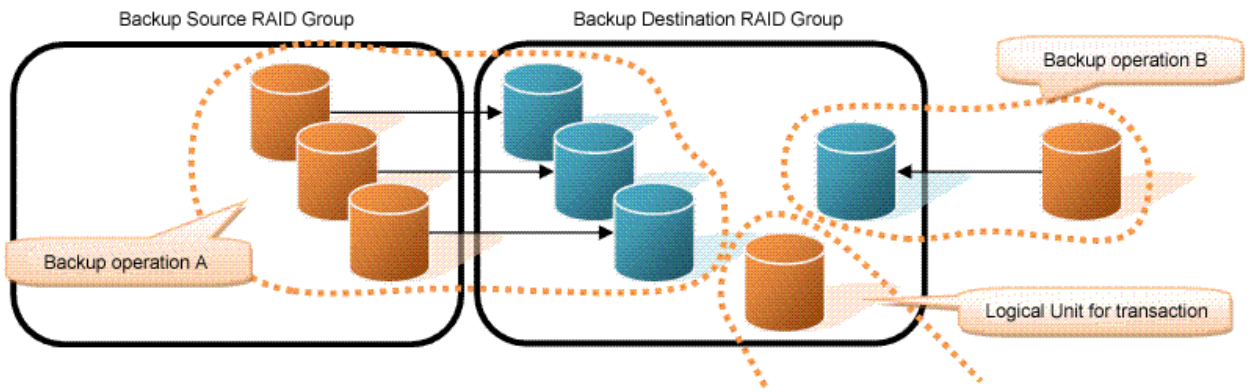
Point

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.
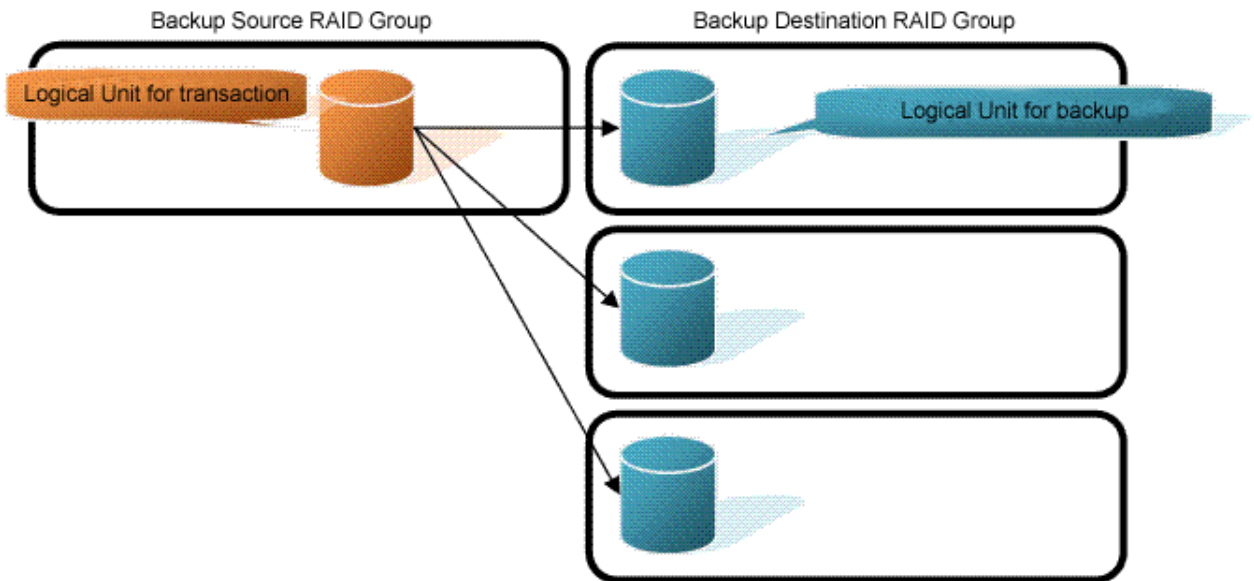
Note

A Snap Data Volume and a Snap Data Pool should not be included in a backup destination RAID group.
The RAID group disk drive which includes a Snap Data Volume or a Snap Data Pool does not reach a stop status.

Settings in the Eco-mode

This describes the setting details of the Eco-mode that supports RAID group.
For more details about the settings, refer to the ETERNUS Web GUI manual.

Table D.1 Eco-mode common settings

Setting items	Details of settings
Eco-mode settings	Starting the Eco-mode
Host I/O monitoring time (10,20,30,40,50,60 minutes)	Any
Limit of the number of starts/stops in one day (1 to 5 times)	Any

Table D.2 Backup source RAID group - Eco-mode settings

Setting items	Details of settings
Eco-mode schedule ON/OFF	OFF

Table D.3 Backup destination RAID group - Eco-mode settings

Setting items	Details of settings
Eco-mode schedule ON/OFF	ON
Eco-mode schedule	Software control

D.4.3　Settings for AdvancedCopy Manager

AdvancedCopy Manager needs to be configured so that the RAID group for the Eco-mode is used.

Using the backup operation

When assigning a backup volume, use a logical unit or partition (slice) that belongs to a RAID group for the Eco-mode.

Using the replication operation

For the destination volumes, use a logical unit or partition (slice) that belongs to a RAID group.

D.4.4　Settings for ETERNUS SF Storage Cruiser

An ETERNUS SF Storage Cruiser command is used for the power-saving operation. Therefore, ETERNUS SF Storage Cruiser needs to be set. For details, refer to the "ETERNUS SF Storage Cruiser" manual.

D.5　Operation

This section describes the procedure for establishing power-saving operations. This procedure is to be followed for the Storage Management Server.

1. D.5.1 Start the Disk Drive

2. D.5.2 Operate AdvancedCopy Manager

3. D.5.3 Stop the Disk Drive

D.5.1   Start the Disk Drive

A RAID group disk drive is started using ETERNUS SF Storage Cruiser disk control command. It is possible to wait for the start time of the disk drive by specifying the -sync option.

Example when the Storage Management Server is Windows

```
C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle start -
ipaddr <EternusIP> -raid <RaidGroup> -sync

<EternusIP>: ETERNUS disk storage systems IP address
<RaidGroup>: RAID group number to be used for backup destination
```

Example when the Storage Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr <EternusIP> -raid <RaidGroup> -sync

<EternusIP>: ETERNUS disk storage systems IP address
<RaidGroup>: RAID group number to be used for backup destination
```

For details on this command, refer to the "ETERNUS SF Storage Cruiser" manual.

D.5.2   Operate AdvancedCopy Manager

Backup, restoration and replication are performed using AdvancedCopy Manager commands. For details, refer to the description of each operation in this manual.

D.5.3   Stop the Disk Drive

Stopping of a RAID group disk drive is scheduled using the disk control command of the ETERNUS SF Storage Cruiser. This command returns control after the end of the stopping schedule of the disk drive.

Example when the Storage Management Server is Windows

```
C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle stop -
ipaddr <EternusIP> -raid <RaidGroup> -s

<EternusIP>: ETERNUS disk storage systems IP address
<RaidGroup>: RAID group number to be used for the backup destination
```

Example when the Storage Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr <EternusIP> -raid <RaidGroup> -s

<EternusIP>: ETERNUS disk storage systems IP address
<RaidGroup>: RAID group number to be used for the backup destination
```

For details on this command, refer to the "ETERNUS SF Storage Cruiser" manual.

📒 Note

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Depending on the status of the back up destination RAID group, a disk drive may not stop immediately.

- While OPC physical copying
  If the OPC physical copy is in progress on the disk drive, the disk drive stops after a certain period once the physical copy is completed.

- While the disk is being accessed
  If the RAID group for backup destination is being accessed, for example when backing up to a tape, the drive stops after a certain period once the access is stopped.

Other than the above, there are cases that the disk does not stop. For details, refer to the "ETERNUS SF Storage Cruiser" manual.

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