ETERNUS SF
AdvancedCopy Manager V13.2

Operator's Guide (Solaris)

FUJITSU

Preface

++ Purpose

This manual describes the operations on ETERNUS SF AdvancedCopy Manager.

++ Intended Readers

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

++ Organization

This manual has the following chapters:
+ Chapter 1 Overview of AdvancedCopy Manager
This chapter describes the overview of ETERNUS SF AdvancedCopy Manager.
+ Chapter 2 Starting and Stopping a Daemons
This chapter describes starting and stopping a daemons provided by AdvancedCopy Manager.
+ Chapter 3 Security Operation Using the Authentication Feature
This chapter describes the security operation on ETERNUS SF AdvancedCopy Manager.
+ Chapter 4 Backup Operations (Normal Transaction Volumes)
This chapter describes the backup operation.
+ Chapter 5 Backup Operation (Symfoware)
This chapter describes the backup operation (Symfoware).
+ Chapter 6 Backup Process That Uses the Suspend/Resume Function
This chapter describes how to use the Suspend/Resume function in the backup operation.
+ Chapter 7 Backup Operation by the QuickOPC Function
This chapter describes how to use the QuickOPC function in the backup operation.
+ Chapter 8 Replication Operation
This chapter describes the replication operation.
+ Chapter 9 Configuration Maintenance
This chapter describes maintaining a database, performing troubleshooting, and other maintenance methods in the operation.
+ Chapter 10 Commands
This chapter describes commands.
+ Chapter 11 Notes on Operations
This chapter describes notes on the operations.
+ Appendix A Pre-processing and Post-processing of Backup and Restoration
This appendix describes shell scripts used for pre-processing and post-processing for backup and restoration.
+ Appendix B Sample Shell Script for Backup Operations
This appendix describes sample shell scripts for backup operations for ETERNUS SF AdvancedCopy Manager.
+ Appendix C Pre-processing and Post-processing of Replication
This appendix describes replication scripts used by ETERNUS SF AdvancedCopy Manager.
+ Appendix D System Volume Backup Operation
This appendix describes the procedure when the backup and restore of the system volume are operated.

++ Related Manuals

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

- ● ETERNUS SF AdvancedCopy Manager Overview

    Provides an overview of ETERNUS SF AdvancedCopy Manager.

- ● ETERNUS SF AdvancedCopy Manager Installation Guide

    Describes the installation procedure for ETERNUS SF AdvancedCopy Manager.

- ● ETERNUS SF AdvancedCopy Manager Operator's Guide

    Describes the operating procedures for ETERNUS SF AdvancedCopy Manager.

    A different operator's guide is provided for each supported operating system.

- ● ETERNUS SF AdvancedCopy Manager GUI User's Guide

    Describes the operating procedures for the Web-GUI of ETERNUS SF AdvancedCopy Manager.

- ● ETERNUS SF AdvancedCopy Manager Message Guide

    Explains the messages output by ETERNUS SF AdvancedCopy Manager and the associated troubleshooting.

- ● ETERNUS SF AdvancedCopy Manager Operator's Guide for Cluster Environment

    Describes the installation and customization procedures for ETERNUS SF AdvancedCopy Manager in a cluster environment.

- ● ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option

    Describes the operating procedures for tape backup with ETERNUS SF AdvancedCopy Manager.

Users are advised to read the "ETERNUS SF AdvancedCopy Manager Operator's Guide" first to gain an understanding of the general concepts of this software before reading the other manuals as necessary.

++ Conventions

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

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Table of Contents

Chapter 1 Overview of AdvancedCopy Manager

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)

An ETERNUS disk array hardware function [Advanced Copy Function] is used to back up data fast. The advanced copy function, being a fast data copy function independent of a data size, can always maintain fixed backup time even if the data to be backed up increases. Thus, the backup time does not increase even if the data amount increases.
This function can drastically reduce the time in which work must be stopped to perform backup. The AdvancedCopy operations management also works closely with the Oracle DBMS in the Solaris environment, providing high-speed backup without any interruption to daily work.

Even if live operations uses a database other than Oracle or uses a general file system, the time that work is interrupted is still significantly reduced.
With the remote copy function in the ETERNUS storage system, backup operations to disk array devices at remote locations is also possible.

1.1.2 Non-stopped operating backup [database]

By using AdvancedCopy Manager, the Oracle database can be backed up without stopping the application. Please refer to the following for the backup method for Oracle databases:
   ● "Sample Shell script for Backup Operations"
Even while a logical volume manager such as PRIMECLUSTER GDS is operating, AdvancedCopy Manager allows backup without stopping the logical volumes. For the products and configurations applicable to this operation, refer to "Managing a Device on AdvancedCopy Manager."

1.1.3 High-speed replication

An ETERNUS disk array 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 storage system, copying operations to disk array devices at remote locations is also possible.
When using a shell script for specific DBMS integration as shown below, high-speed copying without stopping transactions is possible.
   ● Oracle

Point

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

1.2 Product Configuration of AdvancedCopy Manager

1.2.1 Function system

AdvancedCopy Manager consists of the following two functions:

Table: Functions

Function name	Description
Management module of AdvancedCopy Manager	Operates on the Storage Management Server, and two or more Storage Servers are managed. Backup management and replication management are performed.
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.

— The Manager product includes the Agent function.

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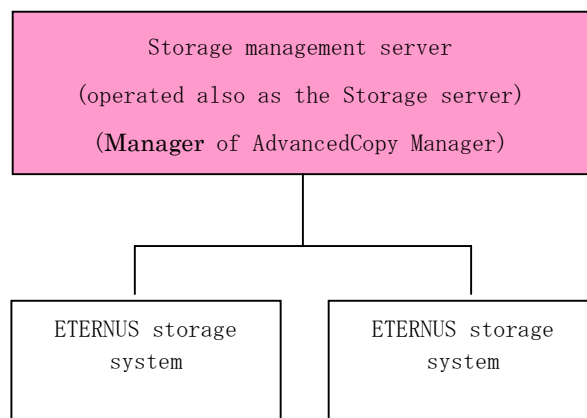
● When two or more Storage Servers are installed
When two or more AdvancedCopy Manager servers are available, set only one of them up as the Storage Management Server or set up a new server with no disk drive connected as the Storage Management Server. Each environment is explained below.

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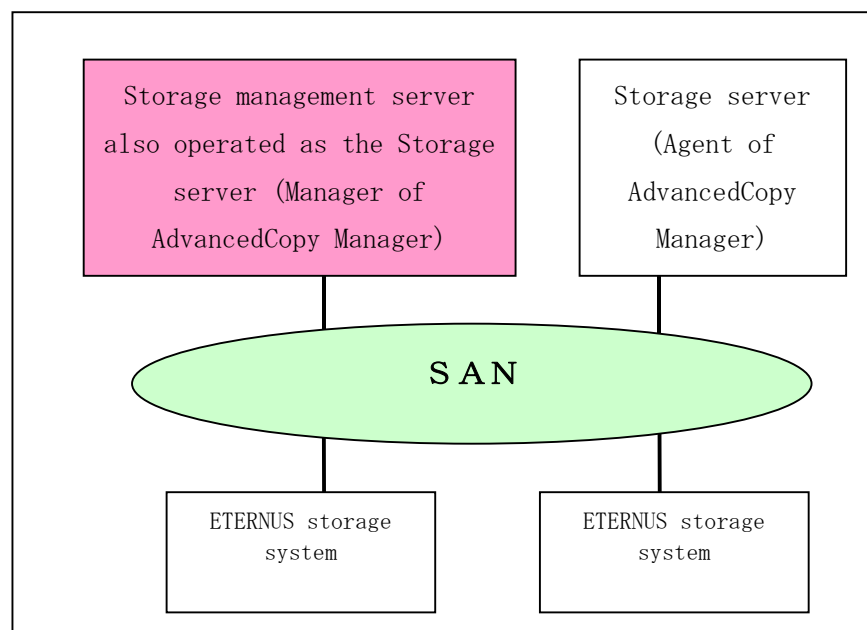
b.　Setting up the special Storage Management Server
This setup comprises two or more Storage Servers with a dedicated Storage Management Server.

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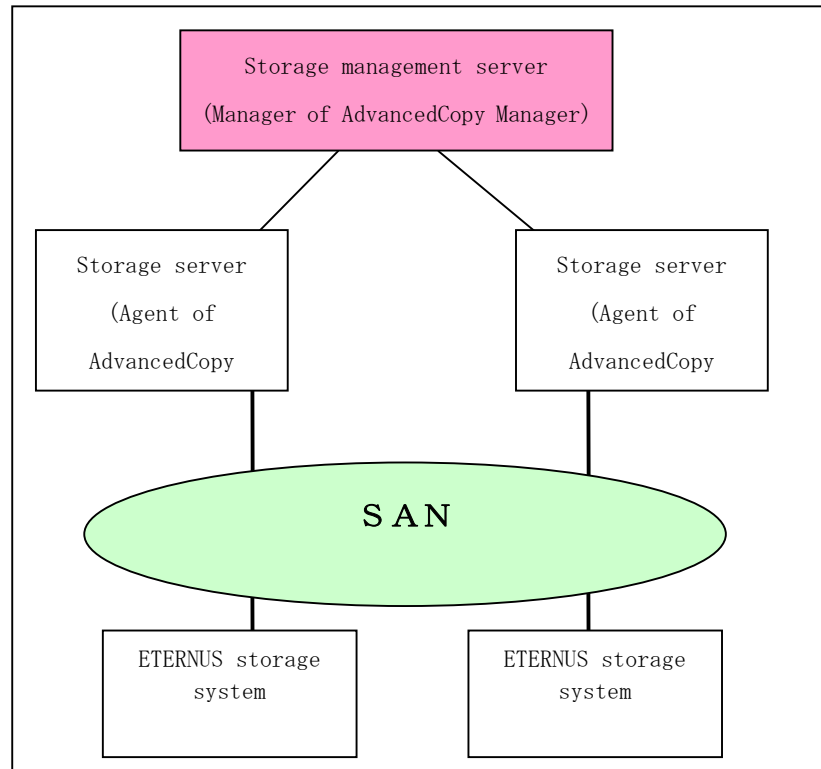
1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

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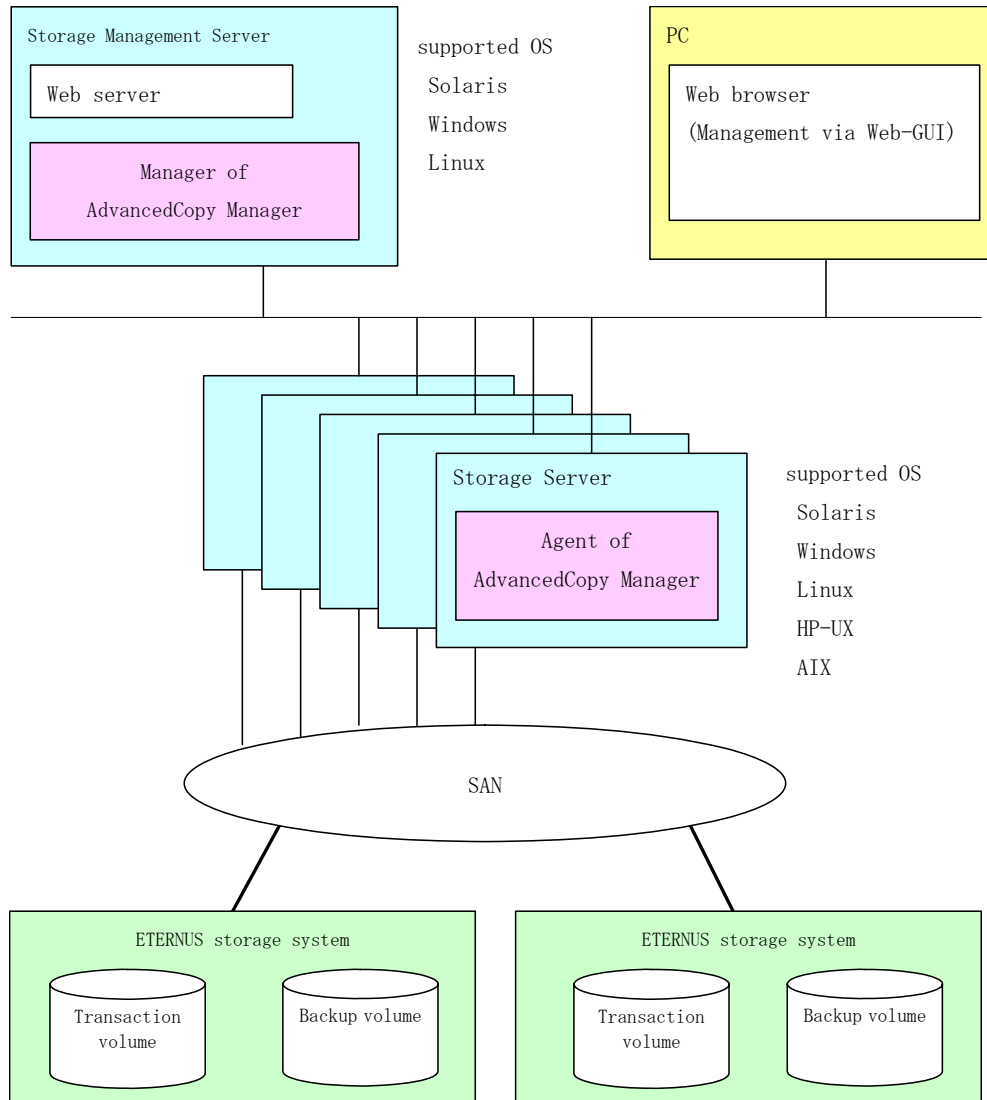
1.2.3 Combinations of products

This section explains combinations of AdvancedCopy Manager products.

Combinations of the manager and agent

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

Table: Combinations of products

			Agent platform (Storage Server)														
			Solaris			Windows			Linux			HP			AIX		
			10.x	11.x	13.x	V10.0 Lxx	V11.0 Lxx	13.x	V10.0 Lxx	V11.0 Lxx	13.x	10.x	11.x	13x0	10.x	11.x	13.x
Manager platform (storage management server)	Solaris	10.x	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		11.x	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13.x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A
	Windows	V10.0Lxx	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lxx	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13.x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A
	Linux	V10.0Lxx	A	C	C	A	C	C	A	C	C	A	C	C	A	C	C
		V11.0Lxx	B	A	C	B	A	C	B	A	C	B	A	C	B	A	C
		13.x	B	B	A	B	B	A	B	B	A	B	B	A	B	B	A

A : Compatible

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

C : Incompatible

Note

● There is a difference in functionality between some product revision levels. Installation of the manager and agent 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
● Versions 10.x, 11.x, V10.0Lxx, and V11.0Lxx in "Table: Combinations of products" are original versions of Softek AdvancedCopy Manager.

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), ROPC (Remote One Point Copy), EC (Equivalent Copy), and REC (Remote Equivalent) function of a Fujitsu Storage Systems ETERNUS.

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

High-speed backup operation

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

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

Backup operation in conjunction with Oracle (sample shell scripts)

The following sample shell scripts provide AdvancedCopy Manager commands and Oracle operations combined together:

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

Additionally, the following functions allow you to manage the backup operation.

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.

Note

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

History information management function

The history information management function manages, 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), ROPC (Remote 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 disk array unit 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 Web-GUI 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 "Security Operation Using Authentication Feature" for more information.

1.3.4 Web client screen

The Web client screen 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 Web browser can be used to access the client screen of a Management Server. The system on which the Web browser is running does not have to have AdvancedCopy Manager installed.
Backup management and replication management can also be performed at the command line.
For more information, see "AdvancedCopy Manager Web Client" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide.

1.4 Operating Environment of AdvancedCopy Manager

1.4.1 Hardware requirements

One of the following hardware devices is required to perform backup 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).

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

1.4.2 Software requirements

1.4.2.1 Manager of AdvancedCopy Manager

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

Table: Software requirements for Manager of AdvancedCopy Manager

Product name	Requirement	Remarks
Solaris 8, Solaris 9, Solaris 10	Required	Support OS
Apache 1.3.4 or later	Conditionally Required	Web server
SynfinityCLUSTER 2.0 PRIMECLUSTER V4.1 or later VERITAS Cluster Server 4.0, 4.1, 5.0 SunCluster 3.1	Conditionally required	For cluster operation with Manager of AdvancedCopy Manager
Multipath disk control (MPHD) 2.0 or later	Conditionally required	When a Storage Management Server serves as a Storage Server, and when multipath disk control is carried out
Multipath disk control load balance option (MPLB) 2.0 or later	Conditionally required	When a Storage Management Server serves as a Storage Server, and when it carries out multipath disk control and load distribution of a path is carried out further
GR multipath driver (GRMPD) 1.0 for Solaris	Conditionally required	When a Storage Management Server serves as a Storage Server, and when it carries out multipath disk control and load distribution of a path is carried out further
ETERNUS multipath driver	Conditionally required	When a Storage Management Server serves as a Storage Server, and when it carries out multipath disk control and load distribution of a path is carried out further

Product name	Requirement	Remarks
PRIMECLUSTER GDS Snapshot 4.1A30 or later	Conditionally required	When the Storage Management Server also serves as the Storage Server, and when the backup operation or replication operation is performed in linkage with GDS Snapshot.
VERITAS Volume Manager 4.0, 4.1, 5.0	Conditionally required	When the Storage Management Server also serves as the Storage Server, and when a logical volume of VERITAS Volume Manager is the target of the operation performed.

If Solaris 10 operating system is in use

The Solaris 10 operating system functions not supported are:
— Containers(Zones)
— ZFS

If multi-path drivers are in use

Use the ETERNUS multi-path drivers for synchronous replication operations that target areas that include VTOC.

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

1.4.2.2 Agent of AdvancedCopy Manager

Table: Software requirements for Agent of AdvancedCopy Manager

Product name	Requirement	Remarks
Solaris 8, Solaris 9, Solaris 10	Required	Support OS
Symfoware Server Advanced Backup Controller 6.x or later	Conditionally required	For backup operations linked to Symfoware
SynfinityCLUSTER 2.0 PRIMECLUSTER V4.1 or later VERITAS Cluster Server 4.0, 4.1, 5.0 SunCluster 3.1	Conditionally required	For cluster operation with Agent of AdvancedCopy Manager
Multipath disk control (MPHD) 2.0 or later	Conditionally required	For multipath disk control
Multipath disk control load balance option (MPLB) 2.0 or later	Conditionally required	For multipath disk control and path load balancing
GR multipath driver (GRMPD) 1.0 for Solaris	Conditionally required	For multipath disk control and path load balancing
ETERNUS multipath driver	Conditionally required	For multipath disk control and path load balancing
PRIMECLUSTER GDS Snapshot 4.1A30 or later	Conditionally required	When the backup operation or replication operation is performed in linkage with GDS Snapshot.
VERITAS Volume Manager 4.0, 4.1, 5.0	Conditionally required	When a logical volume of VERITAS Volume Manager is the target of the operation performed.

If Solaris 10 operating system is in use

The Solaris 10 operating system functions not supported are:
— Containers(Zones)
— ZFS

If multi-path drivers are in use

Use the ETERNUS multi-path drivers for synchronous replication operations that target areas that include VTOC.

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

1.4.2.3 Web Browser

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

1.5 Managing a Device on AdvancedCopy Manager

1.5.1 Normal devices

The following devices are supported in backup management and replication management.

- sd driver resources
- hddv driver resources
- MPxIO driver resources
- MPLB resources

Moreover, the unit of management is a disk partition (slice) unit or a Logical Unit (disk unit).

> **Note**
>
> For the operation of disks that exceed 1 terabyte, refer to "Using large-capacity disks" under "Notes on use".

> **Note**
>
> If Logical Units (disk units) are used for operations, refer to "Notes on executing Logical Unit (disk unit) copy".

> **Note**
>
> Under the Solaris 10 operating system, if operations are performed under an ETERNUS multipath driver (hereafter referred to as ETMPD) environment, some functions provided by AdvancedCopy Manager may not be able to be used, depending on the ETMPD environment settings.
> Refer to "Operations under the ETERNUS multipath driver environment" under "Notes on operation" for details.

1.5.2 SDX objects of PRIMECLUSTER GDS/SynfinityDISK

PRIMECLUSTER GDS (hereinafter referred to as GDS)/SynfinityDISK is software whose main function is mirroring disk units.
AdvancedCopy Manager can backup and replicate the SDX objects of GDS/SynfinityDISK.
SDX objects are virtual resources managed by GDS/SynfinityDISK, and they include classes, groups, disks, volumes, and slices.
AdvancedCopy Manager can backup and replicate SDX objects in units of logical volumes or slices.
The format used to specify a device name in AdvancedCopy Manager is different depending on whether units of logical volumes or units of slices are to be used. Specify a device name as follows:

- For operation in units of logical volumes
  /dev/sfdsk/(class-name)/dsk/(volume-name)
- For operation in units of slices
  /dev/sfdsk/(class-name)/dsk/(volume-name):(devnam-value-of-sdxinfo)

Example: The class name is class1, the volume name is volume1, and the DEVNAM value of sdxinfo is c1t0d10.

- For operation in units of logical volumes:
  /dev/sfdsk/class1/dsk/volume1
- For operation in units of slices:
  /dev/sfdsk/class1/dsk/volume1:c1t0d10

— PRIMECLUSTER GDS 4.1A30 or later and PRIMECLUSTER GDS Snapshot 4.1A30 or later are required to perform separate operations for each logical volume.
— Operation in units of logical volumes and operation in units of slices at the same time on a single Storage Server is not possible. Note that for cluster operations, operating in units of logical volumes or in units of slices is possible in separate Storage Server transactions.

For details on backup of SDX objects, refer to "SDX Object Operation" (Backup Operation). For details on replication of SDX objects, refer to "SDX Object Operation" (Replication Operation).

Note that the software versions and levels vary in accordance with the environment at the installation destination system. Refer to the relevant software manuals for details.

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 slices in a logical volume
● Physical disk that constitutes a volume group

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

1.5.3.1 Logical volume

AdvancedCopy Manager copies a logical volume by copying the entire public region of the VM disk (physical disk) having the sliced attribute (the private region is separate from the public region) instead of copying in units of sub-disks.
Specify a device name as the VxVM logical volume name.

Figure: VM disk (physical disk) having the sliced attribute (the private region is separate from the public region)
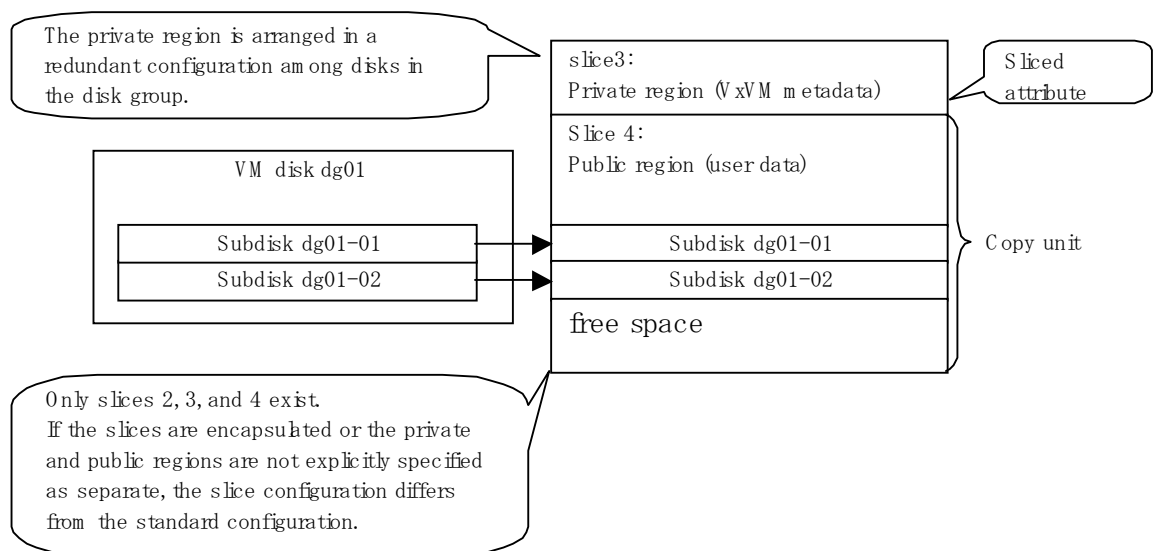
The above means that AdvancedCopy Manager copies the VxVM logical volume in units of physical slices (/dev/dsk/cXtXdXsX) instead of units of logical volumes.

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

● All sub-disks making up the logical volume are in one VM disk, and the VM disk does not have any sub-disk of another logical volume.
● The VM disk has the sliced attribute (the private region and public region are located in different slices).
● It is not a non-layered volume.
● The logical volume is not encapsulated.

Figure: Relationships between volumes, VM disks, and physical disks (1)
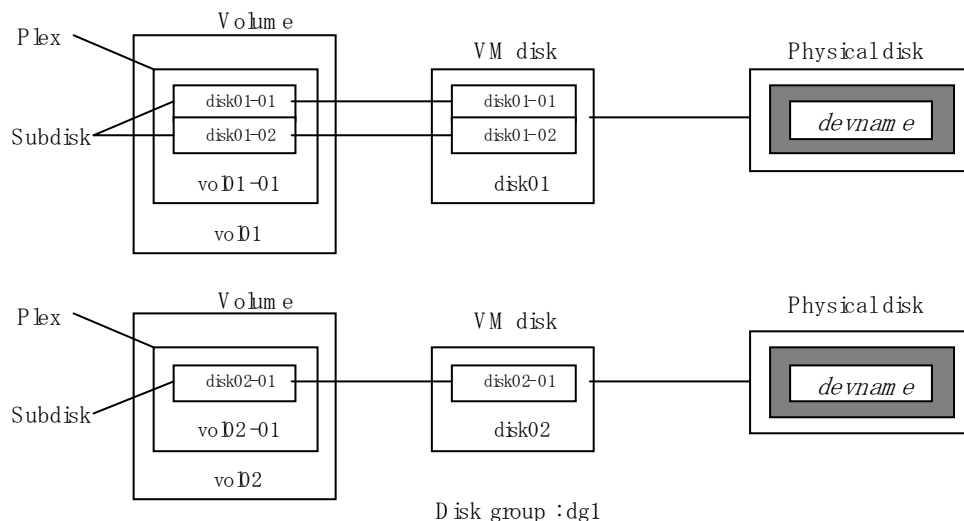
A configuration with more than one logical volume in a single VM disk (the logical volumes and VM disk are defined as N:1 (N>1)), such as shown below, is also supported but note the following points:

● For logical volumes with a constructed file system, the unmount/mount operation must be performed before and after backup or replication.
● For backup of an Oracle database, all logical volumes of the VM disk must be table areas.

Figure: Relationships between volumes, VM disks, and physical disks (2)
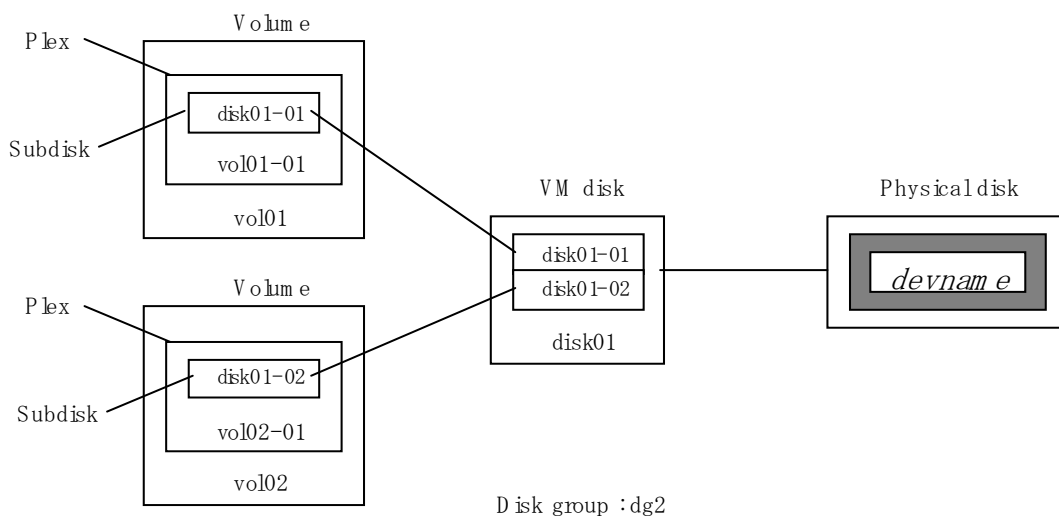
Figure: Relationship between volumes and subdisks

```
                                          ┌─────────────────────────────┐
                                          │ slice3:                     │
                                          │ Private region (VxVM metadata)│
                                          ├─────────────────────────────┤
                                          │ slice:                      │
 ┌──────────────────────────────────┐    │ Public region (user data)   │
 │ Volume vol01 (Oracle table space)│─┐  │                             │
 └──────────────────────────────────┘ │  │                             │
 ┌──────────────────────────────────┐ └─►├─────────────────────────────┤ ┐
 │ Volume vol02 (Oracle table space)│────►│   Subdisk dg01-01           │ │
 └──────────────────────────────────┘     ├─────────────────────────────┤ │
 ┌──────────────────────────────────┐     │   Subdisk dg01-02           │ ├ Copy unit
 │ Volume vol03 (Oracle table space)│────►├─────────────────────────────┤ │
 └──────────────────────────────────┘     │   Subdisk dg01-03           │ │
 ┌──────────────────────────────────┐────►├─────────────────────────────┤ ┘
 │ Volume vol04 (Oracle table space)│     │   Subdisk dg01-04           │
 └──────────────────────────────────┘     ├─────────────────────────────┤
                                          │ free space                  │
                                          │                             │
                                          └─────────────────────────────┘
```
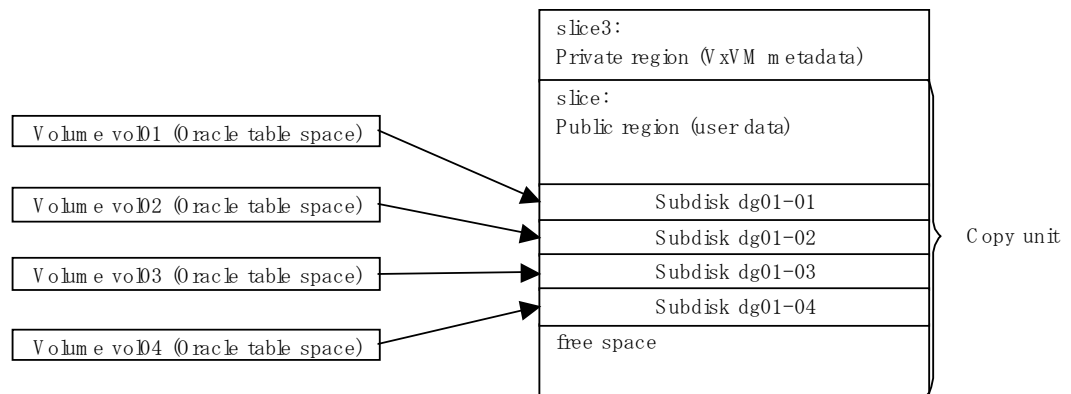
AdvancedCopy Manager does not support logical volumes whose configuration is:
● Concatenation with spanning (Concatenation without spanning is supported.)
● Striping (RAID-0)
● Mirroring (RAID-1)
● RAID-5
● Mirroring Plus Striping (RAID-1 + RAID-0)
● Striping Plus Mirroring (RAID-0 + RAID-1)

Note

● A disk group is created as a CDS disk group by default for VxVM 4.0. To obtain a disk group supported by AdvancedCopy Manager, create a non-CDS disk group, and specify "sliced" as the disk type.

1.5.3.2 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.

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 be the same. For operation in a SunCluster environment, the VxVM enclosure name must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the enclosure name must be the same.

Note

It is only VM disk of the <nopriv> type that a physical slice becomes the unit of management.

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

Disk group rdg3
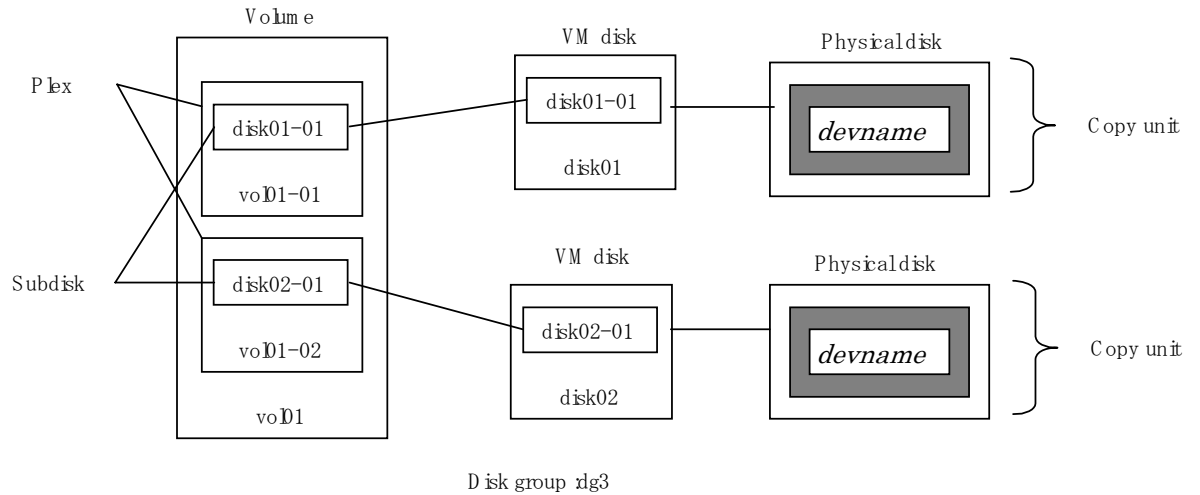
Since AdvancedCopy Manager copies an entire VM disk, not only the shared area that is a sub-disk but also the public region containing VxVM-internal configuration information is copied. When backup or replication is performed, therefore, the integrity of VxVM configuration information must be maintained during copying.

Specify a device name as follows:
- ● /dev/vx/dmp/c#t#d#s#
- ● /dev/vx/dmp/c#t#d#
- ● /dev/vx/dmp/enclosure name (only for use under a SunCluster environment)

> **Note**
>
> Except when used under a SunCluster environment, operations are not supported under naming convention operations based on enclosures in VxVM.

Chapter 2 Starting and Stopping Daemons

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

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

2.1 Daemons that Configure AdvancedCopy Manager

Manager of AdvancedCopy Manager is configured with the following daemons:

Table: Types of daemons that configure Manager of AdvancedCopy Manager

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

Agent of AdvancedCopy Manager is configured with the following daemons:

Table: Types of daemons that configure Agent of AdvancedCopy Manager

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

When the Storage Management Server is in cluster operation, the following daemons compose Storage Management Server transactions:

Table: Types of daemons used for Storage Management Server transactions

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

The AdvancedCopy Manager agent is composed of the following agent:

Table: Type of daemon used for Storage Server transactions

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

Note

The following daemon cannot be used for a Storage Management Server transaction or Storage Server transaction:
● Communication daemon (local daemon)

2.2 Starting a Daemon

Daemons must be activated on the Storage Management Server and Storage Server.
Normally, they are automatically activated. However, if activation fails or the daemon is stopped, activate the daemon on each server by executing the following command:

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

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

When the Storage Management Server or Storage Server is in cluster operation, start up the daemon(s) from the cluster system. For the start procedure, see the relevant cluster software manual.

To start the daemon separately for certain AdvancedCopy Manager transactions for some reason, follow the steps described below.
● For the communication daemon:
   You must start the daemon for each AdvancedCopy Manager transaction (including storage local transactions). Take the following steps for the respective transactions.
   1) Execute the following command on the command line:

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

   Confirm that command execution does not display:

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

   If the message above is displayed, the daemon has already started.
   2) For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.
   3) Start the communication daemon.
      For the startup command, see "Start/Stop Daemon Commands".

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

2.3 Stopping a Daemon

Stop daemons from the Storage Management Server and the Storage Server. Normally, they are automatically stopped when the system stops.
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 Management Server or Storage Server is in cluster operation, stop the daemon(s) from the cluster system. For the stop procedure, see the relevant cluster software manual.

Note

To stop the daemon separately of certain AdvancedCopy Manager transactions for some reason, follow the steps described below.
● For the communication daemon:
You must stop the daemon in each AdvancedCopy Manager transaction (including storage local transactions). Take the following steps for the respective transactions.
   1) Execute the following command on the command line:

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

   Confirm that command execution displays:

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

   If the message above is not displayed, the daemon has already stopped.
   2) For environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.
   3) Stop the communication daemon.
   For the stop command, see "Start/Stop Daemon Commands".

Note

If you command the communication daemon to stop while it is running, the command may take up to 10 seconds to complete.

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

Chapter 3 Security Operation Using the Authentication Feature

This chapter details security operations using the authentication feature provided by AdvancedCopy Manager.

3.1 Overview

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

AdvancedCopy Manager allows you to set access permissions for each user performing backups. Authentication features provide security for backup and replication operation.

In AdvancedCopy Manager the authentication information must fulfill the following conditions:

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

3.2 Access Permission

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

Table: Access permissions on AdvancedCopy Manager

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

The table below shows the operations on the initial window made available to each of the access permissions.

Table: Operations on the initial window made available to access permissions

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

Yes: Enabled   No: Disabled

Note

The access permissions for the initial window are determined by the combination of their access permissions for the backup management function and the replication management function.

The table below shows the backup management operations made available for each of the access permissions.

Table: Backup management operations made available due to access permissions

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

Yes: Enabled　No: Disabled

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

Table: Replication management operations made available for each access permission

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

Yes: Enabled　No: Disabled

3.3 Setup Procedure

This section describes how to perform the security operation on AdvancedCopy Manager.

3.3.1 Flow of setup

The following shows the flow of setup.

Figure: Security setup flow

```
┌─────────────────────────────────────────────────┐
│          Logging in as a privileged user          │
└─────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────┐
│            Displaying the initial window           │
└─────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────┐
│    Displaying the authentication feature management │
└─────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────┐
│                 Adding a new user                  │
└─────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────┐
│      Setting an access permission for the above user │
└─────────────────────────────────────────────────┘
```
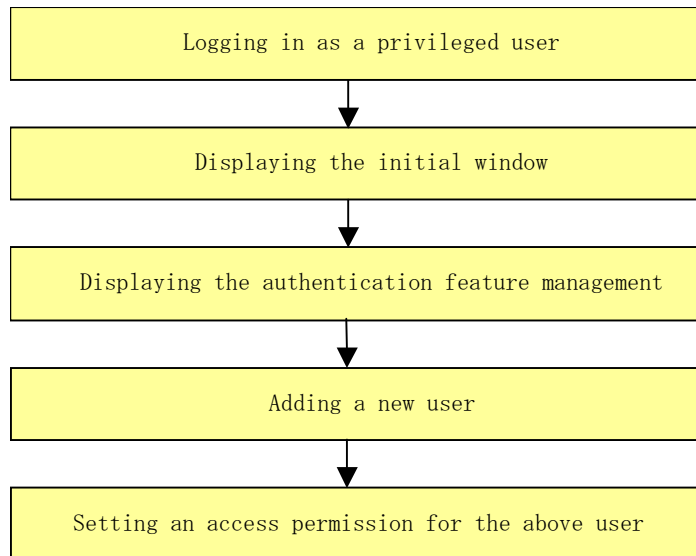
3.3.2 Setup work details

The following steps describe the operational details.   For a description, operational methods, and notes on each window, see "Operating the Authentication Feature Window" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide.
1.   Specify the URL of the AdvancedCopy Manager initial window to display it.
2.   After the following authentication dialog box is displayed, specify a root user name and the password for the root user, and then click the [OK] button.
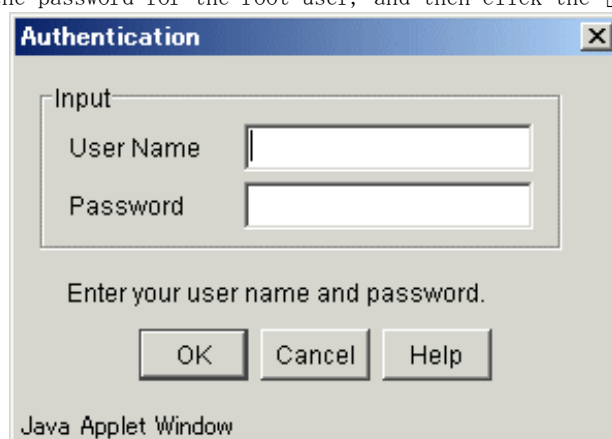
3. The initial window of AdvancedCopy Manager will be displayed.
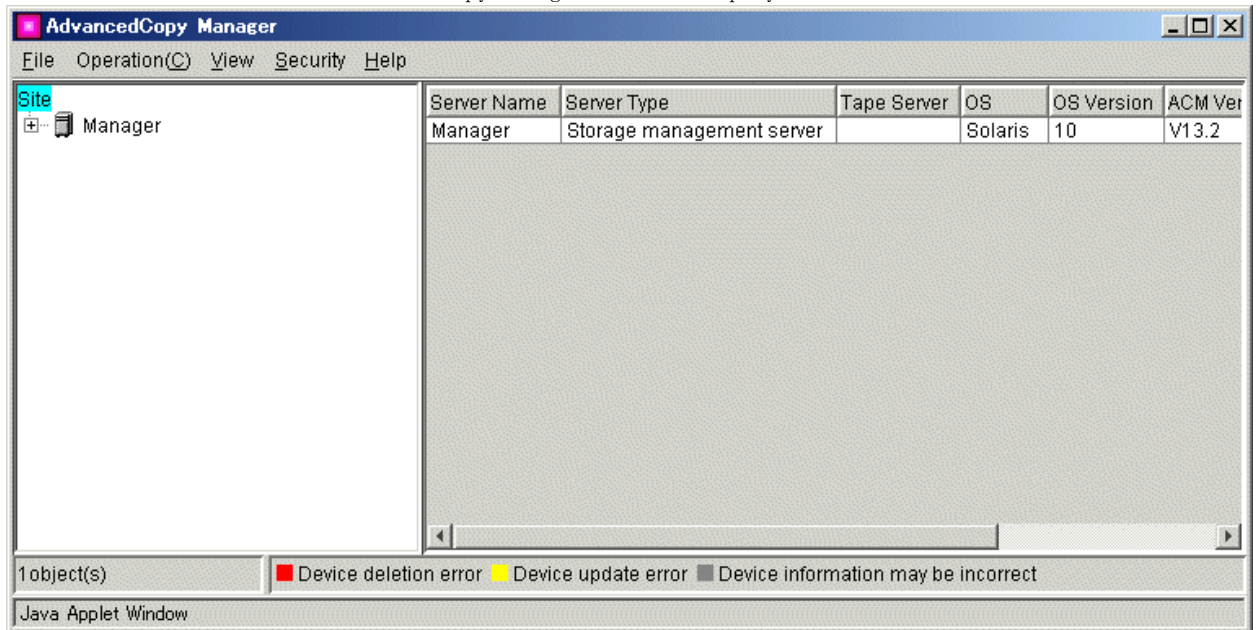
4. From the Security menu in the initial window, select [Users and Permissions].
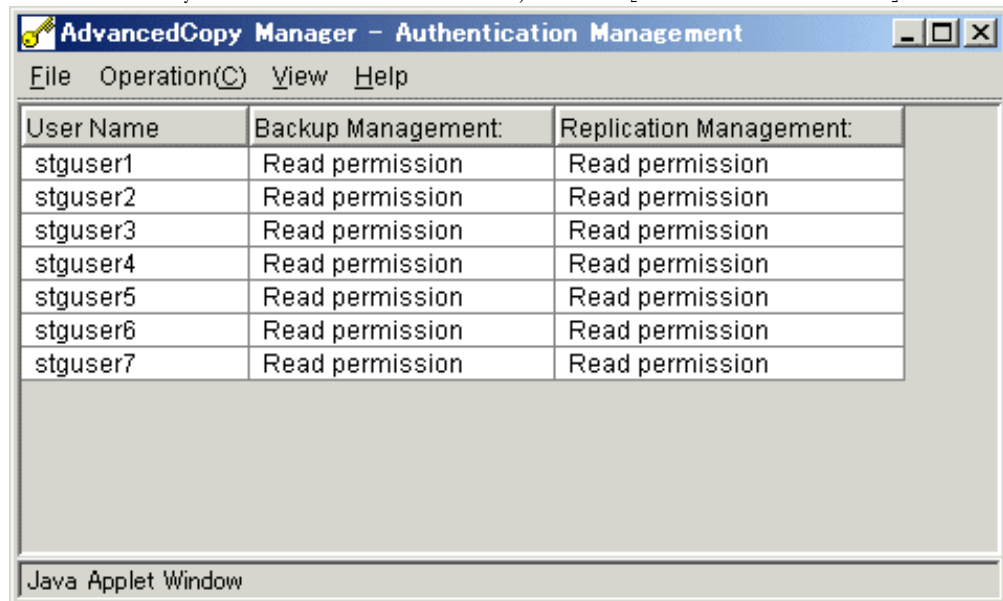
5. From the operation menu, select [Add user]. The following window will be displayed.
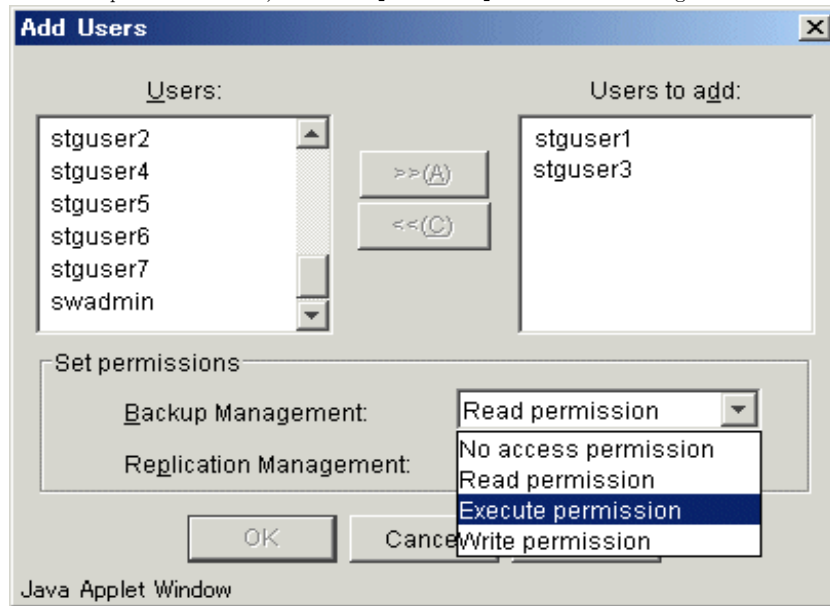
From the "User list", select a user to be added to move it to the "User to be added" list. From the combo box, select an access permission and click the [OK] button. You can add either a specific user or multiple users. After you have set the access permission, click the [OK] button. The addition of the user and the access permission for this user will be completed.

Note

● The displayed user name is one that is registered on the Storage Management Server.
● A user name already registered on one of the management systems will not be displayed in the user name list dialog.
● If no user to be added exists, the following warning dialog will be output and you will be returned to the authentication feature management window.

3.4 Security Operation in Cluster Configuration

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

● Set the same account information (e.g., user accounts, passwords, groups) to the primary node and secondary node.

● The size of the authentication management screen is not inherited after failover.

● To transfer authentication information to a Storage Management Server in non-cluster operation, take the following steps:

1) Before canceling the cluster configuration of the Storage Management Server transaction, execute the "/opt/FJSVswssc/bin/smmkbat" command on the primary side of the Storage Management Server transaction to extract the definition information. Execute the command with root user permission. The information is extracted as a shell script enumerating commands that reflect the definition information.

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

2) On the Storage Management Server transaction, execute the cluster setup command of AdvancedCopy Manager to cancel the cluster configuration.

3) On the Storage Management Server, run the definition information output shell script extracted. Run the script with root user permission.

Chapter 4 Backup Operations (Normal Transaction Volumes)

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

The Solaris version of the AdvancedCopy Manager Agent enables management of the backup operation described in this chapter by interfacing with the AdvancedCopy Manager Management module running under Windows, Solaris or Linux.

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

4.1 Overview

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

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

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

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

AdvancedCopy Manager automatically manages and selects a resource to be used for backup (a backup volume).
AdvancedCopy Manager also manages the backup carriers and generations and allows you to restore data from the latest or other past generations.

Figure: Managing a backup volume
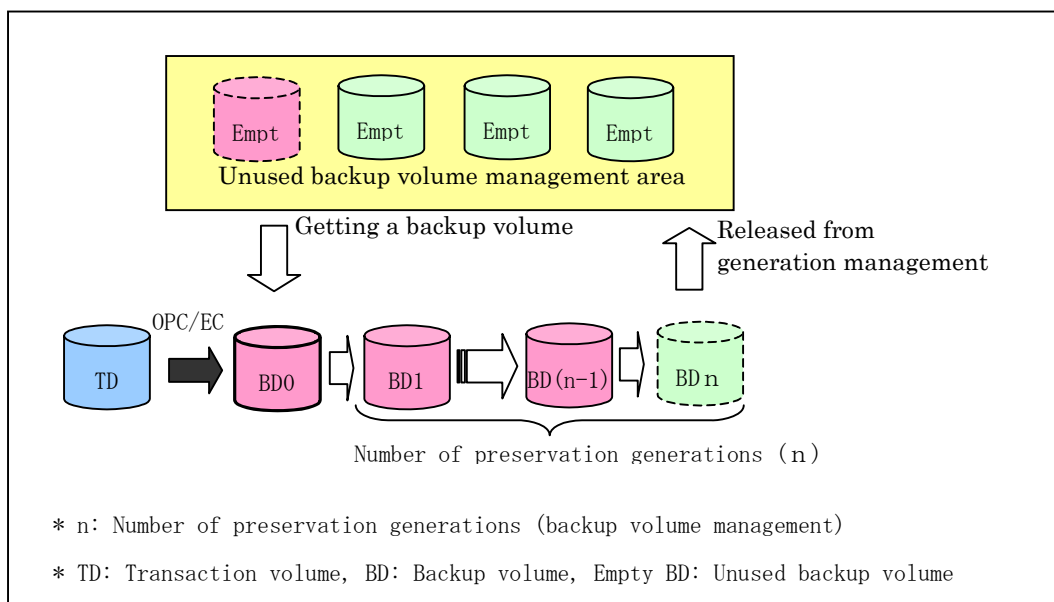
4.1.1 Snapshot backup processing

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

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

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

    — An unused backup volume will be acquired from the unused backup volume management area.

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

      3.   Backup carrier information will be set.

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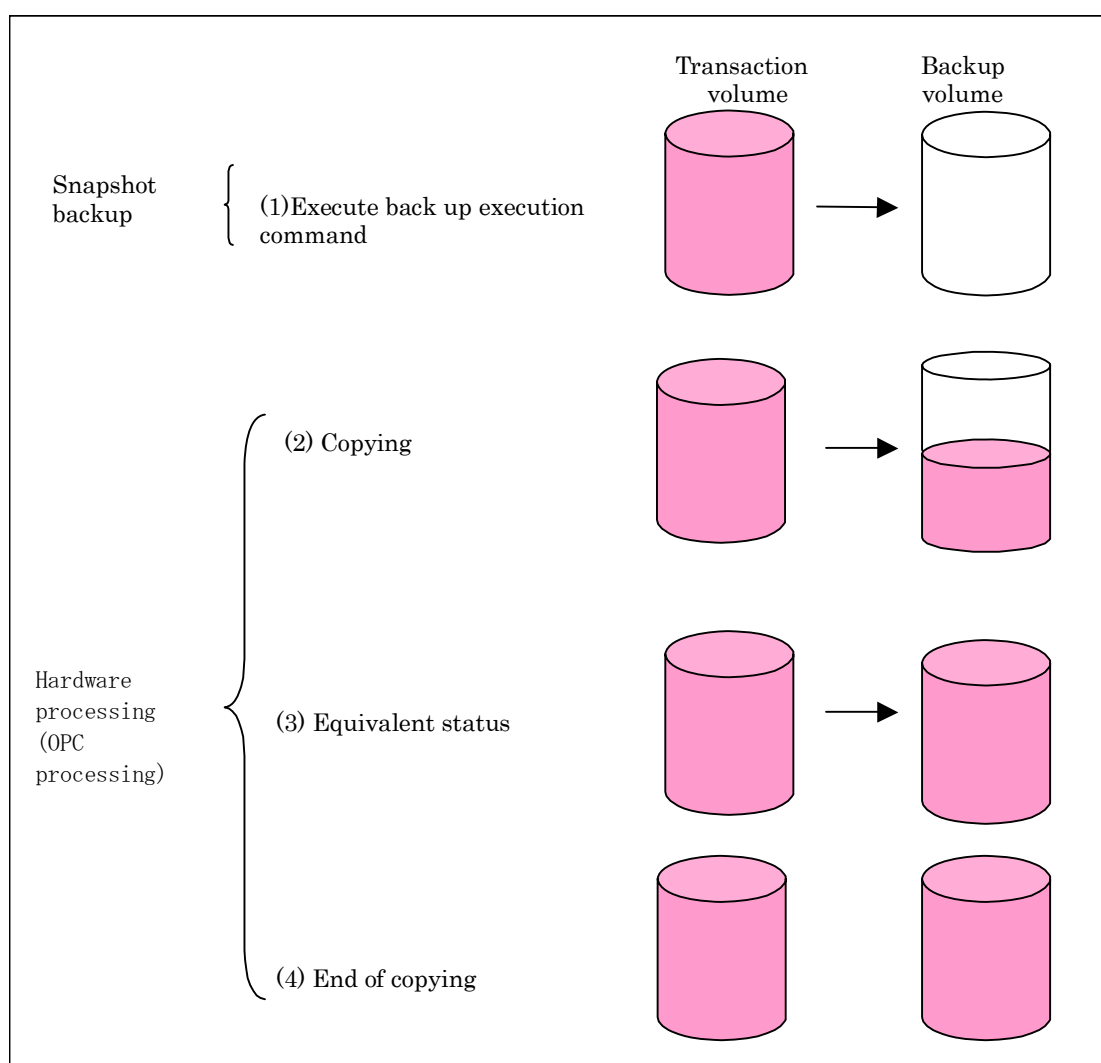
The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC hardware function of the disk array unit of the ETERNUS storage system.

Using the QuickOPC function in the snapshot high-speed backup, physically copying only the data differences from the start of the previous backup can create a complete snapshot image, which can greatly reduce the time taken for physical copying.
For information on the QuickOPC function, see "Backup Operation by the QuickOPC Function."

4.1.2 Synchronized high-speed backup processing

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

To perform synchronized high-speed backup:

1. Execute the backup synchronized processing start command ((1) in the following figure). An unused backup volume with the same capacity as the transaction volume is selected from the unused backup management area, and then synchronized backup processing starts.

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

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

4. When the generation number of the newly backed up data exceeds the number of generations of backup history being kept, the oldest backup volume is treated as an unused backup volume. Redundant history data is deleted, the unused backup volume is overwritten with the new data and the new history data is saved.

Note

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

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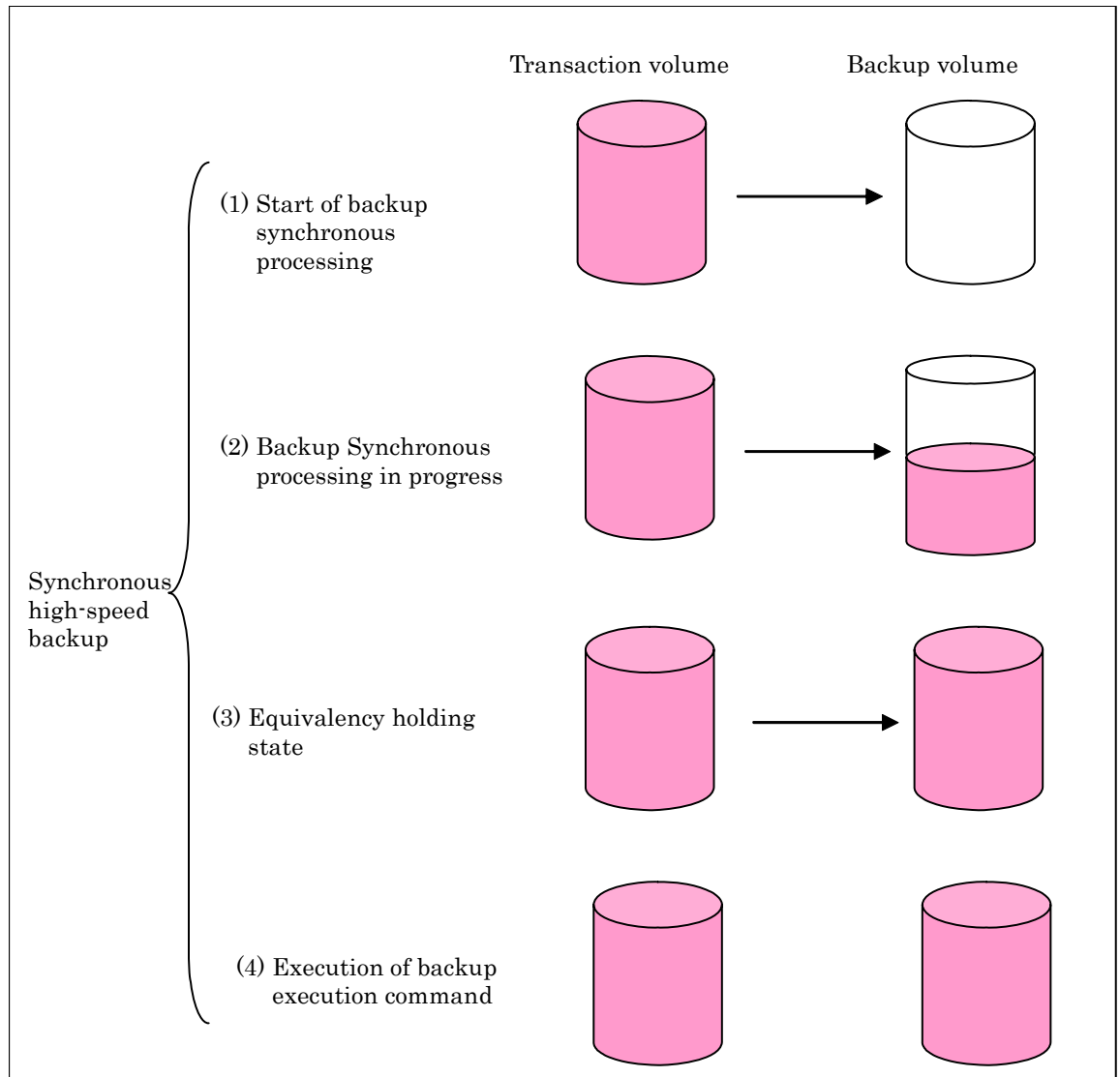
During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. Consequently, the synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

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

Note

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

4.1.3 Restoration processing

This section describes how data is restored in AdvancedCopy Manager.

The restoration operation refers to restoring data from a backup volume managed by the backup carrier information to a transaction volume and uses the OPC function provided by the disk array unit to restore data from a backup volume to a transaction volume.
If the data on a backup volume under carrier management is restored to a transaction volume, the carrier management information will not change.
Restoration processing is performed to the transaction volume that was the backup source. However, it is also possible to change the restore destination

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

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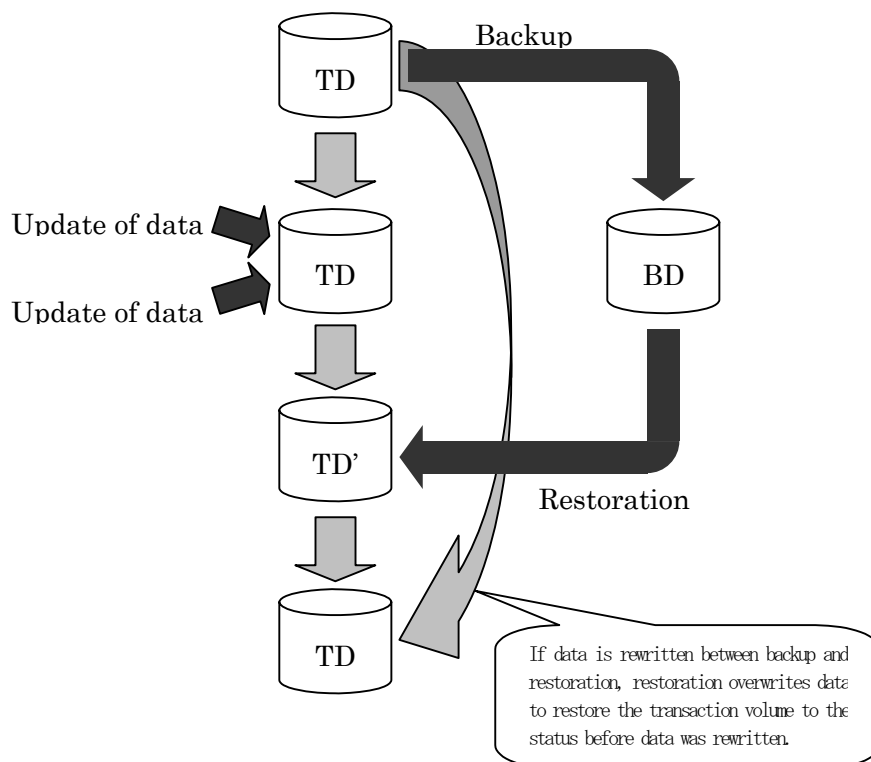
TD: Transaction volume
BD: Backup volume

4.2 Operation Setup and Configuration

This chapter describes the backup operation on AdvancedCopy Manager.

Design a backup operation as follows:
● Selecting a server on which the backup operation should be performed
● Selecting a backup source target
● Selecting a backup policy
● Preparing a backup volume
● Preparing the automatic backup operation

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

Determine the server that will be used to perform backup.
The following servers can be used to perform backup:
● Storage Management Server

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

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

● Storage Server

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

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: Configuration of servers on which the backup operation should be performed
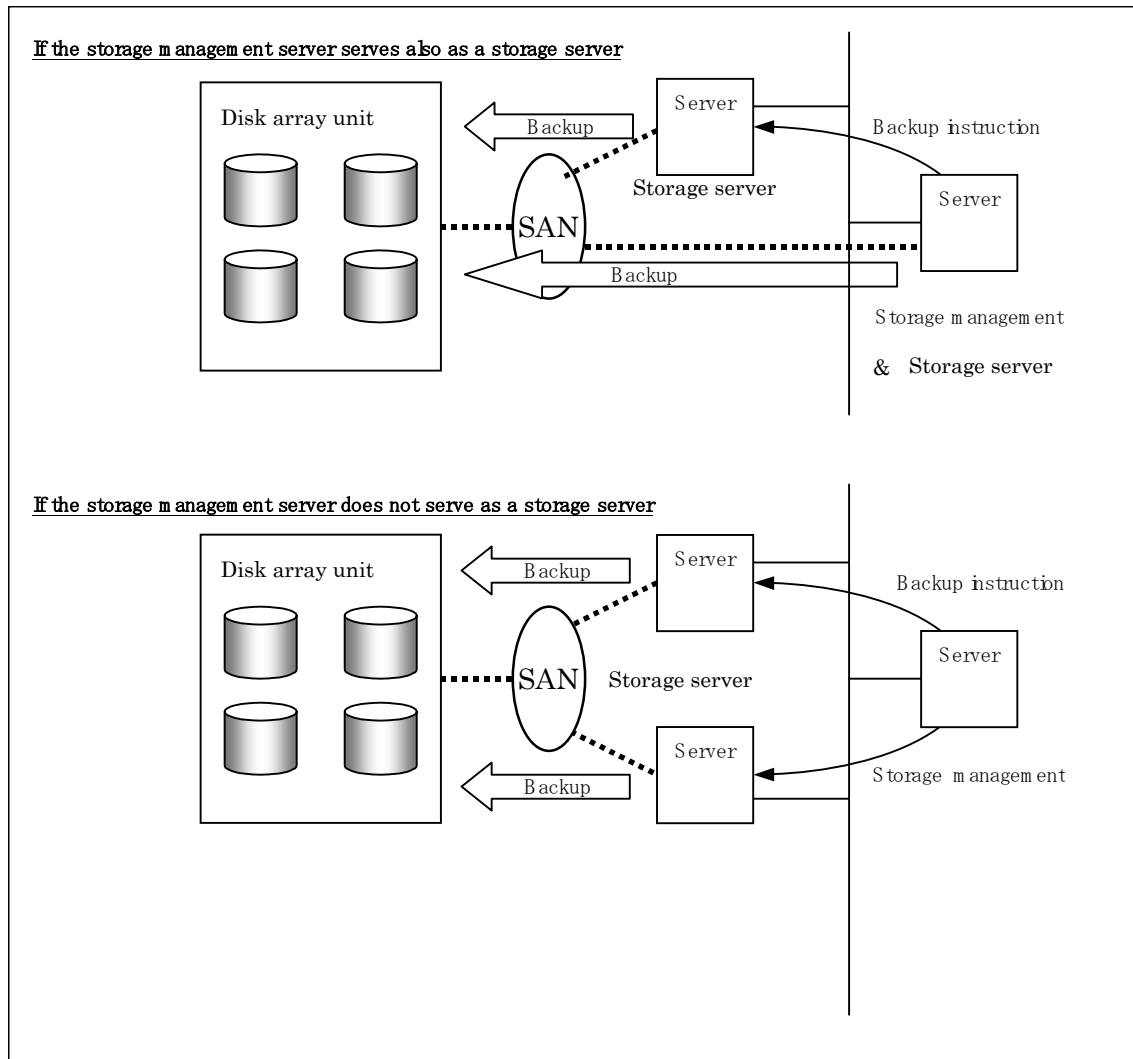
4.2.2 Selecting a backup target

AdvancedCopy Manager backs up data in units of slices. A slice that stores work data is called a transaction volume. A transaction volume to be backed up must be placed on the disk array unit ETERNUS storage system.
For the supported units, refer to "Managing a Device on AdvancedCopy Manager".
For information on setting up a transaction volume, see "Setting the operation type for a device".

![Note]
Slices must be allocated for transaction volumes in the following manner:
— Create slices so that no VTOC is created.
— No slice area may be duplicated on the same disk.

![Note]
For backup targets, do not select slices which contain system disks or where AdvancedCopy Manager is installed.

For any slice that defines an entire volume, do not register it as a transaction volume.

No file system of SynfinityFILE consisting of multiple slices and no Global File Services local file systems can be processed.
When backing up or restoring a file system of SynfinityFILE consisting of multiple slices or a Global File Services local file system, unmount the multiple slices at the same time.

Refer to "General notes" for cautionary notes on the following when selecting the backup source target.
— Exclusion from Backup Targets or Replication Targets
— Slice containing VTOC

4.2.3 Configuring a backup policy

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

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

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

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

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

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

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

4.2.4 Preparing a backup volume

This section describes how to prepare the backup volume.

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

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

Table: Number of backup volumes required

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

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

Table: Number of backup volumes required if there are newly registered transaction volumes

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

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

Slices must be allocated for backup volumes in the following manner:
— Create slices without a VTOC.
— No slice may be duplicated on the same disk. In a backup volume, there is no need to create a slice for a whole volume, such as slice2.

Do not set slices where the system is stored or where AdvancedCopy Manager is installed as backup volumes.

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

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

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

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

4.2.5 Preparing the automatic backup operation

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

Automatic snapshot fast backup

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

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

Figure: Started in a job net

Started in a job net:

Job A → Job B → Backup execution → Job C
                                  → Job D
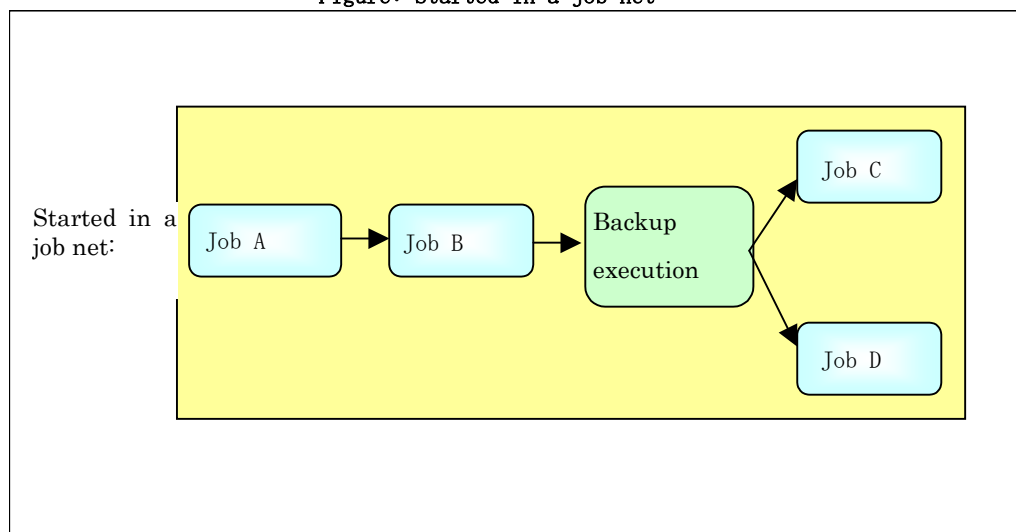
● Start the backup command at the specified time.

Figure: Started at specified time

Started at specified time   HH:MM   Backup execution
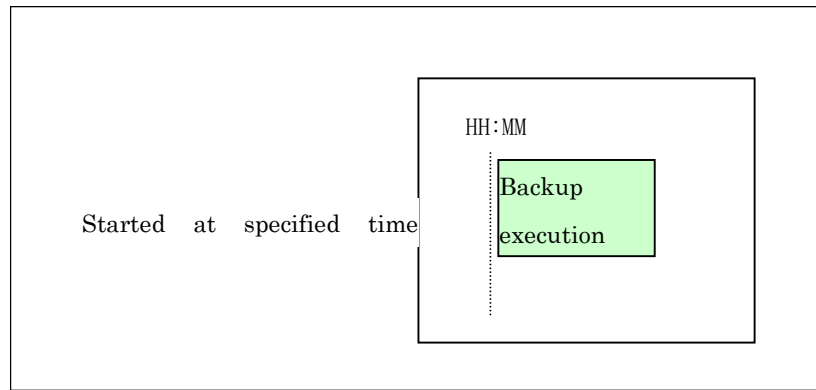
Automatic synchronized high-speed backup

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

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

Starting the backup synchronous processing start command

Estimate the time required for the synchronized backup processing.

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

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

Starting the backup execution command

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

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

Figure: Started in a job net

Start the backup execution command in a job net:

Job A → Job B → Backup execution command → Job C / Job D
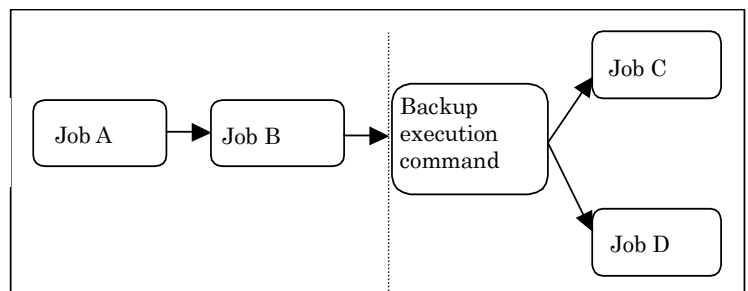
Start the synchronized backup processing start command by specifying a time:

Goes back by the estimated time

HH:MM

Synchronized backup processing start command

Copy in progress

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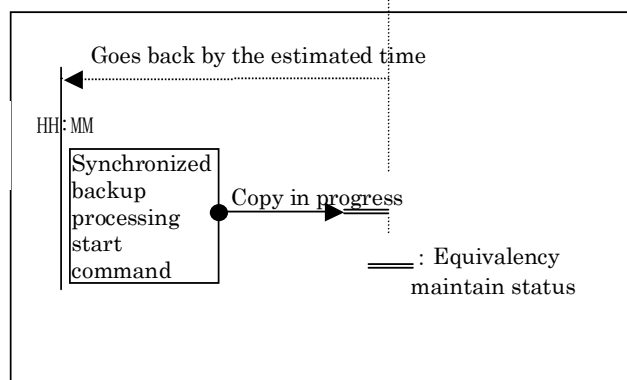
If there are other jobs (jobs A and B in the figure) to be executed before the backup execution command in the job net, the start time of the backup execution command cannot be determined. Assume that the start time of the backup execution command is the time obtained by adding the shortest time required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

● Start the backup execution command with the time specified.

Figure: Started at a specified time

Start the backup execution command with the time specified:

HH:MM

Backup execution command

Goes back by the estimated time

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

HH:MM

Synchronized backup processing start command

Copying in progress

: Equivalency maintain status
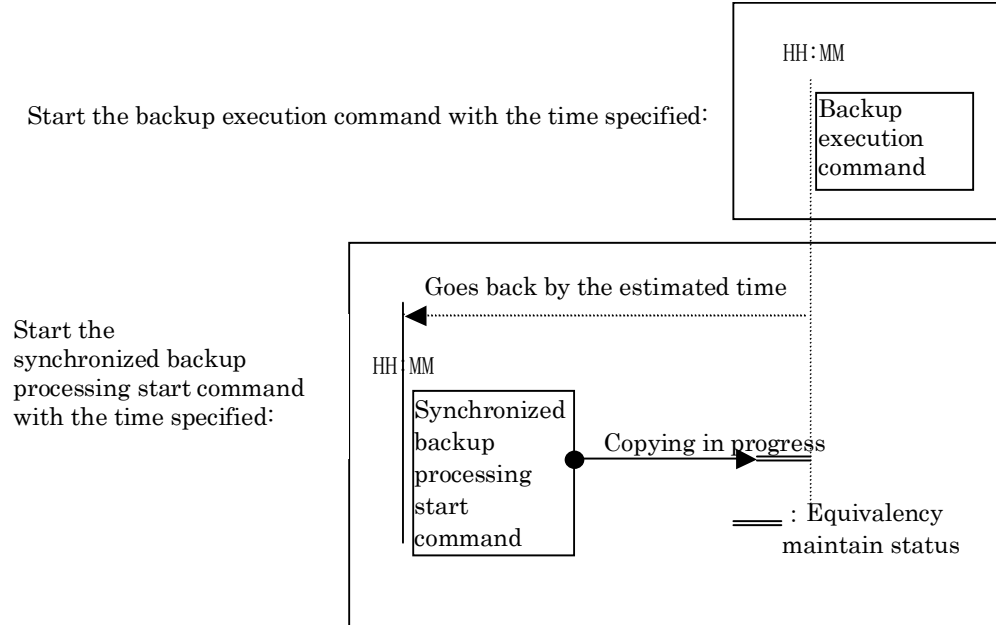
4.3 Flow of Operation

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

Figure: Flow of backup operations on a regular transaction volume

```
┌─────────────────────────────────────────────────────┐
│              Activating daemons                       │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│          Setting an access permission                 │
│          For the first time and as required           │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│          Starting the initial window                  │
│    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                  │
│   For the first time or only when a device is changed │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│       Displaying the backup management window         │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│      Setting the environment for a backup operation   │
│                      Server                           │
│            Only when operation is changed             │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│       Setting the operation type for a device         │
│            Only when operation is changed             │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│                  Setting options                      │
│       Only when inter-box backup is performed         │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│              Setting backup policies                  │
│            Only when operation is changed             │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│    Customizing preprocessing and postprocessing       │
│                     scripts                           │
│          Only when the operation is changed           │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│           Preparing a device map file                 │
│     Only when the backup destination is changed       │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│                   Operation                           │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│               Stopping daemons                        │
└─────────────────────────────────────────────────────┘
```

4.4 Preparations

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

4.4.1 Activating daemons

Before the backup operation is started, the daemons of AdvancedCopy Manager must be started on the Storage Management Server and the Storage Servers. Normally, these daemons are automatically started up when the system is started.

If the startup fails to start this daemon for some reason or if a daemon has been stopped, you need to start the daemon on each server.

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

4.4.2 Configuring access permission

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

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

4.4.3 Starting the initial window

Specify the following URL to start the initial window of AdvancedCopy Manager. In cluster operation, URL is different. For details, please refer to "Initial Window," in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide."

```
http://storage-management-server-address(:port-number)/swstorage/index.html
```

The following GUI (server list view) will be started.
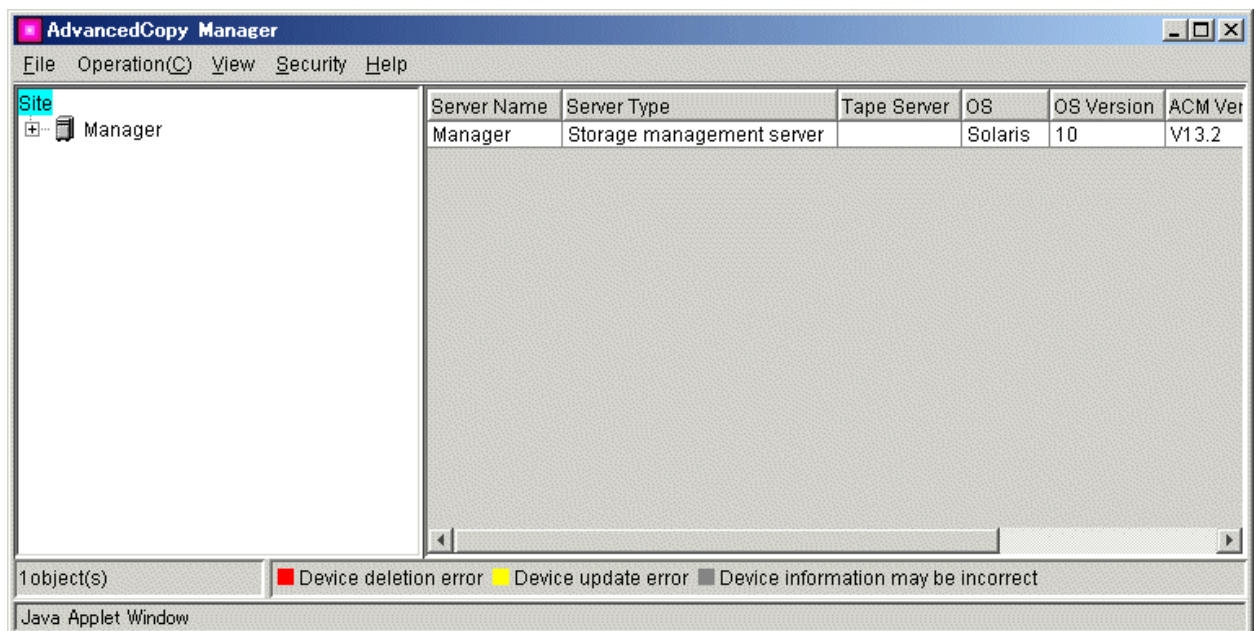
When running a backup from the command line, (i.e., without using the GUI), it is not necessary to perform this operation
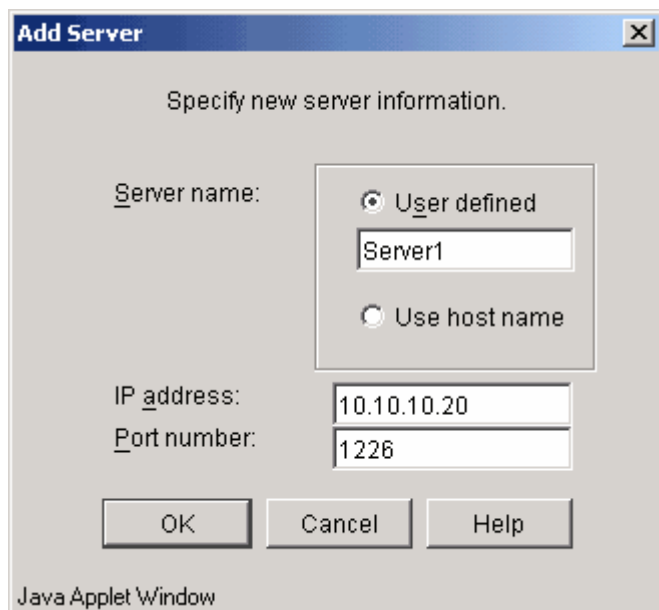
Note **When the Storage Management Server is in cluster operation**

When the Storage Management Server is in cluster operation, you must configure an authentication-related file in order to use the Web client screens. For more information, refer to the "Configuring the authentication-related file" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

4.4.4 Registering a Storage Server

The Storage Management Server registers the Storage Servers to be managed. When the Storage Server is operated as a Storage Management Server the server does not need to be added. Select the Operations menu; select [*Add Server*]. The following window will be displayed.

To add the Storage Server, specify the server name, IP address, and port number required for communications The port number is specified as the "communications service port number", when Agent of AdvancedCopy Manager was installed.

In cluster operation, specify the logical IP address of the Storage Server as IP address. And specify the port number registered at the time of the cluster setup of Storage Server transaction.

If the information entered is correct, click the [OK] button to continue with the processing of a Storage Server.

This process can also be performed at the command line using the server information addition command (stgxfwcmaddsrv).

4.4.5 Fetching device information on a Storage Server

Before the backup management can be performed, device information on a Storage Server must be temporarily saved to the repository.

Note

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

To acquire information on a device on the Storage Management Server, select [*Refresh Server*]. The following window will be displayed.

Confirm Refresh Server

Refreshing device information may take several minutes.
Are you sure you want to proceed?

Server name: Server1
IP address: 10.10.10.20
Operating system: Solaris

[Yes] [No] [Help]

Java Applet Window
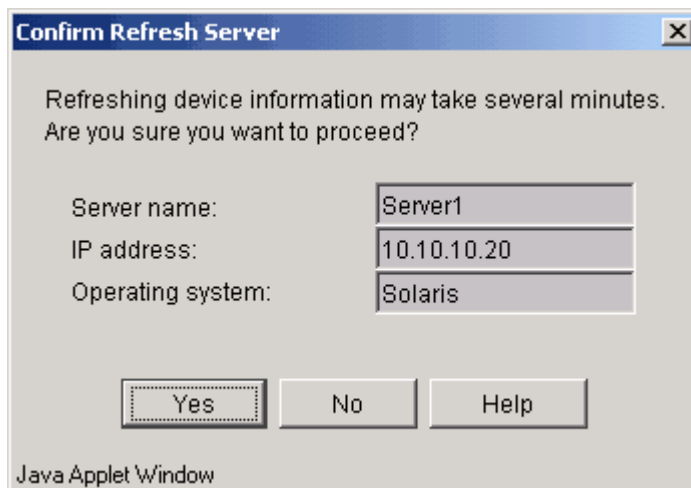
Check the server from which device information should be acquired and then press the [Yes] button.
After device information is acquired from each server, the following dialog will be displayed.
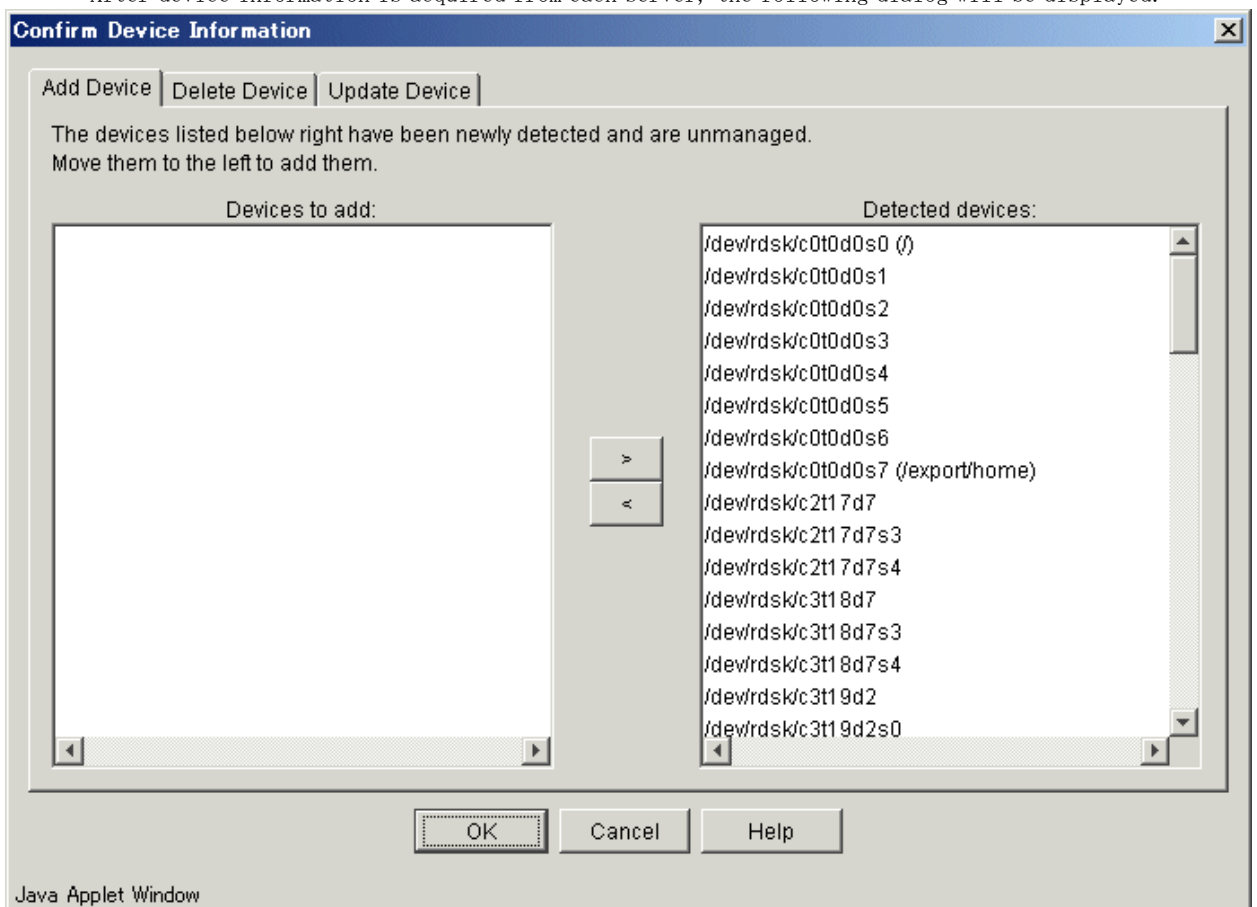
Confirm Device Information

Add Device | Delete Device | Update Device

The devices listed below right have been newly detected and are unmanaged.
Move them to the left to add them.

Devices to add:

Detected devices:

/dev/rdsk/c0t0d0s0 (/)
/dev/rdsk/c0t0d0s1
/dev/rdsk/c0t0d0s2
/dev/rdsk/c0t0d0s3
/dev/rdsk/c0t0d0s4
/dev/rdsk/c0t0d0s5
/dev/rdsk/c0t0d0s6
/dev/rdsk/c0t0d0s7 (/export/home)
/dev/rdsk/c2t17d7
/dev/rdsk/c2t17d7s3
/dev/rdsk/c2t17d7s4
/dev/rdsk/c3t18d7
/dev/rdsk/c3t18d7s3
/dev/rdsk/c3t18d7s4
/dev/rdsk/c3t19d2
/dev/rdsk/c3t19d2s0

[>]
[<]

[OK] [Cancel] [Help]

Java Applet Window

The devices displayed at "Add Device" are newly detected devices. Move the devices to be managed to the list box on the left side.
The devices displayed at "Delete Device" are those managed devices that currently could not be detected. To remove the devices from the management targets, move the devices to the list box on the right side.
The devices displayed at "Update Device" are devices for which the device information (for example, the mount point name) has changed.
After performing the above operations, press the OK button to save the configuration information.
This process can also be performed using the device information collection/reflection command (stgxfwcmsetdev) at the command line.

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

4.4.6 Displaying the backup management window

On the server list view, select the [*File*] menu and then [*Backup Management*]. The server list
view for the backup management will be displayed as follows:
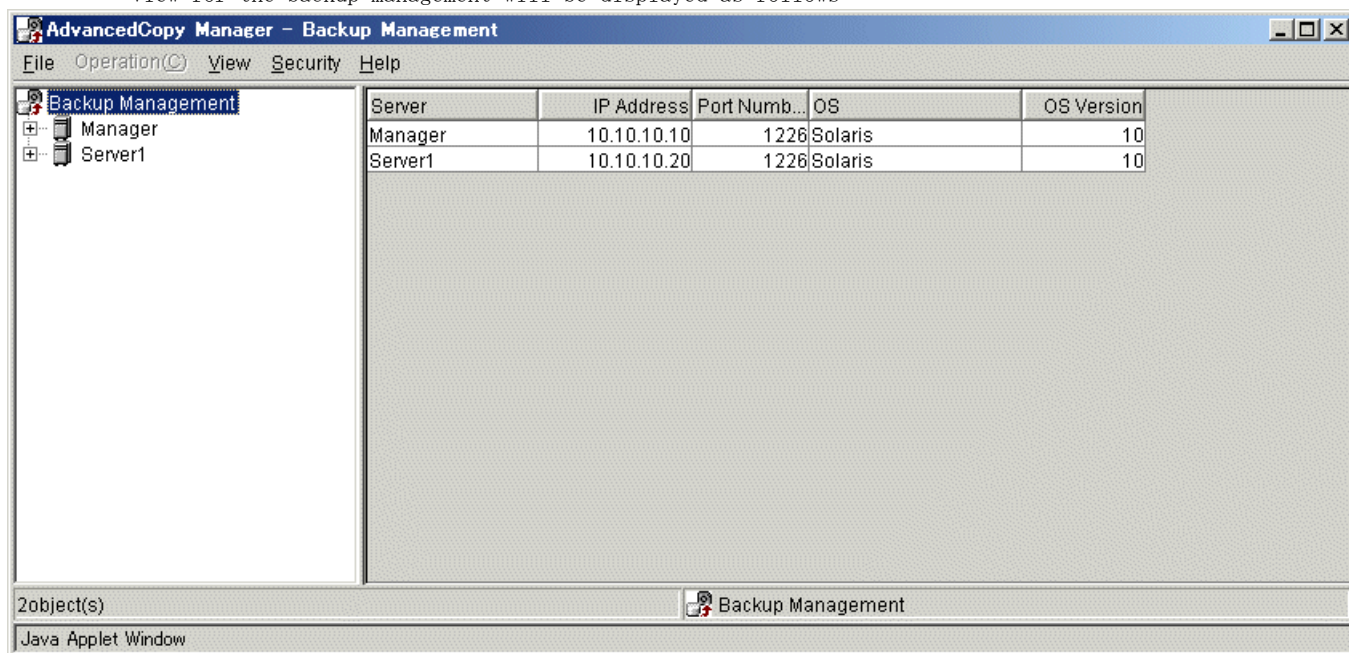
All the GUI operations are available on a Storage Management Server provided it is capable
of supporting a web browser. For more about GUI operation, see "ETERNUS SF AdvancedCopy
Manager GUI User's Guide".

4.4.7 Configuring the environment for a backup operation server

This section describes how to configure the environment for each Storage Server.

From the server list view, select [*Backup Management*] from the upper part of the tree displayed
on the left side. Select the Storage Server in a list panel displayed on the right side of
the window.
Select [*Set Storage Server Configuration Information*] from the Operations menu.
The following setup window will be displayed.

This input item is for Symfoware linkage backup and cannot be entered in the international edition.
When a Symfoware database does not exist in the Storage Server, or when the Storage Server runs under HP-UX or AIX, this input item is grayed out and the information cannot be specified.
After completing the input of necessary items, click the [OK] button.

You also need to make this environment setting on the Storage Management Server if it serves as a Storage Server. This step is not required if the environment setting has already been made on the Storage Servers.
You can also make this environment setting using the Storage Server configuration command.
For operation only with commands, the Storage Server configuration command must be executed as part of startup operations.

4.4.8 Configuring the operation type for a device

This section describes how to configure the device operation type, before backing up data in a Storage Server. This involves the following:
● Define the volume to be backed up as a transaction volume.
● Prepare backup volumes. Prepare as many volumes as the number required for the backup type , each of which has the same size as the transaction volume, and define them as the backup volumes:

Table: Number of required backup volumes

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

Define the operational device type (backup/transaction volume) on the server list view.
Select a Storage Server from the list panel on the right side of the server list view, then select [Set Device Information] from the [Operations] menu.
The following setup window will be displayed:
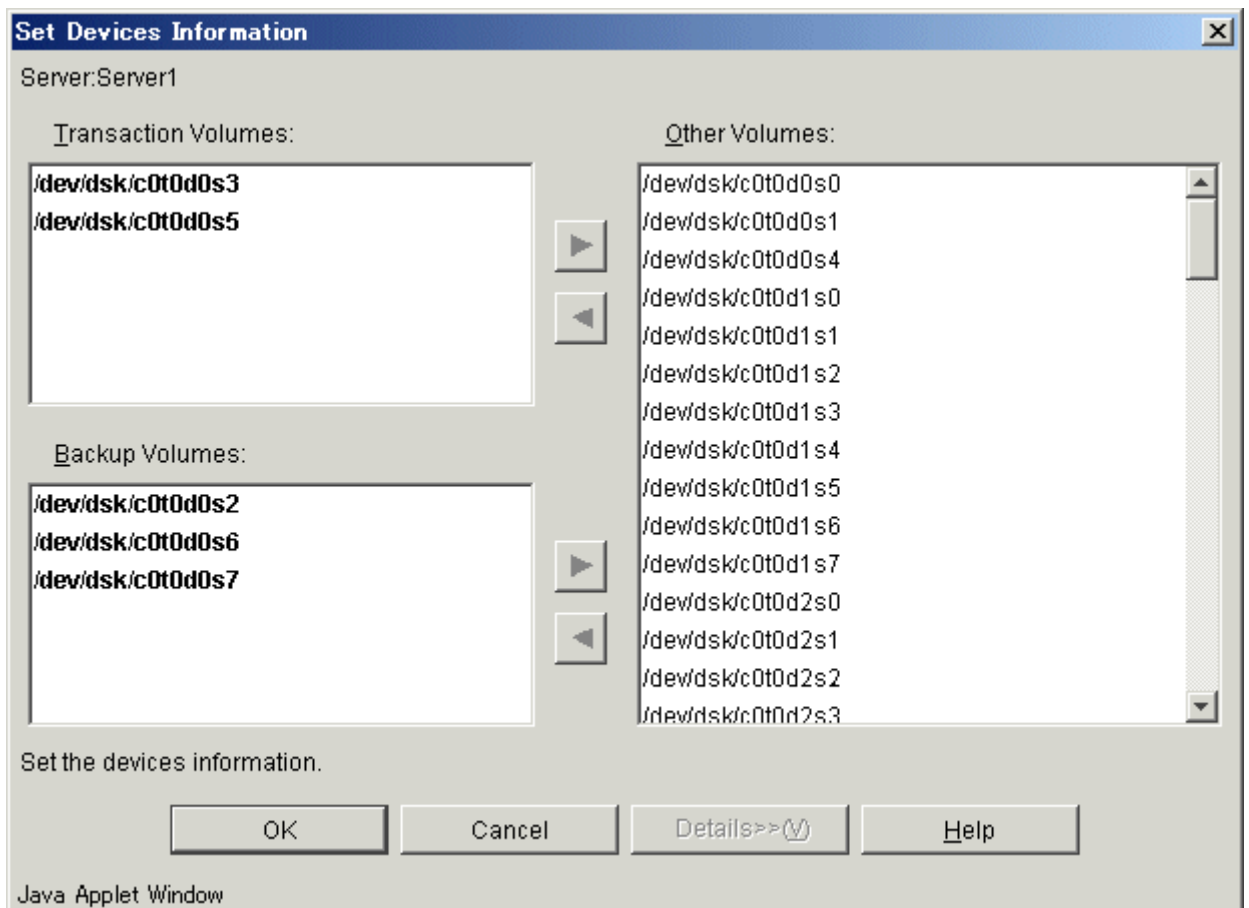
Volumes displayed in the "Other Volume" list have not been configured with a device operation type. Set the type as follows

● Set as a "transaction volume"

After selecting a target volume, click the [<] button next to the "Transaction volume" list. The target volume will be moved to the "Transaction volume" field list.

● Set as a "backup volume"

After selecting a target volume, click the [<] button next to the "Backup volume" side. The target volume will be moved to the "Backup volume" field list.

After configuring settings for the required volumes, click the [OK] button.

You can also configure this setting using the device information configuration command (swstdevinfoset).

For any slice that defines an entire volume, do not register it as a transaction volume.

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

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

Note

The backup volume must be the same size (have the same number of bytes) as the operating volume.
Use the following procedure to display and check the transaction volume and backup volume sizes to the byte:

1) From the Web browser, display the AdvancedCopy Manager "Server list view". When a user enters the AdvancedCopy Manager URL at the Web browser to start AdvancedCopy Manager and enters the user name and password, the "Server list view" is the first screen displayed. Refer to "Initial screen" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details.
2) In the tree panel on the left side of the Server list view, double-click the server that contains the volume for which you want to check the size.
3) Then, on the left-side tree panel or the right-side list panel, select (single click) the volume for which you want to check the size.
4) While the volume is in the selected state, right-click the mouse to display a pop-up menu, and select [Properties].
5) Check the size displayed under [Properties].

Note

Do not set slices where the system is installed or slices where AdvancedCopy Manager is installed as backup targets or backup volumes.

Note

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

Note

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

Point

You can check what has been registered as follows:
Use the following procedure to display and check the volume size (number of bytes) of the operating volume and the backup volume:

● Use a Web browser to display the AdvancedCopy Manager server list view. When the AdvancedCopy Manager is started by entering its URL at a Web browser, the server list view is the first window displayed after the username and password are entered. Refer to "Initial window" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details.
● In the tree on the left side of the server list view, double-click the server that includes the volume for which the size is to be checked.
● Then, from either the tree on the left side of the view or from the list on the right side, select the volume for which the size is to be checked.
● Once the volume is selected, use the right-click (alternate) mouse button to display a pop-up menu, and select "Properties" in the pop-up menu.
● Check the size shown under "Properties".

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

4.4.9 Configuration options

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

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

Create the following files to set options:

```
For normal operation (non-cluster)
/etc/opt/FJSVswsts/data/DEFAULT/check.ini
For cluster operation
/etc/opt/FJSVswsts/logical-node-name(*1)/data/DEFAULT/check.ini
```

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

Code as follows:

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

●

4.4.10 Configuring backup policies

For a transaction volume 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 window.

Specify the backup policy settings from the Transaction Volume List view.
Select "Transaction Volume" of the Storage Server from the tree to display the transaction volume list.
After selecting a transaction volume for which you want to set a backup policy, click the right mouse button.
From the popup menu, select [*Set Backup Policy*]. The following setup window will be displayed.
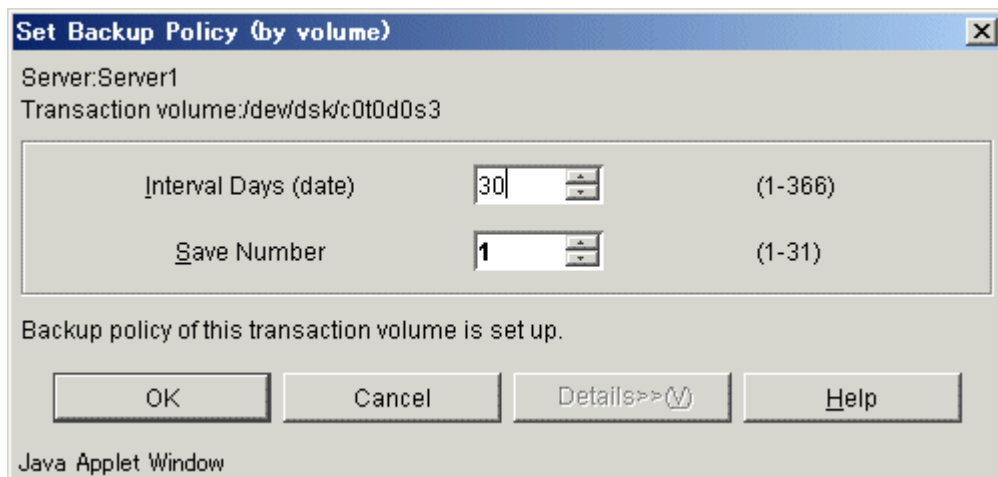
In this window, specify the number of interval days and the number of preservation generations and click the [OK] button. Perform this procedure on all the transaction volumes.
You can also set a backup policy also using the backup policy setting command (swstbkpolset).

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

You can check that the volumes that have been registered in the following ways:
— Checking in a GUI window
You can view information on a backup policy on the transaction volume list view. For more information on the window, see the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
— Checking using a command
You can view information on a defined backup policy using the "backup policy display command (swstbkpoldisp)".

4.4.11 Customizing pre-processing and post-processing scripts

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

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

- ● For operational reasons, to avoid unmount and mount processing of transaction volumes that comprise a file system
- ● To describe special pre-processing or post-processing in the pre-processing and post-processing scripts

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

Point   **When AdvancedCopy Manager is upgraded**

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

4.4.12 Preparing a device map file

When using AdvancedCopy Manager to back up data, a backup volume with the same capacity as a transaction volume is automatically selected from the available registered backup volumes. If a specific backup volume is to be used to back up a given transaction volume, a "Device map file" must be created. A "Device map file" is a file defining the relationship between the transaction and a specific backup volume
A device map file may be created anywhere on the Storage Server that performs backup. If you specify this file while performing a backup, an operation that recognizes the backup destination is enabled.

Point

To manage multiple generations of backups using defined transaction volume to backup volume relationships, multiple device map files must be prepared.
The device map file used when backing up or starting synchronous processing should meet either of the following requirements:
   — Either an unused backup volume must be specified,
      or
   — A backup volume detailed in the history information that was deleted by this backup must be specified.
      Care should taken to ensure that the device map file is configured and used correctly where the backup system uses two or more backup volumes.

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

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

4.4.12.1 Describing a device map file

The following shows a description example of a device map file.

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

# Normal Disks
/dev/dsk/c1t1d1s1              /dev/dsk/c1t1d20s1
/dev/dsk/c1t1d1s3              /dev/dsk/c1t1d20s3
/dev/dsk/c1t1d1s4              /dev/dsk/c1t1d20s4

# LOG01/GRP1
  # A comment can also be entered in this section.
/dev/dsk/c1t1d2s1              /dev/dsk/c1t1d30s1
/dev/dsk/c1t1d2s3              /dev/dsk/c1t1d30s3
/dev/dsk/c1t1d2s4              /dev/dsk/c1t1d30s4

# LOG02/GRP2
/dev/dsk/c1t1d5s4              /dev/dsk/c1t1d10s4
/dev/dsk/c1t1d5s5              /dev/dsk/c1t1d10s5
 :
 :
```

The rules for creating a device map file are as follows:
- Describe a transaction volume name and a corresponding output destination backup volume name in one line. Separate the transaction volume name and output destination backup volume name with one or more space or tab characters".
- One or more "Spaces or a tabbed space" may be used as delimiters between the beginning of a line and a transaction volume name or between the end of an output destination backup volume name and the end of a line (new line character).
- A blank line ("Space or tabbed space") may be included in a file.
- Text in a single line preceded by the symbol "#" at the beginning of the line to the end of a line is assumed to be a comment. If the comment uses more than a single line, then each line must be preceded by a "#" character.
- You cannot specify more than one target backup volume for one working disk in one device map file. If you do, only the information in the line first found will be valid. While the device map file will still be read, the lines after the first line will be ignored.
- A device map file may include descriptions of transaction volumes other than the processing target. See the description example provided in the beginning of this chapter.
- All the transaction volumes in a single file must be described when defining the output destination backup volume for a log group. The description may span multiple files.

4.5 Operation

This section describes how to perform a backup in AdvancedCopy Manager
Before performing the backup operation, configure the environment settings required for the
backup operation according to "Preparations".
There are two kinds of backup in AdvancedCopy Manager:
- ● Snapshot fast backup operations
- ● Synchronous high-speed backup operations

4.5.1 Performing the snapshot fast backup

1. Before backing up a general file system, stop work on the system.
2. Display the transaction volume list view and select a transaction volume to back up.
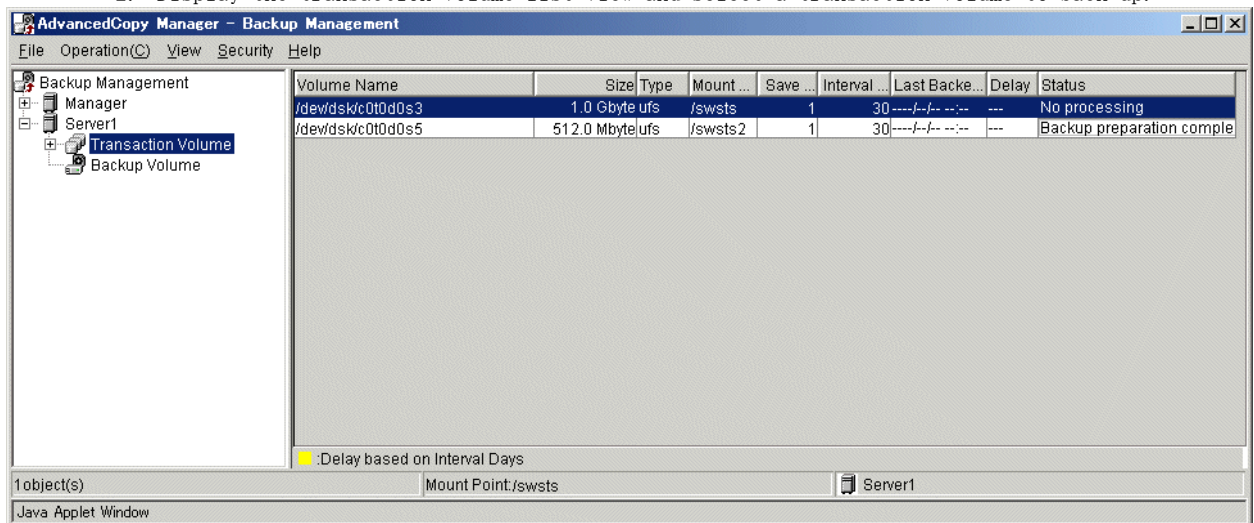
3. From the Operations menu, select [*Backup*] to open the 'Backup' window.
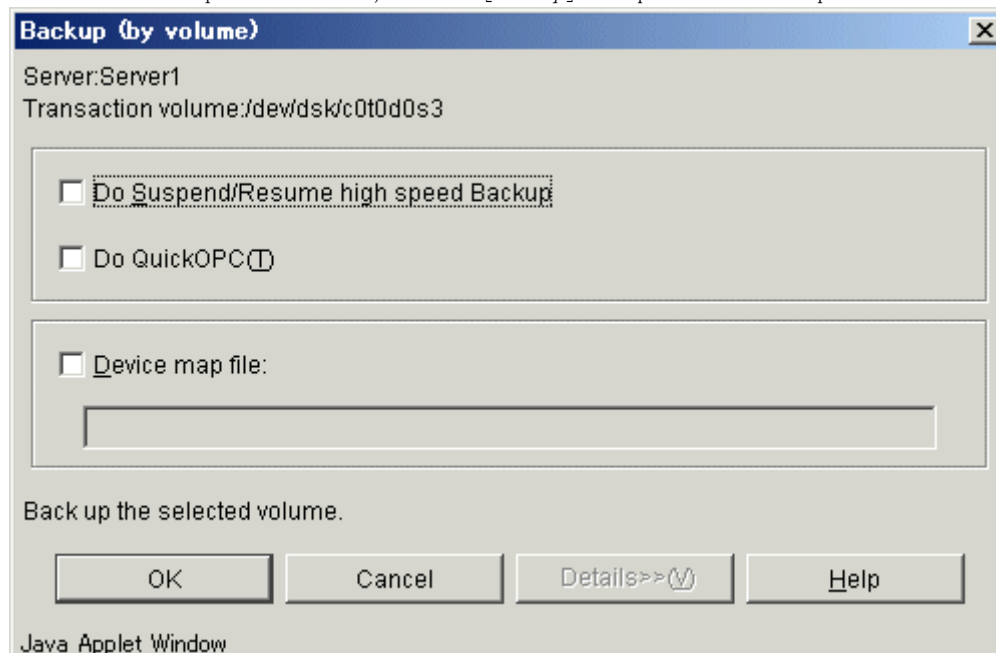
4. Check the displayed server names and transaction volume names and perform the following:
- ● Use a volume automatically selected by AdvancedCopy Manager as a backup volume:
  Click the [OK] button.

- ● Use a specific volume as a backup volume:
  Specify a device map file created on the Storage Server that performs backup (e.g.,
  /home/usr1/devmap1) and then click the [OK] button.

5. When the backup has successfully completed, the 'Backup' window is displayed. Click the [OK] button and you will be returned to the transaction volume list view.

6. This completes backup, and normal work can be restarted.

Note

At this point the physical copying of a volume is not completed in the target transaction volume. To check the status of physical copying, perform the following:

Display the Transaction Volume list view and check the <Status> field of a target transaction volume. This field displays the progress status of the copy process.
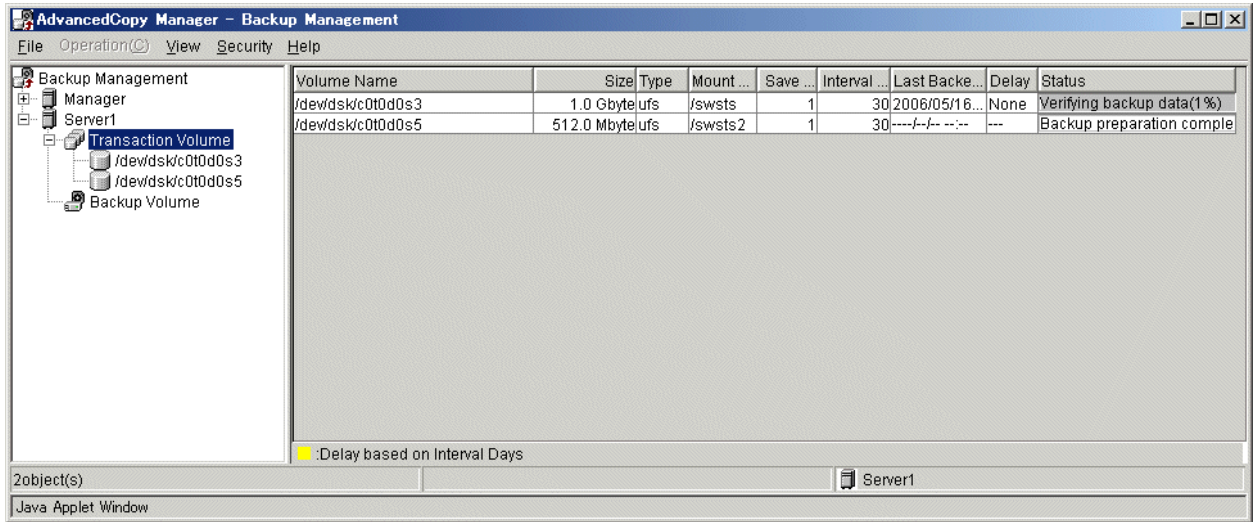
To update or refresh the copy status, either:
● Press the [F5] Refresh key, or
● Select [*Refresh*] from the View menu.
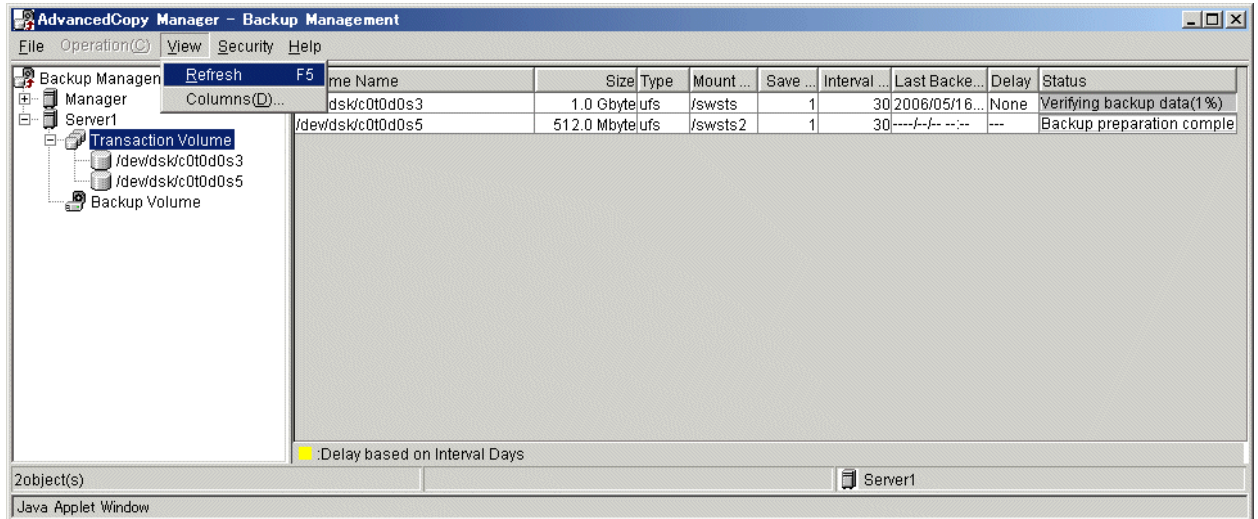
Work stopped or suspended on the transaction volume as per step 1 to allow the backup to start can now be resumed.

Point

— You can perform backup also using the backup execution command.
— You can check the backup status also using the backup execution status display command.

Note

When the QuickOPC function is used for snapshot high-speed backup, the command options listed below cannot be performed from the Transaction Volume List view.
Enter the appropriate command for operation.
— Execute the tracking cancel command (swstcanceltrk).

4.5.2 Performing the synchronized high-speed backup

Perform synchronized high-speed backup for a transaction volume as follows:
1. Display the transaction volume list view and select a transaction volume to be backed up.
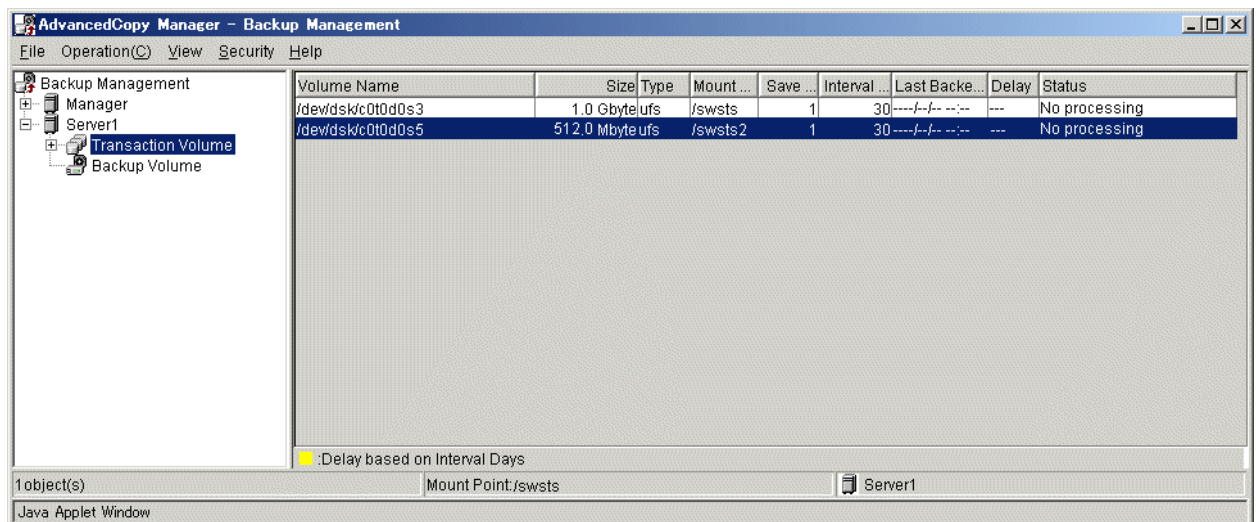
2. On the Operations menu, select [*Start Synchronization processing*] to open the 'Start Synchronization Processing' window.
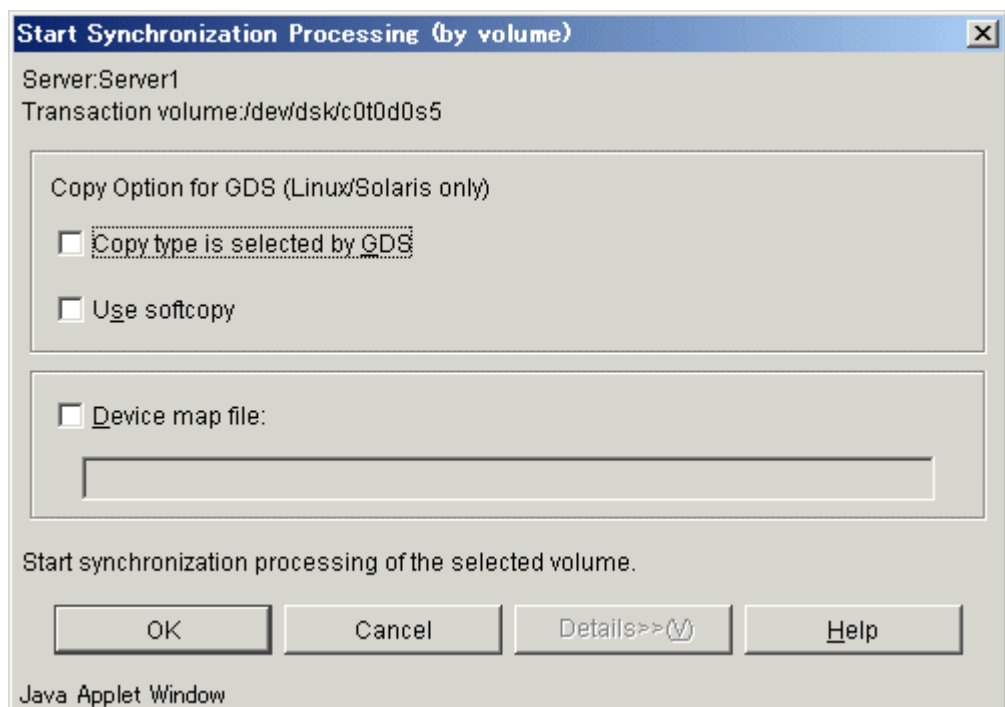
3. Check the displayed server name and transaction volume name, and perform one of the following operations:
   ● To use a volume automatically selected by AdvancedCopy Manager as a backup volume:
      Click the [OK] button.
   ● To use a specific volume as a backup volume:
      Specify a device map file name created on the Storage Server (e.g., /home/usr1/devmap1) for which backup will be performed and then click the [OK] button.

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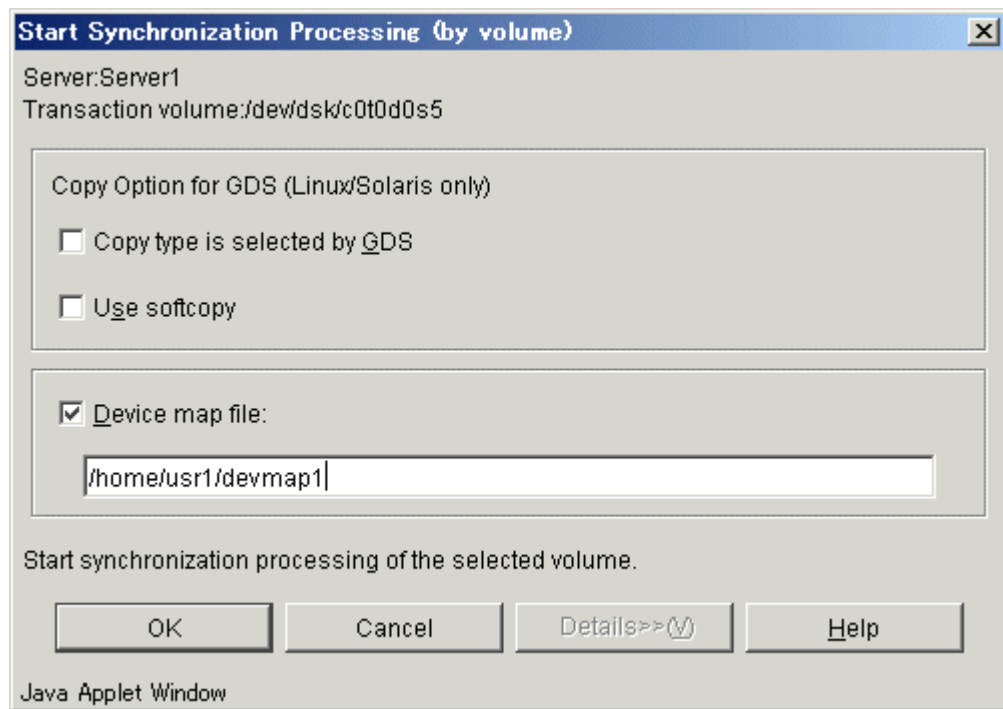
4. When synchronized backup processing is completed, the AdvancedCopy Manager will return
   to the 'Start Synchronization Processing' window. Click the [OK] button to return to
   the Transaction Volume list view.
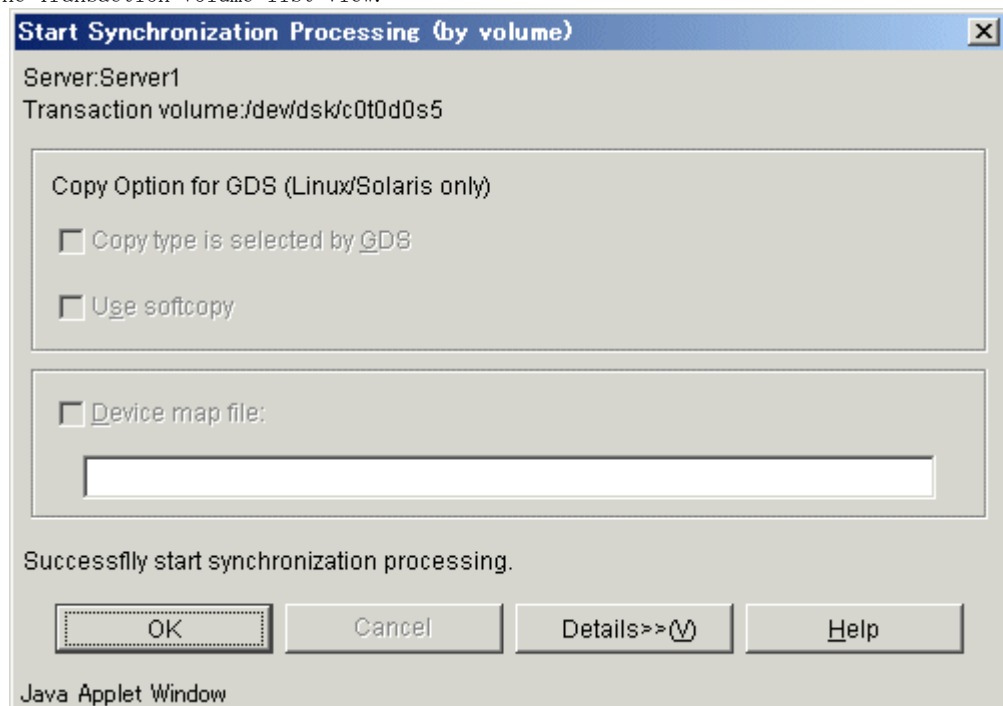
5. Physical copying from the transaction volume to backup volume now starts. Perform the
   following operation to check the physical copy status.
6. To check the status of the physical copying, open the transaction volume list view and
   check the <Status> field of the target transaction volume. This field displays the progress
   of the coping process.
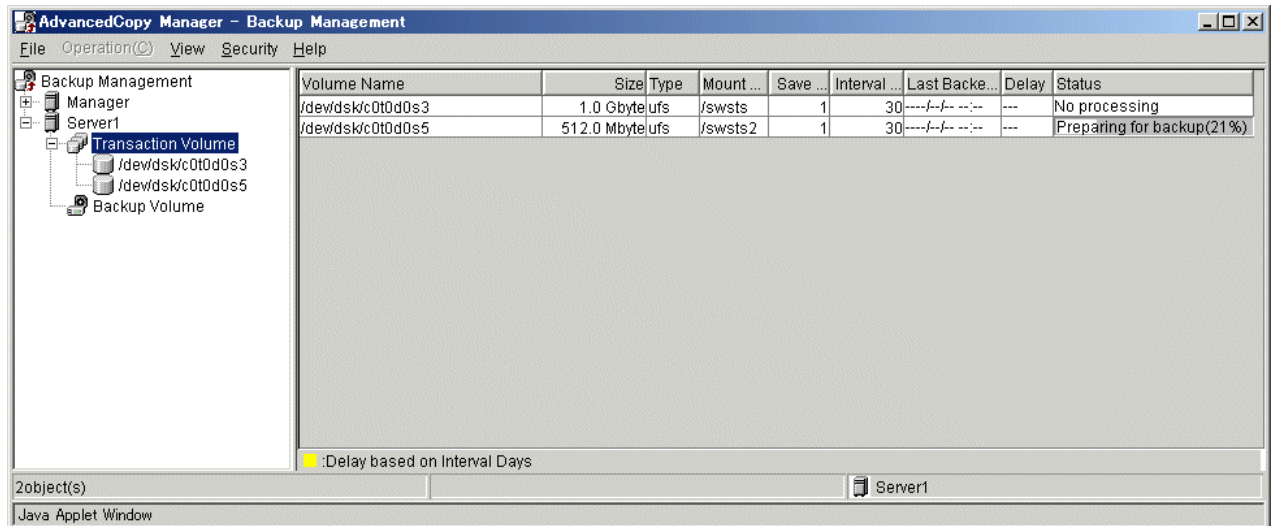
7. To update or refresh the copy status, either:
   ● Press the [F5] Refresh key, or
   ● Select [*Refresh*] from the View menu.
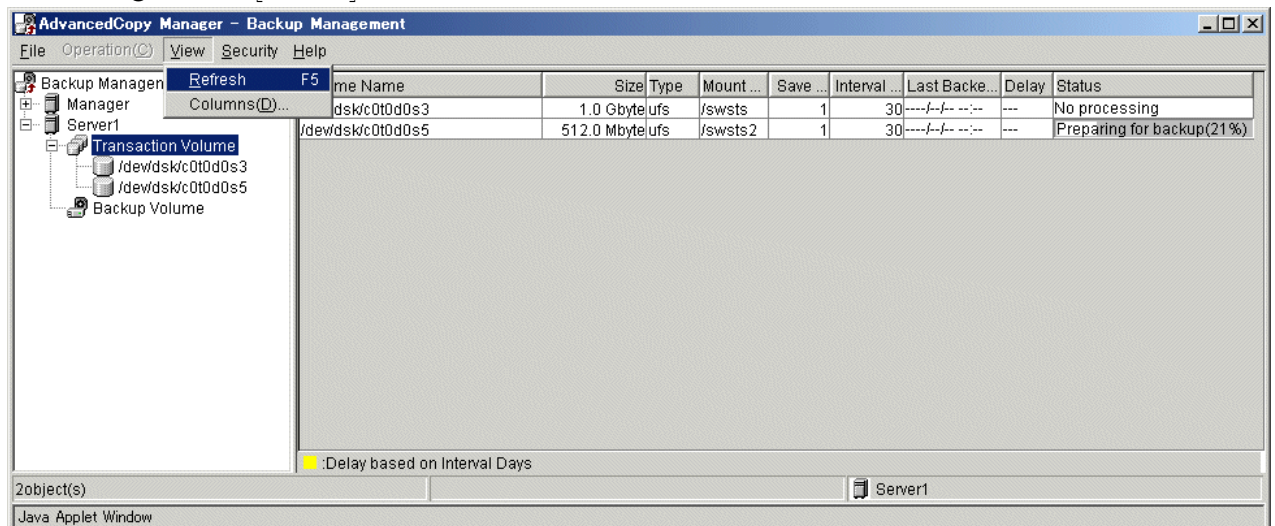
8. The transaction and backup volumes have obtained equivalency status when the <Status> field indicates "Backup Preparation Completed".

9. Stop transactions to create a backup history for an ordinary file system.

10. To create a backup history, select the target transaction volume from the transaction volume list view and select [*Backup*] from the Operations menu. The following 'Backup' window displays:
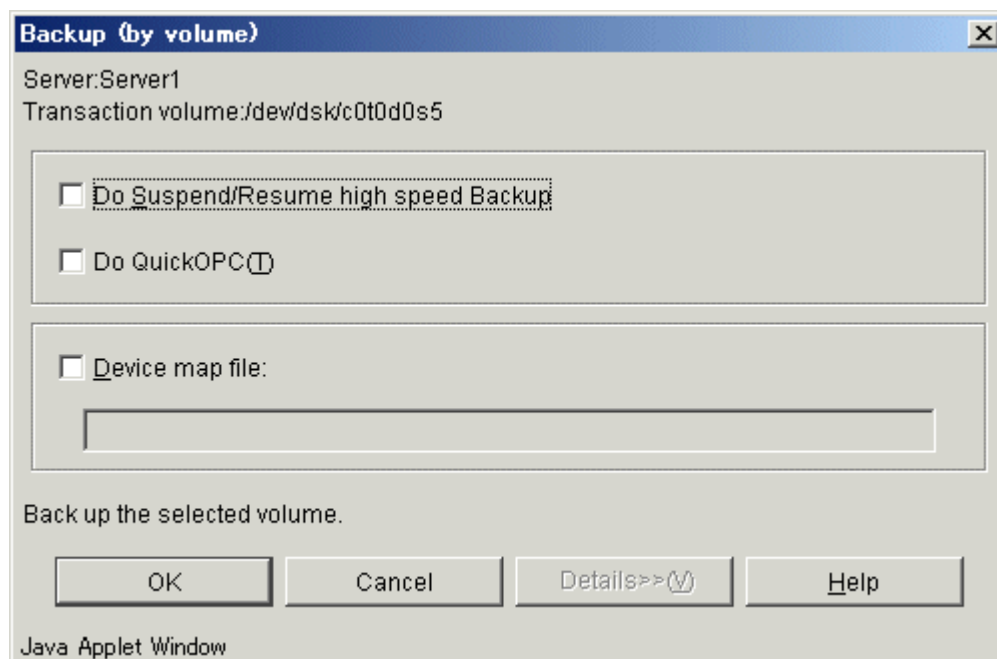
11. Check the displayed server name and transaction volume name, and click the [OK] button.
12. When the backup is successfully completed, the system will return to the "Backup" window.
    Click the [OK] button to return to the Transaction Volume list view.
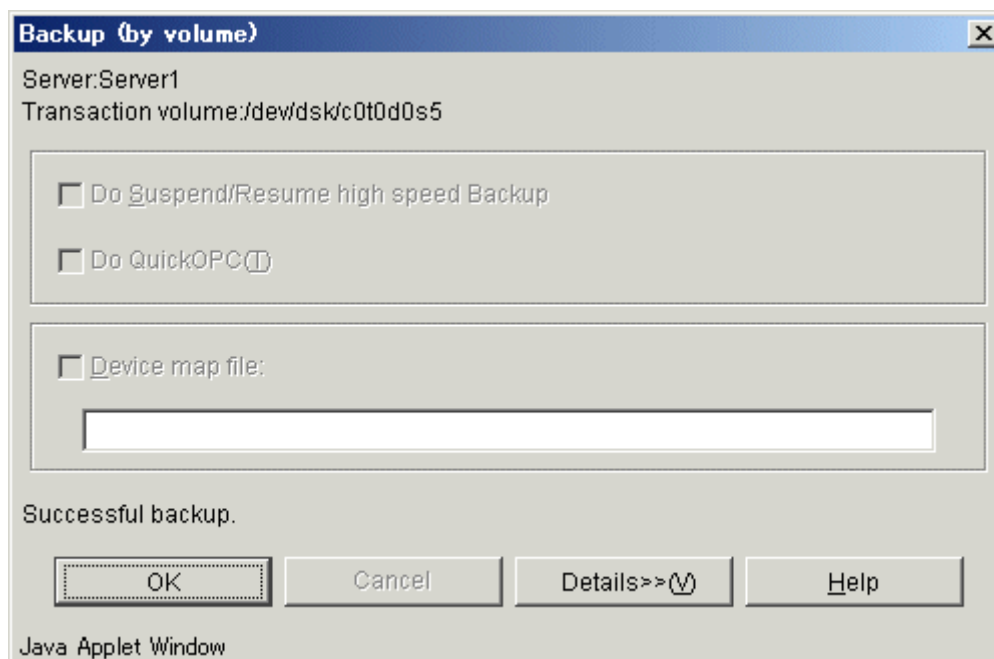
13. If transactions were stopped in step 9, resume transactions.

Note

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

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― Backup Synchronous backup processing is started with the Backup Synchronous processing start command.

― A synchronous backup processing state is checked with the Backup Synchronous processing progress display command.

― Backup can also be executed with the backup execution command.

― The backup status can also be checked with the backup execution status display command.

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

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

4.5.3 Performing data restoration

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

4.5.3.1 Restoring an entire volume

To restore all the data in a volume that has been backed up in the snapshot fast backup.

1. Stop any processing that is occurring in the system.
2. Display the Transaction Volume list view. Select a transaction volume to be restored.
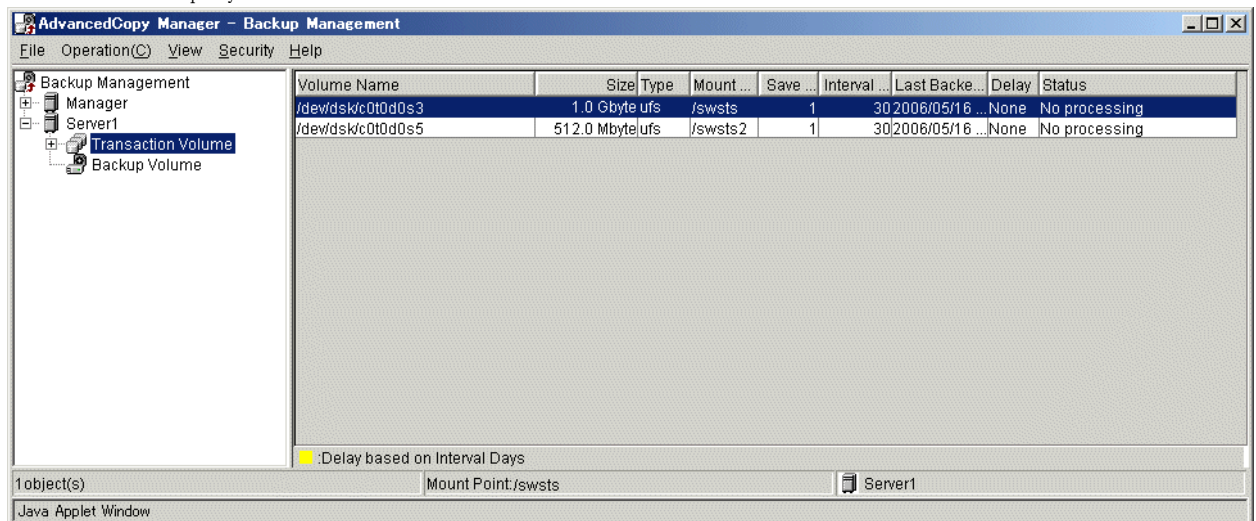
3. From the Operations menu, select [*Restore*] to display the 'Restore' window. The latest backup destination volume for the corresponding transaction volume will be selected as the source volume for the restore.
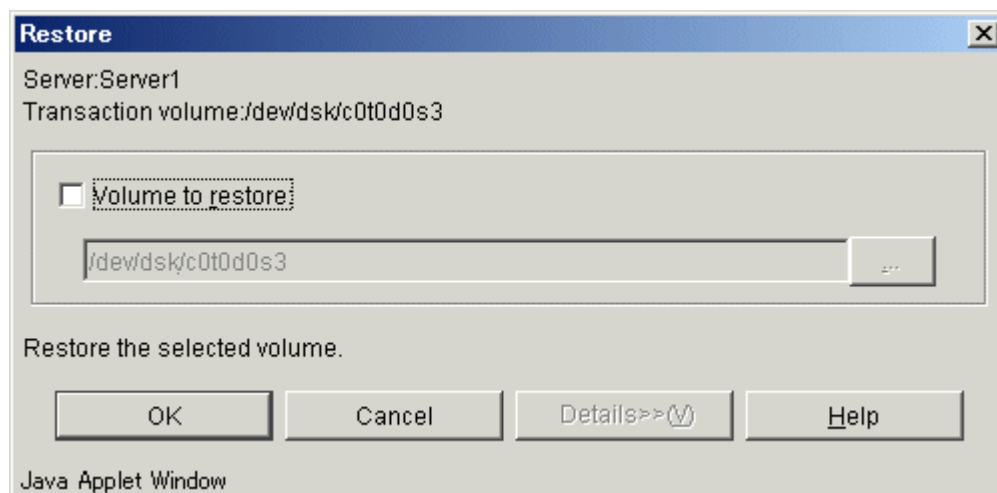
4. Check the name of the volume to restore.
   The transaction volume name selected will be displayed in the Transaction Volume list
   view. Click the [OK] button to restore data to this transaction volume. To change the
   restore destination, click the Volume Name to Restore checkbox, and then click the [...]
   button. The 'Volume Selection' window displays:
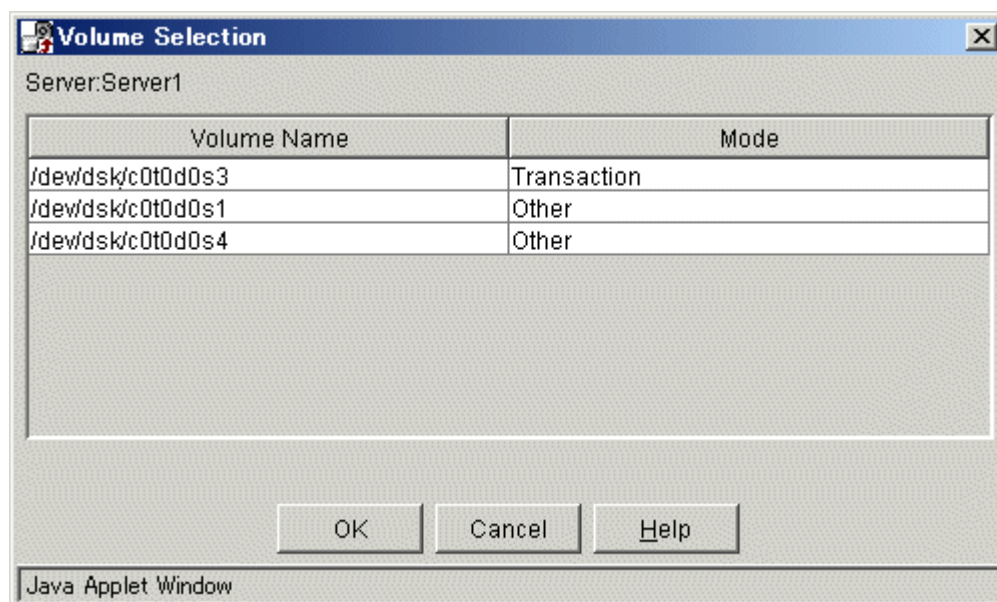
   Select the volume to which you want to restore data and then click the [OK] button. You
   will be returned to the restore window.
   Check that the name of the volume to restore is correct and then click the [OK] button
   on the Restore Window.

5. The Restore window will display when the restoration is completed. Click the [OK] button
   and you will be returned to the transaction volume list view.
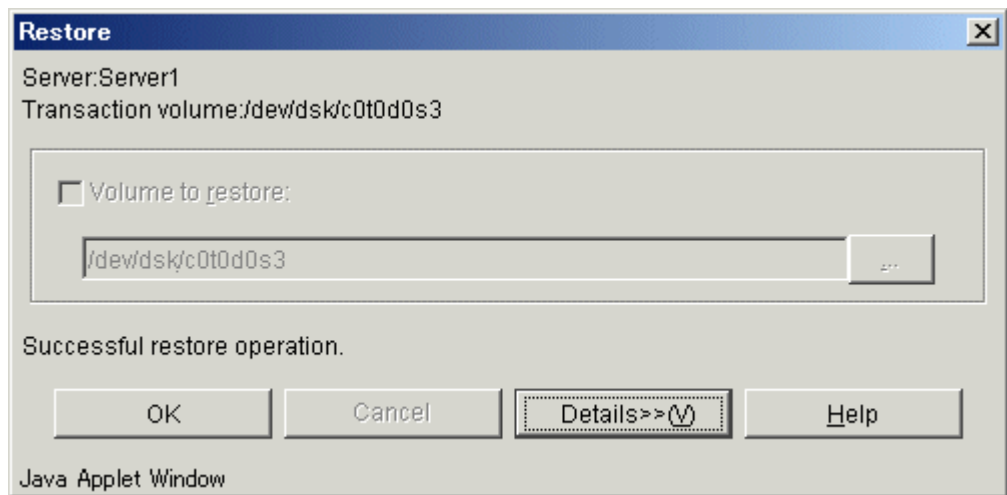
6. This completes restoration. Normal work can now be resumed.

Note

At this point, however, the physical copying of a volume is not completed at the back end. To check the status of physical copying, open the Transaction Volume list view and check the <Status> field of the target transaction volume. This allows you to check the current physical copying status of the restore.

To check the status of the physical copying, open the transaction volume list view and check the <Status> field of the target transaction volume. This field displays the progress of the coping process.
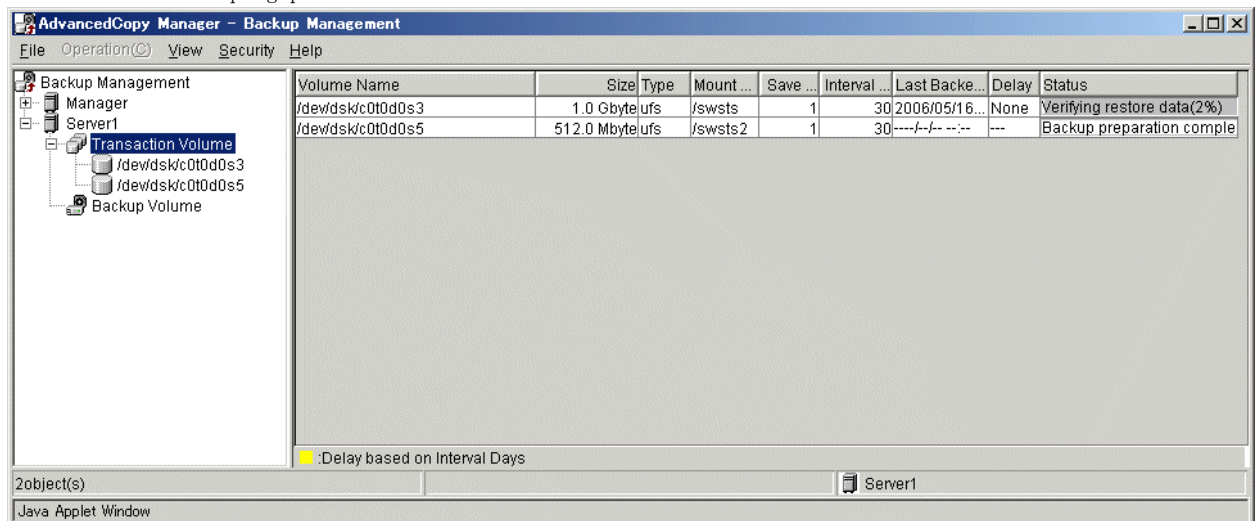
To refresh latest progress information,
● Press the [PF5] key, or
● Select [*Refresh*] from the View menu.
If the transaction was stopped in 1, restart it.

Point

— You can perform restoration also using the restore execution command.
— You can check the restore status also using the restore execution status display command.
— See the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details on restoring data in which absolute generations and relative generations are indicated in the backup data that is subject to history management. For absolute generations, 1 is permanently assigned to the data backed up first, and the number assigned to each new and more recent generation, increments by 1 each time a successful backup is performed. For relative generations, 1 is temporarily assigned to the latest data and the number increments by one as the data ages and is replaced by a more recent backup.

4.5.3.2 Restoring an individual file

Restore an individual file as shown below. Note that you cannot restore an individual file on the GUI window.
1. Mount backup volume. To check backup volume by the history list view or executing history information display command.
2. Copy files to restore using the cp command.
3. Unmount backup volume.

4.5.4 Managing a backup history

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

Point

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

4.5.4.1 Displaying a backup history

You can display a specific backup history on the backup history list view. To display the backup history list view, access the server list view, display the required Storage Server in the tree view, and select a transaction volume on the Storage Server.
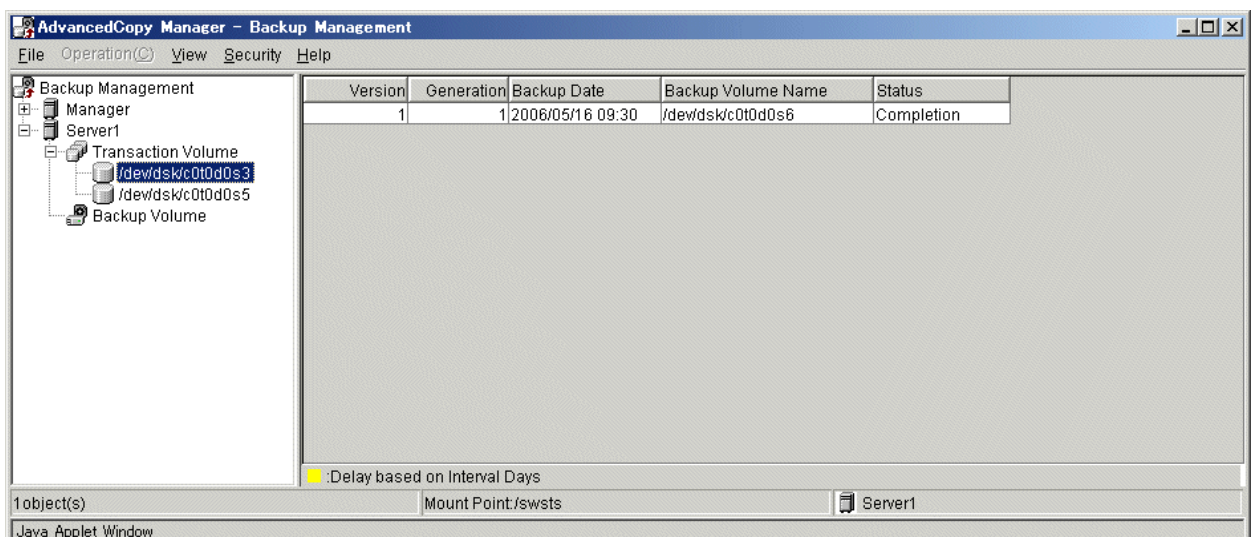
Point

You can display a backup history also using the history information display command at the command line.

4.5.4.2 Deleting a backup history

You can delete a backup history in the server list view.

Display a Storage Server in a tree view on the server list view, and select a transaction volume history for which you want to delete a backup history.
Click the right (alternate) mouse button and, from the popup menu, select [*Delete History*].
The following dialogue box will be displayed.
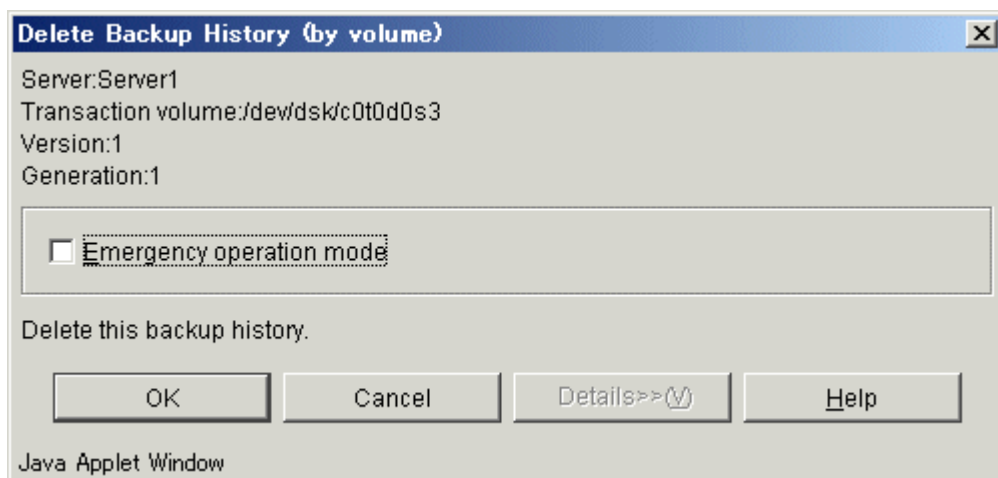
Carefully check the displayed server name and associated transaction volume name, then click the [OK] button.

Point

You can delete a backup history also using the history information delete command at the command line.

4.6 Changing the configuration information

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

4.6.1 Adding a device

After a device is added to any Storage Server, it must be incorporated (i.e. detected) into the AdvancedCopy Manager configuration environment. Perform the following to add a device:

— System resources such as disk and memory resources may be insufficient when a device is added. Re-estimate the system resource requirements before adding a device. Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.

— There may not be sufficient area available for updating the repository when a device is added. Check if the area required when updating the repository is available before fetching the device information. If there is insufficient area, free an area, then fetch the device information. Refer to step 2 of "Action required when access to repository fails" for the method for checking the required area.

— The repository (directory for the DB space that stores repository data) may be too small when a device is added. Re-estimate the repository size before adding a device.
Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.
If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a device. Refer to "Action required when the repository is too small" for details.

1. Display the initial window. For more information, see "Starting the initial window".
2. Fetch all the device information for a specific Storage Server. Fetching device information will force any newly added devices to be detected. Highlight the new device and move it to the [*Device to be added*] field. For information on fetching device information, see "Fetching device information on a Storage Server".
3. Display the backup management window. For more information, see "Displaying the backup management window".
4. Configure the operation type for a device that has been added to either a transaction or backup volume. For more information, see "Setting the operation type for a device".
5. If the added device has been defined as a transaction volume, you must set a backup policy for it. For more information, see "Setting backup policies".

4.6.2 Deleting a device

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

4.6.2.1 Deleting a transaction volume

To delete a transaction volume, follow the steps shown below. Ensure that all of the steps are complete before removing the device.
1. Display the backup management window. For more information, see "Displaying the backup management window".
2. Delete a backup history for the transaction volume to be deleted. For more information, see "Deleting a backup history".
3. Delete any backup policy for the transaction volume to be deleted.
Display a Storage Server in a tree view, and a list of transaction volumes on this Storage Server will be displayed.
Select the required transaction volume and select [*delete backup policy*]. You can use the right (alternate) mouse button or using the popup menu, select [*Delete backup policy*].

The following setup window will be displayed.
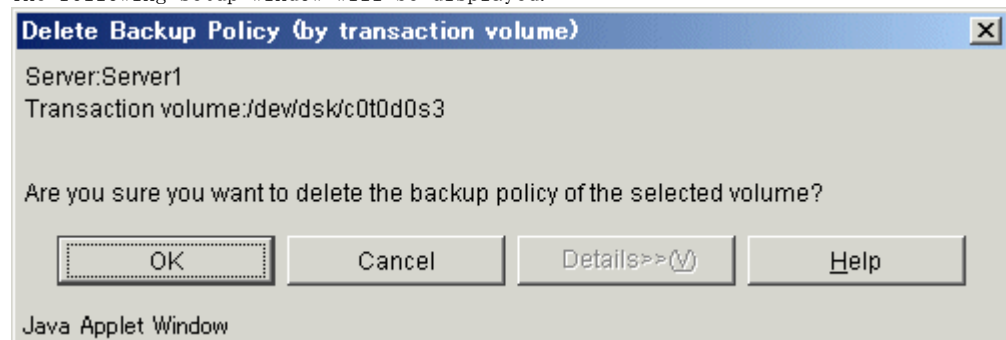
Carefully check the server name and transaction volume name as displayed and click the [OK] button.

4. To delete device information for a transaction volume:

Highlight the Storage Server and associated device, and select [*Set Device Information*] from the Operations menu. The following setup window will be displayed.
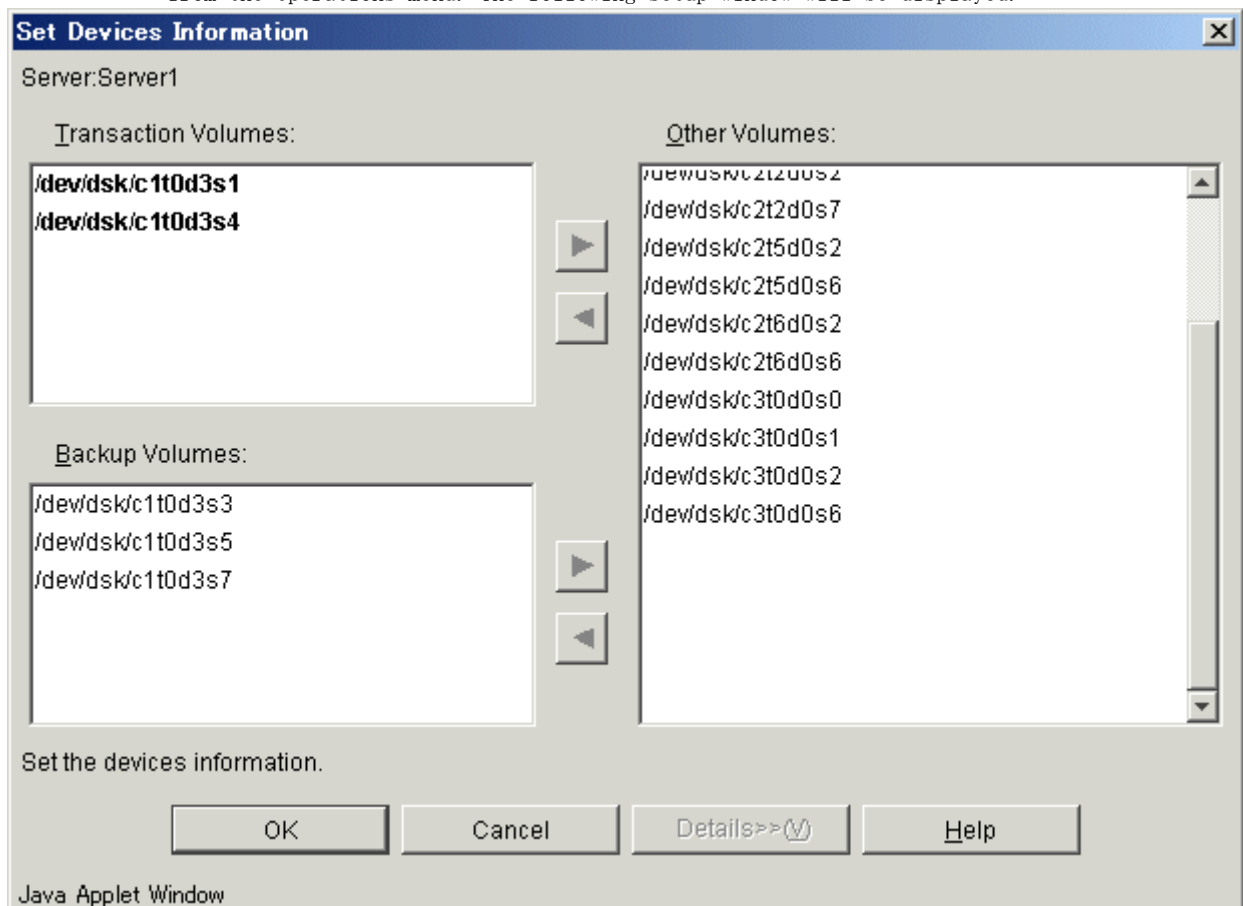
Move the target transaction volume displayed in the "Transaction Volume" field to the "Other Volume" field by clicking the relevant directional button [>].

Point

You can also remove this device using the history information delete command, backup policy deletion command, or device information configuration command.

4.6.2.2 Deleting a backup volume

To delete a backup volume follow the steps as shown below. Ensure that all of the steps are complete before removing the device

1. Display the backup management window. For more information, see "Displaying the backup management window".
2. Put the backup volume to be deleted into the unused status.
   When a volume is unused, this volume does not exist in a backup history. If the volume exists in a backup history, delete the backup history. If the volume is already unused, skip to the next step.
3. Delete device information for the backup volume to be deleted.
   To delete device information for a transaction volume:
   Highlight the Storage Server and associated device, and select [*Set Device Information*] from the Operations menu.
   The following setup window will be displayed.
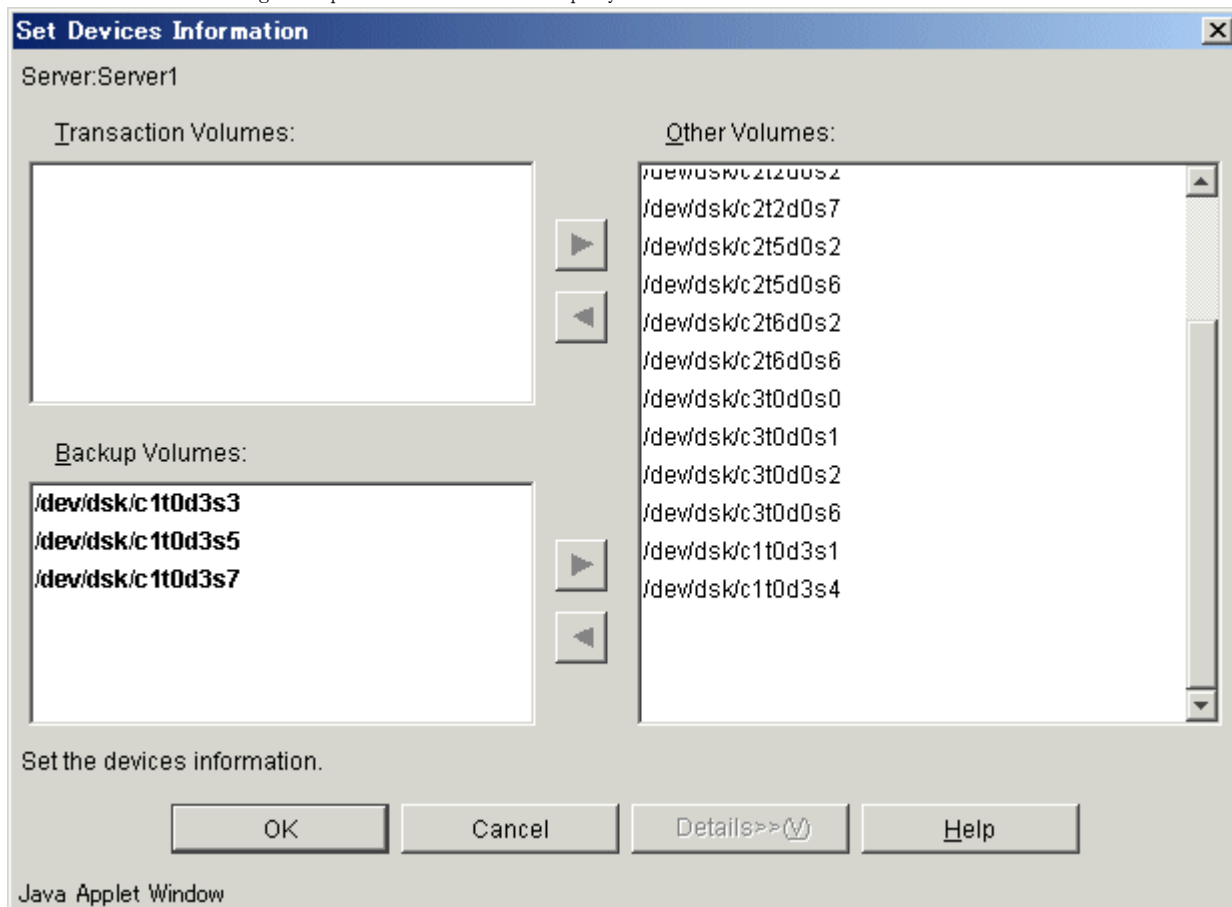
Move a target backup volume displayed in the "Backup Volume" field to the "Other Volume" field by clicking the relevant directional button [>].

Note

If a backup volume is deleted, an already defined backup policy may be affected (e.g., the number of backup volumes is less than the number of preservation generations or a device map may become invalid). In which event, the affected backup operation will abort on execution.
Always check existing defined backup policy documentation to ensure no policies will be affected before deleting a backup volume.
If the number of defined backup volumes required for a specific backup policy is affected register an alternative backup volume to replace the one being deleted before and deleting the target backup volume.

You can execute this processing also using the history information delete command, or device information setting command at the command line.

4.6.3 Adding a Storage Server

Add a Storage Server to the backup operation as shown below.

— System resources such as disk and memory resources may be insufficient when a Storage Server is added. Re-estimate the system resource requirements before adding a Storage Server. Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.

— There may not be sufficient area available for updating the repository when a Storage Server is added. Check if the area required when updating the repository is available before adding the Storage Server. If there is insufficient area, free an area, then add the Storage Server. Refer to step 2 of "Action required when access to repository fails" for details on checking the required area.

— The repository (directory for the DB space that stores repository data) may be too small when a Storage Server is added. Re-estimate the repository size before adding a Storage Server.
Refer to "Estimating database area" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.
If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a Storage Server. Refer to "Action required when the repository is too small" for details.

1. Display the initial window. For more information, see "Starting the initial window.
2. Register a Storage Server. For more information, see "Registering a Storage Server".
3. Fetch the device information for all devices connected to the added Storage Server. For more information, see "Fetching device information on a Storage Server".
4. Display the backup management window. For more information, see "Displaying the backup management window".
5. Set the information for the Storage Server. For more information, see "Configuring the environment for a backup operation server".
6. Configure the operation type for the relevant device whose information has been fetched in Step 3. For more information, see "Configuring the operation type for a device".
7. Configure a backup policy for all the transaction volumes registered in Step 2. For more information, see "Configuring backup policy".

4.6.4 Deleting a Storage Server

To delete a Storage Server follow the steps as shown below. Ensure that all of the steps are complete before removing the device

1. Display the backup management window. For more information, see "Displaying the backup management window".
2. Delete the backup history for all of the transaction volumes on the Storage Server to be deleted. For more information, see "Deleting a backup history".

3. Delete any backup policies for all the transaction volumes on the Storage Server to be deleted.
   Display a Storage Server in a tree view and a list of transaction volumes on this Storage Server will be displayed.
   Select the transaction volume to be deleted, and delete the backup policy. Click the right (alternate) mouse button and from the popup menu, select [*Delete backup policy*]. The following setup window will be displayed.
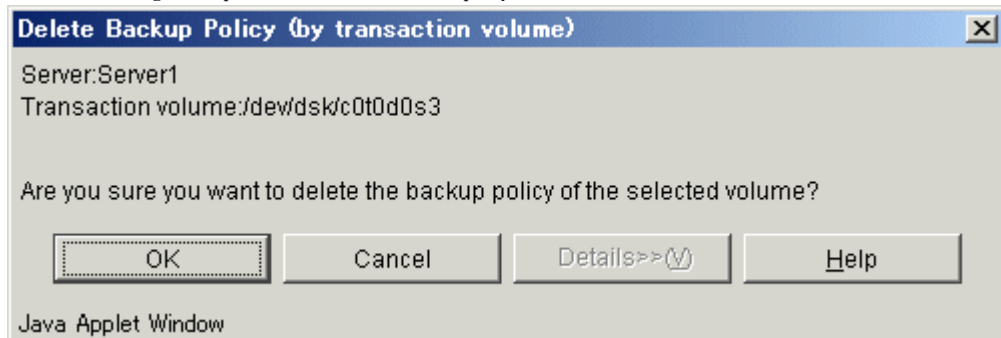
Carefully check that the server name and transaction volume name as displayed is correct and click the [OK] button.

4. Delete device information on the Storage Server to be deleted.
   Highlight the required Storage Server, and select [*Set Device Information*] from the Operations menu. The following setup window will be displayed.
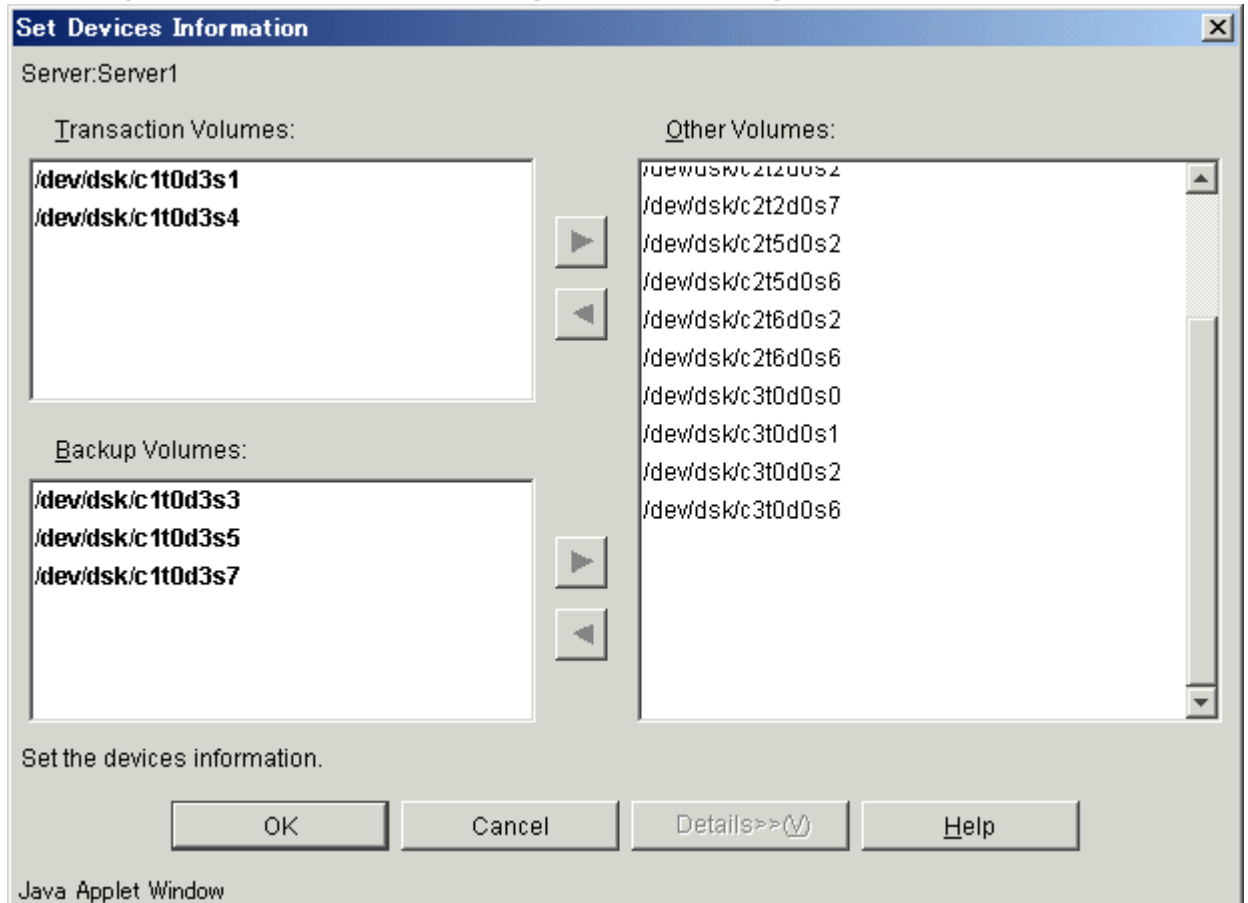
Move all the volumes displayed in the "Transaction Volume" and "Backup Volume" fields to the "Other Volume" field. By click the relevant directional buttons [>] to move the volumes.

5. Redisplay the initial window. For more information, see "Starting the initial window".

6. Now, delete a Storage Server. Highlight the relevant Storage Server and select [*Delete Server*] from the Operations menu. The following window will be displayed.

Confirm Delete Server

Are you sure you want to delete this server?

Server name:	Server1
IP address:	10.10.10.20
Operating system:	Solaris

Yes　　　No　　　Help

Java Applet Window
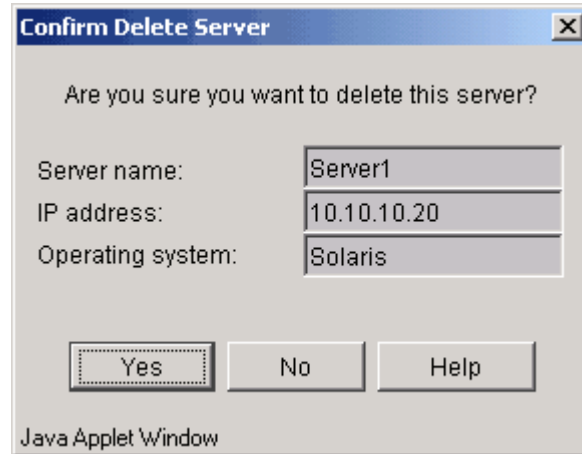
Carefully check that the server name is correct and click the [Yes] button.
You can delete also server information using the server information deletion command at the command line.

4.7 Stopping the Operation

To stop a backup operation, stop any daemons running on the Storage Server.
Normally, they are automatically stopped when the system stops.
You can stop a specific daemon if you need to do so for some reason. For more information,
see "Starting and Stopping Daemons".

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

4.8 SDX Object Operations

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

4.8.1 Units of SDX object operations

There are two types of the backup operations (with different copy units for each type):
1.   Backup operation in units of logical volumes (method with GDS Snapshot)
2.   Backup operation in units of slices (method without GDS Snapshot)
For details on how to confirm and select the type of operation, refer to "Configuring units of SDX object operations."

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

4.8.1.1 Configuring the unit of SDX object operations

The unit of SDX object operations is normally set as follows:
● Units of Logical volumes
When PRIMECLUSTER GDS Snapshot has been included PRIMECLUSTER GDS 4.1A30 or later

● Units of Slices
Other than the above

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

> If PRIMECLUSTER GDS has already been upgraded from version 4.1A20 or earlier to 4.1A30 or later, follow the procedure below to change the configuration to operation in units of logical volumes.
>   1) Refer to "Deleting the Storage Server," and delete the Storage Server.
>   2) Use the command described in "SDX object management unit setting command (stgxfwcmsetsdx)," to specify management in units of logical volumes.
>   3) Perform the steps as described in "Registering the Storage Server."
>
> For operation in units of slices as before, the above procedure need not be followed.

> If AdvancedCopy Manager has been upgraded from version 10.3 or earlier in an environment that includes PRIMECLUSTER GDS 4.1A30 or later, the operating unit for SDX objects will have changed. Therefore, fetching device information from a Storage Server will detect that the managed devices have changed.
>
> To keep the operation in units of slices, abort the fetching operation without accepting the detected change, and use the SDX object management unit configuration command (stgxfwcmsetsdx), to set operation in units of slices, and re-specify the required values as necessary.

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

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

Figure: Backup operation in units of logical volumes
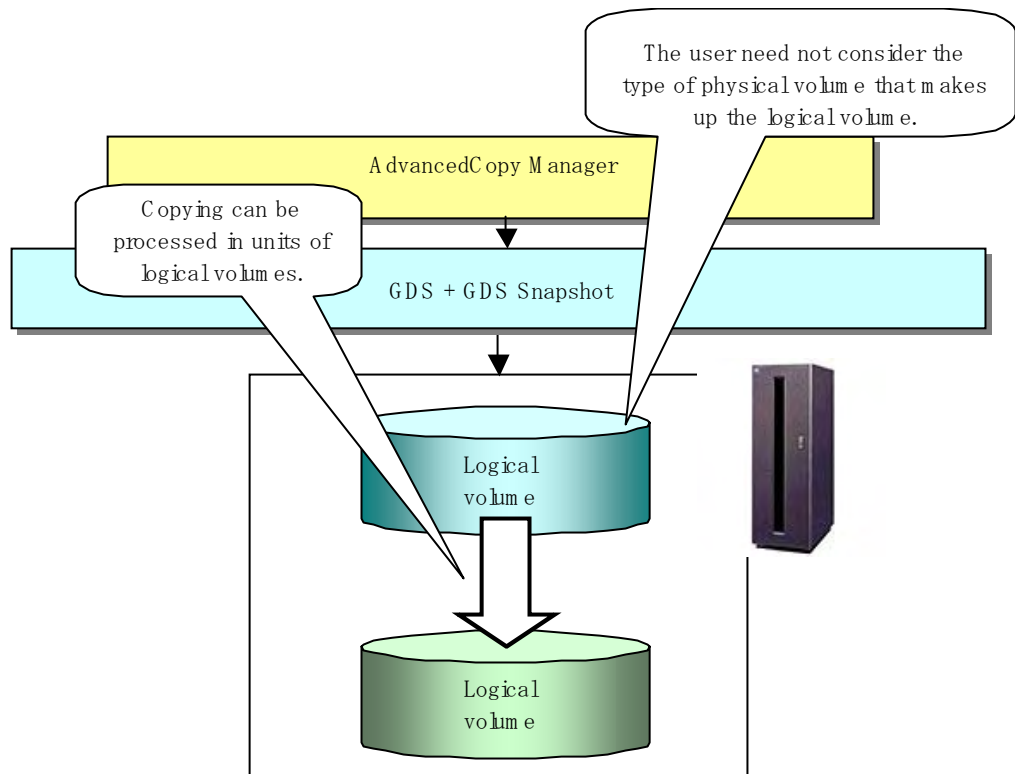
To specify a GDS logical volume in the AdvancedCopy Manager command, specify the GDS logical volume name.

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

Note **Configuration and conditions of unsupported SDX objects**

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

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

Copying cannot be processed in the following circumstances:
   — If the total number of the slices that make up the transaction volume plus all
     slices that make up all backup volumes associated with the transaction volume at
     the start of synchronous processing or snapshot-type backup processing is 33 or
     greater,
   — If either the source volume (the transaction volume for backup processing or the
     backup volume for restore processing) are in an invalid state,

Point

To confirm the type of volume being used, (that is: single, mirror, stripe, concatenation,
or switch), execute "sdxinfo -e long" at the command line and check the volume type
attribute values returned.
The value in the TYPE column on the line indicated for the volume in the OBJ column will
match one of the following:
[Volume object type attributes]
   — single : Single volume (supported)
   — mirror : Mirror volume (supported)
   — stripe : Stripe volume (not supported)
   — concat : Volume in a concatenation group (not supported)
   — switch : Switch volume (not supported)

4.8.2.1 Designing the backup operation

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

For a backup performed in collaboration with GDS Snapshot, AdvancedCopy Manager processes
binding, separation, and release of volumes by using the GDS Snapshot function.
Therefore, an SDX object used by AdvancedCopy Manager must be set to a state in which the object
can operate as either a master object or proxy object.

A transaction volume operates as a master object, and a backup volume as a proxy object.
Configure the GDS volume structure accordingly before registering a volume with AdvancedCopy
Manager.
When configuring SDX objects of GDS for use by AdvancedCopy Manager, pay careful attention
to the relevant structure attributes of "Transaction volume" and "Backup volume" described
in the next sections.
For details on GDS Snapshot and premises of the proxy structure, refer to the "PRIMECLUSTER(TM)
Global Disk Services User's Guide (Solaris(TM) Operating Environment)."

4.8.2.2 Transaction volume

To use an SDX object (logical volume) for transactions, register it as a transaction volume.
The transaction volume operates as a master object of GDS Snapshot.
Therefore, note the following about configuring the backup operation:
   ● An SDX object that belongs to a shadow class cannot be registered as the transaction
     volume.
   ● The only types of logical volumes that can be registered as the transaction volume are
     single volumes and mirror volumes.
   ● A stripe volume, a volume in a concatenation group, or a switch volume cannot be
     registered as the transaction volume. Stripe groups and concatenation groups, however,
     can be used as subordinate groups of a mirror group.
   ● A volume in a disk group to which a backup volume also belongs cannot be registered as
     the transaction volume.
   ● A logical volume that belongs to the single disk group with a backup volume cannot be
     registered as the transaction volume.
   ● If any of the slices that make up the transaction volume are separated temporarily or
     are being copied, backup cannot be performed.
   ● If the transaction volume (logical volume) is in the invalid state, backup cannot be
     performed.
   ● A proxy object of GDS Snapshot cannot be used as the transaction volume.

4.8.2.3 Backup volumes

Register an SDX object (logical volume) as a backup volume.
The backup volume operates as a proxy object of GDS Snapshot.
Therefore, note the following about configuring the backup operation:

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

4.8.2.4 Copy functions available when used with GDS Snapshot

The following copy functions can be used with GDS Snapshot:

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

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

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

Unit	Volume	SDX object structure		Available copy function
Logical volume	Transaction	Single		Advanced copy Software-copy
		Mirror	No subordinate group exists.	Advanced copy Software-copy
			A subordinate group exists.	Software-copy
	Backup	Single		Advanced copy Software-copy
		Mirror	This consists of one disk.	Advanced copy Software-copy
			This consists of multiple disks.	Software-copy

> **Note**
>
> For backup, stripe- and concatenation-type volumes in SDX object (volume) structures cannot be copied.

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

Unit	Volume	SDX object structure		Available copy function
Logical volume	Backup	Single		Advanced copy Software-copy
		Mirror	No subordinate group exists.	Advanced copy Software-copy
			A subordinate group exists.	Software-copy
	Transaction	Single		Advanced copy Software-copy
		Mirror	This consists of one disk.	Advanced copy Software-copy
			This consists of multiple disks.	Advanced copy Software-copy

Note

For restoration, stripe-, concatenation-, and switch-type volumes in SDX object (volume) structures cannot be copied.

4.8.2.5 Configuration options

Specify options when performing backup to a backup volume in a cabinet that does not contain the transaction volume.
Backup with GDS Snapshot does not require a setting to indicate inter-cabinet copying.

4.8.2.6 Fetching device information from a Storage Server

To perform the backup operation with a Storage Server and obtain information of a subordinate device related to the Storage Server, you must register the server.
For details on how to fetch the device information, refer to "Fetching device information from a Storage Server".

4.8.2.7 Configuring the operation type for a device

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

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/sfdsk/CLS1/dsk/vol1
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/sfdsk/CLS1/dsk/bvol1
swstdevinfoset completed
```


Note

The following SDX objects cannot be registered as transaction volumes or backup volumes:
— Object of a shadow class
— Stripe-type object
— Concatenation-type object
— Switch-type object

4.8.2.8 Configuring a backup policy

Checking the number of backup generations

Before setting a backup policy, the required number of backup volumes for operation must be prepared according to the backup policy. (For details, refer to the section titled "Setting a backup policy.")
If the transaction volume is an SDX object, verify that there are enough backup volumes registered as proxy objects to match the required number of backup generations.
If the transaction volume is a GDS logical volume, each backup volume must be also a GDS logical volume.

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

> **Note**
>
> In the following cases, some SDX objects are not counted as available backup volumes:
> — Where the backup volume is an object whose class is different from that of the transaction volume.
> — Where the size of the backup volume is different from that of the transaction volume.

Limit on the number of slices

Where an SDX object is to be backed up,, the transaction volume is described as the master and its associated backup volume is described as the proxy. Therefore, the total number of the slices that make up the transaction volume plus the number of slices that make up the associated backup volume must not exceed 32. Consequently, the number of backup generations that can be used is limited according to the GDS structure. This will be important when configuring a backup policy.

For example:
If both the transaction volume and backup volume are single volumes, you can set the number of backup generations to 31, which is the maximum value. However, if both the transaction volume and backup volume have a two-slice structure, the number of backup generations is limited to 15. If 16 or a higher value is set, the 16th generation and subsequent generations are not backed up.

4.8.2.9 Backup

Backup in units of logical volumes

If the transaction volume is an SDX object, select a backup volume that can be a valid proxy object for the backup.
AdvancedCopy Manager automatically selects it from the registered backup volumes.

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

Available copy processing methods

The available copy methods vary depending on the hardware environment or configuration supporting the GDS logical volumes.
EC/OPC cannot be used in the following cases:
- ● The backup volume is an SDX object in a mirroring structure.
- ● A subordinate group is connected to the disk group to which the transaction volume and backup volume belong.

<div align="center">Table: Relationship between hardware functions and copy processing</div>

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

4.8.2.10 Restore

Restoration to a transaction volume in units of logical volumes

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

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

Restoration with the restore destination specified

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

Available copy processing methods

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

OPC cannot be used in the following case:

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

<div align="center">Table: Relationship between hardware functions and copy processing</div>

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

4.8.2.11 Operational notes

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

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

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

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

Figure: Backup operation in units of slices
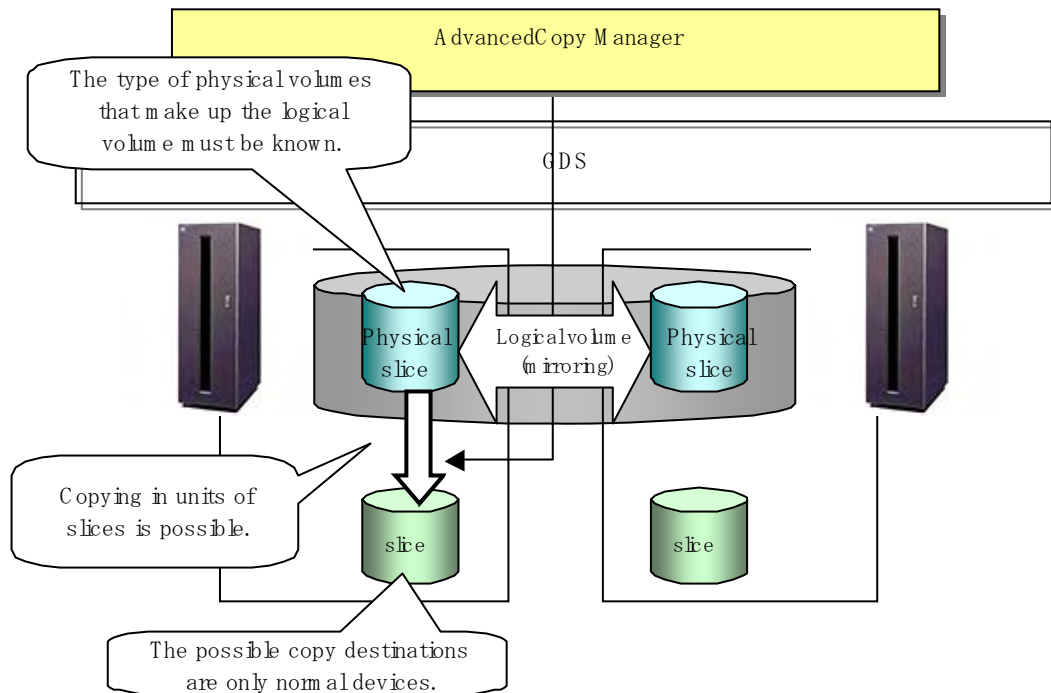
When specifying a name in the AdvancedCopy Manager command, use the following name format that combines a logical volume name and AdvancedCopy Manager device name.

dev/sfdsk/*class-name*/dsk/*volume-name*:*DEVNAM value by sdxinfo*

Note

The following SDX objects can be used for operations in units of slices:
— Single volumes
— Non-hierarchical mirror volumes

Point

The volume type attribute (the value in the TYPE field in the volume row of the OBJ field) displayed when "sdxinfo -e long" is executed can be used to determine whether the volume being used is single, mirror, stripe, concatenation, or switch volume.
[Volume object type attributes]
— single: Single volume (operation possible)
— mirror: Mirror volume (operation possible)
— stripe: Stripe volume (operation not possible)
— concat: Volume in concatenation group (operation not possible)
— switch: switch volume (operation not possible)

Note

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

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

4.8.3.1 Configuring the backup operation

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

4.8.3.2 Fetching device information from a Storage Server

To perform the backup operation with a Storage Server and obtain information of a subordinate device of the Storage Server, you must register the server.
For details on how to fetch the device information, refer to the section titled "Fetching device information on a Storage Server."

4.8.3.3 Configuring the operation type for a device

Transaction volume

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

```
#/opt/FJSVswsts/bin/swstdevinfoset -t /dev/sfdsk/CLS01/dsk/VOL01:c1t0d1
swstdevinfoset completed
#
```

Backup volume

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

```
#/opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d2s6
swstdevinfoset completed
#
```

4.8.3.4 Backup

Backup example

```
#/opt/FJSVswsts/bin/swstbackup /dev/sfdsk/CLS01/dsk/VOL01:c1t0d1
/dev/sfdsk/CLS01/dsk/VOL01:c1t0d1 swstbackup completed
#
```

Backup states

Backup can only be performed when the SDX object that makes up the applicable logical volume is in one of the states listed below.
If the object is in any other state, backup cannot be performed.
(AdvancedCopy Manager checks the state of the SDX object by using the <sdxinfo> command of SafeDISK/PRIMECLUSTER GDS.)
1. The state of the volume is "ACTIVE" or "STOP".
2. The state of the physical disk is "ENABLE".
3. The state of the slice is "ACTIVE" or "TEMP".

Backup pre-processing and post-processing

The pre-processing and post-processing script is not executed if a slice of an SDX object is in the "TEMP" state.

4.8.3.5 Restore

For operation in units of slices, restoration can be performed only if the transaction volume is a single volume.
An SDX object that is not a single volume cannot be restored.
For details on restoration of an SDX object that is not a single volume, refer to "Notes on SDX object operations (backup management)".

Restoration example

```
#/opt/FJSVswsts/bin/swstrestore  /dev/sfdsk/CLS01/dsk/VOL01:c1t0d1
/dev/sfdsk/CLS01/dsk/VOL01:c1t0d1 swstrestore completed
#
```

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 logical volumes

When the VxVM volume configuration satisfies the relevant conditions, backup operation can be performed in units of logical volumes.

![Note]

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

4.9.1.1 Configuring the Backup operation

4.9.1.1.1 Supported VxVM volume structures

For the supported VxVM volume structures, refer to "Managing a device on AdvacnedCopy Manager."

4.9.1.1.2 Preparing a backup volume

The following types of volumes only can be used as backup volumes of VxVM logical volumes:
- ● Logical volume of VxVM
- ● Normal device (slice)

For this backup volume, however, use a VxVM logical volume with the same structure as that of the transaction volume, in anticipation of mounting of the backup volume or its use by other applications.

The same volume structure means the following conditions are satisfied:
- ● The size of the physical disk (LUN) is the same.
- ● The size of the private region is the same.
- ● The size of the public region is the same.
- ● Each sub-disk in the public region has a corresponding start offset and size.
- ● The logical volume and sub-disks have a corresponding association.

Figure: Example of correspondence between transaction volume and backup volume (1)
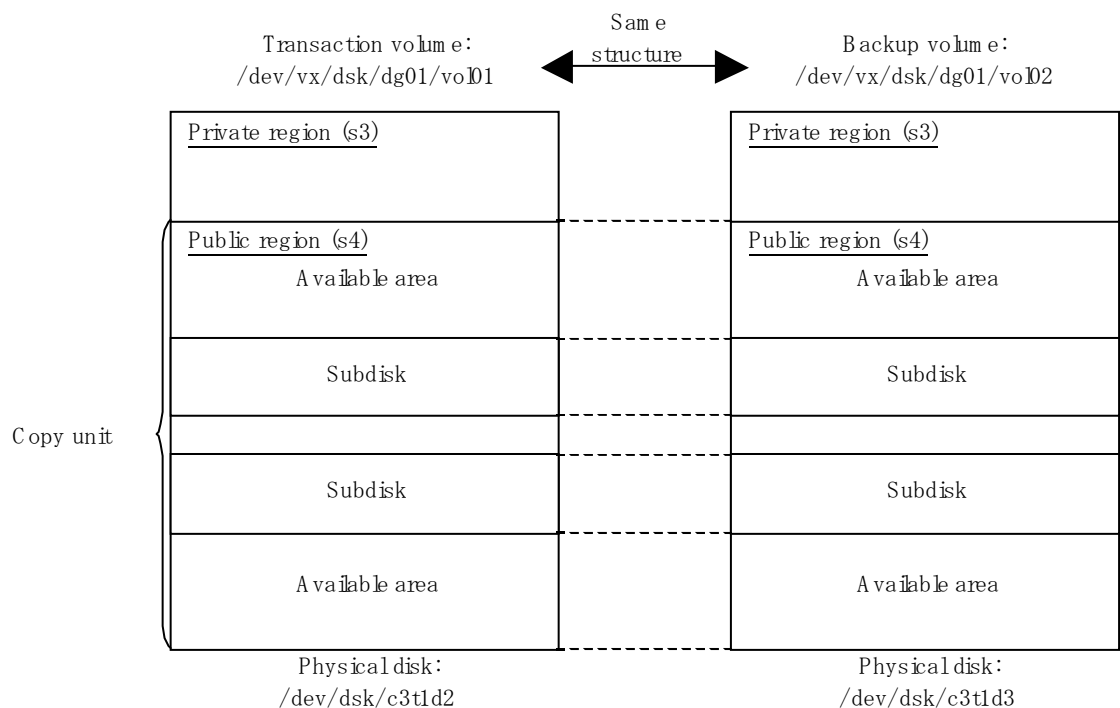
Figure: Example of correspondence between transaction volume and backup volume (2)
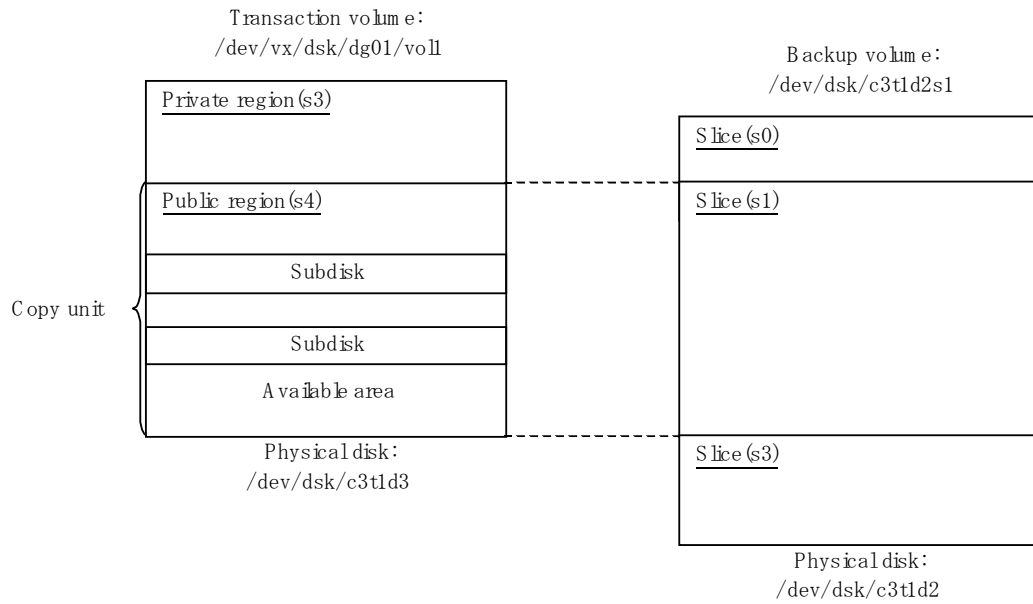
> **Note**
>
> If the backup volume is the same size as the public region, a backup volume of a VxVM volume can be made into a normal device (slice). However, it is generally not possible to mount the backup volume and have other applications use it.
> Similarly, a backup volume of a normal device (slice) can be made into a VxVM volume. However, it is generally not possible to mount the backup volume and have other applications use it.

4.9.1.2 Preparations

4.9.1.2.1 Configuring the operation type of a device

If the target VxVM logical volume satisfies the condition of logical volumes:VM disk = N:1 (N>1), use one of the logical volume names included with each VM disk to register a transaction volume or backup volume.

As an example, assume the transaction volume and backup volume in the following volume structure.

Disk group AGT01
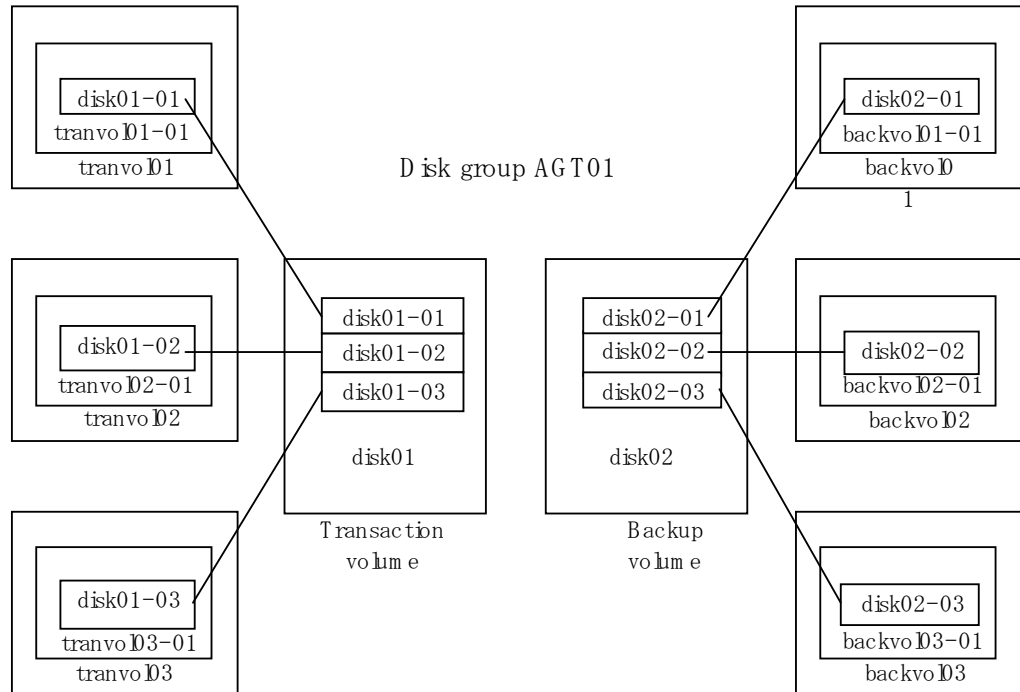
● VM disk disk01 (transaction volume) has logical volumes named tranvol01, tranvol02, and tranvol03, and VM disk disk02 (backup volume) has logical volumes named backvol01, backvol02, and backvol03.
● VM disks disk01 and disk02 have the same slice size. The sub-disk structures of VM disks disk01 and disk02 are the same. (The sub-disk structure can be checked by executing "vxprint -AGts".)

In the above example, use the logical volume names tranvol01 and backvol01 when configuring the device information.

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/vx/dsk/AGT01/tranvol01
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dsk/AGT01/backvol01
swstdevinfoset completed
```

The logical volume specified in the device information configuration command is used to specify the VM disk (slice) for backup processing. This means that tranvol02 or tranvol03 instead of tranvol01 can be set in the above example (and this is also true for backvol01). However, if tranvol01 and backvol01 are already registered, the other volumes (tranvol02, tranvol03, backvol02, and backvo03) cannot be registered.

4.9.1.2.2 Customizing pre-processing and post-processing scripts

If the target VxVM logical volume satisfies the condition where logical volumes:VM disk = N:1 (N>1) and unmount/mount processing of the transaction volume with a constructed file system is to be avoided for operational reasons, customize the backup pre-processing script (OpcBackup.pre) so that the transaction volume cannot be unmounted.

In such cases, add processing before unmount processing of the backup pre-processing script (OpcBackup.pre) to clear the mount point of the VxVM logical volume, as shown below.

```
79:    exit 0

80:  fi

81:  post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"

82:  fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"

83:  bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"

84:

      if [ "$device" = "/dev/vx/dsk/AGT01/tranvol01" ]

      then

          mount_point=""

      fi

85:  if [ "$mount_point" != "" ]

86:  then

87:

88:  # When device cannot be unmounted

89:  #

90:  # if [ "$device" = "/dev/dsk/c*t*d*s*" ]
```

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          Output destination backup volume

/dev/vx/dsk/AGT01/tranvol01    /dev/vx/dsk/AGT01/backvol01
```

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

4.9.1.3 Operations

4.9.1.3.1 Executing backup

If the target VxVM logical volume satisfies the condition where logical volumes:VM disk = N:1 (N>1), the transaction volume cannot be unmounted/mounted using the pre-processing or post-processing script.
For this type of structure, unmount the file system before executing backup, and mount the file system after backup.
If the target VxVM logical volume satisfies the condition where logical volumes:VM disk = 1:1, the transaction volume is unmounted and mounted in the same way as with normal slices, and the following procedure is not required.

[Snapshot Backup procedure]

```
# umount /global/AGT01/tranvol01 <-- unmount tranvol01
# umount /global/AGT01/tranvol02 <-- unmount tranvol02
# umount /global/AGT01/tranvol03 <-- unmount tranvol03
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dsk/AGT01/tranvol01 -Xdevmap /acm/devmap.txt
/dev/vx/dsk/AGT01/tranvol01 swstbackup completed
# mount -F ufs /dev/vx/dsk/AGT01/tranvol01 /global/AGT01/tranvol01 <-- mount tranvol01
# mount -F ufs /dev/vx/dsk/AGT01/tranvol02 /global/AGT01/tranvol02 <-- mount tranvol02
# mount -F ufs /dev/vx/dsk/AGT01/tranvol03 /global/AGT01/tranvol03 <-- mount tranvol03
```

To prevent unmount/mount processing of the transaction volume for operational reasons, take action as described in "Customizing preprocessing and postprocessing scripts" and execute backup by using the procedure described below.

[Snapshot Backup procedure (while preventing unmount/mount processing of the transaction volume)]

```
# lockfs -w /global/AGT01/tranvol01 <-- lock file system tranvol01
# lockfs -w /global/AGT01/tranvol02 <-- lock file system tranvol02
# lockfs -w /global/AGT01/tranvol03 <-- lock file system tranvol03
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dsk/AGT01/tranvol01 -Xdevmap /acm/devmap.txt
/dev/vx/dsk/AGT01/tranvol01 swstbackup completed
# lockfs -u /global/AGT01/tranvol01 <-- unlock file system tranvol01
# lockfs -u /global/AGT01/tranvol02 <-- unlock file system tranvol02
# lockfs -u /global/AGT01/tranvol03 <-- unlock file system tranvol03
# fsck -n -F ufs /dev/vx/dsk/AGT01/backvol01 <-- check file system backvol01
# fsck -n -F ufs /dev/vx/dsk/AGT01/backvol02 <-- check file system backvol02
# fsck -n -F ufs /dev/vx/dsk/AGT01/backvol03 <-- check file system backvol03
```

Note

Even if the command "lockfs -w" is used to flush the file system cache and prevent further update, file contents are not guaranteed while ever the file is in Write Open (excluding the database space of Oracle used to support on-line backup).
If renewal of metadata is currently occurring, consistency of file system data itself can not be guaranteed either because "lockfs" has been specified.
To manage this problem, perform "fsck" after backup to check the consistency of the backup data.
Even if the following message is output in fsck processing, there is no problem with the consistency of the file system. Execute "fsck -y" to restore.

```
FILE SYSTEM STATE IN SUPERBLOCK IS WRONG; FIX?
```

4.9.1.3.2 Executing restoration

If the target VxVM logical volume satisfies the condition where logical volumes:VM disk = N:1 (N>1), the transaction volume cannot be unmounted/mounted using the pre-processing or post-processing script.
For this type of structure, unmount the file system before executing restoration, and mount the file system after restoration.
If the target VxVM logical volume satisfies the condition where logical volumes:VM disk = 1:1, the transaction volume is unmounted and mounted in the same way as in operation with normal slices, and the following procedure is not required.

[Restoration procedure]

```
# umount /global/AGT01/tranvol01 <-- ummount tranvol01
# umount /global/AGT01/tranvol02 <-- ummount tranvol02
# umount /global/AGT01/tranvol03 <-- ummount tranvol03
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dsk/AGT01/tranvol01
/dev/vx/dsk/AGT01/tranvol01 swstrestore completed
# mount -F ufs /dev/vx/dsk/AGT01/tranvol01 /global/AGT01/tranvol01 <-- mount tranvol01
# mount -F ufs /dev/vx/dsk/AGT01/tranvol01 /global/AGT01/tranvol02 <-- mount tranvol02
# mount -F ufs /dev/vx/dsk/AGT01/tranvol01 /global/AGT01/tranvol03 <-- mount tranvol03
```

4.9.1.4 Changing the configuration information

To change the volume structure during the backup operation, follow the procedure given below.

1. Specify the "-z" option for the "History information deletion command (swsthistdel)," to delete all history information.
2. Use the backup policy deletion command (swstbkpoldel) to delete relevant backup policies.
3. Delete the registration of the transaction volume by specifying the "-o" option in the device information configuration command (swstdevinfoset). If the backup volume is a VxVM volume, also delete the registration of the backup volume by specifying the "-o" option in the device information configuration command (swstdevinfoset).
4. Change the transaction volume. If the backup volume is a VxVM volume, also change the volume structure of the backup volume so that the backup volume and transaction volume can be in the same structure.
5. On the initial screen, execute [*Get and reflect information on all devices*].
6. Register the transaction volume and backup volume again by using the device information setting command (swstdevinfoset).
7. Use the backup policy setting command (swstbkpolset) to set a backup policy.
8. Resume the backup operation.

4.9.2 Backup operation in units of physical disks

When the VxVM volume configuration does not satisfy the conditions for backup operation using units in logical volumes, backup operation can be performed using units of physical disks. When backup operation 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 processed synchronously.

Refer to "Device information display command (stgxfwcmdispdev)", 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.

It is only VM disk of the "nopriv" type that a physical slice becomes the unit of management.

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.
For operation in a SunCluster environment, the VxVM enclosure name must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the enclosure name must be the same.

4.9.2.1 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: Transaction volume and backup volume
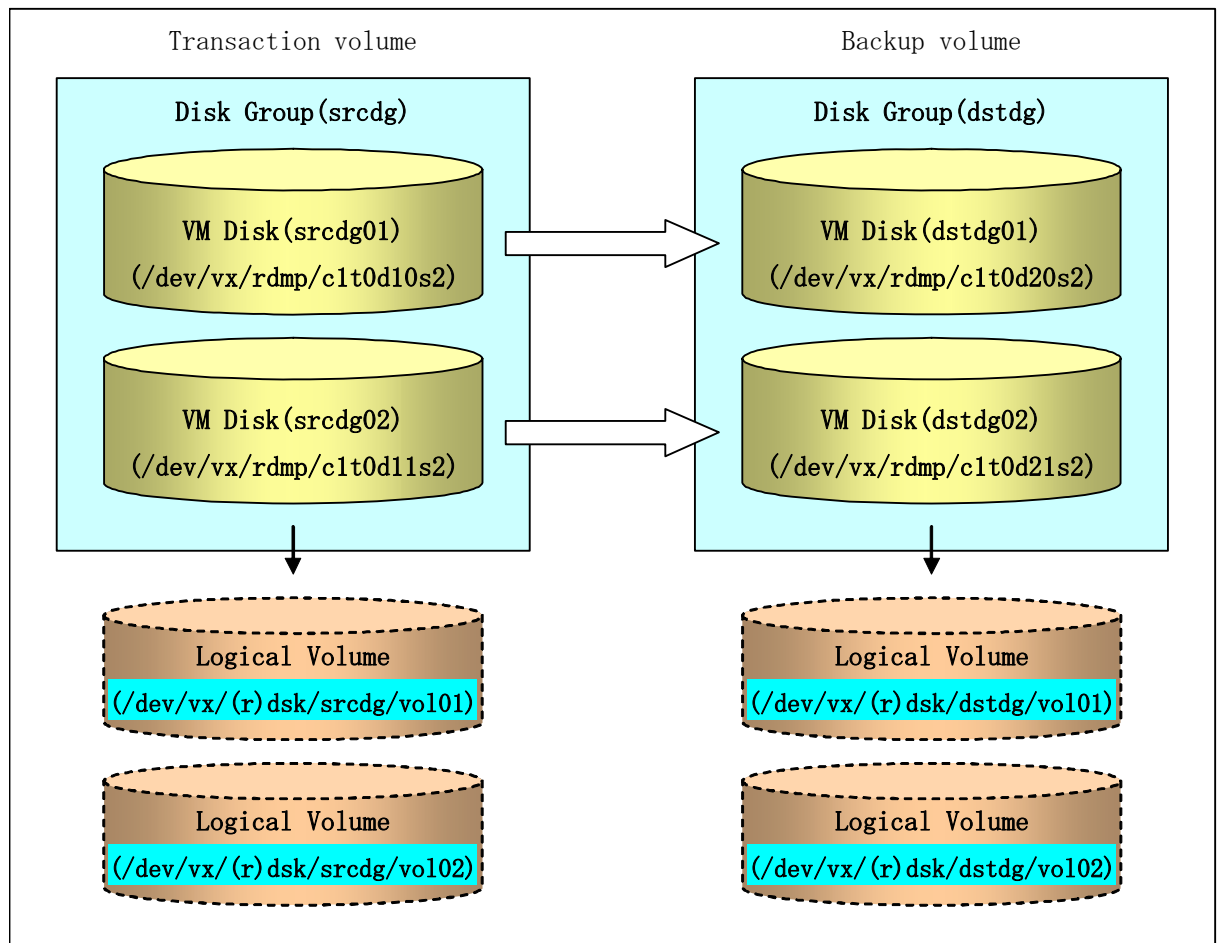
4.9.2.2 Preparations

4.9.2.2.1 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>
```

4.9.2.2.2 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/c1t0d10s2
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/vx/dmp/c1t0d11s2
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d20s2
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d21s2
swstdevinfoset completed
#
```

4.9.2.2.3 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          Backup volume
/dev/vx/dmp/c1t0d10s2          /dev/vx/dmp/c1t0d20s2
/dev/vx/dmp/c1t0d11s2          /dev/vx/dmp/c1t0d21s2
```

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

4.9.2.3 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

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d10s2 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10s2 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11s2 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11s2 swstbackup completed
#
(Perform postprocessing for the transaction and backup volumes.)
```

Example of synchronous backup

```
(Perform preprocessing for the backup volumes.)
# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/c1t0d10s2 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10s2 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/c1t0d11s2 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11s2 swstsstartsync completed
(State of equivalency upkeep)
(Perform preprocessing for the transaction volumes.)
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d10s2
/dev/vx/dmp/c1t0d10s2 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11s2
/dev/vx/dmp/c1t0d11s2 swstbackup completed
#
(Perform postprocessing for the transaction and backup volumes.)
```

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

Table: Pre-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. 3. Import the disk group, when the disk group is not imported.	1. If file systems are included, mount the volumes that were unmounted during preprocessing.
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 c1t0d20s2 ...
Installing volume manager disk header for c1t0d21s2 ...
-
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.

> **Note**
>
> 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.

> **Note**
>
> 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.

4.9.2.4 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

```
(Perform preprocessing for the transaction and backup volumes.)
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/c1t0d10s2
/dev/vx/dmp/c1t0d10s2 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/c1t0d11s2
/dev/vx/dmp/c1t0d11s2 swstrestore completed
#
(Perform post-processing for the transaction and backup volumes.)
```

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

Table: Pre-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 c1t0d10s2 ...
Installing volume manager disk header for c1t0d11s2 ...
-
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 icon]

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.

Note

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.

Note

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 Operations (Symfoware)

The Backup Operations (Symfoware) is not been supported in a Solaris operating environment.

Chapter 6　Backup Process That Uses the Suspend/Resume Function

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

6.1 Overview

The Suspend/Resume function sets Suspend/Resume for the equivalency maintain status by EC. Using this function for differential copying from the Suspend state enables higher-speed synchronous backup operation.

AdvancedCopy Manager provides two backup functions:

Snapshot high-speed backup

Synchronous high-speed backup.

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

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

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

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

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

	Ordinary synchronous high-speed backup	Synchronous high-speed backup with -suspend specified

Transaction volume | Backup volume | Backup volume

Synchronous processing starts — Fullcopy — Fullcopy

Fullcopy — Fullcopy

Equivalent — Equivalent

Backup executed — Disconnect — Suspended

Transaction data updated — Disconnect — Suspended

Synchronous processing starts — Fullcopy — Differential copy

Fullcopy — Equivalent

Fullcopy

Fullcopy

Equivalent

Copy time reduced
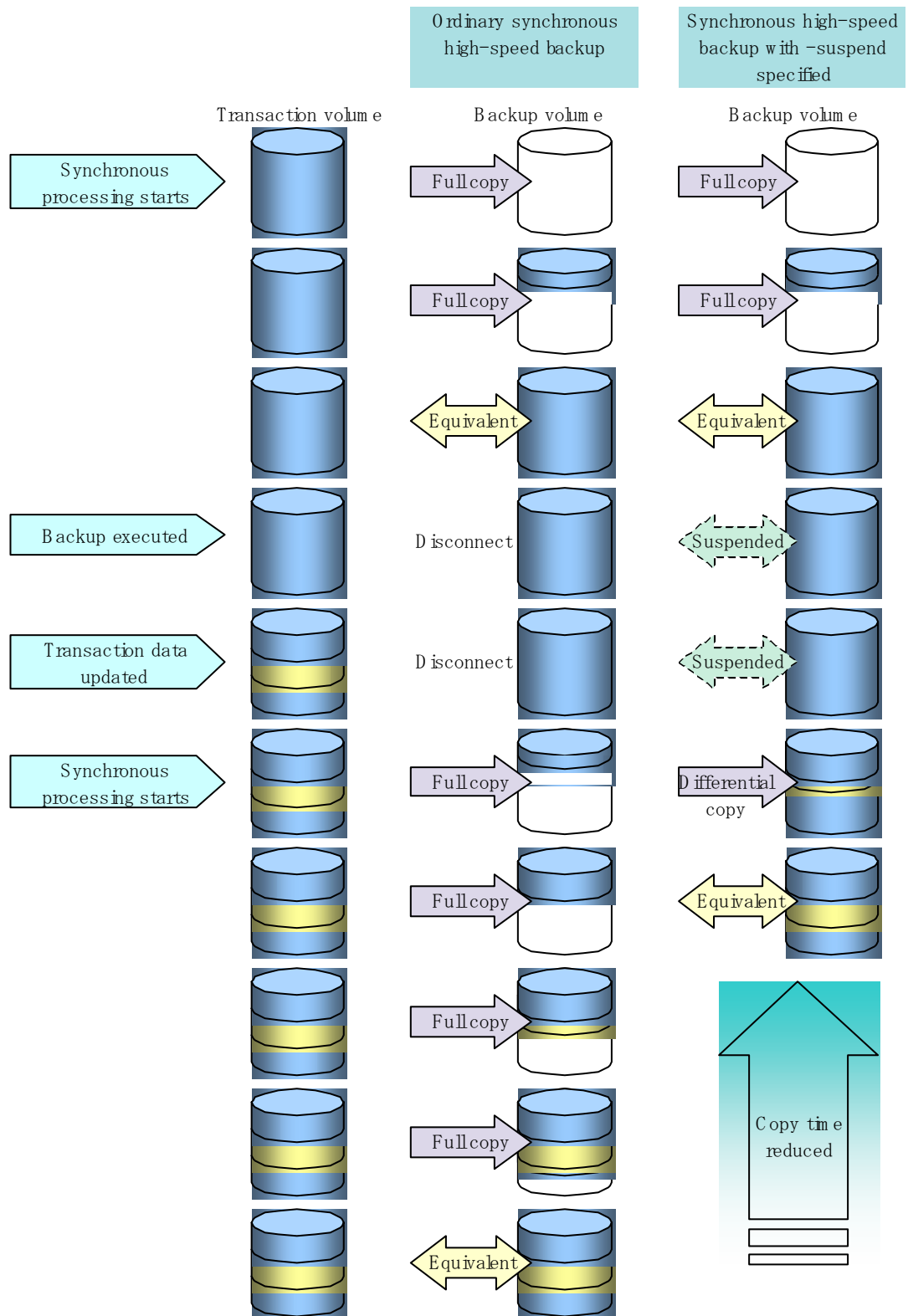
6.2 Backup Operation Configuration

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

Transaction volume

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

Backup volume

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

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

Point

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

6.3 Flow of Operations

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

Figure: Flow of backup operations using Suspend/Resume function

Setting up the AdvancedCopy Manager environment
Setting storage server configuration information
Setting device information
Setting a backup policy
Preparing a device map file
Backup operations
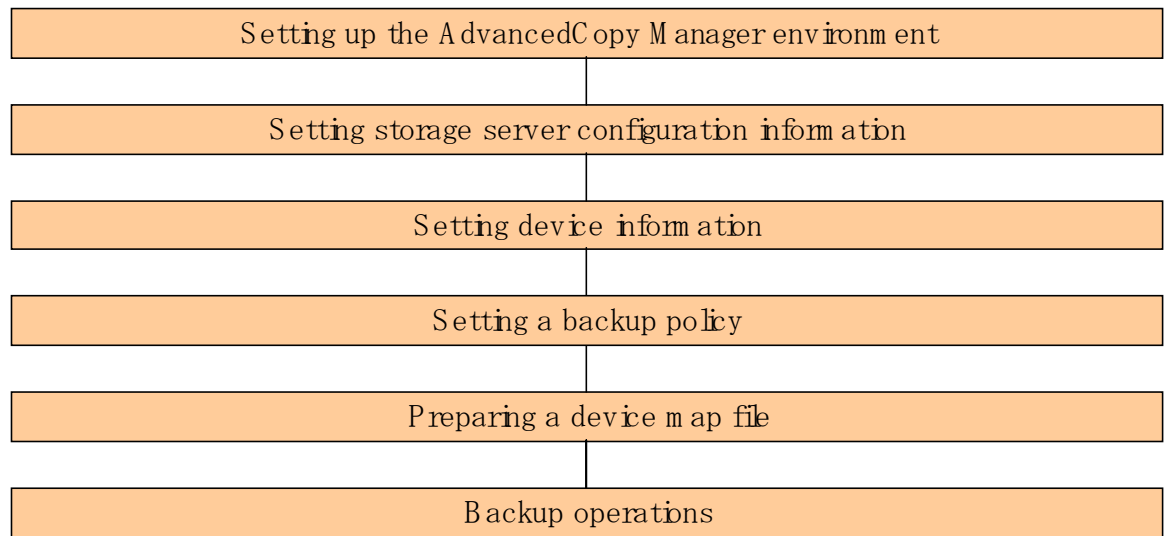
6.4 Preparations

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

6.4.1 Configuring the AdvancedCopy Manager environment

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

6.4.2 Configuring storage server configuration information

Set the configuration information on the storage server processing the backup operations.

To set the storage server configuration information, execute the storage server configuration information setting command (swstsvrset). To refer to the storage server configuration information that has been set, execute the storage server configuration information display command (swstsvrdisp). Alternatively, this information can be set in the Server Information Setting window from a Web browser interface when used.

6.4.3 Configuring device information

Register a transaction volume as the backup source and a backup volume as the backup destination.
To register a transaction volume and/or a backup volume, execute the device information setting command (swstdevinfoset), or use the device information setting window from a Web browser.
To obtain registered volume information, execute the device usage status display command (swstdevdisp).
Alternatively, transaction volume information can be obtained from the Transaction Volume List view of a Web browser interface when used. Backup volume information can be referred to from the Backup Volume List view of the Web browser.

— Neither a suspended transaction volume nor a suspended backup volume can be changed to be used as a device with a different purpose.

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

6.4.4 Configuring a backup policy

Before a backup policy can be configured, as many usable backup volumes as necessary for backup according to the specified backup policy must be registered.
To configure a backup policy, execute the backup policy configuration command (swstbkpolset) at the command line , or use the Backup Policy Setting window from the Web browser.
To examine a backup policy that has been configured, execute the backup policy display command (swstbkpoldisp) at the command line, or use the Transaction Volume List view of the Web browser.
To delete a backup policy, execute the backup policy deletion command (swstbkpoldel) at the command line, or use the Backup Policy Deletion window from the Web browser.

6.4.5 Preparing a device map file

During backup operations, AdvancedCopy Manager automatically selects a device that has the same capacity as the transaction volume from amongst a group of devices registered as backup volumes, and uses the selected device as the backup destination.

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

To monitor backup destination devices for convenient operation, create a "device map file" that maps transaction volumes to backup volumes in advance. Specifying this file at the start of the synchronous processing or during the backup process enables backup using the specified backup destination.

Point

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

6.5 Backup Operations

For synchronous high-speed backup using the Suspend/Resume function, execute the backup execution command (swstbackup) at the command line with "-suspend" specified after the synchronous processing has started and the equivalency maintain status has been set.
Then suspend the synchronous processing.

When history information is deleted because the number of generations has been exceeded or by the history information deletion command, the backup volume enters the Suspend state without history information. If new synchronous processing starts at this time, the suspended backup volume without history information will be selected first and differential copying will start.

Since only data that has been updated since the Suspend state was last set is copied, the equivalency maintain status can be reached quickly.

Note that synchronous high-speed backup that uses the Suspend/Resume function can also be operated from Web screens. Refer to the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for details of Web screens.

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

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

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

TD
Number of preservation generations = 1

Suspended
EC session

No EC session

BD1 — With history information
In use

BD2
Empty

(5) Synchronous processing started

TD
Number of preservation generations = 1

Suspended
EC session

Full copy
EC session

BD1 — With history information
In use

BD2
In use

(6) Equivalency maintain status

TD
Number of preservation generations = 1

Suspended
EC session

Equivalent
EC session

BD1 — With history information
In use

BD2
In use

(7) Backing up with the suspend specification

TD
Number of preservation generations = 1

Suspended
EC session

Suspended
EC session

BD1
Usable

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

BD2 — With history information
In use

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

(8) Transaction volume data updated

TD — Data updated
Number of preservation generations = 1

Suspended
EC session

Suspended
EC session

BD1
Usable

BD2 — With history information
In use
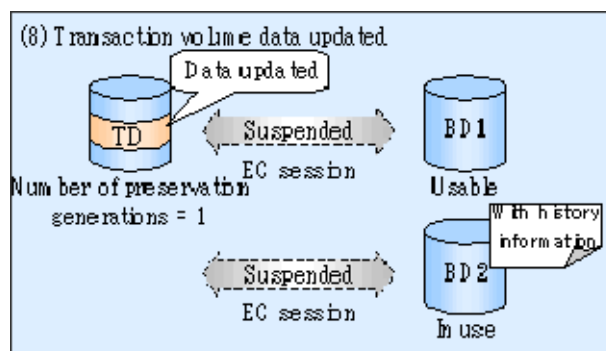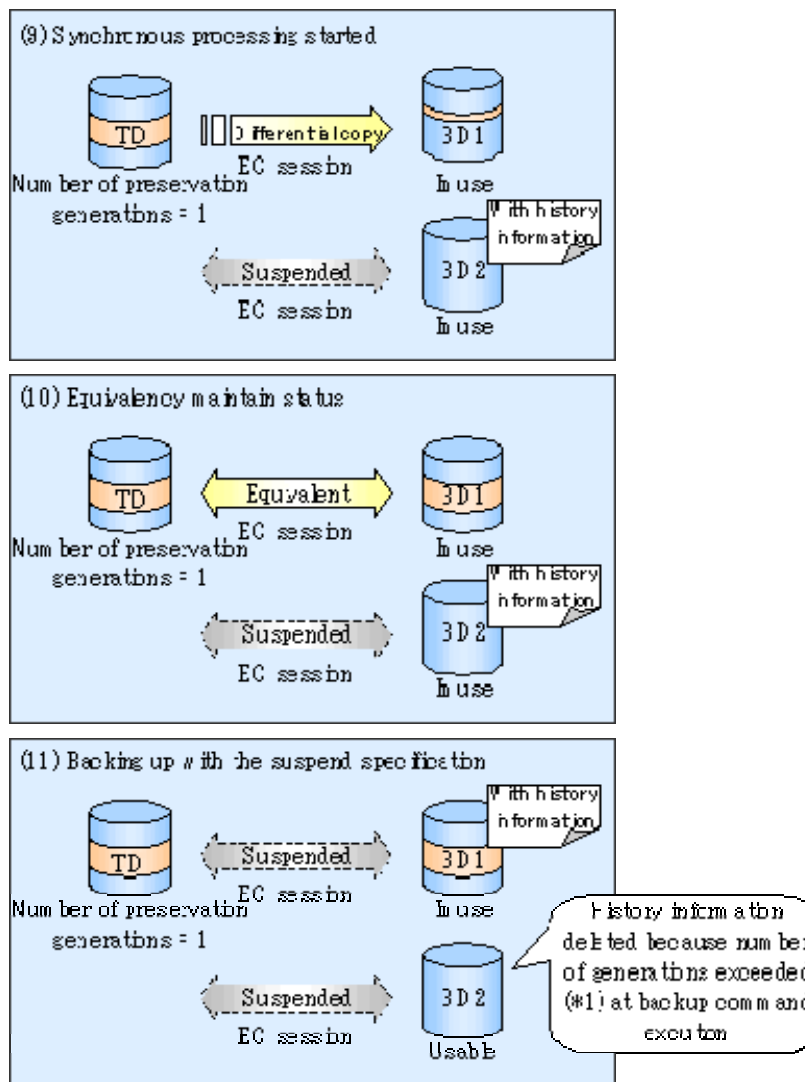
6.5.1 Starting synchronous processing

For synchronous high-speed backup, execute the synchronous processing start command (swststartsync), and start the synchronous processing.

If there is a suspended backup volume at the start of the synchronous processing, then the following devices are selected with priority, and EC resumes (differential copying starts).

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

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

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

Figure: Backup volume selection at the start of synchronous processing

---
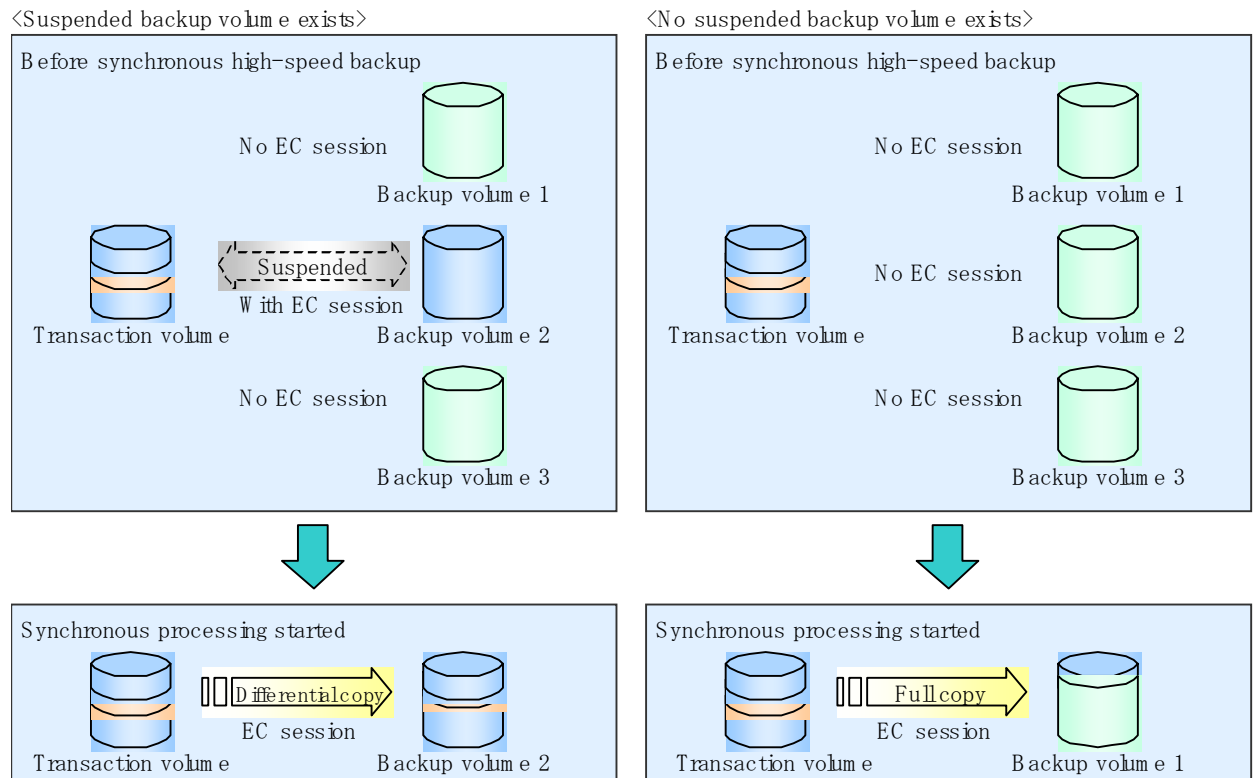
Note

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

6.5.2 Backing up

For synchronous high-speed backup using the Suspend/Resume function, start synchronous processing.

When the copy statuses of the transaction volume and backup volume reach the equivalency maintain status, execute the backup execution command (swstbackup), with "-suspend" specified at the command line.

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

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

Figure: Ordinary backup operations and backup operations with the suspend
specification
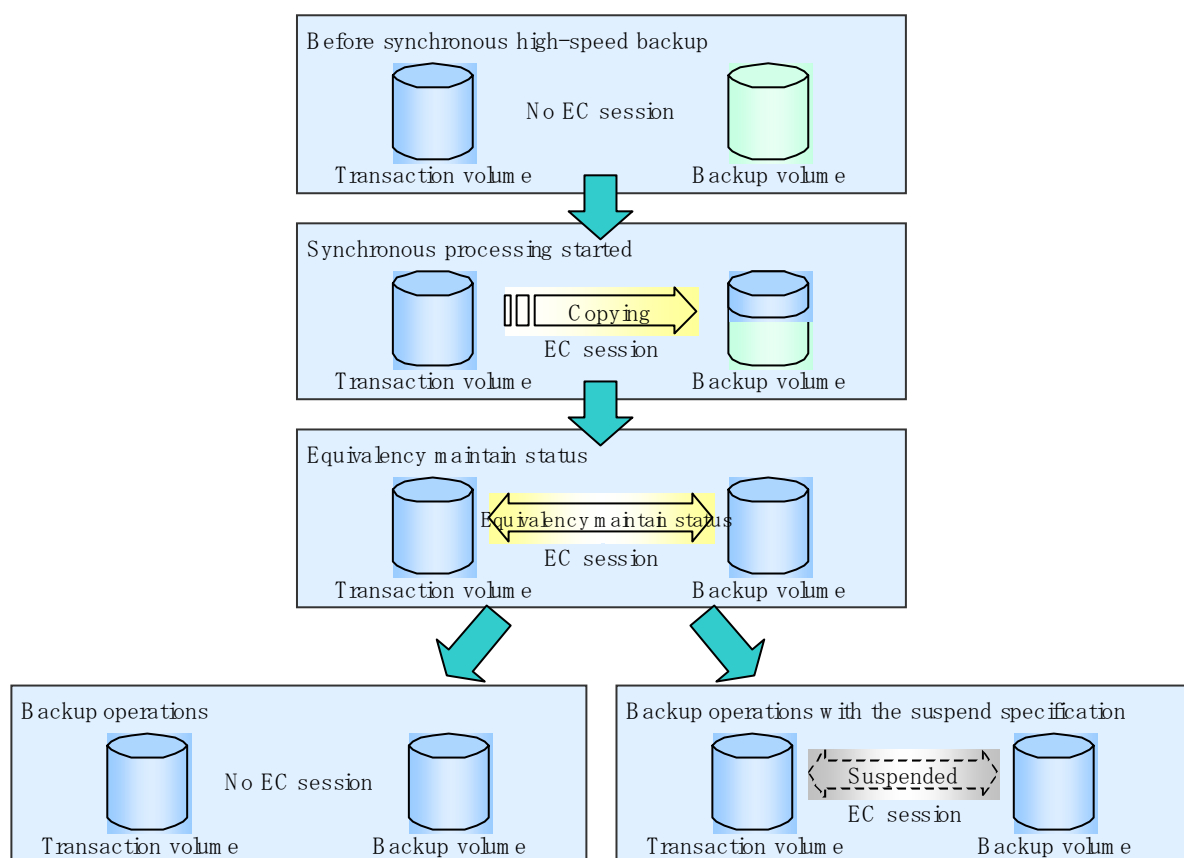
6.5.3 Displaying the synchronous processing execution status

To check the status of synchronous high-speed backup that uses the Suspend/Resume function,
execute the synchronous processing progress display command (swstsyncstat) at the command
line.
If one transaction volume has multiple EC sessions, then this command displays the status
of all EC sessions.
The statuses displayed for synchronous processing are explained below.
- executing: synchronous processing in progress (copying in progress)
- equivalent: equivalency maintain status
- suspend: suspended processing
The command displays the synchronous processing execution status as shown below.

Figure: Ordinary backup operations and backup operations with the suspend
specification
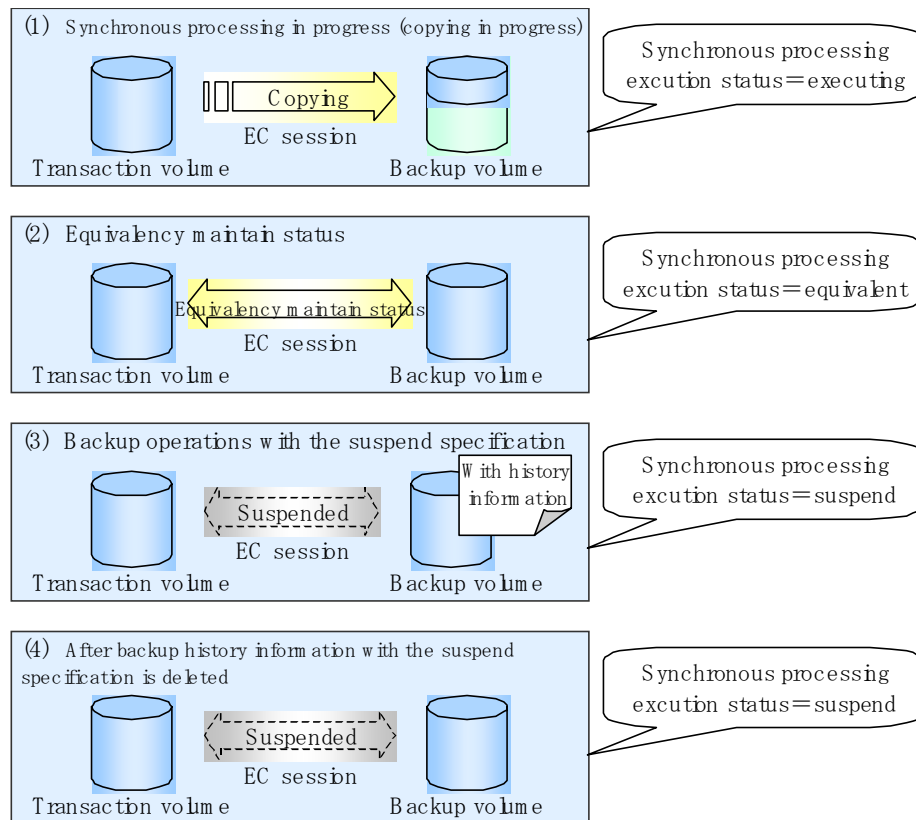
6.5.4 Canceling synchronous processing

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

● executing: synchronous processing in progress (copying in progress)
● equivalent: equivalency maintain status
● suspend: suspended processing

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

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

If one transaction volume has multiple synchronous processing EC sessions, then only the EC sessions specifically related to the backup volume can be cancelled. All of the synchronous processing of the transaction volume can be cancelled by specifying the synchronous processing.

— Specifying both backup volume and all synchronous processing together is not possible.

Point

— Cancelling the suspended synchronous processing that has history information does not delete the history information.

— Cancelling the synchronous processing (during copying, in the equivalency maintain status, or in the Suspend state) that does not have any history information sets the backup volume to the unused state. Cancelling the synchronous processing (in the Suspend state) that has history information leaves the backup volume in the used state.

Operations when the synchronous processing is cancelled are shown below.

Figure: Operations in synchronous processing cancellation

〈Case of the backup volume being cleared because copy processing is cancelled〉

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

Copying
EC session
Transaction volume   In use   Backup volume

↓

(1)´ After synchronous processing cancellation

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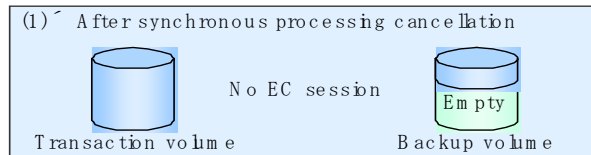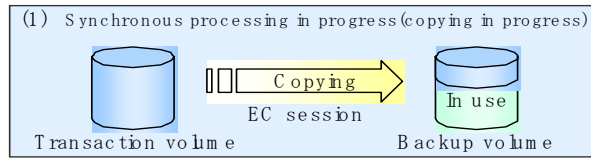
〈Case of the backup volume being cleared because of cancellation under the equivalency maintain status〉

(2) Equivalency maintain status

Equivalency maintain status
EC session
Transaction volume   In use   Backup volume

↓

(2)´ After synchronous processing cancellation

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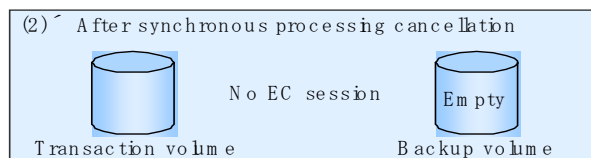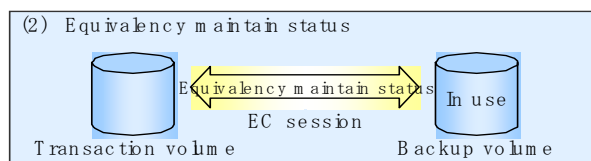
〈Case of the backup volume remaining in use after cancellation in the Suspend state〉

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

Suspended
EC session
Transaction volume   In use   With history information   Backup volume

↓

(3)´ After synchronous processing cancellation

No EC session
Transaction volume   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

Suspended
EC session
Transaction volume   In use   Backup volume

↓

(4)´ After synchronous processing cancellation

No EC session
Transaction volume   Empty   Backup volume

6.5.5 History data management

To obtain backup history information, execute the history information display command (swsthistdisp)at the command line.
To delete backup history information, execute the history information deletion command (swsthistdel)at the command line.

Point

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

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

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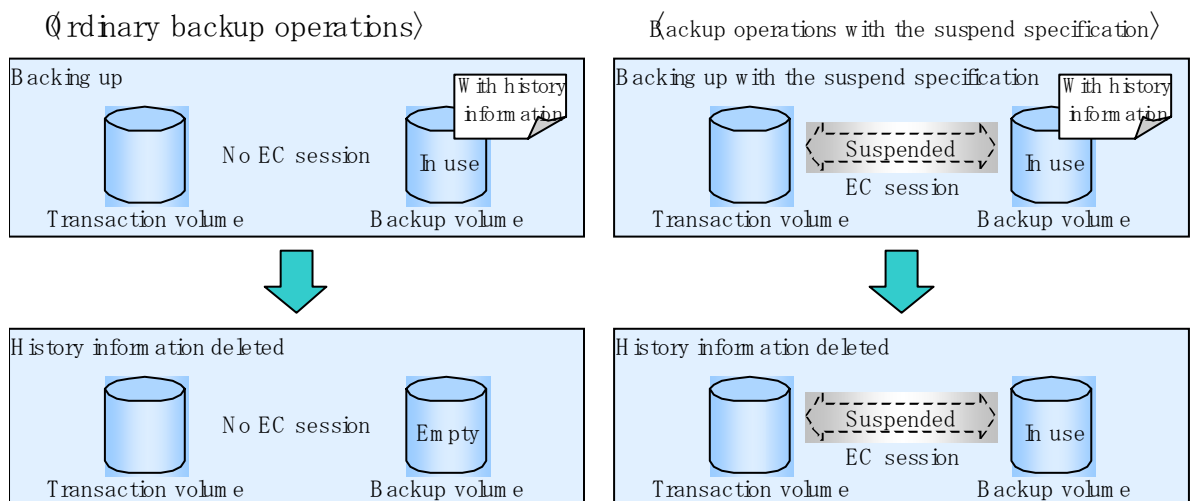
6.5.6 Restoring data

For restoration, execute the restore execution command (swstrestore) at the command line.
To cancel restoration or to delete management information associated with a restoration that ended abnormally, execute the restore cancellation command (swstcancelrest) at the command line.
Before restoration, the synchronous processing cancel command (swstcancelsync) must be executed to release all EC sessions that may be set on the transaction volume. To check for any EC sessions set on the transaction volume, execute the synchronous processing progress display command (swstsyncstat) at the command line.

Note

— If the transaction volume has a backup volume being copied by EC, backup volume under the equivalency maintain status, or suspended backup volume, then restoration is not possible.

— A suspended backup volume cannot be used as the restore destination volume.

Chapter 7 Backup Operation by the QuickOPC Function

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

7.1 Overview

When a snapshot high-speed backup using OPC is performed, the entire transaction volume must be copied to the backup volume every time the backup (OPC) is started.
However, as long as the same pairing of the transaction volume and backup volume is used, the entire transaction volume need not be physically copied every time OPC is started. Instead, a physical copy of only the difference in data from the start of the previous backup is performed creating a complete snapshot image, which can greatly reduce the time taken for physical copying.
The QuickOPC function copies only the data that has been changed from the point of the previous physical copy.
The snapshot high-speed backup using the QuickOPC function is referred to as the differential snapshot high-speed backup.
The conventional snapshot high-speed backup and the differential snapshot high-speed backup are compared below:

Note

To implement the differential snapshot high-speed backup using the QuickOPC function, a disk array that supports the QuickOPC function is required.
The QuickOPC function can be used only for an intra-cabinet copy (OPC), and cannot be used for an inter-cabinet copy (ROPC).
Where SDX objects in units of logical volumes are used, the QuickOPC function cannot be used for backup

Point

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

Figure: Comparison between conventional snapshot high-speed backup and differential snapshot high-speed backup
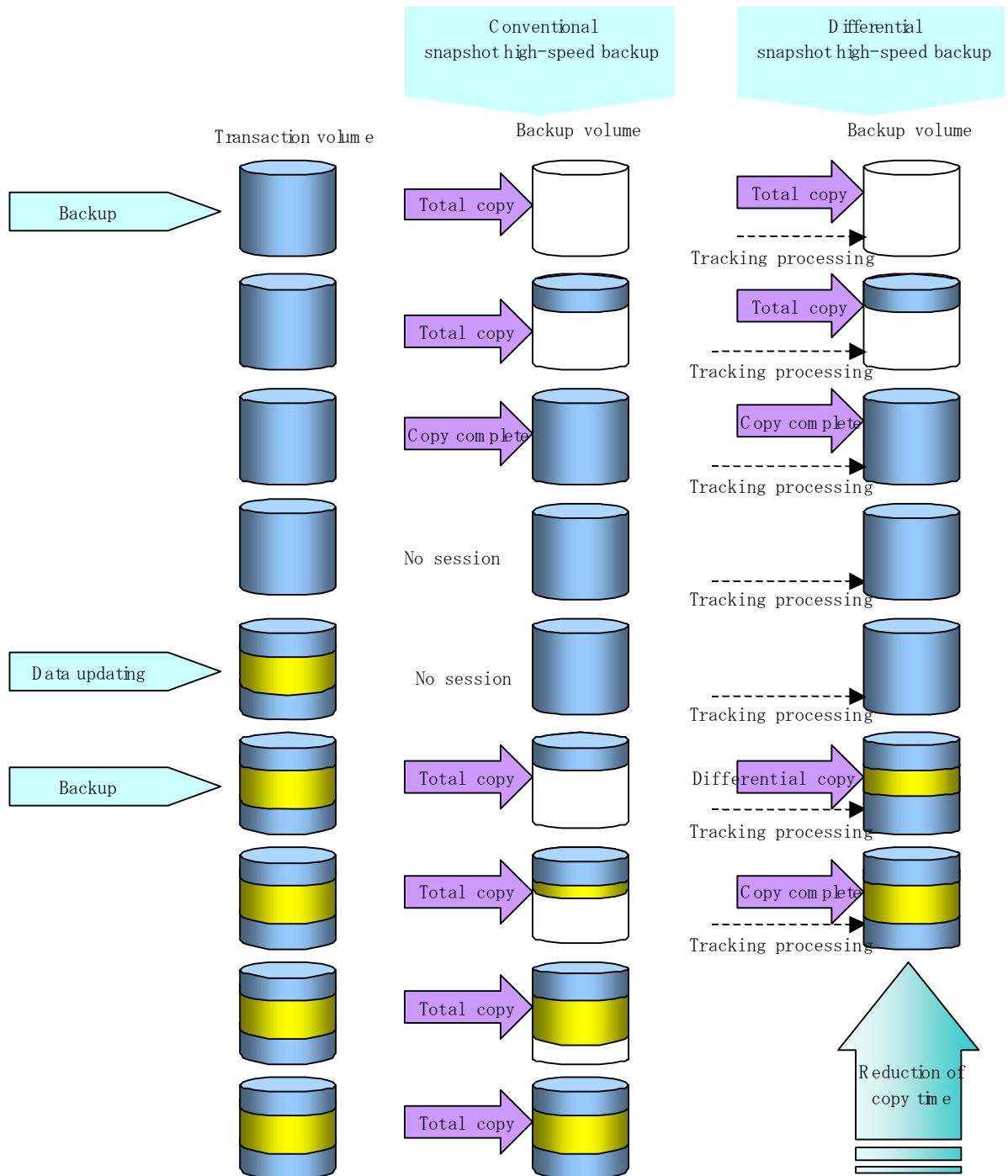
7.2 Configuring Backup Operation

For information about backup management, you should refer to in Operation Setup and Configuration. The following notes should also be considered when configuring a differential snapshot high-speed backup using the QuickOPC function.

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

7.3 Operation Flow

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

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

```
┌─────────────────────────────────────────────────────┐
│    Configure the AdvancedCopy Manager environment    │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│      Setting the environment for Storage server      │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│        Setting the operation type for a device       │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│                 Setting a backup policy              │
└─────────────────────────────────────────────────────┘
                          │
┌─────────────────────────────────────────────────────┐
│               Preparing a device map file            │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│                 Begin backup operation               │
└─────────────────────────────────────────────────────┘
```
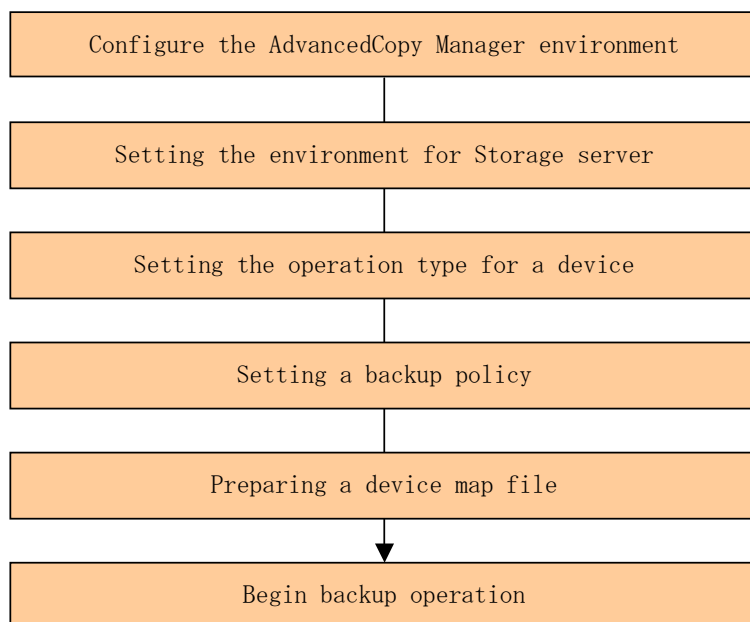
7.4 Preparation

This section describes the preparations for a backup operation using the QuickOPC function.

7.4.1 Configuring the AdvancedCopy Manager environment

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

7.4.2 Configuring the environment for a Storage server

Use the Storage Server configuration information setup command (swstsvrset) to set the Storage Server configuration information. The Storage Server configuration information that has been set can be referenced using the Storage Server configuration information display command (swstsvrdisp) at the command line.

7.4.3 Configuring the operation type for a device

Register the transaction volume and backup volume using the device information setup command (swstdevinfoset) or the device information setup window of a Web client.
Information on the registered volumes can be referenced using the device use status display command (swstdevdisp).
Volumes in the tracking state can be checked using the tracking status display command (swsttrkstat).

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 history data has been deleted, or where they are in the suspend or tracking state.

7.4.4 Configuring a backup policy

When a backup policy is configured, enough usable backup volumes must be registered and available as required to perform the operation in accordance with the specified backup policy.
Set a backup policy using the backup policy setup command (swstbkpolset) or the backup policy setup window on the Web client.
The backup policy that has been set can be referenced using the backup policy display command (swstbkpoldisp) or the transaction volume list window of the Web client.
The backup policy can be deleted using the backup policy deletion command (swstbkpoldel) or the backup policy deletion window on the Web client.

7.4.5 Preparing a device map file

In the AdvancedCopy Manager backup operation, 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 will select a backup volume in the tracking state as a preference to any others and uses it as the backup destination.

When it is necessary to specify the backup destination device, a device map file that defines the relationship between a transaction volume and backup volume must be created in advance.

By specifying the device map file when starting the backup operation, the backup operation can thus be performed as if the backup destination is specified.

Point

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

7.5 Operation

7.5.1 Executing backup

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

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

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

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

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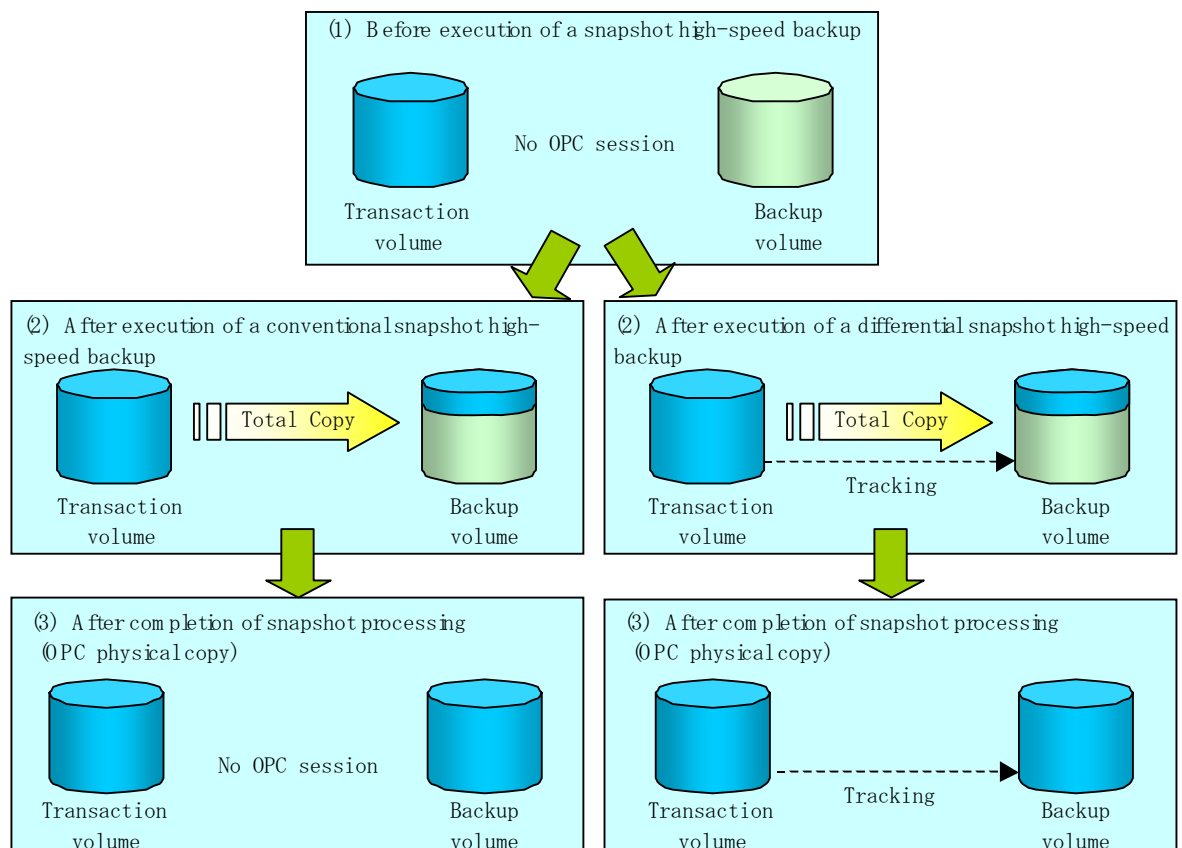
After history information is deleted in a differential snapshot high-speed backup, the backup volume is put in the tracking state without any history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history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

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

Figure: Flow of differential snapshot high-speed backup operation
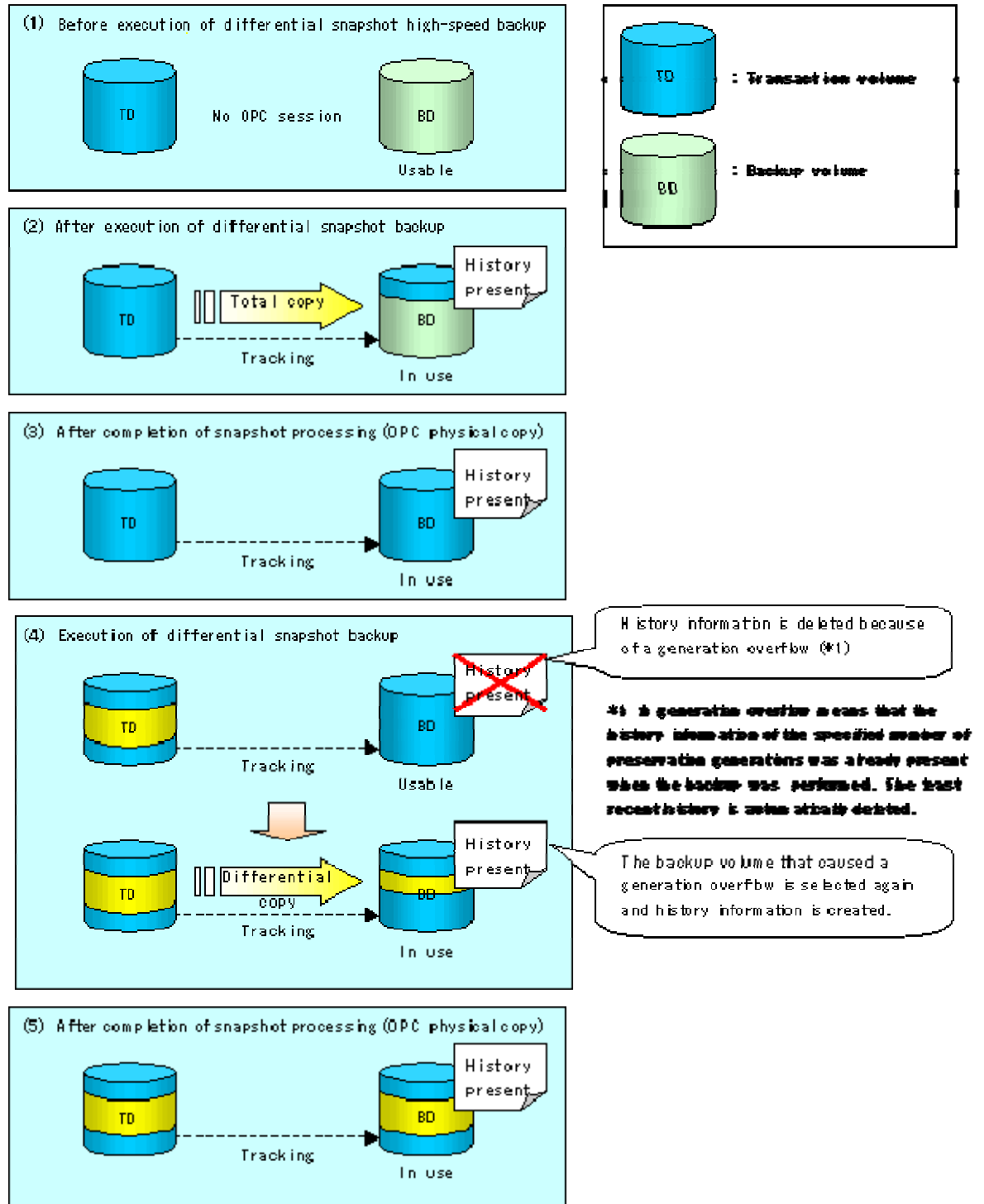
7.5.2 History data management

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

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

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

In the conventional snapshot high-speed backup, after the history information is deleted, the backup volume is released and "Backup (free)" is displayed in the Device-Mode column by the device use status display command (swstdevdisp).

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

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

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

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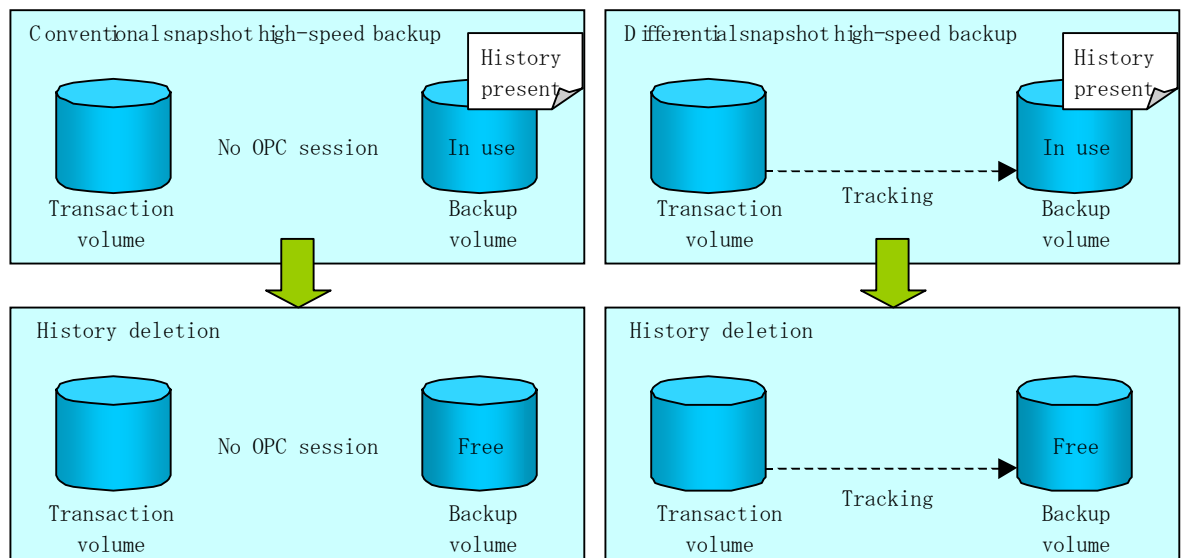
7.5.3 Restoration

Use the restore execution command (swstrestore) for restoration.

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

Figure: Tracking of differential snapshot high-speed backup operations
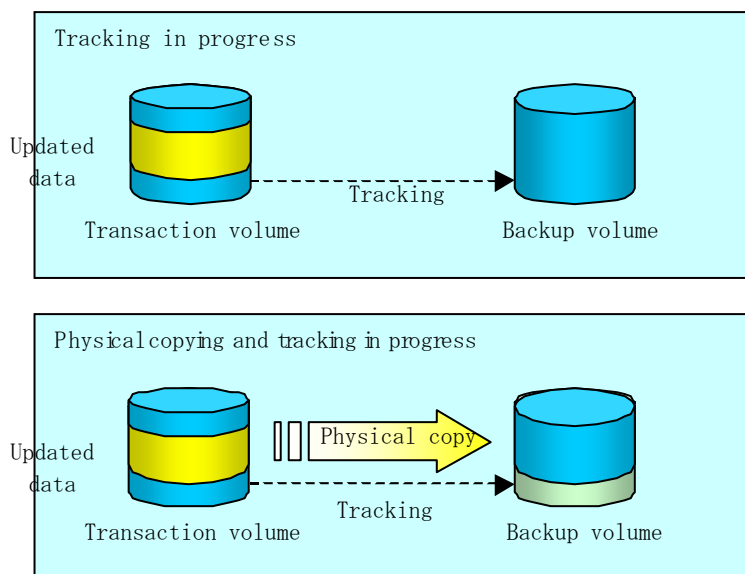
When restoration is executed, ordinary OPC (from the backup volume to the transaction volume) is started while the tracking state from the transaction volume to the backup volume is maintained. Because OPC for restoration physically copies only the data that has been updated after the backup, the time taken for the physical copy, for both the backup and restoration can be reduced.

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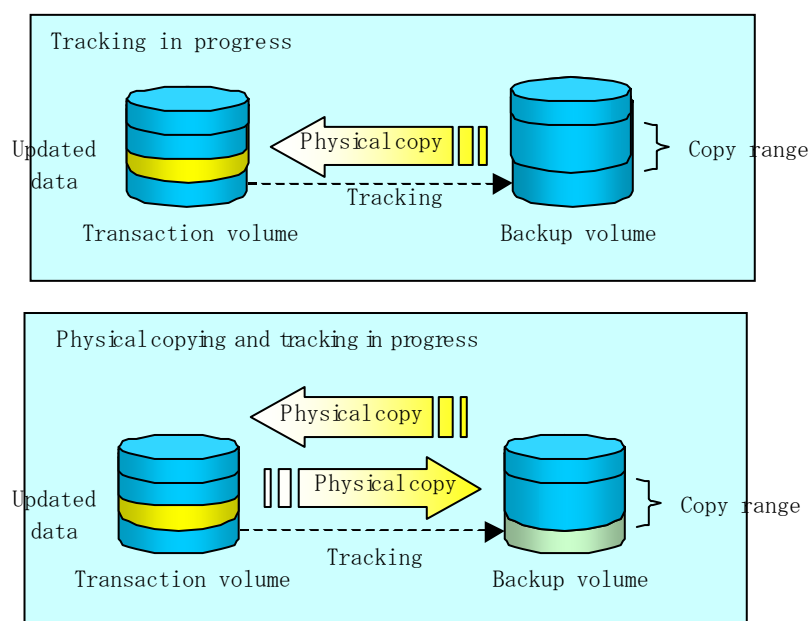
While tracking processing is being performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes needs to be performed, the following operations must be performed in advance:

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

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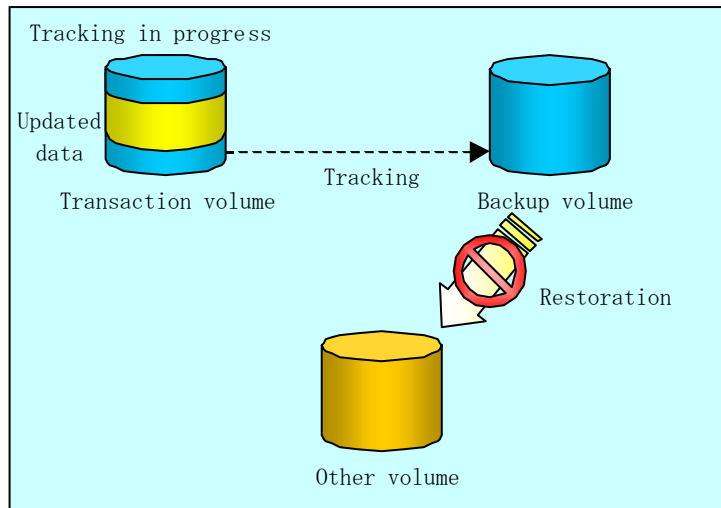
If tracking processing is terminated, all data in the transaction volume is physically copied by the next differential snapshot high-speed backup.

7.5.4 Canceling restoration

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

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

7.5.5 Displaying the execution status of tracking processing

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

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

7.5.6 Stopping tracking processing

Use the tracking cancel command (swstcanceltrk) to stop the tracking process.

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

Chapter 8 Replication

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

8.1 Overview

This chapter explains the AdvancedCopy Manager replication function.

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

Snapshot replication is replication that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of an ETERNUS disk array unit.

Replication that uses the Equivalent Copy (EC) or Remote Equivalent Copy (REC) function is called synchronized replication.

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

8.1.1 Snapshot replication processing

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

The snapshot replication performs the following two types of processing:

1. When a copy is created, the snapshot processing (OPC or ROPC) from the original volume to the replica volume is executed with the replication creation command (swsrpmake). The replication creation command dismounts or mounts the original volume. This process will determine the original data (for details, refer to "Preprocessing and Postprocessing of Replication". ((1) to (4) in the following figure)

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

Figure: Snapshot replication processing

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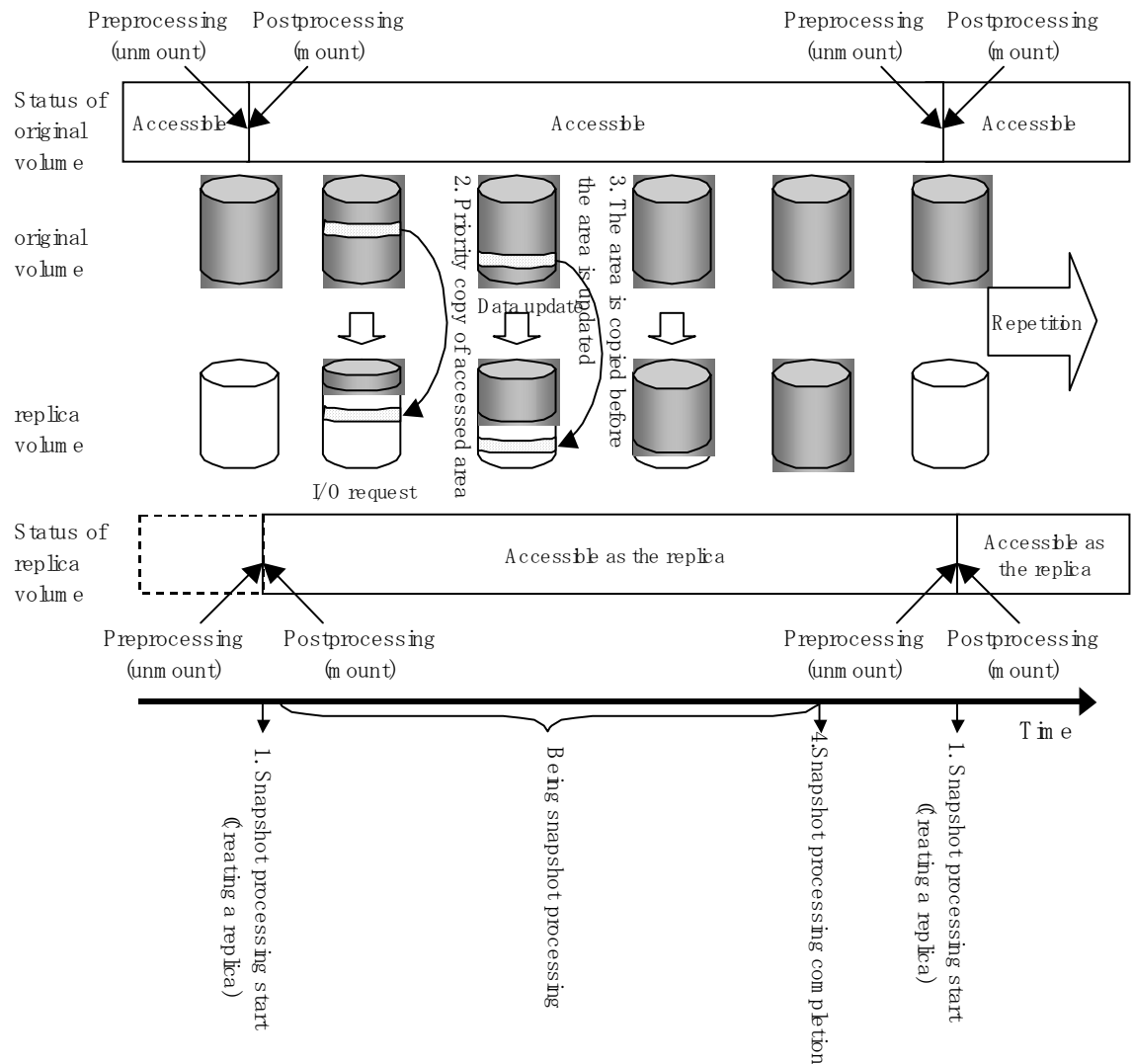
Snapshot replication is completed when the replication creation command is issued. The actual data is internally copied by the OPC or ROPC function of the ETERNUS storage system disk array unit.

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

8.1.1.1 Snapshot replication types

The following types of snapshot replication are available, depending on the AdvancedCopy Manager functions used:
- Ordinary snapshot replication
- QuickOPC replication
- SnapOPC replication
- SnapOPC+ replication

Ordinary snapshot replication

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

Figure: Ordinary snapshot replication
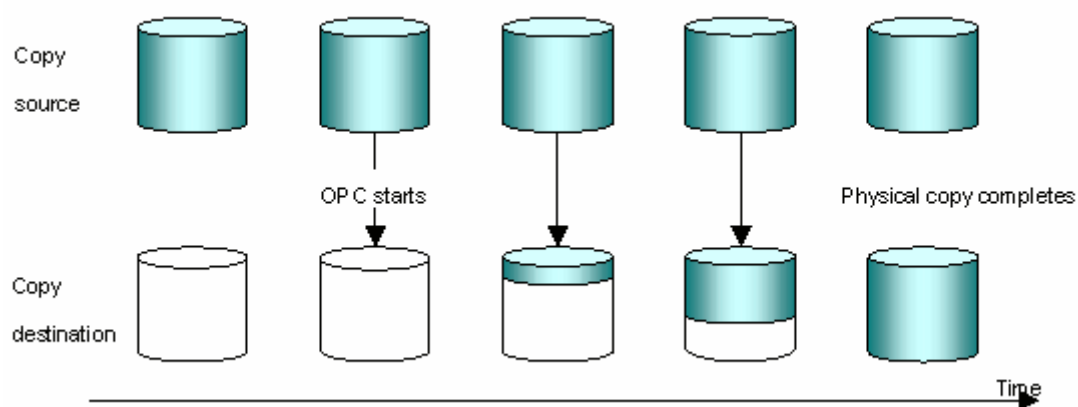
Point

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

QuickOPC type replication

If the ETERNUS disk array supports the QuickOPC function, then QuickOPC replication can be performed.
Initially, all the data at a specific point in time (logical copy) is copied to the copy destination disk area.
Second and subsequent copy operations only copy the data that has been updated since the previous copy operation.

Figure: QuickOPC replication
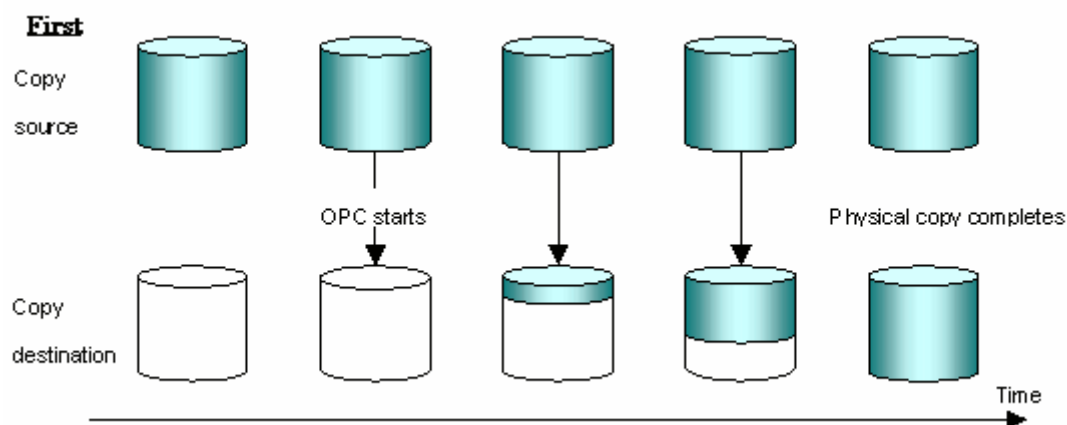
Second and subsequent copies
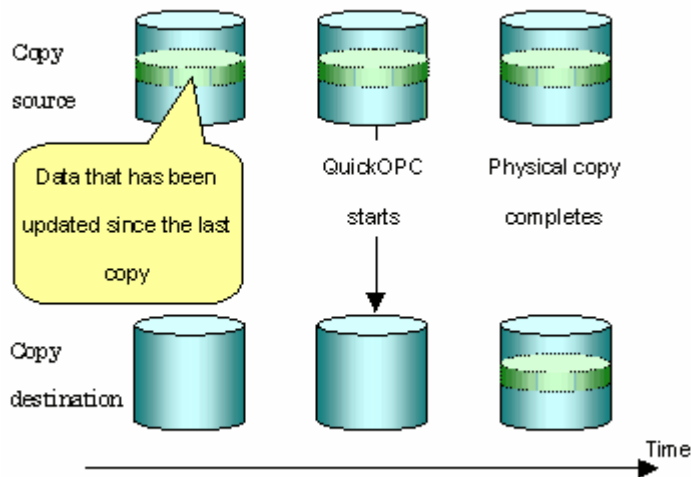
Copy source

Data that has been updated since the last copy

QuickOPC starts

Physical copy completes

Copy destination

Time

Point

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

Note

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

Point

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

SnapOPC type replication

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

Figure: SnapOPC replication
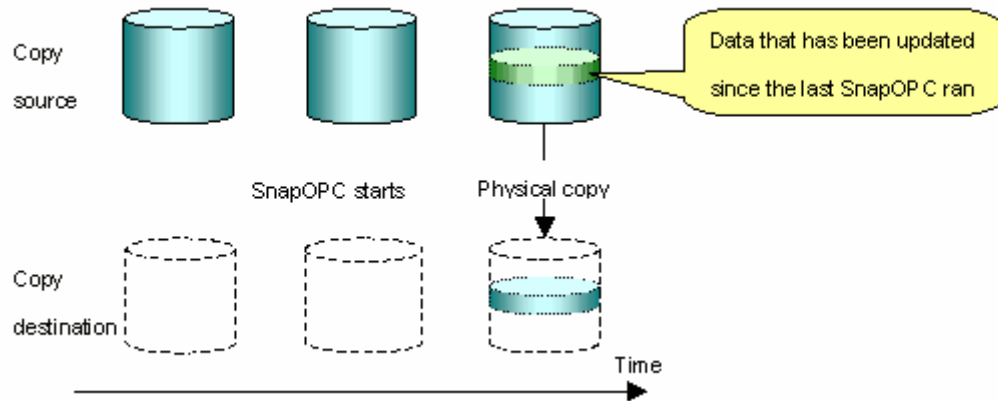
Point

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

Note

SnapOPC can only be used for replication (OPC) within a cabinet, not for inter-cabinet replication (ROPC).
The copy destination disk for SnapOPC is referred to as a Snap Data Disk.

Figure: SnapOPC mechanism
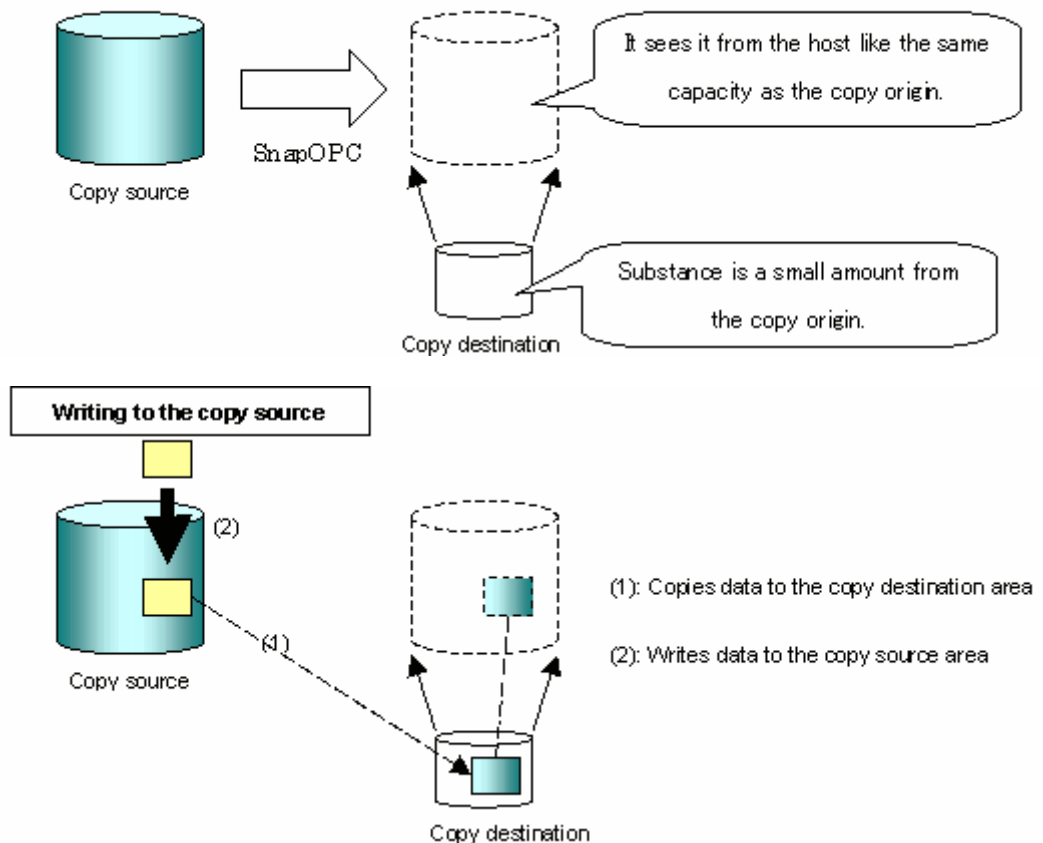
Reading from the copy source

A: Reads to the area that has not been updated

-> Reads from the copy source area

B: Reads to the area that has been updated

-> Reads from the copy destination area

Copy source
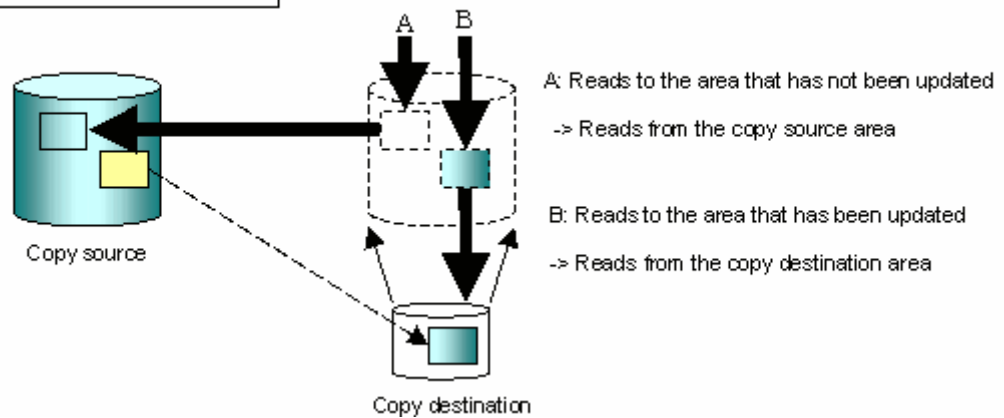
Copy destination

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

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

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

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

SnapOPC+ type replication

When data is 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 flow of SnapOPC+ processing.

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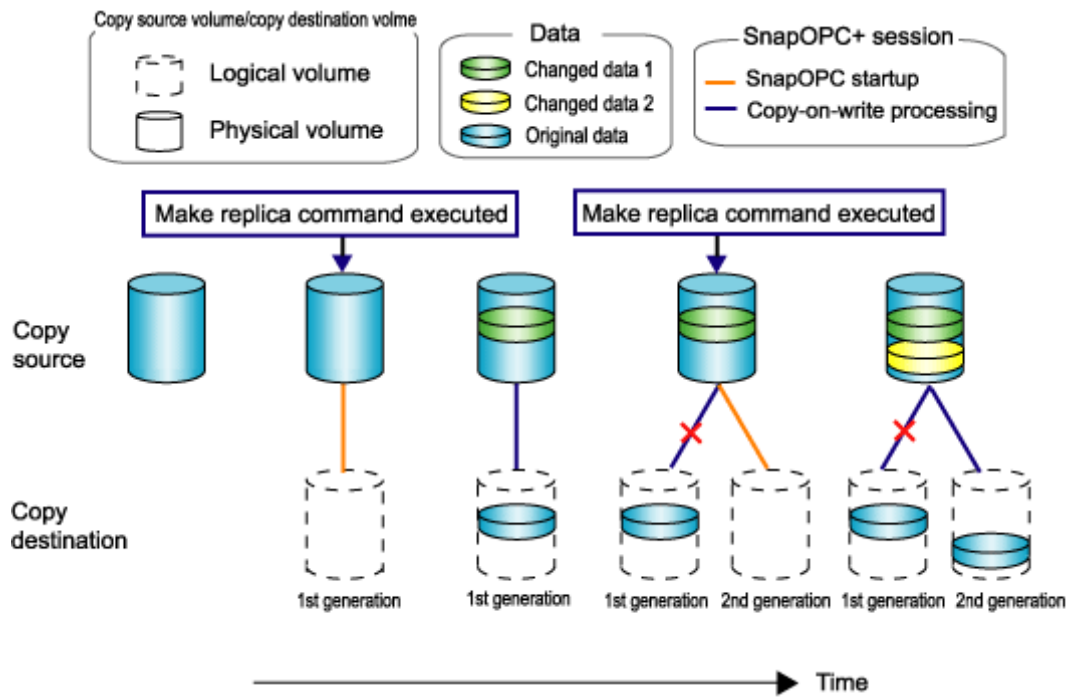
1. Logical copy is performed from the copy source to the copy destination.
2. After the logical copy, a SnapOPC+ session is set between the copy source and the copy destination.
3. After the SnapOPC+ session is set, only the original data of the data updated at the copy source is copied to the copy destination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

Since SnapOPC+ copy-on-write processing is performed only between the copy source volume and the latest copy destination volume, there is no effect on access performance to the copy source volume even when the number of copy destination volumes increases.
In addition, space at the copy destination volume is required only for the amount of 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.
However, the replication function cannot be used to restore data when SnapOPC+ is used. If restoration is required, the data must be copied manually from the copy destination volume.
Snapshot replication that uses SnapOPC+ is called SnapOPC+ replication.

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

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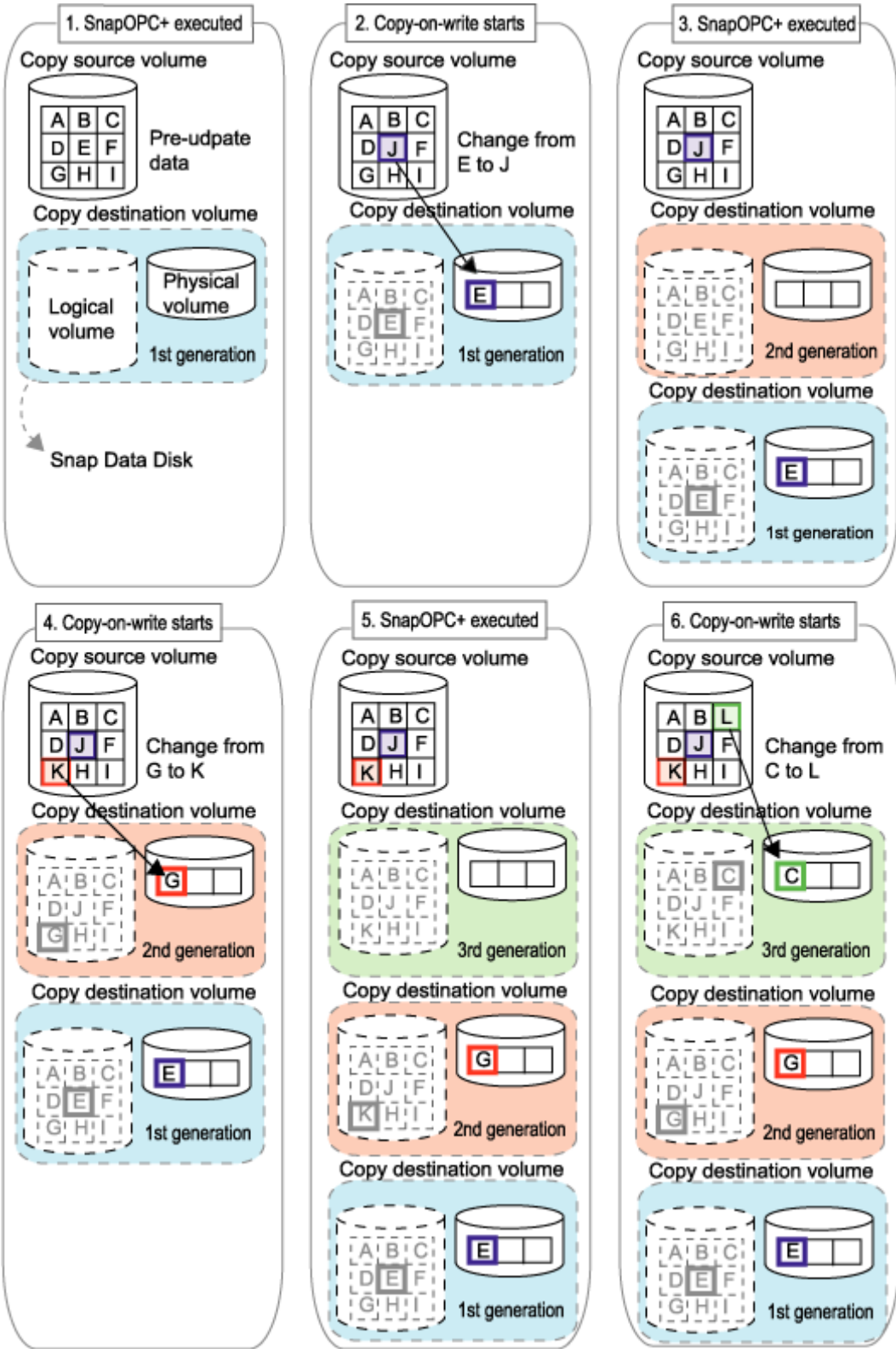
Due to the functionality and features of SnapOPC+, it is assumed that it will be used as a backup to enable recovery from minor errors, such as operator mistakes and software errors. In order to be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying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

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

Table: List of function differences between SnapOPC and SnapOPC+

Function	SnapOPC	SnapOPC+
Copy method	Copy-on-write method	Copy-on-write method
Copy time (logical copy duration)	Instant	Instant
Copy destination volume type	Snap Data Disk	Snap Data Disk
1:N operation	Y	R Access performance to the copy source volume is better than with SnapOPC. Also, compared with SnapOPC, less physical space is required at the copy destination volume.
Snap generation numbers	N	Y
Maximum number of sessions(*)	8	8
Restoration using the replication function	Y	N
Usefullness	● 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

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

Y = Yes

N = No

R = Recommended

8.1.2 Synchronized replication processing

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

Synchronized replication uses two methods to create a copy:

- full copying where all of the original volume is completely copied,
- incremental copying where only modified data from the previous copy is copied.
- Creating replicas with full copying

  Use this method to create the first copy in a replication.
- Creating copies with incremental copying

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

The following steps describe the procedure for a synchronized replication:

1. When synchronized backup using the synchronous processing start command (swsrpstartsync) starts, full copying from the original volume to the replica volume starts. see ((1) in the following figure)

2. When full copying is complete, both the original volume and replica volume enter the equivalence status. From this point on, updates in the original volume are sequentially reflected in the replica volume so that data equivalence is always maintained (equivalency maintenance state). (States in (2) and (3) in the following figure)

3. Synchronized processing is temporarily stopped with the replication creation command (swsrpmake) to create a copy of the original volume. The replication creation command dismounts or mounts the original volume. This process will define the original data image. For details, refer to "Preprocessing and Postprocessing of Replication". After execution of the replication creation command, the replica volume can be accessed (copy established status). (States in (3) and (4) in the following figure)

4. To create another copy, the synchronized processing that has been temporarily stopped is restarted with the synchronous processing start command. For this copy, the only data copied to the replica volume is the (incremental) data on the original volume that has been updated since the previous copy was made until the restart of synchronized processing ((4) in the following figure).
    When the replica volume has been updated after the previous copy is made, the content of the previous update of the replica volume is cleared.
5. When the incremental data has been copied, the status returns to the equivalency maintenance state again. (States in (5) and (6) in the following figure)
6. When this status has been set, the copy is re-created with the replication creation command. ((6) in the following figure)

Figure: Synchronized replication processing
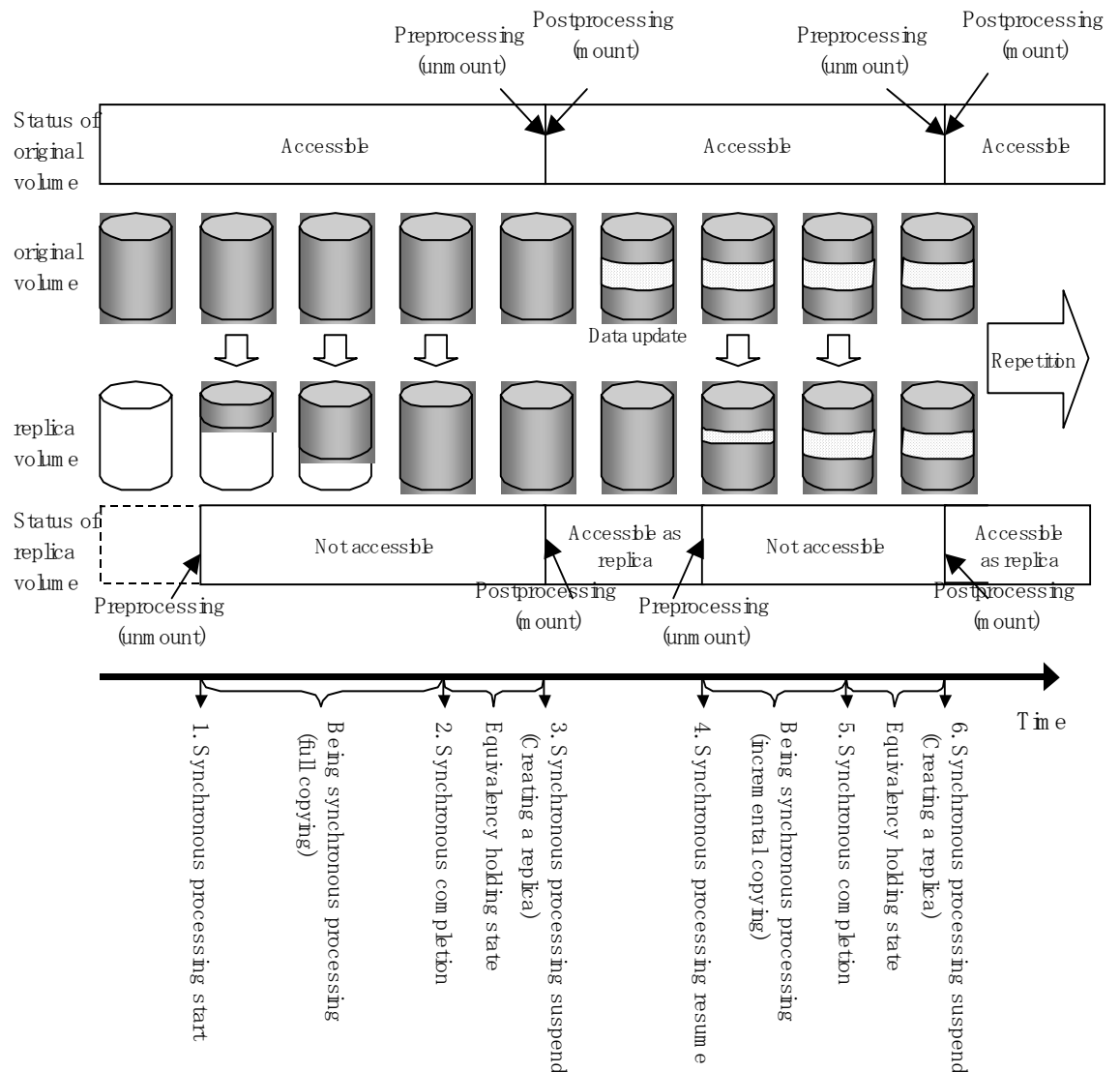
![Note]

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

8.2 Operational Configuration

This chapter explains the operation of AdvancedCopy Manager replication.

Design replication using the following procedures:
- ● Determine the server that performs replication.
- ● Determine the replication target.

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

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

8.2.1 Determining the server that performs replication

Determine the server that performs replication.
The following servers are used to perform replication:
- ● Storage Management Server
  Multiple Storage Servers are logically grouped and managed by a Storage Management Server which can also be used as a Storage Server.
- ● Storage Server
  AdvancedCopy Manager operations are performed on the Storage Server(s).

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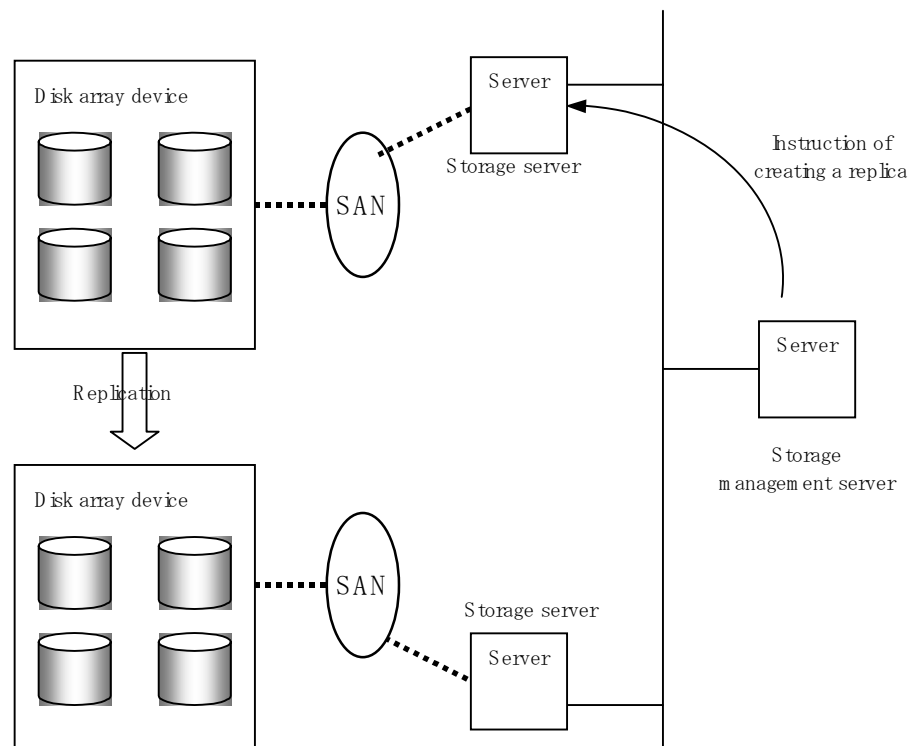
The following requirements apply when box to box replication is performed using the remote copying function (ROPC or REC) of an ETERNUS storage system disk array unit:

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

8.2.2 Determining a replication target

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

- The original source volume is the volume on which original source data to be replicated is stored.
- The replica volume is the volume on which an image of the original source data is created.

Determine the following attributes to be assigned to the original volume and replica volume:

1. Copy direction

   Determine the direction of copying used in replication. Specify one of the following options:
   - bi-direction: Copying is bi-directional between the original source volume and replica volume.
   - uni-direction: Data is copied only from the original source volume to the replica volume. During this operation, copying from the replica to the original volume is be disabled.

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

   In replication between servers, you can specify whether to allow replication to be performed on only the copy source server or copy destination server, or on both servers:
   - "Original server": Sets the Storage Server with the original volume connected as the operational server.
   - "Replica server": Sets the Storage Server with the replica volume connected as the operational server.
   - "Both servers": Sets both the copy source server and copy destination server as operational servers.

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

Figure: Servers used in performing replication

When you operate the replication from original server (The example:contents delivery)

When you operate the replication from replica server (The example:backup server operation)
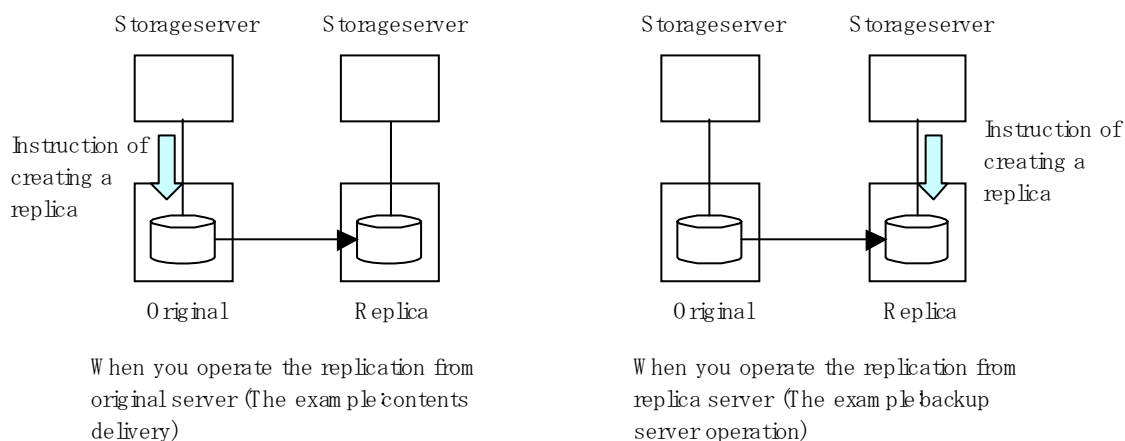
In this manual, a Storage Server used to perform replication is called the operational server.
An original server or replica server can be specified as the operational server.
An operational server can use all of the replication functions.
Any other type of server can use only the information display function and operational release function.

Note

When determining candidates for backup, refer to "General notes" for information on the following points:
― Exclusion from Backup Targets or Replication Targets
― Slice containing VTOC

8.2.2.1 Logical Unit (disk unit) operation

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

The following disk formats are supported for Logical Unit (disk unit) copying:
● EFI labeled disks
● VTOC labeled disks

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

Note

To copy a VTOC labelled disk, the second slice, indicating the entire disk, and the -Xvtoc option must be specified in setting of the original volume and replica volume.

8.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication

8.2.3.1 Session settings

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

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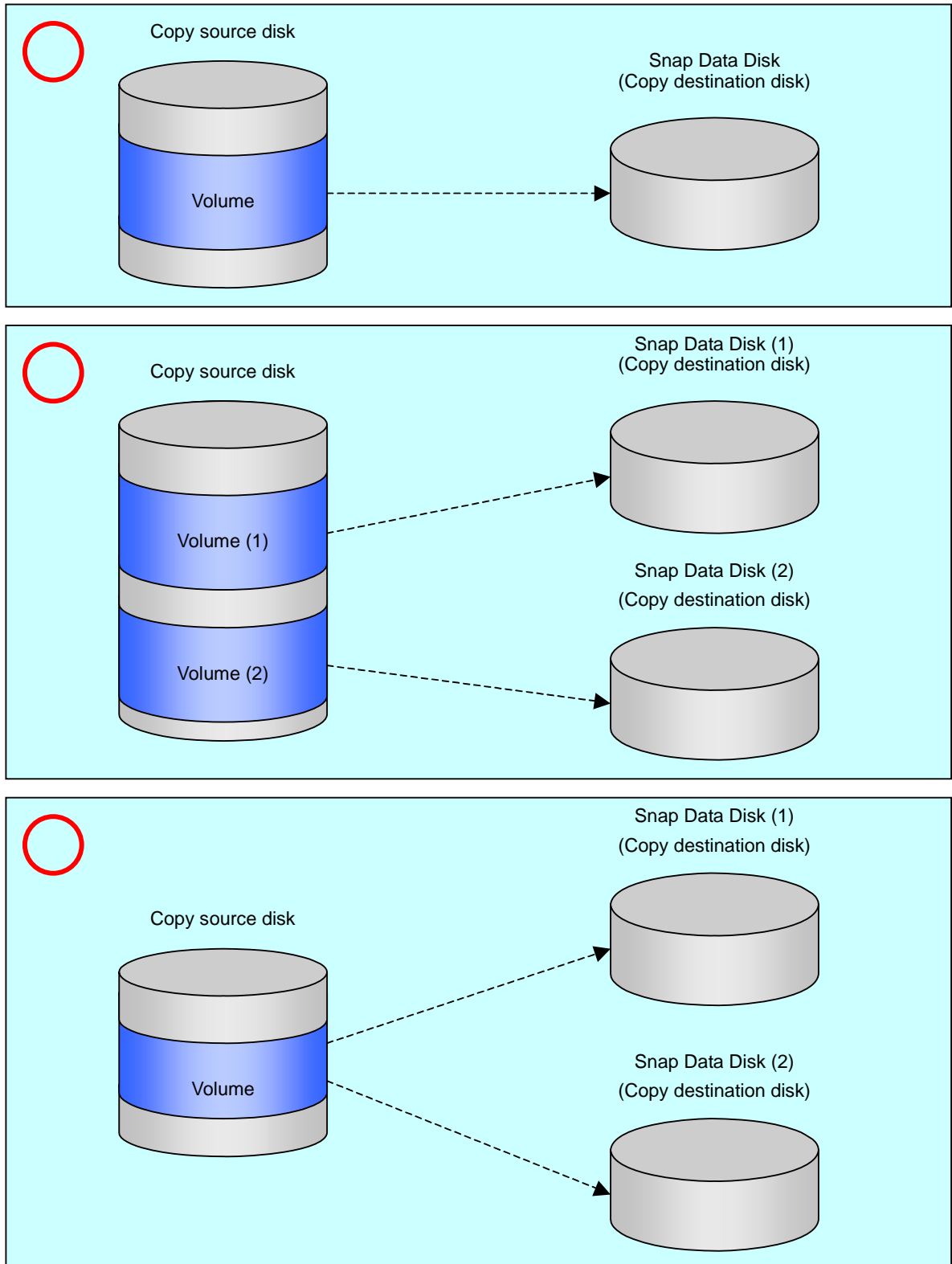
Accordingly, multiple sessions cannot be set up for a single Snap Data Disk, as shown in the following figure:

Figure: If multiple sessions are set for the Snap Data Disk
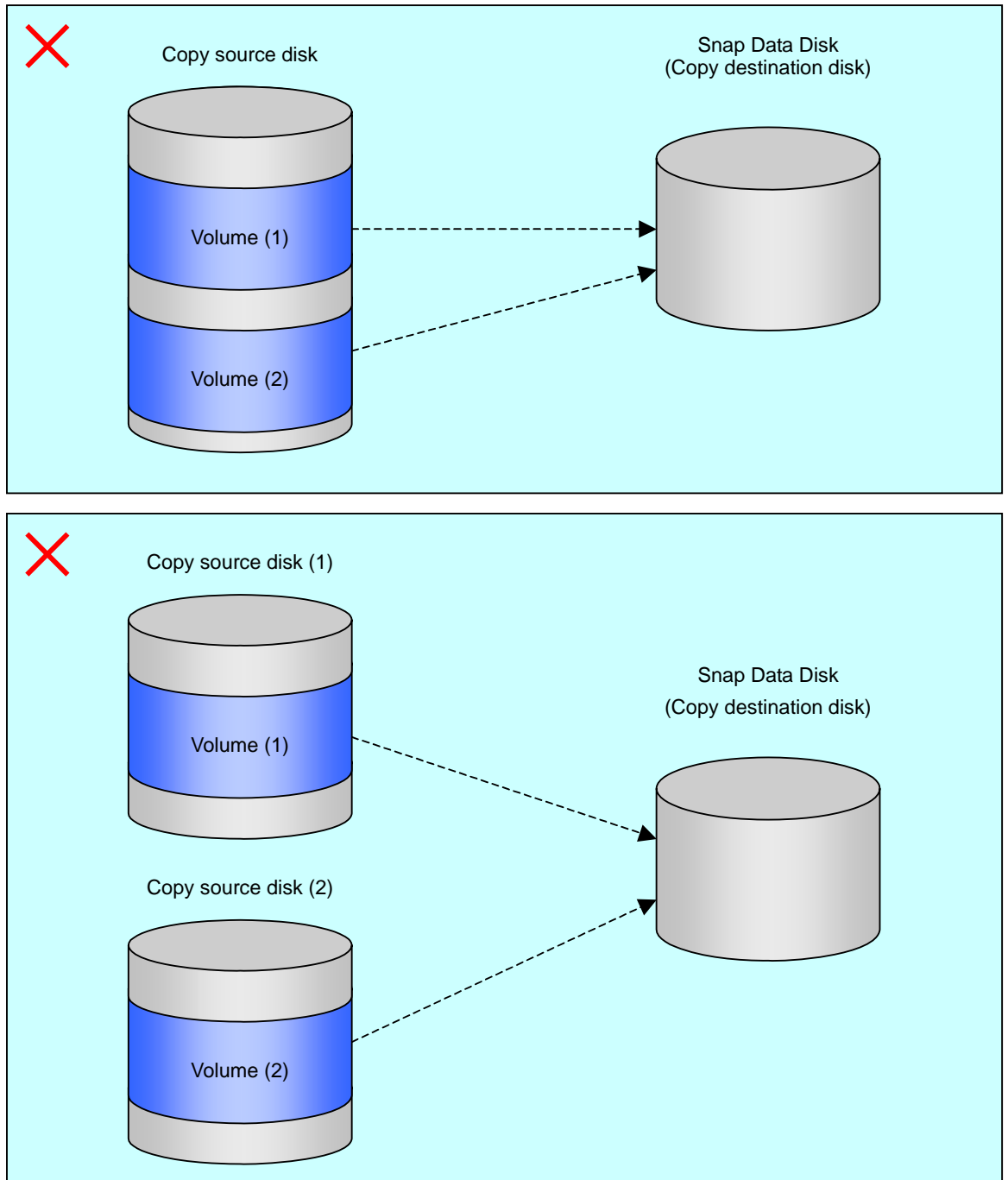
The following additional restrictions apply:
- ● It is not possible to copy from the Snap Data Disk to a disk other than the copy source disk while SnapOPC is running. It is not possible to copy from the Snap Data Disk to a different disk while SnapOPC+ is running.

Figure: If copying from the Snap Data Disk to a disk other than the copy source
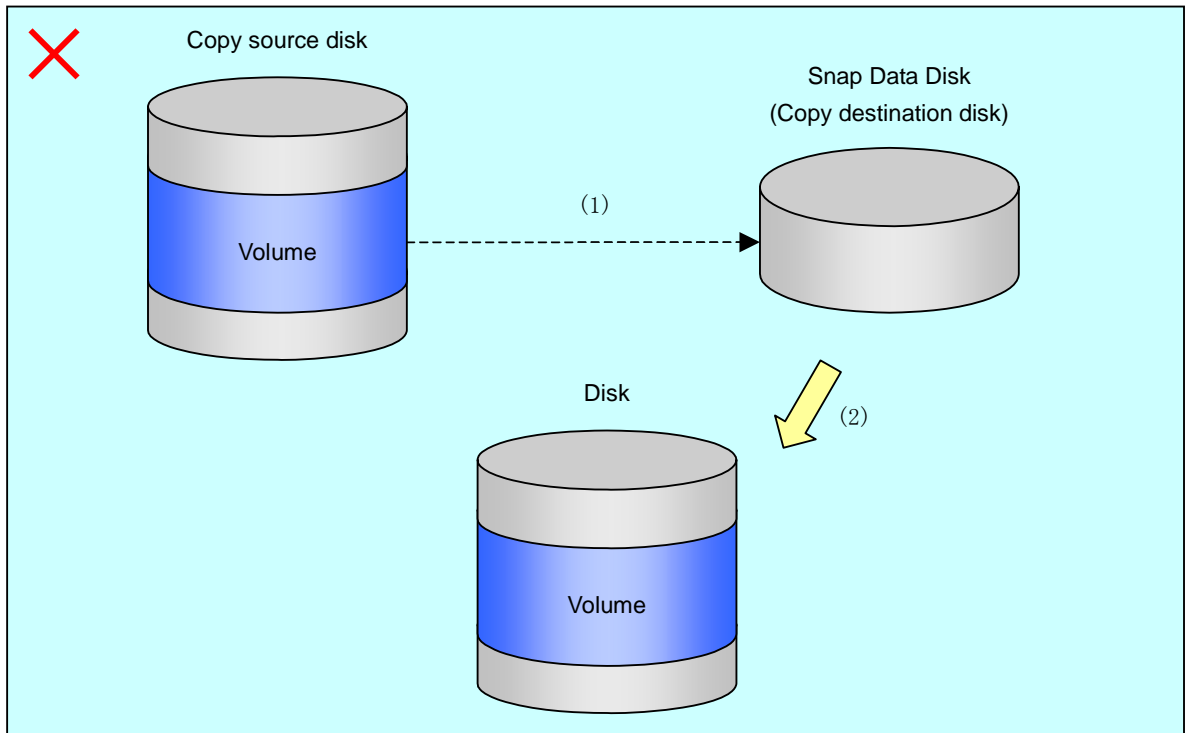
8.2.3.2 Creating a Snap Data Disk

Create a Snap Data Disk by performing the following steps:
1. Calculate the physical capacity for the Snap Data Disk.
2. Define and initialize the Snap Data Disk.
3. Connect to the host.
4. Create slices and file systems.

Calculate the physical capacity for the Snap Data Disk.

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

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

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

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

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

```
# /opt/FJSVswsts/bin/swstestupdate start /dev/dsk/c1t0d0s1
/dev/dsk/c1t0d0s1 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/c1t0d0s1
Volume-Name     Update
/dev/dsk/c1t0d0s1 644333
#
```

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

```
# /opt/FJSVswsts/bin/swstestupdate stop /dev/dsk/c1t0d0s1
/dev/dsk/c1t0d0s1 swstestupdate completed
#
```

Define and initialize the Snap Data Disk.

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

Connect to the host.

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

Create slices and file systems.

Create slices and file systems so that a copy source volume can be created on the Snap Data Disk.

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 Disk.

8.2.3.3 Cluster Operations

Do not use Snap Data Disks as shared disks for cluster systems. This is to avoid the danger of the cluster system failing when the physical capacity of the Snap Data Disk is exceeded. For cluster operations, use one of the following methods to prevent the Snap Data Disk from being used as a shared disk.
  a. Permit the Snap Data Disk to be referenced from all the nodes in the cluster system.
  b. Use inter-server replication between the cluster system and a non-cluster system.

8.3 Flow of Operations

The following figure shows the flow of the replication operations.

Figure: Flow of replication operations

```
┌─────────────────────────────────────────────┐
│            Starting a daemon                  │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│          Starting the initial screen         │
│  When a command performs subsequent operations,│
│  starting of an initial screen is unnecessary │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│          Registering a storage server        │
│               First time only                 │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│          Acquiring device information         │
│   First time and only if a device was changed │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│   Setting a original volume and replica volume│
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│  Customizing preprocessing and postprocessing │
│                   scripts                     │
│     Only when the operation is changed        │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│              Creating groups                  │
└─────────────────────────────────────────────┘
                       │
┌─────────────────────────────────────────────┐
│                 Operation                     │
└─────────────────────────────────────────────┘
                       ▼
┌─────────────────────────────────────────────┐
│             Stopping operation                │
└─────────────────────────────────────────────┘
```

8.4 Preparations

The following preparations are required before replication can start.

8.4.1 Starting a daemon

Before replication is started, the AdvancedCopy Manager daemon must be started on the Storage Management Server and Storage Server. Normally, the daemon is configured to be automatically invoked at system startup.
However, if a daemon fails to start for some reason or has stopped, both servers must restart their respective daemons. For information about starting daemons, refer to "Starting and Stopping daemons".

8.4.2 Starting a Web client

Use the following URL to start the AdvancedCopy Manager Web client. In cluster operation, the URL is different. For details, please refer to "Web Client - Initial Window," in the ETERNUS SF AdvancedCopy Manager GUI User's Guide.

```
http:// storage-management-server-address(:port-number)/swstorage/index.html
```

The following client GUI (server list screen) will display.
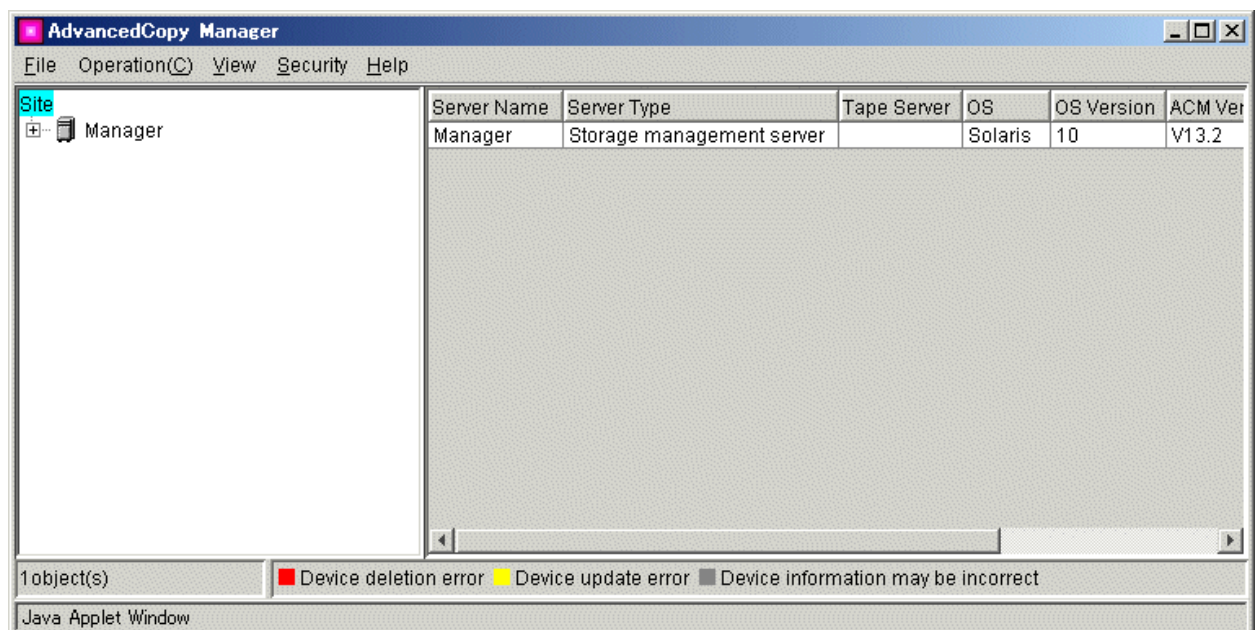
When using the command line only, instead of the Web client, it is not necessary to perform this step.

Note

All AdvancedCopy Manager Web client GUI operations are available on a Storage Management Server in OS environments where the browser client is supported. For more about GUI operations, refer to ETERNUS SF AdvancedCopy Manager GUI User's Guide.

Note **When the Storage Management Server is in cluster operation**

When the Storage Management Server is in cluster operation, you must configure an authentication-related file to use Web screens. Refer to "Configuring the authentication-related file" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide.
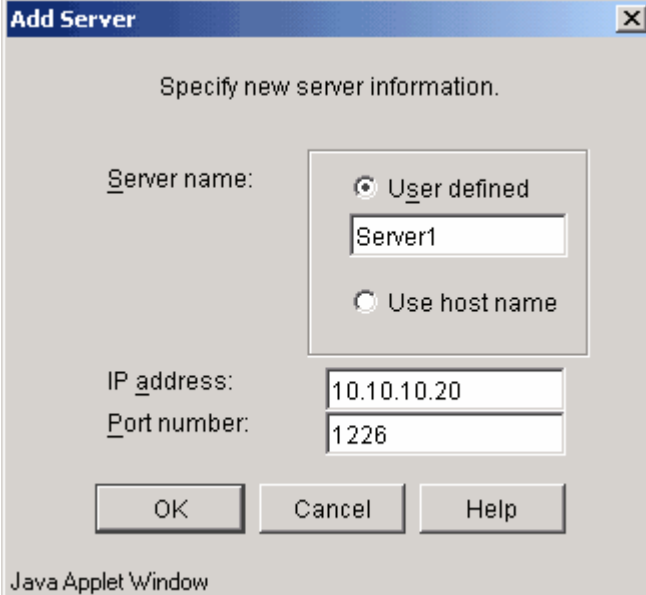
8.4.3 Registering a Storage Server

The Storage Management Server registers the Storage Server to be managed.
When a Storage Server also operates as a Storage Management Server, the Storage Server does not need to be added as a server.
Select the Operations menu, and then select [*Add Server*].
The following window displays.

To add a Storage Server, specify a server name, IP address, and the port number required for communications.
The port number used here is the same port number which would have been specified as the "communications daemon port number", when the Agent of AdvancedCopy Manager was installed.
In a cluster operation, specify the logical IP address of the Storage Server as the IP address. Also specify the port number for Storage Server transactions registered at the time the cluster was setup.
Click [OK] to process Storage Server information.
This process can also be performed using the server information addition command (stgxfwcmaddsrv) at a command line.

8.4.4 Fetching device information from a Storage Server

Before the backup management can be performed, device information on a Storage Server must be temporarily saved to the repository.

Note

The area required when updating the repository may not be available when information concerning devices under multiple Storage Servers is fetched. Therefore, check if there is sufficient area for updating the repository before fetching the device information. If there is insufficient area, allocate the required area before fetching the device information. Refer to Step 2 in "Action required when access to the repository fails" for the details on checking the required area.

Device information concerning slices and Logical Units (disks) can be collected when the device information is obtained.
To obtain information on a device on the Storage Management Server, select [*Refresh Server*] from the Operations menu.

The following window displays:
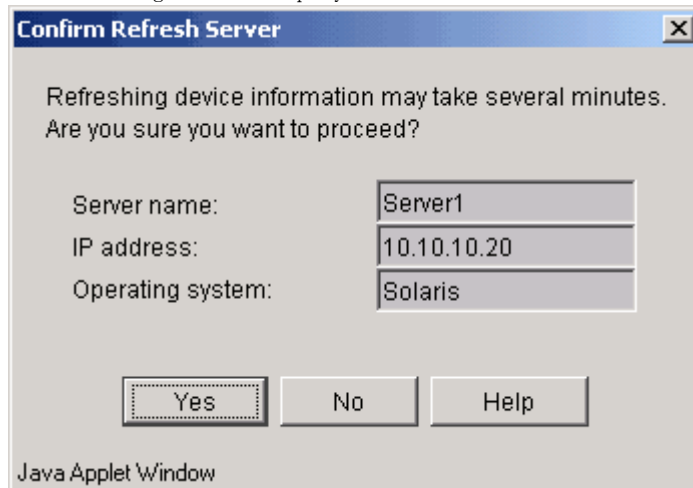
After confirming the server details entered are correct, click the [Yes] button.
After the device information has been obtained from each server, the following dialog box
displays:
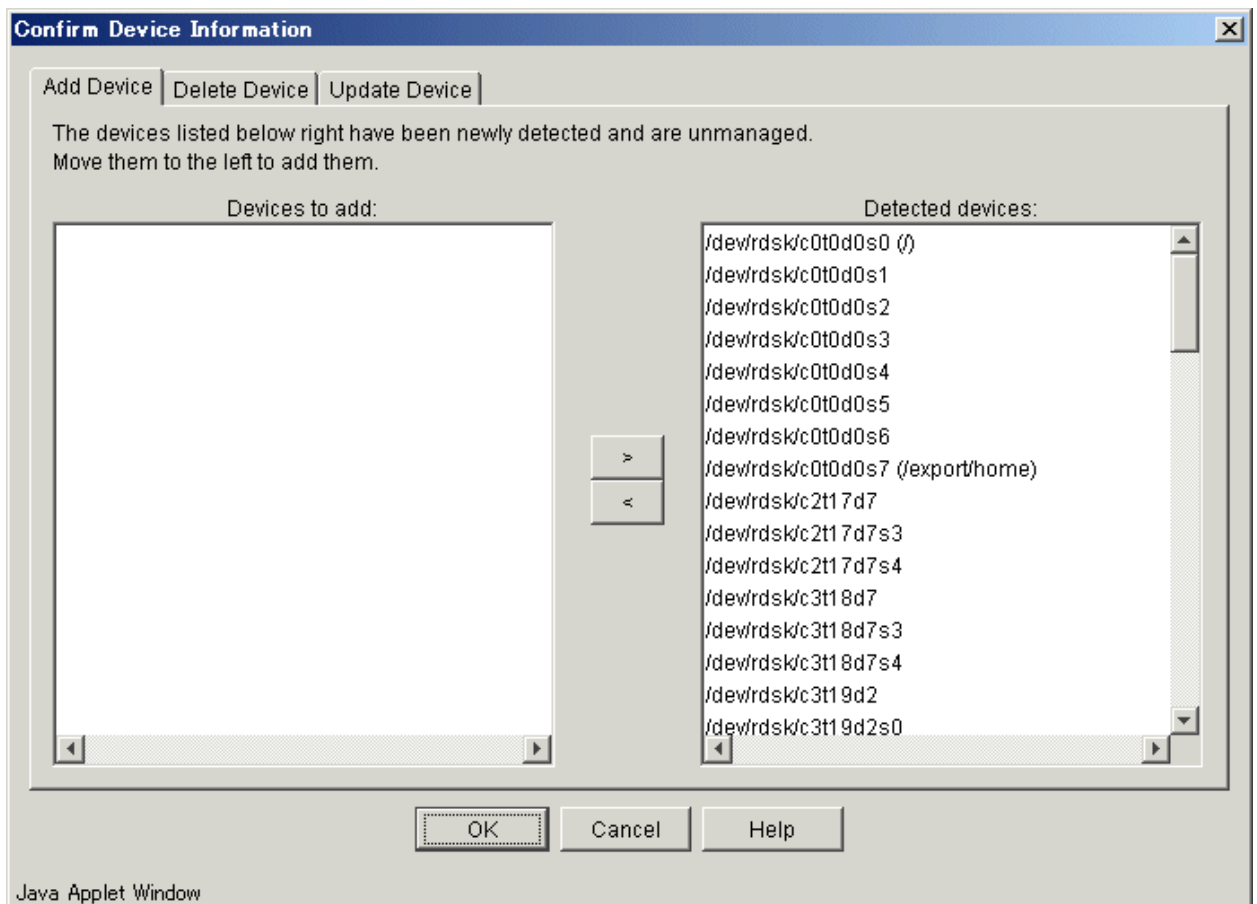
The devices displayed at "Add Device" are newly detected devices. Move the devices to be managed
to the list box on the left side.
The devices displayed at "Delete Device" are those managed devices that currently could not
be detected. To remove the devices from the management targets, move the devices to the list
box on the right side.
The devices displayed at "Update Device" are devices for which the device information (for
example, the mount point name) has changed.
After completing the above tasks, click the [OK] button to accept the updated configuration
information.
This processing can also be carried out by the device information collection/reflection command
(stgxfwcmsetdev) at the command line.

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

8.4.5 Configuring the original volume and replica volume

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

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

8.4.6 Customizing pre-processing and post-processing scripts

In AdvancedCopy Manager, replication processing must be performed while volumes are unmounted. Therefore, when replication is executed, processing to unmount and mount the volume is required to be performed by the pre-processing and post-processing scripts respectively.
The replication process is not executed when the volume can not be unmounted.
For details of the pre-processing and post-processing script, refer to "Pre-processing and Post-processing of Replication."
The replication pre-processing and post-processing scripts will need to be customized when:
  ● You want to avoid the unmount/mount processing of the volume where a file system is constructed, for operational reasons
  ● You want to add special pre-processing and post-processing instructions to the scripts
Refer to "Preprocessing and Postprocessing of Replication," for details on the customization.

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.

When Logical Unit (disk unit) copy is performed, pre-processing and post-processing are not executed for the slices included in the Logical Unit (disk unit). Therefore, the slices included in the Logical Unit (disk unit) must be unmounted before creating the replica, and the unmounted slices must be mounted after the replica is made.

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

8.4.7 Creating groups

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

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

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

Figure: Condition 1
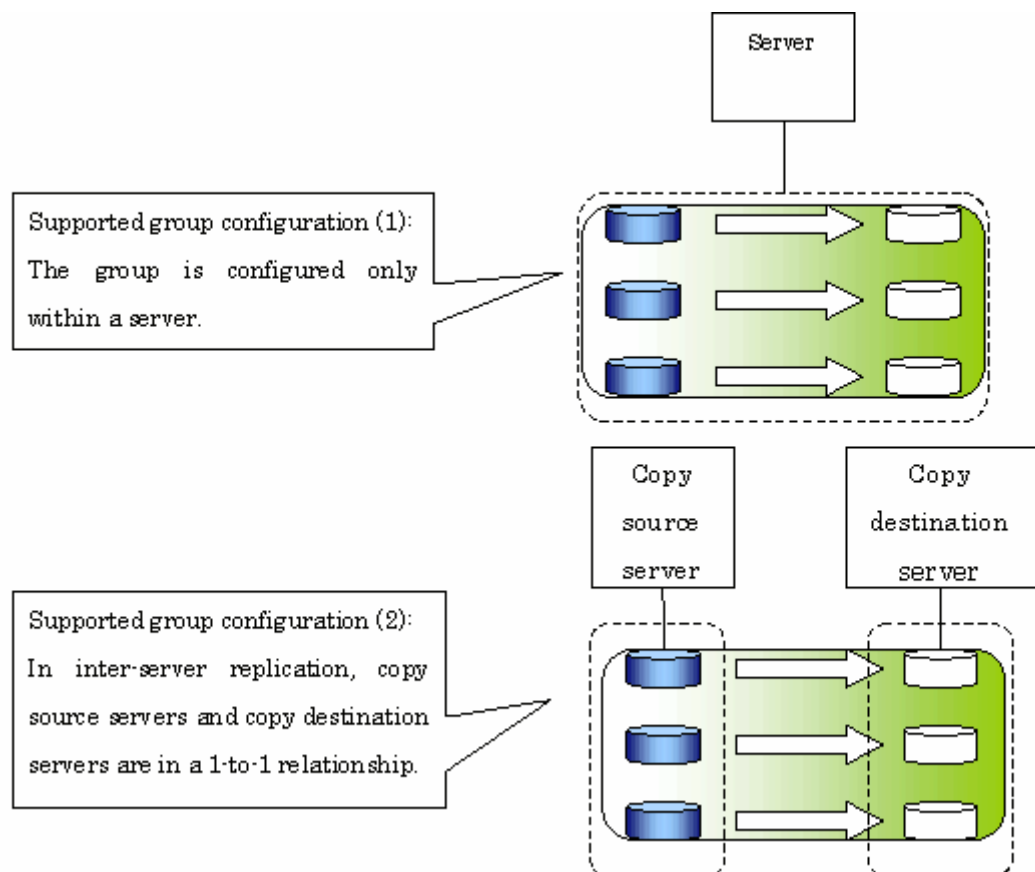
Figure: Condition 2

Figure: Condition 3

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

Group A

Group B

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

Group A

Group B

Figure: Condition 4

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

Unsupported group configuration (2):
The replication destination is duplicated.

Supported group configuration (1):
The group consists of only non-GDS logical volumes.

Supported group configuration (2):
The group consists of only GDS volumes.

Unsupported group configuration (3):
The group consists of GDS logical volumes and other volumes.

8.4.7.2 How to create groups

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

Execution example:

Two groups (GRP1), composed of an original volume and the replica volume, are made.

```
# swsrpsetvol -Xgroup GRP1 /dev/dsk/c1t1d1s4@SRC /dev/dsk/c1t1d11s4@TARG-1
swsrpsetvol completed
# swsrpsetvol -Xgroup GRP1 /dev/dsk/c1t1d2s4@SRC /dev/dsk/c1t1d12s4@TARG-1
swsrpsetvol completed
# swsrpvolinfo -L
Server Original-Volume       Size     Replica-Volume         Size     Copy
Op-Server Group
SRC    /dev/dsk/c1t1d1s4@SRC 4.0Gbyte /dev/dsk/c1t1d11s4@TARG-1 4.0Gbyte bi-direction both
GRP1
SRC    /dev/dsk/c1t1d2s4@SRC 4.0Gbyte /dev/dsk/c1t1d12s4@TARG-1 4.0Gbyte bi-direction both
GRP1
#
```

8.5 Operations

This chapter explains AdvancedCopy Manager replication.
Before performing replication, see "Preparations" to set up the environment required for replication.
This section describes the operation of Replication Management using commands. Refer to "Replication Management Operations" of the ETERNUS SF AdvancedCopy Manager GUI User's Guide for information about using the Web client.

8.5.1 Executing snapshot replication

The replication creation command (swsrpmake) is used to perform snapshot replication.
Refer to "Snapshot replication processing" about explanation of snapshot replication.
The execution status of a physical copy can be checked by executing the operation status display command (swsrpstat) at the command line.

QuickOPC replication

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

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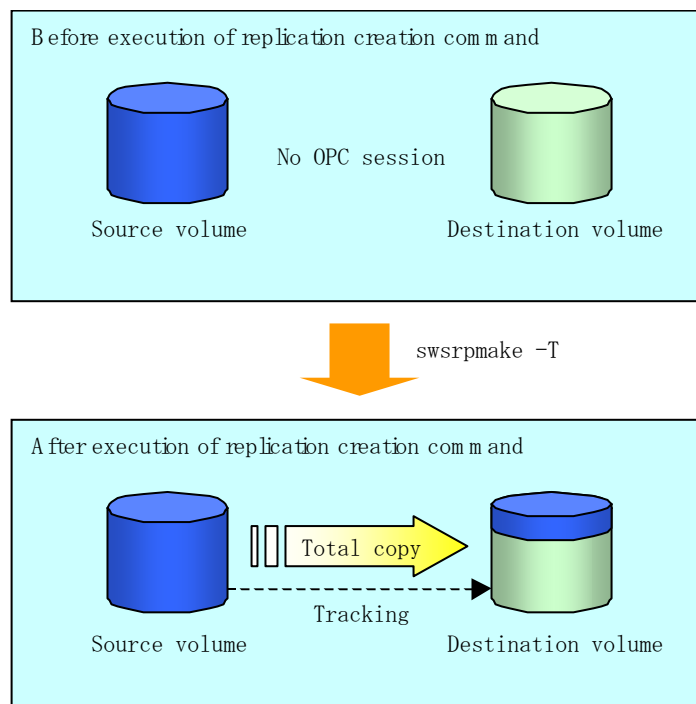
To check the execution status of physical copying, use the operation status display command (swsrpstat) in the same way as for an ordinary snapshot replication.
After snapshot processing (OPC physical copy) is complete, only the tracking process is active.
To check the tracking status, use the operation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

Figure: When snapshot processing is completed

Immediately after execution of replication creation command

Total copy

Tracking

Source volume   Destination volume

Completion of snapshot processing
(OPC physicalcopy)

After completion of snapshot processing (OPC physicalcopy)

Tracking

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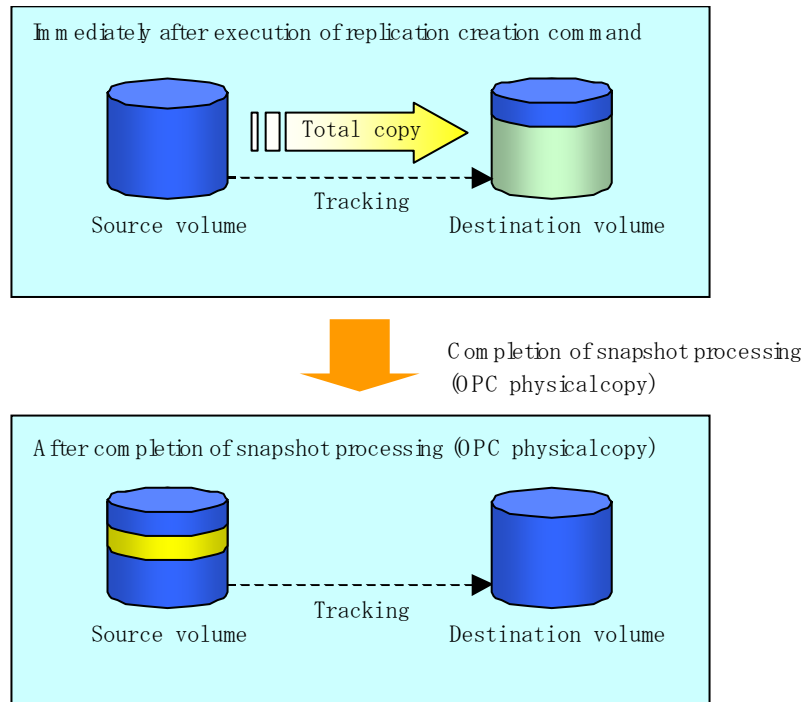
Entering the replication creation command (swsrpmake) with the "-T" option specified during tracking process performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

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

Immediately before execution of replication creation command

Updated data

Tracking

Source volume   Destination volume

swsrpmake -T

After execution of replication creation command

Updated data

Differential copy

Tracking

Source volume   Destination volume
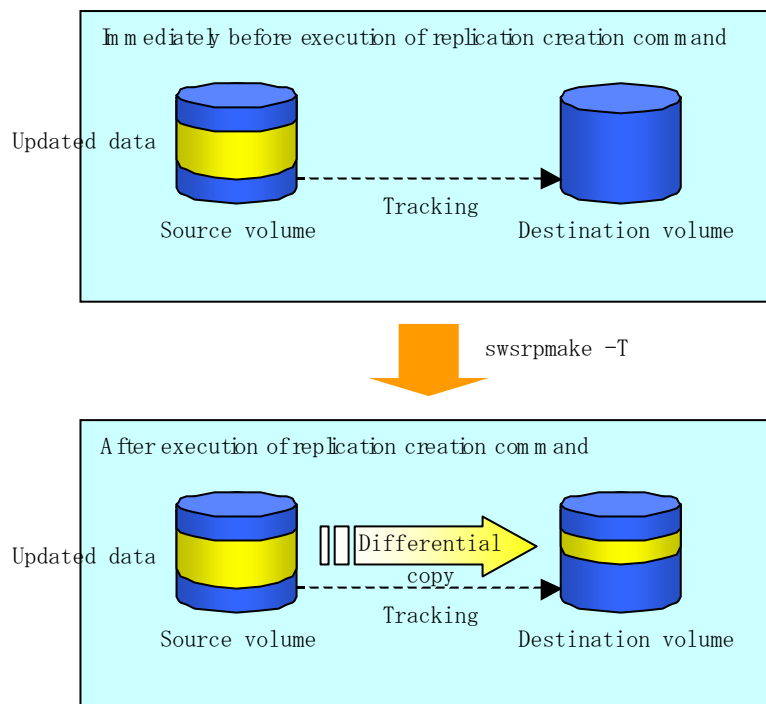
When performing a restoration with tracking, you need to perform a restoration using OPC (i.e., execute the replication creation command without the "-T" option).

The replication operation using QuickOPC is done as follows:

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

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

Though a restoration is executed with OPC, only the data that has been updated after the previous replication (it can be obtained from the 'Update' column of swsrpstat) is copied. Therefore the replication operation using QuickOPC is also completed in a short period of time.

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

SnapOPC type replication

Execute SnapOPC type replications with the "-C" option specified in the replication creation command (swsrpmake).
When the replication creation command is executed, a SnapOPC session will be set up between the copy source volume and the copy destination volume.
[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpmake -C /dev/dsk/c1t0d0s1 /dev/dsk/c1t0d11s1
FROM=/dev/dsk/c1t0d0s1@SV1,TO=/dev/dsk/c1t0d11s1@SV1 swsrpmake completed
#
```

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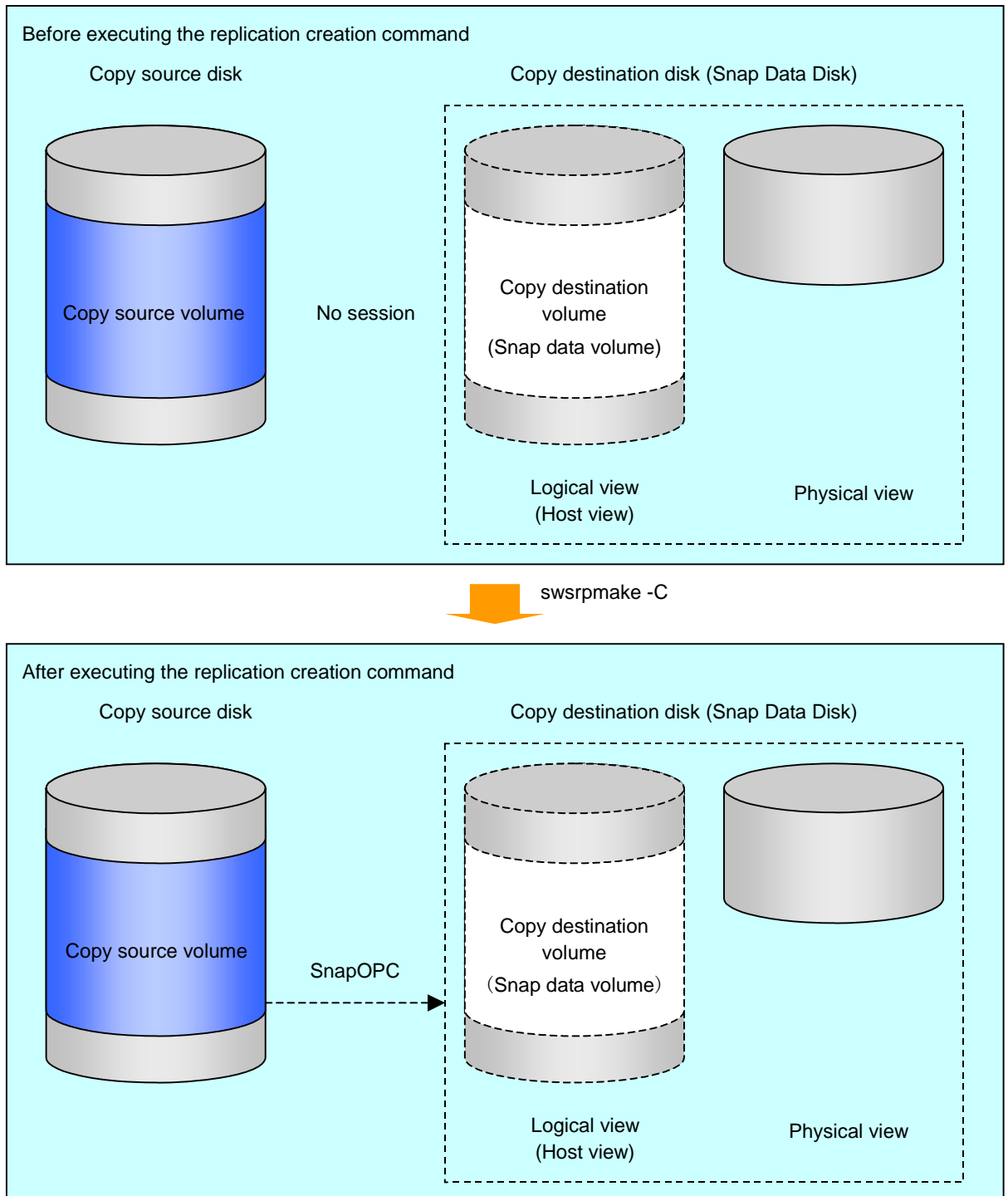
Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the copy source volume, but instead copy only the data that has been updated on the copy source or copy destination since the SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure: When updating the original volume

Update on the copy source

Copy source disk

(2) Write

Copy destination disk (Snap Data Disk)

(1) Copy

Copy source volume

SnapOPC

Copy destination
volume

Logical view
(Host view)

Physical view
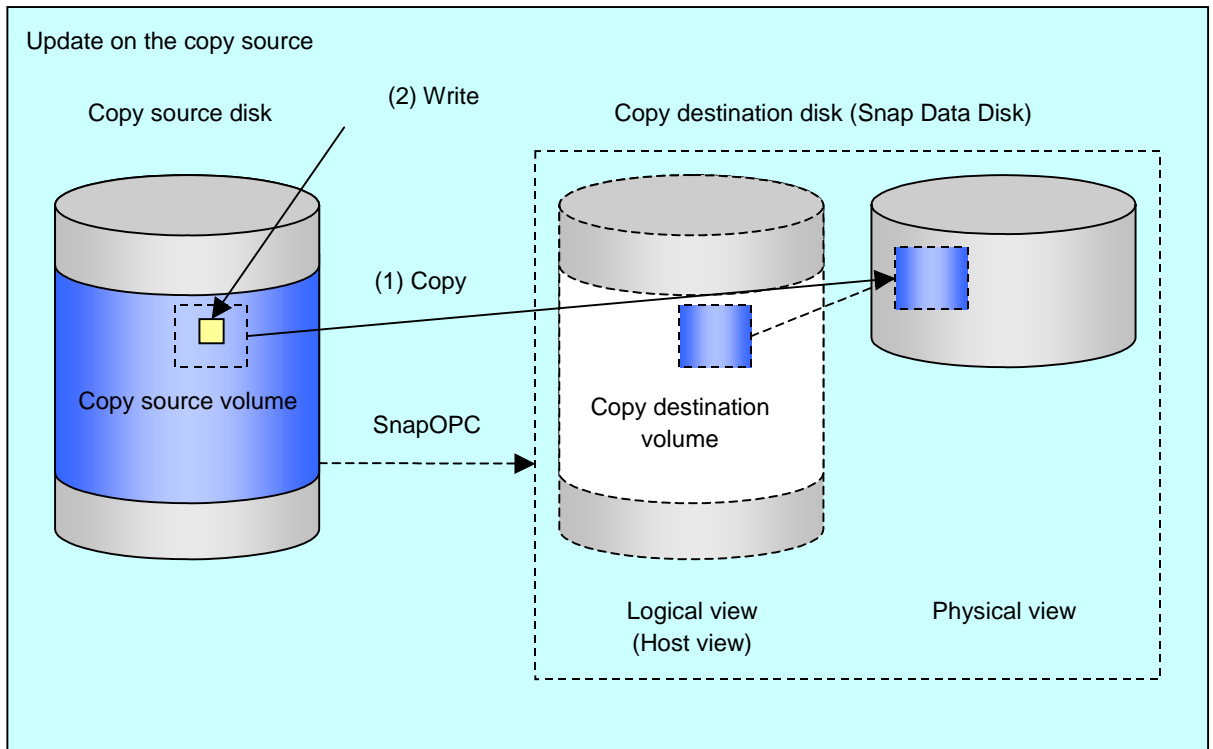
Figure: When updating the copy destination volume

Update on the copy destination

Copy source disk

(2) Write

Copy destination disk (Snap Data Disk)

(1) Copy

Copy source volume

SnapOPC

Copy destination
volume

Logical view
(Host view)

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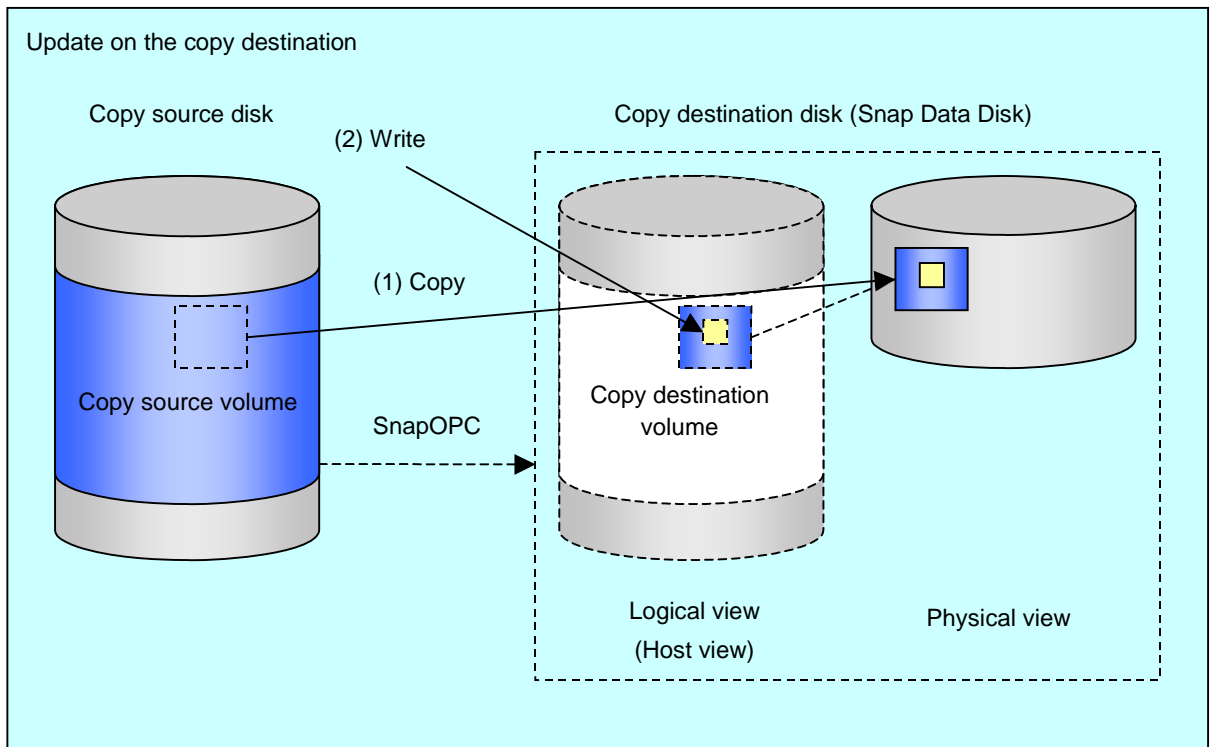
Note: The units for host I/O and storage device copies are different (512 bytes for host
I/O and 8 kilobytes for storage device copies), therefore data copies also occur when
the copy destination is updated.

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

The following example shows the output of the execution 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.
[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/dsk/c1t0d0s1
Server Original-Volume      Replica-Volume           Direction Status       Execute Trk
Update Rcv  Split Xfer Snap-Gen
SV1    /dev/dsk/c1t0d1s1@SV1 /dev/dsk/c1t0d11s1@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 cancelled, and a new SnapOPC session will be set up.

Note

If the physical capacity of the Snap Data Disk is exceeded, the SnapOPC session will become error-suspended. This can be confirmed if "failed" is displayed in the Status field of the operation status display command.
Execution example

```
# /opt/FJSVswsrp/bin/swsrpstat -L /dev/dsk/c1t0d0s1
Server Original-Volume      Replica-Volume           Direction Status Execute Trk
Update Rcv  Split Xfer Snap-Gen
SV1    /dev/dsk/c1t0d1s1@SV1 /dev/dsk/c1t0d11s1@SV1 regular   failed ----    off
----    ---- ----  ---- ----
#
```

If the physical capacity of the Snap Data Disk is exceeded, the SnapOPC session must be cancelled using the replication cancellation command (swsrpcancel), and extra physical capacity must be added to the Snap Data Disk.

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

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t0d11s1 /dev/dsk/c1t0d0s1
FROM=/dev/dsk/c1t0d11s1@SV1,TO=/dev/dsk/c1t0d0s1@SV1 swsrpmake completed
#
```

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

Figure: When executing restore

Pre-restoration state

Copy source disk

Copy destination disk (Snap Data Disk)

Copy source volume

SnapOPC

Copy destination volume

Logical view (Host view)

Physical view

☐ Data that has been updated since the SnapOPC

☐ Data during the SnapOPC

swsrpmake

Post-restoration state

Copy source disk

Copy destination disk (Snap Data Disk)

OPC

Copy source volume

SnapOPC

Copy destination volume

Logical view (Host view)

Physical view

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

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/c1t0d0s1
Server Original-Volume      Replica-Volume          Direction Status Execute
SV1    /dev/dsk/c1t0d1s1@SV1 /dev/dsk/c1t0d11s1@SV1 reverse   snap   80%
#
```

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

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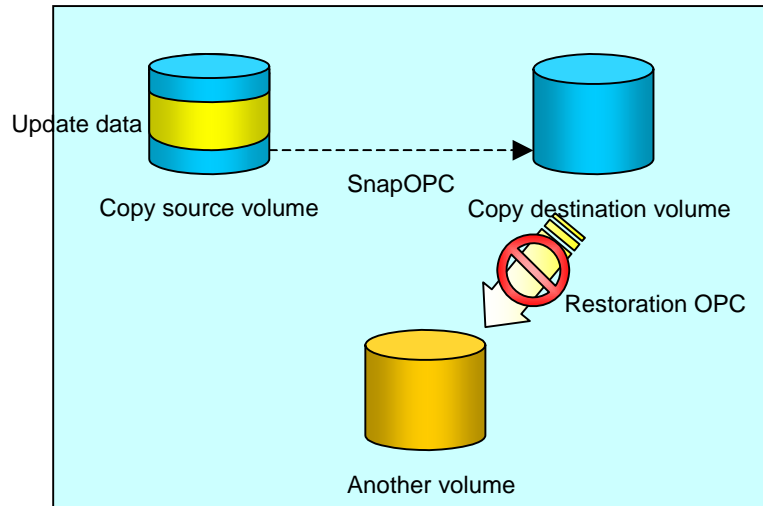
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure: If SnapOPC is performed in relation to multiple copy destination volumes
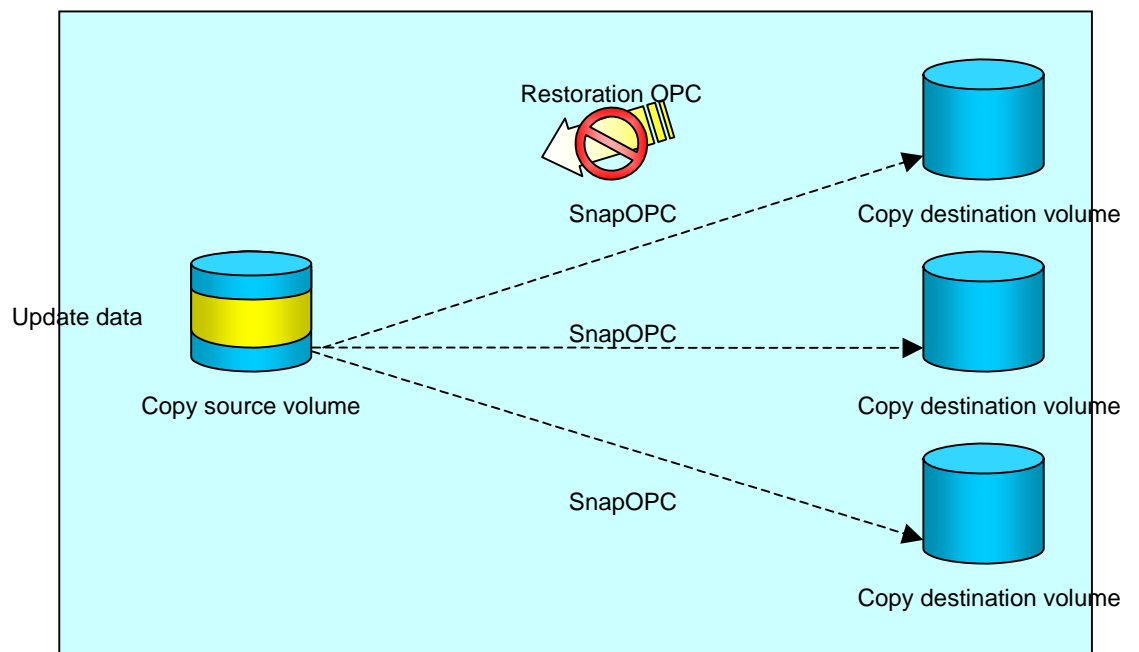
In this case, restoration using an OPC can be performed by canceling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were canceled, will be lost.

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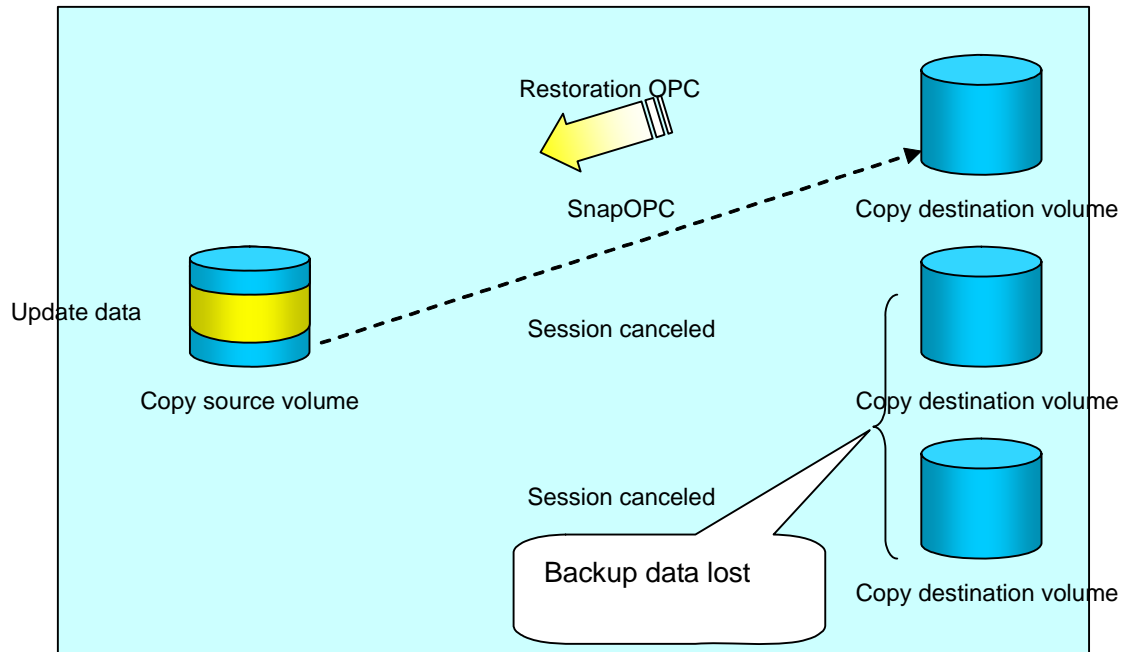
To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration. However, if restoration is performed using operating system functionality, the amount of updated data on the copy source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

Figure: Restoration without cancelling SnapOPC sessions
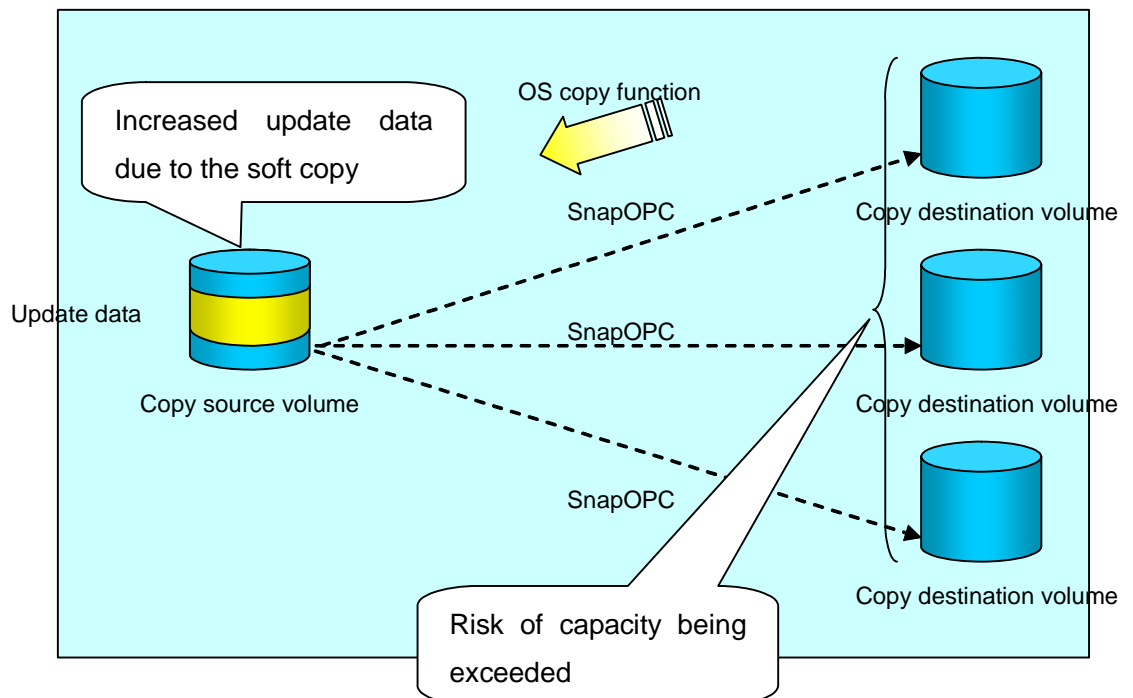
SnapOPC+ replication

Execute the replication creation command (swsrpmake) 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/c1t1d0s3@SRC-SV /dev/dsk/c1t1d1s3@TARG-SV
FROM=/dev/dsk/c1t1d0s3@SRC-SV,TO=/dev/dsk/c1t1d1s3@TARG-SV 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/c1t1d0s3@SRC-SV /dev/dsk/c1t1d2s3@TARG-SV
FROM=/dev/dsk/c1t1d0s3@SRC-SV,TO=/dev/dsk/c1t1d2s3@TARG-SV swsrpmake completed
#
```

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

![Note]

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

[Figure: When the oldest snap generation number is specified as the replication volume]
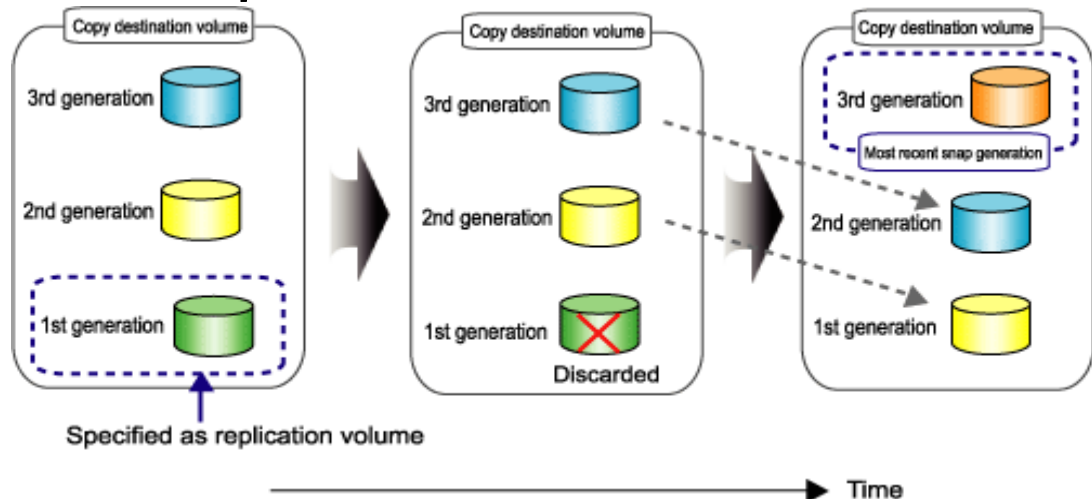
The operation status of SnapOPC+ replication can be checked by executing the operating status display command (swsrpstat) with the -L option specified.

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

[Execution example]

```
# /opt/FJSVswsrp/bin/swsrpstat -L
Server Original-Volume           Replica-Volume            Direction Status
Execute Trk  Update Rcv  Split Xfer Snap-Gen
SRC-SV /dev/dsk/c1t1d0s3@SRC-SV   /dev/dsk/c1t1d1s3@TARG-SV  regular
copy-on-write(inactive) ----    off  0%     ---- ---- ---- 1
SRC-SV /dev/dsk/c1t1d0s3@SRC-SV   /dev/dsk/c1t1d2s3@TARG-SV  regular
copy-on-write(active)   ----    off  5%     ---- ---- ---- 2
#
```

Note

> If a snapOPC+ session is suspended due to a hardware error, exceeding the Snap Data Disk
> physical capacity, or similar, an error suspend will also occur for prior SnapOPC+
> sessions. The replica volumes of the SnapOPC+ sessions for which an error suspend has
> occurred can no longer be used.
> The error suspend status can be checked in the results output by the operating status
> display command. The error suspend status is indicated by "failed" in the Status column.
> [Execution example]
>
> ```
> # /opt/FJSVswsrp/bin/swsrpstat -L
> Server Original-Volume           Replica-Volume            Direction Status Execute
> Trk Update Rcv  Split Xfer Snap-Gen
> SRC-SV /dev/dsk/c1t1d0s3@SRC-SV /dev/dsk/c1t1d1s3@TARG-SV regular   failed ----
> off ----    ---- ----  ---- ----
> SRC-SV /dev/dsk/c1t1d0s3@SRC-SV /dev/dsk/c1t1d2s3@TARG-SV regular   failed ----
> off ----    ---- ----  ---- ----
> #
> ```
>
> If an error suspend state occurs due to exceeding the Snap Data Disk capacity, execute
> the replication cancel command (swsrpcancel) to cancel the SnapOPC+ session. The physical
> capacity of the Snap Data Disk must be increased.

Note

> Fujitsu recommends operating SnapOPC+ in conjunction with OPC/QuickOPC/EC(REC) to make
> a complete copy in case a hardware error.
> Even if snapOPC+ and OPC/QuickOPC/EC(REC) are used in conjunction, the maximum number
> of sessions that can be set for one copy source volume is 8.
> The next example shows the operation of one OPC per week in conjunction with one SnapOPC+
> per day.

[Figure: Operation example when SnapOPC+ and OPC are used in conjunction]
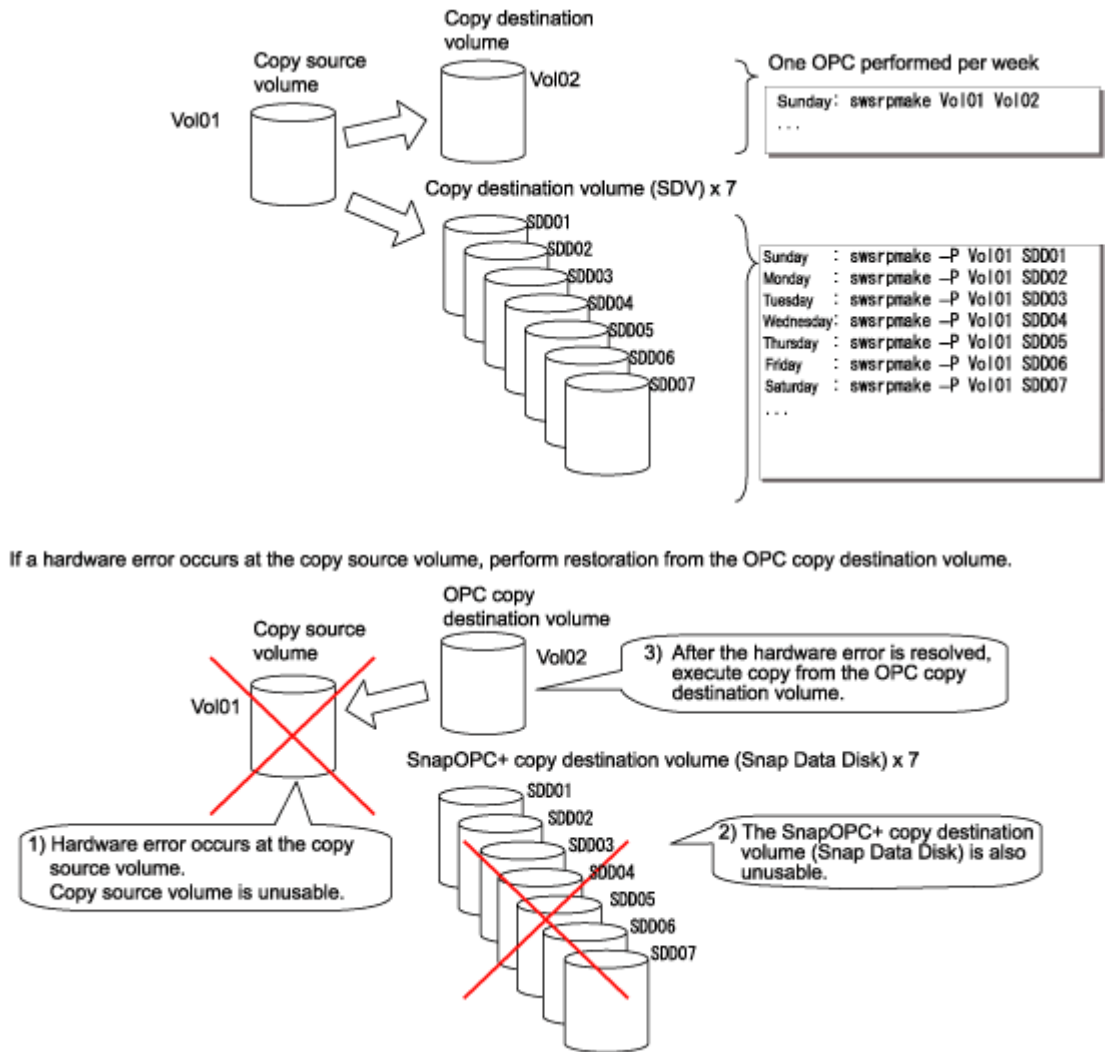
8.5.2 Executing synchronized replication

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

8.5.2.1 Intra-box synchronous replication

Intra-box synchronous replication creates a replication from a source volume to a destination volume by using the EC function of the disk array.
The EC function operates in a mode in which a copy is made to a destination volume in synchronization through a write to a source volume (in synchronous write mode).

8.5.2.2 Inter-box synchronous replication

Inter-box synchronous replication creates a replication from a source volume to a destination volume by using the REC function of the disk array.
The REC function provides three copy operational modes:
- ● 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: Transfer mode types

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

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

Figure: Synchronous replication flow (for Stack mode/Consistency mode)
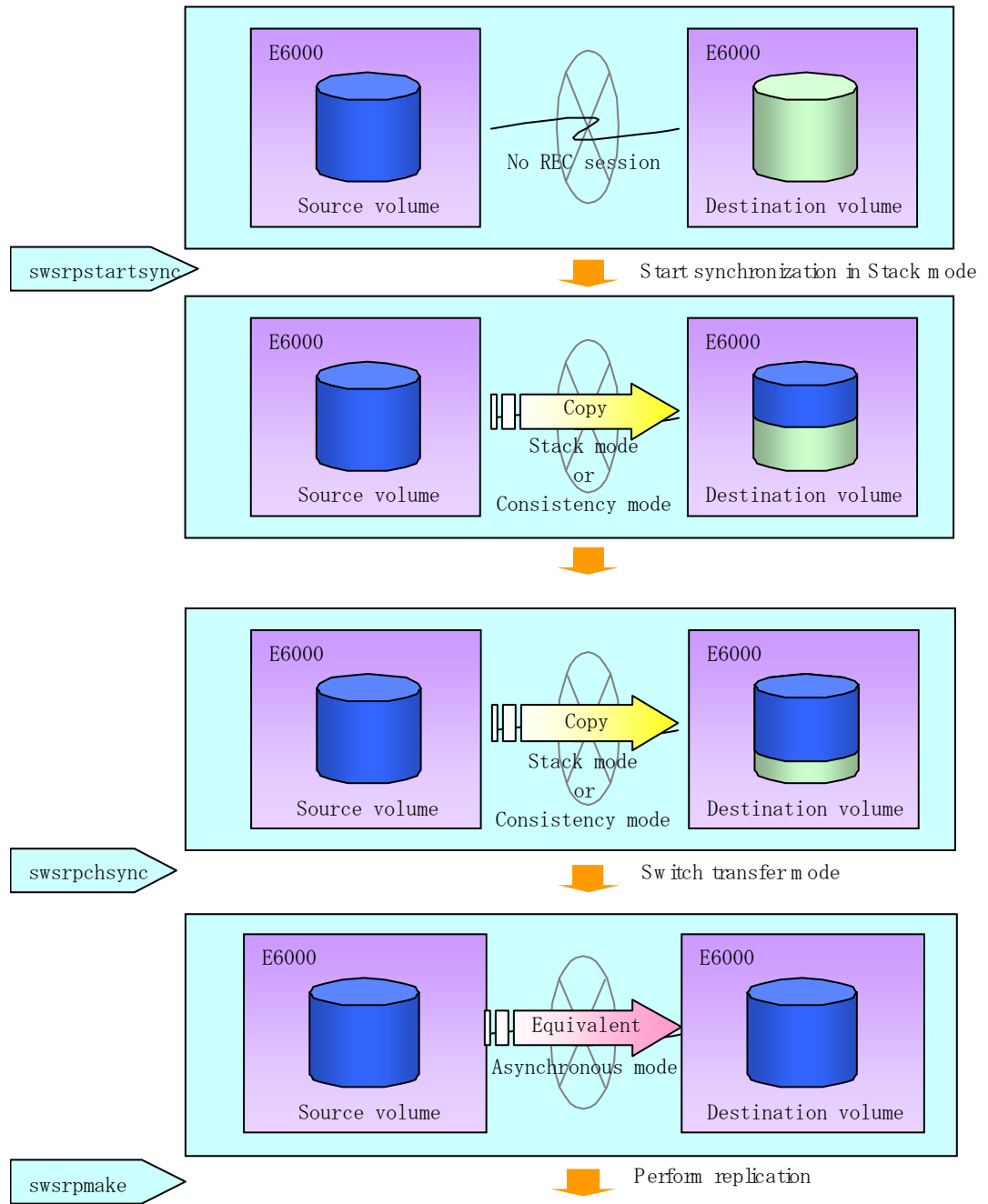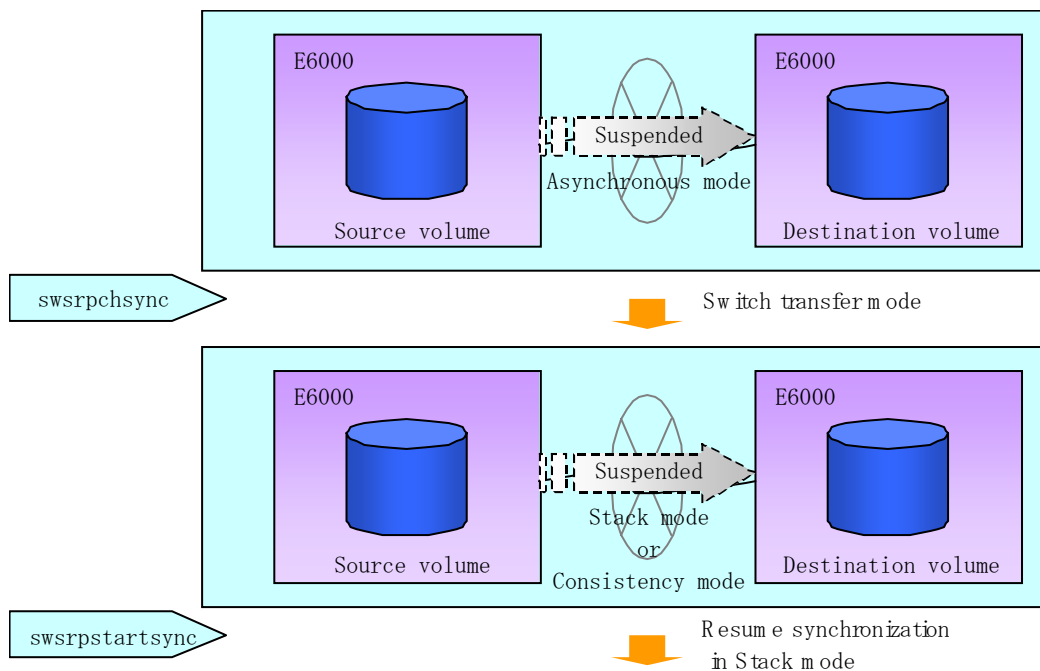
E6000 Source volume — Suspended Asynchronous mode → E6000 Destination volume

swsrpchsync

Switch transfer mode

E6000 Source volume — Suspended Stack mode or Consistency mode → E6000 Destination volume

swsrpstartsync

Resume synchronization in Stack mode

Note

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

Recovery mode

Recovery mode includes two modes to restart copying after recovery from an inter-box path error (halt status).

Table: 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 write operation to the source volume when REC is used for synchronous transfer mode and for recovery from an inter-box path error (halt status).

Table: Split mode types

Mode	Description
Automatic Split	This split mode forcibly executes successful write operations to source volumes even if the inter-box FCRA path is fully blocked and HALT status occurs. This mode enables write operations to source volumes even if the inter-box FCRA path is fully blocked, thus this mode does not affect transactions. When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode settings.

Mode	Description
Manual Split	This split mode rejects write operations to source volumes (returns an error) if the inter-box FCRA path is fully blocked and HALT status occurs. This mode enables source volumes and destination volumes to be fully synchronized even if the FCRA path is fully blocked. When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode settings.

Copy direction reversal

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

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

1. Assume that Site A is operating as the copy source and REC is operating from Site A to Site B.

Figure: When REC performed from Site A to Site B
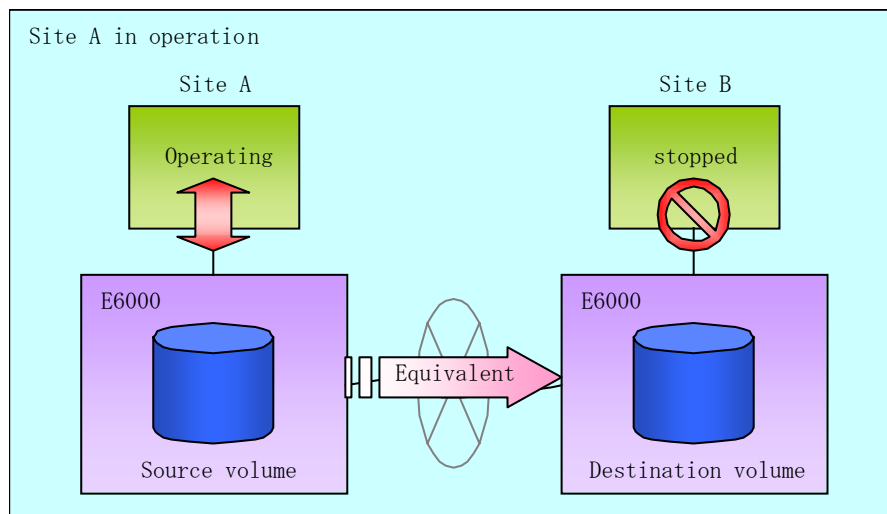
2. To switch the sites, execute the replication execution command to make a replication to Site B. Then, stop operating Site A.

Figure: When the replication creation command is used to create a replica at Site B
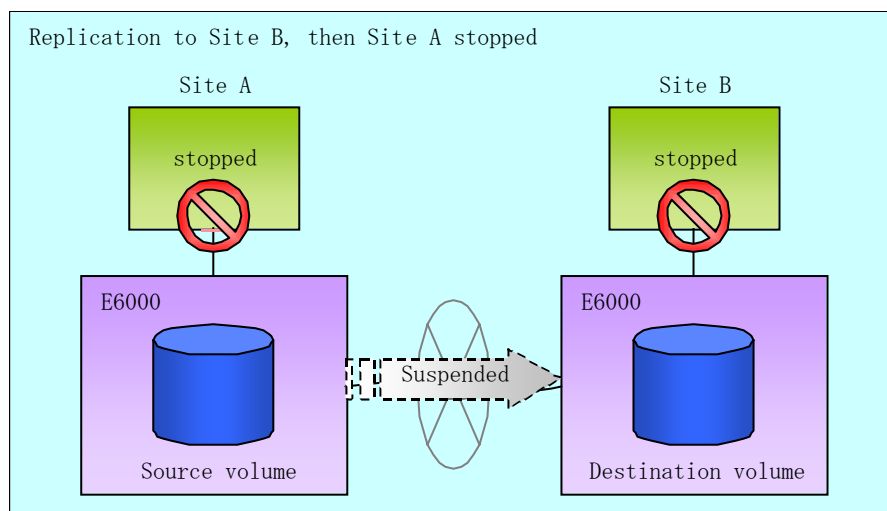
3. Execute the synchronization reverse command to reverse the copy direction.

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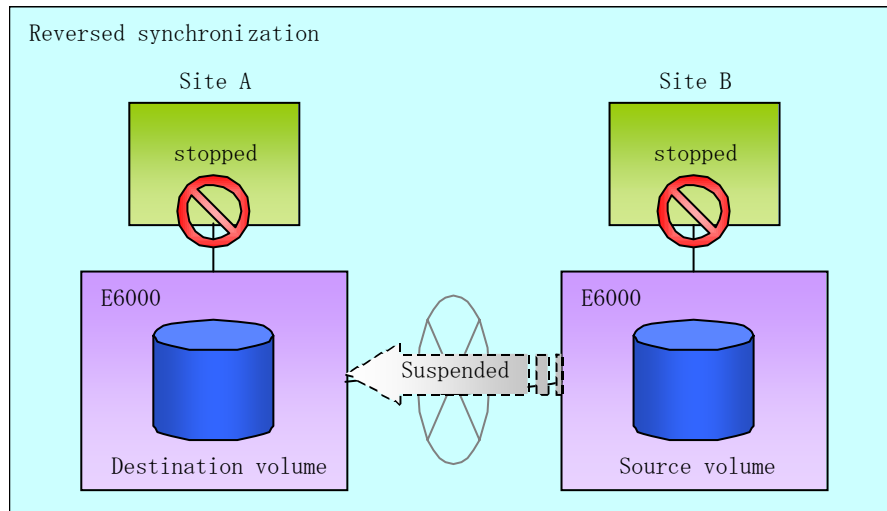
4. Put Site B into operation as the copy source. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

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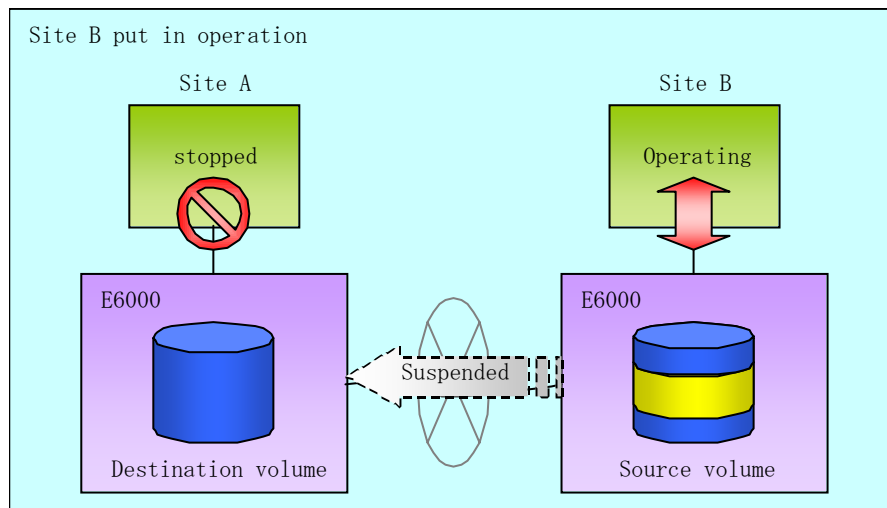
5. Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected into Site A with differential copies.

Figure: When Site B operation is started (synchronization resumed)
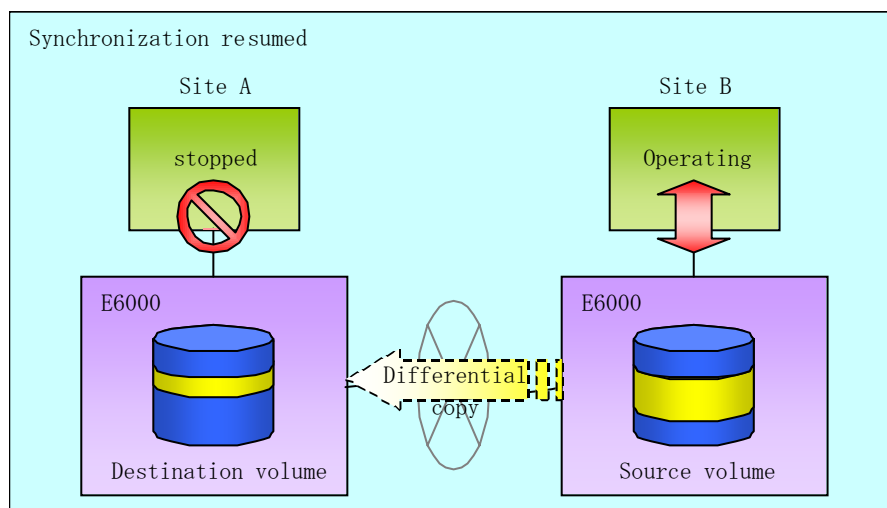
8.5.2.2.1 Initial copy skip function

The initial copy skip function is used when the initial copy cannot be executed because of the insufficient line capacity. The following example shows the initial copy being skipped via tape transfer.

1. Suppose that operations at Site A have stopped.

Figure: When operations have been stopped at Site A
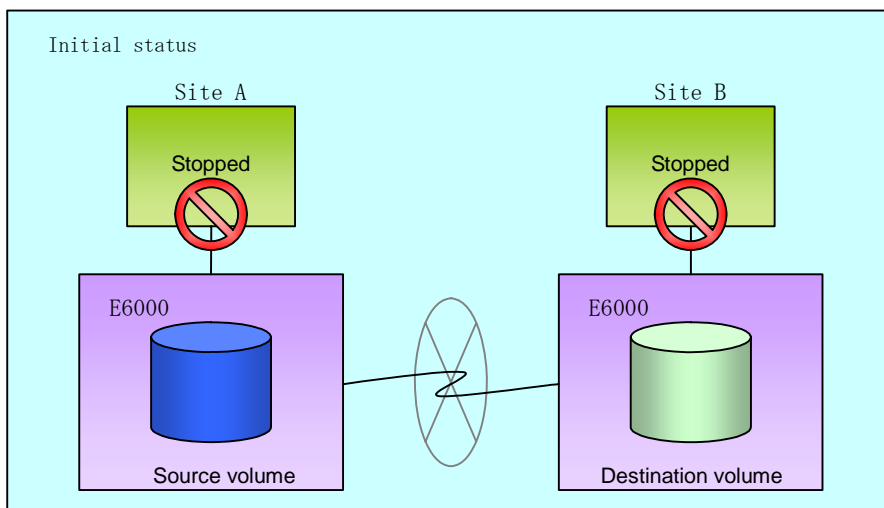
2. Next, synchronous processing begins, using the initial copy skip function. At this point, an REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

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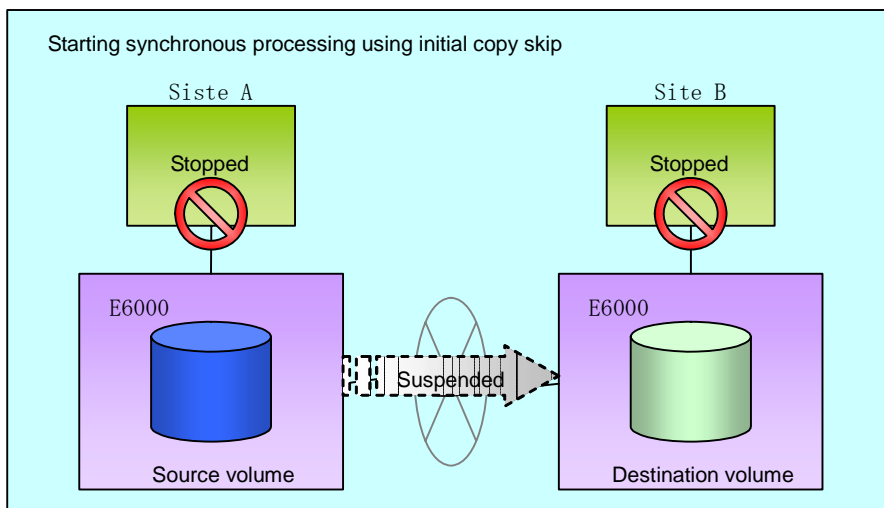
3. Next, the data on the copy source volume is backed up to tape.

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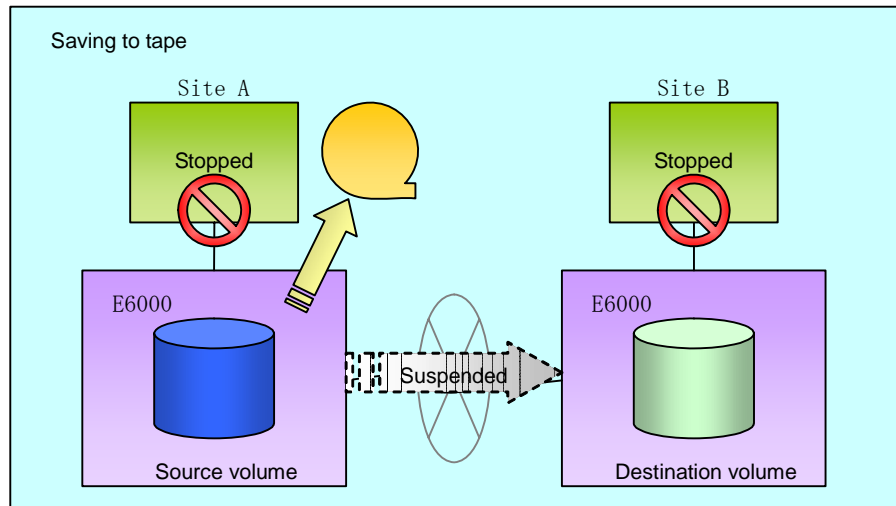
4. The tape medium is sent to Site B, and jobs at Site A restart.

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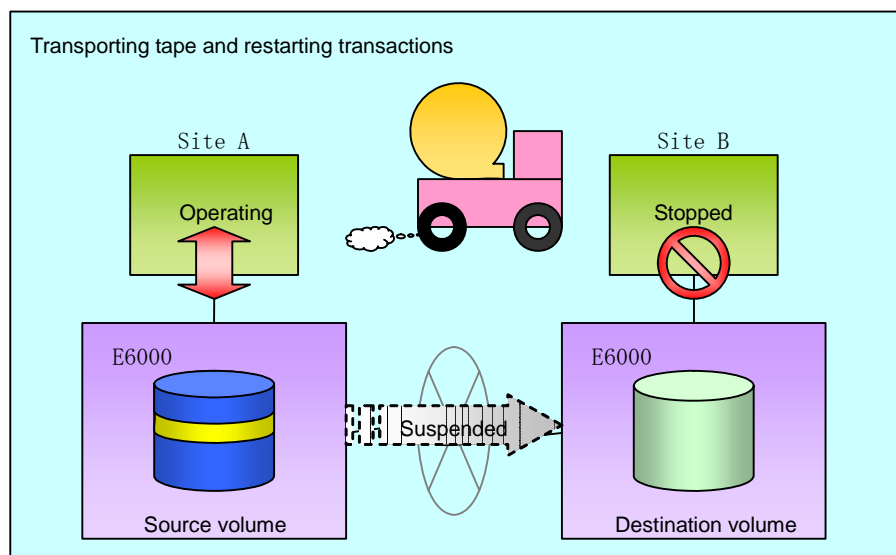
5. The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure: When tape restored to copy destination

Restoring data from tape

Site A

Operating

Site B

Stopped

E6000

Source volume

E6000

Destination volume

Suspended
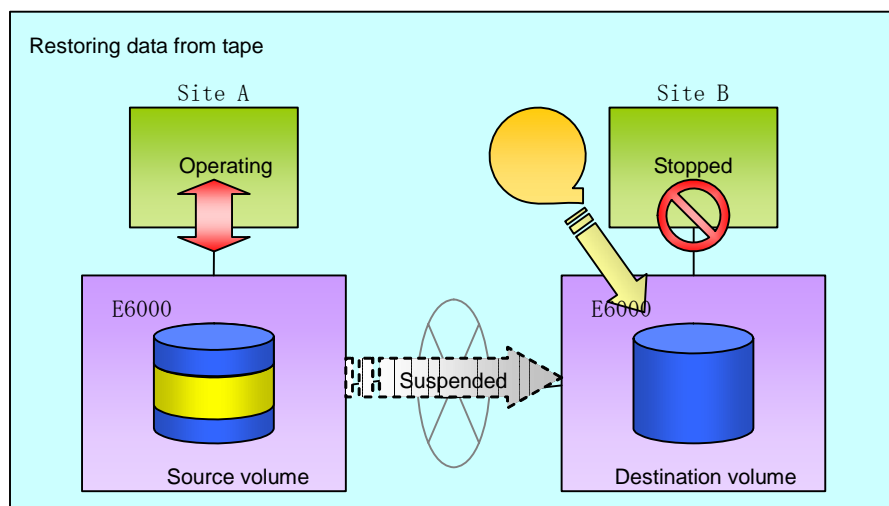
6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied.

Figure: When synchronization restarted in Remain mode

Restarting synchronous processing in Remain mode

Site A

Operating

Site B

Stopped

E6000

Source volume

E6000

Destination volume

Differential copy
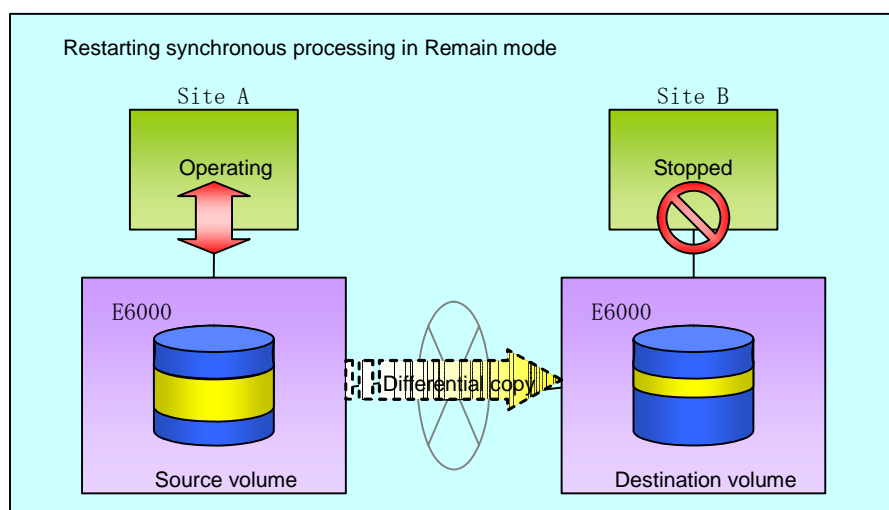
8.5.2.3 Concurrent suspension function

The concurrent suspension function simultaneously suspends multiple EC/REC sessions for disk array systems.
With this function, a copy with consistency can be easily performed.
This is useful for databases composed of multiple volumes.
The manner in which this operates within the disk array system is shown below.

Figure: Internal operation of disk array unit
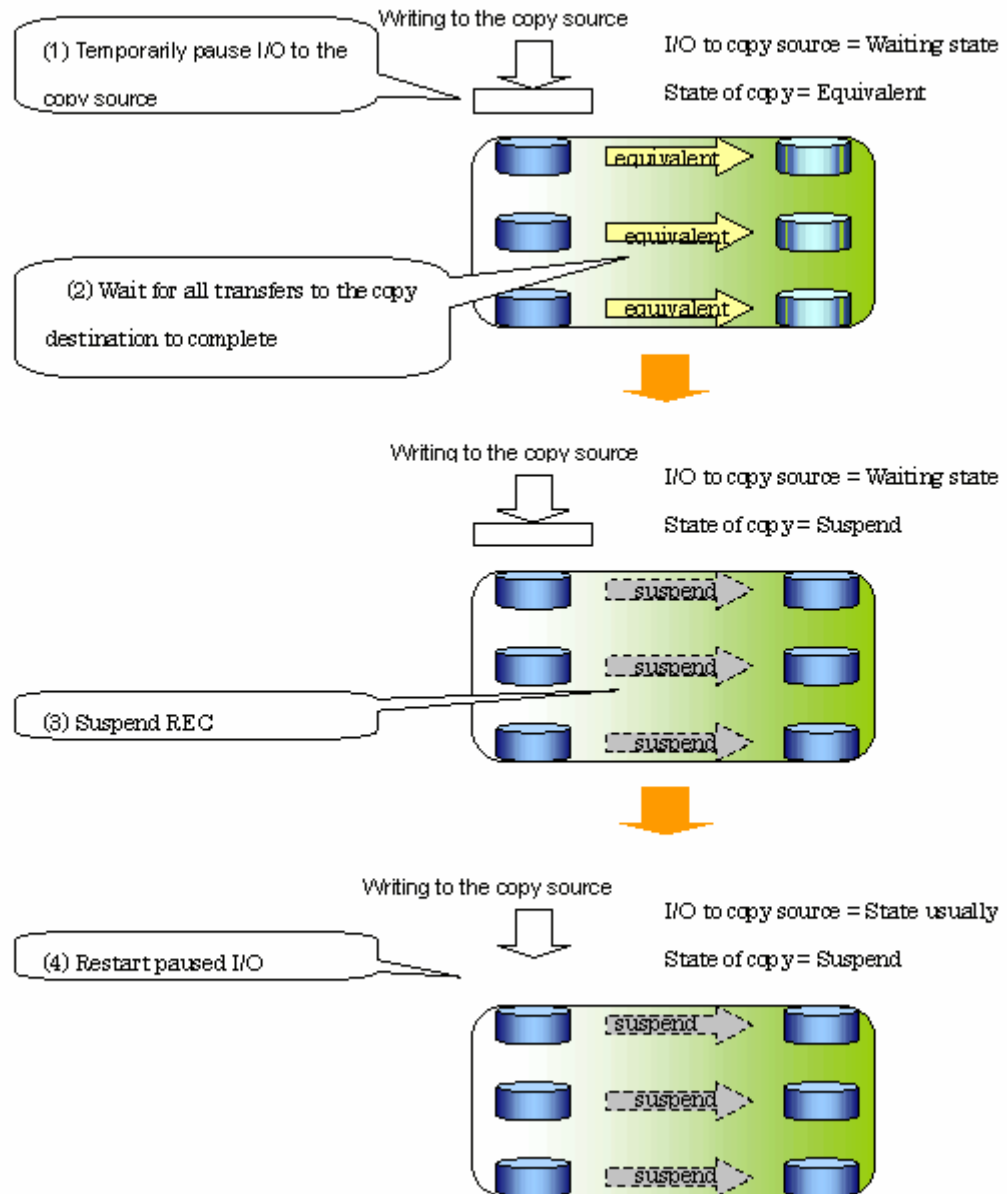
Replication using the concurrent suspension function is performed by specifying the "-Xconcur" option for the replication creation command (swsrpmake).

If concurrent suspension is performed using the Consistency transfer mode, it is no longer necessary to make temporary mode changes during multiple creation processes. 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: Consistency mode
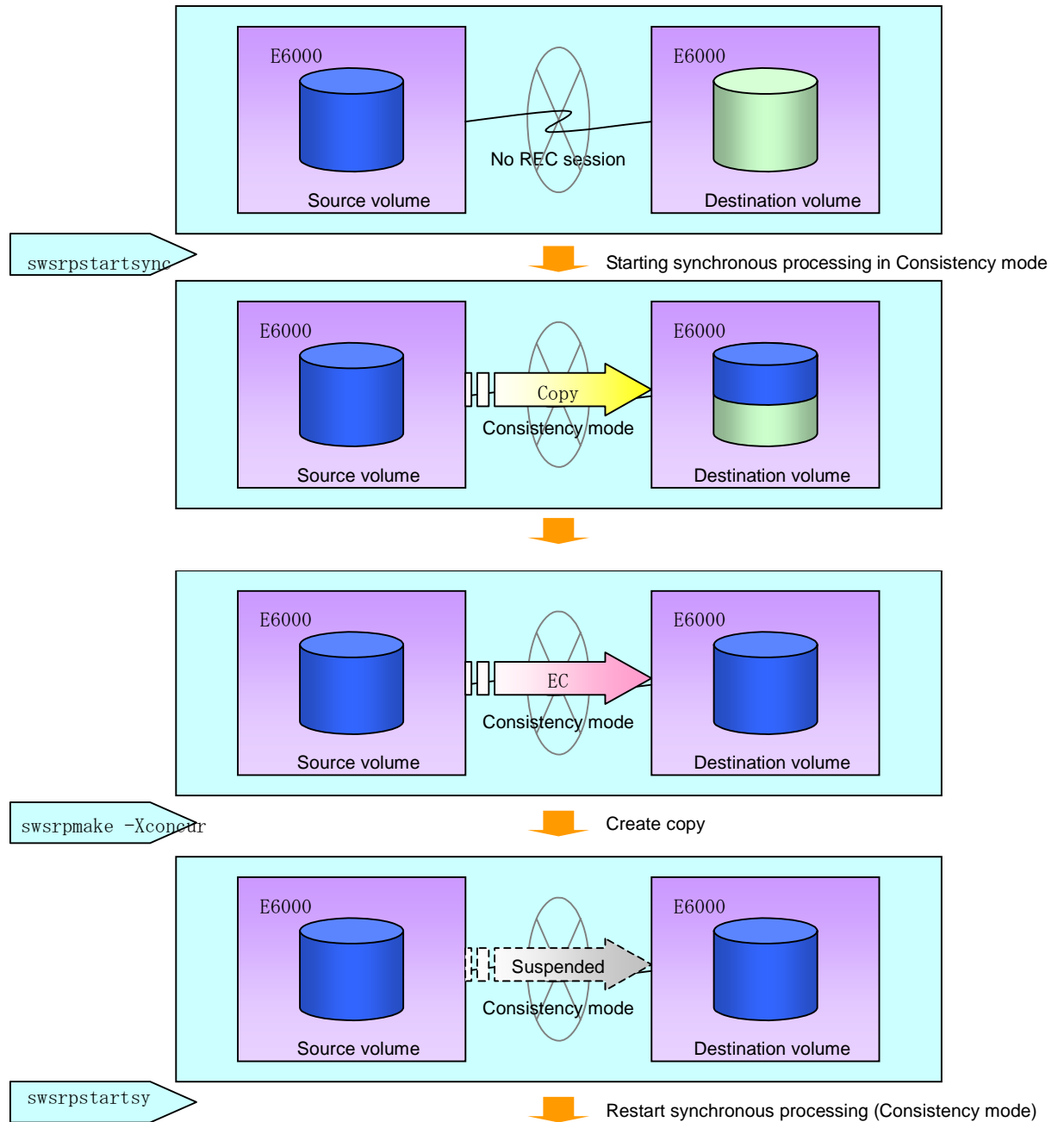
8.5.3 Backup and restoration using the replication function

Data can be restored from the replica volume to the original volume if a volume pair has been defined as bi-directional copy capable with the replication volume information setting command (swsrpsetvol).

Restoration can be executed in accordance with the following procedures.

1. Execute the replication cancellation command (swsrpcancel) when the target volume for restoration is in EC session.
2. Execute the replication creation command (swsrpmake). The specification of an original volume and the replica volume is reversed at the time that the replication was executed. The replication command is executed specifying neither "-T" option nor the "-C" option for QuickOPC/SnapOPC backup operations.

Note

● With SnapOPC+, the replication function cannot be used to restore data from the copy destination volume to the copy source volume. If restoration is required, copy the data from the copy destination volume manually.

Figure: Restoration with SnapOPC+
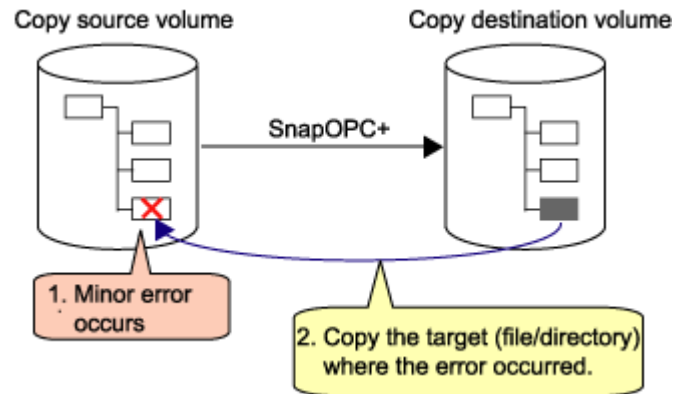
8.6 Changing the configuration Information

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

8.6.1 Changing an original volume or replica volume

To change existing attributes of the original source volume and/or replica volume such as copy direction and operational servers of server-to-server replication, delete the configuration information using the replication volume information deletion command (swsrpdelvol) and then invoke the replication volume information setting command (swsrpsetvol) to set the attributes to the required values.

8.6.2 Deleting an original volume or replica volume attributes

To delete existing attributes of the original volume or replica volume, use the replication volume information deletion command (swsrpdelvol).

8.6.3 Changing the device information of an original or replica volume

When changing device size and composition information for an original / replica volume/s, device composition is only changed after the deletion and re-configuration of the original / replica volume/s is complete.
The following steps should be taken when performing any or composition changes to an original / replica volume/s. If these steps are not adhered to, the changes may not be completed properly

1. Perform deletion processing for the original / replica volume for device change. For details, see "Deleting an original volume or replica volume".
2. Change the device composition.
3. Perform all configuration processing of a device as normal. For more information, see "Fetching device information from a Storage Server".
4. Perform setting of the original/replica volume.

8.7 Stop Replication processing

To stop the replication processing, or to change the synchronized replication to snapshot replication, use the replication cancellation command (swsrpcancel).

To stop replication processing by SnapOPC+, the replication must be stopped starting with the oldest snap generation.
To forcibly stop the second or subsequent snap generations, specify the -Xforce option in the replication cancellation command (swsrpcancel). This will stop the specified snap generation and all earlier snap generations.

To stop replication operation, stop the daemons on the Storage Server.   In general, the daemons stop when the system stops.
The daemon can be stopped independently if it needs to be stopped for some reason.   For more information, see "Starting and Stopping Daemons".

―   When the daemon stops, all functions of AdvancedCopy Manager running on the Storage Server stop.
―   Before stopping the Storage Management Server daemon, make sure that operations on all Storage Servers under management have stopped.

8.8 SDX Object Replication

This section describes the replication operation of SDX objects.
A good understanding of the basic operation of normal volumes is required for this operation.
For details on GDS, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating Environment)."

8.8.1 Operation with Units of the SDX object

There are two modes of operation according to the difference in copy units:
1. Replication operation in units of logical volumes (method with GDS Snapshot)
2. Replication operation in units of slices (method without GDS Snapshot)

For details on how to confirm and select the type of operation, refer to the section titled "Setting the unit of SDX object operation". Replication in units of logical volumes (method with GDS Snapshot) is applicable only to replication within a server.
For replication between servers, you must use units of slices.

> **Note**
>
> The two types of operation cannot be performed on a single Storage Server.

8.8.2 Replication operation in units of logical volumes (method with GDS Snapshot)

SDX objects of GDS can be replicated in units of logical volumes.
Replication is performed in linkage with GDS Snapshot.
You can specify a GDS logical volume name as the target volume. Therefore, you need not consider the physical disk structure of the SDX object. For operation in units of slices, all physical slices that make up the mirror volume must be specified, and the physical structure must be considered in the configuration and operation of replication.

Figure: Backup operation in units of logical volumes
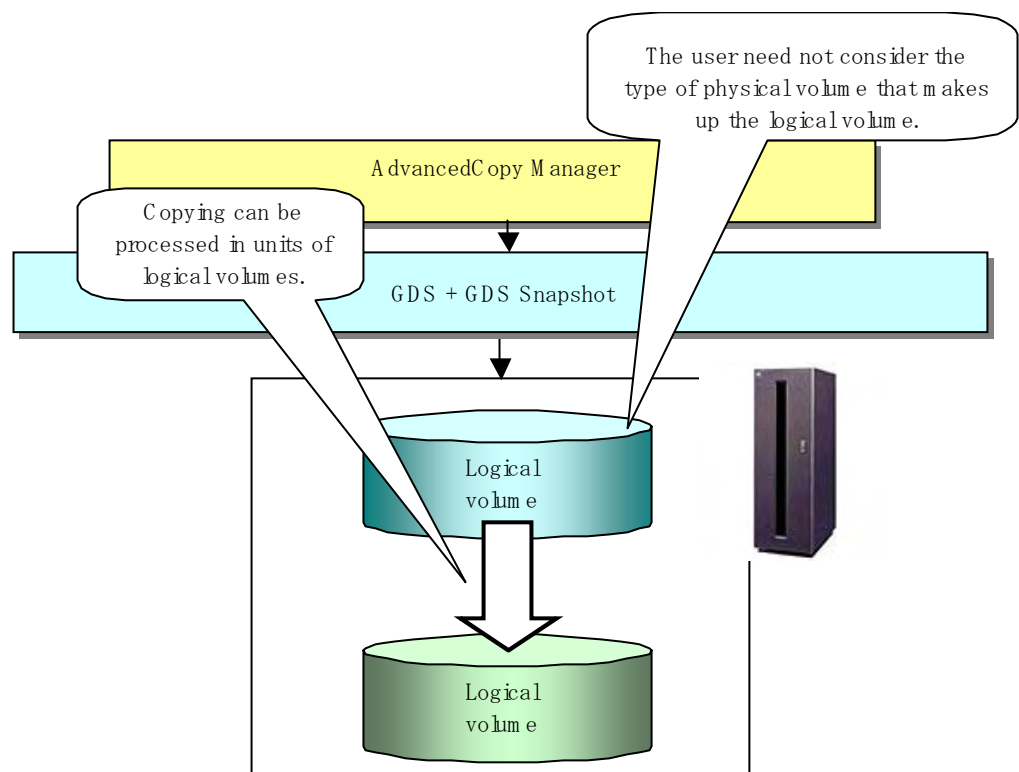
To specify a GDS logical volume in a AdvancedCopy Manager command, specify the name of the GDS logical volume.

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

Note   Configuration and conditions of unsupported SDX objects

The supported volume types are single volumes and mirror volumes.
AdvancedCopy Manager does not support the following SDX objects (volumes):
- Volume of a shadow class
- Stripe volume
- Switch volume
- Volume in a concatenation group

   Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.

If the total number of the slices that make up the original volume and slices that make up all replica volumes associated with the original volume at the start of synchronous replication or snapshot-type replication is 33 or greater, copying cannot be processed.
Also, if the original volume is in the invalid state, copying cannot be processed.

Point

   To confirm whether the type of volume being used is either single, mirror, stripe, concatenation, or switch, execute the command <sdxinfo -e long> and check the volume type attribute displayed in the TYPE column for the matching volume label in the OBJ column.

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

8.8.2.1 Configuring the replication operation

For replication with GDS Snapshot, AdvancedCopy Manager processes binding and separation of volumes by using the GDS Snapshot function.
Therefore, original and replica volumes must be SDX objects that can be used as a master object and proxy object respectively for a GDS Snapshot.
The copy source volume is the master object, and the copy destination volume is the proxy object.
Specify the GDS volume structure before registering a volume with AdvancedCopy Manager.
Note the compatibility requirements described below for replication in units of physical slices.
(For detailed conditions on what constitutes a master/proxy volume, refer to "Preconditions for Proxy Constitution" in "Cautions," in the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating Environment).")
- The original volume and replica volume must be the same type of SDX objects. Replication volume information based on logical volumes in a combination that includes slices or volumes of another OS cannot be set. When logical volumes are used, the original volume and replica volume must be the same size.

If the volumes are separated or there is no copy session, AdvancedCopy Manager assumes a non-replicated state. The following conditions will result in this state:
- OPC is started by the replication creation command (swsrpmake), and copy processing is completed.
- The synchronous processing start command (swsrpstartsync) is executed with the "software-copy" operand specified, and synchronous processing is suspended by the replication creation command (swsrpmake).

If a pair of separated replication volumes is specified, the synchronous processing start command (swsrpstartsync), the replication creation command (swsrpmake), or the replication volume information deletion command (swsrpdelvol) will automatically clear the separated state.

To clear the separated state without a copy session for operational reasons, delete the replication volumes by using the replication volume information deletion command (swsrpdelvol) or by using the "sdxproxy" command, referring to "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating System)."

8.8.2.2 Replication volumes

To use the advanced copy function, the structures of the original volume and replica volume must satisfy the following conditions.

Structures of copy source volumes

To use the advanced copy function, the structure of the copy source volume must be one of the following:
- ● Single volume
- ● Not the root class
- ● Mirror volume belonging to a mirror group that has no subordinate groups

For a mirror volume in a mirror group connected to a subordinate group, only "software-copy" can be used.

AdvancedCopy Manager does not support the following SDX objects (volumes):
- ● Volume of a shadow class
- ● Stripe volume
- ● Switch volume
- ● Volume in a concatenation group
  Stripe groups and concatenation groups, however, can be used as subordinate groups of a mirror group.

If the total number of the slices that make up the original volume plus the slices that make up all replication volumes associated with the original volume at the start of synchronous processing or snapshot-type replication processing is 33 or greater, copying cannot be processed.

Also, if the copy source volume is in the invalid state, copying cannot be processed.

Figure: Copy source volume structures supported by the advanced copy function

Structure supported by the advanced copy function
(mirror group not connected to a subordinate group)
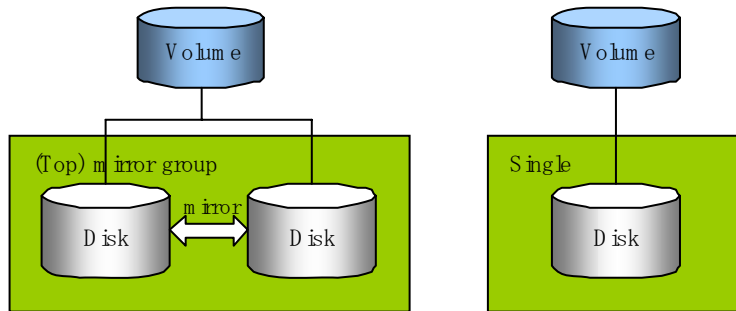
Structure supported only by the software-copy function
(mirror group connected to a subordinate group)
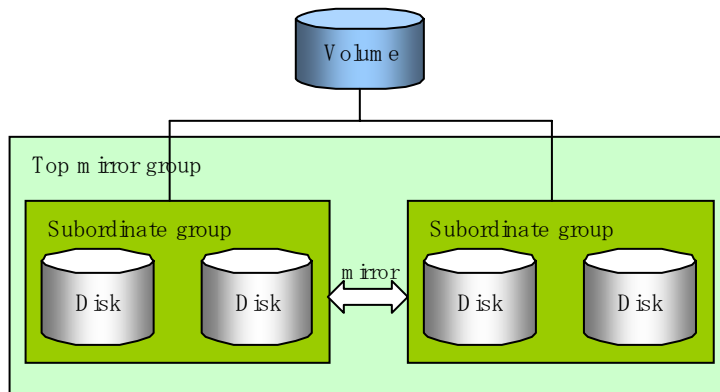
Structures of copy destination volumes

To use the advanced copy function, the structure of the copy destination volume must be one of the following:

- Single structure
  This means that the type attribute of the volume is "single" or the type attribute is "mirror" and one disk makes up the disk group.
- Not the root class
- Not a Stripe or Concatenation type

If the copy destination volume is a mirror volume, only the software-copy function can be used. To use the advanced copy function in both directions, both volumes must be in a single structure. Neither a stripe nor concatenation volume can be used as the copy destination volume.

Figure: Copy destination volume structures supported by the advanced copy function

Structure supported by the advanced
copy function in both directions

(1) Number of slices in both volumes = 1
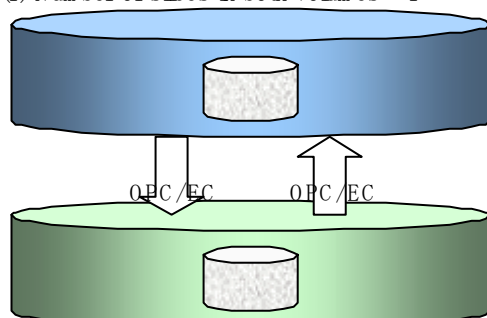
Structure supported by the advanced
copy function in one direction

(2) Number of slices in one of the volumes = 1

OPC/EC   OPC/EC

OPC/EC   Software-copy
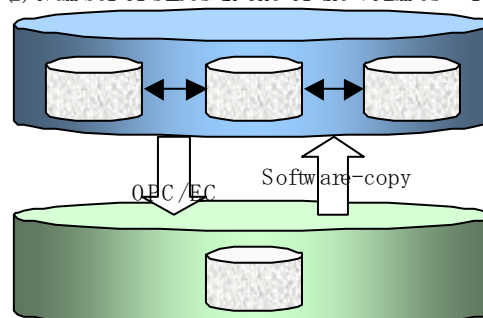
Structure not supported by the advanced
copy function in either direction

(3) Number of slices in both volumes > 1

Software-copy   Software-copy
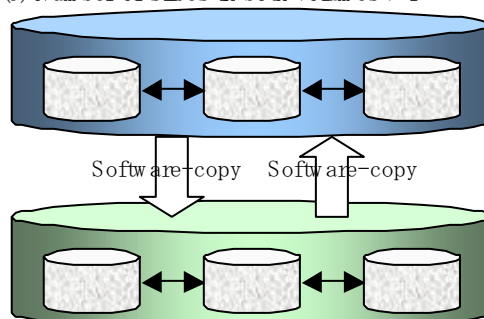
8.8.2.3 Copy functions available for each GDS structure

The two types of GDS Snapshot copy functions are described below.
The availability of the functions depends on the SDX object structure.
● Advanced copy: Copying with the hardware function of ETERNUS, Fujitsu's storage systems
● Software-copy: Copying with the disk driver of PRIMECLUSTER GDS
The following table shows the relationship between SDX object structures and their available copy functions.

Table: Copy functions available with GDS Snapshot linkage

Replication structure	Unit	Copy source/ destination	SDX object structure		Available copy function
Within a server	Logical volume	Copy source	Single		Advanced copy Software-copy
			Mirror	No subordinate group exists.	Advanced copy Software-copy
				Subordinate groups exist.	Software-copy
		Copy destination	Single		Advanced copy Software-copy
			Mirror	This consists of one disk.	Advanced copy Software-copy
				This consists of multiple disks.	Software-copy

> Stripe-, concatenation-, and switch-type volumes in SDX object (volume) structures cannot be copied.

8.8.2.4 Fetching device information from a Storage Server

To perform the replication operation with a Storage Server and obtain information relating to a subordinate device of the Storage Server, you must register the server.
For details on how to fetch the device information, refer to the section titled "Fetching device information from a Storage Server."

8.8.2.5 Configuring replication volumes

Note the following about configuring the original and replica volumes.
- ● Confirm that the volume is of a structure as described in the section titled "Supported logical volume structures."
- ● Confirm that the original/replica volume is not a master volume or proxy volume.

Register GDS logical volumes as the original and replica volumes.

```
# swsrpsetvol -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
swsrpsetvol completed
#
```

8.8.2.6 Executing replication

Note the following about performing replication of SDX objects.
To start or resume synchronous processing (swsrpstartsync) or to start snapshot processing (swsrpmake), the logical volume of the copy destination must be inactive.
If the logical volume of the copy destination is active when the command is executed, processing to stop the volume will be performed within the command. If the copy destination volume is a file system volume, the file system is unmounted during replication pre-processing and the volume is then stopped.
If the volume cannot be stopped (because the volume is accessed by an application) then the command will be terminated abnormally.

Example of synchronous replication

```
# swsrpstartsync -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpstartsync completed
Equivalency holding state
# swsrpmake -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpmake completed
```

Example of snapshot replication

```
# swsrpmake -h SRC-SV /dev/sfdsk/CLS1/dsk/VOL1 /dev/sfdsk/CLS1/dsk/VOL2
FROM=/dev/sfdsk/CLS1/dsk/VOL1, TO=/dev/sfdsk/CLS1/dsk/VOL2 swsrpmake completed
#
```

8.8.2.7 Operational notes

Do not use the "sdxprox" command directly to change the state of a volume registered for the replication function.
Otherwise, the "sdxproxy" command may create an inconsistency between the management information of the replication function and the actual volume state. In this case, use the replication cancellation command (swsrpcancel) to cancel the replication operation.

8.8.3 Replication operation in units of slices (method without GDS Snapshot)

SDX objects of GDS can be replicated in units of slices where replication is performed without GDS Snapshot.
This operation however requires that the physical disks that make up the GDS logical volume be specified.
For details on GDS, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating System)."

Figure: Replication operation in units of slices
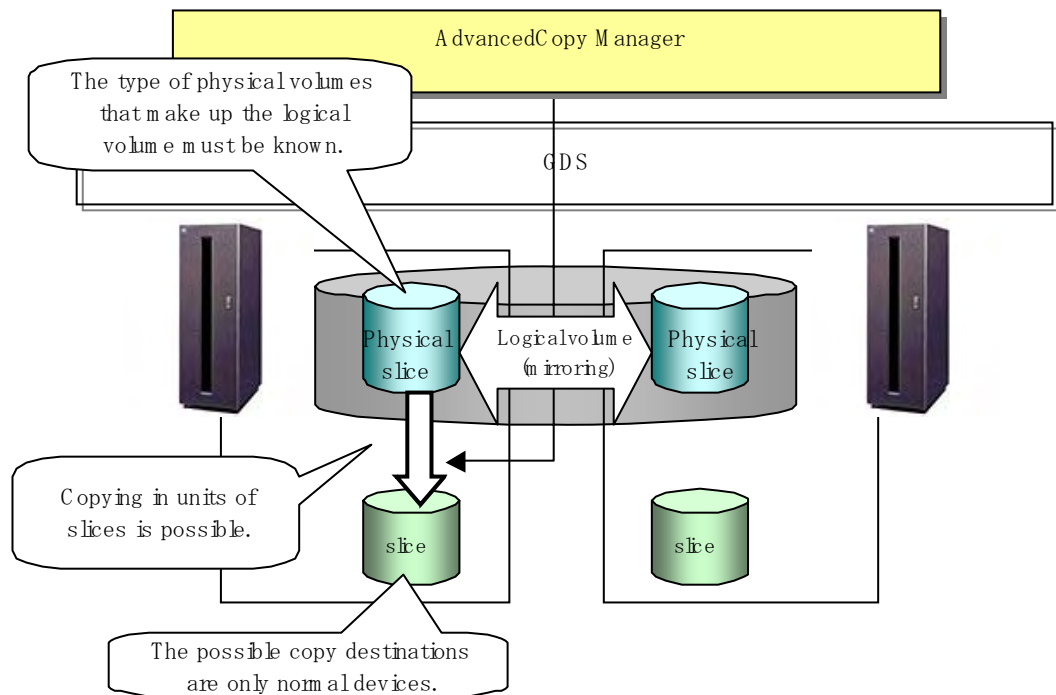
> **Note**
>
> If mirroring between cabinets is enabled and copying to the original volume by OPC is required in the event of a cabinet failure, both mirrored systems must be replicated. In this case, the required capacity of the replica volume is not the size of the logical volume but the size of the physical volume.

When specifying a name in the AdvancedCopy Manager command, use the following name format that combines a logical volume name and AdvancedCopy Manager device name.

dev/sfdsk/*class-name*/dsk/*volume-name*:*DEVNAM value by sdxinfo*

The following SDX objects can be used for operations in units of slices:
— Single volumes
— Non-hierarchical mirror volumes
—

The volume type attribute (the value in the TYPE field in the volume row of the OBJ field) displayed when "sdxinfo -e long" is executed can be used to determine whether the volume being used is a single, mirror, stripe, concatenation, or switch volume.
[Volume object type attributes]
— single: Single volume (operation possible)
— mirror: Mirror volume (operation possible)
— stripe: Stripe volume (operation not possible)
— concat: Volume in concatenation group (operation not possible)
— switch: switch volume (operation not possible)

8.8.3.1 Configuring the replication operation

For notes on configuring the replication operation, refer to the section titled "Notes on SDX object operations (replication management)."

8.8.3.1.1 Supported logical volume structures

Replication with the copy destination volume of a mirror slice is not supported. Consequently, if either the original volume or replica volume is a mirror slice, you can perform replication only from the mirror slice to a physical slice.
To copy data to a mirror slice, use the "dd" command. This requires copying to all mirror slices that make up the logical volume.

8.8.3.2 Fetching device information from a Storage Server

To perform the replication operation with a Storage Server and obtain information about a subordinate device of the Storage Server, you must register the server.
For details on how to fetch the device information, refer to "Fetching device information from a Storage Server."

8.8.3.3 Configuring replication volumes

Register the mirror slices that make up a mirror volume of GDS/SafeDISK as replication volumes.

```
# swsrpsetvol /dev/sfdsk/CLS1/dsk/VOL1:c1t0d1 /dev/sfdsk/CLS1/dsk/VOL2:c1t0d2
swsrpsetvol completed
#
```

8.8.3.4 Executing replication

Example of snapshot replication

```
# swsrpmake /dev/sfdsk/CLS1/dsk/VOL1:c1t0d1 /dev/sfdsk/CLS1/dsk/VOL2:c1t0d2
FROM=/dev/sfdsk/CLS1/dsk/VOL1:c1t0d1, TO=/dev/sfdsk/CLS1/dsk/VOL2:c1t0d2 swsrpmake
completed
#
```

States of the objects in replication

Replication can be performed when the SDX object that makes up the relevant logical volume is in one of the states listed below. If the object is in any other state, replication cannot be performed. (AdvancedCopy Manager checks the state of the SDX object by using the <sdxinfo> command of GDS/SafeDISK.)

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

Replication pre-processing and post-processing

Pre-processing and post-processing scripts are not executed in the following case:

● A slice within an SDX object is in the TEMP state.

8.9 VxVM Volume Operation

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

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

● Replication operation in units of logical volume
● Replication operation in units of physical disks

8.9.1 Replication operation in units of logical volume

Replication can only be performed when the VxVM volume configuration satisfies the conditions required for operation involving units of logical volumes.

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

8.9.1.1 Configuration of operations involving VERITAS Volume structures

8.9.1.1.1 Supported VxVM volume structures

For the supported VxVM volume structures, refer to "Managing a Device on AdvancedCopy Manager."

8.9.1.1.2 Preparing a replica volume

The following two types of volumes can be used as a replica volume of a VxVM logical volume:

● Logical volume of VxVM
● Slice

For this replica volume, however, use a VxVM logical volume in the same structure as that of the original volume where the replica volume is mounted or in use by another application. The same volume structure means the following conditions are satisfied:

● The size of the physical disk (LU) is the same.
● The size of the private region is the same.
● The size of the public region is the same.
● Each sub-disk in the public region has a corresponding start offset and size.
● The logical volume and sub-disks have a relationship.

Figure: Example of correspondence between transaction volume and backup volume (1)
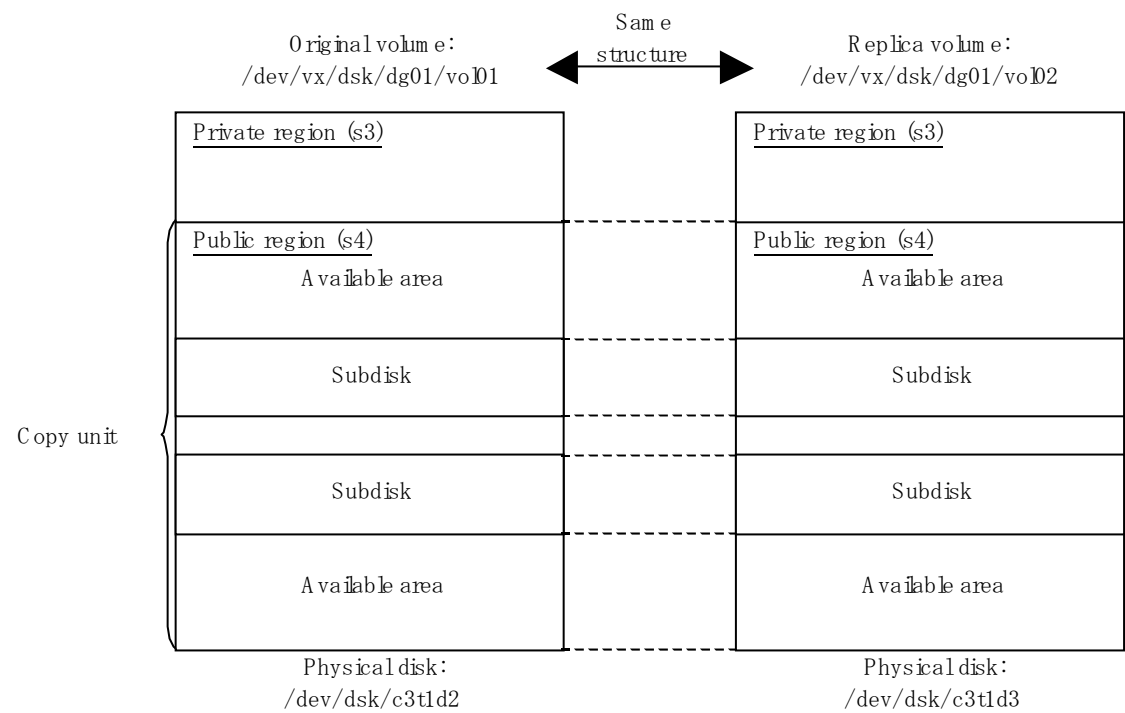
Note

If the replica volume is the same size as the public region, the replica volume of a VxVM volume can be made into a slice. However, the replica volume generally cannot be mounted or used by other applications.

Figure: Example of correspondence between transaction volume and backup volume (2)
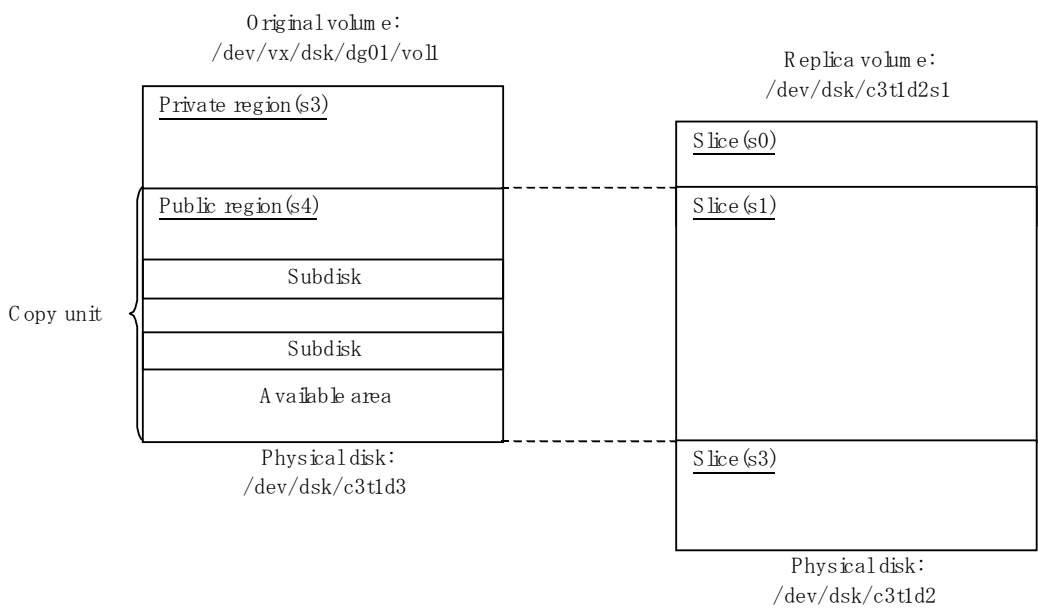
Similarly, a replica volume of a slice type can be made into a VxVM volume. However, the replica volume cannot be mounted or used by other applications.

8.9.1.2 Preparations

8.9.1.2.1 Setting the original volume and replica volume

If the target VxVM logical volume satisfies the condition of logical volumes: VM disk = N:1 (N>1), use one of the logical volume names included with each VM disk to register an original or replica volume, and set the replication volume information.

As an example, assume the original volume and replica volume in the following volume structures:

Figure: Volume structure example
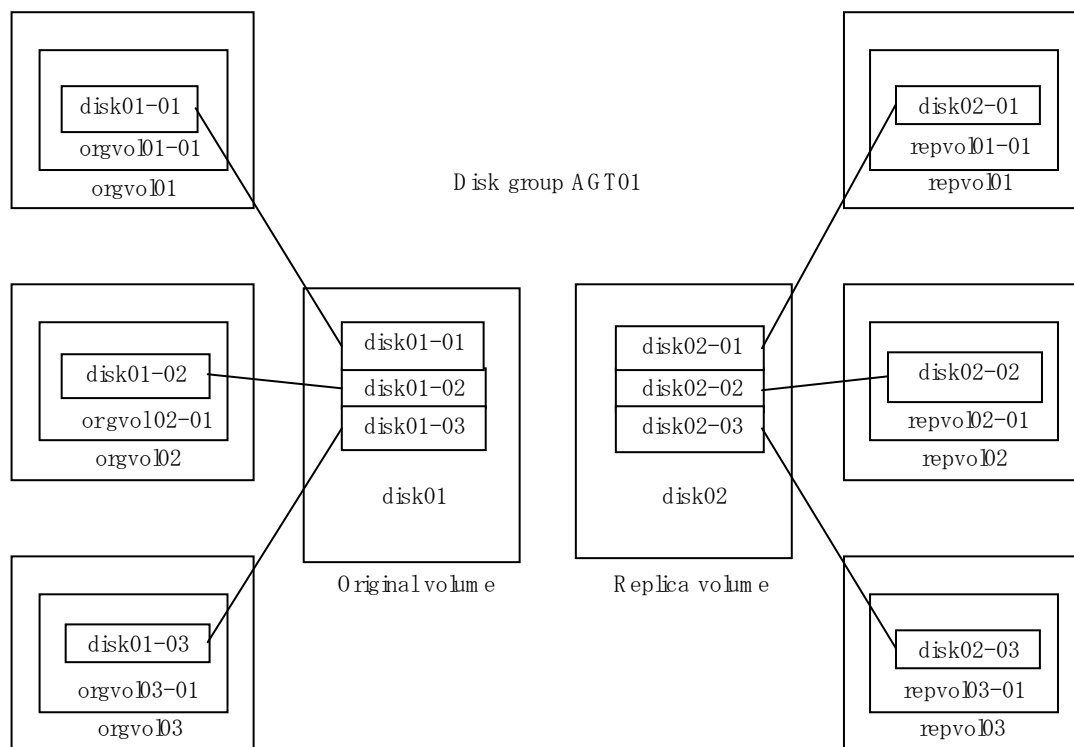
- ● VM disk disk01 (original volume) has logical volumes named orgvol01, orgvol02, and orgvol03, and VM disk disk02 (replica volume) has logical volumes named repvol01, repvol02, and repvol03.
- ● VM disks disk01 and disk02 have the same slice size. The sub-disk structures of VM disks disk01 and disk02 are the same. The sub-disk structure can be checked by executing "vxprint -AGts".

In the above example, use the logical volume names of orgvol01 and repvol01 when setting the replication volume information.

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
swsrpsetvol completed
#
```

The logical volume name specified in the replication volume information setting command is used to specify the VM disk (slice) for replication processing.
This means that orgvol02 or orgvol03 instead of orgvol01 can be set in the above example. This is also true for repovol01.
However, if replication volume information for the combination of orgvol01 and repvol01 is already set, replication volume information using another combination of volumes (e.g., orgvol02 and repvol02) cannot be set.

8.9.1.3 Executing replication

If the target VxVM logical volume satisfies the condition of logical volumes: VM disk = N:1 (N>2), unmount/mount processing cannot be performed using the pre-processing or post-processing scripts.

For this type of structure, unmount the file system before executing replication, and mount the file system after replication creation.

If the target VxVM logical volume satisfies the condition of logical volumes: VM disk = 1:1, the logical volume is unmounted and mounted in the same way as in operation with normal slices and the following procedure is not required.

Procedure for synchronous replication:

```
# umount /global/AGT01/repvol01 <-- unmount repvol01
# umount /global/AGT01/repvol02 <-- unmount repvol02
# umount /global/AGT01/repvol03 <-- unmount repvol03
# swsrpstartsync /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpstartsync
completed



                                     :
                                     :
                                     :
(check equivalency holding state)
# umount /global/AGT01/orgvol01 <-- unmount orgvol01
# umount /global/AGT01/orgvol02 <-- unmount orgvol02
# umount /global/AGT01/orgvol03 <-- unmount orgvol03
# swsrpmake /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpmake
completed
# mount -F ufs /dev/vx/dsk/AGT01/orgvol01 /global/AGT01/orgvol01 <-- mount orgvol01
# mount -F ufs /dev/vx/dsk/AGT01/orgvol02 /global/AGT01/orgvol02 <-- mount orgvol02
# mount -F ufs /dev/vx/dsk/AGT01/orgvol03 /global/AGT01/orgvol03 <-- mount orgvol03
# mount -F ufs /dev/vx/dsk/AGT01/repvol01 /global/AGT01/repvol01 <-- mount repvol01
# mount -F ufs /dev/vx/dsk/AGT01/repvol02 /global/AGT01/repvol02 <-- mount repvol02
# mount -F ufs /dev/vx/dsk/AGT01/repvol03 /global/AGT01/repvol03 <-- mount repvol03
```

Procedure for snapshot replication:

```
# umount /global/AGT01/repvol01 <-- unmount repvol01
# umount /global/AGT01/repvol02 <-- unmount repvol02
# umount /global/AGT01/repvol03 <-- unmount repvol03
# umount /global/AGT01/orgvol01 <-- unmount orgvol01
# umount /global/AGT01/orgvol02 <-- unmount orgvol02
# umount /global/AGT01/orgvol03 <-- unmount orgvol03
# swsrpmake /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpmake
completed
# mount -F ufs /dev/vx/dsk/AGT01/orgvol01 /global/AGT01/orgvol01 <-- mount orgvol01
# mount -F ufs /dev/vx/dsk/AGT01/orgvol02 /global/AGT01/orgvol02 <-- mount orgvol02
# mount -F ufs /dev/vx/dsk/AGT01/orgvol03 /global/AGT01/orgvol03 <-- mount orgvol03
# mount -F ufs /dev/vx/dsk/AGT01/repvol01 /global/AGT01/repvol01 <-- mount repvol01
# mount -F ufs /dev/vx/dsk/AGT01/repvol02 /global/AGT01/repvol02 <-- mount repvol02
# mount -F ufs /dev/vx/dsk/AGT01/repvol03 /global/AGT01/repvol03 <-- mount repvol03
```

To prevent unmount/mount processing of the original volume, back up the volume by using the procedures described below.

 Procedure for synchronous replication (while preventing unmount/mount processing of the original volume):

```
# umount /global/AGT01/repvol01 <-- unmount repvol01
# umount /global/AGT01/repvol02 <-- unmount repvol02
# umount /global/AGT01/repvol03 <-- unmount repvol03
# swsrpstartsync /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpstartsync
 completed




                                        :
                                        :
                                        :
(chekc EC equivalent)
# lockfs -w /global/AGT01/orgvol01 <-- lock file system orgvol01
# lockfs -w /global/AGT01/orgvol02 <-- lock file system orgvol02
# lockfs -w /global/AGT01/orgvol03 <-- lock file system orgvol03
# swsrpmake /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpmake
completed
# lockfs -u /global/AGT01/orgvol01 <-- unlock file system orgvol01
# lockfs -u /global/AGT01/orgvol02 <-- unlock file system orgvol02
# lockfs -u /global/AGT01/orgvol03 <-- unlock file system orgvol03
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol01 <-- check file system backvol01
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol02 <-- check file system backvol02
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol03 <-- check file system backvol03
# mount -F ufs /dev/vx/dsk/AGT01/repvol01 /global/AGT01/repvol01 <-- mount repvol01
# mount -F ufs /dev/vx/dsk/AGT01/repvol02 /global/AGT01/repvol02 <-- mount repvol02
# mount -F ufs /dev/vx/dsk/AGT01/repvol03 /global/AGT01/repvol03 <-- mount repvol03
```

 Procedure for snapshot replication (while preventing unmount/mount processing of the original volume):

```
# umount /global/AGT01/repvol01 <-- unmount repvol01
# umount /global/AGT01/repvol02 <-- unmount repvol02
# umount /global/AGT01/repvol03 <-- unmount repvol03
# lockfs -w /global/AGT01/orgvol01 <-- lock file system orgvol01
# lockfs -w /global/AGT01/orgvol02 <-- lock file system orgvol02
# lockfs -w /global/AGT01/orgvol03 <-- lock file system orgvol03
# swsrpmake /dev/vx/dsk/AGT01/orgvol01 /dev/vx/dsk/AGT01/repvol01
FROM=/dev/vx/dsk/AGT01/orgvol01@svr1,TO=/dev/vx/dsk/AGT01/repvol01@svr1 swsrpmake
completed
# lockfs -u /global/AGT01/orgvol01 <-- unlock file system orgvol01
# lockfs -u /global/AGT01/orgvol02 <-- unlock file system orgvol02
# lockfs -u /global/AGT01/orgvol03 <-- unlock file system orgvol03
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol01 <-- check file system backvol01
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol02 <-- check file system backvol02
# fsck -n -F ufs /dev/vx/dsk/AGT01/repvol03 <-- check file system backvol03
# mount -F ufs /dev/vx/dsk/AGT01/repvol01 /global/AGT01/repvol01 <-- mount repvol01
# mount -F ufs /dev/vx/dsk/AGT01/repvol02 /global/AGT01/repvol02 <-- mount repvol02
# mount -F ufs /dev/vx/dsk/AGT01/repvol03 /global/AGT01/repvol03 <-- mount repvol03
```

Note

Even if <lockfs -w> is used to flush the file system cache and prevent subsequent update, file contents are not guaranteed for the file in Write Open (excluding the database space of Oracle used to support on-line backup).
If metadata renewal is in progress, consistency of data of the file system itself is cannot be guaranteed because <lockfs> is specified.
To handle this problem, perform <fsck> processing after replication to check the consistency of the data.
Even if the following message is output in <fsck> processing, there is no problem with the consistency of the file system. Execute <fsck -y> to restore.

```
FILE SYSTEM STATE IN SUPERBLOCK IS WRONG; FIX?
```

8.9.1.4 Changing configuration information

To change the volume structure during the replication operation, follow the procedure below.
1. Delete the replication volume. For details on how to delete a replication volume, refer to "Deleting the original volume or replica volume."
2. Change the structure of the logical volume.
3. On the initial client screen, execute [Get and reflect information on all devices].
4. Re-configure the replication volume. For details on how to register a replication volume, refer to "Setting the original volume and replica volume."
5. Resume the replication operation.

8.9.2 Replication operation in units of physical disks

When the VxVM volume configuration does not satisfy the conditions for replication in units of logical volumes, replication can be performed 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.

Point

Refer to "Device information display command (stgxfwcmdispdev)," 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

It is only VM disk of the "nopriv" type that a physical slice becomes the unit of management.

Note

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

Note

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. For operation in a SunCluster environment, the VxVM enclosure name must be the same at all servers that comprise the cluster, and the ETERNUS disk indicated by the enclosure name must be the same.

8.9.2.1 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: Copy source volume and copy destination volume
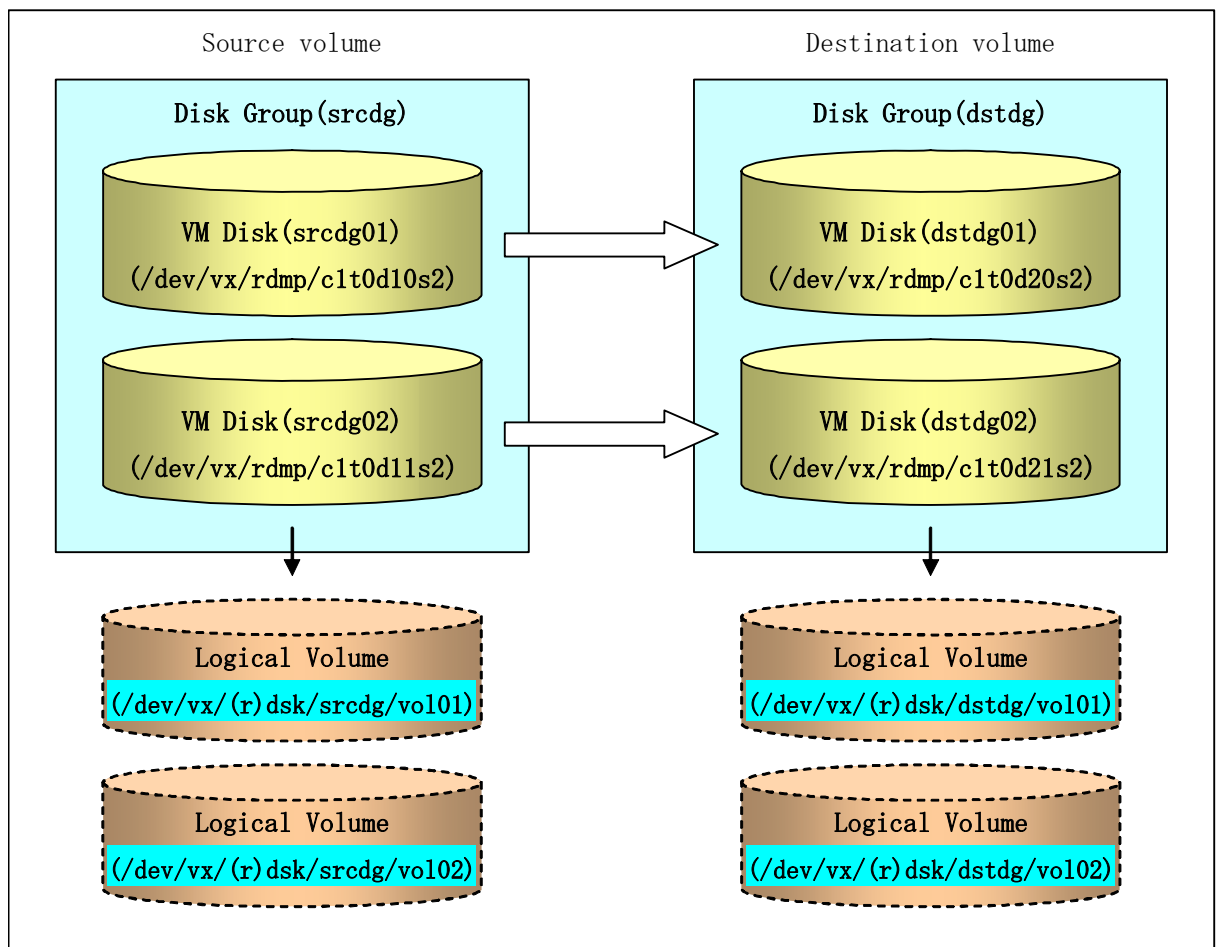
8.9.2.2 Preparations

8.9.2.2.1 Confirming the disk group configuration information file

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

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

8.9.2.2.2 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/c1t0d10s2 /dev/vx/dmp/c1t0d20s2
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/c1t0d11s2 /dev/vx/dmp/c1t0d21s2
swsrpsetvol completed
#
```

8.9.2.3 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/c1t0d10s2 /dev/vx/dmp/c1t0d20s2
FROM=/dev/vx/dmp/c1t0d10s2@SV1, TO=/dev/vx/dmp/c1t0d20s2@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11s2 /dev/vx/dmp/c1t0d21s2
FROM=/dev/vx/dmp/c1t0d11s2@SV1, TO=/dev/vx/dmp/c1t0d21s2@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/vx/dmp/c1t0d10s2 /dev/vx/dmp/c1t0d20s2
FROM=/dev/vx/dmp/c1t0d10s2@SV1, TO=/dev/vx/dmp/c1t0d20s2@SV1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/vx/dmp/c1t0d11s2 /dev/vx/dmp/c1t0d21s2
FROM=/dev/vx/dmp/c1t0d11s2@SV1, TO=/dev/vx/dmp/c1t0d21s2@SV1 swsrpstartsync completed
(After state of equivalency upkeep)
(Perform preprocessing for the source volume.)
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d10s2 /dev/vx/dmp/c1t0d20s2
FROM=/dev/vx/dmp/c1t0d10s2@SV1, TO=/dev/vx/dmp/c1t0d20s2@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11s2 /dev/vx/dmp/c1t0d21s2
FROM=/dev/vx/dmp/c1t0d11s2@SV1, TO=/dev/vx/dmp/c1t0d21s2@SV1 swsrpmake completed
#
(Perform postprocessing for the source and target volumes.)
```

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

Table: Replication pre-processing and post-processing

	Preprocessing	Postprocessing
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. 3. Import the disk group, when the disk group is not imported for replication within the server.	1. If file systems are included, remount the volumes that were unmounted by pre-processing.

	Preprocessing	Postprocessing
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 preprocessing is set to online. Reconfigure the volume group 2. If file systems are included, remount the volumes that were unmounted by preprocessing.

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 c1t0d20s2 ...
Installing volume manager disk header for c1t0d21s2 ...
-
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 c1t0d20s2 c1t0d21s2
```

![Note icon]

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.

![Note icon]

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.

![Note icon]

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 9 Configuration Maintenance

This chapter describes maintenance of the management database, performing troubleshooting, and changing the configuration information.

9.1 Maintenance of Management information

AdvancedCopy Manager holds various files and database tables of critical management information for use in backup operations.

It is recommended that these management information files and tables are backed up regularly to ensure there is always sufficient capacity to cater for the typically high volume of dynamic information such configuration and device related data, scripts, authentication lists, history information and other critical management information built up over long term use of the system. Corruption or loss of this critical management data particularly history data could lead to data inconsistencies in live volumes and generation and tracking inconsistencies in backup volumes. Please note that these files and tables will differ in environments involving ORACLE databases.

The following table lists the backup frequency relating to this information according to Host, type and purpose.

Table: Databases on a Storage Management Server

Type	When backup to be made	Backup method (reference)	Size
Database	A Storage Server has been added, the configuration information has changed as a result of loading of new device information or for some other reason, or the information about the backup management or replication management operation has changed.	Saving a database or Making a package backup of databases	Refer to Saving a database.
Authentication management list	Authenticated data has been set.	Backing up an authentication management list or Making a package backup of databases	Refer to Backing up an authentication management list.
Registry	DB setup has been performed on a Storage Management Server (a transaction on a Storage Management Server has been created in a cluster system) or the Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.

Table: Databases on a Storage Server

Type	When backup to be made	Backup method (reference)	Size
Registry	A Storage Server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.

Type	When backup to be made	Backup method (reference)	Size
Backup management list	A backup transaction has been completed.	Backing up a backup management list or Making a package backup of databases	Refer to Backing up a backup management list.
Pre-processing and post-processing scripts for backup management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the pre-processing and post-processing script file for backup management.
Pre-processing and post-processing scripts for tape-copy	A pre-processing or post-processing script has changed.	Saving a database by using the copy command **or** Making a package backup of databases	Check the size of the pre-processing and post-processing script files for tape-copy.
Replication management list	A replication transaction has been completed.	Backing up a replication management list or Making a package backup of databases	Refer to Backing up a replication management list.
Pre-processing and post-processing scripts for replication management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the pre-processing and post-processing script file for replication management.
Policy file for management information package backup	The policy file has changed.	Saving a database by using the copy command or Making a package backup of databases	Check the size of the policy file for management information package backup.

Table: Databases on a tape server

Type	When backup to be made	Backup method (reference)	Size
Registry	A tape server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	Backing up a registry or Making a package backup of databases	Refer to Backing up a registry.
Tape management list	A tape-backup transaction has been completed.	Backing up a tape management list or Making a package backup of databases	Refer to Backing up a tape management list.

Point

You can make backups of databases either individually or as a whole.
If a Storage Server also operates as a Storage Management Server, the Storage Server contains a database for the Storage Management Server as well as for the Storage Server.

9.1.1 Individual backup of databases

9.1.1.1 Maintaining a backup a management list

This chapter describes maintenance of a backup management list. A backup management list is maintained on the server that performs the backup operation.

9.1.1.1.1 Backing up a backup management list

A backup management list is backed up.
For details, refer to "Resource backup command (swstresback)."

Backup management list backup data size

Check the size of the subordinate directories of the following path:

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

In the cluster environment, check the size of the subordinate directories of the following path:

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

Point

When you reuse a directory used before to save the data, the size of this directory must be capable of supporting repositories which have been allocated a size to cater for high growth. Rule of thumb would suggest that the filesystem in which these directories exist should be at least three times greater than the size returned in query above.

9.1.1.1.2 Restoring a backup management list

A backup management list is restored.
For details, please refer to "Resource restore command (swstresrst)."

9.1.1.2 Maintaining a replication management list

This chapter describes maintenance of a replication management list.

9.1.1.2.1 Backing up a replication management list

To back up a replication management list, back up the repository of the Storage Management Server. For information about backing up a repository, see "Database save command (saving a database)."

Point

● Management information for replication management is saved in a repository.
● It is recommended that a replication management list be backed up when management information for replication management is changed with the replication volume information configuration command (swsrpsetvol) or the replication volume information deletion command (swsrpdelvol).

9.1.1.2.2 Restoring a replication management list

Take the following steps to restore a replication management list.
1. Restore the repository on the Storage Management Server. For information about restoring a repository, see "Database recovery command (recovering a database)." Specify recovery mode 0.
2. On the Storage Server, execute the resource adjustment command (swsrprecoverres) with the "-r" option specified.

Point

● When the procedure above is performed, information for replication management of a repository is copied to a Storage Server, where it is available for use.
● When the information for replication management in the repository does not need to be changed and the information on the Storage Server is only incorrect for some other reason, perform the procedure above.

9.1.1.3 Maintaining a database

This chapter describes maintaining a database used by a Storage Management Server.

9.1.1.3.1 Saving a database

Execute the database save command to save a database space.
Execute this command on the Storage Management Server.

Note

● To execute the database save command, log in as a root user.
● Execute the command using the locale that was specified when installing the Storage Management Server.
● Processing may not end normally if a browser client is used to perform this operation or if another command is executed while this command is being executed. In this case, execute the command at the command line or wait until all other processes have terminated.
● If no data is saved by this command, the respective database cannot be recovered with the database recovery method if I/O error occurs in the database space.
● When the Storage Management Server is in cluster operation, you should prepare directories into which data is saved on shared disks.

a. Specification

```
# /opt/swstorage/bin/stgdbdmp -d Backup-Directory [ -y ]
```

b. Explanation of options

Option	Explanation
-d	Specify the name of the directory in which to save a database space. This directory must be created in advance.
-y	Existing contents of the specified directory will be overwritten when the database space is saved. If this option is omitted and existing content is retained in the specified directory, processing ends without saving the database space.

c. End status
= 0: Normal end
> 0: Abnormal end

d. Execution example

```
# /opt/swstorage/bin/stgdbdmp -d /storage/dmpdir - y


////// AdvancedCopy Manager database save //////


================================================================
DB data will be saved.
================================================================
Editing of the work file used for save processing is complete.
.
Update of the DB space is suppressed.
Forced switching of archive log files is complete.
.........................
Save processing of DSI data is complete.
Archive log files have been completely discarded.
Save processing of RDB dictionary data is complete.
Suppression of DB space updates has been completely canceled.
================================================================
Save processing of DB data is complete.
================================================================


Database save processing ended normally.

#
```

Point

● Use this save method only when configuration information is changed due to the addition of another Storage Server or fetching of device information. It is recommended that saving the database should be performed at least once per day.
● To prepare for an I/O error in an external file while save data is being acquired, you are recommended to keep at least two generations of save data.

Database backup data size

Calculate the size with the following formula:

```
60 + (number of devices to be managed x 0.001) megabytes
```

9.1.1.3.2 Finding an error in a database

Refer to the following file, and beginning from the last line, search for any message with
"rdb: ERROR: qdgXXXXX-" in its contents (also check the messages output at the same time).
Then, obtain the value of "qdgXXXXX" to determine the recovery mode.
(For non-cluster operation) /var/opt/FJSVswstf/log/RDBSWSTF.log
(For cluster operation) /var/opt/FJSVswstf/<logical-node-name>/log/RDBSWSTF.log

Table: Relationships between the qdg message and recovery mode

qdg message	Description of error	Target of checking	Recovery mode
qdg13039u	I/O error or detected damage	The directory for storing data of a DB in a repository/hdrdb_rep1	1
qdg12079e	File delete		
qdg03400u	Rollback disabled	-	
qdg03401u			
qdg03121u	I/O error	The directory for the RDB	2

qdg message	Description of error	Target of checking	Recovery mode
qdg12078u	File delete	dictionary/hdrdic	
qdg03420u	I/O error, detected damage, etc.	The directory for DB file/SWSTFDB/rdbdir/DIR_FILE1	
qdg12150u	File open error	The directory for DB file/SWSTFDB/rdbdir/DIR_FILE2	
qdg12151u			
qdg12251e	I/O error	The directory for DB file/SWSTFDB/rdbdir/rdblogmanage	3
qdg12443u			
qdg12434u	File error		
qdg02290u	File delete		
qdg12111u	I/O error	The directory for RDB log files/hdrlog	4
qdg12440u			
qdg12441u			
qdg12442u			
qdg02296u	File delete		
qdg03815u	System call error	The directory for DB file/SWSTFDB/rdbdir/archive1	5
qdg12275W			
qdg12250u	Damage detection	The directory for DB file/SWSTFDB/rdbdir/archive2	
qdg12483u	File read error		

Note
- If multiple errors occur simultaneously, recovery using recovery modes 1 to 5 may not be possible.
- To restore a database to its state when it was last saved, re-create the database and execute the database save command in recovery mode 0. (Data updated or inserted after the last time the database was saved cannot be recovered.)
- At this point, execute the resource adjustment command (see "Resource match command") with option "-x" on all the Storage Servers on which the backup operation is performed.
- Then, execute the resource adjustment command (see "Resource adjustment command") with option "-r" on all the Storage Servers on which the replication operation is performed.

9.1.1.3.3 Recovering a database

Execute the database recovery command for database recovery if an I/O error occurs in a database space.
Execute this command on the Storage Management Server.

Note
- To execute the database recovery command, log in as a root user.
- Execute the command using the locale that was specified when installing the Storage Management.

Note
- After the database recovery command ends normally, acquire the latest save data using the saving database. Fujitsu recommends using a different save data storage directory than the save data storage directory used by the recovery command.
- After the database recovery command ends normally, restart (start after stopping) the AdvancedCopy Manager daemons. For an explanation on restarting the daemons, see "Starting and Stopping Daemons."

a.　Specification

```
# /opt/swstorage/bin/stgdbrcv -m mode [-d Backup-Directory]
```

b.　Explanation of options

Option	Explanation
-m	Specify a recovery mode based on the type of error that occurred in a database space. For the relationship between types of errors and recovery modes, see "Table: Relationships between the qdg message and recovery mode".
-d	Specify the name of the directory storing the saved data. This option is required if 0, 1, 2, or 4 is specified in the -m option.

c.　End status
   = 0:　Normal end
   ＞ 0:　Abnormal end

d.　Execution example

```
# /opt/swstorage/bin/stgdbrcv -m 1 -d /storage/dmpdir


////// AdvancedCopy Manager database recovery //////

================================================================
DSI recovery (FW mode) will start.
================================================================
Editing of the work file used for recovery is complete.
DSI access inhibition is complete.
........................
DSI data recovery is complete.
================================================================
DSI recovery (FW mode) is complete.
================================================================


Database recovery ended normally.

#
```

9.1.1.4 Maintaining authentication management list

This chapter describes maintenance of the authentication feature.　Execute the command on the server (Storage Server) where the authentication feature is implemented.

9.1.1.4.1 Backing up an authentication management list

On a Storage Management Server, execute the /opt/FJSVswssc/bin/smmkbat command to extract authentication management information.　The root user must execute this command.
/opt/FJSVswssc/bin/Smmkbat - f definition-information-output-shell-script-name
Example: /opt/FJSVswssc/bin/smmkbat - f acldata.sh
The definition information output shell script is extracted as a shell script in which the command example for reflecting definition information is described.

Authentication management list backup data size

Calculate the size with the following formula:

```
400 + (length of the account name with an access permission assigned + 29 (*1)...) bytes
```

*1 Add the lengths of all accounts with an access permission assigned.

9.1.1.4.2 Restoring an authentication management list

Execute the definition information output shell script. This script must be executed by a root user.

9.1.1.5 Maintaining a registry

This chapter describes maintaining a registry.
Perform this procedure on a Storage Management Server or a Storage Server.

9.1.1.5.1 Backing up a registry

Back up the following file by executing the cp command.

a. File names
In the case of a non-cluster

```
/etc/opt/swstorage/swnode.ini
```

In the case of a cluster

```
etc/opt/swstorage/Logic node name/swnode.ini
```

b. Execution example
Save it in the /backup directory.

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

Registry backup data size

Check the size of the file to be backed up.

9.1.1.5.2 Restoring a registry

Restore the following file by executing the cp command:

a. File names
In the case of a non-cluster

```
/etc/opt/swstorage/swnode.ini
```

In the case of a cluster

```
/etc/opt/swstorage/Logic node name/swnode.ini
```

b. Execution example
Restore the following file saved in the /backup directory:

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

9.1.2 Making a package backup of databases

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

With a packaged backup of management information, you can execute a backup of management information across all Storage Servers, Storage Management Servers, and tape servers from a single participating server.
The server from which you invoke a packaged backup of management information is called the "package-backup-of-the-management-information execution server". The servers whose data is to be backed up are called the "package-backup-of-the-management-information target servers".

<p align="center">Figure: Storage Management Server and Storage Server</p>
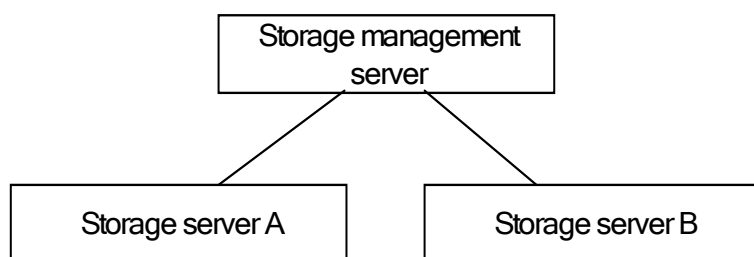
Example: Assume that the package backup of management information function has been used to back up the management information on a Storage Management Server, Storage Server A, and Storage Server B onto Storage Server B in the diagram above. In this case, Storage Server B is the management information package backup execution server.
The Storage Management Server, Storage Server A, and Storage Server B are the management information package backup target servers. That is, Storage Server B operates as both the management information package backup execution server and a management information package backup target server.
The following table shows the types of management information handled in a package backup of management information.

<p align="center">Table: Types of management information backed up by package backup of management information</p>

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

Function	Type of data
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

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 make a backup, back up each management information component individually as described in "Maintaining a database" in the Operator's Guide applicable to the Storage Server.

9.1.2.1 Preliminaries

Before making a packaged backup of management information, you must perform the following:
1. Determine the management information package backup target servers and the types of management information to be backed up.
2. Determine the management information package backup execution server.
3. Create a directory where the management information package backup execution server will store the backup data. The size of the directory must not be less than the total of the following sizes:

● The required size for a database is the size of the database backup data multiplied by 1.2.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

● The required size for an authentication management list is the size of the authentication management list backup data.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

● The required size for the registries is the total of the data sizes of the registry backup data on the management information package backup target servers.
For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.

● The required size for backup management is the total of the sizes below for each management information package backup target server:
For the size of each backup data, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.
    – Size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 1.2
    – Size of the pre-processing and post-processing scripts for backup management
    – Sizes of the pre-processing and post-processing scripts for tape-copy
    – Size of the transaction volume locking specification file for backups for backup management
    – Size of the backup volume locking specification file for backups for backup management
    – Size of the backup-restored volume locking specification file for backup management

- Size of the backup volume locking specification file for backups for tape copy
- The required size for replication management is the total of the following sizes for each management information package backup target server:
  - Size of the pre-processing and post-processing scripts for replication management
  - Size of the copy-source volume locking specification file for replication management
  - Size of the copy-destination volume locking specification file for replication management
- The required size for the policy file for package backup of management information is the size of the policy file backup.
  - The size required for tape management information is 1.2 times the size of backup of the tape management information.
    For details on the size of tape management information, see the section titled "Maintaining Databases" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".
4. Check the size of the work directory for the management information package backup target servers (or the shared disk for shared data for AdvancedCopy Manager in a cluster system). The sizes described below are needed only when a package backup of management information is being done. Use the largest value of the sizes of the databases to be backed up from the management information package backup target servers. The required sizes are as follows:
- The required size for the databases is the size of the database backup data multiplied by 2.2.
  For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
- The required size for the authentication management list is the size of the authentication management list backup data.
  For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.
- The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2
  For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.
- The work directory does not require any space for registry, replication management, and policy file backups.
  - 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, see 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 "Management information package backup server registration/deletion command (stgmgrinfoset)", 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. Policy file

Management information package backup execution server		Policy file
OS	Operation type	
Windows	Non-cluster	environment-setting-directory¥etc¥stgmgrinfo_policy.ini
	Cluster	<AdvancedCopy-Manager-shared-data>:¥etc¥opt¥swstorage¥etc¥stgmgrinfo_policy.ini
Solaris	Non-cluster	/etc/opt/FJSVswstf/stgmgrinfo_policy.ini
HP-UX Linux AIX	Cluster	etc/opt/FJSVswstf/<logical-node-name>/stgmgrinfo_policy.ini

Note

● Do not specify more than one Storage Server as a management information package backup execution server.

● When the management information package backup execution server is used for executing transactions on the Storage Server in a cluster system, create a directory for storing backup data on a shared disk.

● For databases, backup management, authentication management lists, and tape backup management, backup commands are executed on the respective management information package backup target servers. In addition, for database backups, backup management (backup management lists) backups, and tape backup management information backups, a temporary capacity that is approximately 2.2 times greater than the total size of the backups is required to put the backup data in an archive file.

Table: Policy file settings

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape server
Server name	DBData	Specifies whether to make a backup of the database. Yes: Make a backup of the database. No: Do not make a backup of the database. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), "No" is set.	A	C	C

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

```
A: Configurable,
B: Configurable only when the applicable function is operating on the server,
C: Non-configurable
```

Example: Set up a policy file as follows:
- ● The Storage Management Server named ACMMGR creates backups for the database, the authentication feature, and backup management.
- ● The Storage Server named ACMAGT1 creates backups for backup management.
- ● The Storage Server named ACMAGT2 creates backups for replication management.
- ● The tape server (name: ACMTAPE) makes a tape backup management backup.

```
[ACMMGR]
DBData=Yes
AuthData=Yes
BkupData=Yes
[ACMAGT1]
BkupData=Yes
[ACMAGT2]
ReplData=Yes
[ACMTAPE]
TapeData=Yes
```

Note
- ● Create a policy file only if it will be used.
- ● The policy file cannot include any settings for backups of registries and of the policy file for management information package backup.

9.1.2.2 Backup operations

Executing the management information package backup command (stgmgrinfobkup) on the management information package backup execution server stores the backup data in the directory under the following structure:

Table: Directory structure and data types

Directory			Data type
*1	Server name	DBData	Database
		AuthData	Authentication management list
		RegiData	Registry
		BkupData	FJSVswsts	Backup management list, or backup management list and recovery control file
			Scripts	Pre-processing and post-processing scripts for backup management Pre-processing and post-processing scripts for tape-copy
			data	Transaction volume locking specification file for backups for backup management Backup volume locking specification file for backups for backup management Backup-restored volume locking specification file for backups for backup management Backup volume locking specification file for tape copy
		ReplData	Scripts	Pre-processing and post-processing scripts for replication management
			data	Copy-source volume locking specification file for replication management Copy-destination volume locking specification file for replication management
		MgrInfoData	Policy file for management information package backup
		TapeData	Tape management list

*1 is the backup data storage directory specified by the management information package backup server registration/deletion command (stgmgrinfoset).

Example: When *1 is /ACMBkupData and the server name is ACMAGT1, the pre-processing and post-processing scripts for backup management are put in the following directory:
    /ACMBkupData/ACMAGT1/BkupData/Scripts

Initial operations
The initial operations are as follows:
1. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make backups of the registries on all of the Storage Servers.
2. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

General operations
Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server in accordance with the data backup timing to make backups of the target data.
For the timing of the backups, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the applicable operating system.

Operations when a server is added or deleted

Operations when server added

1. On the management information package backup execution server, set up a policy for the added Storage Server in the policy file.
2. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the registry of the added Storage Server.
3. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

Operations when server deleted

1. On the management information package backup execution server, delete the information about the Storage Server deleted from the policy file.
2. In the backup data directory on the management information package backup execution server, delete the directory having the name of the deleted Storage Server.
3. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

Operations when server name changed

1. On the management information package backup execution server, delete the information for the Storage Server from the policy file.
2. In the backup data directory on the management information package backup execution server, delete the directory having the name of the Storage Server.
3. On the management information package backup execution server, set up a policy for the renamed Storage Server in the policy file.
4. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the registry of the renamed Storage Server.
5. Execute the management information package backup command (stgmgrinfobkup) on the management information package backup execution server to make a backup of the policy file.

9.1.2.3 Restore operations

This section describes how to use the backup data created by the management information package backup command (stgmgrinfobkup) to execute restoration.
Perform the operations below as a root user or with an account that belongs to the administrators group.

Restoring a registry

1. Execute the management information package backup server registration/deletion command (stgmgrinfoset) 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:

   [Solaris, Linux, HP-UX, or AIX version]
     directory-determined-in-step1¥<server-whose-registry-to-be-restored>¥RegiData
   [Windows version]
     directory-determined-in-step1¥<server-whose-registry-to-be-restored>¥RegiData

3. Transfer the registry backup copied in step 2 to the target server in binary mode.
4. Restore the registry on the server. For details on restoring a registry, refer to "Restoring a registry" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.

Restoring a database

1. Execute the management information package backup server registration/deletion command (stgmgrinfoset) 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:

   [Solaris, Linux, HP-UX, or AIX version]
     directory-determined-in-step1¥<storage-management-server-name>¥RegiData
   [Windows version]
     directory-determined-in-step1¥<storage-management-server-name>¥RegiData

3. Transfer the backup of the database copied in step 2 to the Storage Management Server in binary mode.
4. On the Storage Management Server, expand the database backup transferred in step 3. On the Windows version Storage Management Server, expand the database backup by using the expand backup data command. For the backup data expansion command, refer to the section "Backup data expansion command (stgarcext)" 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 the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backup of the authentication management list to the following directory:
   [Windows version]
     directory-determined-in-step1¥<storage-management-server-name>¥AuthData
   [Solaris, Linux, HP-UX, or AIX version]
     directory-determined-in-step1/<storage-management-server-name>/AuthData
3. Transfer the backup of the authentication management list copied in step 2 to the Storage Management Server in binary mode.
4. On a 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 the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backup of the backup management list or the backups of the backup management list and the recovery control file to the following directory:

   > [Windows version]
   > directory-determined-in-step1¥<server-whose-list/file-to-be-restored>¥Bkup Data¥FJSVswsts
   >
   > [Solaris, Linux, HP-UX, or AIX version]
   > directory-determined-in-step1/<server-whose-list/file-to-be-restored>/Bkup Data/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 by using the expand backup data command. For the backup data expansion command, refer to the section "Backup data expansion command (stgarcext)" 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 backup and tape-copy management pre-processing/ post-processing scripts

1. Execute the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the backup and tape-copy management pre-processing/ post-processing scripts to the following directory:

   > [Windows version]
   > directory-determined-in-step1¥<server-whose-scripts-to-be-restored>¥BkupDa ta¥Scripts
   >
   > [Solaris, Linux, HP-UX, or AIX version]
   > directory-determined-in-step1/<server-whose-scripts-to-be-restored>/BkupDa ta/Scripts

3. Transfer the backups of the backup and tape-copy management pre-processing/ post-processing scripts copied in step 2 to the target server in binary mode.
4. Transfer the backups of the backup and tape-copy management pre-processing/ post-processing scripts copied in step 3 to the directory in which the scripts will be executed on the target server in binary mode. For the directory in which the pre-processing and post-processing scripts for backup management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing for backup/restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.

5. 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 the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the locking specification files for backup management to the following directory:

> [Windows version]
> directory-determined-in-step1¥<server-whose-files-to-be-restored>¥BkupData
> ¥data
>
> [Solaris, Linux, HP-UX, or AIX version]
> directory-determined-in-step1/<server-whose-files-to-be-restored>/BkupData
> /data

3. Transfer the backups of the locking specification files for backup management copied in step 2 to the target server in binary mode.
4. Copy the backups of the locking specification files for backup management transferred in step 3 to the target server.   For the directory in which the locking specification files for backup management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Backup and Restoration", in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring pre-processing and post-processing scripts for replication management

1. Execute the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.
2. On the management information package backup execution server, copy the backups of the pre-processing and post-processing scripts for replication management to the following directory:
    [Windows version]

    directory-determined-in-step1¥<server-whose-scripts-to-be-restored>¥ReplData¥Script
    s
    [Solaris, Linux, HP-UX, or AIX version]

    directory-determined-in-step1/<server-whose-scripts-to-be-restored>/ReplData/Script
    s
3. Transfer the backups of the pre-processing and post-processing scripts for replication management copied in step 2 to the target server in binary mode.
4. Copy the backups of the pre-processing and post-processing scripts for replication management transferred in step 3 to the directory in which the scripts will be executed on the target server.   For the directory in which the pre-processing and post-processing scripts for replication management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing of replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.
5. 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 the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the backups of the locking specification files for replication management to the following directory:
   [Windows version]
      directory-determined-in-step1¥<server-whose-files-to-be-restored>¥ReplData¥data
   [Solaris, Linux, HP-UX, or AIX version]
      directory-determined-in-step1/<server-whose-files-to-be-restored>/ReplData/data

3. Transfer the backups of the locking specification files for replication management copied in step 2 to the target server in binary mode.

4. Copy the backups of the locking specification files for replication management transferred in step 3 to the target server. For the directory in which the locking specification files for replication management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Replication", in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring a policy file for management information package backup

1. Execute the management information package backup server registration/deletion command (stgmgrinfoset) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the policy file located in the following directory to the policy file for the management information package backup command:
   [Windows version]
      directory-determined-in-step1¥<server-whose-file-to-be-restored>¥MgrInfoData
   [Solaris, Linux, HP-UX, or AIX version]
      directory-determined-in-step1/<server-whose-file-to-be-restored>/MgrInfoData
   For the directory for the policy file for the management information package backup command, refer to step 6 in the section "Preliminaries".

Restoring the tape management information

1. On the package-backup-of-the-management-information execution server, execute the management information package backup server registration/deletion command (stgmgrinfoset) to check the directory that contains the backup data.

2. On the package-backup-of-the-management-information execution server, copy the backup data of the tape management information from the directory indicated below:
   [Windows version]
   directory-checked-at-step-1¥<name-of-the-target-server-of-restoration>¥TapeData
   [Solaris, Linux, HP-UX, or 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, see the section titled "Restoring the tape management information" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".

9.2 Troubleshooting

9.2.1 Troubleshooting for insufficient free space in a repository

This chapter describes what to do if there is insufficient free space in a repository used by a Storage Management Server.
Perform this procedure on a Storage Management Server.

You can use this troubleshooting method when there is insufficient free space in a repository and if the operation status is significantly different from the initial installation time to prevent the occurrence of insufficient free space in the repository.

Extend the repository space as follows:

1. Backup the registry of a Storage Management Server (See "backing up a registry")
2. Store data saved in the processing (see "Database backup")
3. Release a repository (See "Cancel of repository settings," of the "ETERNUS SF AdvancedCopy Manager Installation Guide".)
4. Re-estimate the database size (see "Estimation of Database area," of the "ETERNUS SF AdvancedCopy Manager Installation Guide").
5. Re-create partitions (See "Directory creation," of the "ETERNUS SF AdvancedCopy Manager Installation Guide".)
6. Create a repository (See "Database creation," of the "ETERNUS SF AdvancedCopy Manager Installation Guide".)
7. Start a RDB daemon (see "Starting and stopping the RDB Daemon")
8. Save data restore processing (see "Database restoration")
9. Restore the registry of a Storage Management Server (See "Restoring a registry")

9.2.1.1 Database backup

This chapter describes saving data stored in a database to the specified directory collectively.
This method is mainly used for converting data.   To save normal operational data, use the method described in "Saving a database".

● A directory in which data will be saved must be created in advance.
● To start the database backup, log in as a root user.
● Use the location specified at Storage Management Server installation.

Back up a database as follows:

1. Start database backup.
   Execute the following command to start database backup:

   ```
   # /opt/swstorage/bin/stgdbbackup
   ```

2. Confirm to continue processing.
   Enter "y" to continue processing or "n" to stop processing.

```
//////////////////////////////////////////////////////////////////
        AdvancedCopy Manager Storage Management Server ( kiku )
                            Database backup
//////////////////////////////////////////////////////////////////


   +------------------------------------------------------------+
   |                                                            |
   |    All of the stored data will be saved in an external file. |
   |                                                            |
   |  [Notes]                                                   |
   |    Prepare a directory for storing the data to be saved.   |
   |                                                            |
   +------------------------------------------------------------+


            Do you want to continue with processing? [y/n] ==> y
```

3. Enter the name of the data storage directory the data will be saved in.
   Using an absolute pathname, enter the name of the directory in which to store save data.

   Note

   If the data has already been saved in the directory the processing is not performed.
   Delete the save data in the directory or specify another directory, and then retry
   processing.

```
//////////////////////////////////////////////////////////////////
        AdvancedCopy Manager Storage Management Server ( kiku )
                            Database backup
//////////////////////////////////////////////////////////////////




        Enter the absolute path name of the directory
        for storing the data to be saved.

                Enter ==> /storage/backdir
```

4. To continue with database backup processing, enter a final confirmation.
   Enter "y" to continue with database backup processing or "n" to stop it.
   If "y" is entered, the window display returns that of step 2.

```
//////////////////////////////////////////////////////////////////
        AdvancedCopy Manager Storage Management Server ( kiku )
                            Database backup
//////////////////////////////////////////////////////////////////




        Directory containing the saved data : /storage/backdir


        Do you want to continue with processing? [y/n] ==> y
```

5. Database backup copies are created.
   Database backup copies are created, and execution results are displayed on the window as necessary. An example of such execution results is shown below.

```
////// AdvancedCopy Manager database backup //////


================================================================
DB data backup will start.
================================================================
....
Unloading of data is complete.(base)
...
Unloading of data is complete.(backup)
.
Unloading of data is complete.(repl)


================================================================
Backup of DB data is complete.
================================================================


Database backup ended normally.

#
```

9.2.1.2 Database restoration

This chapter describes restoring data that has been saved as described in "Database backup" to a database collectively.

Note
● Data currently stored in a database will be lost in this processing because it will be overwritten by save data.
● To start the database restoration, log in as a root user.
● Use the location specified at Storage Management Server installation.

Note
After the database restoration is normally completed, execute the processing in "Saving a database" to save the post-restoration database area.

Restore a database as follows:

1. Start database restore processing.
   Execute the following command to start database restore processing:

```
# /opt/swstorage/bin/stgdbrestore
```

2. Confirm to continue processing.
   Enter "y" to continue processing or "n" to stop processing.

```
//////////////////////////////////////////////////////////////////
       AdvancedCopy Manager Storage Management Server ( kiku )
                          Database restore
//////////////////////////////////////////////////////////////////


   +----------------------------------------------------------------+
   |                                                                |
   |   All of the saved data will be restored to database.          |
   |                                                                |
   |   [Notes]                                                      |
   |     Check the directory containing the saved data.             |
   |                                                                |
   +----------------------------------------------------------------+


          Do you want to continue with processing? [y/n] ==> y
```

3. Enter the name of the data storage directory where the data has been saved.
   Using an absolute pathname, enter the name of the directory in which the data is saved.

Note

> If any part of saved data in the directory is missing, processing is not performed
> because data consistency may not be maintained.

```
//////////////////////////////////////////////////////////////////
       AdvancedCopy Manager Storage Management Server ( kiku )
                          Database restore
//////////////////////////////////////////////////////////////////



          Enter the absolute path name of the directory
          in which the saved data is stored.

                  Enter ==> /storage/backdir
```

4. To continue with database restore processing, enter the final confirmation.
   Enter "y" to continue with database restore processing or "n" to stop it.
   If "n" is entered, the window display returns to that of step 2.

```
//////////////////////////////////////////////////////////////////
       AdvancedCopy Manager Storage Management Server ( kiku )
                          Database restore
//////////////////////////////////////////////////////////////////



          Directory containing the saved data : /storage/backdir


          Do you want to continue with processing? [y/n] ==> y
```

5. Database restore processing is performed.
   Database restore processing is performed, and execution results are displayed in the window as necessary.　Sample results are shown below.

```
////// AdvancedCopy Manager database restore //////


================================================================
DB data will be restored.
================================================================
....
Loading of data is complete.(base)
....
Updating of the optimal information is complete.(base)
...
Loading of data is complete.(backup)
...
Updating of the optimal information is complete.(backup)
.
Loading of data is complete.(repl)
.
Updating of the optimal information is complete.(repl)


================================================================
DB data has been completely restored.
================================================================


Database restore processing ended normally.

#
```

9.2.2 Collecting maintenance information

9.2.2.1 Collecting information using a Web client

Collect information as follows:
1.　Start the Java Plug-in control panel.
　　Start the Java Plug-in control panel as follows:
　　Select [Settings] - [Control Panel] - [Java Plug-in].
2.　Configure the startup settings of the Java console.
　　On the Java control panel, access the [Basics] tag, mark the [Display Java Console] check box, click the [Apply] button, and exit the Java Plug-in control panel.
3.　Start the Web client of AdvancedCopy Manager.
4.　The Java console will be started and a message will be output. Save the message to a file, and attach the file to your report.

9.2.2.2 Collecting error survey information

Log into the Storage Management Server and the Storage Server.
Collect the following information. When the Storage Management Server is also the Storage Server, collect resources from both the Storage Management Server and Storage Server.
1. When an error occurs during backup management

Table: Error investigation data collected when a backup management error occurs

Type	Storage Management Server	Storage Server
System log	Must be collected.	Must be collected.
Trace log	Acquire the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log	Acquire the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log
Backup management list	Need not be collected.	Acquire the files under the following directory: /etc/opt/FJSVswsts (Note)
Common information	Acquire the files under the following directory: /var/opt/FJSVswstf/cluster (Note) /var/opt/FJSVswstf/cmdevs (Note) /var/opt/FJSVswstf/daemon (Note) /var/opt/FJSVswstf/log (Note) /etc/opt/swstorage (Note)	Acquire the files under the following directory: /var/opt/FJSVswstf (Note) /etc/opt/swstorage (Note)

Note: When cluster operation is performed, the backup management list and the common information are located on the shared disk, where a symbolic link is set.
When collecting the information, also collect the data on the shared disk as follows.
Example

```
# cd /etc/opt
# tar -cvfh /tmp/FJSVswsts_node1.tar FJSVswsts swstorage
```

2. When an error occurs during replication management

Table: Error investigation data collected when a replication management error occurs

Type	Storage Management Server	Storage Server
System log	Must be acquired.	Must be acquired.
Trace log	Get the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log	Get the files under the following directory: /var/opt/FJSVswtrc/trc/ Acquire the file when the following file exists. /tmp/f3cvtrc.log
Replication management list	Replication management list	Get the files under the following directory: /etc/opt/FJSVswsrp (Note)
Common information	Get the files under the following directory: /var/opt/FJSVswstf/cluster (Note) /var/opt/FJSVswstf/cmdevs (Note) /var/opt/FJSVswstf/daemon (Note) /var/opt/FJSVswstf/log (Note) /etc/opt/swstorage (Note)	Get the files under the following directory: /var/opt/FJSVswstf (Note) /etc/opt/swstorage (Note)

Note: When cluster operation is performed, the replication management list and the common information are located on the shared disk, where a symbolic link is set. When collecting the information, also collect the data on the shared disk as follows. Example

```
# cd /etc/opt
# tar -cvfh /tmp/FJSVswsrp_node1.tar FJSVswsrp swstorage
```

9.2.3 Troubleshooting a failure when accessing a repository database

This chapter describes how to investigate the cause and remediate access failure to a repository.
If executing the following steps resolves the problem, no further steps are required.
Perform this procedure on the Storage Management Server.

1. Check whether the RDB daemons are still running.
   Check method
   Execute the following command to check for any process related to the RDB daemons.

```
# ps -ef | grep RDBSWSTF | grep -v grep
```

   Required action
   If no process related to the two RDB daemons is in progress, retry after restarting (start after stopping) the daemons. For an explanation on restarting the daemons, see "Starting and stopping the RDB daemons."

2. Check that there is sufficient free space as required to update a repository database.
   Check method
   Execute the following command to check the usage ratio of space required to update a repository.

```
# /opt/swstorage/bin/stgdbloginf
```

   Required action
   If the usage ratio is 100%, save the database space according to "Saving a database". Consequently, there should be sufficient free space required to update a repository. After using the database save method, restart (start after stopping) the RMI daemon. For an explanation on restarting the daemon, see "Starting and stopping the RMI daemon". Then, perform this step again.

3. Check whether the database save process is in progress.
   Check method
   Execute the following command to check for any process related to the database save command.

```
# ps -ef | grep stgdbdmp | grep -v grep
```

   Required action
   If any process related to the database save command is in progress, retry after waiting for the end of the database save command.

4. Check whether the capacity of repository is insufficient.
   Check method
   In the file a /var/opt/FJSVswstf/log/RDBSWSTF.log (in cluster operation, they are /var/opt/FJSVswstf/logic-node-name/log/RDBSWSTF.log), search for the strings "JYP5019E" or "JYP5045E" in any message taking the form "rdb: ERROR: qdgXXXXXX-"

   Required action
   If it exists, please extend repository capacity with reference to "Troubleshooting for insufficient free space in a repository". Then, attempt re-processing.

5. Check whether an I/O error or any other error has occurred in the database space.
   Check method
   Check the /var/opt/FJSVswstf/log/RDBSWSTF.log file (/var/opt/FJSVswstf/<logical-node-name>/log/RDBSWSTF.log file in cluster operations), and beginning from the last line, search for any message containing "rdb: ERROR: qdgXXXXX-" (also check the messages output at the same time). Obtain the value of "qdgXXXXX," and check for it in "Table: Relationships between the qdg message and recovery mode".

   Required action
   If "qdgXXXXX" is in the table, examine the target according to the error description corresponding to the qdg messages in "Table: Relationships between the qdg message and recovery mode", and determine if there is a problem. If a problem is found, take corrective action as appropriate to solve the problem, and specify the appropriate settings. Then, recover the database space by using the database recovery method. After the database recovery command ends normally, acquire the latest save data by using the database save method.
   Then, restart (start after stopping) the AdvancedCopy Manager daemons. For an explanation on restarting the daemons, see "Starting and stopping the AdvancedCopy Manager daemons".
   Retry processing.

   Note

   If the database recovery command is executed with the value "0" specified for option "-m", after the command terminates normally, perform the following tasks:
   - Execute the resource adjustment command specified with option "-x" (see "Resource adjustment command (swstsrsemtch)") on all Storage Servers in a backup operation.
   - Execute the resource adjustment command (see "Resource adjustment command (swstsrsemtch)" using option "-r" on all the Storage Servers that are performing replication.

   Note

   If an error such as an I/O error occurs in a database space, a file required for analyzing the cause of the error may be created in /SWSTFDB/core. If the corresponding recovery ends normally, delete the file in this directory.

6. Collect the files in /var/opt/FJSVswstf/log, and contact a Fujitsu SE.

9.3 Troubleshooting a hardware error during backup

This chapter describes what action to take for a hardware error during a backup using AdvancedCopy Manager.

9.3.1 Overview

If a hardware error occurs during backup operation, the following symptoms are generated:

- The backup execution status display command (swstbackstat) displays "failed" in the Status column.
- The synchronous backup operation status display command (swstsyncstat) displays "failed" in the Status column.
- The restoration execution status display command (swstreststat) displays "failed" in the Status column.
- The history information display command (swsthistdisp) displays "failed" in the Status column.
- The tracking status display command (swsttrkstat) displays "failed" in the Status column.
- Code swst0634, swst0719, or swst0740 is displayed during command execution.

If the execution status display command and history information display command display "failed" in the Status column, a hardware error has occurred during physical copying, and the copy process has failed.

If swst0634, swst0719, or swst0740 is displayed during command execution and the same error occurs even if the command is retried, a hardware error has occurred, causing AdvancedCopy to fail.

If a hardware error occurs during remote copying, the following symptoms may be generated:

- The backup execution status display command (swstbackstat) displays "halt" in the Status column.
- The synchronous backup operation status display command (swstsyncstat) displays "halt" in the Status column.
- The restoration execution status display command (swstreststat) displays "halt" in the Status column.
- The history information display command (swsthistdisp) displays "halt" in the Status column.

If the execution status display command and history information display command display "halt" in the Status column, a hardware error has occurred during physical copying, and the remote copy process has failed.

If these symptoms are generated, a hardware error may have occurred in the transaction volume or backup volume. Check the hardware status, and if a hardware error is found, remediate the cause of the error, and retry processing.

9.3.2 Troubleshooting

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

Figure: Troubleshooting flow for hardware and similar faults
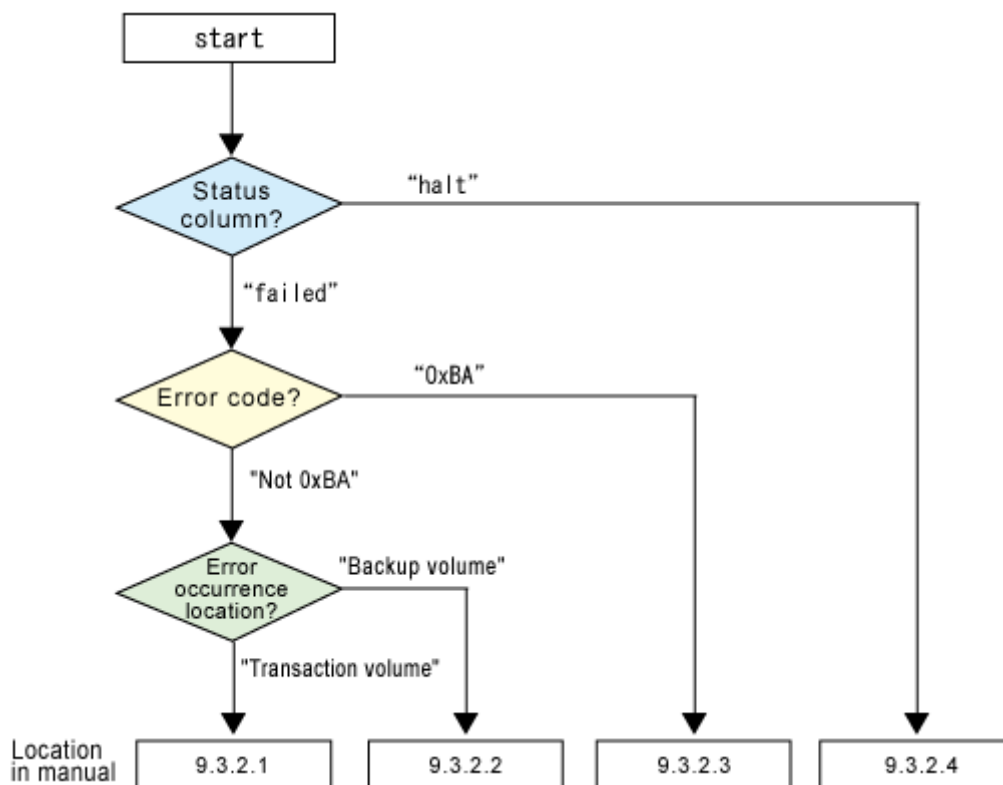
● Refer to "Overview" for details of the "status column" and "error occurrence location".
● Use ETERNUSmgr to check the copy process error codes. Use the following method to check the error codes:
 — On the [Display status] menu, click [AdvancedCopy status display] in the status display.
 — At [Session status], click the "Number of active sessions" link for the relevant copy type.
 — Refer to the value in the "Error code" column of the relevant copy process.
The following table shows the meanings of the error codes.

[Table: Meanings of error codes]

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a) QuickOPC has not yet performed physical copying and tracking is in progress b) EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a transaction volume when a) or b) applies, the disk array device automatically changes the copy processing to the error suspend state. This prevents restart of QuickOPC or EC/REC resume and prevents the backup volume from being overwritten with invalid transaction volume data.
Other than 0xBA	An error other than the above occurred.

Error code 0xBA is returned only for the following disk array devices:
- ― ETERNUS4000/ETERNUS8000 (firmware versionV11L30-0000 or later)
- ― ETERNUS6000 (firmware version V31L40-0000 or later)

For disk array devices other than the above, the event indicated by error code 0xBA does not occur. (When the above a) or b) apply, the copy status does not change, even if a bad sector occurs in the copy source volume.)

9.3.2.1 Troubleshooting a hardware error on a transaction volume

When a hardware error occurs in an operating volume, remediate the error according to the following procedures.

1. If an error occurred during physical copying, cancel the process during which the error occurred.
   ● If an error occurred during backup (OPC) physical copy: swsthistdel command
   ● If an error occurred during synchronous processing (EC): swstcancelsync command
   ● If an error occurred during restore (OPC) physical copy: swstcancelrest command
   ● If an error occurred during tracking process (QuickOPC): swstcanceltrk command

2. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat), and history information display command (swsthistdisp) to verify that no other errors have occurred.

3. Remediate the hardware error on the transaction volume.

4. Execute the restoration execution command (swstrestore) to restore the transaction volume.

![Note]

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

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

9.3.2.2 Troubleshooting a hardware error on a backup volume

When a hardware error occurs in backup volume, remediate the error according to the following procedures.

1. Cancel the process during which the error occurred.
   ● If an error occurred during backup (OPC) physical copy: swsthistdel command
   ● If an error occurred during synchronous processing (EC): swstcancelsync command
   ● If an error occurred during restoration (OPC) physical copy: swstcancelrest command
   ● If an error occurred during tracking process (QuickOPC): swstcanceltrk command

2. If the process cannot be canceled by using the command, use ETERNUSmgr/GRmgr to cancel it.

3. Execute the resource match command (swstsrsemtch)

4. Cancel the process during which the error occurred. At this point, the execution status display commands (swstbackstat, swstreststat) and history information display command (swsthistdisp) display "succeeded" in the Status column. However, because the copy process is suspended, be sure to cancel the commands. If an error occurred in the synchronous processing (EC), the command has already been canceled, so no response is required.
   ● If an error occurred during backup (OPC) physical copy: swsthistdel command
   ● If an error occurred during restoration (OPC) physical copy: swstcancelrest command

5. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat) and history information display command (swsthistdisp) to verify that no other errors have occurred.

6. Use the device configuration command (swstdevinfoset) to delete the backup volume in which the error occurred.

7. Then, use the device configuration command (swstdevinfoset) to register a new backup volume.   If the backup volume in which the error occurred is repaired and reused, execute the command to collect or display information for a specific device from the initial window and re-save the information in the backup volume.

8. Re-attempt the process in which the error occurred.

9.3.2.3 Troubleshooting if a bad sector occurred in the transaction volume

If a bad sector occurred in the transaction volume, use the following procedure to restore the transaction volume:

1. Cancel the copy processing for which the bad sector occurred.
    — If the bad sector occurred during the suspend state of synchronous processing (EC): swstcancelsync command
    — If the bad sector occurred during QuickOPC tracking: swstcanceltrk command
2. Execute the execution status display commands (swstbackstat, swstsyncstat, swstreststat, swsttrkstat) and the history information display command (swsthistdisp) to check for other errors.
3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the transaction volume, from the restoration methods below and perform restoration.
    — Restoration method 1
      If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.
    — Restoration method 2
      If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special- purpose tool (for example, the UNIX dd command) to write to the area.
    — Restoration method 3
      Use the restore command (swstrestore) to restore the transaction volume from a backup volume. (If the backup volume for the copy processing for which the bad sector occurred contains backup history information, restoration is also possible from that backup volume.)

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

9.3.2.4 Troubleshooting for an error (halt) on a remote copy process

1. Clear the hardware error.
2. The suspended copy process is re-tried.

9.4 Troubleshooting a Hardware or Other Error during Replication

This chapter describes the corrective action for hardware or other errors during AdvancedCopy Manager replication.

9.4.1 Overview

If a hardware error occurs during replication, the following symptoms are generated:
- The operation status display command (swsrpstat) displays "failed" or "?????" in the Status column.
- Code swsrp2606 is displayed during command execution.
- Code swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution.

If the operational 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 process has failed.

If swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution, and the same error occurs even if the command is retried, a hardware error has occurred, causing AdvancedCopy to fail.

If a hardware error occurs during remote copying, the following symptoms may be generated:
- The operation status display command (swsrpstat) displays "halt" in the Status column.
- Code swsrp2648 is displayed during command execution.

If the operation status display command displays "halt" in the Status column, and swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy process has failed.

If these symptoms are generated, a hardware error may have occurred in the original or replica volume. Check the hardware status, and if a hardware error is found, remediate the error and retry the command.

9.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure: Troubleshooting flow when a hardware or similar fault occurs
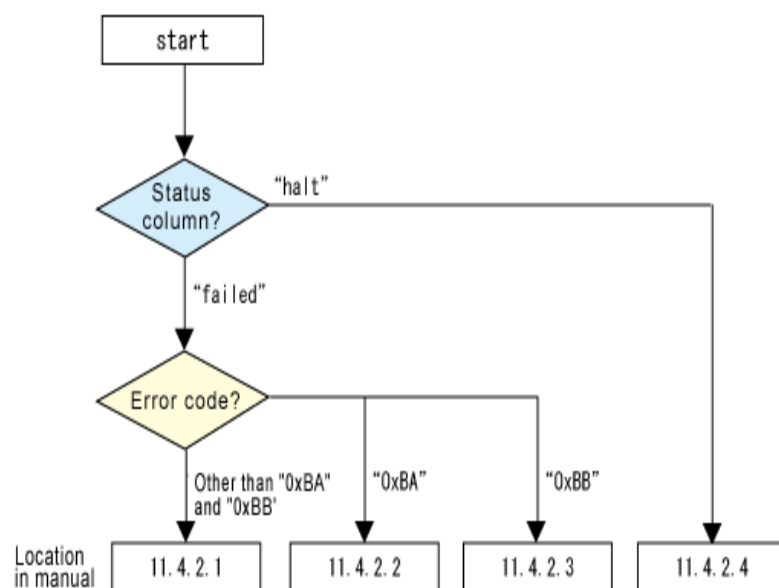
Note

1. Refer to "Overview" for details of the "status column".
   If the status column is "?????", check if ETERNUSmgr/GRmgr copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt").
   If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
   In other cases, another cause (Storage Server, switch, and so on) is likely, so contact your Fujitsu SE.

● Use ETERNUSmgr to check the error codes. Use the following method to check the error codes:
   — On the [Display status] menu, click [AdvancedCopy status display] in the status display.
   — At [Session status], click the "Number of active sessions" link for the relevant copy type.
   — Refer to the value in the "Error code" column of the relevant copy process.
The following table shows the meanings of the error codes.

[Table: Meanings of error codes]

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a) QuickOPC has not yet performed physical copying and tracking is in progress b) EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a transaction volume when a) or b) applies, the disk array device automatically changes the copy processing to the error suspend state. This prevents restart of QuickOPC or EC/REC resume and prevents the copy destination volume from being overwritten with invalid transaction volume data.
0xBB	The capacity already used on the Snap Data Disk (Snap Data Volume) exceeds the physical capacity.
Other than 0xBA and 0xBB	An error other than the above occurred.

Error codes 0xBA and 0xBB are returned only for the following disk array devices:
   — ETERNUS4000/ETERNUS8000 (firmware version V11L30-0000 or later)
   — ETERNUS6000 (firmware version V31L40-0000 or later)
For disk array devices other than the above, the events indicated by error code 0xBA and 0xBB are identified by the following methods:

[Table: Error code events]

Event	Identification method
Events indicated by 0xBA	These events do not occur. In cases a) and b) above, the copy status does not change even if a bad sector occurs at the copy source volume.
Events indicated by 0xBB	Use ETERNUSmgr to check the capacity already used on the SDV in order to identify whether or not the physical capacity has been exceeded. ● On the [Display status] menu, click [Volume list] in the status display. ● Click the SDV link for the relevant volume in the "Volume type" column ● Refer to the value shown in the "Capacity already used" column. If this event applies, refer to "Troubleshooting when the Snap Data Disk (Snap Data Volume) capacity used exceeds the physical capacity".

9.4.2.1 Troubleshooting a hardware error on a replication volume

When a hardware error occurs in duplicate volume, remediate the error according to the following procedures.

1. Use the replication cancellation command (swsrpcancel) to cancel the process during which the error occurred. If the process cannot be canceled from the operator server when inter-server replication is performed, cancel it from a non-operator server.
2. If the process cannot be canceled by using the command, use ETERNUSmgr/GRmgr to cancel it.
3. Execute the resource adjustment command (swsrprecoverres)
4. Execute the operation status display command (swsrpstat) to verify that no other errors are found.
5. Use the replication volume information deletion command (swsrpdelvol) to delete the replication volume in which the error occurred.
6. Use the replication volume information setting command (swsrpsetvol) to register a new replication volume. If the replication volume in which the error occurred is repaired and reused, execute [Collect or reflect the information for a specific device] from the initial window and store the information again in the replication volume.
7. Retry the process during which the error occurred.

9.4.2.2 Troubleshooting if a bad sector occurred in the copy source volume

If a bad sector occurred in the copy source volume, use the following procedure to restore the copy source volume:

1. Use the replication cancellation command (swsrpcancel) to cancel 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 ETERNUSmgr to cancel it.
2. Execute the operation status display command (swsrpstat) to check for other errors.
3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the copy source volume, from the restoration methods below and perform restoration.
   — Restoration method 1
      If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.
   — Restoration method 2
      If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special-purpose tool (for example, the UNIX dd command) to write to the area.
   — Restoration method 3
      Use the replica creation command (swsrpmake) to restore the data from the copy destination volume (Restoration is also possible from the copy destination volume of the copy process for which the bad sector occurred.)

9.4.2.3 Troubleshooting when the Snap Data Disk (Snap Data Volume) capacity used exceeds the physical capacity

If the Snap Data Disk (Snap Data Volume) capacity used exceeds the physical capacity, use the replication cancel command (swsrpcancel) to cancel processing for which the error occurred. If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.
   —

If processing cannot be cancelled using commands, use ETERNUSmgr to cancel it. Cancellation of the process for which the error occurred makes execution of SnapOPC/SnapOPC+ possible again.

The following are possible causes of exceeding the physical capacity of the Snap Data Disk:

 a. Inaccurate estimation of the Snap Data Disk physical capacity
 b. The estimation of the Snap Data Disk physical capacity was accurate, but a large quantity of updates were made to the Snap Data Disk at a time when there were no SnapOPC/SnapOPC+ sessions, which unexpectedly used up the physical capacity of the Snap Data Disk.

If a. above applies, re-estimate the Snap Data Disk physical capacity and re-create the Snap Data Disk.
If b. above applies, use ETERNUSmgr to initialize the Snap Data Disk.
Note that, after the re-creation/initialization of the Snap Data Disk, disk partitions (slices) must be re-created.

9.4.2.4 Troubleshooting for an error (halt) on a remote copy process

The REC restart (Resume) method differs for different REC Recovery modes.

[For Automatic Recovery mode]
 1. Remove the problem that caused all paths to close (halt).
 2. The ETERNUS disk array automatically restarts (Resumes) REC.

[For Manual Recovery mode]
 1. Remove the problem that caused all paths to close (halt).
 2. Use the create replica command (swsrpmake) to forcibly suspend the halt status REC.

```
[For volume units]
swsrpmake -j <replication source volume name> <replication destination volume name>
[For group units]
swsrpmake -j -Xgroup <group name>
```

 3. Use the replication start command (swsrpstartsync) to restart (Resume) REC. (The -t option must be specified to restart REC 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>
```

9.5 Changing the Operating Environment

The "server information package" changes operational server information as a batch while maintaining consistency between the server information in all systems managed by AdvancedCopy Manager. Therefore, the daemons and transactions of all Storage Servers in the systems that include Storage Management Servers and Storage Management Server transactions must be running.

> **Note** **If the server information change command (stgxfwcmmodsrv) is used to change the IP address, etc.**
>
> Do not execute backup management commands or replication management commands at the Storage Management Server that executes the server information change command (stgxfwcmmodsrv), nor at any of the Storage Servers managed by Storage Management Server transactions, either before or during execution of the server information change command (stgxfwcmmodsrv).
> If executed, this command may terminate abnormally. If the server information change command (stgxfwcmmodsrv) 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 or replication management commands terminate abnormally, wait until the server information change command (stgxfwcmmodsrv) terminates normally, then re-execute the backup management or replication management commands.

9.5.1 Changing the IP address of a Storage Management Server

Change the IP address of a Storage Management Server as follows:
If a physical IP address only needs to be changed and the Storage Management Server uses a logical IP address, perform only from step 6. Otherwise, perform all steps.

1. Check if the Storage Management Server transactions where the IP address is to be changed are also used for Storage Server transactions.
    If the Storage Management Server is also used for Storage Server transactions and replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
    Refer to "Deleting a copy source or copy destination volume" for the method of deleting the copy source or copy destination volume settings.
2. On the Storage Management Server, change the system's IP address.
3. On the Storage Management Server, restart the daemons of AdvancedCopy Manager. For information on restarting a daemons, see "Starting and Stopping a Daemons".
    This step is not necessary if the system was restarted in Step 2.
4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command (stgxfwcmmodsrv)with the -f option specified to change the IP address.
5. Restart the various AdvancedCopy Manager daemons on the Storage Management Server. Refer to "Starting and stopping daemons" for details.
6. Use the environment information display command (stgenvdisp) to check that the IP address used for GUI connection is correct. If necessary, execute the GUI connection information setting command (stgguiipset) to change the IP address used for GUI connections.
7. If the Storage Management Server uses a logical IP address, use the Web GUI to change the settings of authentication-related files.
    Change the definition part of the logical IP address to a new logical IP address when the logical IP address is changed. Refer to the section called "Downloading authentication-related files" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide". This operation can also be applied to a physical IP address when it is changed.
8. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

In the following cases, the IP address used for GUI connections will need to be changed in Step 6:

— If multiple network cards are installed in the Storage Management Server, and the IP address used for communication with Storage Servers (the IP address specified during database creation when the Storage Management Server was installed) is operated separately from the IP address specified for Web GUI use

— If the above does not apply, but if the GUI connection information setting command (stgguiipset) is executed to explicitly set the IP address to be used for GUI connections.

For information about making the above change in a cluster operation, refer to "Changing the IP address of a Storage Management Server transaction".

9.5.2 Changing the IP address of a Storage Server

Change the IP address of a Storage Server as follows:

1. If the replication management functions were used to define the Storage Server as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "Deleting a copy source or copy destination volume" for the method of deleting the copy source or copy destination volume settings.
2. On a target Storage Server, stop the AdvancedCopy Manager daemons. For more information on stopping a service, see "Starting and Stopping a Daemons".
3. On the target Storage Server, change the IP address.
4. On the target Storage Server, restart the AdvancedCopy Manager daemons. For more information on starting a daemons, see "Starting and Stopping a Daemons".
5. Create a server information change instruction file on the Storage Management Server, then execute the server information change command (stgxfwcmmodsrv) with the -f option specified to change the IP address.
6. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

For information about making the above change in a cluster operation, see "Changing the IP address of a Storage Server transaction".

9.5.3 Changing the port number of a Storage Management Server or Storage Server

Change the port number of a Storage Management Server or Storage Server as follows:

1. If replication management functions were used at the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. The port number of the communication daemon (stgxfws) of AdvancedCopy Manager indicated by /etc/services at the target Storage Management Server or Storage Server is changed.

3. On the target Storage Management Server or Storage Server, restart the AdvancedCopy Manager daemons. For information on restarting daemons, refer to "Starting and Stopping Daemons".
4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command (stgxfwcmmodsrv) with the -f option specified to change the IP address.
5. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

> **Note**
>
> For information about change in a cluster operation, see "Changing the port number of a Storage Management Server transaction or Storage Server transaction".

9.5.4 Changing the server name of a Storage Management Server or Storage Server

Change the server name of a Storage Management Server as follows:
1. If replication management functions were used at the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. Create a server information change instruction file on the Storage Management Server.
3. Execute the server information change command (stgxfwcmmodsrv) with the -f option (specify the created file) to change the server name. Refer to "Server information change command (stgxfwcmmodsrv)" for details of the server information change command.
4. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

> **Note**
>
> For information about change in a cluster operation, see "Changing the server name of a Storage Management Server transaction or Storage Server transaction".

9.5.5 Changing the device configuration

Changing the device configuration refers to the following tasks:
- ● Mount name change
- ● Change from File System operation to RawDevice operation
- ● Capacity change of partitions (mainly for re-creation of LUN mapping)
- ● Start position for change of partitions (mainly for re-creation of LUN mapping)

9.5.5.1 Backup management

Use the following procedure to change the device configuration. This process is executed for all volumes on the disk where the volume whose device configuration to be changed is located.

1. Check whether there is a transaction volume on the target disk that needs to be backed up. If it does, delete the transaction volume. For information on deleting a transaction volume, see "Deleting a transaction volume".
2. Check whether a backup volume exists in the target disk. If it does, delete the backup volume. For information on deleting a backup volume, see "Deleting a backup volume".
3. Change the device configuration.

4. Because the updated device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "Fetching device information on a Storage Server," for details on changing the device information.

5. Reconfigure a deleted transaction volume or backup volume in the backup operation. Refer to "Setting the operation type for a device," for details on adding a transaction volume or backup volume.

Point

If the device configuration is changed (step 3) before the transaction volume and backup volume are deleted (steps 1 and 2), any history information relating to these volumes cannot be deleted and synchronized backup processing cannot be cancelled. This may disable the deletion of the transaction volume and/or backup volume.

In this case, set the emergency operation mode, and delete history information or cancel synchronized backup processing.

For details on the emergency operation mode, refer to the history information deletion command (swsthistdel) and the backup synchronous processing cancel command (swstcancelsync).

9.5.5.2 Replication management

Change the device configuration as shown below.

When executed, this processing applies to all the volumes on a disk on which a volume whose device configuration to be changed is located.

1. Check whether there are any replication volumes on the target disk. If there are, delete them. For information about deleting a replication volume, see "Deleting a replication source volume and replication destination volume".

2. Change the device configuration.

3. Because the updated device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "Fetching device information from a Storage Server," for details on changing the device information.

4. Reconfigure a deleted replica volume again in the replication operation. Refer to "Setting the original volume and replica volume," for details on adding the replica volume.

Point

If the device configuration is changed (step 2) before the replication volumes are deleted (step 1), replication processing cannot be cancelled, possibly disabling deletion of the replication volumes.

In this case, set the emergency operation mode, and cancel replication processing.

For details on the emergency operation mode, refer to the Replication volume information deletion command (swsrpdelvol).

9.5.6 Changing the IP address for web client connection of a Storage Management Server

The Storage Management Server is equipped with two or more network cards. In order to distinguish between the IP address used to communicate with other Storage Servers which was specified when the Storage Management Server was originally configured, and the IP address used by the Web client to communicate with a Storage Server, the IP address used for the web client connection is changed using a web client GUI connection information configuration command.

Refer to information in the GUI connection information setting command (stgguiipset).

When the Storage Management Server has multiple network cards, you must configure the cards on the client side.
For an explanation on how to specify the settings, see "Setting of authentication-related files," in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

9.5.7 Change of deletion/password of the user who specified it as the repository access user

When a "repository access user" specified in the setup of repository at the time that AdvancedCopy manager was installed is deleted in the OS or, when the password for the specified user name is changed in the OS, information regarding this "repository access user" must be set up again using the repository access user change command.
Refer to the repository access user change command (stguserset) about a repository access user change command.

For information about change in a cluster operation, refer to "Deleting a repository accessible user or changing a repository accessible user's password".

9.5.8 Changing the configuration in a cluster environment

This section describes how to make a change to the configuration in a cluster operation.

9.5.8.1 Changing the IP address of a Storage Management Server transaction

Change the IP address of a Storage Management Server transaction by taking the following steps:
1. Check if the target Storage Management Server transaction is also used for Storage Server transactions.
   If it is also used for Storage Server transactions and replication management functions were used to define Storage Management Server transaction as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. Stop the Storage Management Server transaction.
   For details on how to stop it, see the relevant cluster software manual.
3. Change the resource IP address.
   For details on how to change an IP address, see the relevant cluster software manual.
4. Check whether the Storage Management Server transaction is operating.
   — If the transaction is not running, start up the Storage Management Server transaction.
   — For details on how to start it up, see the relevant cluster software manual.
5. On the node where which the Storage Management Server transaction is running, create a server information change instruction file, then execute the server information change command (stgxfwcmmodsrv) with the -f option specified to change the IP address.
6. Restart the Storage Management Server transaction
   Refer to the cluster software manual for details of how to stop and restart transactions.
7. On the Storage Management Server operating node, use the environment information display command (stgenvdisp) to check that the IP address used for GUI connections is correct.
   If required, use the GUI connection information setting command (stgguiipset) to change the IP address used for GUI connections.

8. When using a Web client, make the change to the authentication file configuration. Change the logical IP address to the new logical IP address in accordance with the instructions contained in "Configuring the authentication-related file" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
    When the physical IP address must be changed too, the physical IP address in the authentication files must also be changed accordingly.
9. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

In the following cases, the IP address used for GUI connections will need to be changed in Step 7:
— If multiple network cards are installed in servers where the Storage Management Server transactions run, and the IP address used for communication with Storage Servers (specified during cluster setup for the Storage Management Server transactions) is separate from the IP address specified for Web GUI use.
— If the above does not apply, but if the GUIconnection information setting command (stgguiipset) is executed to explicitly set the IP address to be used for GUI connections.

The IP address displayed by the cluster configuration command to delete the cluster environment of the Storage Management Server transaction is not the new IP address. It is the IP address specified by the cluster configuration command.

9.5.8.2 Changing the IP address of a Storage Server transaction

Change the IP address of a Storage Server transaction by taking the following steps:
1. If replication management functions were used to define the Storage Server transaction as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
    Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.
2. Stop the Storage Server transaction.
    For details on how to stop it, see the relevant cluster software manual
3. Change the resource IP address.
    For details on how to change an IP address, see the relevant cluster software manual.
4. Restart the Storage Server transaction.
    For details on how to start it up, see the relevant cluster software manual.
5. Create a server information change instruction file on the Storage Management Server that manages the Storage Server transactions, then execute the server information change command (stgxfwcmmodsrv) with the -f option specified to change the IP address.
6. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

9.5.8.3 Changing the port number of a Storage Management Server transaction or Storage Server transaction

Change the port number of a Storage Management Server transaction or Storage Server transaction by taking the following steps:

1. If replication management functions were used by the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.

2. Stop the Storage Management Server transaction or Storage Server transaction. Refer to the relevant cluster software manual for details.

3. On the primary and secondary nodes of the target Storage Management Server transaction or Storage Server transaction, change the port number of the AdvancedCopy Manager communication daemon (stgxfws_<logical-node-name>) specified in /etc/services.

4. Restart the target Storage Management Server transaction or Storage Server transaction. For details on how to start it up, see the relevant cluster software manual.

5. Create a server information change instruction file. If the target is a Storage Management Server transaction, create the file on the Storage Management Server transaction operating node. If the target is a Storage Server transaction, create the file on the Storage Management Server that manages the Storage Server transaction. Then, execute the server information change command (stgxfwcmmodsrv) with the -f option specified to change the port number.

6. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

9.5.8.4 Changing the server name of a Storage Management Server transaction or Storage Server transaction

Change the server name of a Storage Management Server transaction or Storage Server transaction by taking the steps below.

1. If replication management functions were used by the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.

2. Create a server information change instruction file. If the target is a Storage Management Server transaction, create the file on the Storage Management Server transaction operating node. If the target is a Storage Server transaction, create the file on the Storage Management Server that manages the Storage Server transaction.

3. Execute the server information change command (stgxfwcmmodsrv) with the -f option (specify the created file) to change the server name.
Refer to "Server information change command (stgxfwcmmodsrv)" for details of the server information change command.

4. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

9.5.8.5 Deleting a user's repository access user or changing a repository user's password

Make a change to a user's repository access by performing the following steps:

1. Check whether the target Storage Management Server transaction is operating.
If the transaction is not running, start up the Storage Management Server daemon.
For details on how to start it up, refer to the relevant cluster software manual.

2. Make a change to a user's repository access.
For details on how to make a change to a repository accessible user, refer to "Deleting a repository accessible user or changing a repository accessible user's password".

9.5.8.6 Changing the logical node name

Change the logical node name of a Storage Management Server transaction or Storage Server transaction by performing the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.
   If the transaction is not operating, start the Storage Management Server transaction or Storage Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

2. For a Storage Management Server transaction, check whether it also functions as a Storage Server transaction.
   If this is the case, go to Step 3.
   Otherwise, go to Step 4.

3. Delete the configuration of the Storage Server transaction.
   When using the backup management function, delete the transaction volume and backup volume. For details on how to delete a transaction volume/backup volume, see "Deleting a device".
   When it is defined as an original or replica volume by using the replication control function, delete the original/replica volume configuration. For details on how to delete an original/replica volume configuration, see "Deleting an original/replica volume".

4. Save the AdvancedCopy Manager data.
   For a Storage Management Server transaction, save the following data:
   - Repository
     Make a backup of the repository.
     For details on how to make a backup of the repository, see "Making a backup of a database".
   - Authentication management list
     On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
     For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".
   - ― Web browser client files
     Make a backup of the browser client files.
     On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

   In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:
   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication control.

   For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:
   - Policy file for package backup of the management information
     For details on the policy file path, see "Preliminaries".

5. For a Storage Server transaction delete /etc/opt/swstorage/<logical-node-name>/swnode.ini on the node operating the transaction.

6. Delete the cluster environment of the target transaction.
   For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note

- Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Solaris" or "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for Solaris" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

7. Create the cluster environment of the target transaction.
   For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   ⚠ Note
   - For the "-n" option of the cluster setup command, specify the name of the new logical node.
   - Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 33 in "Details of the steps for customization" on PRIMECLUSTER for Solaris, Step 32 in "Details of the steps for customization" on VERITAS Cluster Server for Solaris).

8. Start the target server transaction.
   For details on how to start it up, see the relevant cluster software manual.

9. Restore the AdvancedCopy Manager data.
   For a Storage Management Server transaction, restore the following data:
   - Repository
     Restore the repository.
     For details on how to restore a repository, see "Restoring a database".
   - Authentication management list
     On the node on which the Storage Management Server transaction is running, restore the authentication management list.
     For details on how to restore an authentication management list, see "Restoring an authentication list".
   - —Web browser client files
     Restore the Web browser client files.
     On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

   In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:
   - Pre-processing/post-processing scripts
     Restore the pre-processing and post-processing scripts for backup management and replication control.

   For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
   - Policy file for package backup of the management information
     For details on the policy file path, see "Preliminaries".

10. Change the server name.
    Refer to "Changing the server name of a Storage Management Server transaction or Storage Server transaction".
    For a Storage Server transaction, perform Step 3 in "Changing the server name of a Storage Server transaction" in this manual.

11. To use the backup management or replication control function, reconfigure the backup management or replication control environment, respectively (perform the "Display backup management screen" task and subsequent tasks).

12. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.7 Changing the service name

Change the name of an AdvancedCopy Manager transaction by taking the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is running.
   If the transaction is not running, start the Storage Management Server transaction or Storage Server transaction.
   For details on how to start it up, see the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.
   For a Storage Management Server transaction, save the following data:
   — Repository
      Make a backup of the repository.
      For details on how to make a backup of the repository, see "Making a backup of a database".
   — Authentication management list
      On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
      For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".
   — Web browser client files
      Make a backup of the Web browser client files.
      On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data directory.   Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
   Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), save the following data:
   — AdvancedCopy Manager management file
      On the node running the transaction, save /etc/opt/swstorage/<logical-node-name>/swnode.ini.
   In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:
   — Backup management list
      Make a backup of the backup management list.
      For details on how to make a backup of a backup management list, see "Making a backup of backup management list".
   — Pre-processing/post-processing scripts
      Save the pre-processing and post-processing scripts for backup management and replication control.
   For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:
   — Policy file for package backup of the management information
      For details on the policy file path, see "Preliminaries".

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete /etc/opt/swstorage/<logical-node-name>/swnode.ini on the node running the transaction.

4. Delete the cluster environment of the target transaction.
   For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   Note

   — Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Solaris" or "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for Solaris" in the Operator's Guide for cluster environment.

5. On the cluster system, change the name of the userApplication.
   For details on how to change the name of a userApplication, see the relevant cluster software manual.

6. Create the cluster environment of the target transaction.
   For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   ![Note]

   — Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 33 in "Details of the steps for customization" on PRIMECLUSTER for Solaris, Step 32 in "Details of the steps for customization" on VERITAS Cluster Server for Solaris).
   — Do not change any information other than the name of a transaction by using the cluster setup command.
7. Start the target transaction.
   For details on how to start it up, see the relevant cluster software manual.
8. Restore the AdvancedCopy Manager data.
   a) For a Storage Management Server transaction, restore the following data:
      — Repository
        Restore the repository.
        For details on how to restore a repository, see "Restoring a database".
      — Authentication management list
        On the node on which the Storage Management Server transaction is running, restore the authentication management list.
        For details on how to restore an authentication management list, see "Restoring an authentication list".
      — Browser client files
        Restore the browser client files.
        On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
   b) Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), restore the following data:
      — AdvancedCopy Manager management file
        On the node operating the transaction, restore /etc/opt/swstorage/<logical-node-name>/swnode.ini.
   c) In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:
      — Backup management list
        Restore the backup management list.
        For details on how to restore a backup management list, see "Restoring the backup management list".
      — Pre-processing/post-processing scripts
        Restore the pre-processing and post-processing scripts for backup management and replication control.
      — When using the replication control function, restore the environment by using the resource adjustment command (swsrprecoverres).
        Specify the "-r" option for the resource adjustment command.
   d) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
      — Policy file for package backup of the management information
        For details on the policy file path, see "Preliminaries".
9. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.8 Changing a shared disk for shared data

Changing a shared disk for AdvancedCopy Manager shared data (e.g., name of a mount point of a physical disk or shared disk) by taking the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.
   If the transaction is not running, start the Storage Management Server transaction or Storage Server transaction.
   For details on how to start it up, see the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.
   For a Storage Management Server transaction, save the following data:
   - Repository
     Make a backup of the repository.
     For details on how to make a backup of the repository, see "Making a backup of a database".
   - Authentication management list
     On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
     For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".
   - Web browser client files
     Make a backup of the Web browser client files.
     On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.

   Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), save the following data:
   - AdvancedCopy Manager management file
     On the node operating the transaction, save /etc/opt/swstorage/<logical-node-name>/swnode.ini.

   In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, save the following data:
   - Backup management list
     Make a backup of the backup management list.
     For details on how to make a backup of a backup management list, see "Making a backup of backup management list".
   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication control.

   For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:
   - Policy file for package backup of the management information
     For details on the policy file path, see "Preliminaries".

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete /etc/opt/swstorage/<logical-node-name>/swnode.ini on the node running the transaction.

4. Delete the cluster environment of the target transaction.
   For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   ![Note icon]

   - Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Solaris" or "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for Solaris" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

5. Create the cluster environment of the target transaction.
   For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note
- To change the name of a mount point, specify the new mount point name in the "-m" option of the cluster setup command.
- To change a physical disk, specify the new physical disk when you mount it.
- Change the configuration of a shared disk in the cluster system.
- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment (particularly Step 33 in "Details of the steps for customization" on PRIMECLUSTER for Solaris, Step 32 in "Details of the steps for customization" on VERITAS Cluster Server for Solaris).

6. Start the target transaction.
   For details on how to start it up, see the relevant cluster software manual.
7. Restore the AdvancedCopy Manager data.
   a) For a Storage Management Server transaction, restore the following data:
      - Repository
        Restore the repository.
        For details on how to restore a repository, see "Restoring a database".
      - Authentication management list
        On the node on which the Storage Management Server transaction is running, restore the authentication management list.
        For details on how to restore an authentication management list, see "Restoring an authentication list".
      - Web browser client files
        Restore the Web browser client files.
        On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
   b) Regardless of the type of transaction (Storage Management Server transaction or Storage Server transaction), restore the following data:
      - AdvancedCopy Manager management file
        On the node operating the transaction, restore /etc/opt/swstorage/<logical-node-name>/swnode.ini.
   c) In the Storage Server transaction or Storage Management Server transaction that also functions as a Storage Server transaction, restore the following data:
      - Backup management list
        Restore the backup management list.
        For details on how to restore a backup management list, see "Restoring the backup management list".
      - Pre-processing/post-processing scripts
        Restore the pre-processing and post-processing scripts for backup management and replication control.
      - When using the replication control function, restore the environment by using the resource adjustment command (swsrprecoverres).
      - Specify the "-r" option for the resource adjustment command.
   d) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
      - Policy file for package backup of the management information
        For details on the policy file path, see "Preliminaries".
8. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

9.5.8.9 Changing the repository shared disk

Change the shared disk for the AdvancedCopy Manager repository by taking the following steps:

1. Check whether the target Storage Management Server transaction is operating.
   If the transaction is not running, start the Storage Management Server transaction.
   For details on how to start it up, see the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.
   Save the following data:
   — Repository
     Make a backup of the repository.
     For details on how to make a backup of the repository, see "Making a backup of a database".
   — Authentication management list
     On the node on which the Storage Management Server transaction is running, make a backup of the authentication management list.
     For details on how to make a backup of an authentication management list, see "Making a backup of an authentication list".
   — Web browser client files
     Make a backup of the Web browser client files.
     On the node on which the Storage Management Server transaction is running, save the files under /opt/swstorage/java/data by the directory. Also save /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
   — AdvancedCopy Manager management file
     On the node operating the transaction, save /etc/opt/swstorage/<logical-node-name>/swnode.ini.

   When the Storage Management Server transaction also functions as a Storage Server transaction, save the following data:
   — Backup management list
     Make a backup of the backup management list.
     For details on how to make a backup of a backup management list, see "Making a backup of backup management list".
   — Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication control.

   For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:
   — Policy file for package backup of the management information
     For details on the policy file path, see "Preliminaries".

3. Delete the cluster environment of the target transaction.
   For details on how to delete a cluster environment, see "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   — Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on PRIMECLUSTER for Solaris" "Detailed steps for deletion" in "Deletion on VERITAS Cluster Server for Solaris" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

4. Create the cluster environment of the target transaction.
   For details on how to create a cluster environment, see "Customizing a Storage Management Server transaction or Storage Server transaction" in the 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 33 in "Details of the steps for customization" on PRIMECLUSTER for Solaris, Step 32 in "Details of the steps for customization" on VERITAS Cluster Server for Solaris).

5. Start the target transaction.
   For details on how to start it up, see the relevant cluster software manual.
6. Restore the AdvancedCopy Manager data.
   a) Restore the following data:
       — Repository
         Restore the repository.
         For details on how to restore a repository, see "Restoring a database".
       — Authentication management list
         On the node on which the Storage Management Server transaction is running, restore the authentication management list.
         For details on how to restore an authentication management list, see "Restoring an authentication list".
       — Web browser client files
         Restore the Web browser client files.
         On the node on which the Storage Management Server transaction is running, restore the files under /opt/swstorage/java/data by the directory. Also restore /etc/opt/FJSVswssc/data/security/root.ini on both nodes.
       — AdvancedCopy Manager management file
         On the node running the transaction, restore /etc/opt/swstorage/<logical-node-name>/swnode.ini.
   b) When the Storage Management Server transaction also functions as a Storage Server transaction, restore the following data:
       — Backup management list
         Restore the backup management list.
         For details on how to restore a backup management list, see "Restoring the backup management list".
       — Pre-processing/post-processing scripts
         Restore the pre-processing and post-processing scripts for backup management and replication control.
       — When using the replication control function, restore the environment by using the resource adjustment command (swsrprecoverres).
         Specify the "-r" option for the resource adjustment command.
   c) For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:
       — Policy file for package backup of the management information
         For details on the policy file path, see "Preliminaries".
7. For the package-backup-of-the-management-information execution server of AdvancedCopy Manager, execute the package-backup-of-the-management-information server registration/deletion command to register the package-backup-of-the-management-information execution server.

Chapter 10 Commands

This chapter describes using commands.

Set the following paths in the PATH environment variable to execute the commands.
— /usr/sbin
— /usr/bin

10.1 Command list

The commands are classified as follows:

Backup management

Environment definition commands

Table: List of environment definition commands for backup management

Function	Command name	Explanation
Storage Server configuration information configuration 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 configuration command	swstdevinfoset	Sets the usage type of a device.
Device use status display command	swstdevdisp	Displays the information of a device.
Backup policy configuration 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: 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.
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: List of maintenance commands for backup management

Function	Command name	Explanation
Resource match command	swstsrsemtch	Recovers the consistency of information in a backup management file.
Resource backup command	swstresback	Backs up a backup management files
Resource restore command	swstresrst	Restores a backup management files

Configuration management

Table: List of configuration management commands for backup management

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	Use this command to change the username or password used to access the repository.
GUI connection information configuration command	stgguiipset	Use this command if multiple network cards are installed in the Storage Management Server and the IP address used for communication with Storage Servers is operated separately from the IP address specified when Web screens are used.
Server information addition command	stgxfwcmaddsrv	This command adds information of a Storage Server newly managed by AdvancedCopy Manager.
Server information change command	stgxfwcmmodsrv	This command changes the information of a Storage Server managed by AdvancedCopy Manager.
Server information deletion command	stgxfwcmdelsrv	This command deletes the information of a Storage Server currently managed by AdvancedCopy Manager.
Device information fetch/reflect command	stgxfwcmsetdev	This command collects the information of the device most recently detected by the server and displays the differences compared with the information managed by AdvancedCopy Manager.
Device information deletion command	stgxfwcmdeldev	This command deletes the information of a device currently managed by AdvancedCopy Manager.
Server information display command	stgxfwcmdispsrv	This command displays the information of a server managed by AdvancedCopy Manager.
Device information display command	stgxfwcmdispdev	This command displays the information of a device managed by AdvancedCopy Manager.

Function	Command name	Explanation
Partition information display command	stgxfwcmdisppat	This command displays the information of the partitions that comprise a device managed by AdvancedCopy Manager.
Environment information display command	stgenvdisp	Displays the environment values set for AdvancedCopy Manager
Management information batch backup server registration/deletion command	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
SDX object management unit configuration command	stgxfwcmsetsdx	Sets the management unit for SDX objects handled by AdvancedCopy Manager

Replication management

Environment definition commands

Table: List of environment definition commands for replication management

Function	Command name	Explanation
Replication volume information configuration 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: 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.

Function	Command name	Explanation
Synchronous processing reverse command	swsrprevsync	Reverses the copying direction of inter-box synchronization in suspended status.

Maintenance commands

Table: 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: List of daemon start and stop commands

Function	Command name	Explanation
Communication daemon start and stop	stgfwcom	Starts and stops communication daemons
RMI daemon start and stop	stgrmicom	Starts and stops RMI daemons
RDB daemon start and stop	stgdbcom	Starts and stops RDB daemons
Authentication daemon start and stop	rc.smfwsec	Starts and stops authentication daemons
AdvancedCopy Manager daemon start and stop	Startacm stopacm	Starts and stops AdvancedCopy Manager

SnapOPC/SnapOPC+ support command

Table: SnapOPC/SnapOPC+ support command

Function	Command name	Explanation
Update size measurement command	swstestupdate	Uses the pseudo-session configuration function to measure the physical size of a SnapOPC disk

10.2 Backup Management Commands

This section describes operations using backup management commands.

Note

Only a root or superuser 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 aborts.

Note

Backup operations in Logical Unit (disk) units is not supported. If a Logical Unit (disk)
is specified in the device information configuration command (swstdevinfoset), an error
occurs.

Note Operating environment for command execution

— The table below lists the requirements for the operating environment in which to
execute the respective commands.

Table: Operating environment required for command execution

Command	Operating environment of AdvancedCopy Manager
swstbackstat	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
swstbackup	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows and is in EC operation, the daemons and services of the Storage Server must be operating.
swstbkpoldel	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be operating. To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstbkpoldisp	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
swstbkpolset	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be operating. To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstcancelrest	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstcancelsync	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows and is in EC operation, the daemons and services of the Storage Server must be operating.

Command	Operating environment of AdvancedCopy Manager
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	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
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	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
swsthistdel	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swsthistdisp	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
swstresback	-
swstresrst	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be operating. To execute this command with the -x option specified, the daemons and services of the Storage Management Server must be operating.
swstrestore	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating.
swstreststat	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
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.

Command	Operating environment of AdvancedCopy Manager
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	To execute this command on a Storage Management Server with either of the following parameter designations, the daemons and services of the Storage Management Server and target Storage Server must be operating: ● -h option specified, or ● No device name specified
swsttrkstat	When this command is executed in the following format on the Storage Management Server, the daemons/services of the Storage Management Server and target Storage Server must be active: ● -h option is specified, or ● No device name is specified.

Note In cluster operation

In cluster operation, execute a command by taking the following steps:
1) If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=<logical-node-name><Enter>
# export SWSTGNODE
```

2) Execute the command.
The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Commands for cluster operations

Command	Environment variable	Command execution node	Remarks
swstsvrset	Required	Cluster active server	
swstsvrdisp	Required	Cluster active server	
swstdevinfoset	Required	Cluster active server	
swstdevdisp	Required	Cluster active server	
swstbkpolset	Required	Cluster active server	
swstbkpoldisp	Required	Cluster active server	
swstbkpoldel	Required	Cluster active server	
swstbackup	Required	Cluster active server	
swstbackstat	Required	Cluster active server	
swstrestore	Required	Cluster active server	
swstcancelrest	Required	Cluster active server	
swstreststat	Required	Cluster active server	
swsthistdisp	Required	Cluster active server	
swsthistdel	Required	Cluster active server	
swststartsync	Required	Cluster active server	
swstcancelsync	Required	Cluster active server	
swstsyncstat	Required	Cluster active server	
swstexecstat	Required	Cluster active server	
swstcanceltrk	Required	Cluster active server	
swsttrkstat	Required	Cluster active server	
swstsrsemtch	Required	Cluster active server	
swstresback	Required	Cluster active server	
swstresrst	Required	Cluster active server	

10.2.1 Environment definition commands

This chapter describes environment definition commands for backup management.

10.2.1.1 Storage Server configuration information configuration command (swstsvrset)

This command sets configuration information of a Storage Server. Execute this command to declare that the Storage Serveron which the command is executed is subject to the backup operation.

a. Specification

```
[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstsvrset

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstsvrset [-h Server]
```

b. Description of options

Option	Description
-h	Specifies the name of a Storage Server to be subject to the backup operation. This option is valid only on a Storage Management Server. If this option is omitted, the Storage Server on which the command is entered will be subject to the processing.

c. End status
   = 0: Normal end
   > 0: Abnormal end

d. Execution example
   Set configuration information of a Storage Server.

```
# /opt/FJSVswsts/bin/swstsvrset
swstsvrset completed
#
```

   Set configuration information of a Storage Server (job1) from a Storage Management Server.

```
# /opt/FJSVswsts/bin/swstsvrset - h job1
swstsvrset completed
#
```

Note

This command can be executed only while none of the following commands are running.
- ― Storage Server configuration information configuration command(swstsvrset)
- ― Backup policy configuration command (swstbkpolset)
- ― Backup policy deletion command (swstbkpoldel)
- ― Backup execution command (swstbackup)
- ― Restore execution command (swstrestore)
- ― Restore cancellation command (swstcancelrest)
- ― Backup synchronous processing start command (swststartsync)
- ― Backup synchronous processing cancel command (swstcancelsync)
- ― Device information configuration command (swstdevinfoset)
- ― History information deletion command (swsthistdel)
- ― Tracking cancel command (swstcanceltrk)
- ― Resource backup command (swstresback)
- ― Resource restore command (swstresrst)
- ― Resource match command (swstsrsemtch)

10.2.1.2 Storage Server configuration information display command (swstsvrdisp)

This command displays configuration information of a Storage Server, which has been set using the Storage Server configuration information configuration command (swstsvrset).

a. Specification

```
[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstsvrdisp

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstsvrdisp [-h Server]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option is valid only on a Storage Management Server.

c. End status
   = 0: Normal end
   > 0: Abnormal end

d. Execution example
   Display configuration information of a Storage Server (Work1).

```
# /opt/FJSVswsts/bin/swstsvrdisp
Storage-Server  = Work1
#
```

The following information will be displayed.

Title	Description
Storage-Server	Displays a Storage Server name.

10.2.1.3 Device information configuration command (swstdevinfoset)

Configure a volume that has been allocated to the ETERNUS storage system disk array unit, as a transaction or backup volume.

A transaction volume refers to a volume that stores live transaction data to be backed up.

A backup volume refers to a volume used to store a backup of this transaction data.   When using transaction volumes to back up data, see "Determining a backup target" in "Backup Operations (Normal Transaction Volumes)" for information about the transaction volume. See "Preparing a backup volume" in "Backup Operations (Normal Transaction Volumes)" for information about the backup volume.

GDS logical volumes can also be registered.

a.   Specification method

```
[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] -t | -b | -o Device-Name
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option is valid only on a Storage Management Server.
-t	Register the specified device as a transaction volume. Cannot be specified at the same time as the -b and -o options.
-b	Register the specified device as a backup volume. Cannot be specified at the same time as the -t and -o options.
-o	Deregister the specified device if it has been registered as a transaction or backup volume. Cannot be specified at the same time as the -t and -b options.

c.   Description of operand

Operand	Description
Device-Name	Specify a device name. Specify the name of a block device.

d.   End status
    = 0: Normal end
    > 0: Abnormal end

e.   Execution example
    Register a device (/dev/dsk/c1t0d0s6) as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/dsk/c1t0d0s6
swstdevinfoset completed
#
```

    Register a device (/dev/dsk/c1t0d2s6) as a backup volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d2s6
swstdevinfoset completed
#
```

Deregister a device (/dev/dsk/c1t0d0s6) that has been registered as a transaction volume.

```
# /opt/FJSVswsts/bin/swstdevinfoset -o /dev/dsk/c1t0d0s6
swstdevinfoset completed
#
```

Note

No device can be registered as a transaction volume if:
- Another device with the same logical volume information (box identifier, OLU number, EXTENT start position, and EXTENT size) has already been registered as a transaction volume.
- The space of the device to be registered overlaps the space of an already registered transaction or backup volume.
- When the specified volume is a logical volume of VxVM in an unsupported structure. For the supported logical volumes of VxVM, refer to "Managing a Device on AdvancedCopy Manager."
- If it is a Logical Unit (disk)

Note

No device can be registered as a backup volume if:
- Another device with the same logical volume information (box identifier, OLU number, EXTENT start position, and EXTENT size) has already been registered as a backup volume.
- The space of the device to be registered overlaps the space of an already registered transaction or backup volume.
- The device to be configured is already mounted.
- The device is an SDX object.
- The device which to be configured is registered as a replication destination volume of replication management.
- The device being registered is already registered as replication source volume of the duplicate volume information in which the bidirectional copy of replication management is possible.
- The specified volume is a logical volume of VxVM in an unsupported structure. For the supported logical volumes of VxVM, refer to "Managing a Device on AdvancedCopy Manager."
- If it is a Logical Unit (disk)

Note

You must delete related backup history information before:
- Changing a backup volume to a transaction volume
- Canceling the configuration of a backup volume

Note

You must delete a backup policy specified on a transaction volume before:
- Changing a transaction volume to a backup volume
- Canceling the configuration of a transaction volume

The following changes are not possible unless the related synchronous processing (EC session) is cancelled:

● Changing a configuration of a suspended transaction volume

● Changing a configuration of a suspended backup volume

To perform the following changes, the related tracking process (OPC session) must be canceled in advance.

— Changing the configuration of a transaction volume in tracking processing

— Changing the configuration of a backup volume in tracking processing

This command can be executed only while none of the following commands are running.

● Storage Server configuration information configuration command (swstsvrset)

● Device information configuration command(swstdevinfoset)

● Backup policy configuration command (swstbkpolset)

● Backup policy deletion command (swstbkpoldel)

● Backup execution command (swstbackup)

● Restore execution command (swstrestore)

● Restore cancellation command (swstcancelrest)

● Backup synchronous processing start command (swststartsync)

● Backup synchronous processing cancel command (swstcancelsync)

● History information deletion command (swsthistdel)

● Tracking cancel command (swstcanceltrk)

● Resource match command (swstsrsemtch)

● Resource backup command (swstresback)

● Resource restore command (swstresrst)

If GDS SDX objects are used, refer to "Configuration and conditions of unsupported SDX objects" and "Notes on SDX object operation (backup management)".

10.2.1.4 Device usage status display command (swstdevdisp)

This command displays information of a transaction or backup volume or any other definable device, which has been configured using the device information configuration command (swstdevinfoset).

a.   Specification method

```
[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstdevdisp [-h Server] [-t] [-b [-u]] [-o] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-t	Displays information on a device that has been configured 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 configured 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 configured as a transaction or backup volume. Displays all the devices other than those configured as a transaction or backup volume if the device name in an operand is omitted.

Information on a device that has been configured as a transaction volume will be displayed if all of the "-t", "-b", and "-o" options are omitted.

c. Description of operand

Operand	Description
Device-Name	Specify a device name. Specify the name of a block device. Displays device information on all the transaction volumes if this operand as well as the options are omitted.

d. End status
= 0: Normal end
> 0: Abnormal end

e. Execution example
Display the usage statuses of the registered devices.

```
# /opt/FJSVswsts/bin/swstdevdisp - tb
Server Device           Size          Device-Mode    Mount-Point (Method)
Backup-Engine
Work2  /dev/dsk/c1t0d0s6    1.0 Gbyte Transaction   /mnt/tran1 (ufs)
AdvancedCopy
Work2  /dev/dsk/c1t1d0s6    1.0 Gbyte Transaction   ---- (----)
AdvancedCopy
Work2  /dev/dsk/c1t0d2s6    1.0 Gbyte Backup (used) ---- (----)        AdvancedCopy
Work2  /dev/dsk/c1t0d2s3    1.0 Gbyte Backup (free) ---- (----)        AdvancedCopy
Work2  /dev/dsk/c1t0d7s6    2.0 Gbyte Backup (free) ---- (----)        AdvancedCopy
Work2  /dev/dsk/c1t0d7s3    2.0 Gbyte Backup (free) ---- (----)        AdvancedCopy
:
#
```

The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Device	Displays an AdvancedCopy Manager device name.
Size	Displays the size of a partition allocated to a device. For a logical volume of VxVM, the size of the public area (slice) that makes up the volume is displayed instead of the volume size.

Title	Description
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 transaction or backup volume. A backup volume is indicated as "Backup (used)" if it is being used or "Backup (free)" if it is not used. During the backup process with -suspend or - T specified, the backup volume remains in use after history information is deleted. When the -u option is specified, "Backup (used-S)" is displayed for a backup volume in the suspend status for which history information was deleted, or "Backup (used-T)" is displayed for a backup volume in the tracking status for which history information was deleted.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Backup-Engine	Displays the operation type. ● "AdvancedCopy": Backup operation using AdvancedCopy Manager

Note

This command cannot be used to display volume sizes to the byte. Refer to "Notes" under "Configuring the device operation type" for the method for displaying and checking the number of bytes in a volume.

10.2.1.5 Backup policy configuration command (swstbkpolset)

This command sets a backup policy (numbers of preservation generations and interval days).
The number of preservation generations refers to the number generations of backup data that should be kept.
The number of interval days refers to the number of days after the execution of backup in that the next backup should be performed.

Note

Even if the number of interval days is specified, AdvancedCopy Manager does not automatically perform backup.

Note

When you specify a backup policy, there must be as many backup volumes required by the specified backup policy. To view information on the number of backup volumes required to perform the backup operation of a regular transaction volume, see "Preparing a backup volume".

a. Specification method

```
- Setting backup policies by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstbkpolset [-i Interval-Days] [-s Save-Number][Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstbkpolset [-h Server][-i Interval-Days] [-s
Save-Number][Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-i	Specifies the number of interval days. You can specify a value between 1 and 366. If this option is omitted during initial registration, 30 will be set. If this option is omitted during update, the existing value will be inherited.
-s	Specifies the number of preservation generations. You can specify a value between 1 and 31. If this option is omitted during initial registration, 2 will be set as the default. If this option is omitted during update, the existing value will be inherited.

c. Description of operand

Operand	Description
Device-Name	Specify an AdvancedCopy Manager device name. Refer to "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.

d. End status
    = 0: Normal end
    〉0: Abnormal end

e. Execution example
    To set 3 as the save number of a transaction volume (/dev/dsk/c1t0d5s3) as a backup
    policy:

```
  # /opt/FJSVswsts/bin/swstbkpolset -s 3 /dev/dsk/c1t0d5s3
/dev/dsk/c1t0d5s3 swstbkpolset completed
#
```

Note

Change to the number of preservation generations can only be performed if there is less history information across the generation timeframe than the number of preservation generations currently configured.

Note

Ordinary transaction volumes must be backed up to ordinary backup volumes.
If the transaction volume is a GDS logical volume, the backup destination must be a backup volume
of a GDS logical volume.

Note

No backup policy can be set in the following circumstances:
- If there are less backup volumes than the specified number of preservation generations;
- If a value for a greater number of preservation generations than allowable is specified;
- If a value for specifying more interval days than allowable is specified;
- When the replication control function or tape backup function uses the target transaction volume.
- When the specified device is an LU (disk unit)

Note

This command can be executed only while none of the following commands are running.
- Resource match command (swstsrsemtch)
- Device information configuration command (swstdevinfoset)
- Storage Server configuration information configuration command (swstsvrset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

Note

If GDS SDX objects are to be used, refer to information regarding "Configuration and
conditions of unsupported SDX objects."

10.2.1.6 Backup policy display command (swstbkpoldisp)

This command displays a backup policy that has been set for a transaction volume.

a. Specification method

```
- Displaying backup policies by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstbkpoldisp [Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstbkpoldisp [-h Server] [Device-Name]
```

b.　Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.

c.　Description of operand

Operand	Description
Device-Name	Specify an AdvancedCopy Manager device name. Specify the name of a block device. If the device name is omitted, a backup policy for a transaction volume with a registered backup policy will be displayed.

d.　End status

    = 0:　Normal end
    > 0:　Abnormal end

e.　Execution example

    To display the backup policies of a transaction volume(/dev/dsk/c1t0d5s3):

```
# /opt/FJSVswsts/bin/swstbkpoldisp /dev/dsk/c1t0d5s3
Server Device             Interval-Days Save-Number Mount-Point (Method)
Work2  /dev/dsk/c1t0d5s3 30            2           /stg(ufs)
#
```

    The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Device	Displays a device name.
Interval-Days	Displays a number of interval days.
Save-Number	Displays a number of preservation generations.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point will be displayed inside the parentheses.

10.2.1.7 Backup policy deletion command (swstbkpoldel)

This command deletes a backup policy.
If the transaction volume to be deleted has backup history information, delete the backup history information and then execute this command.

a.　Specification method

```
- Deleting backup policies by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstbkpoldel Device-Name

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstbkpoldel [-h Server] Device-Name
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.

c. Description of operand

Operand	Description
Device-Name	Specify an AdvancedCopy Manager device name. Specify the name of a block device.

d. End status
   = 0: Normal end
   > 0: Abnormal end

e. Execution example
   To delete the backup policies of a transaction volume (/dev/dsk/c1t0d5s3):

```
# /opt/FJSVswsts/bin/swstbkpoldel /dev/dsk/c1t0d5s3
/dev/dsk/c1t0d5s3 swstbkpoldel completed
#
```

Note

A backup policy can not be deleted in the following circumstances:
● If the transaction volume to be deleted has backup history information;
● If a transaction volume whose backup policies are to be deleted has already started backup synchronous processing;
● When the replication control function or tape backup function uses the target transaction volume

Note

This command can be executed only while none of the following commands are running:
● Storage Server configuration information configuration command (swstsvrset);
● Device information configuration command (swstdevinfoset);
● Resource match command (swstsrsemtch);
● Resource backup command (swstresback);
● Resource restore command (swstresrst).

10.2.2 Operational commands

This chapter describes operation commands for backup management.

10.2.2.1 Backup execution command (swstbackup)

The behavior of the swstbackup command, changes according to various processing states of the copy during execution.

● When synchronous processing (EC) is not performed.
  Snapshot processing (OPC) is performed and relevant history information, such as the timestamp and backup volume of a copy destination, is registered into backup history information. This type of Backup is referred to as a snapshot type high-speed backup.

● When synchronous processing (EC) is performed.
  The state of synchronous processing is checked and, equivalency maintenance status is set, backup synchronous processing is suspended. Information, such as the timestamp and backup volume of a copy destination, is simultaneously registered into the backup history file. This type of Backup is referred to as a synchronous high-speed backup. A fatal error is generated when an equivalency maintenance state can not be attained.

To use the Suspend/Resume function for synchronous high-speed backup, execute the backup command with "-suspend" specified, to suspend backup synchronous processing.

In both cases, the backup is established and access to the backup volume is granted immediately after command execution.

AdvancedCopy Manager executes a backup pre-processing Shell script (OpcBackup.pre) before executing backup and a backup post-processing Shell script (OpcBackup.post) after executing backup. You can customize these Shell scripts to suit your operational needs. For more information, see "Pre-processing and Post-processing of Backup and Restoration".

a. Specification method

```
- Creating backup copies by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstbackup [-suspend|-T] Device-Name [-Xdevmap Device-Map-File]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstbackup [-h Server] [-suspend|-T] Device-Name [-Xdevmap
Device-Map-File]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-Xdevmap	Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a device map file in which a combination pair of transaction volume and target backup volume is described. If this option is not specified, the target backup volume will be automatically selected. To execute this command remotely using the -h option, specify a device map file (of a Storage Server) using an absolute pathname. A file name specified in <Device-Map-Fil> must not include any special or reserved characters.
-suspend	This results in synchronous high-speed backup using the Suspend/Resume function.
-T	Specifies that the differential snapshot high-speed backup is to be executed. This option cannot be specified during synchronous processing. This option is valid only for copying within a cabinet when the disk array supports the QuickOPC function. For the snapshot high-speed backup without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must always be specified to perform a backup operation using differential snapshots.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d. End status

　= 0: Normal end
　〉 0: Abnormal end

e. Execution example
　Back up a business volume

```
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t1d0s6
/dev/dsk/c1t1d0s6 swstbackup completed
#
```

Note

To preserve data integrity, this command performs the backup only after inhibiting access to both transaction and backup volumes from all other processes. Thus, drive letters, logical volume names or device labels of devices are unassigned.
This command will terminate with an error under the following circumstances:

- If a drive letter, logical volume name or device label of a transaction volume is assigned ;
- The mount point has directories to which other volumes are also mounted
- The volume has a file in use.

Note

To mount a transaction volume from a server other than the server on which this command is invoked, unmount the transaction volume, using the authority of the backup administrator. If the transaction volume needs to be mounted, create backup copies with the following procedure:
1. Execute the sync command to synchronize the transaction volume and file system.
2. Execute this command.
3. Execute the fsck command for the backup volume, and check the file system.

Note

You cannot perform backup in the following cases where:
(In these cases, check the corresponding "System Administrator's Response" in the message displayed.)

● No backup policy has been specified for the specified transaction volume;
● The Backup executed one generation earlier was unsuccessful;
● Restore is being executed for the processing target transaction volume;
● Synchronous backup processing is performed in a transaction volume to be processed, but the state of equivalence is not reached;
● The mount point of a transaction volume set at registration has been changed;
● A device containing SynfinityFILE resources consisting of multiple transaction volumes is mounted;
● Restoration is being executed using backup history information that will cause a generation overflow;
● No unused backup volume to be used as the copy destination could be acquired;
● Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed;
● A backup volume defined as the copy destination is mounted;
● When the transaction volume or backup volume is a logical volume of VxVM, or the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager;
● When the transaction volume or backup volume is a logical volume of VxVM, or the logical volume is deleted from VxVM;
● The "-n" option is specified when the log group includes both GDS volumes and non-GDS volumes;
● When the replication control function or tape backup function uses the target transaction volume;
● When the replication control function or tape backup function uses the target backup volume;
● When the replication control function or tape backup function uses backup history information outside the range of preservation generations;
● When the "-T" option is specified during an operation in which SDX objects are backed up in units of logical volumes

Point

If existing backup history information conforms to the expected number of saved generations specified by the backup policy configuration command (swstbkpolset), then history information on the oldest generation is automatically deleted during the backup process, and the backup volume is cleared.　However, if "-suspend" or "-T" options are specified for the backup history information, then the backup volume with the Suspend or tracking statuses is not cleared and the backup volume remains in use.

Note

Neither the transaction volume on which the backup command is executed, any additional transaction volume/s, nor the suspended or tracking backup volume can be specified as backup destinations in the device map file.

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A Destination backup volume cannot be specified and backup cannot be performed under the following circumstances:

- When the backup volume specified by the device map file (or operand of the "-t" option) cannot be used as backup volume of a pair because it is not in an "intact" state or the partition size of the transaction volume and backup volume are not the same.
- When an error is detected in the description of the source transaction volume specified in a device map file (refer to "Preparing a device map file").
- When special or reserved words are used in the device map file name.
- When an ordinary volume is specified as the transaction volume and a GDS logical volume as the backup volume.
- When a GDS logical volume is specified as the transaction volume and an ordinary volume as the backup volume.

The pre-processing and post-processing scripts are not executed when the mirror slice of the SDX object is TEMP.

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."

See "General notes," for notes on executing backup.

In the case of a SynfinityFILE file system whose transaction volume consists of more than one device (multipartition), backup cannot be performed the unmount/mount tasks cannot be performed inside the pre-processing and post-processing scripts respectively.
In this case, manually unmount the file system before backup is performed and re-mount it after the backup has completed.

When the SynfinityFILE and AdvancedCopy Manager configurations are as follows:

```
# sfxinfo /dev/dsk/c1t3d10s1
ID   special                    size     mount    Type
0    /dev/dsk/c1t3d10s1(800019)  25986   /mnt     META
0    /dev/dsk/c1t3d10s1(800019)  105751  /mnt     DATA
1    /dev/dsk/c1t3d15s3(800028)  5120    /mnt     LOG
2    /dev/dsk/c1t3d16s3(800030)  131736  /mnt     DATA


# /opt/FJSVswsts/bin/swstdevdisp - t
Server Device          Size       Device-Mode Mount-Point (Method) Backup-Engine
SV1   /dev/dsk/c1t3d10s1  128.0 Mbyte Transaction /mnt (ufs)          AdvancedCopy
SV1   /dev/dsk/c1t3d15s3    5.0 Mbyte Transaction /mnt (ufs)          AdvancedCopy
SV1   /dev/dsk/c1t3d16s3  128.0 Mbyte Transaction /mnt (ufs)          AdvancedCopy
```

Backup procedure

```
# umount /mnt
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t3d10s1
/dev/dsk/c1t3d10s1 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t3d15s3
/dev/dsk/c1t3d15s3 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t3d16s3
/dev/dsk/c1t3d16s3 swstbackup completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```


This command can be executed only while none of the following commands are running:
- ● Storage Server configuration information configuration command (swstsvrset);
- ● Device information configuration command (swstdevinfoset);
- ● Resource match command (swstsrsemtch);
- ● Resource backup command (swstresback);
- ● Resource restore command (swstresrst).

10.2.2.2 Backup execution status display command (swstbackstat)

This command displays the completion status of a backup that is being performed using the backup execution command (swstbackup).

Do not use the OPC stop function of GRmgr/ETERNUSmgr while executing a snapshot high speed backup. When the OPC stop function of GRmgr/ETERNUSmgr is used, it will display "succeeded" regardless of the success or failure of an actual backup.

a.   Specification method

```
- Displaying the backup processing status by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstbackstat [Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstbackstat [-h Server] [Device-Name]
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the backup execution statuses of all the transaction volumes will be displayed.

d. End status
    = 0: Normal end
    > 0: Abnormal end

e. Execution example
    Display the actual copying execution status.

```
# /opt/FJSVswsts/bin/swstbackstat
Server Transaction-Disk  Backup-Disk       Status    Execute
Work1  /dev/dsk/c1t0d0s3 /dev/dsk/c1t0d2s3 succeeded ----
Work1  /dev/dsk/c1t0d0s4 /dev/dsk/c1t0d2s4 executing 70%
Work1  /dev/dsk/c1t0d0s5 /dev/dsk/c1t0d2s5 executing 30%
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the device name of a transaction volume.
Backup-Disk	Displays a backup volume name. If no backup has been collected, "----" will be displayed.
Status	Displays a backup completion status using one of the following character strings. ● "----": No backup has been collected (no history exists). ● "succeeded": Backup has been completed. ● "executing": Copying using OPC is in progress. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

![Note icon]

Note

If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred.
Refer to information regarding "Troubleshooting for a hardware error occurring during backup".

Backup execution status display cannot be executed In the following circumstances:

- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager;
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

If "gds-error" is displayed in the Status field, a problem with GDS is assumed.

Remedy the cause of the GDS problem, and take one of the following steps:

- ● If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing

    or,
- ● If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information

    or,
- ● If restoration is in progress, execute the resource match command (swstsrsemtch) , and perform restoration again.

10.2.2.3 Restore execution command (swstrestore)

The backup history information is restored by using OPC.

Restoration of each individual file cannot be performed because copying between devices will be performed.

When the restore execution command is executed, AdvancedCopy Manager performs the restore pre-processing Shell script (OpcRestore.pre) before copying data using OPC and then the restore post-processing Shell script(OpcRestore.post) after copying data using OPC. You can customize these Shell scripts. For more information, see "Pre-processing and Post-processing for Backup and Restoration".

Restoration to a device other than that of the transaction volume can be performed. For this type of restoration, the destination device must be a device that is not registered as a transaction volume and the size of its area must be the same as that of the specified transaction volume. Restoration of a GDS logical volume to a device other than that of the original transaction volume cannot be performed.

You can restore data to any device other than a transaction volume. When you do so, the device must not be registered as a transaction volume and the device must have the same size as the specified transaction volume.

a.　Specification method

```
Restoring a normal transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstrestore [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] [-Xgds-softcopy] Device-Name

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstrestore [-h Server] [-g Generation-No | -v Version-No]
                [-r Restore-Device-Name] [-Xgds-softcopy] Device-Name
```

b.　Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-g	Specifies the relative generation number of data to be restored. Check the relative generation number using the history information display command (swsthistdisp).
-v	Specifies the absolute generation number of data to be restored. Check the absolute generation number using the history information display command (swsthistdisp).
-r	Specifies a restore destination device name to restore data to any other device than a transaction volume. Cannot be specified for a GDS logical volume.
-Xgds-softcopy	Performs restoration by software-copy for restoration in linkage with GDS Snapshot. If this option is not specified, restoration is performed with OPC.

Note: If neither the "-g" or "-v" option is specified, the latest information out of information under history management will be restored.

c.　Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device.

d.　End status
   = 0:　Normal end
   〉0:　Abnormal end

e.　Execution example
   Restore data with relative generation number 2. For information on the relative generation number, see data displayed using the history information display command.

```
# /opt/FJSVswsts/bin/swstrestore -g 2 /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstrestore completed
#
```

If 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, see the data displayed by the backup synchronous processing execution status display command. Execute the backup synchronous processing cancel command (swstcancelsync) to cancel the synchronous processing.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk       Status     Execute
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s5 suspend    ----
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync - all /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk Status Execute
Work2  /dev/dsk/c1t0d0s6 ----        ----   ----
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstrestore completed
#
```


Point

On a transaction volume on which a file system has been constructed, restore a specific file as follows:
1. Mount a backup volume. Check the backup volume by executing the Backup History List view/History information display command.
2. Copy the file to be restored by executing the cp command.
3. Unmount the backup volume.
For the SynfinityFILE file system, follow the procedure below:
1. Execute the following commands for a backup volume:
```
# sfxadm  <RAW-device-name-of-the-backup-volume>
# fsck -F sfxfs -o f  <RAW-device-name-of-the-backup-volume>
```
2. Mount the backup volume:
```
# mount -F sfxsfs  <backup-volume-name> <mount-point-name>
```
3. Copy the file to be restored by executing, for example, the cp command:
4. Unmount the backup volume:
```
# unmount  <backup-volume-name> or <mount-point-name>
```


Note

If a transaction volume is mounted from a server other than the server on which this command is executed, execute the command only after unmounting the transaction volume, using the authority of the backup administrator.

You cannot perform restoration or recovery in the following circumstances.
In these instances, perform as instructed by the [System Administrator's Response] in the displayed message.

- ● Both a relative and absolute generation numbers have been specified.
- ● A device registered as a transaction volume has been specified as a parameter with the "-r" option.
- ● When a device registered as a backup volume has been specified as a parameter with the "-r" option, or the device has been registered in the backup registration information of a certain transaction volume. If you restore data to a backup volume without registered backup data, and the backup volume is used to back up a certain transaction volume, then data will be overwritten. It is recommended never to specify a backup volume as a restore destination device.
- ● A slice including VTOC is specified for the "-r" option.
- ● The "-r" option is specified for recovery of a GDS logical volume.
- ● You perform restoration immediately after performing backup (the physical copying using OPC is in progress) (except when the combination of transaction volume and backup volume is the same for backup and restoration). In this case, perform restoration after the physical copying using OPC is completed. Alternatively, on a transaction volume on which a file system has been constructed, perform restoration according to the method described in the Point icon above (when restoring a specific file at a transaction volume on which a file system has been constructed).
- ● If the SynfinityFILE file system is already mounted before restoration of devices of the SynfinityFILE file system consisting of multiple partitions, unmount the SynfinityFILE file system, and then restore all devices that make up the SynfinityFILE file system.
- ● A transaction volume currently in use with synchronous backup processing is specified.
- ● Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume to be restored has been changed.
- ● The mount point set at registration of a transaction volume has been changed.
- ● An SDX object has been specified in a parameter in the "-r" option.
- ● The -Xgds-softcopy option is specified for a device that is not a GDS logical volume.
- ● A GDS logical volume is specified as the restoration destination volume of an ordinary transaction volume.
- ● The "-n" or "-bundle" options are specified when the log group includes both GDS volumes and non-GDS volumes.
- ● 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 suspended or tracking backup volume cannot be used as the restore destination volume.

The restore command cannot be executed on a transaction volume during the synchronous processing (during copying by EC, under the equivalency maintain status, in the Suspend state).
If the following error occurs during restore processing, then execute the backup synchronous processing cancel command (swstcancelsync) (with the "-all" option specified) to cancel all of the synchronous processing of the transaction volume, and execute the restore command.
- swst0639 Command cannot be run because a copy is running.
or
- swst0634 OPC cannot be run. Error code=26 (SCSI command busy).

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Note

See "General notes" for notes on executing restore.

Note

Restore/recovery cannot be performed in the following circumstances. In these cases, take appropriate action according to [System administrator's action] in the message displayed.

● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.

● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects," and "Notes on SDX object operations (backup management)."

Note

If the transaction volume is an SDX object and a non-single volume, you cannot perform restoration using this command. If so, perform recovery as follows:

1. The backup volume is confirmed by backup history list view/History information display command.
2. copies onto the volume which is restore in the dd command

Point

In the case of a SynfinityFILE file system that consists of more than one device (multipartition), backup cannot be performed by using pre-processing and post-processing scripts to execute unmount/mount.

In the case of a SynfinityFILE file system that consists of more than one device (multipartition), unmount the file system before restoration is performed and mount it after that restoration is completed.

When the SynfinityFILE and AdvancedCopy Manager configurations are as follows:

```
# sfxinfo /dev/dsk/c1t3d10s1
ID     special                      size      mount    Type
0      /dev/dsk/c1t3d10s1(800019)   25986     /mnt     META
0      /dev/dsk/c1t3d10s1(800019)   105751    /mnt     DATA
1      /dev/dsk/c1t3d15s3(800028)   5120      /mnt     LOG
2      /dev/dsk/c1t3d16s3(800030)   131736    /mnt     DATA


# /opt/FJSVswsts/bin/swstdevdisp - t
Server Device            Size          Device-Mode Mount-Point (Method) Backup-Engine
SV1    /dev/dsk/c1t3d10s1  128.0 Mbyte Transaction /mnt (ufs)           AdvancedCopy
SV1    /dev/dsk/c1t3d15s3    5.0 Mbyte Transaction /mnt (ufs)           AdvancedCopy
SV1    /dev/dsk/c1t3d16s3  128.0 Mbyte Transaction /mnt (ufs)           AdvancedCopy
```

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Restore procedure

```
# umount /mnt
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t3d10s1
/dev/dsk/c1t3d10s1 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t3d15s3
/dev/dsk/c1t3d15s3 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t3d16s2
/dev/dsk/c1t3d16s3 swstrestore completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

Point

When the SynfinityFILE file system is restored, the restore destination device may not be able to be mounted. In this event, use the following procedure to mount the restore destination device:

1. Execute the following on the restore destination device:

```
# sfxadm <raw-device-name-of-restore-destination-device>
```

2. Mount the restore destination device as follows:

```
# mount -F sfxfs <restore-destination-device-name mount-point-name>
```

Note

This command can be executed only while none of the following commands are running.
- ● Storage Server configuration information configuration command (swstsvrset)
- ● Device information configuration command (swstdevinfoset)
- ● Resource match command (swstsrsemtch)
- ● Resource backup command (swstresback)
- ● Resource restore command (swstresrst)

10.2.2.4 Restore cancellation command (swstcancelrest)

This command cancels OPC-based restoration. If you have executed the restore execution command (swstrestore) and while data is copied using OPC, an abnormality due to a hardware error is detected. Then, remove the cause of the hardware error and perform restoration again using the restore execution command (swstrestore).

Check whether an abnormality has occurred using the restore execution status display command (swstreststat).

Note

If you cancel OPC-based restoration using this command, the transaction volume will be in an incomplete status and can no longer be used because part of the data has already been copied. Perform restoration again using the restore execution command (swstrestore).

If the transaction volume is a GDS logical volume and restoration is cancelled, the state of the transaction volume becomes INVALID. In such cases, refer to the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating System)," and restore the logical volume.

a. Specification method

```
- Canceling restore processing for the specified transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstcancelrest [-g Generation-No | -v Version-No] [-r
Restore-Device-Name] [-emergency] Device-Name

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstcancelrest [-h Server] [-g Generation-No | -v Version-No] [-r
 Restore-Device-Name] [-emergency] Device-Name
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-g	Specifies the relative generation number of data being restored. This option cannot be specified at the same time as the -v option. Check the relative generation number using the restore execution status display command (swstreststat).
-v	Specifies the absolute generation number of data being restored. This option cannot be specified at the same time as the -g option. Check the absolute generation number using the restore execution status display command (swstreststat).
-r	Specifies the device name if data is restored to any other device than a transaction volume. Check the device name using the restore execution status display command (swstreststat).
-emergency	Emergency operation mode is available for operations. In such cases, OPC sessions are neither confirmed nor cancelled.

Note: The restoration of the latest history information will be canceled if neither
the -g or -v option is specified.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d. End status
   = 0: Normal end
   > 0: Abnormal end

e. Execution example
   Cancel restore processing of a transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swstcancelrest  -g  1  /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstcancelrest completed.
#
```

Restoration of the latest history information on the transaction volume (/dev/dsk/c1t0d0s6) is cancelled in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelrest -emergency /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstcancelrest completed.
#
```

Note

You cannot cancel restoration if:
- The history specified in the "-g" or "-v" option does not exist.
- Restoration is not performed on the device specified in the "-r" option.
- Restoration is not performed from the specified history. In this case, processing is terminated with an information message "swst0303 Restoration for specified restoration device is not performed". The end status is a normal end.
- When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
- When the replication control function or tape backup function uses the target transaction volume

Note

However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr, GRmgr, GDS or similar must be used to cancel these sessions.

Note

If a logical volume of VxVM is deleted or its structure is changed to a structure not supported by AdvancedCopy Manager, restoration cannot be cancelled. In such cases, take action according to either item a) or b).
   a. Make sure that advanced copy is not in progress for the replication volume to be deleted, and execute this command with the "-emergency" option specified. If advanced copy is in progress, stop advanced copy processing by using the disk array unit or take action according to item b).
   b. Re-create the logical volume or return the logical volume structure to its original state, and then execute this command.

Note

This command can be executed only while none of the following commands are running.
- Storage Server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfoset)
- Resource match command (swstsrsemtch)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.5 Restore execution status display command (swstreststat)

This command displays the execution status of restoration.

Note

Do not use the OPC stop function of GRmgr while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUSmgr/GRmgr, this command displays "succeeded" whether or not the restoration has actually been successful.

a. Specification method

```
-  Displaying the restore processing status by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstreststat [-g Generation-No | -v Version-No] [-Xgds-softcopy]
[Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstreststat [-h Server ] [-g Generation-No | -v Version-No]
[-Xgds-softcopy] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-g	Specifies the relative generation number of data whose restore execution status should be displayed.
-v	Specifies the absolute generation number of data whose restore execution status should be displayed.
-Xgds-softcopy	Displays the restore execution status of a GDS logical volume. Use this option to check the copy status when restoration using the software-copy function of GDS is in progress. When the option is specified, the Status field display when copying is completed is "----", which is the same as before copying started.

Note: The restore execution statuses of all the history will be displayed if both the -g and -v options are omitted.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device. If this operand is omitted, the restore execution statuses of all the transaction volumes will be displayed.

d. End status

= 0: Normal end
> 0: Abnormal end

e. Execution example

Display the restore processing status of transaction volumes.

```
# /opt/FJSVswsts/bin/swstreststat
Server Transaction-Disk  Generation Version Backup-Disk       Restore-Device
Status     Execute
Work2 /dev/dsk/c1t0d0s3 1          10      /dev/dsk/c1t0d2s3 /dev/dsk/c1t0d1s3
executing 75%
Work2 /dev/dsk/c1t0d0s4 ----       ----    ----              ----
----       ----
Work2 /dev/dsk/c1t0d0s5 2          12      /dev/dsk/c1t0d2s5 ----
succeeded ---
Work2 /dev/dsk/c1t0d0s6 3          13      /dev/dsk/c1t0d2s6 /dev/dsk/c1t0d1s6
executing 75%
:
#
```

The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the device name of a transaction volume.
Generation	Displays the relative generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no history being restored exists.
Version	Displays the absolute generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no history being restored exists.
Backup-Disk	Displays the name of a backup volume from which data should be copied and restored. "----" will be displayed if restoration is not in progress.
Restore-Device	Displays a restore target device name unless data is copied and restored to a transaction volume. "----" will be displayed if restoration is not in progress or data is restored to a transaction volume.
Status	Displays an execution status. ● "----": No copying using OPC or software-copy by GDS is in progress. ● "executing": Copying using OPC or software-copy by GDS is in progress. ● "succeeded": Copying using OPC or software-copy by GDS has been completed. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

Note

If "failed" is displayed in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".

Note

   If no generation number has been specified with the "-v" or "-g" option, the restore execution statuses of all the history will be displayed. If, at this time, restoration is not in progress from any of the history, "----" will be displayed in all the information fields other than "Server" and "Transaction-Disk".

Note

In the following cases, restore execution status display processing cannot be executed:
- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

Note

If "gds-error" is the status displayed in the Status field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:
- ● If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) described in Section 10.1.2.9 to cancel the backup synchronous processing.
- ● If snapshot backup is in progress, execute the history information deletion command (swsthistdel) described in Section 10.1.2.7 to delete the backup history information.
- ● If restoration is in progress, execute the resource match command (swstsrsemtch) described in Section 10.1.3.1, and perform restoration again.

10.2.2.6 History information display command (swsthistdisp)

This command displays history information that has been backed up.

a.   Specification method

```
-  Displaying the backup history information by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swsthistdisp [Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swsthistdisp [-h Server] [Device-Name]
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.

c.   Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the backup history information of all the transaction volumes will be displayed.

d. End status

   = 0: Normal end

   > 0: Abnormal end

e. Execution example

    Display the backup history information of all the transaction volumes.

```
# /opt/FJSVswsts/bin/swsthistdisp
Server=StrgSV01 Device=/dev/sdb6 Mount-Point=/mnt/Tran1 (ext2)
Generation Version Backup-Date     Backup-Device Status    Execute
1          10      2000/11/12 22:00 /dev/sdd6     succeeded ----
2          9       2000/11/11 22:00 /dev/sdf6     succeeded ----
  :
#
```

    The following information will be displayed.

Keyword	Description
Server	Displays a Storage Server name.
Device	Displays a device name.
Mount-Point	Displays the mount point name of the device and the file system type in parentheses.
Generation	Displays a relative generation number. This item will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a timestamp at which backup has been completed. This item will not be displayed if no backup history information exists.
Backup-Device	Displays the name of a backup volume to which data has been backed up. This item will not be displayed if no backup history information exists.
Status	Displays an actual copying execution status using one of the following character strings. ● "succeeded": Copying using OPC has been completed. ● "executing": Copying using OPC is in progress. ● "failed": Copying using OPC has been interrupted due to an error. ● "halt": Copying using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally. This item will not be displayed if no backup history information exists.
Execute	Displays how much has been copied in percentage if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.
ArcSerial	The archive log serial number is displayed "Reference" is displayed for history information backed up by the reference dump. When backup history information does not exist, the archive log serial number is not displayed.

Note

If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred.

Refer to "Troubleshooting for a hardware error, etc. occurring during backup".

In the following cases, history information display processing cannot be executed:
- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

If "gds-error" is the status displayed in the Status field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:
- ● If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- ● If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- ● If restoration is in progress, execute the resource match command (swstsrsemtch), and perform restoration again.

10.2.2.7 History information deletion command (swsthistdel)

This command deletes backup history information.
The backup volume of the deleted history is released and turns into empty backup volume.

If the history information display command (swsthistdisp) displays "failed" in the "Status" field, a hardware error may have occurred. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".

a.   Specification method

```
- Deleting backup history information by specifying a transaction volume

[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] -g Generation-No| -v Version-No | -z [-emergency]
Device-Name
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-g	Specifies the relative generation number of backup history information to be deleted. This option cannot be specified at the same time as the -v or -z. Check the relative generation number using the history information display command (swsthistdisp).

Option	Description
-v	Specifies the absolute generation number of backup history information to be deleted. This option cannot be specified at the same time as the -g or -z. Check the absolute generation number using the history information display command (swsthistdisp).
-z	Specifies to delete all the backup history information. This option cannot be specified at the same time as the -g or -v.
-emergency	Emergency operation mode is available for operations. In such cases, OPC sessions are neither confirmed nor cancelled.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device.

d. End status

= 0: Normal end

> 0: Abnormal end

e. Execution example

Delete the backup history of absolute generation number 10 in a transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swsthistdel -v 10 /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swsthistdel completed
#
```

The history information of relative generation number 1 of the transaction volume (/dev/dsk/c1t0d0s6) is deleted in emergency operation mode.

```
# /opt/FJSVswsts/bin/swsthistdel -g 1 -emergency /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swsthistdel completed
#
```

Note

You cannot delete backup history information if:
- ● The backup history information specified in the "-g" or "-v" option does not exist.
- ● The specified backup history information is used in restoration.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
- ● 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 state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr, GRmgr, GDS or similar must be used to cancel these sessions.

Deleting the suspended history information does not cancel the synchronous processing (EC session).
Deleting the tracking history information does not cancel the tracking processing (OPC session).

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 a logical volume of VxVM is deleted or its structure is changed to a structure not supported by AdvancedCopy Manager, restoration cannot be cancelled. In such cases, take action according to either item a) or b).
  a.   Make sure that advanced copy is not in progress for the replication volume to be deleted, and execute this command with the "-emergency" option specified. If advanced copy is in progress, stop advanced copy processing by using the disk array unit or take action according to item b).
  b.   Re-create the logical volume or return the logical volume structure to its original state, and then execute this command.

If the history information is deleted while the OPC physical copy has not been completed in a backup operation mode other than the differential snapshot high speed backup, physical copying of the deleted history is interrupted. In this case, the data in the backup volume is incomplete (copy stopped part way through). The backup volume is put in the unused state upon deletion of the history information and becomes ready to use at the subsequent backup.
In the differential snapshot high-speed backup mode, the physical copying of the deleted history is continued even after the history information on the incomplete OPC physical copy is deleted. Even after deletion of the history information, the backup volume is in the busy state and becomes ready to use at the subsequent backup of the relevant transaction volume.

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (backup management)".

This command can be executed only while none of the following commands are running.
  ● Storage Server configuration information configuration command (swstsvrset)
  ● Device information configuration command (swstdevinfoset)
  ● Resource match command (swstsrsemtch)
  ● Resource backup command (swstresback)
  ● Resource restore command (swstresrst)

10.2.2.8 Backup synchronous processing start command (swststartsync)

This command starts backup synchronous processing (starts disk-to-disk copy using EC).
For a GDS transaction volume, synchronous processing by software-copy is also possible.

a.   Specification method

```
-  Starting synchronous backup processing by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swststartsync [-Xgds-softcopy | -Xgds-selectcopy] Device-Name
[-Xdevmap Device-Map-File]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swststartsync [-h Server] [-Xgds-softcopy | -Xgds-selectcopy]
Device-Name [-Xdevmap Device-Map-File]
```

b.   Description of options

Option	Description
-h	Specify the name of a Storage Server. This option can be specified only on the Storage Management Server.
-Xdevmap	Specifies a target backup volume to perform the backup synchronous processing. In the operand, specify a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, the target backup volume will be automatically selected. To execute this command on a remote basis using the -h option, specify a device map file of a Storage Server using an absolute pathname. A file name specified in Device-Map-File must not include any national character.
-Xgds-softcopy	Specifies the start of backup synchronous processing of an SDX object and use of the software-copy function instead of the advanced copy function. If you specify this option to start differential copying when the advanced copy function is being used, advanced copy processing stops and software-copy processing starts. You can specify the option when the function in linkage with GDS Snapshot is being used.
-Xgds-selectcopy	Specifies that GDS select the copy processing method of an SDX object. You can specify the option when the function in linkage with GDS Snapshot is being used.

c.   Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device.

d.   End status
   = 0: Normally end
   > 0: Abnormally end

e. Execution example
Start synchronous backup processing of a transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swststartsync completed.
#
```

Backup synchronous processing of a logical volume (/dev/sfdsk/CLS01/dsk/VOL01) of an SDX object is started. The copy processing method is software-copy.

```
# /opt/FJSVswsts/bin/swststartsync -Xgds-softcopy /dev/sfdsk/CLS01/dsk/VOL01
/dev/sfdsk/CLS01/dsk/VOL01 swststartsync completed.
#
```

![Note]

When you execute the backup synchronous processing start command for a transaction volume to which the backup synchronous processing is being executed, the message, "swst0301 Backup synchronous processing is being executed" is displayed and execution terminates normally.

![Note]

You cannot start backup synchronous processing in the following cases. In any of the cases below, take an action according to the "System administrator response" message.
- A device that does not support the EC function (no linkage with GDS Snapshot) is specified.
- When the backup volumes that are needed to start backup synchronous processing cannot be obtained.
- When specifying a device that is being restored by OPC.
- When mounting the backup volume to which data is copied.
- When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
- The "-Xgds-softcopy" option is specified for a device that is not a GDS logical volume. Alternatively, the "-Xgds-selectcopy" option is specified for a device that is not a GDS logical volume.
- When the replication control function or tape backup function uses the target transaction volume

![Point]

If 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 (differential copy starts). Otherwise, the synchronous processing (full copy) starts.

![Point]

Even if already in use, the transaction volume, where the synchronous processing started the suspended backup volume, can be used as backup destinations.

Except for the transaction volume, where the synchronous processing started with the suspended backup volume, transaction volumes cannot be specified as backup destinations in the device map file.

Backup synchronous processing with the output destination backup volume specified cannot be started in the following circumstances:
- The backup volume specified in the device map file cannot be used as the backup volume to be paired with the transaction volume. This means that neither of the following conditions is satisfied:
    1) The specified backup volume is in the unused state.
    2) The transaction volume and backup volume have the same partition size.
- The target transaction volume is incorrectly described in the device map file (Refer to "Describing a device map file").
- Any special or foreign characters, operators or reserved words are used in the in the device map file names.
- An ordinary volume is specified as the transaction volume and a GDS logical volume as the backup volume.
- A GDS logical volume is specified as the transaction volume and an ordinary volume as the backup volume.

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (backup management)".

When any of the following commands is running, this command cannot be executed:
- Resource match command (swstsrsemtch)
- Storage Server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfoset)
- Resource backup command (swstresback)
- Resource restore command (swstresrst)

10.2.2.9 Backup synchronous processing cancel command (swstcancelsync)

The backup synchronous processing during copying by EC or under the equivalency maintenance status may be canceled.

The synchronous processing can be canceled with the backup volume during copying by EC, under the equivalency maintain status, or while the Suspend state is set. Specifying cancellation of all of the synchronous processing cancels all of the backup synchronous processing including those in the Suspended state.

If the system detects an error while backup synchronous processing is being executed, the copying being performed at that time terminates abnormally. In such a case, use this command to cancel the backup synchronous processing. Use the backup synchronous processing progress display command (swstsyncstat) to check for the error.

a. Specification method

```
-  Canceling synchronous backup processing by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstcancelsync [-emergency] [-bd Backup-Device-Name | -all]
 Device-Name

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstcancelsync [-h Server] [-emergency] [-bd Backup-Device-Name
 | -all] Device-Name
```

b. Description of options

Option	Description
-h	Specify the name of a Storage Server. This option can be specified only with a Storage Management Server.
-emergency	Emergency operation mode is available for operations. In such cases, EC sessions are neither confirmed nor cancelled.
-bd	The synchronous processing on a specific backup volume can be cancelled. To do so, specify the backup volume name in an operand. The backup volume name and -all option cannot be specified together.
-all	All of the synchronous processing of the transaction volume can be specified to be cancelled. This specification and the -bd option cannot be specified together.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device. The partition name is specified for the SDX object.
Backup-Device-Name	Specify the copy destination backup volume name. Specify the block device name for the specified device.

d. End status
    = 0: Normally end
    > 0: Abnormally end

e. Execution example
    Cancel synchronous backup processing of a transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swstcancelsync/dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstcancelsync completed.
#
```

    Backup synchronous processing of transaction volume (/dev/dsk/c1t0d0s6) is cancelled
    in emergency operation mode.

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/dsk/c1t0d0s6
/dev/dsk/c1t0d0s6 swstcancelsync completed.
#
```

The backup synchronous processing of the backup volume (/dev/dsk/c1t0d2s6) can be specified to be canceled from the transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk       Status    Execute
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s5 suspend   ----
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0s6 -bd /dev/dsk/c1t0d2s6
/dev/dsk/c1t0d0s6 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk       Status  Execute
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s5 suspend ----
#
```

All of the backup synchronous processing of the transaction volume (/dev/dsk/c1t0d0s6) can be specified to be cancelled.

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk       Status    Execute
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s5 suspend   ----
Work2  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0s6 - all
/dev/dsk/c1t0d0s6 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk Status Execute
Work2  /dev/dsk/c1t0d0s6 ----        ----   ----
#
```


Note

However, EC sessions are neither confirmed nor cancelled by execution in emergency operation mode.   If an EC session is in the error suspended state or halt state, then unmanaged sessions remain.   In this event, ETERNUSmgr, GRmgr, GDS or similar must be used to cancel these sessions.

Note

You cannot cancel synchronous processing if:
● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

Note

If a logical volume of VxVM is deleted or its structure is changed to a structure not supported by AdvancedCopy Manager, restoration cannot be cancelled. In such cases, take action according to either item a) or b).
  a. Make sure that advanced copy is not in progress for the replication volume to be deleted, and execute this command with the -emergency option specified. If advanced copy is in progress, stop advanced copy processing by using the disk array unit or take action according to item b).
  b. Re-create the logical volume or return the logical volume structure to its original state, and then execute this command.

300

Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (backup management)".

Note

You cannot perform cancel processing of synchronous backup processing in the following cases
● When the replication control function or tape backup function uses the target transaction volume

Note

This command cannot be executed when any of the following commands is running:
● Resource match command (swstsrsemtch)
● Device information configuration command (swstdevinfoset)
● Storage Server configuration information configuration command (swstsvrset)
● Resource backup command (swstresback)
● Resource restore command (swstresrst)

10.2.2.10 Backup synchronous processing progress display command (swstsyncstat)

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintenance status, in the suspended status).
If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.

a.　Specification method

- Displaying the synchronous backup processing status of a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstsyncstat [*Device-Name*]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstsyncstat [-h *Server*] [*Device-Name*]

b.　Description of options

Option	Description
-h	Specify the name of a Storage Server. This option can be specified only with the Storage Management Server.

c.　Description of operand

Operand	Description
Device-Name	Specifies a device name. Specify the name of a block device. When you omit the device name, the system displays the status of backup synchronous processing for all of the transaction volumes.

d. End status
  = 0: Normally end
  > 0: Abnormally end

e. Execution example
  Display the synchronous backup processing status of a transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk       Status    Execute
Work1  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s5 suspend   ----
Work1  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 executing 75%
#
```

Display the synchronous backup processing status of all business volumes.

```
# /opt/FJSVswsts/bin/swstsyncstat
Server Transaction-Disk  Backup-Disk       Status     Execute
Work1  /dev/dsk/c1t0d0s3 /dev/dsk/c1t0d2s1 suspend    ----
Work1  /dev/dsk/c1t0d0s3 /dev/dsk/c1t0d2s3 executing  75%
Work1  /dev/dsk/c1t0d0s3 /dev/dsk/c1t0d3s3 suspend    ----
Work1  /dev/dsk/c1t0d1s3 /dev/dsk/c1t0d3s5 equivalent 100%
Work1  /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 failed     ----
Work1  /dev/dsk/c1t0d1s4 ----              ----       ----
#
```

The table below lists the meaning of each title.

Title	Description
Server	Indicates the name of the Storage Server.
Transaction-Disk	Indicates the name of the transaction volume.
Backup-Disk	Indicates the name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	Indicates the status of backup synchronous processing: ● "----": Backup synchronous processing is not being executed. ● "executing": Backup synchronous processing is being executed but equivalency maintain status has not been established. ● "equivalent": Equivalency maintain status is established. ● "suspend": Suspend status is established. ● "failed": Backup synchronous processing was abnormally terminated. ● "nosession": No session exists (inconsistent resource information). ● "halt": Backup synchronous processing is being halt status. ● "gds-error": Copying with GDS ended abnormally.
Execute	Indicates the progress of the backup synchronous processing by EC or software-copy as a percentage (0 to 100%). "----" is displayed when the status is Suspend and at times not during the backup synchronous processing.

![Note]

If "failed" or "halt" is indicated as the status of the backup synchronous processing (in the "Status" field), a hardware failure is considered. Refer to "Troubleshooting for a hardware error, etc. occurring during backup".

If "nosession" is indicated as the status of the backup synchronous processing (in the "Status" field)," resource information having inconsistency is considered. Use the resource match command (swstsrsemtch) to remove the inconsistency from the resource information.

In the following cases, backup synchronous processing progress display command cannot be executed:

- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

If "gds-error" is the status displayed in the "Status" field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:

- ● If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- ● If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- ● If restoration is in progress, execute the resource match command (swstsrsemtch) and perform restoration again.

10.2.2.11 Execution status display command (swstexecstat)

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC/EC will be displayed if OPC/EC is being executed.

a. Specification method

```
- Displaying the execution status by specifying a transaction volume

[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstexecstat [-j] [Device-Name]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstexecstat [-h Server] [-j] [Device-Name]
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-j	Specifies to display information in another format.

c. Description of operand

Operand	Description
Device-Name	Specifies a device name corresponding to a transaction volume. Specify the name of a block device. If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

d. End status
 = 0: Normal end
 > 0: Abnormal end

e. Execution example
 Display the execution statuses of transaction volumes.

```
# /opt/FJSVswsts/bin/swstexecstat
Server Device          Last-Backup-Date Interval Status Mount-Point (Method) Execute
Work1  /dev/dsk/c1t0d0s3 2000/12/11 12:20 OK        IDLE   /usr1 (ufs)          ----
Work1  /dev/dsk/c1t0d0s4 2000/12/10 12:20 DELAY=1  IDLE   /usr2 (ufs)
sync(22%)
Work1  /dev/dsk/c1t0d0s5 2000/12/09 12:20 DELAY=2  IDLE   /usr3 (ufs)
snapshot(45%)
 :
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a Storage Server name.
Device	Displays an AdvancedCopy Manager device name.
Last-Backup-Date	Displays the last backup timestamp. * Displays the time when the backup execution command was accepted.
Interval	Displays how many days have passed after the specified number of interval days since the last backup timestamp has been exceeded. This item will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.
Status	Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. ● Backup policy configuration command (swstbkpolset) ● Backup policy deletion command (swstbkpoldel) ● Backup execution command (swstbackup) ● Restore execution command (swstrestore) ● History information deletion command (swsthistdel) ● Backup synchronous processing start command (swststartsync) ● Backup synchronous processing cancel command (swstcancelsync) ● Restore cancellation command (swstcancelrest)
Mount-Point(Method)	Displays the mount point name of a transaction volume and FStype in parentheses.

Keyword	Description
Execute	Displays the name of a command being executed or the copying progress ratio. ● ″----″: Neither a command or OPC/EC is being executed. ● ″swststartsync″: Backup synchronous processing start command is being executed. ● ″swstcancelsync″: Backup synchronous processing cancel command is being executed. ● ″swstbackup″: The backup execution command is being processed. ● ″swstrestore″: The restore execution command is being processed. ● ″swstcancelrest″: The restore cancellation command is being processed. ● ″swstbkpolset″: The backup policy configuration command is being processed. ● ″swstbkpoldel″: The backup policy deletion command is being processed. ● ″swsthistdel″: The history information deletion command is being processed. ● ″swstcanceltrk″: The tracking cancel command is being processed. ● ″sync(xxx%)″: How far the EC operation has progressed. ● ″sync(failed)″: Backup synchronous processing has been abnormally terminated. ● ″sync(halt)″: EC has been halt status. ● ″snapshot(xxx%)″: Progress ratio of backup using OPC ● ″snapshot(failed)″: Backup using OPC has abnormally terminated. ● ″snapshot(halt)″: Backup using OPC has been halt status. ● ″restore(xxx%)″: Progress ratio of restoration using OPC ● ″restore(failed)″: Restoration using OPC has abnormally terminated. ● ″restore(halt)″: Restoration using OPC has been halt status. ● ″gds-error″: Copying with GDS ended abnormally.

If multiple processes are performed on transaction volumes (for example, when the backup synchronous processing start command is issued while a real copy of the snap shot backup is being performed), the display in the Execute field conforms to the following rule:

● The display of a command name takes priority if both copying and command execution are in progress.

● When a disk copy of the snapshot backup and a disk copy of the backup synchronous processing are being performed simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. A disk copy for restoration is not performed during disk copy of the snap shot backup or backup synchronous processing due to a restriction of the ETERNUS storage system.

The execution example of using the ″-j″ option is as follows:

```
# /opt/FJSVswsts/bin/swstexecstat − j
Server Device          Execute-Date      Status Mount-Point (Method) Execute
Work1  /dev/dsk/c1t0d0s3 2000/12/11 12:20 IDLE   /usr1 (ufs)          ----
Work1  /dev/dsk/c1t0d0s4 2000/12/10 12:20 IDLE   /usr2 (ufs)          sync(22%)
Work1  /dev/dsk/c1t0d0s5 2000/12/09 12:20 IDLE   /usr3 (ufs)          snapshot(45%)
:
#
```

The following information will be displayed.

Keyword	Description
Server	Displays a Storage Server name.
Device	Specifies an AdvancedCopy Manager device name.
Execute-Date	Displays the command execution time.

Keyword	Description
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. ● Backup policy configuration command (swstbkpolset) ● Backup policy deletion command (swstbkpoldel) ● Backup execution command (swstbackup) ● Restore execution command (swstrestore) ● History information deletion command (swsthistdel) ● Backup synchronous processing start command (swststartsync) ● Backup synchronous processing cancel command (swstcancelsync) ● Restore cancellation command (swstcancelrest)
Mount-Point(Method)	Displays the mount point name of a transaction volume and FStype in parentheses.
Execute	Displays the name of a command being executed or the copying progress ratio. ● "----": Neither a command or OPC/EC is being executed. ● "swststartsync": Backup synchronous processing start command is being executed. ● "swstcancelsync": Backup synchronous processing cancel command is being executed. ● "swstbackup": The backup execution command is being processed. ● "swstrestore": The restore execution command is being processed. ● "swstcancelrest"": The restore cancellation command is being processed. ● "swstbkpolset": The backup policy configuration command is being processed. ● "swstbkpoldel": The backup policy deletion command is being processed. ● "swsthistdel": The history information deletion command is being processed. ● "swstcanceltrk": The tracking cancel command is being processed. ● "sync(xxx%)": How far the EC operation has progressed. ● "sync(failed)": Backup synchronous processing has been abnormally terminated. ● "sync(halt)": EC has been halt status. ● "snapshot(xxx%)": Progress ratio of backup using OPC ● "snapshot(failed)": Backup using OPC has abnormally terminated. ● "snapshot(halt)": Backup using OPC has been halt status. ● "restore(xxx%)": Progress ratio of restoration using OPC ● "restore(failed)": Restoration using OPC has abnormally terminated. ● "restore(halt)": Restoration using OPC has been halt status. ● "gds-error": Copying with GDS ended abnormally.

Point

During synchronous high speed backup with "-suspend" specified, no operation ("----") is indicated in the Execute field.

Note

If "sync (failed),", "snapshot(failed)", or "restore(failed)", "sync (halt)", "snapshot(halt)" or "restore(halt)" is displayed in the "Execute" field, a hardware error may have occurred. After removing the cause of the hardware error, do as follows:

● For "sync (failed)"
Execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
● If "snapshot(failed)" is displayed
Delete backup history information using the history information deletion command (swsthistdel).
● If "restore(failed)" is displayed
Cancel restoration using the restore cancellation command (swstcancelrest).

In the following cases, execution status display command cannot be executed:
- ● When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- ● When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.

If "gds-error" is the status displayed in the "Status" field, a problem with GDS is assumed. Correct the cause of the GDS problem, and take action as follows:
- ● If backup synchronous processing is in progress, execute the backup synchronous processing cancel command (swstcancelsync) to cancel the backup synchronous processing.
- ● If snapshot backup is in progress, execute the history information deletion command (swsthistdel) to delete the backup history information.
- ● If restoration is in progress, execute the resource match command (swstsrsemtch), and perform restoration again.

10.2.2.12 Tracking cancel command (swstcanceltrk)

This command stops tracking processing.

a. Specification method

```
[To execute on the Storage Server]
/opt/FJSVswsts/bin/swstcanceltrk [-copy | -emergency] Device-Name (-bd
 Backup-Device-Name | -all)
[To execute on the Storage Management Server]
/opt/FJSVswsts/bin/swstcanceltrk -h Server-Name [-copy | -emergency] Device-Name (-bd
 Backup-Device-Name | -all)
```

b. Options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on the Storage Management Server.
-copy	Specifies that physical copying, if active, should also be stopped (the OPC session should be canceled). This option cannot be specified for a backup volume that has already been a backup history. For a volume whose copy destination volume has been a backup history, delete the history information in advance using the history information deletion command (swsthistdel).
-emergency	Specifies that the command should operate in emergency operation mode. The command does not check tracking processing and does not stop tracking processing and the OPC session.
-bd	Stops tracking processing for the specified backup volume. Specify the target backup volume name as an operand. This option cannot be specified together with the - all option.
-all	Stops the entire tracking processing specified for the transaction volumes. This option cannot be specified together with the - bd option.

c. Operand

Operand	Description
Device-Name	Specifies a device name.
	Specify a block device name.

d. End status
   = 0: Normal end
   > 0: Abnormal end

e. Example
   The following example stops the tracking processing that was specified for the backup
   volume (/dev/dsk/c1t0d2s6) from the transaction volume (/dev/dsk/c1t0d0s6)

```
# /opt/FJSVswsts/bin/swstcanceltrk /dev/dsk/c1t0d0s6 -bd /dev/dsk/c1t0d2s6
/dev/dsk/c1t0d0s6 swstcanceltrk completed.
#
```

   The following example stops tracking processing and physical copying that were specified
   for the transaction volume (/dev/dsk/c1t0d0s6).

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/dsk/c1t0d1s6
Server Transaction-Disk  Backup-Disk      Status     Execute Update
job2   /dev/dsk/c1t0d1s6 /dev/dsk/c1t0d2s6 executing 33%     -----
# /opt/FJSVswsts/bin/swstcanceltrk -copy /dev/dsk/c1t0d1s6 - bd /dev/dsk/c1t0d2s6
/dev/dsk/c1t0d0s6 swstcanceltrk completed.
#
```


   If the command is executed in emergency operation mode, no OPC session is canceled. A
   session that is not managed remains if the command is entered during tracking.   The
   session must be canceled using ETERNUSmgr, GRmgr, or GDS.

   Tracking processing cannot be stopped under the following conditions.   In this case,
   take action according to "System administrator response" provided in the message
   displayed.
     - The tracking process is not performed for the specified copy source and destination
        volumes.

   This command cannot be executed while the following command is executed:
   ● Storage Server configuration information configuration command (swstsvrset)
   ● Device information configuration command (swstdevinfoset)
   ● Resource matching command (swstsrsemtch)
   ● Resource backup command (swstresback)
   ● Resource restore command (swstresrst)

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10.2.2.13 Tracking status display command (swsttrkstat)

This command displays the status of tracking processing.
When multiple types of tracking processing exist for one transaction volume, the command displays the statuses of all types of tracking processing.

a. Specification method

```
[To execute on the Storage Server]
/opt/FJSVswsts/bin/swsttrkstat [Device-Name]
[To execute on the Storage Management Server]
/opt/FJSVswsts/bin/swsttrkstat [-h Server] [Device-Name]
```

b. Options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on the Storage Management Server.

c. Operands

Operand	Description
Device-Name	Specifies a device name. Specify a block device name. If this operand is omitted, the command displays the statuses of tracking processing for all transaction volumes.

d. End status
   = 0: Normal end
   > 0: Abnormal end

e. Example
   The following example displays the status of tracking processing of a transaction volume (/dev/dsk/c1t0d0s6):

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/dsk/c1t0d0s6
Server Transaction-Disk  Backup-Disk      Status     Execute Update
job1   /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 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/dsk/c1t0d0s3 /dev/dsk/c1t0d2s3 nosession ----    ----
job1   /dev/dsk/c1t0d0s4 /dev/dsk/c1t0d2s4 executing 75%     ----
job1   /dev/dsk/c1t0d0s5 /dev/dsk/c1t0d2s5 failed    ----    ----
job1   /dev/dsk/c1t0d0s6 /dev/dsk/c1t0d2s6 tracking  ----    12%
job1   /dev/dsk/c1t0d1s4 ----              ----      ----    ----
   :
#
```

The displayed data is explained below.

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays a transaction volume name.
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----": Not in progress of tracking "executing": In progress of physical copying and tracking "tracking": In progress of tracking "failed": Physical copying or tracking terminated abnormally. "nosession": No session exists. (Resource information is inconsistent.)
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.

Note

When the execution status (status displayed in the "Status" column) is "failed," a hardware problem is assumed. Remediate the problem and then retry the differential snapshot backup.

Note

When the execution status (status displayed in the "Status" column) is "nosession," the resource information is probably inconsistent. Use the resource matching command (swstsrsemtch) to remove any inconsistencies from the resource information.

Note

The execution status of the tracking process cannot be displayed under the following conditions:
   - When the transaction volume or backup volume is a VxVM logical volume, the volume configuration of the logical volume has been changed to one that is not supported by AdvancedCopy Manager.
   - When the transaction volume or backup volume is a VxVM logical volume, the logical volume has been deleted from VxVM.

10.2.3 Maintenance commands

This chapter describes maintenance commands for backup management.

10.2.3.1 Resource match command (swstsrsemtch)

This command performs recovery to make resource information consistent as a result of a system failure etc.

a.   Specification method

```
[To be executed on a Storage Server]

/opt/FJSVswsts/bin/swstsrsemtch [-x]

[To be executed on a Storage Management Server]

/opt/FJSVswsts/bin/swstsrsemtch [-x] [-h Server]
```

b.   Description of operands

Operand	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-x	Gets consistency with a repository. Use this option if the backup management file of the Storage Management Server cannot be recovered for any reason.

c.   Execution example

```
# /opt/FJSVswsts/bin/swstsrsemtch
swstsrsemtch completed
#
```

Note

Resource match processing cannot be executed in the following circumstances:
- When the transaction volume or backup volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager.
- When the transaction volume or backup volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
- The restore execution command (swstrestore) using software-copy with GDS is aborted, such as for a forced termination, and software-copy processing has not yet completed.

10.2.3.2 Resource backup command (swstresback)

This command copies backup management files to a specified directory.
- ● Backup management file
    Management file for Storage Server configuration information.

a. Specification method

```
/opt/FJSVswsts/bin/swstresback Backup-Directory
```

b. Description of operand

Operand	Description
Backup-Directory	Specifies the name of a directory to which resource control information should be saved.

c. Execution example
    Create backup copy of the backup management files in /home/backup.

```
# /opt/FJSVswsts/bin/swstresback /home/backup
swstresback completed
#
```

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Note

This command can be executed only while none of the following commands are running.
- Storage Server configuration information configuration command (swstsvrset)
- Device information configuration command (swstdevinfoset)
- Backup policy configuration command (swstbkpolset)
- Backup policy deletion command (swstbkpoldel)
- Backup execution command (swstbackup)
- Restore execution command (swstrestore)
- Restore cancellation command (swstcancelrest)
- Backup synchronous processing start command (swststartsync)
- Backup synchronous processing cancel command (swstcancelsync)
- History information deletion command (swsthistdel)
- Tracking cancel command (swstcanceltrk)
- Resource match command(swstsrsemtch)
- Resource backup command(swstresback)
- Resource restore command(swstresrst)

10.2.3.3 Resource restore command (swstresrst)

The following Backup management files are restored from the specified directory.
- Managed resources information
  Management files, such as Storage Server configuration information.

a.   Specification method

```
/opt/FJSVswsts/bin/swstresrst Backup-Directory
```

b.   Description of operand

Operand	Description
Backup-Directory	Specify the name of the directory that was indicated in the resource backup command (swstresback) to which to save the backup management files.

c.   Execution example
     Create backup copy of the backup management files in /home/backup.

```
# /opt/FJSVswsts/bin/swstresrst /home/backup
swstresrst completed
#
```


Note

Before the backup management files can be restored by this command, the Storage Server configuration information configuration command (swstsvrset) must be executed.
Specify the directory specified in the resource backup command as the output destination directory name of the backup management files.

Note

You cannot perform restoration if:
- The specified directory does not exist.
- No backup management files exist in the specified directory.
- Copying of data from the specified directory for restoration failed because of insufficient free space.

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This command can be executed only while none of the following commands are running:

- ● Storage Server configuration information configuration command (swstsvrset)
- ● Device information configuration command (swstdevinfoset)
- ● Backup policy configuration command (swstbkpolset)
- ● Backup policy deletion command (swstbkpoldel)
- ● Backup execution command (swstbackup)
- ● Restore execution command (swstrestore)
- ● Restore cancellation command (swstcancelrest)
- ● Backup synchronous processing start command (swststartsync)
- ● Backup synchronous processing cancel command (swstcancelsync)
- ● History information deletion command (swsthistdel)
- ● Tracking cancel command (swstcanceltrk)
- ● Resource match command(swstsrsemtch)
- ● Resource backup command(swstresback)
- ● Resource restore command(swstresrst)

10.3 Configuration Management Commands

This section describes the operation of the configuration management command, which manages the information about servers and their hosted devices for backup management or replication management.

Note

Operating environment for command execution

— The table below lists the requirements for the operating environment in which to execute the respective commands.

Table: Operating environment required for command execution

Command	Operating environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a Storage Management Server (Storage Management Server daemon), the Storage Management Server (Storage Management Server daemon) must be running.
stguserset	In cluster operation, the Storage Management Server daemon must be running.
stgguiipset	In cluster operation, the Storage Management Server daemon must be running.
stgxfwcmaddsrv	The Storage Management Server (Storage Management Server daemon) and target Storage Server (Storage Server daemon) must be running.
stgxfwcmmodsrv	The Storage Management Server (Storage Management Server daemon) and target Storage Server (Storage Server daemon) must be running.
stgxfwcmdelsrv	The Storage Management Server (Storage Management Server daemon) must be running.
stgxfwcmsetdev	The Storage Management Server (Storage Management Server daemon) and target Storage Server (Storage Server daemon) must be running.
stgxfwcmdeldev	The Storage Management Server (Storage Management Server daemon) and target Storage Server (Storage Server daemon) must be running.
stgxfwcmdispsrv	The Storage Management Server (Storage Management Server daemon) must be running.
stgxfwcmdispdev	The Storage Management Server (Storage Management Server daemon) must be running.
stgxfwcmdisppat	The Storage Management Server (Storage Management Server daemon) must be running.
stgenvdisp	This command is executable when both Storage Management Server (Storage Management Server daemon) and Storage Server (Storage Server daemon) are not running. Note that when the cluster service (named differently in respective cluster systems) is not running in cluster operation, this command cannot display certain information.
stgmgrinfoset	The package-backup-of-the-management-information execution server must be running.
stgmgrinfobkup	The Storage Management Server (Storage Management Server daemon), package-backup-of-the-management-information execution server, and package-backup-of-the-management-information target servers must be running.
stgmgrinfodisp	The package-backup-of-the-management-information execution server must be running.
stgxfwcmsetsdx	For cluster operation, the Storage Server transaction 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. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=logical-node-name<Enter>
# export SWSTGNODE
```

2) Execute the command.
   The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Commands when cluster operation used

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Active cluster server	
stgguiipset	Not required	Active cluster server	Executable only on Storage Management Server transaction
stguserset	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmaddsrv	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmmodsrv	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmdelsrv	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmsetdev	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmdeldev	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmdispsrv	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmdispdev	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgxfwcmdisppat	Not required	Active cluster server	Executable only on Storage Management Server transaction
stgenvdisp	Not required	Active cluster server	
stgmgrinfobkup	Required	Active cluster server	
stgmgrinfodisp	Required	Active cluster server	
stgmgrinfoset	Required	Active cluster server	

10.3.1 Management server information change command (stgcmmodnode)

This command changes the server information of the Storage Management Server.
Execute this command for the following purposes:
● To change the IP address of the Storage Management Server or the PORT number (stgxfws) used by the communication daemon
  Follow the procedure below:
1. Change server information by executing this command on the Storage Management Server.

2. Change server information of the Storage Management Server by executing this command on every Storage Server. This command must be executed on all Storage Servers managed by the Storage Management Server.
● To change the server name of the Storage Management Server
   Follow the procedure below:
1. Change the server name from the initial window of the Storage Management Server.
2. Change the server name of the Storage Management Server by executing this command on every Storage Server. This command must be executed on all Storage Servers managed by the Storage Management Server.

This command has the following two functions:
● Displays Storage Management Server information specified on the Storage Server on which this command is currently executed
● Changes Storage Management Server information.

Refer to the following for the change procedure which uses this command.
● "Changing the IP address of a Storage Management Server"
● "Changing the port number of a Storage Management Server"
● "Changing the server name of a Storage Management Server"

a.   Specification method

```
/opt/FJSVswstf/bin/stgcmmodnode  [-i IP-address] [-p PORT number] [-n server name]
```

b.   Description of options

Option	Description
None	Displays the server information currently managed.
-i	Specifies the IP address of a Storage Management Server to change the IP address of the Storage Management Server.
-p	Specifies the port number of a Storage Management Server to change the port number of the Storage Management Server.
-n	Specifies the server name of a Storage Management Server to change the server name of the Storage Management Server. This option cannot be specified if this command is executed on a Storage Management Server.

c.   End status
     = 0: Normal end
     ＞ 0: Abnormal end

d.   Execution example
     Display server information.

```
# /opt/FJSVswstf/bin/stgcmmodnode
swstf2413 IP Address = 10.10.10.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
#
```

     Change the IP address of a Storage Management Server to 10.12.13.14.

```
# /opt/FJSVswstf/bin/stgcmmodnode -i 10.12.13.14
swstf2401 AdvancedCopy Manager registry updated.
```

Note the follow points regarding this command.

- ● To execute this command, the AdvancedCopy Manager daemons must be stopped.
- ● This command can be executed only by root users.
- ● As the PORT number of a Storage Management Server, you can specify a value between 1024 and 65535.
- ● You must specify the same value as the value specified on the Storage Management Server. An error will occur if an invalid value is specified.
- ● After successful execution, you must restart the AdvancedCopy Manager daemons.

10.3.2 Repository access user change command (stguserset)

This command changes a user name and/or password used to access a repository. This command must be executed on the Storage Management Server.

We recommend that you use a high root or superuser instead of the general user frequently used for password changes for security reasons.

The change in the user-name and the password is executed according to the following procedures.
1. Close Web browser of AdvancedCopy Manager.
2. Execute Repository access user change command (stguserset).
3. Stop RMI daemons.
4. Start RMI daemons.

a. Specification method

```
/opt/swstorage/bin/stguserset user-name password
```

b. Description of options

Option	Description
User name	Specifies a user name to be used for repository access. Specify a username of 18 bytes or less that can be specified in the operating system.
Password	Specifies a user password to be used for repository access. Specify a password of 18 bytes or less that can be specified in the operating system.

c. End status
   = 0: Normal end
   > 0: Abnormal end

d. Execution example
   Change the user name and the password to be used for repository access to a1234 and Yfd1fz3, respectively.

```
# /opt/swstorage/bin/stguserset a1234 Yfd1fz3
Password for accessing the repository has been registered.
```


This command can be executed only by root users.

10.3.3 Web client GUI connection information configuration command (stgguiipset)

The Storage Management Server is equipped with two or more network cards. This allows multiple IP address to be associated with a single Storage Management Server. The Storage Management Server uses the IP address allocated in the initial AdvancedCopy manager configuration to manage the hosted Storage Servers in addition to using a secondary IP address which used to allow communication by a web browser client with any Storage Servers managed by the Storage Management Server.

This command has the following 2 functions.
- ● Display or set up the IP address for web client GUI for connection to the Storage Management Server
- ● Change the IP address for web client GUI connection of a Storage Management Server

The change in IP address for web client GUI connection to a Storage Management Server is executed according to the following procedures.
1. Close AdvancedCopy Manager Web browser.
2. Execute GUI connection information configuration command (stgguiipset).
3. Stop RMI daemons.
4. Start RMI daemons.

a.   Specification method

```
/opt/FJSVswstf/bin/stgguiipset [-i IP address]
```

b.   Description of options

Option	Description
None	Displays the IP address for GUI connection currently managed.
-i	The IP address for GUI connection to change is specified.

c.   End status
= 0: Normal end
> 0: Abnormal end

d.   Execution example
The IP address for the present GUI connection is displayed.

```
# /opt/FJSVswstf/bin/stgguiipset
IP Address = 10.10.10.10
```

The IP address for GUI connection of a Storage Management Server is changed into 10.12.13.14.

```
# /opt/FJSVswstf/bin/stgguiipset - i 10.12.13.14
swstf2401 Renewal of the server information on a Storage Management Server was completed normally.
```

This command can be executed only by root users.

10.3.4 Server information addition command (stgxfwcmaddsrv)

This command adds Storage Server information for servers to be managed by AdvancedCopy Manager.
It is necessary to execute this command on the Storage Management Server.

a.　　Specification method

```
/opt/FJSVswstf/bin/stgxfwcmaddsrv [-n Server-Name] -i IP-Address -p PORT-Number
```

b.　　Description of options

Option	Description
-n	Specifies the name of the Storage Server to be added.　The name must be less than 255 bytes(*2) and a unique server name for AdvancedCopy Manager in order for it to manage the server. If this option is omitted, the following value is set, in accordance with the type of operation: ● Non-cluster operation:　Host name recognized by the operating system ● Cluster operation:　AdvancedCopy Manager logical node name specified during cluster setup
-i	Specify the IP address of the Storage Server to be added by IPv4 format. Specify a physical IP address if the Storage Server is managed as a physical server. Specify a logical IP address if the IP address is made redundant and managed (as a logical server), like under the cluster environment.
-p	Specify the port number that is set on the Storage Server side to communicate with the Storage Server to be added.　(Value from 1,024 to 65,535) Under the cluster environment, specify the port number that is allocated to the service name stgxfws_? (*1).

(*1) Logical node name of AdvancedCopy Manager specified during cluster setup
(*2) The usable characters are:　1-byte alphanumeric characters, minus sign (-), underscore (_), number sign (#), and period (.), with the first character being a 1-byte alphanumeric character.　A 2-byte character causes an error.

c.　　End status
= 0:　Normal end
> 0:　Abnormal end

d.　　Execution example
Add a server by using host name.

```
# /opt/FJSVswstf/bin/stgxfwcmaddsrv -i 10.10.10.10 -p 1226
stgxfwcmaddsrv completed
#
```

Add a logical server using the server name specified during cluster setup.
(Logical IP address: 10.10.10.20; port number allocated to stgxfws_logical-node-name: 1227)

```
# /opt/FJSVswstf/bin/ stgxfwcmaddsrv -n Server1 -i 10.10.10.20 -p 1227
stgxfwcmaddsrv completed
#
```

Note

The following provides notes on this command:
- Only the root or superuser can execute this command.
- Please use the location specified at the time of installation.
- Because a Storage Management Server and a logical server for a Storage Management Server transaction are added during database setup and cluster setup, they are not added by this command.

Note

This command cannot be executed when the following commands are being executed:
- Server information change command(stgxfwcmmodsrv)
- Server information deletion command(stgxfwcmdellsrv)
- Device information collection/display command(stgxfwcmsetdev)
- Device information deletion command(stgxfwcmdeldev)

Note

This command cannot be executed when the following operations are being performed using the Web client screen:
- Addition of server
- Change of server
- Deletion of server
- Acquisition and Display of Information on All Devices
- Acquisition and Display of Information on Specific Device
- Deletion of device information

10.3.5 Server information change command (stgxfwcmmodsrv)

This command changes the following server information managed by AdvancedCopy Manager. It is necessary to execute this command on the Storage Management Server at the command line.
- Storage Server IP address
- Storage Server port number
- Server name of Storage Management Server
- Server name of Storage Server

Also, use this when installing the tape server function on the target server later.

Alternatively, a server information change instruction file can be specified to change server information as a batch while maintaining consistency between multiple items of information for multiple servers within a management system.
The following server information can be changed:
- Storage Management Server IP address
- Storage Server IP address
- Storage Management Server port number
- Storage Server port number
- Server name of Storage Management Server
- Server name of Storage Server

Note

This command cannot change the following server information if a server information change instruction file is not specified, because this information is changed by using the management server information change command (stgcmmodnode) :
- IP address of Storage Management Server
- Port number of Storage Management Server

Note

When the server information is changed by using this command, the hardware configuration information must be changed in advance.　Refer to the procedure given in Chapter 9.5, "Changing the operating Environment," to execute the processing.

a. Specification method

```
/opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server-Name [-s New-Server-Name] [-i
New-IP-Address] [-p New-Port-Number] | [-f
Server-information-change-instruction-filename [-y]]
```

b. Description of options

Options	Description
-n	Specify a server name that is currently being managed.
-s	Specify a new server name within 255 bytes. The usable characters are:　1-byte alphanumeric characters, minus sign (-), underscore (_), number sign (#), and period (.), with the first character being a 1-byte alphanumeric character.　A 2-byte character causes an error. Specify at the same time as the -n option.
-i	Specify the IP address of the Storage Server to be added by IPv4 format. Specify a physical IP address if the Storage Server is managed as a physical server. Specify a logical IP address if the IP address is made redundant and managed (as a logical server), like under the cluster environment. Specify at the same time as the -n option.
-p	Specify a port number required for postchange communication.　(Value from 1024 to 65535) Under the cluster environment, specify the port number that is allocated to service name stgxfws_? (*1). For non-cluster operation, specify the port number allocated to the service name stgxfws. Specify at the same time as the -n option.
-f	Specify the absolute path of the server information change instruction file. The -y option is the only option that can be specified at the same time.
-y	Specifies that processing will continue if there are multiple servers in the management system and if an error occurs at one specific server. Remove the cause of the error at the server where it occurred, then make the required change separately for this server. Specify at the same time as the -f option.

(*1) Logical node name of AdvancedCopy Manager specified during cluster setup

c. Coding method for the server information change instruction file
— In one line, enter the server name of a currently managed server, the information class to be changed, and the new value, delimited by spaces or tabs.
— —The information classes to be changed are as follows:
S: Server name
I: IP address
P: Port number
— If multiple information classes, such as the IP address and the port number, need to be changed for the same server, enter the IP address change specification and the port number change specification on separate lines.
[Coding example]

```
Manager      I  10.10.20.10
Server1      I  10.10.20.20
Server1      P  9888
Server2      S  DstServer
```

d. End status
= 0: Normal end
> 0: Abnormal end

e. Execution example
The IP address of a Storage Server (server name: Server1) is changed to 10.20.30.40.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server1 -i 10.20.30.40
stgxfwcmmodsrv completed
#
```

The server name of a Storage Server (server name: Server1) is changed to Agent5.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -n Server1 -s Agent5
stgxfwcmmodsrv completed
#
```

A server information change instruction file is specified to change server information as a batch.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -f /acm/modfile
stgxfwcmmodsrv completed
#
```

A server information change instruction file is specified to change server information as a batch even if an error occurs at a specific server.

```
# /opt/FJSVswstf/bin/stgxfwcmmodsrv -f /acm/modfile - y

swstf2459 Resource adjustment command terminated abnormally. Server name=[Server1]
swsrp0625 This command cannot be executed because execution of other AdvancedCopy
Manager commands is in progress.

stgxfwcmmodsrv completed, excluding the server where the error occurs
#
```

Note

The following provides notes on this command:
- ● Only the root or superuser can execute this command.
- ● Please the location specified at the time of installation.

Note

The following notes apply to changing the Storage Management Server information (except when the -f option is specified):
- — Use the management server information change command (stgcmmodnode) to change the IP address and port number, then restart the various AdvancedCopy Manager daemons.
- — After Storage Management Server information is changed, execute the management server information change command (stgcmmodnode) at the managed servers to set the changed Storage Management Server information.

Note

The following notes apply to changing Storage Server information:
- — Stop the various AdvancedCopy Manager daemons before changing the IP address. Then, change the IP address in the software that provides the system or logical IP address and restart the AdvancedCopy Manager daemons.
- — Stop the various AdvancedCopy Manager daemons before changing the port number. Then, change the port number in the system and restart the AdvancedCopy Manager daemons.

Note

The following notes apply when the -f option is specified:
- — The server name or IP address that is to be changed cannot be in use by another server that is currently managed.
- — AdvancedCopy Manager must be running at the Storage Management server that executes this command and at all Storage Servers managed by Storage Management server transactions.
- — Do not execute backup management commands or replication management commands at the Storage Management Server that executes this command, nor at any of the Storage Servers managed by Storage Management Server transactions, either before or during execution of this command. If executed, commands may terminate abnormally. If this 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 this command, and if the backup management or replication management commands terminate abnormally, wait until this command terminates normally, then re-execute the backup management or replication management commands.

Note

The following notes apply when the -y option is specified:
- ― If this option is specified, processing will be forcibly continued if a communication or other error occurs for some servers. Therefore, consistency of the overall system cannot be maintained. Usually, do not specify this option. Specify this option only when absolutely necessary due to problems at some servers.
- ― Take the action indicated in the error message at the server which output the message. Normal operation is not possible until this action is taken, so take action promptly.

Note

This command cannot be executed when the following commands are being executed:
- ● Server information addition command(stgxfwcmaddsrv)
- ● Server information deletion command(stgxfwcmdelsrv)
- ● Device information collection/display command(stgxfwcmsetdev)
- ● Device information deletion command(stgxfwcmdeldev)

Note

This command cannot be executed when the following operations are being performed using the Web client screen:
- ● Addition of server
- ● Change of server
- ● Deletion of server
- ● Acquisition and Display of Information on All Devices
- ● Acquisition and Display of Information on Specific Device
- ● Deletion of device information

10.3.6 Server information deletion command (stgxfwcmdelsrv)

This command deletes the Storage Server information that AdvancedCopy Manager is currently managing. It is necessary to execute this command on the Storage Management Server.

a. Specification method

```
/opt/FJSVswstf/bin/stgxfwcmdelsrv -n Server-Name
```

b. Description of options

Options	Description
-n	Specify the Storage Server name to be deleted.

c. End status
= 0: Normal end
> 0: Abnormal end

d. Execution example
A Storage Server's (server name: Server1) information is deleted.

```
# /opt/FJSVswstf/bin/stgxfwcmdelsrv -n Server1
stgxfwcmdelsrv completed
#
```

The following provides notes on this command:
- ● Only the root or superuser can execute this command.
- ● Please use the location specified at the time of installation.
- ● The Storage Management Server information cannot be deleted.

This command cannot be executed when the following commands are being executed:
- ● Server information addition command(stgxfwcmaddsrv)
- ● Server information change command(stgxfwcmmodsrv)
- ● Device information collection/display command(stgxfwcmsetdev)
- ● Device information deletion command(stbxfwcmdeldev)

This command cannot be executed when the following operations are being performed using the Web client screen:
- ● Addition of server
- ● Change of server
- ● Deletion of server
- ● Acquisition and Display of Information on All Devices
- ● Acquisition and Display of Information on Specific Device
- ● Deletion of device information

10.3.7 Device information collection/display command (stgxfwcmsetdev)

This command collects the latest device information detected by the server and displays a comparison of the difference with information managed by AdvancedCopy Manager. It can also be used to compare any differences for specified devices with saved AdvancedCopy Manager management information. This command must be executed on the Storage Management Server.
The device information currently saved in AdvancedCopy Manager and the device information detected are compared, stored, deleted, and updated, and may be used in the following instances:
- ● When AdvancedCopy Manager is started
- ● When device information being managed by AdvancedCopy Manager is changed

a.   Specification method

```
/opt/FJSVswstf/bin/stgxfwcmsetdev -n Server-name [-d Device-Name] [-f File-Name | -y ]
```

b.   Description of options

Options	Description
-n	Specify the server name whose device information is to be collected or reflected.
-d	Specify the device name whose information is to be collected or reflected. If this specification is omitted, all devices of the specified server are assumed to be specified.
-f	Use the absolute path to specify the file name to which the difference between the device information managed currently and the device information collected is output. The device difference information is only output to the file, and no display is provided. This option cannot be specified with the -y option.

Options	Description
-y	The difference between the device information managed by AdvancedCopy Manager and the latest device information detected is displayed as is in the management information with no comment about that difference. This option cannot be specified with the -f option.

c.   End status
     = 0:   Normal end
     > 0:   Abnormal end

d.   Execution example
     The information for each device of a server (server name: Server1) is collected or reflected.

```
# /opt/FJSVswstf/bin/stgxfwcmsetdev -n Server1
>Device detected
  1: /dev/rdsk/c1t0d0s6 (/aaa)
  2: /dev/rdsk/c1t0d0s7
>Specify devices to be added. [* or ?-? or ?,? or q]

>Device not detected
  1: /dev/rdsk/c2t1d0s1
  2: /dev/rdsk/c2t1d0s2 (/bbb)
  3:/dev/rdsk/c3t0d0s7

>Specify a device requested to be deleted. [* or ?-? or ?,? or q]
*1,3
>Information for the following device is changed. Information will be updated.
  1:/dev/rdsk/c1t0d0s5
>Do you want to continue the processing? [y or n] y
stgxfwcmsetdev completed
#
```


Point

The following message is displayed if the number of devices either detected or not detected is high:
        - Press Enter for more or s to select -
Press the Enter key to continue to display more devices. To interrupt the display and request either an addition or a deletion, press "s".

The information for a specific device (device name: /dev/rdsk/c4t0d10s0) managed by the server (server name: Server1) is collected or reflected.

```
# /opt/FJSVswstf/bin/stgxfwcmsetdev -n Server1 -d /dev/rdsk/c4t0d10s0
> The following device information has been changed.  This information is updated.
  1:/dev/rdsk/c4t0d10s0 (/zzz)
> Do you want to continue the processing? [y or n] y
stgxfwcmsetdev completed
#
```

Use the following operand syntax to request addition or deletion:
- ● Enter "*" to specify all.
- ● A range may be specified using integer values separated with a hyphen (Example: 1-3).
- ● A comma may be used to specify an enumeration. (Example: 2, 4)
- ● A combination of range and enumeration specifications can be used.(Example: 1-3, 5)
- ● Entering nothing is permissible.
- ● Use the option "q" to stop the process.

The following provides notes on this command:
- ● Only the root or superuser can execute this command.
- ● Please use the location specified at the time of product installation.
- ● Obtaining disk information for HP-UX servers with GPT disks using AdvancedCopy Manager is not possible.

The following message may be displayed when attempting to add a specified device.
It is indicating that you are attempting to register a device in the GR cabinet which may have invalid settings. Ensure that any such settings are correct before continuing the process. This message is also displayed when the "-y" option is specified.

```
>The setting of license or the table size is not done, or the table size is insufficient,
 to the cabinet where the partition that makes up the following device exists.
>Continue? [y or n]
```

The following message may be displayed when a device requested to be added is specified.
In this case, check the following before continuing the processing: whether the device is to be subjected to duplicated registration when two or more logical servers running on the same physical server are managed. This message is also displayed when the -y option is specified.

```
> The partitions that comprise the following device are already managed.
> Do you want to continue the processing? [y or n]
```

The amount of time required to process this command is proportional to the total number of devices defined on the specified server when the device information is collected. When there are a large number of devices, execute the command while CPU and I/O loads are low.
As a guide, it takes about 0.5 second for one device (partition) in a no load state.

This command cannot be executed when the following commands are being executed:
- ● Server information addition command(stgxfwcmaddsrv)
- ● Server information change command(stgxfwcmmodsrv)
- ● Server information deletion command(stgxfwcmdelsrv)
- ● Device information deletion command(stgxfwcmdeldev)

This command cannot be executed when the following operations are also being performed using a web client:
- ● Addition of server
- ● Change of server
- ● Deletion of server
- ● Acquisition and Display of Information on All Devices
- ● Acquisition and Display of Information on Specific Device
- ● Deletion of device information

10.3.8 Device information deletion command (stgxfwcmdeldev)

This command deletes the device information currently being managed by AdvancedCopy Manager. This command must be executed on a Storage Management Server.

The device information collection/display command (stxfwcmsetdev) compares the device information currently being managed and the device information detected before it executes the processing. However, this command deletes the device information irrespective of whether the device information currently being managed is detected.

a. Specification method

```
/opt/FJSVswstf/bin/stgxfwcmdeldev -n Server-Name -d Device-Name
```

b. Description of options

Options	Description
-n	Specify the server name that is managing the device to be deleted.
-d	Specify the device name to be deleted.

c. End status
   = 0: Normal end
   > 0: Abnormal end

d. Execution example
   The device (/dev/rdsk/c4t0d12s7) information for a Storage Server (server name: Server1) is deleted.

```
# /opt/FJSVswstf/bin/stgxfwcmdeldev -n Server1 -d /dev/rdsk/c4t0d12s7
stgxfwcmdeldev completed
#
```


The following provides notes on this command:
- ● The following provides notes on this command:
- ● Please use the location specified at the time of installation.

This command cannot be executed when the following commands are being executed:
- ● Server information addition command(stgxfwcmaddsrv)
- ● Server information change command(stgxfwcmmodsrv)
- ● Server information deletion command(stgxfwcmdelsrv)
- ● Device information collection/display command(stgxfwcmsetdev)

This command cannot be executed when the following operations are also being performed using a Web client:
- ● Addition of server
- ● Change of server
- ● Deletion of server
- ● Acquisition and Display of Information on All Devices
- ● Acquisition and Display of Information on Specific Device
- ● Deletion of device information

10.3.9 Server information display command (stgxfwcmdispsrv)

This command displays the server information managed by AdvancedCopy Manager. This command must be executed on the Storage Management Server.

a.   Specification method

```
/opt/FJSVswstf/bin/stgxfwcmdispsrv [-n Server-Name ]
```

b.   Description of options

Options	Description
-n	Specify the server name whose information is to be displayed. If this specification is omitted, the information for all servers managed by AdvancedCopy Manager is displayed.

c.   End status
= 0: Normal end
> 0: Abnormal end

d.   Execution example
The information for all servers is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispsrv
Server  Server-Type        Tape OS-Type OS-Version Version IP-Address  Port-Number
Manager Management-Server -- Solaris 9          V10.2   10.10.10.10 1226
Server1 Server           -- Solaris 7          V10.2   10.10.10.20 1226
#
```

The information for a Storage Server (server name: Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispsrv -n Server1
Server  Server-Type Tape OS-Type OS-Version Version IP-Address  Port-Number
Server1 Server      --   Solaris 7          V10.2   10.10.10.20 1226
#
```

The contents to be displayed are as follows:

Title	Description
Server	A server name is displayed.
Server-Type	A server type is displayed. "Management-server": Storage Management Server "Server": Storage Server
Tape	"Y" indicated for a tape server.
OS-Type	An operating system type is displayed.
OS-Version	An operating system version is displayed.
Version	The version of this product is displayed.

Title	Description
IP-Address	The IP address for communication with the server is displayed.
Port-Number	The port number for communication with the server is displayed.

The following provides notes on this command:
- Only the root or superuser can execute this command.
- Please use the location specified at the time of installation.

10.3.10 Device information display command (stgxfwcmdispdev)

This command displays device information for servers managed by AdvancedCopy Manager which includes:
- a list of the device which use the same specified device copy area
- s specified device,
- devices which exist in the same, logical group.

This command must be on the Storage Management Server.

The command displays the information based on information registered in AdvancedCopy Manager. Therefore, when the configuration has been changed and there is a device not registered in a logical group, d after it is registered, the correct information may not be displayed. In this case, please execute acquisition of device information on the device not registered and the device which performs the "Acquisition/display of information on all devices" again.

a. Specification method

```
/opt/FJSVswstf/bin/stgxfwcmdispdev -n Server-Name [-d Device-Name [-sm|-grp]]
```

b. Description of options

Options	Description
-n	Specify the server name that manages the device whose information is to be displayed.
-d	Specify the device name whose information is to be displayed. If this specification is omitted, the information for all devices managed by the specified server is displayed.
-sm	With the -d option also specified, this option specifies that a list of the devices using the same copy area as the specified device be displayed.
-grp	The list of the device which exists in the same logical group as a specified device is displayed by specifying it simultaneously with -d option. This option can only be specified if the device type specified by the -d option is LVM/VxVM.

c. End status
= 0: Normal end
> 0: Abnormal end

d. Execution example
   The information for a device (/dev/rdsk/c4t0d10s0) of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/rdsk/c4t0d10s0
S Device          Block-Device      Mount-Point File-System Device-Type Size(MB)
  /dev/rdsk/c4t0d10s0 /dev/dsk/c4t0d10s0 /zzz        ufs         Normal      1028
#
```

The information for each device of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1
S Device                    Block-Device              Mount-Point  File-System
Device-Type Size(MB)
  /dev/sfdsk/class/rdsk/vol1 /dev/sfdsk/class/dsk/vol1 ---          ---
SDX(Volume)    25000
* /dev/sfdsk/class/rdsk/vol2 /dev/sfdsk/class/dsk/vol2 /work        ufs
SDX(Volume)     1250
U /dev/rdsk/c1t0d0s0        /dev/dsk/c1t0d0s0         /storagedata ufs
Normal          5200
D /dev/rdsk/c1t0d0s1        /dev/dsk/c1t0d0s1         ---          ---
Normal         15400
#
```

Device (/dev/vx/rdsk/dg1/vol1) of server (Server1) is displayed and device information which uses the same copy area is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/vx/rdsk/dg1/vol1 -sm
Device              Mount-Point
/dev/vx/rdsk/dg1/vol1  /storagedata
/dev/vx/rdsk/dg1/vol2  ---
/dev/vx/rdsk/dg1/vol3  /zzz
#
```

Device information which exists in the same logical group as device (/dev/vx/rdsk/dg1/vol1) of server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdispdev -n Server1 -d /dev/vx/rdsk/dg1/vol1 -grp
Device              Mount-Point
/dev/vx/rdmp/c1t0d0s2  ---
/dev/vx/rdmp/c1t0d1s2  ---
/dev/vx/rdsk/dg1/vol1  /storagedata
/dev/vx/rdsk/dg1/vol2  ---
/dev/vx/rdsk/dg1/vol3  /zzz
/dev/vx/rdsk/dg1/vol4  ---
#
```

The following contents are displayed. Note that "SDX" or "SDX object" in the table are SynfinityDISK or PRIMECLUSTER Global Disk Services (GDS) terms.

Title	Description
S	The status of each device is indicated. The following is displayed according to the device status: *: Device not set up (The AdvancedCopy license settings may be undefined, cache table size may be unspecified, or cache table may be too small in the cabinet containing this device). D: Device deletion error U: Device update error
Device	(For Solaris server) A RAW device name is displayed. (Windows server) A device name managed internally by AdvancedCopy Manager is displayed. The name is displayed in the g?d?p? format. g?: Disk array number (0 if the device is not installed in the ETERNUS storage system) d?: Disk number (*1) p?: Logical disk number (*2) In the case of the SDX object, the name is displayed in the disk class name or mirror volume name g?d?p? format. Disk class name: Disk class name of SDX object Mirror volume name: Mirror volume name of SDX object (HP-UX server) A RAW device name or a volume group name under LVM is displayed. (Linux server) When a RAW device has been created, its name is displayed; otherwise, a block device name is displayed. (AIX server) A RAW device name or a volume group name under LVM is displayed.
Block-Device	(Solaris server) A block device name is displayed. (Windows server) The name is displayed in the disk?p? format. disk?: Disk number displayed by disk administrator p?: Logical disk number (*2) (HP-UX server) A block device name or a volume group name under LVM is displayed. (Linux server) A block device name is displayed. (AIX server) A block device name or a volume group name under LVM is displayed.
Mount-Point	(Solaris server, HP-UX server, AIX server and Linux server) A mount point name is displayed. (Windows server) A drive character is displayed.
File-System	A file system name is displayed.
Device-Type	A device type is displayed. Normal/SDX(slice)/LVM/VxVM/SDX(volume)
Size(MB)	The capacity (in megabytes) allocated to a device is displayed.

(*1) A number given uniquely on the disk array. This number differs from the disk number on the disk administrator.
(*2) The sequential number of a logical disk on the disk.
The logical disk indicates the following contents of the disk administrator. The number is given by counting up from the left to the right on the disk administrator.
— In the case of the basic partition, the logical disk is that entire partition.
— In the case of the extended partition, the logical disk is a logical drive in that partition.

The following provides notes on this command:
- Only the root user can execute this command.
- Please use the location specified at the time of product installation.

10.3.11 Partition information display command (stgxfwcmdisppat)

This command displays the information for the partitions that comprise a device managed by AdvancedCopy Manager. This command must be executed on the Storage Management Server.

    a.   Specification method

```
/opt/FJSVswstf/bin/stgxfwcmdisppat -n Server-Name -d Device-Name
```

    b.   Description of options

Options	Description
-n	Specify the server name that manages a device whose information is to be displayed.
-d	Specify a device name whose information is to be displayed.

    c.   End status
    = 0: Normal end
    > 0: Abnormal end

    d.   Execution example
    The partition information for a device (/dev/rdsk/c4t0d10s0) of a server (Server1) is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmdisppat -n Server1 -d /dev/rdsk/c4t0d10s0
Partition          Identifier        Physical-Disk Disk-Type LU-Number
/dev/rdsk/c4t0d10s0 /dev/dsk/c4t0d10s0 ---             GR        10
#
```

The following contents are displayed.　Note that "SDX" or "SDX object" in the table are
SynfinityDISK or PRIMECLUSTER Global Disk Services (GDS) terms.

Title	Description
Partition	(Solaris server) A RAW device name is displayed. In the case of an SDX (slice) object, the name is displayed in the RAW device name c?t?d? format. (Windows server) When the device is installed in the ETERNUS storage system, the same contents as Device of the device information display command (stgxfwcmdispdev) are displayed. When the device is not installed in the ETERNUS storage system, the name is displayed in the following format: For MBR disks: S?p? S?:　Signature (8-digit hexadecimal number) p?:　Logical disk number (*1) For GPT disks: G?p? G?:　DiskId of disk (32-digit hexadecimal number) p?:　Logical disk number (*1) (HP-UX server) A RAW device name or a volume group name under LVM is displayed. (Linux server) When a RAW device has been created, its name is displayed; otherwise, a block device name is displayed. In the case of a SDX (slice) object, it displays in the form of RAW device name:sd?. (AIX server) A RAW device name or a volume group name under LVM is displayed.
Identifier	(Solaris server) A block device name is displayed. In the case of an SDX (slice) object, the name is displayed in the block device name c?t?d? format. (Windows server) A device name managed internally by AdvancedCopy Manager is displayed. The same contents as Device of the device information display command (stgxfwcmdispdev) are displayed. (HP-UX server) A block device name or a volume group name under LVM is displayed. (Linux server) A block device name is displayed. In the case of a SDX (slice) object, it displays in the form of block device name:sd?. (AIX server) A block device name or a volume group name under LVM is displayed.
Physical-Disk	(Solaris server, HP-UX server, Linux server, and AIX server) "---" is always displayed. (Windows server) A physical device name is displayed. The same contents as Block-Device of the device information display command (stgxfwcmdispdev) are displayed.
Disk-Type	When the device is installed in the ETERNUS storage system, "GR" is displayed. When the device is not installed in the ETERNUS storage system, "---" is displayed.
LU-Number	When the device is installed in the ETERNUS storage system, a logical unit number is displayed. When the device is not installed in the ETERNUS storage system, "---" is displayed.

(*1) The sequential number of a logical disk on the disk. The logical disk indicates
the following contents of the disk administrator. The number is given by counting up
from the left to the right on the disk administrator.
- In the case of the basic partition, the logical disk is that entire partition.
- In the case of the extended partition, the logical disk is a logical drive of that
partition.

![Note icon]

The following provides notes on this command:
- Only the root or superuser can execute this command.
- Please use the location specified at the time of product installation.

10.3.12 Environment information display command (stgenvdisp)

This command displays values of environment settings in AdvancedCopy Manager.

![Note icon]

- To display cluster information, execute the command from an active node (server).
Executing the command from a standby node displays only partial information.
- To display cluster information while a transaction is stopped, set the shared disk
containing the AdvancedCopy Manager shared data of the transaction to the online state
or mount the shared disk, and then execute the command.
- When this command is executed in a cluster environment, the environment variable
(SWSTGNODE) need not be set.
- Only users with root authority can execute this command.

a.   Specification method

```
/opt/FJSVswstf/bin/stgenvdisp [-n transaction-logical-node-name]
```

b.   Description of options

Option	Description
-n	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 displayed. Otherwise, information on all transactions is displayed. [In a non-cluster environment] This option cannot be specified. If the option is specified, then message swstf6001 is displayed and processing ends. Otherwise, information is displayed.

c.   End status
= 0: Normal end
> 0: Abnormal end

d.   Execution example
        Information in a non-cluster environment is displayed.
        [For the Storage Management Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type          : Management server
  Manager IP address   : 10.10.10.10
  Repository user       : acm
  DB file               : /dev/dsk/c0t0d0s4
  RDB dictionary        : /dev/rdsk/c0t0d0s5
  RDB log file          : /dev/rdsk/c0t0d0s6
  Database space        : /dev/rdsk/c0t0d0s7
  IP address for GUI    : 10.10.10.10
  Communication         : 1226
  Remote access         : 9851
  Exclusive control     : 9852
  Authentication feature : 4660
  Repository            : 2004
-----------------------------------------------------------------------
  Version               : 13.2
  Language              : JAPANESE
  Code                  : EUC
  Program install directory        : /opt
  Fixed configuration directory    : /etc/opt
  Modifying configuration directory  : /var/opt
#
```

[For the Storage Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type          : Server
  Manager IP address   : 10.10.10.10
  Communication        : 1226
-----------------------------------------------------------------------
  Version               : 13.2
  Language              : JAPANESE
  Program install directory        : /opt
  Fixed configuration directory    : /etc/opt
  Modifying configuration directory  : /var/opt
#
```

Information on all transactions in a cluster environment (SynfinityCluster or PRIMECLUSTER) is displayed.
[For the Storage Management Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type           : Management server
  Cluster system        : SynfinityCluster or PRIMECLUSTER
  Node type             : Primary
  Node name             : nodemgr
  Service name          : manager_service
  Mount point           : /acmmgrdisk
  Resource Type         : Procedure
  IP by cluster setup   : 10.10.10.10
  Manager IP address    : 10.10.10.10
  Repository user       : acm
  DB file               : /dev/sfdsk/Service1Cls1/dsk/Service1Vol2
  RDB dictionary        : /dev/sfdsk/Service1Cls1/rdsk/Service1Vol3
  RDB log file          : /dev/sfdsk/Service1Cls1/rdsk/Service1Vol4
  Database space        : /dev/sfdsk/Service1Cls1/rdsk/Service1Vol5
  IP address for GUI    : 10.10.10.10
  Communication         : 11000
  Remote access         : 9851
  Exclusive control     : 9852
  Authentication feature : 4660
  Repository            : 2004
-----------------------------------------------------------------------
  Server type           : Server
  Node name             : Local-Service
  Manager IP address    : 10.10.10.10
  Communication         : 1226
-----------------------------------------------------------------------
  Version               : 13.2
  Language              : JAPANESE
  Code                  : EUC
  Program install directory        : /opt
  Fixed configuration directory    : /etc/opt
  Modifying configuration directory : /var/opt
#
```

[For the Storage Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type          : Server
  Cluster system       : SynfinityCluster or PRIMECLUSTER
  Node type            : Primary
  Node name            : nodeagt1
  Service name         : agent_service1
  Mount point          : /acmagt1disk
  Resource Type        : CmdLine
  Manager IP address   : 10.10.10.10
  Communication        : 11000
  --------------------------------------------------------------------
  Server type          : Server
  Cluster system       : SynfinityCluster or PRIMECLUSTER
  Node type            : Secondary
  Node name            : nodeagt2
  Service name         : agent_service2
  Mount point          : /acmagt2disk
  Resource Type        : CmdLine
  Manager IP address   : 10.10.10.10
  Communication        : 12000
  --------------------------------------------------------------------
  Server type          : Server
  Node name            : Local-Service
  Manager IP address   : 10.10.10.10
  Communication        : 1226
  --------------------------------------------------------------------
  Version              : 13.2
  Language             : JAPANESE
  Program install directory      : /opt
  Fixed configuration directory  : /etc/opt
  Modifying configuration directory  : /var/opt
#
```

Information on all transactions in a cluster environment (VERITAS Cluster Server) is
displayed.

[For the Storage Management Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type            : Management server
  Cluster system         : VERITAS Cluster Server
  Node type              : Primary
  Node name              : nodemgr
  Service name           : manager_service
  Mount point            : /acmmgrdisk
  IP by cluster setup    : 10.10.10.10
  Manager IP address     : 10.10.10.10
  Repository user         : acm
  DB file                : /dev/dsk/c2t0d0s4
  RDB dictionary         : /dev/rdsk/c2t0d0s5
  RDB log file           : /dev/rdsk/c2t0d0s6
  Database space         : /dev/rdsk/c2t0d0s7
  IP address for GUI     : 10.10.10.10
  Communication          : 11000
  Remote access          : 9851
  Exclusive control      : 9852
  Authentication feature : 4660
  Repository             : 2004
----------------------------------------------------------------------
  Server type            : Server
  Node name              : Local-Service
  Manager IP address     : 10.10.10.10
  Communication          : 1226
----------------------------------------------------------------------
  Version                : 13.2
  Language               : JAPANESE
  Code                   : EUC
  Program install directory         : /opt
  Fixed configuration directory     : /etc/opt
  Modifying configuration directory : /var/opt
#
```

[For the Storage Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type            : Server
  Cluster system         : VERITAS Cluster Server
  Node type              : Primary
  Node name              : nodeagt1
  Service name           : agent_service1
  Mount point            : /acmagt1disk
  Manager IP address     : 10.10.10.10
  Communication          : 11000
-----------------------------------------------------------------------
  Server type            : Server
  Cluster system         : VERITAS Cluster Server
  Node type              : Secondary
  Node name              : nodeagt2
  Service name           : agent_service2
  Mount point            : /acmagt2disk
  Manager IP address     : 10.10.10.10
  Communication          : 12000
-----------------------------------------------------------------------
  Server type            : Server
  Node name              : Local-Service
  Manager IP address     : 10.10.10.10
  Communication          : 1226
-----------------------------------------------------------------------
  Version                : 13.2
  Language               : JAPANESE
  Program install directory        : /opt
  Fixed configuration directory    : /etc/opt
  Modifying configuration directory  : /var/opt
#
```

In a cluster environment (SunCLUSTER), information concerning all transactions is
displayed.

[For the Storage Management Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type            : Management server
  Cluster system         : SunCLUSTER
  Node type              : Primary
  Node name              : nodemgr
  Service name           : manager_service
  Mount point            : /acmmgrdisk
  Network Resource       : acm_rsc
  IP by cluster setup    : 10.10.10.10
  Manager IP address     : 10.10.10.10
  Repository user        : acm
  DB file                : /dev/dsk/c2t0d0s4
  RDB dictionary         : /dev/rdsk/c2t0d0s5
  RDB log file           : /dev/rdsk/c2t0d0s6
  Database space         : /dev/rdsk/c2t0d0s7
  IP address for GUI     : 10.10.10.10
  Communication          : 11000
  Remote access          : 9851
  Exclusive control      : 9852
  Authentication feature : 4660
  Repository             : 2004
-----------------------------------------------------------------------
  Server type            : Server
  Node name              : Local-Service
  Manager IP address     : 10.10.10.10
  Communication          : 1226
-----------------------------------------------------------------------
  Version                : 13.2
  Language               : JAPANESE
  Code                   : EUC
  Program install directory           : /opt
  Fixed configuration directory       : /etc/opt
  Modifying configuration directory   : /var/opt
#
```

[For the Storage Server]

```
# /opt/FJSVswstf/bin/stgenvdisp
  Server type          : Server
  Cluster system       : SunCLUSTER
  Node type            : Primary
  Node name            : nodeagt1
  Service name         : agent_service1
  Mount point          : /acmagt1disk
  Network Resource     : acm_rsc
  Manager IP address   : 10.10.10.10
  Communication        : 11000
------------------------------------------------------------------------
  Server type          : Server
  Node name            : Local-Service
  Manager IP address   : 10.10.10.10
  Communication        : 1226
------------------------------------------------------------------------
  Version              : 13.2
  Language             : JAPANESE
  Program install directory       : /opt
  Fixed configuration directory   : /etc/opt
  Modifying configuration directory : /var/opt
#
```

The contents of displayed information are described below.

Title	Description
Server type	The server type is displayed as follows: Management server: Storage Management Server or Storage Management Server transaction Server: Storage Server of Storage Server transaction
Cluster system	The type of cluster system is displayed as follows: SynfinityCluster or PRIMECLUSTER: SynfinityCluster or PRIMECLUSTER VERITAS Cluster Server: VERITAS Cluster Server SynfinityCluster: SynfinityCluster PRIMECLUSTER: PRIMECLUSTER MC/ServiceGuard: MC/ServiceGuard MSCS: MSCS HACMP: High Availability Cluster Multi-Processing SunCLUSTER: SunCLUSTER
Node type	The node type is displayed as follows: Primary: Primary node Secondary: Secondary node
Node name	The logical node name is displayed. Local-Service indicates a local transaction.
Service name	The transaction name is displayed.
Cluster name	The cluster name is displayed.
Mount point	The mount point for AdvancedCopy Manager shared data is displayed.
Disk resource	The name of the shared disk resource used for AdvancedCopy Manager shared data is displayed.
Drive	The drive letter used for AdvancedCopy Manager shared data is displayed.
Volume group	The volume group name is displayed.
Network name	The name of the network for AdvancedCopy Manager is displayed.
External connection	The external connection network name is displayed.
Subnet mask	The subnet mask is displayed.
IP address resource	IP address resource information is displayed.
IP by cluster	The logical IP address specified in the cluster configuration command is

Title	Description
setup	displayed. However, note that the displayed IP is not the active logical IP address if the IP address of either the Storage Management Server transaction or Storage Server transaction is changed during operation.
Manager IP address	The IP address of the Storage Management Server is displayed. However, if no server is added, then "????" is displayed.
Repository user	The name of the user accessing the repository is displayed.
DB log file	[Windows Edition only] The name of the DB log file storage destination folder is displayed.
DB dictionary file	[Windows Edition only] The name of the DB dictionary file storage destination folder is displayed.
Repository database	[Windows Edition only] The name of the repository DB storage destination folder is displayed.
DB file	[Solaris Edition] The name of the DB file system device or directory is displayed. [Linux Edition] The DB file directory name is displayed.
RDB dictionary	[Solaris Edition] The RDB dictionary raw device name is displayed. [Linux Edition] The RDB dictionary directory name is displayed.
RDB log file	[Solaris Edition] The name of the RDB log file raw device or directory is displayed. [Linux OE Edition] The RDB log file directory name is displayed.
Database space	[Solaris Edition] The name of the raw device containing the repository data storage DB is displayed. [Linux Edition] The name of the directory containing the repository data storage DB is displayed.
Database size	[Windows Edition and Linux Edition only] The database size is displayed.
IP address for GUI	The GUI connection IP address is displayed.
Communication	The communication service/daemon port number (service name in the services file: stgxfws) is displayed. In a cluster environment, the transaction communication service/daemon port number (service name in the services file: stgxfws_logical-node-name) is displayed.
Remote access	The remote access service/daemon port number (service name in the services file: rmiswstf) is displayed.
Exclusive control	The exclusive control service/daemon port number (service name in the services file: semswstf) is displayed.
Authentication feature	The authentication feature service/daemon port number (service name in the services file: smaclmgr) is displayed.
Repository	The repository service/daemon port number (service name in the services file: rdaswstf) is displayed.
Resource Type	[Solaris and Linux only] Displays the resource type. Procedure: Procedure resource CmdLine: Command line resource
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	Displays the transactions directory specified during installation.

Title	Description
configuration directory	
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type. JAPANESE: Domestic edition ENGLISH: International edition
Code	[Solaris and Linux only] Displays the encoding specified during installation.

> **Note**
> ● "????" is displayed for any information that cannot be displayed because of an error.
> ● Some items may not be displayed depending on the server type (Storage Management Server/Storage Server) or cluster type.

10.3.13 Management information package backup server registration/deletion command (stgmgrinfoset)

The command registers the management information package backup execution server (the server on which the management information package backup command (stgmgrinfobkup) is executed).
The command deletes the management information package backup execution server.
The command displays information about the management information package backup execution server.

a. Specification method

```
program-directory¥bin¥stgmgrinfoset [-del | -d directory-name -c
storage-management-server-encoding]
```

b. Description of options

Option	Description
None	Displays information about the management information package backup execution server.
-del	Deletes the management information package backup execution server.
-d	Specify the full path to the directory where the backup data is to be stored. Only alphanumeric characters and underscores can be used in the directory name.
-c	Specify the encoding designated when the Storage Management Server was installed. Specify either of the following: ASCII : ASCII

c. End status
   =0: Normal end
   >0: Abnormal end

d. Execution example
   Register the management information package backup execution server (the path to the directory where backup data is to be stored is D:¥stgbkupdata, and the encoding used on the Storage Management Server is ASCII):

```
# /opt/FJSVswstf/bin/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
#
```

Note

The following notes apply to this command:
● Only a root or superuser or an account which belongs to the administrators group can execute this command.
● To change the backup data storage directory, first use the -del option to delete the current directory, then register a new backup data storage directory.
● Register only one Storage Server as the management information package backup execution server.
● Set the name of the logical node in the SWSTGNODE environment variable when the Storage Server registered as the management information package backup execution server is in a cluster system.
● Create the directory specified in the "-d" option in advance.

10.3.14 Management information package backup command (stgmgrinfobkup)

This command makes backups of the management information stored on the Storage Servers and Storage Management Server.

a. Specification method

```
program-directory¥bin¥stgmgrinfobkup [-n server-name] [-t backup-type]
```

b. Description of options

Option	Description
-n	Makes backups of the management information stored on the specified server. If this option is not specified, the management information on all Storage Servers (including the Storage Management Server) is backed up.

Option	Description
-t	Specifies the types of data that is to be backed up. Specify one of the values listed below. Do not specify more than one value in the -t option: DBData : Database RegiData : Registry MgrInfoData : Policy file for management information package backup AuthData : Authentication management list BkupData : Backup management ReplData : Replication management TapeData : Tape backup management backup If this option is not specified, backups are made as defined in the policy file. For details on the policy file, refer to "Preliminaries".

c.   End status
    =0: Normal end
    >0: Abnormal end

d.   Execution example
    Make backups of the management information on all the Storage Servers as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00,
Server name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:05:00, Server name=acm02
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

    Make backups of the management information on Storage Server acm01 as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Makes backups of the registries on all of the Storage Servers.

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -t RegiData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00,
Server name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:05:00, Server name=acm02
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Make a backup of backup management located on Storage Server acm01:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01 -t BkupData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00,
Server name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02
11:02:00, Server name=acm01
swstf3021 The normal end of the backup of management information was carried out by all
servers.
#
```

Note

The following notes apply to this command:
● Only a root or superuser or an account which belongs to the administrators group can execute this command.
● Be sure to check the information (a message indicating completion or an error) displayed by this command.
● This command can be executed only on the management information package backup execution server.
● Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.
● Do not execute other AdvancedCopy Manager commands or WEB CLIENT GUI commands while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a WEB CLIENT GUI command is running.
● Do not execute this command again if it is already running.
● To save backup data to a tape or similar medium, save all files and directories under the backup data storage directory.
● Registry backups are made only when RegiData is specified in the "-t" option. A registry backup will not be made if the "-t" option is not specified.
● A backup of the policy file for management information package backup is made only when MgrInfoData is specified in the "-t" option. No backup is made when the "-t" option is not specified. Additionally, specify the name of the management information package backup execution server in the "-n" option.
● Backup is not possible for any management information on Storage Servers with Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier.

10.3.15 Management information package backup status display command (stgmgrinfodisp)

This command displays the execution status of the management information package backup command (stgmgrinfobkup).

a. Specification method

```
program-directory¥bin¥stgmgrinfodisp [-n server-name]
```

b. Description of options

Option	Description
-n	Specifies the name of the server where the backup status is to be displayed. If this option is not specified, the status of backups on the Storage Server for which the management information package backup command was executed is displayed.

c. End status
    =0: Normal end
    >0: Abnormal end

d. Information displayed

The types of information listed below are displayed. If no backups are made when the management information package backup command is executed or if the management information package backup command terminates with an error, no data is displayed.

Item	Description
Server	Server name
RegiData	TimeStamp for when the management information package backup command created a backup of a registry (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
DBData	TimeStamp for when the management information package backup command created a backup of the database (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
AuthData	TimeStamp for when the management information package backup command created a backup of the authentication management list (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
BkupData	TimeStamp for when the management information package backup command created a backup of the backup management (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
ReplData	TimeStamp for when the management information package backup command created a backup of replication management (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	TimeStamp for when the management information package backup command created a backup of the policy file for management information package backup (date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss

Item	Description
TapeData	TimeStamp for when a backup of tape backup management was made by package backup using the management information command (with package backup of the management information command executed) yy/mm/dd hh:mm:ss

e. Execution example
Display information about all Storage Servers:

```
# /opt/FJSVswstf/bin/stgmgrinfodisp
Server:          acm01
   DBData:       04/08/02 16:11:26
   AuthData:     04/08/02 16:32:00
   RegiData:     04/08/01 09:00:00
   ReplData:     04/08/02 16:32:22
Server:          acm02
   RegiData:     04/08/01 09:00:00
   BkupData:     04/08/03 16:00:00
Server:          tape
   RegiData:     05/08/01 09:00:00
   TapeData:     05/08/03 16:00:00
#
```

Display information about Storage Server acm01:

```
# /opt/FJSVswstf/bin/stgmgrinfodisp -n acm01
Server:          acm01
   DBData:       04/08/02 16:11:26
   AuthData:     04/08/02 16:32:00
   RegiData:     04/08/01 09:00:00
   ReplData:     04/08/02 16:32:22
#
```

The following notes apply to this command:
● Only a root or superuser or an account which belongs to the administrators group can execute this command.
● This command can be executed only on the management information package backup execution server.
● Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.

10.3.16 SDX object management unit configuration command (stgxfwcmsetsdx)

The unit of operation of the SDX object treated with AdvancedCopy Manager (Refer to the "Units of SDX object operations") is set. Moreover, the unit of operation of a present SDX object is displayed.

a. Specification method

```
/opt/FJSVswstf/bin/stgxfwcmsetsdx [-slice | -volume ]
```

b. Description of options

Option	Description
none	The unit of present of the SDX object management is displayed.
-slice	The unit of management of the SDX object treated with AdvancedCopy Manager is set to the unit of the slice.
-volume	The unit of management of each logical volume of the SDX object treated with AdvancedCopy Manager is set.

c. End status
    =0: Normal end
    >0: Abnormal end

d. Execution example
    The unit of present of the SDX object management in non-cluster environment is displayed.

```
# /opt/FJSVswstf/bin/stgxfwcmsetsdx
Volume (SWSTGNODE=null)
```

The display form is 'Unit of management (SWSTGNODE = <configuration value>).'
    ─ Unit of management
    ─ Slice in case of each slice.
    ─ Volume in case of each logical volume.
One of these values are used value-environment variable SWSTGNODE is set. The value is Null when environment variable SWSTGNODE is not set.

The unit of the SDX object of the Storage Management Server service (The logical node name: aserv) is set to the unit of the slice.

```
# SWSTGNODE=aserv; export SWSTGNODE
# /opt/FJSVswstf/bin/stgxfwcmsetsdx -slice
stgxfwcmsetsdx completed (SWSTGNODE=aserv)
```

Note

The following lists notes on this command.
    ─ This command can be executed only by root users.
    ─ When the cluster is operated, each Storage Server service is set.

10.4 Replication Management Command

This section describes operations using Replication Management Commands. It is necessary to execute the command of Replication management by the root user.

Note

Only a root or superuser 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 commands.

Table: Operating environment required for command execution

Command	Operating environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows and is in EC operation, the daemons and services of the copy destination Storage Server must be operating (except when the -m option or -t option is specified). For inter-server replication in EC equivalency status, the associated server must be running (except when the -m option is specified).
swsrpchsync	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 running.
swsrpdelvol	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be running. 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 running. For inter-server replication, the daemons and services of 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, the daemons and services of the Storage Management Server and target Storage Server must be running.
swsrprecbuffset	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be running. 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 running
swsrpmake	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows and is engaged in intra-server replication and EC operation, the daemons and services of the Storage Server must be running. For inter-server replication, the daemons and services of 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, the daemons and services of the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be running. To specify the - r option, the daemons and services of the Storage Management Server must be running.

Command	Operating environment of AdvancedCopy Manager
swsrprevsync	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be running.
swsrpsetvol	To execute this command on a Storage Server, the daemons and services of the Storage Management Server must be running. 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 running. For inter-server replication, the daemons and services of the Storage Server in communication must be running.
swsrpstartsync	To execute this command on a Storage Management Server with the -h option specified, the daemons and services of the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, the daemons and services of the Storage Server must be running. 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, the daemons and services of 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, the daemons and services of 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. For bsh, specify the environment variable as follows:

```
# SWSTGNODE=logical-node-name<Enter>
# export SWSTGNODE
```

2) Execute the command.
   The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Commands when cluster operation used

Command	Environment variable	Command execution node	Remarks
swsrpsetvol	Required	Cluster active server	
swsrpvolinfo	Required	Cluster active server	
swsrpdelvol	Required	Cluster active server	
swsrprecbuffstat	Required	Cluster active server	
swsrprecbuffset	Required	Cluster active server	
swsrpstartsync	Required	Cluster active server	
swsrpmake	Required	Cluster active server	

Command	Environment variable	Command execution node	Remarks
swsrpstat	Required	Cluster active server	
swsrpcancel	Required	Cluster active server	
swsrpchsync	Required	Cluster active server	
swsrpprevsync	Required	Cluster active server	
swsrprecoverres	Required	Cluster active server	

10.4.1 Environment definition commands

This chapter describes environment definition commands for replication management.

10.4.1.1 Replication volume information configuration command (swsrpsetvol)

This command sets the replication source 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.

a.   Specification method

```
[To be executed on a Storage Server]
For replication on a server
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xgroup Group-Name] [-Xvtoc]
 Original-Volume-Name Replica-Volume-Name
For replication between servers
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup Group-Name]
 [-Xvtoc] Original-Volume-Name Replica-Volume-Name
[To be executed on a Storage Management Server]
For replication on a server
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] [-Xgroup Group-Name] [-Xvtoc]
 Original-Volume-Name Replica-Volume-Name
For replication between servers
/opt/FJSVswsrp/bin/swsrpsetvol -h Server-Name [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup
 Group-Name] [-Xvtoc] Original-Volume-Name Replica-Volume-Name
```

b.   Description of options

Option	Description
-h	Specifies the name of a Storage Server on which the replication will occur. This option is valid only on a Storage Management Server. If this option is omitted, the Storage Server on which the command is entered will be the target of the processing.
-u	Specifies the direction of copying. If this option is specified, copying from a replication source volume to a replication destination volume is performed only in this direction. Copying from a replication destination volume to a replication source volume is prohibited. If this option is omitted, copying between the replication source and replication destination volumes interactively is bidirectional.

Option	Description
-o	Specifies the operational 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: ● Replication volume information display command (swsrpvolinfo) ● Operation status display command (swsrpstat) ● Replication cancellation command (swsrpcancel) (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 only 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, make the copy destination volume size the same or larger than the copy source volume size. This option cannot be used for SDX object logical volumes (GDS Snapshot function linkage function).
-Xgroup	Specifies that the copy source and copy destination volumes 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 (_), hash sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.

Option	Description
-Xvtoc	If this option is not specified, slices that include VTOC under Solaris cannot be set as replication source volumes or replication destination volumes. Specification of this option avoids the need to check whether or not a replication source volume or replication destination volume VTOC is included. Specify this option if the following volumes are set as replication source volumes or as replication destination volumes: ・ Under Solaris, slices that include a VTOC of a VTOC labeled disk ・ Under Solaris, the second slice, which indicates the entire disk of a VTOC labeled disk If this option is specified for other volumes, it is ignored.

c.   Description of operands

Operand	Description
Original-Volume-Name	Specifies a replication source volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."
Replica-Volume-Name	Specifies a replication destination volume name. For the volume names of other servers, use the format "volume-name@storage-server-name."

d.   End status
   = 0: Normal end
   > 0: Abnormal end

e.   Execution example
   Set replication volume information by specifying volume/dev/dsk/c1t2d0s3 of Storage
   Server SRC-SV as the replication source volume and volume /dev/dsk/c1t2d0s3 of Storage
   Server TARG-SV as the replication destination volume.   In addition, specify one-way
   copying for the copy direction and specify the replication source server (SRC-SV) as
   the operation server.   The example below shows the command executed on SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/dsk/c1t2d0s3 /dev/dsk/c1t2d0s3@TARG-SV
swsrpsetvol completed
#
```

   When the same settings are made from TARG-SV, the example is as follows (be careful
   with the volume name):

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d0s3
swsrpsetvol completed
#
```

Note

Replication volume information cannot be set if:

- Replication volume information has already been set.
- The specified replication source volume and replication destination volume are set as the replication destination volume and the replication source volume.
- The "-n" option is not specified when the sizes of the replication source volume and the replication destination volume are different.
- Two volumes that have the same cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) as the cabinet information of the specified two volumes have already been set as replication volumes.
- The replication destination volume has been registered as a backup volume of the backup management function.
- The replication source volume has been registered as a backup volume of the backup management function and bi-directional copying is specified as a replication volume attribute.
- The specified replication destination volume and replication source volume are volumes belonging to other servers (at least one volume must be a volume on the local server).
- If the replication source volume and the replication destination volume are located on another disk array device, the remote copy function of the disk array device is not correctly set.
- Communication with the Storage Management Server fails.
- Communication with a destination server fails for replication between servers.
- When the replication source volume and the replication destination volume are a replication management function and a logical volume of unsupported VxVM
  (For details on the logical volume that can be supported by the replication management, refer to "Normal devices").

Note

Note the following points about creating copy source volumes and copy destination volumes under Solaris:

- When creating multiple volumes (slices) on the same disk, volume areas must not overlap.
-
- If slices contain VTOC, check the notes in "Slices that contain VTOC" under "General notes".

Note

When you change physical information on volumes (partition size, drive letter, and cabinet information on a disk array device) using such functions as an OS management tool (for example, Disk Administrator) or the ETERNUSmgr, GRmgr, or GDS functions provided by the disk array device, you need to reset the registered replication volume information associated with the changed volumes, according to the following procedures:

1. Delete the replication volume information by the replication volume information deletion command (swsrpdelvol).
2. In an initial screen, "information acquisition / display" of all devices are performed. Or device information acquisition / display command (stgxfwcmsetdev) is executed in a Storage Management Server.
3. Reset the replication volume information by the replication volume information configuration command (swsrpsetvol).

Note

When you use a replication destination volume by mounting or by allocating a drive letter after creating a replication, the size of the replication destination volume must exactly match the size of the replication destination volume to the byte. If you do not use a replication destination volume (for example, when you need copy data, you restore it to the replication source volume and then use it), the size of the replication destination volume can be larger than the size of the replication source volume.

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 is running:
● Replication volume information configuration command (swsrpsetvol)
● Replication volume information deletion command (swsrpdelvol)
● Synchronous processing start command (swsrpstartsync)
● Replication creation command (swsrpmake)
● Operation status display command (swsrpstat)
● Replication cancellation command (swsrpcancel)
● Synchronization mode change command (swsrpchsync)
● Synchronization reverse command (swsrprevsync)
● Resource adjustment command (swsrprecoverres)

When GDS SDX objects are used:
Refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (replication management)".

10.4.1.2 Replication volume information display command (swsrpvolinfo)

This command displays the replication volume information registered by the replication volume information configuration command (swsrpsetvol).

a.   Specification method

```
[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]
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option is valid only on a Storage Management Server.
-L	Specifies that information be displayed using the extended format. Refer to the table in the execution example for information about the items that are displayed when this option is specified. The items that are displayed when this option is specified may be expanded to support new functions provided by future versions.

c. Description of operands

Operand	Description
Original-Volume-Name	Specifies a replication source volume name. For the volume names of other servers, use the format volume-name@storage-server-name. Displays all the replication volume information for the specified replication source volume. If this operand is omitted, all the replication volume information existing on the Storage Server on which this command is executed is displayed.

d. End status
    = 0: Normal end
    〉0: Abnormal end

e. Execution example
    Direct that all the replication volume information on a Storage Management Server be displayed on Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpvolinfo -h SRC-SV
Server Original-Volume          Size        Replica-Volume          Size
Copy        Op-Server
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV     4.0Gbyte /dev/dsk/c1t2d0s3@TARG-SV     4.0Gbyte
uni-direction original
SRC-SV /dev/dsk/c1t2d1s3@SRC-SV     4.0Gbyte /dev/dsk/c1t2d1s3@TARG-SV     5.0Gbyte
bi-direction  original
SRC-SV /dev/dsk/c1t2d2s3@SRC-SV     9.1Gbyte /dev/dsk/c1t2d2s3@TARG-SV     9.1Gbyte
bi-direction  replica
SRC-SV /dev/dsk/c1t2d2s4@SRC-SV     7.5Gbyte /dev/dsk/c1t2d2s4@TARG-SV     7.5Gbyte
bi-direction  both
#
```

    The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Original-Volume	Displays a replication source volume name.
Size	Displays the volume size. For a logical volume of VxVM, the size of the public area (slice) that makes up the volume is displayed instead of the volume size.
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 if the -L option has been specified]	Displays the group name. "----"is displayed if the copy source and destination volumes are not registered in a group.

Note

Replication volume information cannot be displayed if:
- The specified volume is not set as a replication source volume

Note

This command cannot be executed while the following command is running:
- Resource adjustment command (swsrprecoverres)

10.4.1.3 Replication volume information deletion command (swsrpdelvol)

Delete the replication volume information that has been set.
If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

a.　Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpdelvol -h Server-Name [-e] [-d] Original-Volume-Name
Replica-Volume-Name
```

b.　Description of options

Option	Description
-h	Specifies a Storage Server name. This option is valid only on a Storage Management Server.
-e	Emergency operation mode is available for operations. Specifies deleting replica volume information, without checking the execution state of an advanced copy. Use this option, only when it is clear that the advanced copy is not executed. Deletes replication volume information without confirming the release of the master-proxy relationship of an SDX object when the function in linkage with GDS Snapshot is used.
-d	Specifies that no communication take place between the linked servers in replication between servers.　When this option is specified, replication volume information is deleted without communication taking place between the linked servers. Use the option only when recovery of one of the linked servers cannot be expected. The option is valid only for replication between servers. The option can be used on the server not specified as the operation server.

c.　Description of Operand

Operand	Description
Original-Volume-Name	Specifies a replication source volume name.　For the volume names of other servers, use the format "volume-name@storage-server-name."
Replica-Volume-Name	Specifies a replication destination volume name.　For the volume names of other servers, use the format "volume-name@storage-server-name."

d.　End status
- = 0:　Normal end
- ＞ 0:　Abnormal end

e. Execution example
    Delete replication volume information on Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpdelvol /dev/dsk/c1t2d0s3 /dev/dsk/c1t2d0s3@TARG-SV
swsrpdelvol completed
#
```

Replication volume information cannot be deleted if:
- ● The specified replication source volume and the replication destination volume are not
  set as replication volumes.
- ● The copy processing (synchronization processing and snapshot processing) is performed
  between replication volumes.
- ● For server-to-server replication, the Storage Server that executed the command is not
  the operation server of the replication volume.
- ● Communication with a Storage Management Server fails.
- ● For server-to-server replication, communication with a destination server fails.
- ● However, OPC sessions are neither confirmed nor cancelled by execution in emergency
  operation mode. If an OPC session is in the error suspended state or halt state, then
  unmanaged sessions remain. In this event, ETERNUSmgr, GRmgr, or GDS must be used to
  cancel these sessions.

If a logical volume of VxVM is deleted or its structure is changed to a structure not supported
by AdvancedCopy Manager, replication volume information cannot be deleted. In such cases, take
action according to either item a) or b).
  a. Make sure that advanced copy is not in progress for the replication volume to be deleted,
      and execute this command with the "-emergency" option specified. If advanced copy is in
      progress, stop advanced copy by using the disk array unit or take action
      according to item b).
  b. Re-create the logical volume or return the logical volume structure to its original state,
      and then execute this command.

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of
unsupported SDX objects", and "Notes on SDX object operations (replication management)."

This command cannot be executed while any of the following commands is running:
- ● Replication volume information configuration command (swsrpsetvol)
- ● Replication volume information deletion command (swsrpdelvol)
- ● Synchronous processing start command (swsrpstartsync)
- ● Replication creation command (swsrpmake)
- ● Replication cancellation command (swsrpcancel)
- ● Synchronization mode change command (swsrpchsync)
- ● Synchronization reverse command (swsrprevsync)
- ● Resource adjustment command (swsrprecoverres)

10.4.1.4 REC transfer buffer information display command (swsrprecbuffstat)

Displays information for the transfer buffer used by ETERNUS when REC is performed in Consistency mode.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrprecbuffstat [-Xaltpath] Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrprecbuffstat -h Server [-Xaltpath] Volume-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a Storage Server. You can use this option only for a Storage Management Server.
-Xaltpath	When replication volume is applying per logic volume by the SDX object, an alternative path is specified as an operand in the form of the following. /dev/sfdsk/(class name)/dsk/(volume name):(DEVNAM value for sdxinfo)

c. Description of operands

Operand	Description
Volume-Name	Specifies the name of a volume that has been registered as a replication volume. You can only specify volumes that are connected to the Storage Server where the command is executed. Specify the AdvancedCopy Manager device name as the volume name.

d. End status
   =0:Normal end
   >0:Abnormal end

e. Execution example
   Display information for the transfer buffer used by the REC, where the copy source volume is /dev/FJSVmplb/dsk/mplb2048s3@Server1 and the copy destination volume is /dev/FJSVmplb/dsk/mplb3048s3@Server1, and replication is performed within the Storage Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb3048s3@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Display information for the transfer buffer used by the REC in an environment where replication is being performed between Storage Server "Server1" and Storage Server "Server2". Additionally, the copy source volume is /dev/FJSVmplb/dsk/mplb2048s3@Server1 and the copy destination volume is /dev/FJSVmplb/dsk/mplb2148s3@Server2:

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
 BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
[Command executed on Storage Server "Server2"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2148s3@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2  SEND 5%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Display information for the transfer buffer used by the REC if a cabinet where the copy source volume /dev/FJSVmplb/dsk/mplb2048s3@Server1 resides has been set up to make remote copies to multiple cabinets, and replication is being performed between Storage Server "Server1" and Storage Server "Server2":

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
 BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
3  SEND 4%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
4  RECV 0%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
5  SEND 10%  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
6  RECV 0%   EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
7  SEND 3%   FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
8  SEND 5%   GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
#
```

Display information for the transfer buffer used by the REC, where the copy source volume is /dev/sfdsk/class1/dsk/volume1@Server1 and the copy destination volume is /dev/sfdsk/class2/dsk/volume1@Server2, and replication is being performed between Storage Server "Server1" and Storage Server "Server2":
(The SDX object is in a two-cabinet mirror configuration.)

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb2048
 BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb3048
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use  Rate RemoteBoxID
1  SEND 11%  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
2  RECV 0%    DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
#

[Command executed on Storage Server "Server2"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb2148
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2  SEND 4%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb3148
BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use  Rate RemoteBoxID
1  RECV 0%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
2  SEND 5%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
#
```

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.

Point

The device name on a cabinet to display information can be specified as -Xaltpath.

Note

Information is displayed only for cabinets that contain replication volumes for the server where the command was executed.
If intercabinet replication is being performed between servers, then the command must be executed on both servers involved in the replication in order to check information for the transfer buffers in both cabinets.

Note

It will take a short period for changes to REC transfer buffer settings to take effect, during which time the buffer may become unusable (the "Rate" field will be displayed as "----"). In this case, wait about one minute and then execute the command again.

Note

This command cannot be executed while the following command is running:
Resource adjustment command (swsrprecoverres)

10.4.1.5 REC transfer buffer configuration change command (swsrprecbuffset)

This function changes the settings for the transfer buffer used by ETERNUS when REC is performed in Consistency mode.
Refer to "ETERNUSmgr User's Guide Setup / Maintenance" about the configuration method of REC transfer buffer.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV}
[-Xaltpath]  Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrprecbuffset -h Server  -Xbuffid buffer-id -Xbuffuse
{SEND|RECV}   [-Xaltpath]  Volume-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a Storage Server. You can use this option only for a Storage Management Server.
-Xbuffid	Specifies the ID for the transfer buffer.
-Xbuffuse	Specifies the usage for the transfer buffer. SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data
-Xaltpath	When replication volume is a logical volume in the SDX object, an alternative path is specified as an operand in the following form. /dev/sfdsk/(class name)/dsk/(volume name):(DEVNAM value for sdxinfo)

c. Description of operands

Operand	Description
Volume-Name	Specifies the name of a volume that has been registered as a replication volume. You can only specify volumes that are connected to the Storage Server where the command is executed. When replication volume is a logic volume in the SDX object, it is necessary to use the -Xaltpath option and to specify an alternative path.

d. End status
   =0:Normal end
   >0:Abnormal end

e. Execution example
   Change the attributes for the transfer buffer used by the REC where the copy source volume is /dev/FJSVmplb/dsk/mplb2048s3@Server1 and the copy destination volume is /dev/FJSVmplb/dsk/mplb3048s3@Server1, and replication is being performed within the Storage Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV
/dev/FJSVmplb/dsk/mplb2048s3@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb3048s3@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND
/dev/FJSVmplb/dsk/mplb3048s3@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb3048s3@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 3%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

Change the attribute for the transfer buffer where the copy source volume is /dev/FJSVmplb/dsk/mplb2048s3@Server1, and replication is being performed between Storage Server "Server1" and Storage Server "Server2".

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb2048s3@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND
/dev/FJSVmplb/dsk/mplb3048s3@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 2 -Xbuffuse RECV
/dev/FJSVmplb/dsk/mplb3048s3@Server1
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/FJSVmplb/dsk/mplb3048s3@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 4%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```

Change the attributes for the transfer buffer used by the REC where the copy source volume is /dev/sfdsk/class1/dsk/volume1@Server1 and the copy destination volume is /dev/sfdsk/class2/dsk/volume1@Server2, and replication is being performed between Storage Server "Server1" and Storage Server "Server2":
(The SDX object is in a two-cabinet mirror configuration.)

```
[Command executed on Storage Server "Server1"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb2048
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb3048
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use  Rate RemoteBoxID
1  SEND 11%   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV - Xaltpath
 /dev/sfdsk/class1/dsk/volume1:mplb2048
swsrpbuffset completed

# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse RECV - Xaltpath
 /dev/sfdsk/class1/dsk/volume1:mplb3048
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb2048 /dev/sfdsk/class1/dsk/volume1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class1/dsk/volume1:mplb3048 /dev/sfdsk/class1/dsk/volume1@Server1
BoxID = CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
ID Use  Rate RemoteBoxID
1  RECV 0%    DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

[Command executed on Storage Server "Server2"]
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb2148 /dev/sfdsk/class2/dsk/volume1@Server2
```

```
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb3148 /dev/sfdsk/class2/dsk/volume1@Server2
BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use  Rate RemoteBoxID
1  RECV 0%    CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb2148 /dev/sfdsk/class2/dsk/volume1@Server2
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrpbuffset -Xbuffid 1 -Xbuffuse SEND -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb3148 /dev/sfdsk/class2/dsk/volume1@Server2
swsrpbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb2148 /dev/sfdsk/class2/dsk/volume1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 1%    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffstat -Xaltpath
/dev/sfdsk/class2/dsk/volume1:mplb3148 /dev/sfdsk/class2/dsk/volume1@Server2
BoxID = DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
ID Use  Rate RemoteBoxID
1  SEND 1%    CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
#
```

Point

The device name for which information is to be displayed can be specified as "-Xaltpath".

Note

Configurations for dedicated REC buffers must be made in advance.
Change configurations while there are no asynchronous Consistency mode sessions in either the ACTIVE or ERROR SUSPEND state.
It will take a short period for changes to buffer settings to take effect, during which time the transfer buffer will become unusable. Do not perform REC operations during this time.

Note

This command cannot be executed while any of the following commands are running:
— Replication volume information configuration command (swsrpsetvol)
— Replication volume information deletion command (swsrpdelvol)
— Synchronous processing start command (swsrpstartsync)
— Replication creation command (swsrpmake)
— Operation status display command (swsrpstat)
— Replication cancellation command (swsrpcancel)
— Synchronization mode change command (swsrpchsync)
— Synchronization reverse command (swsrprevsync)
— Resource adjustment command (swsrprecoverres)

10.4.2 Operation commands

This chapter describes operation commands for replication management.

10.4.2.1 Synchronous processing start command (swsrpstartsync)

Start the synchronous replication processing (copying between disks by EC and REC).
Copy all the specified replication destination and replication source volumes (start of the synchronization processing), or copy (restart of the synchronization processing) updated data (difference).　Use this command at the start of operation or when you want to reflect updated data (difference) from the equivalency maintenance state.
For a GDS transaction volume, synchronous processing using a software copy is also possible.

a.　Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpstartsync [ [ -y [ -a | -v ] | -k | -i ] [-g] [-m] [ -Xskip |
 -Xremain ] [-Xgds-slice-skipchk] | -Xgds-softcopy | -Xgds-selectcopy ] [-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 ] [-Xgds-slice-skipchk] | -Xgds-softcopy | -Xgds-selectcopy ]
 [-t] From-Volume-Name To-Volume-Name
[if executed on a Storage Server: group specification]
/opt/FJSVswsrp/bin/swsrpstartsync [[-y [-a | -v]]| [-k] | [-i]] [-g]|-Xgds-softcopy |
 -Xgds-selectcopy] [-t][-m] [-Xskip | -Xremain] [-Xreverse] -Xgroup Group-Name
[if executed on a Storage Management Server: group specification]
/opt/FJSVswsrp/bin/swsrpstartsync -h Server-Name [[-y [-a | -v]]| [-k] | [-i]]
 [-g]|-Xgds-softcopy | -Xgds-selectcopy] [-t][-m] [-Xskip | -Xremain] [-Xreverse]
 - Xgroup Group-Name
```

b.　Description of options

Option	Description
-h	This option is valid only on a Storage Management Server. This option can be specified only on a Storage Management Server.
-y	Specifies synchronization in synchronous write mode.　This option is valid only when total copy is started for inter-ETERNUS replication. Not specifying the -y, -k, and -i option sets asynchronous write mode. Synchronization in intra-box replication is always handled in synchronous write mode.
-a	Specifies the start of split mode for inter-box synchronization in Automatic Split mode.　This option is valid only when total copy is started for inter-box replication. Specify this option together with the -y option.　Specifying the -y option without the -a option or -v option sets Automatic Split mode.
-v	Specifies the start of split mode for inter-box synchronization in Manual Split mode.　This option is valid only when total copy is started for inter-box replication. Specify this option together with the -y option.　Specifying the -y option without the -a option or -v option sets Automatic Split mode. You must specify this option when specifying synchronization mode (-y option) on a box that does not support Automatic Split mode.

Option	Description
-k	Specifies the configuration of transfer mode for inter-box synchronization in Stack mode. This option is valid only when total copy is started for inter-box replication. Not specifying the -y, -k, or -i option sets asynchronous write mode. You cannot use this option when operating SDX objects in units of logical volumes.
-i	Specifies the configuration 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 configuration 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, 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-operational server are not performed. This option is valid only during server-to-server replication.
-t	Specifies that pre-processing for the replication destination volume is not performed. Use this option only when any one of the following conditions applies: ● When AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and special pre-processing and post-processing instructions are incorporated before and after the AdvancedCopy Manager command ● When you determine that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device) ● When restarting inter-cabinet synchronous processing (REC) after a forcible suspend
-Xgds-softcopy	Specifies the start of synchronous processing of an SDX object and use of the software-copy function instead of the advanced copy function. If you specify this option to start differential copying when the advanced copy function is being used, the advanced copy processing stops and software-copy processing starts. You can specify the option when the function is used with GDS Snapshot. The option is applicable only to SDX objects. The option cannot be specified together with -y or -Xgds-selectcopy.
-Xgds-selectcopy	Specifies the start of synchronous processing without a specified copy type, such as copying with the disk array unit (OPC/EC) or software-copy. GDS selects the type of copying to be started. You can specify the option when the function in linkage with GDS Snapshot is being used. The option is applicable only to SDX objects. The option cannot be specified together with -Xgds-softcopy.
-Xgroup	Specifies that synchronous processing be started for each group.

Option	Description
-Xreverse	Specifies that synchronous processing be started for each group in the reverse direction (from replica volumes to original volumes).
-Xskip	Specifies that synchronous processing be suspended using the initial copy skip function. This option is valid only when total copy is started for inter-box replication. This option is not supported when GDS Snapshot linkage is being used.
-Xremain	Enables data that has been updated to the copy destination during replication established status when synchronous processing is restarted. This option is valid only when inter-box replication is restarted. This option is used to reflect to the copy destination volume only those parts of the copy source volume that have been updated, after synchronous processing has been started by specifying the -Xskip option and backup data has been copied from the tape medium to the copy destination volume. This option is not supported when used with GDS Snapshot.
-Xgds-slice-skipchk	Skips the SDX object status check processing that is usually performed as part of the copy destination pre-processing if SDX objects are operated in slice units. If this option is specified for a stopped volume, the -t option must also be specified.

c. Description of operands

Operand	Description
From-Volume-Name	Specifies a replication source volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a replication destination volume name. Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).

d. End status
   = 0: Normal end
   > 0: Abnormal end

e. Execution example
   Start replication from /dev/dsk/c1t2d0s3 of a Storage Management Server to /dev/dsk/c1t2d0s3@TARG-SV of Storage Server SRC-SV.

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/dsk/c1t2d0s3
/dev/dsk/c1t2d0s3@TARG-SV
FROM=/dev/dsk/c1t2d0s3@SRC-SV,TO=/dev/dsk/c1t2d0s3@TARG-SV swsrpstartsync completed
#
```

   Start replication for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
#
```

Replication cannot be started if:
— The specified replication source volume and replication destination volume are
   not set as replication volumes.
— A replication source volume is specified as the copy volume and a replication
   destination volume is specified as the copied material volume, and one-way copy
   is set as the copy attribute of the replication volume.
— Volume information (box identifier, OLU, EXTENT start position, and EXTENT size)
   is changed after operation starts. In this case, operation cannot continue for
   the corresponding volume. Stop the replication operation for the corresponding
   volume, then delete and reset the replication volume information.
— For server-to-server replication, the Storage Server on which the command is
   executed is not the operation server of the replication volume.
— For server-to-server replication, communication with a destination server fails.
— Replication cannot be started as a result of the preceding advanced copy function.
— When option "-g" is specified, except for a remote copy.
— When the original volume or replica volume is a logical volume of VxVM, the
   structure of the logical volume is changed to a structure not supported by
   AdvancedCopy Manager.
— When the original volume or replica volume is a logical volume of VxVM, the logical
   volume is deleted from VxVM.
— The Xgds-softcopy or Xgds-selectcopy option is specified when the function in
   linkage with GDS Snapshot is not being used.
— The "-a" , "-v", "-k", "-i" or "-g" options are specified when the function in
   linkage with GDS Snapshot is being used.
— **When the backup management function or tape backup function uses a specified
   source/destination volume**
— Either the copy source volume or the copy destination volume is a Snap Data Disk.

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 to either of the following conditions,
please perform drive character release or unmount of copy source volume before executing
a command.
— When a replication is performed between different OS's
— When the sizes of replication source volume and replication destination volume
   differ
— When the file systems of replication source volume and replication destination
   volume differ
When performing neither drive character release nor unmount in the above-mentioned case,
post-processing of the copy source volume at the time of replica creation, an error
occurs.

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: Differences in processing corresponding to symchronization status

Status of synchronization processing	Processing
Unmount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is displayed and normally end
Equivalency maintain status	Informational message (swsrp2401) is displayed and normally end
Replication established status (halt status)	Start of incremental copy

Before starting the replication, run the replication pre-processing script for the replication destination volume. The contents of this script can be customized. For more information, see "Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing script, use the "-t" option.

If replication is started with the -Xgroup option specified, the replication pre-processing script is not executed for the copy destination volume. Therefore, pre-processing must be executed for all copy destination volumes in the group before this command is executed.

Before starting replication that targets a Logical Unit (disk), execute pre-processing and post-processing for the Logical Unit (disk). Refer to "Pre-processing and Post-processing of Replication" for details.

To protect replication processing that accesses a destination volume, disable access to the destination volume for all other processes before starting replication.

This can be achieved by canceling the drive letter of the destination volume or by executing an unmount instruction provided, that there is no directory in which other volumes are mounted under the mount point, or a file on that volume is being used.

If the replication destination volume is being used from a server other than the server on which this command is invoked, the administrator must disable access to the replication destination volume by canceling the shared configuration, by unmounting, or some other legitimate method.

See "General notes", for notes on starting replication.

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (replication management)".

When the SynfinityFILE and AdvancedCopy Manager configurations are as follows:

```
# sfxinfo /dev/dsk/c1t3d10s1
ID    special                      size    mount    Type
0     /dev/dsk/c1t3d10s1(800019)   25986   /mnt     META
0     /dev/dsk/c1t3d10s1(800019)   105751  /mnt     DATA
1     /dev/dsk/c1t3d15s3(800028)   5120    /mnt     LOG
2     /dev/dsk/c1t3d16s3(800030)   131736  /mnt     DATA


Setting AdvancedCopy Manager

# /opt/FJSVswsrp/bin/swsrpvolinfo
Server Original-Volume       Size           Replica-Volume        Size           Copy
Op-Server
SV1    /dev/dsk/c1t3d10s1@SV1   128.0 Mbyte /dev/dsk/c1t3d20s1@SV1   128.0 Mbyte bi-direction
original
SV1    /dev/dsk/c1t3d15s3@SV1     5.0 Mbyte /dev/dsk/c1t3d25s3@SV1     5.0 Mbyte bi-direction
original
SV1    /dev/dsk/c1t3d16s3@SV1   128.0 Mbyte /dev/dsk/c1t3d26s3@SV1   128.0 Mbyte bi-direction
original
```

Replica creation procedure (original volume: SynfinityFILE)

```
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d10s1 /dev/dsk/c1t3d20s1
FROM=/dev/dsk/c1t3d10s1@SV1,TO=/dev/dsk/c1t3d20s1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d15s3 /dev/dsk/c1t3d25s3
FROM=/dev/dsk/c1t3d15s3@SV1,TO=/dev/dsk/c1t3d25s3 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d16s3 /dev/dsk/c1t3d26s3
FROM=/dev/dsk/c1t3d16s3@SV1,TO=/dev/dsk/c1t3d26s3 swsrpstartsync completed
:
:(Checking equivalence-held state)
:
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d10s1 /dev/dsk/c1t3d20s1
FROM=/dev/dsk/c1t3d10s1@SV1,TO=/dev/dsk/c1t3d20s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d15s3 /dev/dsk/c1t3d25s3
FROM=/dev/dsk/c1t3d15s3@SV1,TO=/dev/dsk/c1t3d25s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d16s3 /dev/dsk/c1t3d26s3
FROM=/dev/dsk/c1t3d16s3@SV1,TO=/dev/dsk/c1t3d26s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

Replica creation procedure (replica volume: SynfinityFILE)

```
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d20s1 /dev/dsk/c1t3d10s1
FROM=/dev/dsk/c1t3d20s1@SV1,TO=/dev/dsk/c1t3d10s1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d25s3 /dev/dsk/c1t3d15s3
FROM=/dev/dsk/c1t3d25s3@SV1,TO=/dev/dsk/c1t3d15s3 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d26s3 /dev/dsk/c1t3d16s3
FROM=/dev/dsk/c1t3d26s3@SV1,TO=/dev/dsk/c1t3d16s3 swsrpstartsync completed:
:(Checking equivalence-held state)
:
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d20s1 /dev/dsk/c1t3d10s1
FROM=/dev/dsk/c1t3d20s1@SV1,TO=/dev/dsk/c1t3d10s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d25s3 /dev/dsk/c1t3d15s3
FROM=/dev/dsk/c1t3d25s3@SV1,TO=/dev/dsk/c1t3d15s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d26s3 /dev/dsk/c1t3d16s3
FROM=/dev/dsk/c1t3d26s3@SV1,TO=/dev/dsk/c1t3d16s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

10.4.2.2 Replication creation command (swsrpmake)

While synchronization processing (EC) is not being performed, start snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) to create a replication volume.

When synchronization processing is performed, check whether the processing is in equivalency maintenance statues and, If so, suspend the synchronization processing and create a replication volume. The status where the synchronization process is suspended is referred to as the replication established status.

After this command has been executed, the replication volume (replication destination volume) can be accessed.

The behavior of this command could differ depending on the status of the advanced copy during progress and the following should be noted:

● When synchronous processing is not performed, the command starts snapshot processing and creates replication volumes. This form of replication is called snapshot replication.

● When synchronous processing is performed, the command checks the state of synchronous processing and, if the synchronous processing is in the equivalency maintenance state, the command suspends the processing in order to create a replication volume. This form of replication is called synchronous replication. The state in which synchronous processing is suspended is called the copy established state.

In either case, the copy destination volume is made accessible after this command is executed.

This command executes the replication pre-processing and post-processing scripts before a replication is created. For details of these scripts, see "Pre-processing and Post-processing of Replication".

a.   Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpmake [-f] [-t] [-m] ([-j|-T|-Xconcur|-C | -P])
 [-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-f] [-t] [-m] ([-j|-T|-Xconcur|-C | -P])
 [-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[if executed on a Storage Server: group specification]
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse]
 - Xgroup
 Group-Name
[if executed on a Storage Management Server: group specification]
/opt/FJSVswsrp/bin/swsrpmake -h Server-Name [-m] [-f] [-t] ([-j|-T|-Xconcur|-C | -P])
 [-Xreverse] -Xgroup Group-Name
```

b.   Description of options

Option	Description
-h	Specifies a Storage Server name. This option can be specified only on a Storage Management Server.
-m	For server to server replication, -m option specifies that no communication exists with the non-operational server. When this option is specified, the volume status check, pre-processing and post-processing are not performed for the non-operational server volume. This option cannot be used 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 for a replication source volume are not performed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-t	Specifies that the pre-processing and post-processing for a replication destination volume are not performed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-j	Specifies that copy processing be forcibly suspended even if the execution status of copying is "sync: Total copy or incremental copy is being performed" or "halt: Hard suspend status" in the synchronization process of intercabinet replication. This option can be used only for intercabinet replication. If used for intracabinet replication, an error occurs. When this option is specified, the integrity of the data in the destination volume is not guaranteed. Also, when this option is specified, pre-processing and post-processing for the source and destination volumes are not performed. When restarting inter-cabinet synchronous processing (REC), execute the replication start command (swsrpstartsync) with the -t option specified.

Option	Description
-T	Specifies that differential snapshot processing be executed. This option cannot be specified while synchronous processing is performed. This option is valid only for a replication within a cabinet and when the disk array supports the QuickOPC function. For a snapshot replication without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be specified to perform the replication operation using differential snapshots.
-Xgroup	Specifies that operation statuses are displayed by the group.
-Xreverse	Specifies that a replication be created for each group in the reverse direction (from replica volumes to original volumes).
-Xconcur	Specifies that a replication be created using the concurrent suspension function. This option is not supported when GDS Snapshot linkage is being used.
-C	Specifies that a SnapOPC start. This option is only valid with intra-cabinet replications and for disk array devices that support the SnapOPC function. In order to execute a SnapOPC, the copy destination volume must be a Snap Data Disk.
-P	Specifies to start SnapOPC+. This option is only valid with intra-cabinet replications and for disk array devices that support the SnapOPC function. In order to execute SnapOPC+, the copy destination volume must be a Snap Data Disk. 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.
-Xgds-slice-sk ipchk	Skips the SDX object status check processing that is usually performed as part of the copy source and copy destination pre-processing if SDX objects are operated in slice units. If this option is specified for a stopped volume, the -f option and the -t option must also be specified.

c.　Description of operands

Operand	Description
From-Volume-Name	Specifies a replication source volume that was set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a replication destination volume that was set with the replication volume information configuration command (swsrpsetvol).

d.　End status
　　= 0:　Normal end
　　> 0:　Abnormal end

e. Execution example

The Storage Management Server instructs Storage Server: SRC-SV to create a copy of /dev/dsk/c1t2d0s3 in /dev/dsk/c1t2d0s3@TARG-SV.

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/dsk/c1t0d2s3 /dev/dsk/c1t2d0s3@TARG-SV
FROM=/dev/dsk/c1t2d0s3@SRC-SV,TO=/dev/dsk/c1t2d0s3@TARG-SV swsrpmake completed
#
```

Creates a copy for the group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
#
```

Note

Replication cannot be created in the following circumstances:
— If the specified replication source and replication destination volumes are not set as replication volumes.
— If the synchronization processing from the specified replication source volume to the replication destination volume is not in the equivalency maintain status.
— If, after the operation starts, the 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.
— If a replication source volume is an SDX object (SynfinityDISK), the status of the SDX object does not match the following:
    1- The mirror volume is ACTIVE or STOP.
    2- The mirror slice status is ACTIVE or TEMP.
    3- The SDX disk status is ENABLE.
* When the mirror slice is TEMP, a reproduction former volume is not pre-processed.
— When the copy source volume or destination volume constitutes a SynfinityFILE of multi-volume composition and the file system is mounted. In this case, unmount all the volumes.
— During server to server replication, the Storage Server on which the command is executed is not the operational server of the replication volume.
— During server to server replication, communication with a destination server fails.
— When the original volume or replica volume is a logical volume of VxVM and the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager or deleted from VxVM.
— If the "-j", "- T", or "-C" options are specified when the function is used with GDS Snapshot.
— When the backup management function or tape backup function uses a specified source/destination volume

Note

If the "-Xgroup" option is specified, processing will be terminated without creating a copy if the operational statuses of the replication volumes being processed are both snapshot replication and synchronous replication.
Additionally, if the "-Xgroup" option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

Drive character release or unmount of the copy source volume should be performed before executing a command in the following circumstances:
- When a replication is performed between different OS's;
- When the sizes of replication source volume and replication destination volume differ;
- When the file systems of replication source volume and replication destination volume differ.

If neither drive character release nor unmount is performed as in the abovementioned circumstances, post-processing of the copy destination volume at the time of replica creation will result in an error.

Before a replication is created, the replication pre-processing and post-processing scripts for the replication source volume are executed (for synchronized replication, only pre-processing script is executed). After the replication has been created, the replication post-processing script for the replication source volume and replication destination volume is executed.   These scripts can be customized for operational reasons. For more information, see "Pre-processing and Post-processing of Replication" If you do not want to implement the pre-processing and post-processing scripts, use the "-f" option and the "-t" option.
If a replica is created with the -Xgroup option specified, the replication pre-processing and post-processing scripts are not executed for the copy source volume/copy destination volume. Therefore, execute pre-procssing 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 in progress and restart the snapshot again.

To protect the data, disable access to the replication source volume for all other applications before starting a replication so that other processes cannot access the volume. This can be achieved by canceling the drive letter of the replication source volume or unmounting the volume. If you cannot disable access to the replication source volume in the manner described above, the replication command will abort due to the following reasons:
- There is a directory in which other volumes are mounted using the same mount point.
- A file on the volume is being used. If the replication source volume is being used from a server other than the server on which this command is entered, the backup-operation administrator must disable access to the replication source volume by removing the share configuration, or unmounting.

If for whatever reason you do not want to remove the shared configuration of the replication source volume or execute unmount, see "Pre-processing and Post-processing of Replication" and note the following.
- When the replication source volume is being used by backup management, unmount may not be possible, and an error occurs. The message "swsrp2613 An error occurred on the pre-processing script at replication creation. Error code = 2" will be displayed.

— For replication pre-processing, execute the UNIX sync command to synchronize volumes and the file system.
— In replication post-processing, execute the <fsck> command to check the file system at the copy destination.

Point

When you are using the original copy source volume in the SynfinityFILE file system, use the following procedures (UNIX commands) to mount the copy source volume.

```
# sfxadm <The list of RAW device names which constitute SynfinityFILE>
# fsck -F sfxfs [-y] <The representation RAW device name of SynfinityFILE>
# mount - F sfxfs <The representation device name of SynfinityFILE Mount point>
```

Note

For Snap Data Disks, only SnapOPC and SnapOPC+ can be executed.
When data is restored from a Snap Data Disk, there must be a SnapOPC session between the copy source volume and the copy destination volume (the Snap Data Disk).

Note

See "General notes", for notes on starting replication.

Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (replication management)".

Note

This command cannot be executed while any of the following commands is running:
— Replication volume information configuration command (swsrpsetvol);
— Replication volume information deletion command (swsrpdelvol);
— Resource adjustment command (swsrpecoverres).

Point

Where a SynfinityFILE file system whose original or replica volume consists of more than one device (multipartition), replication cannot be performed by executing the unmount/mount instruction inside the pre-processing and post-processing scripts. The unmounting of the file system must be performed manually before replication is started and re-mounted manually after that replication has completed.

When the SynfinityFILE and AdvancedCopy Manager configurations are as follows:

```
# sfxinfo /dev/dsk/c1t3d10s1
ID    special                      size     mount    Type
0     /dev/dsk/c1t3d10s1(800019)   25986    /mnt     META
0     /dev/dsk/c1t3d10s1(800019)   105751   /mnt     DATA
1     /dev/dsk/c1t3d15s3(800028)   5120     /mnt     LOG
2     /dev/dsk/c1t3d16s3(800030)   131736   /mnt     DATA


Setting AdvancedCopy Manager
# /opt/FJSVswsrp/bin/swsrpvolinfo
Server Original-Volume        Size          Replica-Volume        Size          Copy
Op-Server
SV1    /dev/dsk/c1t3d10s1@SV1   128.0 Mbyte /dev/dsk/c1t3d20s1@SV1   128.0 Mbyte bi-direction
original
SV1    /dev/dsk/c1t3d15s3@SV1     5.0 Mbyte /dev/dsk/c1t3d25s3@SV1     5.0 Mbyte bi-direction
original
SV1    /dev/dsk/c1t3d16s3@SV1   128.0 Mbyte /dev/dsk/c1t3d26s3@SV1   128.0 Mbyte bi-direction
original
```

Replica creation procedure (original volume: SynfinityFILE (snapshot))

```
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d10s1 /dev/dsk/c1t3d20s1
FROM=/dev/dsk/c1t3d10s1@SV1,TO=/dev/dsk/c1t3d20s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d15s3 /dev/dsk/c1t3d25s3
FROM=/dev/dsk/c1t3d15s3@SV1,TO=/dev/dsk/c1t3d25s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d16s3 /dev/dsk/c1t3d26s3
FROM=/dev/dsk/c1t3d16s3@SV1,TO=/dev/dsk/c1t3d26s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
```

Replica creation procedure (original volume: SynfinityFILE (synchronous))

```
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d10s1 /dev/dsk/c1t3d20s1
FROM=/dev/dsk/c1t3d10s1@SV1,TO=/dev/dsk/c1t3d20s1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d15s3 /dev/dsk/c1t3d25s3
FROM=/dev/dsk/c1t3d15s3@SV1,TO=/dev/dsk/c1t3d25s3 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d16s3 /dev/dsk/c1t3d26s3

FROM=/dev/dsk/c1t3d16s3@SV1,TO=/dev/dsk/c1t3d26s3 swsrpstartsync completed
:
:(Checking equivalence-held state)
:
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d10s1 /dev/dsk/c1t3d20s1
FROM=/dev/dsk/c1t3d10s1@SV1,TO=/dev/dsk/c1t3d20s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d15s3 /dev/dsk/c1t3d25s3
FROM=/dev/dsk/c1t3d15s3@SV1,TO=/dev/dsk/c1t3d25s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d16s3 /dev/dsk/c1t3d26s3
FROM=/dev/dsk/c1t3d16s3@SV1,TO=/dev/dsk/c1t3d26s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

Replica creation procedure (original volume: SynfinityFILE (snapshot))

```
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d20s1 /dev/dsk/c1t3d10s1
FROM=/dev/dsk/c1t3d20s1@SV1,TO=/dev/dsk/c1t3d10s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d25s3 /dev/dsk/c1t3d15s3
FROM=/dev/dsk/c1t3d25s3@SV1,TO=/dev/dsk/c1t3d15s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d26s3 /dev/dsk/c1t3d16s3
FROM=/dev/dsk/c1t3d26s3@SV1,TO=/dev/dsk/c1t3d16s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

Replica creation procedure (original volume: SynfinityFILE (synchronous))

```
# umount /mnt
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d20s1 /dev/dsk/c1t3d10s1
FROM=/dev/dsk/c1t3d20s1@SV1,TO=/dev/dsk/c1t3d10s1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d25s3 /dev/dsk/c1t3d15s3
FROM=/dev/dsk/c1t3d25s3@SV1,TO=/dev/dsk/c1t3d15s3 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/dsk/c1t3d26s3 /dev/dsk/c1t3d16s3
FROM=/dev/dsk/c1t3d26s3@SV1,TO=/dev/dsk/c1t3d16s3 swsrpstartsync completed
:
:(Checking equivalence-held state)
:
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d20s1 /dev/dsk/c1t3d10s1
FROM=/dev/dsk/c1t3d20s1@SV1,TO=/dev/dsk/c1t3d10s1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d25s3 /dev/dsk/c1t3d15s3
FROM=/dev/dsk/c1t3d25s3@SV1,TO=/dev/dsk/c1t3d15s3 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t3d26s3
/dev/dsk/c1t3d16s3FROM=/dev/dsk/c1t3d26s3@SV1,TO=/dev/dsk/c1t3d16s3 swsrpmake completed
# mount -F sfxfs /dev/dsk/c1t3d10s1 /mnt
#
```

Point

— If this command is executed during snapshot processing, snapshot processing is restarted. See the following table for details of copy operation:

Table: 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 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.

10.4.2.3 Operational status display command (swsrpstat)

This command displays the operational status of the specified volume. If a volume is not specified, the operational status of each replication volume is displayed.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpstat [-L] [-E] [-H][Original-Volume-Name]
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpstat -h Server-Name [-L] [-E] [-H] [Original-Volume-Name]
[if executed on a Storage Server: group specification]
/opt/FJSVswsrp/bin/swsrpstat [-L] [-E] -Xgroup Group-Name
[if executed on a Storage Management Server: group specification]
/opt/FJSVswsrp/bin/swsrpstat -h Server-Name [-L] [-E] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name.

This option can be specified only on a Storage Management Server. |

Option	Description
-L	Specifies display in extended format. For the items displayed by this option, see the table in the execution example. Note that the items displayed by this option may be subject to change in a future release.
-E	This option will display the operational status in the opposite direction only(from the copy destination to the copy source). In case this option is not set, the operational status in the normal direction (from the copy source to the copy destination) will always be displayed when a bidirectional OPC physical copy is taking place. In case this option is set, the operational status in the normal direction will not be displayed. Only the operational status in the opposite direction will be displayed. This option can be used to check the operational status of an OPC session performed in an opposite direction in case a QuickOPC/SnapOPC session in the normal direction exists.
-Xgroup	Specifies a group name. In case this option is set, all the operational statuses about the specified group will be displayed.
-H	Changes the Status field display method used when a REC enters a hard suspend (HALT) status. If this option is specified, then "halt (sync)" will be displayed when a hard-suspend status occurs during a total copy or a differential copy. "halt (equivalent)" will be displayed when hard-suspend status occurs during an equivalency maintenance state. Note that hard-suspend status will still be displayed as "halt" even if this option is specified for ROPC or GDS Snapshot linkage.

c.   Description of operands

Operand	Description
Original-Volume-Name	Specifies a replication source volume name. For the volume names of other servers, use the format volume-name@storage-server-name. Displays all operational statuses for the specified replication source volume. If this operand is omitted, all the operational statuses of the Storage Server on which this command is executed are displayed.

d.   End status
       = 0: Normal end
       > 0: Abnormal end

e.   Execution example
      Direct that all the replication operation statuses for Storage Server SRC-SV be displayed
      on the Storage Management Server.

```
# /opt/FJSVswsrp/bin/swsrpstat -h SRC-SV
Server Original-Volume          Replica-Volume           Direction  Status
Execute
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d0s3@TARG-SV regular    replicated ----
SRC-SV /dev/dsk/c1t2d1s3@SRC-SV /dev/dsk/c1t2d1s3@TARG-SV ----       ----       ----
SRC-SV /dev/dsk/c1t2d2s3@SRC-SV /dev/dsk/c1t2d2s3@TARG-SV reverse    snap       45%
#
```

From Storage Management Server to Storage Server: Instruct SRC-SV to display the status of all replication operations (with the -L option specified).

```
# /opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L
Server Original-Volume          Replica-Volume          Direction Status
Execute Trk  Update Rcv  Split Xfer  Snap-Gen
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d0s3@TARG-SV regular   replicated
----     ---- ----   auto ----  async ----
SRC-SV /dev/dsk/c1t2d1s3@SRC-SV /dev/dsk/c1t2d1s3@TARG-SV ----      ----
----     on   6%       ---- ---- ---- ----
SRC-SV /dev/dsk/c1t2d2s3@SRC-SV /dev/dsk/c1t2d2s3@TARG-SV reverse   snap
45%      off ----   ---- ---- ---- ----
SRC-SV /dev/dsk/c1t1d0s3@SRC-SV /dev/dsk/c1t1d1s3@TARG-SV regular
copy-on-write(inactive) ----    off 0%       ---- ---- ---- 1
SRC-SV /dev/dsk/c1t1d0s3@SRC-SV /dev/dsk/c1t1d2s3@TARG-SV regular
copy-on-write(inactive) ----    off 5%       ---- ---- ---- 2
SRC-SV /dev/dsk/c1t1d0s3@SRC-SV /dev/dsk/c1t1d3s3@TARG-SV regular
copy-on-write(active)   ----    off 6%       ---- ---- ---- 3
#
```

The following information will be displayed.

Title	Description
Server	Displays a Storage Server name.
Original-Volume	Displays a replication source volume name.
Replica-Volume	Displays a replication destination volume name.
Direction	Displays the copy direction. ● regular: Copying from the replication source to the replication destination is being performed. ● reverse: Copying from the replication destination to the replication source is being performed. ● ----: Copying is not performed.
Status	Displays the progress. ● ---- : Copying is not being performed. ● sync : Total copy or incremental copy is being performed. ● equivalent : Equivalency maintain status ● replicated : Replication established status ● copy-on-write: SnapOPC processing is being performed. ● copy-on-write(active): SnapOPC+ processing is being performed (most recent snap generation). ● copy-on-write(inactive): SnapOPC+ processing is being performed (past snap generations). ● failed : Error suspend status ● 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 : Snapshot processing is being performed. ● ????? : Copy situation cannot be acquired. ● "gds-error": Copying with GDS ended abnormally.
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 in progress. ----: Snapshot processing is not performed. Always displays "----" when the GDS Snapshot linkage function is enabled.

Title	Description
Update	Displays the percentage of data that has been updated since the last copy was created, in the cases shown below. For SnapOPC+, displays the percentage of data that has been updated since the previous snap generation. ● When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not executed). ● When the Status column is "copy-on-write" (that is, when a SnapOPC is being performed) ● When the Status column is "copy-on-write(active)" (that is, when SnapOPC+ (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) In all other cases, "----" is displayed. Always displays "----" when the GDS Snapshot linkage function is enabled.
Rcv	Indicates recovery mode for inter-box synchronization. auto: Automatic Recovery mode. manual: Manual Recovery mode. ----: Synchronous duplication (REC) is not performed between boxes.
Split	Indicates split mode for inter-box synchronization. auto: Automatic Split mode. manual: Manual Split mode. ----: Synchronous duplication (REC) is not performed between boxes.
Xfer	Indicates transfer mode in inter-box synchronization. sync: Synchronous mode. async: Asynchronous mode. stack: Stack mode. consist: Consistency mode. ----: Synchronous duplication (REC) is not performed between boxes.
Snap-Gen	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.

Note

― When the execution status (displayed in the Status field) is one of the following, take the relevant action.

Table: Actions corresponding to execution status (displayed in the "Status" field)

Status display	Corrective action
Failed	A hardware error may have occurred. Correct the hardware error, and then use the replication cancellation command (swsrpcancel) to stop operation.
Halt	A hardware error during replication operation between cabinets may occur. Correct the hardware error, and then use the replication cancellation command (swsrpcancel) to stop the copy operation.
?????	Copy situation cannot be acquired. A hardware error may have occurred if the result is the same after retry. Correct the hardware error, and then retry the command.
gds-error	A problem with GDS is assumed. Correct the cause of the GDS problem, and execute the replication cancellation command (swsrpcancel) to stop the replication operation.

> **Note**
>
> The operation status cannot be displayed in the following circumstances:
> — If the volumes are not set as replication volumes.
> — When the original volume or replica volume is a logical volume of VxVM and the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager or the logical volume is deleted from VxVM.

> **Note**
>
> This command cannot be executed while the following command is running:
> — Resource adjustment command (swsrprecoverres)

10.4.2.4 Replication cancellation command (swsrpcancel)

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b])  | [-T]| [-Xforce]
[-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b]) | [-T] |
[-Xforce]
 [-Xgds-slice-skipchk] From-Volume-Name To-Volume-Name
[if executed on a Storage Server: group specification]

/opt/FJSVswsrp/bin/swsrpcancel [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] [-Xreverse]
-Xgroup Group-Name
[if 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
```

b. Description of options

Option	Description
-h	Specifies a Storage Server name.

This option can be specified only on a Storage Management Server. |

Option	Description
-c	Specifies that copy processing can be canceled from servers other than the operation server if the operation server becomes unavailable (due to system failure, etc). If this option is used, copy processing is stopped without executing pre-processing and post-processing. This option cannot be specified on the operation server.
-m	For server-to-server replication, this specifies that communication processing with non-operation servers is not performed. When this option is specified, volume status check processing and pre-processing and post-processing for the replication destination volume of a non-operation server are not performed. This option is valid only during server-to-server replication.
-f	When stopping the synchronous processing under the equivalency maintenance status, specify that pre-processing and post-processing for the copy source volume not be executed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-t	When stopping the synchronous processing under the equivalency maintain status, specify that post-processing for the copy destination volume not be executed. Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and special pre-processing and post-processing instructions are performed before and after the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).
-b	Specifies that the intercabinet copy operation in the HALT status be stopped. For replication on a server, the copying is cancelled for both cabinets. For replication between servers, the copying is cancelled only for the cabinet connected to the server on which this command was executed. Use the option only for a copy operation in the HALT status and whose recovery cannot be expected. The option is valid only for a copy operation in the HALT status. The option can be used on the server not specified as the operation server. If this option is specified together with the - Xgroup option, copy processing is only stopped for sessions in the group whose status is HALT.
-T	Specifies that differential snapshot processing be terminated. This option terminates only tracking processing but does not terminate snapshot processing (OPC physical copying) in progress. This option releases the OPC session if snapshot processing (OPC physical copying) is complete. This option can be used only while physical copying or tracking is in progress. This option cannot be used for the logical volume of an SDX object. If this option is specified together with the -Xgroup option, only tracking processing within the group is stopped.
-Xgroup	Specifies that copy processing be stopped for each group.
-Xreverse	Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) be stopped.

Option	Description
-Xgds-slice-skipchk	Skips the SDX object status check processing that is usually performed as part of the copy source and copy destination pre-processing. This takes place if SDX objects are operated in slice units and the synchronization processing for equivalency maintenance state is stopped. If this option is specified for a stopped volume, the -f option and the -t option must also be specified.
-Xforce	Use 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, only the SnapOPC+ sessions in that group are stopped.

c.　Description of operands

Operand	Description
From-Volume-Name	Specifies a copy source volume name.　Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies a copy destination volume name.　Specifies the replication source volume or the replication destination volume set with the replication volume information configuration command (swsrpsetvol).

d.　End status
    = 0:　Normal end
    > 0:　Abnormal end

e.　Execution example
    On the Storage Management Server, direct that copying from /dev/dsk/c1t2d0s3 to /dev/dsk/c1t2d0s3@TARG-SV be stopped for Storage Server SRC-SV.

```
#/opt/FJSVswsrp/bin/swsrpcancel -h SRC-SV /dev/dsk/c1t2d0s3 /dev/dsk/c1t2d0s3@TARG-SV
FROM=/dev/dsk/c1t2d0s3@SRC-SV,TO=/dev/dsk/c1t2d0s3@TARG-SV swsrpcancel completed
#
```

    Stops copy processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
#
```

Note

    When the "-b" option is specified in replication on a server, the command will stop normally when cancellation of the copy occurs in either of the cabinets.

Copy processing cannot be performed in the following circumstances:
- — The specified replication source volume and replication destination volume are not set as replication volumes;
- — The copy processing is not performed for the specified replication source and replication destination volumes;
- — During server to server replication, the Storage Server on which the command is executed is not the operation server of the replication volume;
- — During server to server replication, communication with a destination server fails;
- — When the original volume or replica volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager or the logical volume is deleted from VxVM;
- — When the backup management function or tape backup function uses a specified source/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 circumstances:
- — 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.
- — When you execute with the -Xforce option specified and there are no SnapOPC+ sessions in the group

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.

The volume information for the specified volume is not checked (matching the volume information in the management list with the actual physical information). The Operation is cancelled automatically there is no match 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: Processing differences in accordance with operationg 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.

Point

Pre-processing and post-processing for a replication source and replication destination volumes are performed only when the status of synchronization processing is that of equivalency maintenance.

Note

Synchronization processing cannot be stopped in equivalency maintenance status in the following circumstances:
— When a replication source volume is an SDX object (SynfinityDISK), the status of the SDX object is not one of the following:
1. The mirror volume is ACTIVE or STOP.
2. The mirror slice status is ACTIVE or TEMP.
3. The SDX disk status is ENABLE.
* Pre-processing is not performed when the mirror slice is TEMP
— When copy source volume or copy destination volume is a SynfinityFILE of multi-volume composition and the file system is mounted. In this case, perform unmount for all the volumes with SynfinityFILE.

Note

For details on how to use SDX objects of GDS, refer to "Configuration and conditions of unsupported SDX objects", and "Notes on SDX object operations (replication management)".

Note

This command cannot be executed while any of the following commands is running:
— Replication volume information configuration command (swsrpsetvol);
— Replication volume information deletion command (swsrpdelvol);
— Resource adjustment command (swsrprecoverres).

Point

— When the "-T" option is not specified, command processing varies depending on the operation status of the source and destination volumes.

Table: 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 maintenance status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.
Snapshot processing complete status and tracking processing in progress (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

— When the -T option is specified, command processing varies depending on the operation status of the source and destination volumes.

Table: Processing when 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 maintain status (Status is "equivalent".)	Processing is interrupted.
Replica created status (Status is "replicated".)	Processing is interrupted.
Snapshot processing is in progress and tracking processing is not in progress. (Status is "snap" and Trk is "off")	Processing is interrupted.
Snapshot processing is in progress and tracking processing is progress. (Status is "snap" and Trk is "on".)	Only tracking processing is terminated. Snapshot processing (physical copying) is continued. The destination volume can be used as a replica.
Snapshot processing complete status and tracking processing in progress. (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

10.4.2.5 Synchronization mode change command (swsrpchsync)

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

a.   Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/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

[if 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

[if 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
```

b.   Description of options

Option	Description
-h	Specifies the name of a Storage Server. You can use this option only for a Storage Management Server.
-F	Changes the transfer mode. You can specify one of the following parameters in the operand: Sync: Changes to Synchronous mode. Async: Changes to Asynchronous (sequential transfer) mode. Stack: Changes to Stack mode. Consist: Changes to Consistency mode. Changing the transfer mode requires this option. You can only specify the -S option together with the -F Sync option. Specifying the -F Sync option to change the transfer mode from a non-synchronous mode to the synchronous mode without specifying the -S option sets the automatic split mode.
-R	Changes the recovery mode. You can specify either of the following parameters in the operand: Auto: Changes to Automatic Recovery mode. Manual: Changes to Manual Recovery mode. Changing the recovery mode requires this option.

Option	Description
-S	Changes the split mode. You can specify either of the following parameters in the operand: Auto: Changes to Automatic Split mode. Manual: Changes to Manual Split mode. Changing the split mode requires this option. To specify this option, you must also specify -F Sync or the transfer mode of the current synchronization must be synchronous mode.
-Xgroup	Changes the operation mode of inter-box synchronous processing for each group (transfer mode, recovery mode, or split mode).
-Xreverse	Specifies that the operation mode of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) be changed.

c.   Description of operands

Operand	Description
From-Volume-Name	Specifies the name of a source volume. Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume. Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).

d.   End status
   = 0: Normal end
   > 0: Abnormal end

e.   Execution example
   From Storage Management Server to Storage Server: Instruct SRC-SV to change the transfer mode for inter-box synchronization between /dev/dsk/c1t2d0s3@SRC-SV and /dev/dsk/c1t2d10s3@TARG-SV from Consistency mode to Asynchronous mode.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV - L /dev/dsk/c1t2d0s3@SRC-SV
Server Original-Volume        Replica-Volume            Direction Status Execute
Trk  Rcv  Split Xfer    Snap-Gen
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d10s3@TARG-SV regular    sync    99%
---- auto ----  consist ----
:
#/opt/FJSVswsrp/bin/swsrpchsync - h SRC-SV - F Async /dev/dsk/c1t2d0s3@SRC-SV
/dev/dsk/c1t2d10s3@TARG-SV
FROM=/dev/dsk/c1t2d0s3@SRC-SV, TO=/dev/dsk/c1t2d10s3@TARG-SV swsrpchsync completed
:
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV - L /dev/dsk/c1t2d0s3@SRC-SV
Server Original-Volume        Replica-Volume            Direction Status
Execute Trk  Rcv  Split Xfer  Snap-Gen
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d10s3@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
#
```

Note

You cannot change the operational mode of inter-box synchronization in the following circumstances:
— The specified original/replica volume has not been configured as a replica volume.
— None of the "-F", "-R", and "-S" options have been specified.
— In inter-server replication, the Storage Server on which you execute the command is not the operation server for the replica volume.
— Synchronization from the specified source volume to the destination volume is not secured.
— Synchronization from the specified source volume to the destination volume is in error-suspended status (with "failed" Status in the status display of the operational status display command (swsrpstat)) or hard-suspended status (with "halt" Status in status display of the operational status display command (swsrpstat)).
— The disk array in which the specified original/replica volume is hosted does not support the operation mode change function.
— A change is made to a logical disk configuration that AdvancedCopy Manager does not support.
— When the original volume or replica volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
— The specified volume is being used with GDS Snapshot.

Note

If the "-Xgroup" option is specified, the synchronous processing for all replication volumes being processed is changed to the same operation mode. However, the operation mode cannot be changed if any of the replication volumes meets any of the conditions above.
If the "-Xgroup" option is specified, replication volumes are processed in order, but processing is aborted if an error occurs.

Note

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

Note

This command cannot be executed while any of the following commands is running:
— Replication volume information configuration command (swsrpsetvol);
— Replication volume information deletion command (swsrpdelvol);
— Resource adjustment command (swsrprecoverres).

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10.4.2.6 Synchronization reverse command (swsrprevsync)

This command reverses the copying direction of inter-box synchronization (REC) in suspended status.
This command is unusable with intra-box synchronization or a logical volume of an SDX object.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrprevsync From-Volume-Name To-Volume-Name

[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name

[if executed on a Storage Server: group specification]
/opt/FJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup Group-Name

[if executed on a Storage Management Server: group specification]
/opt/FJSVswsrp/bin/swsrprevsync -h Server-Name [-Xreverse] -Xgroup Group-Name
```

b. Description of options

Option	Description
-h	Specifies the name of a Storage Server. You can only use this option for a Storage Management Server.
-Xgroup	Changes the direction of inter-box synchronous processing for each group.
-Xreverse	Specifies that the direction of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) be inverted.

c. Description of operands

Option	Description
From-Volume-Name	Specifies the name of a source volume (as the destination in the reverse direction). Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).
To-Volume-Name	Specifies the name of a destination volume (as the source in the reverse direction). Specify the original volume or replica volume configured by the replication volume information configuration command (swsrpsetvol).

d. End status
    = 0: Normal end
    > 0: Abnormal end

e. Execution example
    From Storage Management Server to Storage Server: Instruct SRC-SV to reverse the copying direction of inter-box synchronization between /dev/dsk/c1t2d0s3@SRC-SV and /dev/dsk/c1t2d10s3@TARG-SV.

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV /dev/dsk/c1t2d0s3@SRC-SV
Server Original-Volume          Replica-Volume             Direction  Status
Execute
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d10s3@TARG-SV reverse    replicated ----
#/opt/FJSVswsrp/bin/swsrprevsync /dev/dsk/c1t2d10s3@TARG-SV /dev/dsk/c1t2d0s3@SRC-SV
FROM=/dev/dsk/c1t2d0s3@SRC-SV,TO=/dev/dsk/c1t2d10s3@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /dev/dsk/c1t2d0s3@SRC-SV
Server Original-Volume          Replica-Volume             Direction  Status
Execute
SRC-SV /dev/dsk/c1t2d0s3@SRC-SV /dev/dsk/c1t2d10s3@TARG-SV regular    replicated ----
#
```

Change the direction of inter-box synchronous processing for group "GRP1".

```
# /opt/FJSVswsrp/bin/swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
#
```


The direction of synchronization cannot be reversed in any of the following circumstances:
— The specified original/replica volume has not been configured as a replica volume.
— Unidirectional copying has been specified in the copying attribute for the replica volume.
— In inter-server replication, the Storage Server on which you execute the command is not the operational server for the replica volume.
— Replication has not been established in synchronization from the specified source volume to the destination volume.
— The disk array in which the specified original/replica volume is hosted does not support the REC reverse function.
— A change is made to a logical disk configuration that AdvancedCopy Manager does not support.
— When the original volume or replica volume is a logical volume of VxVM, the logical volume is deleted from VxVM.
— The specified volume is being used with GDS Snapshot.

If the "-Xgroup" option is specified, the direction of synchronous processing for all replication volumes being processed is changed. However, the direction of synchronous processing cannot be changed if any of the replication volumes meets any of the conditions above.
If the "-Xgroup" option is specified, replication volumes are processed in order, but processing is aborted 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 is running:
— Replication volume information configuration command (swsrpsetvol);
— Replication volume information deletion command (swsrpdelvol);
— Resource adjustment command (swsrprecoverres).

10.4.3 Maintenance commands

This chapter describes the maintenance commands for replication management.

10.4.3.1 Resource adjustment command (swsrprecoverres)

This command executes recovery to make replication management information consistent if a system failure or other problem has made the replication management information inconsistent.

a. Specification method

```
[To be executed on a Storage Server]
/opt/FJSVswsrp/bin/swsrprecoverres [-r] [-p]
[To be executed on a Storage Management Server]
/opt/FJSVswsrp/bin/swsrprecoverres -h Server-Name [-r] [-p]
```

b. Description of options

Options	Description
-h	Specifies a Storage Server name. This option can be used only on a Storage Management Server.
-r	Specify this option when an incorrect status exists in the replication management files For example: the replication volume information configuration command (swsrpsetvol) or the replication volume information deletion command (swsrpdelvol) that updates the replication management files aborts suddenly because of a forced stop or a system failure, or the replication management files have been deleted for any reason. When this option is specified, the following procedure to re-create the replication management files is performed. Replication management information in the Storage Management Server repository is downloaded to the Storage Server, and the replication volume information is restored. The disk array device is queried, and the execution information for the synchronization processing is restored.
-p	Specifies not to perform any post-processing. This option can be used when the replication creation command (swsrpmake) processing aborts suddenly because of a forced stop or system failure.

c. End status
      = 0: Normal end
      > 0: Abnormal end

d. Execution example
      Perform resource adjustment.

```
#/opt/FJSVswsrp/bin/swsrprecoverres
swsrprecoverres completed
#
```

Note

Resource adjustment processing cannot be performed in the following circumstances:
- Communication with a Storage Management Server fails and the ″-r″ option is specified.
- The ″-r″ option is not specified when this command is executed after processing by the replication volume information configuration command (swsrpsetvol) and the replication volume information deletion command (swsrpdelvol) has been forcibly terminated.
- When the original volume or replica volume is a logical volume of VxVM, the structure of the logical volume is changed to a structure not supported by AdvancedCopy Manager or the logical volume is deleted from VxVM.

Note

The consistency of resource information is restored only for the Storage Server on which this command is executed. When a resource inconsistency occurs during processing related to replication between servers, this command must be executed on both the Storage Server where processing was performed and the Storage Server with which communication is being made.

Note

This command cannot be executed while any of the following commands is running:
- Replication volume information configuration command (swsrpsetvol);
- Replication volume information display command (swsrpvolinfo);
- Replication volume information deletion command (swsrpdelvol);
- Synchronous processing start command (swsrpstartsync);
- Replication creation command (swsrpmake);
- Operation status display command (swsrpstat);
- Replication cancellation command (swsrpcancel);
- Synchronization mode change command (swsrpchsync);
- Synchronization reverse command (swsrprevsync);
- Resource adjustment command (swsrprecoverres).

10.5 Start/Stop Daemon Commands

AdvancedCopy Manager daemons can be started in the following manner.

A note on this command is as follows:
— Make sure that the SWSTGNODE environment variable is not set.
— Execute this command using the same LANG environment variable that of the code system used by the system.
— Only a root or superuser can execute this command.
— For details on cluster operation, refer to the "Starting and Stopping Daemons".

10.5.1 Starting and stopping the communication daemon

● Starting the communication daemon
Execute the following command to start the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom start
```

● Stopping the communication daemon
Execute the following command to stop the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom stop
```

Termination of the communication demon may take up to ten seconds to take effect.

10.5.2 Starting and stopping the RMI daemon

● Starting the RMI daemon
Execute the following command to start the RMI daemon:

```
# /opt/FJSVswstf/bin/stgrmicom start
```

● Stopping the RMI daemon
Execute the following command to stop the RMI daemon:

```
# /opt/FJSVswstf/bin/stgrmicom stop
```

The authentication daemon runs only on the Storage Management Server.

10.5.3 Starting and stopping the RDB daemon

● Starting the RDB daemon
Execute the following command to start the RDB daemon:

```
# /opt/FJSVswstf/bin/stgdbcom start
```

● Stopping the RDB daemon
Execute the following command to stop the RDB daemon:

```
# /opt/FJSVswstf/bin/stgdbcom stop
```

The authentication daemon runs only on the Storage Management Server.

10.5.4 Starting and stopping the authentication daemon

● Starting the authentication daemon
Execute the following command to start the authentication daemon:

```
# /opt/FJSVswssc/bin/rc.smfwsec start
```

● Stopping the authentication daemon
Execute the following command to stop the authentication daemon:

```
# /opt/FJSVswssc/bin/rc.smfwsec stop
```

The authentication daemon runs only on the Storage Management Server.

10.5.5 Starting and stopping AdvancedCopy Manager daemons

The daemons listed below are started and stopped together:

Table: Daemons started and stopped together

Server type	Storage Server	Storage Management Server
Daemon name	Communication daemon	Communication daemon RMI daemon RDB daemon Authentication daemon

● Starting a AdvancedCopy Manager daemon
Execute the following command to start a AdvancedCopy Manager daemon:

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

● Stopping a AdvancedCopy Manager daemon
Execute the following command to stop a AdvancedCopy Manager daemon:

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

10.6 SnapOPC/SnapOPC+ Support Commands

This section explains the commands that execute SnapOPC/SnapOPC+.

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

Table: Operating environment for executing SnapOPC/SnapOPC+ support commands

Command	Operating environment of AdvancedCopy Manager
Swstestupdate	-

In cluster operation

In cluster operation, execute a command by taking the following steps:

1) If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. For "bsh" shell, specify the environment variable as follows:

```
# SWSTGNODE= logical-node-name<Enter>
# export SWSTGNODE
```

2) Execute the command.
   The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, see the Remarks column.

Table: Commands when cluster operation used

Command	Environment variable	Command execution node	Remarks
swstestupdate	Required	Cluster active server	-

10.6.1 Update volume measurement command (swstestupdate)

This command measures the physical capacity of Snap Data Disks using the pseudo SnapOPC session setup function.

a. Specification method

```
[When starting update volume measurements (setting up a pseudo session)]
/opt/FJSVswsts/bin/swstestupdate start Volume-Name
[When looking up the update volume (displaying the status of the pseudo session)]
/opt/FJSVswsts/bin/swstestupdate status Volume-Name

[When finishing update volume measurements (canceling the pseudo session)]
/opt/FJSVswsts/bin/swstestupdate stop Volume-Name
```

b. Description of operands

Operand	Description
Volume-Name	Specifies the volume name. Specify a copy source volume that is used with SnapOPC/SnapOPC+ operations. GDS logical volumes cannot be specified.

c. End status
= 0 : Normal end
> 0 : Abnormal end

d. Execution example
Measure the update volume for /dev/dsk/c1t0d0s1:

```
(Start taking measurements by starting a pseudo session)
#/opt/FJSVswsts/bin/swstestupdate start /dev/dsk/c1t0d0s1
/dev/dsk/c1t0d0s1 swstestupdate completed

(First measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t0d0s1
Volume-Name      Update
/dev/dsk/c1t0d0s1 644333

(Second measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t0d0s1
Volume-Name      Update
/dev/dsk/c1t0d0s1 1045000

(Stop taking measurements by canceling the pseudo session)
# /opt/FJSVswsts/bin/swstestupdate stop /dev/dsk/c1t0d0s1
/dev/dsk/c1t0d0s1 swstestupdate completed
#
```

The following information will be displayed:

Title	Description
Volume-Name	Displays the volume name.
Update	Displays the amount of data (the number of blocks) that has been updated since measurements started (1 block = 512 bytes). Displays "----" if there is no pseudo session. Displays "failed" if the pseudo session is error-suspended.

Note

The amount of data updated cannot be measured in the following circumstances:
— When the specified volume does not exist;
— When the disk array device does not support the SnapOPC/SnapOPC+ function;
— When the pseudo session has already been set up (when the "start" option is specified);
— When the pseudo session does not exist (when the "stop" option is specified).

Chapter 11 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

11.1 Notes on Backup and Replication Operation

This chapter provides notes on backup and replication.

11.1.1 General notes

This chapter provides general notes on backup and replication.

Storage Server locale

The locale (i.e., software localization including language settings) 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: Actions required for differing language environments (LANG)

Storage Management Server	Storage Server	Action required
Windows (SJIS)	Windows (SJIS)	None
	Solaris (EUC)	Install the SJIS package on the Storage Server.
	HP-UX (EUC)	Install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None
	AIX (EUC)	Add the SJIS language environment on the Storage Server.
In accordance with the Solaris locale setting (standard: EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)
	Solaris (EUC)	None (if the code is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	HP-UX (EUC)	None (if LANG is the same). If the Management Server is SJIS, install the SJIS package on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	None (if LANG is the same). If the Management Server is EUC, add the EUC language environment.
	AIX (EUC)	None (if LANG is the same). If the Management Server is SJIS, add the SJIS language environment.
Linux (EUC)	Windows (SJIS)	None. (If the Storage Management Server is EUC, Storage Server processing is problem free.)
	Solaris (EUC)	None
	HP-UX (EUC)	None
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	Add the EUC language environment on the Storage Server.
	AIX (EUC)	None

Storage Management Server	Storage Server	Action required
Linux (UTF8)	Windows (SJIS)	None
	Solaris (EUC)	Add the UTF8 language environment on the Storage Server.
	HP-UX (EUC)	Add the UTF8 language environment on the Storage Server.
	Linux (EUC)	None
	Linux (UTF8)	None
	AIX (SJIS)	Add the UTF8 language environment on the Storage Server.
	AIX (EUC)	Add the UTF8 language environment on the Storage Server.

Depending on the action required, install the SUNWJPCK SJIS package. After the appropriate package is installed, re-execute the "Collect and reflect information for all devices" operation at the Web client.

Exclusion from Backup Targets or Replication Targets

The following devices must be backed up or replicated:
- ● Device on which AdvancedCopy Manager has been installed
- ● Device on which the resource files of AdvancedCopy Manager exists

Data integrity with data in a volume

Table: Data integrity maintenance

Data in transaction volume	Maintenance of data integrity	Operation
Oracle database space being used	Linkage with Oracle is required.	Use a sample script designed for linkage with Oracle. For details on sample scripts, refer to "Sample Scripts".
File system	An AdvancedCopy Manager command unmounts the file system to maintain the integrity.	See "Preprocessing and Postprocessing of Backup and Restoration", and "Preprocessing and Postprocessing of Replication".
Other than the above	The data integrity must be maintained in operations.	Take appropriate action, such as stopping transactions during execution of backup or replication.

Fetching of Device Information

Before starting the backup or replication operation, fetch device information managed by all the Storage Servers on the Web window of AdvancedCopy Manager.
The time taken to complete this operation depends on the total number of devices defined on the selected Storage Servers. If many devices are involved, perform this operation while the CPU load or I/O load is low.
As a guide, about 0.5 seconds are required per device (partition) under a no-load condition.

Simultaneous execution limit

An upper limit (maximum value) applies to the number of Advanced Copy sessions in one LU (Logical Unit) that can be executed simultaneously. Ensure the number of volumes in one LU is the same as or less than the maximum number of copy sessions per LU.

If a greater number of volumes than the maximum number of copy sessions per LU needs to be created in the LU for operational reasons, operations must be designed to prevent simultaneous execution of more than the maximum number of Advanced Copy sessions to volumes in the same LU.

Refer to the disk array unit SA/SE Handbook for the maximum number of copy sessions per LU.

Slice containing VTOC

The header slice in VTOC-labelled disks may contain disk management information (VTOC). Slices that contain this type of VTOC cannot be used in backup operations.

These slices can be used in replication operations if the -Xvtoc option is specified when the replication volume information is set.

Note

The above restriction does not apply if there are separate operations for each physical disk that makes up the VxVM disk group.

Note

When a slice that contains VTOC is copied to the header slice (containing VTOC) of another disk, the VTOC of the copy destination disk is rewritten.

If a slice that contains VTOC is to be copied to the header slice (containing VTOC) of another disk, prepare the copy destination disk as a VTOC-labelled disk and set the same disk configuration, and then execute the copy process.

Note

Do not copy a slice that does not contain VTOC to the header slice (containing VTOC) of another disk.

If a slice that does not contain VTOC is copied to the header slice (containing VTOC) of another disk, the VTOC of the copy destination disk is rewritten, and access to the slices in the copy destination disk may no longer be possible.

SynfinityFILE and Global File Services local file systems

SynfinityFILE file systems comprised of multiple slices and the global file systems of Global File Services cannot be processed.

To backup or restore SynfinityFILE file systems comprised of multiple slices or the global file systems of Global File Services, process the multiple slices simultaneously in the unmounted state.

SynfinityFILE/Global file system and Global File Services shared file system

Note the following points about backup, restoration, and replication of the SynfinityFILE/Global file system and Global File Services shared file system.
- ● The target file system must be unmounted in advance.
- ● Execute the operations on all partitions of the target file system.

The file system is unmounted as follows.

SynfinityFILE/Global file system: Stop all daemons/services

Global File Services shared file system: Unmount all nodes

Mounting of disks from other servers

Before backup, restoration, or replication of a volume that can be mounted from multiple servers, cancel mounting from the other servers.

For disks that do not need to be mounted from other servers, prevent multiple servers from detecting or accessing the same logical disk by setting up appropriate hardware, such as devices in the ETERNUS storage system and Fibre Channel switches.

Notes on copy operations targeted at file systems

For a copy operation targeted at a file system, unmount the applicable volume to prevent data access and maintain the data integrity.

If backup/restoration and replication are performed without unmounting the volume, an error occurs, since a volume in use cannot be unmounted.

Note the following points about the processing in circumstances in which 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, stop sharing it for the duration of the copy operation.

Unmounting is required only during command execution. Operation can be resumed after command execution.

Use of large-capacity disks

If disks that exceed 1 terabyte are used, disks with an EFI disk label must be used.

Notes on executing Logical Unit (disk unit) copy

Logical Unit (disk unit) copy can be used for replication operations.

Note the following points when executing Logical Unit (disk unit) copy:

- Tape backup
  Refer to "Backing up and restoring a system volume" in the ETERNUS SF AdvancedCopy Manager Operator's Guide Tape Backup edition for details of the tape backup function.
- Copying between servers
  Both servers must be version 13.1 or later.
- Copying between Logical Units (disks) of different sizes
  When copying between Logical Units (disks) that are different sizes, the physical copy matches the size of the smaller Logical Unit (disk). If the copy direction is from the smaller Logical Unit (disk) to the larger Logical Unit (disk), part of the area on the larger disk is not physically copied to, and data from before the copy operation remains on the larger disk. If this remaining area contains the Logical Unit (disk) management information, partitioning tools may identify the disk format incorrectly. Therefore, format the copy destination Logical Unit (disk) before copying to it.
- Duplication of disk management information
  Copying between Logical Units (disks) of EFI labelled disks also copies the UUID disk management information that is used to uniquely identify disks and slices included in the Logical Unit (disk). Thus, after copy is executed, duplicate disk management information may exist within a system.
  Performing the following types of copy duplicates the disk management information:
    — Copying between Logical Units (disks) within a server
    — Copying between Logical Units (disks) on different servers when there are multiple copy destinations within the copy destination server for the same copy source
    — Copying from a previously copied volume to a Logical Unit (disk) that is different to the copy source but on the same server as the copy source
  Refer to "Solaris 10 System Administrator Collection" - "System Administration Guide: Devices and File Systems", "29. Copying UFS Files and File Systems (Tasks)", "Example 29-2" for the action to take if disk management information (UUID) is duplicated.

● Notes when executing copy
— If replication source volume/replication destination volume areas for replication management and transaction volume/backup volume areas for backup management are duplicated, do not execute replication management and backup management operations concurrently for the volumes that have duplicated areas.
— Execute copy operations when the slices included in the Logical Unit (disk) are in the unmounted state. If copy is executed when the slices are in the mounted state, the slices included in the copy destination disk may not be able to be made consistent as a file system.
● SDX objects
Logical Unit (disk unit) copying cannot be used for SDX objects.

Notes on executing copy between different operating systems

Copies can be made between different operating systems by using replication operations. Use the following combinations to execute copy between different operating systems:

Table: Combinations for executing copy between different operating systems

		Copy destination	
		Slice	Logical Unit (disk)
Copy source	Slice	Y	N
	Logical Unit (disk)	Y	N

Y: Possible
N: Not possible

To perform copy operations between different operating systems, ensure the operating systems support SnapOPC+.
The following operating systems support SnapOPC+:
— Windows 2000, Windows Server 2003
— Solaris
Note: The Agent of AdvancedCopy Manager 13.2 or later must be installed on the above operating systems.

Operations in an ETERNUS multipath driver environment

When setting the ETERNUS multipath driver environment in a Solaris 10 operating system, select one of the following to use as the access special file:

● Solaris standard special file (/dev/[r]dsk/c*t*d*s*)
● Mplb special file (/dev/FJSVmplb/[r]dsk/mplb*s*)

The following table shows how the specifications and restrictions of the ETERNUS multipath driver corresponding to each access special file influence AdvancedCopy Manager operations.

Table: Influence of ETERNUS multipath driver specifications and restrictions

Access special file name	Influence	ETERNUS multipath driver specifications/restrictions
Solaris standard special file	System volume backup operations are not possible.	Cannot be used as a Boot device
Mplb special file	Logical Unit (disk unit) copy of EFI disk label disks is not possible.	Access path that indicates the entire disk of the EFI disk label disk cannot be generated

Notes on using the -m option

For inter-server replication, the -m option can be used in the following commands to prevent communication with the inactive server:

- ● Replication start command (swsrpstartsync)
- ● Create replica command (swsrpmake)
- ● Replication cancel command (swsrpcancel)

In order to avoid potential problems resulting from volume pre-processing and post-processing being omitted at the inactive server, one of the following conditions must be met if the -m option is specified:

1. The inactive server is shut down.
2. Pre-processing and post-processing is executed manually for the inactive server volume.
3. The target volume is a RAW device (Oracle, etc.), that does not require pre-processing and post-processing, rather than a file system.

Copy processing performance of Advanced Copy

The Advanced Copy copy processing is performed by the disk array unit. Therefore, direct any questions concerning copy processing performance to the support department of the disk array unit.

11.1.2 Notes on the snapshot high-speed backup

This chapter provides notes on the snapshot high-speed backup.

Number of Required Backup Volumes

The snapshot high-speed backup requires as many backup volumes as the number of specified generations. Thus, the snapshot backup is disabled if:

- ● All the specified number of generations have been backed up, and
- ● No new volume exists which can be used as a backup volume.

Continuous Backup

Performing the snapshot high-speed backup continuously with the same transaction volume specified will perform the backup operation in parallel.

If you perform the snapshot high-speed backup continuously more often than the number of saved generations, the backup operations will be cancelled, starting from the oldest one. In other words, you cannot simultaneously perform the backup operation more often than the specified number of generations.

11.1.3 Notes on synchronous high-speed backup

This chapter includes some notes on synchronous high-speed backup.

Backup processing

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

Backup policy settings

Backup policies can be set if the number of registered backup volumes is enough for snapshot-type high-speed backup operation, even if it is not enough for synchronous high-speed backup. In this event, high-speed backup may not be possible.

11.1.4 Notes on restoration

This chapter provides notes on restoration.

Timing of Restoration

If data on a transaction volume has been rewritten since the latest backup data was copied to a backup volume, until restoration is performed the rewritten data is not guaranteed to be accurate.

Figure: Notes on restoration of AdvancedCopy Manager
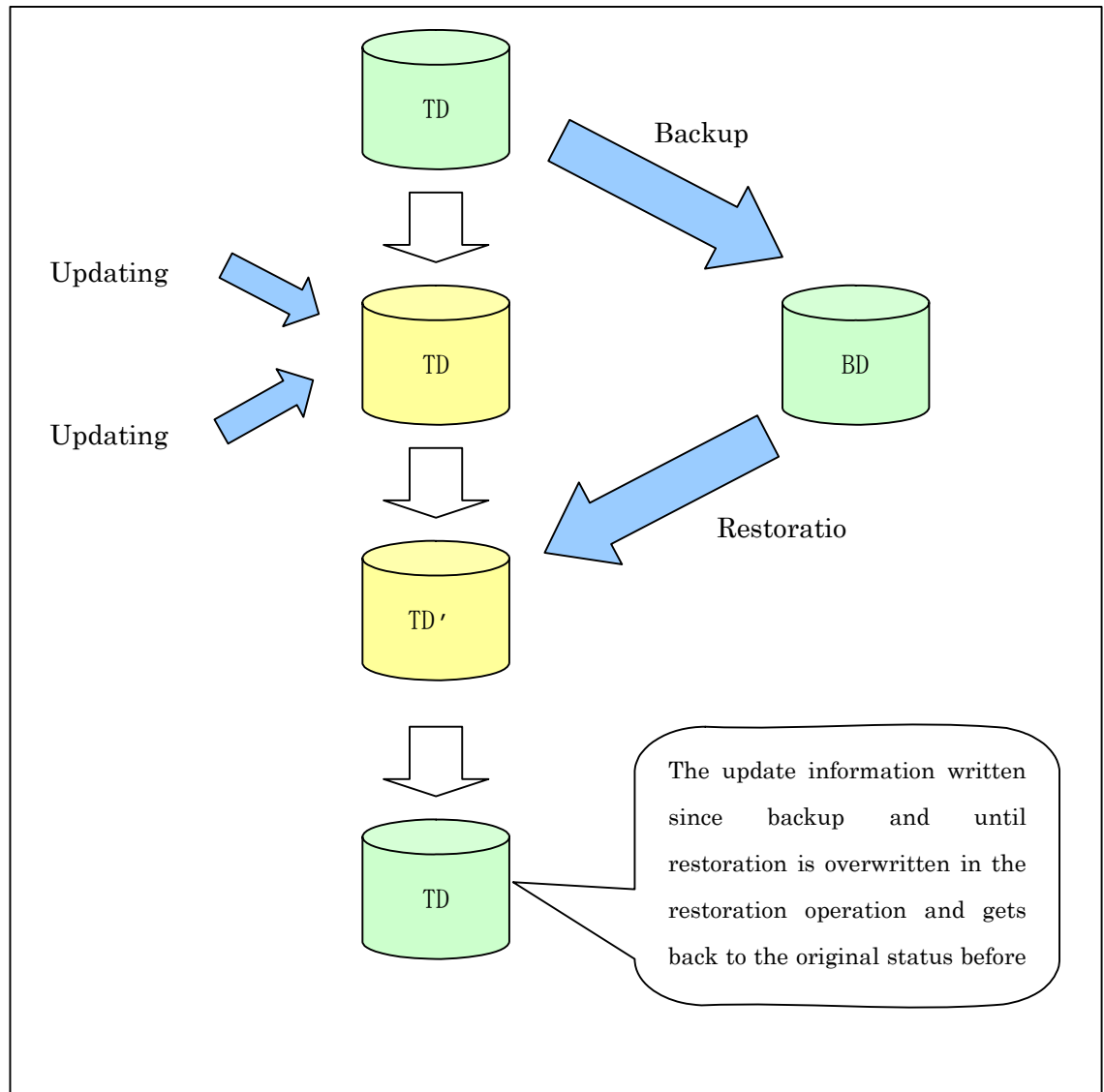
TD: Transaction volume
BD: Backup volume

11.1.5 Notes on SDX object operations (backup management)

Note the following points about backing up SDX objects.

Device information setting command (swstdevinfoset)

Note the following about using an SDX object in units of logical volumes:

- A volume in a disk group to which the transaction volume belongs cannot be registered as a backup volume.
- A volume in a single disk to which the transaction volume belongs cannot be registered as a backup volume.
- A volume in a disk group to which an associated backup volume belongs cannot be registered as the transaction volume.
- A volume in a single disk to which an associated backup volume belongs cannot be registered as the transaction volume.

Backup synchronous processing start command (swststartsync)

Note the following about using an SDX object in units of logical volumes.

Backup synchronous processing of a GDS transaction volume cannot be started in the following circumstances:

- The volume structure of the transaction volume is changed.
- The transaction volume is set as a proxy object.
- A backup volume cannot be stopped.
- The slices that make up the transaction volume include a temporarily separated slice or a slice being copied.

In the case of any of the above, you should take appropriate action according to [System administrator's action] in the error message as displayed

Backup synchronous processing with EC cannot be started in the following circumstances:

- An SDX object that does not support the EC function is specified.
- All available backup volumes are in a mirroring structure.
- The transaction volume belongs to a mirror group connected to any subordinate group.
- An SDX object is in the root class.

In the case of any of the above, only software-copy with GDS is available. To use the software-copy function of GDS, specify the "-Xgds-softcopy" option.

If a backup volume satisfies any of the following conditions, it is not selected as the backup destination because it cannot be used as a proxy object of the transaction volume, even if it is specified as the backup destination.

- The backup volume is not the same class as the transaction volume.
- The slices that make up the backup volume include a temporarily separated slice or a slice that is being copied.
- The backup volume is set as the master object associated with another proxy of GDS.
- The backup volume is mounted.
- The backup volume is a logical volume whose size is different to that of the transaction volume.
- The backup volume is in a mirroring structure (excluding cases where "-Xgds-softcopy" or "-Xgds-selectcopy" is specified).
- No disk is connected directly to the backup volume (excluding cases where "-Xgds-softcopy" or "-Xgds-selectcopy" is specified).

Backup synchronous processing cancel command (swstcancelsync)

Note the following points about use with an SDX object in units of logical volumes.

The backup volume enters the invalid data state (INVALID) if synchronous processing is cancelled in the following circumstances during the backup of an SDX object:

- When the synchronous processing is not in the equivalency maintenance state or copy established state

Restart synchronous processing or snapshot processing again, and the volume should enter the stop state (STOP), which will automatically clear the data invalid state.
To use an alternative method to restore the state, refer to Section F.1.3, "Errors Related to Volume States," in the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating System)," and take appropriate action.

Backup execution command (swstbackup)

Note the following points about use with an SDX object in units of logical volumes.

Backup of a GDS transaction volume cannot be performed in the following circumstances:
- ● The volume structure of the transaction volume is changed.
- ● The transaction volume is set as a proxy object.
- ● A backup volume cannot be stopped.
- ● The slices that make up the transaction volume include a temporarily separated slice or a slice being copied.
- ● An SDX object that does not support the OPC function is specified.
- ● All available backup volumes are in a mirroring structure.
- ● The transaction volume belongs to a mirror group connected to any subordinate group.
- ● An SDX object is in the root class.

In the case of any of the above, you should take appropriate action according to [System administrator's action] in the error message as displayed

If a backup volume satisfies any of the following conditions, it is not selected as the backup destination because it cannot be used as a proxy object of the transaction volume even if it is specified as the backup destination.
- ● The backup volume is not the same class as the transaction volume.
- ● The slices that make up the backup volume include a temporarily separated slice or a slice being copied.
- ● The backup volume is set as the master object associated with another proxy of GDS.
- ● The backup volume is mounted.
- ● The backup volume is a logical volume whose size is different to that of the transaction volume.
- ● The backup volume is in a mirroring structure.
- ● No disk is connected directly to the backup volume.

Backup with the output destination backup volume specified cannot be performed in the following circumstances:
- ● An ordinary volume is specified as the transaction volume and a GDS logical volume as the backup volume.
- ● A GDS logical volume is specified as the transaction volume and an ordinary volume as the backup volume.

Note the following about using an SDX object in units of slices.

A Backup cannot be performed when an SDX object does not satisfy the following conditions:
- ● The state of the mirror volume is ACTIVE.
- ● The state of the SDX disk is ENABLE.
- ● The state of the mirror slice is ACTIVE or TEMP.

In the case of any of the above, you should take appropriate action according to [System administrator's action] in the error message as displayed

Note that pre-processing and post-processing scripts will not be executed if the state of the SDX object slice is TEMP.

Restore execution command (swstrestore)

Note the following about using an SDX object in units of logical volumes.

A GDS transaction volume cannot be restored in the following circumstances:
- ● When restoring a transaction volume, the backup volume is not the proxy object of the transaction volume.
- ● When restoring a transaction volume, the transaction volume cannot be stopped.
- ● When restoring a transaction volume, the target backup volume cannot be stopped.

In the case of any of the above, you should take appropriate action according to [System administrator's action] in the error message as displayed

Restoration with OPC cannot be performed for a GDS transaction volume in the following circumstances:

- ● A GDS logical volume that does not support the OPC function is specified.
- ● The backup volume belongs to a mirror group connected to any subordinate group.
- ● An SDX object is in the root class.

In these cases, only software-copy is available. To use the software-copy function of GDS, specify the "-Xgds-softcopy" option.

If the restore command (swstrestore) using the software-copy function of GDS is suspended, (such as for a forced termination), the started software-copy processing continues. In this case, wait for the software-copy processing to finish, and then execute the resource adjustment command (swstsrsemtch).

Note the following about using an SDX object in units of slices.

If the transaction volume is a slice of an SDX object and it is not a single volume, restoration using this command cannot be performed. This is because advanced copy cannot be performed on a mirror volume.

To restore the transaction volume of an SDX object, perform the following steps:

1. Confirm the backup volume by using the backup history list view/history information display command.
2. For restoration, use the "dd" command to copy data to the volume.

11.1.6 Notes on SDX object operations (replication management)

Note the following about the replication operation of SDX objects.

Replication volume information setting (swsrpsetvol)

Note the following about using an SDX object in units of logical volumes.

Replication volume information for the replication operation of an SDX object cannot be set in the following circumstances:

- ● An SDX object and slice, or an SDX object and a volume of another OS are specified.
- ● A logical volume and the "-n" option are specified.
- ● The original volume and replica volume belong to different classes.
- ● The original volume and replica volume belong to the same group; alternatively, in operation of single volumes, they belong to the same single disk.

Replication volume information deletion (swsrpdelvol)

Note the following about using an SDX object in units of logical volumes.

If the original volume and replica volume are bound, or if they are separated when a copy session exists, the replication volume information cannot be deleted.

Replication start command (swsrpstartsync)

Note the following about using an SDX object in units of logical volumes.

If any of the following is true, the replication start command cannot be executed to replicate an SDX object:

- ● The copy source volume and copy destination volume are in the master-proxy relationship when synchronous processing is started.
- ● The copy source volume and copy destination volume have not been separated from their master-proxy relationship when synchronous processing is resumed.
- ● The copy source volume and copy destination volume belong to different classes when synchronous processing is started.
- ● The copy source volume and copy destination volume belong to the same disk group or single disk.
- ● Any of the following is true for the copy source volume:
  — The volume contains any temporarily separated slice or slice that is being copied.
  — The copy source volume is a proxy object when synchronous processing is started.
  — Copy processing with another volume is in progress.

● Any of the following is true for the copy destination volume:
  ── The volume is in a mirroring structure and the "-Xgds-softcopy" or "-Xgds-selectcopy" option is not specified when synchronous processing is started. The volume cannot be stopped.
  ── The volume is a master volume when synchronous processing is started.
  ── The volume contains any temporarily separated slice or slice that is being copied.
  ── The volume is a proxy of another master.
● The hardware copy function is not available (excluding cases when "-Xgds-softcopy" or "-Xgds-selectcopy" is specified). The typical causes are:
  ── EC/REC of the disk array unit is not properly set.
  ── The copy source volume belongs to a mirror group connected to any subordinate group.
  ── The copy destination volume is in a mirroring structure.
  ── The volume is in the root class.

When replicating an SDX object registered with the replication function, do not use the "sdxproxy" command directly to change the state of the SDX object. The "sdxproxy" command may create an inconsistency between the management information of the replication function and the actual object state. In this case, use the replication cancellation command (swsrpcancel) to cancel the replication operation.

Note the following about using an SDX object in units of slices.
Note the following points for replicating an SDX object:

Replication cannot be started in the following cases:
● The copy destination volume is an SDX object and the status of the SDX object is not as follows:
  ── Mirror volume is either ACTIVE or STOP
  ── Mirror slice status is either ACTIVE OR STOP
● If the copy destination volume is an SDX object and is not a single volume, replication using this command cannot be performed.
● To copy data to a volume that is an SDX object but not a single volume, use the "dd" command.

Replication creation command (swsrpmake)

Note the following about using an SDX object in units of logical volumes.
If any of the following is true, replication in the replication operation of an SDX object cannot be created:
● The copy source volume and copy destination volume are in the master-proxy relationship in snapshot replication.
● The copy source volume and copy destination volume belong to different classes in snapshot replication.
● The copy source volume and copy destination volume belong to the same disk group or a single disk in snapshot replication.
● Any of the following is true for the copy source volume:
  ── The volume contains any temporarily separated slice or slice that is being copied, in snapshot replication.
  ── The copy source volume is a proxy object in snapshot replication.
  ── Copy processing with another volume is in progress.
● Any of the following is true for the copy destination:
  ── The volume is in a mirroring structure in snapshot replication.
  ── The volume could not be stopped in snapshot replication.
  ── The volume is a master volume in snapshot replication.
  ── The volume contains any temporarily separated slice or slice that is being copied, in snapshot replication.
  ── The volume is a proxy of another master in snapshot replication.

● The OPC/ROPC function is not available for snapshot replication. The typical causes are:
— OPC/ROPC of the disk array unit is not properly set.
— EC/REC in the equivalency maintenance state or suspended state is between the specified copy source volume and another proxy. However, advanced copy can be set in units of mirror slices. This means you can set advanced copy for as many copy destination volumes as the number of mirror slices at the same time. Therefore, this error occurs as the result of an attempt to set advanced copy for a greater number of copy source volumes than the number of mirror slices.
— The copy source volume belongs to a mirror group connected only to subordinate groups but not directly to a disk. The copy source volume belongs to a mirror group connected to any subordinate group.
— The copy destination volume is in a mirroring structure.
— The volume is in the root class.

In the replication operation of an SDX object registered with the replication function, do not use the "sdxproxy" command directly to change the state of the SDX object. The "sdxproxy" command may create an inconsistency between the management information of the replication function and the actual object state. In this case, use the replication cancellation command (swsrpcancel) to cancel the replication operation.

Note the following about using an SDX object in units of slices.
Replication cannot be performed in the following circumstances:
● The copy source volume is an SDX object for replication of an SDX object, and the SDX object is not in the following states:
— The state of the mirror volume is either ACTIVE or STOP.
— The state of the mirror slice is either ACTIVE or TEMP.
— The state of the SDX disk is ENABLE.
● The copy destination volume is an SDX object, and the SDX object is not in the following states:
— The state of the mirror volume is either ACTIVE or STOP.
— The state of the mirror slice is either ACTIVE or STOP.
● If the copy destination volume is an SDX object that is not a single volume for the replication operation for an SDX object, replication using this command cannot be performed. Therefore, if either the original volume or replica volume is an SDX object that is not a single volume, you can perform replication only from an SDX object to a non-SDX object.
● To copy data to a volume that is an SDX object but not a single volume, use the "dd" command.

Note that preprocessing of the copy source volume is not performed if the state of the slice of the SDX object is TEMP.

Replication cancellation command (swsrpcancel)

Note the following about using an SDX object in units of logical volumes.
If any of the following is true, replication of an SDX object cannot be cancelled:
● The pair of the target replication volume used for replication cancellation is in the equivalency maintenance state, and copy processing between the copy source volume and another volume is in progress.

The copy destination volume enters the invalid data state (INVALID) if replication is cancelled at either of the following times during replication of an SDX object:
● When snapshot replication is neither in the equivalency maintenance state nor copy established state
● When data copy processing of snapshot processing is in progress

Restart synchronous processing or snapshot processing, and the volume will enter the stop state (STOP), which will automatically clear the data invalid state.
To restore the state using an alternative method, refer to Section F.1.3, "Errors Related to Volume Statuses," in the "PRIMECLUSTER(TM) Global Disk Services User's Guide (Solaris(TM) Operating System)," and take appropriate action.

Note the following about using an SDX object in units of slices.

Synchronous processing in the equivalency maintenance state cannot be stopped in the following circumstances:

● The copy source volume is an SDX object, and the SDX object is in any of the following states:
— The state of the mirror volume is either ACTIVE or STOP.
— The state of the mirror slice is either ACTIVE or TEMP.
— The state of the SDX disk is ENABLE.
If the mirror slice is in the TEMP state, preprocessing of the original volume is not performed.
● The file system is mounted in an environment where the copy source volume or copy destination volume makes up a SynfinityFILE of a multi-volume structure. In such cases, unmount the file system, and process all of the volumes that make up the SynfinityFILE.

11.1.7 Notes on cluster operation

Note the following general points on cluster operation:
● Do not make a SWSTGNODE registration that configures an environment variable to the entire system.
● AdvancedCopy Manager does not monitor daemons of an active server. If the daemon of a transaction stops for some reason, AdvancedCopy Manager does not automatically restart it, so you must restart it manually. Moreover, stopping an active server daemon of AdvancedCopy Manager does not cause the userApplication to fail over.
For details on the daemons of AdvancedCopy Manager active servers and how to start these daemons, see "Starting and Stopping Daemons".

For a Storage Server daemon (Storage Management Server daemon) operating together with a daemon in a scalable operation, note the following points that do not apply to regular operation or cluster operation:
● For a Storage Management Server, note that the logical IP address you specify in the cluster setup command must be the logical IP address of the Storage Management Server. Specifying the physical or logical IP address of a server in scalable class will result in an incorrect setting.
● Do not register any user Application resource of a transaction in scalable operation as a userApplication cluster resource of a Storage Server (Storage Management Server).
● In Step 2 of "Configuring the authentication-related file" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide, note that the IP address to be edited is the logical IP address of the Storage Management Server. Editing this address as a physical or logical IP address of a server in scalable operation will result in an incorrect setting.
● On the [Add Server] dialog shown in "Registering a Server" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide, enter the logical IP of the Storage Server in the IP address field. Entering a physical or logical IP address of a server in scalable operation will result in an incorrect setting.
● On the [Add Server] dialog shown in "Registering a Server" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide, in the port number field enter the port number that was registered when the Storage Server was customized and dedicated to the active server communication daemon (stgxfws_logical-node-name). Entering a different port number will result in an incorrect setting.
● On the [Check Device Information] dialog shown in "Registering Device Information" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide, add a transaction volume and backup volume for the server in scalable operation to be placed in backup/replication operation
● You can make a backup or replication on a node operating a Storage Server (Storage Management Server). You cannot make a backup or replication on any standby node of a Storage Server (Storage Management Server).
● If a daemon (in scalable operation) running on a node operating a Storage Server (Storage Management Server) stops for some reason, you must manually switch the Storage Server (Storage Management Server) over to a node running in scalable operation. Storage Servers (Storage Management Servers) do not work with the scalable class, and stopping scalable operation does not cause a Storage Server (Storage Management Server) transaction to fail over.

11.1.8 Notes on backup operation in cluster operation

SynfinityCLUSTER or PRIMECLUSTER

For backup operation in a cluster system, note the following points that do not apply to regular operation:

- If failover occurs while running a backup command, you must ensure consistency by using the resource adjustment command as a recovery measure.
- You must perform backup operation on the active server of the cluster service (userApplication) because AdvancedCopy Manager is placed in the cluster service (userApplication) and operates as part of the cluster service (userApplication). You cannot make a backup from a standby node or another cluster service (userApplication).

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Note the following points if a file system has been created on a transaction volume and the file system has been registered as a cluster resource:

- Change the backup preprocessing so that the transaction volume is not unmounted. Refer to "Pre-processing of backup" for information about changing backup pre-processing.
- It is not possible to restore data using the restore execution command during transaction operations. To restore data on the volume, either copy the data using the "dd" command, or mount the backup volume and copy the necessary data. Alternatively, perform the procedure described in "Making a backup and restoration during stoppage of a cluster service".

PRIMECLUSTER 4.1A30 or later

If a file system has been created on a transaction volume, and the file system has been registered as a cluster resource, use the following procedure to back up and restore data. Perform snapshot backups and restorations using the following procedure:

1. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

2. Execute the backup or restoration.

```
# /opt/FJSVswsts/bin/swstbackup Device-Name
Device-Name swstbackup completed
#
```

3. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

Execute synchronized backups using the following procedure.

1. Start synchronous processing.

```
# /opt/FJSVswsts/bin/swststartsync Device-Name
Device-Name swststartsync completed
#
```

2. Check equivalency maintenance state.

3. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

4. Execute the backup.

```
# /opt/FJSVswsts/bin/swstbackup Device-Name
Device-Name swstbackup completed
#
```

5. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

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 the resource adjustment command as a recovery measure.

● To use synchronous high-speed backup, do not register a backup to any cluster transaction.

● You must perform backups on the active 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 "Backup/Restoration Pre-processing/Post-processing". For details on the commands used to set resources offline and online, see the relevant cluster system manual.

11.1.8.1 Making a backup and restoration during stoppage of a cluster service

SynfinityCLUSTER or PRIMECLUSTER

When a cluster service (userApplication) to which AdvancedCopy Manager belongs is operating, backup operation is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for backup operation, and backup is, therefore, disabled. Likewise, if the cluster service (userApplication) has been stopped, the environment is not ready and disables backup operation.
However, backup is temporarily enabled when the cluster service (userApplication) has been stopped.

Note

● When transactions in scalable operation are handled together, ensure that you only stop cluster services (userApplications) in scalable operation; do not stop cluster services (userApplications) for storage (management) server transactions.
Enabling backup operation disks (transaction volume and backup volume to operate) allows you to perform backups in the same way as for regular operations.
If a backup operation disk cannot be enabled, you cannot do backups while stopping a cluster service (userApplication) in scalable operation.
● If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), backup operation is disabled:
  — Shared disk for AdvancedCopy Manager shared data
  — Backup operation disk (transaction volume/backup volume to operate)
● The following operations are not allowed in backup operation:
  — Backup/restoration through GUI
  — Manipulation for backup operation from a Storage Management Server (host specification with the "-h" option)
  — Addition or deletion of a transaction volume/backup volume, or change in policy
● To execute a display command for backup management to a Storage Management Server transaction that also functions as a Storage Server transaction, you must specify options for the command. For details on the display command for backup management, see the "Commands for Backup Management".

Perform backup operation during stoppage of a cluster service (userApplication) by performing the following steps:
  1. Confirm that the cluster service (userApplication) has been stopped on both nodes.
     For details on how to stop a cluster service (userApplication), see the SynfinityCLUSTER or PRIMECLUSTER manual.
  2. Log in (for example, through 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 backup.
     You can perform the backup in the same way as for regular operations in a cluster environment.
     You can use the restore command to perform a 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 cluster service (userApplication).
     Start the cluster service (userApplication), if necessary.
     For details on how to start a cluster service (userApplication), see the SynfinityCLUSTER or PRIMECLUSTER manual.

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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.

● 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 "Commands for Backup Management".

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.

   — 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 the restore 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.

11.1.9 Notes on replication operation in cluster operation

SynfinityCLUSTER or PRIMECLUSTER

For replication in a cluster system, note the following points that do not apply to regular operation:

● If failover occurs while running a replication command, you must ensure consistency by using the Resource adjustment command as a recovery measure.

● You must perform replication operation on the active system of the cluster service (userApplication) because AdvancedCopy Manager is placed in the cluster service (userApplication) and operates as a part of it (userApplication).
You cannot perform replication from a standby node or another cluster service (userApplication).

PRIMECLUSTER

PRIMECLUSTER 4.1A20 or earlier

Note the following points if a file system has been created on a copy source volume and the file system has been registered as a cluster system resource.

● Change the pre-processing and post-processing for replication so that the copy source volume is not unmounted.

● Set up a RAW partition on the copy destination volume.

● Data cannot be restored from the copy destination volume to the copy source volume using the replication creation command during transaction operations. To restore data on the volume, either copy the data using the "dd" command, or mount the copy destination volume and copy the necessary data. Alternatively, perform the procedure described in "Making a replication during stoppage of a cluster service".

PRIMECLUSTER 4.0A30 or later

Note the following points if a file system has been created on a copy source volume and the file system has been registered as a cluster system resource.

● Set up a RAW partition on the copy destination volume.

Execute snapshot replications using the following procedure.

1. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

2. Execute the replication.

```
# /opt/FJSVswsrp/bin/swsrpmake From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed
#
```

3. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

Execute synchronized replication using the following procedure.

1. Start synchronous processing.

```
# /opt/FJSVswsrp/bin/swsrpstartsync From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpstartsync completed
#
```

2. Check equivalency maintenance state.

3. Switch the userApplication to Maintenance mode.

```
# hvutil -m on userApplication
#
```

4. Execute the replication.

```
# /opt/FJSVswsrp/bin/swsrpmake From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed
#
```

5. Turn Maintenance mode off for the userApplication.

```
# hvutil -m off userApplication
#
```

VERITAS Cluster Server

For replication in a cluster system, note the following points that do not apply to regular operation:

● If failover occurs while running a replication command, you must ensure consistency by using the resource adjustment command as a recovery measure.

● When you use synchronous replication, do not register any destination 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 "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.

11.1.9.1 Making a replication during stoppage of a cluster service

SynfinityCLUSTER or PRIMECLUSTER

When a cluster service (userApplication) 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 operation, so replication is, therefore, disabled. Likewise, if the cluster service (userApplication) has been stopped, the environment is not ready and disables replication operation.

However, replication is temporarily enabled when the cluster service (userApplication) has been stopped.

● When transactions in scalable operation are handled together, ensure that you only stop cluster services (userApplications) in scalable operation; do not stop cluster services (userApplications) for storage (management) server transactions.
Enabling replication operation disks (source volume/destination volume to operate) allows you to perform replication in the same way as for regular operations.
If a replication operation disk cannot be enabled, you cannot perform replication while cluster services (userApplications) in scalable operation are stopped.

● If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), 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 that also functions as a Storage Server, you must specify options for the command.　For details on the display command for replication management, see "Commands for Replication Management".

Perform replication during stoppage of a cluster service (userApplication) by taking the following steps:

1. Confirm that the cluster service (userApplication) has been stopped on both nodes.
   For details on how to stop a cluster service (userApplication), see the SynfinityCLUSTER or PRIMECLUSTER 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.

　　— 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 cluster service (userApplication).
   Start the cluster service (userApplication), if necessary.
   For details on how to start a cluster service (userApplication), see the SynfinityCLUSTER or PRIMECLUSTER 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.

● 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 "Commands for Replication Management".

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.

— 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.

11.2 Notes on the Web Window Environment

For notes on the Web screen environment, see "Setting up a client" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide.

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

This appendix describes the shell scripts used for pre-processing and post-processing of backup and restoration.

Note that a shell script described in this appendix has different linefeed positions due to formatting of this manual.

A.1 Overview

Shell scripts used for pre-processing and post-processing of backup or restoration are started
before and after backup or restoration when a backup or restore execution command is executed.

These shell scripts describe pre-processing required by AdvancedCopy Manager to back up or
restore a transaction volume.
This chapter describes the setup of pre-processing and post-processing.

A.2 Pre-processing and Post-processing of Backup

Backup using AdvancedCopy Manager must be performed while access to a transaction volume from other processes is inhibited.

The pre-processing task acquires the mount status of a transaction volume using the transaction volume name and then performs the following processing:

Table: Pre-processing for transaction volume

Transaction volume status	Pre-processing
Mounted	Unmount a transaction volume.(*1)
Unmounted	Take no action.

*1 If the transaction volume cannot be unmounted, however, 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 post-processing are generally determined by what has been done in pre-processing.

Table: Backup pre-processing and post-processing

Pre-processing	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: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

Note

If post-processing failed, execute the Resource match command (swstsrsemtch) because the consistency of resource information may be incomplete.

A.2.1 Pre-processing of backup

The name of the shell script for pre-processing before backup processing is as follows.

● In the case of non-cluster operation

```
etc/opt/FJSVswsts/sh/OpcBackup.pre
```

● In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcBackup.pre
```

The shell script contents are as follows

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
5:
6: #
7: #   Pre-processing of backup processing
8: #
9: #       Argument: $1 Device name of transaction disk
```

```
10: #                 $2 Mount point of transaction disk
11: #                 $3 Device name of backup disk
12: #
13: # Error number
14: #      2: Argument error
15: #     10: umount error
16:
17:
18: # Argument check
19: case $# in
20: 1)
21:    ;;
22: 2)
23:    ;;
24: 3)
25:    ;;
26: *)
27:    exit 2
28:    ;;
29: esac
30:
31: device="`echo $1`"
32: mount_point="`echo $2`"
33: bk_device="`echo $3`"
34:
35: # Determination post-processing file name
36:
37: if [ "$SWSTGNODE" != "" ]
38: then
39: swstg_node="/`echo $SWSTGNODE`"
40: else
41: swstg_node=""
42: fi
43:
44: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
45:
46: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
47: then
48:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
49:   dev="`echo $device | /usr/bin/sed "s/\/dev\/dsk\///"`"
50: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
51: then
52:   # /dev/FJSVmphd/dsk/mplb?s? -> /dev/FJSVmphd/dsk/mplb?s?
53:   # /dev/FJSVmphd/dsk/mphd?s? -> /dev/FJSVmphd/dsk/mphd?s?
54:   dev="`echo $device | /usr/bin/cut -d/ -f5`"
55: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
56: then
57:   if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
58:   then
59:       # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
60:       dev="`echo $device | /usr/bin/sed "s/\/dev\/sfdsk\///"`"
61:       dev="`echo $dev | /usr/bin/sed "s/\/dsk\//_/"`"
62:       dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
63:       device="`echo $device | /usr/bin/cut -d: -f1`"
64:   else
65:       # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
66:       dev="_gds_`echo $device | /usr/bin/sed "s/\/dev\/sfdsk\///"`"
67:       dev="`echo $dev | /usr/bin/sed "s/\/dsk\//_/"`"
68:   fi
69: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
70: then
71:   # /dev/vx/dsk/volume -> _vx_rootdg_volume
```

```
 72:     # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
 73:     dev=_vx_"`echo $device | /usr/bin/awk -F¥/ '{ if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
 74: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
 75: then
 76:     # /dev/vx/dmp/device -> _vx_pv_device
 77:     dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
 78: else
 79:     exit 0
 80: fi
 81: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 82: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 83: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 84:
 85: if [ "$mount_point" != "" ]
 86: then
 87:
 88: # When device cannot be unmounted
 89: #
 90: # if [ "$device" = "/dev/dsk/cXtXdXsX" -o "$device" = "/dev/dsk/cYtYdYsY" ]
 91: # then
 92: #     /usr/sbin/lockfs -w $mount_point > /dev/null 2>&1
 93: #     if [ "$bk_device" != "" ]
 94: #     then
 95: #         echo $bk_device > $bd_file
 96: #     fi
 97: #     df -ln $mount_point | cut -f2 -d: | cut -f2 -d' ' > $fstype_file
 98: #     sync
 99: #     sync
100: #     echo "fsck" > $post_file
101: #
102: # When device can be unmounted
103: #
104: # else
105:         /usr/bin/df -ln $mount_point | /usr/bin/cut -f2 -d: | /usr/bin/cut -f2 -d'
' > $fstype_file
106:         /usr/sbin/umount $mount_point 2>/dev/null
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:                 /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
116:                 if [ $? != 0 ]
117:                 then
118:                     retry_count=`expr $retry_count - 1`
119:                     /usr/bin/sleep $sleep_time
120:                 else
121:                     /usr/bin/rm -f $err_log_path/$dev.umount
122:                     result_flag=0
123:                     break
124:                 fi
125:             done
126:
127:             if [ $result_flag != 0 ]
128:             then
129:                 /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
130:                 /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
131:
```

```
132:              exit 10
133:          fi
134:      fi
135:      echo "mount" > $post_file
136:
137: # fi
138:
139: # When device was not mounted
140: #
141: else
142:   echo "none" > $post_file
143: fi
144:
145: exit 0
```

When you do not want to unmount a transaction volume

Edit the script to delete the comment characters ("#") on the 90th to 100th, 104th, and 137th lines for a transaction volume that is mounted that you do not want to unmount, and specify the target device in the if statement on the 90th line.

Make sure that any special editing of this script has not changed the line numbers quoted above or label the lines to be modified in these circumstances clearly.

Do not update the file system of the transaction volume in the period from execution of the sync command on the 91st line to backup post-processing. Otherwise, the backed-up file system may be incomplete or execution of the "fsck" command in the backup.

This operation is possible only when the file system is one of the following:

● ufs
● SynfinityFILE (single-partition configuration)

The pre-processing by the customized scripts is as follows:

Table: Pre-processing by the customized script

State of transaction volume	pre-processing
It is mounted.	Update of operating volume is prevented.

The post-processing by the customized scripts is as follows:

Table: Post-processing by the customized script

pre-processing	Post-processing
If Update to operating volume was prevented.	Restore capacity to update operating volume. Matching of the backup volume is checked.

> **Note**
>
> Where the standard script is used, the caching of a file system and renewal of subsequent updates are inhibited by unmounting a file system before an advanced copy process using (EC/OPC), the integrity of the data of the entire file system is guaranteed.
>
> Although flushing the cache of a file system and renewal of subsequent updates are inhibited using "lockfs -w", when customizing a script to prevent unmounting a file system, data integrity or file consistency can not be guaranteed if the file is in Write Open mode (the database space of Oracle which is supporting on-line backup).
>
> Moreover, when the renewal of metadata is occurring, the data updates to the file system itself are not guaranteed even with "lockfs -w" specified.
>
> It is therefore critical to consider this and manage the integrity of data updates accordingly when you elect not to unmount a file system.

> **Note**
>
> If an SDX object is operated in slice units, do not specify a slice name (/dev/sfdsk/(class name)/dsk/(volume name):(sdxinfo DEVNAM value)) in Line 90. Instead,

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specify a logical volume name (/dev/sfdsk/(class name)/dsk/(volume name)).

A.2.2 Post-processing of backup

The name of the shell script for post-processing before backup processing is as follows.
● In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcBackup.post
```

● In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcBackup.post
```

The shell script contents are as follows

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
 5:
 6: #
 7: #   Post-processing of backup processing
 8: #
 9: #     Argument: $1 Device name of transaction disk
10: #               $2 Mount point of transaction disk
11: #
12: # Error number
13: #      2: Argument error
14: #     11: mount error
15: #     12: fsck error
16:
17: # Argument check
18: case $# in
19: 1)
20:   ;;
21: 2)
22:   ;;
23: *)
24:   exit 2
25:   ;;
26: esac
27:
28: device="`echo $1`"
29: mount_point="`echo $2`"
30:
31: # Determination of post-processing file name
32:
33: if [ "$SWSTGNODE" != "" ]
34: then
35: swstg_node="/`echo $SWSTGNODE`"
36: else
37: swstg_node=""
38: fi
39:
40: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
41:
42: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
43: then
44:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
45:   dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
46: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
47: then
48:   # /dev/FJSVmphd/dsk/mplb?s? -> /dev/FJSVmphd/dsk/mplb?s?
```

```
49:     # /dev/FJSVmphd/dsk/mphd?s? -> /dev/FJSVmphd/dsk/mphd?s?
50:     dev="`echo $device | /usr/bin/cut -d/ -f5`"
51: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
52: then
53:   if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
54:   then
55:       # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
56:       dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
57:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
58:       dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
59:       device="`echo $device | /usr/bin/cut -d: -f1`"
60:   else
61:       # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
62:       dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
63:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
64:   fi
65: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
66: then
67:   # /dev/vx/dsk/volume -> _vx_rootdg_volume
68:   # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
69:   dev=_vx_"`echo $device | /usr/bin/awk -F¥/ '{ if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
70: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
71: then
72:   # /dev/vx/dmp/device -> _vx_pv_device
73:   dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
74: else
75:   exit 0
76: fi
77: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
78: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
79: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
80:
81: # Confirmation of post-processing
82: if [ ! -r $post_file ]
83: then
84:   exit 0
85: fi
86: post="`/usr/bin/cat $post_file`"
87:
88: # Confirmation of FStype
89: if [ ! -r $fstype_file ]
90: then
91:   fs=""
92: else
93:   fs="`/usr/bin/cat $fstype_file`"
94: fi
95:
96: # No processing
97: if [ "$post" = "none" ]
98: then
99:   /usr/bin/rm -rf $post_file 2> /dev/null
100:   /usr/bin/rm -rf $fstype_file 2> /dev/null
101:   exit 0
102: fi
103:
104: # mount processing
105: if [ "$post" = "mount" ]
106: then
107:   /usr/bin/df -l $device > /dev/null 2>&1
108:   if [ $? != 0 ]
109:   then
```

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```
110:        if [ ! -r $fstype_file ]
111:        then
112:            /usr/sbin/mount $device $mount_point 2> /dev/null
113:        else
114:            if [ "$fs" = "" ]
115:            then
116:                /usr/sbin/mount $device $mount_point 2> /dev/null
117:            else
118:                /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
119:            fi
120:        fi
121:        if [ $? != 0 ]
122:        then
123:            retry_count=3
124:            sleep_time=1
125:            result_flag=1
126:
127:            while [ $retry_count -gt 0 ]
128:            do
129:                if [ ! -r $fstype_file ]
130:                then
131:                    /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
132:                else
133:                    if [ "$fs" = "" ]
134:                    then
135:                        /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
136:                    else
137:                        /usr/sbin/mount -F $fs $device $mount_point >
$err_log_path/$dev.mount 2>&1
138:                    fi
139:                            fi
140:                if [ $? != 0 ]
141:                then
142:                    retry_count=`expr $retry_count - 1`
143:                    /usr/bin/sleep $sleep_time
144:                else
145:                    /usr/bin/rm -f $err_log_path/$dev.mount
146:                    result_flag=0
147:                    break
148:                fi
149:            done
150:
151:            if [ $result_flag != 0 ]
152:            then
153:                exit 11
154:            fi
155:        fi
156:    fi
157:    /usr/bin/rm -rf $post_file 2> /dev/null
158:    /usr/bin/rm -rf $fstype_file 2> /dev/null
159:    exit 0
160: fi
161:
162: # fsck processing
163: if [ "$post" = "fsck" ]
164: then
165:    /usr/sbin/lockfs -u $mount_point > /dev/null 2>&1
166:    if [ -r $bd_file ]
167:    then
168:        bk_device="`/usr/bin/cat $bd_file`"
```

```
169:        fsck_dev="`echo $bk_device | /usr/bin/sed "s/¥/dsk¥//¥/rdsk¥//"`"
170:        if [ ! -r $fstype_file ]
171:        then
172:            /usr/sbin/fsck -m $fsck_dev > /dev/null 2>&1
173:        else
174:            if [ "$fs" = "" ]
175:            then
176:                /usr/sbin/fsck -m $fsck_dev > /dev/null 2>&1
177:            else
178:                if [ "$fs" = "sfxfs" ]
179:                then
180:                    /usr/sbin/sfxadm $fsck_dev > /dev/null 2>&1
181:                    /usr/sbin/fsck -y -F $fs -o p,log $fsck_dev > /dev/null 2>&1
182:                else
183:                    /usr/sbin/fsck -m -F $fs $fsck_dev > /dev/null 2>&1
184:                fi
185:            fi
186:        fi
187:        if [ $? != 0 ]
188:        then
189:            if [ "$fs" = "" ]
190:            then
191:                result="`/usr/sbin/fsck -n $fsck_dev |/usr/bin/grep ¥?`"
192:            else
193:                result="`/usr/sbin/fsck -n -F $fs $fsck_dev |/usr/bin/grep ¥?`"
194:            fi
195:            if [ "$result" = "FILE SYSTEM STATE IN SUPERBLOCK IS WRONG; FIX?  no" ]
196:            then
197:                if [ "$fs" = "" ]
198:                then
199:                    /usr/sbin/fsck -y $fsck_dev > $err_log_path/$dev.fsck 2>&1
200:                else
201:                    /usr/sbin/fsck -y -F $fs $fsck_dev > $err_log_path/$dev.fsck
2>&1
202:                fi
203:                if [ $? != 0 ]
204:                then
205:                    exit 12
206:                else
207:                    /usr/bin/rm -f $err_log_path/$dev.fsck
208:                fi
209:            else
210:                echo "$result" > $err_log_path/$dev.fsck 2>&1
211:                exit 12
212:            fi
213:        fi
214:    fi4
215:    /usr/bin/rm -rf $post_file 2> /dev/null
216:    /usr/bin/rm -rf $fstype_file 2> /dev/null
217:    /usr/bin/rm -rf $bd_file 2> /dev/null
218:    exit 0
219: fi
220:
221: exit
```

When cluster operation by VERITAS Cluster Server

Customization of a pre-processing and post-processing script is required, when, in using a VERITAS Cluster Server, the mount point of a transaction volume is registered into the cluster environment.

You need to modify the unmount/mount commands in pre-processing and post-processing script into offline/online commands of 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] unmount processing change of backup pre-processing script (OpcBackup.pre)
[lines 106, 115]

(Before change)	/usr/sbin/umount $mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name -sys system-name

[Example] unmount wait processing addition of backup pre-processing script (OpcBackup.pre)
[line 135]

(addition)	while /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

[Example] mount processing change of backup post-processing script (OpcBackup.post)
[lines 112, 116, 118, 131, 135, 137]

(Before change)	/usr/sbin/mount $device $mount_point or /usr/sbin/mount -F $fs $device $mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name -sys system-name

[Example] mount wait processing addition of backup post-processing script (OpcBackup.post)
[line 157]

(addition)	until /usr/sbin/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.

In pre-processing, the mount state of the transaction volume is determined using its name, and the following processing is then performed:

Table: Pre-processing for a transaction volume

Transaction volume status	Pre-processing
Mounted	Unmount the transaction volume.
Unmounted	Take no action.

Post-processing tasks will be determined by what has occurred in pre-processing.

Table: Pre-processing and post-processing for restoration

Pre-processing	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 instructions as appropriate to the shell script.

When customizing a script, strictly observe the following rules regarding error code:

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

Note

If post-processing fails, execute the Resource match command (swstsrsemtch) because the consistency of resource information may be incomplete.

A.3.1 Pre-processing of restoration

The name of the shell script for pre-processing before restore processing is as follows.

● In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.pre
```

● In the case of cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.pre
```

The shell script contents are as follows

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
 5:
 6: #
 7: #    Pre-processing of restoration processing
 8: #
 9: #      Argument: $1 Device name of transaction disk
10: #                $2 Mount point of transaction disk
11: #
12: # Error number
13: #      2: Argument error
14: #     10: umount error
15:
```

```
16:
17: # Argument check
18: case $# in
19: 1)
20:    ;;
21: 2)
22:    ;;
23: *)
24:    exit 2
25:    ;;
26: esac
27:
28: device="`echo $1`"
29: mount_point="`echo $2`"
30:
31: # Determination of post-processing file name
32:
33: if [ "$SWSTGNODE" != "" ]
34: then
35: swstg_node="/`echo $SWSTGNODE`"
36: else
37: swstg_node=""
38: fi
39:
40: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
41:
42: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
43: then
44:    # /dev/dsk/c?t?d?s? -> c?t?d?s?
45:    dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
46: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
47: then
48:    # /dev/FJSVmphd/dsk/mplb?s? -> /dev/FJSVmphd/dsk/mplb?s?
49:    # /dev/FJSVmphd/dsk/mphd?s? -> /dev/FJSVmphd/dsk/mphd?s?
50:    dev="`echo $device | /usr/bin/cut -d/ -f5`"
51: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
52: then
53:    if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
54:    then
55:       # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
56:       dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
57:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
58:       dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
59:       device="`echo $device | /usr/bin/cut -d: -f1`"
60:    else
61:       # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
62:       dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
63:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
64:    fi
65: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
66: then
67:    # /dev/vx/dsk/volume -> _vx_rootdg_volume
68:    # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
69:    dev=_vx_"`echo $device | /usr/bin/awk -F¥/ '{ if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
70: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
71: then
72:    # /dev/vx/dmp/device -> _vx_pv_device
73:    dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
74: else
75:    exit 0
76: fi
```

```
 77: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 78: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 79: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 80:
 81: if [ "$mount_point" != "" ]
 82: then
 83:
 84: # When device can be unmounted
 85: #
 86:    /usr/bin/df -ln $mount_point | /usr/bin/cut -f2 -d: | /usr/bin/cut -f2 -d' '
> $fstype_file
 87:    /usr/sbin/umount $mount_point 2> /dev/null
 88:    if [ $? != 0 ]
 89:    then
 90:        retry_count=3
 91:        sleep_time=1
 92:        result_flag=1
 93:
 94:        while [ $retry_count -gt 0 ]
 95:        do
 96:            /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
 97:            if [ $? != 0 ]
 98:            then
 99:                retry_count=`expr $retry_count - 1`
100:                /usr/bin/sleep $sleep_time
101:            else
102:                /usr/bin/rm -f $err_log_path/$dev.umount
103:                result_flag=0
104:                break
105:            fi
106:        done
107:
108:        if [ $result_flag != 0 ]
109:        then
110:            /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
111:            /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
112:
113:            exit 10
114:        fi
115:    fi
116:    echo "mount" > $post_file
117:
118: # When device was not mounted
119: #
120: else
121:    echo "none" > $post_file
122: fi
123:
124: exit 0
```

Restore processing is not possible on a mounted transaction volume that cannot be unmounted.
Specify a device at the restore destination.

A.3.2 Post-processing of restoration

The name of the shell script for post-processing after restore processing is as follows.
● In the case of non-cluster operation

```
/etc/opt/FJSVswsts/sh/OpcRestore.post
```

● In the case of non-cluster operation

```
/etc/opt/FJSVswsts/<logic node name>/sh/OpcRestore.post
```

The shell script contents are as follows

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
 5:
 6: #
 7: #    Post-processing of restoration processing
 8: #
 9: #      Argument: $1 Device name of transaction disk
10: #               $2 Mount point of transaction disk
11: #
12: # Error number
13: #       2: Argument error
14: #      11: mount error
15:
16: # Argument check
17: case $# in
18: 1)
19:   ;;
20: 2)
21:   ;;
22: *)
23:   exit 2
24:   ;;
25: esac
26:
27: device="`echo $1`"
28: mount_point="`echo $2`"
29:
30: # Determination of post-processing file name
31:
32: if [ "$SWSTGNODE" != "" ]
33: then
34: swstg_node="/`echo $SWSTGNODE`"
35: else
36: swstg_node=""
37: fi
38:
39: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
40:
41: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
42: then
43:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
44:   dev="`echo $device | /usr/bin/sed "s/\/dev\/dsk\///"`"
45: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
46: then
47:   # /dev/FJSVmphd/dsk/mplb?s? -> /dev/FJSVmphd/dsk/mplb?s?
48:   # /dev/FJSVmphd/dsk/mphd?s? -> /dev/FJSVmphd/dsk/mphd?s?
49:   dev="`echo $device | /usr/bin/cut -d/ -f5`"
50: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
51: then
52:   if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
53:   then
54:       # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
55:       dev="`echo $device | /usr/bin/sed "s/\/dev\/sfdsk\///"`"
56:       dev="`echo $dev | /usr/bin/sed "s/\/dsk\//_/"`"
57:       dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
58:       device="`echo $device | /usr/bin/cut -d: -f1`"
59:   else
```

```
 60:        # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
 61:        dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
 62:        dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
 63:   fi
 64: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
 65: then
 66:    # /dev/vx/dsk/volume -> _vx_rootdg_volume
 67:    # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
 68:    dev=_vx_"`echo $device | /usr/bin/awk -F¥/ '{ if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
 69: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
 70: then
 71:    # /dev/vx/dmp/device -> _vx_pv_device
 72:    dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
 73: else
 74:    exit 0
 75: fi
 76: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
 77: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
 78: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
 79:
 80: # Confirmation of post-processing
 81: if [ ! -r $post_file ]
 82: then
 83:    exit 0
 84: fi
 85: post="`/usr/bin/cat $post_file`"
 86:
 87: # Confirmation of FStype
 88: if [ ! -r $fstype_file ]
 89: then
 90:    fs=""
 91: else
 92:    fs="`/usr/bin/cat $fstype_file`"
 93: fi
 94:
 95: # No processing
 96: if [ "$post" = "none" ]
 97: then
 98:    /usr/bin/rm -rf $post_file 2> /dev/null
 99:    /usr/bin/rm -rf $fstype_file 2> /dev/null
100:    exit 0
101: fi
102:
103: # mount processing
104: if [ "$post" = "mount" ]
105: then
106:    /usr/bin/df -l $device > /dev/null 2>&1
107:    if [ $? != 0 ]
108:    then
109:        if [ ! -r $fstype_file ]
110:        then
111:           /usr/sbin/mount $device $mount_point 2> /dev/null
112:        else
113:            if [ "$fs" = "" ]
114:            then
115:               /usr/sbin/mount $device $mount_point 2> /dev/null
116:            else
117:                if [ "$fs" = "sfxfs" ]
118:                then
119:                   dev="`echo $device | /usr/bin/sed "s/¥/dsk¥//¥/rdsk¥//"`"
120:                   /usr/sbin/sfxadm $dev > /dev/null 2>&1
```

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```
121:            fi
122:            /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
123:        fi
124:    fi
125:    if [ $? != 0 ]
126:    then
127:        retry_count=3
128:        sleep_time=1
129:        result_flag=1
130:
131:        while [ $retry_count -gt 0 ]
132:        do
133:            if [ ! -r $fstype_file ]
134:            then
135:                /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
136:            else
137:                if [ "$fs" = "" ]
138:                then
139:                    /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
140:                else
141:                    if [ "$fs" = "sfxfs" ]
142:                    then
143:                        dev="`echo $device | /usr/bin/sed
"s/¥/dsk¥//¥/rdsk¥//"`"
144:                        /usr/sbin/sfxadm $dev > $err_log_path/$dev.sfxadm
2>&1
145:                    fi
146:                    /usr/sbin/mount -F $fs $device $mount_point >
$err_log_path/$dev.mount 2>&1
147:                fi
148:            fi
149:            if [ $? != 0 ]
150:            then
151:                retry_count=`expr $retry_count - 1`
152:                /usr/bin/sleep $sleep_time
153:            else
154:                /usr/bin/rm -f $err_log_path/$dev.mount
155:                result_flag=0
156:                break
157:            fi
158:        done
159:
160:        if [ $result_flag != 0 ]
161:        then
162:            exit 11
163:        fi
164:    fi
165: fi
166: /usr/bin/rm -rf $post_file 2> /dev/null
167: /usr/bin/rm -rf $fstype_file 2> /dev/null
168: exit 0
169: fi
170:
171: exit 0
```

When cluster operation by VERITAS Cluster Server

Customization of a pre-processing and post-processing script is required, when, in using a VERITAS Cluster Server, the mount point of a transaction volume is registered into the cluster environment.

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You need to modify the unmount/mount commands in pre-processing and post-processing script into offline/online commands of 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] unmount processing change of restoration pre-processing script (OpcRestore.pre)
[lines 87, 96]

(Before change)	/usr/sbin/umount $mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name *-sys system-name*

[Example] unmount wait processing addition of restoration pre-processing script (OpcRestore.pre)
[line 116]

(addition)	while /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

[Example] mount processing change of restoration post-processing script (OpcRestore.post)
[lines 111, 115, 122, 135, 139, 146]

(Before change)	/usr/sbin/mount $device $mount_point or /usr/sbin/mount -F $fs $device $mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name *-sys system-name*

[Example] mount wait processing addition of restoration post-processing script (OpcRestore.post)
[line 166]

(addition)	until /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

Appendix B Sample Shell Script for Backup Operations

This appendix describes sample scripts for AdvancedCopy Manager.
A sample script allows you to back up data on a transaction volume by using AdvancedCopy Manager.

Point

This section explains how the sample shell script is created for the backup management function.   This script can be used as a reference template and modified accordingly for use with the replication management function, when copying Oracle databases.

B.1 Overview

Use AdvancedCopy Manager to back up a transaction volume.

AdvancedCopy Manager provides some sample shell scripts for backup processing.

The systems administrator must modify the sample shell scripts by modifying them accordingly for their specific operating environment before applying them to live backup operations.

Sample scripts provided for AdvancedCopy Manager are created assuming that the following versions of Oracle are used. If you use any other version, the scripts need to be modified for those versions as required.

- ● Oracle8i Release 8.1.x

B.2 Backup and Restoration of a Transaction volume

B.2.1 Backup procedure

The following shows an overview of the backup procedure.

1. Checking the work operational status
   Check whether any applications are accessing the transaction volume/s.
2. Stoppage of live operational processing
   For any live work in progress in 1, ensure the contents of each transaction volume are consistent.
3. Disk backup
   Create backup copies of transaction volumes by using the backup function of AdvancedCopy Manager.
4. Resumption of live operational processing
   For any live work in progress in 1, restart live processing

Figure: Backup method
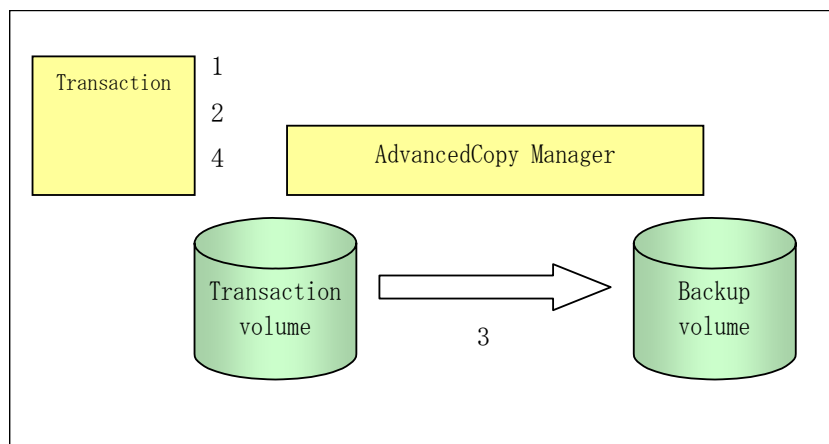
B.2.2 Restoration procedure

The following shows an overview of performing restoration from a backup tape.

1. Checking the work operational status
   Check that all live operational processing is stopped. If live operational processing is in operation, completely stop all live operational processing.
2. Restore
   Use the restoration function of AdvancedCopy Manager to perform restoration from the backup volume to the transaction volume.
3. Restart live operational processing.

Figure: Restore method
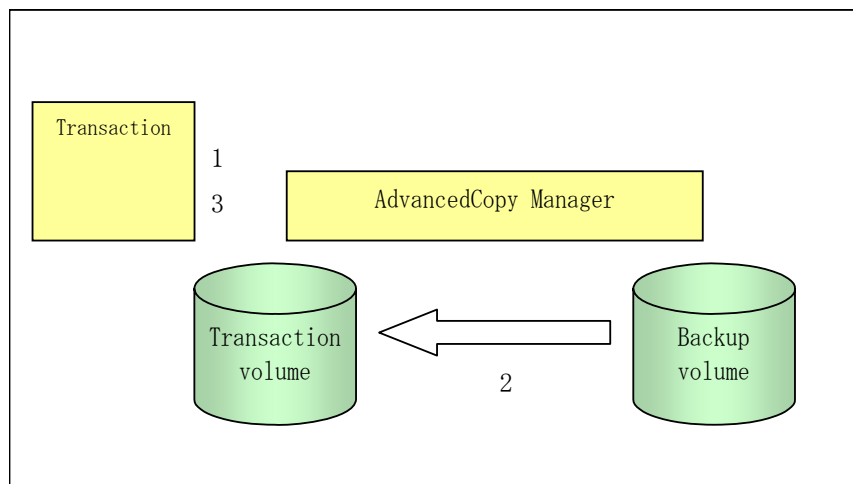
B.3 Sample Shell Scripts

B.3.1 Overview of sample shell scripts

The sample shell scripts provided by AdvancedCopy Manager are summarized below. These sample shell scripts are stored in the /etc/opt/FJSVswsts/samp directory.

Table: Sample shell scripts

No.	Type	Script name	Associated transaction	Associated resource type
1	Collection of DB information	swst_or_iv	Oracle transaction	-
2	Backup	swst_or_fs_bk	Oracle transaction, general file transaction	File system
3	Backup	swst_or_rd_bk	Oracle transaction	Raw device

Collecting DB information

The script "swst_or_iv" outputs the following information of an Oracle database.
Output file names and their contents are as follows:

- ● spdata.lst: List of table space names and storage destinations
- ● spdata.srt: Sorted results of spdata.lst using the storage destination as the key
- ● spdata.bgn: Command in the following format
  tablespace: Table-space-name begin backup
- ● spdata.end: Command in the following format
  tablespace: Table-space-name end backup
- ● spcont.lst: Control file information of an Oracle database
- ● splog.lst: Log file information of an Oracle database

The above files are used as reference sources for information used in creating shell scripts for backup processing.

> **Note**
>
> For Oracle 9i or later, replace the "svrmgrl" command used in "swst_or_iv" with the sqlplus command.

a. Start

```
Swst_or_iv
```

b. Usage example

```
# swst_or_iv
swst_or_iv completed.
```

c. Result example

```
spdata.lst
TABLESPACE-NAME                 DEVICE-NAME


-------------------- ------------------------------------------------
ORA10           /ora1/ora0.dbf

ORA20           /ora2/ora0.dbf

RBS             /oracle/ora/oradata/rbs01.dbf
```

```
SYSTEM              /oracle/ora/oradata/system01.dbf

TEMP                /oracle/ora/oradata/temp01.dbf

TOOLS               /oracle/ora/oradata/tools01.dbf

USERS               /oracle/ora/oradata/users01.dbf

spdata.bgn

alter tablespace ORA10 begin backup;

alter tablespace ORA20 begin backup;

alter tablespace RBS begin backup;

alter tablespace SYSTEM begin backup;

alter tablespace TEMP begin backup;

alter tablespace TOOLS begin backup;

alter tablespace USERS begin backup;

spdata.end

alter tablespace ORA10 end backup;

alter tablespace ORA20 end backup;

alter tablespace RBS end backup;

alter tablespace SYSTEM end backup;

alter tablespace TEMP end backup;

alter tablespace TOOLS end backup;

alter tablespace USERS end backup;

spcont.lst

NAME                    TYPE    VALUE


-------------------------------- ------- -----------------------------
control_files       string  /oracle/ora/oradata/control

splog.lst

NAME                    TYPE    VALUE


-------------------------------- ------- -----------------------------

log_archive_dest    string  /oracle/ora/oradata/archive
```

d.   Processing outline

```
#!/bin/sh
```

```
reterr() --- An error message is output before an error is returned.
sqldata()


{
sqlplus AAA/BBB <<!
SELECT --- Acquire Oracle table space information.


}
sqllog()


{
svrmgrl <<!
show --- Acquire Oracle log information.


}
sqlcont()


{
svrmgrl <<!
show --- Acquire Oracle control information.


}

# main()

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Acquisition of Oracle table space information
sqldata() invocation --- Acquire Oracle table space information

# 2) Acquisition of Oracle log information
sqllog() invocation --- Acquire Oracle log information

# 3) Acquisition of Oracle control information
sqlcont() invocation --- Acquire Oracle control information

exit 0
```

File system backup

> The "swst_or_fs_bk" script runs AdvancedCopy Manager to back up an Oracle database on the file
> system and business data using general files.
> Live data is copied to the backup volumes of AdvancedCopy Manager. These scripts apply to steps
> 2 to 5 in "Backup procedure."
> a. Start

```
Swst_or_fs_bk  {-a | -i} <mount-point-name>
```

> b.   Explanation of operands

```
-a  Specify when processing using an Oracle database is active.   The start of backup
 processing is declared to the Oracle server.
```

```
-i  Specify when processing using an Oracle database is stopped or the file is a general
    file.  The start of backup processing is not declared to the Oracle server.
mount-point-name  Specifies the name of the mount point targeted for backup.
```

c. Example of using swst_or_fs_bk

```
While business is active, back up /gyoumu_db in which an Oracle database is located.
#  swst_or_fs_bk  -a  /gyoumu_db
swst_or_fs_bk  completed. ( /gyoumu_db -> /dev/dsk/c1t3d0s2/gyoumu_db_SW at 23:00 on
1999.11.01 )
```

d. Processing outline of swst_or_fs_bk

```sh
#!/bin/sh
usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
chkmp() --- Check for a mount point
get_mp_blk() --- Conversion from a mount point to a device
getfs() --- Conversion from a mount point to a file system type
sqlbegin()


{
sqlplus AAA/BBB <<!
alter system switch logfile;
alter system flush shared_pool;
alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.


}
sqlend()


{
sqlplus AAA/BBB <<!
alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.


}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy
Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and mount point check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
```

```
swstbackup $UDBLK --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
BDBLK="`getbd $UDBLK`" --- Fetch a backup volume as a character device.
BDDATE="`getdate $UDBLK`"--- Fetch the backup date.
BDTIME="`gettime $UDBLK`"--- Fetch the backup time.

exit 0
```

Raw device backup

The script "swst_or_rd_bk" runs AdvancedCopy Manager to back up live data of an Oracle database on a raw device.
Live data is copied to work disks prepared by users.
These scripts apply to steps 2 to 5 in "Backup procedure."

a. Start

```
Swst_or_rd_bk  {-a | -i}  <device name>
```

b. Explanation of operands

```
-a  Specify when live processing using an Oracle database is active.   The start of backup
 processing is declared to the Oracle server.
-i  Specify when live processing using an Oracle database is stopped or the file is a
 general file.   The start of backup processing is not declared to the Oracle server.
device name  Specify the name of the raw device partition targeted for backup.
```

c. Example of using swst_or_rd_bk

```
While live processing is active, back up /dev/rdsk/c0t0d0s0 in which an Oracle database
is located.
# swst_or_rd_bk  -a  /dev/rdsk/c0t0d0s6
swst_or_rd_bk  completed. ( /dev/rdsk/c0t0d0s6 -> /dev/rdsk/c1t3d0s2 at 23:01 on
1999.11.01 )
```

d. Processing outline of swst_or_rd_bk

```
#!/bin/sh

usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
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 AAA/BBB <<!
alter system switch logfile;
alter system flush shared_pool;
alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.


}
sqlend()


{
sqlplus AAA/BBB <<!
alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.


}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy
Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and raw device check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $SRC --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
DSTBLK="`getbd $SRC`" --- Fetch a backup volume.
DST="`get_blk_chr $DSTBLK`"
BKDATE="`getdate $SRC`"
BKTIME="`gettime $SRC`"

exit 0
```

B.3.2 Applying the sample shell scripts
DB information collection

Sample shell script update
Modify the following statements of "swst_or_iv" for the specific live operational environment.
The following numbers correspond to those in the scripts.

- ● 0) Environmental variable setting
- ● 1) Acquisition of Oracle table space information
- ● 2) Acquisition of Oracle log information
- ● 3) Acquisition of Oracle control information

The statements 1) to 3) above change Oracle account information.

These scripts can operate only on live transaction servers of AdvancedCopy Manager.

File system backup

AdvancedCopy Manager setup

Set up backup volumes so that the mount point targeted for backup is backed up correctly in AdvancedCopy Manager.

The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Modify the following statements of "swst_or_fs_bk" for the specific live operational environment.

The following numbers correspond to those in the scripts.

- ● 0) Environmental variable setting
- ● 1) Notification issued to Oracle of the start of backup
- ● 3) Notification issued to Oracle of the stopping of backup

The statements 1) and 3) above refer to the "spdata.bgn" and "spdata.end" files created by "swst_or_iv".

These scripts can operate only on transaction servers of AdvancedCopy Manager.

Raw device backup

AdvancedCopy Manager setup

Set up backup volumes so that the raw device targeted for backup is backed up correctly in AdvancedCopy Manager.

The generations of the backup volumes to be managed are arbitrary.

Sample shell script update

Modify the following statements of swst_or_rd_bk for the specific live operational environment.

The following numbers correspond to those in the scripts.

- ● 0) Environmental variable setting
- ● 1) Notification issued to Oracle of the start of backup
- ● 3) Notification issued to Oracle of the stopping of backup

The statements 1) and 3) above refer to the files "spdata.lst", "spdata.srt", "spdata.bgn", "spdata.end", "splog.lst" and "spcont.lst" files created by "swst_or_iv".

These scripts can operate only on transaction servers of AdvancedCopy Manager.

Recording and managing the backup volume name and processing time

After executing the shell script, a backup volume name and the processing time are displayed. This information is needed if a restoration is required to be performed. Therefore, the backup volume name and processing time displayed after execution of a shell script must be recorded accordingly.

B.3.3 Restore Method

File system

Use the restore function of AdvancedCopy Manager for restore processing.

Raw device

Use the restore function of AdvancedCopy Manager for restore processing.

B.3.4 Notes about using the sample shell scripts

Oracle resource location

Store Oracle data files and files other than data files on separate disks or in separate slices.

Backup operation of Oracle resources

1. Initialization parameter file
Every time a change occurs, the cp command of the OS is executed for backup.
2. Control files
   a. It is recommended that mirroring is used with Oracle.
   b. If a change is made in the DB environment, use the following command to create a trace file. If a control file is destroyed, execute the SQL statement in the trace file to recover the control file.
      alter database backup control file to trace;
3. Data files
   a. The recommended location of data files is on a raw device.
   b. To store a data file on the file system, disable the automatic extended function of the data file (AUTOEXTEND OFF). Customization of the sample shell script is required to prevent unmounting during context processing.
   c. Create backup copies in AdvancedCopy Manager.
   d. The range of table space targeted for backup must be within the unit of synchronous backup processing (begin backup/end backup) in Oracle and the unit of backup in AdvancedCopy Manager. For example, if backup copies must be created in units of LUNs in AdvancedCopy Manager, place one table space in one LUN.
   e. Archive all of the latest logs by executing the following command after backing up all table spaces in the system:
      alter system archive log current;
4. REDO files
   a. It is recommended to mirror online REDO log files and archive log files using Oracle or the OS.
   b. No online REDO log file needs to be backed up.

   For online backup operations, the target Oracle database must use an archive log.

Recovery of Oracle databases

After the Oracle database has stopped, restore the database, and restart it. To recover the database to the latest state, use the recovery function of Oracle.

Appendix C Pre-processing and Post-processing of Replication

This chapter explains the shell scripts that perform the pre- and post-processing of replication in AdvancedCopy Manager.

C.1 Overview

The shell scripts that perform the pre- and post-processing of replication start before and after replication (copy) processing.

These shell scripts contain processing statements required by AdvancedCopy Manager for the copy source volume and copy destination volume.
This chapter describes the setup of pre-processing and post-processing.

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

Pre-processing and post-processing for Replication in AdvancedCopy Manager needs to be performed for both the replication source volume and the replication destination volume. However, the purpose for each is different.

● Pre-processing and post-processing for a replication source volume
The purpose of the processing is to freeze the replication source data in a state in which consistency is temporarily ensured. Replication source data is frozen temporarily in pre-processing, and after the replication has been created, the frozen status is released in post-processing.
● Pre-processing and post-processing for a replication destination volume
The purpose of the processing is to prevent any application from accessing a replication destination volume during replication (copy) processing. In pre-processing, replication data for the destination is placed in access-disabled status, and after the replication has been created, this status is released in post-processing.

Specific processing performed in pre-processing and post-processing varies according to the data on the volume. The next section describes the pre-processing and post-processing of a file system.

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, this processing consists of allocating and canceling a drive letter.) The pre-processing and post-processing for the replication source volume ensure that the integrity of the replication source data is maintained. The pre-processing and post-processing for the replication destination volume are performed to prevent access from other processes during synchronization processing and snapshot copying. If no volume is mounted, the pre-processing and post-processing are not performed.
If the replication source/destination volume is a Logical Unit (disk), pre-processing and post-processing are not performed for the slices included in the Logical Unit (disk). Therefore, the slices included in the Logical Unit (disk) must be unmounted before creating a replica, and the unmounted slices must be mounted after the replica is made.
The implementation status of the pre-processing and post-processing for a file system is shown below. This table shows whether pre-processing and post-processing are performed depending on the command type. It also shows the copy status upon execution of the command.

Table: Pre-processing and post-processing for a file system

| Command	Copy status	Source/target	Pre-processing	Post-processing
Replication start command (swsrpstartsync)	uncopy or replication establishment	Source	X	X
		target	O--*1	X
Replication making command (for synchronous replication) (swsrpmake)	equivalence maintenance	Source	O	O
		target	X	O--*2
Replication cancellation command (swsrpcancel)	equivalence maintenance	Source	O	O
		target	X	O--*2
	Replication establishment	Source	X	X
		target	X	X
	copying	Source	X	X
		target	X	X
Replication making command (for snapshot replication) (swsrpmake)	uncopy	Source	O	O
		target	O	O

O: executed
X : not executed

The post-processing for the pre-processing performed in (1) is performed in (2). In the post-processing in (2), a mount is performed for the mount point where unmount was performed in the pre-processing in (1).

The pre-processing and post-processing for a file system can be customized. The processing is started in accordance with the table above when a replication management command is executed. For replication between servers, these scripts are executed by remote execution by TCP/IP in the pre-processing and post-processing of a volume that is not connected.

The operation image of before and after processing is shown in the figure below.

Figure: Synchronized replication processing
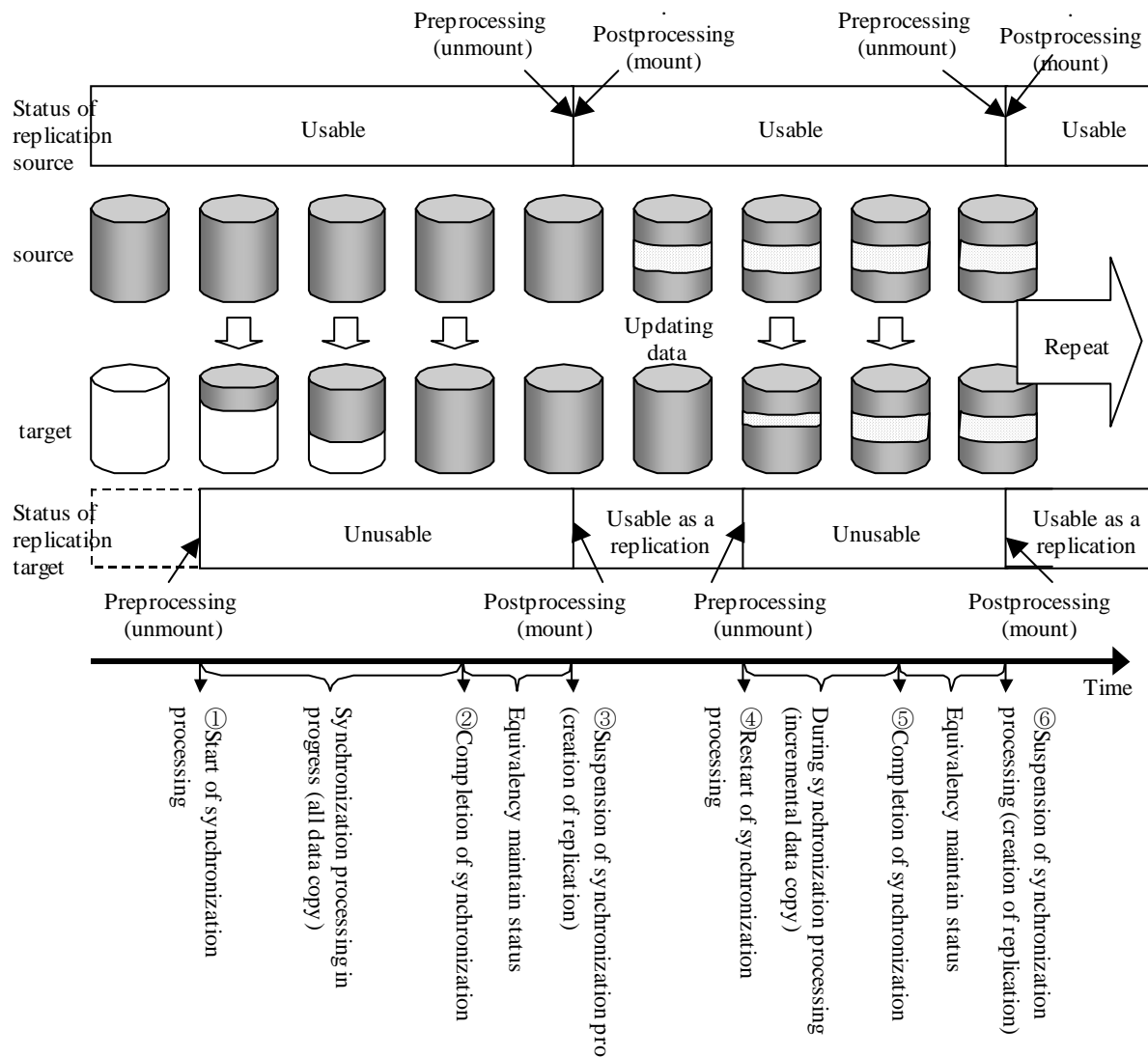
If additional instructions are to be performed over and above the standard pre-processing and post-processing that is required, the scripts must be customized accordingly with the required statements.

When customizing a script, strictly observe the following rules regarding error code:

Table: Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

AdvancedCopy Manager does not support any functions for the pre-processing and post-processing of a database.　You will need to manually perform your own pre-processing and post-processing before and after the execution of an AdvancedCopy Manager command.

C.2.2　Pre-processing when replication is executed

The replication source volume (RepSrcPre.js) and the replication destination volume (RepDstPre.js) are prepared for a pre-processing script, and it is stored using the following path.
Please customize a script according to your specific requirements.

● In the case of non-cluster operation

```
/etc/opt/FJSVswsrp/sh directory subordinate
```

● In the case of cluster operation

```
/etc/opt/FJSVswsrp/<logic node name>/sh directory subordinate
```

● RepSrc.pre (copy source volume script)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
 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:
16: # Argument check
17: case $# in
18: 2)
19:   ;;
20: *)
21:   exit 2
22:   ;;
23: esac
24:
25: device=$1
26: mount_point=$2
27:
28: # Determination post-processing file name
29: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
30: then
31:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
32:   dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
33: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
34: then
35:   # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
36:   # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
37:   dev="`echo $device | /usr/bin/cut -d/ -f5`"
38: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
39: then
40:   if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
```

```
41:    then
42:        # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
43:        dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
44:        dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
45:        dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
46:        device="`echo $device | /usr/bin/cut -d: -f1`"
47:    else
48:        # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
49:        dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
50:        dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
51:    fi
52: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
53: then
54:    # /dev/vx/dsk/volume -> _vx_rootdg_volume
55:    # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
56:    dev=_vx_"`echo $device | /usr/bin/awk -F¥/ ' { if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
57: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
58: then
59:    # /dev/vx/dmp/device -> _vx_pv_device
60:    dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
61: else
62:    exit 0
63: fi
64: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
65: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
66:
67: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
68:
69: if [ "$mount_point" != "" ]
70: # When device was mounted
71: #
72: then
73:
74: # When device cannot be unmounted
75: #
76: # if [ "$device" = "/dev/dsk/cXtXdXsX" -o "$device" = "/dev/dsk/cYtYdYsY" ]
77: # then
78: #     /usr/sbin/lockfs -w $mount_point > /dev/null 2>&1
79: #     sync
80: #     sync
81: #     echo "lockfs,$mount_point" > $post_file
82: #
83: # When device can be unmounted
84: #
85: # else
86: #
87:         /usr/bin/df -ln $mount_point | /usr/bin/cut -f2 -d: | /usr/bin/cut -f2
-d' ' > $fstype_file
88:
89:         /usr/sbin/umount $mount_point 2>/dev/null
90:
91:         if [ $? != 0 ]
92:         then
93:             retry_count=3
94:             sleep_time=1
95:             result_flag=1
96:
97:             while [ $retry_count -gt 0 ]
98:             do
99:                 /usr/sbin/umount $mount_point > $err_log_path/$dev.umount
2>&1
100:                 if [ $? != 0 ]
```

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```
101:                    then
102:                        retry_count=`expr $retry_count - 1`
103:                        /usr/bin/sleep $sleep_time
104:                    else
105:                        /usr/bin/rm -f $err_log_path/$dev.umount
106:                        result_flag=0
107:                        break
108:                    fi
109:                done
110:
111:                if [ $result_flag != 0 ]
112:                then
113:                    /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser
2>&1
114:                    /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
115:                    exit 10
116:                fi
117:        fi
118:
119:        echo "mount,$mount_point" > $post_file
120:
121: # fi
122:
123: # When device was not mounted
124: #
125: else
126:     echo "none" > $post_file
127: fi
128:
129: exit 0
```

● RepDst.pre (copy destination volume script)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
 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(system error)
14: #       10: umount error
15:
16: # Argument check
17: case $# in
18: 2)
19:     ;;
20: *)
21:     exit 2
22:     ;;
23: esac
24:
25: device=$1
26: mount_point=$2
27:
28: # Determination post-processing file name
```

```
29: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
30: then
31:     # /dev/dsk/c?t?d?s? -> c?t?d?s?
32:     dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
33: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
34: then
35:     # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
36:     # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
37:     dev="`echo $device | /usr/bin/cut -d/ -f5`"
38: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
39: then
40:     if [ "`echo $device | /usr/bin/grep ":"`" != ""    ]
41:     then
42:         # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
43:         dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
44:         dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
45:         dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
46:         device="`echo $device | /usr/bin/cut -d: -f1`"
47:     else
48:         # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
49:         dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
50:         dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
51:         post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
52:     fi
53: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
54: then
55:     # /dev/vx/dsk/volume -> _vx_rootdg_volume
56:     # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
57:     dev=_vx_"`echo $device | /usr/bin/awk -F¥/ '{ if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
58: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
59: then
60:     # /dev/vx/dmp/device -> _vx_pv_device
61:     dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
62: else
63:     exit 0
64: fi
65: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
66:
67: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
68:
69: if [ "$mount_point" != "" ]
70: # When device was mounted
71: #
72: then
73:
74:     /usr/sbin/umount $mount_point 2>/dev/null
75:
76:     if [ $? != 0 ]
77:     then
78:             retry_count=3
79:             sleep_time=1
80:             result_flag=1
81:
82:             while [ $retry_count -gt 0 ]
83:             do
84:                 /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
85:                 if [ $? != 0 ]
86:                 then
87:                     retry_count=`expr $retry_count - 1`
88:                     /usr/bin/sleep $sleep_time
89:                 else
90:                     /usr/bin/rm -f $err_log_path/$dev.umount
```

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```
 91:                    result_flag=0
 92:                    break
 93:                fi
 94:            done
 95:
 96:            if [ $result_flag != 0 ]
 97:            then
 98:                /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
 99:                /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
100:                exit 10
101:            fi
102:    fi
103:
104:    echo "mount,$mount_point" > $post_file
105:
106: # When device was not mounted
107: #
108: else
109:    echo "none" > $post_file
110: fi
111:
112: exit 0
```

If you do not want to unmount the copy source volume

To ensure the copy source volume is not unmounted, make the following modifications to the script.

● If you do not want to unmount the copy source volume
Use an editor to remove the comment character ("#") at lines 76 to 81, 85, and 121 in the copy source volume pre-processing script (RepSrc.pre), and specify the target copy source volume name in the if statement on line 76.

● If you do not want to unmount the copy destination volume for the copy source volume
Use an editor to remove the comment character ("#") on lines 84 to 136 in the copy destination volume post-processing script (RepDst.post), and specify the target copy destination volume name in the if statement on line 84.

Ensure that the line numbers quoted above are not changed by the insertion of removal of any special processing statements used in the script.

Ensure these changes are fully tested before applying the script to live backup processing.

This operation is possible only when the file system is one of the following:

● ufs
● SynfinityFILE (single-partition configuration)

The pre-processing and post-processing of the copy source volume in the customized script is described below.

Table: Copy source volume pre-processing and post-processing using the customized script

Copy source volume status	Copy source pre-processing	Copy source post-processing
Mounted	Suppresses updating of the copy source volume	Cancels the suppressed updating of the copy source volume

The pre-processing and post-processing of the copy destination volume in the customized script is described below.

Table: Copy destination volume pre-processing and post-processing using the customized script

Copy destination post-processing
Check of matching of the copy destination volume

Where the standard script is used, the caching of a file system and renewal of subsequent updates are inhibited by unmounting a file system before an advanced copy process using (EC/OPC), the integrity of the data of the entire file system is guaranteed.
Although flushing the cache of a file system and renewal of subsequent updates are inhibited using lockfs-w, when customizing a script to prevent unmounting a file system, data integrity or file consistency can not be guaranteed if the file is in Write Open mode (the database space of Oracle which is supporting on-line backup).

Moreover, when the renewal of metadata is occurring, the data updates to the file system itself are not guaranteed, even with "lockfs" specified.
It is therefore critical to consider this and manage the integrity of data updates accordingly when you elect not to unmount a file system.

If an SDX object is operated in slice units, do not specifya slice name (/dev/sfdsk/(class name)/dsk/(volume name):(sdxinfo DEVNAM value))in Line 76 of the copy source volume pre-processing script (RepSrc.pre) and in Line 84 of the copy destination volume post-processing script (RepDst.post). Instead, specify a logical volume name (/dev/sfdsk/(class name)/dsk/(volume name)).

C.2.3 Post-processing when replication is executed

The replication source volume (RepSrcPost.js) and the replication destination volume (RepDstPost.js) are prepared for a post-processing script, and it is stored in the following directory subordinates. Please customize a script according to your specific requirements.

● In the case of non-cluster operation

```
/etc/opt/FJSVswsrp/sh directory subordinate
```

● In the case of cluster operation

```
/etc/opt/FJSVswsrp/<logic node name>/sh directory subordinate
```

● RepSrc.post (copy source volume script)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
 5:
 6: #
 7: #   Post-processing of Replication(Source) processing
 8: #
 9: #     Argument: $1 Device name of Source disk
10: #
11: # Error number
12: #      2: Argument error
13: #     11: mount error
14:
15: # Argument check
16: case $# in
17: 1)
18:   ;;
19: *)
```

```
20:   exit 2
21:   ;;
22: esac
23:
24: device=$1
25:
26: # Determination of post-processing file name
27: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
28: then
29:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
30:   dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
31: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
32: then
33:   # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
34:   # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
35:   dev="`echo $device | /usr/bin/cut -d/ -f5`"
36: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
37: then
38:   if [ "`echo $device | /usr/bin/grep ":"`" != ""    ]
39:   then
40:       # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
41:       dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
42:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
43:       dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
44:       device="`echo $device | /usr/bin/cut -d: -f1`"
45:   else
46:       # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
47:       dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
48:       dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
49:   fi
50: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
51: then
52:   # /dev/vx/dsk/volume -> _vx_rootdg_volume
53:   # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
54:   dev=_vx_"`echo $device | /usr/bin/awk -F¥/ ' { if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
55: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
56: then
57:   # /dev/vx/dmp/device -> _vx_pv_device
58:   dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
59: else
60:   exit 0
61: fi
62: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
63: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
64:
65: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
66:
67: # Confirmation of post-processing
68: if [ ! -r $post_file ]
69: then
70:   exit 0
71: fi
72: post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
73: mount_point="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
74:
75: # Confirmation of FStype
76: if [ ! -r $fstype_file ]
77: then
78:   fs=""
79: else
80:   fs="`/usr/bin/cat $fstype_file`"
81: fi
```

```
 82:
 83: # No processing
 84: if [ "$post" = "none" ]
 85: then
 86:   /usr/bin/rm -rf $post_file 2> /dev/null
 87:   /usr/bin/rm -rf $fstype_file 2> /dev/null
 88:   exit 0
 89: fi
 90:
 91: # mount processing
 92: if [ "$post" = "mount" ]
 93: then
 94:   /usr/bin/df -l $device > /dev/null 2>&1
 95:   if [ $? != 0 ]
 96:   then
 97:       if [ ! -r $fstype_file ]
 98:       then
 99:           /usr/sbin/mount $device $mount_point 2> /dev/null
100:       else
101:           if [ "$fs" = "" ]
102:           then
103:               /usr/sbin/mount $device $mount_point 2> /dev/null
104:           else
105:               /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
106:           fi
107:       fi
108:       if [ $? != 0 ]
109:       then
110:           retry_count=3
111:           sleep_time=1
112:           result_flag=1
113:
114:           while [ $retry_count -gt 0 ]
115:           do
116:               if [ ! -r $fstype_file ]
117:               then
118:                   /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
119:               else
120:                   if [ "$fs" = "" ]
121:                   then
122:                       /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
123:                   else
124:                       /usr/sbin/mount -F $fs $device $mount_point >
$err_log_path/$dev.mount 2>&1
125:                   fi
126:               fi
127:               if [ $? != 0 ]
128:               then
129:                   retry_count=`expr $retry_count - 1`
130:                   /usr/bin/sleep $sleep_time
131:               else
132:                   /usr/bin/rm -f $err_log_path/$dev.mount
133:                   result_flag=0
134:                   break
135:               fi
136:           done
137:
138:           if [ $result_flag != 0 ]
139:           then
140:               exit 11
141:           fi
```

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```
142:      fi
143:    fi
144:    /usr/bin/rm -rf $post_file 2> /dev/null
145:    /usr/bin/rm -rf $fstype_file 2> /dev/null
146:    exit 0
147: fi
148:
149: # lockfs processing
150: if [ "$post" = "lockfs" ]
151: then
152:    /usr/sbin/lockfs -u $mount_point > /dev/null 2>&1
153:    /usr/bin/rm -rf $post_file 2> /dev/null
154:    /usr/bin/rm -rf $fstype_file 2> /dev/null
155:    exit 0
156: fi
157:
158: exit 0
```

● RepDst.post (copy destination volume script)

```
 1: #!/bin/sh
 2:
 3: # AdvancedCopy Manager
 4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2007
 5:
 6: #
 7: #   Post-processing of Replication(Destination) processing
 8: #
 9: #     Argument: $1 Device name of Destination disk
10: #
11: # Error number
12: #      2: Argument error
13: #     11: mount error
14: #     12: fsck error
15:
16: # Argument check
17: case $# in
18: 1)
19:   ;;
20: *)
21:   exit 2
22:   ;;
23: esac
24:
25: device=$1
26:
27: # Determination of post-processing file name
28: if [ "`echo $device | /usr/bin/grep "/dev/dsk/"`" != "" ]
29: then
30:   # /dev/dsk/c?t?d?s? -> c?t?d?s?
31:   dev="`echo $device | /usr/bin/sed "s/¥/dev¥/dsk¥///"`"
32: elif [ "`echo $device | /usr/bin/grep "/dev/FJSV"`" != "" ]
33: then
34:   # /dev/FJSVmphd/dsk/mplb?s? -> mplb?s?
35:   # /dev/FJSVmphd/dsk/mphd?s? -> mphd?s?
36:   dev="`echo $device | /usr/bin/cut -d/ -f5`"
37: elif [ "`echo $device | /usr/bin/grep "/dev/sfdsk/"`" != "" ]
38: then
39:   if [ "`echo $device | /usr/bin/grep ":"`" != ""   ]
40:   then
```

```
 41:        # /dev/sfdsk/class/dsk/volume:c?t?d? -> class_volume_c?t?d?
 42:        dev="`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
 43:        dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
 44:        dev="`echo $dev | /usr/bin/sed "s/:/_/"`"
 45:        device="`echo $device | /usr/bin/cut -d: -f1`"
 46:    else
 47:        # /dev/sfdsk/class/dsk/volume -> _gds_class_volume
 48:        dev="_gds_`echo $device | /usr/bin/sed "s/¥/dev¥/sfdsk¥///"`"
 49:        dev="`echo $dev | /usr/bin/sed "s/¥/dsk¥//_/"`"
 50:    fi
 51: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dsk/"`" != "" ]
 52: then
 53:    # /dev/vx/dsk/volume -> _vx_rootdg_volume
 54:    # /dev/vx/dsk/disk-group/volume -> _vx_disk-group_volume
 55:    dev=_vx_"`echo $device | /usr/bin/awk -F¥/ ' { if (NF == 6) { print $5"_"$6 }
else print "rootdg_"$5 }'`"
 56: elif [ "`echo $device | /usr/bin/grep "/dev/vx/dmp/"`" != "" ]
 57: then
 58:    # /dev/vx/dmp/device -> _vx_pv_device
 59:    dev=_vx_pv_"`echo $device | /usr/bin/cut -d/ -f5`"
 60: else
 61:    exit 0
 62: fi
 63: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
 64:
 65: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
 66:
 67: # Confirmation of post-processing
 68: if [ ! -r $post_file ]
 69: then
 70:    exit 0
 71: fi
 72: post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
 73: mount_point="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
 74:
 75: # Confirmation of FStype
 76: fs="`/usr/sbin/fstyp $device 2> /dev/null`"
 77: if [ $? != 0 ]
 78: then
 79:    fs=""
 80: fi
 81:
 82: # When source device cannot be unmounted, fsck for destination device is needed
 83: #
 84: #if [ "$device" = "/dev/dsk/cXtXdXsX" -o "$device" = "/dev/dsk/cYtYdYsY" ]
 85: #then
 86: # fsck_dev="`echo $device | sed "s/¥/dsk¥//¥/rdsk¥//"`"
 87: #
 88: # if [ "$fs" = "" ]
 89: # then
 90: #      fsck -m $fsck_dev > /dev/null 2>&1
 91: # else
 92: #      if [ "$fs" = "sfxfs" ]
 93: #      then
 94: #          sfxadm $fsck_dev > /dev/null 2>&1
 95: #          fsck -y -F $fs -o p,log $fsck_dev > /dev/null 2>&1
 96: #      else
 97: #          fsck -m -F $fs $fsck_dev > /dev/null 2>&1
 98: #      fi
 99: # fi
100: # if [ $? != 0 ]
101: # then
102: #      if [ "$fs" = "" ]
```

```
103: #      then
104: #              result="`fsck -n $fsck_dev |grep ¥?`"
105: #      else
106: #              result="`fsck -n -F $fs $fsck_dev |grep ¥?`"
107: #      fi
108: #      if [ "$result" = "FILE SYSTEM STATE IN SUPERBLOCK IS WRONG; FIX?  no" ]
109: #      then
110: #          if [ "$fs" = "" ]
111: #          then
112: #              fsck -y $fsck_dev > /dev/null 2>&1
113: #          else
114: #              fsck -y -F $fs $fsck_dev > /dev/null 2>&1
115: #          fi
116: #          if [ $? != 0 ]
117: #          then
118: #              if [ "$fs" = "" ]
119: #              then
120: #                  fsck -y $fsck_dev > $err_log_path/$dev.fsck 2>&1
121: #              else
122: #                  fsck -y -F $fs $fsck_dev > $err_log_path/$dev.fsck 2>&1
123: #              fi
124: #              if [ $? != 0 ]
125: #              then
126: #                  exit 12
127: #              else
128: #                  rm -f $err_log_path/$dev.fsck
129: #              fi
130: #          fi
131: #      else
132: #          echo "$result" > $err_log_path/$dev.fsck
133: #          exit 12
134: #      fi
135: # fi
136: #fi
137:
138: # No processing
139: if [ "$post" = "none" ]
140: then
141:   /usr/bin/rm -rf $post_file 2> /dev/null
142:   exit 0
143: fi
144:
145: # mount processing
146: if [ "$post" = "mount" ]
147: then
148:   /usr/bin/df -l $device > /dev/null 2>&1
149:   if [ $? != 0 ]
150:   then
151:       if [ "$fs" = "" ]
152:       then
153:           /usr/sbin/mount $device $mount_point 2> /dev/null
154:       else
155:           if [ "$fs" = "sfxfs" ]
156:           then
157:               dev="`echo $device | /usr/bin/sed "s/¥/dsk¥//¥/rdsk¥//"`"
158:               /usr/sbin/sfxadm $dev > /dev/null 2>&1
159:           fi
160:           /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
161:       fi
162:       if [ $? != 0 ]
163:       then
164:           retry_count=3
165:           sleep_time=1
```

```
166:         result_flag=1
167:
168:         while [ $retry_count -gt 0 ]
169:         do
170:             if [ "$fs" = "" ]
171:             then
172:                 /usr/sbin/mount $device $mount_point >
$err_log_path/$dev.mount 2>&1
173:             else
174:                 if [ "$fs" = "sfxfs" ]
175:                 then
176:                     dev="`echo $device | /usr/bin/sed "s/¥/dsk¥//¥/rdsk¥//"`"
177:                     /usr/sbin/sfxadm $dev > $err_log_path/$dev.sfxadm 2>&1
178:                 fi
179:                 /usr/sbin/mount -F $fs $device $mount_point >
$err_log_path/$dev.sfxadm 2>&1
180:             fi
181:             if [ $? != 0 ]
182:             then
183:                 retry_count=`expr $retry_count - 1`
184:                 /usr/bin/sleep $sleep_time
185:             else
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:   /usr/bin/rm -rf $post_file 2> /dev/null
198:   exit 0
199: fi
200:
201: exit 0
```

Cluster operation by VERITAS Cluster Server

Customization of a pre-processing and post-processing script is required, when, in using a VERITAS Cluster Server, the mount point of a transaction volume is registered into the cluster environment.

You need to modify the unmount/mount commands in pre-processing and post-processing script into offline/online commands of 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] unmount processing change of source volume pre-processing script (RepSrc.pre) [lines 89, 99]

(Before change)	/usr/sbin/umount $mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name *-sys system-name*

[Example] unmount wait processing addition of source volume pre-processing script

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(RepSrc.pre)
    [line 118]

(addition)	while /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

[Example]   unmount processing change of destination volume pre-processing script (RepDst.pre)
    [lines 74, 84]

(Before change)	/usr/sbin/umount $mount_point
(after change)	/opt/VRTSvcs/bin/hares -offline resource-name *-sys system-name*

[Example] unmount wait processing addition of destination volume pre-processing script (RepDst.pre)
    [line 103]

(addition)	while /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

[Example] mount processing change of source volume post-processing script (RepSrc.post)
    [lines 99, 103, 105, 118, 122, 124]

(Before change)	/usr/sbin/mount $lvname $lv_mount_point Or /usr/sbin/mount -F $fs $device $mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name *-sys system-name*

[Example] mount wait processing addition of source volume post-processing script (RepSrc.post)
    [line 144]

(addition)	until /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

[Example] mount processing change of destination volume post-processing script
    [lines 153, 160, 172, 179]

(Before change)	/usr/sbin/mount $lvname $lv_mount_point Or /usr/sbin/mount -F $fs $device $mount_point
(after change)	/opt/VRTSvcs/bin/hares -online resource-name *-sys system-name*

[Example] mount wait processing addition of destination volume post-processing script
    [line 197]

(addition)	until /usr/sbin/df -l "$device">/dev/null 2>&1; do :; done

Appendix D System Volume Backup Operation

For information on how to make a backup of and restore a system volume by using AdvancedCopy Manager, see "System volume backup operation" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option.