ETERNUS SF
AdvancedCopy Manager 14.0

Operator's Guide

Windows

Preface

Purpose

This manual describes the functionality of ETERNUS SF AdvancedCopy Manager.

Intended Readers

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

Organization

This manual has the following chapters:

Related Manuals

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

- ETERNUS SF AdvancedCopy Manager Overview
  Provides an overview of ETERNUS SF AdvancedCopy Manager.

- ETERNUS SF AdvancedCopy Manager Installation Guide
  Describes the installation procedure.

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

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

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

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

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

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

- ETERNUS SF AdvancedCopy Manager Glossary

  Describes the terminology used in ETERNUS SF AdvancedCopy Manager manuals.

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

Conventions

- Microsoft(R) Windows Server(R) 2003, Standard Edition, Microsoft(R) Windows Server(R) 2003, Enterprise Edition, Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems are abbreviated as Windows Server 2003.

- Microsoft(R) Windows Server(R) 2008 Standard, Microsoft(R) Windows Server(R) 2008 Enterprise, Microsoft(R) Windows Server(R) 2008 Datacenter, and Microsoft(R) Windows Server(R) 2008 for Itanium-Based Systems are abbreviated as Windows Server 2008.

- Microsoft(R) Windows(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.

- ETERNUS DX60, ETERNUS DX80, ETERNUS2000, ETERNUS3000, ETERNUS4000, ETERNUS6000, ETERNUS8000, and ETERNUS GR series are referred to as Fujitsu ETERNUS Storage Systems.

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Contents

Chapter 1 Overview of AdvancedCopy Manager

This chapter describes the overview of AdvancedCopy Manager.

1.1 What is AdvancedCopy Manager?

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

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

1.1.1 High-speed backup (24-hour basis)

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

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

- Oracle
- SQL Server

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

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

1.1.2 Non-stop backup [database]

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

- For Oracle: "B.3 Sample Scripts for Oracle"
- For SQL Server: "Chapter 9 Backup and Restore of an SQL Server Database"

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 ETERNUS storage systems at remote locations are also possible.

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

- Oracle
- SQL Server
- Exchange Server 2003/Exchange Server 2007

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

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1.2 Product Configuration of AdvancedCopy Manager

1.2.1 Function system

AdvancedCopy Manager consists of the following three functions:

Table 1.1 Functions

Function name	Description
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.
AdvancedCopy Manager GUI client	The GUI client can be run on a user's local machine in the same way as any other application, to monitor and/or manage the AdvancedCopy Manager environment by connecting to the Storage Management Server.

Note
....

The Manager product includes the Agent function.

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The AdvancedCopy Manager server type depends on the operating environment.

Storage Server

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

Storage Management Server

   The Storage Management Server manages the Storage Servers and only one Storage Management Server can be set in the system. The Management module of AdvancedCopy Manager is installed on the Storage Management Server.

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

· When only one Storage Server is installed

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

Figure 1.1 When only one Storage Server is installed
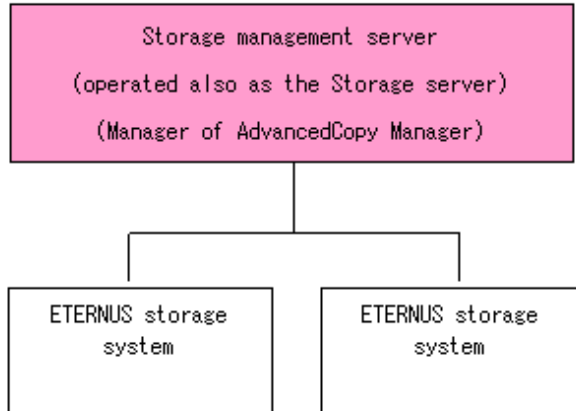
· When two or more Storage Servers are installed

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

a. When the Storage Server is operated as a Storage Management Server

One of the servers functions as a Storage Management Server. The Storage Management Server has a repository where the information on operating and management of all Storage Servers is stored.

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

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

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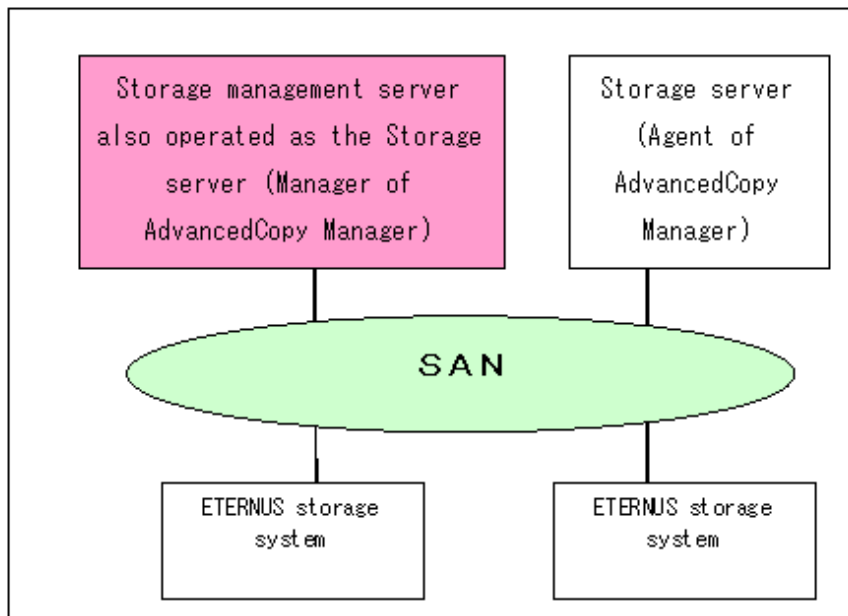
b. Setting up the special Storage Management Server
   This setup comprises two or more Storage Servers with a dedicated Storage Management Server.

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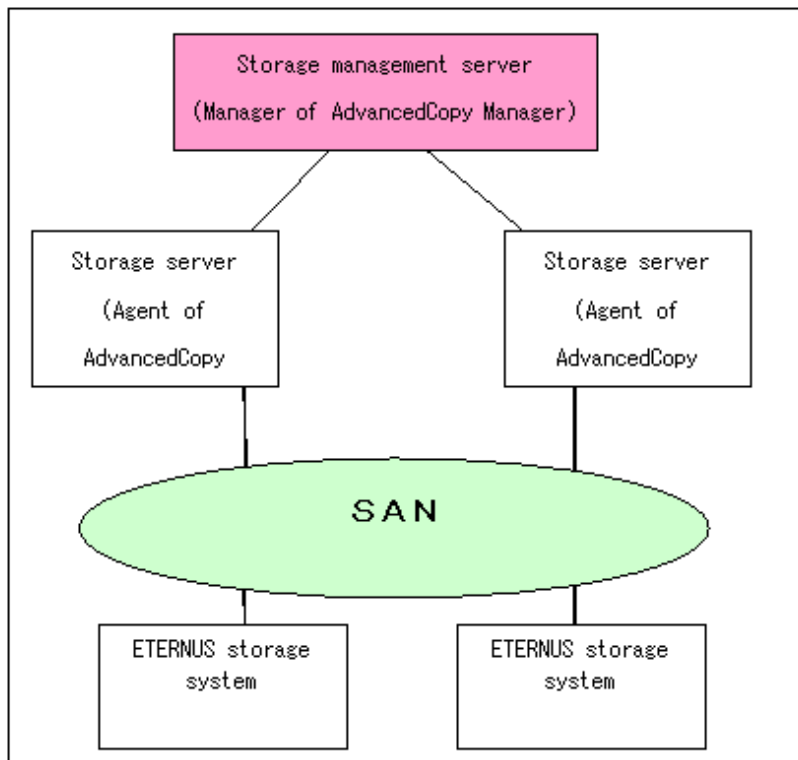
1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

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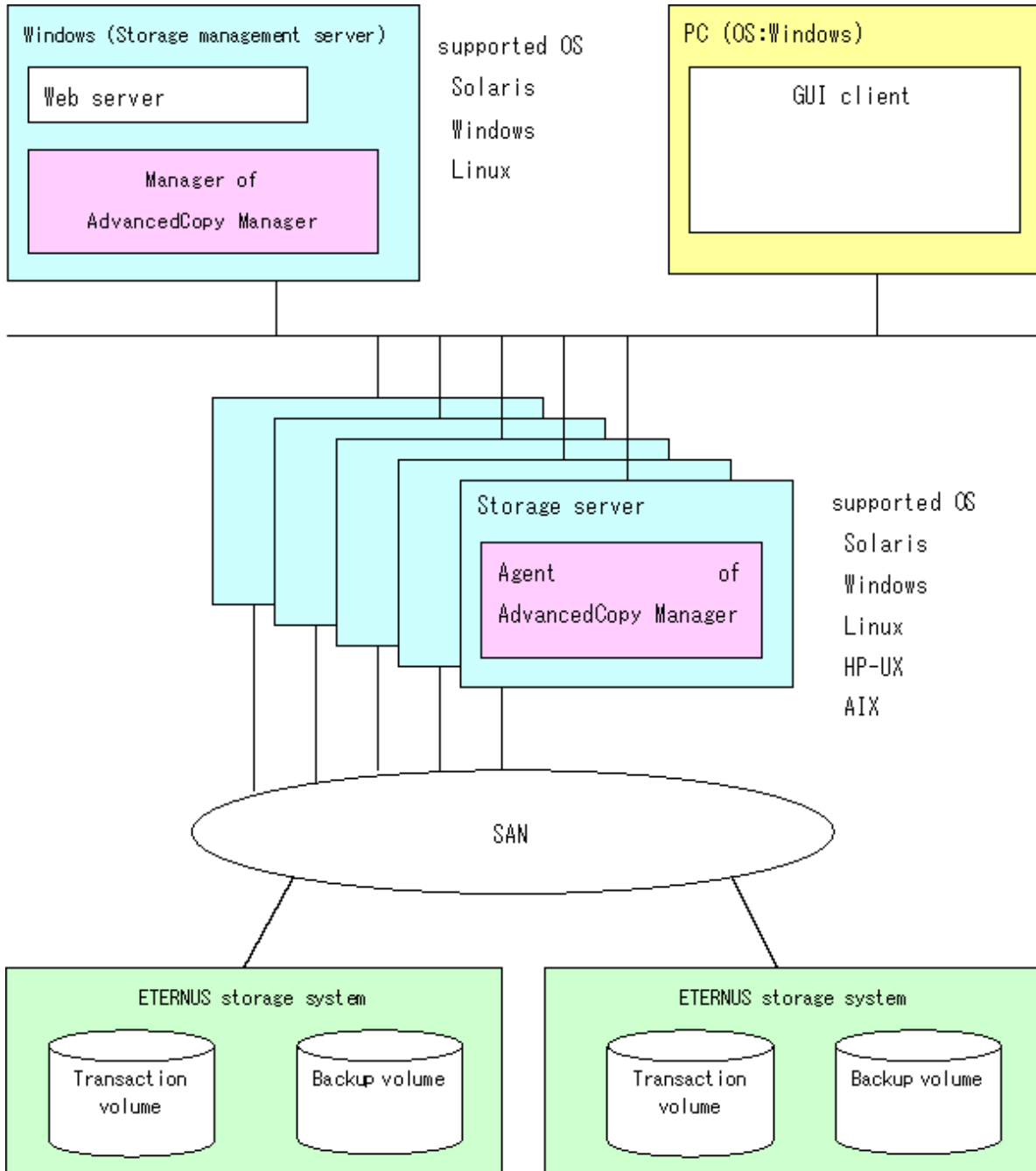
1.2.3 Combining the Agent and Manager

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

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

Table 1.2 Combining the AdvancedCopy Manager Agent and Manager

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

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

📝 Note

・ There is a difference in functionality between some product revision levels. Installation of the manager and agent of the same revision level is recommended.

・ The following restrictions apply to combinations of Manager and Agent products at different revision levels:

- If the Manager is a newer level than the Agent

Connection possible (but functions supported by levels later than that of the Storage Server cannot be used)

- If the Agent is a newer level than the Manager

Connection not possible

1.3 Function Overview of AdvancedCopy Manager

1.3.1 What is the backup function?

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

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 scripts)

The following sample 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**
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> Backup using ROPC/REC is limited to ETERNUS storage systems 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 ETERNUS storage system is used to perform high-speed replication between volumes regardless of volume capacities. This function greatly reduces the impact of a replication operation.

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

Consistency recovery function

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

Main differences with backup function

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

1.3.3   Authentication feature function

The GUI client provided by AdvancedCopy Manager can be used to manage the users who have access to the system. This allows you to set up secure operations that specify the functions each user can access. Refer to "Chapter 3 Security Operation Using Authentication Feature" for more information.

1.3.4　GUI Client

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

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

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

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

A GUI client can be used to access the client screen of a Management Server. The AdvancedCopy Manager GUI client must be installed as the GUI client. For details, refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide".
Backup management and replication management can also be performed at the command line as well as the GUI client.
For more information, see "GUI Client" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

1.3.5　Copy Control Module

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

1.4　Operating Environment of AdvancedCopy Manager

1.4.1　Hardware requirements

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

- ・ ETERNUS DX60

- ・ ETERNUS DX80

- ・ ETERNUS GR720

- ・ ETERNUS GR730

- ・ ETERNUS GR740

- ・ ETERNUS GR820

- ・ ETERNUS GR840

- ・ ETERNUS VS900 virtualization switch

- ・ ETERNUS2000 (model 100 or higher)

- ・ ETERNUS3000 (model 100 or higher)

- ・ ETERNUS4000 (model 100 or higher)

- ・ ETERNUS6000

・ ETERNUS8000

Note

One of the following ETERNUS storage systems that support ETERNUS VSS Hardware Provider 1.3.0 (VSSHP) is required to back up or restore Exchange Server 2007 on Windows Server 2008.
The Advanced Copy license and the cache table size setting are required to use the Advanced Copy function.

・ ETERNUS DX60

・ ETERNUS DX80

・ ETERNUS2000 (model 100 or higher)

・ ETERNUS4000 (model 100 or higher)

・ ETERNUS8000

Note

If ETERNUS VS900 is used

If ETERNUS VS900 is used, refer to "12.1.8 Notes on using ETERNUS VS900 (virtualization switch)".

1.4.2   Software requirements

1.4.2.1   Manager of AdvancedCopy Manager

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

Table 1.3 Software requirements for Manager of AdvancedCopy Manager

Product name	Requirement	Remarks
Microsoft(R) Windows Server(R) 2003, Standard Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition SP2 Microsoft(R) Windows Server(R) 2008 Standard(x86,x64) Microsoft(R) Windows Server(R) 2008 Enterprise(x86,x64) Microsoft(R) Windows Server(R) 2008 Datacenter(x86,x64)	Required	Support OS (Excluding the Hyper-V(TM) function of Windows Server 2008)
Multipath Control for WindowsNT/2000 V2.0L12	Conditionally required	When a Storage Management Server operates as a Storage Server, and when multipath disk control is carried out

Product name	Requirement	Remarks
GR multipath driver (GRMPD)1.0 for Windows	Conditionally required	When a Storage Management Server operates as a Storage Server, and when it carries out multipath disk control and load distribution of a path.
ETERNUS multipath driver V2.0L14 or later	Conditionally required	In Windows Server 2003 or Windows Server 2008, when a Storage Management Server operates as a Storage Server, and when it carries out multipath disk control and load distribution of a path.
Microsoft(R) SQL Server(TM) 2000 SP3 or SP4 Microsoft(R) SQL Server(TM) 2005 Microsoft(R) SQL Server(TM) 2005 SP1 or SP2 Microsoft(R) SQL Server(TM) 2008	Conditionally required	If a Storage Management Server also acts as a Storage Server and the backup of an SQL Server database is carried out
Microsoft(R) Exchange Server 2003 SP1 or SP2 Microsoft(R) Exchange Server 2007	Conditionally required	If a Storage Management Server also acts as a Storage Server and backup of the Exchange database is carried out Not supported in Windows Server 2008.
Microsoft(R) Exchange Server 2003 system management tool SP1 or SP2 Microsoft(R) Exchange Server 2007 Management Tools (32bit) (*1)	Conditionally required	When a Storage Management Server s acts as a Storage Server, and is used as a backup server to back up the Exchange database using the replication management function Not supported in Windows Server 2008.
Microsoft(R) Cluster Service (MSCS)	Conditionally required	When cluster operation using MSCS is performed with Manager (The MSCS included with Windows Server 2003).
Windows Server(R) Failover Clustering(WSFC)	Conditionally required	When cluster operation using WSFC is performed with Manager (The WSFC included with Windows Server 2008 Enterprise, Windows Server 2008 Datacenter)
Oracle 8i Oracle 9i Oracle 10g	Conditionally required	In conjunction with Oracle
handle.exe tool	Conditionally required	When using this tool to collect troubleshooting data for volume locking error. (*2)

(*1) The English version of this software can be downloaded from the following URL:
http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=6be38633-7248-4532-929b-76e9c677e802
(*2) This software can be downloaded from the following URL.:
http://technet.microsoft.com/en-us/sysinternals/bb896655.aspx

Note that the software version and level differs in accordance with the install destination system environment. Refer to the relevant software manual for details.

1.4.2.2 Agent of AdvancedCopy Manager

Table 1.4 Software requirements for Agent of AdvancedCopy Manager

Product name	Requirement	Remarks
Microsoft(R) Windows Server(R) 2003, Standard Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition SP1,SP2 Microsoft(R) Windows Server(R) 2003, Standard x64 Edition Microsoft(R) Windows Server(R) 2003, Standard x64 Edition SP2 Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition SP2 Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based systems SP1/SP2 Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems SP2 Microsoft(R) Windows Server(R) 2008 Standard(x86,x64) Microsoft(R) Windows Server(R) 2008 Enterprise(x86,x64) Microsoft(R) Windows Server(R) 2008 Datacenter(x86,x64) Microsoft(R) Windows Server(R) 2008 for Itanium-Based Systems	Required	・ Support OS (Excluding the Hyper-V(TM)function of Windows Server 2008) ・ The clustered configuration of Exchange Server 2007 SP1 or later is only supported by the Enterprise version. ・ Only x64 is supported when Microsoft(R) Windows Server(R) 2008 Standard or Microsoft(R) Windows Server(R) 2008 Enterprise and Exchange Server 2007 SP1 or later are used together.
Multipath Control for WindowsNT/2000 V2.0L12	Conditionally required	If the multipath disk control is performed
GR multipath driver (GRMPD) 1.0 for Windows	Conditionally required	For multipath disk control and path load balancing
ETERNUS multipath driver V2.0L14 or later	Conditionally required	When a Storage Management Server operates as a Storage Server with multipath disk control and load distribution of a path in Windows Server 2003 or Windows Server 2008.

Product name	Requirement	Remarks
Microsoft(R) SQL Server(TM) 2000 SP3 or SP4 Microsoft(R) SQL Server(TM) 2005 Microsoft(R) SQL Server(TM) 2005 SP1 or SP2 Microsoft(R) SQL Server(TM) 2008	Conditionally required	When the SQL Server database is backed up
Microsoft(R) Exchange Server 2003 SP1 or SP2 Microsoft(R) Exchange Server 2007 Microsoft(R) Exchange Server 2007 SP1	Conditionally required	When the Exchange database is backed up ・ Exchange Server 2007 SP1 or later is required on Windows Server 2008. ・ AdvancedCopy Manager (64bit) for Windows Server 2008 (x64) is required for Windows Server 2008.
Microsoft(R) Exchange Server 2003 system management tool SP1 or SP2 Microsoft(R) Exchange Server 2007 Management Tools (32bit) (*2)	Conditionally required	When using it as a backup server to back up the Exchange database with the replication management function ・ Exchange Server 2007 SP1 or later is required on Windows Server 2008. ・ AdvancedCopy Manager (64bit) for Windows Server 2008 (x64) is required for Windows Server 2008.
ETERNUS VSS Hardware Provider 1.3.0	Conditionally required	This is required if the ETERNUS storage system that supports VSS is used. (i.e., Windows Server 2008 and Exchange Server 2007 SP1 or later are used together.) Bundled with the AdvancedCopy Manager.
Microsoft(R) Cluster Service(MSCS)	Conditionally required	When cluster operation using MSCS is performed with Agent of AdvancedCopy Manager (The MSCS included with and Windows Server 2003)
Windows Server(R) Failover Clustering(WSFC)	Conditionally required	When cluster operation using WSFC is performed with Manager (The WSFC included with Windows Server 2008 Enterprise, Windows Server 2008 Datacenter or Windows Server 2008 for Itanium-Based Systems)
Oracle 8i Oracle 9i Oracle 10g	Conditionally required	In conjunction with Oracle
handle.exe tool	Conditionally required	When using this tool to collect troubleshooting data for volume locking error. (*3)

(*1) The English version of this software can be downloaded from the following URL:
http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=6be38633-7248-4532-929b-76e9c677e802
(*2) This software can be downloaded from the following URL:
http://technet.microsoft.com/en-us/sysinternals/bb896655.aspx

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 Backup Server of AdvancedCopy Manager

The following table lists the software requirements for a backup server if Windows Server 2008 and Exchange Server 2007 SP1 or later are used together.

Table 1.5 Software requirement for a backup server

Product name	Requirement	Remarks
Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 Standard without Hyper-V(x64) Microsoft Windows Server 2008 Enterprise without Hyper-V(x64)	Required	・ Support OS (Excluding the Hyper-V(TM) function of Windows Server 2008) ・ If the Exchange server is Windows Server 2008, the backup server requires Windows Server 2008 as well. ・ The cluster configuration is not supported for the backup server.
Microsoft(R) Exchange Server 2007 Management Tools (32bit) (*1)	Required	・ The license is not required for the system management tool. ・ The service pack level must be same for the Exchange Server and Exchange System Management Tool (Backup Server).
ETERNUS VSS Hardware Provider 1.3.0	Conditionally required	This is required if the ETERNUS storage system that supports VSS is used. (i.e., Windows Server 2008 and Exchange Server 2007 SP1 or above are used together.) Bundled with the AdvancedCopy Manager.
handle.exe tool	Conditionally required	When using this tool to collect troubleshooting data for volume locking error. (*2)

(*1) The English version of this software can be downloaded from the following URL:
http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=6be38633-7248-4532-929b-76e9c677e802
(*2) This software can be downloaded from the following URL:
http://technet.microsoft.com/en-us/sysinternals/bb896655.aspx

1.4.2.4 GUI client of AdvancedCopy Manager

In order to use the GUI 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

AdvancedCopy Manager manages a device (physical disk) in an ETERNUS storage system. Each device is managed using its own unique identifier (AdvancedCopy Manager device name). An AdvancedCopy Manager device name must be in the following format:

Table 1.6 AdvancedCopy Manager device name

Device name	Description
g?d?p? or Disk class name/mirror volume name: g?d?p? or g?d?	The characters "g," "d," and "p" indicate the following. 　ETERNUS GR Series 　　The character "g" indicates a device number, "d" indicates an OLU number, and "p" indicates a partition number. 　ETERNUS storage system (except the ETERNUS GR Series) (*1) 　　The character "g" indicates a fixed value of 0, "d" indicates a serial number used on the server, and "p" indicates a partition number. For the SDX object 　Disk class name: Disk class name of SDX object 　Mirror volume name: Mirror volume name of SDX object For Logical Units (disk units) 　A device name of "g?d?" with no "p?" attached indicates a Logical Unit (disk unit).

(*1) About the device name of an ETERNUS storage system (except for the ETERNUS GR Series) <g?d?p?>
The character "g" is always 0 for an ETERNUS storage system (except for the ETERNUS GR Series).
The character "d" indicates an AdvancedCopy Manager specific number that is unique on the server to which devices are connected. This number is different from that used by Disk Management.
The character "p" follows the same rules as the ETERNUS GR Series.

Devices not to be processed

For units of partitions, the following devices will not be processed by any part of AdvancedCopy Manager.

- Dynamic volumes

- Devices mounted at two or more locations

Use of the device name in the backup operation.
Each device name corresponds to a Volume (partition/logical drive) on Disk Management in Microsoft Management Console (MMC), but does not match a management number on Disk Management. AdvancedCopy Manager displays a block device name in the device list window to show the relationship between an AdvancedCopy Manager device name and a Disk Management name.

A block device name is in the following format:

disk?p?

　disk?

　　A physical disk number, i.e., a disk number displayed on Disk Management

　p?

　　The same value as <p?> in an AdvancedCopy Manager device name

The relationship between the AdvancedCopy Manager device name and the block device name can be referred to using either the GUI client or the device information display command.

For more information on the GUI client, see "Displaying device information" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide". Please refer to "stgxfwcmdispdev (Device information display command)" for details on the device information display command.

🖙 Note
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For information on using disks with a physical size in excess of 2 terabytes, refer to "Using large capacity disks" under "12.1.1 General notes".
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> 📙 **Note**
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> If Logical Unit (disk unit) operations are used, refer to "12.1.1.18 Notes on executing Logical Unit (disk) unit copy".
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Target file system

The following device file systems can be registered in jobs:

- FAT(File Allocation System)

- FAT32

- NTFS(NT File System)

1.6 Operations on Windows Server 2003

By default, the automatic mount function for basic volumes is disabled in Windows Server 2003 Enterprise Edition.
The automatic mount function is assumed to be enabled in AdvancedCopy Manager. When using Windows Server 2003 products, take the following steps to enable the automatic mount function before starting:

・ Run mountvol /e from the command prompt.

・ Reboot the system.

If the automatic mount function is disabled, then AdvancedCopy Manager cannot recognize a volume in the mount cancel state. (The drive letter and mount point are not assigned.)

> 🅿 **Point**
>
> ....
>
> The following method can be used to check the automatic mount function settings:
>
> 1. From command prompt, execute the mountvol command without specifying any operands.
>
> 2. Check the results displayed.
>   If the following sentence is displayed in the display results, the automatic mount function is disabled. If it is not displayed, the function is enabled.
>
>    ```
>     New volumes are not mounted automatically when added to the system.
>     To mount a volume, you must create a volume mount point.
>    ```
>
> ....

1.7 Operations on Windows Server 2008

This section describes notes for operating with Windows Server 2008.

1.7.1 Internet Protocol (IP)

AdvancedCopy Manager operates with Internet Protocol version 4 (IPv4), version 6 (IPv6) is not supported.

1.7.2 Notes when using User Account Control (UAC)

The User Account Control (UAC) function has been added to Windows Server 2008 to provide added security.

The following describes the difference when UAC is enabled to when it's disabled.

When UAC is enabled

A "permissions granted/authorized dialogue" is displayed when all users other than the built-in Administrator account and accounts in the "Administrators" group, attempt to execute a process or program that requires Administrator rights. For this reason, permissions granted and permissions authorized must be checked.

When UAC is disabled

A process or program that requires Administrator rights can only be executed by either a built-in Administrator account or a user account in the Administrators group.

Operating requirements are described below.

Table 1.7 Relationship between account and UAC

	UAC: enabled	UAC: disabled
Built-in Administrator Account	Y	Y
User Account in the Administrator group	C	Y
Standard user account	C	N

Y: The program or process will run without displaying the permissions granted dialogue.

C: The permissions granted dialogue is displayed and the process or program will run if the user is authorized.

N: The process or program will not run because the user does not have Administrator rights.

To run a process or program without the permissions dialog displaying, for example in batch processing, use one of the methods below to execute with Administrator rights:

・ Use the "runas" command in the command prompt to execute a program as a user with either administrator rights, or rights to operate AdvancedCopy Manager. A password will need to be entered.

An example of executing the batch file named test.bat

```
runas /noprofile /user:mymachine\acmuser "cmd.exe /k test.bat"
```

・ In the task scheduler, start the process with "Execute with maximum permissions" specified.

・ In the command prompt, go to the [Start] - [All programs] - [Accessories] menu and right click on [Command prompt]. Specify "Execute as Administrator" and start, then execute the program from the command prompt that was opened.

1.7.3   Notes about the online/offline status of disks

In Windows Server (R) 2008, it is possible to put the disk in the online/offline state using the "Disk Management" window and the DISKPART tool.
When an ETERNUS disk is first detected by Windows Server (R) 2008 Enterprise, Windows Server (R) 2008 Datacenter, and Windows Server (R) 2008 for Itanium-based Systems, it will have a status of "offline".

This status must be changed if the disk is to be used for AdvancedCopy Manager copy operations.

1.7.4   Notes about becoming unable to lock a volume

When operating under Windows Server 2008, problems related to Windows Server 2008 disk management may make it impossible to lock volumes that are not being used by applications or services.

Details of this problem and a patch module are available at the following URL (Microsoft online support KB952790):

http://support.microsoft.com/kb/952790

Since volumes may be locked when AdvancedCopy Manager is executing the following commands, execution of these commands may be affected by this problem.

・ swstbackup (Backup execution command)

・ swststartsync (Backup synchronous processing start command)

- swstrestore (Restore execution command)

- swsrpstartsync (Replication start command)

- swsrpmake (Replication creation command)

- swsrpvssbackup_exchange (Exchange VSS backup execution command)

- swsrpvssrestore_exchange (Exchange VSS restore execution command)

- swstbackup_sqlsvr (SQL Server backup execution command)

- swstrestore_sqlsvr (SQL Server restore execution command)

- swsrpbackup_sql (SQL Server backup execution command)

- swsrprestore_sql (SQL Server restore execution command)

The following message will be displayed if the above problem affects execution of a command:

```
[swst3607 or swsrp3607]
Locking the volume failed. Please confirm that the volume is being used by other processes.
Error=[ERROR], Volume Name=[VOLUME]
```

If the above message is output frequently, it is recommended to apply the patch module from the above URL (Microsoft online support KB952790).

Alternatively, the problem may be resolved by remounting the volume indicated at [VOLUME NAME] in the error message. By way of a temporary counter-measure, the volume dismount methods are described below. Note that the mounting of the dismounted volume is performed automatically by the OS when the volume is accessed.

Dismount method using commands

Use the following procedure to dismount a volume:

1. Check that the volume for which the problem occurred is not being used by an application or service.
When a volume is dismounted, all handles that are open for that volume are disabled.
Use the handle-exe tool, available from the following URL, to identify the processes that are using the volume:

```
http://www.microsoft.com/technet/sysinternals/utilities/handle.mspx
```

For example, to identify the processes that are using the E: drive, execute " handle.exe E:" from command prompt.

2. Execute the following command to dismount the volume:

   - swstdismount (Dismount command)

   If, for example, the name of the volume for which this problem occurred is "g1d1p1", execute "swstdismount g1d1p1" from command prompt.

Dismount method using definitions in the volume lock operation specification file

If this problem affects operations frequently, "LockForceMode=on" can be set in the volume lock operation specification file. This resolves the problem by performing an automatic volume dismount operation before copy is executed.
In this case, ensure that applications and services are not using the volume when copy is executed.
When a volume is dismounted, all handles that are open for that volume are disabled.
Refer to the following sections for the settings in the volume lock operation specification files:

For backup management:

   - A.2.2.2 Transaction volume locking specification file for backups

   - A.2.2.3 Backup volume locking specification file for backups

   - A.3.2.2 Backup-restored volume locking specification file

   If the above problem occurs for the restore source backup volume, use the method described above under "Dismount method using commands" to dismount the volume.

For replication management:

1.8 Volume lock error investigation function

1.8.1 Overview

The volume locking performed by backup and replication pre-processing may fail if the target volume is in use by other processes. This type of lock error is referred to as an "in-use lock error"in this section.
If an "in-use lock error" occurs, backup function and replication function commands output the error messages shown below and terminate abnormally.

For backup function

```
swst3607 Locking the volume failed. Please confirm that the volume is being used by other
processes. Error=[ERROR], Volume Name=[VOLUME]
```

For replication function

```
swsrp3607 Locking the volume failed. Please confirm that the volume is being used by other
processes. Error=[ERROR], Volume Name=[VOLUME]
```

AdvancedCopy Manager 14.0 and later provides data collection (the list of processes using the file handle) for identifying the process that caused the "in-use lock error".

1.8.2 Selecting the investigation tool

The following two tools list the processes using file handles:

・ handle.exe

・ openfiles.exe

Table 1.8 Features of handle.exe and openfiles.exe

Item	handle.exe	openfiles.exe
Method of obtaining	Obtainable from Microsoft website	Installed as standard in OS
Setting method	Advance setting not required	"openfiles /local on" must be executed and 'maintain objects list' must be enabled. The OS must be restarted after the command is executed.
OS performance deterioration resulting from investigation tool use	No	Yes (Enabling 'maintain objects list' reduces the OS performance.)
File for a display	All files in the system	Only the file that is used by the user executed openfiles.exe. *AdvancedCopy Manager commands or services execute openfiles.exe in this function. The files for a display are as follows. ・ The file that is used by the user executed AdvancedCopy Manager commands.(In case of "in-use lock

Item	handle.exe	openfiles.exe
		error" in command execution server) ・ The file that is used by AdvancedCopy Manager startup account.(In case of "in-use lock error" in the destination server)
Maintenance	Microsoft does not provide support (file is provided "as is").	Microsoft provides support (openfiles.exe is an OS standard function)
OS	Can operate with any Windows OS, except for the ones listed below - that is, with all Windows (x86,x64) except "Itanium-based system": ・ Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems ・ Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based systems SP1/SP2 ・ Microsoft(R) Windows Server(R) 2003, Enterprise Edition for Itanium-based Systems SP2 ・ Microsoft(R) Windows Server(R) 2008 Standard(x86,x64) ・ Microsoft(R) Windows Server(R) 2008 Enterprise(x86,x64) ・ Microsoft(R) Windows Server(R) 2008 Datacenter(x86,x64) ・ Microsoft(R) Windows Server(R) 2008 for Itanium-Based Systems	Can operate with any Windows OS that supports AdvancedCopy Manager

Since Windows 2003/2008 for Itanium-bases Systems cannot use handle.exe, only openfiles.exe can be used. Under Windows 2003/2008 (x86/x64), handle.exe and/or openfiles.exe can be selected but the recommendation is handle.exe because of the file for a display.

Both tools are able to identify the cause only if the process is using (i.e., if it opened) a file or directory. Thus, neither tool will be able to identify the cause if the following conditions apply:

・ Target volume is being used by a driver.

・ An application has loaded a DLL in the target volume.

If neither tool can identify the cause, then investigate whether the conditions above applied in the applications or services that were running when the error was issued.

🛑 **Note**

. . . .

Occasionally openfiles.exe will not output any information - this problem is thought to be caused by the OS load or an OS incompatibility, but at the moment there is no means of avoiding it.

. . . .

1.8.3 Setting the volume lock error investigation function

This section explains how to set the investigation tool used by the volume lock error investigation function.

1.8.3.1 When to set an investigation tool

Since handle.exe does not reduce OS performance, it is recommended to enable this function before operations start (always leave it enabled), so that the the cause of "in-use lock errors" can be quickly identified.

And since openfiles.exe does cause OS performance deterioration, it is recommended to enable this function only when an "in-use lock error" has occurred.

1.8.3.2 Setting handle.exe

To use handle.exe, download it from http://technet.microsoft.com/en-us/sysinternals/bb896655.aspx and store it in Work directory \var \HandleTool.

In a clustered environment, store handle.exe at all the cluster nodes.

After handle.exe is stored, execute it from the command prompt without arguments - the "Handle License Agreement" dialog box is displayed. If you agree with the conditions, click the "Accept" button. After that, the dialog box will no longer be displayed in future executions of the program. To prevent display of the dialog box when an "in-use lock error" occurs, make sure you execute handle.exe in advance.

Also after handle.exe is stored, perform the following tasks at all nodes where it is stored:

1. Log into Windows using the user account that executes AdvancedCopy Manager commands.

2. At the command prompt, go to "<Work directory>\var\HandleTool".

3. Type "handle.exe" and press Enter.

4. If the "Handle License Agreement" dialog box is displayed, then click "Accept" if you agree with the conditions of use.

5. If the user account that executes AdvancedCopy Manager commands and the AdvancedCopy Manager startup account (communication service logon account) are different, then log into Windows using the AdvancedCopy Manager startup account and perform tasks 2-4 above.

If the above tasks are not performed in advance, then commands stop responding when an "in-use lock error" occurs. If this occurs, then use the Task Manager to forcibly end handle.exe.

1.8.3.3 Setting openfiles.exe

To use openfiles.exe to track information on files opened locally, the 'maintain objects list' option must be enabled. To do that, execute "openfiles /local on" from the command prompt, then restart the system.

If a cluster is operating, then execute the above command and restart the system at all nodes that comprise the cluster.

Next, if and only if one of the conditions below apply, copy *%SYSTEMROOT%*\system32\openfiles.exe to <*Work directory*>\var \Openfiles_WOW64 (usually *%SYSTEMROOT%* is C:\Windows):

・ The OS is Windows Server 2003, x64 Edition or Windows Server 2003 for Itanium-based Systems.

・ The OS is Windows Server 2008(x64) and the 32-bit edition of AdvancedCopy Manager is being used,

In a clustered environment, then store openfiles.exe at all nodes that comprise the cluster.

1.8.4 Output file

If an "in-use lock error" occurs, backup function and replication function commands output the error messages shown below and terminate abnormally.

For backup function

```
swst3607 Locking the volume failed. Please confirm that the volume is being used by other
processes. Error=[ERROR], Volume Name=[VOLUME]
```

For replication function

```
swsrp3607 Locking the volume failed. Please confirm that the volume is being used by other
processes. Error=[ERROR], Volume Name=[VOLUME]
```

When an error failure occurs, the output of the investigation tool is saved in the files dislayed below

(to determine the process using the volume,refer to these files):

Tool output results	Save destination file
handle.exe -a	*<Work directory>*\var\D2D*<volume_name>*_Handle_*<date and time>*.txt
openfiles.exe /query /v	*<Work directory>*\var\D2D*<volume_name>*_Openfiles_*<date and time>*.txt
tasklist.exe /v	*<Work directory>*\var\D2D*<volume_name>*_Tasklist-v_*<date and time>*.txt
tasklist.exe /svc	*<Work directory>*\var\D2D*<volume_name>*_Tasklist-svc_*<date and time>*.txt
net.ext start	*<Work directory>*\var\D2D*<volume_name>*_Net-start_*<date and time>*.txt
mountvol	*<Work directory>*\var\D2D*<volume_name>*_Mountvol_*<date and time>*.txt

The save destination files listed above are not deleted - when suitable, delete unnecessary files.

Apart from handle.exe and openfiles.exe, other tools can be used to obtain supplementary process information:

- ・ tasklist.exe /v displays a list of processes.
- ・ tasklist.exe /svc displays the service(s) for each processes.
- ・ net.exe start displays the activated services.
- ・ mountvol.exe displays a list of the volume mount points.

1.8.5 Disabling the function

This section explains how to release the settings for the investigation tool used by the volume lock error investigation function.

1.8.5.1 Releasing handle.exe setting

Delete (or rename) the handle.exe file stored in *<Work directory>*\var\HandleTool.

In a clustered environment, delete handle.exe at all nodes in the cluster.

1.8.5.2 Releasing openfiles.exe setting

From the command prompt, execute "openfiles /local off", then restart the system.

In a clustered environment, execute the above command and restart the system at all nodes that comprise the cluster.

Next, if openfiles.exe is stored in *<Work directory>*\var\Openfiles_WOW64, then delete it.

In a clustered environment, delete openfiles.exe at all nodes in the cluster.

1.8.6 How to investigate the process where volume is used

This chapter describes how to investigate processes using the volume from openfiles.exe output files. (The investigation using openfiles.exe /query /v output file is also same procedure.)

handle.exe -a output format

When handle -a is handle v3.42, it displays information by the following format. In case of other versions, output format can not be the followings.

・ The handle information on each section is displayed by processes.

・ Each section is separated by dashed lines. The process name and the process ID are displayed below dashed line. The handle information that the process uses is displayed below that.

[The output example for handle.exe -a]

```
Handle v3.42
Copyright (C) 1997-2008 Mark Russinovich
Sysinternals - www.sysinternals.com

--------------------------------------------------------------------------------
System pid: 4 NT AUTHORITY\SYSTEM
    4: Process       System(4)
    8: Thread        System(4): 12
               :
               :
 1FF8: File  (---)   \Device\Tcp
--------------------------------------------------------------------------------
smss.exe pid: 1424 NT AUTHORITY\SYSTEM
    4: KeyedEvent    \KernelObjects\CritSecOutOfMemoryEvent
    8: Event
               :
               :
   70: Port
--------------------------------------------------------------------------------
csrss.exe pid: 1840 NT AUTHORITY\SYSTEM
    4: Key           HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Image File Execution
Options
    8: KeyedEvent    \KernelObjects\CritSecOutOfMemoryEvent
               :
               :
  A28: Thread        lsass.exe(840): 4084
--------------------------------------------------------------------------------
winlogon.exe pid: 1976 NT AUTHORITY\SYSTEM
    4: Key           HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Image File Execution
Options
    8: KeyedEvent    \KernelObjects\CritSecOutOfMemoryEvent
               :
               :
  86C: Key           HKCR
--------------------------------------------------------------------------------
services.exe pid: 812 NT AUTHORITY\SYSTEM
    4: KeyedEvent    \KernelObjects\CritSecOutOfMemoryEvent
    8: Event
               :
               :
```

The investigation procedure using handle.exe -a output information

Specify the process using the following procedures.

1. Open the save destination file of handle.exe -a any in text editor.

2. Search all lines including drive letters in error volumes or mount point.

3. Specify the error caused process name and process ID by scrolling up from the each line that is retrieved above 2.

[Example: Retrieve handle.exe -a output information by "X:"]

```
svchost.exe pid: 1884 NT AUTHORITY\SYSTEM                 <--The process using "X:"
    4: KeyedEvent     \KernelObjects\CritSecOutOfMemoryEvent
    8: Event
                :
                :
  EA0: File  (RWD)   X:\$Extend\$ObjId                     <--The line including "X:"
                :
                :
```

In case that the process using the volume is a service, this service is determined by reffering to tasklist /svc output information.

[Example: Retrieve tasklist /svc output information by process name:svchost.exe and process ID:1884]

```
Image Name                     PID Services
========================= ======== ============================================
System Idle Process              0 N/A
System                           4 N/A
smss.exe                      1424 N/A
csrss.exe                     1840 N/A
winlogon.exe                  1976 N/A
services.exe                   812 Eventlog, PlugPlay
lsass.exe                      840 HTTPFilter, kdc, Netlogon, NtLmSsp,
                                   PolicyAgent, ProtectedStorage, SamSs
svchost.exe                   1132 DcomLaunch
svchost.exe                   1692 RpcSs
svchost.exe                   1736 Dhcp, Dnscache
svchost.exe                   1808 Alerter, LmHosts, W32Time
svchost.exe                   1884 AeLookupSvc, BITS, Browser, CryptSvc,
                                   dmserver, EventSystem, helpsvc,
                                   lanmanserver, lanmanworkstation, Netman,
                                   Nla, NtmsSvc, Schedule, seclogon, SENS,
                                   ShellHWDetection, TrkWks, winmgmt,
                                   wuauserv, WZCSVC
ccSetMgr.exe                  2036 ccSetMgr
                 :
                 :
```

A process can be used by multiple services like the above example.In this case, specify the error caused service by stopping each corresponding service one by one. ("TrkWks" service, whose service display name is "Distributed Link Tracking Client", is using "X:\ $Extend\$ObjId".)

Chapter 2 Starting and Stopping a Service

This chapter describes how to start and stop a service provided by AdvancedCopy Manager.

2.1 Services of AdvancedCopy Manager

Manager of AdvancedCopy Manager consists of the following services:

Table 2.1 Services of Manager of AdvancedCopy Manager

Displayed service name	Description
AdvancedCopy Manager GUI Service	A service that manages GUI windows
AdvancedCopy Manager ACL Service	A service that manages the authentication feature
AdvancedCopy Manager COM Service	A service that communicates with a storage server
SymfoWARE RDA RDBSWSTF	A service that performs repository access
SymfoWARE RDB RDBSWSTF	A service that performs repository access

Note

AdvancedCopy Manager does not use the "SymfoWARE RDA RDBSWSTF" service if it is used on Windows Server 2008.

Agent of AdvancedCopy Manager consists of the following service:

Table 2.2 Services of Agent of AdvancedCopy Manager

Displayed service name	Description
AdvancedCopy Manager COM Service	A service that communicates with a storage management server and other storage servers

When using MSCS or WSFC for cluster operations

When MSCS or WSFC is used for cluster operations, the following application resources are used in the storage management server transactions:

Table 2.3 Application resources used in Storage Management Server transactions

Displayed service name	Resource name	Description
AdvancedCopy Manager GUI Service	AdvancedCopy GUI Service logical node name	Service for controlling GUI windows
AdvancedCopy Manager ACL Service	AdvancedCopy ACL Service logical node name	Service for controlling the authentication mechanism
AdvancedCopy Manager COM Service for logical-node-name	AdvancedCopy COM Service_logical-node-name	Transaction-oriented service for communication with storage servers
SymfoWARE RDA RDBSWSTF	SymfoWARE RDA RDBSWSTF logical node name	Service for handling access to the repository
SymfoWARE RDB RDBSWSTF	SymfoWARE RDB RDBSWSTF logical node name	Service for handling access to the repository

Note

AdvancedCopy Manager does not use the "SymfoWARE RDA RDBSWSTF" service if it is used on Windows Server 2008.

When MSCS or WSFC is used for cluster operations, the following application resources are used in Storage Server transactions:

Table 2.4 Application resource used in Storage Server transactions

Displayed service name	Resource name	Description
AdvancedCopy Manager COM Service for logical-node-name	AdvancedCopy COM Service_logical-node-name	Transaction-oriented service for communication with Storage Management Servers and Storage Servers

Note

The following service cannot be a cluster service (application resource):

・ AdvancedCopy Manager COM Service

2.2 Starting a Service

Normally, you do not need to manually start AdvancedCopy Manager services because they are automatically started when the system is started.

However, you need to manually start a service if:

・ The startup of the service has failed for some reason.

・ The service has been intentionally stopped.

To manually start a service:

1. Click [Control Panel]->[Administrative Tools]->[Services] to display the service window.

2. A list of services registered in the system will be displayed. Select a service to be started and click the [Start] button

When using MSCS or WSFC for cluster operations

This section describes how to start the services in a cluster system.
In a cluster system that is already established, the startup types assigned to the services are as follows:

Table 2.5 Startup types of services for the manager function

Displayed service name	Startup type
AdvancedCopy Manager GUI Service	Manual
AdvancedCopy Manager ACL Service	Manual
AdvancedCopy Manager COM Service	Automatic
AdvancedCopy Manager COM Service for logical-node-name	Manual
SymfoWARE RDA RDBSWSTF	Manual
SymfoWARE RDB RDBSWSTF	Manual

Note

AdvancedCopy Manager does not use the "SymfoWARE RDA RDBSWSTF" service if it is used on Windows Server 2008.

Table 2.6 Startup types of services for the agent function

Displayed service name	Startup type
AdvancedCopy Manager COM Service	Automatic

Displayed service name	Startup type
AdvancedCopy Manager COM Service for logical-node-name	Manual

To start AdvancedCopy Manager as a resource in a cluster, take the following steps:

1. Start the cluster administrator (MSCS) or failover cluster manager (WSFC).

2. Set Storage Management Server transactions or Storage Server transactions online.

To start AdvancedCopy Manager COM Service as a standalone service, take the following steps:

1. Select [Control Panel]->[Administrative Tools]->[Services] to display the [Services] window.

2. The services already registered in the system are then listed. Select the service you want to start, and then click the [Start] button.

 Note
. . . .

・ Be sure to start AdvancedCopy Manager as a resource in a cluster from the cluster administrator (MSCS) or failover cluster manager (WSFC). Do not start it from the [Services] window.

・ If a resource in a cluster stops for some reason, you must take the steps described above to restart it.

・ Do not change the startup type of AdvancedCopy Manager as a resource in a cluster to Automatic.
. . . .

2.3 Stopping a Service

Services are automatically stopped when the system is stopped. If you need to stop an individual service for some reason, manually stop the service as follows:

1. Click [Control Panel]->[Administrative Tools]->[Services] to display the service window.

2. Select the service to be stopped and click the [Stop] button.

 Note
. . . .

The Storage Management Server of AdvancedCopy Mananger uses Symfoware. Stopping the service may fail if the Symfoware is monitored by other software. Stop monitoring Symfoware before stopping the serivces at the Storage Management Server.
. . . .

When using MSCS or WSFC for cluster operations

The services stop automatically when the system stops. However, if you must manually stop the cluster service for some reason, take the following steps.

To stop AdvancedCopy Manager as a resource in a cluster:

1. Start the cluster administrator (MSCS) or failover cluster manager (WSFC).

2. Set Storage Management Server transactions or Storage Server transactions offline.

To stop AdvancedCopy Manager COM Service as a standalone service, take the following steps:

1. Select [Control Panel]->[Administrative Tools]->[Services] to display the [Services] window.

2. Select the service you want to stop, and then click the [Stop] button.

Note

- Be sure to stop AdvancedCopy Manager as a resource in a cluster from the cluster administrator (MSCS) or failover cluster manager (WSFC). You cannot stop it from the [Services] window.

Chapter 3 Security Operation Using Authentication Feature

This chapter describes how to implement security using the authentication feature provided by AdvancedCopy Manager.

3.1 Overview

The GUI client of AdvancedCopy Manager provides functionality for backup and Replication management and operation. If any of the features are incorrectly used, the operation may stop.
AdvancedCopy Manager security features allow you to secure Backup and Replication operations by setting access permissions for each user.

The user name and password must be as follows:

- The user name must consist of up to 20 alphanumeric characters

- The password must consist of up to 14 alphanumeric characters

Note

Note the following precautions for Windows Server 2003/Windows Server 2008:

Setup of NetBIOS over TCP/IP

In the case of Windows Server 2003:

Do not disable NetBIOS over TCP/IP in the detailed settings of TCP/IP. This setting has been enabled upon installation of Windows Server 2003. If you disable this setting by mistake, you should re-enable it as follows:

1. Open the Control Panel, select [Network and Dial-up Connections], and open the property [Local Area Connection].

2. Select the [Advanced...] button of [Internet Protocol(TCP/IP) Properties] to open the [Advanced TCP/IP Settings] window.

3. Open the WINS tag and check the "Enable NetBIOS over TCP/IP" option.

In the case of Windows Server 2008:

If using a static IP address, do not disable NetBIOS over TCP/IP in the detailed settings of TCP/IP.
There is no problem with using the "prescribed value" that is defined as the initial value.
If using a DHCP server, enable the NetBIOS over TCP/IP settings using the following method:

1. Open the Control Panel, select [Network sharing centre], and open the properties of [Local area Connection] from [Managing of network connections].

2. Open [Property] in [Internet Protocol version 4 (TCP/IPv4)], and select the [Advanced...] button of [Properties] to open the [Advanced TCP/IP Settings] window.

3. Open the WINS tag and check the "Enable NetBIOS over TCP/IP" option.

Access control using a user principal name

The user authentication and access control using a user principal name that was introduced in Windows 2000/Windows Server 2003 is not supported by AdvancedCopy Manager. A user principal name is a user representation that can be used if Active Directory is installed on Windows 2000/Windows Server 2003. A user principal name is expressed as "user-name@dns-name".

Password length on Windows Server 2003/Windows Server 2008

Although a password consisting of up to 127 alphanumeric characters can be specified on Windows Server 2003/Windows Server 2008, only a password of up to 14 alphanumeric characters is valid in AdvancedCopy Manager.

3.2 Access Permission

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

Table 3.1 Access permissions in AdvancedCopy Manager

Access permission	Description
Write permission	Allows you to change the operation information (such as policy information) and perform a series of storage operations. Write permission includes execute and read permissions. Write permission can only be set for a user belonging to the Administrators group.
Execute permission	Allows you to perform a series of storage operations and read information. Execute permission includes read permission.
Read permission	Allows you to only read information.

The following table shows the GUI client operations available on the initial window, and the required access permissions.

Table 3.2 GUI client Operations available on the initial window and required access permissions

Operation	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
List Devices in the Same Logical Group	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 GUI client are determined by the logical sum of the access permissions for the backup management and replication management functions.

The following table lists the backup management operations and the access permissions required to perform them.

Table 3.3 Backup management operations and their required access permissions

Operation name	Write permission	Execute permission	Read permission
Window display	Yes	Yes	Yes
Backup	Yes	Yes	No
Restore	Yes	Yes	No
Recovery	Yes	Yes	No
Delete History	Yes	Yes	No

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

Yes: Enabled
No: Disabled

The following table lists the replication management operations and the access permissions required to perform them.

Table 3.4 Replication management operations and their access permissions

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

Yes: Enabled
No: Disabled

3.3 Setup Procedure

This section describes how to implement security in AdvancedCopy Manager.

For details on the setup procedure, refer to "Manage user Access and Permissions" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

Figure 3.1 Security Setup Flow


```
Log in as a privileged user
```

```
Display the GUI screen
```

```
Add a new user
```

```
Setup of access permissions for user above
```
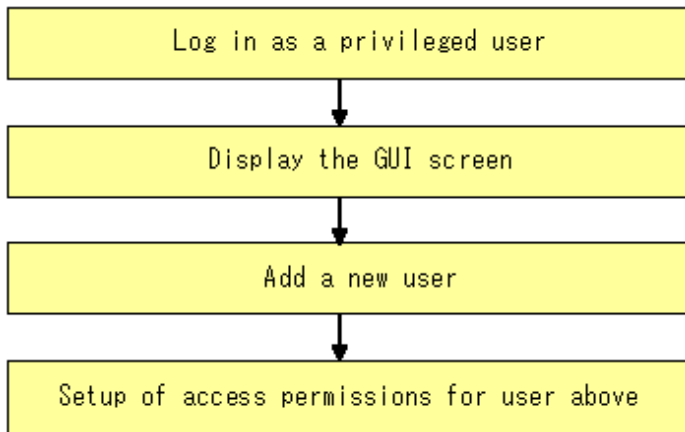
P Point

....

If the account is not a Startup account, the toolbar for [User Accounts] in the File menu will be disabled.

....

3.4 Security Operation in Cluster Configuration

To use an authentication mechanism in a cluster system, note the following points that do not apply to regular operation:

- Set the same account information (e.g., user accounts, passwords, groups, user permissions) in the primary and secondary nodes.

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

- To transfer authentication information from AdvancedCopy Manager on a storage management server in non-cluster operation, take the following steps:

  1. Before canceling the cluster configuration of the storage management server transaction, extract the definition information by executing the command below on the primary side of the storage management server transaction. Execute the command as a user belonging to the Administrators group. The information is extracted as a batch file enumerating commands that reflect the definition information.

     ```
     program-directory\bin\smmkbat -f definition-information-output-batch-file
     ```

  2. For the storage management server transaction, execute the AdvancedCopy Manager cluster setup command to cancel the cluster configuration.

  3. On the storage management server, run the extracted definition information output batch file. Run the batch file as a user belonging to the Administrators group.

Chapter 4 Backup Operation

This chapter provides details of the backup operation performed by AdvancedCopy Manager on Windows Server 2003/Windows Server 2008 systems.AdvancedCopy Manager backups are created in units of partitions.

Throughout this manual, a partition is expressed as a "volume".

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

4.1 Overview

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

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

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

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

As synchronized high-speed backup deletes the history after backup processing is complete, there is no status where backup data does not exist, even though the generation number is 1, but synchronized high-speed backup does requires one more backup volume generation than is required by snapshot fast backup. Synchronized high-speed backup also requires synchronized backup processing before the backup execution command is entered. Therefore, execution of automatic synchronized high-speed backup must be scheduled to allow enough time for synchronized processing to finish first. Synchronized backup processing is then started based on the estimated time, and the backup execution command is entered after equivalency maintained status has been achieved.

For online processing, databases such as Oracle and SQL Server etc can be backed up in utilizing the sample script provided by AdvancedCopy Manager without stopping the database. For all other applications requiring to be backed up, the application must be temporarily stopped during the backup processing.

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

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

Figure 4.1 Managing a backup volume
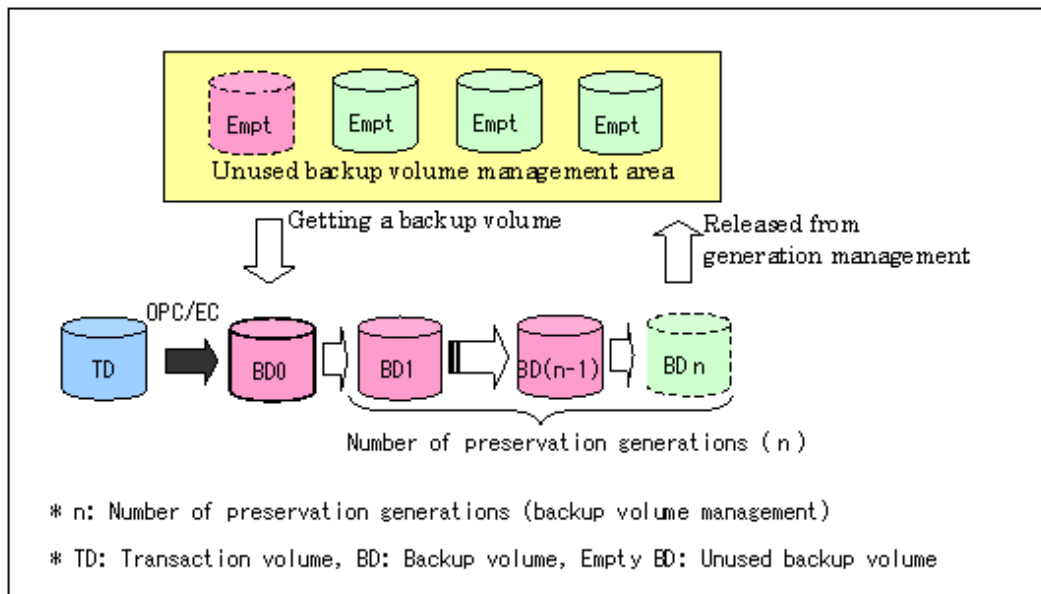
4.1.1 Snapshot backup processing

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

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

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

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

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

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

3. Backup carrier information will be set.

Figure 4.2 Snapshot fast backup processing
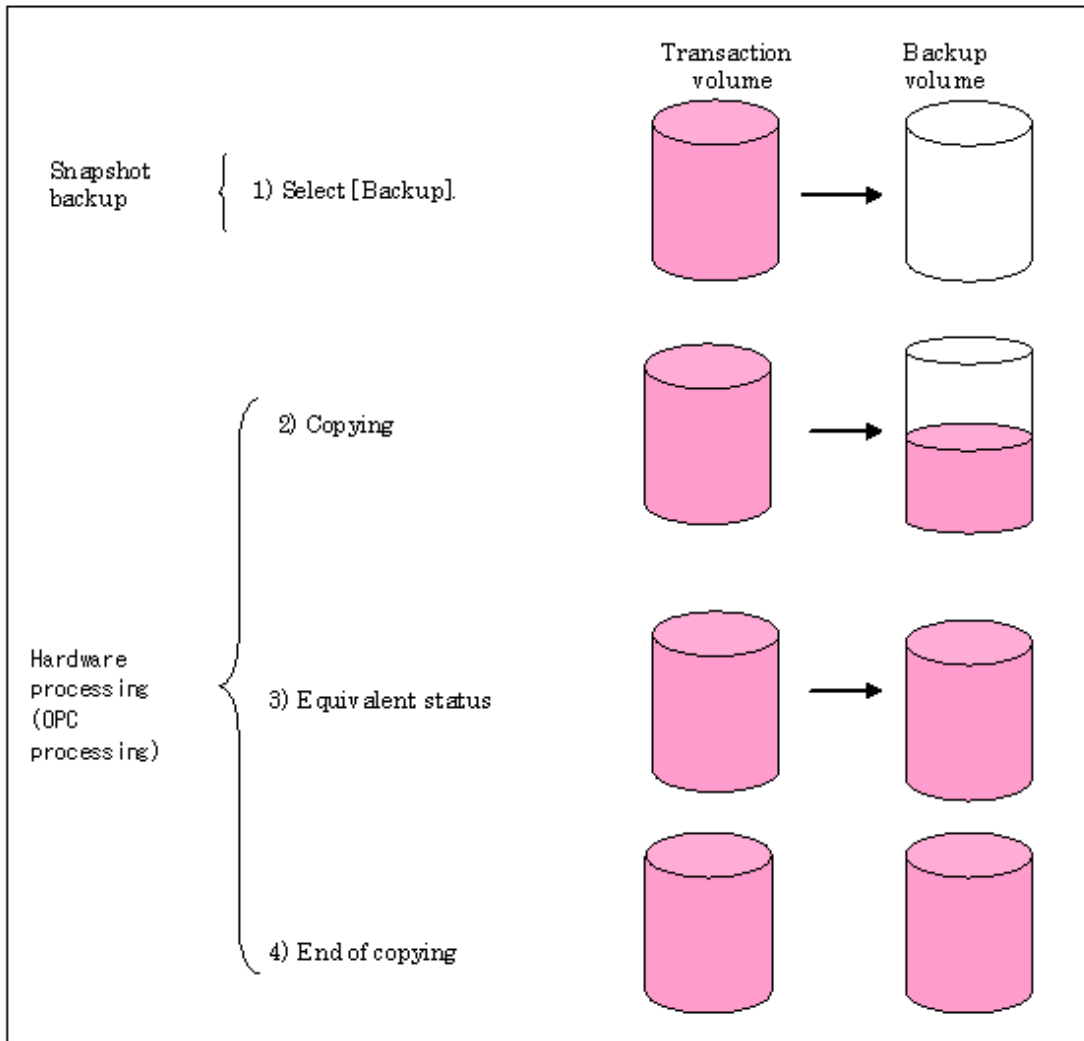
The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC function of the Fujitsu ETERNUS storage system.

The QuickOPC function of the snapshot high-speed backup creates a snapshot image by only copying the data updated since the start of previous backup. This reduces the time for physical copying significantly.

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

📙 Note
....

・ If all the generations of backup volumes are being managed, and if no backup volume can be obtained from the unused region in the backup volume management area, backup copies cannot be created.

・ Backup using ROPC is limited to an ETERNUS storage system within the same Storage Server that supports ROPC.
....

4.1.2   Synchronized high-speed backup processing

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

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

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

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

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

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

📙 **Note**

• •

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

• •

Figure 4.3 Backup using the synchronized high-speed backup function
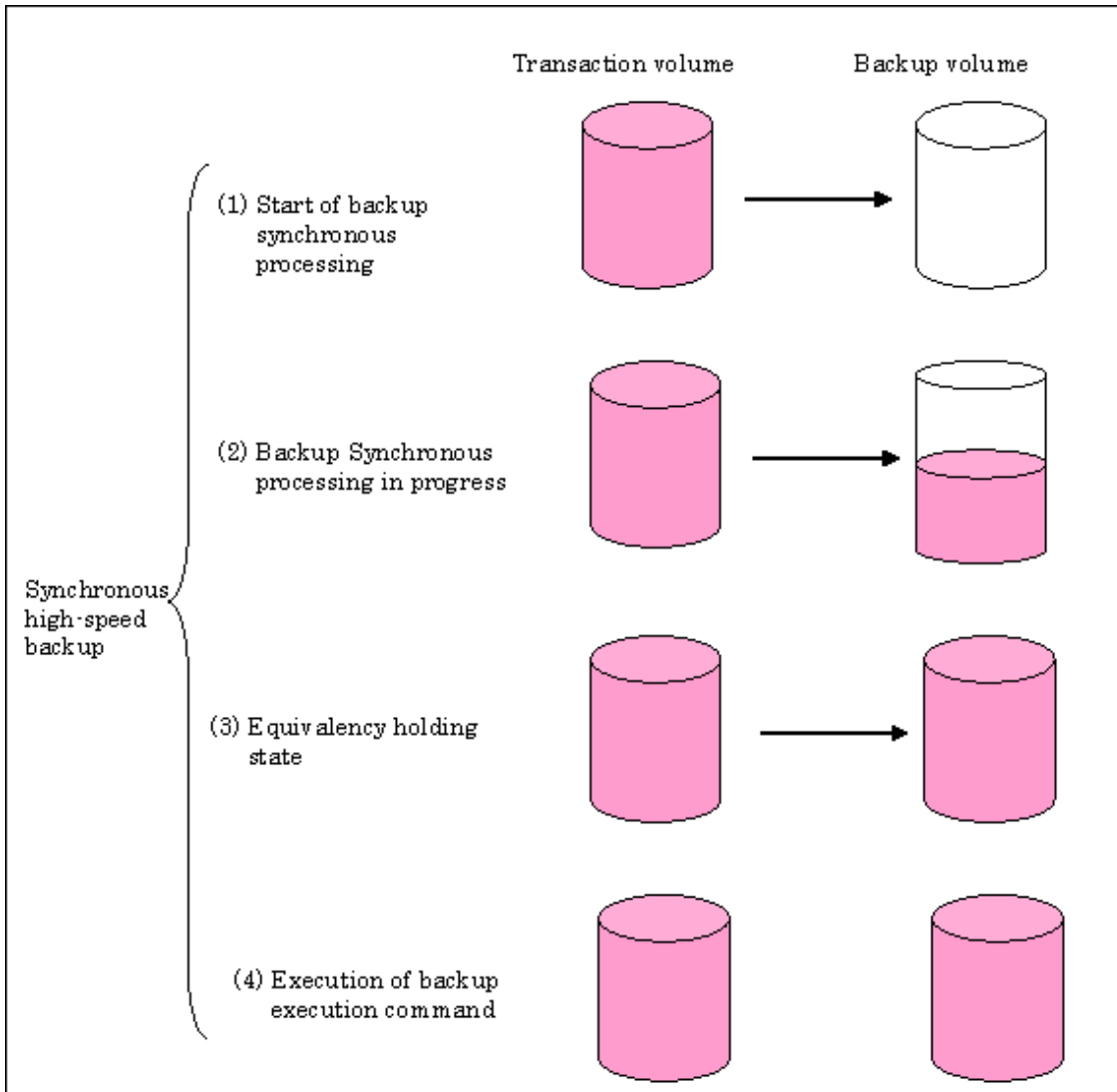
During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. The synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

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

Note

・ If all generations of backup volumes are being managed, and if no backup volume can be obtained from the unused region in the backup volume management area, backup copies cannot be created.

・ Backup using REC is limited to an ETERNUS storage system within the same Storage Server that supports ROPC/REC.

4.1.3 Restoring Data

This section describes how data is restored in AdvancedCopy Manager.

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

Data restore from a backup volume refers to using the OPC function provided by the ETERNUS storage system to restore data from a backup volume to a transaction volume.

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

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

Note

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

Figure 4.4 Notes on restore operations in AdvancedCopy Manager
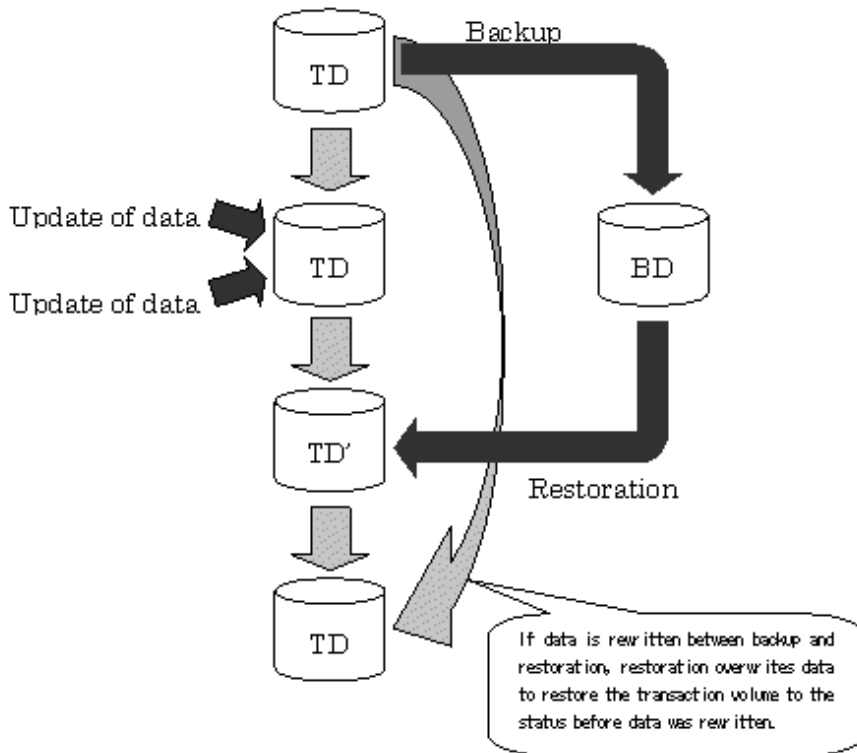
TD: Transaction volume
BD: Backup volume

4.1.4 Device name

The backup operation of AdvancedCopy Manager is performed at the device level (partition level) in an ETERNUS storage system. This device is managed using a unique name determined by AdvancedCopy Manager. The name is known as the "AdvancedCopy Manager device name". For information on the AdvancedCopy Manager device name, see "1.5 Managing a Device on AdvancedCopy Manager".

4.2 Operation Design

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

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

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

4.2.1 Selecting a server on which backups are performed

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

Storage Management Server

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

Storage Server

AdvancedCopy Manager operations can be performed on the Storage Server.

📑 Note

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For the backup management function, and in order to enable the backup server operation, both the source transaction volume and the destination backup volume must be on the same Storage Server.
If the backup server operation is performed, then the replication management function must be used.

. . . .

Figure 4.5 Configuration of servers on which the backup operation should be performed
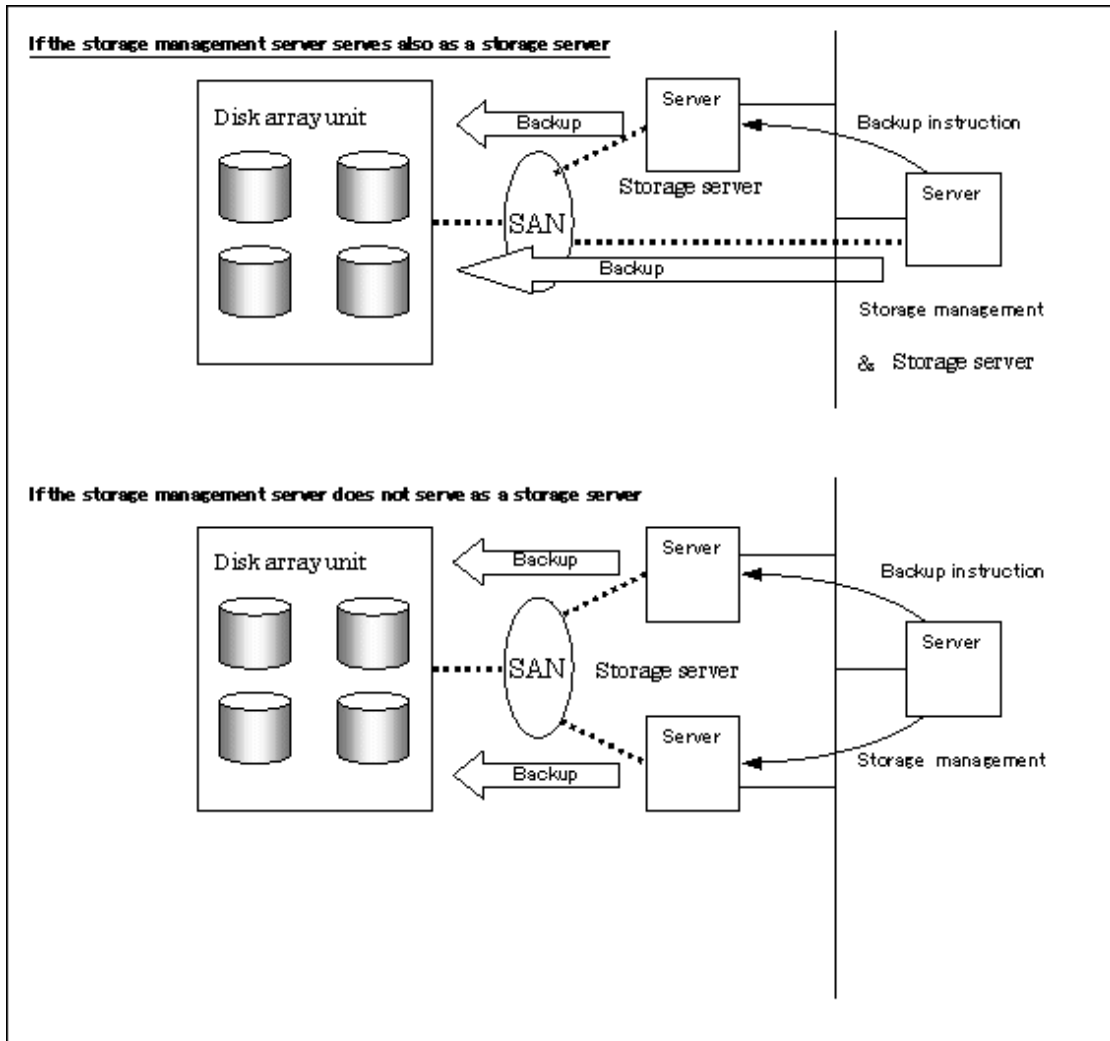
4.2.2 Selecting a backup source

AdvancedCopy Manager backs up data in units of devices. A device that stores working data is called a transaction volume.

A transaction volume to be backed up must reside on the Fujitsu ETERNUS storage system.

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

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

> 🖑 **Note**
>
> ....
>
> Do not back up the systems disk or the disk on which AdvancedCopy Manager is installed.
>
> ....

> 🖑 **Note**
>
> ....
>
> Refer to the "12.1.1 General notes" for points to consider when deciding on a candidate volume for backup. Some points to consider include but may not be limited to:
>
> ・ Backup and Replication Exclusions
>
> ・ Size of a Partition

- Layout of Partition

- Dynamic Volume

- The configuration of a disk

4.2.3　Configuring a backup policy

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

The number of preservation generations

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

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

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

A synchronous high-speed backup operation releases the oldest generation from generation management after backup of the latest generation is completed. Therefore, the required number of backup volumes is equal to the maximum number of backup generations + 1.

Interval days

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

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

For information on setting a backup policy, see "4.4.9 Setting backup policies".

4.2.4　Preparing a backup volume

This section describes how to prepare the backup volume.

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

A destination backup volume must be placed on the same Fujitsu ETERNUS storage system disk array unit.

A backup volume must have the same size as a transaction volume. For more information, see 12.1.1.1 Size of a Partition" under "12.1.1 General notes".

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

Table 4.1 Number of backup volumes required for backup operations

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

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

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

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

For information on configuring a backup volume, see "4.4.7 Setting the operation type for a device".

Note

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

Note

The automatic mount function must be enabled in order for AdvancedCopy Manager to manage backup volumes.

Disabled is set as the default for the automatic mount function under Windows Server 2003, Enterprise Edition. Refer to "1.6 Operations on Windows Server 2003" to enable the automatic mount function.

Point

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

To do this, follow the procedure below:

1. Start backup synchronization.

2. Confirm the equivalency maintain status.

3. Execute backup.

4. Save the backup volumes to secondary media.

5. Delete history information.

6. Return to step 1.

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

Note

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

・ The ETERNUS storage system 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 an ETERNUS storage system 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.

4.2.5 Preparing the automatic backup operation

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

Automatic snapshot fast backup

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

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

Figure 4.6 Start in a job net
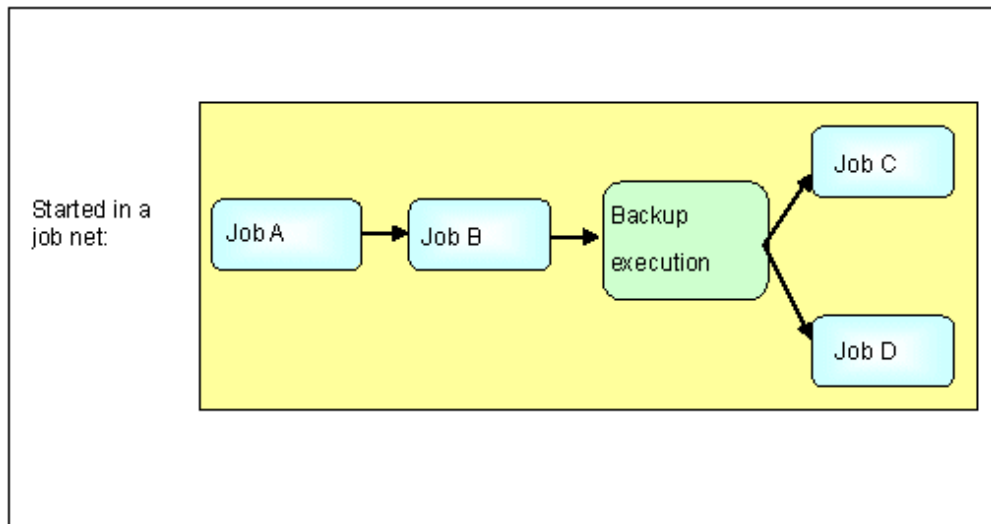
・ Start the backup command at the specified time.

Figure 4.7 Start at a specified time

Automatic synchronized high-speed backup

For synchronized high-speed backup, the transaction and backup volumes must have maintained equivalency status at the scheduled time for backup.
For this reason, if synchronized high-speed backup is automated, the synchronized backup processing start command and the backup execution command must be started separately, as described below.

Starting the synchronized backup processing start command

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

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

Starting the backup execution command

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

- Start the backup execution command as part of a batch job.

Figure 4.8 Start in a job net

![Note icon] **Note**

. . . .

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

. . . .

・ Start the backup execution command with the time specified.

Figure 4.9 Start at a specified time
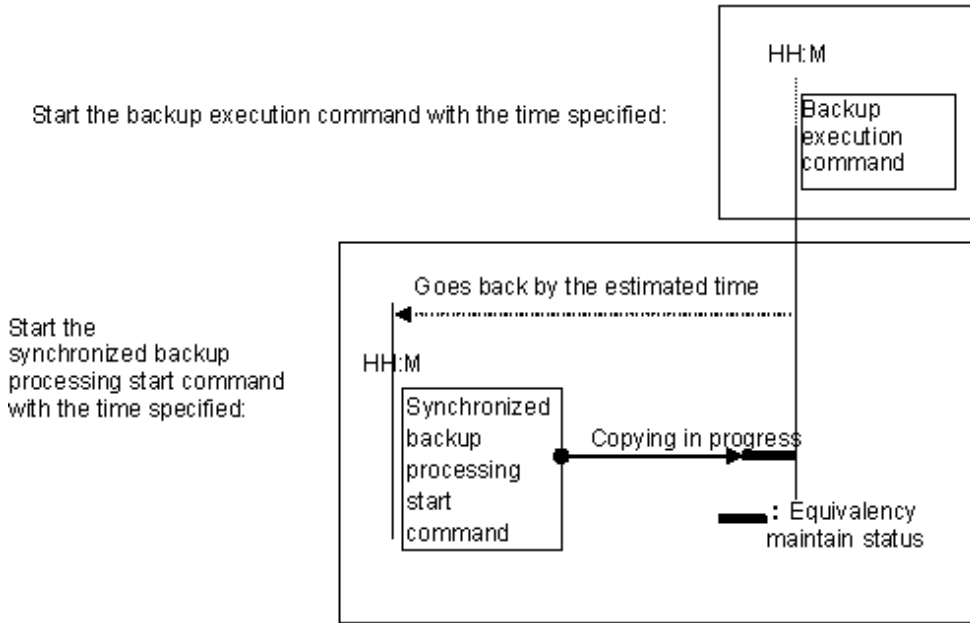
4.3 Flow of Operation

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

Figure 4.10 Flow of backup operation on a regular transaction volume
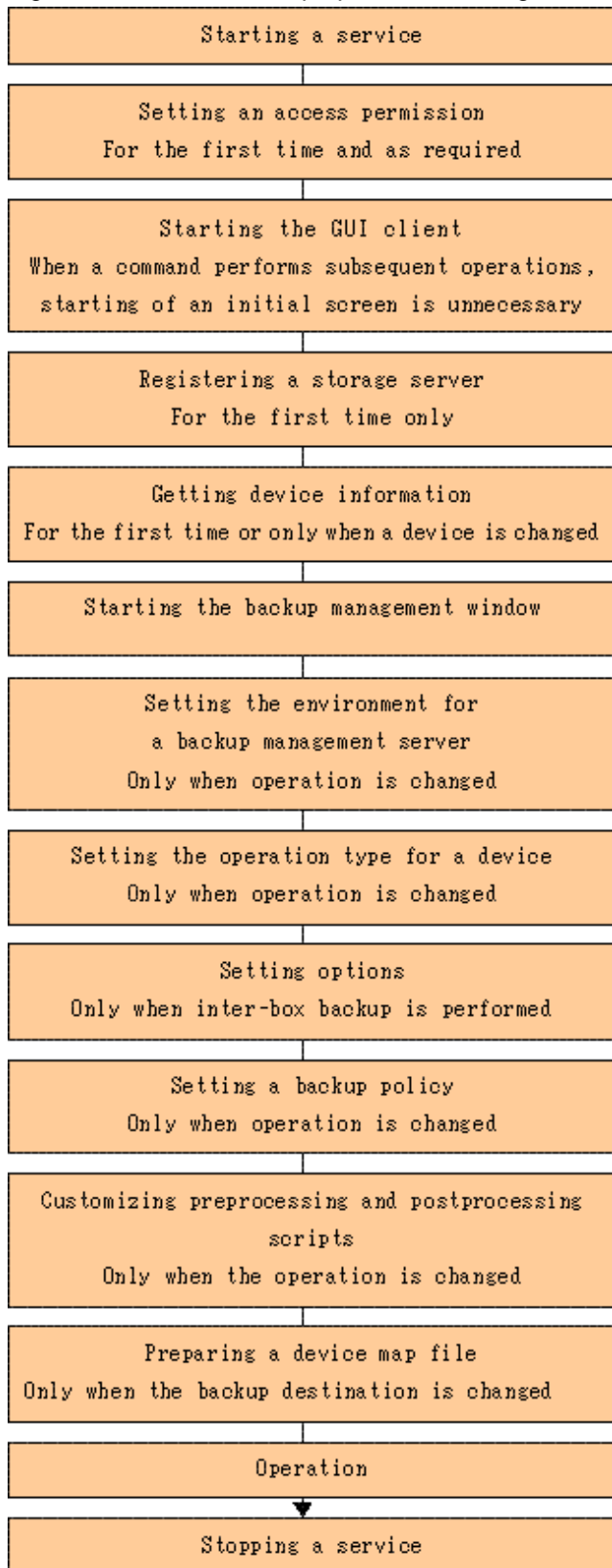
4.4 Preparing to Start the Backup

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

4.4.1 Starting a service

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

For information on starting a service, see "Chapter 2 Starting and Stopping a Service".

4.4.2 Setting an access permission

When performing backup from a backup management screen, access permission is set up for each operation of a backup management screen.

For details on how to set access permissions, see "Chapter 3 Security Operation Using Authentication Feature".

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

4.4.3 Starting the GUI client

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

4.4.4 Registering a Storage Server

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

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

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

4.4.5 Fetching device information on a Storage Server

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

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

 Note
. . . .
As part of replication management, device information on a Storage Server must first be stored in the repository.
There may not be sufficient area available for updating the repository if information is to be obtained for devices under two or more Storage Servers. Check if the area required when updating the repository is available before obtaining the device information. If there is insufficient area, allocate the required area, then obtain` the device information.

Refer to step 2 of "10.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.
. . . .

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

Note
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While synchronous backup replication processing is being performed, device information cannot be acquired correctly. Therefore, if you need to acquire information for a device, all synchronous processing must first be canceled, and you can then acquire the device information.
. . . .

4.4.6 Configuring the environment for a backup operation server

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

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

4.4.7 Setting the operation type for a device

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

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

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

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

Table 4.3 Number of backup volumes required for backup operations

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

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

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

Note
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In order to set up a volume as a transaction volume, there are some points which should be taken into consideration. For more details, see "12.1.1 General notes".
. . . .

📙 Note

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

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

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

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

📙 Note

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

📙 Note

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

📙 Note

The assigned device to a drive letter or mount point cannot be configured as a backup volume. But, It is only possible to configure it as a transaction volume.

📙 Note

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

📘 Point

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

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

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

4.4.8 Configuration options

You must set a number of options when performing backup to a backup volume in a cabinet that is different from the cabinet containing the transaction volume.

Backup operations may not be able to continue if the options setup file is changed after operations start. Therefore, do not change the options setup file after operations start.

If the options setup file is changed, the backup policy must also be reset.

📙 Note

・ The ETERNUS storage system must support the REC and ROPC functions.

- Both cabinets must be connected to an FCRA (FC Remote Adapter).
  Since data flows only from the Initiator side to the Target side through an FCRA connection, FCRA connections must be established in sets of two or more.

- In a backup involving an ETERNUS storage system that does not support the ROPC function, only the REC function can be used. In this case, you cannot backup data to a backup volume in a cabinet which does not contain a transaction volume, because the backup uses the ROPC function during restore.

Create the following files to set the options:

For normal operation (non-cluster)

```
<environment-setting-directory>\etc\backup\data\DEFAULT\check.ini
```

For cluster operation

```
<logical-node-environment-setting-directory>\etc\backup\data\DEFAULT\check.ini
```

Update the file with the following lines:

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

4.4.9 Setting backup policies

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

- Preservation generations

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

- Interval days

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

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

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

Note

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

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

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

Point

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

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

・ Checking using a command

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

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4.4.10 Customizing pre-processing and post-processing

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

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

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

🅿 Point

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When AdvancedCopy Manager is upgraded

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

· ·

4.4.11 Preparing a device map file

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

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

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

🅿 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 can be performed by saving the backup volumes to secondary media, such as tape, and then deleting corresponding history information.

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

· ·

4.4.11.1 Describing a device map file

The following provides an example of a device map file:

```
# Start a comment line with "#".
# transaction-volume-name    target-backup-volume-name

# Normal Disks
g1d0p3        g1d1p3
g1d0p4        g1d1p4
g1d0p5        g1d1p5


# Normal Disks
g1d2p3        g1d3p3  # A comment can be described here also.
g1d2p4        g1d3p4
g1d2p5        g1d3p5


# Normal Disks
g1d4p3        g1d5p3
g1d4p4        g1d5p4
g1d4p5        g1d5p5
g1d4p6        g1d5p6
:
```

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

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

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

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

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

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

4.5 Operation

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

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

There are two kinds of backup in AdvancedCopy Manager:

・ Snapshot type high-speed backup

・ Synchronous high-speed backup

4.5.1 Performing snapshot high-speed backup

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

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

> 📝 **Note**
> ....
>
> When the QuickOPC function is used for snapshot high-speed backup, the command options listed below cannot be performed from the GUI client.
>
> Enter the appropriate command for each operation.
>
> ・ Execute the backup command with the "-T" option specified swstcanceltrk (Tracking cancel command).
> ....

4.5.2 Performing synchronized high-speed backup

Synchronous high-speed backup can be carried out using either GUI operations or commands.

For information on the operation method using GUI, refer to "Perform a Snapshot Backup" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

If operating with commands, perform the backup synchronous process, then carry out the backup for the transaction volume that you need to backup. For details on commands, refer to the following:

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

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

・ Executing backup: swstbackup (Backup execution command)

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

> 📝 **Note**
> ....
>
> ・ The backup execution command causes an error if it is executed before the transaction and backup volumes have entered equivalency maintenance status.
>
> ・ The device map cannot be specified while backup is processing.
> ....

> 📝 **Note**
> ....
>
> When the "Chapter 5 Backup Process That Uses the Suspend/Resume Function" is used for synchronous high-speed backup, the operations listed below cannot be performed from the GUI client.
>
> Enter the appropriate command for operation.
>
> ・ If one transaction volume has multiple synchronous processing (ie, EC sessions), specify the backup volume and cancel only the specified EC session swstcancelsync (Backup synchronous processing cancel command).
> ....

4.5.3 Restoring Data

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

4.5.3.1   Restoring an entire volume

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

For information on the operation method using commands, refer to swstrestore (Restore execution command)

To check restore status, use swstreststat (Restore execution status display command)

> 📝 **Note**
> ....
> If restoring for a general file system, stop operations.
> ....

4.5.3.2   Restoring an individual file

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

1. Using swstdrvset (Drive letter allocation command), assign a drive letter to a backup volume.

2. Either execute the COPY command on the command prompt window or copy the file using Windows Explorer from the backup volume.

3. When the copy is complete, use swstdrvunset (Drive letter deallocation command), to remove assignment of that drive letter from the backup volume.

4.5.4   Managing a backup history

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

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

4.5.4.1   Displaying a backup history

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

4.5.4.2   Deleting a backup history

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

4.6   Changing the setting information

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

4.6.1   Adding a device

After a device is added to any Storage Server, incorporate it into the backup as described below.

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

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

1. Use stgxfwcmsetdev (Device information collection/reflection command) to acquire information for the newly added device, and accept management information.

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

3. If the added device was defined as a transaction volume, use swstbkpolset (Backup policy setting command) to set up the backup policy.

📒 Note

・ System resources such as disk and memory resources may be insufficient when a device is added. Re-estimate the system resource requirements before adding a device.

   Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.

・ There may not be sufficient area available for updating the repository when a device is added. Check if the area required when updating the repository is available before obtaining the device information. If there is insufficient area, free an area, then obtain the device information.

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

4.6.2   Deleting a device

This section describes how to delete different types of devices.

4.6.2.1   Deleting a transaction volume

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

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

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

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

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

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

🅿 Point

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

4.6.2.2 Deleting a backup volume

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

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

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

   Note

   ....

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

   ....

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

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

Point

....

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

....

4.6.3 Adding a Storage Server

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

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

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

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

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

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

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

5. Configure a backup policy for all the transaction volumes registered in Step 4. For more information on this, refer to "4.4.9 Setting backup policies".

Note

....

- System resources such as disk and memory resources may be insufficient when a Storage Server is added. Re-estimate the system resource requirements before adding a Storage Server.

  Refer to "Required resources" in the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details.

・ There may not be sufficient area available for updating the repository when a Storage Server is added. Check if the area required when updating the repository is available before adding the Storage Server. If there is insufficient area, free an area, then add the Storage Server.

Refer to step 2 of "Action required when access to repository fails" for details on checking the required area.

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

4.6.4 Deleting a Storage Server

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

For information on the operation method using commands, refer to "stgxfwcmdelsrv (Server information deletion command)".

P Point

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

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

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

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

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

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

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

4. Delete the Storage Server.

4.7 Stopping the Operation

To stop the backup operation, stop the services on the Storage Server. Normally, services are automatically stopped when the system is stopped.

However, you can stop an individual service if you need to for any reason. For more information on this, refer to "Chapter 2 Starting and Stopping a Service".

Note

・ When the service stops, all functions of AdvancedCopy Manager running on the Storage Server also stop.

・ You should stop services on a Storage Management Server only after checking that all the related services on the Storage Servers that it manages have been successfully stopped.

Chapter 5 Backup Process That Uses the Suspend/ Resume Function

This chapter provides details of the backup process that uses the Suspend/Resume function.

5.1 Overview

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

AdvancedCopy Manager provides two backup functions: snapshot high-speed backup and synchronous high-speed backup. In snapshot high-speed backup, One Point Copy (OPC) is used to create a backup. In synchronous high-speed backup, EC is used to create a backup. The Suspend/Resume function can be thought of as a kind of synchronous high-speed backup that uses EC.

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

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

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

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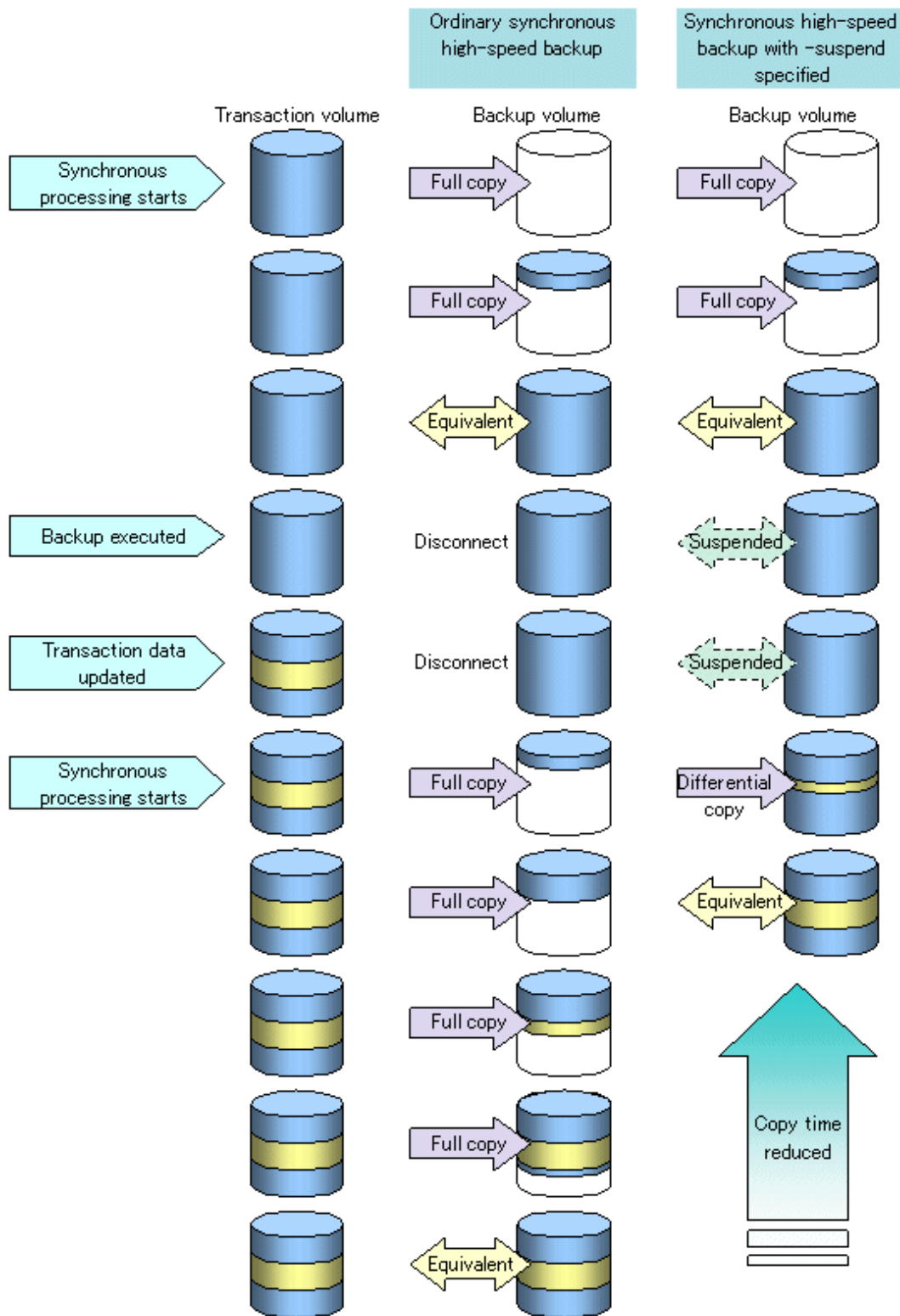
5.2 Backup Operation Design

Notes about synchronous high-speed backup using the Suspend/Resume function and backup operation design are provided below, as well as information related to backup management operation design (see "4.2 Operation Design").

Transaction volume

Register the backup source device used for storing transaction data as the transaction volume.

Backup volume

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

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

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

5.3 Flow of Operations

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

Figure 5.2 Flow of backup operations using Suspend/Resume function
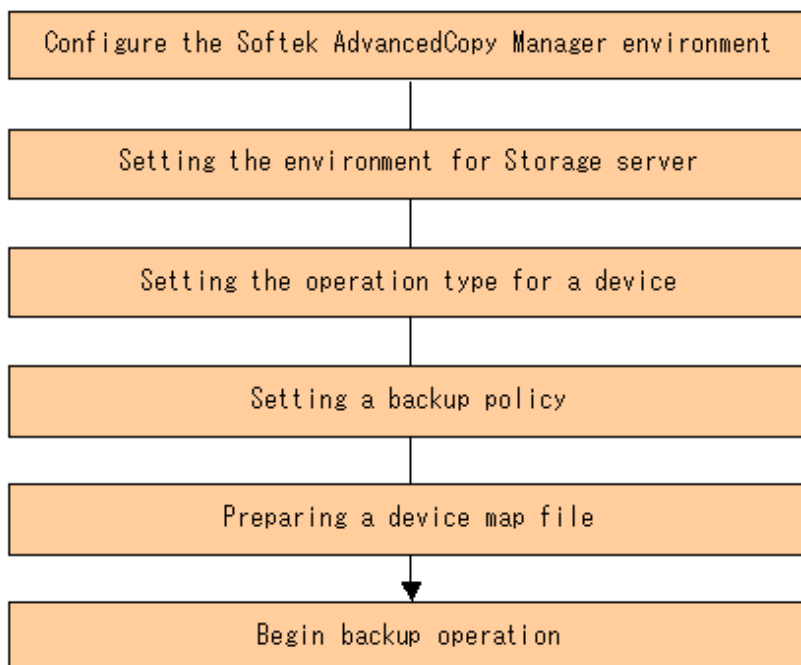
5.4 Preparations

This section describes how to prepare the backup process that uses the Suspend/Resume function.

5.4.1 Setting up the AdvancedCopy Manager environment

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

5.4.2 Setting Storage Server configuration information

Set the configuration information on the Storage Server processing the backup operations.

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

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

5.4.3 Setting device information

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

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

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

🖙 Note

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

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

🅿 Point

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

5.4.4 Setting a backup policy

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

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

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

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

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

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

5.4.5 Preparing a device map file

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

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

To conveniently monitor backup destination devices, create a "4.4.11 Preparing a device map file" that maps transaction volumes to backup volumes in advance. Specifying this file at the start of the synchronous processing or during the backup process enables operation with the backup destination specified.

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

5.5 Backup Operations

For synchronous high-speed backup using the Suspend/Resume function, execute swstbackup (Backup execution command) after the synchronous processing has started and the equivalency maintenance status has been set.

Then suspend the synchronous processing.

When history information is deleted because the number of generations has been exceeded or when swsthistdel (History information deletion command) is executed, the backup volume enters the Suspend state without any history information.

If new synchronous processing starts at this time, then the suspended backup volume without history information is selected first, and differential copying starts. Only data that has been updated since the Suspend state was last set is copied, therefore the equivalency maintenance status can be reached quickly.

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

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

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

(1) Before synchronous high-speed backup

TD   No EC session   BD1
                       Empty
Number of preservation
generations = 1
      No EC session   BD2
                       Empty

(2) Synchronous processing started

TD   Full copy   BD1
      EC session   In use
Number of preservation
generations = 1
      No EC session   BD2
                       Empty

(3) Equivalency maintain status

TD   Equivalent   BD1
      EC session   In use
Number of preservation
generations = 1
      No EC session   BD2
                       Empty

Transaction volume

Backup volume 1

Backup volume 2

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

(5) Synchronous processing started

(6) Equivalency maintain status

(7) Backing up with the suspend specification

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

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

(8) Transaction volume data updated

(9) Synchronous processing started

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

(10) Equivalency maintain status

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

(11) Backing up with the suspend specification

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

5.5.1   Starting synchronous processing

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

・ The backup volume from which history information is deleted because the number of generations has been exceeded; or

・ The suspended backup volume without history information.

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

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

Figure 5.4 Backup volume selection at the start of synchronous processing
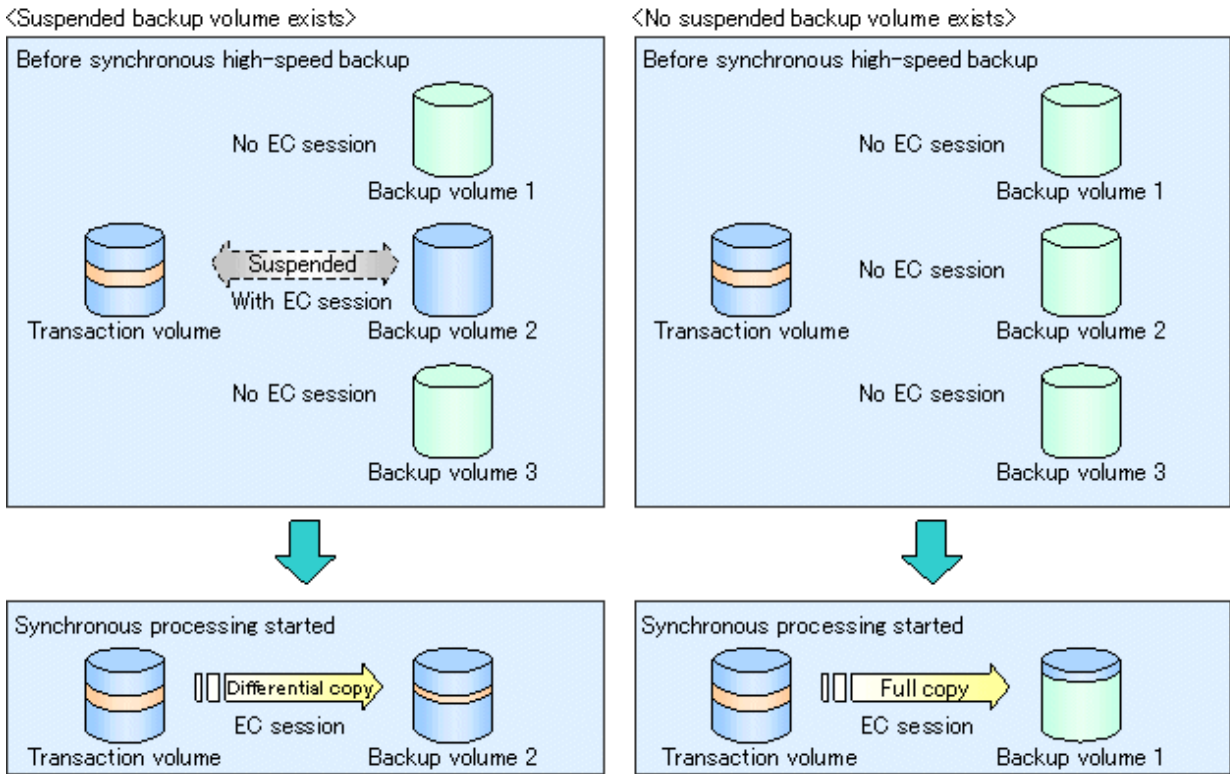
![Note icon] **Note**
....

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

5.5.2 Backing up

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

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

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

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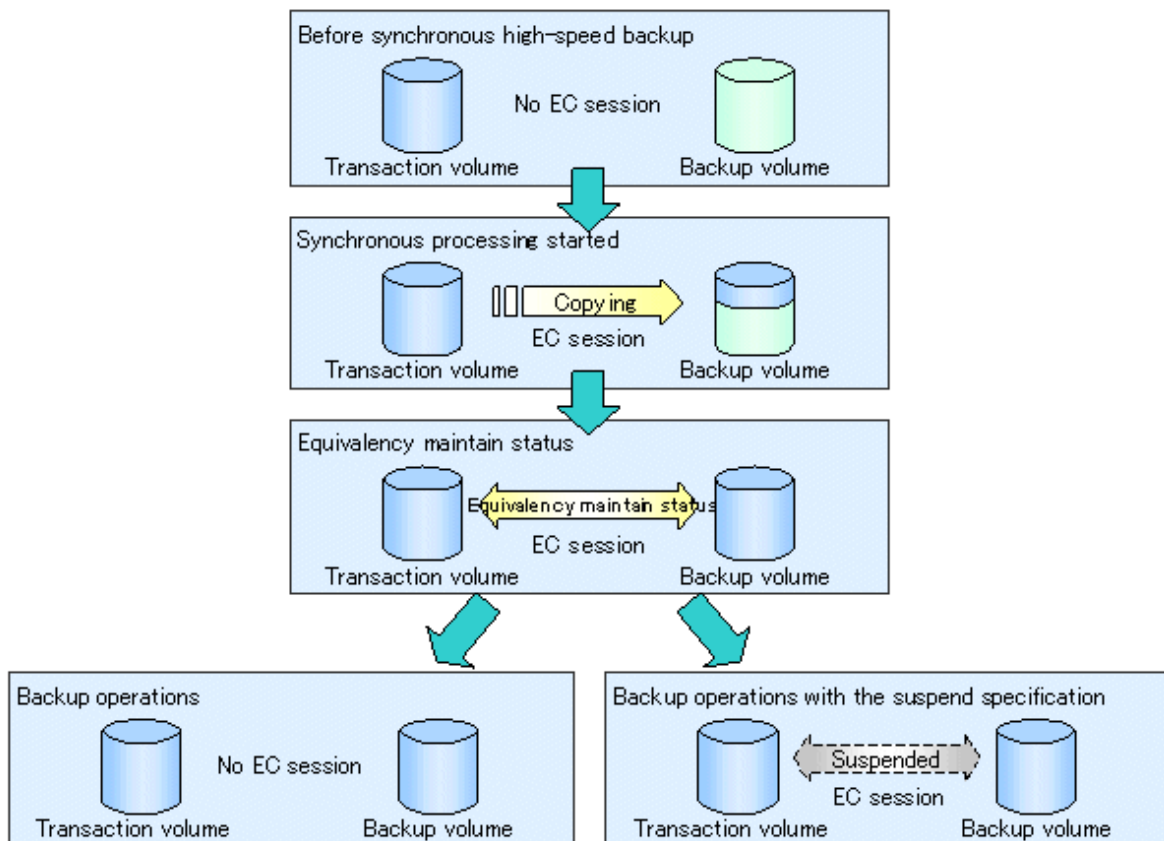
5.5.3 Displaying the synchronous processing execution status

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

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

- equivalent: equivalency maintenance status

- suspend: suspended processing

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

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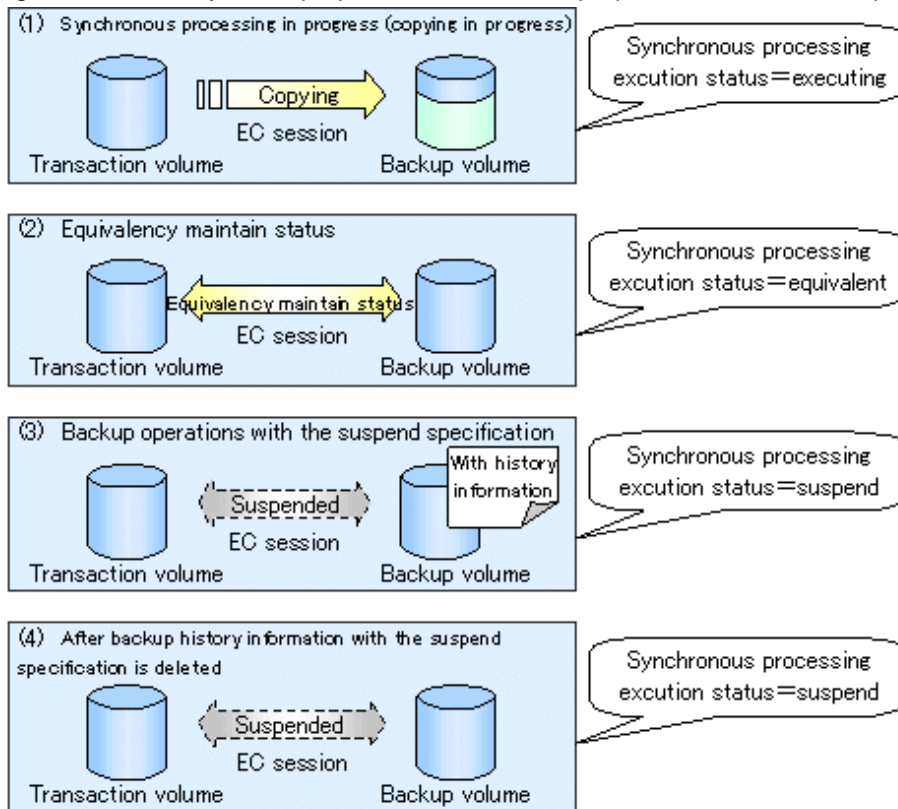
5.5.4 Canceling synchronous processing

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

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

- equivalent: equivalency maintenance status

- suspend: suspended processing

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

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

If one transaction volume has multiple synchronous processing in progress (i.e., running multiple EC sessions), then only the EC sessions mapped to specific backup volumes can be cancelled. All of the synchronous processing of the transaction volume can be cancelled by specifying the synchronous processing.

🛈 Note

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

℗ Point

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

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

・ Cancelling synchronous processing (in the Suspend state) that has history information leaves the backup volume in the used state.

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

Figure 5.7 Operational states in synchronous processing caused by cancellation

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

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

Copying
EC session
Transaction volume   Backup volume   In use

(1)′ After synchronous processing cancellation

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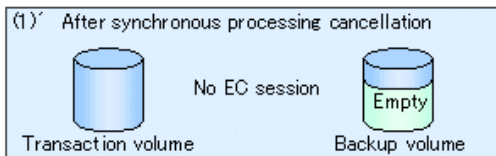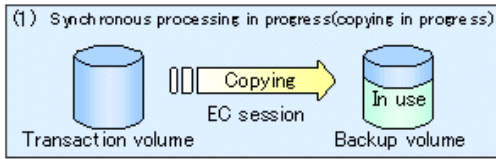
〈Case of the backup volume being cleared because of cancellation under the equivalency maintain status〉

(2) Equivalency maintain status

Equivalency maintain status
EC session
Transaction volume   Backup volume   In use

(2)′ After synchronous processing cancellation

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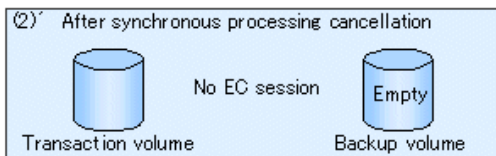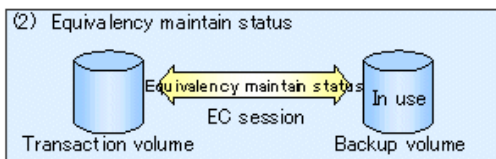
〈Case of the backup volume remaining in use after cancellation in the Suspend state〉

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

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

(3)′ After synchronous processing cancellation

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

〈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   Backup volume   In use

(4)′ After synchronous processing cancellation

No EC session
Transaction volume   Backup volume   Empty

5.5.5 History management

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

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

Point

. . . .

- Even when the history information created during backup operations with the suspend specification is deleted, an associated EC session is not released.

- Deleting history information during ordinary synchronous high-speed backup releases the backup volume, and Backup(free) is displayed in the Device-Mode field by swstdevdisp (Device use status display command).

- Deleting history information during backup operations with the suspend specification does NOT release the backup volume after the information is deleted, and Backup(used) is displayed in the Device-Mode field by the device usage status display command.

. . . .

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

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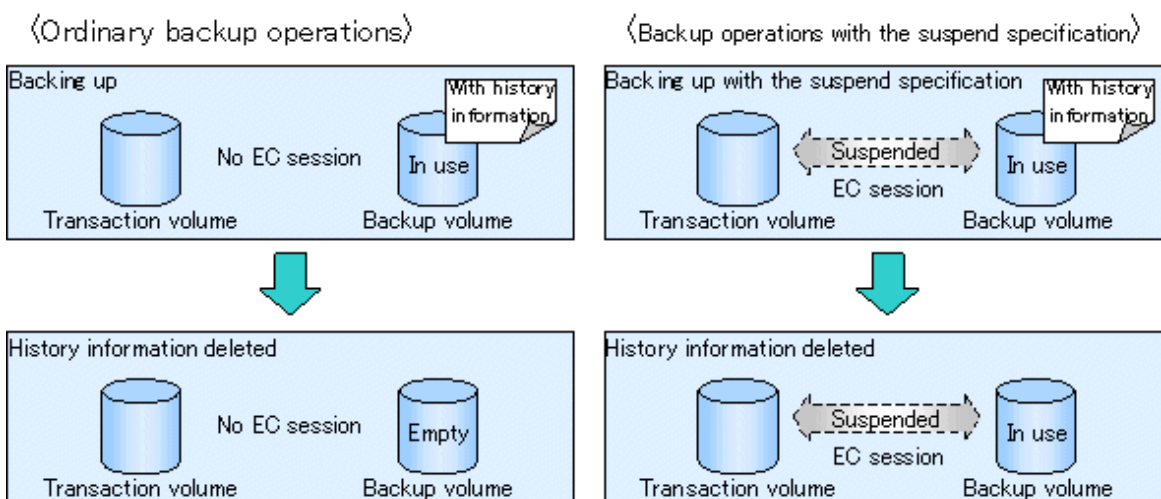
5.5.6 Restoring

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

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

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

Note

. . . .

- Restoration is not possible if the transaction volume has a backup volume being copied by EC, a backup volume under the equivalency maintenance status, or a suspended backup volume.

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

Chapter 6 Backup Operation by the QuickOPC Function

This chapter provides details of the backup operation using the QuickOPC function.

The old name for this function was Differential OPC.

6.1 Overview

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

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

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

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

🛇 Note

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To implement the differential snapshot high-speed backup using the QuickOPC function, an ETERNUS storage system that supports the QuickOPC function is required.

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

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

．．

🄿 Point

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

．．

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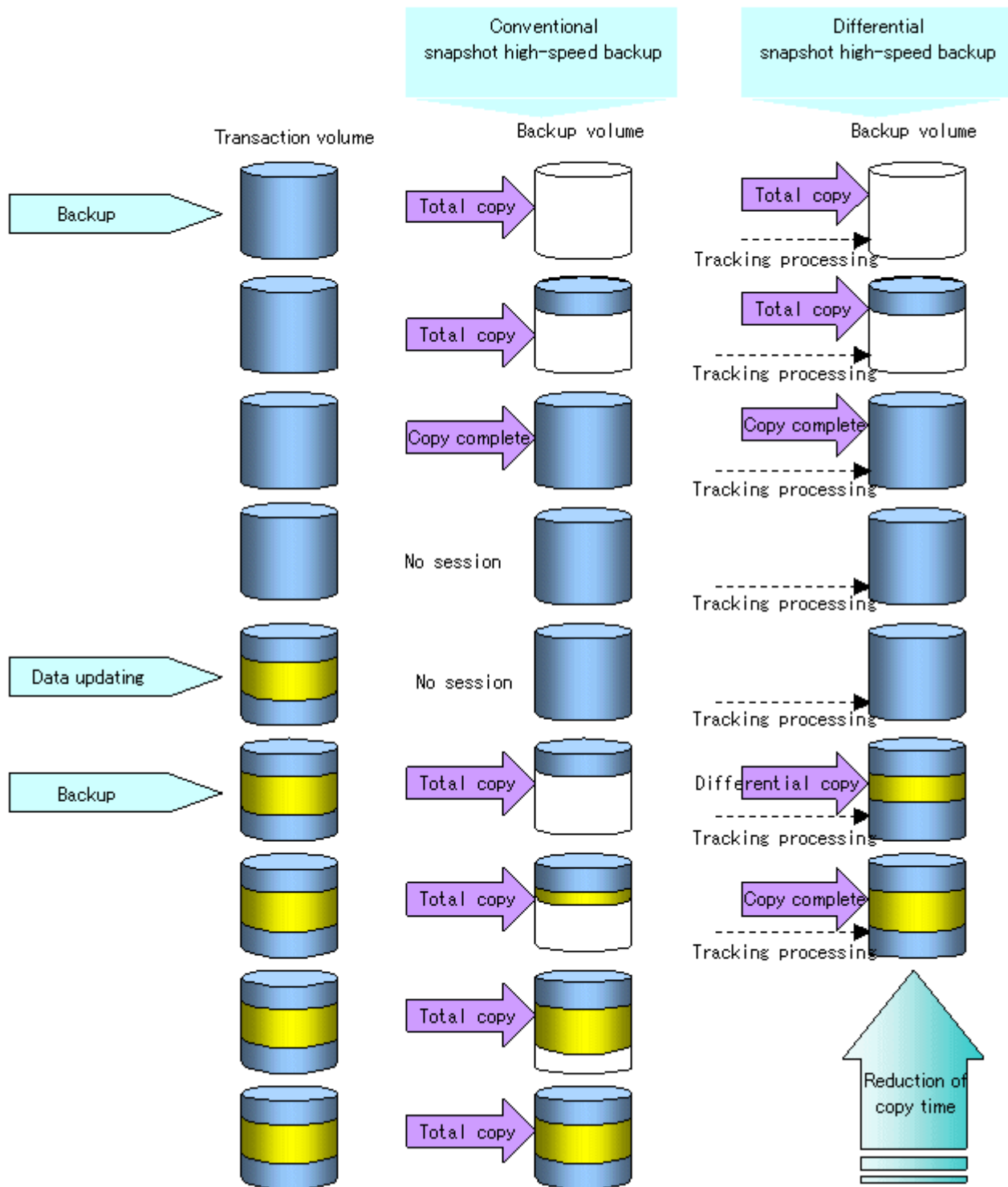
6.2 Configuring Backup Operation

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

> **Note**
>
> Consider the following when making decisions on the backup policy configuration and backup volume preparation:
>
> ・ In a backup operation using the QuickOPC function, an OPC session remains active even after the physical copy has been completed. Operators should specify the number of preservation generations so that the maximum number of OPC sessions that can be defined for the same logical unit cannot be exceeded.
>
> ・ The QuickOPC function can be used only for an intra-cabinet copy (OPC). It cannot be used for an inter-cabinet copy (ROPC). Operators must prepare a backup volume in the same cabinet as the transaction volume to be backed up.

6.3 Operation Flow

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

Figure 6.2 Flow of backup operations using the QuickOPC function
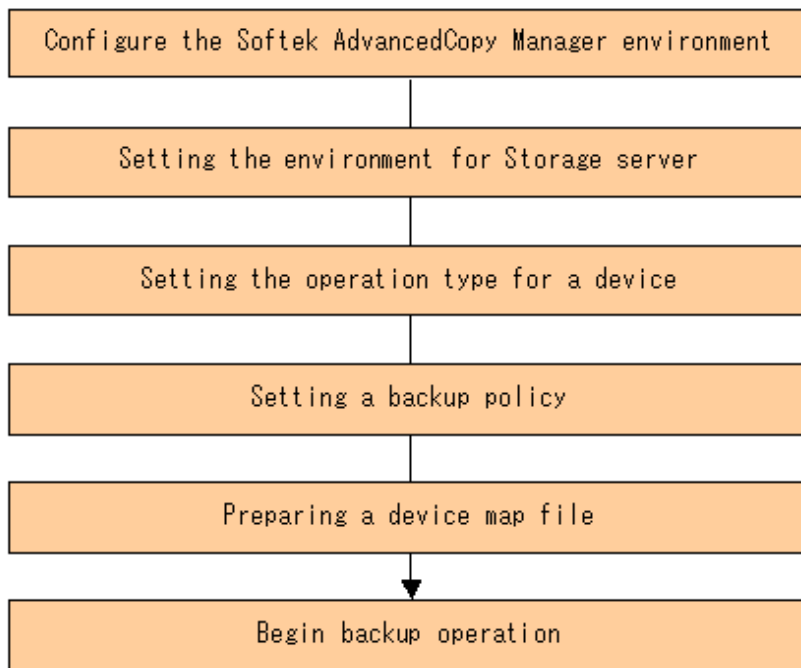
6.4 Preparation

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

6.4.1 Configuring the AdvancedCopy Manager environment

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

6.4.2 Setting the environment for Storage Server

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

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

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

6.4.3 Setting the operation type for a device

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

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

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

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

📒 Note

. . . .

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

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

. . . .

📘 Point

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

. . . .

6.4.4 Setting a backup policy

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

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

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

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

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

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

6.4.5 Preparing a device map file

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

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

When it is necessary to recognize a specific backup destination device for any reason a "4.4.11 Preparing a device map file" that defines the relationship between a transaction volume and backup volume must be created in advance. By specifying the 4.4.11 Preparing a device map file when starting the backup, the backup can always be performed because the backup destination has already been specified.

P Point

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

6.5 Operation

6.5.1 Invoking backup

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

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

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

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

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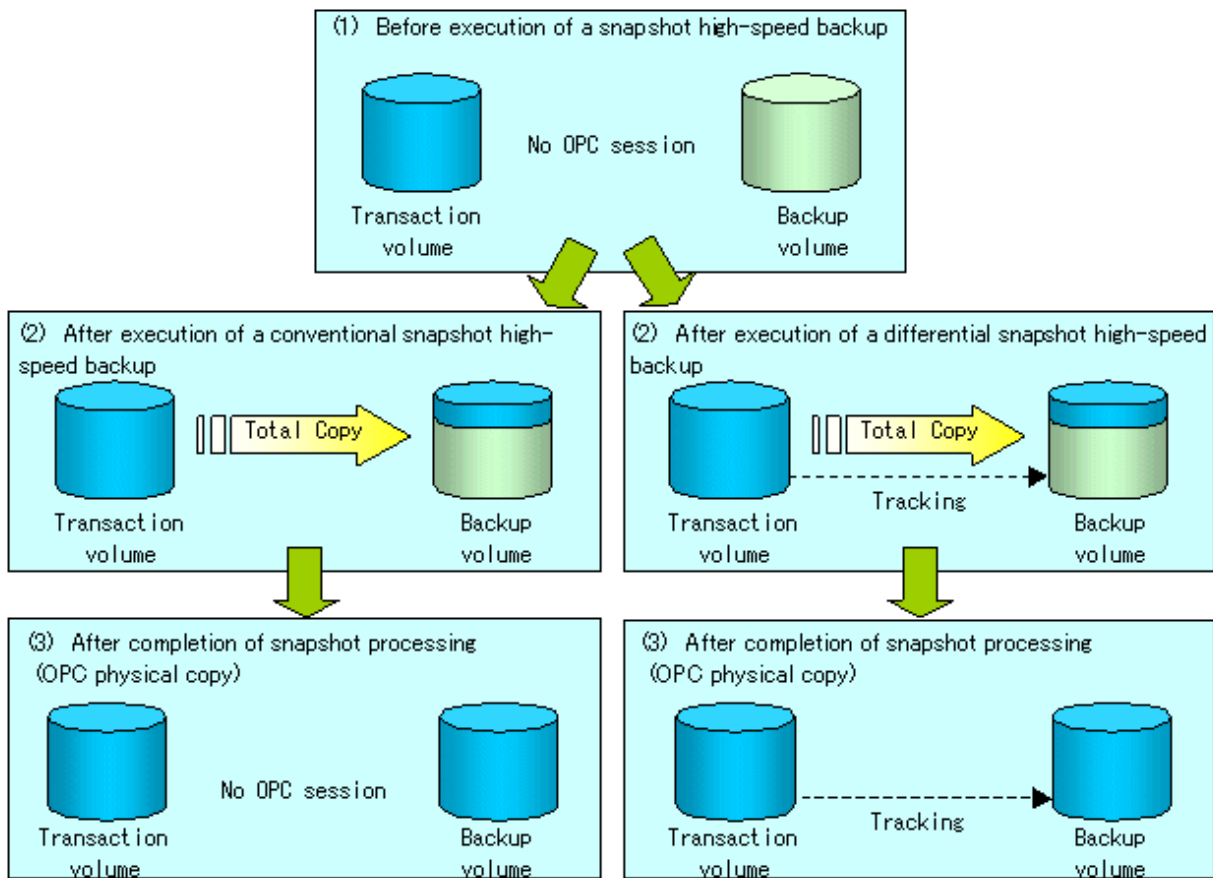
After history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history information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

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

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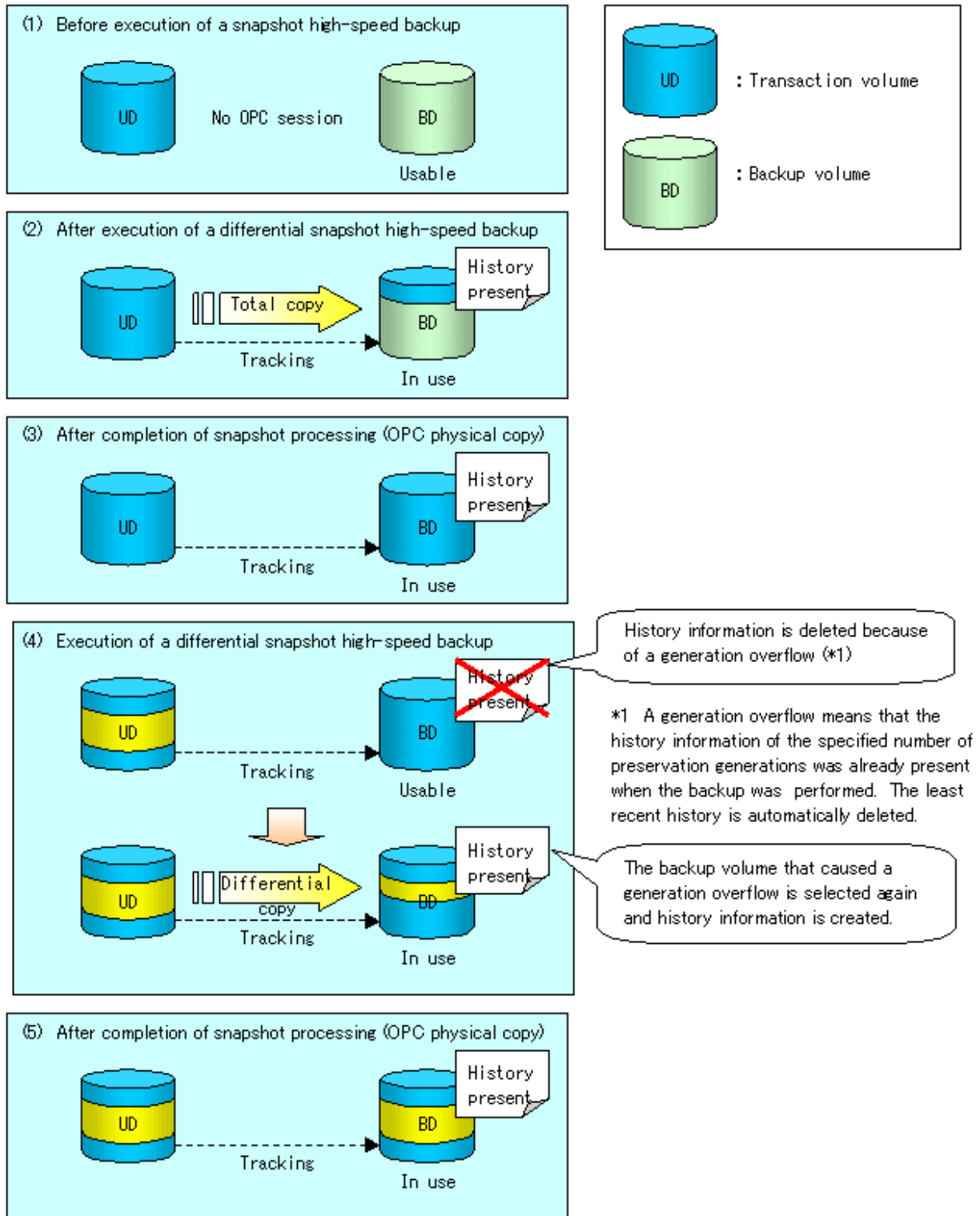
6.5.2 History management

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

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

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

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

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

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

Figure 6.5 Comparison of history deletion between snapshot high-speed backup and differential snapshot high-speed backup
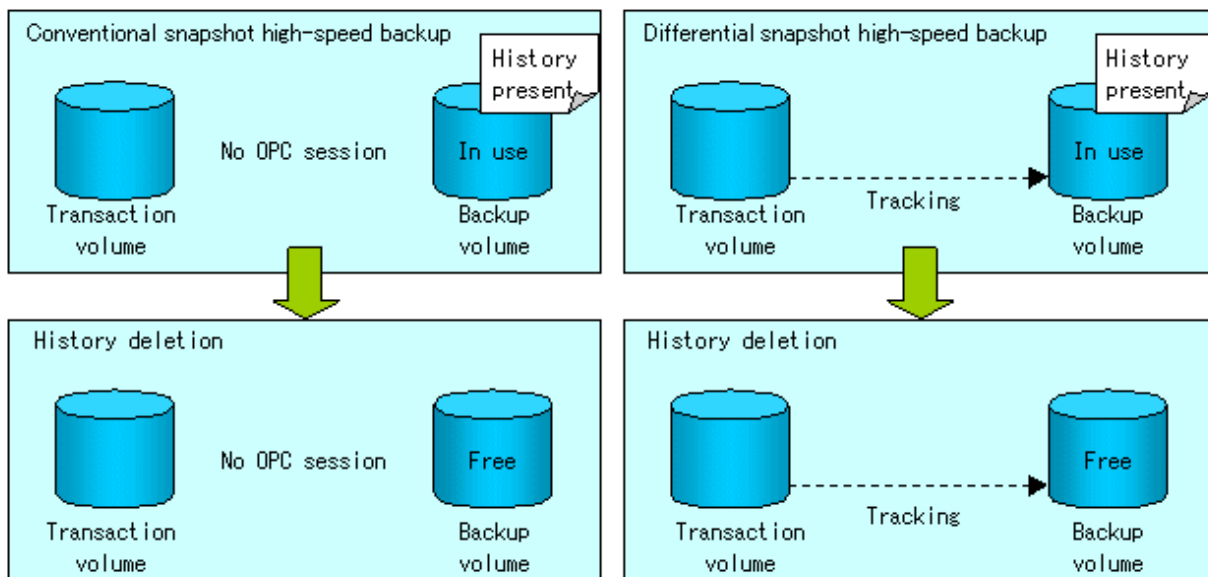
6.5.3 Restoration

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

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

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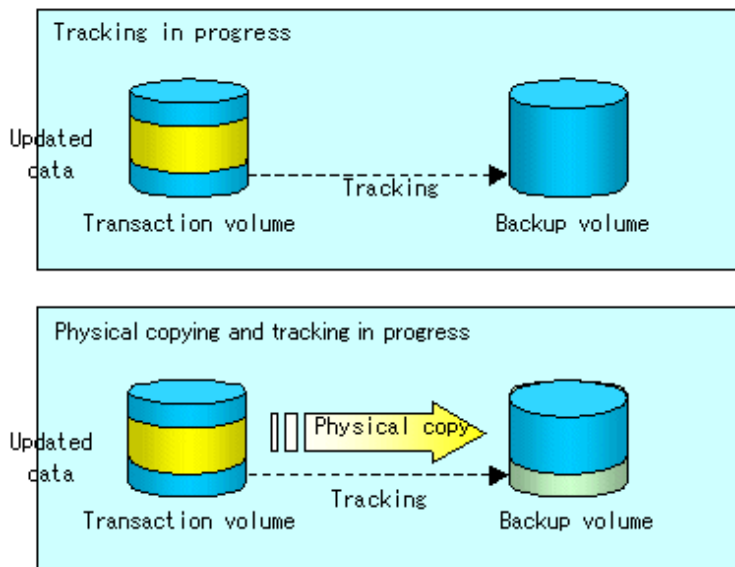
When restoration is executed, normal OPC from the backup volume to the transaction volume is started while the tracking state from the transaction volume to the backup volume is maintained.

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

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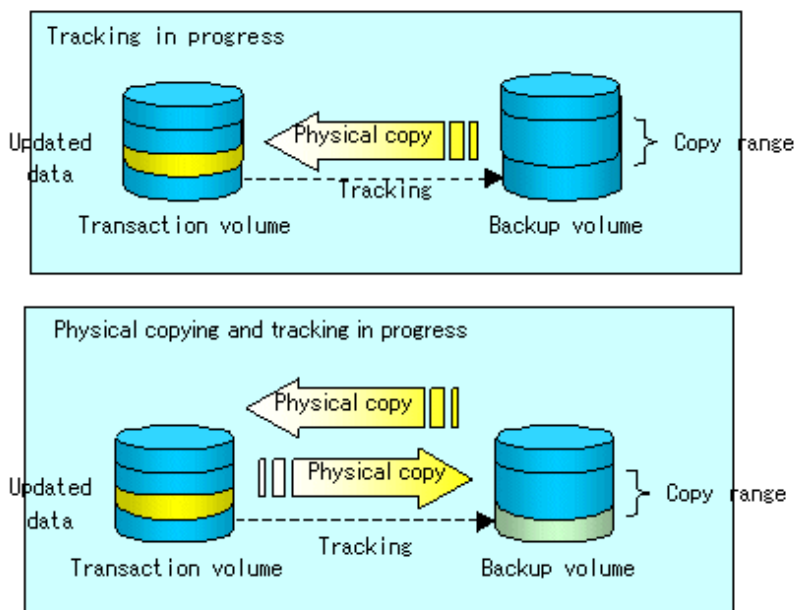
While tracking processing is performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes is required, the following operational steps must be performed in advance:

1. If the OPC physical copy from the transaction volume to the backup volume is in progress, wait for the completion of the copy.

2. Stop tracking processing using swstcanceltrk (Tracking cancel command).

Figure 6.8 Restoration to another volume
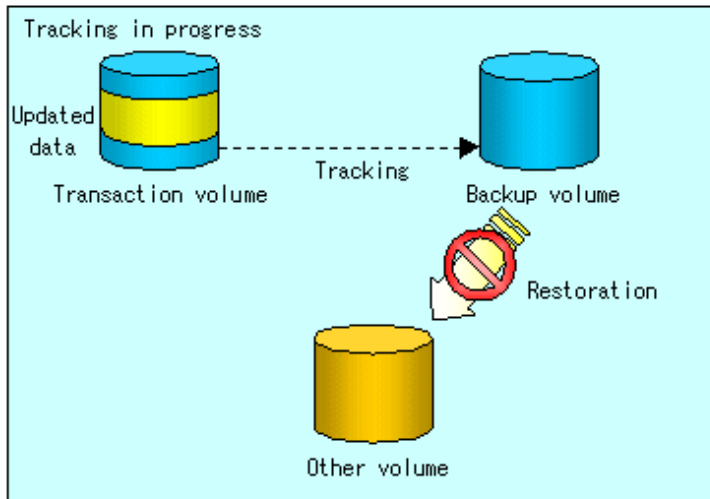
Note

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

6.5.4 Canceling restoration

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

Point

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

6.5.5 Displaying the execution status of tracking processing

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

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

6.5.6 Stopping tracking processing

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

Point

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

Chapter 7 Replication

This chapter provides details of AdvancedCopy Manager replication in a Windows Server 2003/Windows Server 2008.

A partition or Logical Unit (disk) is used as the replication unit.

In this manual, the term "volume" is used instead of "partition" or "Logical Unit (disk)".

7.1 Overview

This chapter explains the operation of the replication function.

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

Snapshot replication is the term used for the replication function that uses the One Point Copy (OPC) or Remote One Point Copy (ROPC) function of a Fujitsu ETERNUS disk array unit.

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

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

7.1.1 Snapshot replication processing

Snapshot replication copies from a source volume to a destination volume using the OPC or ROPC function of a Fujitsu ETERNUS disk array unit.

The snapshot replication performs the following two types of processing:

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

   swsrpmake (Replication creation command) locks and unlocks the source volume.

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

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

Figure 7.1 Snapshot replication processing
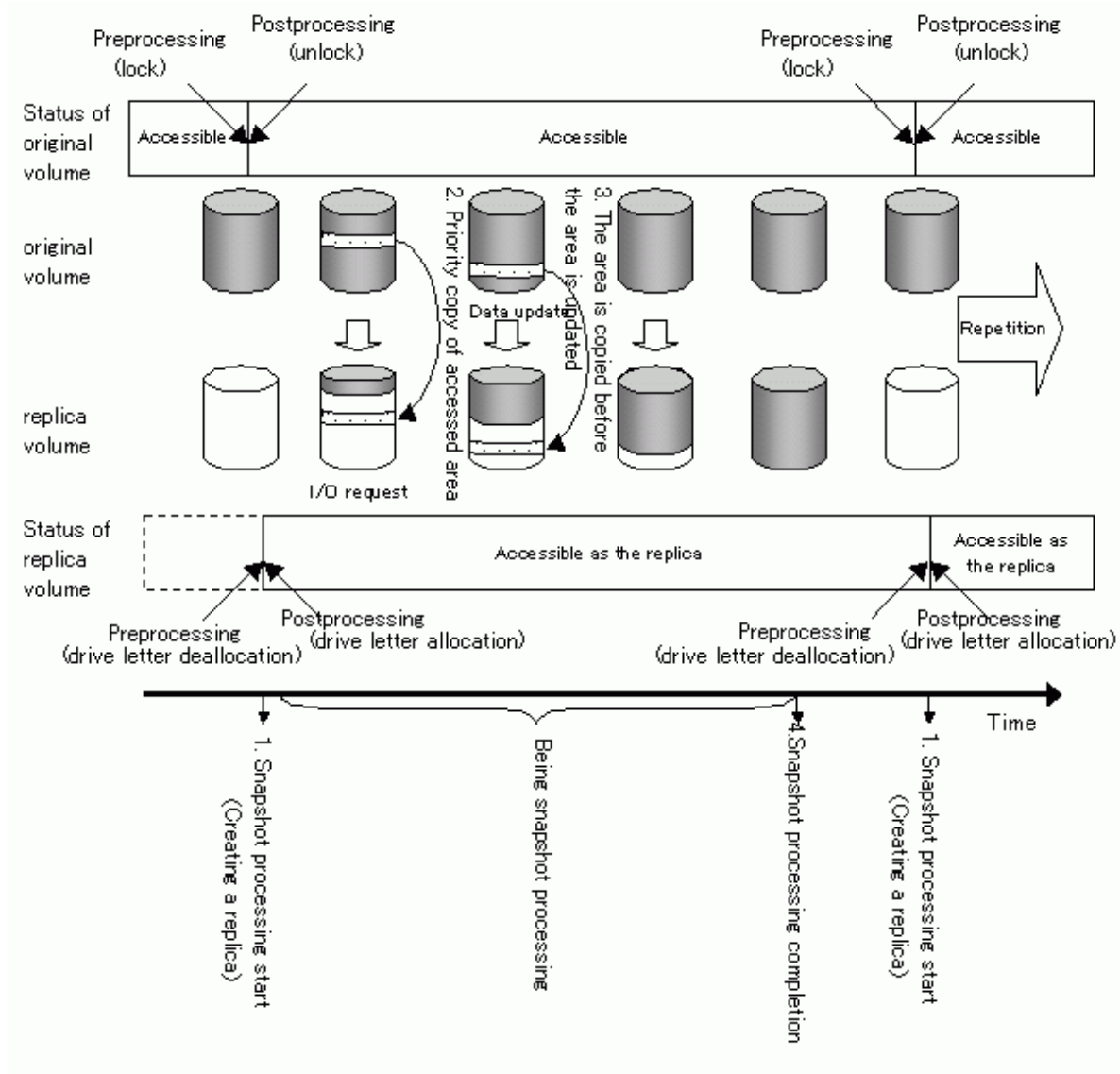
Snapshot replication is completed when the replication creation command is issued. The actual data is internally copied by the OPC or ROPC function of the Fujitsu ETERNUS storage system disk array unit.

Note

ETERNUS disk array devices must support the ROPC function in order to use it in the Advanced Copy snapshot replication function.

7.1.1.1   Types of snapshot replication

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

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

Ordinary snapshot replication

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

Figure 7.2 Ordinary snapshot replication
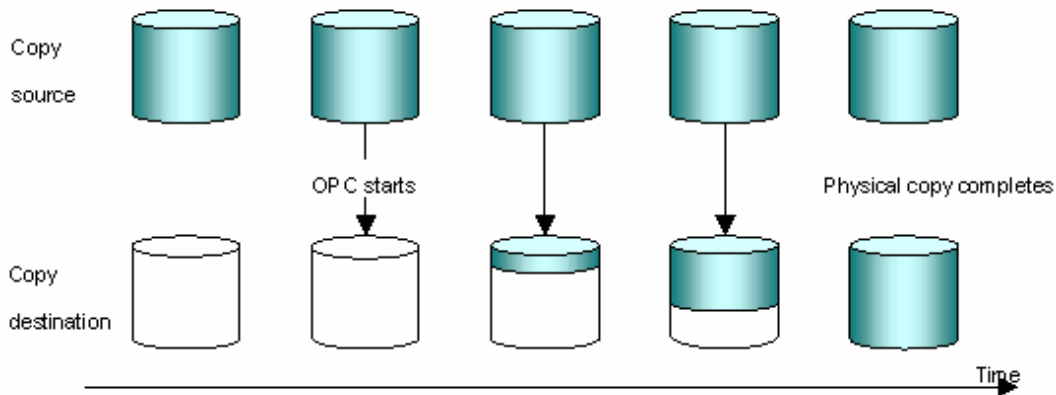
P Point

....

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

....

QuickOPC replication

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

Figure 7.3 QuickOPC replication
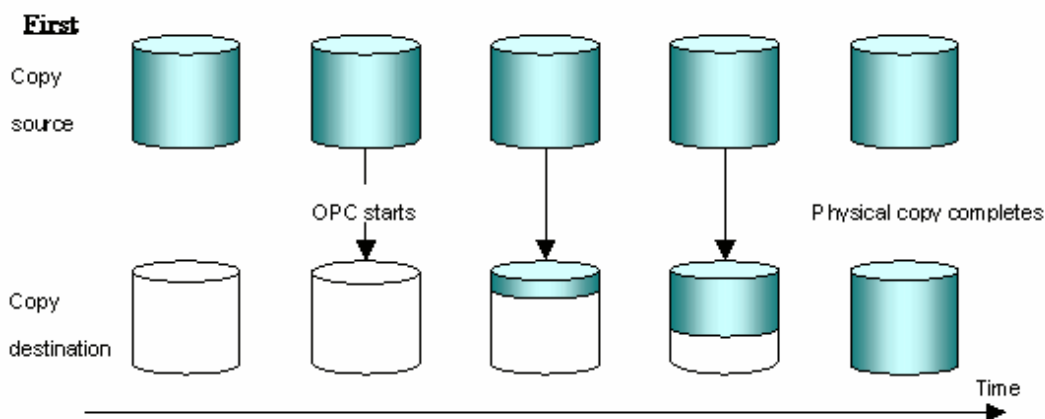
Second and subsequent copies
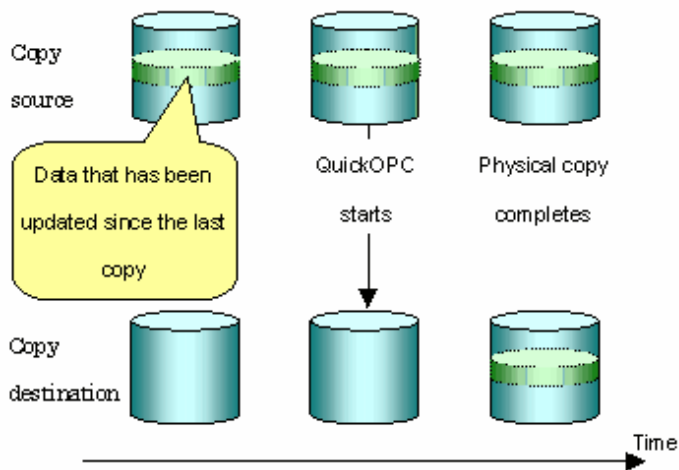
P Point

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

The copying time for subsequent replications is the time taken to copy the differential data.

Note

To execute QuickOPC replication, it is necessary to use an ETERNUS disk array that supports the QuickOPC function.

The QuickOPC function 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.

P Point

Hardware using the QuickOPC function records the updates made to the copy source or destination after the completion of OPC logical copying. The status in which the hardware records and displays updates is referred to as the "tracking status."

SnapOPC type replication

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

Figure 7.4 SnapOPC replication
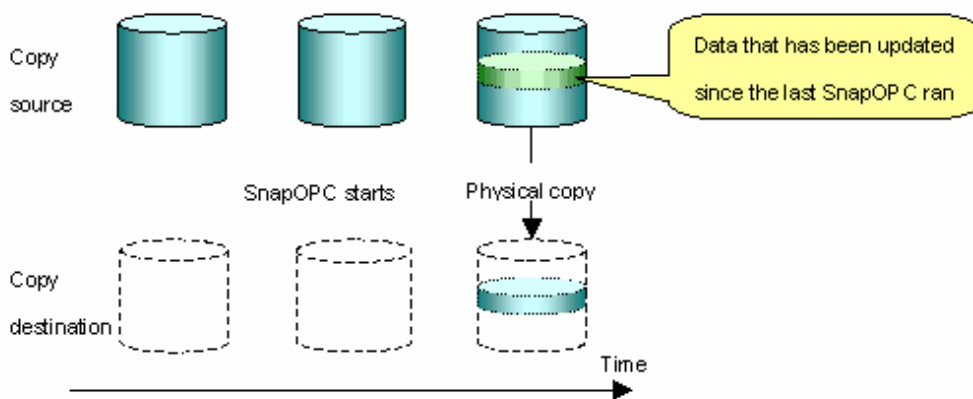
![P] **Point**

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 icon] **Note**

SnapOPC can only be used for replication within a cabinet (OPC). SnapOPC cannot be used for replication between cabinets (ROPC).
The SnapOPC copy destination disk is called a Snap Data Volume.

Figure 7.5 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
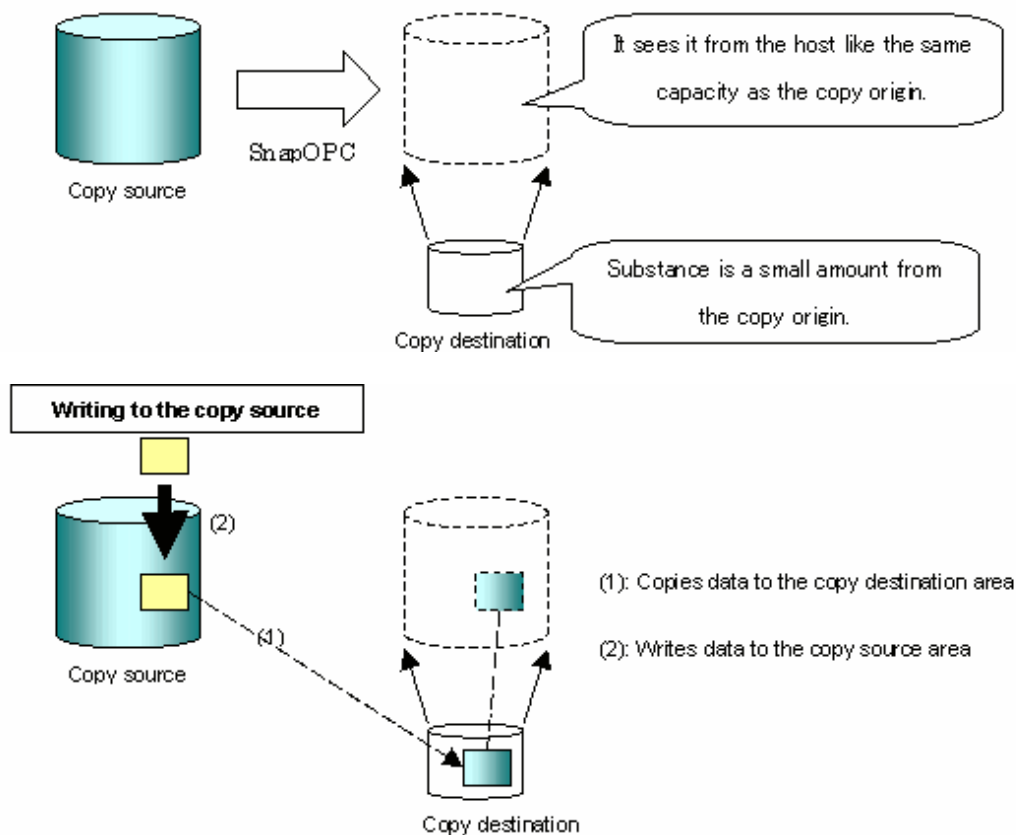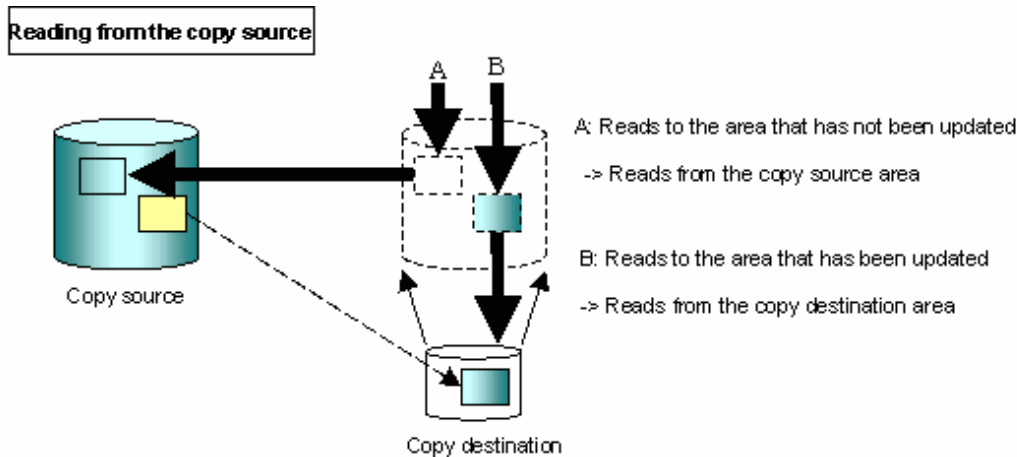
Copy destination

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

Access performance

Since the data copy from the source to the destination occurs inside SnapOPC, the access performance of the copy source is sometimes reduced, as well as the access performance of the copy destination.

Reliability of copy data

Copy data is made up of two parts: the "copy source" and "updated part of the copy source". Therefore, a hardware fault with the copy source can cause copy data to be lost.

Additionally, performing a restoration is equivalent to losing the "copy source" data, and so even if there are multiple "updated parts of the copy source", these become invalid from the point when the restoration is performed.

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

SnapOPC+ type replication

When data is changed, the SnapOPC+ function copies only the original data of the changed data set, and saves it in snap generation units.

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

Figure 7.6 SnapOPC+ function flow
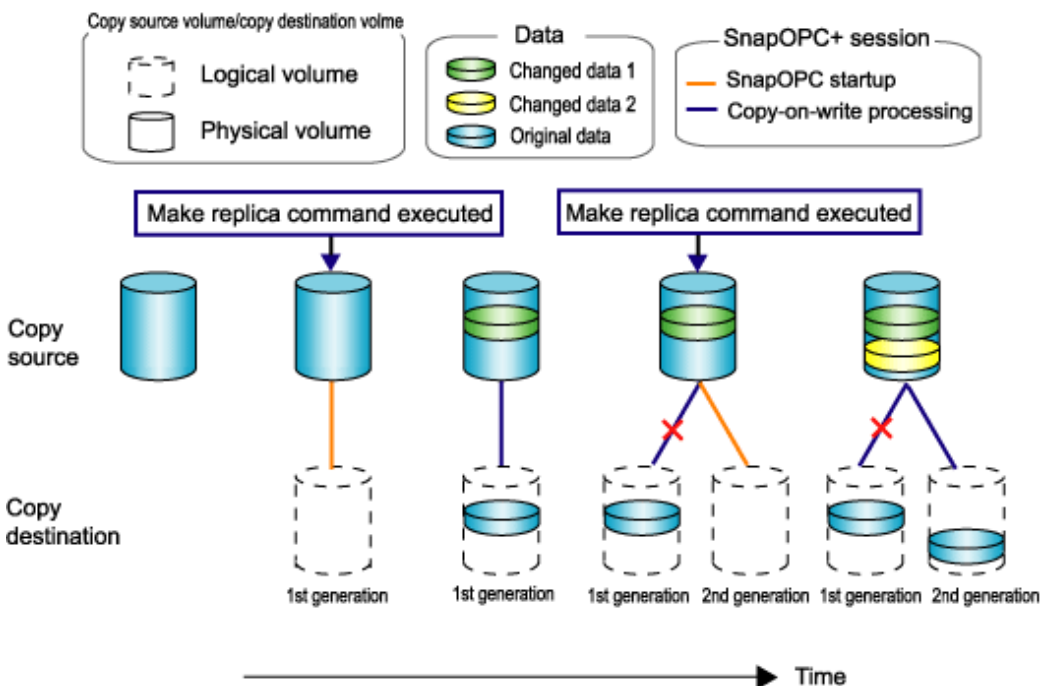
1. Logical copy is performed from the copy source to the copy destination.

2. After the logical copy, a SnapOPC+ session is set between the copy source and the copy destination.

3. After the SnapOPC+ session is set, only the original data of the changed data at the copy source is copied to the copy destination (copy-on-write processing).

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

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

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

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

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

Point

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

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

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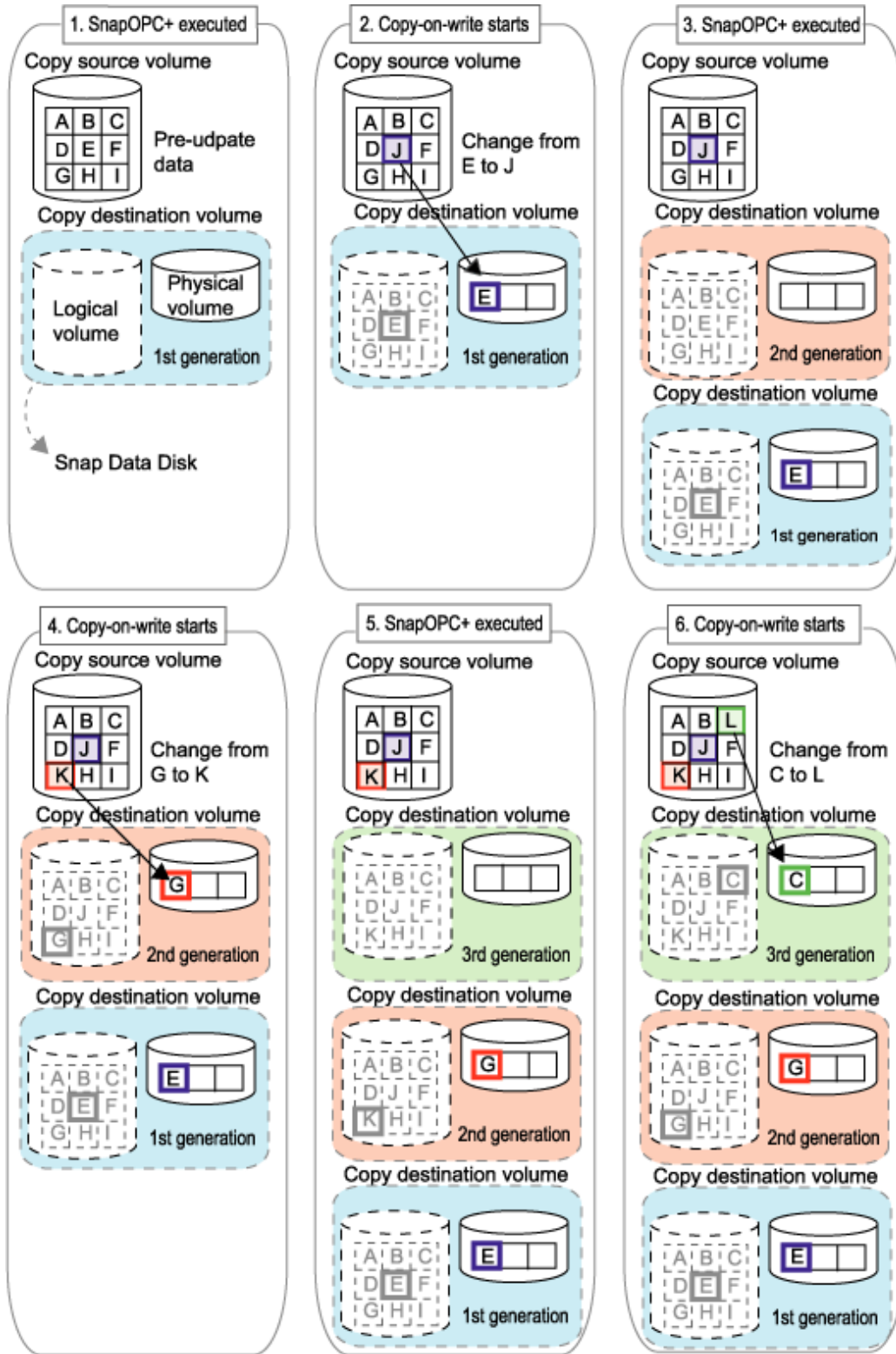
Due to the mechanism and features of SnapOPC+, it is assumed that it will be used as a backup to enable recovery from minor errors, such as operator mistakes and software errors. In order to be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all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

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

Table 7.1 List of function differences between SnapOPC and SnapOPC+

Function	SnapOPC	SnapOPC+
Copy method	Copy-on-write method	Copy-on-write method
Copy time (logical copy duration)	Instant	Instant
Copy destination volume type	Snap Data Volume	Snap Data Volume
1:N operation	Y	R Access performance to the copy source volume is better than with SnapOPC. Also, compared with SnapOPC, less physical space is required at the copy destination volume.
Snap generation numbers	N	Y
Maximum number of sessions(Note1)	8	8
Restoration using the replication function	Y	Y(Note2)
Usefulness	・ Tape backup temporary area ・ Backup of file servers or similar that have a small amount of updates	・ Tape backup temporary area ・ Backup of file servers or similar that have a small amount of updates

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

Y = Yes
N = No
R = Recommended

7.1.1.2   Snap Data Volume and Snap Data Pool

Snap Data Volume

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

Note

When there is insufficient Snap Data Volume capacity, it is not possible to access source volume (Snap Data Volume).
When there is insufficient capacity, refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Snap Data Pool

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

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

![Note icon] **Note**

. . . .

When there is insufficient Snap Data Pool capacity, it is not possible to access the copy destination (Snap Data Volume).
When there is insufficient capacity, refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

. . . .

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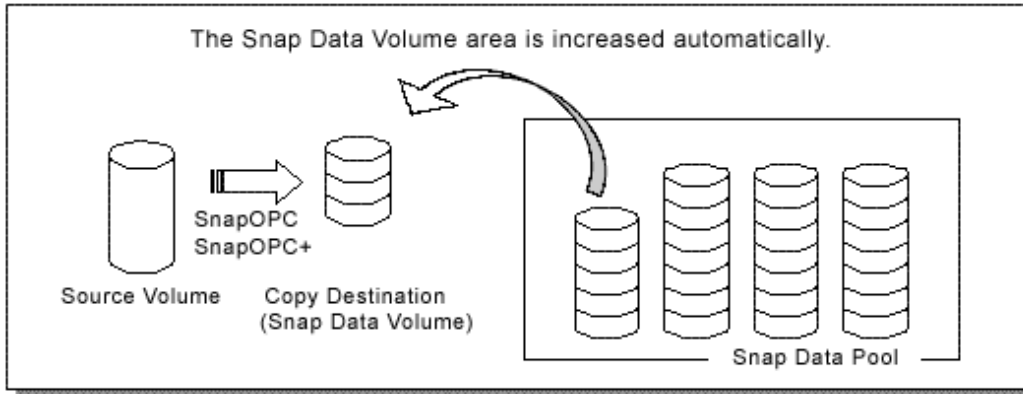
7.1.2 Synchronized replication processing

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

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

- ・ Creating replicas with full copying
  Use this method to create the first copy in a replication.

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

The procedure for synchronized replication incorporates the following steps:

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

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

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

   The replication creation command locks and unlocks the source volume.

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

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

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

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

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

Figure 7.9 Synchronized replication processing
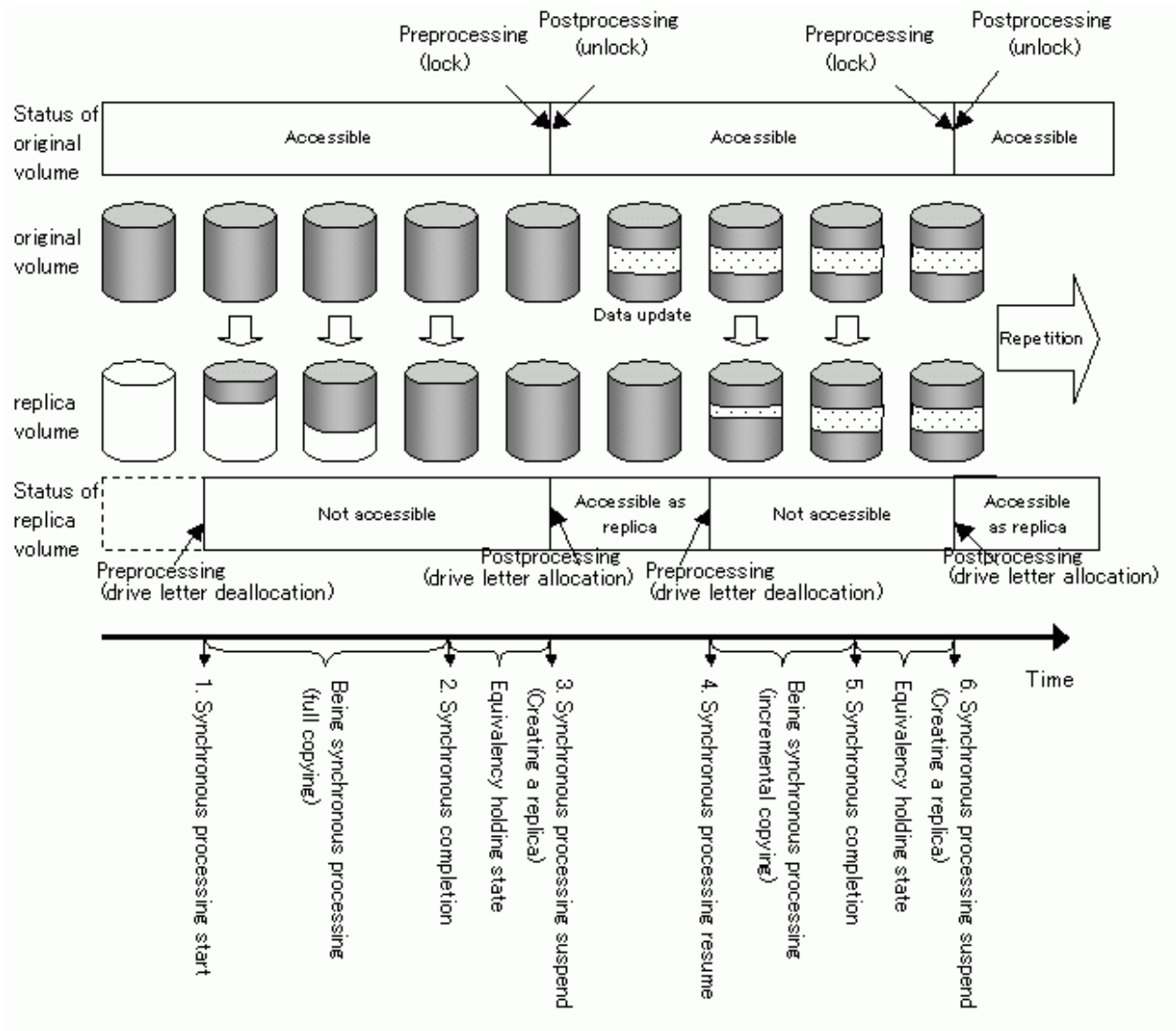
📝 **Note**

. . . .

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

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

. . . .

7.1.3 Device name

A device in the ETERNUS storage system is the target of replication. AdvancedCopy Manager manages the device with a unique name in the form "AdvancedCopy Manager device name." For details of the device name, refer to "1.5 Managing a Device on AdvancedCopy Manager".

7.2 Configuration

This section explains the operation of replication.

Configure replication using the following procedure:

- ・ 7.2.1 Determining the server that performs replication.
- ・ 7.2.2 Determining a replication target.

Refer to "7.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication", when SnapOPC/SnapOPC+ snapshot replication is used.

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".

7.2.1 Determining the server that performs replication

Determine the server that performs replication.

The following servers are used to perform replication:

Storage Management Server

    Multiple Storage Servers are unified and operated centrally. The Storage Management Server can also be used as a Storage Server.

Storage Server

    AdvancedCopy Manager operations are performed.

Figure 7.10 Configuration of the servers that perform replication
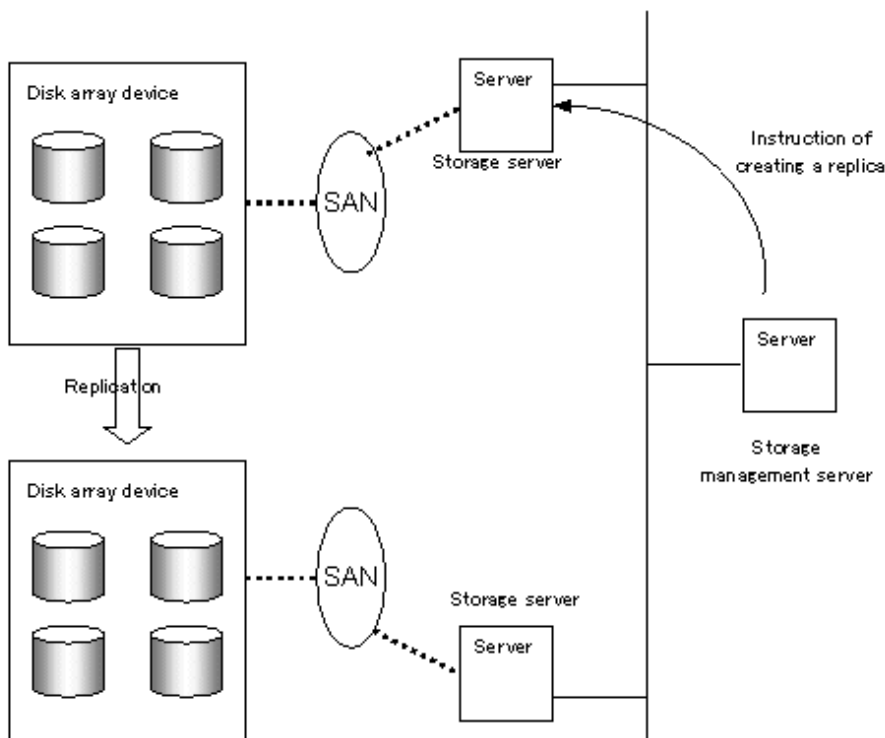
Note

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

・ The ROPC or REC function must be installed in both systems.

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

....

Note

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When performing a replication between servers, if data needs to be sent to a remote site (e.g., for disaster recovery use at some time in the future) from a duplicated system like a backup server, you need to be careful with the handling of the data in the remote site so that it can be accessed correctly in the future.

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7.2.2 Determining a replication target

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

Point

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・ The source volume is the volume on which the data to be copied is stored.

・ The replica volume is the volume on which a copy of the data is stored.

....

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

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

   bi-directional

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

   uni-directional

      Data can only be copied from the source volume to the replica volume. During this operation, copying from the replica to the original volume is disabled.

2. Operational servers (used only for server-to-server replication)
   In the case of replication between servers, you can specify whether to allow replication to be performed on either the source server or destination server, or on both servers.

   Original server

      Sets the Storage Server with the source volume that was connected as the operational server.

   Replica server

      Sets the Storage Server with the replica volume that was connected as the operational server.

   Both servers

      Sets both the source and destination servers as operational servers.

It is possible to create a group by arranging multiple source volumes and destination volumes.
In addition, the operation for multiple source volumes and destination volumes can be performed in a group. For details, refer to "7.4.7 Creating groups".

Figure 7.11 Servers used in performing replication
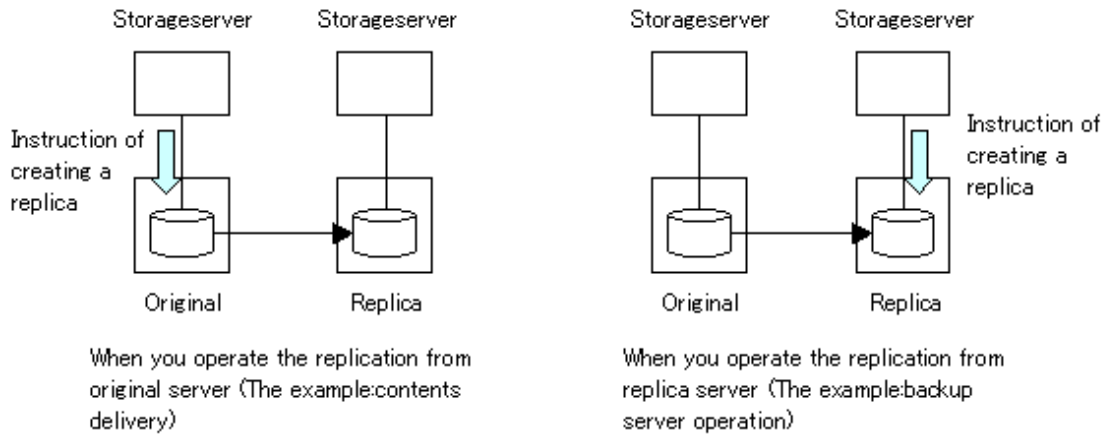
In this manual, a Storage Server used to perform replication is called the operational server. An original server or replica server is specified as the operational server.

An operational server can perform all of the replication functions. In contrast, any other type of server can use only the information display function and operational release function.

Note

In order to set up a volume as a source volume, there are some points which should be taken into consideration. For details, please refer to "12.1.1 General notes", for notes on determining a replication target.

・ Backup and Replication Exclusions

・ Size of a Partition

・ Layout of Partition

・ Dynamic Volume

・ The configuration of a disk

7.2.2.1 Logical Unit (disk) operation

Replication operations can copy data in Logical Units (disk units).
Logical Unit (disk) unit copying supports the following disk formats:

・ MBR disk format (DOS format)

・ GPT disk format

To execute Logical Unit (disk unit) copy, refer to "12.1.1.18 Notes on executing Logical Unit (disk) unit copy".

7.2.3 Notes on the configuration of SnapOPC/SnapOPC+ replication

7.2.3.1 Notes on session configurations

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

Figure 7.12 If one session is set for the Snap Data Volume
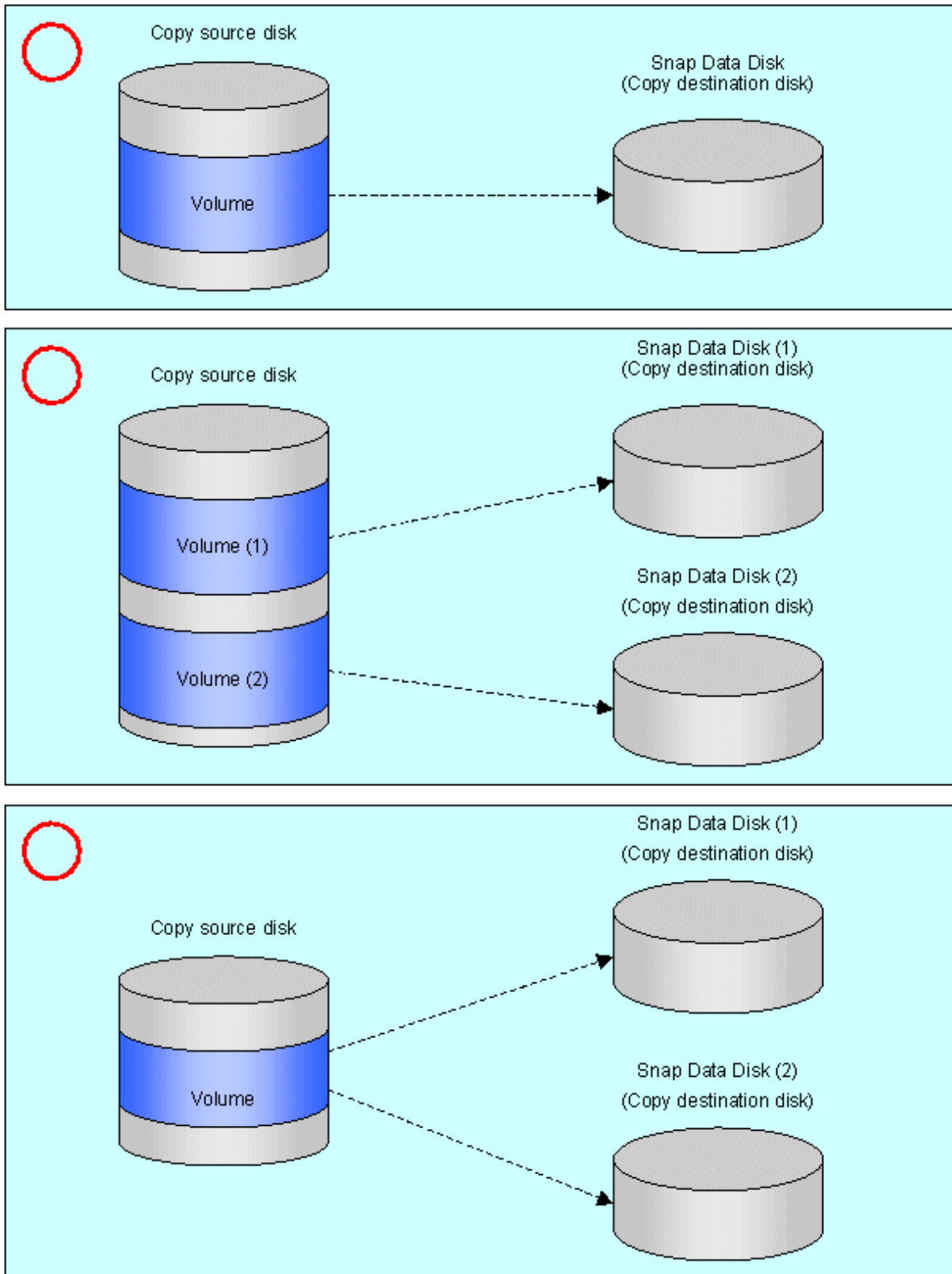
Accordingly, multiple sessions cannot be set up for a single Snap Data Volume, as shown in the following figure:

Figure 7.13 If multiple sessions are set for the Snap Data Volume
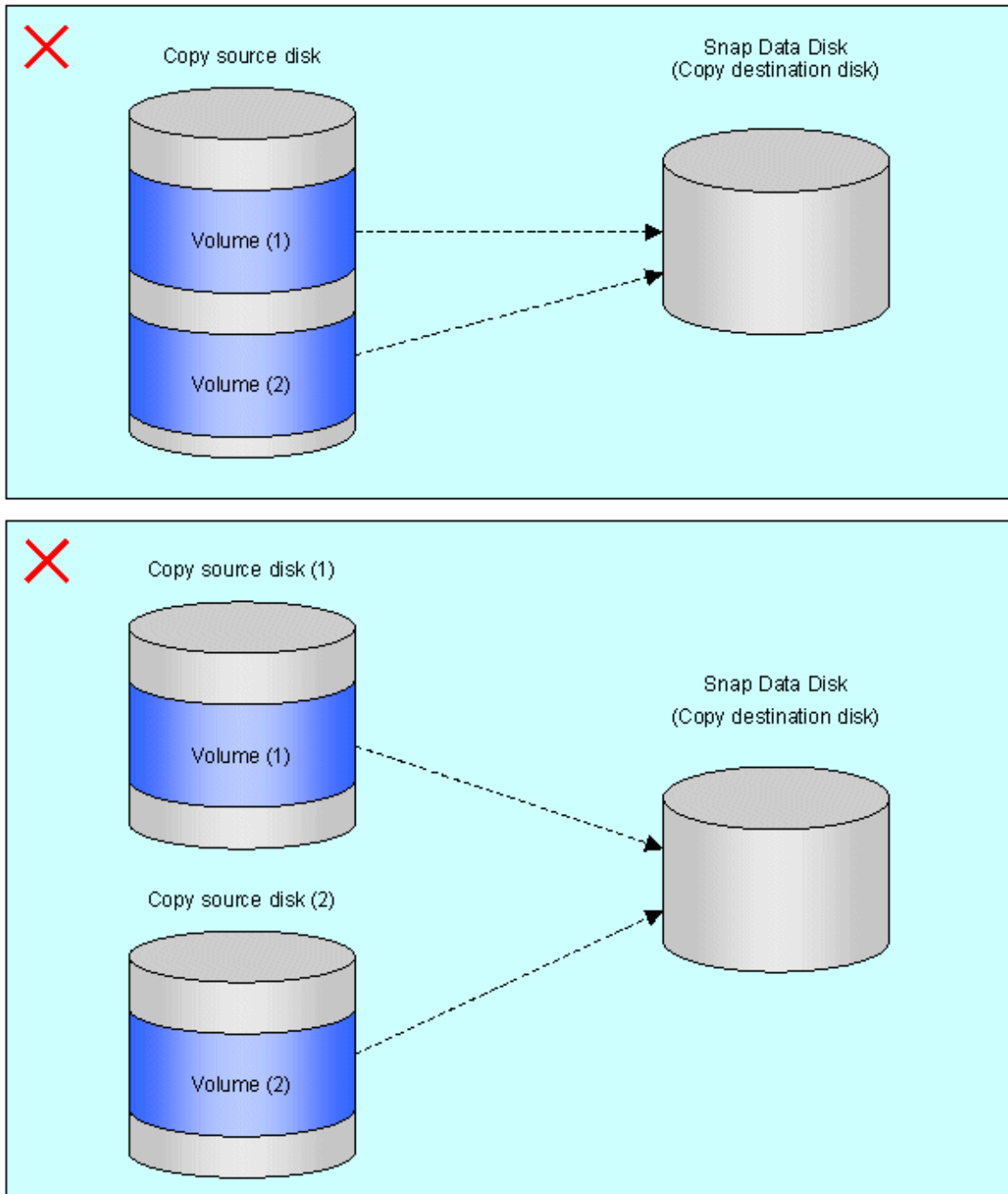
The following additional restrictions apply:

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

Figure 7.14 If copying from the Snap Data Volume to a disk other than the copy source
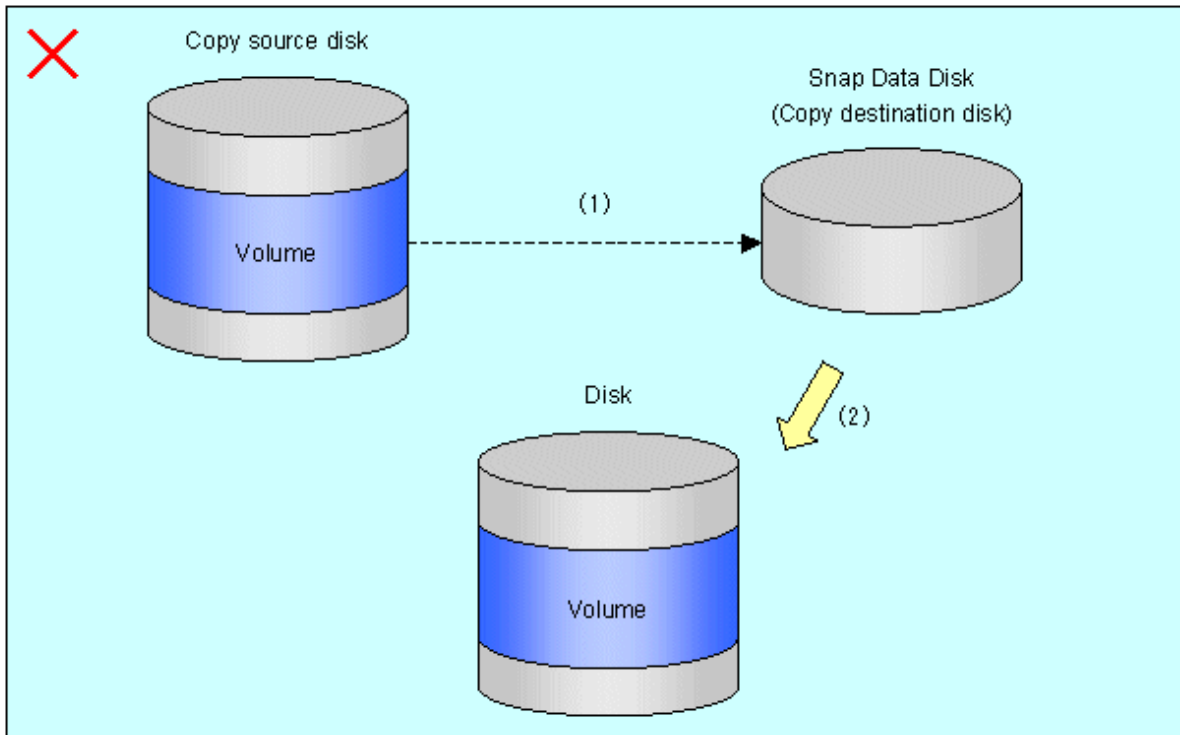
7.2.3.2　Creating a Snap Data Volume

Create a Snap Data Volume by performing the following steps:

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

2. Define and initialize the Snap Data Volume.

3. Connect to the host.

4. Create partitions and file systems.

Calculate the physical capacity for the Snap Data Volume.

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

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

Strictly speaking, both the number of blocks that have been updated on the Snap Data Volume and the management area used by the hardware (about 0.1% of the logical capacity) should also be taken into account before the SnapOPC/SnapOPC+ is taken, however this can be covered by increasing the safety factor.
The number of blocks that have been updated on the copy source volume can be estimated using swstestupdate (update amount measurement command).

Make this measurement using the following procedure:

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

```
C:\Win32App\AdvancedCopyManager\bin>swstestupdate start g1d1p1
g1d1p1 swstestupdate completed
C:\Win32App\AdvancedCopyManager\bin>
```

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.

```
C:\Win32App\AdvancedCopyManager\bin>swstestupdate status g1d1p1
Volume-Name     Update
g1d1p1          644333
C:\Win32App\AdvancedCopyManager\bin>
```

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

```
C:\Win32App\AdvancedCopyManager\bin>swstestupdate stop g1d1p1
g1d1p1 swstestupdate completed
C:\Win32App\AdvancedCopyManager\bin>
```

Note

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

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Define and initialize the Snap Data Volume.

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

Connect to the host.

Connect the created Snap Data Volume to the host. Refer to the manual for the disk array device (the Server Connection Guide) for information on this procedure.

Create partitions and assign a drive letter

Create partitions and assign a drive letter so that a destination volume can be created on the Snap Data Volume.

Note

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To avoid wasting the physical capacity of the Snap Data Volume only create partitions, assign drive letters and create a file system using quick format.

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7.2.3.3 Creating a Snap Data Pool

The Snap Data Pool is created using ETERNUSmgr.
Note the following points when creating the Snap Data Pool.

Note

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

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

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7.2.3.4 Snap Data Volume/Snap Data Pool monitoring

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

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

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

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

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

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

When there is insufficient Snap Data Volume or Snap Data Pool capacity, refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Creating an access path

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

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

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

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

The following operations can be executed using the access path:

- Snap Data Volume initialization

- Snap Data Volume status display

- Snap Data Pool status display

7.2.3.5 Cluster Operations

Do not use Snap Data Volume as shared disks in cluster systems. This is to avoid the danger of the cluster system failing over when the physical capacity of the Snap Data Disk is insufficient.
In cluster operations, use one of the following methods to prevent the Snap Data Volume from being used as a shared disk:

a. Permit the Snap Data Volume to be referenced from all the nodes in the cluster system.

b. Use inter-server replication between the cluster system and a non-cluster system.

7.3 Flow of Operations

The following figure shows the flow of the replication.

Figure 7.15 Flow of replication operations

| Starting a service |
| Starting the GUI client
When a command performs subsequent operations,
starting of the GUI client is unnecessary |
| Registering a storage server
First time only |
| Acquiring device information
First time and only if a device was changed |
| Setting an original volume and replica volume |
| Customizing preprocessing and postprocessing
scripts
Only when the operation is changed |
| Creating groups |
| Operation |
| Stopping operation |

7.4 Preparations

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

7.4.1 Starting a service

Before replication is started, the service must be started on the Storage Management Server and Storage Server. Normally, the service is automatically started at system startup. However, if for some reason the service fails to start or has stopped, the service must be restarted on both servers. For information about starting the service, refer to "Chapter 2 Starting and Stopping a Service".

7.4.2 Starting the GUI Client

Start the GUI client. For details, refer to "Starting the AdvancedCopy Manager Workbench" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".
There is no need to perform this operation for command-only operations.

7.4.3 Registering a Storage Server

The Storage Management Server registers the Storage Server to be managed. When the Storage Server is operated as a Storage Management Server, it is not necessary to register a server.
The process of registering the Storage Server can be executed using either GUI or command operations.
For details on the operation method using the GUI, refer to "Register a New Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

7.4.4 Fetching device information from a Storage Server

This process can be executed using either GUI or command operations.
For details on the operation method using the GUI, refer to "View Storage Server Device Information" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide".

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

🛈 Note

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

Refer to Step 2 in "10.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.
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🛈 Note

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

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When backup synchronous processing or synchronous replication processing is being performed, device information may not be obtained accurately. Therefore, when determining device information, please take this into consideration when synchronous processes are canceled.
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7.4.5 Configuring the source volume and replica volume

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

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

7.4.6 Customizing pre-processing and post-processing

Replication must be performed while access to the volume by other processes is inhibited. Therefore, when replication is executed, operations such as volume lock/unlock are performed as part of pre-processing and post-processing.

The replication processing will not execute if the volume cannot be locked.

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

In addition, refer to "Running Software" in 12.1.1 General notes.

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

For example:

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

- ・ To modify the standard operation of replication pre-processing and post-processing

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

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When AdvancedCopy Manager is upgraded

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

7.4.7.1 Conditions for the replication volumes that make up the group

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

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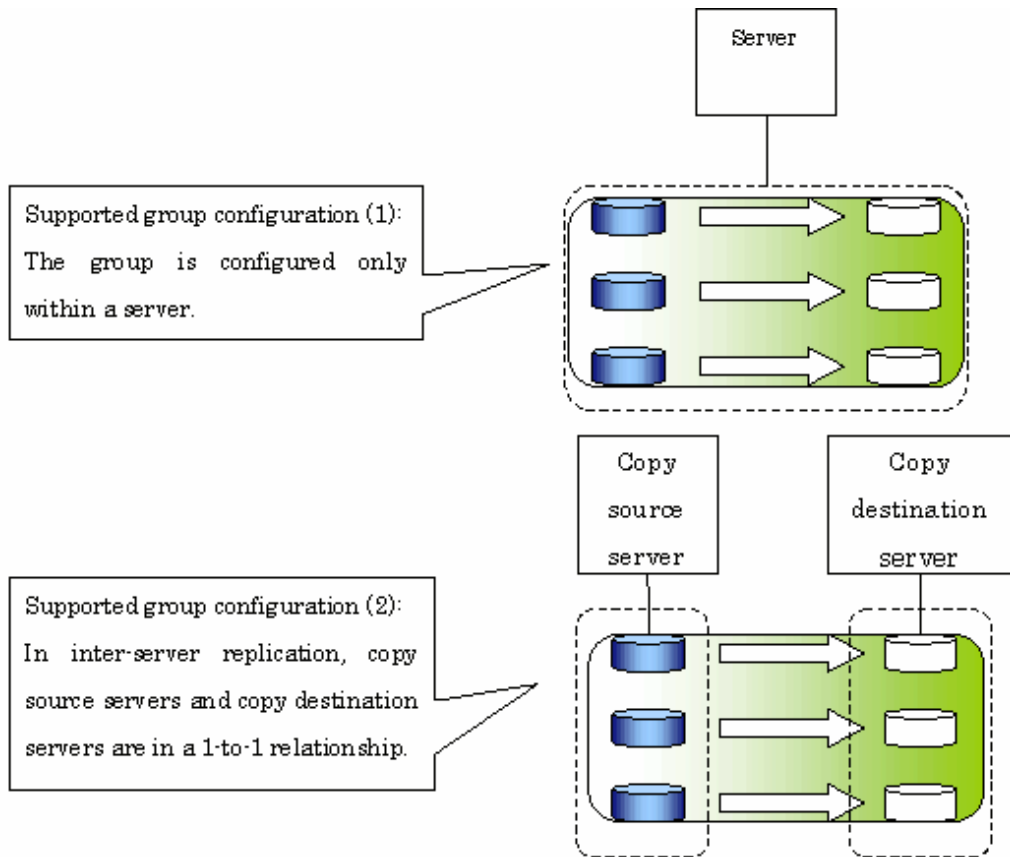
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the "Op-Server" and "Copy" columns obtained by executing swsrpvolinfo (Replication volume information display command).
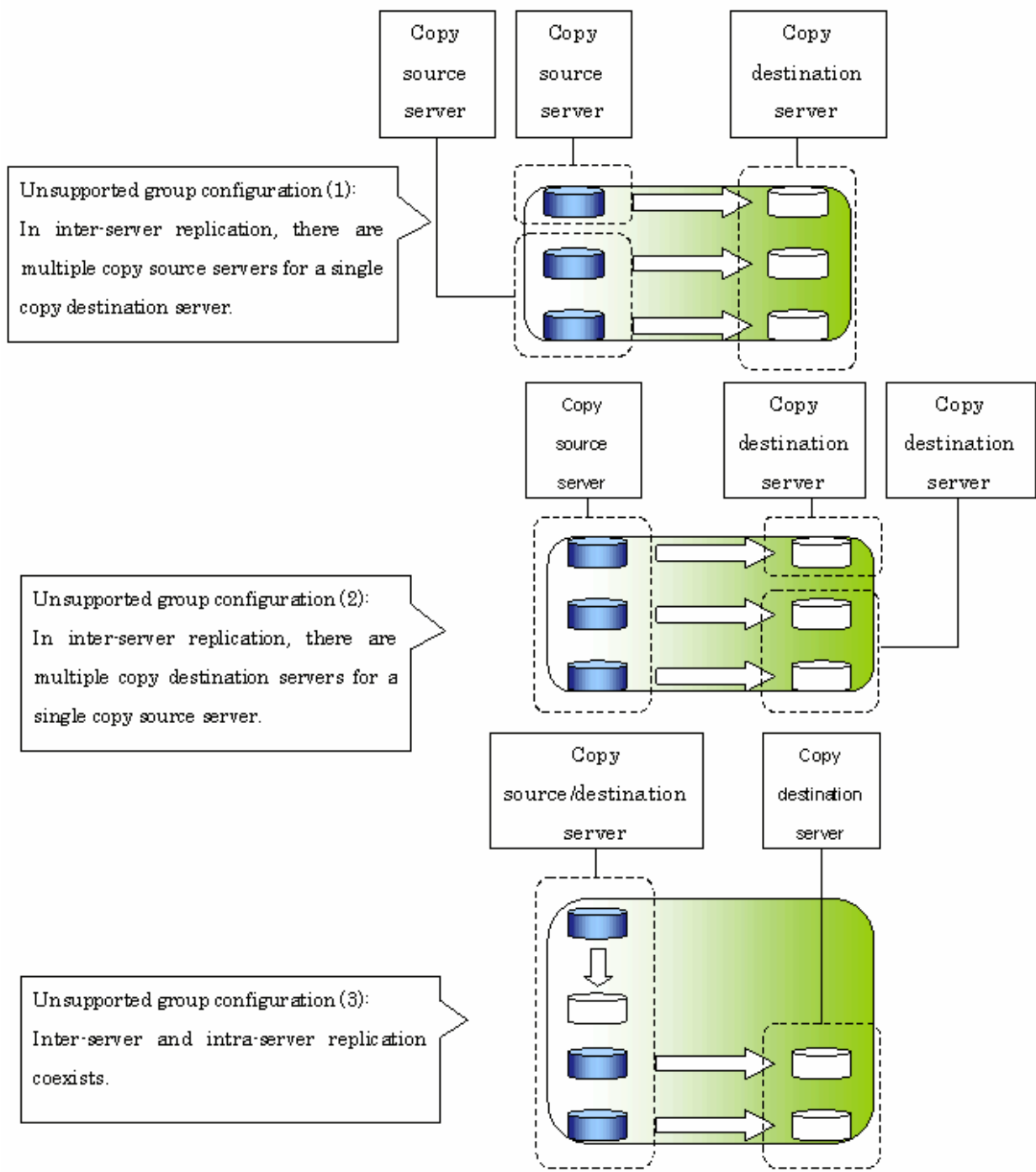
・ The replication volume information being registered must not be registered in any other group.

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

Unsupported group configuration:
The copy sources and destinations are duplicated with another group.
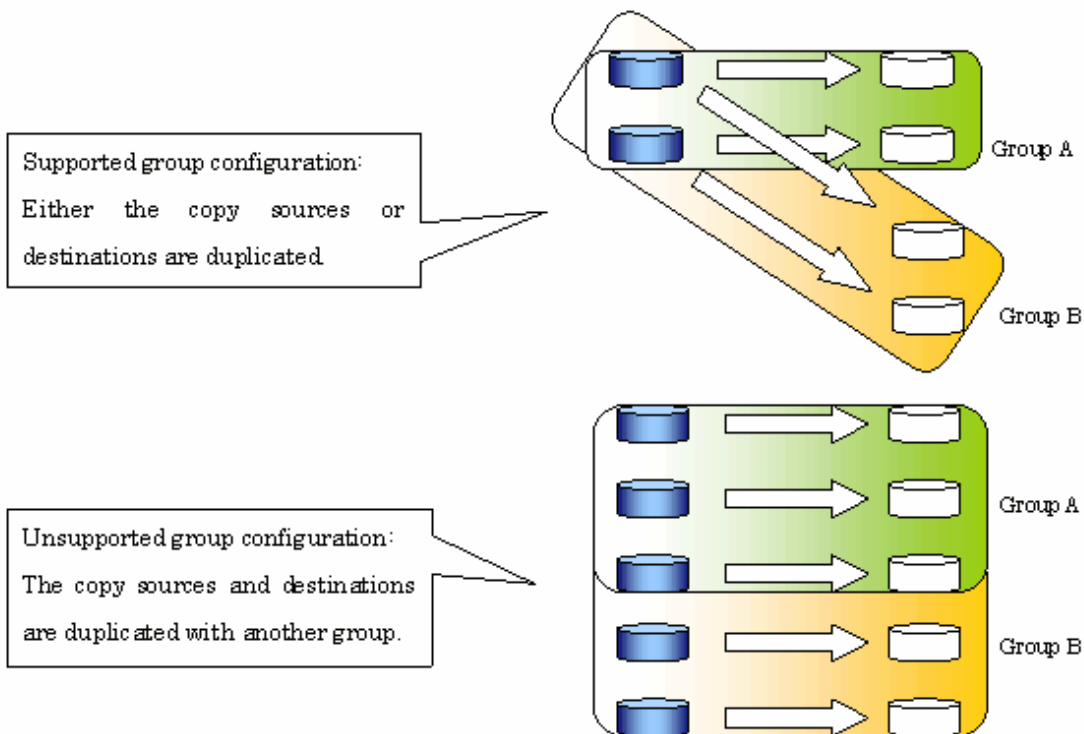
・ Source volumes and destination volumes must not be duplicated within the group.
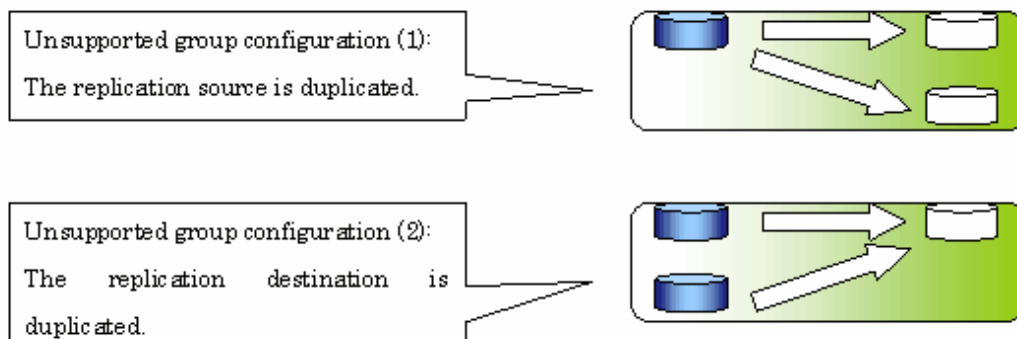
Unsupported group configuration (1):
The replication source is duplicated.

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

・ If a Logical Unit (disk) is specified, the information of the replication volume in a partition included in the Logical Unit (disk) must not be registered to another group.

・ If a Logical Unit (disk) is specified, the information of the replication volume in a partition included in the Logical Unit (disk) must not be registered within the same group.

7.4.7.2 How to create groups

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

Example

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

```
C:\Win32App\AdvancedCopyManager\bin> swsrpsetvol -Xgroup GRP1 g1d1p1@SRC
g1d11p1@TARG-1
```

```
swsrpsetvol completed
C:\Win32App\AdvancedCopyManager\bin> swsrpsetvol -Xgroup GRP1 g1d2p1@SRC
g1d12p1@TARG-1
swsrpsetvol completed
C:\Win32App\AdvancedCopyManager\bin> swsrpvolinfo -L
Server Original-Volume Size     Replica-Volume Size     Copy          Op-Server
Group
SRC    g1d1p1@SRC       4.0Gbyte g1d11p1@TARG-1 4.0Gbyte bi-direction both
GRP1
SRC    g1d2p1@SRC       4.0Gbyte g1d12p1@TARG-1 4.0Gbyte bi-direction both
GRP1
C:\Win32App\AdvancedCopyManager\bin>
```

7.5 Operations

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

This section describes the operation by command. Refer to "Perform Replication" of the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for information about operation using the GUI client.

7.5.1 Executing snapshot replication

Use swsrpmake (Replication creation command) to perform snapshot replication.
Refer to "7.1.1 Snapshot replication processing" for an explanation of snapshot replication.

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

QuickOPC replication

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

Figure 7.16 When replication creation command is executed (first time)
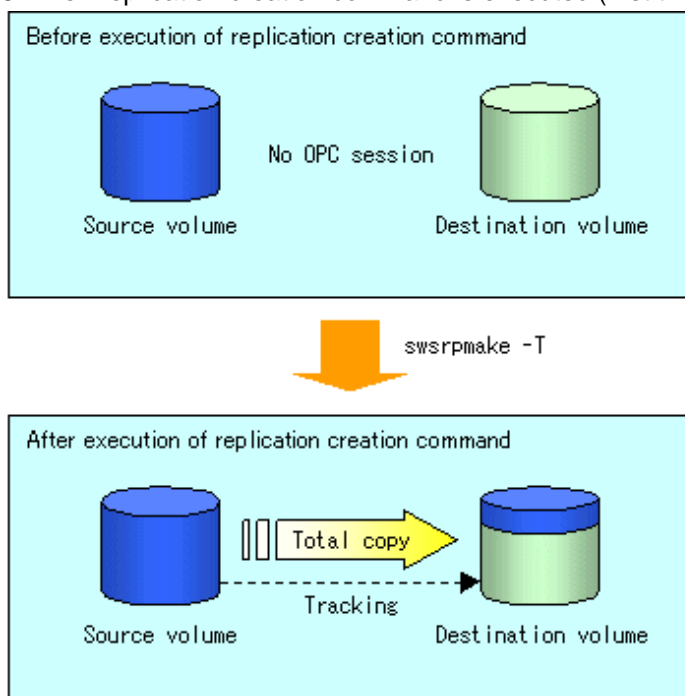
To check the execution status of physical copying, use swsrpstat (operation status display command) in the same way as for an ordinary snapshot replication.

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

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

Figure 7.17 When snapshot processing is completed
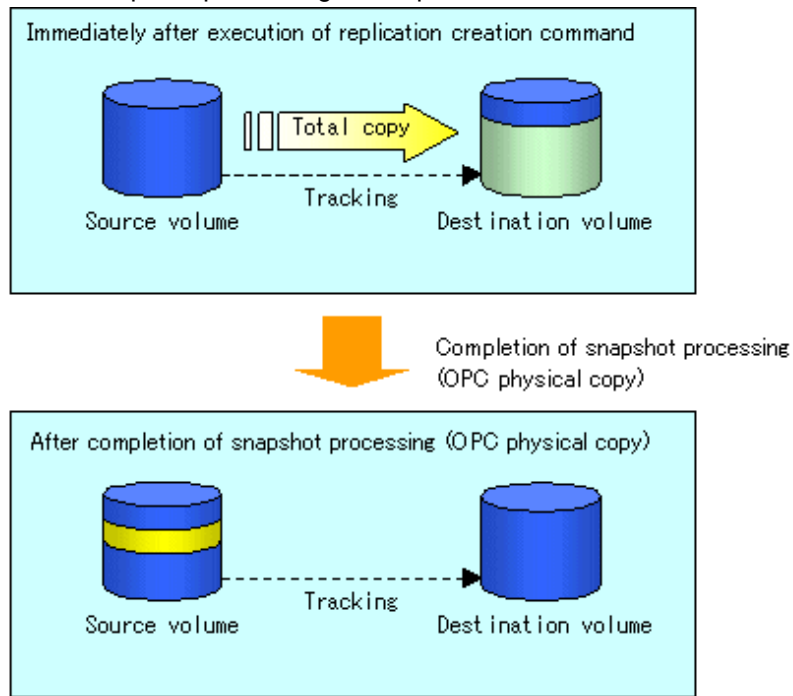
Entering swsrpmake (Replication creation command) with the "-T" option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

Figure 7.18 When replication creation command is executed (second time)
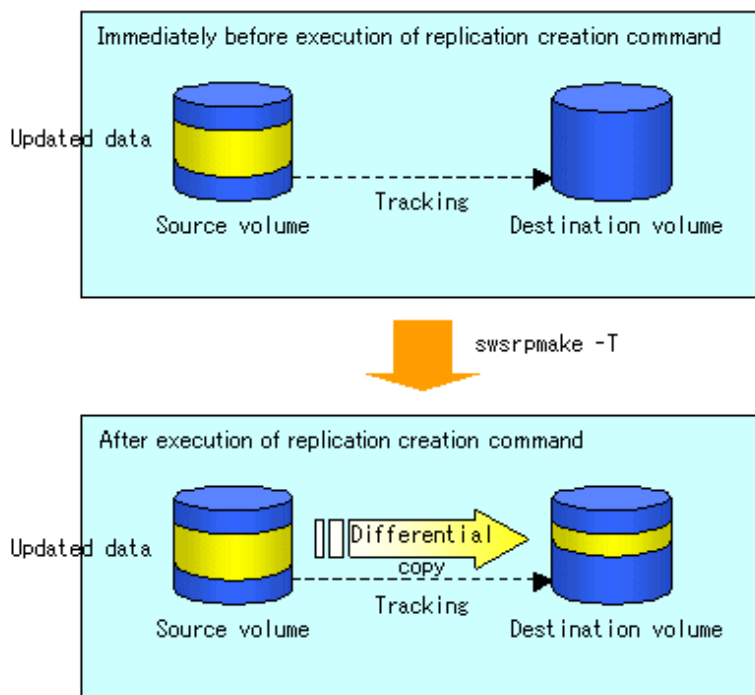
When you want to perform a restoration while tracking processing is being executed, you need to perform a restoration by OPC (to achieve this, you need to execute the replication creation command without the -T option). QuickOPC cannot be executed in the reverse direction while tracking processing is being executed. The replication using QuickOPC is done as follows:

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

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

Although a restoration is executed with OPC, only the data that has been updated since the previous replication (it can be obtained from the 'Update' column of swsrpstat) is copied.
Therefore, in replication using QuickOPC, not only a physical backup but also restoration is completed in a short period of time.
The restore execution status can be checked by executing swsrpstat (operation status display command) with the -E option specified.

SnapOPC type replication

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

Example

```
C:\Win32App\AdvancedCopyManager\bin> swsrpmake -C g1d1p1 g1d2p1
FROM=g1d1p1@SV1,TO=g1d2p1@SV1 swsrpmake completed
C:\Win32App\AdvancedCopyManager\bin>
```

Figure 7.19 When the replication creation command is executed
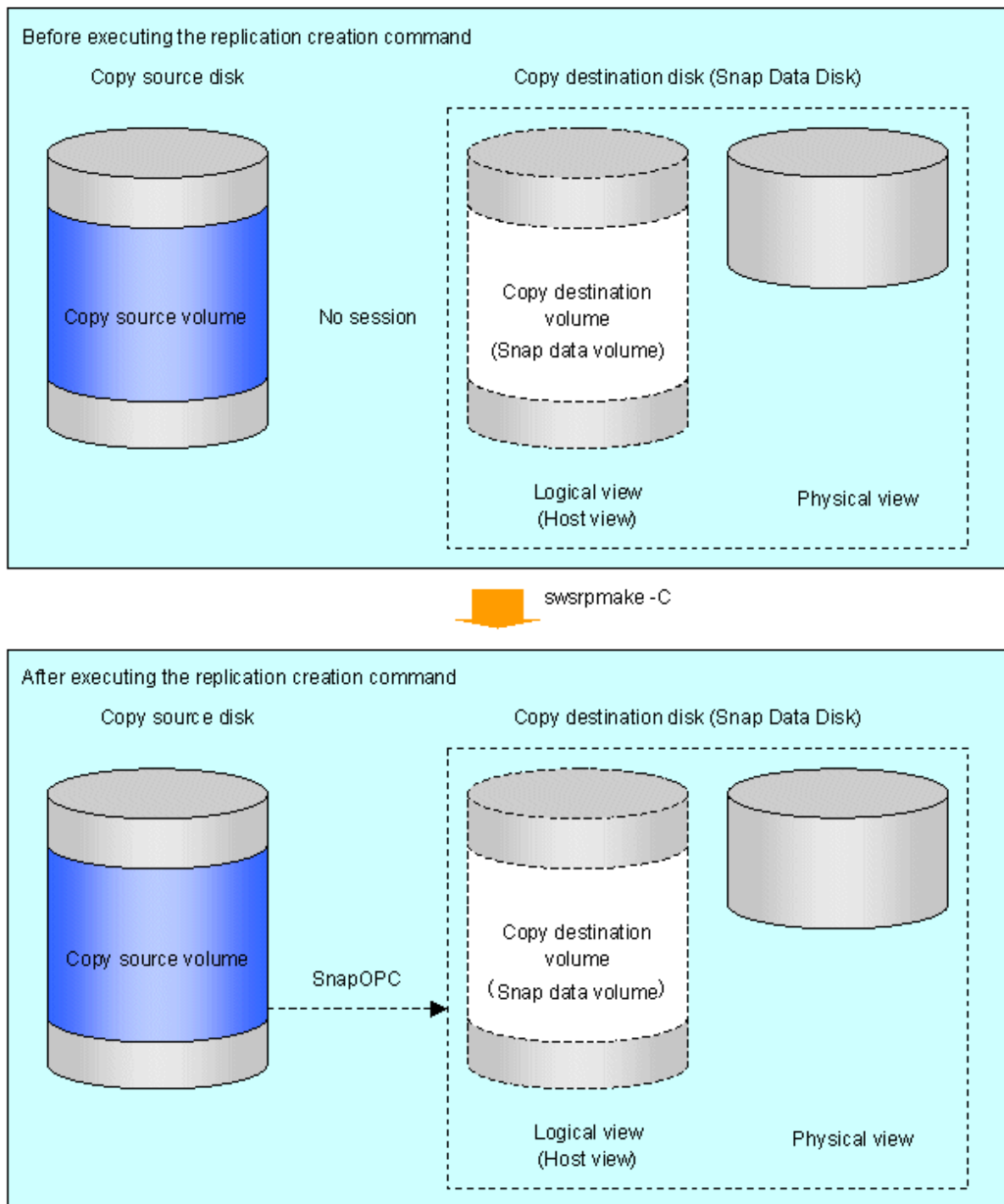
Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the source volume, but instead copy only the data that has been updated on the source or destination since SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure 7.20 When the copy source volume is updated
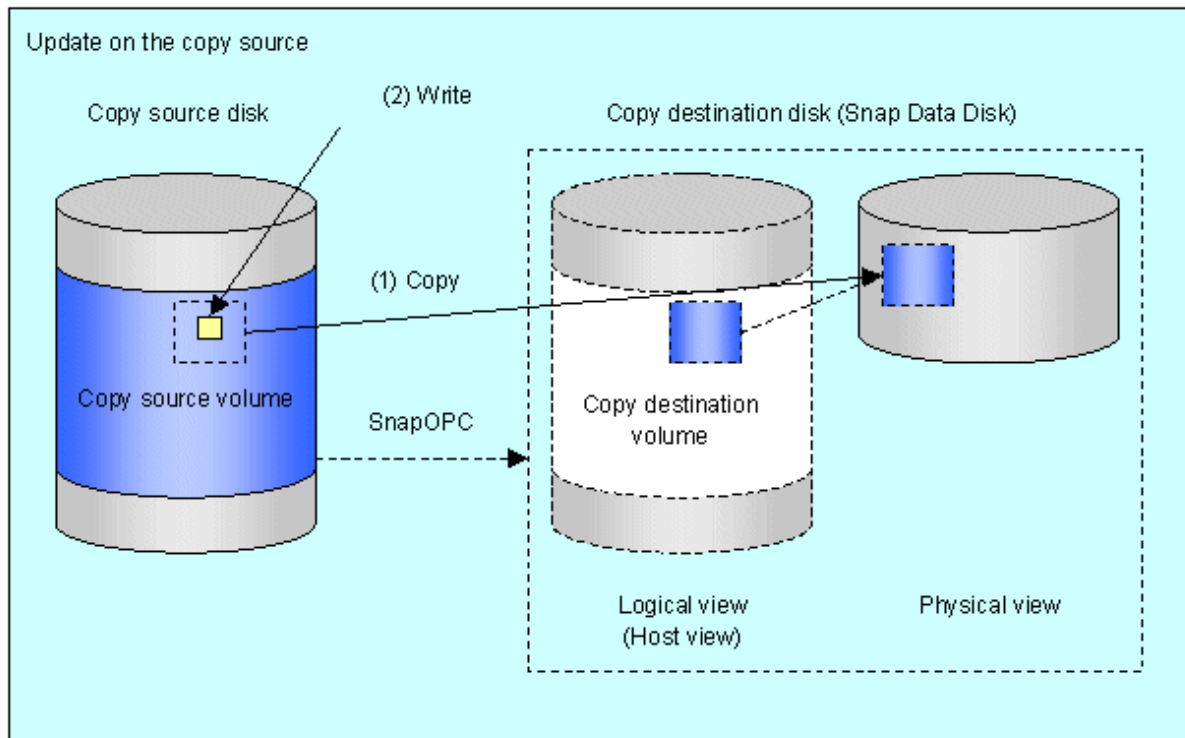
Figure 7.21 When the copy destination volume is updated
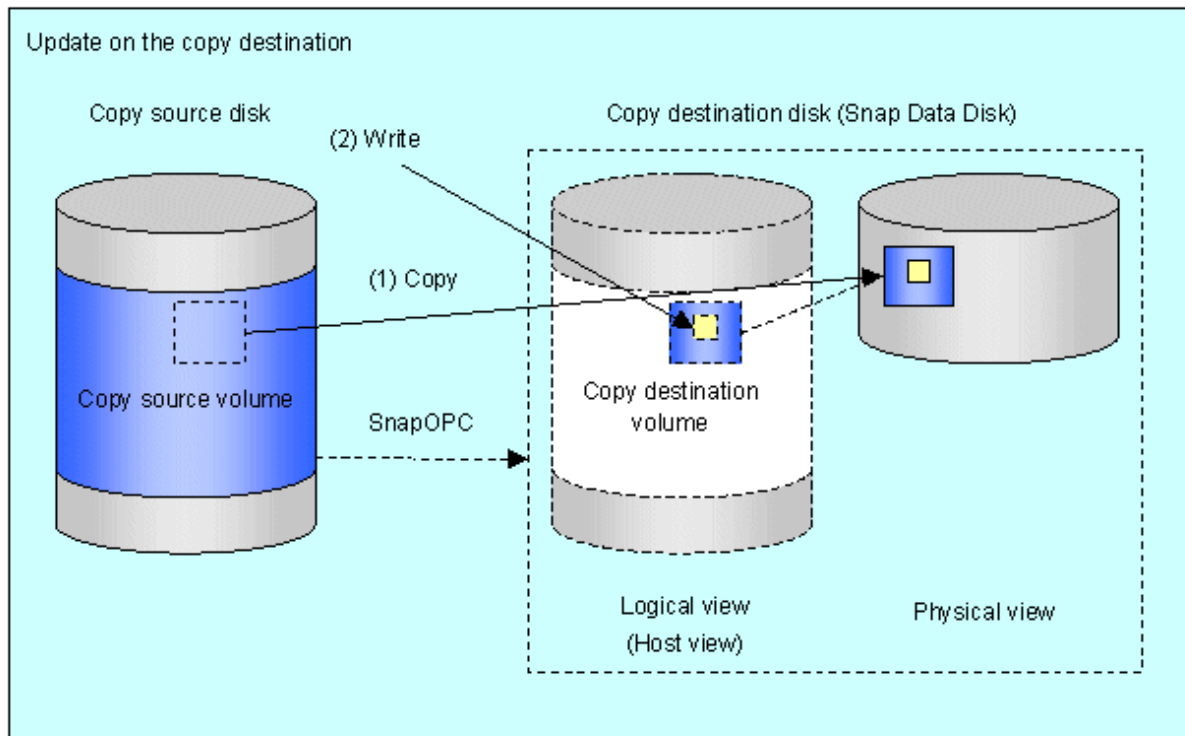
Note: The units for host I/O and storage device copies are different (512 bytes for host I/O and 8 kilobytes for storage device copies), and therefore data copies also occur when the copy destination is updated.

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

Example

```
C:\Win32App\AdvancedCopyManager\bin> swsrpstat -L g1d1p1
Server Original-Volume Replica-Volume Direction Status      Execute Trk  Update Rcv  Split  Xfer
Snap-Gen
SV1    g1d1p1@SV1      g1d1p1@SV1     regular   copy-on-write ----    off  0%      ---- ---- ----
---- ----
C:\Win32App\AdvancedCopyManager\bin>
```

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

🔔 Note

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When there is insufficient Snap Data Volume or Snap Data Pool capacity, the SnapOPC+ execution status changes to error suspend status ("failed"), and replication volume cannot be used.
The SnapOPC execution status can be checked in swsrpstat (operation status display command) output result Status column.

Example

```
C:\Win32App\AdvancedCopyManager\bin> swsrpstat -L g1d1p1
Server Original-Volume Replica-Volume Direction Status Execute Trk  Update Rcv   Split Xfer Snap-
Gen
SV1    g1d1p1@SV1      g1d2p1@SV1     regular   failed ----    off  ----   ---- ---- ---- ----
----
C:\Win32App\AdvancedCopyManager\bin>
```

When the SnapOPC execution status is error suspend status ("failed"), refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

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

```
C:\Win32App\AdvancedCopyManager\bin> swsrpmake g1d2p1 g1d1p1
FROM=g1d2p1@SV1,TO=g1d1p1@SV1 swsrpmake completed
C:\Win32App\AdvancedCopyManager\bin>
```

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

Figure 7.22 When restoration is executed
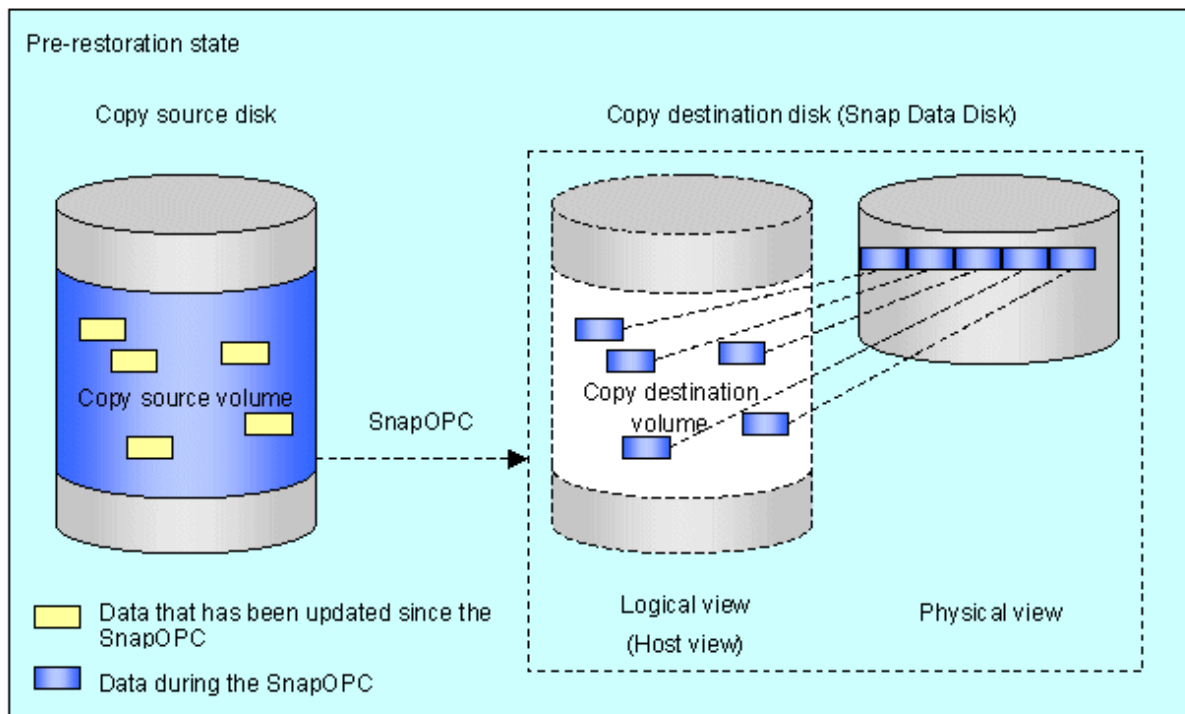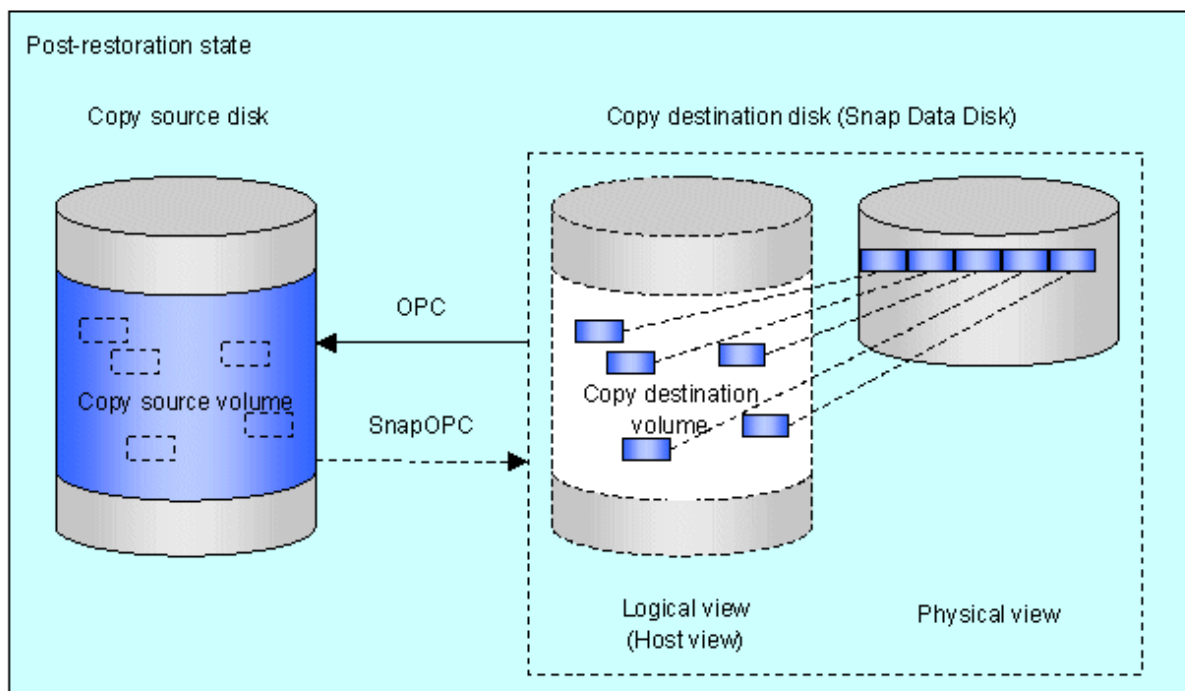
The execution status of restorations can be checked by specifying the -E option with swsrpstat (operation status display command).

```
C:\Win32App\AdvancedCopyManager\bin> swsrpstat -E g1d1p1
Server Original-Volume Replica-Volume Direction Status Execute
SV1     g1d1p1@SV1      g1d2p1@SV1      reverse   snap    80%
C:\Win32App\AdvancedCopyManager\bin>
```

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

Figure 7.23 When restoring to a volume other than the copy source volume
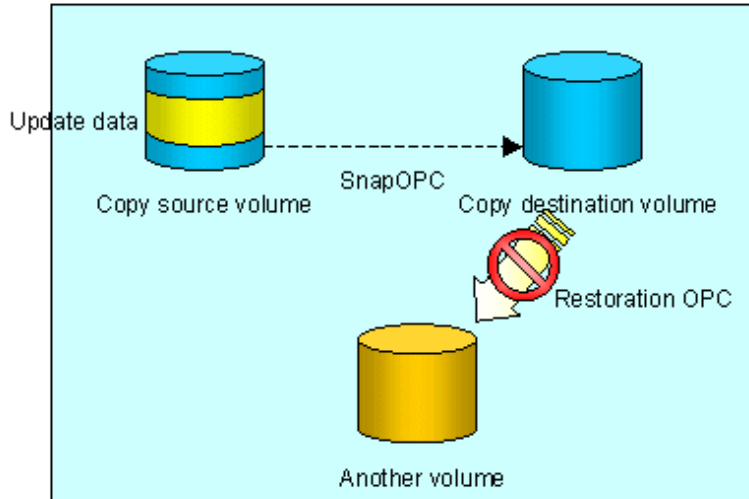
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure 7.24 [When SnapOPC is performed for multiple copy destination volumes]
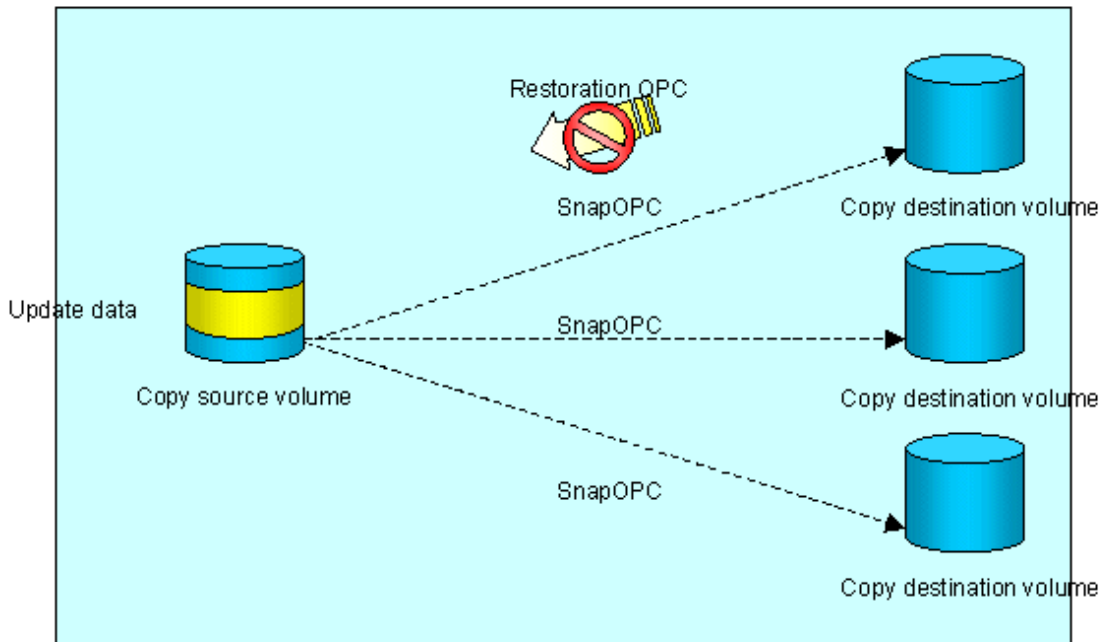
In this case, restoration using an OPC can be performed by canceling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were canceled will be lost.

Figure 7.25 [When SnapOPC session cancelled to perform restoration]
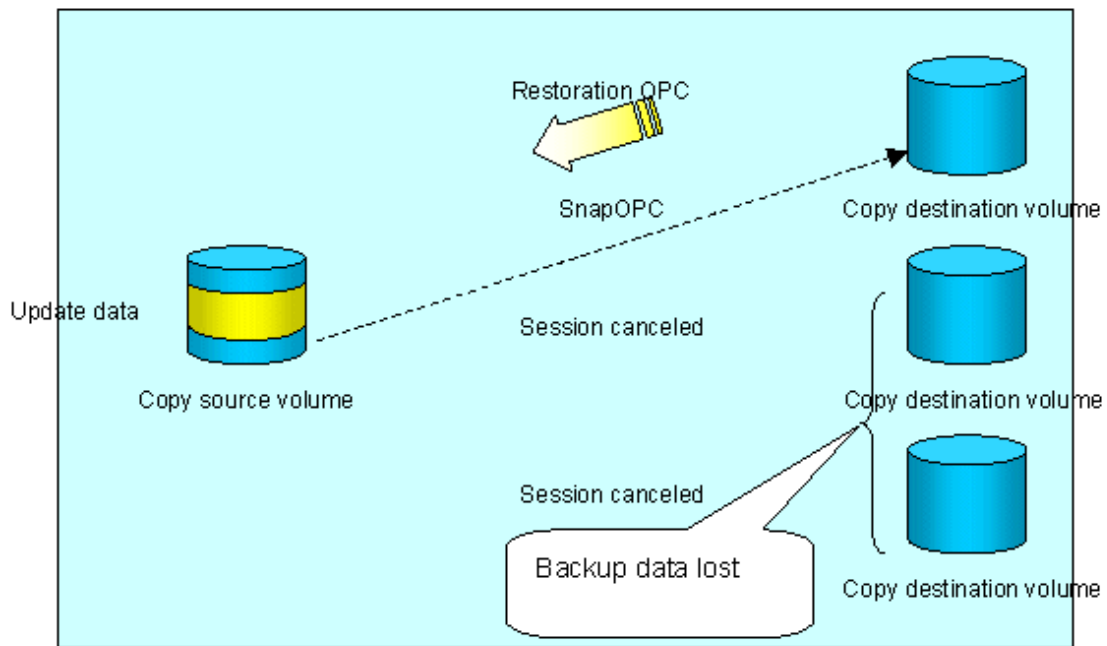
To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration.

However, if restoration is performed using operating system functions, the amount of updated data on the source volume will increase, and there is a risk that the capacity of the SnapOPC volume will be insufficient.

Figure 7.26 [When performing restoration without cancelling SnapOPC session]
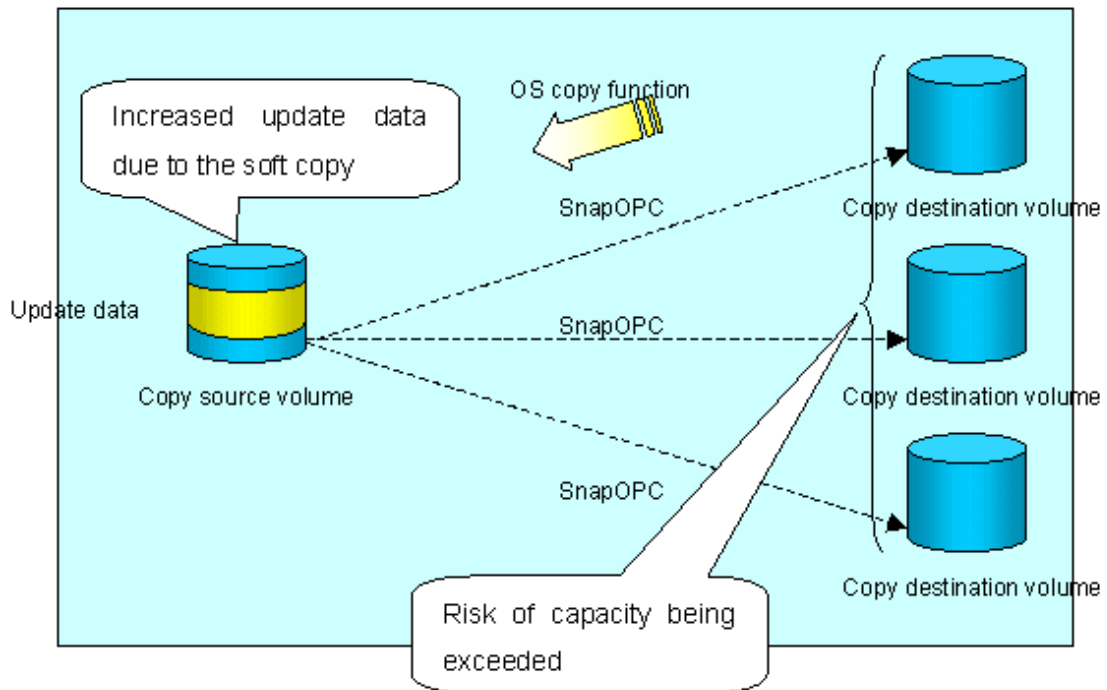
SnapOPC+ replication

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

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

Execution example

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -P g1d1p1@SV1 g1d2p1@SV1
FROM=g1d1p1@SV1,TO=g1d2p1@SV1 swsrpmake completed
C:\>
```

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

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -P g1d1p1@SV1 g1d2p1@SV1
FROM=g1d1p1@SV1,TO=g1d2p1@SV1 swsrpmake completed
C:\>
```

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

🛑 Note

・・・

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

Figure 7.27 When the oldest snap generation number is specified as the replication volume

・・・
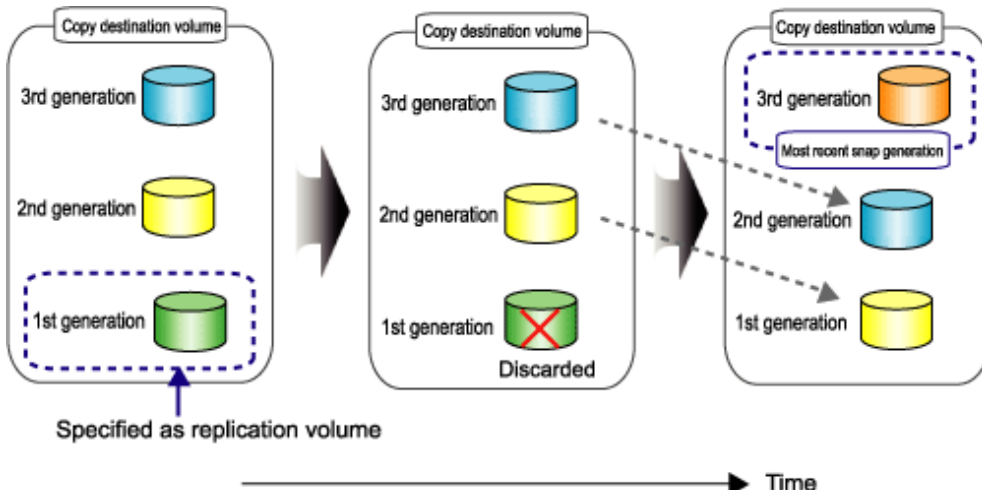
The operation status of SnapOPC+ replication can be checked by executing swsrpstat (operation status display command) using the -L option.
For the most recent snap generation, "copy-on-write(active)" is displayed in the Status column. For past snap generations, "copy-on-

write(inactive)" is displayed. In the Update column, the amount of data that has finished being updated after replication creation, is displayed as a percentage. In the Snap-Gen column, the snap generation number is displayed.

Execution example

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -L g1d1p1
Server Original-Volume Replica-Volume Direction Status             Execute Trk  Update Rcv
Split Xfer Snap-Gen
SV1   g1d1p1@SV1      g1d2p1@SV1     regular   copy-on-write(inactive) ----   off 0%     ----
---- ---- 1
SV1   g1d1p1@SV1      g1d3p1@SV1     regular   copy-on-write(active)  ----   off 5%     ----
---- ---- 2
C:\>
```

Note

. . . .

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

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

Execution example

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -L g1d1p1
Server Original-Volume Replica-Volume Direction Status Execute Trk Update Rcv  Split Xfer Snap-Gen
SV1   g1d1p1@SV1      g1d2p1@SV1     regular   failed ----   off ---- ---- ---- ---- ----
SV1   g1d1p1@SV1      g1d3p1@SV1     regular   failed ----   off ---- ---- ---- ---- ----
C:\>
```

When the SnapOPC+ execution status is error suspend status ("failed"), refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

. . . .

To restore from a Snap Data Volume, use swsrpmake (11.4.2.2 swsrpmake (Replication creation command)to start OPC.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake g1d3p1@SV1 g1d1p1@SV1
FROM=g1d3p1@SV1,TO=g1d1p1@SV1 swsrpmake completed
C:\>
```

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

Maintaining the SnapOPC+ session during restore can reduce the physical copying time, because only the data updated after creation of the replica is physically copied.

Figure 7.28 Restoration with SnapOPC+ session maintained
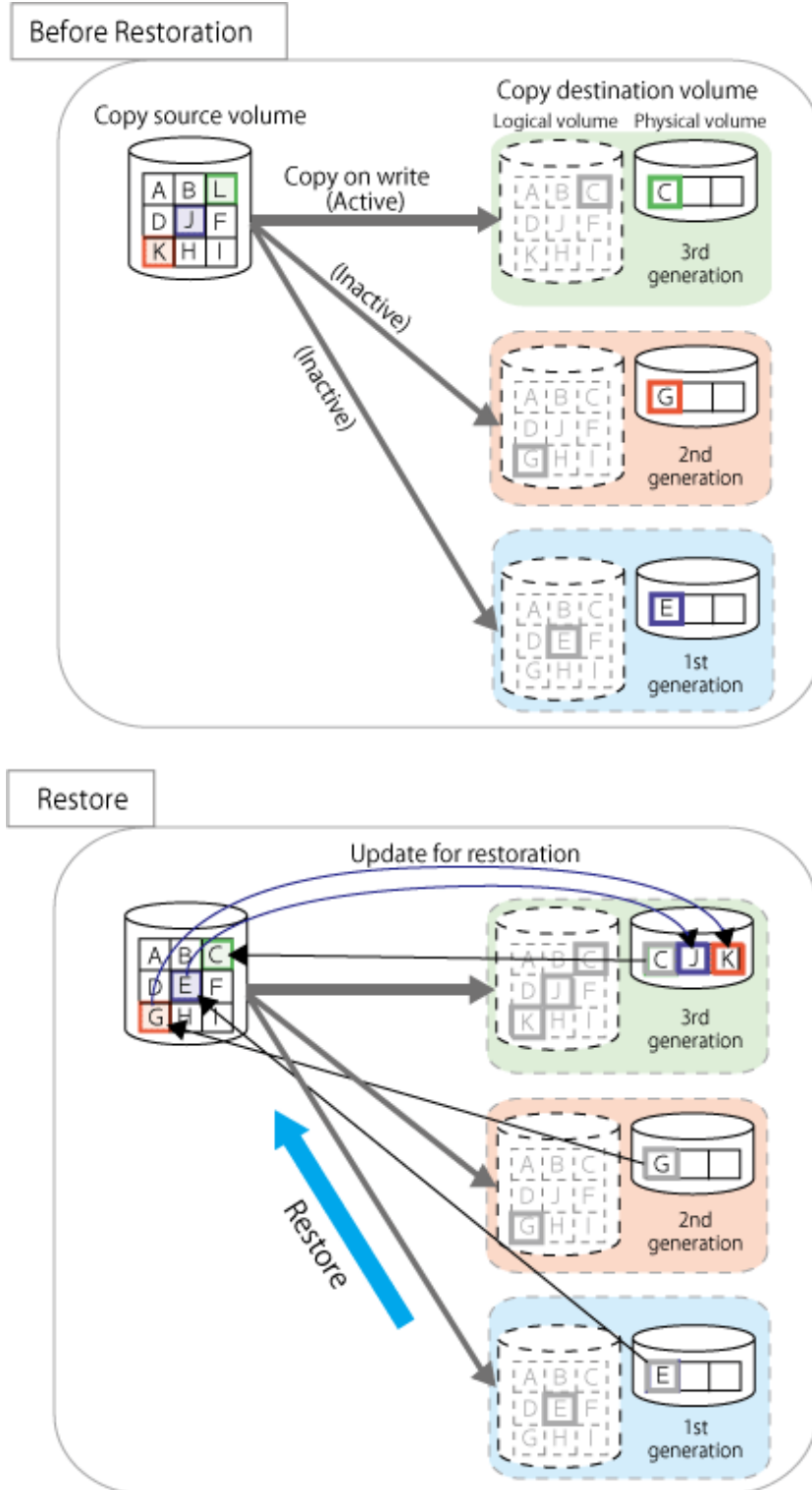
To check the restoration execution status, execute swsrpstat (Operation status display command) with the -E option.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat -E g1d1p1
Server Original-Volume Replica-Volume Direction Status Execute
SV1    g1d1p1@SV1       g1d2p1@SV1     ----      ----   ----
SV1    g1d1p1@SV1       g1d3p1@SV1     reverse   snap   80%
C:\>
```

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

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

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

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -L g1d1p1
Server Original-Volume Replica-Volume Direction Status            Execute Trk  Update Rcv
Split Xfer Snap-Gen
SV1   g1d1p1@SV1      g1d2p1@SV1     regular   copy-on-write(inactive) ----    off 8%     ----
---- ---- 1
SV1   g1d1p1@SV1      g1d3p1@SV1     regular   copy-on-write(inactive) ----    off 12%    ----
---- ---- 2
SV1   g1d1p1@SV1      g1d4p1@SV1     regular   copy-on-write(inactive) ----    off 0%     ----
---- ---- 3
SV1   g1d1p1@SV1      g1d5p1@SV1     regular   copy-on-write(active)   ----    off 3%     ----
---- ---- 4
```

In this example, g1d3p1 and g1d4p1 are targeted.

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

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

[g1d3p1 disk usage]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv stat g1d3p1
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
100% 8388608         1048576          1048576      1048384      192          640
```

[g1d4p1 disk usage]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv stat g1d4p1
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 111 (0x6F)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
4%   8388608         1048576          46928        16           46912        0
```

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

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

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

```
C:\Win32app\AdvancedCopyManager\bin>swstsdv poolstat -G g1d1p1
BoxID = 00E4000M3#####E450S20A####KD4030639004##
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
```

```
Normal    10%  20971520       2097152         0              2097152       18874368
Encrypted 0%   20971520       0               0              0             20971520
```

The disk usage in this example is 15% =~ (2097152 + 1049040) / 20971520 x 100

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

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

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

Note

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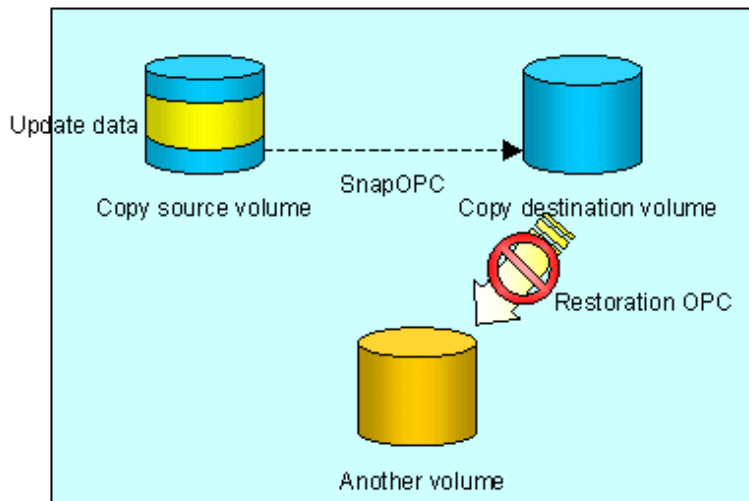
Point

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

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

Figure 7.29 Example of operation using SnapOPC+ and QuickOPC
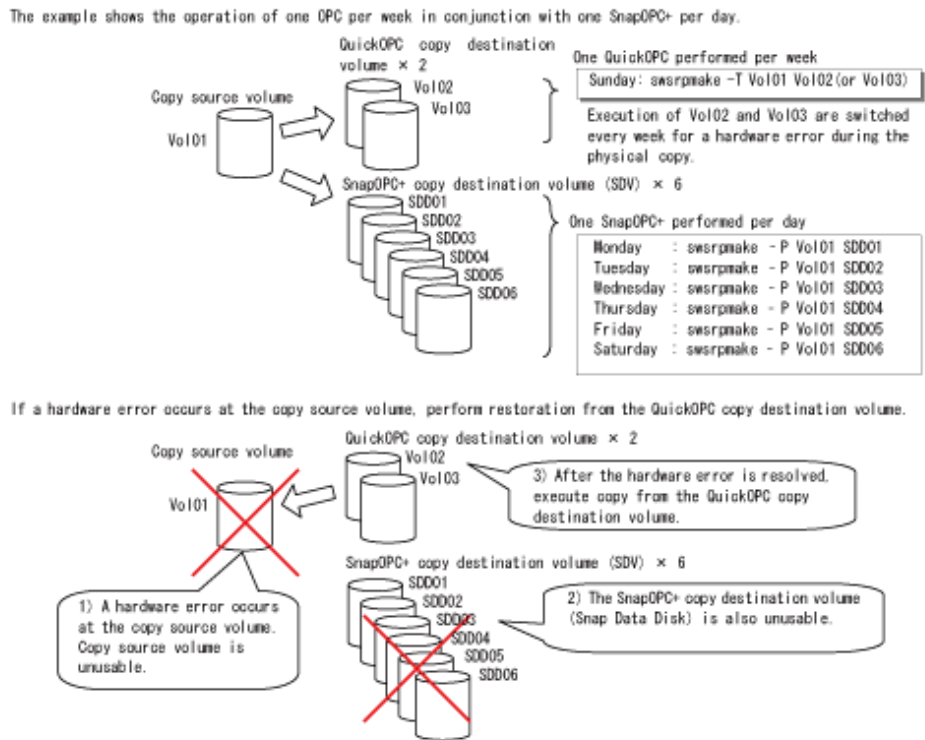
7.5.2 Executing synchronized replication

To perform synchronized replication, use the following procedure:

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

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

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

7.5.2.1 Intra-box synchronous replication

Intra-box synchronous replication creates a replication from a source volume to a destination volume by using the EC function of the ETERNUS storage system.
The EC function operates in a mode in which a copy is made to a destination volume in synchronization through a write to a source volume (ie, in synchronous write mode).
It is also possible to reverse the copy direction from suspend status using the EC functionality.

7.5.2.2 Inter-box synchronous replication

Inter-box synchronous replication creates a replication from a source volume to a destination volume by using the REC function of the ETERNUS storage system.

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

- Transfer mode

- Recovery mode

- Split mode

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

Transfer mode

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

Table 7.2 Transfer mode types

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

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

Figure 7.30 Flow of synchronous replication (for Stack mode/Consistency mode)
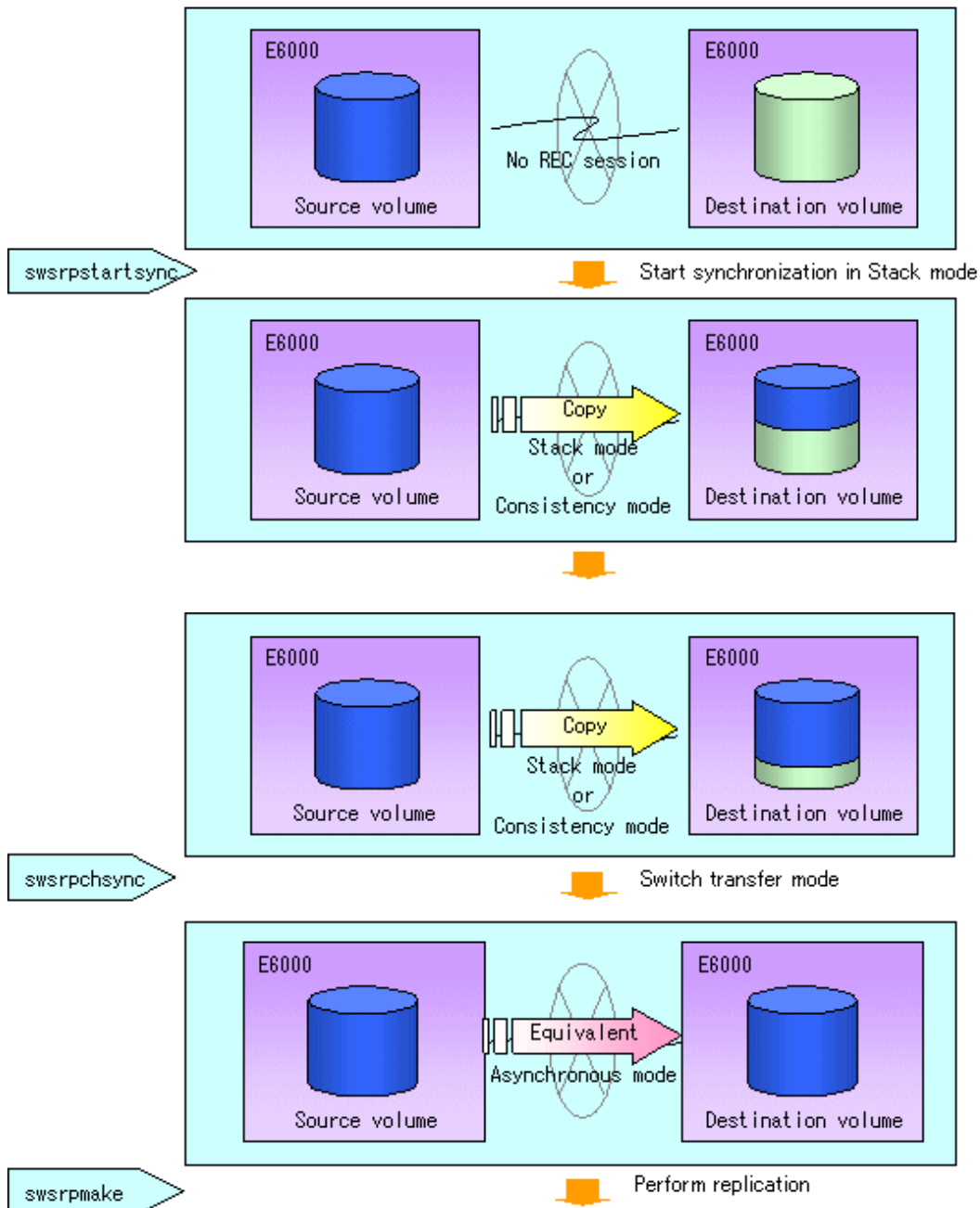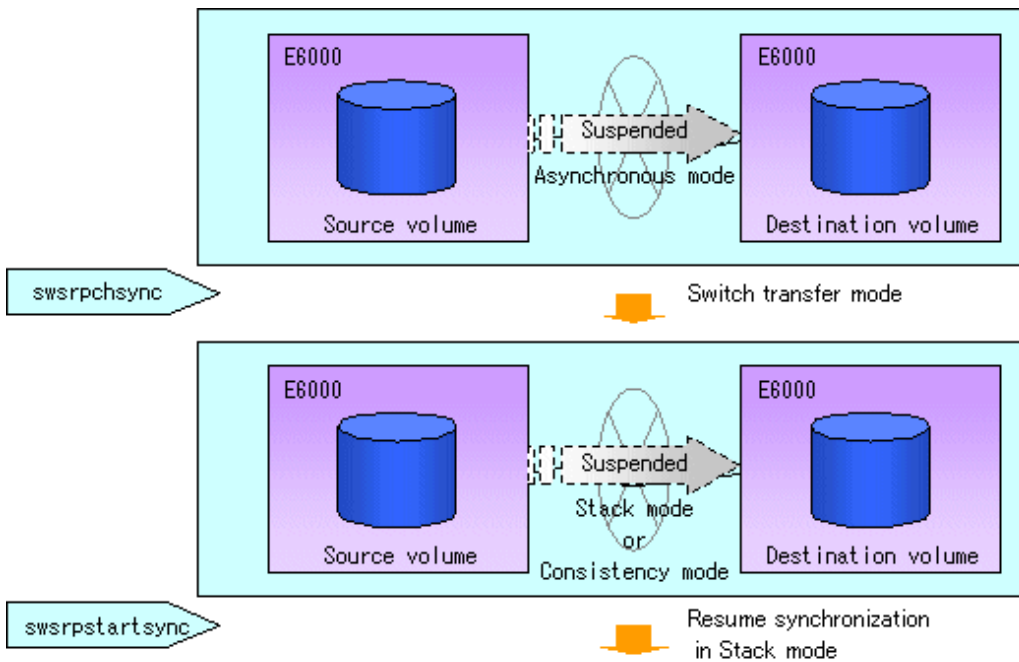
> **Note**
>
> If the equivalency maintenance status REC operating mode is changed, after the operating mode is changed, the user must wait until the equivalency maintenance status is attained.

Recovery mode

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

Table 7.3 Recovery mode types

Mode	Description
Automatic Recovery	In this mode, the REC session automatically switches from halt status to regular status, and copy processing resumes when the inter-box FCRA path is recovered.
Manual Recovery	In this mode, the REC session remains in halt status and copy processing does not resume even if the inter-box FCRA path is recovered. Manually resume copying. This mode is used, for example, when operating a standby database.

Split mode

Split mode includes two modes for performing a write operation to the source volume when REC is used for synchronous transfer mode, and for recovery from an inter-box path error (halt status).

Table 7.4 Split mode types

Mode	Description
Automatic Split	This split mode forcibly executes successful write operations to source volumes even if the inter-box FCRA path is fully blocked and halt status occurs. This mode enables write operations to source volumes even if the inter-box FCRA path is fully blocked, thus this mode does not affect transactions. When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode configurations.
Manual Split	This split mode rejects write operations to source volumes (it returns an error) if the inter-box FCRA path is fully blocked and halt status occurs. This mode enables source volumes and destination volumes to be fully synchronized even if the FCRA path is fully blocked.

Mode	Description
	When the inter-box FCRA path is recovered, copy processing resumes according to the recovery mode configurations.

Copy direction reverser

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

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

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

   Figure 7.31 When REC performed from Site A to Site B
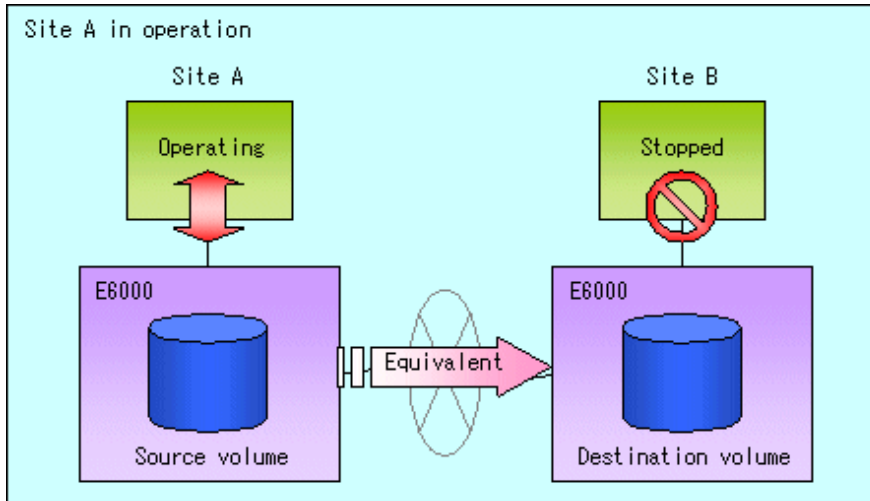
2. To switch the sites, execute swsrpmake (Replication creation command) to make a replication to Site B. Then, stop operating Site A.

   Figure 7.32 When replication creation command used to create a replica at Site B
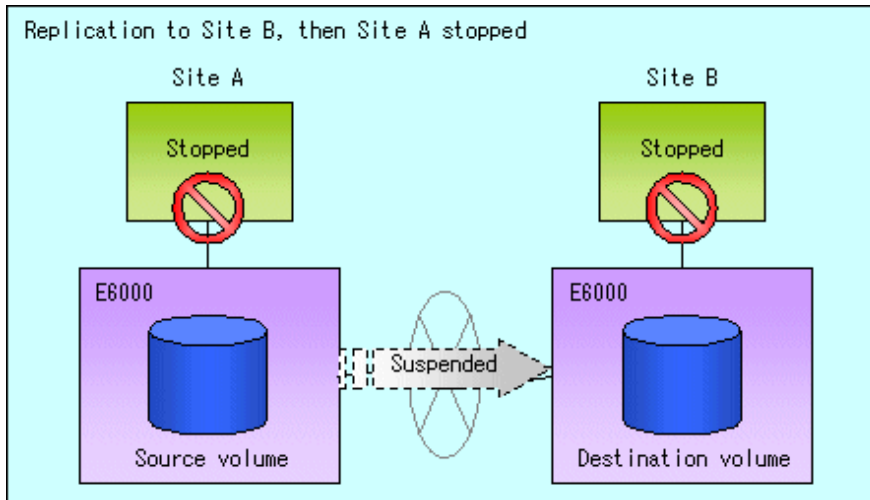
3. Execute swsrprevsync (Synchronization reverse command) to reverse the copy direction.

Figure 7.33 When the synchronization reverse command is executed
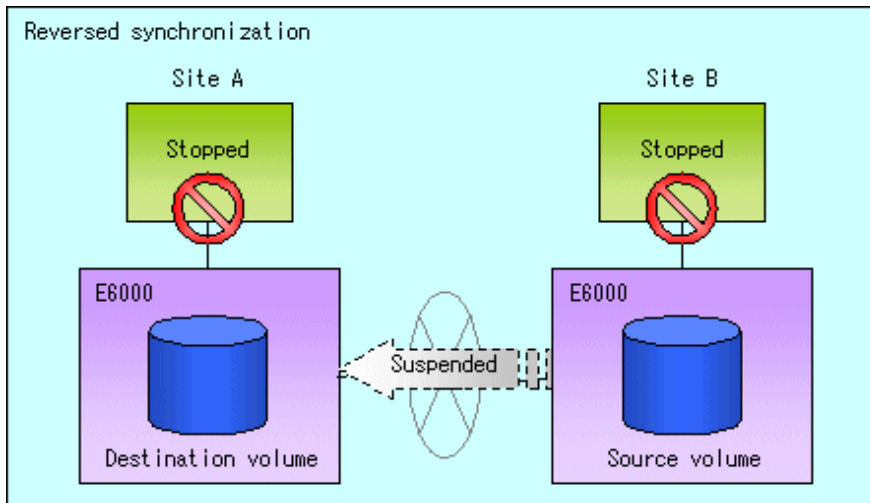
4. Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure 7.34 When operation is started at Site B (synchronization suspend state)
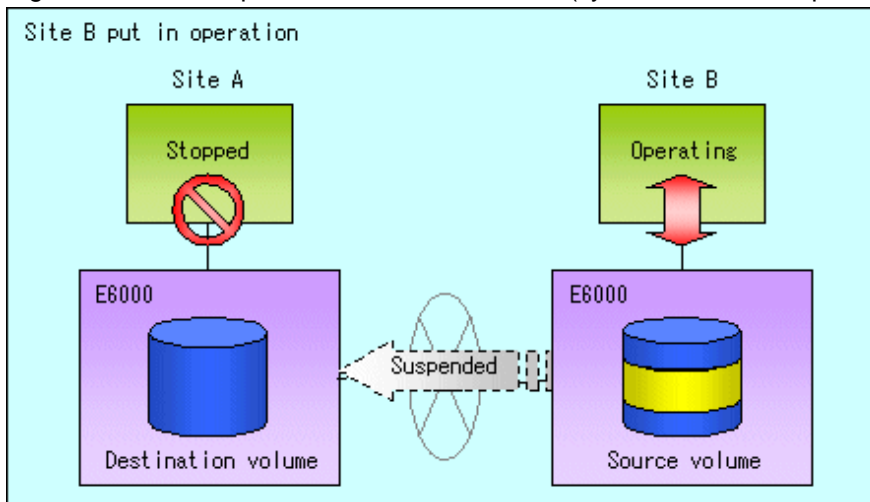
5. Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected in Site A with differential copies.

Figure 7.35 When operation is started at Site B (synchronization resumed)
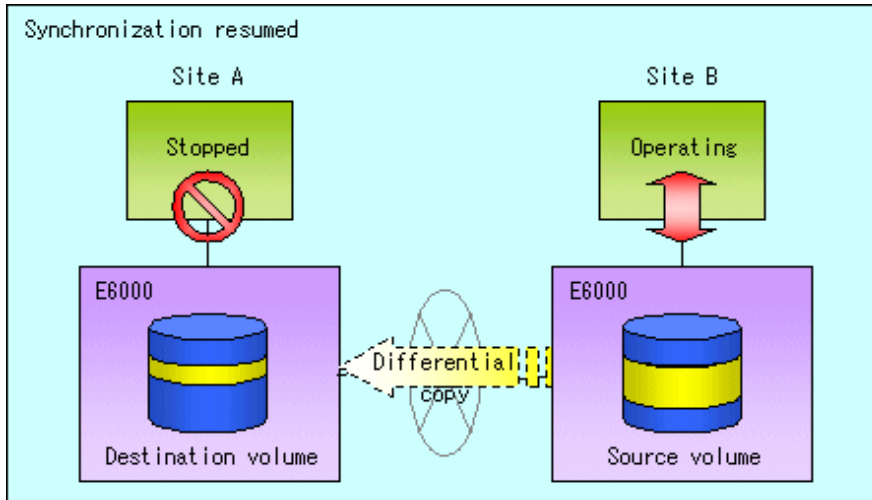
7.5.2.2.1 Initial copy skip function

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

1. Suppose that operations at Site A have stopped.

Figure 7.36 If operations at Site A have stopped
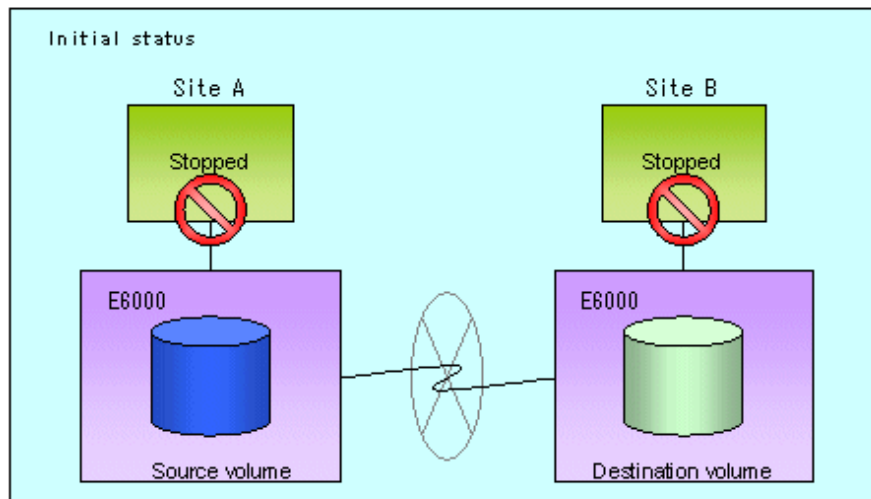
2. Next, synchronous processing begins, using the initial copy skip function. At this point, an REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

Figure 7.37 When synchronization is started by the initial copy skip function
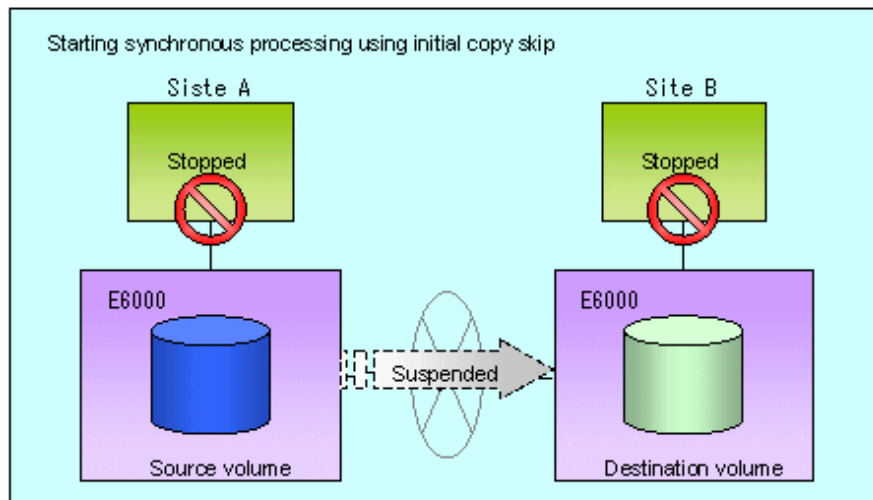
3. Next, the data on the copy source volume is backed up to tape.

Figure 7.38 When copy source data is backed up to tape
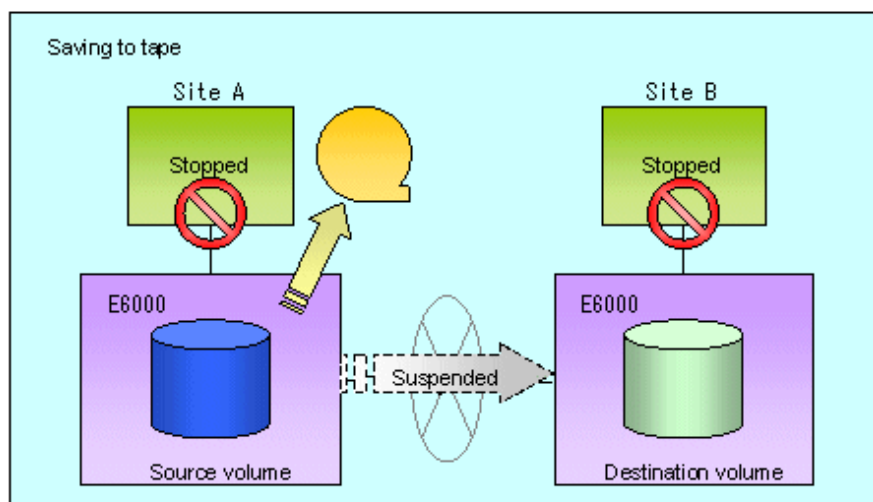
4. The tape medium is sent to Site B and jobs at Site A restart.

Figure 7.39 When Site A operations restart
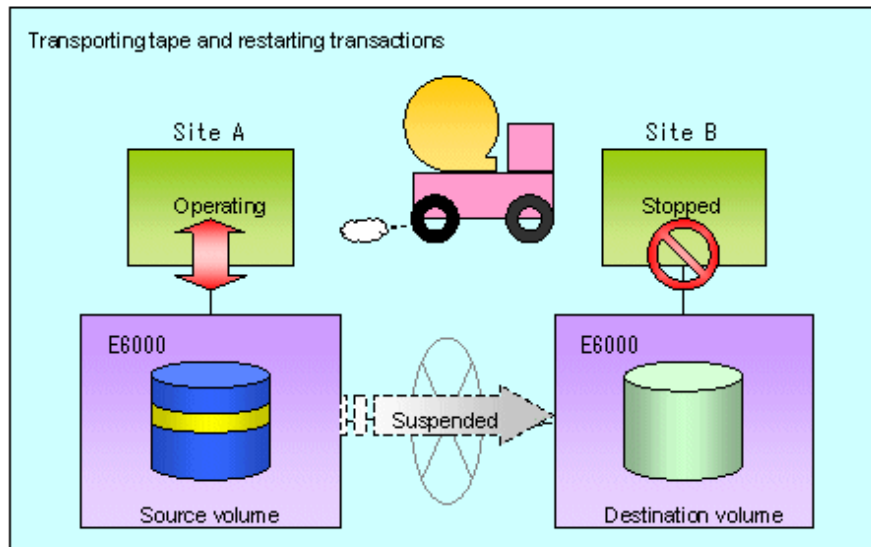
5. The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure 7.40 When data is restored from tape to the copy destination
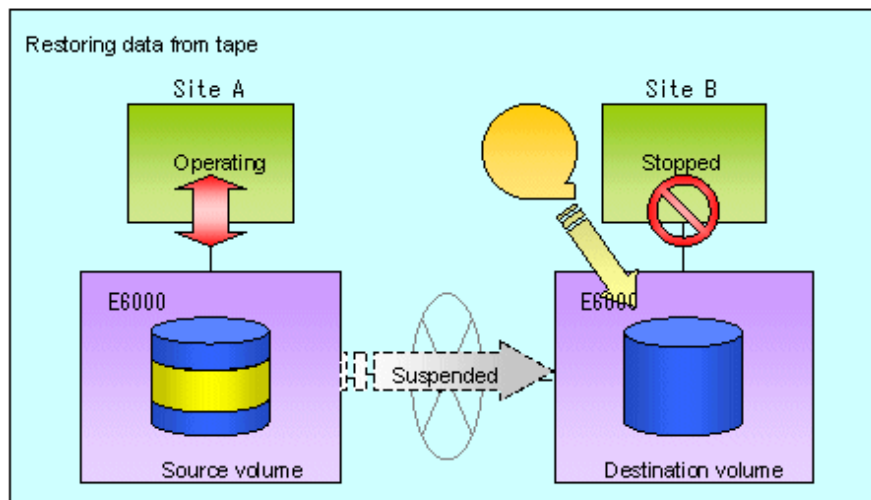
6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied. Execute swrepstartsync with -Xremain option to restart in Remain mode.

Figure 7.41 When synchronization is restarted in Remain mode
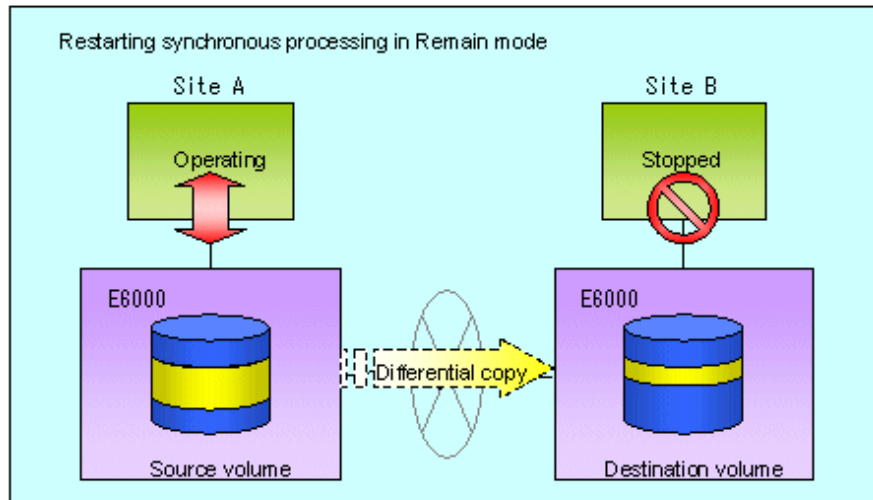
7.5.2.3 Concurrent suspension function

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

Figure 7.42 Internal operation of ETERNUS storage system
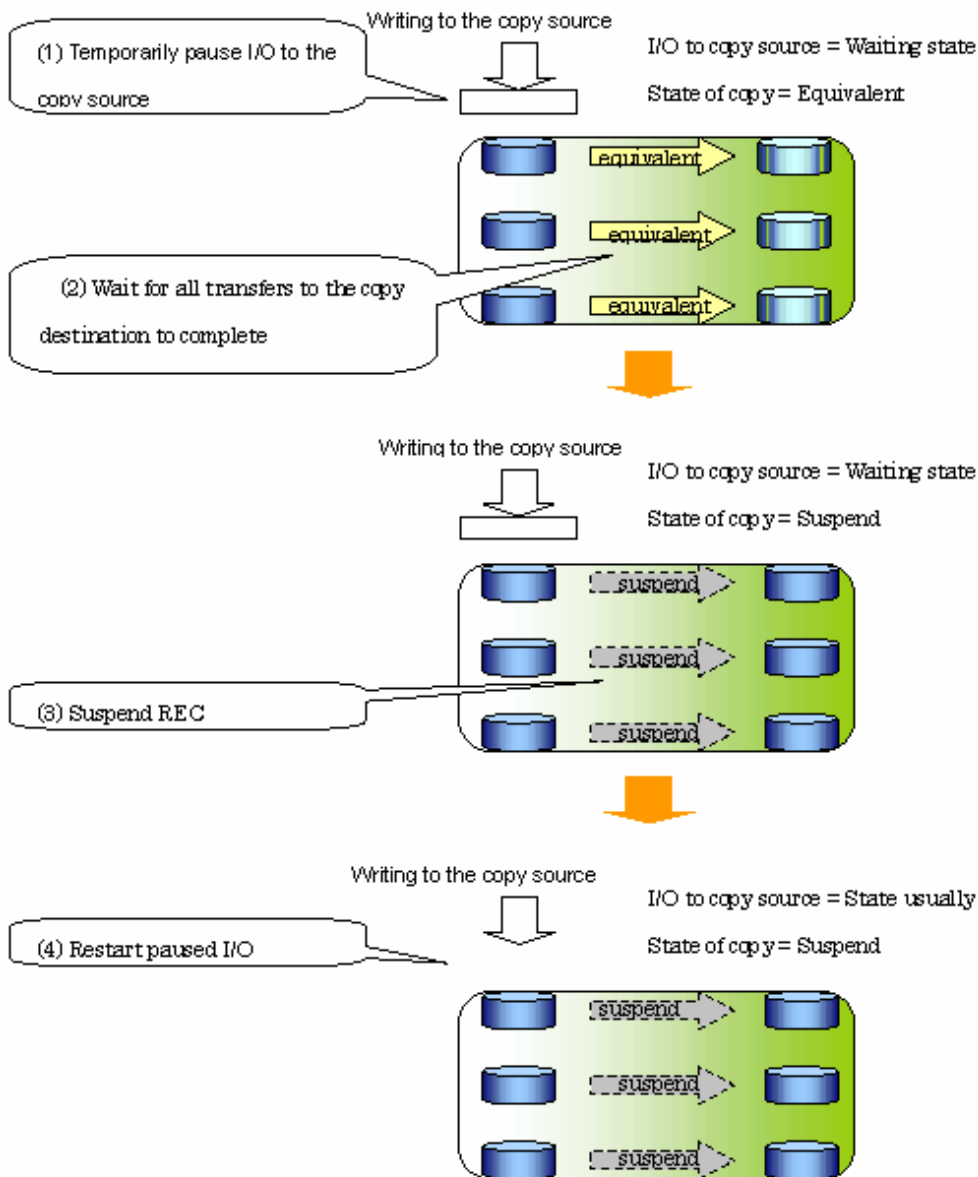
Replication using the concurrent suspension function is performed by specifying the -Xconcur option for swsrpmake (Replication creation command).

Additionally, if concurrent suspension is performed using the Consistency transfer mode, it is no longer necessary to make temporary mode changes during multiple creation processes. (Refer to the figure below). Accordingly, the operating procedure used when concurrent suspension is executed in Consistency mode is the same as the procedure for asynchronous mode and synchronous mode.

Figure 7.43 When Consistency mode used
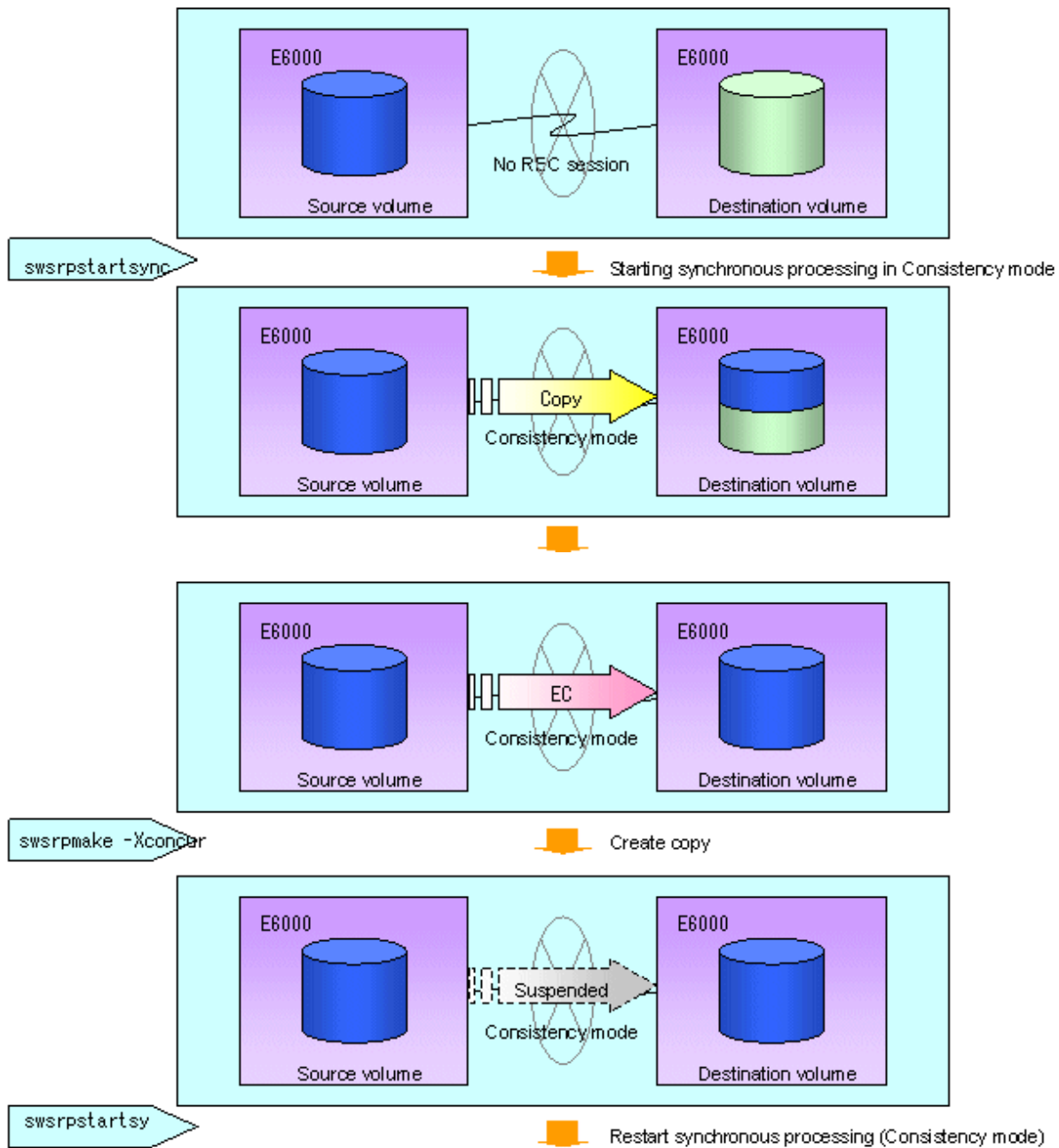
7.5.2.3.1 Changing the timeout value for the concurrent suspend function

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

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

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

In case of normal operation (non-clustered environment)

```
<Environment setup directory>\etc\repl\data\DEFAULT\check.ini
```

In case of operation in clustered environment

```
<Environment setup directory for logical node use>\etc\repl\data\DEFAULT\check.ini
```

Table 7.5 File format of the check.ini

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

Example

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

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

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

7.5.3 Backup and restoration using the replication function

Data can be restored from the replica volume to the original volume if a volume pair has been defined with bi-directional copying by using swsrpsetvol (Replication volume information configuration command).

Restoration can be executed according to the following procedures:

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

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

Note

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

Figure 7.44 Manual restoration with SnapOPC+
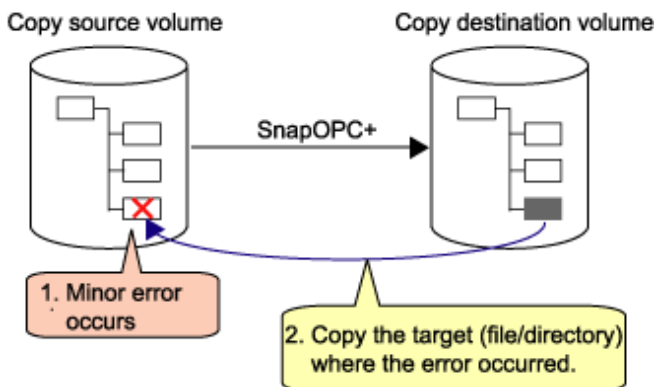
7.5.4 Execution of synchronization reversal

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

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

Figure 7.45 Example of EC reversal operation
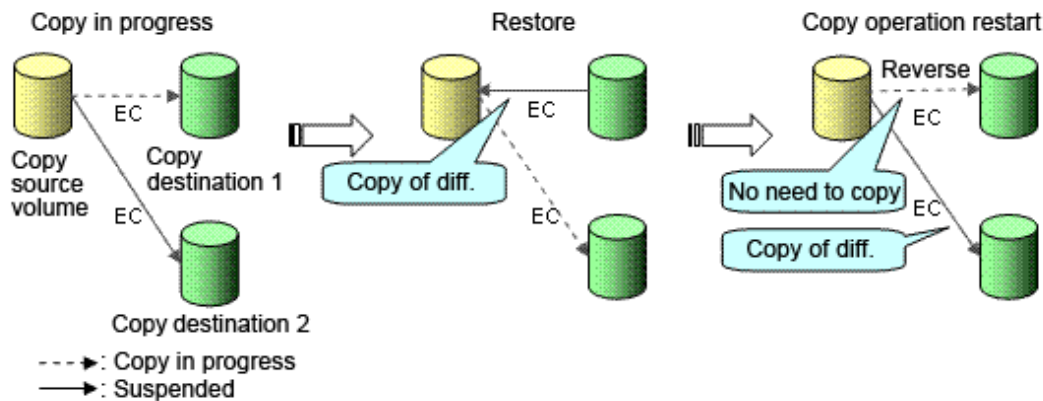
7.6 Changing the Configuration Information

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

7.6.1 Changing a source volume or replica volume

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

7.6.2 Deleting a source volume or replica volume

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

7.6.3 Changing the device information of a source or replica volume

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

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

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

2. Change the device configuration.

3. Perform any additional steps may be required in the processing of a device. For more information on this, refer to "7.4.4 Fetching device information from a Storage Server".

4. Configure the source/replica volume with the new information.

7.7 Stopping the Operation

To stop replication processing that is in progress, or to change synchronized replication into snapshot replication, use swsrpcancel (Replication cancellation command).

Note

To stop replication processing by SnapOPC+, start with the oldest snap generation.
To forcibly stop the second or subsequent snap generations, use the -Xforce option with swsrpcancel (Replication cancellation command). This will stop the specified snap generation and all earlier snap generations.

If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

To stop the replication, stop the service on the Storage Server. Normally the service will stop when the system stops.
The service may also be stopped independently if this is required for any reason. For more information on this, refer to "Chapter 2 Starting and Stopping a Service".

Note

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

Chapter 8 Backing Up and Restoring Exchange Server Databases

This chapter explains the procedure for backing up or restoring the Exchange Server 2003 and Exchange Server 2007 databases. In this chapter, the Exchange Server 2003 and Exchange Server 2007 databases are referred to as "Exchange databases".

There are differences in terminology between Exchange Server 2003 and Exchange Server 2007. In this chapter, the Exchange Server 2003 terminology is used. The following table shows the correspondences between the terminology of Exchange Server 2003 and Exchange Server 2007.

Table 8.1 Correspondence between Exchange Server 2003 and Exchange Server 2007

Exchange Server 2003	Exchange Server 2007
Exchange system manager	Exchange management console
Active-passive cluster (shared memory area)	Single copy cluster (SCC)
Exchange virtual server	Clustered mailbox server

To understand the contents of this chapter, the reader should have a basic knowledge of Exchange Server 2003, Exchange Server 2007, and Volume Shadow Copy Service (VSS), in addition to AdvancedCopy Manager.

Additionally, before reading this chapter, the user is recommended to read "Microsoft Exchange Server 2007" > Operations > Disaster recovery in the Exchange Server 2003 Disaster Recovery Operations Guide issued by Microsoft Corporation, or "Microsoft Exchange Server 2007 help". The latest versions of these documents can be downloaded from the following URLs:

```
Exchange Server 2003 Disaster Recovery Guide:
http://www.microsoft.com/technet/prodtechnol/exchange/2003/library/disrecopgde.mspx
Microsoft Exchange Server 2007 help:
http://www.microsoft.com/downloads/details.aspx?familyid=555F5974-9258-475A-
B150-0399B133FEDE&displaylang=ja
```

Exchange server is a trademark or registered trademark of Microsoft Corporation in the United States and other countries.

8.1 Backup and Restore of an Exchange Database in a Windows Server 2003 Environment

8.1.1 Overview

AdvancedCopy Manager provides the functionality to back up and restore Microsoft Exchange server databases.

8.1.1.1 Backing up Exchange server databases

The advanced copy function of the Fujitsu ETERNUS storage system can link with VSS to implement a high-speed online backup of the Exchange server databases.

The backup data of an Exchange server database includes the backups of the following files that constitute the Exchange server database:

・ EDB file and STM file (database files)

  - Exchange Server 2003
    The paired EDB file and STM file constitutes a database. Both files exist in each information store.

  - Exchange Server 2007
    The database is comprised of only an EDB file (there is no STM file). Each information store contains one EDB file.

・ LOG file (the transaction log file)
  The LOG file contains a transaction log. At least one LOG file exists in each storage group.

- CHK file (the checkpoint file)

  The checkpoint file points to the latest transaction in the transaction log that has been committed to the database. One checkpoint file exists in each storage group.

Online backup

A linkage with VSS enables the online backup of the Exchange server database.

- Backup is performed in units of storage groups. Because backup processing is performed without stopping the messaging service, store access is enabled even during backup processing.

- Because the backup data testing (ESEUTIL) and log deletion are executed as part of the online backup processing, these types of operations need not be executed after backup processing.

Backup using advanced copy (OPC/EC, REC or QuickOPC)

Backup can be created instantly and without placing a burden on the Exchange server, using advanced copy functions (such as OPC/EC, REC or QuickOPC)

- Advanced copies are executed by the ETERNUS/GR hardware provider. (*1)

- Storage group configuration files (ie, those with extensions *.edb, *.stm, *.log or *.chk) are copied to the backup volume.

  *1: This function can only be used by ETERNUS/GR hardware providers. Other hardware providers cannot be used.

📝 Note

REC is executed in the following operational modes for this function:

- Transfer mode = Synchronous

- Split mode = Automatic Split

- Recovery mode = Automatic Recovery

📝 Note

For Exchange Server 2007, backup using EC/REC is not supported

Backup to the backup server

The transport function of VSS shadow copy can be used to make a backup (a shadow copy) on the disk connected to the backup server. The function thus enables a backup to tape to be created without placing any load on the Exchange server.

Figure 8.1 Exchange server database backup processing image

Table 8.2 Exchange server and backup server functions

Server	Component	Description
Exchange server	Exchange Writer	Exchange writer
	ACM Requester	The AdvancedCopy Manager Exchange requester that provides backup and restore functions for Exchange.
	ETERNUS Provider	ETERNUS/GR hardware provider that offers a shadow copy creation function using advanced copy functions (such as (OPC/EC, REC, or QuickOPC).
Backup server	ESEUTIL	Exchange server database consistency check and recovery utility The ACM Requester uses this component to check backup data for consistency.
	ACM Requester	Exchange requester provided by AdvancedCopy Manager. This component manages (e.g., with a status check and deletion) the shadow copy according to instructions from the ACM Requester on the Exchange server.
	ETERNUS Provider	ETERNUS/GR hardware provider, which manages the copy destination disk (LUN).

8.1.1.2   Restoring Exchange server databases

The advanced copy function of the Fujitsu ETERNUS storage system can link with VSS to restore the Exchange server databases from the online backup data.

Restoration from online backup data

A linkage with VSS enables restoration from the online backup data.

・ As with a backup, restoration is performed in units of storage groups. All databases (ie, stores) are dismounted during restoration processing.

・ Two restoration modes are supported: roll-forward restoration (which is restoration to the latest point) and point-in-time restoration (which is restoration to the backup point).

・ When the online backup data is stored on tape, it must be restored in advance to the backup disk.

📒 Note

Exchange Server 2007 supports a function that allows restoration to a different location than the original path, but AdvancedCopy Manager does not support this function. Therefore, the original disk is the only restore destination that can be selected under AdvancedCopy Manager.

High-speed restoration by OPC/EC/REC

Advanced Copy (e.g., OPC) can also be used for restoration to resume a job operation quickly without placing any load on the Exchange server.

・ OPC is executed by a conventional AdvancedCopy Manager function (e.g., the replication creation command).

・ Because log application and mounting are enabled soon after the execution of OPC logical copying, live operations can be restarted quickly without waiting for the completion of OPC physical copying.

・ When you perform restoration by EC or REC, the time between stopping and restarting live operations becomes longer than that in the case of using OPC, because you need to wait until all the data on the disk is copied. For this reason, if it is possible to use OPC, we recommend that you perform restoration by OPC.

・ The suspension of EC or REC is executed by a conventional AdvancedCopy Manager function (e.g., the replication creation command).

・ Log application and mounting are enabled soon after suspending EC or REC.

Figure 8.2 Exchange server database restoration processing image
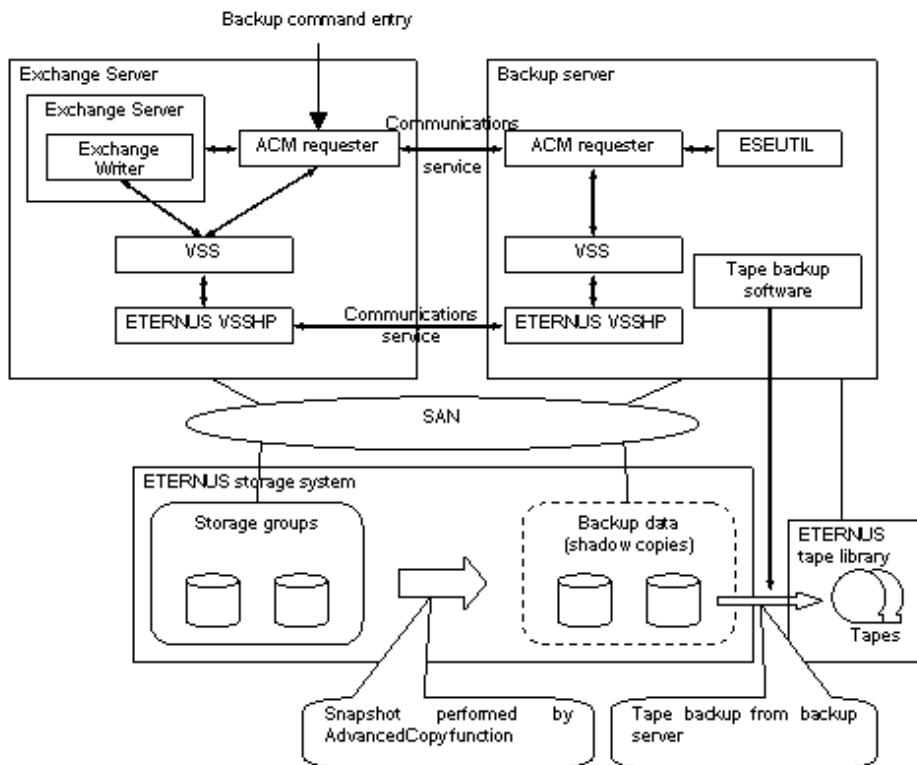
*1: With VSS, the requester restores the necessary files without using a hardware provider for file copying in the restoration processing.

The requester performs restorations using existing functions (swsrpstartsync and swsrpmake).

Figure 8.3 Snapshot restoration (restoration by OPC)
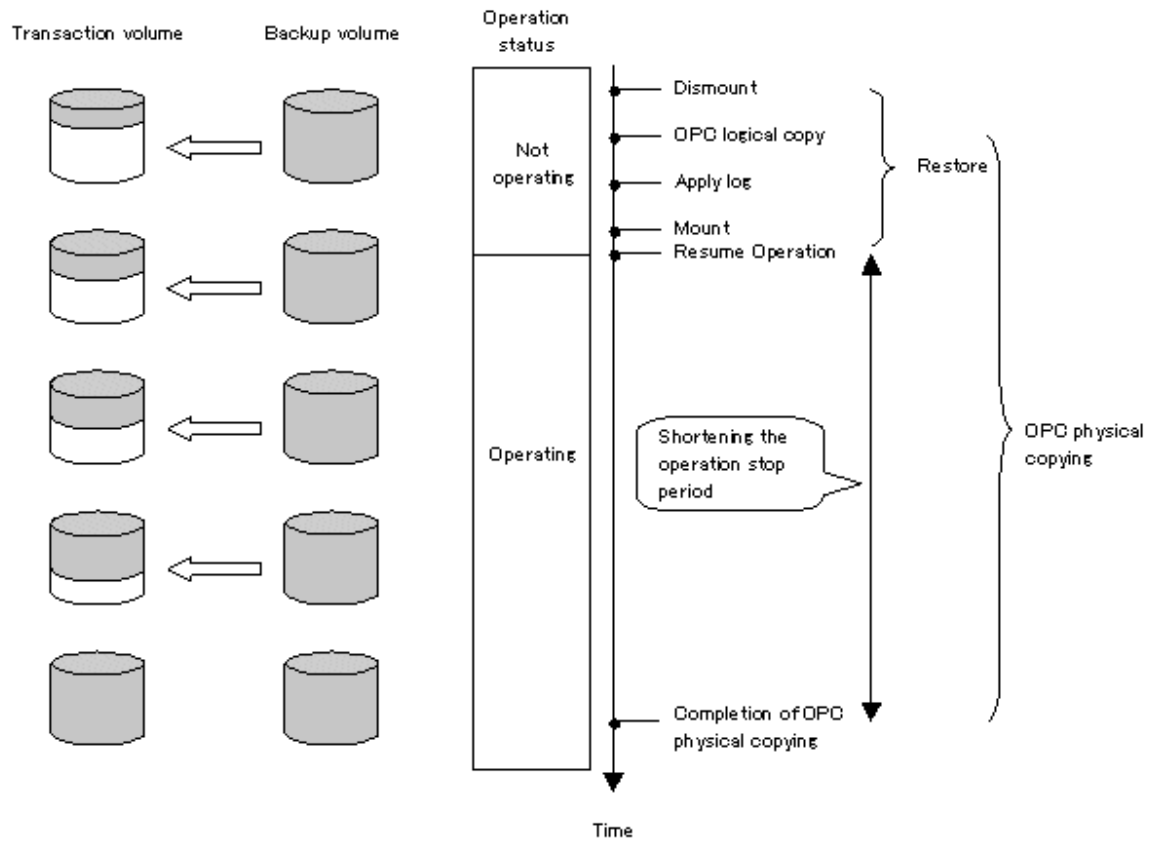
Figure 8.4 Synchronous restoration (restoration by EC/REC)
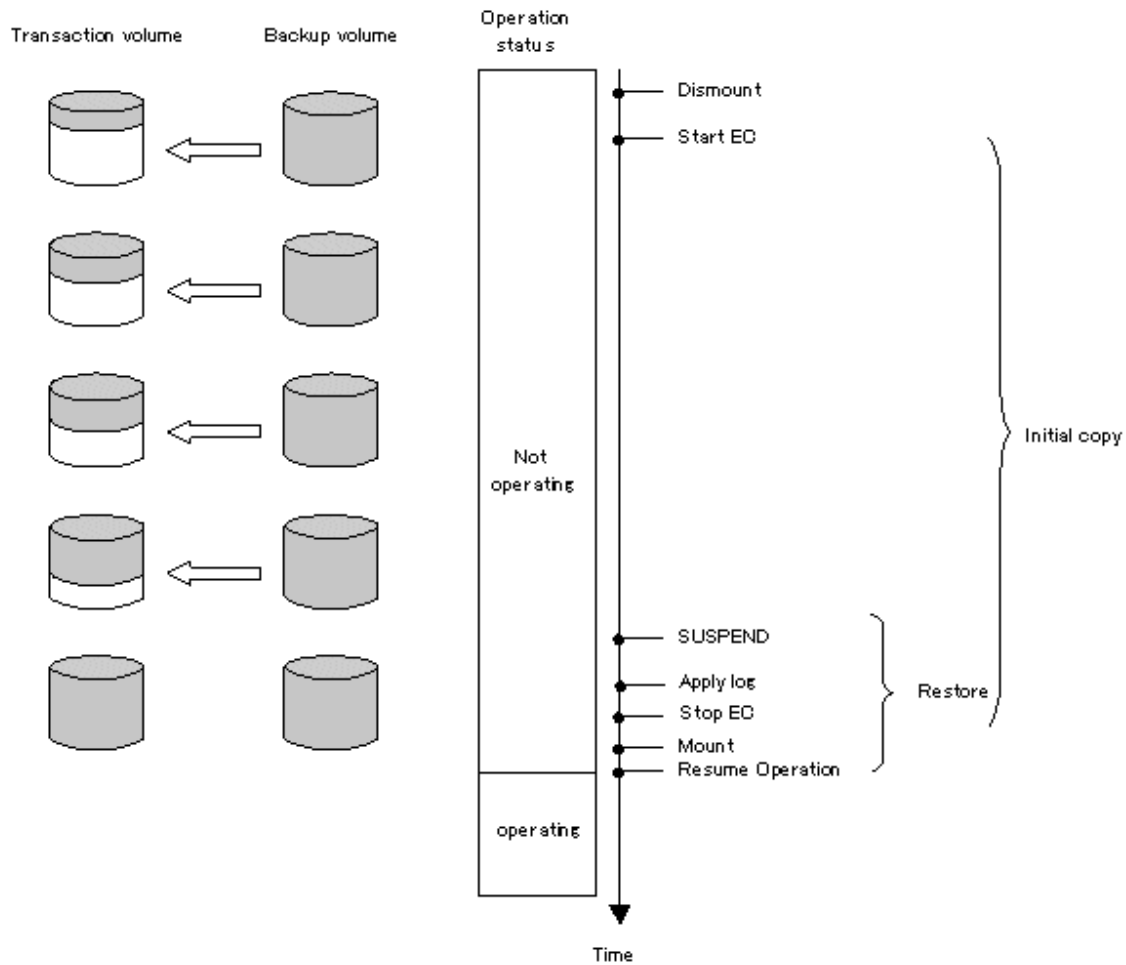
8.1.1.2.1 Point-in-time restoration

In the point-in-time restoration mode, the Exchange server database and log file are restored so that the database is restored to the state it was in when it was backed up. Data created after the backup was created is not restored.

8.1.1.2.2 Roll-forward restoration

In the roll-forward restoration mode, the previous backup data and currently remaining transaction log are used to restore the database to the latest state. This mode can be used when the log file is not damaged, even though the database is damaged. It cannot be used when both the database and log file are damaged.

8.1.2 Operation Design

This section explains the following procedures for designing the backup of the Exchange server database:

- Designing server configurations

- Designing storage groups

- Designing circular logs

・ Preparing backup disks (LUNs) and backup volumes (partitions)

・ Designing copy set groups

8.1.2.1   Designing server configurations

Storage Management Server

The Storage Management Server centrally manages and operates multiple Storage Servers.
Install the Manager function on this server. The Storage Management Server can also work as a Storage Server.

Storage Server (Exchange server)

This Storage Server is used for the Exchange server operation.
Install the Agent function on this sever. Type in the instructions for database backup or restoration from this server.
Storage groups subject to a backup and the disks (i.e., the transaction volumes) to which the storage groups are allocated must be connected to this server.
The Exchange server supports operations using cluster operation implemented by Microsoft(R) Cluster Service (hereafter referred to as MSCS) or single nodes.

Note

It is necessary to apply the following service packs to the Storage Server (Exchange server):

・ Exchange Server 2003
Windows Server 2003, Enterprise Edition SP1 or later
Windows Server 2003, Standard Edition SP1 or later

・ Exchange Server 2007
Windows Server 2003, Enterprise x64 Edition SP1 or later
Windows Server 2003, Standard x64 Edition SP1 or later

Storage Server (Backup server)

This Storage Server is used for the backup server operation.
Install the AdvancedCopy Manager Agent function on this sever.
In addition, install the Exchange server system management tool to check the backup data.
The disks (ie, the backup volumes) to which the database volumes are backed up must be connected to the backup server.

Note

・ The backup server cannot be used in cluster operation mode.

・ The Exchange server and backup server cannot be used in combination.

Note

An Exchange Server 2003 and an Exchange Server 2007 backup server cannot both be on the one backup server machine.
If an environment contains both Exchange Server 2003 and Exchange Server 2007, a separate Exchange Server 2003 backup server and a separate Exchange Server 2007 backup server must be provided.

Note

ETERNUS multi-path drivers are required if both multi-path disk control and path load balancing are to be performed.

・ It is necessary to apply the following service packs to the Storage Server (ie, the Backup server).

- Microsoft Windows Server 2003 Enterprise x86 Edition SP1 or later

- Microsoft Windows Server 2003 Standard x86 Edition SP2 or later

Figure 8.5 System configuration
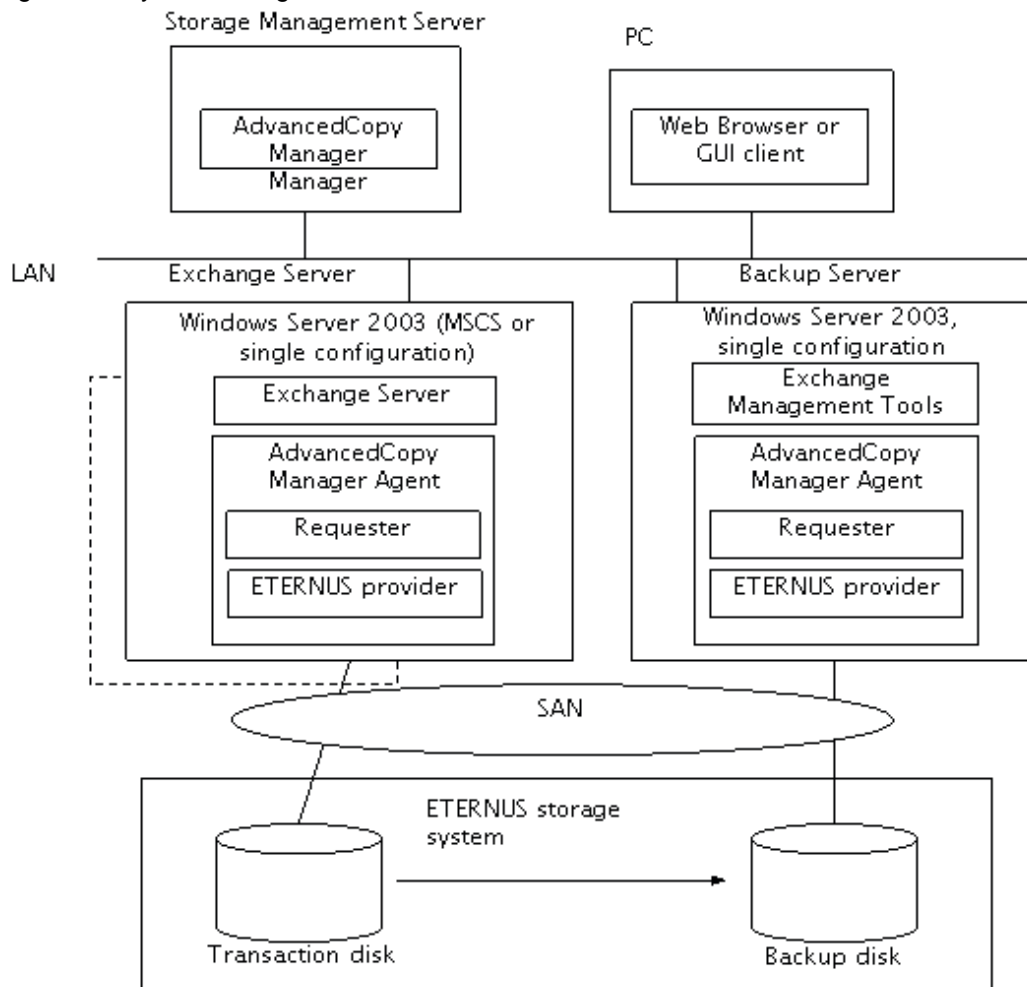
8.1.2.2 Designing storage groups

8.1.2.2.1 Partition configuration

Advanced Copy for backup is performed in units of disks (i.e., LUNs), not in units of partitions. For this reason, when multiple partitions are created on a disk, the individual partitions must contain files belonging to a specific storage group (refer to Example A below).

An operation cannot be performed with a configuration in which one disk contains files belonging to different storage groups (refer to Example B below), or which contains files used by other applications (refer to Example C below).

Figure 8.6 Partition configuration

Example A: Configuration in which the operation can be performed
(individual partitions contain only files belonging to a specific storage group)

| Drive E: | | Database file belonging to a storage group A |
| Drive F: | | Log file belonging to a storage group A |

Example B: Configuration in which operation cannot be performed
(individual partitions contain files belonging to different storage groups)

| Drive E: | | Database file belonging to a storage group A |
| Drive F: | | Database file belonging to a storage group B |

Example C: Configuration in which the operation cannot be performed
(the disk contains files belonging to other applications)

| Drive E: | | Database file belonging to a storage group A |
| Drive F: | | Files belonging to other applications |
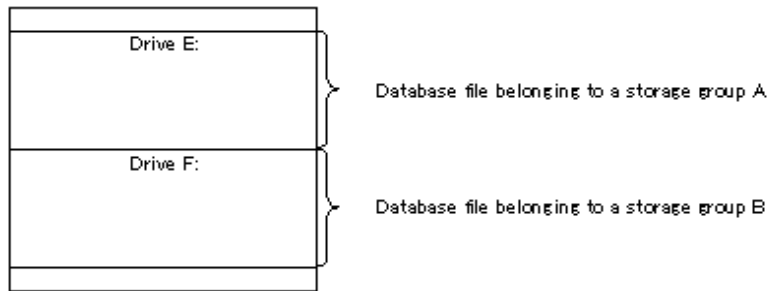
The operation can be performed in the configuration shown in Example A.

However, it is recommended that a configuration consisting of multiple disks (such as the one as shown below) is used for improved performance and easy management.

Figure 8.7 Recommended partition configuration

Recommended configuration (multiple-disk configuration)
Drive E: — Database file belonging to a storage group A
Drive F: — Log file belonging to a storage group A
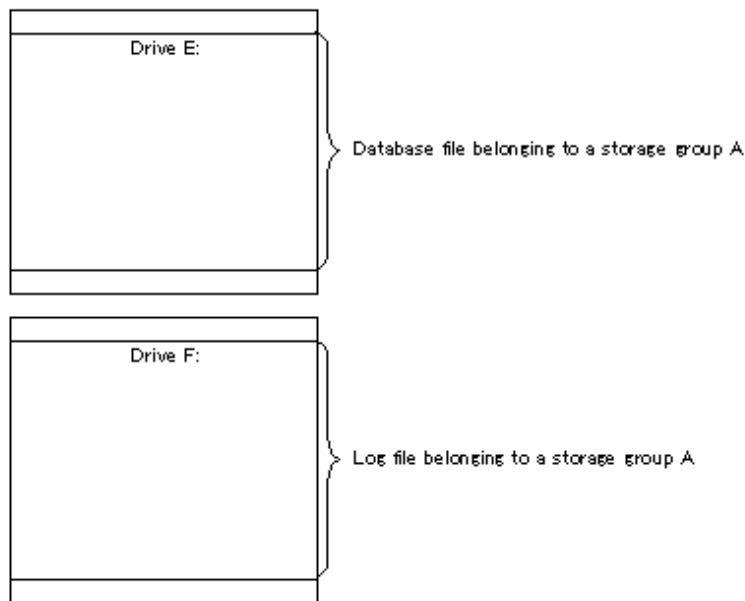
> **Note**
>
> GPT disks cannot be used.

> **Point**
>
> Assign drive letters (or mount points) to the volume (partition) that configures the storage group. AdvancedCopy Manager supports both drive letters and mount points.

8.1.2.2.2 Storage group file allocation

Database file allocation

The Exchange server linkage function provides the backup/restore function that backs up or restores the Exchange server databases in units of storage groups. AdvancedCopy Manager copies data in units of volumes (partitions). For this reason, if two or more storage groups exist in the same volume, the backup/restore function cannot be used.

With these restrictions in mind, the following instructions must be followed when designing the physical layout of storage groups:

1. Only store Exchange server database files that are to be backed up in the volume in which the database files are to be allocated. If a file other than an Exchange server database is stored in the same volume, it is also backed up. Accordingly, when it is restored, the latest data in the non-database file will be damaged.

2. Only one storage group can be stored in the same volume. Say, for example, that storage groups 1 and 2 are stored in the same volume. When storage group 1 is backed up, the files in storage group 2 are also backed up. Even if only storage group 1 is subsequently deliberately restored, storage group 2 is also restored. As a result, when the database of storage group 2 has been updated, the storage group 2 database is corrupted by the data from the time of the backup (refer to the figure below).

Figure 8.8 Data destruction example
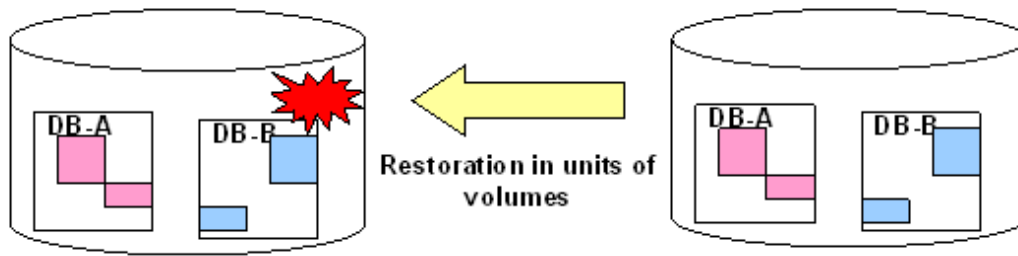
Restoration in units of volumes

![Note]
Note

. . . .

- When a backup is performed from a volume that contains a database that is subject to a backup and a database that is not subject to a backup, the data integrity of the database that is not subject to a backup is not guaranteed.

- A database can not be allocated to the volume that contains the Exchange server executable and control files.

. . . .

![Point]
Point

. . . .

To copy an already allocated database file, use the Exchange system manager.

. . . .

Transaction log file allocation

Figure 8.9 Relationship between log file allocation and feasible restoration modes

File allocation that permits both the point-in-time and roll-forward restoration modes
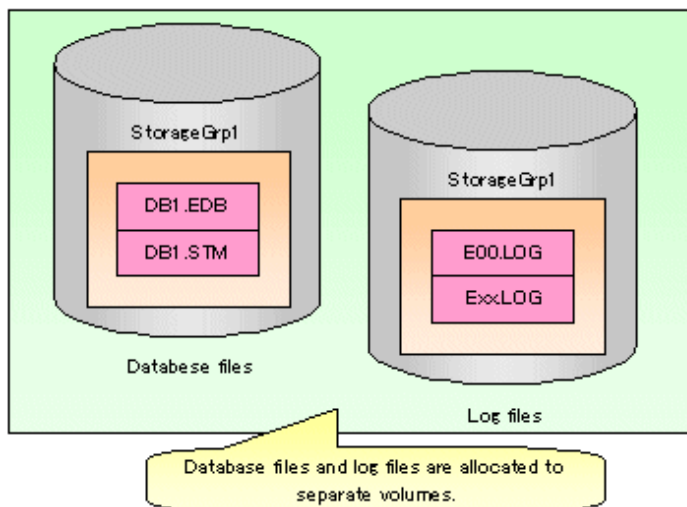
File allocation that permits only the point-in-time restoration mode
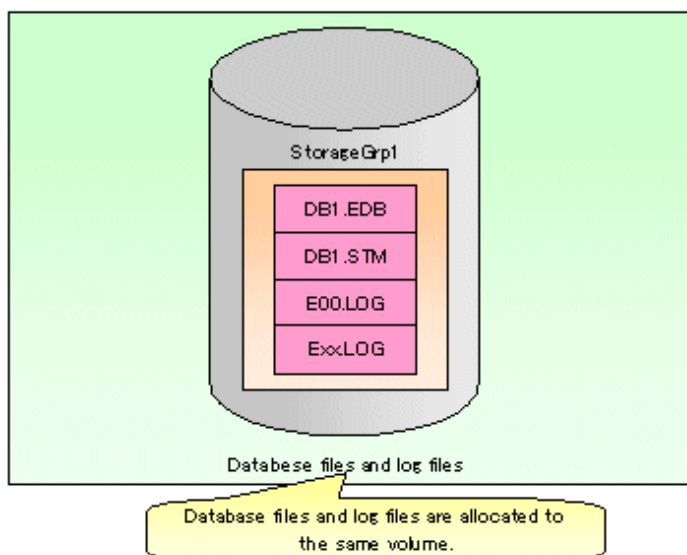
Table 8.3 Relationship between log file allocation and feasible restoration modes

		Restoration mode	
		Point-in-time	**Roll-forward**
Log file allocation	**Database files and log files are allocated to the same volume.**	Enabled	Disabled
	Database files and log files are allocated to separate volumes.	Enabled	Enabled

・ When a log file is stored on the volume containing a database, roll-forward restoration cannot be performed. This is because Advanced Copy performs copying in units of volumes. If a log file is stored in the volume containing a database and copy is performed, the log file at the time of backup overwrites the latest log file. When the roll-forward restoration is specified, AdvancedCopy Manager checks whether the database file and log file are stored on the same drive.

・ The roll-forward restoration can only be performed when a transaction log file and database file are stored on separate drives.

・ The point-in-time restoration can be performed regardless of the log file allocation.

・ CHK file allocation is not related to the available restoration modes.

Therefore, allocate the database files and log files to different volumes when roll-forward restoration is required. Although Exchange normally creates database files and transaction log files in the same volume, the Exchange system manager can be used to move the transaction log files to another volume.

Distributed allocation of an EDB/STM file

As shown in the figure below, a database file can be distributed and stored in multiple volumes. When a storage group is distributed and stored in multiple volumes, AdvancedCopy Manager backs up all the volumes.

Figure 8.10 Distributing a database file to multiple volumes
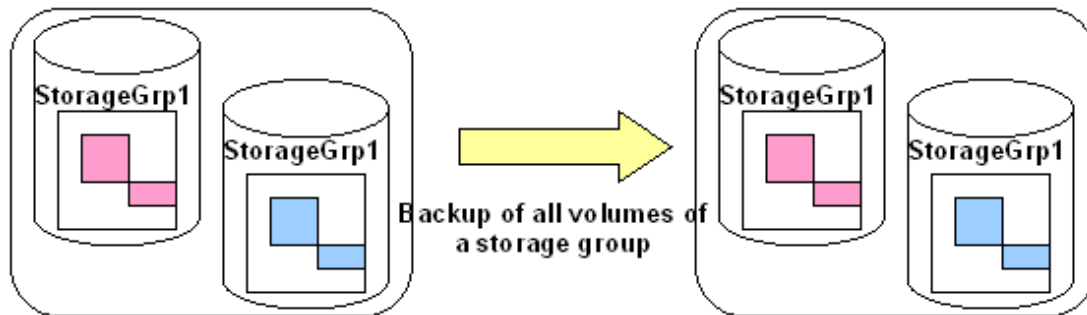
8.1.2.3   Circular log design

Circular logging must be disabled to implement the backup of Exchange server databases. A backup cannot be performed if circular logging is enabled.

With circular logging disabled, the log files are sequentially created as the amount of logged data increases and they reduce the free volume space accordingly. When a backup is successful, however, backed-up data that is no longer needed in the volume can be deleted.

8.1.2.4   Preparing the backup disks (LUN) and the backup volumes (partitions)

Placement of the backup disk

Backup disks must be placed on the Fujitsu ETERNUS storage system.
If the backup disk is placed on the same ETERNUS disk array as the transaction volume, the OPC, EC, and QuickOPC functions can be used. If the backup disk is placed on a different ETERNUS disk array from the transaction volume, the REC function should be used.

Creating backup disks and volumes (partitions)

There should be no complications if the backup disk is the same size or larger than the transaction disk. However, if the transaction disk and the backup disk are of different sizes, some space will be wasted and the operating procedure will be complicated. Accordingly, it is recommended that transaction disks and backup disks are the same size.

A backup volume must be prepared (refer to 8.1.3 Preparation) before the operation that is explained in 4.4.5 Fetching device information on a Storage Server is performed.

A backup volume must be created so that the partition size and start offset match those of the transaction volume (because Advanced Copy is executed in units of disks when the backup is performed). In a "1 LUN = 1 partition" configuration, it is enough to match the partition size - the start offset need not be recognized.

Figure 8.11 Creating a backup volume
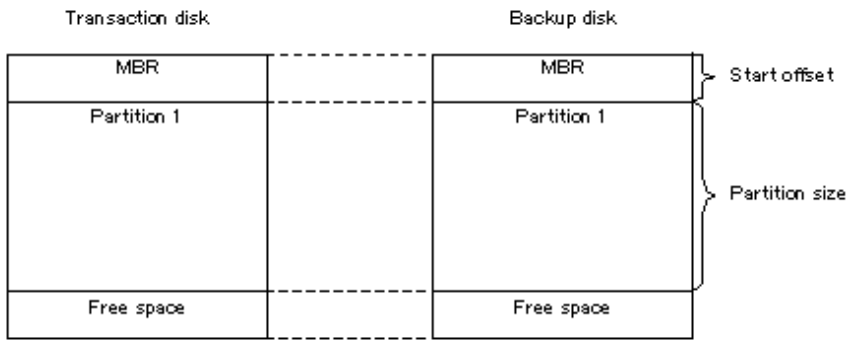
8.1.2.5 Designing copy set groups

Create copy set groups using the copy set registration command (eternus_copyset).

Register with the copy set group all copy sets related to the storage group being backed up.

Figure 8.12 Registration to copy set group
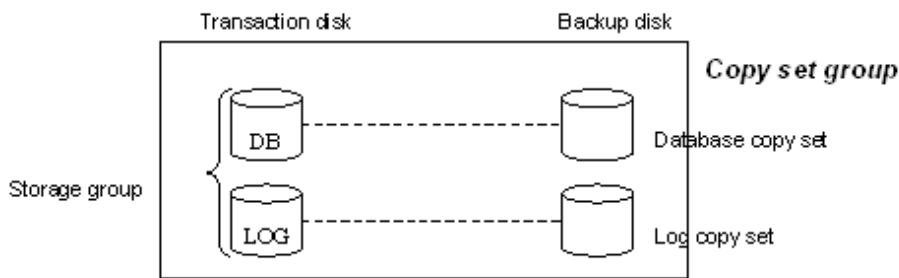
Only one transaction disk can be registered with a copy set group. Copy sets with the same transaction disk but different backup disks cannot be registered in the same copy set group.

Figure 8.13 When registration to a copy set group is not possible
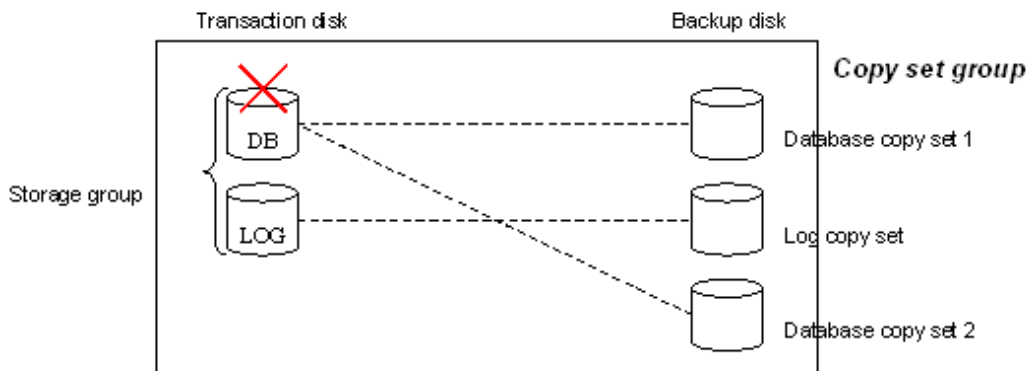
To keep multiple generations of shadow copies, prepare multiple copy set groups.

Figure 8.14 When saving multiple shadow copy generations
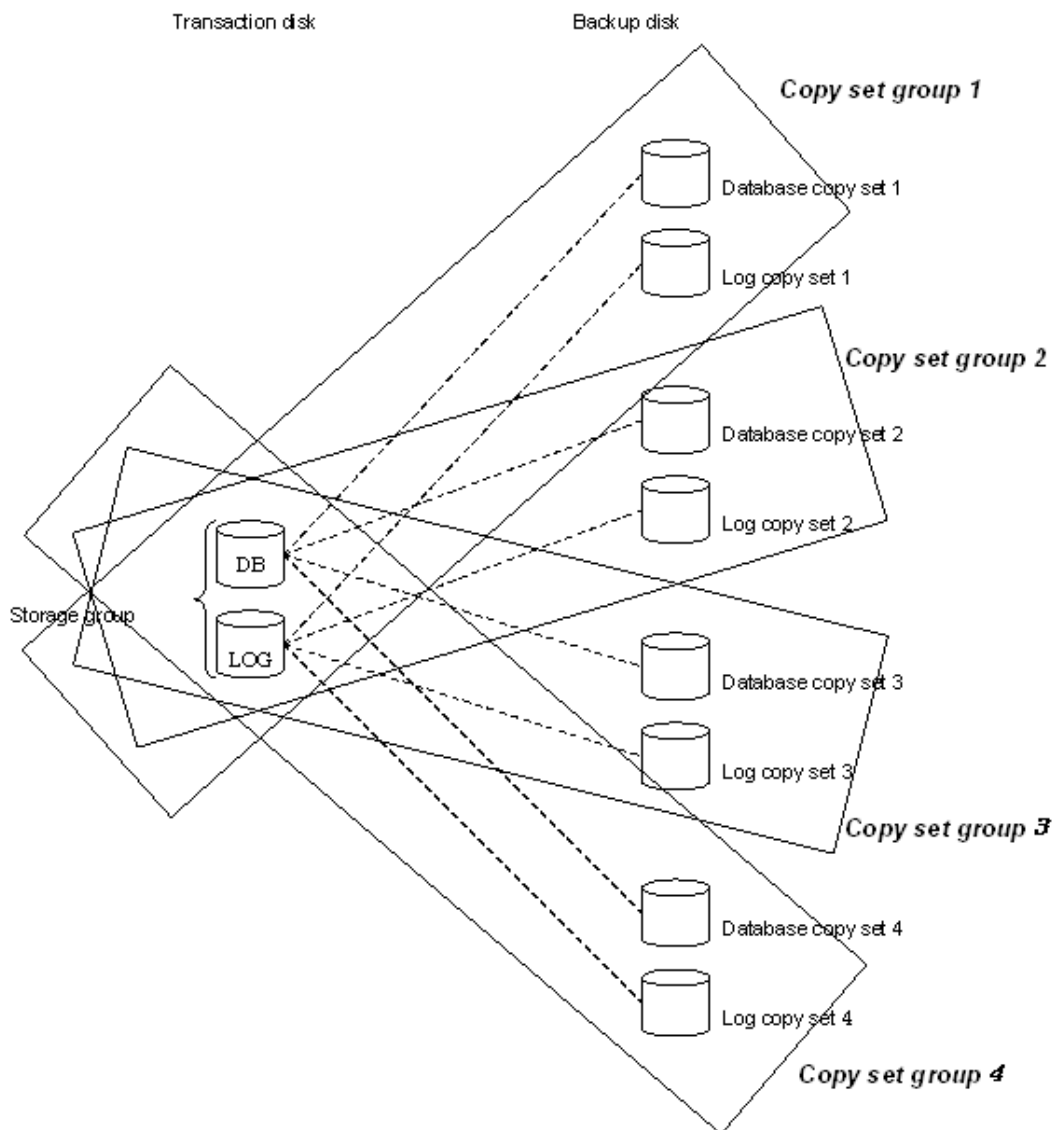
Exchange linkage commands (swsrpXXX_exchange) perform processing on particular copy sets based on the storage group name and the copy set group name. Accordingly, multiple storage groups can be registered in a single copy set group.

Figure 8.15 When multiple storage groups are registered

swsrpxxx_exchange –sgname Storage group A –copygrp Copy set group 1
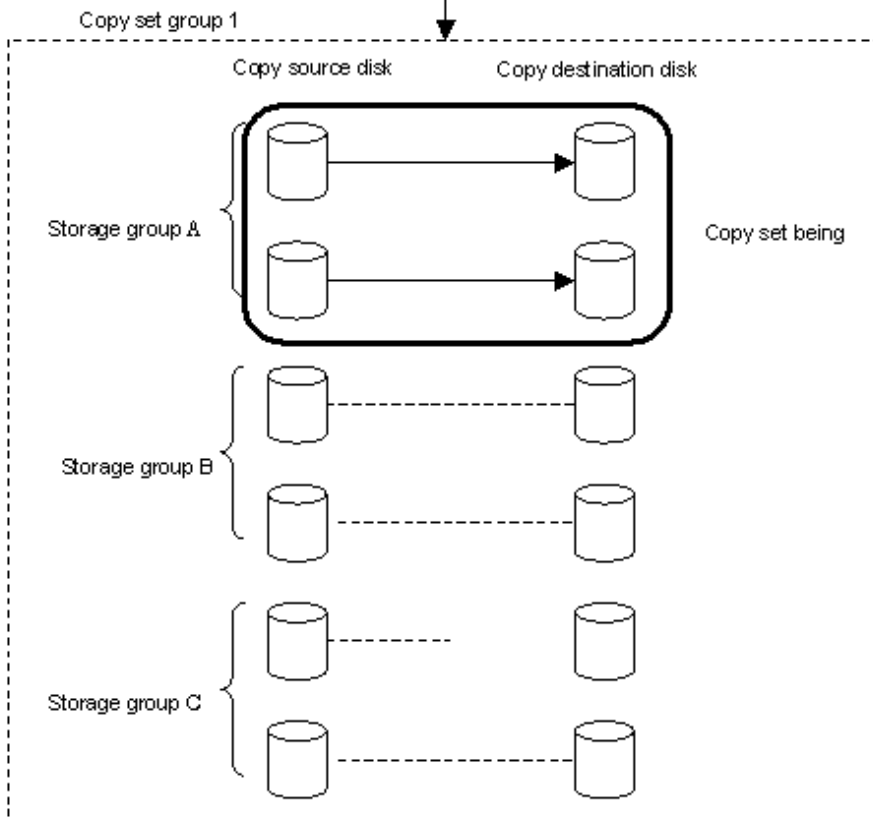
To keep multiple generations of shadow copies, create a copy set group for each generation you wish to keep.

Figure 8.16 When saving multiple shadow copy generations
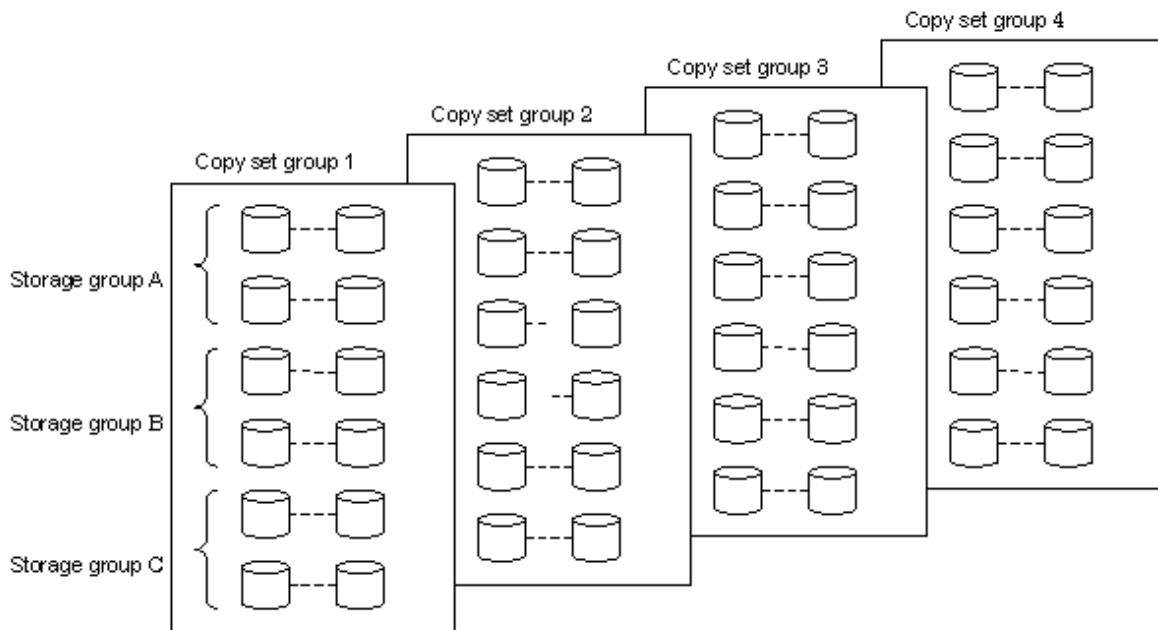
If separate copy set groups are created for each storage group, the number of copy set groups required is given by the formula <number of storage groups> x <number of generations kept>.

Figure 8.17 When creating a copy set group for each storage group
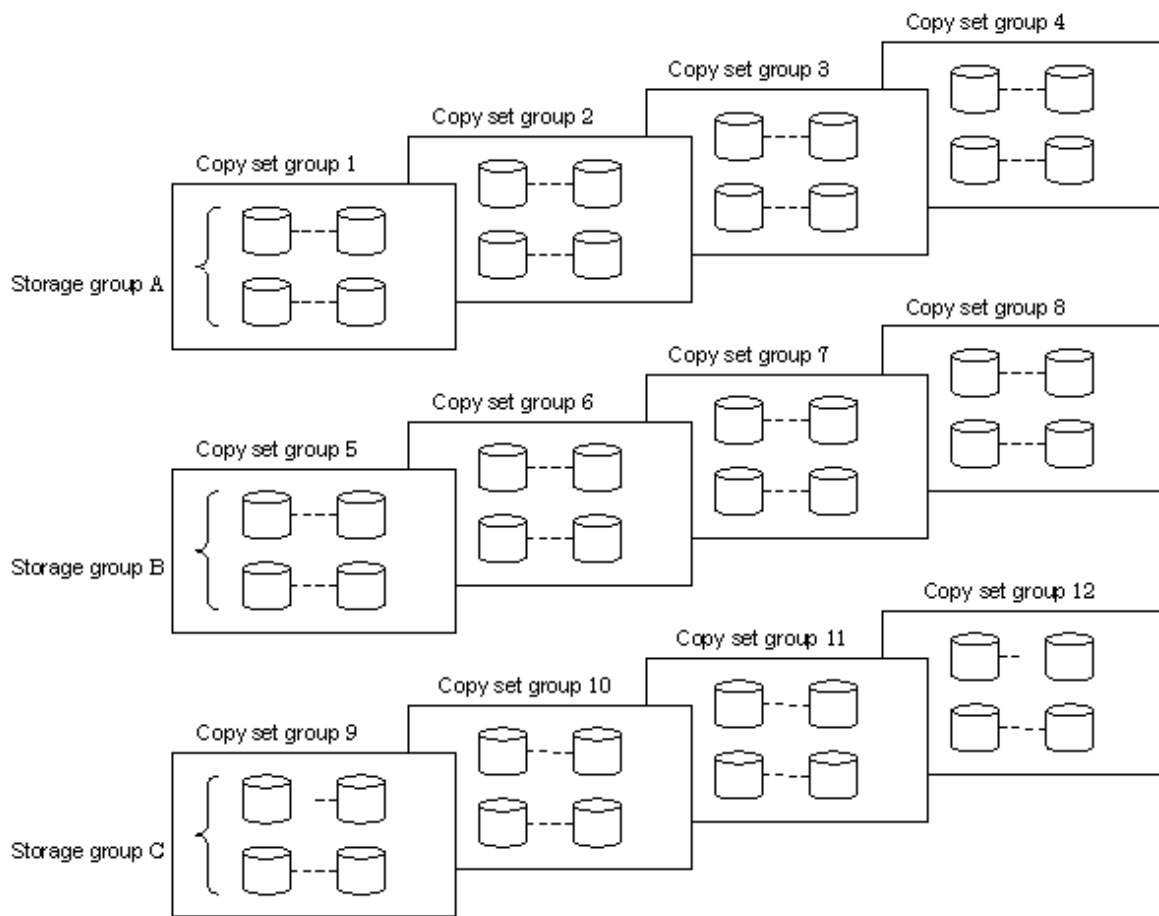
There must be only one backup server for storage groups. If storage groups are made up of multiple disks, it is not possible to back up each disk to a different backup server.

Figure 8.18 When a storage group is comprised of multiple disks
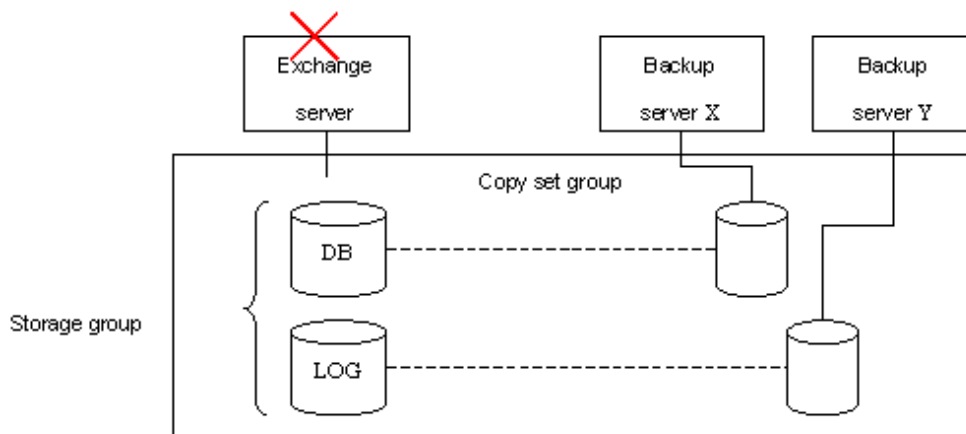
However, if a copy set group includes multiple storage groups, each storage group can use a separate backup server.

Figure 8.19 When multiple storage groups are included in a copy set group
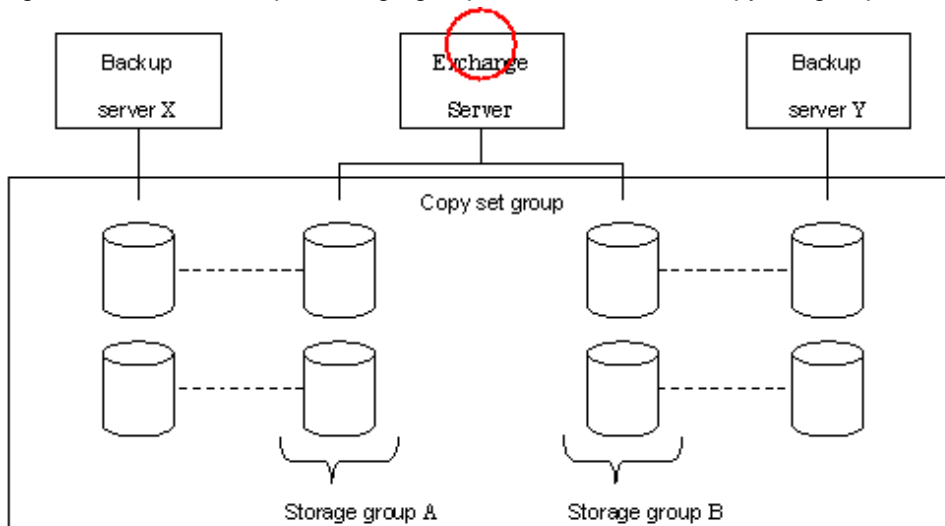
If multiple backup servers are used for a single storage group, use a different backup server for each copy set group.

Figure 8.20 When multiple backup servers are used for one storage group
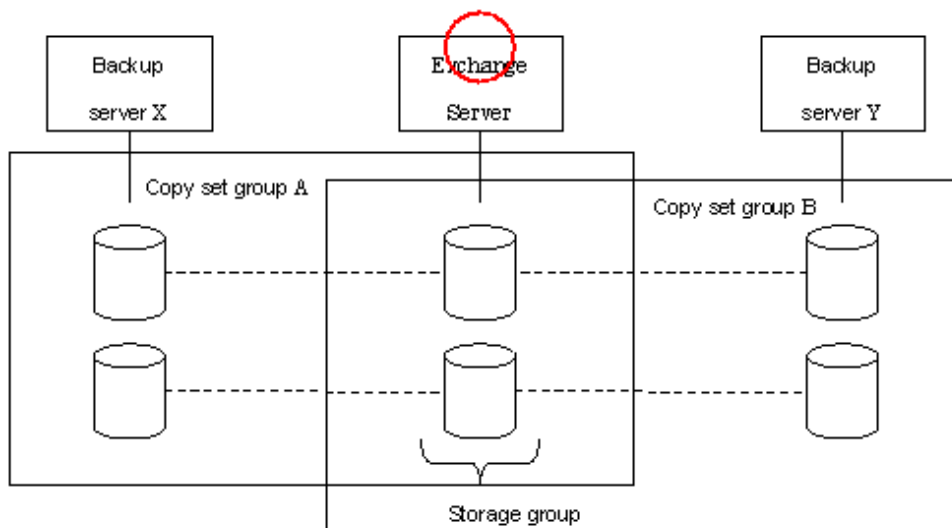
8.1.3 Preparation

Before starting the Exchange server backup, make the following preparations:

- ・ Register the hardware provider
- ・ Configure the Exchange server environment
- ・ Set up the AdvancedCopy Manager cluster
- ・ Prepare a drive letter map file
- ・ Set up the source and replica volumes
- ・ Register the hardware provider copy set
- ・ Save the hardware provider management file
- ・ Create a device management file

- Save the device management file

- Register database information

8.1.3.1 Registering the hardware provider

On both the Exchange server and the backup server, execute eternus_provider (Provider registration/deletion command) to register the ETERNUS hardware provider. Perform this operation with the Exchange server on all nodes that make up the cluster group.

8.1.3.2 Configuring the Exchange server environment

Set up the Exchange server based on the results of the backup design.

Applying the Service Pack

This function supports Exchange server 2003 or Exchange Server 2007.

For Exchange Server 2003, Service Pack 1 and Service Pack 2 are supported. You should apply Service Pack 1 or Service Pack 2 if it has not been applied.

Allocating EDB, STM, CHK, and LOG files

Allocate the Exchange server EDB, STM, CHK, and LOG files.

Refer to "8.1.2.2 Designing storage groups" for details.

Installing Exchange system management tools

Be sure to install the Exchange server system management tools on the backup server. For Exchange Server 2003, apply Service Pack 1 or Service Pack 2 (the service pack level on the backup server must be the same as the Exchange Server).

8.1.3.3 Setting up an AdvancedCopy Manager cluster

If the Exchange Server has a cluster configuration, customize the Storage Server transactions at the Exchange Server.

Refer to the following manuals for transaction details:

- ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment

- "12.1.5 Notes on cluster operation"

- "12.1.7 Notes on replication in a cluster system"

8.1.3.4 Preparing a drive letter map file

The drive letter map file defines the drive letters (or mount points) to be assigned to the shadow copies (ie, backup volumes).

Create a drive letter map file with the following file name on the backup server:

```
Configuration settings directory\etc\repl\data\EXDMAP.INI
```

An example of the settings in the drive letter map file is shown below.

```
[DRVMAP]
g1d1p1=F:
g1d2p1=C:\mnt
```

During backup processing, a drive letter is assigned to a backup volume based on the settings in the drive letter map file.

The drive letter assignment is not performed if there is no drive letter defined in the drive letter map file, or if the file contains a setting error (e.g., the relevant drive letter is in use, or an invalid directory is specified for a mount point, etc.)

8.1.3.5　Setting up the source and replica volumes

Complete the following additional steps when performing the operations explained in "7.4 Preparations":

- ・ Register all the transaction volumes (those to which files with *.edb, *.stm, *.log, and *.chk extensions are allocated) and their backup volumes as replica volumes.

- ・ Set the transaction volumes as source volumes and the backup volumes as replica volumes. (Do not reverse the source and replica volumes.)

- ・ Set the Exchange server (the source volume server) as an operation server (by specifying "ORG" or "BOTH" as an argument of the -o option in the replication volume information configuration command (swsrpsetvol)).

- ・ Do not specify the -u option because the restoration needs to be performed.

- ・ Use the partition unit (gXdYpZ) as the volume registration unit. Do not register using the LUN unit (gXdY).

8.1.3.6　Registering the hardware provider copy set

Execute the copy set registration command on the Exchange server to register the relationship between transaction disks and backup disks. Execute the command in the primary node making up the cluster group.

Example:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_copyset -set -o g1d1@ EXCHG-SVR -t
g1d11@BKUP-SVR -c QOPC -g BK1
eternus_copyset set successfully completed.
C:\>
```

8.1.3.7　Saving the provider management file

Save the hardware provider management files in case of emergency. The files to be saved are as follows:

Exchange server

```
AdvancedCopy Manager shared-data shared-disk drive:\etc\opt\swstorage\etc\prov_copyset.ini
```

Backup Server

```
Configuration settings directory\etc\prov_copyset.ini
```

8.1.3.8　Creating a device definition file

Create a device definition file on the backup server according to the following procedure:

1. Confirm the OLU number and physical device number of the copy destination device.
   Execute the (eternus_getolu) command to confirm the OLU number and physical device number of the copy destination device.
   Refer to eternus_getolu (Source disk number display command) for information on this command.

2. Confirm the device instance IDs of all copy destination devices.
   Confirm the device instance IDs as follows:

   a. Start Computer Management.
      Select [Start] -> [Management Tool] -> [Computer Management].
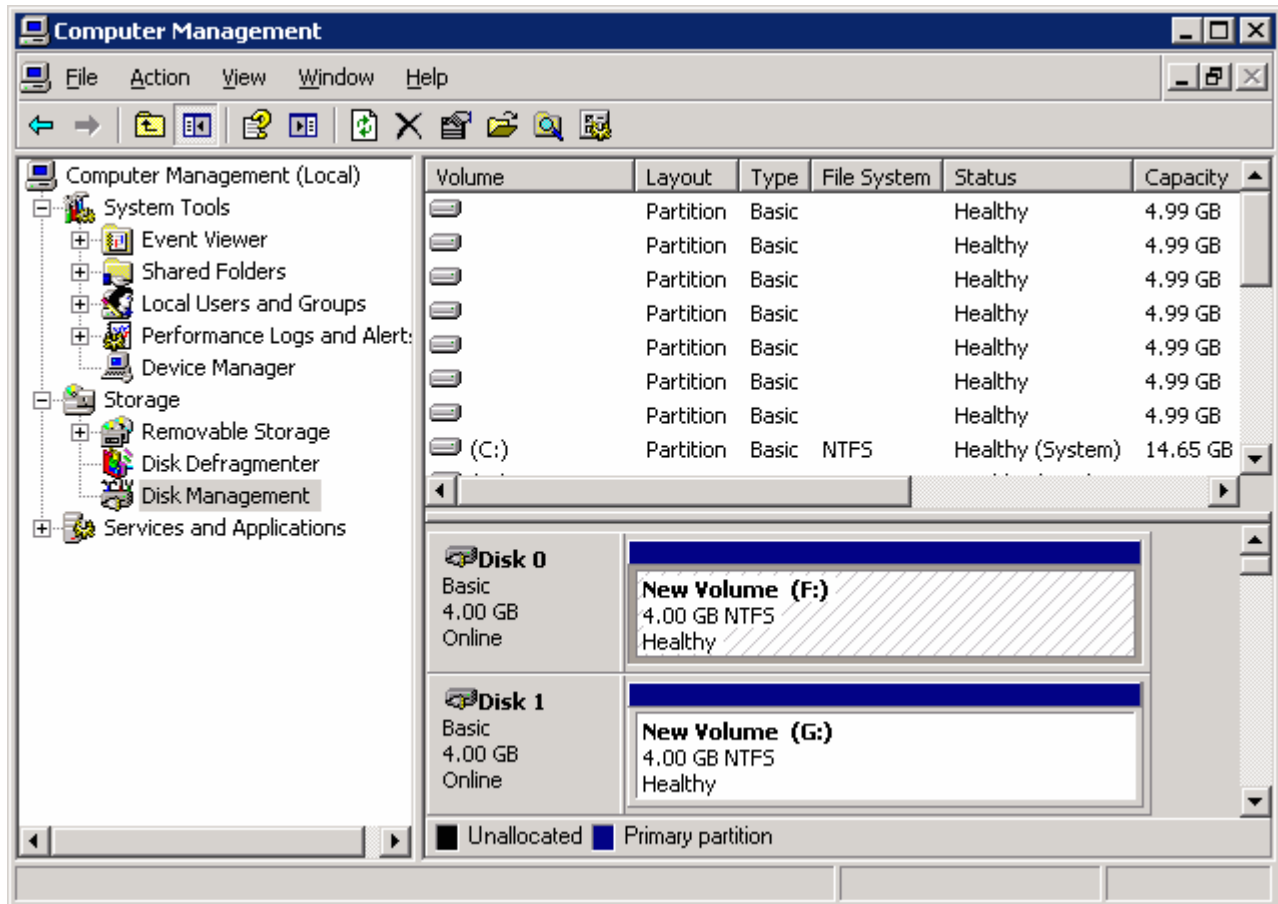
b. Select [Disk Management] from [Computer Management] to display the properties of the device subject to a backup. Confirm the location (Bus Number, Target ID, LUN).
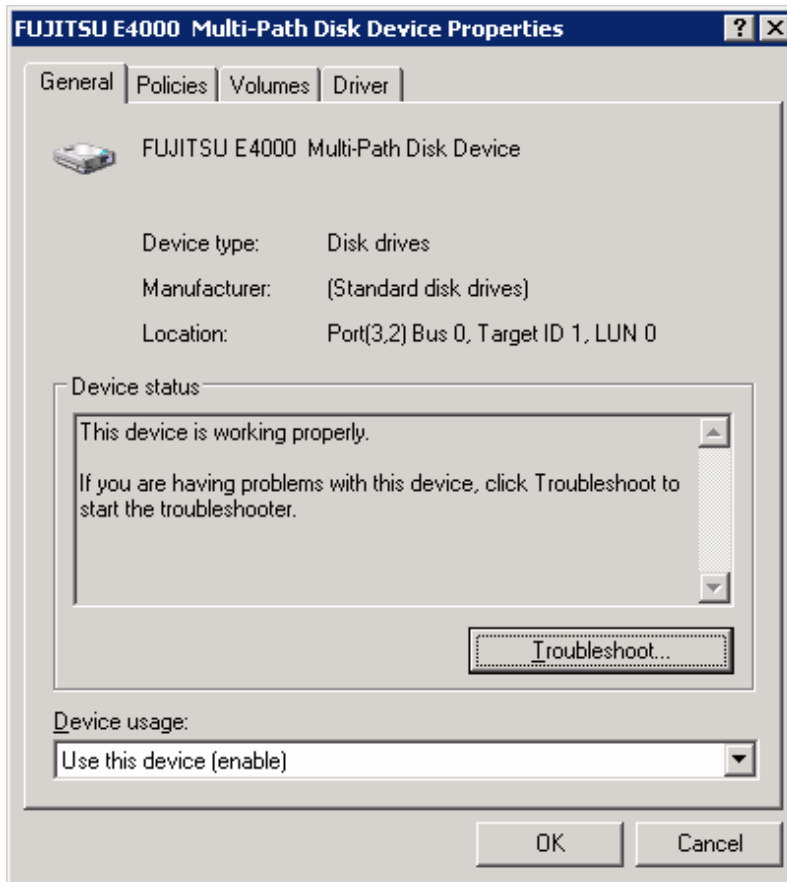
c. From [Computer Management], select [Device Manager] -> [Disk Drive] to display the disk drives.
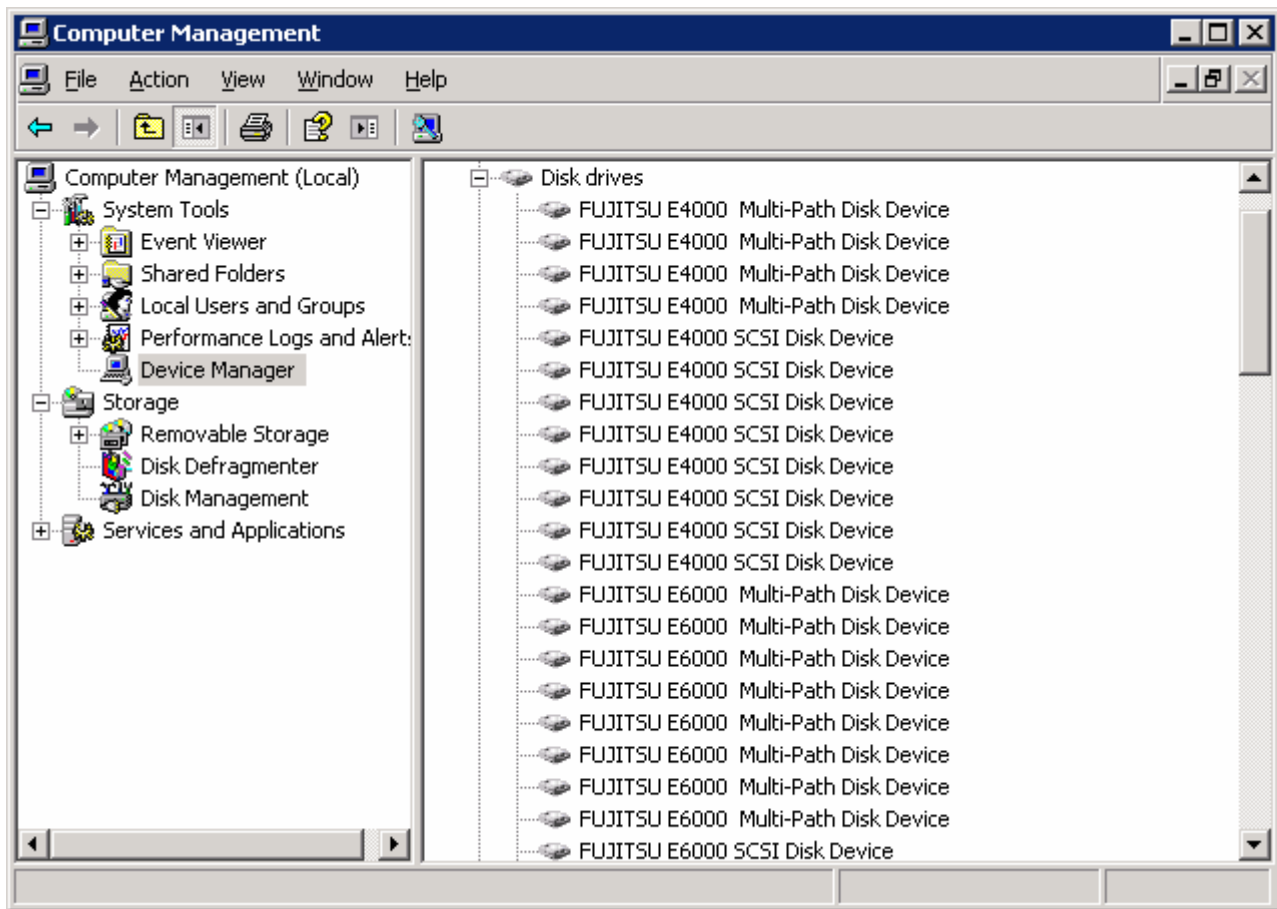
d. Select Disk Device (such as FUJITSU GR740 SCSI Disk Device) from [Disk Drive] to confirm the device subject to a backup.
Select Disk Device (such as FUJITSU GR740 SCSI Disk Device) and right-click, and then select Properties. Confirm that

the Disk Device for which the location (Bus Number, Target ID, LUN) confirmed in b) of Step 2 matches the location (Bus Number, Target ID, LUN) indicated in the displayed Properties.

e. When the location that was confirmed in b) of Step 2 matches a location confirmed in d) of Step 2, select Detail to confirm the device instance ID.

f. Save the combination of the physical disk number and the device instance ID confirmed in point e) of Step 2 to a text file.
The device instance ID can be displayed by executing the eternus_getins command.
Refer to eternus_getins (device instance ID display command) for information on this command.

3. Create a device definition file.
Create a device definition file using a combination of the destination device OLU number confirmed in Step 1 and the device instance ID confirmed in Step 2.
Name the following device definition file with notepad:

```
AdvancedCopy Manager configuration settings directory\etc\eternus_hardope.def
```

The definition format is as follows:

```
OLU number, device instance ID
```

Example:

```
149,MPIO
\DISK&VEN_FUJITSU&PROD_E4000&REV_0000\1&7F6AC24&0&45343530533230412323232020202020
2036413030303033330333033390000
150,MPIO
\DISK&VEN_FUJITSU&PROD_E4000&REV_0000\1&7F6AC24&0&45343530533230412323232320202020
2036413030303033330333033390001
151,MPIO
\DISK&VEN_FUJITSU&PROD_E4000&REV_0000\1&7F6AC24&0&45343530533230412323232320202020
2036413030303033330333033390002
152,MPIO
```

```
\DISK&VEN_FUJITSU&PROD_E4000&REV_0000\1&7F6AC24&0&453435305332304123232323232020202020
203641303030303330333033390003
```

8.1.3.9   Saving the device definition file

To ensure that this file is not lost, save the device definition file of the backup server.

Save the following file:

```
AdvancedCopy Manager configuration settings directory \etc\eternus_hardope.def
```

8.1.3.10   Registering database information

Register Exchange server database information in the management file using swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command). Before backing up or restoring the Exchange server databases, execute this command on the Exchange server to perform an initialization. Additionally, execute this command after any change has been made to the Exchange server configuration.

Example: This example stores the database information of the storage group FirstStorageGroup. Execute the command from the business server (EXCHG-SVR).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_ex2k3  -evs VSVR -sgname
FirstStorageGroup
swsrpdbinfo_ex2k3 successfully completed
C:\>
```

8.1.3.11   Creating an access path definition file (only for Exchange Server single configuration)

If the Exchange Server has a single configuration, an AdvancedCopy control disk (access path) must be created for the Exchange Server.

This section is not required for cluster configurations because the shared disk for AdvancedCopy Manager shared data is used as the access path.
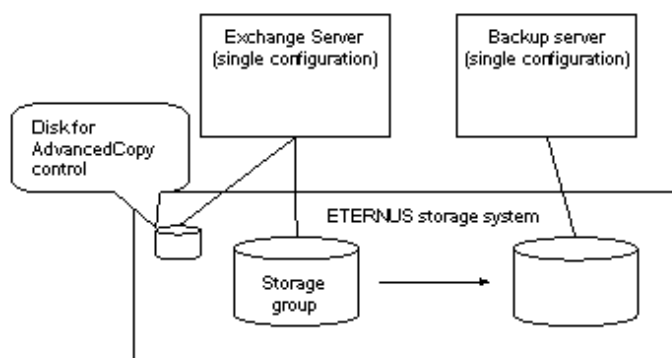
The following table shows the procedures for creating an AdvancedCopy Manager control disk.

No	Procedure	Tasks
1	Create a logical unit	Create a logical unit in the same disk array as the backup target Exchange database. The logical unit can be any size. (Since the AdvancedCopy control disk does not depend on the size of the disk, it can be created with the minimum size.)
2	Connect to host	Connect the created logical unit to the host. Refer to the ETERNUS disk array manual for the connection procedure.
3	Create partitions	Create a partition in the logical unit (disk) that has been connected to the host (server).
4	Assign a drive letter	Assign a drive letter to the partition created in Step 3. * A mount point cannot be used instead of a drive letter.
5	Create a file system	Format the partition created in Step 3 as NTFS.

After the AdvancedCopy control disk is created, create a new access path definition file under the following filename on the Exchange Server:

```
<ACM configuration settings directory>\etc\eternus_accdrv.ini
```

he format for the access path definition file is as follows:

```
Drive=<drive letter>
```

The following example show an access path definition file entry (if the drive letter is E):

```
Drive=E
```

8.1.4 Backup

8.1.4.1   Backing up databases

Back up the Exchange server databases by executing swsrpvssbackup_exchange (Exchange VSS backup command) on the Exchange server. This command backs up the databases in units of storage groups.

📓 Note

When backups are executed, all databases (i.e., stores) in the storage group must be mounted. If any databases are not mounted, the backup processing will terminate abnormally.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpvssbackup_exchange successfully completed
C:\>
```

When this command is executed, the following processing is performed:

1. Shadow copies of all of the files that make up the storage group (ie, files with extensions *.edb, *.stm, *.log and *.chk) are created on the backup volume for the specified copy set group. After the shadow copies have been created, the backup volume becomes read-only.

   - For snapshot type backups, shadow copies are created as a result of OPC or QuickOPC having been run.

- For synchronous type backups, shadow copies are created when EC or REC in the equivalency maintenance state is suspended.

2. After a shadow copy is created, ESEUTIL is used to verify the backup data (the -skipchk option can be used to skip the backup data verification). After the backup is finished, Exchange deletes any unnecessary log data.

3. A "writer metadata" document and "backup components" document are saved to the following locations on the backup server. These files are used for restoration:

File	Output location
Writer metadata document	[If the copy set group name is "BkupGroup" (the default name)] Configuration settings directory\etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc\<storage group name>.wmd.xml [If the copy set group name is anything other than "BkupGroup" (the default name)] Configuration settings directory\etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc\<storage group name>.<copy set group name>.wmd.xml
backup components document	[If the copy set group name is "BkupGroup" (the default name)] Configuration settings directory \etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc \<storage group name>.bcd.xml [If the copy set group name is anything other than "BkupGroup" (the default name)] Environment settings directory\etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc \<storage group name>.<copy set group name>.bcd.xml

🔖 Note

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Backup notes

The VSS specifications do not allow multiple sets of backup processing to be executed in parallel. When two or more storage groups exist, multiple sets of backup processing need to be executed sequentially, not in parallel. If multiple backup processes are executed in parallel, future processes will be put on hold until the shadow copy creation for the prior processes completes.

. . . .

The progress status of the advanced copy and the information about the shadow copies that have been created can be checked by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command).

Example: (For snapshot type backups)

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
[Shadow Copy Status]
Original-Volume                    Replica-Volume                     Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}       {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}       {XXXX}
[AdvancedCopy Status]
Type Group-Name Original-Disk  Replica-Disk    Status Execute Trk Update
QOPC BK1        g1d1@EXCHG-SVR g1d11@BKUP-SVR snap   ----    on  3%
QOPC BK1        g1d2@EXCHG-SVR g1d12@BKUP-SVR snap   83%     on  ----
C:\>
```

Example: (For synchronous type backups)

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
[Shadow Copy Status]
```

```
Original-Volume                    Replica-Volume                    Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
[AdvancedCopy Status]
Type Group-Name Original-Disk  Replica-Disk    Status Execute Trk Update
EC   BK1       g1d1@EXCHG-SVR g1d11@BKUP-SVR suspend ----    ---- ----
EC   BK1       g1d2@EXCHG-SVR g1d12@BKUP-SVR suspend ----    ---- ----
C:\>
```

8.1.4.2   Backup to tape

When a backup is executed, the metadata documents (ie, the writer metadata document and the backup component document) that are required for restoration are saved to the backup server.

When data is backed up to tape, both the data in the backup volume and these two metadata files need to be backed up. The flow of backup processing including a backup to tape is shown in the figure below.

Figure 8.21 For snapshot type backups
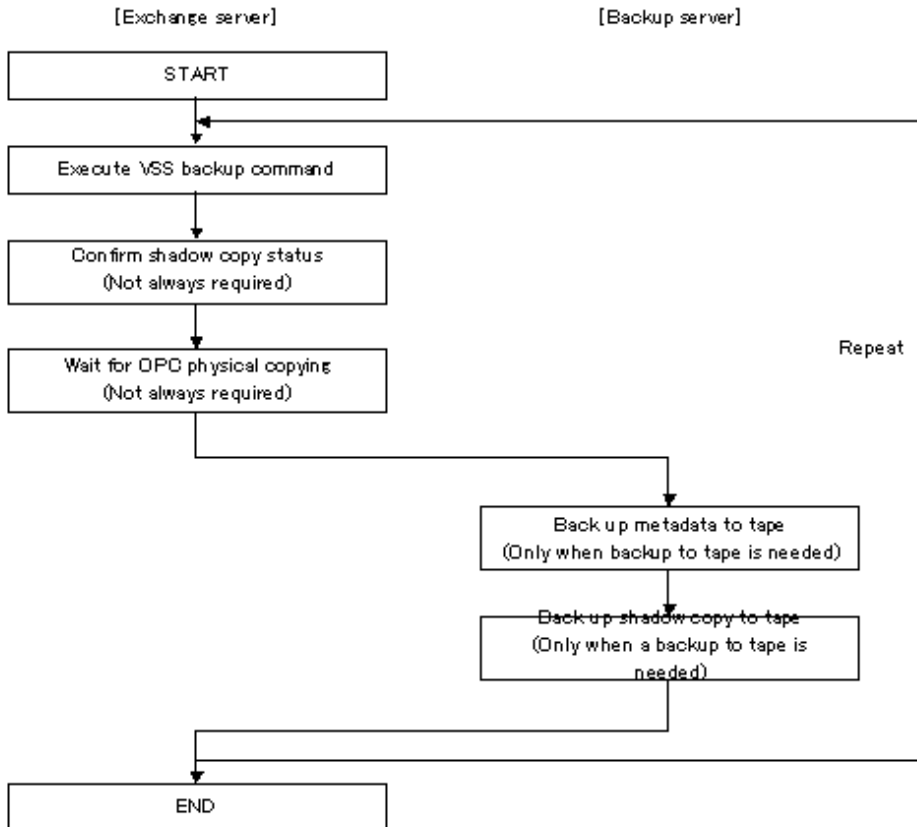
Figure 8.22 For synchronous type backups
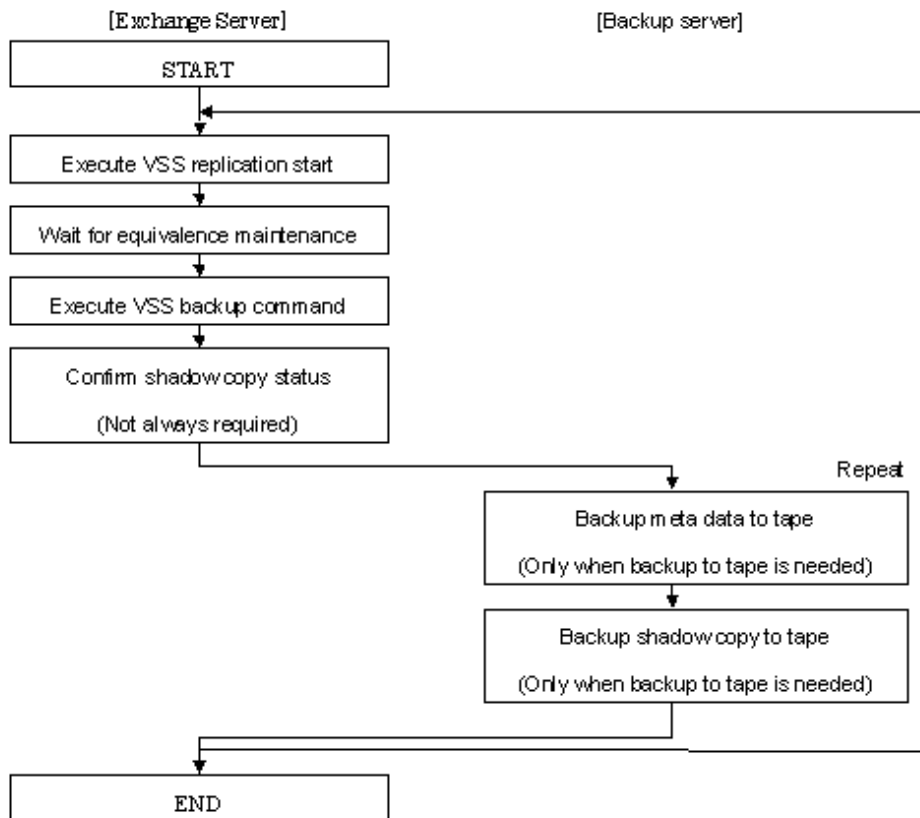
For the tape backup procedure using AdvancedCopy Manager's Tape Backup function, see "ETERNUS SF AdvancedCopy Manager Operator's Guide (Tape Backup Option)".

8.1.4.3   States of the backup disk

If a backup disk (LUN) uses volumes (ie, partitions), the mount point is temporarily released and the volumes are deleted before synchronous processing starts (for synchronous type backups,), or before backup processing starts (for snapshot type backups). Accordingly, no processes that use the backup volumes can be active when the backup is taken.

The mount point is released and the volume is deleted while the volume is locked by the requester. If locking of the volume fails, the system will continue to attempt locking until successful. The standard retry operation is as follows:

- If locking fails, it is retried at one second intervals.

- If the locking cannot be achieved in 20 retries (ie, 21 times including the first attempt), processing is canceled and the command terminates abnormally.

The maximum number of retries (the default value = 20) and the retry interval (for which the default value = 1 second) can be changed by creating a configuration file called the VSS copy destination disk locking specification file.

This configuration file can also be used to instruct in the pre-processing of the copy destination volume:

- Disable all the file handles in the volume before subsequent attempts at locking are performed (using the Forced lock function).

Create a VSS copy destination disk locking specification file with the following file name on the backup server:

```
Configuration settings directory\etc\repl\data\VSSDSTLOCK.INI
```

The format of this file is the same as for the copy destination volume locking specification file, except that the section name is "gXdY" instead of "gXdYpZ."

The state of the backup disk changes to either A, B, or C in the following figure. If the backup disk is in either state B or C when the backup is to be executed, it is placed into state A before backup processing can begin.

Figure 8.23 Backup disk state transition
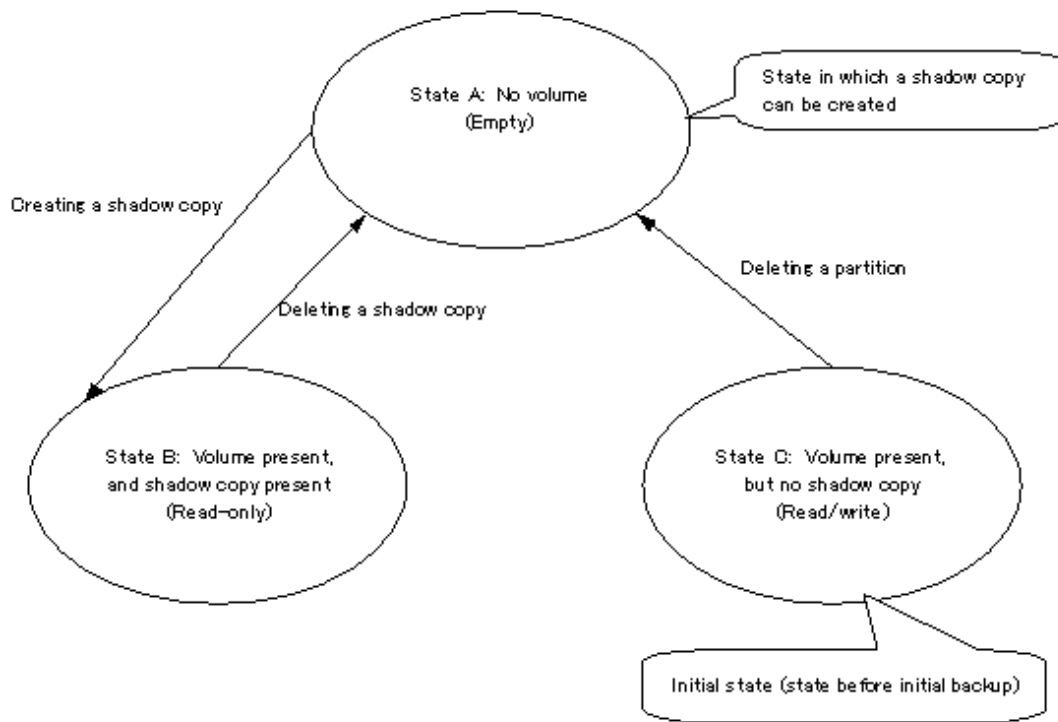
Because the backup disk is never put in state C except before the initial backup, it moves between states A and B during the backup.

Figure 8.24 For snapshot type backups
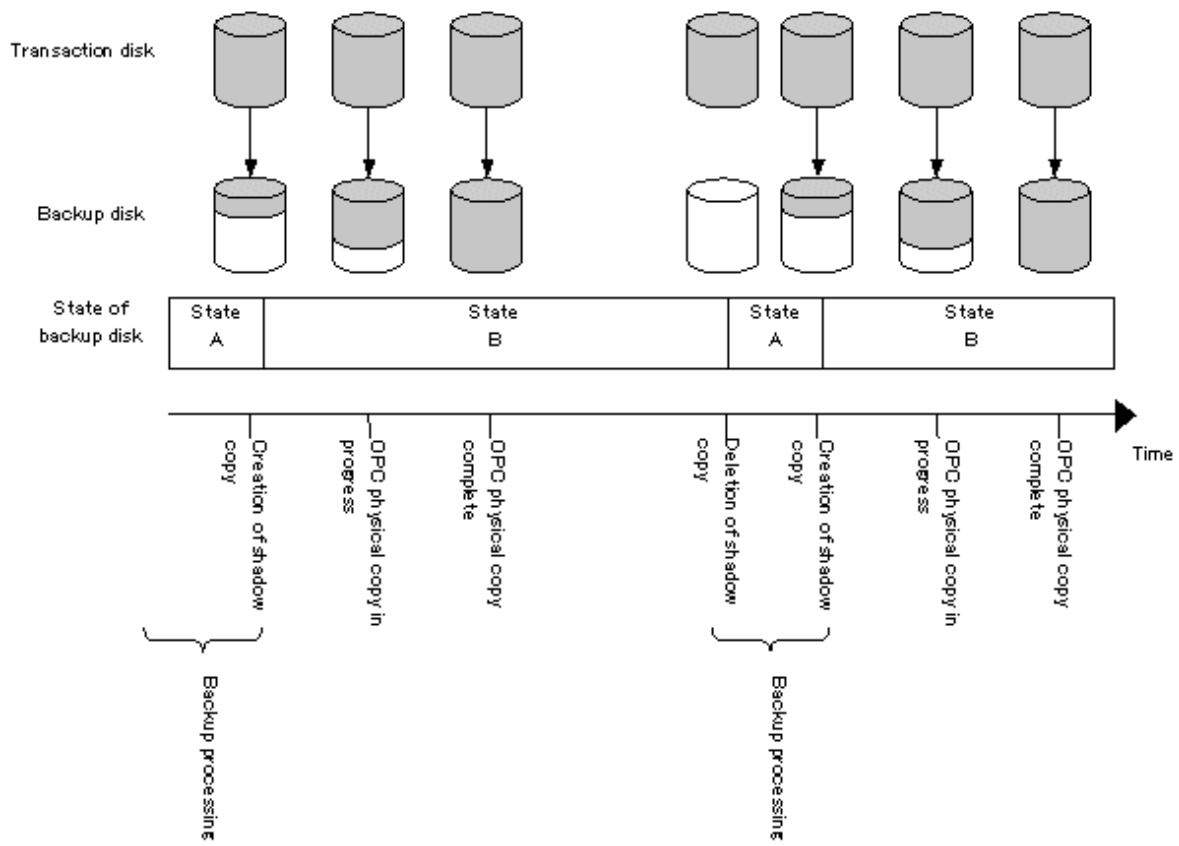
Figure 8.25 For synchronous type backups
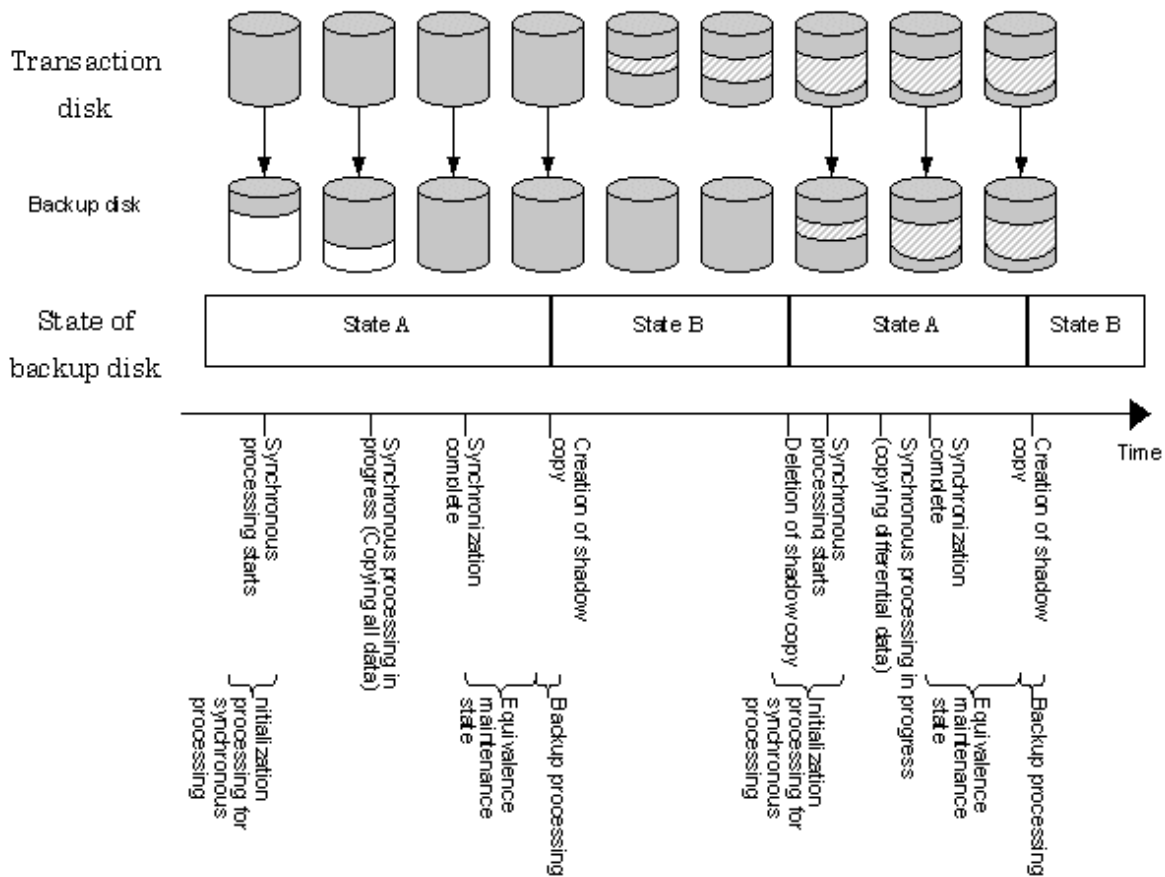
8.1.5 Restoration

8.1.5.1 Preparation

The following steps must be completed before performing a restoration:

- ・ Dismount the storage group (only when performing a synchronous restoration, or with Exchange Server 2007)

- ・ Stop resource monitoring for the physical disk

- ・ Stop the EC or REC session (only for synchronous type backups)

- ・ Stop the QuickOPC session (only for differential snapshot type backups)

- ・ Start restoration synchronous processing and coordinate equivalency maintenance state (only when performing a synchronous restoration)

For Exchange Server 2007 and Exchange Server 2003, the steps that must be completed before performing a restoration are as follows.

Table 8.4 Steps that must be completed before performing a restoration for Exchange Server 2003

Steps	Restore Methods	
	OPC	EC/REC
Dismounting the storage group (when performing synchronous restoration or with Exchange Server 2007)	Not required	Required

Steps	Restore Methods	
	OPC	EC/REC
Stopping resource monitoring for the physical disk	Required	Required
Stopping the EC/REC session (only for synchronous backup)	Required only for synchronous type backups	Required only for synchronous type backups
Stopping the QuickOPC session (only for differential snapshot backup)	Required only for differential snapshot type backups	Required only for differential snapshot type backups
Starting restoration synchronous processing and coordinating equivalence maintenance state (only when performing synchronous restoration)	Not required	Required

Table 8.5 Steps that must be completed before performing a restoration for Exchange Server 2007

Steps	Restore Methods	
	OPC	EC/REC
Dismounting the storage group (when performing synchronous restoration or with Exchange Server 2007)	Required	Not supported
Stopping resource monitoring for the physical disk	Required	Not supported
Stopping the EC/REC session (only for synchronous backup)	Required only for synchronous type backups	Not supported
Stopping the QuickOPC session (only for differential snapshot backup)	Required only for differential snapshot type backups	Not supported
Starting restoration synchronous processing and coordinating equivalence maintenance state_(only for synchronous restoration)	Not required	Not supported

8.1.5.1.1 Permitting overwrite of database during restoration

Under Exchange Server 2007, use the Exchange management console to specify the [Overwrite this database when restoring] option for all stores in the target storage group.

8.1.5.1.2 Dismounting the storage group (when performing a synchronous restoration, or with Exchange Server 2007)

To restore using synchronous restoration or with Exchange Server 2007, use the Exchange system manager or Exchange management console and dismount all of the stores in the storage group that is to be restored. After dismounting the stores, close the Exchange system manager or the Exchange management console.

8.1.5.1.3 Stopping resource monitoring for the physical disk

The transaction volume that is the restoration destination for EC or REC is an MSCS shared volume. Therefore, resource monitoring for the target physical disk must be stopped before a restoration is executed. If restoration is executed without stopping resource monitoring, the cluster group will fail.

🖐 **Note**

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The disks for which resource monitoring is to be stopped differ according to the restoration method. Refer to "8.1.5.2 Executing the restoration" for more information.

- For "Point-in-Time" restorations, all physical disk resources where storage groups (files with extensions *.edb, *.stm, *.log and *.chk) are located must be stopped.

- For roll-forward restorations, only physical disk resources where database files (files with extensions *.edb and *.stm) are located must be stopped. In this case, no problems will occur if resource monitoring is stopped for all physical disk resources where storage groups are located.

Stop resource monitoring by switching the resources to maintenance mode by using the cluster command.

[Example (Switching physical disk resource "Disk J:" to maintenance mode)]

```
C:\>cluster ExampleCluster res "Disk J:" /maint:on

Setting maintenance mode for resource 'Disk J:'
Resource            Group               Node            Status
------------------- ------------------- --------------- ------
Disk J:             GRP1                NODE1           Online(Maintenance)

C:\>
```

8.1.5.1.4 Stopping the EC/REC session (only for synchronous type backups)

For synchronous type backups, all EC or REC sessions that have been set up on the transaction disk must be cancelled using swsrpvsssync_exchange (Exchange VSS synchronous processing command) before the restoration is executed. The EC/REC sessions that have been set up for the transaction disk can be checked using swsrpshadowadm_exchange (Exchange VSS shadow copy management command).

Note

Restoration cannot be executed if there are any backup disks on the transaction disk array that are being copied via EC/REC, or that are suspended, or in equivalency maintenance state.

8.1.5.1.5 Stopping the QuickOPC session (only for differential snapshot type backups)

For differential snapshot type backups, all of the QuickOPCs that have been set up on the transaction disk must be canceled using swsrpshadowadm_exchange (Exchange VSS shadow copy management command) before the restoration is executed.

Note

Restoration cannot be executed if there are any backup disks on the transaction disk that are undergoing QuickOPC.

In order to cancel QuickOPC where physical copies are in progress, the shadow copies must be deleted first.

8.1.5.1.6 Starting restoration synchronous processing and coordinating equivalence maintenance state (only when performing a synchronous restoration)

If restoration synchronous processing has been started on the volume being restored, synchronous processing waits until equivalency maintenance status is reached.

- Start restoration synchronous processing using swsrpstartsync (Synchronous processing start command).

- Use either swsrpstat_exchange (Exchange operation status display command) or swsrpstat (operation status display command) to wait until synchronous processing reaches equivalency maintenance state.

8.1.5.2   Executing the restoration

Restoration is performed separately for each storage group, using swsrpvssrestore_exchange (Exchange VSS restoration execution command) on the Exchange server. When this command is executed, all of the databases (i.e. stores) in the storage group are dismounted. Restoration is performed using advanced copies, but the processing content is different depending on the copy execution status when the restoration command is executed:

· If restoration synchronous processing is not being performed, restoration is performed by starting an OPC logical copy.

· If restoration synchronous processing is being performed and is in equivalency maintenance state, restoration is performed by suspending the EC or REC functions.

There are two restoration methods:

· Point-in-time restoration (restoring to the point when the (last) backup was taken)

· Roll forward restoration (restoring to the latest point)

8.1.5.2.1   Point-in-time restoration (restoring to the point when the backup was taken)

Point-in-time restoration works by restoring all of the databases in the storage group to the state they were in when the backup was taken. Point-in-time restorations are executed by specifying the "point" option with swsrpvssrestore_exchange (Exchange VSS restoration execution command). If the "point" option is specified, this command will restore the storage group to the point when the backup was taken by restoring all of the files (files with extensions *.edb, *.stm, *.log and *.chk) that make up the storage group.

Figure 8.26 Point-in-time restoration
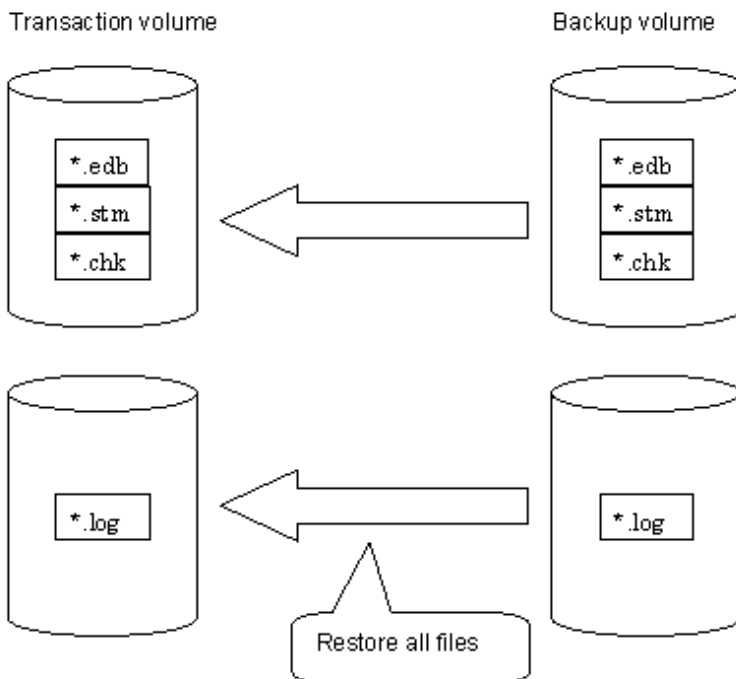
Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -point -sgname
FirstStorageGroup -copygrp BK1
swsrpvssrestore_exchange successfully completed
C:\>
```

8.1.5.2.2 Roll forward restoration (restoring to the latest point)

Roll forward restorations restore all of the databases in the storage group to the latest point.

Roll forward restorations are executed by specifying the "roll" option with swsrpvssrestore_exchange (Exchange VSS restoration execution command). If the "roll" option is specified, the restore is performed as follows:

1. Only database files (with extensions *.edb and *.stm) are restored.

2. Logs are applied using the log files that exist on the transaction volume.

3. Databases are restored to the latest point.

Figure 8.27 Roll forward restoration
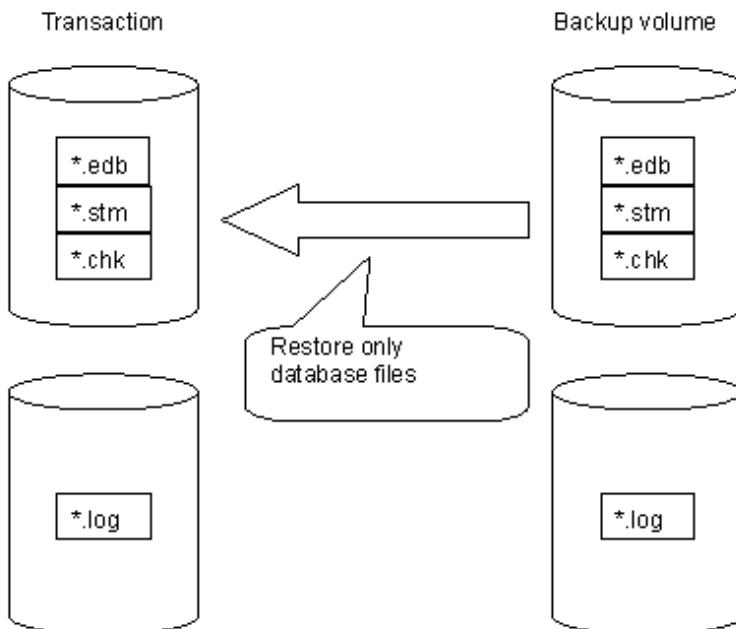
Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -roll -sgname
FirstStorageGroup -copygrp BK1
swsrpvssrestore_exchange successfully completed
C:\>
```

Note

In order to execute a roll forward restoration, the following conditions must be met:

・ All of the transaction logs that have been created since the latest complete backup was taken must exist.

・ The generation numbers (the "XXXXX" part of EOnXXXXX.log) of the existing log files must be consecutive.

・ A new backup must be created immediately after the database path is changed.

・ A new backup must be created immediately after the commands ESEUTIL /p (restores faults or damaged databases) or ESEUTIL /d (defrags or compresses databases) are executed.

・ A backup of all databases in the storage group must be taken immediately after any databases are added or deleted.

8.1.5.3 Post-restoration operations

The following steps must be completed before performing a restoration:

・ Stop restoration synchronous processing (only when performing synchronous restoration).

・ Restart resource monitoring for physical disks.

・ Mount the storage group.

For Exchange Server 2007 and Exchange Server 2003, the steps that must be completed before performing a restoration are as follows.

Table 8.6 Steps that must be completed after performing a restoration for Exchange Server 2003

Steps	Restore Methods	
	OPC	EC/REC
Stopping restoration synchronous processing (only when performing synchronous restoration)	Not required	Required
Restarting resource monitoring for physical disks	Required	Required
Mounting the storage group	Required only for point-in-time restorations	Required only for point-in-time restorations

Table 8.7 Steps that must be completed after performing a restoration for Exchange Server 2007

Steps	Restore Methods	
	OPC	EC/REC
Stopping restoration synchronous processing (only when performing synchronous restoration)	Not required	Not supported
Restarting resource monitoring for physical disks	Required	Not supported
Mounting the storage group	Required	Not supported

8.1.5.3.1 Stopping restoration synchronous processing (only when performing synchronous restoration)

Stop restoration synchronous processing by executing swsrpcancel (replication cancellation command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -sgname FirstStorageGroup
Server    Original-Volume    Replica-Volume    Direction Status   Execute
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR reverse    suspend ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR reverse    suspend ----
EXCHG-SVR g1d1p1@EXCHG-SVR g1d13p1@BKUP-SVR ----       ----    ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d14p1@BKUP-SVR ----       ----    ----
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d11p1@BKUP-SVR g1d1p1@EXCHG-SVR
FROM=g1d3p1@BKUP-SVR, TO=g1d1p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d12p1@BKUP-SVR g1d2p1@EXCHG-SVR
FROM=g1d4p1@BKUP-SVR, TO=g1d2p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -sgname FirstStorageGroup
Server    Original-Volume    Replica-Volume    Direction Status Execute
```

```
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR ----      ----    ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR ----      ----    ----
EXCHG-SVR g1d1p1@EXCHG-SVR g1d13p1@BKUP-SVR ----      ----    ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d14p1@BKUP-SVR ----      ----    ----

C:\>
```

8.1.5.3.2   Restarting resource monitoring for physical disks

Restart resource monitoring by canceling maintenance mode for the physical disks where resource monitoring has been stopped.

[Example (Releasing physical disk resource "Disk J:" from maintenance mode)]

```
C:\>cluster ExampleCluster res "Disk J:" /maint:off

Clear maintenance mode for resource 'Disk J:'
Resource            Group                Node            Status
------------------- -------------------- --------------- ------
Disk J:             GRP1                 NODE1           Online

C:\>
```

8.1.5.3.3   Mounting the storage group (for point-in-time restorations only)

For point-in-time restore under Exchange Server 2003, use the Exchange system manager to mount all stores that have been dismounted. For roll forward restorations, the stores do not need to be mounted, as they are mounted already.
Under Exchange Server 2007, use the following procedure to mount the stores:

1. For roll forward restorations, either delete or rename the CHK file (EXX.chk). (For Point-in-Time restorations, do not perform this procedure.)

2. Use the Exchange management console to mount all the stores that have been dismounted.

8.1.5.4   Restoring data backed up to tape

When data backed up to tape is to be restored, the backup data on the tape first needs to be restored on the backup server and then the Exchange VSS restore command needs to be entered.

If the backup volume is used as a shadow copy, the backup data on the tape must be restored after deleting the shadow copy. The figure below shows the flow of a restoration from tape.

Figure 8.28 Snapshot restoration (restoration performed using OPC)
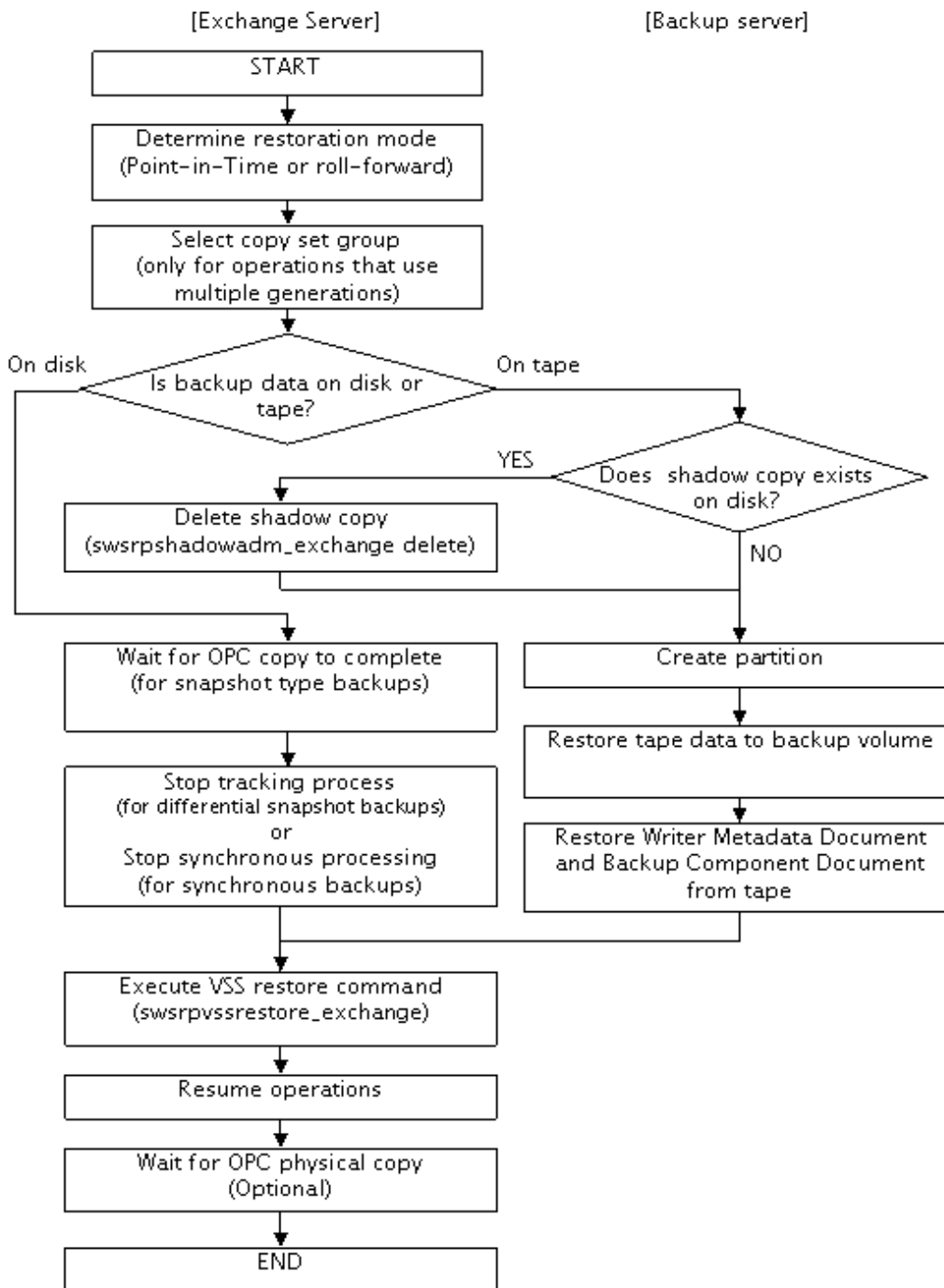
Figure 8.29 Synchronous restoration (restoration performed using EC or REC)
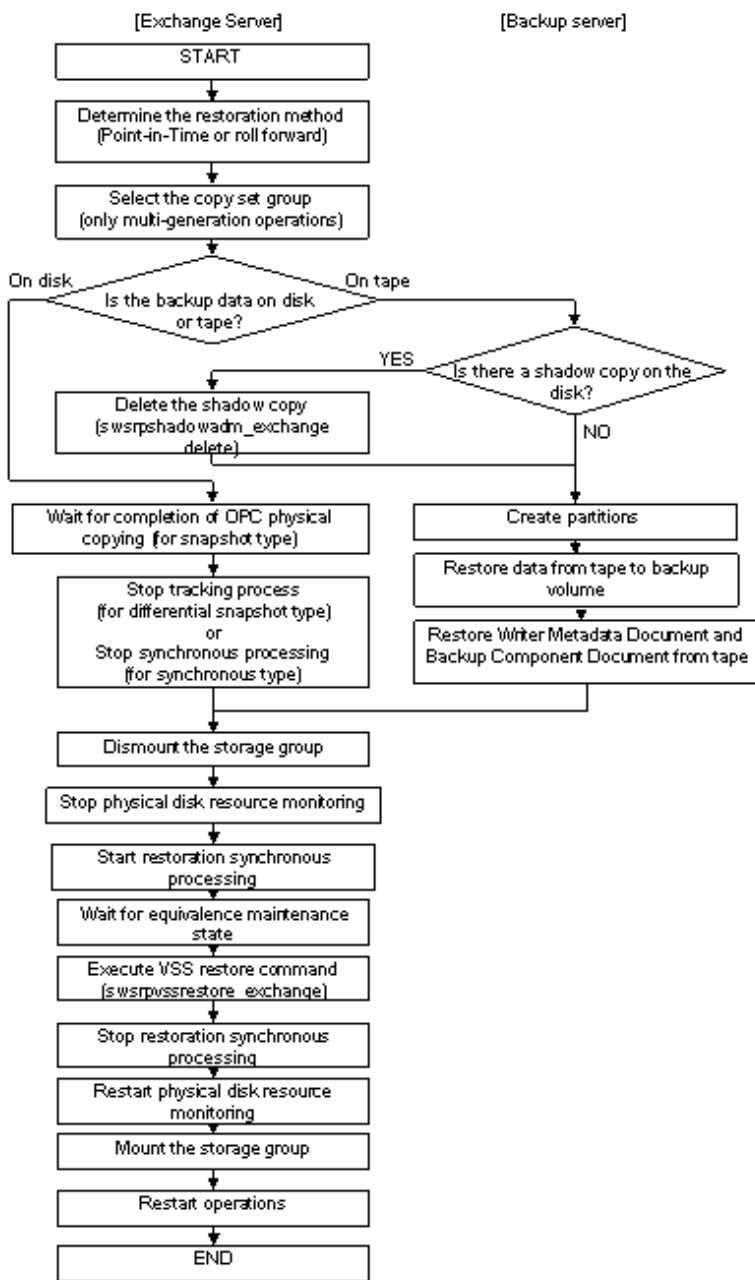
8.1.6 Reconfiguration

To change resources that make up the backup configuration, the AdvancedCopy Manager settings need to be changed. This section explains how to change the various types of settings.

8.1.6.1 Changing device information on source and replica volumes

To reconfigure the device used as a source or replica volume, the source or replica volume must first be deleted. The device can then be reconfigured and the volume set up.

The source or replica volume must be deleted before the device is reconfigured. Otherwise, the volume may not be deleted after the device reconfiguration.

This process is summarized as follows:

1. Delete the source or replica volume on the device to be reconfigured. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

2. Reconfigure the device.

3. Add the device information. Refer to "7.4.4 Fetching device information from a Storage Server" for this operation.

4. Specify the source or replica volume.

5. Prepare a drive letter map file.

8.1.6.2   Changing hardware provider configuration Information

To reconfigure the disk (ie, the LUN), follow the procedure below:

1. On the primary node of the Exchange server, check the copy status using eternus_query (Status query command). If any copy is executing, stop it using eternus_stopcopy (Copy stop command).

2. On the primary node of the Exchange server, execute eternus_copyset (Copy set registration/deletion/reference command) to delete the copy set information of the hardware provider.

3. Delete the source or replica volume on the device to be reconfigured. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

4. Reconfigure the device.

5. Add the device information. Refer to "7.4.4 Fetching device information from a Storage Server" for information about this operation.

6. On the primary node of the Exchange server, execute eternus_copyset (Copy set registration/deletion/reference command) to register the copy set information of the hardware provider.

7. Execute "8.1.3.7 Saving the provider management file".

8. Execute "8.1.3.8 Creating a device definition file".

9. Execute "8.1.3.9 Saving the device definition file".

10. Specify the source or replica volume.

11. Prepare a drive letter map file.

8.1.6.3   Changing storage group information

If the storage group information registered by swsrpdbinfo ex2k3/swsrpdbinfo exchange (Exchange database information registration command) is changed, swsrpdbinfo ex2k3/swsrpdbinfo exchange (Exchange database information registration command) needs to be executed again to make the system reflect the changes.
The change in the storage group information is caused by a change in the device information on the source or replica volume. The device information must be changed before swsrpdbinfo ex2k3/swsrpdbinfo exchange (Exchange database information registration command) is executed.

8.1.6.4   Changing the Storage Server name

To change the Storage Server name, follow the procedure below:

1. On the primary node of the Exchange server, check eternus_query (Status query command). If any copy is executing, stop it using eternus_stopcopy (Copy stop command).

2. Delete the source or replica volume on the device to be reconfigured. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

3. Change the Storage Server name. For details, refer to "10.5.4 Changing the server name of a Storage Management Server or Storage Server.

4. On the primary node of the Exchange server, execute eternus_chgsrv (Copy set information server name change command) to register the provider copyset information. Execute eternus_copyset (Copy set registration/deletion/reference command) to check the updated content.

5. At the backup server, execute eternus_chgsrv (Copy set information server name change command) to register the provider copyset information.

6. Execute "8.1.3.7 Saving the provider management file".

7. Execute "8.1.3.8 Creating a device definition file".

8. Execute "8.1.3.9 Saving the device definition file".

9. Specify the source or replica volume.

8.1.7 Stopping Operation

Backup of the Exchange server databases can be stopped by performing the following steps:

・ Delete the shadow copy

・ Stop the copy process during execution

8.1.7.1 Deleting the shadow copy

Delete the shadow copy by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -evs VSVR -sgname
FirstStorageGroup-copygrp BK1
swsrpshadowadm_exchange delete successfully completed
C:\>
```

Executing this command:

1. Deletes any shadow copy that exists on the backup server.

2. Deletes the backup server "writer metadata" documents and the "backup component" documents.

3. Makes the hardware provider stop the OPC physical copy if it is in progress.

8.1.7.2 Stopping synchronous processing (for synchronous type backups only)

For synchronous type backups, synchronous processing must be stopped first.

Stop synchronous processing by executing swsrpvsssync_exchange (Exchange VSS synchronous processing command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvsssync_exchange cancel -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
```

```
swsrpvsssync_exchange successfully completed
C:\>
```

It is also possible to stop synchronous processing by executing eternus_stopcopy (Copy stop command).

8.1.7.3 Stopping tracking processing (only for differential snapshot type backups)

To perform differential snapshot type backups, tracking processing must first be stopped.

Stop tracking processing by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpshadowadm_exchange successfully completed
C:\>
```

It is also possible to stop tracking processing by executing eternus_stopcopy (Copy stop command) at the command line.

8.1.7.4 Stopping restoration copies

Stop the restoration copy process by executing swsrpcancel (replication cancellation command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d11p1@BKUP-SVR g1d2p1@EXCHG-SVR
FROM=g1d3p1@BKUP-SVR, TO=g1d1p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d12p1@BKUP-SVR g1d2p1@EXCHG-SVR
FROM=g1d4p1@BKUP-SVR, TO=g1d2p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -sgname FirstStorageGroup
Server    Original-Volume   Replica-Volume   Direction Status Execute
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR ----      ----   ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR ----      ----   ----
EXCHG-SVR g1d1p1@EXCHG-SVR g1d13p1@BKUP-SVR ----      ----   ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d14p1@BKUP-SVR ----      ----   ----

C:\>
```

When this command is executed, any restoration copy process in progress will be stopped.
It is generally not possible to use a transaction volume as a normal file system after restoration copy process has been stopped;
The transaction volumes must be reformatted so that they can be used again.

8.1.8 Uninstallation

To uninstall AdvancedCopy Manager that has been used to perform the backup of the Exchange server databases, the following operations must be performed in advance:

・ Stop the backup copy process

・ Delete the copy set of the hardware provider

・ Delete the source and replica volumes

・ Delete the database information

- Delete the Storage Server

- Cancel the cluster settings for AdvancedCopy Manager

- Cancel the hardware provider registration

- Uninstall AdvancedCopy Manager

8.1.8.1　Stopping backup copy process

On the primary node of the Exchange server, check the copy status using the status lookup command (eternus_query). If any copy process is still executing, stop it using eternus_stopcopy (Copy stop command).

8.1.8.2　Delete the copy set of the hardware provider

Delete the copy set information of the hardware provider on the prime node of the Exchange server.
Refer to "eternus_copyset (Copy set deletion command)" for information on how to delete the copy set.

8.1.8.3　Delete source and replica volumes

Delete the source and replica volumes that have been set up.
Refer to "swsrpdelvol (Replica volume information deletion command)" for information on how to delete the source and replica volumes.

8.1.8.4　Delete the Storage Server

Delete the Storage Server to be uninstalled from the control of AdvancedCopy Manager.
Refer to "Delete the Registration of a Storage Server" in the ETERNUS SF AdvancedCopy Manager GUI User's Guide for information on how to delete the Storage Server from the GUI client.
For information on how to delete the Storage Server with a command, refer to "stgxfwcmdelsrv (Server information deletion command) ".

8.1.8.5　Cancel the cluster settings for AdvancedCopy Manager

If the Exchange Server has a cluster configuration, delete the Storage Server transactions and the Storage Server management transactions from the Exchange Server.
Refer to the ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment for more information about canceling cluster settings.

8.1.8.6　Cancel the hardware provider registration

Cancel the hardware provider registration on both the Exchange server and the backup server.
Refer to the "eternus_provider (Provider deletion command)" for more information about how to cancel the hardware provider registration.

Note

Do not cancel the hardware provider registration if there are other storage groups on the backup and Exchange servers where operations may use this hardware provider registration.

8.1.8.7 Deleting AdvancedCopy Manager

Refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide" to delete AdvancedCopy Manager.

8.2 Backup and Restore of an Exchange Server 2007 Database in a Windows Server 2008 Environment

8.2.1 Overview

AdvancedCopy Manager provides the functionality to back up and restore Exchange server 2007 databases (hereafter referred to as Exchange databases) in a Windows Server 2008 environment.

8.2.1.1 Backing up Exchange databases

The advanced copy function of the Fujitsu ETERNUS storage system can link with VSS to implement a high-speed online backup of the Exchange databases.

The backup data of an Exchange database includes the backups of the following files that constitute the Exchange database:

- ・ EDB file (database files)
  The database is comprised of only an EDB file. Each information store contains one EDB file.

- ・ LOG file (the transaction log file)
  The LOG file contains a transaction log. At least one LOG file exists in each storage group.

- ・ CHK file (the checkpoint file)
  The checkpoint file points to the latest transaction in the transaction log that has been committed to the database. One checkpoint file exists in each storage group.

Online backup

A linkage with VSS enables the online backup of the Exchange database.

- ・ Backup is performed in units of storage groups (a group of Exchange databases that share the one transaction log). Because backup processing is performed without stopping the messaging service, store access is enabled even during backup processing.

- ・ Because the backup data testing (ESEUTIL) and log deletion are executed as part of the online backup processing, these types of operations need not be executed after backup processing.

Backup using advanced copy (OPC or QuickOPC)

A backup can be created instantly and without placing a burden on the Exchange server, using advanced copy functions (such as OPC and QuickOPC).

- ・ Advanced copies are executed by the ETERNUS VSS hardware provider (hereafter referred to as VSSHP). (*1)

- ・ Storage group configuration files (ie, those with extensions *.edb, *.log or *.chk) are copied to the backup volume.

  *1: This function can only be used by ETERNUS VSS hardware provider 1.3. Other hardware providers, such as third-party providers and the ETERNUS/GR hardware provider that is bundled with packages intended for AdvancedCopy Manager Windows Server 2003 cannot be used.

🔔 Note
. . . .

For Exchange Server 2007, backup using EC/REC is not supported
. . . .

Backup to the backup server

The transport function of VSS shadow copy can be used to make a backup (a shadow copy) on the disk connected to the backup server. The function thus enables a backup to tape to be created without placing any load on the Exchange server.

Figure 8.30 Exchange database backup processing image
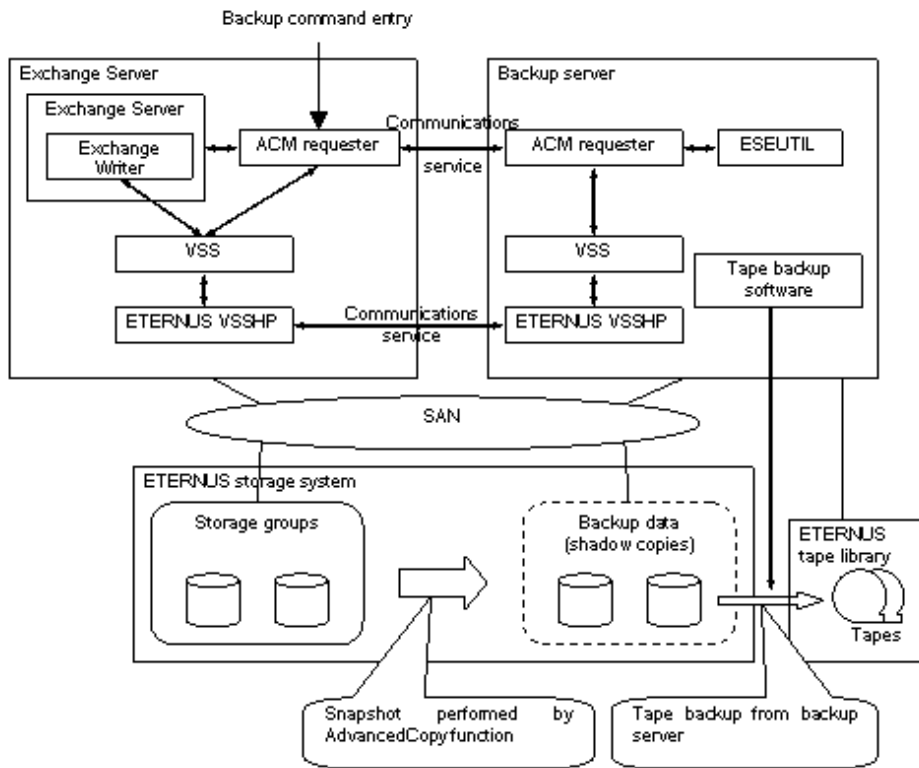
Table 8.8 Exchange server and backup server functions

Server	Component	Description
Exchange server	Exchange Writer	Exchange writer
	ACM Requester	The AdvancedCopy Manager Exchange requester that provides backup and restore functions for Exchange.
	ETERNUS VSSHP	ETERNUS VSS hardware provider that offers a shadow copy creation function using advanced copy functions.
Backup server	ESEUTIL	Exchange server database consistency check and recovery utility The ACM Requester uses this component to check backup data for consistency.
	ACM Requester	Exchange requester provided by AdvancedCopy Manager. This component manages (e.g., with a status check and deletion) the shadow copy according to instructions from the ACM Requester on the Exchange server.
	ETERNUS VSSHP	ETERNUS VSS hardware provider, which uses AdvancedCopy functions to provide a shadow copy creation function.

8.2.1.2   Restoring Exchange databases

The advanced copy function of the Fujitsu ETERNUS storage system can link with VSS to restore the Exchange databases from the online backup data.

Figure 8.31 Exchange database restoration processing image
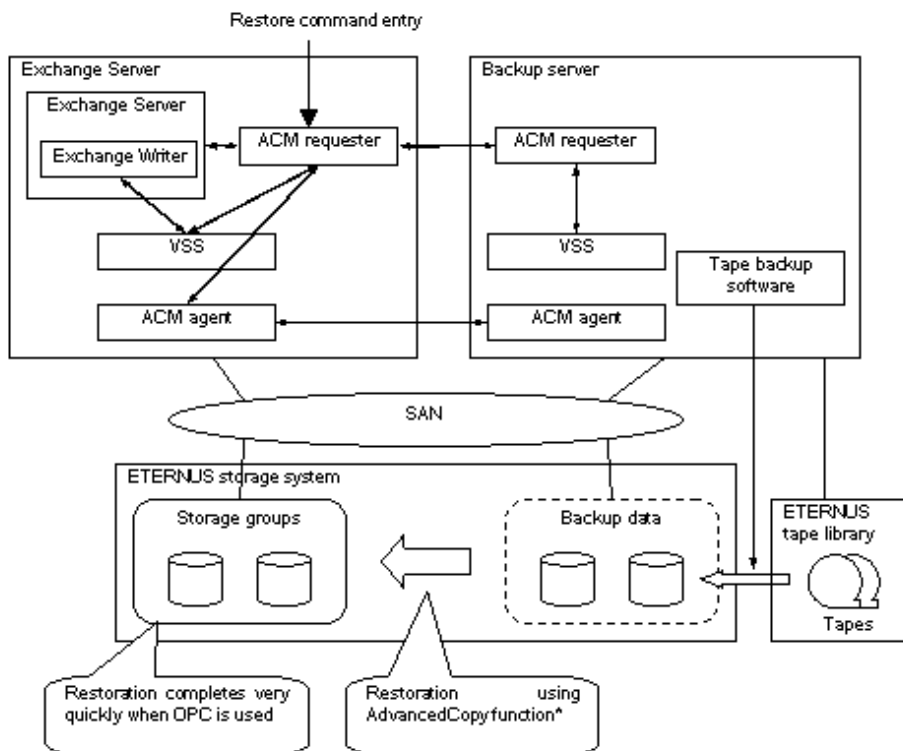
* VSS and the restoration processing file copying restore the files required by the requestor without using the provider.

The requestor uses the existing functions (swsrpmake (Replication creation command)) to perform restoration.

Restoration from online backup data

A linkage with VSS enables restoration from the online backup data.

- As with a backup, restoration is performed in units of storage groups. All databases (ie, stores) are dismounted during restoration processing.

- Two restoration modes are supported: roll-forward restoration (which is restoration to the latest point) and point-in-time restoration (which is restoration to the backup point).

- When the online backup data is stored on tape, it must be restored in advance to the backup disk.

📋 Note

Exchange Server 2007 supports a function that allows restoration to a location that is different from the original path, but AdvancedCopy Manager does not support this function. Therefore, the original disk is the only restore destination that can be selected under AdvancedCopy Manager.

High-speed restoration by OPC

Advanced Copy (OPC) can also be used for restoration to resume a job operation quickly without placing any load on the Exchange server.

- OPC is executed by a conventional AdvancedCopy Manager function (e.g., the replication creation command).

- Because log application and mounting are enabled soon after the execution of OPC logical copying, live operations can be restarted quickly without waiting for the completion of OPC physical copying.

Figure 8.32 Snapshot restoration (restoration by OPC)
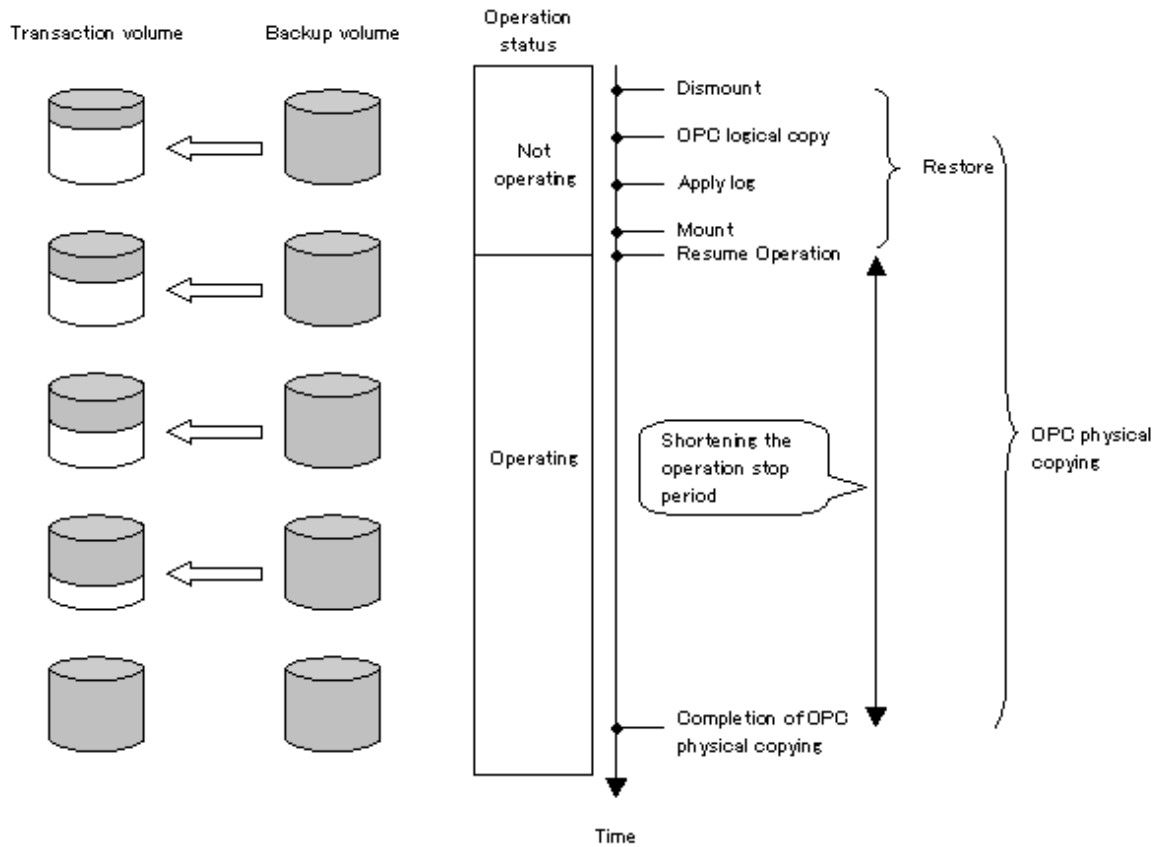
> ⚑ **Note**
> ....
> Restoration using EC/REC is not supported under Exchange Server 2007.
> ....

8.2.1.2.1　Point-in-time restoration

In the point-in-time restoration mode, the Exchange database and log file are restored so that the database is restored to the state it was in when it was backed up. Data created after the backup was created is not restored.

8.2.1.2.2　Roll-forward restoration

In the roll-forward restoration mode, the previous backup data and currently remaining transaction log are used to restore the database to the latest state. This mode can be used when the log file is not damaged, even though the database is damaged. It cannot be used when both the database and log file are damaged.

8.2.2　Operation Design

This section explains the following procedures for designing the backup of the Exchange database:

- ・ Designing server configurations
- ・ Designing storage groups
- ・ Designing circular logs

・ Determining the backup method

・ Preparing backup disks (LUNs) and backup volumes (partitions)

・ Designing copy sets

8.2.2.1 Designing server configurations

Storage Management Server

The Storage Management Server centrally manages and operates multiple Storage Servers.
Install the AdvancedCopy Manager function on this server. The Storage Management Server cannot also work as the Storage Server (Exchange server or backup server) that performs Exchange database backup.

Storage Server (Exchange server)

This Storage Server is used for the Exchange server operation.
In a Windows Server 2008 (x64) environment, install the AdvancedCopy Agent function on this sever. During installation, select the [Use Exchange Server 2007 linkage online backup function] checkbox.
Execute database backup or restoration from this server.

Storage groups subject to a backup and the disks (i.e., the transaction volumes) to which the storage groups are allocated must be connected to this server.
The Exchange server supports operations using Windows Server Failover Clustering (hereafter referred to as WSFC) or single nodes.

Storage Server (Backup server)

This Storage Server is used for the backup server operation.
In a Windows Server 2008 (x64) environment, install the AdvancedCopy Manager Agent function on this sever. During installation, select the [Use Exchange Server 2007 linkage online backup function] checkbox.
In addition, install the Exchange server system management tool to check the backup data.
The disks (ie, the backup volumes) to which the database volumes are backed up must be connected to the backup server.

📋 Note

・ The backup server cannot be used in cluster operation mode.

・ Only one backup server is supported from one (one cluster service) Exchange Server.

・ The Exchange server and backup server cannot be used in combination.

📋 Note

An Exchange Server 2003 and an Exchange Server 2007 backup server cannot both be on the one backup server machine.
If an environment contains both Exchange Server 2003 and Exchange Server 2007, a separate Exchange Server 2003 backup server and a separate Exchange Server 2007 backup server must be provided.

The following figure shows a server configuration example. The minimum configuration contains three machines, a Storage Management Server, an Exchange Server, and a backup server, as well as one ETERNUS storage system.

Figure 8.33 System configuration example
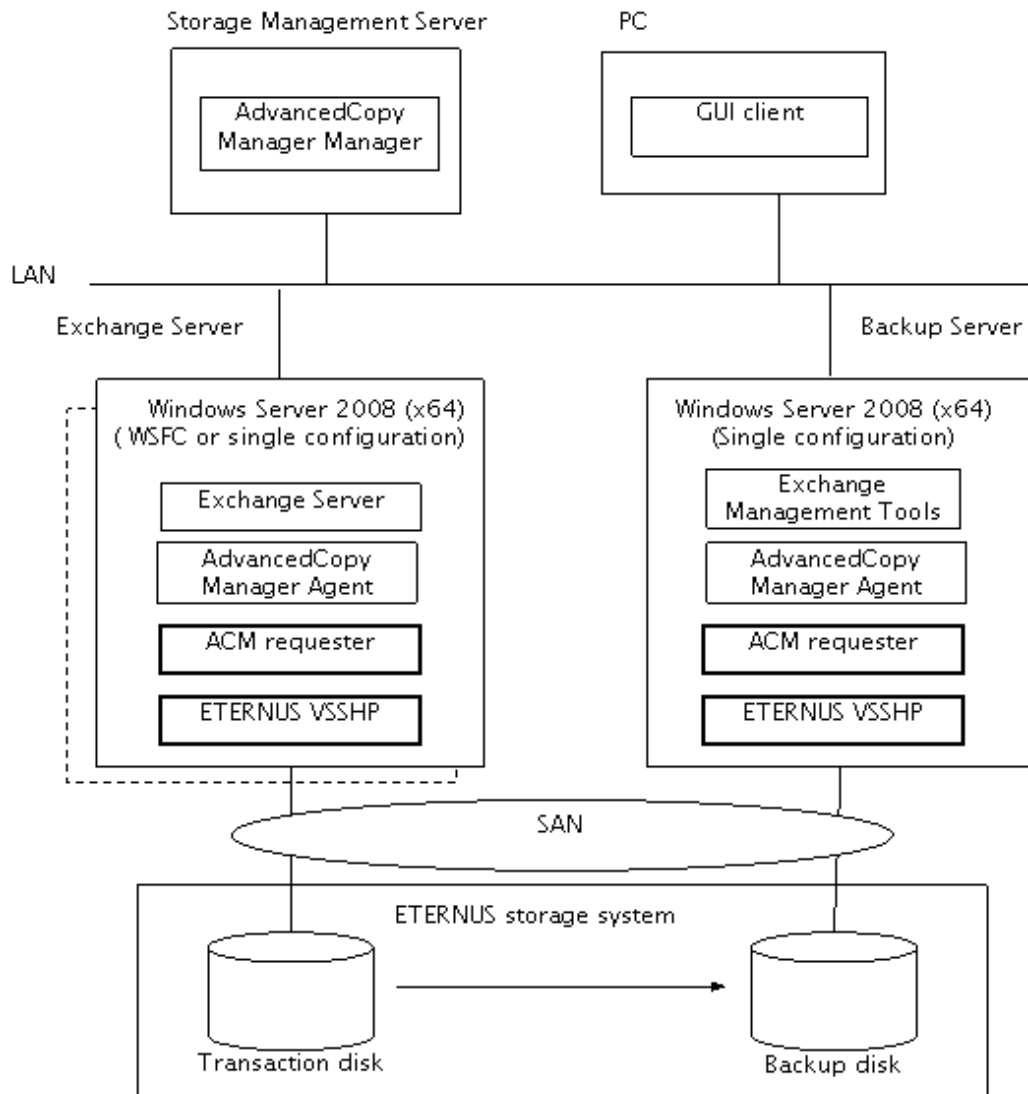
8.2.2.2 Designing storage groups

8.2.2.2.1 Partition configuration

Advanced Copy for backup is performed in units of disks (i.e., LUNs), not in units of partitions. For this reason, when multiple partitions are created on a disk, the individual partitions must contain files belonging to a specific storage group (refer to Example A below). An operation cannot be performed with a configuration in which one disk contains files belonging to different storage groups (refer to Example B below), or which contains files used by other applications (refer to Example C below). Configure a copy target disk such that it contains only partitions for Exchange Server log files or database files.

Figure 8.34 Partition configuration

Example A: Configuration in which the operation can be performed
(individual partitions contain only files belonging to a specific storage group)

Drive E:

Database file belonging to a storage group A

Drive F:

Log file belonging to a storage group A

Example B: Configuration in which operation cannot be performed
(individual partitions contain files belonging to different storage groups)

Drive E:

Database file belonging to a storage group A

Drive F:

Database file belonging to a storage group B

Example C: Configuration in which the operation cannot be performed
(the disk contains files belonging to other applications)

Drive E:

Database file belonging to a storage group A

Drive F:
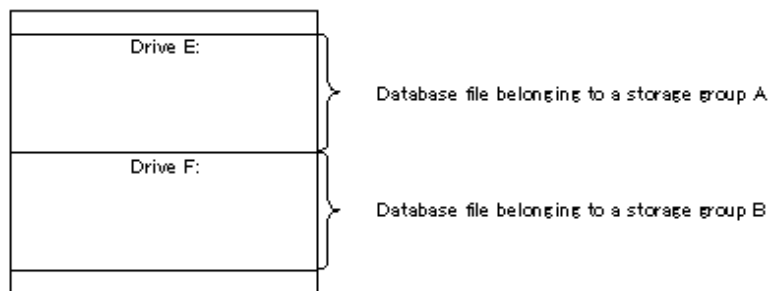
Files belonging to other applications

The operation can be performed in the configuration shown in Example A.

However, it is recommended that a configuration consisting of multiple disks (such as the one as shown below) is used for improved performance and easy management.

Figure 8.35 Recommended partition configuration (multiple disk configuration)

Recommended configuration (multiple-disk configuration)
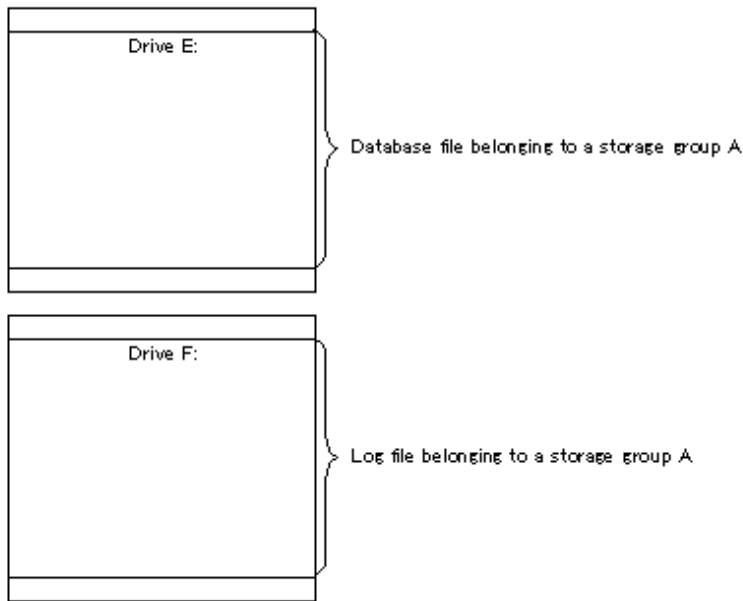
![Drive E: Database file belonging to a storage group A / Drive F: Log file belonging to a storage group A]

🅿 **Point**

....

Assign drive letters (or mount points) to the volume (partition) that configures the storage group. AdvancedCopy Manager supports both drive letters and mount points.

....

📝 **Note**

....

Use copy source and copy destination disks in their initial state, in which Exchange Server linkage function backup has not been performed. Refer to "8.2.6.4 Initializing a disk" for details of disk initialization.

....

8.2.2.2.2   Storage group file allocation

Database file allocation

The Exchange server linkage function provides the backup and restore function that backs up or restores the Exchange server databases in units of storage groups. AdvancedCopy Manager copies data in units of volumes (partitions). For this reason, if two or more storage groups exist in the same volume, the backup and restore function cannot be used.

With these restrictions in mind, the following instructions must be followed when designing the physical layout of storage groups:

1. Only store Exchange server database files that are to be backed up in the volume in which the database files are to be allocated. If a file other than an Exchange server database is created in the same volume, it is also backed up. Accordingly, when it is restored, the latest data in the non-database file will be damaged.

2. Only one storage group can be stored in the same volume. Say, for example, that storage groups 1 and 2 are stored in the same volume. When storage group 1 is backed up, the files in storage group 2 are also backed up. When only storage group 1 is subsequently intended to be restored, storage group 2 is also restored. As a result, when the database of storage group 2 has been updated, the storage group 2 database is corrupted by the data from the time of the backup (refer to the figure below).

Figure 8.36 Data destruction example
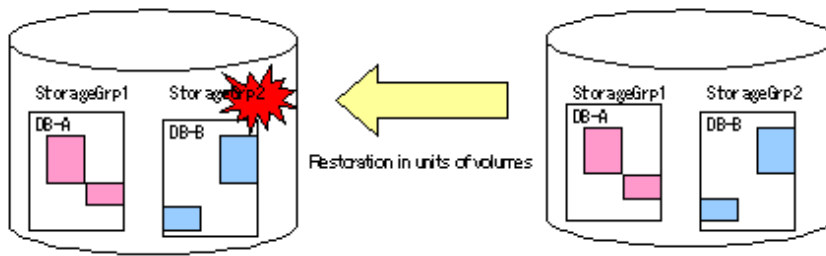
> 🔔 **Note**
> ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯
> - When a backup is performed from a volume that contains a database that is subject to a backup and a database that is not subject to a backup, the data integrity of the database that is not subject to a backup is not guaranteed.
>
> - A database can not be allocated to the volume that contains the Exchange server and AdvancedCopy Manager executable and control files.
> ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯

> 🅿 **Point**
> ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯
> To copy an already allocated database file, use the Exchange system manager to move the file.
> ⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯

Transaction log file allocation

Figure 8.37 Relationship between log file allocation and feasible restoration modes

Table 8.9 Relationship between log file allocation and feasible restoration modes

		Restoration mode	
		Point-in-time	Roll-forward
Log file allocation	**Database files and log files are allocated to the same volume.**	Enabled	Disabled
	Database files and log files are allocated to separate volumes.	Enabled	Enabled

· When a log file is stored on the volume containing a database, roll-forward restoration cannot be performed. This is because Advanced Copy performs copying in units of volumes. If a log file is stored in the volume containing a database and copy is performed (virtual copy is performed), the log file at the time of backup overwrites the latest log file. When the roll-forward restoration is specified, AdvancedCopy Manager checks whether the database file and log file are stored on the same drive.

· The roll-forward restoration can only be performed when a transaction log file and database file are stored on separate drives.

· The point-in-time restoration can be performed regardless of the log file allocation.

· CHK file allocation is not related to the available restoration modes.

Therefore, allocate the database files and log files to different volumes when roll-forward restoration is required. Although Exchange normally creates database files and transaction log files in the same volume, the Exchange system manager can be used to move the transaction log files to another volume.

Distributed allocation of an EDB file

As shown in the figure below, a database file can be distributed and stored in multiple volumes. When a storage group is distributed and stored in multiple volumes, AdvancedCopy Manager backs up all the volumes.

Figure 8.38 Distributing a database file to multiple volumes
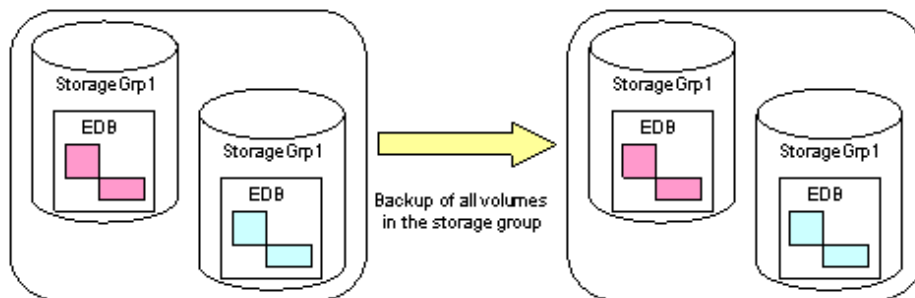
8.2.2.3   Circular log design

Circular logging must be disabled to implement AdvancedCopy Manager backup of Exchange databases. A backup cannot be performed if circular logging is enabled.

With circular logging disabled, the log files are sequentially created as the amount of logged data increases and they reduce the free volume space accordingly. When a backup is successful, however, backed-up data that is no longer needed in the volume can be deleted.

8.2.2.4   Determining the backup method

The Exchange database online backup function supports the replication function.

Different copy methods cannot be mixed in the one storage group. Select one of the following copy methods for each storage group unit.

Snapshot backup

This backup method uses the ETERNUS disk array OPC function. A backup is taken by starting OPC.

Differential snapshot backup

This backup method uses the ETERNUS disk array QuickOPC function. A backup is taken by starting or restarting QuickOPC.

📝 **Note**

. . . .

Exchange Server 2007 database backup using SnapOPC, SnapOPC+, or EC/REC is not supported.

. . . .

8.2.2.5   Preparing the backup disks (LUN) and the backup volumes (partitions)

Placement of the backup disk

The backup disks and the disks used by transactions must be placed on the same ETERNUS disk array.

Creating backup disks and volumes (partitions)

A backup volume must be prepared (refer to 8.1.3 Preparation) before the operation that is explained in 4.4.5 Fetching device information on a Storage Server is performed.

A backup volume must be created so that the partition size and start offset match those of the transaction volume (because Advanced Copy is executed in units of disks when the backup is performed). In a "1 LUN = 1 partition" configuration, it is enough to match the partition size - the start offset need not be recognized.

Figure 8.39 Creating a backup volume
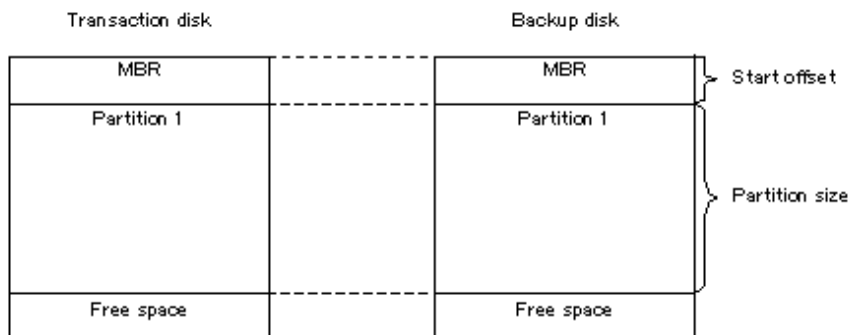
Note that a backup disk LUN and a transaction disk LUN of the same size must be prepared.
Supported disk partition formats are MBR and GPT. However, the transaction disk and backup disk partitions must have the same format.

8.2.2.6   Designing copy set groups

Design copy sets so that there is a 1:1 relationship between backup disks and all the transaction disks related to the storage group being backed up.

Figure 8.40 Copy set registration
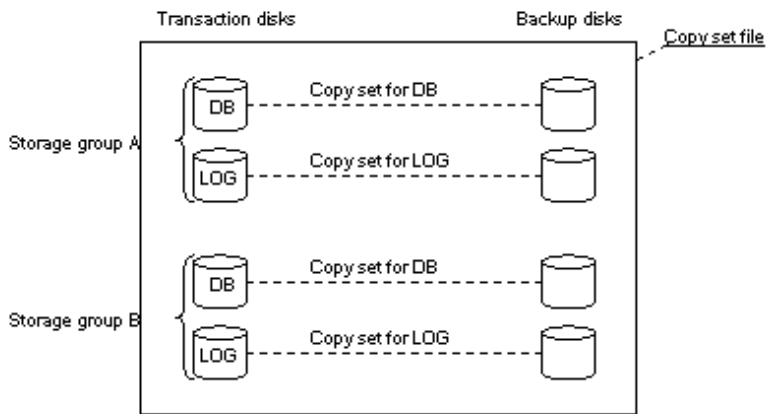
Copy sets with the same transaction disk but different backup disks cannot be registered at the same time.

Figure 8.41 When registration to a copy set is not possible
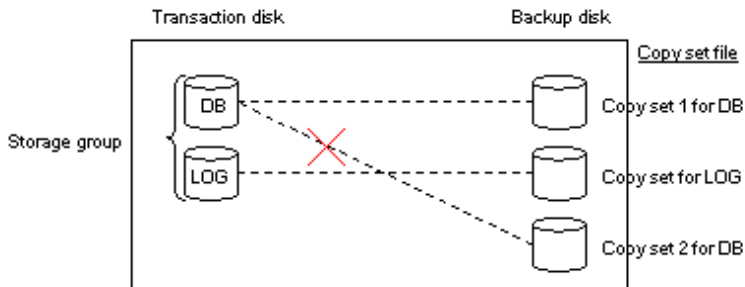
Exchange linkage commands (swsrpXXX_exchange) perform processing on particular copy sets based on the storage group name.

Figure 8.42 When multiple storage groups are registered
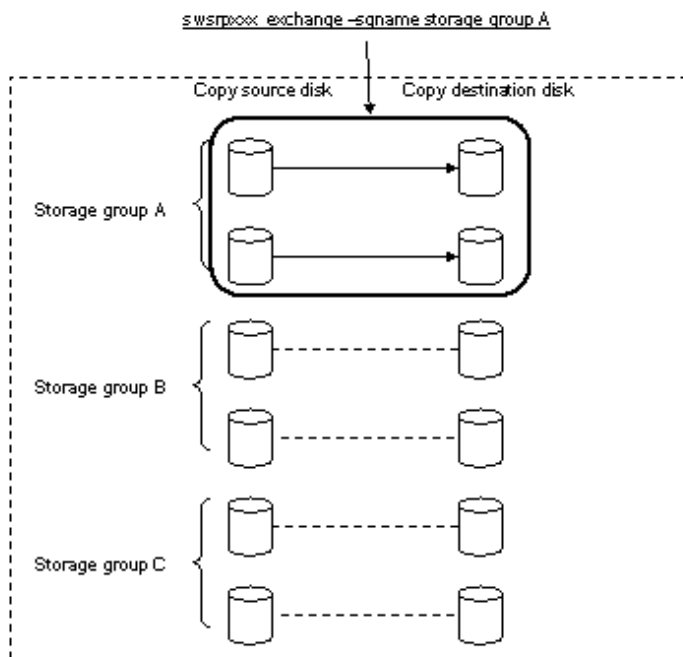
For one Exchange Server machine (one cluster environment), there must be one backup server machine and a non-cluster environment.

Figure 8.43 Exchange Server and backup server example
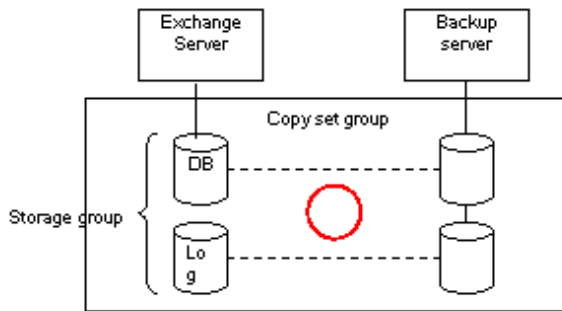
8.2.3 Preparation

8.2.3.1 Installation

This section describes the installation tasks.

The following figure shows the flow of tasks to install and Exchange Server and backup server.

Figure 8.44 Installation task flow
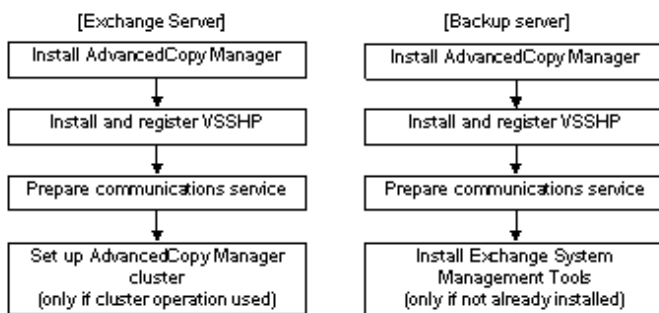
8.2.3.1.1 Installing AdvancedCopy Manager

Refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide" for details of installing AdvancedCopy Manager. In order to use this function, the AdvancedCopy Manager Agent must be installed in a Windows Server 2008 (x64) environment at both the Exchange Server and the backup server. During installation, select the [Use Exchange Server 2007 linkage online backup function] checkbox.

Installation must be to a LUN that is not subject to backup.

8.2.3.1.2 Installing and registering VSSHP

Refer to "Installing" in the "ETERNUS VSS Hardware Provider Software Guide" when performing these tasks.

VSSHP must be installed in a LUN that is not subject to backup.

The VSSHP installer is stored on the Windows edition AdvancedCopy Manager CD-ROM Agent disk.

・ Japanese edition: CD-ROM drive\VSSHP\win2008_x64\setup.exe

・ English edition: CD-ROM drive\VSSHP\win2008_x64\setup.exe

8.2.3.1.3 Preparing the communication service

If VSSHP is used for backup operations in a configuration containing two Windows machines, the communications service (ETERNUS VSS Hardware Provider Communication Server service) must be prepared in advance.
Refer to "Preparing the communications service" in the "ETERNUS VSS Hardware Provider Software Guide" details of preparing the communications service.

![Note icon] **Note**

. . . .

If the firewall is enabled, the port (TCP/IP) used by VSSHP must be registered as an exception. Refer to the manual for the relevant firewall for information concerning changing firewall settings.

. . . .

8.2.3.1.4 Installing Exchange system management tools

Install the Exchange system management tools.

8.2.3.1.5 Setting up an AdvancedCopy Manager cluster

If the Exchange Server has a cluster configuration, customize the Storage Server transactions at the Exchange Server.

Refer to the following manuals for transaction details:

- ・ "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment"
- ・ "12.1.5 Notes on cluster operation"
- ・ "12.1.7 Notes on replication in a cluster system"

8.2.3.2 Environment setup

This section describes the environment settings to be performed before backup operations are started.

Figure 8.45 Environment setup flow
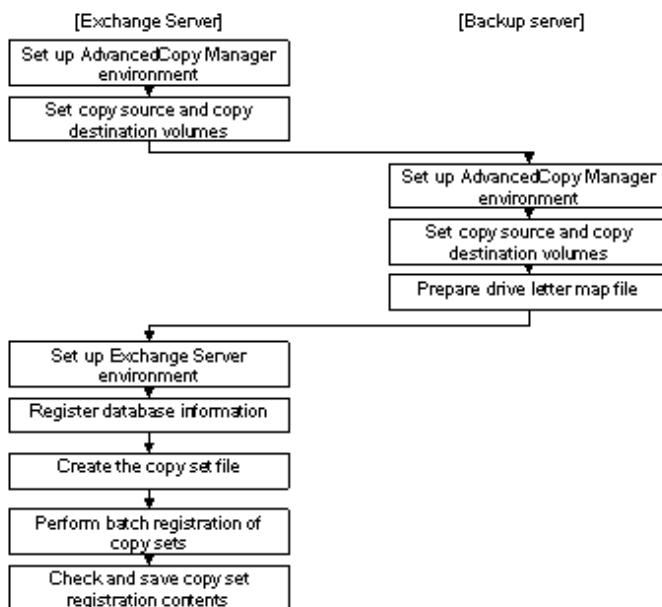
8.2.3.2.1 AdvancedCopy Manager environment setup

Perform the following tasks:

- 7.4.1 Starting a service
- 7.4.2 Starting the GUI Client
- 7.4.3 Registering a Storage Server

8.2.3.2.2 Setting up the source and replica volumes

Use swsrpsetvol (Replication volume information settings command) to register the replication source volume (transaction volume) and replication destination volume (backup volume) in the replication function.

swsrpvolinfo (Replication volume information display command) can be used to check the registered replications source and replication destination volume information.

Note

- Register all the transaction volumes (those to which files with *.edb, *.log, and *.chk extensions are allocated) and their backup volumes as replica volumes.

- Set the transaction volumes as source volumes and the backup volumes as replica volumes. (Do not reverse the source and replica volumes.)

- Set the Exchange server (the source volume server) as an operation server (by specifying "ORG" or "BOTH" as an argument of the -o option in the replication volume information configuration command (swsrpsetvol)).

- Do not specify the -u option because the restoration needs to be performed.

- Use the partition unit (gXdYpZ) as the volume registration unit. Do not register using the LUN unit (gXdY).

8.2.3.2.3 Preparing a drive letter map file

The drive letter map file defines the drive letters (or mount points) to be assigned to the shadow copies (ie, backup volumes).
If there are multiple copies (LUN unit copies) from the same copy source on a backup server, the drive letter (or mount point) may be removed after copying ends.
If you want to maintain the backup volume drive letter in the backup server, create a drive letter map file and define the drive letter (or mount point) assigned to the shadow copy (backup volume).

Create a drive letter map file with the following file name on the backup server:

```
Configuration settings directory\etc\repl\data\EXDMAP.INI
```

An example of the settings in the drive letter map file is shown below.

```
[DRVMAP]
g1d1p1=F:
g1d2p1=C:\mnt
```

During backup processing, a drive letter is assigned to a backup volume based on the settings in the drive letter map file.

The drive letter assignment is not performed if there is no drive letter defined in the drive letter map file, or if the file contains a setting error (e.g., the relevant drive letter is in use, or an invalid directory is specified for a mount point, etc).

📌 **Note**

. . . .

Environment-dependent characters (Unicode) added under JIS2004 cannot be used in drive letter map files.

. . . .

8.2.3.2.4 Configuring the Exchange server environment

Set up the Exchange server and storage groups based on the results of the operations design.

Applying the Service Pack

Exchange Server 2007 SP1 and later versions support the Windows Server 2008 and Exchange Server 2007 combination. You should apply Service Pack 1 if it has not been applied.

Allocating EDB, CHK, and LOG files

Allocate the Exchange server EDB, CHK, and LOG files.
Refer to "8.1.2.2 Designing storage groups" for details.

Installing Exchange system management tools

Be sure to install the Exchange server system management tools on the backup server. The service pack level on the backup server must be the same as the Exchange Server.

8.2.3.2.5 Registering database information

Register Exchange server database information in the management file using swsrpdbinfo ex2k3/swsrpdbinfo exchange (Exchange database information registration command). Before backing up or restoring the Exchange server databases, execute this command on the Exchange server to perform an initialization. Additionally, execute this command after any change has been made to the Exchange server configuration.

Example: This example stores the database information of the storage group FirstStorageGroup (if the command is executed from the business server).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -evs VSVR -sgname
FirstStorageGroup
swsrpdbinfo_exchange successfully completed
C:\>
```

8.2.3.2.6 Creating a copy set file

Set the information about the disks included in the copy source and copy destination volumes set as described in "8.2.3.2.2 Setting up the source and replica volumes", and enter this information in a copy set file to be used as VSSHP copy set information.

Use stxvgetolu (ETERNUS disk OLU/BOXID display command) from the VSSHP group of commands to check the physical disk number and OLU number of the copy source and copy destination disks. Use this information to enter the copy set information in a text file in the format below. Store the created file in a specific folder recognized by VSSHP under a filename recognized by VSSHP. Alternatively, use commands to specify the filename (path name).

Refer to "Creating a copy set file" in the "ETERNUS VSS Hardware Provider Software Guide" for details.

・ Format (enter one copy set in one line)
  Copy type ("OPC" or "QOPC"),
  Copy options (cannot be specified),
  Copy source physical disk number,
  Copy destination OLU,
  Copy destination BOXID

[Example of a copy set file entry]

```
OPC,,5,0x00c0,00E8000M9#####XXXXXXXX####YYYYYYYYYYYY##
QOPC,,6,0x00c1,00E8000M9#####XXXXXXXX####YYYYYYYYYYYY##
```

8.2.3.2.7 Registering copy sets as a batch

Execute stxvcopyset (Copy set file registration command) from the VSSHP group of commands at the transaction server to perform batch registration of the copy set information that has been entered in the copy set file. Refer to "Registering copy set information" in the "ETERNUS VSS Hardware Provider Software Guide" for details.

[Copy set file registration command specification method]

```
stxvcopyset [-c|-r] [-file copy set file]
```

* Option contents: "-c: Check only", "-r: Check then register", "-file: Copy set file specified using full path"

Note

The copy set file registration command overwrites all the contents that have already been registered in the specified file.

8.2.3.2.8 Checking and saving the copy set registration contents

Check and save the copy set registration contents as a precaution. The VSSHP "stxvcopyprt (Copy set registration contents display command)" can be executed at the Exchange Server to check the registration contents. Refer to "Copy set registration contents display command" in the "ETERNUS VSS Hardware Provider Software Guide" for details.

[Copy set registration contents save method]

```
stxvcopyprt > [save file name (full path)]
```

8.2.4 Backup

8.2.4.1 Backing up databases

Back up the Exchange databases by executing swsrpvssbackup_exchange (Exchange VSS backup command) on the Exchange server. This command backs up the databases in units of storage groups.

Note

When backups are executed, all databases (i.e., stores) in the storage group must be mounted. If any databases are not mounted, the backup processing will terminate abnormally.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -evs VSVR -sgname
FirstStorageGroup
swsrpvssbackup_exchange successfully completed
C:\>
```

When this command is executed, the following processing is performed:

1. Shadow copies of all of the files that make up the storage group (ie, files with extensions *.edb, *.log and *.chk) are created on the backup volume for the specified copy set group. After the shadow copies have been created, the backup volume becomes read-only.

   - For snapshot type backups, shadow copies are created as a result of OPC or QuickOPC having been run.

2. After a shadow copy is created, ESEUTIL is used to verify the backup data. After the backup is finished, Exchange deletes any unnecessary log data.

   - The -skipchk option can be used to skip the backup data verification. Refer to "swsrpvssbackup_exchange (Exchange VSS backup command)" for details.

3. A "writer metadata" document and "backup components" document are saved to the following locations on the backup server. These files are used for restoration:

File	Output location
Writer metadata document	Configuration settings directory\etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc\<storage group name>.wmd.xml
Backup components document	Configuration settings directory \etc\repl\data\exchange\<Exchange server Storage Server name>\metadoc \<storage group name>.bcd.xml

Note

Backup notes

The VSS specifications do not allow multiple sets of backup processing to be executed in parallel. When two or more storage groups exist, multiple sets of backup processing need to be executed sequentially, not in parallel. If multiple backup processes are executed in parallel, future processes will be put on hold until the shadow copy creation for the prior processes has completed.

Note

The physical disk numbers for the volumes on the backup server may have changed after backup has been executed. This does not affect the drive letter or mount point of a volume. However, if it necessary to maintain the original drive letter or mount point of a backup volume, the tasks described in "8.2.3.2.3 Preparing a drive letter map file" must be performed in advance.

The progress status of the Advanced Copy and the information about the shadow copies that have been created can be checked by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command) on the Exchange Server.

Example: (For snapshot type backups)

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup
[Shadow Copy Status]
Original-Volume                      Replica-Volume                       Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
[AdvancedCopy Status]
Type Group Original-Disk  Replica-Disk    Status Execute Trk Update
QOPC ----   g1d1@EXCHG-SVR g1d11@BKUP-SVR snap   ----    on  3%
QOPC ----   g1d2@EXCHG-SVR g1d12@BKUP-SVR snap   83%     on  ----
C:\>
```

8.2.4.2 Backup to tape

When a backup is executed, the metadata documents (ie, the writer metadata document and the backup component document) that are required for restoration are saved to the backup server.

When data is backed up to tape, both the data in the backup volume and these two metadata files need to be backed up. The flow of backup processing including a backup to tape is shown in the figure below.

Figure 8.46 For snapshot type backups
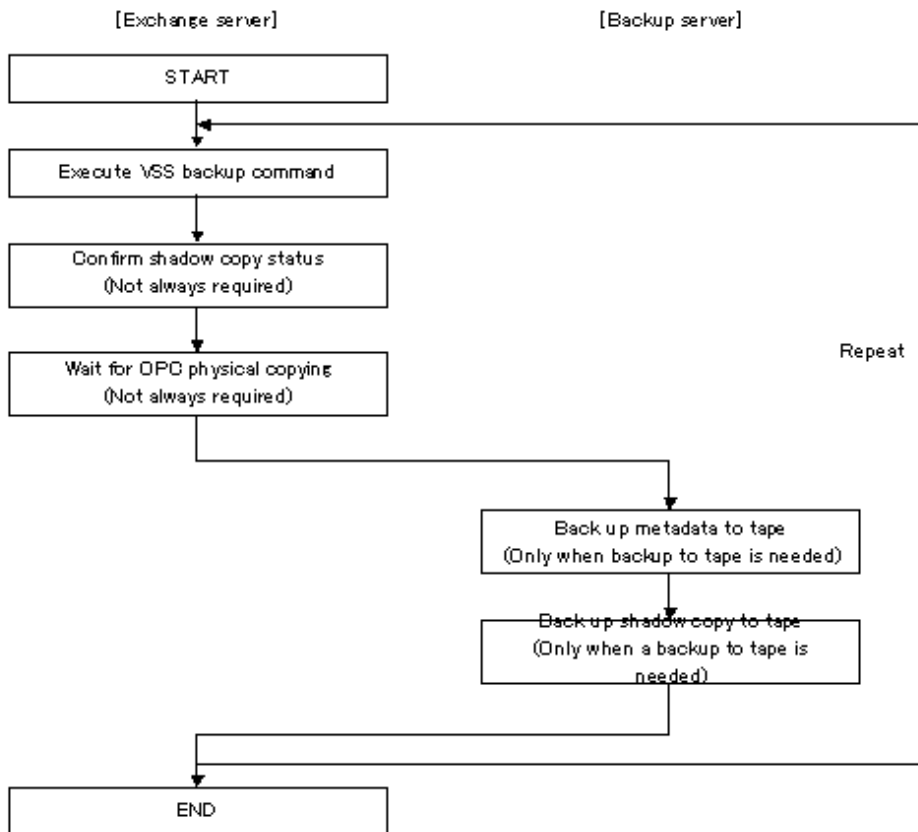
8.2.4.3 States of the backup disk

If a backup disk (LUN) uses volumes (ie, partitions), the mount point is temporarily released before backup processing starts (for snapshot type backups). Accordingly, no processes that use the backup volumes can be active when the backup is taken.

In a Windows Server 2008 environment, the number of backup disks associated with the transaction disk is restricted to one disk. This one backup disk is used repeatedly.

The state of the backup disk changes to one of the states in the following figure. The backup disk is in either the initial state or state A when the backup is executed. If it is in status A, the shadow copy is deleted and it is placed into state B before backup processing can begin.

Figure 8.47 Backup disk state transition
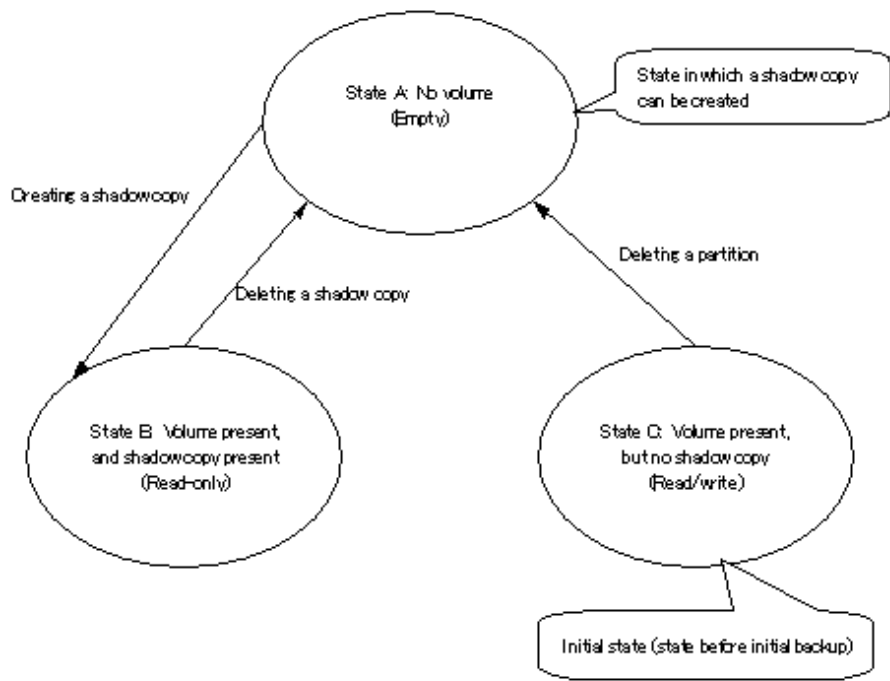
Because the backup disk is never put in the initial state except before the initial backup, it moves between states A and B during the backup.

Figure 8.48 For snapshot type backups
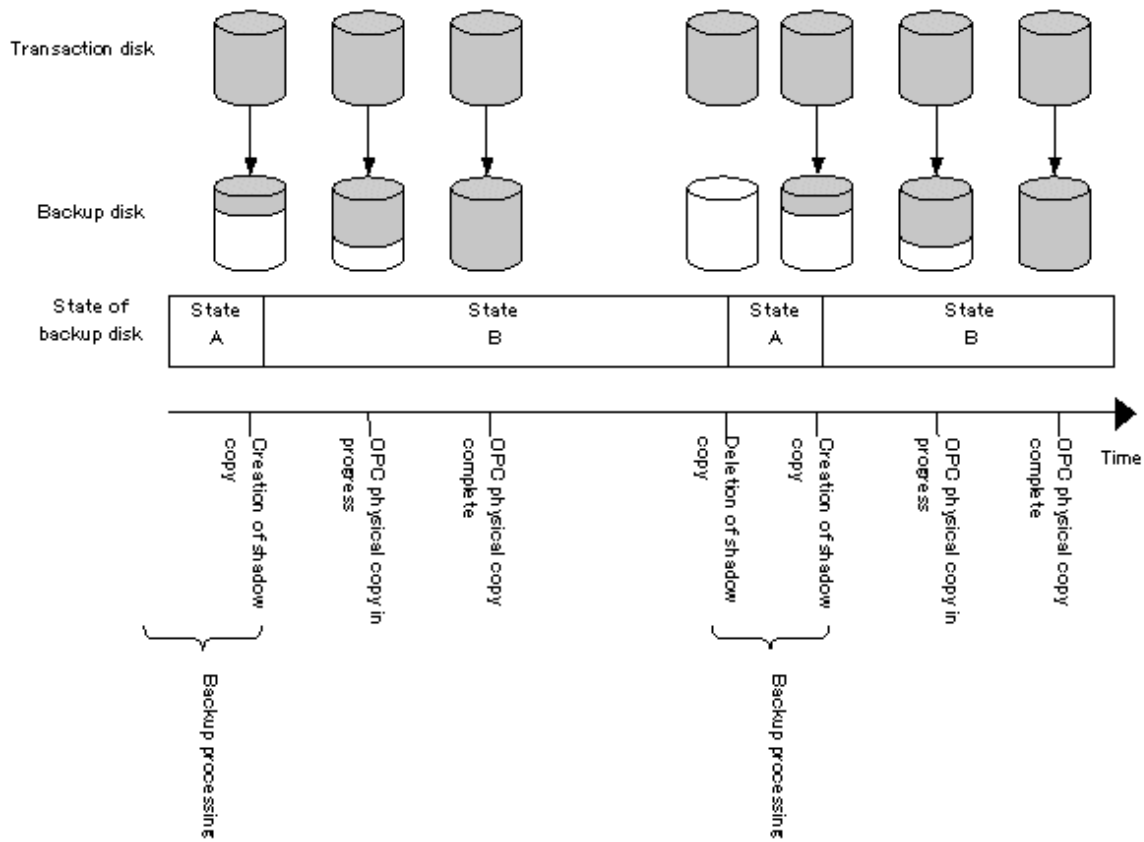
📝 Note

If swsrpshadowadm_exchange (Exchange VSS shadow copy management command) or swsrpshadowadm (Shadow copy management command) is used to delete all shadow copies from a disk, the disk status changes to offline. Since AdvancedCopy Manager cannot execute copy for a disk that is offline, change the disk status to online if you want to continue to use the disk as a backup disk after the shadow copies are deleted. Refer to "1.7.3 Notes about the online/offline status of disks" for information about the online and offline status of disks under Windows Server 2008.

If you want to change the partition configuration of a disk after swsrpvssbackup_exchange (Exchange VSS backup execution command) has been executed for the disk, it must be returned to the initial status and then other tasks are required. Refer to "8.2.6 Reconfiguration" for the procedure.

8.2.5 Restoration

8.2.5.1 Preparation

The following steps must be completed before performing a restoration:

- ・ Dismount the storage group

- ・ Stop resource monitoring for the physical disk

- ・ Stop the QuickOPC session (only for differential snapshot type backups)

8.2.5.1.1 Overwriting database during restoration

Use the Exchange management console and set the "Overwrite this database when restoring" option for all stores in the target storage group.

8.2.5.1.2 Dismounting the storage group

Use the Exchange system manager or Exchange management console and dismount all of the stores in the storage group that is to be restored. After dismounting the stores, close the Exchange system manager or the Exchange management console.

8.2.5.1.3 Stopping resource monitoring for the physical disk (only when WSFC is operating)

When the Exchange Server is using WSFC operation, LUN unit copying is used when a WSFC shared volume is restored. Therefore, resource monitoring must be stopped.

📝 Note

The disks for which resource monitoring is to be stopped differ according to the restoration method. Refer to "8.1.5.2 Executing the restoration" for more information.

- ・ For "Point-in-Time" restorations, all physical disk resources where storage groups (files with extensions *.edb, *.log and *.chk) are located must be stopped.

- ・ For roll-forward restorations, only physical disk resources where database files (files with extension *.edb) are located must be stopped. In this case, no problems will occur if resource monitoring is stopped for all physical disk resources where storage groups are located.

Stop resource monitoring by switching the resources to maintenance mode by using the cluster command.

[Example (Switching physical disk resource "Disk J:" to maintenance mode)]

```
C:\>cluster ExampleCluster res "Disk J:" /maint:on

Setting maintenance mode for resource 'Disk J:'
Resource            Group               Node            Status
------------------- ------------------- --------------- ------
Disk J:             GRP1                NODE1           Online(Maintenance)

C:\>
```

8.2.5.1.4 Stopping the QuickOPC session (only for differential snapshot type backups)

For differential snapshot type backups, all of the QuickOPCs that have been set up on the transaction disk must be canceled using swsrpshadowadm_exchange (Exchange VSS shadow copy management command) before the restoration is executed. swsrpshadowadm_exchange (Exchange VSS shadow copy management command)can be used to check the QuickOPC sessions that have been set up on the transaction disk.

📑 Note

· ·

Restoration cannot be executed if there are any backup disks on the transaction disk that are undergoing QuickOPC.

In order to cancel QuickOPC where physical copies are in progress, the shadow copies must be deleted first.

· ·

8.2.5.2 Executing the restoration

Restoration is performed separately for each storage group, using swsrpvssrestore_exchange (Exchange VSS restoration execution command) on the Exchange server. When this command is executed, all of the databases (i.e. stores) in the storage group are dismounted. Restoration is performed using AdvancedCopy (OPC).

There are two restoration methods:

· Point-in-time restoration (restoring to the point when the (last) backup was taken)

· Roll-forward restoration (restoring to the latest point)

8.2.5.2.1 Point-in-time restoration (restoring to the point when the backup was taken)

Point-in-time restoration works by restoring all of the databases in the storage group to the state they were in when the backup was taken. Point-in-time restorations are executed by specifying the "point" option with swsrpvssrestore_exchange (Exchange VSS restoration execution command). If the "point" option is specified, this command will restore the storage group to the point when the backup was taken by restoring all of the files (files with extensions *.edb, *.log and *.chk) that make up the storage group.

Figure 8.49 Point-in-time restoration
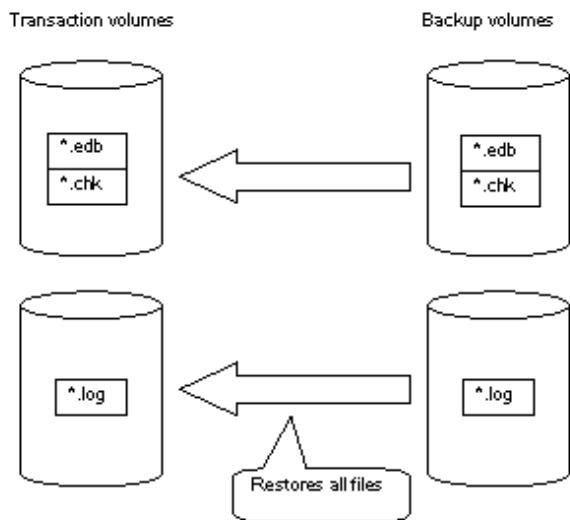
Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -point -sgname
FirstStorageGroup
swsrpvssrestore_exchange successfully completed
C:\>
```

8.2.5.2.2 Roll forward restoration (restoring to the latest point)

Roll forward restorations restore all of the databases in the storage group to the latest point.
Roll forward restorations are executed by specifying the "roll" option with swsrpvssrestore_exchange (Exchange VSS restoration execution command). If the "roll" option is specified, the restore is performed as follows:

1. Only database files (with extension *.edb) are restored.

2. Logs are applied using the log files that exist on the transaction volume.

3. Databases are restored to the latest point.

Figure 8.50 Roll forward restoration
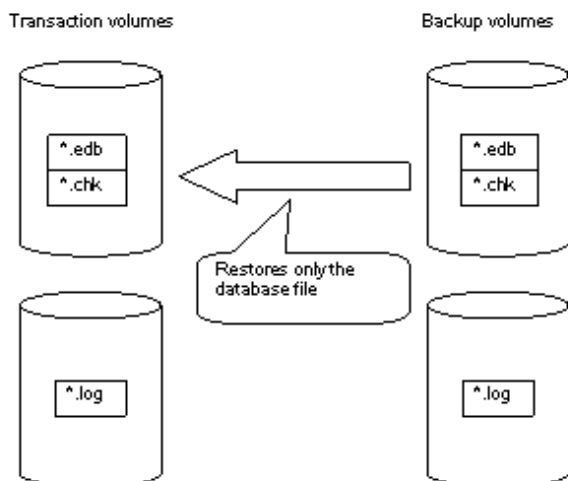
Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -roll -sgname
FirstStorageGroup
swsrpvssrestore_exchange successfully completed
C:\>
```

![Note icon] **Note**

In order to execute a roll forward restoration, the following conditions must be met:

- All of the transaction logs that have been created since the latest complete backup was taken must exist.

- The generation numbers (the "XXXXX" part of EOnXXXXX.log) of the existing log files must be consecutive.

- A new backup must be created immediately if the database path is changed.

- A new backup must be created immediately after the commands ESEUTIL /p (restores faults or damaged databases) or ESEUTIL /d (defrags or compresses databases) are executed.

- A backup of all databases in the storage group must be taken immediately after any databases are added or deleted.

8.2.5.3 Checking a restoration

swsrpstat_exchange (Exchange operation status display command) can be used to check the restoration copy implementation status.

[Execution example (when OPC used to perform restoration)]

```
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange  -sgname FirstStorageGroup
Server    Original-Volume     Replica-Volume     Direction Status  Execute
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR reverse    snap     80%
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR reverse    snap     63%
EXCHG-SVR g1d1p1@EXCHG-SVR g1d13p1@BKUP-SVR ----       ----     ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d14p1@BKUP-SVR ----       ----     ----
C:\>
```

8.2.5.4 Post-restoration operations

The following steps must be completed after performing a restoration:

- Restart resource monitoring for physical disks.

- Mount the storage group.

8.2.5.4.1 Restarting resource monitoring for physical disks

Restart resource monitoring by canceling maintenance mode for the physical disks where resource monitoring has been stopped.

[Example (Releasing physical disk resource "Disk J:" from maintenance mode)]

```
C:\>cluster ExampleCluster res "Disk J:" /maint:off

Clearing maintenance mode for resource 'Disk J:'
Resource            Group               Node            Status
------------------- ------------------- --------------- ------
Disk J:             GRP1                NODE1           Online
```

```
    C:\>
```

8.2.5.4.2   Mounting the storage group

For point-in-time restore, use the Exchange system manager to mount all stores that have been dismounted. Use the following procedure to mount the stores for roll forward restorations:

1. For roll forward restorations, either delete or rename the CHK file (EXX.chk). (For Point-in-Time restorations, do not perform this procedure.)

2. Use the Exchange management console to mount all the stores that have been dismounted.

8.2.5.5   Restoring data backed up to tape

When data backed up to tape is to be restored, the backup data on the tape first needs to be restored on the backup server and then the Exchange VSS restore command needs to be entered.

If the backup volume is used as a shadow copy, the backup data on the tape must be restored after deleting the shadow copy. The figure below shows the flow of a restoration from tape.

Figure 8.51 Snapshot restoration (restoration performed using OPC)
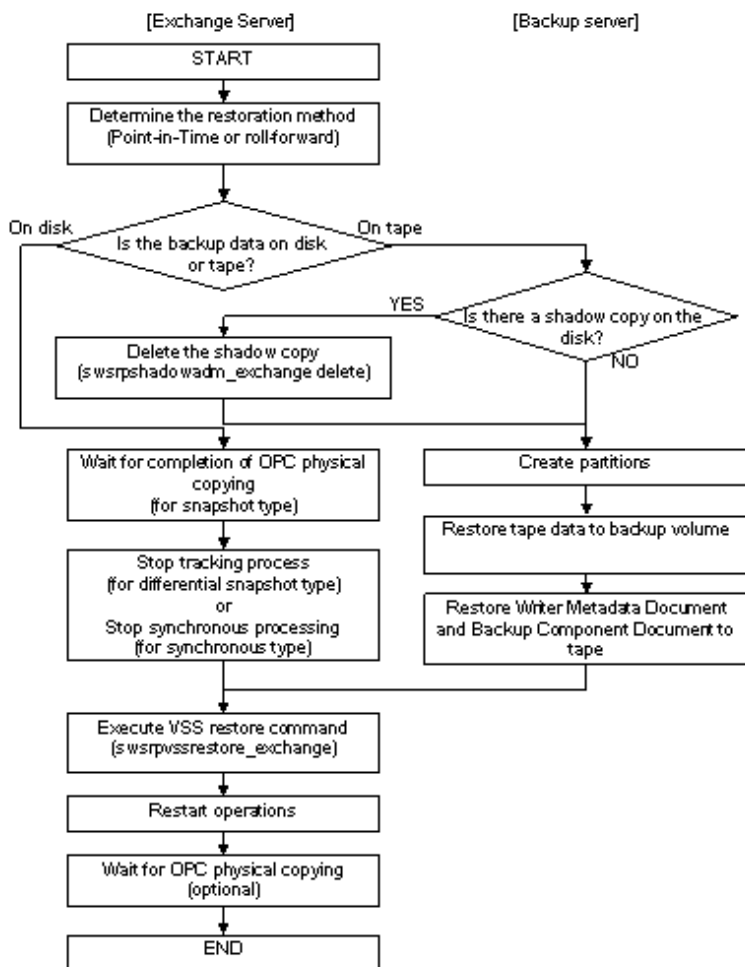
8.2.6   Reconfiguration

To change resources that make up the backup configuration, the AdvancedCopy Manager settings need to be changed.

In a Windows Server 2008 environment, if the partition configuration is to be changed, for example by adding or deleting partitions, in a disk where Exchange Server 2007 database backup and restoration has been performed, the disk status must be returned to the initial status before the disk is reconfigured.

This section explains how to change the various types of settings.

8.2.6.1   Changing device information on source and replica volumes

To reconfigure the device used as a source or replica volume, the source or replica volume must first be deleted. The device can then be reconfigured and the volume set up.

The source or replica volume must be deleted before the device is reconfigured. Otherwise, the volume may not be able to be deleted after the device reconfiguration.

This process is summarized as follows:

1. Delete the source or replica volume on the device to be reconfigured. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

2. If there are changes in the configuration of copy source or copy destination disk partitions, initialize the disk. Refer to "8.2.6.4 Initializing a disk" for details.

3. Reconfigure the device.

4. Add the device information. Refer to "7.4.4 Fetching device information from a Storage Server" for this operation.

5. Specify the source or replica volume.

8.2.6.2   Changing the copy source and copy destination disks (when changing a LUN_V configuration)

To change a copy source or copy destination disk (change the LUN_V size or LUN_V number), first delete the copy source or copy destination volume, then change the disk configuration. Then perform setup processing for the copy source or copy destination volume and perform setup processing for correcting or registering the copy set file.

These tasks must be performed before the configuration of the copy source or copy destination disk is changed. Otherwise, deletion of the copy set or of the copy source or copy destination volume may not be possible after the device configuration is changed.

1. On the primary node of the Exchange server, check the copy status using the VSSHP status lookup command (stxvquery). If any copy is executing, or if QuickOPC is in the tracking state, use the VSSHP "backup control command (stxvcopy)" or the VSSHP "batch stop command (stxvstopall)" to stop the copy process or tracking process.
   If QuickOPC is in the tracking state, the copy source or copy destination disk cannot be changed. If you want to change the copy destination for a transaction volume during QuickOPC backup, the tracking process must be stopped.

2. Delete the source or replica volume on the device to be reconfigured. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

3. If there are changes in the configuration of copy source or copy destination disk partitions, initialize the disk. Refer to "8.2.6.4 Initializing a disk" for details.

4. Reconfigure the device.

5. Add the device information. Refer to "7.4.4 Fetching device information from a Storage Server" for information about this operation.

6. On the primary node of the Exchange server, execute the "8.2.3.2.6 Creating a copy set file" and the "8.2.3.2.7 Registering copy sets as a batch" to change the copy set information.

7. On the primary node of the Exchange Server, perform "8.2.3.2.8 Checking and saving the copy set registration contents".

8. Specify the source or replica volume.

8.2.6.3　Changing storage group information

If the storage group information registered by swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command) is changed, swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command) needs to be executed again to reflect the changes in AdvancedCopy Manager.
The change in the storage group information is caused by a change in the device information on the source or replica volume. The copy source or copy destination device information must be changed before the Exchange storage group information registration command is executed.

8.2.6.4　Initializing a disk

Note that all data is erased from an initialized disk. If essential data has been saved on the disk, use one of the following procedures to take a backup of the data before initializing the disk.

- ・ On the Exchange management console, perform the tasks described in "Moving a database path" and "Moving a storage group path" and move the data to a different disk.

- ・ Create a backup to tape or on a different disk at the backup server. Refer to "8.2.5.5 Restoring data backed up to tape" for the restoration method.

Start "Diskpart" from command prompt, select the target disk, and execute "clean".

Execution example (if the target disk is Disk 1)

```
C:\Users\administrator.domain>diskpart        (*1)
DISKPART> select disk 1                        (*2)
DISKPART> clean                                (*3)
DISKPART> exit                                 (*4)
```

(*1) Starts DiskPart
(*2) Selects Disk 1
(*3) Cleans the disk
(*4) Ends DiskPart

 Note
. . . .
Note that all data is erased from an initialized disk.
. . . .

8.2.6.5　Changing the Storage Server name

To change the Storage Server name, follow the procedure below:

1. Delete the source or replica volume. Refer to "7.6.2 Deleting a source volume or replica volume" for more information.

2. Change the Storage Server name. For details, refer to "10.5.4 Changing the server name of a Storage Management Server or Storage Server.

3. Specify the source or replica volume.

8.2.6.6　Changing the copy type

1. On the primary node of the Exchange Server, execute the VSSHP "stxvquery (Backup status lookup command)" to check the copy status. If copying is in progress, use the VSSHP "stxvcopy (Backup control command)" or the VSSHP "stxvstopall (Batch stop command)" to stop the copy process.

2. On the primary node of the Exchange Server, use the "8.2.3.2.6 Creating a copy set file" and the "8.2.3.2.7 Registering copy sets as a batch" commands to change the copy type. Then perform the tasks described in "8.2.3.2.8 Checking and saving the copy set registration contents".

8.2.6.7 Changing the IP addresses of the Exchange Server and backup server

Use the following procedures to change the IP addresses of the Exchange Server and the backup server:

1. Change the Storage server IP address. Refer to "10.5.1 Changing the IP address of a Storage Management Server" for details.

2. Stop the ETERNUS VSS Hardware Provider Communication Server service used by the Exchange Server and the backup server and then prepare the communications service again. Refer to "Preparing the communications service" in the "ETERNUS VSS Hardware Provider Software Guide" for details.

3. Start the ETERNUS VSS Hardware Provider Communication Server service for the Exchange Server and the backup server.

8.2.6.8 Other environment changes

Refer to "10.5 Changing the Operating Environment" for information concerning other environment changes.

8.2.7 Stopping Operation

Backup of the Exchange server databases can be stopped by performing the following steps:

- Delete the shadow copy

- Stop the copy process that is currently being executed

8.2.7.1 Deleting the shadow copy

Delete the shadow copy by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -evs VSVR -sgname
FirstStorageGroup
swsrpshadowadm_exchange delete successfully completed
C:\>
```

Executing this command:

1. Deletes any shadow copy that exists on the backup server.

2. Deletes the backup server "writer metadata" documents and the "backup component" documents.

📝 Note

OPC/QuickOPC physical copying and tracking are not stopped even if the shadow copy is deleted.

📝 Note

If all shadow copies are deleted from a disk, the disk status changes to offline. Since AdvancedCopy Manager cannot execute copy for a disk that is offline, change the disk status to online if you want to continue to use the disk as a backup disk after the shadow copies are

deleted. Refer to "1.7.3 Notes about the online/offline status of disks" for information about the online and offline status of disks under Windows Server 2008.

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8.2.7.2 Stopping tracking processing (only for differential snapshot type backups)

To perform differential snapshot type backups, tracking processing must first be stopped.

Stop tracking processing by executing swsrpshadowadm_exchange (Exchange VSS shadow copy management command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -evs VSVR -sgname
FirstStorageGroup
swsrpshadowadm_exchange successfully completed
C:\>
```

It is also possible to stop tracking processing by executing the copy stop command (stxvcopy<source-disk>stop).

8.2.7.3 Stopping restoration copies

Stop the restoration copy process by executing swsrpcancel (replication cancellation command) on the Exchange server.

Example:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d11p1@BKUP-SVR g1d1p1@EXCHG-SVR
FROM=g1d3p1@BKUP-SVR, TO=g1d1p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d12p1@BKUP-SVR g1d2p1@EXCHG-SVR
FROM=g1d4p1@BKUP-SVR, TO=g1d2p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -sgname FirstStorageGroup
Server    Original-Volume  Replica-Volume   Direction Status Execute
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR ----      ----   ----
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR ----      ----   ----
C:\>
```

When this command is executed, any restoration copy process in progress will be stopped.
It is generally not possible to use a transaction volume as a normal file system after restoration copy process has been stopped;
The transaction volumes must be reformatted so that they can be used again.

8.2.8 Uninstallation

This section describes how to perform uninstallation.
The following figure shows the flow of uninstallation tasks.

Figure 8.52 Uninstallation task flow
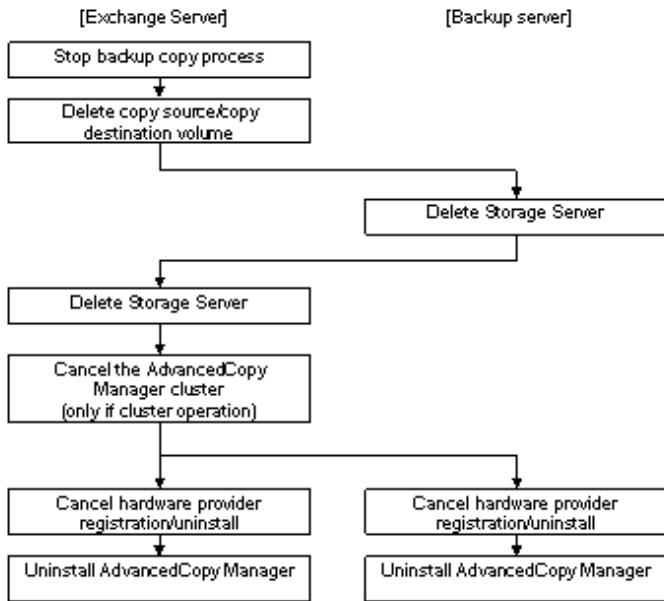
8.2.8.1 Stopping backup copy process

On the primary node of the Exchange server, check the copy status using the VSSHP "Backup status lookup command (stxvquery). If any copy process is still executing, stop it using the VSSHP "Backup control command (stxvcopy)" or the VSSHP "Batch stop command (stxvstopall)" command.

8.2.8.2 Delete source and replica volumes

Delete the source and replica volumes that have been set up.
Refer to "swsrpdelvol (Replica volume information deletion command)" for information on how to delete the source and replica volumes.
Alternatively, if the source or replica volume will no longer be used, initialize the disk. Refer to "8.2.6.4 Initializing a disk" for the procedure.

8.2.8.3 Delete the Storage Server

Delete the Storage Server to be uninstalled from the control of AdvancedCopy Manager.
Refer to "Delete the Registration of a Storage Server" in the "ETERNUS SF AdvancedCopy Manager GUI User's Guide" for information on how to delete the Storage Server from the GUI client.
For information on how to delete the Storage Server with a command, refer to "stgxfwcmdelsrv (Server information deletion command)".

8.2.8.4 Cancel the cluster settings for AdvancedCopy Manager

If the Exchange Server has a cluster configuration, delete the Storage Server transactions and the Storage Server management transactions from the Exchange Server.
Refer to the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment" for more information about canceling cluster settings.

8.2.8.5 Cancel the hardware provider registration/uninstall

If VSSHP will no longer be used, refer to "Uninstallation" in the "ETERNUS VSS Hardware Provider Software Guide" and cancel the VSSHP registration or uninstall on both the Exchange server and the backup server.

 Note

Do not cancel the hardware provider registration or uninstall if there are other storage groups on the backup and Exchange servers where operations may use this hardware provider registration.

8.2.8.6 Deleting AdvancedCopy Manager

Refer to the "ETERNUS SF AdvancedCopy Manager Installation Guide" to delete AdvancedCopy Manager.

Chapter 9 Backup and Restore of an SQL Server Database

This chapter explains how to perform backup and restore of SQL Server databases by employing the backup management function or the replication management function of AdvancedCopy Manager.

The SQL Server 2000 database and the SQL Server 2005/2008 database have different names in the GUI. In this chapter, the name SQL Server 2000 database is used. The correspondence between SQL Server 2000 database and SQL Server 2005/2008 database names is as follows:

Table 9.1 SQL Server 2000 and SQL Server 2005/2008 database names

SQL Server 2000 database	SQL Server 2005/2008 database
Enterprise Manager	Management Studio

SQL Server is a trademark or registered trademark of Microsoft Corporation in the United States and other countries.

9.1 Overview

SQL Server is enterprise database software that serves as the core of the Microsoft(R).NET Enterprise Servers family.

AdvancedCopy Manager performs high-speed backup and restore of SQL Server databases constructed on the Fujitsu ETERNUS storage system by cooperating with SQL Server.

AdvancedCopy Manager provides the following commands to perform high-speed backup and restore of SQL Server databases:

- ・ SQL Server backup execution command
- ・ SQL Server restore execution command

📝 Note
. . . .
The SQL Server backup execution command and SQL Server restore execution command are provided for the backup management function and for the replication management function respectively. Swstbackup_sqlsvr and swstrestore_sqlsvr are used when operating with the backup management function, and swsrpbackup_sql and swsrprestore_sql are used when operating with the replication management function.
. . . .

Table 9.2 SQL Server backup execution commands and SQL Server restore execution commands

	Command for backup management function	Command for replication management function
SQL Server backup execution command	swstbackup_sqlsvr	swsrpbackup_sql
SQL Server restore execution command	swstrestore_sqlsvr	swsrprestore_sql

9.1.1 Backup Function

An SQL Server database consists of the following physical files (ie, database files):

- ・ Primary data file (one file is required per database)
- ・ Secondary data files (there may be none, one or more than one)
- ・ Transaction log files (at least one file is required per database)

Backing up all database files is called the "database backup" or "full backup".
Backing up only the log files is called the "log backup"

The SQL Server backup execution command performs the database backup at high speed, and performs the following tasks:

・ Copies the database files (the primary data file, secondary data files, and transaction log files) to the backup volumes

・ Executes the data copy instantly with the advanced copy function, without utilizing server CPUs

・ Generates an online backup by cooperating with the VDI(Virtual Device Interface) mechanism of SQL Server

Figure 9.1 Backup Function Overview
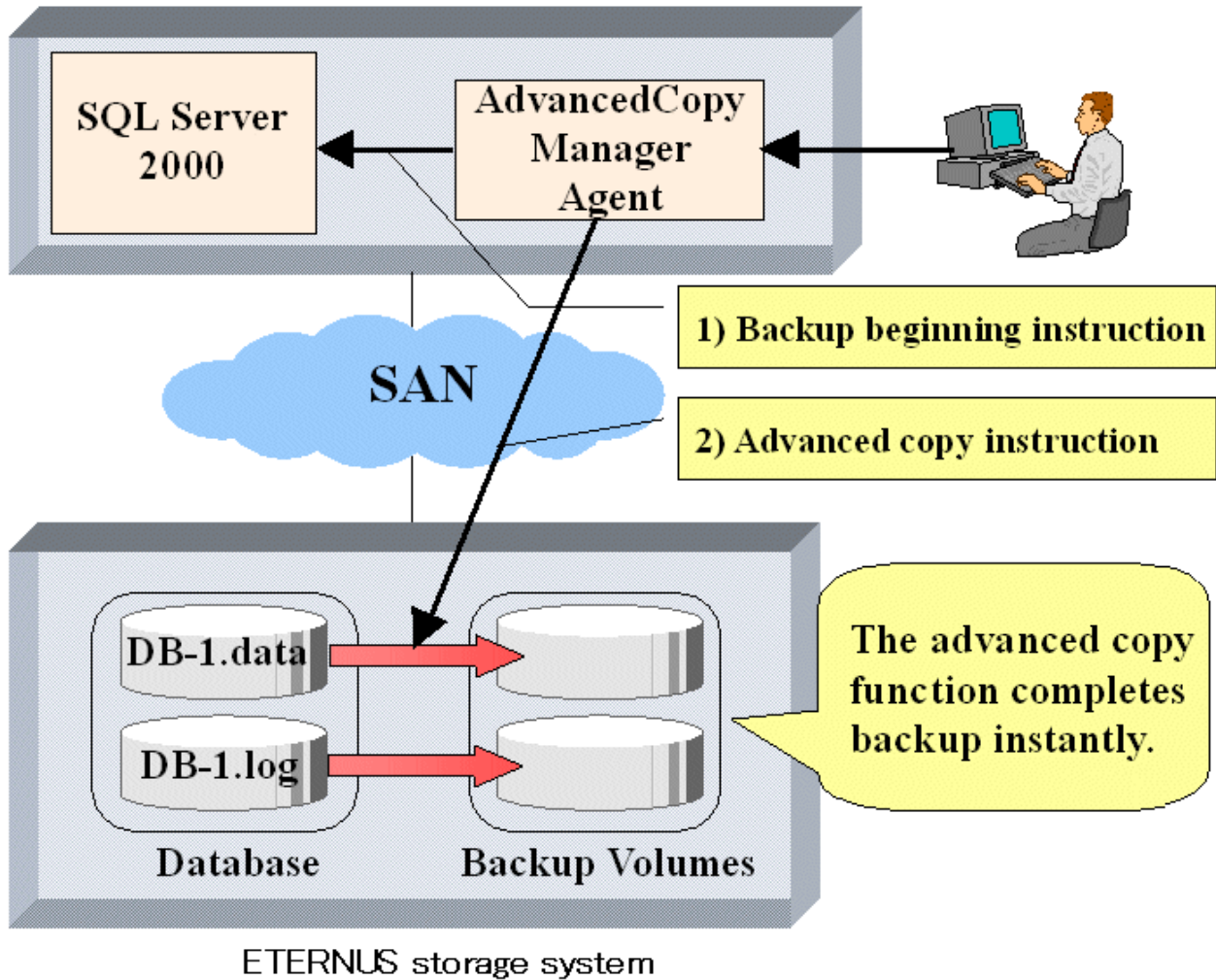
In the backup of SQL Server, generally both the "database backup" and the "log backup" are performed, although not necessarily with the same frequency.

The following figure shows an example of backup operation that combines the database backup and the log backup using SQL Server. In this example, it is assumed that the operation cycle is one week, that the database backup is performed on Sundays, and that the log backup is performed on weekdays:

Figure 9.2 Example of backup operation

Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	···
Database Backup	Log Backup	Log Backup	Log Backup	Log Backup	Log Backup	Log Backup	Database Backup	···
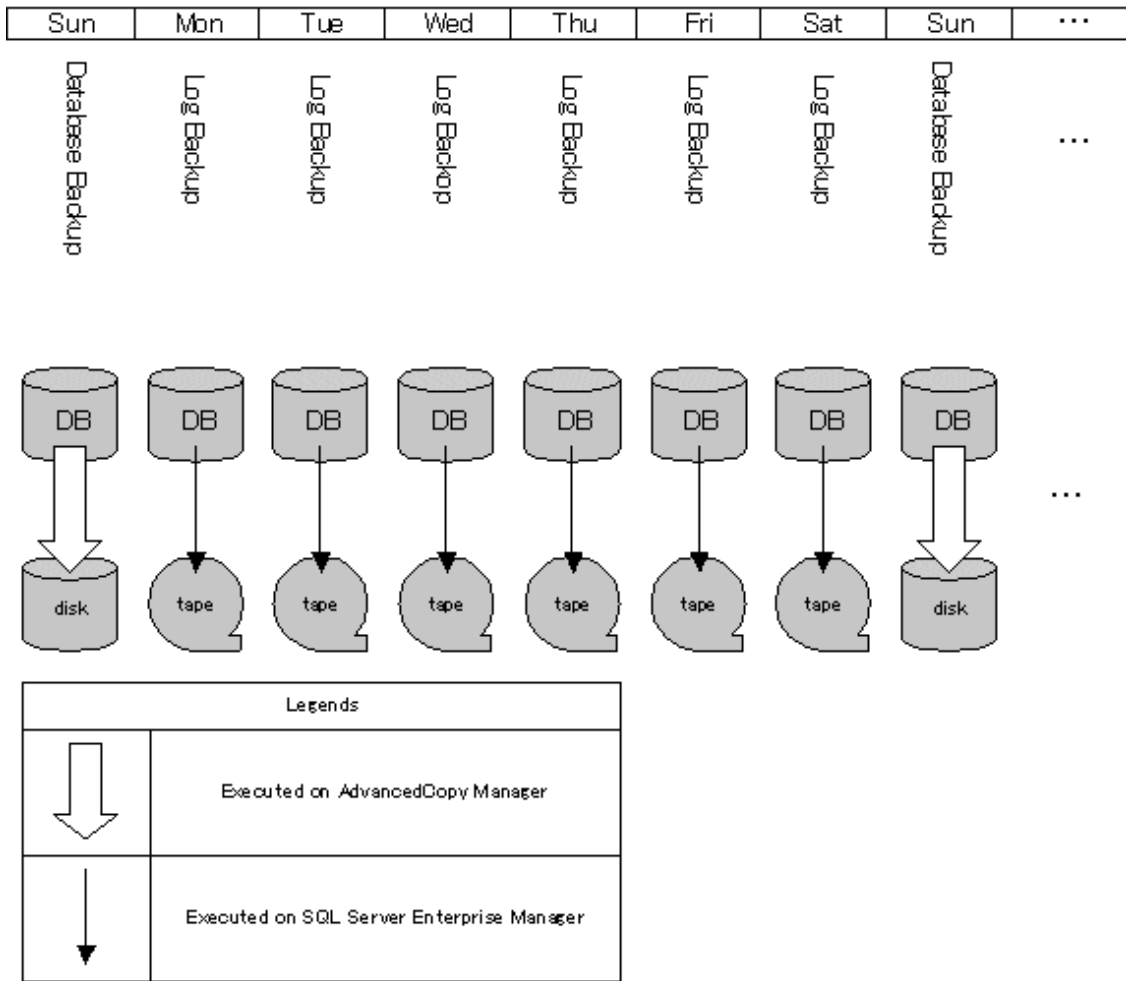
AdvancedCopy Manager provides the "database backup" function. Therefore, backup and restore (ie, recovery) of a transaction log should be performed by SQL Server's Enterprise Manager and Transact-SQL, etc.

The databases which can be backed up with AdvancedCopy Manager are only user databases, and so system databases (ie, master, msdb, model and distribution) cannot be backed up with AdvancedCopy Manager. Backup of the system databases should be performed with SQL Server.

Table 9.3 SQL Server and AdvancedCopy Manager backup

		SQL Server	AdvancedCopy Manager
System Databases (master, msdb, model, distribution)		O	X
User Databases	**Database backup**	O	O
	Log backup	O	X

O: Provided
X: Not provided

> **Note**
>
> ··
>
> In this chapter, the term "database restore" refers to reloading a database image and status at the time of a specified database backup. In contrast, the term "database recovery" refers to applying logs to a database on which the database restore has been performed, in order to restore the database to a specific point or to the latest point after the database backup.
>
> ··

9.1.2 Restore Function

The SQL Server restore execution command recreates a database using the database files restored from a database backup. The following series of processes can be completed in a short time by using OPC (One Point Copy) of the advanced copy function:

1. restoring database files,

2. recreating a database,

3. applying transaction logs,

Figure 9.3 Restore Function Overview
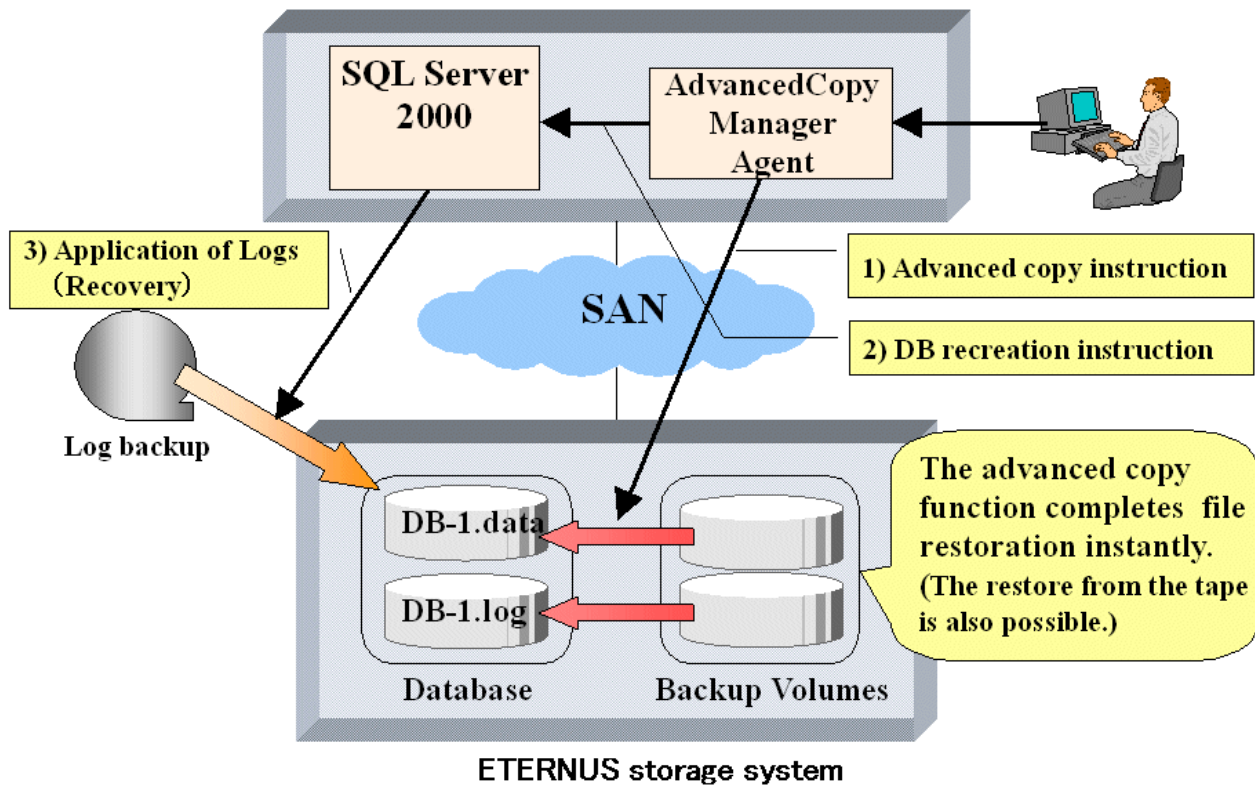
Using the example scenario in the above figure, the diagram below shows how to perform restore up to the latest point when a failure occurs before the log backup on Friday:

Figure 9.4 Example of restore

| Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | ··· |

Database Backup

Log Backup (Mon, Tue, Wed, Thu)

Occurrence of failure (Fri)

DB → disk (Sun)

DB → tape (Mon, Tue, Wed, Thu, Fri)

1) Backup a log

3) Recovery a database (Apply logs))

2) Restore a database

9.2 Operational Overview

This section describes the backup designs that are required before performing the backup of SQL Server.

9.2.1 Backup Operation configuration of an SQL Server Database

To configure the backup of a database, refer to "Designing a Backup and Restore Strategy" in the "SQL Server Books Online".
In addition, observe the following limitations on the construction of database files.

9.2.1.1 Database in raw partitions

AdvancedCopy Manager does not support a database constructed in raw partitions. Databases must be constructed within the logical boundaries of a file system.

9.2.1.2 Placement of files

AdvancedCopy Manager performs copy in units of volume (i.e., in units of partitions). Therefore, do not store any files other than target database files in the volumes on which the database files are placed.

The following scenarios are not recommended unless these databases are under the control of the same instance:
Files from more than one single database constructed on any one single volume, and/or More than one database constructed on any one single volume, and/or
Files intrinsically related to different databases or instances spread across the same array of multiple volumes.

Figure 9.5 N databases on one volume
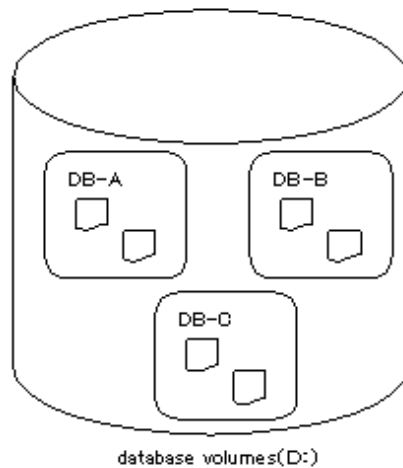
database volumes(D:)

Figure 9.6 N databases on M volumes

database volume(D:)   database volume(E:)
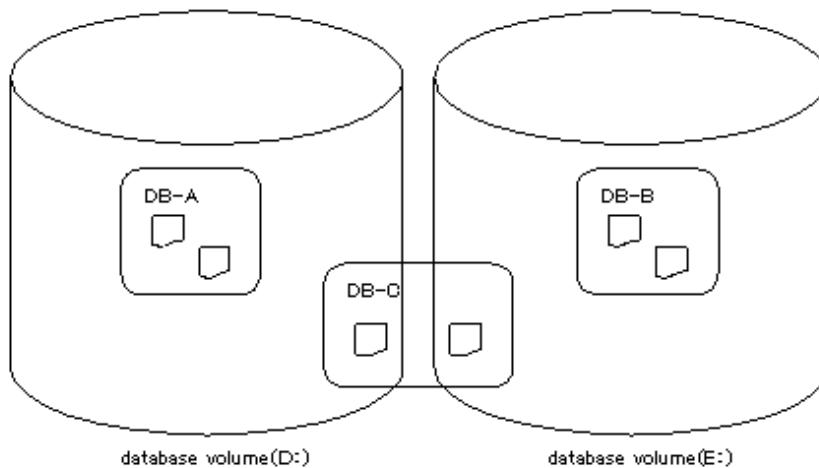
If you perform the backup of the database with such a configuration, specify all the databases which exist on the volumes. After SQL Server secures the data consistency by freezing all the specified databases, AdvancedCopy Manager executes the copy processing to all the volumes where the files are placed. If the backup is performed without specifying all the databases, the database backup cannot be created correctly, because the file systems of the backup volumes might be damaged.

The abovementioned database configuration is found in a system with insufficient drive letters or a system where many small-scale databases exist, and has the following problems in respect of backup:

- When two or more databases are backed up at the same time, all the specified databases are frozen by SQL Server until processing is completed. If the database is frozen for an extended period, there is a possibility that the backup cannot be completed correctly. Design the databases so that the number of databases to be backed up is kept to a minimum.

- If you want to restore a specific database, you cannot use the advanced copy for file restoration processing. In this case, only the database files to be restored must be restored by the means of the COPY command or FTP, etc. The advanced copy can be used only for file restoration when all the databases are restored.

Ⓟ Point

As shown in the figure below, you can distribute database files over multiple volumes. AdvancedCopy Manager performs processing on all the volumes on which database files are placed.

Figure 9.7 Distributed placement of database files
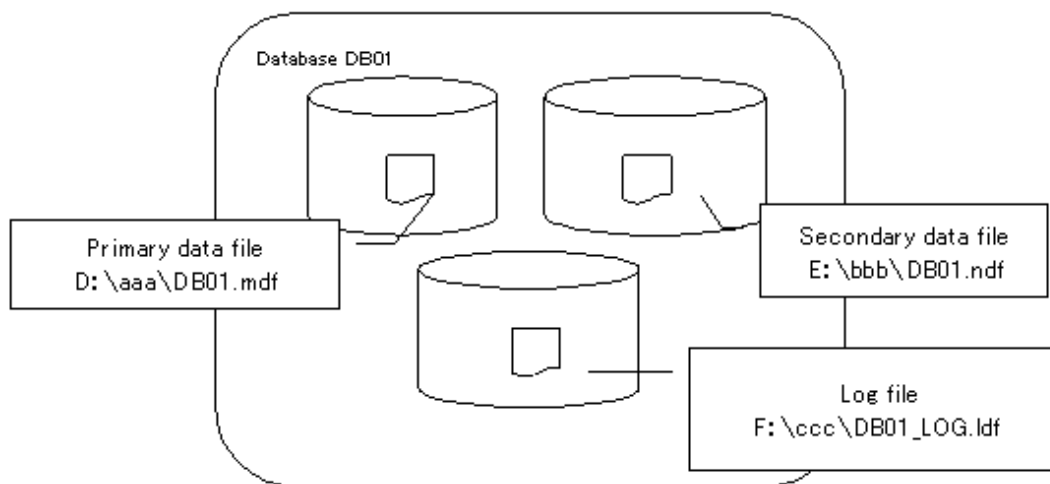
9.2.1.2.1 Full text catalogue assignment (under SQL Server 2005/2008)

If a full text catalogue is used under SQL Server 2005/2008, it can be created on any of the database volumes. This includes the full text catalogue in database backup and restore operations.
If the full text catalogue is created on a non-database volume, the full text catalogue will not be backed up and will need to be reconstructed after restore is executed.

9.2.1.3 Determining the servers to perform backup

Determine the servers that are required to perform backup.
The following servers are used to perform backup:

Storage Management Server

Multiple Storage Servers are unified, and are operated centrally. The manager function of AdvancedCopy Manager should be installed. A Storage Management Server can also be used as a Storage Server.

Storage Server (a Business Server)

SQL Server is run on this server. The agent function of AdvancedCopy Manager should be installed on this server. Backup and restore of databases are performed on this server.

Storage Server (a Backup server: only if the replication management function is used)

The Storage Server typically performs the role of a backup server, with the agent function of AdvancedCopy Manager installed on this server. The volumes (i.e., backup volumes) which become the backup destination of database volumes are connected to this server. The operation using a backup server can be executed only if the replication management function is employed and so cannot be executed if the backup management function is used.

9.2.1.4   Determining a backup target

Determine the databases to be backed up and the volumes (ie, the database volumes) where their database files are located.
All the database volumes must be placed on the Fujitsu ETERNUS storage system.

9.2.1.5   Determining a backup method

Determine the backup method.
One of the following two methods can be selected as a backup method.

Snapshot type backup

This is a backup method using the OPC/ROPC functions of the Fujitsu ETERNUS storage system. The backup is obtained by starting OPC/ROPC.

🅿 Point
. . . .
The differential snapshot high-speed backup can be performed for the ETERNUS storage system where the QuickOPC function is supported.
For information on the differential snapshot high-speed backup, refer to "Chapter 6 Backup Operation by the QuickOPC Function".
. . . .

Synchronous type backup

This is a backup method using the EC/REC functions of the Fujitsu ETERNUS storage system. The backup is obtained by stopping (in the case of using the backup management function) or suspending (in the case of using the replication management function) EC/REC in the equivalency maintenance state.

🅿 Point
. . . .
When the backup management function is used, a backup is created by stopping or suspending EC/REC under the equivalency maintenance status. When the SQL Server backup execution command (swstbackup_sqlsvr) is executed with "-suspend" specified, the Suspend/Resume function suspends the equivalency maintenance status and executes the backup.

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

9.2.1.6   Preparing a backup volume

The volumes which become the backup destination of database volumes are called backup volumes.

All the backup volumes must be placed on the Fujitsu ETERNUS storage system.

9.3 Operation by backup management function

9.3.1 Preparations

Perform the following preparations before the backup of SQL Server is started:

- ・ Configure the environment for SQL Server

- ・ General preparation

- ・ Create the transaction volume locking specification file for backups

- ・ Prepare a device map file (only required if the backup destination is specified)

- ・ Record the output path of a metadata file

- ・ Prepare the automated backup

The following example is used as an illustration in the following sub sections.

Figure 9.8 SQL Server backup environment example
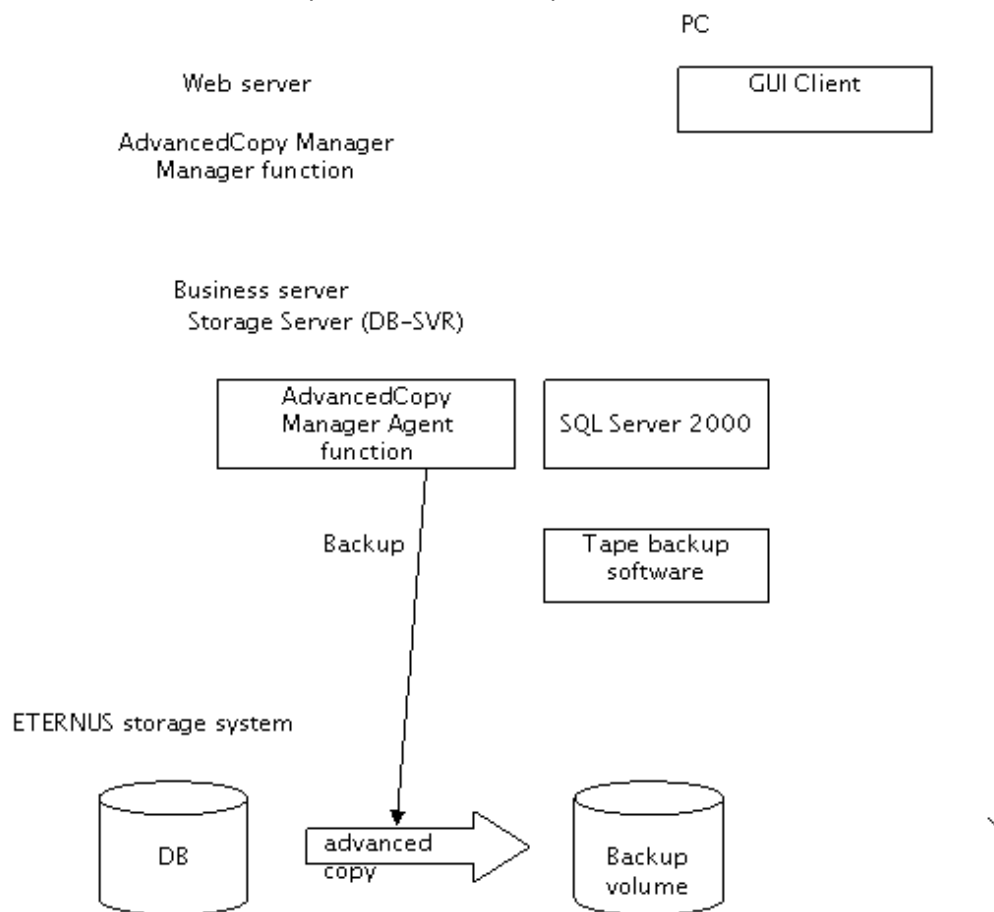
Table 9.4 Server configuration

Server type	Server name	comment
Storage Management Server	MGR-SVR	
Storage Server	DB-SVR	・ Business server ・ operating on MSCS(AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)

Table 9.5 Database configuration

Database name	Database file name	Database file type
DB01	D:\SQLSVR\DB01.mdf	Primary data file
	E:\SQLSVR\DB01.ndf	Secondary data file
	F:\SQLSVR\DB01.ldf	Transaction log file
DB02	D:\SQLSVR\DB02.mdf	Primary data file
	E:\SQLSVR\DB02.ndf	Secondary data file
	F:\SQLSVR\DB02.ldf	Transaction log file
DB03	D:\SQLSVR\DB03.mdf	Primary data file
	E:\SQLSVR\DB03.ndf	Secondary data file
	F:\SQLSVR\DB03.ldf	Transaction log file

Table 9.6 Database volume configuration

Drive letter	AdvancedCopy Manager device name
D:	g1d1p1
E:	g1d2p1
F:	g1d3p1

9.3.1.1 Configuring the environment for an SQL Server

Set up SQL Server according to database backup configuration instructions. If you apply logs at the time of recovering a database, set the "recovery model" of a database to "Full" or "Bulk-Logged". For more information on this, refer to "Designing a Backup and Restore Strategy" in the "SQL Server Books Online".

9.3.1.2 General preparation

Perform the steps described in "4.4 Preparing to Start the Backup", noting the following points:

- When you register transaction volumes, register all the volumes on which database files are placed.

- Set the same backup policies for all the volumes on which database files are placed. The management of backup history information is simplified by making all the backup policies the same. Note that the backup can still be executed even if the backup policies are different.

Example

Register all the target database volumes as transaction volumes, and set the backup policies.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -t g1d1p1
swstdevinfoset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -t g1d2p1
swstdevinfoset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -t g1d3p1
swstdevinfoset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbkpolset -s 1 -i 7 g1d1p1
g1d1p1 swstbkpolset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbkpolset -s 1 -i 7 g1d2p1
g1d2p1 swstbkpolset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbkpolset -s 1 -i 7 g1d3p1
g1d3p1 swstbkpolset completed
C:\>
```

Register the backup volumes.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -b g1d11p1
swstdevinfoset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -b g1d12p1
swstdevinfoset completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstdevinfoset -b g1d13p1
swstdevinfoset completed
```

9.3.1.3   Create a transaction volume locking specification file for backups

In standard backup pre-processing and post-processing, the transaction volume is locked and unlocked. This processing enables copies to be created with the file system in the matched state.

However, when the SQL Server database is being backed up, the transaction volume cannot be locked in backup pre-processing because SQL Server is using the database files.

Set the file so that a transaction volume locking specification file for backups is created for the SQL Server database volume. In addition, ensure that the transaction volume where database files are located is not locked, and that the file system buffer only is flushed.

No problem results from the volume being unlocked because SQL Server guarantees the matching of database component files.

For details about this, refer to "A.2.2.2 Transaction volume locking specification file for backups".

Figure 9.9 Example of a description in the transaction volume locking specification file for backups

```
[g1d1p1]
BufferFlushOnly=on
[g1d2p1]
BufferFlushOnly=on
[g1d3p1]              Specify the buffer flush operation for the
BufferFlushOnly=on   database volume.
[g1d4p1]
BufferFlushOnly=on
[g1d5p1]
BufferFlushOnly=on
```

Note

- Take care with the changes that are made. If a change is made incorrectly, then the backup command will result in an error.

- Since the transaction volume is not locked, do not place files other than database files on the transaction volume where database files are located.

9.3.1.4   Prepare a device map file (only if the backup destination is specified)

If you specify the backup volumes which become copy destinations, create a device map file. For details of this, refer to "4.4.11 Preparing a device map file".

9.3.1.5 Record the output path of a metadata file

At the time of backup execution, the "metadata", which includes information such as path name, size and file type, etc. of the database files in the database being backed up is saved from SQL Server. AdvancedCopy Manager saves metadata in a metadata file in a backup volume.

A metadata file is required to be restored to a database volume at the time of restoration of database files. Since it becomes indispensable when executing swstrestore_sqlsvr (SQL Server restore execution command), it is necessary to record the absolute path of a metadata file in advance.

The metadata file is saved with the name ""DB name".swst-dmp" in the folder where the database file with file identification number (FILE_ID) 1 exists. For example, if the absolute path of the database file with file identification number 1 of a database DB01 is "D:\SQLSVR\DB01_data.mdf", the absolute path of a metadata file becomes "D:\SQLSVR\DB01.swst-dmp."

Even though the database file with file identification number 1 is a primary data file, it is a good idea to check using the following procedure to make sure it is correct:

1. Perform the Transact-SQL command "USE database name EXEC SP_HELPFILE".

2. Look for the record with which the column "file id" is 1 as a result of this execution. The content of the column "filename" of the record is the absolute path of the database file with file identification number 1.

🅿 Point

. . . .

Although it is necessary to ensure that there is enough capacity for storing a metadata file in a transaction volume, the size of a metadata file is very small, so there is really no necessity for taking this into consideration. The size of a metadata file depends on the number of files of a database. For example, it is about 20KB in a database containing 10 files.

. . . .

9.3.1.6 Prepare the automated operation of backup

You can automate the backup using the job creation wizard of SQL Server or SystemWalker/OperationMGR. Automate the backup using commands provided by AdvancedCopy Manager.

9.3.2 Performing backup and restore

This section explains how to perform backup and restore of an SQL Server database.

9.3.2.1 Performing backup

The backup of the SQL Server database consists of the following procedures:

- Starting synchronous processing (only if synchronous- type backup is used)

- Backing up a database

- Backing up a transaction log

Starting synchronous processing (only if synchronous type backup is used)

In the case of synchronous type backup, synchronous processing (EC/REC) should be started beforehand. Synchronous processing starts by executing swststartsync (Backup synchronous processing starting command). If the database consists of two or more volumes, synchronous processing should be executed for all the database volumes.

Example

Start synchronous processing for all the database volumes.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swststartsync  g1d1p1
g1d1p1 swststartsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swststartsync  g1d2p1
g1d2p1 swststartsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swststartsync  g1d3p1
g1d3p1 swststartsync completed
C:\>
```

Backing up a database

Backup of an SQL Server database is performed by swstbackup_sqlsvr (SQL Server backup execution command).

📒 Note

- The transaction log is not truncated by a snapshot backup. Therefore, execute the log backup for the truncation of the transaction log regularly, even when the backup consists only of the database backup. For details, refer to the clause "Truncating the Transaction Log" in "SQL Server Books Online."

- If an error occurs while the SQL Server backup execution command (swstbackup_sqlsvr) is processing a database that consists of two or more volumes and the backup execution command (swstbackup) is running, processing is interrupted at that time and the backup history information on AdvancedCopy Manager may become inconsistent. In order to prevent such inconsistency, delete unnecessary history information using swsthistdel (History information deletion command). Additionally, for the volumes for which the replication processing has already been completed, after you fix the cause of the error, restart synchronous processing by using swststartsync (Backup synchronous processing starting command).

Figure 9.10 Recovery from a backup history information inconsistency
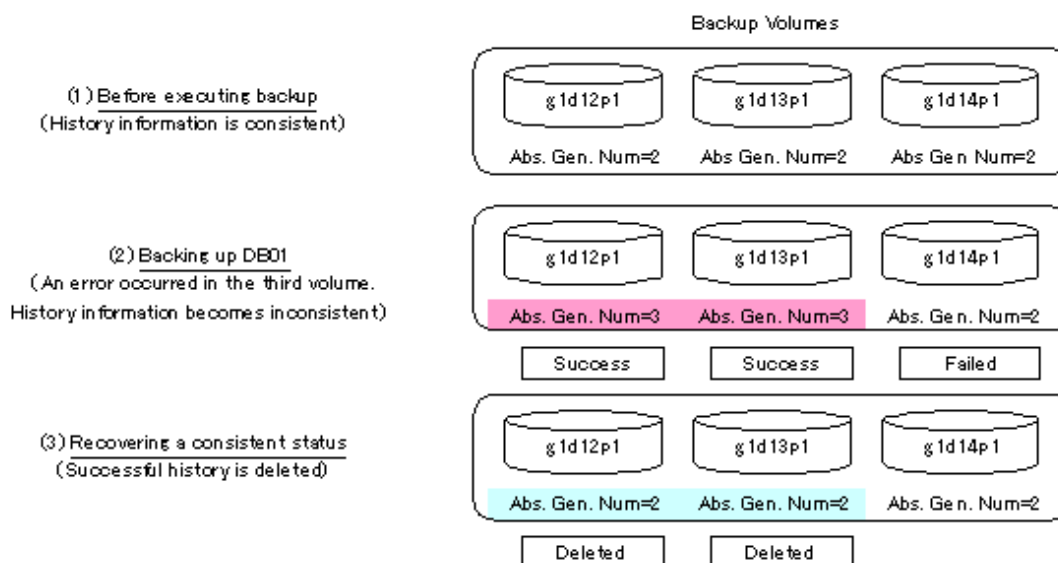
Example

Perform backup of databases DB01, DB02 and DB03. If you use a synchronous type backup, then by executing swstsyncstat (Backup synchronous processing progress display command), you can confirm synchronous processing for all database volumes is in the equivalency maintenance state (namely, when the Execute column is "100%"). Execute the command from the business server (DB-SVR), where it is assumed that the device map file name is G:\SQLADM\devmap.txt.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbackup_sqlsvr -Xserver VSERVER -Xdevmap G:
\SQLADM\devmap.txt DB01 DB02 DB03
DB01 DB02 DB03 swstbackup_sqlsvr completed
C:\>
```

When the SQL Server backup execution command (swstbackup_sqlsvr) is executed with "-suspend" specified, the Suspend/Resume function suspends the synchronous processing and executes the backup. For information on the Suspend/Resume function, refer to Chapter 5 Backup Process That Uses the Suspend/Resume Function

Backing up a transaction log

Back up the transaction log with Enterprise Manager or Transact-SQL of SQL Server.

9.3.2.2 Performing restore

The restore of an SQL Server database consists of the following procedures:

- ・ Backing up a transaction log (perform this if restore to the latest point is required)

- ・ Restoring a database

- ・ Recovering a database (perform this if restore to latest point or specific point is required)

Backing up a transaction log (perform this if restore to the latest point is required)

Back up the transaction log if the restoration to the latest point will need to be performed (you should execute the BACKUP LOG statement using the NO_TRUNCATE clause to back up the currently active transaction log.)

You cannot perform a restore to the latest point if the transaction log has not been backed up or if a failure has occurred, causing the log backup to be disabled. In such cases, use the latest log backup before the failure occurs to perform database recovery.

Restoring a database

Restore a database by performing the following two procedures:

- ・ Restoring files

- ・ Recreating a database

 Note

If the user's default database (at the time of login) is set as the target database for restoration, then it must be changed to the master database before the above operation. In such cases, the steps for restoration are as follows:

1. The default database is changed to the master for restoration.

2. "Restoring file" work is done.

3. "Recreating a database" work is done.

4. The default database is changed back to the database for restoration from the master.

The default database can be changed by Enterprise Manager, as follows:

1. Expand a server group, and then expand a server.

2. Expand Security, and then click Login.

3. In the details pane, right-click the login to modify, and then click Properties.

4. In the Database list, on the General tab, click the new default database to which the login is connected after logging into an instance of SQL Server. (The abovementioned modification method is detailed in the section titled "To change the default database of a login" of [Administering SQL Server]->[Managing Security]->[Managing Security Accounts]->[Modifying Logins] in "SQL Server Books Online".

Restoring files

Restore all the database files (data and log files).

🔻 Note

. . . .

- You cannot restore log files alone.

- Restore all the database files as follows:

Table 9.7 Steps to restore all database files

Step	Step name	Description
1	Deleting a database	Delete a database using Enterprise Manager. When you apply logs, be careful not to delete the "history of database backup and restore". If you do, you will no longer be able to apply logs from Enterprise Manager. In this case, apply logs by Transact-SQL. The user who recreates a database as described in a subsequent section is the owner of the database after restoration is completed. If this user is different from the database owner before the restoration, then the database owner must be changed after the database is recreated. Therefore, identify the present database owner before deleting the database.
2	Executing the restore execution command	Execute swstrestore (Restore execution command) for the transaction volumes on which all the database files are placed.

. . . .

ℙ Point

. . . .

- A metadata file as well as the database files will be restored to the same folder as the data file with file identification number 1.

- If you save the data on a backup volume of AdvancedCopy Manager to a tape unit, you can also directly restore files from the tape unit to the database volumes without using the restore execution command.

. . . .

Example

Restore files by using the restore execution command (swstrestore) after deleting the databases.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore g1d1p1
g1d1p1 swstrestore completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore  g1d2p1
g1d2p1 swstrestore completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore  g1d3p1
g1d3p1 swstrestore completed
C:\>
```

Recreating a database

Recreate a database using swstrestore_sqlsvr (SQL Server restore execution command). You can select one of the following restore methods:

- Restore to the latest point or a specific point

- Restore to the backup point

- 225 -

> 📑 **Note**
>
> ....
>
> The database owner after restoration is the user who recreated the database. If this user is different from the database owner before the restoration, then change the owner by using the following stored procedure: sp_changedbowner.
>
> ....

Example

Recreate the databases after performing file restore. Because the metadata files are restored to D:\SQLSVR\DB01.swst-dmp etc., execute the commands specifying these files.

In the example below, the -Xnolog option is not specified after database recreation. This is because it is assumed that the database will be restored to the latest point or to a specific point in time, as a result of the application of transaction logs.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore_sqlsvr -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB01.swst-dmp DB01
DB01 swstrestore_sqlsvr completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore_sqlsvr -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB02.swst-dmp DB02
DB02 swstrestore_sqlsvr completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstrestore_sqlsvr -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB03.swst-dmp DB03
DB03 swstrestore_sqlsvr completed
C:\>
```

> 🅿 **Point**
>
> ....
>
> Once the SQL server restore execution command completes normally, the metadata file will be deleted automatically.
>
> ....

Recovering a database (perform this if restore to the latest point or a specific point is required)

To restore a database to the latest point or a specific point, apply logs using Enterprise Manager. For information on the operation method, refer to "How to apply a transaction log backup (Enterprise Manager)" in the "SQL Server Books Online".

If you cannot apply logs using Enterprise Manager because, for example, the backup history of msdb is lost, apply logs using Transact-SQL. For information on the operation method, refer to "How to apply a transaction log backup (Transact-SQL)" in the "SQL Server Books Online".

9.3.2.3   Confirming operational status

Confirm the copy status by executing swstsyncstat (Backup synchronous processing progress display command), swstbackstat (backup execution status display command), and swstreststat (Restore execution status display command). The database backup history information is stored in msdb of the SQL Server. You can determine the latest backup time by selecting "Property" after right-clicking in the target database on the tree screen of Enterprise Manager.

9.3.2.4   Stopping operations

To stop the currently running copy processing, use swstcancelsync (backup synchronous processing cancel command), swsthistdel (History information deletion command), and swstcancelrest (Restore cancellation command).

Example

Stop backup synchronous processing under execution.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync  g1d1p1
g1d1p1 swstcancelsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync  g1d2p1
g1d2p1 swsrpcancel completed
```

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync  g1d3p1
g1d3p1 swstcancelsync completed
C:\>
```

9.3.2.5   Operation by Cluster

AdvancedCopy Manager supports Microsoft Clustering Service (MSCS) or Windows Server (R) Failover Clustering (WSFC). For more information on this, refer to the "Notes on cluster operation".

9.4 Operation using replication management function

9.4.1   Preparations

Perform the following preparations before the backup of SQL Server is started:

- ・ Configure the environment for SQL Server

- ・ General preparation

- ・ Prepare a device map file

- ・ Record the output path of a metadata file

- ・ Prepare the automated operation of backup

The following example is used for explanation in the following subsections.

Figure 9.11 SQL Server backup environment example
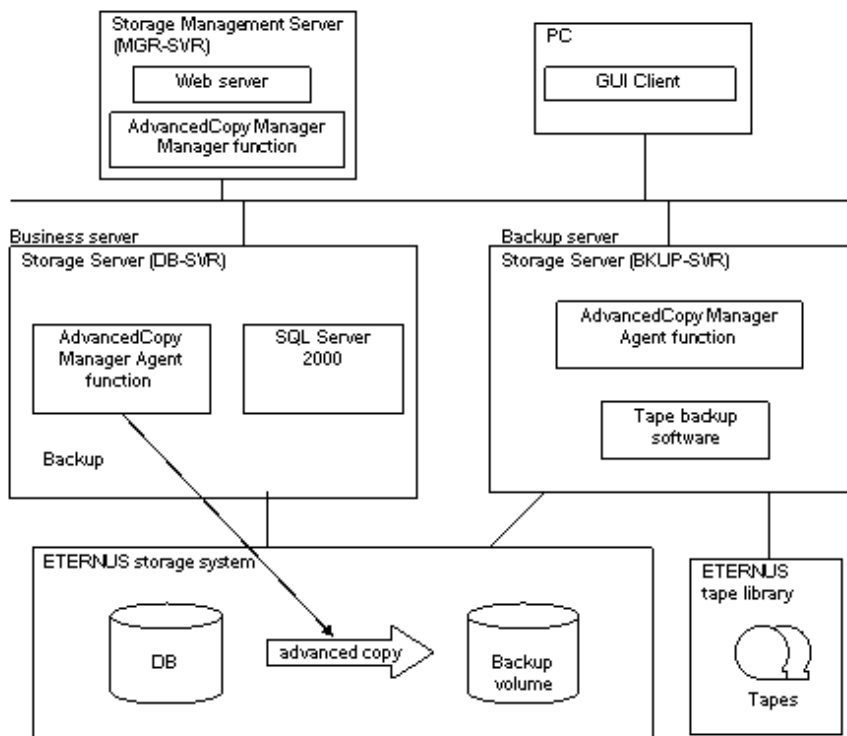
Table 9.8 Server configuration

Server type	Server name	Comment
Storage Management Server	MGR-SVR	
Storage Server	DB-SVR	・ Business server ・ operating on MSCS (AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)
Storage Server	BKUP-SVR	Backup server

Table 9.9 Database configuration

Database name	Database file name	Database file type
DB01	D:\SQLSVR\DB01.mdf	Primary data file
	E:\SQLSVR\DB01.ndf	Secondary data file
	F:\SQLSVR\DB01.ldf	Transaction log file
DB02	D:\SQLSVR\DB02.mdf	Primary data file
	E:\SQLSVR\DB02.ndf	Secondary data file
	F:\SQLSVR\DB02.ldf	Transaction log file
DB03	D:\SQLSVR\DB03.mdf	Primary data file
	E:\SQLSVR\DB03.ndf	Secondary data file
	F:\SQLSVR\DB03.ldf	Transaction log file

Table 9.10 Database volume configuration

Drive letter	AdvancedCopy Manager device name
D:	g1d1p1@DB-SVR
E:	g1d2p1@DB-SVR
F:	g1d3p1@DB-SVR

9.4.1.1   Configure the environment for SQL Server

Set up SQL Server according to database backup configuration instructions. If you apply logs at the time of recovering a database, set the "recovery model" of a database to "Full" or "Bulk-Logged".

For more information, refer to "Designing a Backup and Restore Strategy" in the "SQL Server Books Online".

9.4.1.2   General preparation

Perform the processing described in "7.4 Preparations", noting the following points:

・ Register all the database volumes and register the backup volumes which will become copy destinations.

・ Configure a database volume and a backup volume to be a source volume and a replica volume, respectively (do not reverse a source volume and a replica volume).

・ Configure the original server which operates the database to be an operation server when you use the backup server (specify "ORG" for the argument of the -o option in the replication volume information setting command).

・ Specify the -u option if you do not use the advanced copy to perform the file restore. The direction of the copy can be limited to one direction from the source volume (ie, the database volume) to the replica volume (ie, the backup volume).

Example

Set the replication volume information for all the target database volumes in AdvancedCopy Manager. Execute the command from the business server (DB-SVR).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol  -o  ORG  g1d1p1  g1d11p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol  -o  ORG  g1d2p1  g1d12p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol  -o  ORG  g1d3p1  g1d13p1@BKUP-SVR
swsrpsetvol completed
C:\>
```

9.4.1.3   Prepare a device map file

It is necessary to create a file (called a device map file) which describes the relation between database volumes and backup volumes, which is used by the SQL Server backup execution command. The SQL Server backup execution command copies data onto the backup volumes specified for a device map file.

Place a device map file in an arbitrary place on the server which operates the database (ie, the original server). The backup destination of the database volume is declared by specifying this file when backup is performed.

Describing a device map file

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

```
# Device map file for AdvancedCopy Manager SQL Server Support Function

# database volume names        backup volume names
# (original volume names)      (replica volume names)

# Database DB01,DB02,DB03
g1d1p1        g1d11p1@BKUP-SVR # D: primary data file
g1d2p1        g1d12p1@BKUP-SVR # E: secondary data file
g1d3p1        g1d13p1@BKUP-SVR # F: log file

# Database DB04,DB05,DB06
g1d4p1        g1d14p1@BKUP-SVR # G: primary data file
g1d5p1        g1d15p1@BKUP-SVR # H: secondary data file
 :
```

The following describes the rules for creating a device map file:

・ Describe a database volume and a corresponding target backup volume in one line. Separate a database volume and a backup volume with one or more blank or tab characters. One or more blank or tab characters may be included between the beginning of a line and a database volume name or between t0he end of a backup volume name and the end of a line (which is denoted by a newline character).

・ Specify the backup volume of a backup server in the form of "volume name@server name". Only the form "volume name" can be used for the database volume. It should also be noted that the form "volume name@database server name" cannot be used for the transaction database name.

・ A blank line may be included in a file.

・ The portion from the symbol "#" to the end of a line is interpreted as a comment.

・ You cannot specify more than one target backup volume for each database volume in one device map file. If you do, only the information in the first line will be valid. While the whole device map file will be read, the system will ignore the redundant lines after the first line. You must prepare multiple device map files if you perform a multiple generation backup.

・ A device map file may include descriptions of database volumes other than the processing target database. (Refer to the description example provided in the beginning of this chapter for details of this.)

・ Describe all the database volumes of a multivolume database in one device map file. (The description cannot be extended over multiple files.)

9.4.1.4 Record the output path of a metadata file

At the time of backup execution, the "metadata" which includes information, such as path name, size and file type, etc. of the database files of the database for backup is saved from SQL Server. AdvancedCopy Manager saves this in a metadata file in the backup volume. A metadata file is restored to the database volume at the time of restore of the database files.

Since this file is essential when executing the SQL Server restore execution command (swsrprestore_sql), it is necessary to record the absolute path of the metadata file in advance.

The metadata file is saved with the name of ""DB name".swsrp-dmp" in the folder where the database file with file identification number (FILE_ID) 1 exists. For example, if the absolute path of the database file with file identification number 1 of a database DB01 is "D:\SQLSVR\DB01_data.mdf", then the absolute path of a metadata file will be "D:\SQLSVR\DB01.swsrp-dmp." Even though the database file with file identification number 1 is a primary data file, you should confirm it with the following procedure:

1. Perform the Transact-SQL command "USE database name EXEC SP_HELPFILE".

2. Look for the record with which the column "file id" is 1 as a result of this execution. The content of the column "filename" of the record is the absolute path of the database file with file identification number 1.

🅿 Point
. . . .

Although you need to ensure that there is enough space to store a metadata file in the transaction volume, the size of a metadata file is very small, so there is really no need to check this. The size of a metadata file depends on the number of files of a database. For example, it is about 20KB in a database with 10 files.
. . . .

9.4.1.5 Prepare the automated operation of backup

You can automate the backup by using the job creation wizard of SQL Server or SystemWalker/OperationMGR. In either case, this is achieved with commands provided by AdvancedCopy Manager.

9.4.2 Performing backup and restore

This section explains how to perform backup and restore of an SQL Server database.

9.4.2.1 Performing backup

The backup of an SQL Server database consists of the following procedures:

・ Starting or resuming synchronous processing (only if synchronous type backup is used)

・ Backing up the database

・ Backing up the transaction log

Starting or resuming synchronous processing (only if synchronous type backup is used)

In the case of synchronous type backup, synchronous processing (EC/REC) should be started or resumed beforehand. Synchronous processing starts by executing swsrpstartsync (Backup synchronous processing starting command). If the database is composed of two or more volumes, synchronous processing for all the database volumes should be executed.

Example

Start or resume synchronous processing for all the database volumes. Execute the command from the business server (DB-SVR).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstartsync  g1d1p1  g1d11p1@BKUP-SVR
FROM=g1d1p1@DB-SVR,TO=g1d11p1@BKUP-SVR swsrpstartsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstartsync  g1d2p1  g1d12p1@BKUP-SVR
FROM=g1d2p1@DB-SVR,TO=g1d12p1@BKUP-SVR swsrpstartsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstartsync  g1d3p1  g1d13p1@BKUP-SVR
FROM=g1d3p1@DB-SVR,TO=g1d13p1@BKUP-SVR swsrpstartsync completed
C:\>
```

Backing up a database

Backup of an SQL Server database is performed by swsrpbackup_sql (SQL Server backup execution command).

Note

. . . .

- ・ The transaction log is not truncated by performing a snapshot backup. Therefore, execute the log backup for the truncation of the transaction log regularly even when the backup only consists of the database backup. For details, refer to the section "Truncating the Transaction Log" in "SQL Server Books Online."

- ・ If an error occurs while the SQL Server backup execution command (swsrpbackup_sql) is processing a database that consists of two or more volumes with the replication creation command (swsrpmake), processing is interrupted at that time. In the case of volumes for which the replication processing has already been completed, after you fix cause of the error, restart synchronous processing by using swsrpstartsync (Backup synchronous processing starting command).

. . . .

Example

Perform backup of databases DB01, DB02 and DB03. If you use the synchronous type backup, run swsrpstat (Operation status display command) to confirm that synchronous processing for all database volumes is in the equivalency maintenance state (where the Execute column is "100%"). Execute the command from the business server (DB-SVR), where it is assumed that the device map file name is G:\SQLADM\devmap.txt.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_sql -Xserver VSERVER -Xdevmap G:
\SQLADM\devmap.txt DB01 DB02 DB03
DB01 DB02 DB03 swsrpbackup_sql completed
C:\>
```

Backing up transaction log

Back up the transaction log with Enterprise Manager or Transact-SQL in SQL Server.

9.4.2.2   Performing restore

The restore of the SQL Server database consists of the following procedures:

- ・ Backing up a transaction log (perform this if restore to the latest point is required)

- ・ Restoring a database

- ・ Recovering a database (perform this if restore to the latest point or to a specific point is required)

Backing up a transaction log (perform this if restore to the latest point is required)

Backup the transaction log if a restoration to the latest point is required (execute the BACKUP LOG statement using the NO_TRUNCATE option to back up the currently active transaction log).

You cannot perform the restore to the latest point if the transaction log has not been backed up, or if a failure has occurred when disabling the log backup. In such cases, use the latest log backup before the failure occurred to perform database recovery.

Restoring a database

Restore a database by performing the following two procedures:

・ Restoring files

・ Recreating a database

📒 Note

If a user's default database (the one used after logging on) is set as the target database of restoration, then it must be changed to be the master database before the above operation is performed. In such cases, the steps for restoration are as follows:

1. The default database is changed into the master from the database for restoration.

2. "Restoring file" processing is performed.

3. "Recreating a database" processing is performed.

4. The default database is changed to the database for restoration from the master.

The default database can be changed by Enterprise Manager, as follows:

1. Expand a server group, and then expand a server.

2. Expand Security, and then click Logins.

3. In the details pane, right-click the login to modify, and then click Properties.

4. In the Database list, on the General tab, click the new default database to which the user is connected after logging in to an instance of SQL Server. (The abovementioned modification method is shown by "To change the default database of a login" of [Administering SQL Server]->[Managing Security]->[Managing Security Accounts]->[Modifying Logins] in "SQL Server Books Online").

Restoring files

Restore all the database files (ie, data and log files).

📒 Note

・ You cannot restore log files alone.

・ Restore all the database files as follows:

Table 9.11 Steps to restore all database files

Step	Step name	Description
1	Deleting a database	Delete the database using Enterprise Manager. When you apply logs, be careful not to delete the "history of database backup and restore". If you do, you will no longer be able to apply logs from Enterprise Manager. In this case, apply logs by using Transact-SQL.
		The user who recreates a database as described in a subsequent section is the owner of the database after restoration is completed. If this user is different from the database owner before the restoration, then the database owner must be changed after the database is recreated. Therefore, determine the identity of the present database owner before deleting the database.
2	Executing the replication creation command	For backup within a cabinet
		Executing swsrpmake (Replication creation command), copy all the database files from the backup volumes to the database volumes.

Step	Step name	Description
		For backup between cabinets
		Use the replication start command (swsrpstartsync) and swsrpmake (Replication creation command) to copy all the database files from the backup volumes to the database volumes.

- A metadata file as well as database files will be restored to the same folder as the data file with file identification number 1.

- If you also save the data on a backup volume to a tape unit, you can then directly restore files from the tape unit to the database volumes without using the replication creation command.

Example (for backup within a cabinet)

Restore files by using the snapshot type replication (OPC) after deleting the databases.
Execute the following commands from the business server (DB-SVR):

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake  g1d11p1@BKUP-SVR  g1d1p1
FROM=g1d11p1@BKUP-SVR,TO=g1d1p1@DB-SVR swsrpmake completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake  g1d12p1@BKUP-SVR  g1d2p1
FROM=g1d12p1@BKUP-SVR,TO=g1d2p1@DB-SVR swsrpmake completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake  g1d13p1@BKUP-SVR  g1d3p1
FROM=g1d13p1@BKUP-SVR,TO=g1d3p1@DB-SVR swsrpmake completed
C:\>
```

Example (for backup between cabinets)

Delete the databases, and then use synchronous replication (REC) to restore the files.
Execute these commands from the transaction server (DB-SVR).

```
C:\>set SWSTGNODE=nodeAGT                                        C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpstartsync g1d11p1@BKUP-SVR g1d1p1
FROM=g1d11p1@BKUP-SVR,TO=g1d1p1@DB-SVR swsrpstartsync completed        C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpstarsync g1d12p1@BKUP-SVR g1d2p1
FROM=g1d12p1@BKUP-SVR,TO=g1d2p1@DB-SVR swsrpstartsync completed        C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpstartsync g1d13p1@BKUP-SVR g1d3p1
FROM=g1d13p1@BKUP-SVR,TO=g1d3p1@DB-SVR swsrpstartsync completed          (Wait until
equivalency status is reached)                                  C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpmake g1d11p1@BKUP-SVR g1d1p1   FROM=g1d11p1@BKUP-
SVR,TO=g1d1p1@DB-SVR swsrpmake completed              C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpmake g1d12p1@BKUP-SVR g1d2p1   FROM=g1d12p1@BKUP-
SVR,TO=g1d2p1@DB-SVR swsrpmake completed                 C:\>C:\Win32App
\AdvancedCopyManager\bin\swsrpmake g1d13p1@BKUP-SVR g1d3p1   FROM=g1d13p1@BKUP-
SVR,TO=g1d3p1@DB-SVR swsrpmake completed
C:\>
```

Recreating a database

Recreate a database using swsrprestore_sql (SQL Server restore execution command). You can select one of the following restore methods:

- Restore to the latest point or a specific point

- Restore to the backup point

The database owner after restoration is completed is the user who recreated the database. If this user is different from the database owner before the restoration, then change the owner by using the following stored procedure: sp_changedbowner.

Example

Recreate the databases after performing file restore. Because the metadata files are restored to D:\SQLSVR\DB01.swsrp-dmp etc., execute the commands specifying these files from the business server (DB-SVR).
In the example below, the -Xnolog option is not specified after database recreation. This is because it is assumed that the database will be restored to the latest point or to a specific point in time, as a result of the application of transaction logs.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB01.swsrp-dmp DB01
DB01 swsrprestore_sql completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB02.swsrp-dmp DB02
DB02 swsrprestore_sql completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta  D:
\SQLSVR\DB03.swsrp-dmp DB03
DB03 swsrprestore_sql completed
C:\>
```

💠 Point

Once the SQL server restore execution command completes normally, the metadata file will be deleted automatically.

Recovering a database (perform this if restore to the latest point or to a specific point is required)

To restore a database to the latest point or to a specific point, apply logs using Enterprise Manager. For more information, refer to "How to apply a transaction log backup (Enterprise Manager)" in the "SQL Server Books Online".

If you cannot apply logs using Enterprise Manager because, for example, the backup history of msdb is lost, apply logs using Transact-SQL. For more information, refer to "How to apply a transaction log backup (Transact-SQL)" in the "SQL Server Books Online".

9.4.2.3   Confirming operational status

Confirm the copy status by swsrpstat (Operation status display command). The database backup history information is stored in msdb of SQL Server. You can refer to the latest backup time by selecting "Property" after right-clicking in the target database on the tree screen of Enterprise Manager.

9.4.2.4   Stopping operations

When the copy processing under execution is stopped, use swsrpcancel (Replication cancellation command).

Example

Stop backup synchronous processing under execution.
Execute the command from the business server (DB-SVR).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel  g1d1p1  g1d11p1@BKUP-SVR
FROM=g1d1p1@DB-SVR,TO=g1d11p1@BKUP-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel  g1d2p1  g1d12p1@BKUP-SVR
FROM=g1d2p1@DB-SVR,TO=g1d12p1@BKUP-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel  g1d3p1  g1d13p1@BKUP-SVR
```

```
FROM=g1d3p1@DB-SVR,TO=g1d13p1@BK-SVR swsrpcancel completed
C:\>
```

9.4.2.5 Operation by Cluster

AdvancedCopy Manager supports Microsoft Clustering Service (MSCS) or Windows Server (R) Failover Clustering (WSFC). For more information, refer to the "Notes on cluster operation".

Chapter 10 Operation Maintenance

This chapter provides information on how to maintain a database, perform troubleshooting, and change the operation information.

10.1 Maintenance of Database

AdvancedCopy Manager holds various repositories of management information on the usage of its functions. They are named generically and are referred to as a database in this chapter.

A database is important information. You are recommended to periodically back up a database that is frequently updated, when the space available for repositories becomes insufficient after long-time usage of the database that is different from originally planned, as a safeguard against running out of space. (Note that it differs from other types of databases such as ORACLE etc.)

The following table lists instances when backup of the database is needed.

Table 10.1 Databases on a Storage Management Server

Type	When a backup to be created	Backup method (references)	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. The information on backup management or the replication management operation has changed.	10.1.1.3.1 Saving a database or 10.1.2 Making a package backup of databases	Refer to 10.1.1.3.1 Saving a database.
Authentication management list	Authenticated data has been set.	10.1.1.4 Maintaining an authentication management list or 10.1.2 Making a package backup of databases	Refer to 10.1.1.4 Maintaining 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 information (server name, IP address, or port number) has changed.	10.1.1.5.1 Backing up a registry or 10.1.2 Making a package backup of databases	Refer to 10.1.1.5.1 Backing up a registry.

Table 10.2 Databases on a Storage Server

Type	When a backup to be created	Backup method (references)	Size
Registry	A Storage Server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	10.1.1.5.1 Backing up a registry or 10.1.2 Making a package backup of databases	Refer to 10.1.1.5.1 Backing up a registry.

Type	When a backup to be created	Backup method (references)	Size
Backup management list	A backup transaction has been completed.	10.1.1.1.1 Backing up a backup management list or 10.1.2 Making a package backup of databases	Refer to 10.1.1.1.1 Backing up a backup management list .
Device information used for backup management	The device configuration has changed.	10.1.1.1.3 Saving of device information used by backup management	None
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 10.1.2 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.	Make a backup using the copy command individually or 10.1.2 Making a package backup of databases	Check the size of the pre-processing and post-processing script files for tape-copy.
Transaction volume locking specification file for backups	The transaction volume locking specification file for backups has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the transaction volume locking specification file for backups.
Backup volume locking specification file for backups	The backup volume locking specification file for backups has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the backup volume locking specification file for backups.
Backup-restored volume locking specification file	The backup-restored volume locking specification file has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the file to be backed up.
Backup volume locking specification file for tape-copy	A change is made to the tape-copy backup volume-locking file.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the file for which you make a backup.
Replication management list	A replication transaction has been completed.	10.1.1.2.1 Backing up a replication management list or 10.1.2 Making a package backup of databases	Refer to 10.1.1.2.1 Backing up a replication management list.
Device information used for replication management	The device configuration has changed.	10.1.1.2.3 Saving of device information used by replication management	None
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 10.1.2 Making a package backup of databases	Check the size of the pre-processing and post-processing script file for replication management.

Type	When a backup to be created	Backup method (references)	Size
Copy-source volume locking specification file	The copy-source volume locking specification file has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the copy-source volume locking specification file.
Copy-destination volume locking specification file	The copy-destination volume locking specification file has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the copy-destination volume locking specification file.
Policy file for management information package backup	The policy file has changed.	Saving a database by using the copy command or 10.1.2 Making a package backup of databases	Check the size of the policy file for management information package backup.

Table 10.3 Databases on a tape server

Type	When a backup to be created	Backup method (references)	Size
Registry	A tape server has been added or Storage Management Server information (server name, IP address, or port number) has changed.	10.1.1.5.1 Backing up a registry or 10.1.2 Making a package backup of databases	Refer to 10.1.1.5.1 Backing up a registry.
Tape management list	A tape-backup transaction has been completed.	Backing up a tape management list or 10.1.2 Making a package backup of databases	Refer to 10.1.1.1.1 Backing up a backup management list.

 Point

....

You can create backups of databases either individually or as a whole.

If a Storage Server also operates as a Storage Management Server, the Storage Server contains a database for the Storage Management Server as well as for the Storage Server.

....

10.1.1 Making individual backups of databases

10.1.1.1 Maintaining a backup management list

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

10.1.1.1.1 Backing up a backup management list

A backup management list is backed up.
For details of this, refer to swstresback (Resource backup command).

Backup management list backup data size

Check the size of the file that the subdirectory of the following directory contains.

```
<environment-settings-directory>\etc\backup\data
```

In the cluster environment, check the size of the file that the subdirectory of the following directory contains

```
<shared disk>:\etc\opt\swstorage\etc\backup\data
```

10.1.1.1.2   Restoring a backup management list

A backup management list is restored.
For details of this, refer to swstresrst (Resource restore command).

10.1.1.1.3   Saving of device information used by backup management

To perform the backup by using synchronous high-speed backup, it is necessary to save device information used by the backup management.

When the device configuration is changed, save device information as follows:

1. Confirm that backup synchronous processing has not begun. Use "GUI client" or "swstsyncstat (Backup synchronous processing progress display command)" to confirm the state of the backup synchronous processing.

2. Confirm that replication synchronous processing has not begun when the replication management is performed. Use "swsrpstat (Operation status display command)" to confirm the state of the replication synchronous processing.

3. To acquire device information, follow the instructions in "4.4.5 Fetching device information on a Storage Server".

4. Save the device information used by the backup management. Execute the following command to save the device information.

```
C:\>program-directory\bin\swstcmdmbak.exe
```

When the AdvancedCopy Manager server is operating in a cluster environment, save device information as follows:

Perform this operation without setting environment variable SWSTGNODE.

1. Confirm that the backup synchronous processing has not begun. Use "GUI client" or "swstsyncstat (Backup synchronous processing progress display command)" to confirm the state of the backup synchronous processing.

2. Confirm that the replication synchronous processing has not begun when the replication management is performed. Use "swsrpstat (Operation status display command)" to confirm the state of the replication synchronous processing.

3. Save the device information used by the backup management by e executing the following command.

```
C:\>program-directory\bin\clset_Repdevice.exe Logical-Node-Name
```

10.1.1.1.4   Recovering of device information used by backup management

If the system was rebooted or the AdvancedCopy Manager service was restarted during synchronous processing, device information used with the backup management might have become incorrect.

In this case, recover the device information as follows:

When the AdvancedCopy Manager server is working in a cluster environment, perform the following after the environment variable SWSTGNODE is set:

1. Recover the device information used by backup management by executing the following command:

   ```
   C:\>program-directory\bin\swstcmdmrst.exe
   ```

2. Confirm the backup synchronous processing status. Use "GUI client" or "swstsyncstat (Backup synchronous processing progress display command)" to confirm the state of the backup synchronous processing.

3. Confirm the replication synchronous processing status when replication management is performed. Use "swsrpstat (Operation status display command)" to confirm the state of the replication synchronous processing.

10.1.1.2   Maintaining a replication management list

This section describes the maintenance of a replication management list.

10.1.1.2.1   Backing up a replication management list

To back up a replication management list, back up the repository of the Storage Management Server. For information about backing up a repository, refer to "Saving a database" relevant to the OS of the Storage Management Server.

🅿 Point
. . . .

- ・ Operational information for replication management is saved in a repository.

- ・ It is recommended that a replication management list be backed up when operation information for replication management is changed with swsrpsetvol (Replication volume information configuration command), or with swsrpdelvol (Replication volume information deletion command).
. . . .

10.1.1.2.2   Restoring a replication management list

Perform the following steps to restore a replication management list:

1. Restore the repository to the Storage Management Server. For information about restoring a repository, refer to "Recovering a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS of the Storage Management Server.

   - If the Storage Management Server is Windows
     Select "RDB dictionary and DSI recovery (LOAD Mode)" as the recovery method.

   - If the Storage Management Server is Solaris or Linux
     Specify 0 for stgdbrcv -m option (recovery mode) as the recovery method.

2. On the Storage Server, execute swsrprecoverres (Resource adjustment command) with the -r option specified. For details of the resource adjustment command, refer to "swsrprecoverres (Resource adjustment command)".

🅿 Point
. . . .

- ・ When step 1 above is performed, operational information for replication management of a repository is copied to a Storage Server, where it is then available for use.

- ・ When this information for replication management in the repository does not need to be changed, and only the operation information for replication management on the Storage Server is incorrect (for some reason), perform only step 2.
. . . .

10.1.1.2.3　Saving of device information used by replication management

To perform the replication by using synchronous replication, it is necessary to save device information used by the replication management.

When the device configuration is changed, save device information as follows:

1. Confirm that replication synchronous processing has not begun. Use swsrpstat (Operation status display command) to confirm the state of the replication synchronous processing.

2. Confirm that backup synchronous processing has not begun when the backup management is performed. Use the "GUI client" or swstsyncstat (Backup synchronous processing progress display command) to confirm the state of the backup synchronous processing.

3. To retrieve device information, perform "7.4.4 Fetching device information from a Storage Server".

4. Save the device information used by the replication management. Execute the following command to perform this.

   ```
   C:\>program-directory\bin\swsrpcmdmbak.exe
   ```

When the AdvancedCopy Manager server is working in a cluster environment, save device information as follows:
Perform this operation without setting the environment variable SWSTGNODE.

1. Confirm that replication synchronous processing has not begun. Use swsrpstat (Operation status display command) to confirm the state of the replication synchronous processing.

2. Confirm that backup synchronous processing has not begun when the backup management is performed. Use the "GUI client" or swstsyncstat (Backup synchronous processing progress display command) to confirm the state of the backup synchronous processing.

3. Save the device information used by the replication management. Execute the following command to save the device information.

   ```
   C:\>program-directory\bin\clset_Repdevice.exe Logical-Node-Name
   ```

10.1.1.2.4　Recovery of device information used by replication management

If the system was rebooted or the AdvancedCopy Manager service was restarted while synchronous processing, device information used with the replication management might become incorrect.

In this case, recover device information as follows:

When the AdvancedCopy Manager server is working in a cluster environment, perform this operation after the environment variable SWSTGNODE is set.

1. Recover the device information used by replication management. Execute the following command to recover the device information.

   ```
   C:\>program-directory\bin\swsrpcmdmrst.exe
   ```

2. Confirm the replication synchronous processing status. Use swsrpstat (Operation status display command) to confirm the state of the replication synchronous processing.

3. Confirm the backup synchronous processing status when the backup management is performed. Use the "GUI client" or swstsyncstat (Backup synchronous processing progress display command) to confirm the state of the backup synchronous processing.

10.1.1.3　Maintaining a database

This section describes the maintenance of a database used by a Storage Management Server.

10.1.1.3.1 Saving a database

Saving a database can be performed either through functionality provided Using a Web GUI or Using the database save command.

An explanation of each method is provided below

![Note icon] **Note**

Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

・ Terminal Service (use this via a remote desktop connection)

・ Telnet server service

If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by connecting a console session to it. Refer to the following link for information on how to make console session connections:

```
http://support.microsoft.com/kb/278845
```

![Note icon] **Note**

When the Storage Management Server is in cluster operation, you should prepare directories into which data is saved on shared disks.

Using a Web GUI

Save a database as follows:

1. Click the [Start] button and select [Programs->]/[AdvancedCopy Manager->]/[DB Setup].

2. The following window will be displayed. Click the [DB maintenance] button.
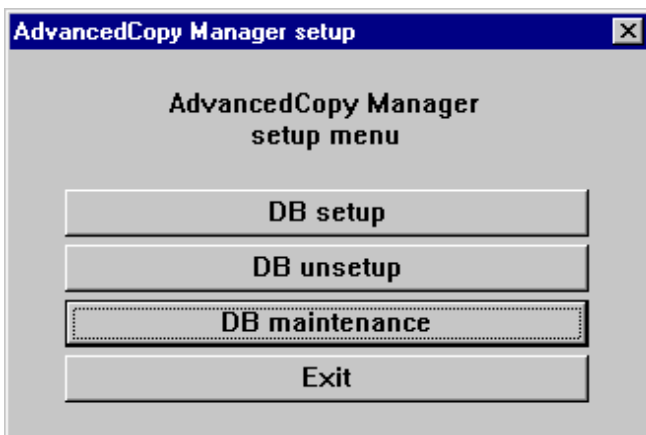
3. The following DB maintenance window will be displayed. Click the [DB save] button.
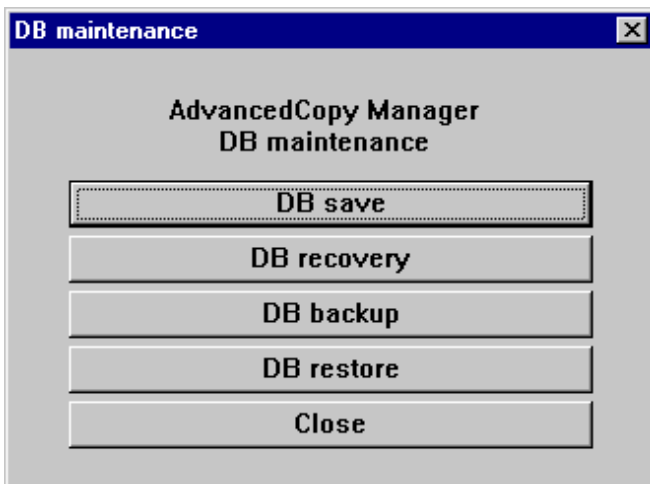
4. The save directory specification window will be displayed. To specify a save directory, enter the directory name and click the [OK] button. To overwrite an already saved directory, click in the [Overwrite if there is any previous save data in the save directory] checkbox.
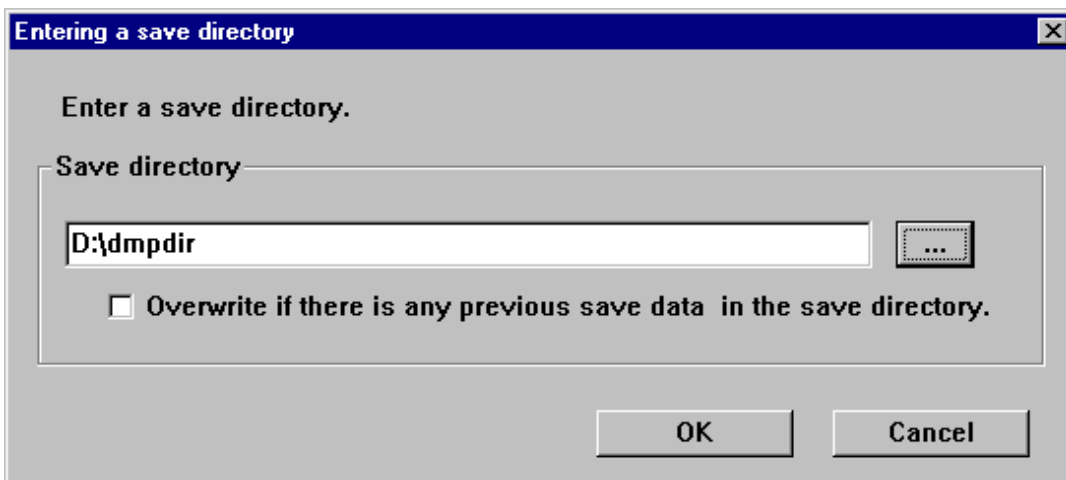
Note

Create the save directory in advance.

5. The DB save processing confirmation window will be displayed. Check that the information entered is correct and click the [Start] button.
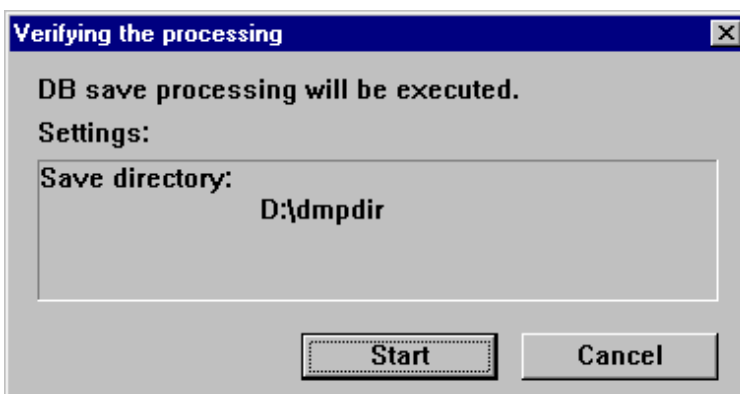
6. When the DB save has completed successfully, the following window will be displayed. Click the [Close] button.
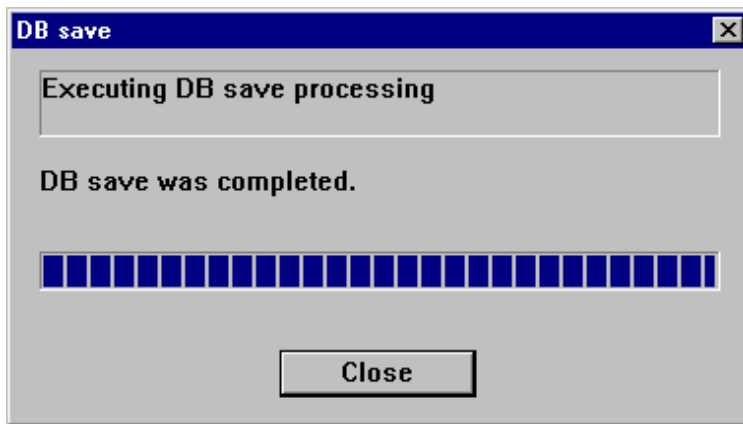
Using the database save command

Execute this command on the Storage Management Server.

SYNOPSIS

```
C:\>program-directory\bin\stgdbdmp -d Backup-Directory [ -y ]
```

OPTIONS

-d *Backup-Directory*

Specify the name of the directory in which to save a database space.
This directory must have been created in advance.

-y

If any files remain in the specified directory, they will be overwritten when the database is saved.
If this option is omitted and if any other files remain in the specified directory, processing ends without saving the database.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

Example

```
C:\>c:\Win32app\AdvancedCopyManager\bin\stgdbdmp -d c:\dmpdir
Starting SymfoWARE/RDB
Obtaining the target DSI name
Setting suppression of DSI update
Forcibly switching the archive log file
Saving the target DSI
.......................
Discarding the archive log
Saving the RDB dictionary data
Releasing suppression of DSI update
DB save was completed.

C:\>
```

NOTES

- To execute the database save command, log into a local account that belongs to the Administrator's group.

- Processing may end abnormally if another application or command is executing while this command is being processed. In this event, retry processing after the other operation has finished.

- Use this save method only when the configuration information is changed due to the addition of a Storage Server, or fetching of new device information. It is recommended to save a database regularly (for example, once a day).

- To safeguard against an input-output error in an external file while saved data is being acquired, it is recommended to keep at least two generations of saved data.

- If no data is saved by this command or by using screens, the database cannot be recovered with the 10.1.1.3.3 Recovering a database process when an input-output error has occurred in the database.

Database backup data size

Calculate the size using the following formula:

60 + (number of devices to be managed x 0.001) megabytes

10.1.1.3.2   Finding an error in a database

You will need to recover a database if an input-output error occurs while using the database. The method of recovering the database depends on where in the database the error occurred.

To determine where an error has occurred in a database, follow the steps below:

1. Click the Start button and select [Programs]->[Administrator Tool (Common)]->[Event Viewer].

2. Display the event viewer window and select [Log]->[Application].

3. The application log window will be displayed. From the records whose source name is displayed as "SymfoWARE", double-click the record that encountered the error. This will display the detailed window.

4. On the detailed window, find a qdgXXXXX error message. Table 11.1 shows the "recovery modes" corresponding to error messages. A "recovery mode" indicates where to find information that is required to recover a database. For more information, refer to "10.1.1.3.3 Recovering a database".

Table 10.4 Relationship between qdg messages and recovery modes

qdg message	Error description	Check	Recovery mode
qdg13039u	I/O error, destruction detected	Repository data space	DSI (FW mode)
qdg03400u	Rollback disabled		
qdg03401u			
qdg12079e	File deleted		
qdg03121u	I/O error	DB dictionary file	RDB dictionary (FW mode)
qdg03420u	I/O error, destruction detected, etc.		
qdg12078u	File deleted		
qdg12150u	File open error		
qdg12151u			
qdg12251e	I/O error	DB dictionary file	Log management file
qdg12443u			
qdg12434u	File error		
qdg02290u	File deleted		

qdg message	Error description	Check	Recovery mode
qdg12111u	I/O error	DB log file	Temporary log file
qdg12440u			
qdg12441u			
qdg12442u			
qdg02299u	File deleted		
qdg03815u	System call error	DB log file	Archive log file
qdg12275W			
qdg12250u	Destruction detected		
qdg12483u	File read error		

📝 Note

- If multiple errors occur at the same time, recovery may not be possible using one of the recovery modes shown above. In this case, recreate a database and then use the recovery mode "Database recovery (LOAD mode)". This will perform a recovery up to the point when data has been saved.
  Data written after the last database save will be adversely affected by the error and cannot be restored.

- swstsrsemtch (Resource adjustment command) with option -x will need to be executed on all Storage Servers on which the backup is performed, after which swsrprecoverres (Resource adjustment command) with option -r will need to be executed on the Storage Servers on which the replication is performed.

10.1.1.3.3 Recovering a database

If an input-output error (or any other error) occurs in the database space, perform recovery as follows:

📝 Note

Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

- Terminal Service (use via a remote desktop connection)

- Telnet server service

If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it. Refer to the following link for information on how to make console session connections:

```
http://support.microsoft.com/kb/278845
```

📝 Note

When the Storage Management Server is in cluster operation, note the following points:

- Before you execute this process, make the shared disk for the repository and that for shared data usable.

- Upon the successful completion of recovery, resource "SymfoWARE RDB RDBSWSTF" on the Storage Management Server transaction may remain faulty on the cluster administrator. In this case, set the Storage Management Server transaction online from the cluster administrator.

1. Click the Start button and select [Programs]->[AdvancedCopy Manager]->[DB Setup].

2. The following window will be displayed. Click the [DB maintenance] button.
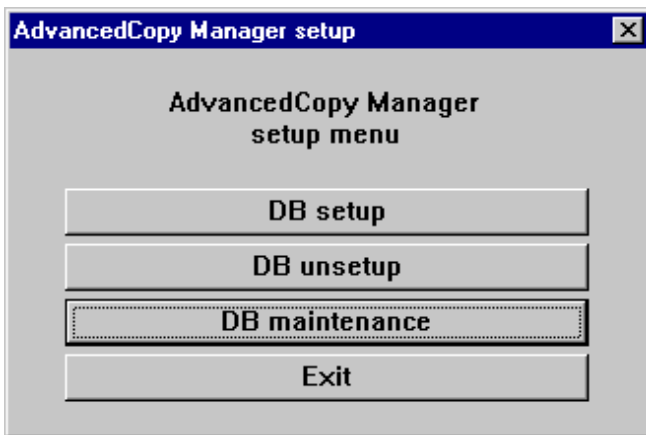
3. The following DB maintenance window will be displayed. Click the [DB recovery] button.
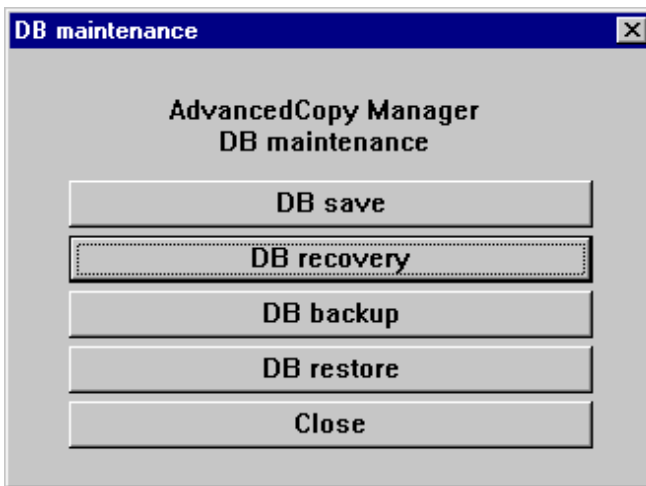
4. The recover mode selection window will be displayed. Select a recovery mode and click the [OK] button. For information on deciding on a recovery method, refer to 10.1.1.3.2 Finding an error in a database.
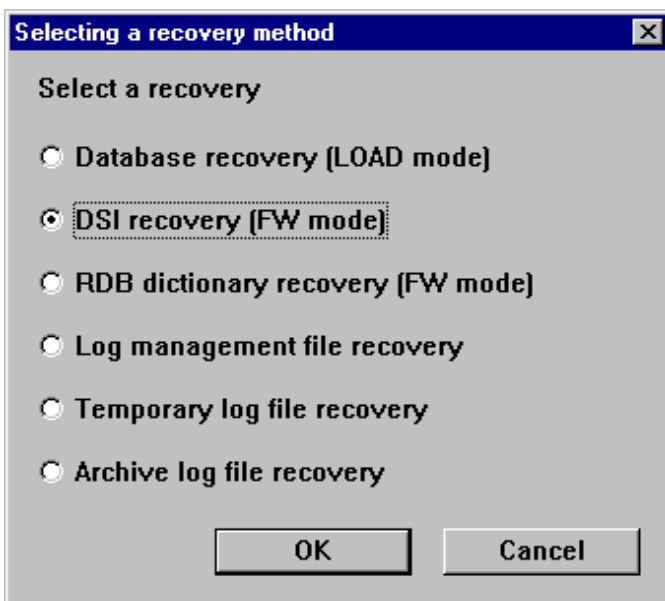
5. The window for entering a save data storage directory will be displayed. Specify a directory in which save data has been stored and click the [OK] button.
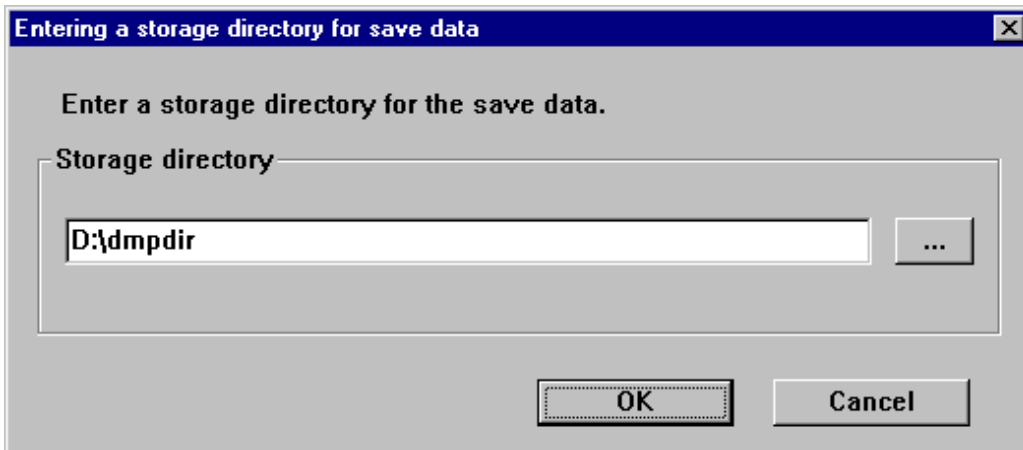
6. The processing confirmation window will be displayed. Check that the entered information is correct and click the [Start] button.
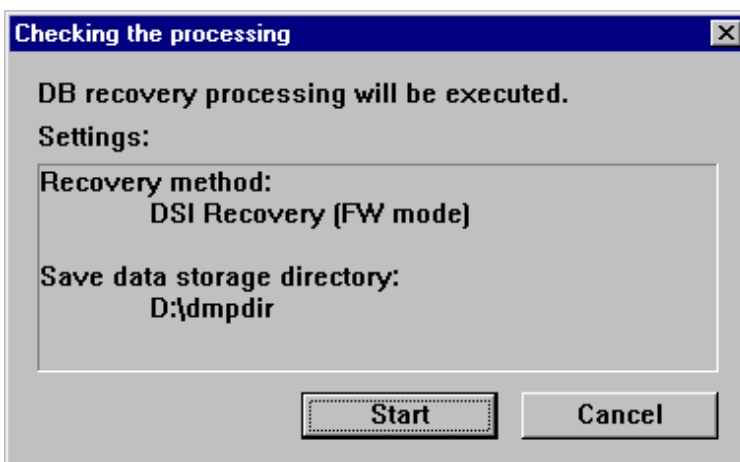
7. When the DB recovery process is completed, the following completion window will be displayed. Click the [Close] button.
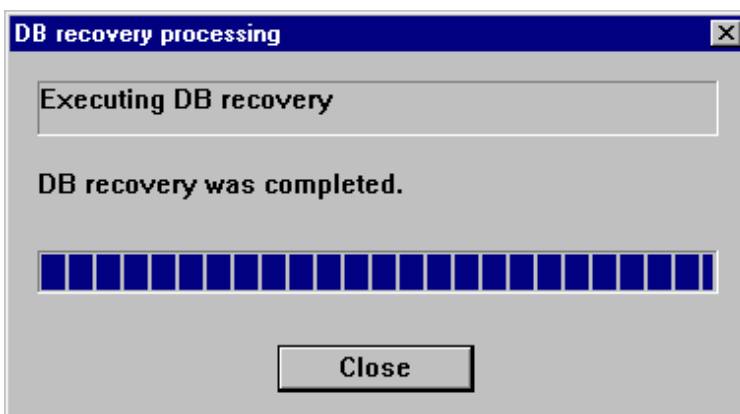
8. When the DB recovery process is completed, save the database. It is recommended to save the database in a different location than previously. For information on the save methods, refer to 10.1.1.3.1 Saving a database.

9. Restart all the services on the Storage Management Server. For information on stopping and starting a service, refer to Chapter 2 Starting and Stopping a Service.

10.1.1.4   Maintaining an authentication management list

This section describes the maintenance of the authentication feature. Execute the command on the server (ie, on the Storage Server) where the authentication feature is implemented.

10.1.1.4.1   Backing up an authentication management list

In a Storage Management Server, a program directory \bin\smmkbat command is executed and authentication management information is extracted. It is necessary to perform this command by logging in as the Administrator.

1. Change to the program directory \bin.

2. Execute the smmkbat command.

```
smmkbat -f <Definition information output batch file>
Example: smmkbat-f acldata.bat
```

A definition information output batch file is extracted as a batch file which describes the command sequence reflecting definition information.

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.

10.1.1.4.2   Restoring an authentication management list

Execute the definition information output script.

To carry this out, it is necessary to log on as the Administrator.

1. Change to the program directory \bin.

2. Execute the definition information output batch macro.

10.1.1.5   Maintaining a registry

This section describes the maintenance of a registry. Perform this procedure on a Storage Management Server or a Storage Server.

10.1.1.5.1   Backing up a registry

In a command prompt window, back up the following files using the copy command, etc.

File names

In the case of a non-cluster

```
environment-settings-directory\etc\swnode.ini
environment-settings-directory\etc\device.ini
```

In the case of a cluster

```
The drive letter of the shared disk for AdvancedCopy Manager share data:\etc\opt\swstorage\etc
\swnode.ini
```

```
The drive letter of the shared disk for AdvancedCopy Manager share data:\etc\opt\swstorage\etc
\device.ini
```

Example

Back up the registry to the backup directory on hard drive D. This example assumes that AdvancedCopy Manager has been installed at C:\Win32app.

```
C:\>copy C:\Win32app\AdvancedCopyManager\etc\swnode.ini D:\backup\
C:\>copy C:\Win32app\AdvancedCopyManager\etc\device.ini D:\backup\
```

Registry backup data size

Check the size of the file to be backed up.

10.1.1.5.2   Restoring a registry

In a command prompt window, use the copy command or another method to restore the following files.

File names

In the case of a non-cluster

```
environment-settings-directory\etc\swnode.ini
environment-settings-directory\etc\device.ini
```

In the case of a cluster

```
The drive letter of the shared disk for AdvancedCopy Manager share data:\etc\opt\swstorage\etc
\swnode.ini
The drive letter of the shared disk for AdvancedCopy Manager share data:\etc\opt\swstorage\etc
\device.ini
```

Example:

Restore files saved to the \backup directory in D drive.

```
C:\>copy D:\backup\swnode.ini C:\Win32app\AdvancedCopyManager\etc\
C:\>copy D:\backup\device.ini C:\Win32app\AdvancedCopyManager\etc\
```

10.1.2 Making a package backup of databases

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

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

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

Figure 10.1 Storage Management Server and Storage Server
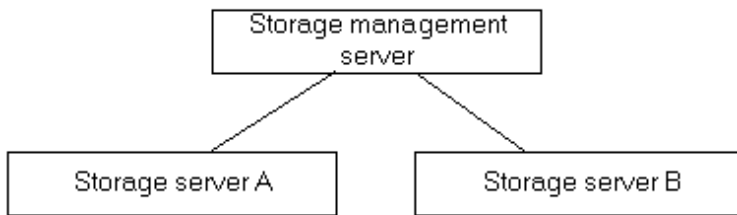
Example

Assume that the package backup of management information function has been used to back up the management information on a Storage Management Server, Storage Server A, and Storage Server B onto Storage Server B in the diagram above. In this case, Storage Server B is the backup execution server. The Storage Management Server, Storage Server A, and Storage Server B are the backup target servers. That is, Storage Server B operates as both the backup execution server and backup target server.

The following table shows the types of management information that is handled in a package backup of management information.

Table 10.5 Types of management information backed up by package backup of management information

Function	Type of data
Database	Database
Authentication feature	Authentication management list
Registry	Registry
Backup management	Backup management list, or backup management list and recovery control file Pre-processing and post-processing scripts Tape-copy pre-processing and post-processing scripts Transaction volume locking specification file for backups Backup volume locking specification file for backups Backup-restored volume locking specification file Tape-copy backup volume-locking file
Replication management	Pre-processing and post-processing scripts Copy-source volume locking specification file Copy-destination volume locking specification file
Package backup of management information	Policy file
Tape backup management	Tape management information

Note

Storage Server management information created by Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier cannot be handled by the package backup of management information function. To create a backup, back up each management information component individually as described in "Maintaining a database" in the Operator's Guide applicable to the Storage Server.

10.1.2.1 Preliminaries

Before creating a package backup of management information, you must perform the following:

1. Determine the management information package backup target servers and the types of management information to be backed up.

2. Determine the management information package backup execution server.

3. Create a directory where the management information package backup execution server will store the backup data. The size of the directory must not be less than the total of the following sizes:

   - The required size for a database is the size of the database backup data multiplied by 1.2.

   - For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The required size for an authentication management list is the size of the authentication management list backup data.

   - For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The required size for the registries is the total of the data sizes of the registry backup data on the management information package backup target servers.

   - For the backup data size, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the management information package backup target server.

   - The required size for backup management is the total of the sizes below for each management information package backup target server:
     For the size of each component of backup data, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the management information package backup target server.

     - Size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 1.2

     - Size of the pre-processing and post-processing scripts for backup management

     - Sizes of the pre-processing and post-processing scripts for tape-copy

     - Size of the transaction volume locking specification file for backups for backup management

     - Size of the backup volume locking specification file for backups for backup management

     - Size of the backup-restored volume locking specification file for backup management

     - Size of the backup volume locking specification file for backups for tape copy

   - The required size for replication management is the total of the following sizes for each management information package backup target server:

     - Size of the pre-processing and post-processing scripts for replication management

     - Size of the copy-source volume locking specification file for replication management

     - Size of the copy-destination volume locking specification file for replication management

   - The required size for the policy file for package backup of management information is the size of the policy file backup.

     - The size required for tape management information is 1.2 times the size of backup of the tape management information.

     For details on the size of tape management information, refer to "Maintaining Databases" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option".

4. Check the size of the working directory for the management information package backup target servers (or the shared disk for shared data for AdvancedCopy Manager in a cluster system). The sizes described below are needed only when a package backup of management information is being created. Use the largest value of the sizes of the databases to be backed up from the management information package backup target servers. The required sizes are as follows:

   - The required size for the databases is the size of the database backup data multiplied by 2.2.
     For the backup data size, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the Storage Management Server.

   - The required size for the authentication management list is the size of the authentication management list backup data.
     For the backup data size, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the Storage Management Server.

   - The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2

For the backup data size, refer to "Maintaining a database" in the Operator's Guide for the operating system running on the management information package backup target server.

- The working directory does not require any space for registry, replication management, and policy file backups.

- The size required for tape management information is 2.2 times the size of the backup of tape management information. For details on the size of tape management information, refer to the section titled "Maintaining Databases" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option.

5. Execute the stgmgrinfoset command as described in stgmgrinfoset (Management information package backup server registration/deletion command), on the management information package backup execution server (determined in step 2).

6. Create a policy file on the management information package backup execution server.

Table 10.6 Management information package backup execution server and policy file paths

Management information package backup execution server		Policy file path
OS	Operation type	
Windows	Non-cluster	environment-setting-directory\etc\stgmgrinfo_policy.ini
	Cluster	<AdvancedCopy-Manager-shared-data>:\etc\opt\swstorage\etc\stgmgrinfo_policy.ini
Solaris HP-UX Linux AIX	Non-cluster	/etc/opt/FJSVswstf/stgmgrinfo_policy.ini
	Cluster	/etc/opt/FJSVswstf/<logical-node-name>/stgmgrinfo_policy.ini

📄 **Note**

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- Do not specify more than one Storage Server as a management information package backup execution server.

- When this server is used for executing transactions on the Storage Server in a cluster system, create a directory for storing backup data on a shared disk.

- For databases, backup management, authentication management lists, and tape backup management, backup commands are executed on the corresponding management information package backup target servers. In addition, for database backups, backup management (ie, backup management lists) backups, and tape backup management information backups, a temporary capacity that is approximately 2.2 times greater than the total size of the backups is required to save the backup data in an archive file.

. . . .

Table 10.7 Policy file format

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape Server
Server name	DBData	Specifies whether to make a backup of the database. Yes: Make a backup of the database. No: Do not make a backup of the database. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.	A	C	C
	AuthData	Specifies whether to make a backup of the authentication feature.	A	C	C

Section name	Key name	Description	Whether specifiable on		
			Storage Management Server	Storage Server	Tape Server
		Yes: Make a backup of the authentication feature. No: Do not make a backup of the authentication feature. If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.			
	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), then "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 sets the value to "No."	C	C	B

A: Specifiable,

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

C: Unspecifiable

Example

Set up a policy file as follows:

- The Storage Management Server named ACMMGR creates backups for the database, the authentication feature, and backup management.

- The Storage Server named ACMAGT1 creates backups for backup management.

- The Storage Server named ACMAGT2 creates backups for replication management.

- The tape server named ACMTAPE makes a tape backup management backup.

```
[ACMMGR]
DBData=Yes
AuthData=Yes
BkupData=Yes
[ACMAGT1]
BkupData=Yes
[ACMAGT2]
ReplData=Yes
[ACMTAPE]
TapeData=Yes
```

Note

. . . .

・ Create a policy file only if it will be used.

・ The policy file cannot include any settings for backups of registries and of the policy file for management information package backup.

. . . .

10.1.2.2 Backup operations

Executing stgmgrinfobkup (Management information package backup command) on the management information package backup execution server stores the backup data in the directory under the following structure:

Table 10.8 Directory structure for execution of management information package backup and data types

Directory			Data type
*1	Server name	DBData		Database
		AuthData		Authentication management list
		RegiData		Registry
		BkupData	FJSVswsts	Backup management list, or backup management list and recovery control file
			Scripts	Pre-processing and post-processing scripts for backup management Pre-processing and post-processing scripts for tape-copy
			data	Transaction volume locking specification file for backups, for backup management Backup volume locking specification file for backups, for backup management Backup-restored volume locking specification file for backups, for backup management Backup volume locking specification file for tape-copy
		ReplData	Scripts	Pre-processing and post-processing scripts for replication management
			data	Copy-source volume locking specification file for replication management Copy-destination volume locking specification file for replication management
		MgrInfoData		Policy file for management information package backup
		TapeData		Tape management list

*1 is the backup data storage directory specified by stgmgrinfoset (Management information package backup server registration/ deletion command).

Example

When *1 is D:\ACMBkupData and the server name is ACMAGT1, the pre-processing and post-processing scripts for backup management are located in the following directory:

```
D:\ACMBkupData\ACMAGT1\BkupData\Scripts
```

Initial operations

The initial operations are as follows:

1. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make backups of the registries on all of the Storage Server.

2. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

Normal-use operations

The normal-use operations are as follows:

- Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server when you need to make backups of the target data.
  For the timing of the backups, refer to "Maintaining a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the applicable operating system.

Operations when a server is added or deleted

Operations when server added

1. On the management information package backup execution server, set up a policy for the added Storage Server in the policy file.

2. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the registry of the added Storage Server.

3. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

Operations when server deleted

1. On the management information package backup execution server, delete the information about the Storage Server that was deleted from the policy file.

2. In the backup data directory on the management information package backup execution server, delete the directory containing the name of the deleted Storage Server.

3. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

Operations when a server name is changed

1. On the management information package backup execution server, delete the information for the Storage Server from the policy file.

2. In the backup data directory on the management information package backup execution server, delete the directory containing the name of the Storage Server.

3. On the management information package backup execution server, set up a policy for the renamed Storage Server in the policy file.

4. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the registry of the renamed Storage Server.

5. Execute stgmgrinfobkup (Management information package backup command) on the management information package backup execution server to make a backup of the policy file.

10.1.2.3 Restoration operations

This section describes how to use the backup data created by stgmgrinfobkup (Management information package backup command) to execute restoration.
Perform the operations below as a root user or with an account that belongs to the Administrators group.

Restoring a registry

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the registry backup to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-registry-to-be-restored>\RegiData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-registry-to-be-restored>/RegiData
   ```

3. Transfer the registry backup that was copied in step 2 to the target server in binary mode.

4. Restore the registry on the server. For details on restoring a registry, refer to "Restoring a registry" in the Operator's Guide for the operating system running on the target server.

Restoring a database

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On the management information package backup execution server, copy the backup of the database to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<storage-management-server-name>\RegiData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<storage-management-server-name>/RegiData
   ```

3. Transfer the backup of the database that was copied in step 2 to the Storage Management Server in binary mode.

4. On the Storage Management Server, expand the database backup transferred in step 3. On the Windows version Storage Management Server, expand the database backup using the stgarcext (Backup data expansion command) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". On a Solaris/Linux-version Storage Management Server, expand the database backup by using the tar command supported by the operating system.

5. On the Storage Management Server, restore the database. For details on restoring a database, refer to "Restoring a database" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server.

   - The backup data storage directory specified for database restoration is the directory expanded in step 4.

   - Specify "RDB Dictionary, DSI(LOAD Mode)" for the Windows version as a recovery mode. Specify "0" for other versions.

Restoring an authentication feature

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. In the management information package backup execution server, copy the backup of the authentication management list to the following directory:

Windows version:

```
directory-determined-in-step1\<storage-management-server-name>\AuthData
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<storage-management-server-name>/AuthData
```

3. Transfer the backup of the authentication management list copied in step 2 to the Storage Management Server in binary mode.

4. On a Solaris/Linux-version Storage Management Server, change the access permission assigned to the backup of the authentication management list transferred in step 3 by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

5. On a Windows-version Storage Management Server, copy the backup of the authentication management list transferred in step 3 to -AdvancedCopy-Manager-program-directory\bin.

6. On the Storage Management Server, restore the authentication management list. For details on restoring the authentication management list, refer to "Restoring an authentication management list" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the Storage Management Server. A definition output batch file and a definition output shell script are the backup data of the authentication management list handled in steps 4 and 5.

Restoring a backup management list, or backup management list and recovery control file

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On this server, copy the backup of the backup management list or the backups of the backup management list and the recovery control file to the following directory:

Windows version:

```
directory-determined-in-step1\<server-whose-list/file-to-be-restored>\BkupData\FJSVswsts
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-list/file-to-be-restored>/BkupData/FJSVswsts
```

3. Transfer the backup of the backup management list or the backups of the backup management list and the recovery control file copied in step 2 to the target server in binary mode.

4. Expand the backup of the backup management list or the backups of the backup management list and recovery control file transferred in step 3 on the target server. On a Windows-version server, expand the backup of the backup management list using the stgarcext (Backup data expansion command) in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)". On a Solaris/Linux/HP-UX/AIX-version server, expand the backup of the backup management list or the backups of the backup management list and recovery control file by using the tar command supported by the operating system.

5. Restore the backup management list, or the backup management list and recovery control file on the target server. For details on restoring, refer to "Restoring a backup management list" or "Restoring a backup management list and recovery control file" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server. The Backup-Directory specified in the resource restoration command is the directory expanded in step 4.

Restoring the backup management pre-processing/post-processing scripts and tape-copy pre-processing/post-processing scripts

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On this server, copy the backups of the backup management pre--processing/ post-processing scripts for backup management to the following directory:

Windows version:

```
directory-determined-in-step1\<server-whose-scripts-to-be-restored>\BkupData\Scripts
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-scripts-to-be-restored>/BkupData/Scripts
```

3. Transfer the backups of the backup management pre-processing/ post-processing scripts and tape copy pre-processing/post-processing scripts copied in step 2 to the target server in binary mode.

4. Transfer the backups of the backup management pre-processing/ post-processing scripts and tape-copy pre-processing/post-processing scripts copied in step 3 to the directory in which the scripts will be executed on the target server in binary mode. For the directory in which the pre-processing and post-processing scripts for backup management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing for backup/restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the operating system running on the target server.

5. On a Solaris/Linux/UP-UX/AIX-version server, change the access permission assigned to the pre-processing and post-processing scripts for backup management copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring locking specification files for backup management

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

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

Windows version:

```
directory-determined-in-step1\<server-whose-files-to-be-restored>\BkupData\data
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-files-to-be-restored>/BkupData/data
```

3. Transfer the backups of the locking specification files for backup management copied in step 2 to the target server in binary mode.

4. Copy the backups of the locking specification files for backup management transferred in step 3 to the target server. For the directory in which the locking specification files for backup management are used (that is, the directory to which the files are to be copied), refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring pre-processing and post-processing scripts for replication management

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On this server, copy the backups of the pre-processing and post-processing scripts for replication management to the following directory:

Windows version:

```
directory-determined-in-step1\<server-whose-scripts-to-be-restored>\ReplData\Scripts
```

Solaris, Linux, HP-UX, or AIX version:

```
directory-determined-in-step1/<server-whose-scripts-to-be-restored>/ReplData/Scripts
```

3. Transfer the backups of the pre-processing and post-processing scripts for replication management copied in step 2 to the target server in binary mode.

4. Copy the backups of the pre-processing and post-processing scripts for replication management transferred in step 3 to the directory in which the scripts will be executed on the target server. For the directory in which the pre-processing and post-processing scripts for replication management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing of replication" in the Operator's Guide for the operating system running on the target server.

5. On a Solaris/Linux/UP-UX/AIX-version server, change the access permission assigned to the pre-processing and post-processing scripts copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring locking specification files for replication management

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On this server, copy the backups of the locking specification files for replication management to the following directory:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-files-to-be-restored>\ReplData\data
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-files-to-be-restored>/ReplData/data
   ```

3. Transfer the backups of the locking specification files for replication management copied in step 2 to the target server in binary mode.

4. Copy the backups of the locking specification files for replication management transferred in step 3 to the target server. For the directory in which the locking specification files for replication management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Replication" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide (Windows)".

Restoring a policy file for management information package backup

1. Execute stgmgrinfoset (Management information package backup server registration/deletion command) on the management information package backup execution server to determine which directory contains the backup data.

2. On this server, copy the policy file located in the following directory to the policy file for the management information package backup command:

   Windows version:

   ```
   directory-determined-in-step1\<server-whose-file-to-be-restored>\MgrInfoData
   ```

   Solaris, Linux, HP-UX, or AIX version:

   ```
   directory-determined-in-step1/<server-whose-file-to-be-restored>/MgrInfoData
   ```

For information on the directory for the policy file for the management information package backup command, refer to step 6 in the section "10.1.2.1 Preliminaries".

Restoring the tape management information

1. On the package-backup-of-the-management-information execution server, execute stgmgrinfoset (Management information package backup server registration/deletion command) to check the directory that contains the backup data.

2. On this server, copy the backup data of the tape management information from the directory indicated below:

   For the Windows version:

   ```
   directory-checked-at-step-1\<name-of-the-target-server-of-restoration>\TapeData
   ```

   For the Solaris/Linux/HP-UX/AIX version:

   ```
   directory-checked-at-step-1/<name-of-the-target-server-of-restoration>/TapeData
   ```

3. Transfer the backup data of the tape management information copied in Step 2 to the target server in binary mode.

4. Expand the tape management information transferred in Step 3 on the target server. If the target server is the Solaris or Linux version, expand the tape management information by using the OS tar command.

5. On the target server, restore the tape management information. For details on how to restore it, refer to the section titled "Restoring the tape management information" in the ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup Option.

10.2 Troubleshooting

10.2.1 Troubleshooting: Insufficient free space in a repository

This section describes the actions to take if there is insufficient free space in a repository used by a Storage Management Server. Perform this procedure on a Storage Management Server.

🅿 Point
. . . .
You can use this troubleshooting method when there is insufficient free space in a repository, or if the operation status is significantly different from the status at the initial installation, in order to ensure that there is sufficient free space in the repository in the future.

Increase the amount of repository space as follows:

1. Back up the registry of a Storage Management Server (refer to "10.1.1.5.1 Backing up a registry")

2. Perform stored data backup processing (refer to 10.2.1.1 Database backup)

3. Perform database unsetup (refer to 10.2.1.4 Database configuration removal)

4. Re-estimate the database size (refer to "Estimating the database space" in the "ETERNUS SF AdvancedCopy Manager Installation Guide")

5. Perform database setup (refer to 10.2.1.3 Database configuration)

6. Start the services "SymfoWARE RDA RDBSWSTF" and "SymfoWARE RDB RDBSWSTF" (refer to Chapter 2 Starting and Stopping a Service")

    ### 🅿 Point
    . . . .
    It is not necessary to start the "SymfoWARE RDA RDBSWSTF" service if this is running under Windows Server 2008.
    . . . .

7. Perform saved data restoration processing (refer to 10.2.1.2 Database restoration)

8. Perform restoration of the registry of a Storage Management Server (refer to "10.1.1.5.2 Restoring a registry")
. . . .

10.2.1.1 Database backup

This section describes the backing up of a database. You can save data stored in a database to the specified directory. This method is mainly used for copying data for reuse for other purposes. For ordinary backup purposes, use the method described in "10.1.1.3.1 Saving a database."

📄 Note
. . . .
- A directory in which data will be saved must be created in advance.

- Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

    - Terminal service(use via a remote desktop connection)

    - Telnet server service

    If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it. Refer to the following link for information on how to make console session connections:

    http://support.microsoft.com/kb/278845
. . . .

Back up a database as follows:

1. Click the Start button and select [Programs]->[AdvancedCopy Manager]->[DB setup].

2. The following DB setup initial window will be displayed. Click the [DB maintenance] button.
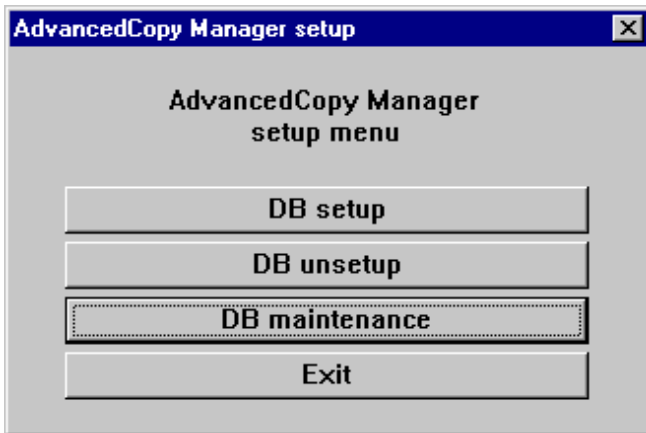
3. The following DB maintenance window will be displayed. Click the [DB backup] button.
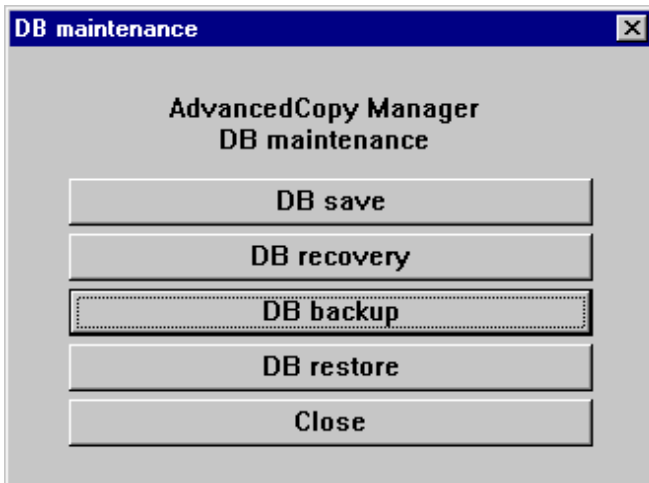
4. The following window for entering a backup directory will be displayed. Enter a data storage directory and click the [OK] button.
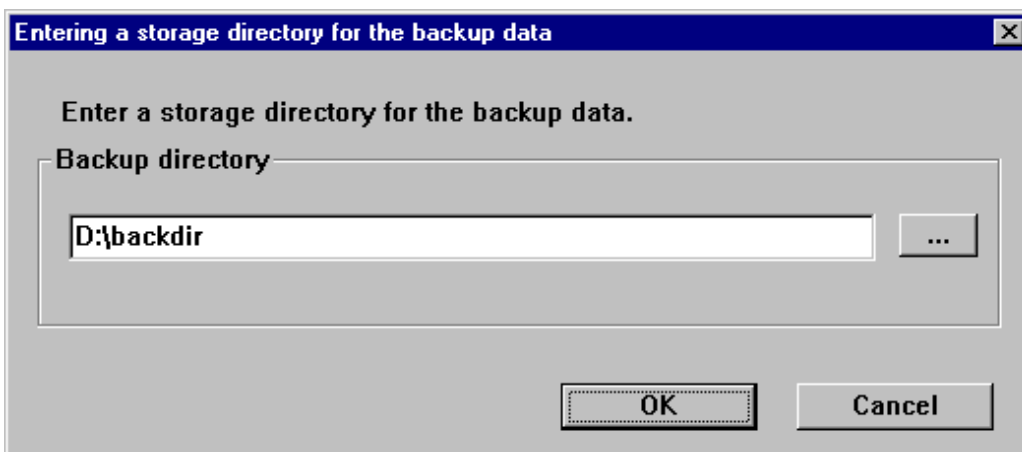
5. The following window will be displayed. Check that the displayed information is correct and click the [Start] button.
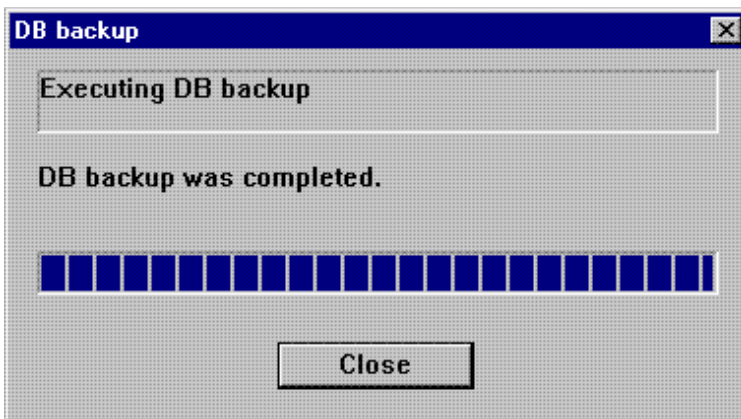
6. When the backup is completed, the following window will be displayed. Click [Close].
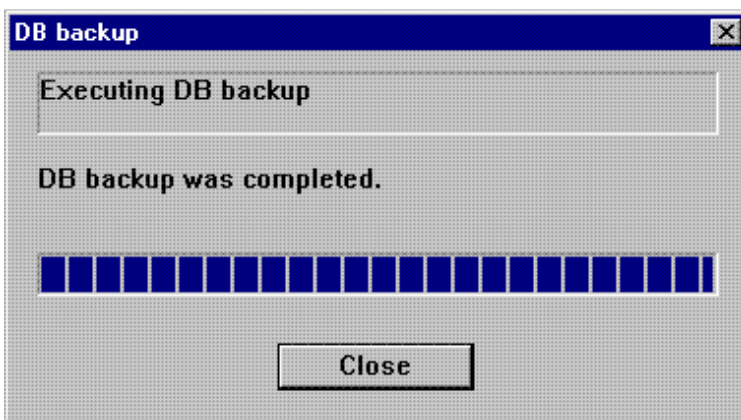
10.2.1.2 Database restoration

This section describes the restoration of a database. You can restore data that has been saved as described in 10.2.1.1 Database backup to a database as shown below.

![Note icon] **Note**

. . . .

- Data currently stored in a database will be lost in this processing because it will be overwritten by saved data.

- When the database restoration has completed normally, the database should then be backed up to save this copy of the data. For more information on this, refer to 10.1.1.3.1 Saving a database.

- Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

  - Terminal service (use via a remote desktop connection)

  - Telnet server service

If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it. Refer to the following link for information on how to make console session connections:

    http://support.microsoft.com/kb/278845

. . . .

Restore a database as follows:

1. Click the Start button and select [Programs]->[AdvancedCopy Manager]->[DB Setup].

2. The following DB setup initial window will be displayed. Click the [DB maintenance] button.

3. The following DB maintenance window will be displayed. Click the [DB restore] button.
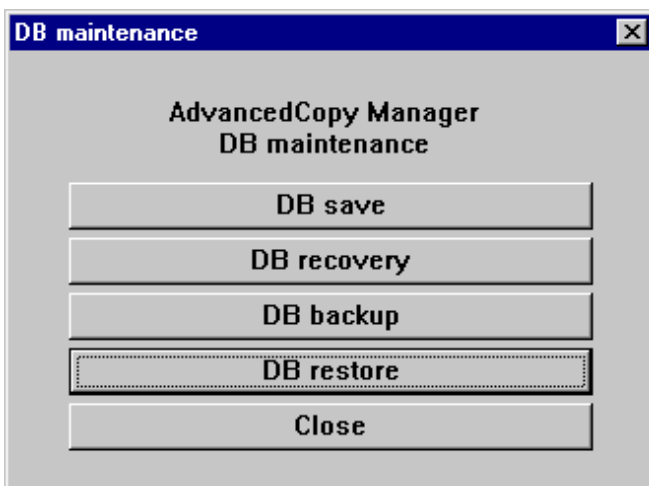
4. The following window for specifying a backup data storage directory will be displayed. Specify a directory in which backup data has been stored and click the [OK] button.
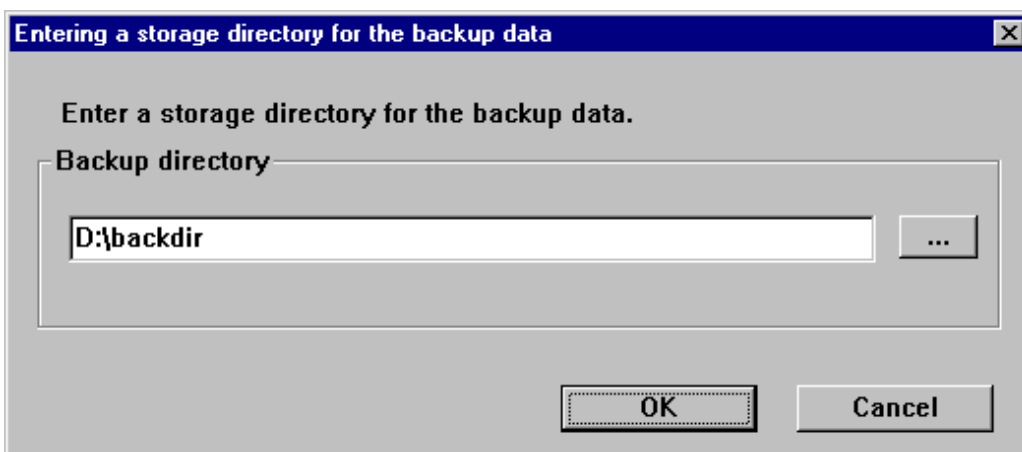
5. The following window will be displayed. Check that the displayed information is correct and click the [Start] button.

6. When the restoration is completed, the following completion window will be displayed. Click [Close].
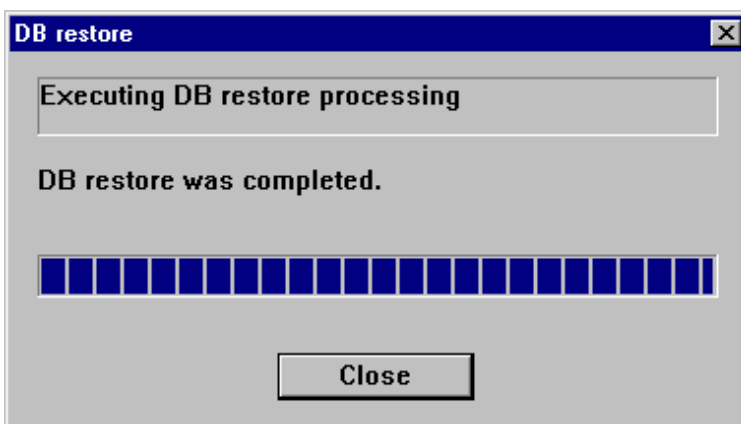
10.2.1.3 Database configuration

This section describes how to configure a database.

Note

Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

- Terminal service(use via a remote desktop connection)

- Telnet server service

If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it. Refer to the following link for information on how to make console session connections:

   http://support.microsoft.com/kb/278845

Configure a database as follows:

1. Click the Start button and select [Programs]->[AdvancedCopy Manager]-> [DB Setup].
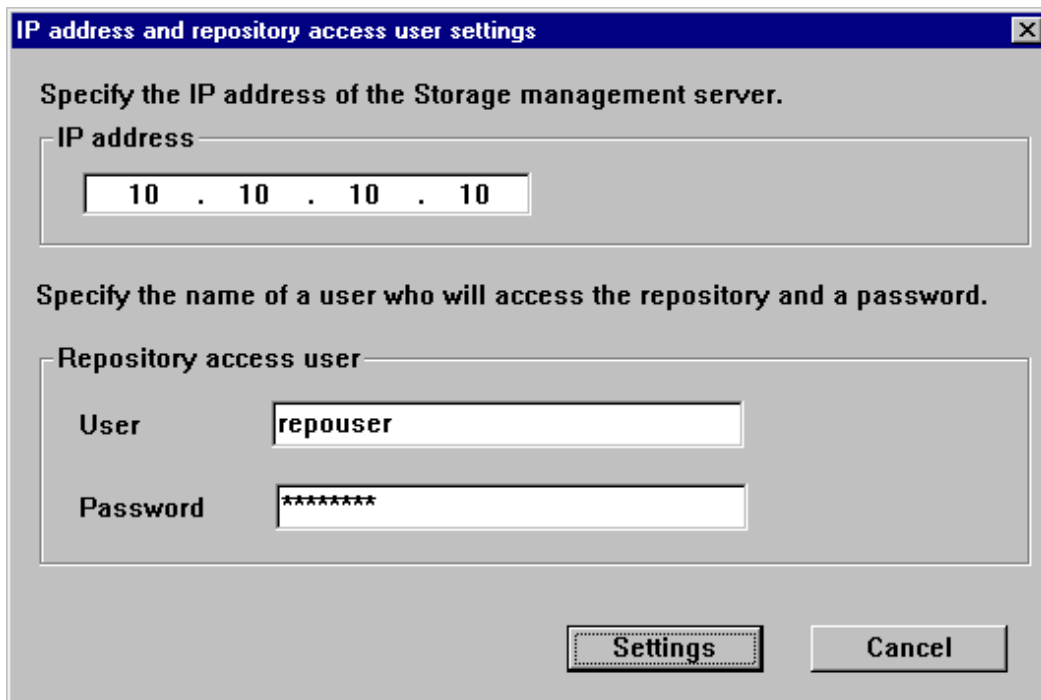
2. The following window will be displayed. Click the [DB setup] button.
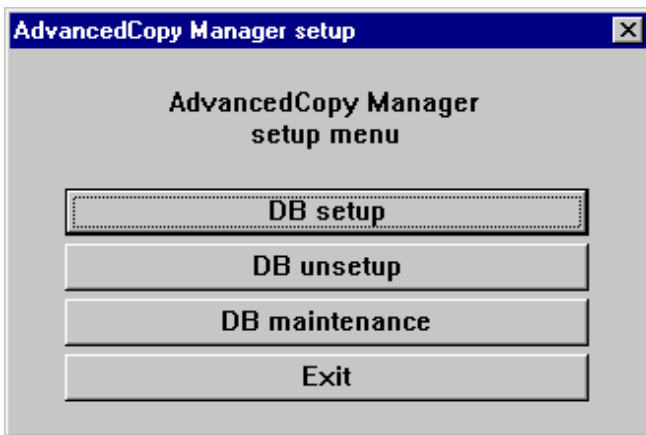
3. The following window will be displayed. Enter the necessary items and click the [Continue] button.
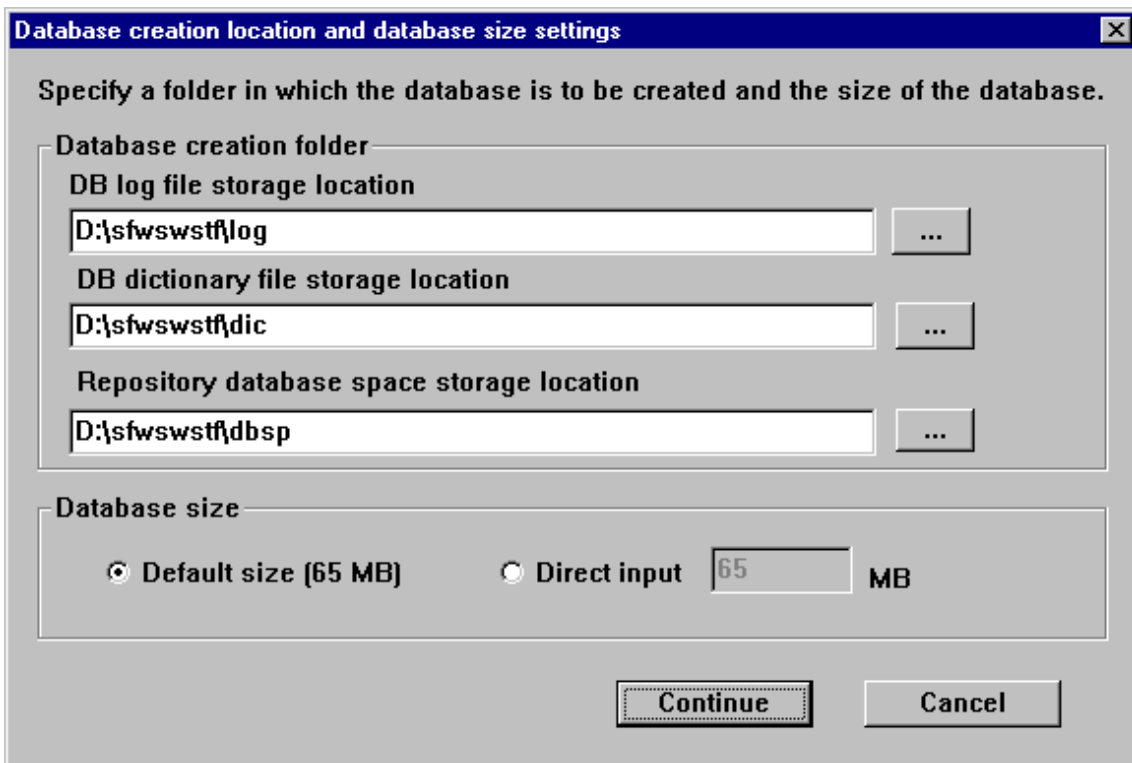
4. The following window will be displayed. Enter the necessary items and click the [Settings] button.

The following conditions apply to the user name and password:

 - They must be specifiable under the operating system.

 - Their length must be 18 bytes or less.

5. The following window will be displayed. Check the displayed information and click the [Start] button.

6. When the database setup is completed, the following window will be displayed. Click the [Close] button.
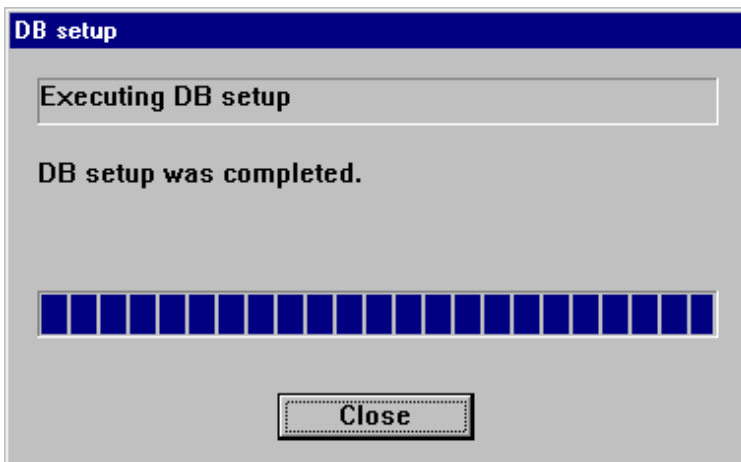
10.2.1.4　Database configuration removal

Remove the setup of a database as follows:

🛑 Note

. . . .

Executing this process with either of the services listed below causes an error. Do not use these services (except when using Symfoware Server V9.1.1 or higher in Windows Server 2008):

- ・ Terminal service (use via a remote desktop connection)

- ・ Telnet server service

If the Storage Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it. Refer to the following link for information on how to make console session connections:

　　http://support.microsoft.com/kb/278845

. . . .

Remove a database as follows:

1. Click the Start button and select [Programs]->[AdvancedCopy Manager]->[DB setup].

2. The following DB setup initial window will be displayed. Click the [DB unsetup] button.
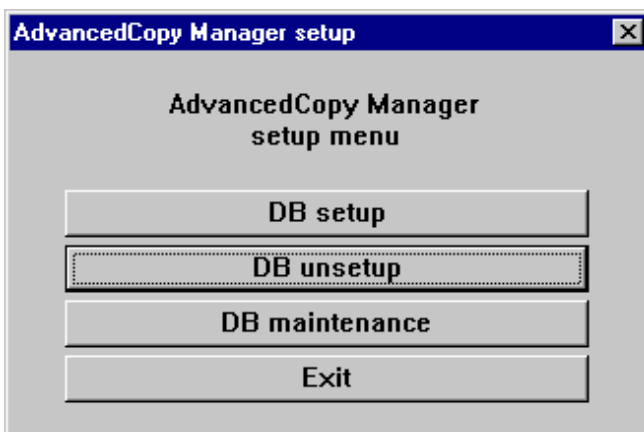
3. The following confirmation window will be displayed. Click the [Start] button.
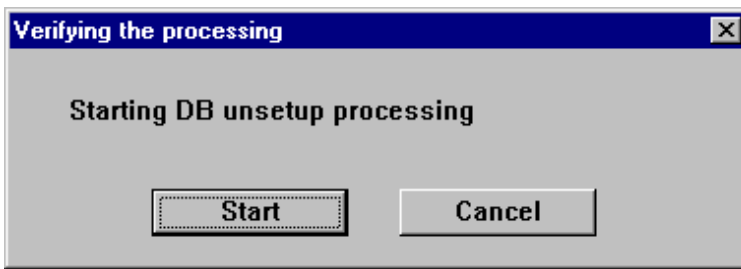
4. When the removal of the setup is completed, the following completion window will be displayed. Click [Close].
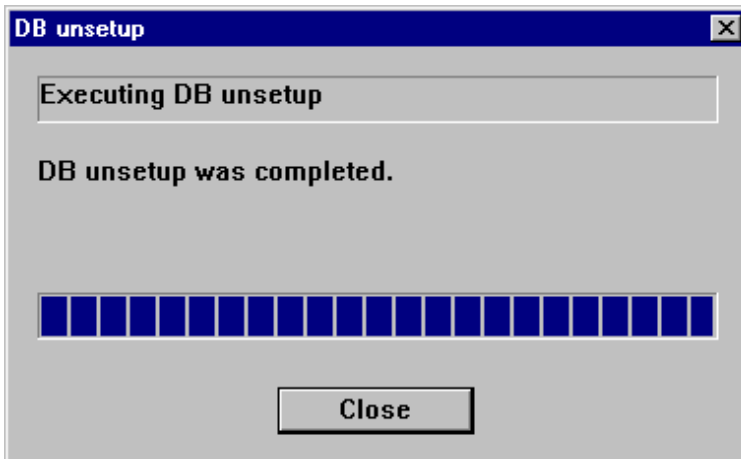
10.2.2 Collecting maintenance information

10.2.2.1 Collecting error survey information

Login to the Storage Management Server or Storage Server and collect the data for each server using acmcapture (Troubleshooting data collection command).

Send the collected data to a Fujitsu system engineer (SE).

 Note
. . . .
If VSSHP (ETERNUS VSS Hardware Provider) is used for backing up the Exchange database, refer to the "How to obtain Error Information" in the "Software Information ETERNUS VSS Hardware Provider ".
. . . .

 Note
. . . .
Collect the files under these directories if the SQL Server database is backed up or replicated.

・ <SQL_Server_installation_ directory>\Log

<SQL_Server_installation_ directory> is usually "\Program Files\Microsoft SQL Server\Mssql" (in case of default instance) or "Program Files\Microsoft SQL Server\Mssql$(<Instance_Name>)"(in case of named instance).
. . . .

10.2.3 Troubleshooting: Failure in accessing a repository database

This section describes how to determine the cause of a failure in accessing a repository database and the actions to perform when this occurs.

Execute the steps below until the problem is resolved and no further steps are required.

Perform this procedure on the Storage Management Server.

1. Check that the following repository access services are running.

   - SymfoWARE RDA RDBSWSTF

   - SymfoWARE RDB RDBSWSTF

   ### Point

   ....

   For Windows Server 2008, it is not a problem even if the "SymfoWARE RDA RDBSWSTF" service has been stopped.

   ....

   Check method

   Select [Control Panel] -> [Services] to display the service window. On the service window, check that the above two services are in the "Started" status.

   Required action

   If any of the repository access services are stopped, select the service on the service window and click the [Start] button. For more information on this, refer to Chapter 2 Starting and Stopping a Service.

2. Check that there is sufficient free space to be able to update a repository database.

   Check method

   Execute the following command to check the usage ratio of space required to update a repository.

   ```
   C:\>program-directory\bin\stgdbloginf.exe
   ```

   Required action

   If the usage ratio is 100%, save the database space according to 10.1.1.3.1 Saving a database. After doing this, there will be sufficient free space required to update a repository.

   After saving a database, restart (ie, stop and then start) the repository access services. For information on stopping and starting a service, refer to Chapter 2 Starting and Stopping a Service.

   Perform this step again.

3. Check whether the 10.1.1.3.1 Saving a database processing is in progress.

   Check method

   Log into the Storage Management Server and check whether the database save window is open. If it is, check whether the database save processing is in progress.

   Required action

   If the database save processing is in progress, wait until it is completed. Then perform this step again.

4. Check whether the size of the repository is sufficient.

   Check method

   1. [Program] -> [management tool (common)] -> [an event viewer] is chosen from the Start button.

   2. An event viewer screen is displayed. Choose [log] -> [application].

   3. An application log screen is displayed. Double-click on the record which identifies an error among the records currently displayed with the source name of "SymfoWARE". A detailed screen is displayed.

   4. The error message of the type qdgXXXXX is displayed on a detailed screen. Check to refer to if "JYP5019E" or "JYP5045E" is displayed in an error message.

Required action

If one of the above messages is displayed, increase the repository size by referring to 10.2.1 Troubleshooting: Insufficient free space in a repository .
Then, perform the processing again.

5. Check whether an input-output error or any other type of error has occurred in the database space.

Check method

Check whether an error exists according to 10.1.1.3.2 Finding an error in a database.

Required action

Recover a database according to "10.1.1.3.3 Recovering a database".
After performing the recovery, perform this step again.

6. Collect survey information according to 10.2.2 Collecting maintenance information.
Then contact your Fujitsu system engineer (SE).

10.3 Troubleshooting: Hardware error during backup

This section describes the actions to perform if a hardware error, etc. occurs during a backup using AdvancedCopy Manager.

10.3.1 Overview

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

· swstbackstat (Backup execution status display command) displays "failed" in the Status column.

· swstsyncstat (Backup synchronous processing progress display command) displays "failed" in the Status column.

· swstreststat (Restoration execution status display command) displays "failed" in the Status column.

· swsthistdisp (History information display command) displays "failed" in the Status column.

· swsttrkstat (tracking status display command) displays "failed" in the Status column.

· Code swst0634, swst0719, or swst0740 is displayed during command execution.

If the execution status display command and history information display command display "failed" in the Status column, a hardware error has occurred during physical copying, and the copy processing has failed.
If code swst0634, swst0719, or swst0740 is displayed during command execution and the same error occurs even if the command is re-executed, a hardware error has occurred, causing AdvancedCopy to fail.

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

· swstbackstat (Backup execution status display command) displays "halt" in the Status column.

· swstsyncstat (Backup synchronous processing progress display command) displays "halt" in the Status column.

· swstreststat (Restoration execution status display command) displays "halt" in the Status column.

· swsthistdisp (History information display command) displays "halt" in the Status column.

If the execution status display command and history information display command display "halt" in the Status column, a hardware error has occurred during physical copying, and the remote copy processing has failed.
If any of these messages, statuses or symptoms is generated, a hardware error may have occurred in the transaction volume or backup volume. Check the hardware status, and if a hardware error is found, fix the cause of the error, then re-execute the processing.

10.3.2 Troubleshooting

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

Figure 10.2 Troubleshooting flow (for faults during backup)
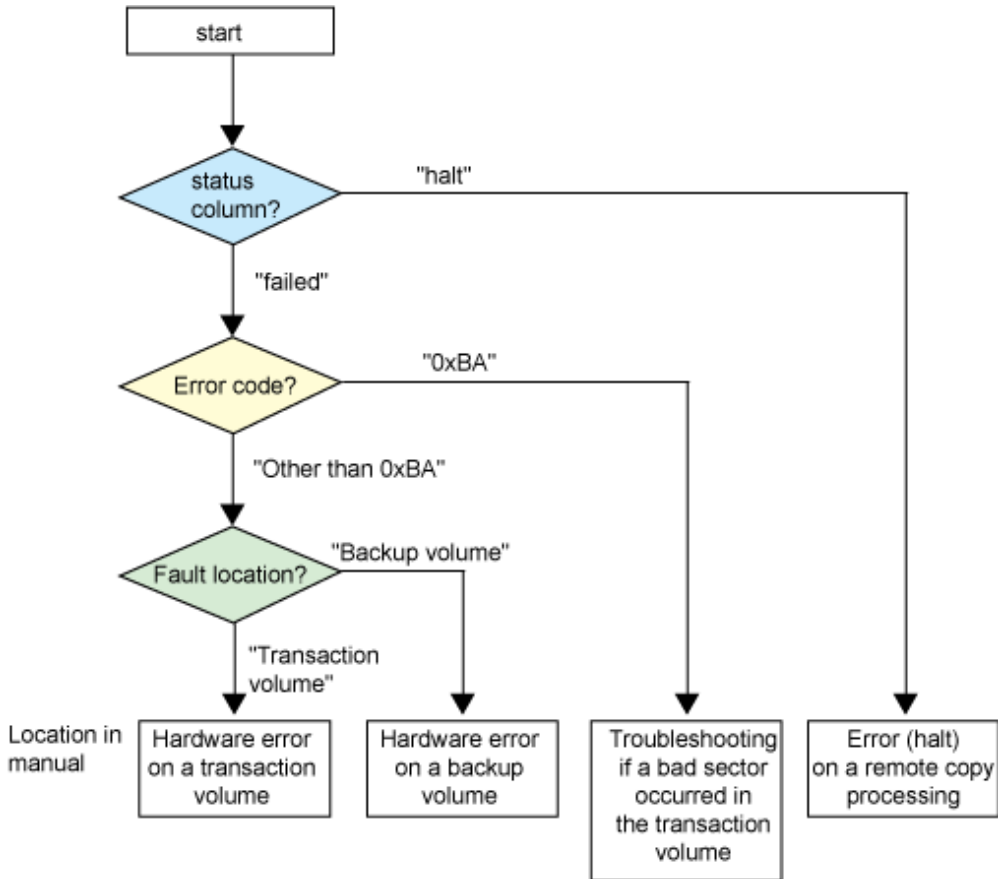
> 📖 **Note**
> ···
>
> ・ Refer to "Overview" for details of the "status column" and "fault location".
>
> ・ Use ETERNUSmgr to check the copy process error codes. Use the following method to check the error codes:
>
>   - On the [Display status] menu, click [AdvancedCopy status display] in the status display.
>
>   - At [Session status], click the "Number of active sessions" link for the relevant copy type.
>
>   - Refer to the value in the "Error code" column of the relevant copy process.
>
> The following table shows the meanings of the error codes.

Table 10.9 Meanings of error codes

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a transaction volume when a) or b) applies, the ETERNUS storage system automatically changes the copy processing to the error suspend state. This prevents a restart of QuickOPC or EC/REC resume and prevents the backup volume from being overwritten with invalid transaction volume data.
Other than 0xBA	An error other than the above occurred.

Error code 0xBA is returned only for the following ETERNUS storage systems:

- ETERNUS4000/ETERNUS8000 (firmware versionV11L30-0000 or later)

- ETERNUS6000 (firmware version V31L40-0000 or later)

For ETERNUS storage systems other than the above, the event indicated by error code 0xBA does not occur. (When the above a) or b) apply, the copy status does not change even if a bad sector occurs in the copy source volume.)

- -

10.3.2.1 Hardware error on a transaction volume

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

1. If an error occurred during physical copying, cancel the processing in which the error occurred, with one of the following commands:

   - If an error occurred during backup (OPC) physical copy: swsthistdel (History information deletion command)

   - If an error occurred during synchronous processing (EC): swstcancelsync (Backup synchronous processing cancel command)

   - If an error occurred during restore (OPC) physical copy: swstcancelrest (Restore cancellation command)

   - If an error occurred during tracking processing (QuickOPC): swstcanceltrk (Tracking cancel command)

2. Execute the execution status display commands (swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command)) to verify that no other errors have occurred.

3. Fix the hardware error in the transaction volume.

4. Execute swstrestore (Restoration execution command) to restore the transaction volume.

Note

- -

・ The backup history information for which a copy failed cannot be used to perform a restoration.

・ If there is no normal (that is, Status is "succeeded") backup history information, restoration is not possible.

- -

10.3.2.2 Hardware error on a backup volume

When a hardware fault occurs in backup volume, perform repair work according to the following procedures.

1. Cancel the processing in which the error occurred, with one of the following commands:

   - If an error occurred during backup (OPC) physical copy: swsthistdel (History information deletion command)

   - If an error occurred during synchronous processing (EC): swstcancelsync (Backup synchronous processing cancel command)

   - If an error occurred during restoration (OPC) physical copy: swstcancelrest (Restore cancellation command)

   - If an error occurred during tracking processing (QuickOPC): swstcanceltrk (Tracking cancel command)

2. If the processing cannot be canceled using one of the above commands, use ETERNUSmgr/GRmgr to cancel it.

3. Execute swstsrsemtch (Resource adjustment command)

4. Cancel the processing in which the error occurred. At this point, the execution status display commands (swstbackstat (Backup execution status display command), swstreststat (Restoration execution status display command) and swsthistdisp (History information display command))

5. display "succeeded" in the Status column. However, because the copy processing is suspended, ensure that the commands are cancelled. If an error occurred in the synchronous processing (EC), the command has already been canceled, so no response is required.

   - If an error occurred during backup (OPC) physical copy: swsthistdel (History information deletion command)

- If an error occurred during restoration (OPC) physical copy: swstcancelrest (Restore cancellation command)

6. Execute the execution status display commands (swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command)) to verify that no other errors have occurred.

7. Use swstdevinfoset (Device information setting command) to delete the backup volume in which the error occurred.

8. Use swstdevinfoset (Device information setting command) to register a new backup volume. If the backup volume in which the error occurred is repaired and reused, execute the option [Collect or reflect the information for a specific device] from the GUI client, and store the information again in the backup volume.

9. Re-execute the processing in which the error occurred.

10.3.2.3   Troubleshooting if a bad sector occurred in the transaction volume

If a bad sector occurred in the transaction volume, use the following procedure to restore the transaction volume:

1. Cancel the copy processing for which the bad sector occurred.

   - If the bad sector occurred during the suspend state of synchronous processing (EC): swstcancelsync (Backup synchronous processing cancel command)

   - If the bad sector occurred during QuickOPC tracking: swstcanceltrk (Tracking cancel command)

2. Use swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restoration execution status display command), swsttrkstat (tracking status display command) and swsthistdisp (History information display command) to check for other errors.

3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the transaction volume, from the methods below.

   - Restoration method 1
     If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.

   - Restoration method 2
     If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special-purpose tool (for example, the UNIX dd command) to write to the area.

   - Restoration method 3
     Use swstrestore (Restoration execution command) to restore the transaction volume from a backup volume. (If the backup volume for the copy processing for which the bad sector occurred contains backup history information, restoration is also possible from that backup volume.)

Note

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

10.3.2.4   Error (halt) on a remote copy processing

When a hardware fault occurs in remote copy processing, perform repair work according to the following procedures.

1. Fix the hardware error.

2. Re-execute the suspended copy processing.

10.4 Hardware or Other Error during Replication

This section describes the corrective action to take when a hardware or other type of error occurs during AdvancedCopy Manager replication.

10.4.1 Overview

If a hardware error occurs during the replication, the following symptoms are displayed:

- swsrpstat (Operation status display command) displays "failed" or "?????" in the Status column.
- Code swsrp2606 is output during command execution.
- Code swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution.

If the operation status display command displays "failed" in the Status column and swsrp2606 is displayed during command execution, a hardware error has occurred during physical copying, and the copy processing has failed.
If swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution, and the same error occurs even if the command is re-executed, a hardware error has occurred, causing AdvancedCopy to fail.

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

- swsrpstat (Operation status display command) displays "halt" in the Status column.
- Code swsrp2648 is displayed during command execution.

If the operation status display command displays "halt" in the Status column, and swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy processing has failed.
If any of these messages, statuses or symptoms is generated, a hardware error may have occurred in the source or replica volume. Check the hardware status, and if a hardware error is found, fix the cause of the error and re-execute the command.

10.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure 10.3 Troubleshooting flow (when a fault occurs during replication)

📌 **Note**

· ·
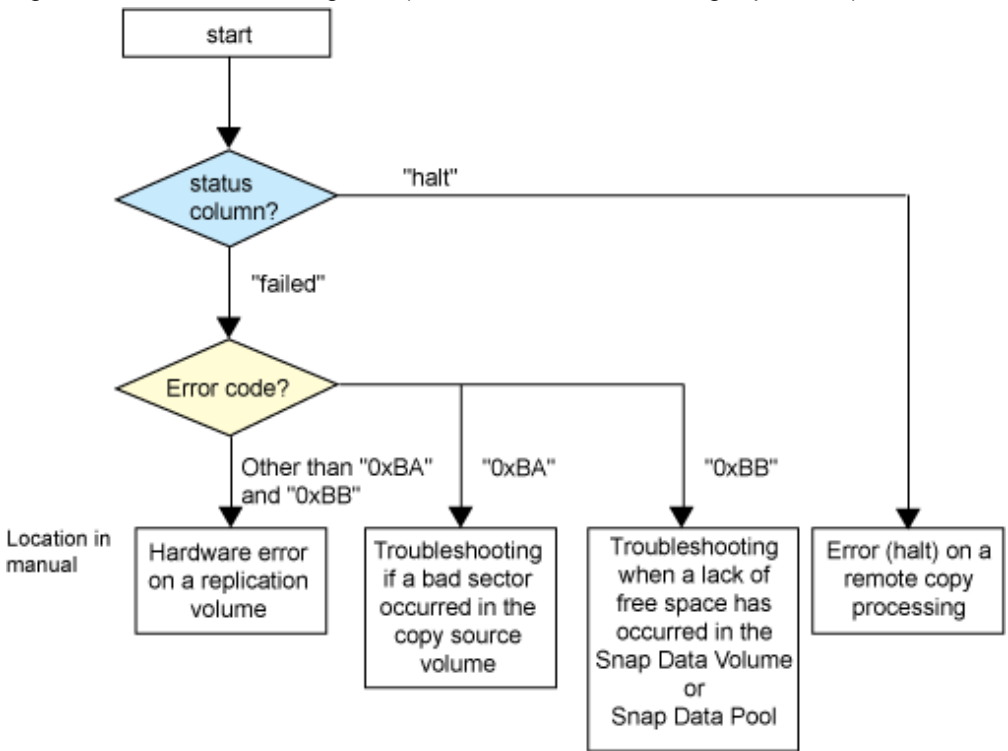
・ Refer to "Overview" for details of the "status column".
 If the status column is "?????", check if ETERNUSmgr/GRmgr copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt").
 If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
 In other cases where another cause is likely (such as the Storage Server or switch etc) contact your Fujitsu SE.

・ Use ETERNUSmgr to check the error codes. Use the following two methods to check.

  - Checking with swsrpstat (Operation status display command) Specify "-0", then execute.

  - Checking with ETERNUSmgr

      1. On the [Display status] menu, click [AdvancedCopy status display] in the status display.

      2. At [Session status], click the "Number of active sessions" link for the relevant copy type.

      3. Refer to the value in the "Error code" column of the relevant copy process.

The following table shows the meanings of the error codes.

Table 10.10 Meanings of error codes

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) Note: If a bad sector is created in a transaction volume when a) or b) applies, the ETERNUS storage system automatically changes the copy processing to the error suspend state. This prevents a restart of QuickOPC or EC/

Error code	Meaning
	REC resume and prevents the copy destination volume from being overwritten with invalid copy source volume data.
0xBB	A lack of free space has occurred in the Snap Data Volume or Snap Data Pool
Other than 0xBA and 0xBB	An error other than the above occurred.

Error codes 0xBA and 0xBB are returned only for the following ETERNUS storage systems:

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

- ETERNUS6000 (firmware version V31L40-0000 or later)

For ETERNUS storage systems other than the above, the events indicated by error code 0xBA and 0xBB are identified by the following methods:

Table 10.11 Error code events

Event	Identification method
Events indicated by 0xBA	These events do not occur. In cases a) and b) above, the copy status does not change even if a bad sector occurs at the copy source volume.
Events indicated by 0xBB	Use ETERNUSmgr to check the capacity already used on the Snap Data Volume in order to determine whether or not a lack of free space has occurred. ・ On the [Display status] menu, click [Volume list] in the status display. ・ Click the link to Snap Data Volume in the "Volume type" column of the relevant volume. ・ Refer to the value shown in the "Capacity already used" column. If this event applies, refer to "10.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool"

10.4.2.1 Hardware error on a replication volume

When a hardware error occurs in a duplicate volume, perform the repair work on the error according to the following procedures.

1. Use swsrpcancel (Replication cancellation command) to cancel the processing in which the error occurred. If the processing cannot be cancelled from the operation server when inter-server replication is performed, cancel it from a non-operational server.

2. If the processing cannot be cancelled by using the command, use ETERNUSmgr/GRmgr to cancel it.

3. Execute swsrprecoverres (Resource adjustment command)

4. Execute swsrpstat (Operation status display command) to verify that no other errors have occurred.

5. Use swsrpdelvol (Replication volume information deletion command) to delete the replication volume in which the error occurred.

6. Use swsrpsetvol (Replication volume information configuration command) to register a new replication volume. If the replication volume in which the error occurred is repaired and reused, execute the option [Collect or reflect the information for a specific device] from the GUI client and store the information again in the replication volume.

7. Re-execute the processing in which the error occurred.

10.4.2.2 Troubleshooting if a bad sector occurred in the copy source volume

If a bad sector occurred in the copy source volume, use the following procedure to restore the copy source volume:

1. Use swsrpcancel (Replication cancellation command) to cancel processing for which the error occurred.
   If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.
   If processing cannot be cancelled using commands, use ETERNUSmgr to cancel it.

2. Execute swsrpstat (Operation status display command) to check for other errors.

3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the copy source volume, from the methods below.

   - Restoration method 1
     If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.

   - Restoration method 2
     If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a special-purpose tool (for example, the UNIX dd command) to write to the area.

   - Restoration method 3
     Use swsrpmake (Replication creation command) to restore the data from the copy destination volume. (Restoration is also possible from the copy destination volume of the copy process for which the bad sector occurred.)

10.4.2.3   Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool

A Snap Data Volume lack of free space occurs when the Snap Data Pool is not being used, whereas a Snap Data Pool lack of free space occurs when the Snap Data Pool is being used.
The following section provides information on recovery when a lack of free space has occurred in either the Snap Data Volume or Snap Data Pool.

Recovery of insufficient free space in Snap Data Volume

When a lack of free space has occurred in the Snap Data Volume, follow these steps to undertake recovery:

- Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command) command.

- If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUSmgr to cancel it.

The likely causes of a lack of free space in the Snap Data Volume are as follows:

a. The estimate of the physical size of the Snap Data Volume is not accurate.

b. The estimate of the physical size of the Snap Data Volume is accurate but, as a result of a large volume being updated in the Snap Data Volume when a SnapOPC/SnapOPC+ session does not exist, the physical capacity of the Snap Data Volume is being used up.

The usage status of the Snap Data Volume can be checked by specifying "stat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the physical size of the Snap Data Volume, and recreate the Snap Data Volume.
If "b." applies, use ETERNUSmgr or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, and then initialize the Snap Data Volume.
Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Volume.

Recovery of insufficient free space in Snap Data Pool

When a lack of free space has occurred in the Snap Data Pool, follow these steps to undertake recovery:

- Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command).

- If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUSmgr to cancel it.

The following are likely causes of a lack of free space in the Snap Data Pool:

    a. The estimate of the size of the Snap Data Pool is not accurate.

    b. The estimate of the size of the Snap Data Pool is accurate but, as a result of a large volume being updated in the Snap Data Volume when a SnapOPC/SnapOPC+ session does not exist, the capacity of the Snap Data Pool is being used up.

The use status of the Snap Data Pool can be checked by specifying "poolstat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the size of the Snap Data Pool, and after increasing the size of the Snap Data Pool, recreate the Snap Data Volume.

If "b." applies, use ETERNUSmgr or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Pool.

10.4.2.4   Error (halt) on a remote copy processing

The REC restart (Resume) method differs for different REC Recovery modes.

For the Automatic Recovery mode

    1. Remove the cause that made all paths close (halt).

    2. ETERNUS disk array automatically restarts (Resume) REC.

For the Manual Recovery mode

    1. Remove the cause that made all paths close (halt).

    2. Use swsrpmake (Replication creation command) to forcibly suspend the REC that is in the halt status.

```
[For volume units]
swsrpmake –j < replication source volume name > <replication destination
volume name >

[For group units]
swsrpmake –j –Xgroup <group name>
```

    3. Use swsrpstartsync (Synchronous processing start command) to restart (Resume) the REC. The -t option must be specified if REC is being restarted after a forcible suspend

```
[For volume units]
swsrpstartsync -t <replication source volume name > <replication destination
volume name >

[For group units]
swsrpstartsync -t –Xgroup <group name>
```

10.5 Changing the Operating Environment

Server information batch change operations preserve the consistency of server information in systems managed by AdvancedCopy Manager. All Storage Server services and transactions in the systems that include a Storage Management Server and Storage Management transactions must be running when these changes are made.

Note

If the server information change command (stgxfwcmmodsrv) is used to change IP addresses, or similar

Do not execute backup management commands or replication management commands at the Storage Management Server that executes stgxfwcmmodsrv (Server information change command), nor at any of the Storage Servers managed by Storage Management Server transactions, either before or during execution of stgxfwcmmodsrv (Server information change command).

If executed, this command may terminate abnormally. If stgxfwcmmodsrv (Server information change command) terminates abnormally, implement recovery in accordance with the action indicated in the error message. If backup management or replication management commands are accidentally executed either before or during execution of the server information change command, and if the backup management and replication management commands terminate abnormally, wait until stgxfwcmmodsrv (Server information change command) terminates normally, then re-execute the backup management and replication management commands,

10.5.1 Changing the IP address of a Storage Management Server

Change the IP address of a Storage Management Server as follows:

If only a physical IP address needs to be changed and the Storage Management Server uses a logical IP address, then perform steps 5 and 6 only. Otherwise, perform all steps.

1. Check if the Storage Management Server transactions where the IP address is to be changed is also used for Storage Server transactions.
   If it is also used for Storage Server transactions and replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "Deleting a copy source or copy destination volume" for the method for deleting the copy source or copy destination volume settings.

2. On the Storage Management Server, change the system IP address.

3. Restart the various AdvancedCopy Manager services on the Storage Management Server. Refer to "Chapter 2 Starting and Stopping a Service" for the restart method.
   Note that this step is not required if the system was restarted in Step 1.

4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command with the -f option specified to change the IP addresses. Refer to "stgxfwcmmodsrv (Server information change command)" for details on this command.

5. On the Storage Management Server, restart the services of AdvancedCopy Manager. For information on restarting a service, refer to Chapter 2 Starting and Stopping a Service.

6. Use the environment information display command to check that the IP address used for GUI connection is correct. If necessary, use the GUI connection information setting command to change the IP address set for GUI connection. Refer to "stgenvdisp (Environment information display command)" and "stgguiipset (GUI connection information setting command)" for details on these commands.

7. If the replication management functions are used, reconstruct the replication management environment (perform the "Setting copy source volume and copy destination volume" task and subsequent tasks).

Point

In the following cases, the IP address for GUI connection needs to be changed in Step 6:

- If multiple network cards are mounted in the Storage Management Server, and the IP addresses used for communication with Storage Servers (IP addresses specified during database creation when the Storage Management Server was installed) are separate from the IP addresses specified for GUI client use

- In other cases, if stgguiipset (GUI connection information setting command) is executed to explicitly set the IP addresses for GUI connection

10.5.2 Changing the IP address of a Storage Server

Change the IP address of a Storage Server as follows:

1. If you have identified the Storage Server to be changed as a replication source or replication destination volume using a replication management function, delete the configuration of the source/replica volume by referring to "7.6.2 Deleting a source volume or replica volume" in the AdvancedCopy Manager Operator's Guide.

2. On the target Storage Server, stop the services of AdvancedCopy Manager. For information on stopping a service, refer to Chapter 2 Starting and Stopping a Service.

3. On the Storage Server, change the system IP address.

4. On the Storage Server, start the services of AdvancedCopy Manager. For information on this, refer to Chapter 2 Starting and Stopping a Service.
   After this, perform steps 5 and 6 if the address is being changed by using the Web GUI screen, or perform step 7 if the address is being changed by using a command.

5. On the server list view on the initial window of AdvancedCopy Manager, select the server whose information is being changed, select [Change of server] from the [Operations] menu, and display the [Change of server] window.

6. On the [Change of server] window, change the IP address and click the [OK] button.

7. After a server information change instruction file has been created, change the IP address by using the server information change command with the -f option specified on the Storage Management Server. For information on this, refer to "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" for the OS under which the Storage Management Server is running for the details.

8. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

10.5.3 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 "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. On the Storage Management Server or Storage Server targeted for change, change the port number of the communications service (stgxfws) of AdvancedCopy Manager.
   Change the port number of the communications service (stgxfws) described at windows-install-directory\system32\drivers\etc\services.

3. On the Storage Management Server or Storage Server targeted for change, restart the services of AdvancedCopy Manager. For information on this, refer to .

4. Create a server information change instruction file on the Storage Management Server, then execute the server information change command with the -f option specified to change the IP address. Refer to "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SR AdvancedCopy Manager Operator's Guide" of the OS running the Storage Management Server for details of the server information change command.

5. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

Note

For information about performing the above change in cluster operation, refer to "10.5.8.3 Changing the port number of a Storage Management Server transaction or Storage Server transaction".

10.5.4 Changing the server name of a Storage Management Server or Storage Server

Change the server name of a Storage Management Server or Storage Server as follows:

1. If replication management functions were used at the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.

   Refer to "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. Create a server information change instruction file on the Storage Management Server.

3. Execute the server information change command with the -f option specified to change the server name. Refer to "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" relevant to the OS running the Storage Management Server for details of the server information change command.

4. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

Note

For information about performing the above change in a cluster operation, refer to "10.5.8.4 Changing the server name of a Storage Management Server transaction or Storage Server transaction".

10.5.5 Changing the device configuration

Changing the device configuration refers to any of the following:

・ Deleting a logical drive in the primary or extended partition

・ Adding a primary or extended partition or a logical drive

・ Changing the partition type (ie a primary or extended partition)

・ Changing the capacity of a logical drive in the primary or extended partition

📝 Note

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When backup synchronized processing or synchronized replication processing is being performed, it may not be possible to correctly acquire the device configuration after change. Therefore, in the management list of the device configuration after change, all synchronous processing should be cancelled and performed again.

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📝 Note

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For correct backup management, the backup volume and the transaction volume must be the same size. For more information on this, refer to "Size of a Logical Disk" in 12.1.1 General notes

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10.5.5.1   Backup management

Change the device configuration by using the following procedure. This processing is executed for all volumes on the disk containing the volume whose device configuration is to be changed.

1. Check whether there is a transaction volume on the target disk that needs to be backed up. If there is, delete the transaction volume. For information on this, refer to 4.6.2.1 Deleting a transaction volume.

2. Check whether a backup volume exists in the target disk. If it does, delete the backup volume. For information on this, refer to 4.6.2.2 Deleting a backup volume.

3. Using Disk Management, change the device configuration. If a logical drive in the primary partition or an extended partition is deleted, restart the system.

4. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing. Refer to "4.4.5 Fetching device information on a Storage Server," for details on changing the device information.

5. Reset the deleted transaction or backup volume in the backup. Refer to "4.4.7 Setting the operation type for a device," for details on adding the transaction volume or backup volume.

📘 Point

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If the device configuration is changed (in step 3 above) before the transaction and backup volumes are deleted (in steps 1 and 2), history information cannot be deleted, and synchronized backup processing cannot be cancelled. This could possibly prevent the deletion of the transaction and backup volumes.
In this case, set the emergency operational mode, and delete the history information or cancel synchronized backup processing.
For details of the emergency operational mode, refer to the section describing swsthistdel (History information deletion command) and swstcancelsync (Backup synchronous processing cancel command).

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10.5.5.2   Replication management

Change the device configuration as shown below. This processing applies to all the volumes on a disk whose device configuration is to be changed.

1. Check whether there are any replication volumes on the target disk. If there are, delete them. For information about this, refer to 7.6.2 Deleting a source volume or replica volume

2. Use Disk Management to change the device configuration. If a logical drive in the primary partition or an extended partition is deleted, restart the system.

3. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "7.4.4 Fetching device information from a Storage Server," for details about changing the device information.

4. Reset a deleted replica volume in the replication operation. Refer to "7.4.5 Configuring the source volume and replica volume," for details about adding the replica volume.

P Point
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If the device configuration is changed (in step 2 above) before the replication volumes are deleted (in step 2), replication processing cannot be cancelled. This could possibly prevent the deletion of the replication volumes.
In this case, set the emergency operational mode, and cancel replication processing.
For details on the emergency operational mode, refer to the section describing swsrpcancel (Replication cancellation command).
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10.5.6 Changing the IP address for GUI connection of a Storage Management Server

The Storage Management Server is equipped with two or more network cards.
The IP address for GUI connection can be changed using a GUI connection information setting command, in cases when a GUI client communicates with a Storage Server via an IP address ie, the IP address that was specified during the data base creation at the time of installing the Storage Management Server).

Refer to GUI connection information setting command and "stgguiipset (GUI connection information setting command)."

10.5.7 Change of password or deletion of the user who was specified as the repository access user

When a user who is specified as the "repository access user" by the environmental setup at the time of the installation of the AdvancedCopy Manager, or when the password of the specified user name is changed by the Operating System, the information of a "repository access user" must be reconfigured using a repository access user change command.

Refer to "stguserset (Repository access user change command)" for information about the repository access user change command.

Note
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For information about performing the above change in a cluster operation, refer to "10.5.8.5 Deleting a repository accessible user or changing a repository accessible user's password".
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10.5.8 Changing the configuration in cluster operation

This section describes how to make a change to the operational configuration in cluster operation.

10.5.8.1 Changing the IP address of a Storage Management Server transaction

Change the IP address of a Storage Management Server transaction by taking the following steps:

1. Check if the target Storage Management Server transaction is also used for Storage Server transactions.
   If it is also used for Storage Server transactions and replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings. Refer to "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. Stop the Storage Management Server transaction.
   For details on how to stop it, refer to the relevant cluster software manual.

3. Change the IP address resource.
   For details on how to change an IP address resource, refer to the relevant cluster software manual.

4. Check whether the Storage Management Server transaction is operating.
   If the transaction is not operating, start up the Storage Management Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

5. On the node on which the Storage Management Server transaction is running, create a server information change instruction file, then execute the server information change command with the -f option specified to change the IP address. Refer to "stgxfwcmmodsrv (Server information change command)" for details of the server information change command.

6. Restart the Storage Management Server transaction.
   For details on how to stop and start it, refer to the relevant cluster software manual.

7. On the Storage Management Server transaction operating node, use the environment information display command to check that the IP address for GUI connections is correct. If required, use the GUI connection information setting command to change the IP address for GUI connections. Refer to "stgenvdisp (Environment information display command)" and "stgguiipset (GUI connection information setting command)" for details on these commands.

8. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

P Point

In the following cases, the IP address for GUI connection needs to be changed in Step 7:

- If multiple network cards are mounted in the Storage Management Server, and the IP addresses used for communication with Storage Servers (IP addresses specified during database creation when the Storage Management Server was installed) are separate from the IP addresses specified for GUI client use

- In other cases, if stgguiipset (GUI connection information setting command) is executed to explicitly set the IP addresses for GUI connection

Note

The IP address displayed by the cluster setup command that is executed to delete the cluster environment of the Storage Management Server transaction is not the IP address that has been newly specified, but is the IP address specified by the cluster setup command.

10.5.8.2   Changing the IP address of a Storage Server transaction

Change the IP address of a Storage Server transaction by performing the following steps:

1. If replication management functions were used to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. Stop the Storage Server transaction.
   For details on how to stop it, refer to the relevant cluster software manual.

3. Change the IP address resource.
   For details on how to change an IP address resource, refer to the relevant cluster software manual.

4. Start the Storage Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

5. On the Storage Management Server that manages the Storage Server transactions, create a server information change instruction file, then execute the server information change command with the -f option specified to change the IP address. Refer to "stgxfwcmmodsrv (Server information change command)" relevant to the OS running the Storage Management Server for details of the server information change command.

6. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

📝 Note

The IP address information displayed by the cluster unsetup command that is executed to delete the cluster environment of the Storage Server transaction is not the IP address that has been newly specified, but is the IP address specified by the cluster setup command.

10.5.8.3 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 performing 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 "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. Stop the Storage Management Server transaction or Storage Server transaction.
   For details on how to stop it, refer to the relevant cluster software manual.

3. On the primary and secondary nodes of the targeted Storage Management Server transaction or Storage Server transaction, change the port number of the AdvancedCopy Manager communication service (stgxfws_logical-node-name) specified in the Windows install directory /system32/drivers/etc/services

4. Start the targeted Storage Management Server transaction or Storage Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

5. Create a server information change instruction file at the Storage Management Server transaction operating node if the change target is the Storage Management Server transaction. If the change target is a Storage Server transaction, create the file at the Storage Management Server that manages the Storage Server. Then, execute the server information change command with the -f option specified to change the port number. Refer to "stgxfwcmmodsrv (Server information change command)" for details on this command.

6. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

10.5.8.4 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 performing the steps below.

1. If replication management functions were used by the target Storage Management Server or Storage Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings.
   Refer to "7.6.2 Deleting a source volume or replica volume" for the method for deleting the copy source or copy destination volume settings.

2. Create a server information change instruction file at the Storage Management Server transaction operating node if the change target is the Storage Management Server transaction. If the change target is a Storage Server transaction, create the file at the Storage Management Server that manages the Storage Server.

3. Execute the server information change command with the -f option specified (specify the created file) to change the server name. Refer to "stgxfwcmmodsrv (Server information change command)" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide" that is applicable to the operating system of the Storage Management server for details on this command.

4. If the replication management functions are used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

10.5.8.5 Deleting a repository accessible user or changing a repository accessible user's password

Make a change to a user's access to a repository by performing the following steps:

Check whether the target Storage Management Server transaction is operating.

1. If the transaction is not operating, start up the Storage Management Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

2. Make a change to a repository accessible user.
   For details about how to make a change to a repository accessible user, refer to "10.5.7 Change of password or deletion of the user who was specified as the repository access user" .

10.5.8.6 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:

Check whether the target Storage Management Server transaction or Storage Server transaction is operating.

1. 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 do this, refer to "4.6.2 Deleting a device".
   When it is defined as a source or replica volume by using the replication control function, delete the source/replica volume configuration. For details on how to perform this, refer to "7.6.2 Deleting a source volume or replica volume".

4. Save the data.

   For a Storage Management Server transaction, save the following data:

   - Repository
     Make a backup of the repository.
     For details on how to do this, refer to "10.2.1.1 Database backup".

   - 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 do this, refer to "10.1.1.4 Maintaining an authentication management list"

   - Screen files
     Make a backup of the screen files.

     On the node on which the Storage Management Server transaction is running, save the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also save the files under the directory <environment setting directory>:\etc\data\security on both nodes.

   The Storage Server transaction or a 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.

   - Lock operation specification file
     If the following lock operation specification files are used, save the relevant lock operation specification files:

     - Transaction volume lock operation specification file for backup

     - Backup volume lock operation specification file for backup

- Restore destination volume lock operation specification file

- Copy source volume lock operation specification file

- Copy destination volume lock operation specification file

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information
For details about the policy file path, refer to "10.1.2.1 Preliminaries".

5. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete <shared disk>:\etc\opt\swstorage\etc\swnode.ini on the node operating the transaction.

6. Delete the cluster environment of the target transaction.
For details about how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note

Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MSCS/WSFC for Windows" 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 do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note

- For the -n option of the cluster setup command, specify the name of the new logical node.

- Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment

(particularly Step 40 in "Detailed steps for customization" on "Windows SafeCLUSTER customization" or Step 54 in "Details of the steps for customization" on "MSCS/WSFC for Windows customization").

8. Start the target transaction.
For details on how to start it up, refer to 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 do this, refer to "10.2.1.2 Database restoration" .

- 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 do this, refer to "10.1.1.4 Maintaining an authentication management list".

- Screen files
Restore the screen files.

On the node on which the Storage Management Server transaction is running, restore the files under the directory <shared disk>: \etc\opt\swstorage\etc\data. Also restore the files under the directory <environment setting directory>:\etc\data\security 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.

- Lock operation specification file
  If lock operation specification files were saved in Step 4, restore the saved lock operation specification files.

For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
  For details about the policy file path, refer to "10.1.2.1 Preliminaries".

10. Change the server name.

Perform the procedure described in "10.5.8.4 Changing the server name of a Storage Management Server transaction or Storage Server transaction".

11. To use the backup management or replication control function, rebuild the backup management or replication control environment. (For backup management, perform the "Display backup management screen" task and subsequent tasks. For replication control, perform the "Setting copy source volume and copy destination volume" task and subsequent tasks.)

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 server.

10.5.8.7 Changing the transaction name

Change the name of an AdvancedCopy Manager 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 about how to start it up, refer to the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

For a Storage Management Server transaction, save the following data:

- Repository
  Create a backup of the repository.
  For details on how to make a backup of the repository, refer to "10.2.1.1 Database backup".

- 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, refer to "10.1.1.4 Maintaining an authentication management list".

- Screen files
  Create a backup of the screen files.

  On the node on which the Storage Management Server transaction is running, save the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also save the files under the directory <environment setting directory>:\etc\data\security 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 <shared disk>:\etc\opt\swstorage\etc\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 about how to do this, refer to "10.1.1.1.1 Backing up a backup management list".

- Pre-processing/post-processing scripts
  Save the pre-processing and post-processing scripts for backup management and replication control.

- Lock operation specification file
  If the following lock operation specification files are used, save the relevant lock operation specification files:

    - Transaction volume lock operation specification file for backup

    - Backup volume lock operation specification file for backup

    - Restore destination volume lock operation specification file

    - Copy source volume lock operation specification file

    - Copy destination volume lock operation specification file

- Backup management or replication management device information
  If device information is saved in advance in accordance with "Program directory \bin\clset_Repdevice.exe logical-node-name" under "Saving device information used for backup management" or "Saving device information used for replication management", use the copy command or similar to save the following file that is output by the relevant command:
  Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>
  If the procedure described in "Program directory\bin\clset_Repdevice.exe logical-node-name" is not executed (that is, if the above file does not exist), the above file need not be saved.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information
  For details about the policy file path, refer to "10.1.2.1 Preliminaries".

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete <shared disk>:\etc\opt\swstorage\etc\swnode.ini on the node operating the transaction.

4. Delete the cluster environment of the target transaction.
   For details on how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

 Note
. . . .
Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MSCS/WSFC for Windows" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".
. . . .

5. On the cluster system, change the cluster group name (MSCS/WSFC) or the cluster service name (SafeCLUSTER for Windows).
   For details on how to do this, refer to the relevant cluster software manual.

6. Create the cluster environment of the target transaction.
   For details on how to do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

 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 40 in "Details of the steps for customization" on "Windows SafeCLUSTER customization" or Step 54 in "Details of the steps for customization" on "MSCS/WSFC for Windows customization")

- Do not change any information other than the name of a transaction by using the cluster setup command.
. . . .

7. Start the target transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

8. Restore the AdvancedCopy Manager data.

   For a Storage Management Server transaction, restore the following data:

- Repository
Restore the repository.
For details on how to do this, refer to "10.2.1.2 Database restoration".

- Authentication management list
On the node on which the Storage Management Server transaction is running, restore the authentication management list.
For details about how to do this, refer to "10.1.1.4 Maintaining an authentication management list".

- Screen files
Restore the screen files.

On the node on which the Storage Management Server transaction is running, restore the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also restore the files under the directory <environment setting directory>:\etc\data\security on both nodes.

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 <shared disk>:\etc\opt\swstorage\etc\swnode.ini.

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 about how to do this, refer to "10.1.1.1.2 Restoring a backup management list".

- Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.

- When using the replication control function, restore the environment by using swsrprecoverres (Resource adjustment command).
Specify the "-r" option for the resource adjustment command. For details about this, refer to "swsrprecoverres (Resource adjustment command)".

- Lock operation specification file
If lock operation specification files were saved in Step 2, restore the saved lock operation specification files.

- Backup management or replication management device information
If backup management or replication management device information was saved in Step 2, use the copy command or similar to restore the saved files to the following file:
Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>

For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
For details about the policy file path, refer to "10.1.2.1 Preliminaries".

9. For the "package backup of the management information" execution server of AdvancedCopy Manager, execute the "package backup of the management information" server registration/deletion command to register the server.

10.5.8.8 Changing a shared disk for shared data

Change a shared disk that is used for AdvancedCopy Manager shared data (e.g., name of a mount point of a physical disk or shared disk) by performing the following steps:

1. Check whether the target Storage Management Server transaction or Storage Server transaction is operating.
If the transaction is not operating, start the Storage Management Server transaction or Storage Server transaction.
For details about how to start it up, refer to the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.

For a Storage Management Server transaction, save the following data:

- Repository
  Create a backup of the repository.
  For details about how to do this, refer to "10.2.1.1 Database backup".

- 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 about how to do this, refer to "10.1.1.4 Maintaining an authentication management list".

- Screen files
  Create a backup of the screen files.

  On the node on which the Storage Management Server transaction is running, save the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also save the files under the directory <environment setting directory>:\etc\data\security 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 <shared disk>:\etc\opt\swstorage\etc\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 about how to do this, refer to "10.1.1.1.1 Backing up a backup management list".

- Pre-processing/post-processing scripts
  Save the pre-processing and post-processing scripts for backup management and replication control.

- Lock operation specification file
  Save the following lock operation specification files if they are used:

  - Transaction volume lock operation specification file for backup

  - Backup volume lock operation specification file for backup

  - Restore destination volume lock operation specification file

  - Copy source volume lock operation specification file

  - Copy destination volume lock operation specification file

- Backup management or replication management device information
  If device information is saved in advance in accordance with "Program directory \bin\clset_Repdevice.exe logical-node-name" under "Saving device information used for backup management" or "Saving device information used for replication management", use the copy command or similar to save the following file that is output by the relevant command:
  Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>
  If the procedure described in "Program directory\bin\clset_Repdevice.exe logical-node-name" is not executed (that is, if the above file does not exist), the file need not be saved.

For the execution server of the package backup of the management information of AdvancedCopy Manager, save the following data:

- Policy file for package backup of the management information
  For details about the policy file path, refer to "10.1.2.1 Preliminaries".

3. For a Storage Server transaction (except a Storage Management Server transaction that also functions as a Storage Server transaction), delete <shared disk>:\etc\opt\swstorage\etc\swnode.ini on the node operating the transaction.

4. Delete the cluster environment of the target transaction.
   For details about how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   📝 **Note**

   . . . .

   Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MSCS/WSFC for Windows" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   . . . .

5. Create the cluster environment of the target transaction.
   For details about how to do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

   📝 **Note**

   . . . .

   - To change the name of a mount point, specify the new mount point name in the -m option of the cluster setup command.

   - To change a physical disk, specify the new physical disk when you mount it.

   - Change the configuration of a shared disk in the cluster system.

   - Do not perform the steps described in "Creating a Storage Management Server transaction or Storage Server transaction environment" in "Detailed steps for customization" on creating a cluster environment

     (particularly Step 40 in "Details of the steps for customization" on "Windows SafeCLUSTER customization" or Step 54 in "Details of the steps for customization" on "MSCS/WSFC for Windows customization").

   . . . .

6. Start the target transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

7. Restore the AdvancedCopy Manager data.

   For a Storage Management Server transaction, restore the following data:

   - Repository
     Restore the repository.
     For details about how to do this refer to "10.2.1.2 Database restoration".

   - Authentication management list
     On the node on which the Storage Management Server transaction is running, restore the authentication management list.
     For details about how to do this, refer to "10.1.1.4 Maintaining an authentication management list".

   - Screen files
     Restore the screen files.

     On the node on which the Storage Management Server transaction is running, restore the files under the directory <shared disk>: \etc\opt\swstorage\etc\data. Also restore the files under the directory <environment setting directory>:\etc\data\security on both nodes.

   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 <shared disk>:\etc\opt\swstorage\etc\swnode.ini.

   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 about how to restore do this, refer to "10.1.1.1.2 Restoring a backup management list".

   - Pre-processing/post-processing scripts
     Restore the pre-processing and post-processing scripts for backup management and replication control.

- When using the replication control function, restore the environment by using swsrprecoverres (Resource adjustment command). Specify the "-r" option for the resource adjustment command.

- Lock operation specification file
  If lock operation specification files were saved in Step 2, restore the saved lock operation specification files.

- Backup management or replication management device information
  If backup management or replication management device information was saved in Step 2, use the copy command or similar to restore the saved files to the following file:
  Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>

For a package-backup-of-the-management-information execution server of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
  For details about the policy file path, refer to "10.1.2.1 Preliminaries".

8. For the "package backup of the management information" execution server of AdvancedCopy Manager, execute the "package backup of the management information" server registration/deletion command to register the server.

10.5.8.9   Changing the repository shared disk

Change the shared disk for the AdvancedCopy Manager repository by g performing the following steps:

1. Check whether the target Storage Management Server transaction is operating.
   If the transaction is not operating, start it up.
   For details on how to do this, refer to the relevant cluster software manual.

2. Save the AdvancedCopy Manager data.
   Save the following data:

   - Repository
     Make a backup of the repository.
     For details about how to do this, refer to "10.2.1.1 Database backup".

   - 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 do this, refer to "10.1.1.4 Maintaining an authentication management list".

   - Screen files
     Make a backup of the screen files.

     On the node on which the Storage Management Server transaction is running, save the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also save the files under the directory <environment setting directory>:\etc\data\security on both nodes.

   - AdvancedCopy Manager management file

     On the node operating the transaction, save <shared disk>:\etc\opt\swstorage\etc\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 about how to do this, refer to "10.1.1.1.1 Backing up a backup management list".

   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication control.

   - Lock operation specification file
     Save the following lock operation specification files if the are used:

     - Transaction volume lock operation specification file for backup

     - Backup volume lock operation specification file for backup

- Restore destination volume lock operation specification file

- Copy source volume lock operation specification file

- Copy destination volume lock operation specification file

- Backup management or replication management device information
  If device information is saved in advance in accordance with "Program directory \bin\clset_Repdevice.exe logical-node-name" under "Saving device information used for backup management" or "Saving device information used for replication management", use the copy command or similar to save the following file that is output by the relevant command:
  Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>
  If the procedure described in "Program directory\bin\clset_Repdevice.exe logical-node-name" is not executed (that is, if the above file does not exist), the above file need not be saved.

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, refer to "10.1.2.1 Preliminaries".

3. Delete the cluster environment of the target transaction.
   For details on how to do this, refer to "Deleting a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note

Do not perform Step 1 (deleting the server) described in "Detailed steps for deletion" in "Deletion on MSCS/WSFC for Windows" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

4. Create the cluster environment of the target transaction.
   For details about how to do this, refer to "Customizing a Storage Management Server transaction or Storage Server transaction" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for cluster environment".

Note

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 40 in "Details of the steps for customization" on "Windows SafeCLUSTER customization" or Step 54 in "Details of the steps for customization" on "MSCS/WSFC for Windows customization").

5. Start the target transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

6. Restore the AdvancedCopy Manager data.

   Restore the following data:

   - Repository
     Restore the repository.
     For details about how to do this, refer to "10.2.1.2 Database restoration".

   - Authentication management list
     On the node on which the Storage Management Server transaction is running, restore the authentication management list.
     For details about how to do this, refer to "10.1.1.4 Maintaining an authentication management list".

   - Screen files
     Restore the screen files.

     On the node on which the Storage Management Server transaction is running, restore the files under the directory <shared disk>:\etc\opt\swstorage\etc\data. Also restore the files under the directory <environment setting directory>:\etc\data\security on both nodes.

- AdvancedCopy Manager management file

On the node operating the transaction, restore <shared disk>:\etc\opt\swstorage\etc\swnode.ini.

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 about how to do this, refer to "10.1.1.1.2 Restoring a backup management list".

- Pre-processing/post-processing scripts
Restore the pre-processing and post-processing scripts for backup management and replication control.

- When using the replication control function, restore the environment by using swsrprecoverres (Resource adjustment command).
Specify the "-r" option for the resource adjustment command.

- Lock operation specification file. If a lock operation specification file was saved in Step 2, recover the saved lock operation specification file.

- Backup management or replication management device information
If backup management or replication management device information was saved in Step 2, use the copy command or similar to restore the saved files to the following file:
Drive letter of shared disk for AdvancedCopy Manager shared data:\etc\swstorage\etc\repl\data\device.ini.<logical-node-name>

For a "package backup of the management information" execution server of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
For details about the policy file path, refer to "10.1.2.1 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 server.

10.5.9 Changing the startup account

As Users typically utilize their startup accounts to start various services of AdvancedCopy Manager, the authority to perform the functions as described below is added at the time of installation.

・ Log on as a service

・ Act as part of the operating system

・ Increase quotas

・ Replace a process level token

Startup accounts are set up automatically at the time of installation as login information for each registered service in the operating system.
Therefore, changes to a startup account require a change to the login information for the services.

📝 Note

Users who specify the startup accounts are required to make sure that the conditions described below are met.

・ The user belongs to the Administrators group of the local computer.

・ The user's password does not expire.

In addition, the account name and password must the following condition:

・ An account name and password that can be specified in the operating system

Chapter 11 Commands

This chapter describes using commands.

All the commands provided in this chapter should be installed in the Win32app\AdvancedCopyManager directory of the C drive.

11.1 Command list

The commands are classified as follows:

Backup management commands

Environment definition commands

Table 11.1 List of environment definition commands for backup management

Function	Command name	Explanation
Storage Server configuration information setting command	swstsvrset	Sets the configuration information of a Storage Server.
Storage Server configuration information display command	swstsvrdisp	Displays the configuration information of a Storage Server.
Device information setting command	swstdevinfoset	Sets the usage type of a device.
Device use status display command	swstdevdisp	Displays the information of a device.
Backup policy setting command	swstbkpolset	Sets a backup policy.
Backup policy display command	swstbkpoldisp	Displays a backup policy that has been set.
Backup policy deletion command	swstbkpoldel	Deletes a backup policy that has been set.

Operation commands

Table 11.2 List of operation commands for backup management

Function	Command name	Explanation
Backup execution command	swstbackup	Performs the synchronous high-speed backup or snapshot fast backup.
Backup execution status display command	swstbackstat	Displays the backup progress status.
Restore execution command	swstrestore	Performs restoration.
Restore cancellation command	swstcancelrest	Cancels the execution of restoration.
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.

Function	Command name	Explanation
Backup synchronous processing start command	swststartsync	Starts backup synchronous processing (copying between disks using EC).
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.
Drive letter allocation command	swstdrvset	Allocates a drive letter to a device.
Drive letter deallocation command	swstdrvunset	Deallocates a drive letter that has already been allocated to a drive.
Dismount command	swstdismount	This command dismounts a volume.
Volume unlock command	swstvolunlock	Unlocks a volume.
Locked-volume information display command	swstvollockstat	Displays information about a volume locked by the volume lock command.
Tracking cancel command	swstcanceltrk	Stops tracking processing.
Tracking execution status display command	swsttrkstat	Displays the status of tracking processing.

Maintenance commands

Table 11.3 List of maintenance commands for backup management

Function	Command name	Explanation
Resource adjustment command	swstsrsemtch	Recovers the consistency of information in a backup management file.
Resource backup command	swstresback	Backup backup management files
Resource restore command	swstresrst	Restores backup management files

Configuration management commands

Table 11.4 List of configuration management commands

Function	Command name	Explanation
Management server information change command	stgcmmodnode	Changes the server information of the Storage Management server
Repository access user change command	stguserset	Changes the user name and password that was specified for the "repository access user" during installation of the Manager of AdvancedCopy Manager
GUI connection information setting command	Stgguiipset	This command is used if multiple network cards are installed for the Storage Management server and if the IP address used for

Function	Command name	Explanation
		communication with Storage Servers is separate from the IP address specified when the GUI client is used.
Server information addition command	stgxfwcmaddsrv	Adds information for a Storage Server newly managed by AdvancedCopy Manager
Server information change command	stgxfwcmmodsrv	Changes the information for servers managed by AdvancedCopy Manager
Server information deletion command	stgxfwcmdelsrv	Deletes the information for servers currently managed by AdvancedCopy Manager
Device information fetch/ reflect command	stgxfwcmsetdev	Fetches information for new devices detected by the server and displays differences compared with the information managed by AdvancedCopy Manager. The specified differences in the device information are then reflected in the AdvancedCopy Manager's management information.
Device information deletion command	stgxfwcmdeldev	Deletes device information currently managed by AdvancedCopy Manager
Server information display command	stgxfwcmdispsrv	Displays server information managed by AdvancedCopy Manager
Device information display command	stgxfwcmdispdev	Displays device information managed by AdvancedCopy Manager
Partition information display command	stgxfwcmdisppat	Displays information concerning the partitions comprising devices 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	Backup 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
Backup data expansion command	stgarcext	Expands the Windows AdvancedCopy Manager Storage Management server and Storage Server backup data that was collected by the management information batch backup command

Replication management commands

Environment definition commands

Table 11.5 List of environment definition commands for replication management

Function	Command name	Explanation
Replication volume information setting command	swsrpsetvol	Sets the information about a replication volume.
Replication volume information display command	swsrpvolinfo	Displays the information about a replication volume.

Function	Command name	Explanation
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 11.6 List of operation commands for replication management

Function	Command name	Explanation
Replication start command	swsrpstartsync	Starts replication when the synchronous type replication function is performed.
Replica creation command	swsrpmake	Creates replication when the snapshot type and the synchronous type replication functions are performed.
Use status display command	swsrpstat	Displays the status of replication operation
Replication cancel command	swsrpcancel	Cancels the replication processing when the snapshot type and the synchronous type replication functions are performed.
Synchronous processing mode change command	swsrpchsync	Changes the operation mode of inter-box synchronization.
Synchronous processing reverse command	swsrprevsync	Reverses the copying direction of inter-box synchronization in suspended status.

Maintenance commands

Table 11.7 List of maintenance commands for replication management

Function	Command name	Explanation
Resource adjustment command	swsrprecoverres	Recovers the consistency of the information in the replication management file

Exchange Server commands

The following commands do not exist in Windows Server 2008 environments.

Table 11.8 List of Exchange Server commands

Function	Command name	Explanation
Exchange database information registration command	swsrpdbinfo_ex2k3 / swsrpdbinfo_exchange	Registers or deletes storage group information
Exchange device information display command	swsrpdevdisp_ex2k3 / swsrpdevdisp_exchange	Displays information that was registered using the Exchange database information registration command (swsrpdbinfo_ex2k3/ swsrpdbinfo_exchange)
Exchange VSS synchronous processing command	swsrpvsssync_exchange	Performs synchronous processing operations for storage groups

Function	Command name	Explanation
Exchange VSS backup execution command	swsrpvssbackup_exchange	Performs online backup of storage groups that are linked to VSS
Exchange VSS restore executioncommand	swsrpvssrestore_exchange	Restores storage groups that are linked to VSS
Exchange VSS shadow copy management command	swsrpshadowadm_exchange	Manages shadow copy of storage groups
Exchange operation status display command	swsrpstat_exchange	Displays the operating status of a specified storage group
Shadow copy management command	swsrpshadowadm	Manages shadow copy
Provider registration/ deletion command	eternus_provider	Registers and deletes ETERNUS providers
Copy set registration/ deletion/reference command	eternus_copyset	Registers, deletes, and references copy set information of transaction disks and backup disks
Copy destination disk number display command	eternus_getolu	Displays the physical disk number and OLU number of the copy destination disk
Device instance ID display command	eternus_getins	Displays the device instance ID
Status reference command	eternus_query	Displays the OPC, EC, and QuickOPC status
Copy stop command	eternus_stopcopy	Stops OPC, EC, or QuickOPC, or temporarily stops EC
Copy set information server name change command	eternus_chgsrv	Changes the server name in copy set information

SQL Server commands

Backup management function commands

Table 11.9 List of SQL Server backup management function commands

Function	Command name	Explanation
SQL Server backup execution command	swstbackup_sqlsvr	Executes backup of SQL Server databases
SQL Server restore execution command	swstrestore_sqlsvr	Restores SQL Server databases

Replication management function commands

Table 11.10 List of SQL Server replication management function commands

Function	Command name	Explanation
SQL Server backup execution command	swsrpbackup_sql	Executes backup of SQL Server databases
SQL Server restore execution command	swsrprestore_sql	Restores SQL Server databases

SnapOPC/SnapOPC+ support commands

Table 11.11 List of SnapOPC/SnapOPC+ support commands

Function	Command name	Explanation
Update size measurement command	swstestupdate	Uses the pseudo-session setting function to measure the physical size of a Snap Data Volume
Snap Data Volume operation/reference command	swstsdv	By specifying a subcommand, Snap Data Volume initialization/status display and Snap Data Pool status display are possible.

Troubleshooting data collection commands

Table 11.12 List of Troubleshooting data collection commands

Function	Command name	Explanation
Troubleshooting data collection command	acmcapture	This command collects troubleshooting data.

11.2 Backup Management Commands

This section describes operations using Backup Management Commands

Note

Only a user belonging to the Administrators group can execute all the commands of backup management. When commands are executed by other users, the message "swst0601 This Command cannot be run because the user is not a root user." will be generated and then the command aborts.

Note

Backup operations in Logical Units (disk units) are not supported. An error occurs if swstdevinfoset (Device information setting command) is used to specify a Logical Unit (disk).

Note

Operating environment for command execution

The table below lists the operating environment requirements for different commands.

Table 11.13 Operating environment for executing backup management commands

Command	Operating environment of AdvancedCopy Manager
swstbackstat	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swstbackup	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows and is in EC operation, Windows services required by the Storage Server must be running.

Command	Operating environment of AdvancedCopy Manager
swstbkpoldel	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstbkpoldisp	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swstbkpolset	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstcancelrest	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstcancelsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows and is in EC operation, Windows services required by the Storage Server must be running.
swstcanceltrk	When this command is executed with the -h option specified on the Storage Management Server, tservices must be active.
swstdevdisp	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swstdevinfoset	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstexecstat	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swsthistdel	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsthistdisp	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations:

Command	Operating environment of AdvancedCopy Manager
	・ -h option specified ・ No device name specified
swstresback	-
swstresrst	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running. To execute this command with the -x option specified, Windows services required by the Storage Management Server must be running.
swstrestore	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstreststat	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swstsrsemtch	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running. To execute this command with the -x option specified, Windows services required by the Storage Management Server must be running.
swststartsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running.
swstsvrdisp	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstsvrset	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swstsyncstat	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations: ・ -h option specified ・ No device name specified
swsttrkstat	Windows services required by the Storage Management Server and target Storage Server must be running in order to execute this command on a Storage Management Server with either of the following parameter designations:

Command	Operating environment of AdvancedCopy Manager
	・ -h option is specified ・ No device name is specified.
swstvolunlock	Windows services required by the Storage Management Server must be running.
swstvollockstat	Windows services required by the Storage Management Server must be running.

Note

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

```
set SWSTGNODE=logical-node-name
```

2. Execute the command.

The table below lists the commands available in cluster operation, notes whether environment variables must be configured, and specifies the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 11.14 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstsvrset	Required	Transaction operation node	-
swstsvrdisp	Required	Transaction operation node	-
swstdevinfoset	Required	Transaction operation node	-
swstdevdisp	Required	Transaction operation node	-
swstbkpolset	Required	Transaction operation node	-
swstbkpoldisp	Required	Transaction operation node	-
swstbkpoldel	Required	Transaction operation node	-
swstbackup	Required	Transaction operation node	-
swstbackstat	Required	Transaction operation node	-
swstrestore	Required	Transaction operation node	-
swstcancelrest	Required	Transaction operation node	-
swstreststat	Required	Transaction operation node	-
swsthistdisp	Required	Transaction operation node	-
swsthistdel	Required	Transaction operation node	-
swststartsync	Required	Transaction operation node	-
swstcancelsync	Required	Transaction operation node	-
swstsyncstat	Required	Transaction operation node	-
swstexecstat	Required	Transaction operation node	-
swstdrvset	Required	Transaction operation node	-
swstdrvunset	Required	Transaction operation node	-
swstsrsemtch	Required	Transaction operation node	-
swstresback	Required	Transaction operation node	-
swstresrst	Required	Transaction operation node	-

Command	Environment variable	Command execution node	Remarks
swstdismount	Required	Transaction operation node	-
swstvolunlock	Required	Transaction operation node	-
swstvollockstat	Required	Transaction operation node	-
swstcanceltrk	Required	Transaction operation node	-
swsttrkstat	Required	Transaction operation node	-

Note

In a Storage Management Server, when a display-type command that has 'disp' or 'stat' at the end of the command name is executed, the display contents will depend on the existence of the -h option and device name. For details, refer to the following table.

Table 11.15 Display contents of the display-type commands in Storage Management Server

-h option	Device name specified	Display contents
Does not exist	No	Displays all Storage Server information registered using the Backup management functionality.
	Yes	Displays only the specified Storage Management Server device information.
Exists	No	Displays all Storage Server information specified using the -h option.
	Yes	Displays only the specified device information for the Storage Server specified using the -h option.

11.2.1 Environment definition commands

This section describes the environment definition commands for backup management.

11.2.1.1 swstsvrset (Storage Server configuration information setting command)

NAME

swstsvrset - sets configuration information of a Storage Server

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstsvrset
```

To be executed on a Storage Management Server

```
program-directory\bin\swstsvrset [-h Server-Name]
```

DESCRIPTION

This command sets configuration information of a Storage Server. Execution of this command declares that the Storage Server on which the command is executed is a server that performs backup operations.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server to be subject to the backup operation. This option is valid only on a Storage Management Server.

If this option is omitted, the Storage Server on which the command is entered will be subject to the processing.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Set the configuration information of a Storage Server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrset
swstsvrset completed
C:\>
```

・ Set the configuration information of a Storage Server named job1 from a Storage Management Server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrset -h job1
swstsvrset completed
C:\>
```

NOTES

・ This command can only be executed if none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstbkpolset (backup policy setting command)

- swstbkpoldel (Backup policy deletion command)

- swstbackup (Backup execution command)

- swstrestore (Restore execution command)

- swstcancelrest (Restore cancellation command)

- swststartsync (Backup synchronous processing start command)

- swstcancelsync (Backup synchronous processing cancel command)

- swstdevinfoset (Device information setting command)

- swsthistdel (History information deletion command)

- swstcanceltrk (Tracking cancel command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

- swstsrsemtch (Resource match command)

- swstbackup_sqlsvr (SQL Server backup execution command)

11.2.1.2   swstsvrdisp (Storage Server configuration information display command)

NAME

swstsvrdisp - displays configuration information of a Storage Server

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstsvrdisp
```

To be executed on a Storage Management Server

```
program-directory\bin\swstsvrdisp [-h Server-Name]
```

DESCRIPTION

This command displays configuration information of a Storage Server that has been set using swstsvrset (Storage Server configuration information setting command).

The following information will be displayed:

Title	Description
Storage-Server	Displays a Storage Server name.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display configuration information of a Storage Server named Work1.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrdisp
Storage-Server  = Work1
C:\>
```

11.2.1.3 swstdevinfoset (Device information setting command)

NAME

swstdevinfoset - sets the device information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstdevinfoset -t | -b | -o Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swstdevinfoset [-h Server-Name] -t | -b | -o Device-Name
```

DESCRIPTION

Set a volume that has been allocated to the Fujitsu ETERNUS Storage System, as a transaction or backup volume.

A transaction volume refers to a volume that stores transaction data to be backed up. A backup volume refers to a volume used to store a backup of this transaction data.

The following devices can be registered on Windows as transaction and backup volumes. Logical Units (disks) cannot be registered.

- ・ SCSI driver resource (OS standard)

- ・ MPHD driver resource (Multipath disk control for WindowsNT)

- ・ MPLB driver resource

Only regular drives can be registered. No mirror set, stripe set, parity-protected stripe set, or volume set that can be recognized as FT (Fault Tolerant) drives can be registered. Additionally, the following file systems can be used (note that HPFS is not supported):

- ・ NTFS, FAT, and FAT32

You may want to change information (partition size, drive letter, and ETERNUS Storage System cabinet information) on a device registered as a working or backup volume using an OS management tool such as Disk Management or a function such as ETERNUSmgr/GRmgr provided by the ETERNUS Storage System. However, if you do, you need to then deselect the target device from the work or backup volume and register it again.

If you add or delete a device (including disk array units and other general devices) on a Storage Server on Windows, use the "getting and reflecting information of all devices" option on the GUI client to update the relationship table between AdvancedCopy Manager device names and OS information.

If you want to perform the backup operation on a regular transaction volume, refer to 4.2.2 Selecting a backup source for information on a transaction volume, and 4.2.4 Preparing a backup volume for information on a backup volume.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

-t

Register the specified device as a transaction volume.
Cannot be specified at the same time as the -b and -o options.

-b

Register the specified device as a backup volume.
Cannot be specified at the same time as the -t and -o options.

-o

Deregister the specified device if it has been registered as a transaction or backup volume.
Cannot be specified at the same time as the -t and -b options.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・Register a device as a transaction volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevinfoset -t g1d1p2
swstdevinfoset completed
C:\>
```

・Register a device as a backup volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevinfoset -b g1d2p1
swstdevinfoset completed
C:\>
```

・Deregister a device that has been registered as a transaction volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevinfoset -o g1d1p2
swstdevinfoset completed
C:\>
```

NOTES

・A device cannot be registered as a transaction volume if:

  - Another device with the same cabinet information (box identifier, OLU number, EXTENT starting position, and EXTENT size) has already been registered as a transaction volume.

  - The space of the device to be registered overlaps the space of an already registered working or backup volume.

  - The device is a FT drive.

  - The device is a dynamic volume.

  - The device is a Logical Unit (disk).

・A device cannot be registered as a backup volume if:

  - Another device with the same cabinet information (box identifier, OLU number, EXTENT starting position, and EXTENT size) has already been registered as a backup volume.

  - The space of the device to be registered overlaps the space of an already registered work or backup volume.

  - The device to be set up is registered as a replication destination volume in replication management.

  - The device to be set up is registered as a replication source volume of the duplicate volume information in which bidirectional copy is possible in replication management.

  - A drive letter has already been allocated to the device to be registered.

  - The device is a FT drive.

  - The device is a dynamic volume.

  - The device is a Logical Unit (disk).

  - The device is an SDX object.

・You must delete related backup history information before:

  - Changing a backup volume to a transaction volume

  - Canceling the setting of a backup volume

- You must delete a backup policy specified on a transaction volume before:
    - Changing a transaction volume to a backup volume
    - Canceling the setting of a transaction volume
- The following changes are not possible unless the related synchronous processing (in an EC session) is cancelled:
    - Changing a setting in a suspended transaction volume
    - Changing a setting in a suspended backup volume
- The related tracking processing (in an OPC session) must be canceled in advance to perform the following changes:
    - Changing the settings of a transaction volume in tracking processing
    - Changing the settings of a backup volume in tracking processing
- This command can be executed only while none of the following commands are running:
    - swstsvrset (Storage Server configuration information setting command)
    - swstdevinfoset (Device information setting command)
    - swstbkpolset (backup policy setting command)
    - swstbkpoldel (Backup policy deletion command)
    - swstbackup (Backup execution command)
    - swstrestore (Restore execution command)
    - swstcancelrest (Restore cancellation command)
    - swststartsync (Backup synchronous processing start command)
    - swstcancelsync (Backup synchronous processing cancel command)
    - swsthistdel (History information deletion command)
    - swstcanceltrk (Tracking cancel command)
    - swstsrsemtch (Resource match command)
    - swstresback (Resource backup command)
    - swstresrst (Resource restore command)
    - swstbackup_sqlsvr (SQL Server backup execution command)

11.2.1.4　swstdevdisp (Device usage status display command)

NAME

swstdevdisp - displays the device information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstdevdisp [-h Server-Name] [-t] [-b [-u]] [-o] [Device-Name]
```

DESCRIPTION

This command displays information about a transaction or backup volume or any other definable device, which has been set using swstdevinfoset (Device information setting command).

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager.
Size	Displays the size of a partition allocated to a device.
Device-Mode	Displays a character string by which a device can be identified: "Transaction": Represents a transaction volume. "Backup": Represents a backup volume. "Other": Represents a device that can be registered as a working or backup volume. A backup volume is indicated as "Backup (used)" if it is being used or "Backup (free)" if it is not used. During the backup process with -suspend or -T specified, the backup volume remains in use after history information is deleted. When the -u option is specified, "Backup (used-S)" is displayed for a backup volume in the suspend status for which history information was deleted, or "Backup (used-T)" is displayed for a backup volume in the tracking status for which history information was deleted.
Mount-Point (Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.
Backup-Engine	Displays the operation type: "AdvancedCopy": Backup operation using AdvancedCopy Manager

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-t

Displays information on a device that has been set as a transaction volume.
Displays device information on all the transaction volumes if the device name in an operand is omitted.

-b

Displays a device that has been set as a backup volume.
Displays device information on all the backup volumes if the device name in an operand is omitted.

-u

Changes the display format of the Device-Mode field.

-o

Displays all the devices other than those set as a transaction or backup volume.
Displays all the devices other than those set as a transaction or backup volume if the device name in an operand is omitted.

Information on a device that has been set as a transaction volume will be displayed if all of the -t, -b, and -o options are omitted.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

Displays device information on all the transaction volumes if this operand and the associated options are omitted.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the usage statuses of the registered devices.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevdisp -tb
Server Device  Size       Device-Mode   Mount-Point (Method)  Backup-Engine
Work2  g1d1p2 1.0 Gbyte  Transaction   D: (NTFS)             AdvancedCopy
Work2  g1d2p1 1.0 Gbyte  Transaction   E: (FAT)              AdvancedCopy
Work2  g1d2p1 1.0 Gbyte  Backup (used) ---- (----)           AdvancedCopy
Work2  g1d2p2 1.0 Gbyte  Backup (free) ---- (----)           AdvancedCopy
Work2  g1d2p3 2.0 Gbyte  Backup (used) ---- (----)           AdvancedCopy
Work2  g1d2p4 2.0 Gbyte  Backup (free) ---- (----)           AdvancedCopy
:
C:\>
```

NOTES

・ This command cannot be used to display volume sizes in bytes. Refer to the notes under 4.4.7 Setting the operation type for a device for information concerning how to display and check the number of bytes.

11.2.1.5   swstbkpolset (Backup policy setting command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstbkpolset [-i Interval-Days] [-s Save-Number] [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstbkpolset [-h Server-Name] [-i Interval-Days] [-s Save-Number] [Device-
Name]
```

DESCRIPTION

This command sets a backup policy (the number of preservation generations and the number of interval days).
The number of preservation generations is the number of generations of backup data that should be kept at one time. The number of interval days means the number of days from the execution of one backup until the next backup should be performed.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-i *Interval-Days*

Specifies the number of interval days. You can specify a value between 1 and 366. If this option is omitted during initial registration, 30 will be set as the default. If this option is omitted during update, the existing value will be inherited.

-s *Save-Number*

Specifies the number of preservation generations. You can specify a value between 1 and 31. If this option is omitted during initial registration, 2 will be set as the default. If this option is omitted during update, the existing value will be inherited.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If the device name is omitted, the backup policy will be set for all the transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Set a backup policy assuming 10 days as the number of interval days and three generations as the number of preservation generations for the transaction volume (called g1d1p2).

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpolset -i 10 -s 3 g1d1p2
g1d1p2 swstbkpolset completed
C:\>
```

NOTES

- Even if the number of interval days is specified, AdvancedCopy Manager does not automatically create a backup.

- When you specify a backup policy, there must be as many backup volumes in operation according to the specified backup policy. To view information on the number of backup volumes required to perform the backup operation of a regular transaction volume, refer to 4.2.4 Preparing a backup volume.

- You can change the number of preservation generations as long as the "history information count at the time" is equal to or less than the "number of preservation generations to be specified".

- No backup policy can be set if:

    - There are not as many backup volumes as the specified number of preservation generations.

    - An option for more than the maximum number of preservation generations is specified.

    - An option for more than the maximum interval days is specified.

    - The replication control function or tape backup function uses the target transaction volume

    - The specified device is an LU (disk unit).

・ This command can only be executed while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

11.2.1.6   swstbkpoldisp (Backup policy display command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstbkpoldisp [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstbkpoldisp [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays a backup policy that has been set for a transaction volume.
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager.
Interval-Days	Displays a number of interval days.
Save-Number	Displays a number of preservation generations.
Mount-Point (Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If the device name is omitted, a backup policy for a transaction volume with a registered backup policy will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display a backup policy of a transaction volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpoldisp g1d1p2
Server Device Interval-Days Save-Number Mount-Point (Method)
Work2  g1d1p2 30            2           D: (NTFS)
C:\>
```

11.2.1.7   swstbkpoldel (Backup policy deletion command)

NAME

swstbkpoldel - deletes the backup policy

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstbkpoldel Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swstbkpoldel [-h Server-Name] Device-Name
```

DESCRIPTION

An existing backup policy can be deleted using this command.
Delete the backup history information of the transaction volume prior to the execution of this command.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ To delete the backup policies of a transaction volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpoldel g1d1p2
g1d1p2 swstbkpoldel completed
C:\>
```

NOTES

・ A backup policy cannot be deleted if:

- The transaction volume to be deleted has backup history information.

- A transaction volume whose backup policies are to be deleted has already started backup synchronous processing.

- The replication control function or tape backup function uses the target transaction volume

・ This command can only be executed while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

11.2.2 Operation commands

This section describes operation commands for backup management.

11.2.2.1 swstbackup (Backup execution command)

NAME

swstbackup - backup

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstbackup [-suspend|-T] Device-Name [-Xdevmap Device-Map-File] [-Xflush]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstbackup [-h Server-Name] [-suspend|-T] Device-Name [-Xdevmap Device-Map-
File] [-Xflush]
```

DESCRIPTION

When using this command, the operation changes according to different states of the advanced copy that is being executed.

・ When synchronous processing (EC) is not performed
Snapshot processing (OPC) is performed and the processing of information, such as the TimeStamp and backup volume of a copy target, is registered into backup history information.

・ When synchronous processing (EC) is performed
The state of synchronous processing is checked and, in the case of an equivalent maintenance state, backup synchronous processing

is suspended. Information such as time and backup volume of a copy target is simultaneously registered into backup history information. A backup of this form is called synchronous high-speed backup. Note that it aborts when an equivalent maintenance state is not reached.To use the Chapter 5 Backup Process That Uses the Suspend/Resume Function for synchronous high-speed backup, execute the backup command with -suspend specified, and suspend backup synchronous processing.

In the above cases, a backup is established, and access to the backup volume is available immediately after the execution command.

AdvancedCopy Manager executes backup pre-processing and post-processing scripts before and after backup.

For information on customizing these scripts, refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration".

AdvancedCopy Manager deletes the oldest backup history information automatically at the time of backup execution, if it has reached the maximum number of preservation generations (*1).

(*1) This configured in swstbkpolset (backup policy setting command).

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-Xdevmap *Device-Map-File*

Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a 4.4.11.1 Describing a device map file in which a combination of a transaction volume and a target backup volume are described. If this option is not specified, the target backup volume will be automatically selected by the backup function. To execute this command on a remote basis using the -h option, specify a device map file (of a Storage Server) using an absolute pathname. A file name specified in Device-Map-File must not include any national character.

-Xflush

Specifies the flushing of the file system buffer of the transaction volume instead of locking the transaction volume. Before this option is specified, all write processing on the transaction volume must be stopped. During a backup process where the write processing is not stopped, the reliability of the transaction volume data is not guaranteed.
The file system buffer can be flushed by specifying 'on' for BufferFlushOnly in the transaction volume locking specification file for backups instead of this option. For details, refer to A.2.2.2 Transaction volume locking specification file for backups

-suspend

This results in synchronous high-speed backup using the Chapter 5 Backup Process That Uses the Suspend/Resume Function.

-T

Specifies that the differential snapshot high-speed backup be executed.
This option cannot be specified during synchronous processing.
This option is valid only for copying within a cabinet when the ETERNUS Storage System supports the QuickOPC function.
If this option is not specified, ordinary snapshot processing (ie, OPC without using the QuickOPC function) is started. This option must always be specified to perform a backup operation using differential snapshots.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Back up a transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup -h Work2 g1d1p2
g1d1p2 swstbackup completed
C:\>
```

・ Specify a target backup volume and back up a transaction volume in the snapshot fast backup.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup g1d1p2 -Xdevmap C:\advancedcopynanager\devmap1
g1d1p2 swstbackup completed
C:\>
```

NOTES

・ To guarantee the data, this command sets the transaction volume to a state in which it cannot be accessed from other processes before a backup is created. Therefore, the command locks the transaction volume. However, if the command is executed while the transaction volume is being used, the command aborts with an error message.
  If the transaction volume is also used by another server, the manager of backup must prevent access to the transaction volume by cancelling the sharing of the transaction volume. If, for some reason, you do not want to cancel the sharing of the transaction volume, carry out the instructions described below. For more information refer to Appendix A Pre-processing and Post-processing of Backup and Restoration.

  - To synchronize the transaction volume with the file system in backup pre-processing, specify the -Xflush option in this command or set BufferFlushOnly to 'on' in the transaction volume locking specification file for backups.

  - In the backup post-processing, execute the chkdsk command to check the file system of a backup volume. You will need to have allocated a drive letter to a backup volume using swstdrvset (Drive letter allocation command).

  Note that backup may not be correctly performed using the above procedure. On any server other than the one on which this command is entered, you are recommended to always perform backup in an environment in which a transaction volume is not being used.

・ Backup cannot be executed in the following situations:

  - No backup policy has been specified for the specified transaction volume.

  - The backup that was executed one generation earlier was unsuccessful.

  - Restore is being performed to the transaction volume that is to be backed up.

  - Restoration is being executed using backup history information that will cause a generation overflow (this may occur when restoration is performed using the backup volume of the oldest history).

  - Any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed.

  - No unused backup volume was available for use as the copying destination.

  - The replication control function or tape backup function uses the target transaction volume

  - The replication control function or tape backup function uses the target backup volume

  - The replication control function or tape backup function uses backup records exceeding the number of preservation generations

  - The drive letter that was specified when the transaction volume was registered has been changed.

  - A drive letter has been allocated to a backup volume to be used as the copying destination.

  - The file system buffer of the transaction volume cannot be flushed by the use of the -Xflush option.

  - The transaction volume cannot be locked.

  - A backup volume could not be locked

  - The contents of the transaction volume locking specification file for backups are invalid.

  - The backup volume locking specification file for backups is invalid

- The state of an SDX object is not in the following states

  - A mirror volume is ACTIVE or STOP.

  - An SDX disk is enabling.

  - A mirror slice is ACTIVE or STOP.

・ You cannot perform backup if:

  - The backup volume specified by the device map file cannot be paired with the transaction volume. This occurs if:

  - The specified backup volume is in use.

  - The transaction volume and the backup volume are not the same partition size.

  - The device map file contains an error (refer to 4.4.11.1 Describing a device map file).

  - The device map file name includes a national character.

・ At this time, if existing backup history information satisfies the condition of the number of saved generations specified by swstbkpolset (backup policy setting command), then information on the oldest generation is automatically deleted from the backup history information during the backup process, and the backup volume is cleared. However, if -suspend or -T is specified for the backup history information, then the backup volume with the Suspend or tracking state is not cleared and the backup volume remains in use.

・ The transaction volume on which the backup command is executed, one other transaction volume, and the suspended or tracking backup volume cannot be specified as backup destinations in the device map file.

・ Refer to "12.1.1 General notes" for notes on executing backup.

・ This command can be executed only while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

11.2.2.2 swstbackstat (Backup execution status display command)

NAME

swstbackstat - displays the completion status of a backup

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstbackstat [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstbackstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the completion status of a backup that is being performed using swstbackup (Backup execution command).

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Backup-Disk	Displays a backup volume name. If no backup has been collected, "----" will be displayed.
Status	Displays a backup completion status using one of the following character strings: "----": No backup has been collected (ie, no history exists). "succeeded": Backup has been completed. "executing": Copying using OPC is in progress. "failed": Copying using OPC has been interrupted due to an error. "halt": Copying using OPC has been halted.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.
If this operand is omitted, the backup execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the actual copying execution status.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackstat
Server Transaction-Disk Backup-Disk Status     Execute
Work1  g1d1p2          g1d2p1      succeeded ----
Work1  g1d1p3          g1d2p2      executing 70%
Work1  g1d1p4          g1d2p3      executing 30%
:
C:\>
```

NOTES

・ Do not use the OPC stop function of ETERNUSmgr/GRmgr while the snapshot fast backup is in progress. If you do use the OPC stop function of ETERNUSmgr/GRmgr, it will display "succeeded" whether or not the backup has actually been successful. If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "10.3 Troubleshooting: Hardware error during backup" for information about this.

11.2.2.3   swstrestore (Restore execution command)

NAME

swstrestore - restore

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstrestore [-g Generation-No | -v Version-No] [-r Restore-Device-Name]
Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swstrestore [-h Server-Name [-g Generation-No | -v Version-No][-r Restore-
Device-Name] Device-Name
```

DESCRIPTION

The data that exists in backup history information is restored using OPC.
When this command is executed, AdvancedCopy Manager performs the restoration pre-processing and post-processing scripts before and after copying data using OPC. For more information on customizing these scripts, refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration."

You can restore data to a device that is not a transaction volume. When you do so, the device must not be registered as a transaction volume and the device must have the same amount of space available as the specified transaction volume.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-g *Generation-No*

Specifies the relative generation number of data to be restored.
Check the relative generation number using swsthistdisp (History information display command).

-v *Version-No*

Specifies the absolute generation number of data to be restored.
Check the absolute generation number using swsthistdisp (History information display command).

-r *Restore-Device-Name*

Specifies a restore destination device name to restore data to any device other than a transaction volume.

Note: If neither the -g or -v option is specified, the latest information from the information history management will be restored.

OPERANDS

Device-Name

Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Restore data with relative generation number 2. For information on the relative generation number, refer to data displayed using swsthistdisp (History information display command).

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstrestore -g 2 g1d1p2
g1d1p2 swstrestore completed
C:\>
```

- If the Chapter 5 Backup Process That Uses the Suspend/Resume Function is used for the backup operation on the transaction volume, the suspended synchronous processing is deleted and the restore command is executed. For information on the suspended synchronous processing, refer to the data displayed by swstsyncstat (Backup synchronous processing execution status display command). Execute swstcancelsync (Backup synchronous processing cancel command) to cancel the synchronous processing.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server  Transaction-Disk Backup-Disk Status     Execute
Work2   g1d1p6           g1d2p6      suspend    ----
Work2   g1d1p6           g1d3p6      executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync -all g1d1p6
g1d1p6 swstcancelsync completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server  Transaction-Disk Backup-Disk Status Execute
Work2   g1d1p6           ----        ----   ----
C:\>C:\Win32app\AdvancedCopyManager\bin\swstrestore g1d1p6
g1d1p6 swstrestore completed
C:\>
```

NOTES

- Restoration of an individual file cannot be performed because copying between devices will be performed.

- On a transaction volume on which a file system has been constructed, restore a specific file as follows:

  1. Allocate a drive letter to a backup volume using swstdrvset (Drive letter allocation command). Check the backup volume using the backup history list view or swsthistdisp (History information display command).

  2. Copy a file to be restored using the copy command (using Windows Explorer).

  3. To unassign the drive letter of a backup volume, use swstdrvunset (Drive letter deallocation command)

- If the transaction volume is used by another server, the manager of backup must only execute the restore command after preventing access to the transaction volume for example, by canceling the sharing of the transaction volume (using Windows Explorer).

- Restoration or recovery cannot be executed in the following situations:

  - When both relative and absolute generation numbers have been specified.

  - When a device registered as a transaction volume has been specified in a parameter with the -r option.

  - When a device registered as a backup volume has been specified in a parameter with the -r option, the device has been registered in the backup registration information of a certain transaction volume. If you restore data to a backup volume without registered backup data, and the backup volume is used to back up a certain transaction volume, then data will be overwritten. It is recommended that a backup volume should NEVER be specified as a restore destination device.

  - When you perform restoration immediately after starting backup where the actual copying using OPC is still in progress, (except when the combination of transaction volume and backup volume is the same for backup and restoration). A restoration should always be performed after the actual copying using OPC is completed. Alternatively, on a transaction volume on which a file system has been constructed, perform restoration according to the method described in the Point "In a transaction volume on which a file system has been constructed, restore a specific file" above.

  - When any of the cabinet information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume to be restored has been changed.

- When the replication control function or tape backup function uses the target transaction volume

- When the replication control function or tape backup function uses the device specified in the -r option

- When a drive letter that has been allocated during transaction volume registration has been changed.

- When the operating volume has two or more mount points

- When other volumes are mounted along with the operating volume

- When a target volume could not be locked

- When the target volume locking specification file is invalid

- When an SDX object has been specified in a parameter with 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 synchronous processing (eg, during copying by EC, under the equivalency maintained status, in the Suspend state).
If the following errors occur during restore processing, then execute swstcancelsync (Backup synchronous processing cancel command) (with the -all option specified) to cancel all of the synchronous processing of the transaction volume, and execute the restore command:

- "swst0639 This Command cannot be run. This is because a copy is currently running"

- "swst0634 OPC cannot be run. Error code=26 (SCSI command busy)"

・ If the transaction volume is an SDX object, you cannot perform restoration using this command. In this case, perform recovery as follows:

1. Assign a drive letter to a backup volume using the drive letter allocation command (swstdrvset). Check the backup volume using the backup history list view, or swsthistdisp (History information display command).

2. Copy the file to be restored using the copy command.

3. Unassign the drive letter of the backup volume using swstdrvunset (Drive letter deallocation command).

・ Refer to "12.1.1 General notes" for notes on executing restore.

・ This command can only be executed while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

11.2.2.4   swstcancelrest (Restore cancellation command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstcancelrest [-g Generation-No | -v Version-No] [-r Restore-Device-Name] [-
emergency] Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swstcancelrest [-h Server-Name][-g Generation-No | -v Version-No][-r Restore-
Device-Name] [-emergency] Device-Name
```

DESCRIPTION

This command cancels OPC-based restoration.

A hardware error will be displayed when swstrestore (Restore execution command) is executed while data is being copied using OPC. Fix the cause of the hardware error and repeat restoration using swstrestore (Restore execution command).

Check whether a fault occurred using swstreststat (restore execution status display command).

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-g *Generation-No*

Specifies the relative generation number of data being restored.
This option cannot be specified at the same time as the -v option.
Check the relative generation number using swstreststat (restore execution status display command).

-v *Version-No*

Specifies the absolute generation number of data being restored.
This option cannot be specified at the same time as the -g option.
Check the absolute generation number using swstreststat (restore execution status display command).

-r *Restore-Device-Name*

Specifies the device name if data is restored to any other device than a transaction volume.
Check the device name using swstreststat (restore execution status display command).

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

Note: The restoration of the latest history information will be canceled if neither the -g or -v option is specified.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

- Cancel restoration of the transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelrest -g 1 g1d1p2
g1d1p2 swstcancelrest completed
C:\>
```

- Restoration of the latest history information on the transaction volume is cancelled in emergency operation mode.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelrest -emergency g1d1p2
g1d1p2 swstcancelrest completed
C:\>
```

NOTES

- If you cancel OPC-based restoration using this command, the transaction volume will be in an incomplete state and can no longer be used because part of the data has already been overwritten by the copy process. Perform restoration again using swstrestore (Restore execution command).

- You cannot cancel restoration if:

    - The history specified in the -g or -v option does not exist.

    - Restoration is not performed on the device specified in the -r option.

    - Restoration is not performed from the specified history. In this case, processing is terminated with an information message "swst0303 Restoration for specified restoration device is not performed". The end status after this message is a normal end.

    - When the replication control function or tape backup function uses the target transaction volume

- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended or halt state, then unmanaged sessions remain. In this case, ETERNUSmgr or GRmgr must be used to cancel these sessions.

- This command can only be executed while none of the following commands are running:

    - swstsvrset (Storage Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

11.2.2.5   swstreststat (Restore execution status display command)

NAME

swstreststat - displays the execution status of restoration

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstreststat [-g Generation-No | -v Version-No] [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstreststat [-h Server-Name [-g Generation-No | -v Version-No] [Device-
Name]
```

DESCRIPTION

This command displays the execution status of restoration.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Generation	Displays the relative generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Version	Displays the absolute generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Backup-Disk	Displays the name of a backup volume from which data should be copied and restored. "----" will be displayed if restoration is not in progress.
Restore-Device	Displays a restoration target device name unless data is copied and restored to a transaction volume. "----" will be displayed if restoration is not in progress, or if data is restored to a transaction volume.
Status	Displays the execution status: "----": No copying using OPC is in progress. "executing": Copying using OPC is in progress. "succeeded": Copying using OPC has been completed. "failed": Copying using OPC has been interrupted due to an error. "halt": Copying using OPC is in halt status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-g *Generation-No*

Specifies the relative generation number of data whose restore execution status is to be displayed.

-v *Version-No*

Specifies the absolute generation number of data whose restore execution status is to be displayed.

Note: The restore execution statuses of all the histories will be displayed if both the -g and -v options are omitted.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If this operand is omitted, the restore execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display the restore execution statuses of transaction volumes.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstreststat
Server Transaction-Disk Generation Version Backup-Disk Restore-Device Status    Execute
Work1  g1d1p2          1          10      g1d2p1     g1d3p2        executing 75%
Work1  g1d1p3          ----       ----    ----       ----          ----      ----
Work1  g1d1p4          2          12      g1d2p3     ----          succeeded ----
Work1  g1d1p5          3          13      g1d2p4     g1d3p5        executing 75%
:
C:\>
```

NOTES

- Do not use the OPC stop function of ETERNUSmgr/GRmgr while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUSmgr/GRmgr, this command displays "succeeded" whether or not the restoration has actually been successful.

- If "failed" is displayed in the "Status" field, a hardware error may have occurred. Refer to "10.3 Troubleshooting: Hardware error during backup" for information about this.

- If no generation number has been specified in the -v or -g option, the restore execution statuses of all the histories will be displayed. If, at this time, restoration is not in progress from any of the histories, "----" will be displayed in all the information fields other than "Server" and "Transaction-Disk".

11.2.2.6   swsthistdisp (History information display command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsthistdisp [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swsthistdisp [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays history information in relation to data that has been backed up.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager .
Mount-Point	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.

Title	Description
Generation	Displays a relative generation number. This item will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a TimeStamp reflecting when backup has been completed. This item will not be displayed if no backup history information exists.
Backup-Device	Displays the name of a backup volume to which data has been backed up. This item will not be displayed if no backup history information exists.
Status	Displays an actual copying execution status using one of the following character strings: "succeeded": Copying using OPC has been completed. "executing": Copying using OPC is in progress. "failed": Copying using OPC has been interrupted due to an error. "halt": Copying using OPC is in halt status. This item will not be displayed if no backup history information exists.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status field. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If this operand is omitted, the backup history information of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· Display the backup history information of all the transaction volumes.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdisp
Server=Work1 Device=g1d1p2 Mount-Point=D: (NTFS)
Generation Version Backup-Date      Backup-Device Status    Execute
1          10      1999/11/12 22:00 g1d2p1        succeeded ----
2          9       1999/11/11 22:00 g1d2p2        succeeded ----
Server=Work1 Device=g1d1p3 Mount-Point= E: (FAT)
Generation Version Backup-Date      Backup-Device Status    Execute
1          13      1999/11/12 23:00 g1d3p1        succeeded ----
2          12      1999/11/11 23:00 g1d3p2        succeeded ----
```

```
        :
    C:\>
```

- If "failed" or "halt" is displayed in the "Status" field, a hardware error may have occurred. Refer to "10.3 Troubleshooting: Hardware error during backup" for information about this.

11.2.2.7 swsthistdel (History information deletion command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsthistdel -g Generation-No| -v Version-No | -z [-emergency] Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsthistdel [-h Server-Name] -g Generation-No| -v Version-No | -z [-
emergency] Device-Name
```

DESCRIPTION

This command deletes backup history information.
The backup volume of the deleted history is released and becomes an empty backup volume.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can only be specified on a Storage Management Server.

-g *Generation-No*

Specifies the relative generation number of backup history information to be deleted.
This option cannot be specified at the same time as the -v or -z.
Check the relative generation number using swsthistdisp (History information display command).

-v *Version-No*

Specifies the absolute generation number of backup history information to be deleted.
This option cannot be specified at the same time as the -g or -z.
Check the absolute generation number using swsthistdisp (History information display command).

-z

Specifies that all the backup history information is to be deleted.
This option cannot be specified at the same time as the -g or -v.

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Delete a history with absolute generation number 10 of a transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdel -v 10 g1d1p2
g1d1p2 swsthistdel completed
C:\>
```

・ The history information of relative generation number 1 of the transaction volume is deleted in the emergency operation mode.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdel -g 1 -emergency g1d1p2
g1d1p2 swsthistdel completed
C:\>
```

NOTES

・ You cannot delete backup history information if:

- The backup history information specified in the -g or -v option does not exist.

- The specified backup history information is currently being used in a restoration.

- When the replication control function or tape backup function uses the target transaction volume

- When the replication control function or tape backup function uses the target backup volume

・ However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended or halt state, then unmanaged sessions remain. In this case, ETERNUSmgr or GRmgr must be used to cancel these sessions.

・ Deleting the suspended history information does not cancel the synchronous processing (in an EC session).
Deleting the tracking history information does not cancel the tracking processing (in an OPC session).

・ In synchronous high-speed backup with -suspend specified, the backup volume remains in use even after the history information is deleted.
In differential snapshot high-speed backup with -T specified, the backup volume remains in use even after the history information is deleted.

・ If the history information is deleted while the OPC physical copy has not been completed in a backup operation mode other than the differential snapshot high-speed backup, physical copying of the deleted history is interrupted. In this case, the data in the backup volume is incomplete (ie, copy has stopped part way through). The backup volume is put in the unused state upon deletion of the history information and becomes ready for use in the next backup.
In the differential snapshot high-speed backup mode, the physical copying of the deleted history is continued even after the history information on the incomplete OPC physical copy is deleted. Even after deletion of the history information, the backup volume is in the busy state and becomes ready for use in the next backup of the relevant transaction volume.

・ This command can be executed only while none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

11.2.2.8   swststartsync (Backup synchronous processing start command)

NAME

swststartsync - starts backup synchronous processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swststartsync Device-Name [-Xdevmap Device-Map-File]
```

To be executed on a Storage Management Server

```
program-directory\bin\swststartsync [-h Server-Name] Device-Name [-Xdevmap Device-Map-File]
```

DESCRIPTION

This command starts backup synchronous processing (ie, it starts disk-to-disk copy using EC).

Even if it is already in use, the transaction volume where the synchronous processing started s well as the suspended backup volume can be used as backup destinations.

Except for the transaction volume where the synchronous processing started and the suspended backup volume, transaction volumes cannot be specified as backup destinations in the device map file.

OPTIONS

-h *Sever-Name*

Specify the name of a Storage Server.
This option can be specified only on the Storage Management Server.

-Xdevmap

Specifies a target backup volume to perform the backup synchronous processing. In the operand, specify a 4.4.11.1 Describing a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, a target backup volume will be automatically selected. To execute this command on a remote basis using the -h option, specify a device map file of a Storage Server using an absolute pathname. A file name specified in Device-Map-File must not include any national characters.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・To start the backup synchronous processing for a transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swststartsync -h Work2 g1d0p0
g1d0p0 swststartsync completed.
C:\>
```

・Synchronous processing of transaction volume begins specifying the backup volume at the output destination.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swststartsync g1d1p2 -Xdevmap C:\AdvancedCopyManager
\devmap1
g1d1p2 swststartsync completed
C:\>
```

NOTES

・When you execute the backup synchronous processing start command for a transaction volume to which the backup synchronous processing is already being executed, the message, "swst0301 Backup synchronous processing is already in progress." is output and then the command is terminated normally.

・You cannot start backup synchronous processing in the following cases. In any of the cases below, perform the action according to the "System administrator response" message.

  - When specifying a device that does not support the EC function.

  - When the backup volumes required for starting the backup synchronous processing cannot be obtained.

  - When specifying a device that is being restored by OPC.

  - When mounting the backup volume to which data is copied.

  - When a backup volume could not be locked

  - When the backup volume locking specification file for backups is invalid.

  - When the replication control function or tape backup function uses the target transaction volume.

・If a suspended backup volume is the transaction volume at the start of the synchronous processing, then the suspended backup volume is selected as the backup destination with the highest priority, and the synchronous processing restarts (ie, differential copy) starts. Otherwise, the synchronous processing (ie, full copy) starts.

・This command cannot be executed when any of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

11.2.2.9   swstcancelsync (Backup synchronous processing cancel command)

NAME

swstcancelsync - cancels the backup synchronous processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstcancelsync [-emergency] [-bd Backup-Device-Name | -all] Device-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swstcancelsync [-h Server-Name] [-emergency] [-bd Backup-Device-Name | -all]
Device-Name
```

DESCRIPTION

The backup synchronous processing can be cancelled during copying by EC or under the equivalency maintained status.

The synchronous processing can be cancelled with the backup volume during copying by EC, under the equivalency maintained status, or while the Suspend state is set. Specifying cancellation of all of the synchronous processing cancels all of the backup synchronous processing including those in the Suspended state.

If the system detects an error while backup synchronous processing is being executed, copying in progress at that time terminates abnormally. In this case, use this command to cancel the backup synchronous processing. Use swstsyncstat (Backup synchronous processing progress display command) to check for the error.

OPTIONS

-h *Sever-Name*

Specify the name of a Storage Server.
This option can be specified only with a Storage Management Server.

-emergency

Emergency operation mode is available for operations.
In such cases, EC sessions are neither confirmed nor cancelled.

-bd *Backup-Device-Name*

The synchronous processing on a specific backup volume can be cancelled.
Specify the copy destination backup volume name. In the operand, specify the 1.5 Managing a Device on AdvancedCopy Manager for the specified device.
Note that the backup volume name and the -all option cannot be specified together.

-all

All of the synchronous processing of the transaction volume can be specified to be cancelled. Note that this specification and the -bd option cannot be used together.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Cancelling backup synchronous processing to a transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync g1d0p0
g1d0p0 swstcancelsync completed.
C:\>
```

・ Cancelling backup synchronous processing of transaction volume in the emergency operation mode.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync -emergency g1d0p0
g1d0p0 swstcancelsync completed.
C:\>
```

・ Cancelling backup synchronous processing of the backup volume from the transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server Transaction-Disk Backup-Disk Status    Execute
Work2  g1d1p6          g1d1p1       suspend    ----
Work2  g1d1p6          g1d1p2       executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync g1d1p6 -bd g1d1p2
g1d1p6 swstcancelsync completed.
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server Transaction-Disk Backup-Disk Status  Execute
Work2  g1d1p6          g1d1p1       suspend  ----
C:\>
```

・ Cancelling all of the backup synchronous processing of the transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server Transaction-Disk Backup-Disk Status    Execute
Work2  g1d1p6          g1d1p1       suspend    ----
Work2  g1d1p6          g1d1p2       executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync g1d1p6 -all
g1d1p6 swstcancelsync completed.
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d1p6
Server Transaction-Disk Backup-Disk Status Execute
Work2  g1d1p6          ----         ----    ----
C:\>
```

NOTES

・ However, EC sessions are neither confirmed nor cancelled by execution in the emergency operation mode. If an EC session is in the error suspended state or the halt state, then unmanaged sessions remain. In this event, ETERNUSmgr or GRmgr must be used to cancel these sessions.

・ You cannot cancel synchronous backup processing in the following case:

  - When the replication control function or tape backup function uses the target transaction volume

・ This command cannot be executed when any of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

11.2.2.10   swstsyncstat (Backup synchronous processing progress display command)

NAME

swstsyncstat - displays the execution status of the backup synchronous processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstsyncstat [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstsyncstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintained status, or in the suspended status).
If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.
The table below lists the meaning of each title.

Title	Description
Server	Displays the name of the Storage Server.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Backup-Disk	Displays the name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	Displays the status of backup synchronous processing: "----": Backup synchronous processing is not being executed. "executing": Backup synchronous processing is being executed but equivalency maintained status has not been established. "equivalent": Equivalency maintained status is established. "suspend": Suspend status is established. "failed": Backup synchronous processing was abnormally terminated. "nosession": No session exists (eg, due to inconsistent resource information). "halt": Backup synchronous processing is in the halt status.
Execute	Displays the progress of the backup synchronous processing as a percentage (0 to 100%). "----" is displayed when the status is Suspend and at times when the backup synchronous processing is not running.

OPTIONS

-h *Sever-Name*

Specify the name of a Storage Server.
This option can be specified only with the Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
When you omit the device name, the system displays the status of backup synchronous processing for all of the transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ To display the status of backup synchronous processing to a transaction volume

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat g1d0p0
Server Transaction-Disk Backup-Disk Status    Execute
Work1  g1d1p2          g1d2p1     suspend   ----
Work1  g1d1p2          g1d2p2     executing 75%
C:\>
```

・ To display the status of backup synchronous processing for all of the transaction volumes:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat
Server Transaction-Disk Backup-Disk Status    Execute
Work1  g1d1p2          g1d2p1     suspend   ----
Work1  g1d1p2          g1d2p2     executing  75%
Work1  g1d1p2          g1d2p5     suspend   ----
Work1  g1d1p3          g1d2p3     equivalent 100%
Work1  g1d1p4          g1d2p4     failed    ----
Work1  g1d1p5          ----       ----      ----
C:\>
```

NOTES

・ If "failed" or "halt" is indicated as the status of the backup synchronous processing (in the Status field), a hardware failure has possibly occurred. Refer to "10.3 Troubleshooting: Hardware error during backup" for more information about this.

・ If "nosession" is indicated as the status of the backup synchronous processing (in the Status field)," resource information having inconsistency is a possible cause. Use 11.2.3.1 swstsrsemtch (Resource match command) to remove the inconsistency from the resource information.

11.2.2.11   swstexecstat (Execution status display command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstexecstat [-j] [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstexecstat [-j] [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC/EC will be displayed if OPC/EC is being executed.
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager
Last-Backup-Date	Displays the time when the last backup execution command was accepted.
Interval	Displays how many days have passed after the specified number of interval days since the last backup date has been exceeded. This item will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.
Status	Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. ・ swstbkpolset (backup policy setting command) ・ swstbkpoldel (Backup policy deletion command) ・ swstbackup (Backup execution command) ・ swstrestore (Restore execution command) ・ swsthistdel (History information deletion command) ・ swststartsync (Backup synchronous processing start command) ・ swstcancelsync (Backup synchronous processing cancel command) ・ swstcancelrest (Restore cancellation command)
Mount-Point(Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.
Execute	Displays the name of a command being executed or the copying progress percentage. "----" : Neither a command nor OPC is being executed "swststartsync" : The backup synchronous processing start command is being executed "swstcancelsync" : The backup synchronous processing cancel command is being executed "swstbackup" : The backup execution command is being processed "swstrestore" : The restore execution command is being processed "swstcancelrest" : The restore cancellation command is being processed "swstbkpolset" : The backup policy setting command is being processed "swstbkpoldel" : The backup policy deletion command is being processed "swsthistdel" : The history information deletion command is being processed "swstcanceltrk" : The tracking cancel command is being processed "sync(xxx%)" : EC progress rate "sync(failed)" : EC has been abnormally terminated "sync(halt)" : EC is halt status "snapshot(xxx%)" : Progress rate of backup using OPC "snapshot(failed)" : Backup using OPC has abnormally terminated "snapshot(halt)" : Backup using OPC has been halted "restore(xxx%)" : Progress rate of restoration using OPC "restore(failed)" : Restoration using OPC has abnormally terminated "restore(halt)" : Restoration using OPC has been halted During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute field.

If multiple processes are performed on transaction volumes (for example, when the backup synchronous processing start command is issued while a real copy of the snapshot backup is being handled), the display in the Execute field conforms to the following rules:

・ The display of a command name takes priority if both copying and command executions are in progress.

・ When a disk copy of the snapshot backup and a disk copy of the backup synchronous processing are being handled simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. A disk copy for restoration is not performed during disk copy of the snapshot backup or backup synchronous processing due to a restriction of the Fujitsu ETERNUS Storage System.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Device	Displays an 1.5 Managing a Device on AdvancedCopy Manager
Execute-Date	Displays the command execution date and time (TimeStamp).
Status	Displays whether any of the following commands are being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. ・ swstbkpolset (backup policy setting command) ・ swstbkpoldel (Backup policy deletion command) ・ swstbackup (Backup execution command) ・ swstrestore (Restore execution command) ・ swsthistdel (History information deletion command) ・ swststartsync (Backup synchronous processing start command) ・ swstcancelsync (Backup synchronous processing cancel command) ・ swstcancelrest (Restore cancellation command)
Mount-Point(Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.
Execute	Displays the name of a command being executed or the copying progress percentage. "----" : Neither a command nor OPC is being executed "swststartsync" : The backup synchronous processing start command is being executed "swstcancelsync" : The backup synchronous processing cancel command is being executed "swstbackup" : The backup execution command is being processed "swstrestore" : The restore execution command is being processed "swstcancelrest" : The restore cancellation command is being processed "swstbkpolset" : The backup policy setting command is being processed "swstbkpoldel" : The backup policy deletion command is being processed "swsthistdel" : The history information deletion command is being processed "swstcanceltrk" : The tracking cancel command is being processed "sync(xxx%)" : EC progress rate "sync(failed)" : EC has been abnormally terminated "sync(halt)" : EC is in halt status "snapshot(xxx%)" : Progress rate of backup using OPC "snapshot(failed)" : Backup using OPC has abnormally terminated "snapshot(halt)" : Backup using OPC has been halted "restore(xxx%)" : Progress rate of restoration using OPC "restore(failed)" : Restoration using OPC has abnormally terminated "restore(halt)" : Restoration using OPC has been halted During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute field.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-j

Specifies to display information in another format.

OPERANDS

Device-Name

Specifies an 1.5 Managing a Device on AdvancedCopy Manager corresponding to a transaction volume.
If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the execution statuses of transaction volumes.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstexecstat
Server Device Last-Backup-Date Interval Status Mount-Point (Method) Execute
Work1  g1d1p2 2000/12/11 12:20 OK      IDLE   D: (NTFS)            ----
Work1  g1d1p4 2000/12/09 12:20 DELAY=2 EXEC   E: (NTFS)            snapshot(45%)
:
C:\>
```

・ An example of using the "-j" option is as follows:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstexecstat -h Work2 -j
Server Device Execute-Date    Status Mount-Point (Method) Execute
Work2  g1d1p2 ----            IDLE   D: (NTFS)            ----
Work2  g1d1p3 2000/12/10 12:20 EXEC  E: (NTFS)            sync
Work2  g1d1p4 2000/12/09 12:20 EXEC  F: (NTFS)            swstbackup
:
C:\>
```

NOTES

・ If "sync (failed)", "snapshot(failed)", "restore(failed)", "sync (halt)", "snapshot(halt)" or "restore(halt)" is displayed in the "Execute"
field, a hardware error may have occurred. After fixing the cause of the hardware error, perform the following:

- For "sync (failed)"
Execute 11.2.2.9 swstcancelsync (Backup synchronous processing cancel command) to cancel the backup synchronous
processing.

- If "snapshot(failed)" is displayed
Delete backup history information using the swsthisdel (History information deletion command).

- If "restore(failed)" is displayed
Cancel restoration using 11.2.2.4 swstcancelrest (Restore cancellation command).

11.2.2.12   swstdrvset (Drive letter allocation command)

NAME

swstdrvset - allocates a drive letter

SYNOPSIS

To allocate a driver letter

```
program-directory\bin\swstdrvset Device-Name [Drive-Letter]
```

To allocate a mount point

```
program-directory\bin\swstdrvset Device-Name Mount-Point
```

DESCRIPTION

Use this command if you need to temporarily allocate a drive letter or mount point to a device when, for example, you restore an individual file.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

Drive-Letter

Specifies a drive letter to be allocated to a device. Valid drive letters include "C:" to "Z:" The letters are not case-sensitive. If this operand is omitted, an unused drive letter will be automatically selected. Unused drive letters are searched starting from "Z:".

Mount-Point

Specifies a mount point to be allocated to a device.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Allocate a drive letter (E:) to a device

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdrvset g3d1p2 E:
swst1001 E: has been allocated to g3d1p2.
swstdrvset completed
C:\>
```

・ Allocate an appropriate used drive letter to a device

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdrvset g3d1p3
Swst1001 Z: has been allocated to g3d1p3.
swst0307 Z: is allocated to g3d1p3.
swstdrvset completed
C:\>
```

NOTES

- You cannot allocate a drive letter if:

    - The specified drive letter has already been allocated to another drive or resource.

    - The specified mount point has already been allocated to another drive.

    - This command is executed with no drive letter specified, and no unused drive letter is available.

    - The user who executes a command does not have the Administrator's authority for the local machine.

    - This command is executed with a drive letter or mount point specified and this drive letter or mount point has already been allocated (the warning message swst1011 will be displayed).

    - This command is executed with no drive letter specified, and one or more drive letters have already been allocated (the warning message swst1011 will be displayed).

    - This command is executed on a dynamic volume.

    - The target device is mounted on another device.

    - The target device mounts another device.

    - The target device mounts itself.

- Do not use Disk Management when you use this command.

11.2.2.13   swstdrvunset (Drive letter deallocation command)

NAME

swstdrvunset - cancels a drive letter

SYNOPSIS

To deallocate a drive letter

```
program-directory\bin\swstdrvunset {Device-Name | Drive-Letter}
```

To deallocate a mount point

```
program-directory\bin\swstdrvunset Mount-Point
```

DESCRIPTION

The drive letter or mount point currently assigned to the device is canceled.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

Drive-Letter

Specifies a drive letter. Valid drive letters include "C:" to "Z:". The letters are not case sensitive.

Mount-Point

Specifies a mount point to be deallocated to a device.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· Deallocate the drive letter of a device.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdrvunset g3d1p2
swst1002 The allocation of the drive letter for g3d1p2 has been released. Drive letter=E:
swstdrvunset completed
C:\>
```

· Deallocate the drive letter of a device (Z:).

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdrvunset Z:
swst1002 The allocation of the drive letter for g3d1p3 has been released. Drive letter=Z:
swstdrvunset completed
C:\>
```

NOTES

· You cannot deallocate a drive letter if:

- No drive letter has been allocated to the specified device.

- The specified device is in use.

- The specified drive letter or mount point has not been allocated to a device.

- The specified device is either in use or is shared.

- The specified drive letter or mount point has been allocated to a device that does not have an AdvancedCopy Manager device name.

- The user who executes the command does not have the Administrator's permission.

- This command is executed on a dynamic volume.

- The target device is mounted on another device.

- The target device mounts another device.

- The target device mounts itself.

· Do not use Disk Management when you use this command.

11.2.2.14   swstdismount (Dismount command)

NAME

swstdismount - dismounts the specified volume

SYNOPSIS

```
program-directory\bin\swstdismount Device-Name
```

DESCRIPTION

This command dismounts the specified volume. When the volume is dismounted, all handles opened for the volume become invalid. The OS automatically remounts the dismounted volume when the volume is accessed.

OPERANDS

Device-Name

> Specify an AdvancedCopy Manager device name.
> Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The device is dismounted.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdismount g3d1p2
swstdismount completed
C:\>
```

NOTES

- Dismounting is not possible in the following situations:

    - The specified device name is invalid.

    - The volume is locked by another process.

11.2.2.15 swstvolunlock (Volume unlock command)

NAME

swstvolunlock - unlocks a volume

SYNOPSIS

```
program-directory\bin\swstvolunlock [-n] Device-Name
```

DESCRIPTION

This command unlocks a volume.

OPTIONS

-n

> Specifies that a device is not to be dismounted before it is unlocked.

OPERANDS

Device-Name

    Specifies the name of an AdvancedCopy Manager device.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Unlock a device

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstvolunlock g3d1p2
swstvolunlock completed
C:\>
```

NOTES

・ This command does not work if:

    - The specified device name is invalid.

    - The device has not been locked.

    - The AdvancedCopy Manager's communication service has not been run or an error has occurred in the service.

・ When this command is executed for a volume in a cluster system, set the name of the logical node for the transaction in the SWSTGNODE environment variable.

11.2.2.16 swstvollockstat (Locked-volume information display command)

NAME

swstvollockstat - displays information about a volume that has been locked

SYNOPSIS

```
program-directory\bin\swstvollockstat [Device-Name]
```

DESCRIPTION

This command displays information about a volume that has been locked.
The following types of information are displayed:

Title	Description
ACM-Volume-Name	AdvancedCopy Manager device name
Lock-Start-Time	Time at which the device was locked.

OPERANDS

Device-Name

Specifies the name of an AdvancedCopy Manager device.
If this operand is omitted, information about all volumes locked by the volume lock command is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display information about a locked volume.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstvollockstat
ACM-Volume-Name Lock-Start-Time
g1d1p1          2003/12/21 3:56:09
g1d2p1          2003/12/21 3:57:21
g3d1p2          2003/12/21 3:58:12
C:\>
```

NOTES

・ This command does not work if:

- The specified device name is invalid.

- The device has not been locked.

- The AdvancedCopy Manager's communication service has not been run or an error has occurred in the service.

・ When this command is executed for a volume in a cluster system, set the name of the logical node for the transaction in the SWSTGNODE environment variable.

11.2.2.17   swstcanceltrk (Tracking cancel command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstcanceltrk [-copy | -emergency] Device-Name (-bd Backup-Device-Name | -
all)
```

To be executed on a Storage Management Server

```
program-directory\bin\swstcanceltrk -h Server-Name [-copy | -emergency] Device-Name (-bd Backup-
Device-Name | -all)
```

DESCRIPTION

This command stops tracking processing.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on the Storage Management Server.

-copy

Specifies that physical copying, if active, should also be stopped (the OPC session should be canceled).
This option cannot be specified for a backup volume that has already contained a backup history. For a volume whose copy destination volume has contained a backup history, delete the history information in advance using 11.2.2.7 swsthistdel (History information deletion command).

-emergency

Specifies that the command should operate in the emergency operation mode.
The command does not check tracking processing and does not stop tracking processing or the OPC session.

-bd

Stops tracking processing for the specified backup volume. Specify the target backup volume name as an operand. This option cannot be specified at the same time as the -all option.

-all

Stops the entire tracking processing specified for the transaction volumes. This option cannot be specified at the same time as the -bd option.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The following example stops the tracking processing that was specified for the backup volume from the transaction volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcanceltrk g1d10p1 -bd g1d20p1
g1d10p1 swstcanceltrk completed.
C:\>
```

・ The following example stops tracking processing and physical copying that were specified for the transaction volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsttrkstat g1d10p1
Server Transaction-Disk  Backup-Disk Status    Execute Update
job2   g1d10p1           g1d20p1     executing 33%      -----
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcanceltrk -copy g1d10p1 -bd g1d20p1
g1d10p1 swstcanceltrk completed.
C:\>
```

NOTES

・ If the command is executed in emergency operation mode, no OPC session is canceled. A session that is not managed remains in operation if the command is entered during tracking. The session must be canceled using ETERNUSmgr, GRmgr.

・ Tracking processing cannot be stopped under the following condition. In this case, take action according to "System administrator response" provided for the message output.

  - When tracking processing is not performed for the specified copy source and destination volumes.

・ This command cannot be executed while one of the following commands is being executed:

  - swstsvrset (Storage Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource matching command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

11.2.2.18   swsttrkstat (Tracking status display command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsttrkstat [Device-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swsttrkstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the status of tracking processing.
When multiple types of synchronous processing are running on one transaction volume, the command displays the statuses of all types of tracking processing.
The displayed data is explained below.

Title	Description
Server	Displays a Storage Server name.
Transaction-Disk	Displays the 1.5 Managing a Device on AdvancedCopy Manager of a transaction volume.
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----": Not in the process of tracking "executing": In the process of physical copying and tracking "tracking": In the process of tracking "failed": Physical copying or tracking terminated abnormally. "nosession": No session exists. (eg, resource information is inconsistent.)

Title	Description
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on the Storage Management Server.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.
If this operand is omitted, the command displays the statuses of tracking processing for all transaction volumes.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The following example displays the status of tracking processing of a transaction volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsttrkstat g1d10p1
Server Transaction-Disk Backup-Disk Status     Execute Update
job1   g1d10p1           g1d20p1     tracking   ----    12%
C:\>
```

・ The following example displays the status of tracking processing of all transaction volumes

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsttrkstat
Server Transaction-Disk Backup-Disk Status     Execute Update
job1   g1d10p1           g1d20p1     nosession  ----    ----
job1   g1d30p1           g1d40p1     executing  75%     ----
job1   g1d50p1           g1d60p1     failed     ----    ----
job1   g1d70p1           g1d80p1     tracking   ----    12%
job1   g1d90p1           ----        ----       ----    ----
  :
C:\>
```

NOTES

・ When the execution status (ie, the value displayed in the "Status" column) is "failed," a hardware problem has occurred Fix cause of the problem and then re-execute the differential snapshot backup.

・ When the execution status (ie, the value displayed in the "Status" column) is "nosession," the resource information is probably inconsistent. Use swstsrsemtch (Resource match command) to remove any inconsistencies from the resource information.

11.2.3 Maintenance commands

This section describes the backup management maintenance commands.

11.2.3.1   swstsrsemtch (Resource match command)

NAME

swstsrsemtch - recovers resource information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swstsrsemtch [-x]
```

To be executed on a Storage Management Server

```
program-directory\bin\swstsrsemtch [-x] [-h Server-Name]
```

DESCRIPTION

This command recovers resource information if a system failure, etc. has made the resource information inconsistent.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-x

Achieves consistency with a repository. Specify this option if a backup management files and a repository become inconsistent.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The following example recovers resource information:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsrsemtch
swstsrsemtch completed
C:\>
```

NOTES

・ This command can only be executed if none of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstbkpolset (backup policy setting command)

- swstbkpoldel (Backup policy deletion command)

- swstbackup (Backup execution command)

11.2.3.2   swstresback (Resource backup command)

NAME

swstresback - backup of management file

SYNOPSIS

```
program-directory\bin\swstresback Backup-Directory
```

DESCRIPTION

A backup management file are backed up to the specified directory.

- Backup management file
  Management information, such as Storage Server configuration information

The information backed up by this command can be restored by swstresrst (Resource restore command).

Note that with this command, a replication management file and a login management file are not backed up.

OPERANDS

Backup-Directory

Specifies the name of a directory to which the backup management file and the recovery control file will be saved.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Bacup of the backup management file.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstresback C:\backup
swstresback completed
C:\>
```

NOTES

- You cannot perform backup if:

  - The specified directory does not exist.

  - Copying of data to the specified directory failed because of insufficient free space, etc.

- This command can be executed only while none of the following commands are running:

  - swstsvrset (Storage Server configuration information setting command)

  - swstbkpolset (backup policy setting command)

  - swstbkpoldel (Backup policy deletion command)

  - swstbackup (Backup execution command)

  - swstrestore (Restore execution command)

  - swstcancelrest (Restore cancellation command)

  - swststartsync (Backup synchronous processing start command)

  - swstcancelsync (Backup synchronous processing cancel command)

  - swstdevinfoset (Device information setting command)

  - swsthistdel (History information deletion command)

  - swstcanceltrk (Tracking cancel command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

  - swstsrsemtch (Resource match command)

  - swstbackup_sqlsvr (SQL Server backup execution command)

11.2.3.3   swstresrst (Resource restore command)

NAME

swstresrst - restore of backup management file

SYNOPSIS

```
program-directory\bin\swstresrst Backup-Directory
```


DESCRIPTION

A backup management file are restored from the specified directory.

- Managed resources information
  Management information, such as Storage Server configuration information.

OPERANDS

Backup-Directory

The backup location directory name directed by swstresback (Resource backup command) is specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Restore the resource management file.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstresrst C:\backup
swstresrst completed
C:\>
```

NOTES

- Before the backup management files can be restored by this command, swstsvrset (Storage Server configuration information setting command) must be executed

- You cannot perform restoration if:

    - The specified directory does not exist.

    - No backup management files exist in the specified directory.

    - Copying of data from the specified directory for restoration failed because of insufficient free space, or for some other reason.

- This command can be executed only while none of the following commands are running:

    - swstsvrset (Storage Server configuration information setting command)

    - swstbkpolset (backup policy setting command)

    - swstbkpoldel (Backup policy deletion command)

    - swstbackup (Backup execution command)

    - swstrestore (Restore execution command)

    - swstcancelrest (Restore cancellation command)

    - swststartsync (Backup synchronous processing start command)

    - swstcancelsync (Backup synchronous processing cancel command)

    - swstdevinfoset (Device information setting command)

    - swsthistdel (History information deletion command)

    - swstcanceltrk (Tracking cancel command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

    - swstsrsemtch (Resource match command)

    - swstbackup_sqlsvr (SQL Server backup execution command)

11.3 Configuration Management Commands

This section explains the operation of the configuration management command. This manages the information on a server device which performs backup and replication, or is a candidate for being used for backup or replication.

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 11.16 Operating environment for executing configuration management commands

Command	Operating environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a Storage Management Server (Storage Management Server transaction), the Storage Management Server (Storage Management Server transaction) must be running.
stguserset	In cluster operation, the Storage Management Server transaction must be running.
stgguiipset	In cluster operation, the Storage Management Server transaction must be running.
stgxfwcmaddsrv	The Storage Management Server (Storage Management Server transaction) and target Storage Server (Storage Server transaction) must be running.
stgxfwcmmodsrv	The Storage Management Server (Storage Management Server transaction) and target Storage Server (Storage Server transaction) must be running.
stgxfwcmdelsrv	The Storage Management Server (Storage Management Server transaction) must be running.
stgxfwcmsetdev	The Storage Management Server (Storage Management Server transaction) and target Storage Server (Storage Server transaction) must be running.
stgxfwcmdeldev	The Storage Management Server (Storage Management Server transaction) and target Storage Server (Storage Server transaction) must be running.
stgxfwcmdispsrv	The Storage Management Server (Storage Management Server transaction) must be running.
stgxfwcmdispdev	The Storage Management Server (Storage Management Server transaction) must be running.
stgxfwcmdisppat	The Storage Management Server (Storage Management Server transaction) must be running.
stgenvdisp	This command is executable when both Storage Management Server (Storage Management Server transaction) and Storage Server (Storage Server transaction) are not operating. Note that when the cluster service (which is named differently in different cluster systems) is not operating 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 transaction), 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.
stgarcext	This command is executable when both Storage Management Server (Storage Management Server transaction) and Storage Server (Storage Server transaction) are not operating.

In cluster operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

```
set SWSTGNODE=logical-node-name
```

2. Execute the command.

The table below lists the commands available in cluster operation, indicates whether environment variables need to be configured, and shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 11.17 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Transaction operating node	-
stgguiipset	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stguserset	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmaddsrv	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmmodsrv	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmdelsrv	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmsetdev	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmdeldev	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmdispsrv	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmdispdev	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgxfwcmdisppat	Not required	Transaction operating node	Executable only on Storage Management Server transaction
stgenvdisp	Not required	Transaction operating node	-
stgmgrinfobkup	Required	Transaction operating node	-
stgmgrinfodisp	Required	Transaction operating node	-
stgmgrinfoset	Required	Transaction operating node	-
stgarcext	Not required	Transaction operating node	-

11.3.1   stgcmmodnode (Management server information change command)

NAME

stgcmmodnode - changes or displays Storage Management Server information

SYNOPSIS

```
program-directory\bin\stgcmmodnode [-i IP-Address] [-p PORT-Number] [-n Server-Name]
```

DESCRIPTION

This command has the following two functions:

・ Displays Storage Management Server information specified on the Storage Server on which this command is currently executed

- Changes Storage Management Server information.

This command changes the following information on a Storage Management Server:

- IP address of a Storage Management Server
- PORT number used by a communication service that runs on a Storage Management Server
- Server name of a Storage Management Server

Refer to the following for the change procedure which uses this command:

- "10.5.1 Changing the IP address of a Storage Management Server"
- "10.5.3 Changing the port number of a Storage Management Server or Storage Server"
- "10.5.4 Changing the server name of a Storage Management Server or Storage Server"

OPTIONS

None

Displays the server information currently being managed.

-i *IP-Address*

Specifies the IP address of a Storage Management Server, to change the IP address of the Storage Management Server.

-p *PORT-Number*

Specifies the port number of a Storage Management Server, to change the port number of the Storage Management Server.

-n *Server-Name*

Specifies the server name of a Storage Management Server to change the server name of the Storage Management Server. This option cannot be specified if this command is executed on a Storage Management Server.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display server information.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgcmmodnode
swstf2413 IP Address = 10.10.10.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
C:\>
```

- Change the IP address of a Storage Management Server to 10.12.13.14.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgcmmodnode -i 10.12.13.14
swstf2401 AdvancedCopy Manager registry updated.
C:\>
```

NOTES

- This command can be executed only by a local account belonging to the Administrator's group.
- For the PORT number of a Storage Management Server, you can specify a value between 1024 and 65535.

- With this command, you must specify the same value as the one specified on a Storage Management Server. An error will occur in the operation if an invalid value is specified.

11.3.2 stguserset (Repository access user change command)

NAME

stguserset - changes the user name and the password

SYNOPSIS

```
program-directory\bin\stguserset User-Name Password
```

DESCRIPTION

This command changes the user name and the password of a "repository access user" specified when the Manager of AdvancedCopy Manager was installed. This command must be executed on a Storage Management Server.

The change in the username and the password is executed according to the following procedures:

1. Close the GUI client of AdvancedCopy Manager.

2. Execute the Repository access user change command (stguserset).

3. Stop the service (the AdvancedCopy Manager GUI service).

4. Start the service (the AdvancedCopy Manager GUI service).

OPERANDS

User-Name

Specifies a user name to be used for repository access.
Specify a username, of up to 18 bytes, that is specifiable under the operating system.

Pa*ssword*

Specifies a user password to be used for repository access.
Specify a username, of up to 18 bytes, that is specifiable under the operating system.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Change the user name and the password to be used for repository access to a1234 and Yfd1fz3, respectively.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stguserset a1234 Yfd1fz3
Password for accessing the repository has been registered.
C:\>
```

NOTES

- This command can be executed by a local account belonging to the Administrator's group.

・ The user name to be specified in this command must already be registered in the system and have a local logon authority.

11.3.3 stgguiipset (GUI connection information setting command)

NAME

stgguiipset - changes to or displays the IP address for GUI connection

SYNOPSIS

```
Program directory\bin\stgguiipset [-i IP-Address]
```

DESCRIPTION

If the Storage Management server has two or more network cards (with different IP addresses for each card) then this command can be used to set which IP address the GUI uses to connect to the server. When the GUI is downloaded it will be correctly configured to connect to the It is necessary to execute this command in the Storage Management Server.

This command has the following functions:

・ It displays the IP address for GUI connection of the Storage Management Server

・ It allows changes to the IP address for GUI connection of a Storage Management Server

To change the IP address for GUI connection of a Storage Management Server:

1. Close the GUI client of AdvancedCopy Manager.

2. Execute the Repository access user change command (stguserset).

3. Stop the service (the AdvancedCopy Manager GUI service).

4. Start the service (the AdvancedCopy Manager GUI service).

OPTIONS

None

Displays the IP address for the GUI connection currently being managed.

-i *IP-Address*

Specify the IP address for the GUI connection that is to be changed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The IP address for the present GUI connection is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgguiipset
IP Address = 10.10.10.10
C:\>
```

- The IP address for the GUI connection of a Storage Management Server is changed to 10.12.13.14.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgguiipset -i 10.12.13.14
swstf2401 Renewal of the registry on a Storage Management Server was completed normally.
C:\>
```

NOTES

- This command can be executed by a local account belonging to the Administrator's group.

11.3.4 stgxfwcmaddsrv (Server information addition command)

NAME

stgxfwcmaddsrv - adds Storage Server information

SYNOPSIS

```
Program directory\bin\stgxfwcmaddsrv [-n Server-Name] -i IP-Address -p Port-Number
```

DESCRIPTION

This command adds Storage Server information to be managed by AdvancedCopy Manager. This command can only be executed from the Storage Management Server.

OPTIONS

-n *Server-Name*

Specifies the name of the Storage Server to be added. The name must be less than 255 bytes and must be a unique server name so that AdvancedCopy Manager can manage the server. 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.

Non-cluster operation: Host name must be recognized by the operating system
Cluster operation: AdvancedCopy Manager logical node name must be specified during cluster setup

-i *IP-Address*

Specify the IP address of the Storage Server to be added in 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), the same as under the cluster environment.

-p *Port-Number*

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_? (Logical node name of AdvancedCopy Manager specified during cluster setup.)

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Add a server by using the host name.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmaddsrv -i 10.10.10.10 -p 1226
stgxfwcmaddsrv completed
C:\>
```

- Add a logical server so that the cluster setup is performed by specifying a server name.
  (Logical IP address: 10.10.10.20; port number allocated to stgxfws_logical-node-name: 1227)

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmaddsrv -n Server1 -i 10.10.10.20 -p 1227
stgxfwcmaddsrv completed
C:\>
```

NOTES

- This command can be executed by a local account belonging to the Administrator's group.

- Please perform the command in the location specified at the time of product installation.

- Because a Storage Management Server and a logical server for a Storage Management Server transaction are added during database setup and cluster setup, they are not added by this command.
  When processing takes a long time, a period (.) is displayed until it is complete.

- This command cannot be executed while the following operations are being performed in the initial window by using the GUI client:

  - Addition of a new server

  - Change of a server

  - Deletion of a server

  - Acquisition and Reflection of Information on All Devices

  - Acquisition and Reflection of Information on a Specific Device

  - Deletion of device information

- This command cannot be executed while the following commands are being executed:

  - stgxfwcmmodsrv (Server information change command)

  - stgxfwcmdellsrv (Server information deletion command)

  - stgxfwcmsetdev (Device information collection/reflection command)

  - stgxfwcmdeldev (Device information deletion command)

11.3.5 stgxfwcmmodsrv (Server information change command)

NAME

stgxfwcmmodsrv - changes the following server information

SYNOPSIS

```
Program directory\bin\stgxfwcmmodsrv -n Server-Name [-s New-Server-Name] [-i New-IP-Address] [-p New-port-Number] | [-f server-information-change-instruction-filename [-y]]
```

DESCRIPTION

This command changes the following server information managed by AdvancedCopy Manager. It is necessary to execute this command on the Storage Management Server.

・ A Storage Server IP address

・ A Storage Server port number

・ The server name of a Storage Management Server

・ The server name of a Storage Server

Also, use this when installing the tape server function on the target server in the future.

Server information can also be changed as a batch while maintaining the consistency of multiple items of information between multiple servers in the managed system by specifying the server information change instruction file.

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 the Storage Management server

・ Server names of Storage Servers

OPTIONS

-n *Server-Name*

Specify a server name that is currently being managed.

-s *New-Server-Name*

Specify a new server name in less than 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 *New-IP-Address*

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), as in a cluster environment.
Specify at the same time as the -n option.

-p *New-port-Number*

Specify a port number required for post-change communication. The values are from 1024 to 65535)
Under the cluster environment, specify the port number that is allocated to service name stgxfws_? (Logical node name of AdvancedCopy Manager specified during cluster setup)
For non-cluster operations, specify the port number assigned to service name stgxfws.
Specify at the same time as the -n option.

-f *server-information-change-instruction-filename*

Specify the absolute path of the server information change instruction filename.
This option can only be specified at the same time as than the -y option.
Format for the server information change instruction file

- In the first 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 at the same server, enter the IP address change instruction, then enter the port number change instruction on the second line.

```
Manager     I  10.10.20.10
Server1     I  10.10.20.20
Server1     P  9888
Server2     S  DstServer
```

-y

Specify this option to continue processing if the management system contains multiple servers and an error occurs at a specific server.
Remove the cause of the error at the server where the error occurred, and perform the required change procedure separately for that server.
Specify at the same time as the -f option.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The IP address of a Storage Server (with server name: Server1) is changed to 10.20.30.40.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmmodsrv -n Server1 -i 10.20.30.40
stgxfwcmmodsrv completed
C:\>
```

・ The server name of a Storage Server (with server name: Server1) is changed to Agent5.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmmodsrv -n Server1 -s Agent5
stgxfwcmmodsrv completed
C:\>
```

・ The server information change instruction file is specified to change server information as a batch.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmmodsrv -f C:\acm\modfile
stgxfwcmmodsrv completed
C:\>
```

・ The server information change instruction file is specified to change server information as a batch, even if an error occurs at a specific server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmmodsrv -f C:\acm\modfile -y

swstf2459 Resource match command terminated abnormally. Server name =[Server1]
swsrp0625 This command cannot be executed because another AdvancedCopy Manager command is currently
being executed.

stgxfwcmmodsrv completed, excluding the server where the error occurs
C:\>
```

NOTES

- Since stgcmmodnode (Management server information change command) is used to change the following server information, this information can only be changed if the server information change instruction file is specified:

  - The IP address of a Storage Management Server

  - The port number of a Storage Management Server

- If the server information is going to be changed by using this command, the machine definition information must be changed in advance. Refer to the procedure given in "10.5 Changing the Operating Environment," for information on executing the processing.

- This command can be executed by a local account belonging to the Administrator's group.

- Please perform the command in the location specified at the time of product installation.

- When processing takes a long time, a period (.) is displayed until it is complete.

- The following notes apply to changing the Storage Management server information (except when the -f option is specified):

  - Use stgcmmodnode (Management server information change command) to change the IP address and port number, then restart the various AdvancedCopy Manager services.

  - After Storage Management server information is changed, execute stgcmmodnode (Management server information change command) at the managed servers to set the changed Storage Management server information.

- The following notes apply to changing Storage Server information:

  - Stop the various AdvancedCopy Manager services 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 services.

  - Stop the various AdvancedCopy Manager services before changing the port number. Then, change the port number in the system and restart the AdvancedCopy Manager services.

- The following notes apply when the -f option is specified:

  - The server name or IP address that is to be changed cannot be in use by another server that is currently managed.

  - The Storage Management server that executes this command and the AdvancedCopy Manager services and Storage Server transactions at all Storage Servers managed by Storage Management server transactions must be running.

  - Backup management commands and replication management commands must not be executed at the Storage Management server that executes this command nor in the AdvancedCopy Manager services and Storage Server transactions at all Storage Servers managed by Storage Management server transactions.
    If commands are executed, they may terminate abnormally. If the server information change command terminates abnormally, perform recovery as indicated in the error message. If backup management or replication management commands are accidentally executed during execution of the server information change command, and if the backup management and replication management commands terminate abnormally, re-execute the backup management or replication management commands after normal termination of the server information change command.

- 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.

- This command cannot be executed while the following operations are being performed in the initial window by using the GUI client:

  - Addition of a new server

  - Change of a server

  - Deletion of a server

  - Acquisition and Reflection of Information on All Devices

  - Acquisition and Reflection of Information on a Specific Device

- Deletion of device information

・ This command cannot be executed while the following commands are being executed:

- stgxfwcmaddsrv (Server information addition command)

- stgxfwcmdellsrv (Server information deletion command)

- stgxfwcmsetdev (Device information collection/reflection command)

- stgxfwcmdeldev (Device information deletion command)

11.3.6   stgxfwcmdelsrv (Server information deletion command)

NAME

stgxfwcmdelsrv - deletes the Storage Server information

SYNOPSIS

```
Program directory\bin\stgxfwcmdelsrv -n Server-Name
```

DESCRIPTION

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.

OPTIONS

-n *Sever-Name*

Specify the Storage Server name to be deleted.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ A Storage Server with server name: Server1) information is deleted.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdelsrv -n Server1
stgxfwcmdelsrv completed
C:\>
```

NOTES

・ This command can be executed by a local account belonging to the Administrator's group.

・ Perform this command in the location specified at the time of product installation.

・ The Storage Management Server information cannot be deleted.

・ When processing takes a long time, a period (.) is displayed until it is complete.

・ This command cannot be executed when the following operations are being performed in the initial window by using the GUI client:

- Addition of a new server

- Change of a server

- Deletion of a server

- Acquisition and Reflection of Information on All Devices

- Acquisition and Reflection of Information on a Specific Device

- Deletion of device information

・ This command cannot be executed while the following commands are being executed:

- stgxfwcmaddsrv (Server information addition command)

- stgxfwcmmodsrv (Server information change command)

- stgxfwcmsetdev (Device information collection/reflection command)

- stgxfwcmdeldev (Device information deletion command)

11.3.7 stgxfwcmsetdev (Device information collection/reflection command)

NAME

stgxfwcmsetdev - collects and reflects the device information

SYNOPSIS

```
Program directory\bin\stgxfwcmsetdev -n Server-Name [-d Device-Name] [-f File-Name | -y]
```

DESCRIPTION

This command collects the latest device information detected by the server and displays the difference between this and the information managed by AdvancedCopy Manager. After this, it displays the specified device difference information in the management information for AdvancedCopy Manager. It is necessary to execute this command on the Storage Management Server.

The device information currently being managed and the device information detected are compared, stored, deleted, updated, and used in the following cases:

・ When operation is started using AdvancedCopy Manager

・ When device information being managed is changed

OPTIONS

-n *Sever-Name*

Specify the server name whose device information is to be collected or reflected.

-d *Device-Name*

Specify the device name whose information is to be collected or reflected.

If this specification is omitted, all devices on the specified server are assumed to be specified.

-f *File-Name*

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. Only the device difference information is output to the file, and the reflection processing for the

subsequent management information is not executed.
This option cannot be specified with the -y option.

-y

The difference between the device information managed by AdvancedCopy Manager and the latest device information detected is reflected unconditionally in the management information, without an inquiry being made about that difference.
This option cannot be specified with the -f option.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The information for each device of a server is collected or reflected.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmsetdev -n Server1
>Device detected
  1:g1d38p1 (X:)
  2:g1d38p2
  3:g1d38p3
>Specify the device to be added. [* or ?-? or ?,? or q]
*1,3
>Device not detected
  1:g1d39p1 (Y:)
  2:g1d39p2

>Specify a device requested to be deleted. [* or ?-? or ?,? or q]
*
>The information of the following device will be changed. Information to be changed:
  1:g1d40p1
>Do you want to continue the processing?  [y or n] y
stgxfwcmsetdev completed
C:\>
```

・ The information for a specific device managed by the server is collected or reflected.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmsetdev -n Server1 -d g1d38p1
> The following device information has been changed. This information is updated.
  1:g1d38p1 (X:)
> Do you want to continue the processing?  [y or n] y
stgxfwcmsetdev completed
C:\>
```

NOTES

・ The following message is displayed if the number of devices is high:

```
 - hit Enter for more or s to select  -
```

Press the Enter key to continue to display more devices. To interrupt the display and specify either an addition or a deletion, press "s".

・ Use the following methods to request addition or deletion:

- Enter "*" to specify all.

- Enter numbers separated by a hyphen to specify a range. (Example: 1-3)

- Enter numbers separated by a comma to specify separate numbers. (Example: 2, 4)

- A combination of range and separate number specifications can be entered. (Example: 1-3, 5)

- Enter no data to specify no devices to add or delete (only press Enter in this case).

- Enter "q" to stop the processing.

・ This command can be executed by a local account belonging to the Administrator's group.

・ Please perform the command in the location specified at the time of product installation.

・ Obtaining disk information for HP-UX servers with GPT disks using AdvancedCopy Manager is not possible.

・ When processing takes a long time, a period (.) is displayed until it is complete.

・ The following message may be displayed when a device requested to be added is specified. It is an indication of an attempt to register a device that is in the cabinet and may have invalid settings. Make sure that this problem is fixed before continuing the processing (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 has been requested to be added. In this case, check the following before continuing the processing: whether the device will be subject 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. Therefore, when the number of devices is large, execute the command at a time of low CPU and I/O loads.
Note that it takes about 0.5 second for each device (partition) when there is no load on the system.

・ When backup synchronous processing or synchronous replication processing is being performed, device information may not be acquired accurately. Therefore, if you need to acquire device information, only perform this command after all synchronous processing has been cancelled

・ This command cannot be executed by using the GUI client when the following operations are being performed:

- Addition of a new server

- Change of a server

- Deletion of a server

- Acquisition and Reflection of Information on All Devices

- Acquisition and Reflection of Information on a Specific Device

- Deletion of device information

・ This command cannot be executed while the following commands are being executed:

- stgxfwcmaddsrv (Server information addition command)

- stgxfwcmmodsrv (Server information change command)

- stgxfwcmdellsrv (Server information deletion command)

- stgxfwcmdeldev (Device information deletion command)

11.3.8 stgxfwcmdeldev (Device information deletion command)

NAME

stgxfwcmdeldev - deletes the device information

SYNOPSIS

```
Program directory\bin\stgxfwcmdeldev -n Server-Name -d Device-Name
```

DESCRIPTION

This command deletes the device information currently being managed by AdvancedCopy Manager. It is necessary to execute this command in the Storage Management Server.

stxfwcmsetdev (Device information collection/reflection command) 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 has been detected.

OPTIONS

-n *Sever-Name*

Specify the name of the server that is managing the device to be deleted.

-d *Device-Name*

Specify the name of the device to be deleted.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The device information for a Storage Server is deleted.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdeldev -n Server1 -d g1d18p1
stgxfwcmdeldev completed
C:\>
```

NOTES

- This command can be executed by a local account belonging to the Administrator's group.

- Please perform this command in the location specified at the time of product installation.

- When processing takes a long time, a period (.) is displayed until it is complete.

- This command cannot be executed by using the GUI client if the following operations are being performed:

    - Addition of a new server

    - Change of a server

    - Deletion of a server

    - Acquisition and Reflection of Information on All Devices

- Acquisition and Reflection of Information on a Specific Device

- Deletion of device information

・ This command cannot be executed while the following commands are being executed:

- stgxfwcmaddsrv (Server information addition command)

- stgxfwcmmodsrv (Server information change command)

- stgxfwcmdellsrv (Server information deletion command)

- stgxfwcmsetdev (Device information collection/reflection command)

11.3.9 stgxfwcmdispsrv (Server information display command)

NAME

stgxfwcmdispsrv - displays the server information

SYNOPSIS

```
Program directory\bin\stgxfwcmdispsrv [-n Server-Name]
```

DESCRIPTION

This command displays the server information managed by AdvancedCopy Manager. It is necessary to execute this command on the Storage Management Server.
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" is indicated for a tape server.
OS-Type	An operating system type is displayed.
OS-Version	An operating system version is displayed.
Version	The version of this product is displayed.
IP-Address	The IP address for communication with the server is displayed.
Port-Number	The port number for communication with the server is displayed.

OPTIONS

-n *Sever-Name*

Specify the server name whose information is to be displayed.
If this option is omitted, the information for all servers managed by AdvancedCopy Manager is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The information for all servers is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdispsrv
Server  Server-Type       Tape OS-Type     OS-Version Version IP-Address  Port-Number
Manager Management-Server --   Windows2000 ---        V10.0L60 10.10.10.10 1226
Server1 Server            --   Windows2000 ---        V10.0L60 10.10.10.20 1226
C:\>
```

- The information for a Storage Server(server name: Server1) is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdispsrv -n Server1
Server  Server-Type Tape OS-Type     OS-Version Version  IP-Address  Port-Number
Server1 Server      --   Windows2000 ---        V10.0L60 10.10.10.20 1226
C:\>
```

NOTES

- In "OS-Version", the OS version that is displayed refers to the following time:
  In the case of the Storage Management Server: the time when the database was created.
  In the case of the Storage Server: the time when the Storage Server was added.
  Even if the OS is upgraded after this, the OS version displayed will retain the version at the database creation time and the time the Storage Server was added.

- This command can be executed by a local account belonging to the Administrator's group.

- Please perform this command in the location specified at the time of product installation.

- When processing takes a long time, a period (.) is displayed until it is complete.

11.3.10 stgxfwcmdispdev (Device information display command)

NAME

stgxfwcmdispdev - displays the Device information

SYNOPSIS

```
Program directory\bin\stgxfwcmdispdev -n Server-Name [-d Device-Name [-sm|-grp]]
```

DESCRIPTION

This command displays information on a device being managed by AdvancedCopy Manager. The list of devices which use the same copy area as the specified device, the specified device itself, and the devices which exist in the same logical group can be displayed.
It is necessary to execute this command on the Storage Management Server.

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 setting may be undefined, cache table size may be unspecified, or the cache table may be too small in the cabinet containing this device.)

Title	Description
	D: Device deletion error U: Device update error

Device	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? and g?d?p? format.
	
	    g? : Disk array number (0 if the device is not installed in the Fujitsu ETERNUS Storage System)
	    d? : Disk number(*1)
	    p? : Logical disk number(*2)
	
	    (*1)This is a number given uniquely within the ETERNUS Storage System.
	    This number differs from the disk number in Disk Management.)
	
	    (*2)This is the sequential number of a logical disk on the physical disk.
	    The logical disk indicates the following contents in Disk Management.
	    The number is given by counting up from the left to right in Disk Management.
	    - In the case of a basic partition, the logical disk is that entire partition.
	    - In the case of an extended partition, the logical disk is a logical drive in that partition.
	
	    In the case of an 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.

Title	Description
	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.

OPTIONS

-n *Sever-Name*

Specify the server name that manages the device whose information is to be displayed.

-d *Device-Name*

Specify the device name whose information is to be displayed.
If this option is omitted, the information for all devices managed by the specified server is displayed.

-sm

With the -d option also specified, this option specifies that a list of the devices using the same copy area as the specified device be displayed.

-grp

The list of the devices which exist in the same logical group as a specified device is displayed by specifying it simultaneously with the -d option. The device type of the specified device can be specified with the d option only for LVM/VxVM.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The information for a device of a server is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdispdev -n Server1 -d g1d19p1
S Device  Block-Device  Mount-Point File-System Device-Type Size(MB)
  g1d19p1 disk19p1      J:          NTFS        Normal      2000
C:\>
```

・ The information for each device of a server is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdispdev -n Server1
S Device  Block-Device Mount-Point File-System Device-Type Size(MB)
  g1d19p1 disk19p1     J:          NTFS        Normal      2000
* g1d19p2 disk19p2     M:          NTFS        Normal      2000
D g1d20p1 disk20p1     K:          NTFS        Normal      2000
U g1d20p2 disk20p2     N:          NTFS        Normal      2000
C:\>
```

・ Device of the server is displayed and device information which uses the same copy area is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\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
     C:\>
```

・ Device information which exists in the same logical group as device of the server is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\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   ---
C:\>
```

NOTES

・ The command displays the above details based on information registered in AdvancedCopy Manager. Therefore, when the configuration has been changed and there is a device not registered in a logical group, and it is registered afterwards, the correct information is not displayed. In this case, please re-attempt the acquisition of device information about the registration of the device that was not previously registered, and the device which does the "Acquisition/reflection of information on all devices" processing.

・ This command can be executed by a local account belonging to the Administrator's group.

・ Please perform the command in the location specified at the time of product installation.

・ When processing takes a long time, a period (.) is displayed until it is complete.

11.3.11 stgxfwcmdisppat (Partition information display command)

NAME

stgxfwcmdisppat - displays the information for the partitions

SYNOPSIS

```
Program directory\bin\stgxfwcmdisppat -n Server-Name -d Device-Name
```

DESCRIPTION

This command displays the information for the partitions that comprise a device managed by AdvancedCopy Manager. It is necessary to execute this command in the Storage Management Server.
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 object, the name is displayed in the RAW device name c?t?d? format. **Windows server** When the device is installed in the Fujitsu ETERNUS Storage System, the same contents as "in stgxfwcmdispdev (Device information display command) are displayed. When the device is not installed in the Fujitsu ETERNUS Storage System, the name is displayed in the following formats.

Title	Description

	MBR disks:
	
	  S?p?
	
	  S? : Signature (8-digit hexadecimal number)
	  p? : Logical disk number (*1)
	
	GPT disks:
	
	  G? : DiskId of disk (32-bit hexadecimal character string)
	  p? : Logical disk number (*1)
	
	  (*1) This is the sequence number of a logical disk on the physical disk. The logical disk indicates the following contents in Disk Management. The number is given by counting up from the left to the right in Disk Management.
	  - In the case of a basic partition, the logical disk is the entire partition.
	  - In the case of an extended partition, the logical disk is a logical drive in that partition
	
	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 an SDX object (ie, a slice), it displays in the form of RAW device name:sd?.
	
	    - RAW device name: The udev device name indicated by the sdxinfo DEVNAME value
	
	    - RAW device name: The sdxinfo DEVNAME value
	
	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 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 stgxfwcmdispdev (Device information display command) 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 an SDX object (ie, a slice), it displays in the form of a block device name:sd?.
	
	    - RAW device name: The udev device name indicated by the sdxinfo DEVNAME value
	
	    - RAW device name: The sdxinfo DEVNAME value
	
	AIX server
	
	  A block device name or a volume group name under LVM is displayed.

Physical-Disk	Solaris server, HP-UX server, Linux, and AIX server "---" is always displayed.

Title	Description
	Windows server A physical device name is displayed. The same contents as 'Block-Device' of stgxfwcmdispdev (Device information display command) are displayed.
Disk-Type	When the device is installed in the Fujitsu ETERNUS Storage System, "GR" is displayed. When the device is not installed in the Fujitsu ETERNUS Storage System, "---" is displayed.
LU-Number	When the device is installed in the Fujitsu ETERNUS Storage System, a logical unit number is displayed. When the device is not installed in the Fujitsu ETERNUS Storage System, "---" is displayed.

OPTIONS

-n *Sever-Name*

Specify the server name that manages a device whose information is to be displayed.

-d *Device-Name*

Specify a device name whose information is to be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ The partition information for a device of a server is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgxfwcmdisppat -n Server1 -d g1d19p1
Partition Identifier Physical-Disk Disk-Type LU-Number
g1d19p1   g1d19p1    disk19p1      GR        19
C:\>
```

NOTES

・ This command can be executed by a local account belonging to the Administrator's group.

・ Please perform the command in the location specified at the time of product installation.

・ When processing takes a long time, a period (.) is displayed until it is complete.

11.3.12   stgenvdisp (Environment information display command)

NAME

stgenvdisp - displays the values of the environment settings

SYNOPSIS

```
Program-directory\bin\stgenvdisp [-n Server-Name]
```

DESCRIPTION

This command displays the values of the environment settings in AdvancedCopy Manager.

The contents of the displayed information are described below.

Title	Description
Server type	The server type is displayed as follows: Management server: Storage Management Server or Storage Management Server transaction Server: Storage Server or Storage Server transaction
Cluster system	The type of cluster system is displayed as follows: SynfinityCluster or PRIMECLUSTER: SynfinityCluster or PRIMECLUSTER VERITAS Cluster Server: VERITAS Cluster Server SynfinityCluster: SynfinityCluster PRIMECLUSTER: PRIMECLUSTER MC/ServiceGuard: MC/ServiceGuard MSCS: MSCS or WSFC HACMP: High Availability Cluster Multi-Processing SunCLUSTER: SunCLUSTER
Node type	The node type is displayed as follows: Primary: Primary node Secondary: Secondary node
Node name	The logical node name is displayed. Local-Service indicates a local transaction.
Service name	The transaction name is displayed.
Cluster name	The cluster name is displayed.
Mount point	The mount point for shared data is displayed.
Disk resource	The name of the shared disk resource used for shared data is displayed.
Drive	The drive letter used for shared data is displayed.
Volume group	The volume group name is displayed.
Network name	The name of the network is displayed.
External connection	The external connection network name is displayed.
Subnet mask	The subnet mask is displayed.
IP address resource	IP address resource information is displayed.
IP by cluster setup	The logical IP address specified in the cluster setting command is displayed. However, note that the displayed IP address is not the active logical IP address if the IP address of either the Storage Management Server transaction or Storage Server transaction is changed during operation.
Manager IP address	The IP address of the Storage Management Server is displayed. However, if no server is added, then "????" is displayed.
Repository user	The name of the user accessing the repository is displayed.
DB log file	Windows Edition only The name of the DB log file storage destination folder is displayed.
DB dictionary file	Windows Edition only The name of the DB dictionary file storage destination folder is displayed.

Title	Description
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 Edition
	
	    The RDB log file directory name is displayed.

Database space	Solaris Edition The name of the raw device containing the repository data storage DB is displayed. Linux Edition The name of the directory containing the repository data storage DB is displayed.
Database size	Windows Edition and Linux Edition only The database size is displayed.
IP address for GUI	The GUI connection IP address is displayed.
Communication	The communication service port number (the service name in the services file: stgxfws) is displayed. In a cluster environment, the transaction communication service port number (the service name in the services file: stgxfws_logical-node-name) is displayed.
Remote access	The remote access service port number (the service name in the services file: rmiswstf) is displayed.
Exclusive control	The exclusive control service port number (the service name in the services file: semswstf) is displayed.
Authentication feature	The authentication feature service port number (the service name in the services file: smaclmgr) is displayed.
Repository	Windows Edition and Solaris Edition only The repository service port number (the service name in the services file: rdaswstf) is displayed.

Resource Type	Solaris and Linux only
	
	    Displays the resource type.
	    Procedure: Procedure resource
	    CmdLine: Command line resource

Network Resource	Solaris only Displays the name of the logical hostname resource or the name of the shared address resource.
Program install directory	Displays the program directory specified during installation.

Title	Description
Fixed configuration directory	Displays the environment settings directory specified during installation.
Modifying configuration directory	Displays the transactions directory specified during installation.
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type. JAPANESE: Domestic edition ENGLISH: International edition
Code	Solaris and Linux only Displays the encoding specified during installation.

OPTIONS

-n *Sever-Name*

Specifies the logical node name (logical node name specified in the cluster setup command) of the transaction.

In a cluster environment

If this option is specified, information on only the specified transactions is output. Otherwise, information on all transactions is output.

In a non-cluster environment

This option cannot be specified. If the option is specified, then message swstf6001 is output and processing ends. Otherwise, information is output.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· Information in a non-cluster environment is displayed.

[For the Storage Management Server]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type           : Management server
  Manager IP address    : 10.10.10.10
  Repository user        : acm
  DB log file           : D:\acmdb\log
  DB dictionary file    : D:\acmdb\dic
  Repository database   : D:\acmdb\spa
  Database size         : 65MB
  IP address for GUI    : 10.10.10.10
  Communication         : 1226
  Remote access         : 9851
  Exclusive control     : 9852
  Authentication feature : 4660
  Repository            : 2004
 -------------------------------------------------------------------
  Version               : 14.0
  Language              : JAPANESE
  Program install directory      : D:\Win32app\AdvancedCopyManager
  Fixed configuration directory  : D:\Win32app\AdvancedCopyManager
```

```
  Modifying configuration directory  : D:\Win32app\AdvancedCopyManager
C:\>
```

[For the Storage Server]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type          : Server
  Manager IP address   : 10.10.10.10
  Communication        : 1226
--------------------------------------------------------------------------
  Version              : 14.0
  Language             : JAPANESE
  Program install directory        : D:\Win32app\AdvancedCopyManager
  Fixed configuration directory    : D:\Win32app\AdvancedCopyManager
  Modifying configuration directory  : D:\Win32app\AdvancedCopyManager
C:\>
```

· Information on all transactions in a cluster environment (MSCS) is displayed.
  Values for any of the following are output according to the IP address information entered in the cluster setting command: network
  name, external connection, subnet mask, and IP address resource.

[For the Storage Management Server]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type          : Management server
  Cluster system       : MSCS
  Node type            : Primary
  Node name            : nodemgr
  Service name         : manager_service
  Cluster name         : ACMCluster
  Disk resource        : Disk R
  Drive                : R
  Network name         : ACMNet
  External connection  : local
  Subnet mask          : 255.255.255.0
  IP by cluster setup  : 10.10.10.10
  Manager IP address   : 10.10.10.10
  Repository user      : acm
  DB log file          : R:\acmdb\log
  DB dictionary file   : R:\acmdb\dic
  Repository database  : R:\acmdb\spa
  Database size        : 65MB
  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              : 14.0
  Language             : JAPANESE
  Program install directory        : D:\Win32app\AdvancedCopyManager
  Fixed configuration directory    : D:\Win32app\AdvancedCopyManager
  Modifying configuration directory  : D:\Win32app\AdvancedCopyManager
C:\>
```

[For the Storage Server]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type          : Server
```

```
    Cluster system         : MSCS
    Node type              : Primary
    Node name              : nodeagt1
    Service name           : agent_service1
    Cluster name           : ACMCluster
    Disk resource          : Disk R
    Drive                  : R
    Network name           : ACMNet1
    External connection    : local
    Subnet mask            : 255.255.255.0
    IP by cluster setup    : 10.10.10.10
    Manager IP address     : 10.10.10.10
    Communication          : 11000
-----------------------------------------------------------------------
    Server type            : Server
    Cluster system         : MSCS
    Node type              : Secondary
    Node name              : nodeagt2
    Service name           : agent_service2
    Cluster name           : ACMCluster
    Disk resource          : Disk P
    Drive                  : P
    IP address resource    : ACM Net Resource
    IP by cluster setup    : 10.10.10.10
    Manager IP address     : 10.10.10.10
    Communication          : 12000
-----------------------------------------------------------------------
    Server type            : Server
    Node name              : Local-Service
    Manager IP address     : 10.10.10.10
    Communication          : 1226
-----------------------------------------------------------------------
    Version                : 14.0
    Language               : JAPANESE
    Program install directory         : D:\Win32app\AdvancedCopyManager
    Fixed configuration directory     : D:\Win32app\AdvancedCopyManager
    Modifying configuration directory : D:\Win32app\AdvancedCopyManager
C:\>
```

NOTES

- To output cluster operation information, execute the command from an active node. Executing the command from a standby node displays only partial information. To output cluster operation information while a transaction is stopped, either set the shared disk containing the AdvancedCopy Manager shared data of the transaction to the online state, or mount the shared disk and then execute the command.

- When this command is executed in a cluster environment, the environment variable (SWSTGNODE) need not be set.

- This command can be executed by an account belonging to the Administrator's group.

- "????" is displayed for any information that cannot be displayed because of an error.

- Some items may not be output, depending on the server type (whether Storage Management Server or Storage Server) or cluster type.

11.3.13 stgmgrinfoset (Management information package backup server registration/deletion command)

NAME

stgmgrinfoset - registers. deletes or displays the management information

SYNOPSIS

```
program-directory\bin\stgmgrinfoset [-del | -d Directory-Name -c storage-management-server-encoding]
```

DESCRIPTION

This command can be used to register, delete or display information about the management information package backup execution server(the server on which stgmgrinfobkup (Management information package backup command) is executed).

- ・ This command registers the management information package backup execution server

- ・ The command deletes the management information package backup execution server.

- ・ The command displays information about the management information package backup execution server.

OPTIONS

None

Displays information about the management information package backup execution server.

-del

Deletes the management information package backup execution server.

-d *Directory-Name*

Specify the absolute path to the directory where the backup data is to be stored.
Only alphanumeric characters and underscores can be used in the directory name.

-c

Specify the encoding designated when the Storage Management Server was installed. Specify ASCII

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- ・ Register the management information package backup execution server.

  (assume that the path to the directory where backup data is to be stored is D:\stgbkupdata, and the encoding used on the Storage Management Server is ASCII):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfoset -d /stgbkupdata -c ASCII
swstf3000 The server which performs package backup of the management information on AdvancedCopy
Manager was registered.
C:\>
```

- ・ Delete the management information package backup execution server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfoset -del
swstf3001 The server which performs package backup of the management information on AdvancedCopy
Manager was deleted. Delete a directory. Directory=/stgbkupdata
C:\>
```

- ・ Display information about the management information package backup execution server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfoset
Directory    : /stgbkupdata
```

```
Manager code : ASCII
C:\>
```

NOTES

- ・ This command can be executed by an account belonging to the Administrator's group.

- ・ 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.

11.3.14 stgmgrinfobkup (Management information package backup command)

NAME

stgmgrinfobkup - backup the management information

SYNOPSIS

```
program-directory\bin\stgmgrinfobkup [-n Server-Name] [-t Backup-Type]
```

DESCRIPTION

This command backup the management information stored on the Storage Server and the Storage Management Server.

OPTIONS

-n *Sever-Name*

Creates backups of the management information stored on the specified server.
If this option is not specified, the management information on all Storage Server (including the Storage Management Server) is backed up.

-t *Backup-Type*

Specifies the types of data that are to be backed up. Specify one of the values listed below. Do not specify more than one value in the -t option:

DBData : Database
RegiData : Registry
MgrInfoData : Policy file for management information package backup
AuthData : Authentication management list
BkupData : Backup management
ReplData : Replication management
TapeData : Tape backup management backup

If this option is not specified, backups are created as defined in the policy file.For details on the policy file, refer to the section "10.1.2.1 Preliminaries".

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Back up the management information on all the Storage Server as defined in the policy file:

```
C:\>C:\Win32app\AdvancedCopyManager\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.
C:\>
```

・ Back up the management information on Storage Server as defined in the policy file:

```
C:\>C:\Win32app\AdvancedCopyManager\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.
C:\>
```

・ Back up the registries on all of the Storage Server.

```
C:\>C:\Win32app\AdvancedCopyManager\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.
C:\>
```

・ Back up the backup management located on Storage Server

```
C:\>C:\Win32app\AdvancedCopyManager\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.
C:\>
```

NOTES

・ This command can be executed by an account belonging to the Administrator's group.

・ Be sure to check the information (ie, a message indicating completion or an error) that is output by this command.

・ This command can be executed only on the management information package backup execution server.

- Set the name of the logical node in the SWSTGNODE environment variable when the management information package backup execution server is in a cluster system.

- Do not execute other AdvancedCopy Manager commands or GUI commands while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a GUI command is running.

- Do not execute this command again if it is already running.

- To save backup data to a tape or similar external medium, save all files and directories under the backup data storage directory.

- Registry backups are made only when RegiData is specified in the -t option. A registry backup will not be made if the -t option is not specified.

- A backup of the policy file for management information package backup is made only when MgrInfoData is specified in the -t option. No backup is made when the -t option is not specified. Additionally, specify the name of the management information package backup execution server in the -n option.

- Backup is not possible for any management information on Storage Server with Softek AdvancedCopy Manager 10.3 (V10.0L40) or earlier.

11.3.15 stgmgrinfodisp (Management information package backup status display command)

NAME

stgmgrinfodisp - displays the status of execution of the stgmgrinfobkup

SYNOPSIS

```
program-directory\bin\stgmgrinfodisp [-n server-name]
```

DESCRIPTION

This command displays the status of execution of stgmgrinfobkup (Management information package backup command).
The types of information listed below are output.
If no backups are created when the management information package backup command is executed or if the management information package backup command ends in error, then no data is output.

Item	Description
Server	Server name
RegiData	Date and time at which the management information package backup command created a backup of a registry (ie, the date and time that the management information package backup command was executed) In yy/mm/dd hh:mm:ss format
DBData	Date and time at which the management information package backup command created a backup of the database (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
AuthData	Date and time at which the management information package backup command created a backup of the authentication management list (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
BkupData	Date and time at which the management information package backup command created a backup of the backup management (ie, the date and time that the management information package backup command was executed)

Item	Description
	yy/mm/dd hh:mm:ss
ReplData	Date and time at which the management information package backup command created a backup of replication management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	Date and time at which the management information package backup command created a backup of the policy file for management information package backup (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
TapeData	Date when a backup of backup management to tape was made by package backup using the management information command ie, with package backup of the management information command executed) yy/mm/dd hh:mm:ss

OPTIONS

-n *Sever-Name*

Specifies the name of the server where the backup status is to be output.

If this option is not specified, the status of backups on the Storage Server for which the management information package backup command was executed is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Output the information about all the Storage Server:

```
C:\>C:\Win32app\AdvancedCopyManager\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
C:\>
```

・ Output the information about Storage Server acm01:

```
C:\>C:\Win32app\AdvancedCopyManager\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
C:\>
```

NOTES

- ・This command can be executed by an account belonging to the Administrator's group.

- ・This command can be executed only on the management information package backup execution server.

- ・When the management information package backup execution server is in a cluster system, set the name of the logical node in the SWSTGNODE environment variable.

11.3.16 stgarcext (Backup data expansion command)

NAME

stgarcext - expands the backup data

SYNOPSIS

```
program-directory\bin\stgarcext File-Name Directory-Name
```

DESCRIPTION

This command expands the following types of backup data collected by stgmgrinfobkup (Management information package backup command) from the Storage Management Server and Storage Server running the Windows version of AdvancedCopy Manager.

- ・Backup management list

- ・Database

OPERANDS

File-Name

Specify the absolute path to the backup file to be expanded.

Directory-Name

Specify the absolute path to the directory where the file is to be expanded.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- ・Expand backup data (c:\temp\acm_db_backup) in a directory (d:\temp\ACM_DB_DATA):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgarcext c:\temp\acm_db_backup d:\temp\ACM_DB_DATA
swstf3035 The stgarcext command was ended normally.
C:\>
```

NOTES

- Only an account which belongs to the Administrator's group can execute this command.

- Create the directory where the file is to be expanded in advance.

- The directory where the file is to be expanded must be different from the directory containing the original backup.

11.4 Replication Management Commands

This section describes operations using Replication Management Commands.

Note

Only a user belonging to the Administrators group 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 output and then the command aborts.

Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 11.18 Operating environment when executing replication management commands

Command	Operating environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be operating. When the Storage Server runs on Windows and is in EC operation, Windows services required by the copy destination Storage Server must be running (except when the -m option or -t option is specified). For inter-server replication in EC equivalency status, the associated server must be operating (except when the -m option is specified).
swsrpchsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpdelvol	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running (except when the -d option is specified).
swsrprecbuffstat	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrprecbuffset	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpmake	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server

Command	Operating environment of AdvancedCopy Manager
	must be running. When the Storage Server runs on Windows and is engaged in intra-server replication and EC operation, Windows services required by the Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running (except when the -m option or -t option is specified).
swsrprecoverres	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running. To specify the -r option, Windows services required by the Storage Management Server must be running.
swsrprevsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpsetvol	To execute this command on a Storage Server, Windows services required by the Storage Management Server must be running. To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. For inter-server replication, Windows services required by the Storage Server in communication must be running.
swsrpstartsync	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running. When the Storage Server runs on Windows, Windows services required by the Storage Server must be running. For inter-server replication, the associated server must be running (except a case where the -m option is specified).
swsrpstat	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.
swsrpvolinfo	To execute this command on a Storage Management Server with the -h option specified, Windows services required by the Storage Management Server and target Storage Server must be running.

 Note

In cluster operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. Specify the environment variable as follows:

```
set SWSTGNODE=logical-node-name
```

2. Execute the command.

The table below lists the commands available in cluster operation, indicates whether environment variables must be configured and shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 11.19 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swsrpsetvol	Required	Transaction operation node	-
swsrpvolinfo	Required	Transaction operation node	-
swsrpdelvol	Required	Transaction operation node	-
swsrprecbuffstat	Required	Transaction operation node	-
swsrprecbuffset	Required	Transaction operation node	-
swsrpstartsync	Required	Transaction operation node	-
swsrpmake	Required	Transaction operation node	-
swsrpstat	Required	Transaction operation node	-
swsrpcancel	Required	Transaction operation node	-
swsrpchsync	Required	Transaction operation node	-
swsrprevsync	Required	Transaction operation node	-
swsrprecoverres	Required	Transaction operation node	-

11.4.1 Environment definition commands

This section describes environment definition commands for replication management.

11.4.1.1 swsrpsetvol (Replication volume information setting command)

NAME

swsrpsetvol - sets the replication source volumes and replication destination volumes

SYNOPSIS

To be executed on a Storage Server

For replication on a server

```
program-directory\bin\swsrpsetvol [-n] [-u] [-Xvtoc] [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

For replication between servers

```
program-directory\bin\swsrpsetvol [-n] [-u] [-Xvtoc] -o {ORG|REP|BOTH} [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

To be executed on a Storage Management Server

For replication on a server

```
program-directory\bin\swsrpsetvol -h Server-Name [-n] [-u] [-Xvtoc] [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

For replication between servers

```
program-directory\bin\swsrpsetvol -h Server-Name [-n] [-u] -o {ORG|REP|BOTH} [-Xvtoc] [-Xgroup
Group-Name] Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

This command sets the replication source volumes and replication destination volumes that will be used in a replication operation. Execute this command to declare that the replication operation will performed using the specified replication volumes.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server that is subject to the replication operation. This option is valid only on a Storage Management Server.
If this option is omitted, the Storage Server on which the command is entered will be the target of the processing.

-u

Specifies the direction of copying.
If this option is specified, copying is performed only in the direction from replication source volume to a replication destination volume.
Copying from a replication destination volume to a replication source volume is prohibited.
If this option is omitted, copying between the replication source and replication destination volumes is bidirectional.

-o {ORG|REP|BOTH}

Specifies the operation server.
Specify one of the following for this operand:

ORG: Sets the replication source server as the operation server.
REP: Sets the replication destination server as the operation server.
BOTH: Sets both the copy-source server and copy-destination server as operation servers.
On the server that is not specified as the operation server, only the following commands can be executed for a replication volume:

- swsrpvolinfo (Replication volume information display command)

- swsrpstat (Operation status display command)

- swsrpcancel (Replication cancellation command) (The forcible stop option is required.)

Specifying BOTH in the operand enables the execution of all commands on both the copy-source server and copy-destination server.
Note that the BOTH option is usable when the versions of both servers are 11.0/V11.0L10 or later.
This option is valid only for replication between servers.

-n

If this option is omitted, replication volume information cannot be set when the sizes of the replication source volume and replication destination volume are different.
When this option is specified, the sizes of the replication source volume and replication destination volume are not checked. Use this option when volume sizes are different (for example, for replication between different OSs).
When the volume sizes of the replication source volume and replication destination volume are different, copying is performed as follows:
The address at which copying starts is the first sector of the replication destination volume.
The copy data size is the size of the smaller volume.
Therefore, ensure that the size of the copy destination volume is the same size or larger than the size of the copy source volume.

-Xgroup *Group-Name*

Specifies that the copy source and copy destination volumes will be registered in a group.
If the specified group does not exist, a new group is created. Otherwise, the specified copy source and copy destination volumes are added to an existing group.
The characters that can be used for the group name are single-byte alphanumeric characters, the minus sign (-), underscore (_), number sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.

-Xvtoc

If this option is not specified, Solaris slices that include VTOC cannot be set as replication source volumes or replication destination volumes.
Specification of this option avoids checking to see whether or not replication source and replication destination volumes include

VTOC.

This option is specified for the following replication source and replication destination volumes:

- Under Solaris, VTOC-labeled disk slices that contain VTOC

- Under Solaris, a VTOC-labeled disk second slice that indicates the entire disk

This option is ignored if it is set for volumes other than the above.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

Replica-Volume-Name

Specifies a replication destination volume name.
For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Set replication volume information by specifying volume g1d1p1 of Storage Server SRC-SV as the replication source volume, and volume g2d1p1 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.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpsetvol -u -o ORG g1d1p1 g2d1p1@TARG-SV
swsrpsetvol completed
C:\>
```

・ When the same settings are made from TARG-SV, the example is as follows (be careful with the volume name):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpsetvol -u -o ORG g1d1p1@SRC-SV g2d1p1
swsrpsetvol completed
C:\>
```

NOTES

・ Replication volume information cannot be set if:

- Replication volume information has already been set.

- The specified replication source volume and replication destination volume are already set as the replication destination volume and the replication source volume respectively.

- The -n option is not specified when the sizes of the replication source volume and the replication destination volume are different.

- Two volumes that have the same cabinet information (ie, box identifier, OLU number, EXTENT start position, and EXTENT size) as the cabinet information of the specified two volumes have already been set as replication volumes.

- The replication destination volume has been registered as a backup volume by the backup management function.

- The replication source volume has been registered as a backup volume by the backup management function and bi-directional copying is specified as a replication volume attribute.

- The specified replication destination volume and replication source volume are volumes belonging to other servers (at least one volume must be a volume on the local server).

- If the replication source volume and the replication destination volume are located on another ETERNUS Storage System, the remote copy function of the ETERNUS Storage System is not correctly set.

- Communication with the Storage Management Server fails.

- Communication with a destination server fails for replication between servers.

・ When you change physical information on volumes (ie, partition size, cabinet information on an ETERNUS Storage System, and Logical Unit (disk) size) using such functions as an OS management tool (for example, Disk Management) or GRmgr provided by the ETERNUS Storage System, 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 swsrpdelvol (Replication volume information deletion command).

2. In the GUI client, "information acquisition/reflection" of all devices is performed. Otherwise stgxfwcmsetdev (Device information collection / reflection command) is executed in a Storage Management Server.

3. Reset the replication volume information with swsrpsetvol (Replication volume information configuration command).

Also, when you add a new device or delete a device (including general devices other than an ETERNUS Storage System), perform the "acquire and reflect all device information" operation listed in the GUI client to update the relationship table for AdvancedCopy Manager device names and OS information.

・ When you use a replication destination volume by mounting or by allocating a drive letter after a replication volume is created in another partition, the size of the replication destination volume must exactly match the size of the replication destination volume to the byte. If you do not use a replication destination volume (for example, when you need copy data, you restore it to the replication source volume and then use it), the size of the replication destination volume can be larger than the size of the replication source volume.

・ Group configurations cannot be made in the following cases:

- When the group configuration conditions are not met

- When both servers involved in inter-server replication are not running version 13.0 or later

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecbuffset (REC transfer buffer settings change command)

- swsrpstartsync (Backup synchronous processing start command)

- swsrpmake (Replication creation command)

- swsrpcancel (Replication cancellation command)

- swsrpchsync (Synchronization mode change command)

- swsrprevsync (Synchronization reverse command)

- swsrprecoverres (Resource adjustment command)

- swsrpbackup_sql (SQL Server backup execution command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

- swsrpvssbackup_exchange (Exchange VSS backup execution command)

- swsrpvssretore_exchange (Exchange VSS restore execution command)

- swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

- swsrpshadowadm (Shadow copy management command)

11.4.1.2 swsrpvolinfo (Replication volume information display command)

NAME

swsrpvolinfo - displays the replication volume information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpvolinfo [-L] [Original-Volumue-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpvolinfo -h Server-Name [-L] [Original-Volume-Name]
```

DESCRIPTION

This command displays the replication volume information registered by swsrpsetvol (Replication volume information setting command).
The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Original-Volume	Displays a replication source volume name.
Size	Displays the volume size.
Replica-Volume	Displays a replication destination volume name.
Copy	Displays the copying direction. uni-direction: One-way copying from a replication source volume to a replication destination volume is allowed. bi-direction: Bidirectional copying is allowed.
Op-Server	Displays the operation server of a pair of replication volumes. original: The replication source server is the operation server. replica: The replication destination server is the operation server. both: Sets both the copy-source server and copy-destination server as operation servers.
Group [Only when -L option is specified]	Displays the group name. "----"is displayed if the copy source and destination volumes are not registered in a group.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option is valid only on a Storage Management Server.

-L

Specifies that information will be displayed using the extended format.
Refer to the table in the example following for information about the items that are displayed when this option is specified.
The items that are displayed may be expanded to support new functions provided by future versions.

OPERANDS

Original-Volume-Name

> Specifies a replication source volume name.
> For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
> Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.
> Displays all the replication volume information for the specified replication source volume. If this operand is omitted, all the replication volume information existing on the Storage Server on which this command is executed is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Direct that all the replication volume information on a Storage Management Server is to be displayed on Storage Server SRC-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpvolinfo -h SRC-SV
Server Original-Volume Size        Replica-Volume Size        Copy          Op-Server
SRC-SV g1d1p1@SRC-SV      4.0Gbyte g2d1p1@TARG-SV    4.0Gbyte uni-direction original
SRC-SV g1d2p1@SRC-SV      4.0Gbyte g2d2p1@TARG-SV    5.0Gbyte bi-direction  original
SRC-SV g1d3p1@SRC-SV      9.1Gbyte g2d3p1@TARG-SV    9.1Gbyte bi-direction  replica
SRC-SV g1d4p1@SRC-SV      7.5Gbyte g2d4p1@TARG-SV    7.5Gbyte bi-direction  both
C:\>
```

NOTES

・ Replication volume information cannot be displayed if:

   - The specified volume has not been set as a replication source volume

・ This command cannot be executed while the following command is running:

   - swsrprecoverres (Resource adjustment command)

11.4.1.3   swsrpdelvol (Replication volume information deletion command)

NAME

swsrpdelvol - delete the replication volume

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpdelvol -h Server-Name [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

Delete the replication volume information that has been set.

If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.

This option is valid only on a Storage Management Server.

-e

Emergency mode is available for operations.

Specifies deleting replica volume information without checking the execution state of an advanced copy. Use this option only when it is clear that the advanced copy has not executed.

-d

Specifies that no communication should take place between the linked servers in replication between servers. When this option is specified, replication volume information is deleted without communication taking place between the linked servers.

Use the option only when recovery of one of the linked servers cannot be expected.

The option is valid only for replication between servers.

The option can be used on the server not specified as the operation server.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.

For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

Replica-Volume-Name

Specifies a replication destination volume name.

For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Delete replication volume information on Storage Server SRC-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdelvol g1d1p1 g2d1p1@TARG-SV
swsrpdelvol completed
C:\>
```

NOTES

・ Replication volume information cannot be deleted if:

- The specified replication source volume and the replication destination volume are not set as replication volumes.

- The copy processing (synchronization processing and snapshot processing) is performed between replication volumes.

- For server-to-server replication, the Storage Server that executed the command is not the operation server of the replication volume.

- Communication with a Storage Management Server fails.

- For server-to-server replication, communication with a destination server fails.

- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state or halt state, then unmanaged sessions remain. In this event, ETERNUSmgr or GRmgr must be used to cancel these sessions.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecbuffset (REC transfer buffer settings change command)

- swsrpstartsync (Backup synchronous processing start command)

- swsrpmake (Replication creation command)

- swsrpcancel (Replication cancellation command)

- swsrpchsync (Synchronization mode change command)

- swsrprevsync (Synchronization reverse command)

- swsrprecoverres (Resource adjustment command)

- swsrpbackup_sql (SQL Server backup execution command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

- swsrpvssbackup_exchange (Exchange VSS backup execution command)

- swsrpvssretore_exchange (Exchange VSS restore execution command)

- swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

- swsrpshadowadm (Shadow copy management command)

11.4.1.4   swsrprecbuffstat (REC transfer buffer information display command)

NAME

swsrprecbuffstat - displays information for the transfer buffer

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrprecbuffstat Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrprecbuffstat -h Server-Name Volume-Name
```

DESCRIPTION

This command displays information for the transfer buffer used by Fujitsu ETERNUS Storage Systems when REC is performed in Consistency mode.
The following information will be displayed:

Title	Description
BoxID	The box identifier for the cabinet connected to the server where the command was executed.
ID	The ID for the transfer buffer.
Use	The attribute (usage) for the transfer buffer. SEND : Transfer buffer for sending data RECV : Transfer buffer for receiving data
Rate	The usage rate of the transfer buffer as a percentage. **If the usage is SEND** Displays the usage rate of the transfer buffer as a percentage. This will never be 0%, even if REC is not being performed in asynchronous Consistency mode. **If the usage is RECV** "0%" will always be displayed. "----" will be displayed if the transfer buffer cannot be used.
RemoteBoxID	The box identifier for the cabinet performing a remote copy.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

OPERANDS

Volume-Name

Specifies the name of a volume that has been registered as a replication volume.
You can only specify volumes that are connected to the Storage Server where the command is executed.

Specifies an 1.5 Managing a Device on AdvancedCopy Manager as the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display information for the transfer buffer used by the REC, and replication is performed within the Storage Server "Server1".

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>
```

- Display information for the transfer buffer used by the REC in an environment where replication is being performed between Storage Server "Server1" and Storage Server "Server2".

[Command executed on Storage Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>
```

[Command executed on Storage Server "Server2"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d30p1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
2  SEND 5%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>
```

- Display information for the transfer buffer used by the REC if a cabinet where the copy source volume is located has been set up to make remote copies to multiple cabinets, and replication is being performed between Storage Server "Server1" and Storage Server "Server2"

[Command executed on Storage Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@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
C:\>
```

NOTES

- Information is displayed only for cabinets that contain replication volumes for the server where the command was executed.

  If inter-cabinet replication is being performed between servers, then the command must be executed on both servers involved in the replication in order to check information for the transfer buffers in both cabinets.

- It will take a short time for changes to REC transfer buffer settings to take effect, during which time the buffer may become unusable (the "Rate" field will be displayed as "----"). In this case, wait about one minute and then execute the command again.

- This command cannot be executed while the following command is running:

  - swsrprecoverres (Resource adjustment command)

11.4.1.5　swsrprecbuffset (REC transfer buffer settings change command)

NAME

swsrprecbuffset - changes the settings of the transfer buffer

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrprecbuffset -h Server-Name -Xbuffid buffer-id -Xbuffuse {SEND|RECV}
Volume-Name
```

DESCRIPTION

This command changes the settings of the transfer buffer used by Fujitsu ETERNUS Storage Systems when REC is performed in Consistency mode.
Refer to "ETERNUSmgr User's Guide Setup / Maintenance" for information about the setting method of REC transfer buffer.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

-Xbuffid *buffer-id*

Specifies the ID for the transfer buffer.

-Xbuffuse {SEND|RECV}

Specifies the usage for the transfer buffer.

SEND : Transfer buffer for sending data
RECV : Transfer buffer for receiving data

OPERANDS

Volume-Name

Specifies the name of a volume that has been registered as a replication volume.
You can only specify volumes that are connected to the Storage Server where the command is executed.

Specifies an 1.5 Managing a Device on AdvancedCopy Manager as the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Change the attributes for the transfer buffer used by the REC, and replication is being performed within the Storage Server "Server1"

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpbuffset -Xbuffid 1 -Xbuffuse RECV g1d10p1@Server1
swsrpbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
```

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpbuffset -Xbuffid 1 -Xbuffuse SEND g1d20p1@Server1
swsrpbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 3%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>
```

· Change the connected cabinet for the transfer buffer of the copy source volume , and replication is being performed between Storage Server "Server1" and Storage Server "Server2".

[Command executed on Storage Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpbuffset -Xbuffid 1 -Xbuffuse SEND g1d20p1@Server1
swsrpbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpbuffset -Xbuffid 2 -Xbuffuse RECV g1d20p1@Server1
swsrpbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 4%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>
```

NOTES

· Settings for dedicated REC buffers must be made in advance.
Change the settings while there are no asynchronous Consistency mode sessions in either the ACTIVE or ERROR SUSPEND state.

Information can be changed only for cabinets that contain replication volumes for the server where the command was executed.

· It will take a short time for changes to buffer settings to take effect, during which time the transfer buffer will become unusable. Do not perform REC operations during this time.

· This command cannot be executed while any of the following commands are running:

   - swsrpsetvol (Replication volume information setting command)

   - swsrpdelvol (Replication volume information deletion command)

   - swsrpstartsync (Backup synchronous processing start command)

   - swsrpmake (Replication creation command)

   - swsrpstat (Operation status display command)

   - swsrpcancel (Replication cancellation command)

   - swsrpchsync (Synchronization mode change command)

   - swsrprevsync (Synchronization reverse command)

   - swsrprecoverres (Resource adjustment command)

   - swsrpbackup_sql (SQL Server backup execution command)

   - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

- swsrpvssbackup_exchange (Exchange VSS backup execution command)

- swsrpvssretore_exchange (Exchange VSS restore execution command)

- swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

- swsrpshadowadm (Shadow copy management command)

11.4.2 Operation commands

This section describes operation commands for replication management.

11.4.2.1   swsrpstartsync (Synchronous processing start command)

NAME

swsrpstartsync - starts synchronous processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t]
From-Volume-Name To-Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpstartsync -h Server-Name [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -
Xremain] [-t] From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-
Xreverse] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrpstartsync -h Server-Name [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -
Xremain] [-t] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

Start the synchronous replication processing (copying between disks by EC and REC).
It will copy all the data from the source volume to the destination volume at the start of the synchronization process, or if run as a restart of the synchronization process it will just copy updated data to the destination volume. Use this command at the start of operation or when you want to reflect updated data (differences) from the equivalency maintenance state.

OPTIONS

-h *Sever-Name*

This option is valid only on a Storage Management Server.
This option can be specified only on a Storage Management Server.

-y

Specifies synchronization in synchronous write mode. This option is valid only when total copy is started for inter-box replication.
Not specifying the -y, -k, and -i options sets asynchronous write mode.
Synchronization in intra-box replication is always handled in synchronous write mode.

-a

Specifies the start of split mode for inter-box synchronization in Automatic Split mode. This option is valid only when total copy is started for inter-box replication.
Specify this option together with the -y option. Specifying the -y option without the -a option or -v option sets Automatic Split mode.

-v

Specifies the start of split mode for inter-box synchronization in Manual Split mode. This option is valid only when total copy is started for inter-box replication.
Specify this option together with the -y option. Specifying the -y option without the -a option or -v option sets Automatic Split mode.
You must specify this option when specifying synchronization mode (the -y option) on a box that does not support Automatic Split mode.

-k

Specifies the setting of transfer mode for inter-box synchronization in Stack mode. This option is valid only when total copy is started for inter-box replication.
Not specifying the -y, -k, or -i option sets asynchronous write mode.

-i

Specifies the setting of transfer mode for inter-box synchronization in Consistency mode. This option is valid only when total copy is started for inter-box replication.
Not specifying the -y, -k, or -i option sets asynchronous write mode.

-g

Specifies the setting of recovery mode for inter-box synchronization in Manual Recovery mode. This option is valid only when total copy is started for inter-box replication.
Not specifying this option sets Automatic Recovery mode.

-m

For server-to-server replication, this option specifies that communication processing with non-operation servers is not performed. When this option is specified, volume status check processing and the pre-processing for the replication destination volume of a non-operation server are not performed.
This option is valid only during server-to-server replication.

-t

Specifies that pre-processing for the replication destination volume is not performed.
Use this option if any of the following conditions apply:

- AdvancedCopy Manager does not perform pre-processing or post-processing for the replication destination volume, and independent pre-processes and post-processes are inserted before and after AdvancedCopy Manager commands.

- Replication destination pre-processing and post-processing are judged to be unnecessary (for example, for databases constructed on RAW devices).

- Synchronous processing (REC) between cabinets is restarted after a forcible suspend.

-Xgroup *Group-Name*

Specifies that synchronous processing must be started for each group.

-Xreverse

Specifies that synchronous processing must be started for each group in the reverse direction (from replica volumes to original volumes).

-Xskip

Specifies that synchronous processing must be suspended using the initial copy skip function. This option is valid only when total copy is started for inter-box replication.

-Xremain

Enables data that has been updated to the copy destination during replication established status when synchronous processing is restarted.

This option is valid only when inter-box replication is restarted.

This option is used to reflect to the copy destination volume only those parts of the copy source volume that have been updated, after synchronous processing has been started using the -Xskip option and backup data has been copied from the tape medium to the copy destination volume.

OPERANDS

From-Volume-Name

Specifies a replication source volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a replication destination volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Start replication from g1d1p1 of a Storage Management Server to g2d1p1@TARG-SV of Storage Server SRC-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstartsync -h SRC-SV g1d1p1 g2d1p1@TARG-SV
FROM=g1d1p1@SRC-SV,TO=g2d1p1@TARG-SV swsrpstartsync completed
C:\>
```

- Start replication for group "GRP1".

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
C:\>
```

NOTES

- Replication cannot be started if:

    - The specified source volume and destination volume have not been set as replication volumes.

    - A replication source volume is specified as the copy volume and a replication destination volume is specified as the copied material volume, and one-way copy is set as the copy attribute of the replication volume.

    - Volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed after operation starts. In this case, the operation cannot continue for the corresponding volume. Stop the replication operation for the corresponding volume, and then delete and reset the replication volume information.

    - For server-to-server replication, the Storage Server on which the command is executed is not the operation server of the replication volume.

    - For server-to-server replication, communication with a destination server fails.

    - Replication cannot be started as a result of the preceding advanced copy function.

    - A destination volume could not be locked

- The destination volume locking specification file is invalid

- Option -g is specified, except for a remote copy.

- The backup management function or tape backup function uses a specified source/destination volume

- Either the copy source volume or the copy destination volume is a Snap Data Volume.

・ If the "-Xgroup" option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

・ When the replication to be performed satisfies either of the following two conditions, please perform drive letter release or unmount of the copy target volume before executing a command.

- When a replication is performed between different OSs

- When the sizes of replication source volume and replication destination volume differ

In the abovementioned cases, If neither drive letter release nor dismount have been performed, post-processing of the copy target volume at the time of duplicate creation results in an error.

・ Replication which uses an SDX object (SynfinityDISK) replication source volume is not supported. Therefore, when either the replication destination volume or the duplicate place volume is an SDX object, only the replication from an SDX object to a non-SDX object can be performed.

Use the COPY command to copy data to an SDX object.

・ 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 11.20 Differences in processing corresponding to synchronization status

Status of synchronization processing	Processing
Dismount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is output and the command ends normally
Equivalency maintain status	Informational message (swsrp2401) is output and the command ends normally
Replication established status (i.e., halt status)	Start of incremental copy

・ Before starting the replication, run the replication pre-processing script for the replication destination volume. The contents of this script can be customized. For more information about this, refer to "Appendix C Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing script, use the -t option.

・ Before starting replication that targets a Logical Unit (disk), execute pre-processing and post-processing of the Logical Unit (disk), Refer to "Appendix C Pre-processing and Post-processing of Replication" for details.

・ To protect processing that accesses a replication destination volume, set the replication destination volume before starting replication so that other processes cannot access it. To do so, cancel the drive letter of the replication destination volume or execute a dismount command. If you cannot cancel the drive letter of the replication destination volume or execute dismount resulting from any of the conditions described below, this command fails and terminates.

- There is a directory in which other volumes are mounted under the mount point.

- A file in the volume is being used. In addition, if the replication destination volume is being used on a server other than the server on which this command is entered, the replication-operation administrator must disable access to the replication destination volume by cancellation of the share setting, unmounting, or by some other method.

・ Refer to "12.1.1 General notes" for notes about starting replication.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecbuffset (REC transfer buffer settings change command)

- swsrprecoverres (Resource adjustment command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.4.2.2 swsrpmake (Replication creation command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur | -C | -P]) From-
Volume-Name To-Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpmake -h Server-Name [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur | -C
| -P])From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -
Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrpmake -h Server-Name [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P])
[-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

When synchronization processing (EC) is not performed, this command will start snapshot processing (OPC/QuickOPC/SnapOPC/
SnapOPC+) to create a replication volume.

When synchronization processing is performed, check whether the status of the processing is in the equivalency maintenance state. If so,
suspend the synchronization processing and create a replication volume. The status in which synchronization processing is suspended is
referred to as the replication established status. After this command is executed, the replication destination volume can be accessed.

This command executes the replication pre-processing and post-processing before a replication is created. For details of these processes,
refer to "Appendix C Pre-processing and Post-processing of Replication".

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-m

For server-to-server replication, this specifies that communication processing is not performed with the non-operation server. When
this option is specified, volume status check processing and pre-processing and post-processing are not performed for the non-operation

server volume.

This option cannot be specified if the command is executed from the copy destination server and the -Xconcur option is specified.

This option is valid only during server-to-server replication.

-f

Specifies that the pre-processing and post-processing are not performed for a replication source volume.

Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-t

Specifies that the pre-processing and post-processing are not performed for a replication destination volume.

Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-Xflush

Specifies the flushing of the file system buffer of the copy source volume instead of locking the copy source volume. Before this option is specified, all write processing on the copy source volume must be stopped. (If a replica is created without the write processing stopped, then the integrity of the copy source volume data is not guaranteed.)

The file system buffer can be flushed by specifying 'on' for BufferFlushOnly in the copy source volume locking specification file instead of this option. For details, refer to C.2.4 Copy source volume locking specification file.

-j

Specifies that copy processing will be forcibly suspended even if the execution status of copying is "sync: Total copy or incremental copy is being performed" or "halt: Hard suspend status" in synchronization processing of intercabinet replication. This option can only be used for intercabinet replication; if attempted for intracabinet replication, an error will occur.

When this option is specified, the data in the destination volume is not guaranteed.

Additionally, when this option is specified, pre-processing and post-processing for the source and destination volumes are not performed. When restarting synchronous processing (REC) between cabinets, execute swsrpstartsync (Replication start command) with the -t option specified.

-T

Specifies that differential snapshot processing will be executed.

This option cannot be specified while synchronous processing is performed.

This option is valid only for a replication within an ETERNUS Storage System and when the ETERNUS Storage System 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 *Group-Name*

Specifies that a replication will be created for each group.

-Xreverse

Specifies that a replication will be created for each group in the reverse direction (i.e., from replica volumes to original volumes).

-Xconcur

Specifies that a replication will be created using the concurrent suspension function.

This option is not supported when GDS Snapshot linkage is being used.

-C

Specifies that SnapOPC will be started.

This option is only valid for intra-box replications and for ETERNUS Storage Systems that support the SnapOPC function.

In order to execute SnapOPC, the copy destination volume must be a Snap Data Volume.

-P

Specifies to start SnapOPC+.

This option is only valid with intra-cabinet replications and for ETERNUS Storage Systems that support the SnapOPC+ function.

In order to execute SnapOPC+, the copy destination volume must be a Snap Data Volume.

An error occurs in the following cases:

- The same SnapOPC+ session exists at the copy source volume and the copy destination volume.

- The total number of SnapOPC+ sessions for the copy source volume exceeds 8.

OPERANDS

From-Volume-Name

Specifies a replication source volume.

Specifies the replication source volume or the replication destination volume that was set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a replication destination volume.

Specifies the replication source volume or the replication destination volume that was set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ On a Storage Management Server, direct replication of g1d1p1 to g2d1p1@TARG-SV for Storage Server SRC-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -h SRC-SV g1d1p1 g2d1p1@TARG-SV
FROM=g1d1p1@SRC-SV,TO=g2d1p1@TARG-SV swsrpmake completed
C:\>
```

・ Creates a copy for the group "GRP1".

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
C:\>
```

NOTES

・ Replication cannot be created if:

- The specified replication source and replication destination volumes are not set as replication volumes.

- The synchronization processing from the specified replication source volume to the replication destination volume is not in the equivalency maintenance status.

- After operation starts, physical volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed. In this case, operation for the corresponding volume cannot continue. Stop the replication operation for the volume, and then delete and reset the replication volume information.

- If a replication source volume is an SDX object, the status of the SDX object does not match the following:

    - The mirror volume is ACTIVE or STOP.

    - The mirror slice status is ACTIVE or STOP.

    - The SDX disk status is ENABLE.

  - For server-to-server replication, the Storage Server on which the command is executed is not the operation server of the replication volume.

  - For server-to-server replication, communication with a destination server fails.

  - The copy source volume cannot be locked.

  - The file system buffer of the copy source volume cannot be flushed by specification of the -Xflush option.

  - The contents of the copy source volume locking specification file are invalid.

  - The replication destination volume cannot be locked

  - The contents of the replication destination volume lock operation specification file are invalid

  - The backup management function or tape backup function uses a specified source or destination volume

- If the -Xgroup option is specified, processing will be terminated without creating a copy if the operation statuses of the replication volumes being processed include both snapshot-type replication and synchronous-type replication. Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

- When the replication to be performed satisfies either of the following conditions, please perform drive letter release or dismount of the copy target volume before executing a command.

  - When a replication is performed between different OSs

  - When the sizes of replication source volume and replication destination volume differ

  If neither drive letter release nor dismount is performed in the abovementioned case, post-processing of the copy target volume at the time of duplicate creation produces an error.

- Replication which uses an SDX object (SynfinityDISK) replication source volume is not supported. Therefore, when one of replication destination volume and the duplicate place volumes is an SDX object, only replication from an SDX object to a non-SDX object can be used.

  Use the COPY command in copying data to an SDX object.

- Before a replica is created, the pre-processing for the source volume and destination volume are executed (for synchronized replication, only pre-processing is executed). After the replica has been created, the post-processing for the source volume and destination volume is executed. The contents of the script can be customized. For more information about this refer to, "Appendix C Pre-processing and Post-processing of Replication". If you do not want to implement the pre-processing and post-processing scripts, use the -f option and the -t option.

- Before creating a replica targeting a Logical Unit (disk), execute pre-processing and post-processing of the Logical Unit (disk), Refer to "Appendix C Pre-processing and Post-processing of Replication" for details.

- If this command is executed during execution of snapshot processing, stop the copy processing in progress and restart the snapshot processing.

- To protect the data, set the replication source volume before creating a replica so that other processes cannot access the volume. To do so, lock the source volume or execute dismount. If you cannot lock the source volume or execute dismount because of the situations described below, this command fails and terminates.

  - There is a directory in which other volumes are mounted under the mount point.

  - A file on the volume is being used. In addition, if the replication source volume is being used from a server other than the server on which this command is entered, the backup-operation administrator must disable access to the replication source volume by cancellation of the share setting, dismounting, or by using some other method. If for whatever reason you do not want to remove

the share setting of the replication source volume, or execute dismount or use some other method, refer to "Appendix C Pre-processing and Post-processing of Replication" and note the following:

- - To synchronize the volumes and the file system in replication pre-processing, specify the -Xflush option in this command or set BufferFlushOnly to 'on' in the copy source volume locking specification file.

- - For replication post-processing, if you want to check the file system at the replication destination, assign a drive letter to the replication destination volume with swstdrvset (Chkdsk drive letter assign command).

- - When the replication source volume is being used by backup management, dismount may not possible. In this case, "swsrp2613 An error occurred in the pre-processing script for creating a replica. Error Code = 2" or "swsrp3607 Locking the volume failed. Please confirm that the volume is being used by other processes. Error=5(FSCTL_LOCK_VOLUME), Volume Name=[VOLUME NAME]" is output.

However, since a replication may not be completely performed in the abovementioned procedure when using servers other than the server which supplies this command, we recommend that you perform a replication in an environment where the copied material volume is not used.

- Before replication is performed in snapshot-type replication, this command option prevents other processes from accessing the replication destination volume to protect the process that is accessing the volume. The command accomplishes this by locking or dismounting the replication destination volume. In cases where the replication destination volume cannot be locked or dismounted, such as those described below, the command terminates with an error:

- - The mount point has a directory for mounting another volume.

- - The volume has a file that is being used. If the replication destination volume is being used by a server that is not the server where the command was entered, prevent the replication destination volume from being accessed by canceling share settings or performing dismounting for the replication operation, using the Administrator's authority.

- For Snap Data Volume, only SnapOPC and SnapOPC+ can be executed.

Additionally, when restoring data from a Snap Data Volume, note that there must be a SnapOPC session between the copy source volume and the copy destination volume (Snap Data Volume).

- If this command is executed during snapshot processing, snapshot processing is restarted.
Refer to the following table for details of copy operation:

Table 11.21 Copy operation when command is executed during snapshot processing

Operation status (Display by swsrpstat -L)	-T option specification	Copy operation
Copy is not executed. (Status is "----" and Trk also is "----".)	No	Ordinary snapshot processing is started.
Copy is not executed. (Status is "----" and Trk also is "----".)	Yes	Differential snapshot processing is started.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	No	Copying that is in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	Yes	Copying in progress is terminated and differential snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	No	Copying in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	Yes	Differential snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	No	Tracking processing is terminated and ordinary snapshot processing is restarted.

Operation status (Display by swsrpstat -L)	-T option specification	Copy operation
Tracking is in progress. (Status is "----" and Trk is "on".)	Yes	Differential snapshot processing is restarted.

・ Refer to "12.1.1 General notes" for notes on creating replication.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecbuffset (REC transfer buffer settings change command)

- swsrprecoverres (Resource adjustment command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.4.2.3   swsrpstat (Operation status display command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpstat [-L] [-E] [-H] [-O] [Original-Volume-Name]
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpstat -h Server-Name [-L] [-E] [-H] [-O] [Original-Volume-Name]
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrpstat [-L] [-E] [-O] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrpstat -h Server-Name [-L] [-E] [-O] -Xgroup Group-Name
```

DESCRIPTION

This command displays the operation status of the specified volume. If a volume is not specified, the operation status of each replication volume is displayed.

The following information will be displayed:

Title	Description
Server	Displays a Storage Server name.
Original-Volume	Displays a replication source volume name.
Replica-Volume	Displays a replication destination volume name.
Direction	Displays the copy direction. regular: Copying from the replication source to the replication destination is being performed. reverse: Copying from the replication destination to the replication source is being performed. ----: Copying is not being performed.

Title	Description
Status	Displays the execution status. ---- : Copying is not being performed. sync: Total copy or incremental copy is being performed. equivalent: Equivalency maintained status replicated: Replication established status copy-on-write: SnapOPC processing is being performed. copy-on-write(active): SnapOPC+ processing is being performed (most recent snap generation). copy-on-write(inactive): SnapOPC+ processing is being performed (past snap generation). failed: Error suspend status failed(badsector): There is a bad sector in the copy source failed(overflow): There is insufficient Snap Data Volume or Snap Data Pool capacity failed(other): The error suspend status is neither failed(badsector) or failed(overflow). halt: Hard suspend status halt(sync): Hard suspend status (hard suspend status has been entered during a REC total copy or differential copy) halt(equivalent): Hard suspend status (hard suspend status has been entered during an REC equivalency maintenance state) snap: OPC or QuickOPC processing is being performed. ?????: Failed to get copy status.
Execute	Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed.
Trk	Displays whether tracking processing is in progress. on: Tracking processing is in progress. off: Tracking processing is not in progress. ----: Snapshot processing is not being performed.
Update	Displays the percentage of data that has been updated since the last copy was created, in the cases shown below. For SnapOPC+, this displays the percentage of data that has been updated since the previous snap generation. • When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not being executed). • When the Status column is "copy-on-write" (that is, when SnapOPC processing is in progress) • When the Status column is "copy-on-write(active)" (that is, when SnapOPC+ (most recent snap generation) is being performed) • When the Status column is "copy-on-write(inactive)" (that is, when SnapOPC+ (past snap generation) is being performed) Displays "----" during physical copying or when tracking is not in progress.
Rcv	Indicates the Recovery mode for Inter-ETERNUS synchronization. auto: Automatic Recovery mode manual: Manual Recovery mode ----: Inter-ETERNUS synchronous replication (REC) is not performed.
Split	Indicates the Split mode for Inter-ETERNUS synchronization. auto: Automatic Split mode manual: Manual Split mode ----: Inter-ETERNUS synchronous replication (REC) is not performed using the Synchronous mode.
Xfer	Indicates the Transfer for Inter-ETERNUS synchronization.

Title	Description
	sync: Synchronous mode async: Asynchronous mode stack: Stack mode consist: Consistency mode ----: Inter-ETERNUS synchronous replication (REC) is not performed.
Snap-Gen	When SnapOPC+ is performed, displays the snap generation number (1 to 8). When SnapOPC+ is not performed, "----" is displayed. 1 is the oldest snap generation, and the snap generation number increases until the most recent generation is reached.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-L

Specifies that display will be in extension format.
For the items displayed by this option, refer to the table in the example following.
Note that the items displayed by this option may be subject to change in a future release.

-E

An option which when set will display the operational status in the opposite direction only (from the copy destination to the copy source).
If this option is not set, the operation status will always be displayed in the normal direction (from the copy source to the copy destination) when a bi-directional OPC physical copy is taking place.
In case this option is set, the operational status in the normal direction will not be displayed. Only the operational status in the opposite direction will be displayed.
This option can be used to check the operational status of an OPC session performed in the opposite direction if a QuickOPC/SnapOPC session in the normal direction exists.

-Xgroup *Group-Name*

Specifies that the operation statuses are displayed by the group.
If this option is set, all the operational statuses relating to the specified group will be displayed.

-H

Changes the Status field display method used when a REC enters a hard-suspend (halt) status.
If this option is specified, then "halt (sync)" will be displayed when hard-suspend status occurs during a total copy or a differential copy. "halt (equivalent)" will be displayed when hard-suspend status occurs during an equivalency maintenance state.
Note that hard-suspend status will still be displayed as "halt" even if this option is specified for ROPC .

-O

Changes the error suspend(failed)status Status field display method.
If this option is specified, the display will be as follows:
There is a bad sector: "failed(badsector)"
When there is insufficient Snap Data Volume or Snap Data Pool capacity: "failed(overflow)"
All other cases: "failed(other)"

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "Volume-Name@Storage-Server-Name."
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

Displays all operation statuses for the specified replication source volume.
If this operand is omitted, all the operation statuses of the Storage Server on which this command is executed are displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Direct that all the replication operation statuses for Storage Server SRC-SV be displayed on the Storage Management Server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -h SRC-SV
Server Original-Volume Replica-Volume Direction Status     Execute
SRC-SV g1d1p3@SRC-SV   g2d1p1@TARG-SV regular   replicated ----
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV ----      ----       ----
SRC-SV g1d3p1@SRC-SV   g2d3p1@TARG-SV reverse   snap       45%
C:\>
```

・ From Storage Management Server to Storage Server: Instruct SRC-SV to display the status of all replication operations (with the -L option specified).

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -h SRC-SV -L
Server Original-Volume Replica-Volume Direction Status                Execute Trk  Update Rcv
Split Xfer  Snap-Gen
SRC-SV g1d1p3@SRC-SV   g2d1p1@TARG-SV regular   replicated            ----    ---- ----   auto
----  async ----
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV ----      ----                  ----    on   6%     ----
----  ----  ----
SRC-SV g1d3p1@SRC-SV   g2d3p1@TARG-SV reverse   snap                  45%     off  ----   ----
----  ----  ----
SRC-SV g1d1p1@SRC-SV   g1d2p1@TARG-SV regular   copy-on-write(inactive) ----  off  0%     ----
----  ----  1
SRC-SV g1d1p1@SRC-SV   g1d3p1@TARG-SV regular   copy-on-write(inactive) ----  off  5%     ----
----  ----  2
SRC-SV g1d1p1@SRC-SV   g1d4p1@TARG-SV regular   copy-on-write(active)  ----   off  6%     ----
----  ----  3
C:\>
```

NOTES

・ When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to "10.4 Hardware or Other Error during Replication" and take action.

・ The operation status cannot be displayed if:

  - The volumes have not been set as replication volumes.

・ This command cannot be executed while the following command is running:

  - swsrprecbuffset (REC transfer buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

11.4.2.4 swsrpcancel (Replication cancellation command)

NAME

swsrpcancel - stops snapshot processing and synchronization processing

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrpcancel [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] [-Xflush] From-Volume-
Name To-Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b])|[-T]|[-Xforce] [-
Xflush] From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrpcancel [-c] ([-f] [-t] [-m] [-b]) | [-T]|[-Xforce] [-Xreverse] [-
Xflush] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrpcancel -h Server-Name [-c] ([-f] [-t] [-m] [-b]) | [-T]|[-Xforce] [-
Xreverse] [-Xflush] -Xgroup Group-Name
```

DESCRIPTION

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be specified only on a Storage Management Server.

-c

Specifies that the copy processing is forcibly stopped from a non-operation server when the operation server cannot be used because of a system failure. If this option is used, the copy processing is stopped without implementing pre-processing and post-processing.

As a result, the copy destination volume may become locked if copy processing is canceled using this option. Check the status of the copy destination volume using swstvollockstat (Locked-volume information display command) and, if it is locked, unlock the volume using swstvolunlock (Volume unlock command)

This option cannot be specified on the operation server.

-m

For server-to-server replication, this option specifies that communication processing is not performed with non-operation servers. When this option is specified, volume status check processing and pre-processing and post-processing are not performed for the replication destination volume of a non-operation server.
This option is valid only during server-to-server replication.

-f

When stopping synchronous processing under the equivalency maintained status, specify that pre-processing and post-processing for the copy source volume is not be executed.
Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy source volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-t

When stopping the synchronous processing under the equivalency maintained status, this specifies that post-processing for the copy destination volume will not be executed.

Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-Xflush

Specifies flushing the file system buffer of the copy source volume instead of locking the copy source volume when synchronous processing under the equivalency maintained status is stopped. Before this option is specified, all write processing on the copy source volume must be stopped. (If a replica is created without the write processing stopped, then the accuracy of the copy source volume data is not guaranteed.)

The file system buffer can be flushed by specifying 'on' for BufferFlushOnly in the copy source volume locking specification file instead of using this option. (For details, refer to C.2.4 Copy source volume locking specification file)

-b

Specifies that the inter-cabinet copy operation in the halt status be stopped.

For replication on a single server, the copying is cancelled for both cabinets.

For replication between servers, the copying is cancelled only for the cabinet connected to the server on which this command was executed.

Use the option only for a copy operation in the halt status and whose recovery is not expected to be done successfully.

The option is valid only for a copy operation in the HALT status.

The option can be used on the server that is not specified as the operation server.

If this option is specified together with the -Xgroup option, copy processing is only stopped for sessions in the group whose status is halt.

-T

Specifies that differential snapshot processing will be terminated.

This option only terminates tracking processing and does not terminate snapshot processing (OPC physical copying) when it is in progress. This option releases the OPC session if snapshot processing (i.e., OPC physical copying) is complete.

This option can only be used while physical copying or tracking is in progress.

If this option is specified together with the -Xgroup option, only tracking processing within the group is stopped.

-Xgroup *Group-Name*

Specifies that copy processing will be stopped for each group.

-Xreverse

Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) will be stopped.

-Xforce

Specification of this option forcibly stops a SnapOPC+ session.

Forcibly stopping SnapOPC+ stops the specified snap generation and all earlier snap generations.

This option can be specified even if there is only one snap generation.

This option is a SnapOPC+ fixed option.

If this option is specified at the same time as the -Xgroup option, the SnapOPC+ sessions in that group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

OPERANDS

From-Volume-Name

Specifies a copy source volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- On the Storage Management Server, direct that copying from g1d1p1 to g2d1p1@TARG-SV will be stopped for Storage Server SRC-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpcancel -h SRC-SV g1d1p1 g2d1p1@TARG-SV
FROM=g1d1p1@SRC-SV,TO=g2d1p1@TARG-SV swsrpcancel completed
C:\>
```

- Stops copy processing for group "GRP1".

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
C:\>
```

NOTES

- Following execution with the -b option specified in replication on a server, the command stops normally when cancellation of the copying succeeds in either of the cabinets.

- Copy processing cannot be performed if:

    - The specified replication source volume and replication destination volume have not been set as replication volumes.

    - The copy processing is not performed for the specified replication source and replication destination volumes.

    - For server-to-server replication, the Storage Server on which the command is executed is not the operation server of the replication volume.

    - For server-to-server replication, communication with a destination server fails.

    - When the backup management function or tape backup function uses a specified source or destination volume

- If the -Xgroup option is specified, processing will be performed for each active replication volume, but processing will be terminated without canceling replication in the following case:

    - If no replication volumes have been copied

    Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

- When stopping SnapOPC+ sessions, the oldest snap generation must be stopped first.
  Specify the -Xforce option to forcibly stop the second and subsequent snap generations. However, note that this option stops the specified snap generation and all earlier snap generations.
  If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

- The volume information for the specified volume is not checked (check for matching of the volume information in the management list and the actual physical information). The operation is canceled unconditionally using the volume information in the management list.

- The following processing is performed depending on the operation status of the specified replication source volume and replication destination volume.

Table 11.22 Processing differences in accordance with operating status

Operation status	Processing
Reverse copy direction	Suspends the processing.
Not operating yet	Suspends the processing.
Total or incremental copy is performed	Suspends synchronization processing. The replication destination volume cannot be used.
Equivalency maintain status	Suspends synchronization processing. The replication destination volume can be used as a copy
Replication established status	Suspends synchronization processing. The replication destination volume can be used as a copy
Snapshot processing is being performed	Stops the snapshot processing. The replication destination volume cannot be used.

- Pre-processing and post-processing for a replication source and replication destination volumes are performed only when the status of synchronization processing is equivalency maintenance status.

- Synchronization processing cannot be stopped in equivalency maintenance status in the following situations:

    - When the copy source volume cannot be locked.

    - When the file system buffer of the copy source volume cannot be flushed by specification of the -Xflush option.

    - When the contents of the copy source volume locking specification file are invalid.

    - When the replication destination volume cannot be locked

    - When the contents of the replication destination volume lock operation specification file are invalid

    - When a replication source volume is an SDX object and the status of the SDX object is not one of the following:

        - The mirror volume is ACTIVE or STOP.

        - The mirror slice status is ACTIVE or STOP.

        - The SDX disk status is ENABLE.

- When the -T option is not specified
command processing varies depending on the operation status of the source and destination volumes.

Table 11.23 Processing when the -T option is not specified

Operation status (Display by swsrpstat -L)	Processing
Reverse copy	Processing is interrupted.
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Synchronous processing is terminated. The destination volume cannot be used.
Equivalency maintained status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.

Operation status (Display by swsrpstat -L)	Processing
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 11.24 Processing when the -T option is specified

Operation status (Display by swsrpstat -L)	Processing
Reverse copy	Processing is interrupted.
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Processing is interrupted.
Equivalency maintained status (Status is "equivalent".)	Processing is interrupted.
Replica created status (Status is "replicated".)	Processing is interrupted.
Snapshot processing is in progress and tracking processing is not in progress. (Status is "snap" and Trk is "off")	Processing is interrupted.
Snapshot processing is in progress and tracking processing is progress. (Status is "snap" and Trk is "on".)	Only tracking processing is terminated. Snapshot processing (ie, physical copying) is continued. The destination volume can be used as a replica.
Snapshot processing complete status and tracking processing in progress. (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecbuffset (REC transfer buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.4.2.5   swsrpchsync (Synchronization mode change command)

NAME

swsrpchsync - changes the operation mode

SYNOPSIS

To be executed on a Storage Server

```
program-directory\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

```
program-directory\bin\swsrpchsync -h Server-Name [-F {Sync|Async|Stack|Consist}] [-R

{Auto|Manual}] [-S {Auto|Manual}] From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrpchsync [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}]
[-S {Auto|Manual}] [-Xreverse] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrpchsync -h Server-Name [-F {Sync|Async|Stack|Consist}] [-R {Auto|
Manual}] [-S {Auto|Manual}] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can use this option only for a Storage Management Server.

-F {Sync|Async|Stack|Consist}

Changes the transfer mode.
You can specify one of the following parameters in the operand:

Sync: Changes to Synchronous mode.
Async: Changes to Asynchronous (i.e., sequential transfer) mode.
Stack: Changes to Stack mode.
Consist: Changes to Consistency mode.

Changing the transfer mode requires this option.
You can only specify the -S option together with the -F Sync option.
Specifying the -F Sync option to change the transfer mode from a non-synchronous mode to the synchronous mode without specifying
the -S option sets the automatic split mode.

-R {Auto|Manual}

Changes the recovery mode.
You can specify either of the following parameters in the operand:

Auto: Changes to Automatic Recovery mode.
Manual: Changes to Manual Recovery mode.

Changing the recovery mode requires this option.

-S {Auto|Manual}

Changes the split mode.
You can specify either of the following parameters in the operand:

Auto: Changes to Automatic Split mode.
Manual: Changes to Manual Split mode.

Changing the split mode requires this option.
To specify this option, you must also specify -F Sync, or the transfer mode of the current synchronization must be synchronous mode.

-Xgroup *Group-Name*

Changes the operation mode of inter-box synchronous processing for each group (transfer mode, recovery mode, or split mode).

-Xreverse

Specifies that the operation mode of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) will be changed.

OPERANDS

From-Volume-Name

Specifies a copy source volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name.

Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).

Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ From Storage Management Server to Storage Server: Instruct SRC-SV to change the transfer mode for inter-box synchronization between g1d2p1@SRC-SV and g2d2p1@TARG-SV from Consistency mode to Asynchronous mode.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -h SRC-SV -L g1d2p1@SRC-SV
Server Original-Volume Replica-Volume Direction Status Execute Trk  Rcv  Split Xfer
Snap-Gen
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV regular   sync   99%      ---- auto  ----
consist  ----
:
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpchsync -h SRC-SV -F Async
g1d2p1@SRC-SV g2d2p1@TARG-SV
FROM=g1d2p1@SRC-SV, TO=g2d2p1@TARG-SV swsrpchsync completed
:
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -h SRC-SV -L g1d2p1@SRC-SV
Server Original-Volume Replica-Volume Direction Status    Execute Trk  Rcv  Split
Xfer  Snap-Gen
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV regular   equivalent 100%      ---- auto  ----
async  ----
C:\>
```

・ Specify that the transfer mode of inter-box synchronous processing for group "GRP1" be changed from consistency mode to asynchronous mode.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpchsync -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsync completed
C:\>
```

NOTES

・ In any of the following cases, you cannot change the operation mode of inter-box synchronization:

   - The specified original/replica volume has not been configured as a replica volume.

   - None of the -F, -R, and -S options are specified.

   - In inter-server replication, the Storage Server on which you execute the command is not the operation server for the replica volume.

   - Synchronization from the specified source volume to the destination volume is not secured.

   - Synchronization from the specified source volume to the destination volume is in error-suspended status (with "failed" indicated as the Status by swsrpstat (Operation status display command) or hard-suspended status (with "halt" indicated as the Status by swsrpstat (Operation status display command) .

   - The ETERNUS Storage System in which the specified original/replica volume is placed does not support the operation mode change function.

・ If the -Xgroup option is specified, the synchronous processing for all replication volumes being processed is changed to the same operation mode. However, the operation mode cannot be changed if there is at least one replication volume that meets the conditions above.
Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

・ If the REC operating mode is changed while in equivalency maintenance status, after the operating mode is changed, users must wait until the equivalency maintenance status is attained.

・ This command cannot be executed while any of the following commands are running:

   - swsrpsetvol (Replication volume information setting command)

   - swsrpdelvol (Replication volume information deletion command)

   - swsrprecbuffset (REC transfer buffer settings change command)

   - swsrprecoverres (Resource adjustment command)

   - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.4.2.6   swsrprevsync (Synchronization reverse command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrprevsync From-Volume-Name To-Volume-Name
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name
```

To be executed on a Storage Server: group specification

```
program-directory\bin\swsrprevsync [-Xreverse] -Xgroup Group-Name
```

To be executed on a Storage Management Server: group specification

```
program-directory\bin\swsrprevsync -h Server-Name [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command reverses the copying direction of synchronization when in suspended status.

Note that this command cannot be used to handle a logical volume of an SDX object.

OPTIONS

-h *Sever-Name*

Specifies the name of a Storage Server.
You can only use this option for a Storage Management Server.

-Xgroup *Group-Name*

Changes the direction of synchronous processing for each group.

-Xreverse

Specifies that the direction of synchronous processing that is being executed in reverse direction (i.e., from replica volumes to original volumes)will be inverted.

OPERANDS

From-Volume-Name

Specifies a copy source volume name. (as the destination in the reverse direction)
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

To-Volume-Name

Specifies a copy destination volume name. (as the source in the reverse direction)
Specifies the replication source volume or the replication destination volume set with swsrpsetvol (Replication volume information setting command).
Specifies an 1.5 Managing a Device on AdvancedCopy Manager for the volume name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- From Storage Management Server to Storage Server: Instruct SRC-SV to reverse the copying direction of synchronization between g1d2p1@SRC-SV and g2d2p1@TARG-SV.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat -h SRC-SV g1d2p1@SRC-SV
Server Original-Volume Replica-Volume Direction  Status     Execute
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV reverse    replicated  ----
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprevsync g1d2p1@TARG-SV g2d2p1@SRC-SV
FROM=g1d2p1@SRC-SV,TO=g2d2p1@TARG-SV swsrprevsync completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpstat g1d2p1@SRC-SV
Server Original-Volume Replica-Volume Direction  Status     Execute
SRC-SV g1d2p1@SRC-SV   g2d2p1@TARG-SV regular    replicated  ----
C:\>
```

・ Change the direction of synchronous processing for group "GRP1".

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
C:\>
```

NOTES

・ In any of the following cases, you cannot reverse the direction of synchronization:

  - The specified original/replica volume has not been configured as a replica volume.

  - Unidirectional copying has been specified in the copying attribute for the replica volume.

  - In inter-server replication, the Storage Server on which you execute the command is not the operation server for the replica volume.

  - Replication has not been established in synchronization from the specified source volume to the destination volume.

  - The ETERNUS Storage System in which the specified original/replica volume is placed does not support the reverse function.

・ If the -Xgroup option is specified, the direction of synchronous processing for all replication volumes being processed is changed. However, the direction of synchronous processing cannot be changed if there is at least one replication volume that meets the conditions above.
  Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

・ If the -Xgroup option is specified, processing is not performed for those sessions in the group where the direction has already been changed.

・ This command cannot be executed while any of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecbuffset (REC transfer buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.4.3 Maintenance commands

This section describes the maintenance commands for replication management.

11.4.3.1   swsrprecoverres (Resource adjustment command)

NAME

swsrprecoverres - executes recovery to make replication management information

SYNOPSIS

To be executed on a Storage Server

```
program-directory\bin\swsrprecoverres [-r] [-p]
```

To be executed on a Storage Management Server

```
program-directory\bin\swsrprecoverres -h Server-Name [-r] [-p]
```

DESCRIPTION

This command executes recovery to make replication management information consistent if a system failure or other problem has made the replication management information inconsistent.

OPTIONS

-h *Sever-Name*

Specifies a Storage Server name.
This option can be used only on a Storage Management Server.

-r

Specify this option when an incorrect status exists in the replication management files. E.g., when swsrpsetvol (Replication volume information setting command) or swsrpdelvol (Replication volume information deletion command) that update the replication management files terminate suddenly because of a forced stop, a system failure or the replication management files have been deleted by mistake.
When this option is specified, the following processing is performed to recreate the replication management files.
Replication management information in the Storage Management Server repository is downloaded to the Storage Server, and the replication volume information is restored.
The ETERNUS Storage System is queried, and the execution information for the synchronization processing is restored.

-p

Specifies to not perform any post-processing that has not already been performed. This option can be used when swsrpmake (Replication creation command) processing terminates suddenly because of a forced stop or system failure.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Perform resource adjustment

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecoverres
swsrprecoverres completed
C:\>
```

NOTES

・ The resource adjustment processing cannot be performed if:

- Communication with a Storage Management Server fails and the -r option is specified.

- The -r option is not specified when this command is executed after processing by swsrpsetvol (Replication volume information setting command) and swsrpdelvol (Replication volume information deletion command) has been forcibly terminated.

・ The consistency of resource information is restored only for the Storage Server on which this command is executed. When a resource inconsistency occurs during processing related to replication between servers, this command must be executed both on the Storage Server on which the processing was performed and on the Storage Server with which communication is being made.

・ If this command is executed for the copy source volume and the copy destination volume in the status where 11.4.2.2 swsrpmake (Replication creation command) is interrupted without completing its process and the remaining processing must be completed, the replication post-processing is executed.

・ This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

11.5 Exchange Server Commands

This section explains the command which AdvancedCopy Manager Exchange support software provides.

The following commands do not exist in Windows Server 2008 environments.

It is necessary to execute an Exchange Server cooperation command by a user belonging to the Administrators group and the Domain Administrator's group.

Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 11.25 Operating environment when executing Exchange Server commands]

Command	Operating environment of AdvancedCopy Manager
swsrpdbinfo_ex2k3/swsrpdbinfo_exchange	-
swsrpdevdisp_ex2k3/swsrpdevdisp_exchange	-
swsrpvssbackup_exchange	The service of the backup server in communication must be running.
swsrpvssrestore_exchange	The service of the backup server in communication must be running.
swsrpshadowadm_exchange	The service of the backup server in communication must be running (except in the situation when the -copy option is specified).
swsrpstat_exchange	-
swsrpcancel_exchange	-
swsrpshadowadm	-

Command	Operating environment of AdvancedCopy Manager
eternus_provider	-
eternus_copyset	The services of the Storage Management Server, Storage Server and backup server must be running when registering or deleting copy set information.
eternus_getolu	-
eternus_getins	-
eternus_chgsrv	AdvancedCopy Manager must be operating on the Storage Management server.

Note

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

   ```
   set SWSTGNODE=logical-node-name
   ```

2. Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 11.26 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swsrpdbinfo_ex2k3/ swsrpdbinfo_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpdevdisp_ex2k3/ swsrpdevdisp_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpvsssync_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpvssbackup_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpvssrestore_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpshadowadm_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpstat_exchange	Required	Transaction operation node	It executes on the Exchange server.
swsrpshadowadm	Not required		It executes on the backup server.
eternus_provider	Not required	Transaction operation node	It executes on the Exchange server or backup server.
eternus_copyset	Not required	Transaction operation node	It executes on the Exchange server or backup server.

Command	Environment variable	Command execution node	Remarks
eternus_getolu	Not required	-	It executes on the backup server.
eternus_getins	Not required		It executes on the backup server.
eternus_chgsrv	Not required		It executes on the Exchange server or Backup server

⚑ **Note**

Backup operations using the SnapOPC function cannot be performed using the Exchange Server commands.

11.5.1 swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

NAME

swsrpdbinfo_ex2k3/swsrpdbinfo_exchange - registers or deletes information about a storage group.

SYNOPSIS

For Exchange Server 2003:

To register Exchange database information

```
program-directory\bin\swsrpdbinfo_ex2k3 [-evs Virtual-Server-Name] [-sgname Storage-Group-Name]
```

To delete Exchange database information

```
program-directory\bin\swsrpdbinfo_ex2k3 [-evs Virtual-Server-Name] -clean
```

For Exchange Server 2007:

To register Exchange database information

```
program-directory\bin\swsrpdbinfo_exchange [-evs Virtual-Server-Name] [-sgname Storage-Group-Name]
```

To delete Exchange database information

```
program-directory\bin\swsrpdbinfo_exchange [-evs Virtual-Server-Name] -clean
```

DESCRIPTION

This command registers or deletes information about a storage group.

The command is used when Exchange Server backup operation begins, or after the file configuration of a storage group is changed.

Executing the command registers or deletes information about the files that constitute a storage group and information on AdvancedCopy Manager device names. (The files that constitute a storage group include mailbox store and public folder store database files, transaction files, and checkpoint file.)

OPTIONS

-sgname *Storage-Group-Name*

Specifies the storage group name.
If this option is omitted, information on all storage groups is registered.

-clean

Specifies that information about the storage group will be deleted from Exchange Server.

-evs *Virtual-Sever-Name*

Specifies the name of an Exchange virtual server (EVS) when cluster operation is used.
Need not be specified unless cluster operation is used.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Register storage group FirstStorageGroup.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_ex2k3 -sgname FirstStorageGroup
swsrpdbinfo_exchange successfully completed
C:\>
```

・ Delete unnecessary storage group information.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_ex2k3 -clean
swsrpdbinfo_exchange successfully completed
C:\>
```

NOTES

・ The command cannot register database information if:

  - The specified storage group does not exist.

・ For Exchange Server 2007, in condition that all the stores (databases) in the storage group are mounted, execute this command.
  If a part of databases are dismounted, their information is not registered.
  This command fails if all the stores in the storage group are dismounted.

・ This command cannot be executed while one of the following commands is in execution:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrpstartsync (Synchronous processing start command)

  - swsrpmake (Replication creation command)

  - swsrpcancel (Replication cancellation command)

  - swsrpchsync (Synchronization mode change command)

  - swsrprevsync (Synchronization reverse command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

  - swsrpvssbackup_exchange (Exchange VSS backup execution command)

11.5.2 swsrpdevdisp_ex2k3/ swsrpdevdisp_exchange (Exchange device display command)

NAME

swsrpdevdisp_ex2k3/ swsrpdevdisp_exchange - displays the Exchange device information

SYNOPSIS

For Exchange Server 2003:

To display information on a specific storage group

```
program-directory\bin\swsrpdevdisp_ex2k3 -sgname Storage-Group-Name
```

To display information on all storage groups used for Exchange

```
program-directory\bin\swsrpdevdisp_ex2k3 [-evs Virtual-Server-Name]
```

For Exchange Server 2007:

To display information on a specific storage group

```
program-directory\bin\swsrpdevdisp_exchange -sgname Storage-Group-Name
```

To display information on all storage groups used for Exchange

```
program-directory\bin\swsrpdevdisp_exchange [-evs Virtual-Server-Name]
```

DESCRIPTION

This command displays the information registered with swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command). The command displays information on the files that constitute a storage group and information on AdvancedCopy Manager device names. The files that constitute a storage group include mailbox store and public folder store database files, transaction files, and checkpoint file.

OPTIONS

-sgname *Storage-Group-Name*

Specifies the storage group name.
If this option is omitted, information on all storage groups is displayed.

-evs *Virtual-Server-Name*

Specifies the name of an Exchange virtual server (EVS) when cluster operation is used.
Need not be specified unless cluster operation is used.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

- With Exchange Server 2003, display device information on storage group FirstStorageGroup.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdevdisp_ex2k3 -sgname FirstStorageGroup Exchange
Storage Group:FirstStorageGroup
  MailBoxStore:Mail1
    EDB:e:\Exchsrvr\mdbdata\priv1.edb AdvancedCopy Manager Device:g1d1p1
    STM:e:\Exchsrvr\mdbdata\priv1.stm AdvancedCopy Manager Device:g1d1p1
  PublicStore:Pub1
    EDB:e:\Exchsrvr\pdbdata\priv1.edb AdvancedCopy Manager Device:g1d1p1
    STM:e:\Exchsrvr\pdbdata\priv1.stm AdvancedCopy Manager Device:g1d1p1
  MailBoxStore:Mail2
    EDB:e:\Exchsrvr\mdbdata\priv2.edb AdvancedCopy Manager Device:g1d1p1
    STM:e:\Exchsrvr\mdbdata\priv2.stm AdvancedCopy Manager Device:g1d1p1
  PublicStore:Pub2
    EDB:e:\Exchsrvr\pdbdata\priv2.edb AdvancedCopy Manager Device:g1d1p1
    STM:e:\Exchsrvr\pdbdata\priv2.stm AdvancedCopy Manager Device:g1d1p1
  TransactionLog=f:\Exchsrvr\log\E00.log AdvancedCopy Manager Device:g1d2p1
  CheckPointFile=e:\Exchsrvr\chk\E00.chk AdvancedCopy Manager Device:g1d1p1
```

- With Exchange Server 2007, display device information on storage group FirstStorageGroup. Since Exchange Server 2007 does not have an STM file, the EDB file is the only database file displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdevdisp_exchange -sgname FirstStorageGroup
Exchange Storage Group:FirstStorageGroup
  Store1: Mailbox 1
    EDB:e:\Exchsrvr\mdbdata\priv1.edb AdvancedCopy Manager Device:g1d1p1
  Store2: Public Store 1
    EDB:e:\Exchsrvr\pdbdata\priv1.edb AdvancedCopy Manager Device:g1d1p1
  Store3: Mailbox 2
    EDB:e:\Exchsrvr\mdbdata\priv2.edb AdvancedCopy Manager Device:g1d1p1
  Store4: Public Store 2
    EDB:e:\Exchsrvr\pdbdata\priv2.edb AdvancedCopy Manager Device:g1d1p1
  TransactionLog=f:\Exchsrvr\log\E00.log AdvancedCopy Manager Device:g1d2p1
  CheckPointFile=e:\Exchsrvr\chk\E00.chk AdvancedCopy Manager Device:g1d1p1
C:\>
```

NOTES

- The command cannot display device information if:

    - Device information has not been registered with swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command).

    - Not all storage group information is registered with AdvancedCopy Manager when an attempt is made to display information on all storage groups.

- This command cannot be executed while the following command is being executed:

    - swsrprecoverres (Resource adjustment command)

11.5.3 swsrpvsssync_exchange (Exchange VSS synchronous processing command)

NAME

swsrpvsssync_exchange - synchronous processing operations for storage groups

SYNOPSIS

When starting or restarting synchronous processing

```
program-directory\bin\swsrpvsssync_exchange start [-evs Virtual-Server-Name] -sgname Storage-Group-
Name [-copygrp Copyset-Group-Name]
```

When stopping synchronous processing

```
program-directory\bin\swsrpvsssync_exchange cancel [-evs Virtual-Server-Name] -sgname Storage-
Group-Name [-copygrp Copyset-Group-Name]
```

DESCRIPTION

This command performs synchronous processing operations for storage groups

・ Starting or restarting synchronous processing

・ Stopping synchronous processing

Starting or restarting synchronous processing

This command starts or restarts synchronous processing for storage groups. It is used to start synchronous type backup operations and to reflect updated (differential) data from a replication established (suspended) state.

Stopping synchronous processing

This command stops synchronous processing for storage groups. Use this command when an error is detected with synchronous processing or when synchronous type backup operations are to be stopped.

OPTIONS

-sgname Storage-Group-Name

Specifies the storage group name.

-evs Virtual-Server-Name

Specifies the name of an Exchange virtual server (EVS) when cluster operation is used.
This option need not be specified unless cluster operation is used.

-copygrp Copyset-Group-Name

Specifies the copy set group name.
If this option is omitted, the default copy set group "BkupGroup" will be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Start synchronous processing for the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR".

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -copy -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
Type Group   Original-Disk   Replica-Disk    Status  Execute Trk  Update
EC   BK1     g1d1@EXCHG-SVR  g1d11@BKUP-SVR  ----    ----         ---- ----
EC   BK1     g1d2@EXCHG-SVR  g1d12@BKUP-SVR  ----    ----         ---- ----
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpvsssync_exchange start -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
```

```
swsrpvsssync_exchange successfully completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -copy -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
Type Group  Original-Disk  Replica-Disk   Status Execute Trk  Update
EC   BK1    g1d1@EXCHG-SVR g1d11@BKUP-SVR sync   3%          ----  ----
EC   BK1    g1d2@EXCHG-SVR g1d12@BKUP-SVR sync   1%          ----  ----
C:\>
```

· Stop synchronous processing for the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR".

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -copy -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
Type Group  Original-Disk  Replica-Disk   Status  Execute Trk  Update
EC   BK1    g1d1@EXCHG-SVR g1d11@BKUP-SVR suspend ----     ----  ----
EC   BK1    g1d2@EXCHG-SVR g1d12@BKUP-SVR suspend ----     ----  ----
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvsssync_exchange cancel -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpvsssync_exchange successfully completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -copy -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
Type Group  Original-Disk  Replica-Disk   Status Execute Trk  Update
EC   BK1    g1d1@EXCHG-SVR g1d11@BKUP-SVR ----    ----     ----  ----
EC   BK1    g1d2@EXCHG-SVR g1d12@BKUP-SVR ----    ----     ----  ----
C:\>
```

NOTES

· For Exchange Server 2007, this command cannot be executed.

· Synchronous processing operation cannot be executed in the following cases:

- When the database information for the specified storage group was not registered using swsrpdbinfo_ex2k3/ swsrpdbinfo_exchange (Exchange database information registration command)

- When the database configuration for the specified storage group has been changed.

- When copy set information cannot be obtained.

- When there is a copy set in the specified storage group whose copy type is not EC.

- When communications with the backup server fail (this only affects the start/restart function).

- When an error occurs with Fujitsu ETERNUS Storage Systems provider processing.

- When a backup LUN volume (i.e., partition) cannot be deleted (this only affects the start/restart function).

- When there is a shadow copy on a backup LUN that cannot be deleted (this only affects the start/restart function).

- When synchronous processing has not been executed on any of the copy sets in the storage group (this only affects the stop function).

- When a store is dismounted (this only affects the start/restart function for Exchange Server 2007).

· This command cannot be executed while any of the following commands are running:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecoverres (Resource adjustment command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

- If this command is executed when synchronous processing has been executed on all copy sets in the storage group, the following information message will be output and the command will terminate: "swsrp4203 Synchronous processing is already in progress. Storage Group Name = [STORAGE-GROUP-NAME]". (The end status will be normal termination.).

- If an error occurs during synchronous processing operations on a storage group that is made up of multiple copy sets, the processing of this command will be interrupted. To execute the synchronous processing operation again, correct the error and then rerun the command.

11.5.4 swsrpvssbackup_exchange (Exchange VSS backup execution command)

NAME

swsrpvssbackup_exchange - backup of a Storage group

SYNOPSIS

```
program-directory\bin\swsrpvssbackup_exchange [-evs Virtual-Server-Name] [-skipchk] -sgname Storage-
Group-Name [-copygrp Copyset-Group-Name]
```

DESCRIPTION

This command cooperates with VSS to perform an on-line backup of a Storage group.

The command performs the following processing:

1. By using VSS and AdvancedCopy, the backup data of a Storage group is created on a backup server.

    - For snapshot type backups, shadow copies are created by starting an OPC, or QuickOPC.

    - For synchronous type backups, shadow copies are created by suspending an EC or REC in an equivalency maintenance state. (Not supported when Windows Server 2008 is combined with Exchange Server 2007).

2. A drive letter is assigned to the backup volume based on a drive letter map file. The backup volume can be accessed as a read-only volume.

3. ESEUTIL is performed against backup data to verify data integrity. When there is no problem with data integrity, Exchange deletes unnecessary log files.

4. The metadata documents, which are needed at the time of restoration, are saved in the following locations of the backup server:

File	Output place
Writer metadata Document	If the copy set group name is "BkupGroup" (the default name) environmental setting directory\etc\repl\data\exchange\<Storage Server name of Exchange server>\metadoc\<Storage group name>.wmd.xml If the copy set group name is anything other than "BkupGroup" (the default name) environment settings directory\etc\repl\data\exchange\<Storage Server name of Exchange server>\metadoc\<Storage group name >.<Copy set group name>.wmd.xml Note) The specification method for which <Copy set group name> is specified is not supported when Windows Server 2008 is combined with Exchange Server 2007.
Backup component Document	If the copy set group name is "BkupGroup" (the default name) environmental setting directory>\etc\repl\data\exchange\<Storage Server name of Exchange server>\metadoc\<Storage group name>.bcd.xml

File	Output place
	If the copy set group name is anything other than "BkupGroup" (the default name) environment settings directory\etc\repl\data\exchange\\<Storage Server name of Exchange server>\metadoc\\<Storage group name >.\<Copy set group name>.bcd.xml Note) The specification method for which <Copy set group name> is specified is not supported when Windows Server 2008 is combined with Exchange Server 2007.

OPTIONS

-sgname *Storage-Group-Name*

A Storage group name is specified.
The storage group name containing a space needs to attach double quotation marks ("")

-evs *Virtual-Server-Name*

When cluster is used, the name of an Exchange virtual server (EVS) is specified.
When cluster employment is omitted, there is no necessity for specification.

-skipchk

This specifies that data consistency verification should not be performed by ESEUTIL.

-copygrp *Copyset-Group-Name*

Specifies the copy set group name.
If this option is omitted, the copy set group name will be the default name "BkupGroup".
This option is not supported in an environment where Windows Server 2008 is combined with Exchange Server 2007.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ For the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR", backup is performed.

```
C:\>set SWSTGNODE=nodeAGT
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpvssbackup_exchange successfully completed
C:\>
```

・ For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", backup is executed.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -evs VSVR -sgname
FirstStorageGroup
swsrpvssbackup_exchange successfully completed
C:\>
```

NOTES

・ Backup cannot be executed in the following cases:

- When the database information on the specified Storage group is not registered by swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command).

- When the database composition of the specified Storage group is changed.

- When acquisition of copy set information results in an error.

- When communication with a backup server results in an error.

- When the store is being dismounted.

- When a copy set with a different copy type exists within the specified storage group.

- When a copy set with a copy type of SnapOPC, SnapOPC+ or EC exists within the specified storage group.

- When not all of the copy set synchronous processes for the storage group are in an equivalency maintenance state (for synchronous type backups) (this does not apply when Windows Server 2008 is combined with Exchange Server 2007).

- When an error occurs with Fujitsu ETERNUS Storage Systems processing (for the contents of the error, refer to "Messages" in the ETERNUS VSS Hardware Provider Software Manual) (this does not apply when Windows Server 2008 is combined with Exchange Server 2007).

- When an error is caused by a hardware provider command (for the contents of the error, refer to "Messages" in the ETERNUS VSS Hardware Provider Software Manual) (this does not apply when Windows Server 2008 is combined with Exchange Server 2007).

- When a certain error occurs in processing of a Fujitsu ETERNUS Storage Systems provider.

- When volume (i.e., partition) deletion of Backup LUN is not completed.

- When a shadow copy exists in Backup LUN and deletion of a shadow copy is not completed.

- When abnormalities are detected by consistency verification of backup data.

- When preservation of a writer metadata document and a backup component document results in an error.

- When assignment of the drive letter of backup volume results in an error.

・ When -skipchk option is specified
When verification of data consistency is omitted using -skipchk option, it is recommend strongly to verify data consistency manually after this command ends. For information about the method of verifying data consistency, refer to the "support technical know-how" documents in the Microsoft Knowledge Base. In particular, refer to:

"Exchange Server 2003 data backup and Volume Shadow Copy services" (refer to the clause of "How to check snapshot consistency") (Note)

```
http://support.microsoft.com/default.aspx?scid=kb;en-us;822896
```

(Note) There is no difference in the application of this note between Exchange Server 2003 and Exchange Server 2007, other than the fact that the "*.stm" file does not exist in Exchange Server 2007.

・ When the command is canceled
An Exchange writer may continue the backup processing when this command is forced to terminate by the task manager, by executing Ctrl-C, etc. In such a case, when you re-execute this command, an error message similar to the following message will be output, and backup cannot be performed.

```
swsrp4648 An error occurred in VSS processing. Processing Phase=[BACKUP] Creation
of Shadow Copy Set, Detected API=StartSnapshotSet, Error=0x80042316
```

In order to recover from this situation, it is necessary to initialize the Exchange writer by restarting the "Microsoft Exchange Information Store" service. Note, however, that if this service is restarted, the client connecting to the Exchange Server may experience an unexpected termination or an unexpected connection shutdown. Therefore, we recommend that you consider the chance to restart this service after consultation with an Exchange administrator.

・ This command cannot be executed during execution of the following commands:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecoverres (Resource adjustment command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

- If an error occurs during the processing for a storage group that is made up of multiple copy sets, processing for this command will be interrupted. If a synchronous-type backup was being performed, suspended synchronous processes must be restarted using swsrpvsssync_exchange (Exchange VSS synchronous processing command).
  This note does not apply when Windows Server 2008 is combined with Exchange Server 2007.

11.5.5 swsrpvssrestore_exchange (Exchange VSS restore execution command)

NAME

swsrpvssrestore_exchange - restore of a Storage group

SYNOPSIS

```
program-directory\bin\swsrpvssrestore_exchange [-evs Virtual-Server-Name] (-point|-roll) -sgname
Storage-Group-Name [-copygrp Copyset-Group-Name]
```

DESCRIPTION

This command cooperates with VSS to perform the restoration of a Storage group.
Because it cooperates with VSS, the writer metadata document and backup component document which are saved in the backup server are used. One of the following two restoration systems is chosen and restoration is performed.

Point-in-time restoration (restoration to a backup time)

By restoring all the files (i.e., those with extensions *.edb, *.stm, *.log, *.chk) that constitute a Storage group from the backup volume, a Storage group is restored to the time that the backup was created.
In Exchange Server 2007, the above "*.stm" file does not exist.

Roll forward restoration (restoration to the newest state)

In this case, only database files (i.e., files with extensions *.edb, *.stm) are restored, the log application is performed using the log file which exists on the operating volume, and the database is restored to the newest time.
In Exchange Server 2007, the above "*.stm" file does not exist.

OPTIONS

-sgname *Storage-Group-Name*

A Storage group name is specified.
The storage group name containing a space needs to attach double quotation marks (" ")

-evs *Virtual-Server-Name*

When cluster is being used, the name of an Exchange virtual server (EVS) is specified.
When cluster usage is omitted, there is no need to specify this option.

-point

A Point-in-Time system is restored.

-roll

A roll forward system is restored.

-copygrp *Copyset-Group-Name*

> A copy set group name is specified.
> If this option is omitted, the copy set group name will be the default name "BkupGroup".
> This option is not supported in an environment where Windows Server 2008 is combined with Exchange Server 2007.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- For the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR", roll-forward restoration is performed.

```
C:\>set SWSTGNODE=nodeAGT
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -roll -sgname
FirstStorageGroup -copygrp GRP1
swsrpvssrestore_exchange successfully completed
C:\>
```

- For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", roll-forward restoration is performed.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -roll -sgname
FirstStorageGroup
swsrpvssrestore_exchange successfully completed
C:\>
```

NOTES

- When the following conditions occur, this command terminates abnormally:

  - When the database information on the specified Storage group is not registered by swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command).

  - When acquisition of copy set information produces an error.

  - When a database volume and a backup volume are not registered as an original volume and a replica volume, respectively.

  - Volume information (i.e., box identifier, OLU, EXTENT start position, and EXTENT size) is changed after the operation starts. In this case, the operation cannot continue for the corresponding volume. Stop the replication operation for the corresponding volume, and then delete and reset the replication volume information.

  - When restoration is being performed using EC or REC and the restoration synchronous process is not in the equivalency maintenance state.

  - When an Exchange server is not the operation server of the replication volume.

  - When communication with a backup server produces an error.

  - When the database is in an inconsistent state.

  - When the store could not be dismounted (Only applies under Exchange Server 2003)

  - When the store could not be mounted (Only applies under Exchange Server 2003)

  - When the roll option is specified and the log files exist on the same volume as database files (i.e., files with extensions *. edb, *.stm) (in Exchange Server 2007, the "*.stm" file does not exist).

- When a transaction log that is required (i.e., when the roll option is specified) in order to perform a roll-forward does not exist in a log file.

- When a volume undergoing the QuickOPC tracking process exists within the specified storage group. (Only applies when Windows Server 2008 is combined with Exchange Server 2007)

- When a backup (i.e., the copy source) volume could not be locked.

- When the contents of the copy source volume locking specification file are invalid.

- When a database volume (the original volume) could not be locked.

- When the contents of the copy destination volume locking specification file are invalid.

- When a writer metadata document and a backup component document do not exist on a backup server.

- When backup data does not exist on the backup volume.

- When the correspondence between the drive number and the OLU has collapsed, and editing of information re-collection/device.ini fails. (Only applies when Windows Server 2008 is combined with Exchange Server 2007)

・ This command cannot be executed during execution of the following commands:

- swsrpsetvol (Replication volume information setting command)

- swsrpdelvol (Replication volume information deletion command)

- swsrprecoverres (Resource adjustment command)

- swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.5.6 swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

NAME

swsrpshadowadm_exchange - shadow copy of a Storage group

SYNOPSIS

When the state display of a shadow copy is performed

```
program-directory\bin\swsrpshadowadm_exchange status [-evs Virtual-Server-Name] [-copy | -shadow]
-sgname Storage-Group-Name [-copygrp Copyset-Group-Name]
```

When a shadow copy is deleted

```
program-directory\bin\swsrpshadowadm_exchange delete [-evs Virtual-Server-Name] -sgname Storage-
Group-Name [-copygrp Copyset-Group-Name]
```

When a QuickOPC is stopped

```
program-directory\bin\swsrpshadowadm_exchange stopqopc [-evs Virtual-Server-Name] -sgname Storage-
Group-Name [-copygrp Copyset-Group-Name]
```

DESCRIPTION

This command allows management of the shadow copy of a Storage group.

State display function

A shadow copy state and an advanced copy execution state are acquired and displayed from the VSS of a backup server, and from a Fujitsu ETERNUS Storage Systems provider, respectively.

The contents of a display are described below.

Table 11.27 Cluster operations (using MSCS)

Title	Description
Original-Volume	A source volume name is displayed. Placed in parentheses, it is the volume name ("\\?\Volume{GUID}\") of Windows. A meaningful volume name is displayed.
Replica-Volume	A duplicate place volume name is displayed. Placed in parentheses, it is the volume name ("\\?\Volume{GUID}\") of Windows. A meaningful volume name is displayed (in the case where a shadow copy does not exist, "---- " is displayed).
Latest-Creation-Time	The creation time of the newest shadow copy is displayed. If a shadow copy does not exist, "----" is displayed.
Snapshot-ID	The shadow copy ID of the newest shadow copy (GUID) is displayed. If a shadow copy does not exist, "----" is displayed.
SnapshotSet-ID	The shadow copy set ID of the newest shadow copy (GUID) is displayed. If a shadow copy does not exist, "----" is displayed.
Type	A copy type is displayed. OPC:OPC QOPC:QuickOPC EC:EC/REC
Group	A copy set group name is displayed.
Original-Disk	A source disk (LUN) name is displayed.
Replica-Disk	A duplicate destination disk (LUN) name is displayed.
Status	The state of the execution of the advanced copy from a source disk to a destination disk is displayed. ---- : Copy has not been carried out. sync : Total copy or incremental copy is being performed. equivalent : Equivalency maintenance state suspend : Suspend status. failed : It is in an error state. halt(sync) : Hard-suspended status for the REC (occurs during REC total copies or differential copies) halt(equivalent) : Hard-suspended status for the REC (this occurs during REC equivalency maintenance state) halt : Hard-suspended status snap : Snapshot processing is being performed. ????? : Acquisition of a copy failed for some reason.
Execute	The progress of the copying is expressed as percentage. Displays "----" when the Status column is anything other than "sync", "equivalent" or "snap". If copy is not being performed, "----" is displayed.
Trk	Displays whether tracking processing is in progress. on : Tracking processing is in progress. off : Tracking processing is not in progress. ---- : Snapshot processing is not performed.
Update	When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy has not been executed), displays the amount of data updated after the previous replica creation as a percentage. Displays "----" during physical copying or when tracking is not in progress.

Table 11.28 Cluster operation (using WSFC)

Title	Description
Original-Volume	The replication source volume name is displayed. A meaningful Windows volume name is displayed in parentheses in the format "\\?\Volume{GUID}\".
Replica-Volume	The replication destination volume name is displayed. Placed in parentheses, a meaningful Windows volume name is displayed in parentheses in the format "\\?\Volume{GUID}\". If a shadow copy does not exist, "--- " is displayed.
Latest-Creation-Time	The creation time of the latest shadow copy is displayed. If a shadow copy does not exist, "----" is displayed.
Snapshot-ID	The shadow copy ID (GUID) of the latest shadow copy is displayed. If a shadow copy does not exist, "----" is displayed.
SnapshotSet-ID	The shadow copy set ID (GUID) of the latest shadow copy is displayed. If a shadow copy does not exist, "----" is displayed.
Type	The copy type is displayed. OPC:OPC QOPC:QuickOPC
Original-Disk	The replication source disk (LUN) name is displayed.
Replica-Disk	The replication destination disk (LUN) name is displayed.
Status	The execution status of an advanced copy from a replication source disk to a replication destination disk is displayed. ---- : Copy has not been performed. sync : Total copy or incremental copy is in progress equivalent : Equivalency maintenance status suspend : Suspended status failed : Error suspended status halt(sync) : Hard-suspended status for the REC (occurs during REC total copy or incremental copy) halt(equivalent) : Hard-suspended status for the REC (occurs during REC equivalency maintenance state) snap : Snapshot processing is in progress ????? : Fetch of a copy failed for some reason
Execute	The copy progress rate is displayed as a percentage. If the Status column is anything other than "sync", "equivalent" or "snap", "----" is displayed.
Trk	Displays whether tracking processing is in progress. on : Tracking processing is in progress. off : Tracking processing is not in progress. ---- : Snapshot processing is not in progress.
Update	When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy has not been executed), the updated data size after the previous replication creation is displayed as a percentage. During physical copying or when tracking is not in progress, "----" is displayed.

Deletion function

A shadow copy is deleted from the VSS of a backup server.

- The writer metadata document and backup component document of a backup server are deleted.

- When the OPC physical copy is performed, an OPC physical copy is stopped by the Fujitsu ETERNUS Storage Systems provider. Synchronous processes and QuickOPCs do not stop even if shadow copies are deleted.

When Windows Server 2008 is combined with Exchange Server 2007, the following processes occur:

- The writer metadata document and backup component document of the backup server are deleted.

- QuickOPC tracking processes are not stopped, even if shadow copies are deleted. If copying again to the same volume, first use the "QuickOPC Tracking Stop Function" to stop tracking processes before copying.

- Copy processes are also not stopped if the OPC physical copy is performed during shadow copy deletion. Even if copying to the same volume, the OPC physical copy need not be stopped.

QuickOPC stop function

This function stops QuickOPC processing (both the physical copy and tracking processing). It can only be used when the copy type is QOPC.

- QuickOPCs, where the physical copy is in progress, cannot be stopped if a shadow copy exists. To stop a QuickOPC where the physical copy is in progress, the shadow copy must first be deleted. QuickOPCs, where tracking is in progress, can be stopped regardless of whether any shadow copies exist.

OPTIONS

-sgname *Storage-Group-Name*

A Storage group name is specified.
The storage group name containing a space needs to attach double quotation marks (" ")

-evs *Virtual-Server-Name*

When cluster usage is being performed, the name of an Exchange virtual server (EVS) is specified.
When cluster usage is omitted, there is no necessity for specifying this option.

-shadow

Only the execution state of an advanced copy is displayed in the state display (i.e., the status) of a shadow copy.

-copy

Only the state of a shadow copy is displayed in the state display (ie, the status) of a shadow copy.

-copygrp *Copyset-Group-Name*

A copy set group name is specified.
If this option is omitted, the copy set group name will be the default name "BkupGroup".
This option is not supported in an environment where Windows Server 2008 is combined with Exchange Server 2007.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Cluster operations (using MSCS)
  For the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR", the status of the shadow copies is displayed.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
[Shadow Copy Status]
Original-Volume                 Replica-Volume                    Latest-Creation-Time Snapshot-
```

```
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
[AdvancedCopy Status]
Type Group Original-Disk  Replica-Disk   Status Execute Trk  Update
QOPC BK1   g1d1@EXCHG-SVR g1d11@BKUP-SVR snap   88%     on   ----
QOPC BK1   g1d2@EXCHG-SVR g1d12@BKUP-SVR snap   83%     on   ----
C:\>
```

· For the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR", the status of the shadow copies is displayed (i.e., when -shadow option is specified).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -shadow -sgname
FirstStorageGroup -copygrp BK1
Original-Volume                 Replica-Volume                 Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 03:23
{XXXX}      {XXXX}
C:\>
```

· For the storage group "FirstStorageGroup" on the MSCS operation Exchange server "VSVR", the status of the shadow copies is displayed (i.e., when -copy option is specified).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -copy -sgname
FirstStorageGroup -copygrp BK1
Type Group Original-Disk  Replica-Disk   Status Execute Trk  Update
EC   BK1   g1d1@EXCHG-SVR g1d11@BKUP-SVR sync   88%     ---- ----
C:\>
```

· For the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR", the shadow copies are deleted.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpshadowadm_exchange successfully completed
C:\>
```

· Stop the QuickOPC for the storage group "FirstStorageGroup" on the cluster operation (using MSCS) Exchange server "VSVR".

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup -copygrp BK1

[Shadow Copy Status]
Original-Volume                 Replica-Volume                 Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
[AdvancedCopy Status]
Type Group Original-Disk  Replica-Disk   Status Execute Trk  Update
QOPC BK1   g1d1@EXCHG-SVR g1d11@BKUP-SVR snap   88%     on   ----
QOPC BK1   g1d2@EXCHG-SVR g1d12@BKUP-SVR ----   ----    on   15%
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -evs VSVR -sgname
FirstStorageGroup -copygrp BK1
swsrpshadowadm_exchange successfully completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
```

```
FirstStorageGroup -copygrp BK1

[Shadow Copy Status]
Original-Volume                         Replica-Volume                          Latest-Creation-Time
Snapshot-ID SnapshotSet-ID

g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----       ----
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----       ----
[AdvancedCopy Status]
Type Group Original-Disk  Replica-Disk    Status  Execute  Trk   Update
QOPC BK1   g1d1@EXCHG-SVR g1d11@BKUP-SVR  ----    ----     ----  ----
QOPC BK1   g1d2@EXCHG-SVR g1d12@BKUP-SVR  ----    ----     ----  ----
C:\>
```

- Cluster operation (using WSFC)
  For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", the status of the shadow copies is displayed.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup
[Shadow Copy Status]
Original-Volume                     Replica-Volume                   Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2008/08/15 07:23
{XXXX}     {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2008/08/15 07:23
{XXXX}     {XXXX}
[AdvancedCopy Status]
Type Original-Disk  Replica-Disk    Status Execute Trk  Update
QOPC g1d1@EXCHG-SVR g1d11@BKUP-SVR  snap   60%     on   ----
QOPC g1d2@EXCHG-SVR g1d12@BKUP-SVR  snap   55%     on   ----
C:\>
```

- For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", the status of the shadow copies is displayed (when -shadow option is specified).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -shadow -sgname
FirstStorageGroup
Original-Volume                     Replica-Volume                   Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2008/08/15 07:23
{XXXX}     {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/08/15 07:23
{XXXX}     {XXXX}
C:\>
```

- For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", the status of the shadow copies is displayed (when -copy option is specified).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -copy -sgname
FirstStorageGroup
Type Original-Disk  Replica-Disk    Status Execute  Trk   Update
QOPC g1d1@EXCHG-SVR g1d11@BKUP-SVR  snap   60%      ----  ----
QOPC g1d2@EXCHG-SVR g1d12@BKUP-SVR  snap   55%      ----  ----
C:\>
```

・ For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", the shadow copies are deleted.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -evs VSVR -sgname
FirstStorageGroup
swsrpshadowadm_exchange successfully completed
C:\>
```

・ For the storage group "FirstStorageGroup" on the cluster operation (using WSFC) Exchange server "VSVR", the QuickOPC is stopped.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup
[Shadow Copy Status]
Original-Volume                      Replica-Volume                       Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
[AdvancedCopy Status]
Type  Group Original-Disk  Replica-Disk   Status Execute Trk  Update
QOPC  ---- g1d1@EXCHG-SVR g1d11@BKUP-SVR snap    88%       on   ----
QOPC  ---- g1d2@EXCHG-SVR g1d12@BKUP-SVR ----    ----      on   15%
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -evs VSVR -sgname
FirstStorageGroup
swsrpshadowadm_exchange successfully completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -evs VSVR -sgname
FirstStorageGroup
[Shadow Copy Status]
Original-Volume                      Replica-Volume                       Latest-Creation-Time
Snapshot-ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\)  ----
----        ----
[AdvancedCopy Status]
Type Original-Disk  Replica-Disk   Status  Execute  Trk   Update
QOPC g1d1@EXCHG-SVR g1d11@BKUP-SVR ----    ----     ----  ----
QOPC g1d2@EXCHG-SVR g1d12@BKUP-SVR ----    ----     ----  ----
```

NOTES

・ When any of the following conditions occur, this command terminates abnormally:

   - When communication with a backup server has a fault.

   - When acquisition of copy set information has a fault.

   - When the acquisition of the state a shadow copy has a fault (this only affects the state display function).

   - When the acquisition of the state an advanced copy has a fault (this only affects the state display function).

   - When an error occurs with Fujitsu ETERNUS Storage Systems hardware provider processing (for the contents of the error, refer to "Messages" in the ETERNUS VSS Hardware Provider Software Manual). (Only applies when Windows Server 2008 is combined with Exchange Server 2007)

   - When an error is caused by a hardware provider command (for the contents of the error, refer to "Messages" in the ETERNUS VSS Hardware Provider Software Manual). (Only applies when Windows Server 2008 is combined with Exchange Server 2007)

   - When the deletion of a shadow copy has a fault (this only affects the deletion function).

- When the deletion of a writer metadata document and a backup component document has a fault (this only affects the deletion function).

・ This command cannot be executed during if any the following commands are being executed:

   - swsrpsetvol (Replication volume information setting command)

   - swsrpdelvol (Replication volume information deletion command)

   - swsrprecoverres (Resource adjustment command)

   - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.5.7 swsrpstat_exchage (Exchange operation status display command)

NAME

swsrpstat_exchage - displays the operation status of the specified storage group.

SYNOPSIS

```
program-directory\bin\swsrpstat_exchange [-Xdevmap Device-Map-File ] -sgname Storage-Group-Name
```

DESCRIPTION

This command displays the operation status of the specified storage group.

Refer to "swsrpstat (Operation status display command)" for display information and notes.

OPTIONS

-sgname *Storage-Group-Name*

   Specifies the storage group name.

-Xdevmap *Device-Map-File*

   Specifies the name of the device map file that defines the combinations of storage group volumes and target backup volumes. Specify the absolute path of the device map file.
   If this option is omitted, the operation status of all replication volumes in the specified storage group is displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Display the operation status of the storage group "FirstStorageGroup". Assume that the device map file that defines the associations between transaction volumes (i.e., the storage group volumes) and backup volumes is K:\STG\DEV.map.

```
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange  -Xdevmap K:\STG\DEV.map  -sgname
FirstStorgeGroup
Server    Original-Volume   Replica-Volume   Direction  Status     Execute
EXCHG-SVR g1d1p1@EXCHG-SVR g1d11p1@BKUP-SVR regular     equivalent 100%
EXCHG-SVR g1d2p1@EXCHG-SVR g1d12p1@BKUP-SVR regular     sync       83%
C:\>
```

NOTES

・ Take corrective action as necessary when the execution status (displayed in the "Status" column) is one of the following:

Status	Corrective action
failed	A hardware error has occurred. Fix the hardware error and use swsrpcancel (the replication cancellation command) to stop operation.
halt	A hardware error has occurred during replication between cabinets. Fix the hardware error and use swsrpcancel (the replication cancellation command) to stop operation.
?????	Copy information could not be obtained. If the same symptom still occurs after re-execution, a hardware error has occurred. Fix the hardware error and re-execute the command.

・ The command cannot display the operation status if:

- The specified original or replica volume is not defined as a replication volume.

・ This command cannot be executed while the following command is being executed:

- swsrprecoverres (Resource adjustment command)

11.5.8 swsrpshadowadm (Shadow copy management command)

NAME

swsrpshadowadm - displays or deletes a shadow copy

SYNOPSIS

When the state display of a shadow copy is performed

```
program-directory\bin\swsrpshadowadm status
```

When a shadow copy is deleted

```
program-directory\bin\swsrpshadowadm delete (-id Snapshot-ID | -all)
```

DESCRIPTION

This command allows a shadow copy to be managed.

This command is used on a backup server. This command is used only in the case where the user wants to delete a shadow copy, or to check a shadow copy status from a backup server because the Exchange server has stopped. It is not necessary to use this command to perform normal everyday backup.

State display function

The shadow copy state created by the Fujitsu ETERNUS Storage Systems provider is acquired and displayed from the VSS of a backup server.

The contents of a display are as follows.

Title	Description
Original-Volume	The volume name of Windows of a source volume ("\\?\Volume{GUID}\"). The volume name of a meaning expressed with the form to say is displayed.
Original-Machine	The machine name (computer name) in which reproducing agency volume exists is displayed.

Title	Description
Replica-Volume	The volume name of Windows of a duplicate place ("\\?\Volume{GUID}\") A meaningful volume name is displayed.
Latest-Creation-Time	The creation time of the newest shadow copy is displayed.
Snapshot-ID	The shadow copy ID of the newest shadow copy (GUID) is displayed.
SnapshotSet-ID	The shadow copy set ID of the newest shadow copy (GUID) is displayed.

Deletion function

The shadow copy created by the Fujitsu ETERNUS Storage Systems provider is deleted from the VSS of a backup server.

Deletion of a shadow copy deletes all volumes (i.e., partitions) from a backup disk.

When the OPC physical copy is performed, the OPC physical copy is stopped by the Fujitsu ETERNUS Storage Systems provider. Synchronous processes and QuickOPCs do not stop even if shadow copies are deleted.

When Windows Server 2008 is combined with Exchange Server 2007, QuickOPC tracking processes are not stopped, even if shadow copies are deleted. If copying again to the same volume, use the "QuickOPC Tracking Stop Function" to stop tracking processes before copying.

Copy processes are also not stopped if the OPC physical copy is performed during shadow copy deletion. Even if copying to the same volume, the OPC physical copy does not need to be stopped.

OPTIONS

-id *Snapshot-ID*

A shadow copy with the specified snapshot ID is deleted.

-all

All the shadow copies created by the Fujitsu ETERNUS Storage Systems provider are deleted.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The status of the shadow copies is displayed.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm status
Original-Volume    Original-Machine Replica-Volume    Latest-Creation-Time Snapshot-ID SnapshotSet-
ID
\\?\Volume{XXXX}\ EXSVR-SV           \\?\Volume{XXXX}\ 2005/06/23 03:23     {XXXX}      {XXXX}
\\?\Volume{XXXX}\ EXSVR-SV           \\?\Volume{XXXX}\ 2005/06/23 03:23     {XXXX}      {XXXX}
C:\>
```

- For the storage group "FirstStorageGroup" on the WSFC operation Exchange server "VSVR", the status of the shadow copies is displayed.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm status
Original-Volume    Original-Machine Replica-Volume    Latest-Creation-Time Snapshot-ID SnapshotSet-
ID
\\?\Volume{XXXX}\ EXSVR-SV           \\?\Volume{XXXX}\ 2005/06/23 03:23     {XXXX}      {XXXX}
\\?\Volume{XXXX}\ EXSVR-SV           \\?\Volume{XXXX}\ 2005/06/23 03:23     {XXXX}      {XXXX}
C:\>
```

- Snapshot ID: A shadow copy with {5928749d-60ea-11d7-ab2d-806d6172696f} is deleted.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm delete -id {5928749d-60ea-11d7-
ab2d-806d6172696f}
```

```
swsrpshadowadm successfully completed
C:\>
```

NOTES

- When the following conditions occur, this command terminates abnormally:

  - When the acquisition of the state a shadow copy causes a fault (this only affects the state display function).

  - When deletion of a shadow copy causes a fault (this only affects the deletion function).

  - When the shadow copy for processing does not exist (this only affects the deletion function).

- This command cannot be run during the execution of the following commands:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

11.5.9 eternus_provider (Provider registration/deletion command)

NAME

eternus_provider - registers or deletes a provider

SYNOPSIS

program-directory\bin\eternus_provider install | uninstall

DESCRIPTION

This command allows a Fujitsu ETERNUS Storage Systems provider to be registered in VSS or deleted from VSS

OPTIONS

install

Registration

uninstall

Deletion

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

Registration

```
C:\>C:\Win32App\AdvancedCopyManager\bin\eternus_provider install
eternus_provider install successfully completed.
C:\>
```

Deletion

```
C:\>C:\Win32App\AdvancedCopyManager\bin\eternus_provider uninstall
eternus_provider uninstall successfully completed.
C:\>
```

NOTES

・ If the "MS DTC service" is not running, this command will terminate with an error. Before executing the command, always check whether the "MS DTC service" is running.

For cluster operations, resources that start the "MS DTC service" must be registered with the cluster system. Use the cluster administrator to check whether any "Distributed Transaction Coordinator" resources have been registered. If no such resources have been registered, create a "Distributed Transaction Coordinator" resource for the cluster service that includes the quorum disk, and vary this resource online.

11.5.10 eternus_copyset (Copy set registration/deletion/reference command)

NAME

eternus_copyset - registers or deletes or displays the copy set information

SYNOPSIS

Registration

```
program-directory\bin\eternus_copyset -set -o Device-Name@Server-Name -t Device-Name@Server-Name -
c {OPC | EC | QOPC} [-g Group-Name]
```

Deletion

```
program-directory\bin\eternus_copyset -del -o Device-Name@Server-Name [-t Device-Name@Server-Name]
```

Reference

```
program-directory\bin\eternus_copyset -disp Serever-Name
```

DESCRIPTION

This command allows the copy set information on an operating disk and a backup disk to be registered, or deleted or displayed for reference.

Registration

This command allows the copy set information on an operating disk and a backup disk to be registered.

Deletion

This command allows the copy set information on an operating disk and a backup disk to be deleted.

Reference

This command allows the copy set information on an operating disk and a backup disk to be displayed for reference.

The contents of a display are as follows.

Title	Description
Type	Copy type
Group-Name	Group name
Original-Disk	Transaction disk
Target-Disk	Backup disk

OPTIONS

-set

    Registration

-del

    Deletion

-disp *Serever-Name*

    Reference

-o *Device-Name@Server-Name*

    Information about copied material (i.e., about on an operating disk, or an operating server)

    Device-Name

        gXdY of the device name managed in ACM

    Server-Name

        The server name of the Storage Server registered in ACM is specified.

-t *Device-Name@Server-Name*

    Copy destination information (on a backup disk, or backup server)
    Required for multiple generation operations in the case of deletions (i.e., when using the -del option).

    Device-Name

        gXdY of the device name managed in ACM

    Server-Name

        The server name of the Storage Server registered in ACM is specified.

-c {OPC | EC | QOPC}

    Copy type

    OPC: One Point Copy
    EC: Equivalent Copy
    QOPC:QuickOPC

-g *Group-Name*

    Specifies a group name.
    Required for multiple generation operations. If this option is not specified (e.g., for single generation operations), the group name will be the default group name "BkupGroup".
    This group name must be unique within the copy source information (the transaction disk and the transaction server).
    Specify the group name using up to 10 alphanumeric characters (including underscore characters "_").
    The group name is not case sensitive.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Registration

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_copyset -set -o g1d87@server1 -t g1d27@bkupsrv1-c
QOPC -g Daily_1
eternus_copyset set successfully completed.
C:\>
```

- Deletion

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_copyset -del -o g1d87@server1 -t g1d27@bkupsrv1
eternus_copyset delete successfully completed.
C:\>
```

- Reference

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_copyset -disp server1
Type    Group-Name   Original-Disk   Target-Disk
QOPC    Daily_1      g1d87@server1   g1d27@bkupsrv1
QOPC    Daily_2      g1d87@server1   g1d28@bkupsrv1
QOPC    Daily_1      g1d88@server1   g1d29@bkupsrv1
QOPC    Daily_2      g1d88@server1   g1d30@bkupsrv1
C:\>
```

NOTES

- When you perform registration processing and deletion processing, a Storage Management Server, an operating server, and a backup server need to be operating.

- Copy set information cannot be deleted if a session involving the copy set is being deleted when the deletion processing is executed.

- The copy type is specified separately for each unit of copy source information.

- If the storage group consists of multiple LUNs, group name consistency is implemented by the operation.

- This command cannot be run during the execution of the following commands:

    - swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.5.11 eternus_getolu (Copy target disk number display command)

NAME

eternus_getolu - displays the copy target disk number

SYNOPSIS

```
program-directory\bin\eternus_getolu
```

DESCRIPTION

The physical disk number and OLU number of a copy target disk are displayed.

The contents of a display are as follows.

Title	Description
PhysicalDrive	Physical disk number
OLU	OLU number
Target	Copy target information (a backup disk, backup server)

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- The physical disk number and OLU number of a copy target disk are displayed. 0 and an OLU number are set to 20 by the physical disk number of g1d20@H200-S2 (copy target disk).

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_getolu
  PhysicalDrive = 3, OLU = 20, Target=g1d20@H200-S2
  PhysicalDrive = 4, OLU = 21, Target=g1d21@H200-S2
  PhysicalDrive = 5, OLU = 22, Target=g1d22@H200-S2
  PhysicalDrive = 6, OLU = 23, Target=g1d23@H200-S2
C:\>
```

NOTES

- It can only be performed by the backup server.

- The information on the disk which has not been registered as copy set information is not output.

- This command cannot be run during the execution of the following commands:

  - swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.5.12 eternus_getins (Device instance ID display command)

NAME

eternus_getins - displays the device instance ID

SYNOPSIS

```
program-directory\bin\eternus_getins
```

DESCRIPTION

This command allows the device instance ID to be displayed.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· The device instance ID is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_getins
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&100   : FUJITSU GR740 SCSI Disk Device
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&101   : FUJITSU GR740 SCSI Disk Device
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&102   : FUJITSU GR740 SCSI Disk Device
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&103   : FUJITSU GR740 SCSI Disk Device
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&104   : FUJITSU GR740 SCSI Disk Device
SCSI\DISK&VEN_FUJITSU&PROD_GR740&REV_0388\4&737E0A5&0&105   : FUJITSU GR740 SCSI Disk Device
C:\>
```

NOTES

· Only the information that includes the character string of "FUJITSU" in the device instance ID is output.

· The information on any device which has not been registered as copy set information is also output.

· A physical disk number etc. is not output.

· This command cannot be run during the execution of the following commands:

   - swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.5.13 eternus_query (Status query command)

NAME

eternus_query - displays the status of an OPC, an EC, or a QuickOPC

SYNOPSIS

```
program-directory\bin\eternus_query Server-Name
```

DESCRIPTION

This command displays the status of an OPC, an EC, or a QuickOPC

The following information will be displayed:

Title	Description
Type	A copy type
Group-Name	A group name
Original-Disk	Copy source information (i.e., the transaction disk and the transaction server).
Target-Disk	Copy destination information (i.e., the backup disk and the backup server).
Status	The execution status of advanced copies from the copy source disk to the copy destination disk ---- : Copying is not being performed. sync : Total copy or incremental copy is being performed. equivalent : Equivalency maintenance state. suspend : Suspend status. failed : Error status. halt(sync):Hard-suspended status for the REC (occurs during REC total copies or differential copies).

Title	Description
	halt(equivalent):Hard-suspended status for the REC (occurs during REC equivalency maintenance state). halt: Hard-suspended status. snap : Snapshot processing is being performed. ????? : The copy status cannot be acquired.
Execute	Displays the copy progress status for OPCs, ECs, or QuickOPCs Displays "----"if there is no copy (i.e., sync or snap) in progress Displays "100%" for equivalency maintenance state (i.e., equivalent).
Trk	Displays whether tracking processing is in progress on: Tracking processing is in progress off: Tracking processing is not in progress ---: Snapshot processing is not being performed
Update	When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not executed). this displays the amount of data updated after the previous replica creation as a percentage. Displays "----" during physical copying or when tracking is not in progress

OPERANDS

Server-Name

Specifies the server name for the Storage Server registered with AdvancedCopy Manager.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Display the status of an OPC

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_query server1
Type   Group-Name   Original-Disk   Target-Disk     Status      Execute   Trk   Update
OPC    Daily_1      g1d87@server1   g1d27@bkupsrv1   snap           95%   off    ----
OPC    Daily_1      g1d88@server1   g1d28@bkupsrv1   ----          ----   ---    ----
C:\>
```

- Display the status of an EC

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_query server1
Type   Group-Name   Original-Disk   Target-Disk     Status      Execute   Trk   Update
REC    Daily_1      g1d87@server1   g1d27@bkupsrv1   sync           95%   ---    ----
REC    Daily_1      g1d88@server1   g1d28@bkupsrv1   equivalent    100%   ---    ----
C:\>
```

- Display the status of a QuickOPC

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_query server1
Type   Group-Name   Original-Disk   Target-Disk     Status      Execute   Trk    Update
QOPC   Daily_1      g1d87@server1   g1d27@bkupsrv1   sync           95%   on     ----
QOPC   Daily_2      g1d87@server1   g1d31@bkupsrv1   ----          ----   on      12%
QOPC   Daily_1      g1d88@server1   g1d28@bkupsrv1   sync           90%   on     ----
```

```
   QOPC   Daily_2    g1d88@server1   g1d32@bkupsrv1   ----          ----   on     5%
   C:\>
```

NOTES

- ・ This command can display the status of devices that have been registered in the hardware provider management file.

- ・ It can be executed on both transaction servers and backup servers

- ・ This command cannot be run during the execution of the following commands:

  - swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.5.14 eternus_stopcopy (Copy stop command)

NAME

eternus_stopcopy - copy stop

SYNOPSIS

```
program-directory\bin\eternus_stopcopy -o Device-Name@Server-Name -t Device-Name@Server-Name stop|
suspend [-f]
```

DESCRIPTION

This command stops the execution of OPCs, ECs, and QuickOPCs, or it suspends ECs.

OPTIONS

-o *Device-Name@Server-Name*

Specifies the copy source information (i.e., the transaction disk and the transaction server)

Device-Name

Specifies the gXdY for the device name managed by AdvancedCopy Manager.

Server-Name

Specifies the server name for the Storage Server registered with AdvancedCopy Manager.

-t *Device-Name@Server-Name*

Specifies the copy destination information (i.e., the transaction disk and the transaction server).

Device-Name

Specifies the gXdY for the device name managed by AdvancedCopy Manager.

Server-Name

Specifies the server name for the Storage Server registered with AdvancedCopy Manager.

stop

Stops OPCs, ECs and QuickOPCs.

suspend

Suspends ECs.

-f

Specifies that the copy is to be forcibly stopped or suspended.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Stop OPC

```
C:\Win32app\AdvancedCopyManager\bin\eternus_stopcopy -o g1d87@server1 -t g1d27@bkupsrv1 stop
eternus_stopcopy successfully completed.
C:\>
```

NOTES

・ Only devices that have been registered with the hardware provider management file can be stopped or suspended using this command.

・ This command can be executed on both transaction servers and backup servers.

・ Use this command when faults occur.

・ This command cannot be run during the execution of the following commands:

- swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.5.15 eternus_chgsrv (Copy set information server name change command)

NAME

eternus_chgsrv - changes the copy set information server name.

SYNOPSIS

```
program-directory\bin\eternus_chgsrv Server-Name -o Old-Server-Name -n New-Server-Name
```

DESCRIPTION

This command changes the copy set information server name.

OPTIONS

-o *Old-Server-Name*

Specifies the pre-change information

-n *New-Server-Name*

Specifies the new information

OPERANDS

Server-Name

　　Specify the server name of the Storage Server that is registered with AdvancedCopy Manager and that executes the command.

EXIT STATUS

　=0:Completed successfully

　>0:Terminated abnormally

EXAMPLES

・ Change the backup server name at the transaction server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_chgsrv server1 -o bkupsrv2 -n bkupsrv1
eternus_chgsrv successfully completed.
C:\>
```

・ Change the backup server name at the backup server.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\eternus_chgsrv bkupsrv1 -o bkupsrv2 -n bkupsrv1
eternus_chgsrv successfully completed.
C:\>
```

NOTES

・ AdvancedCopy Manager must be running at the Storage Management server.

・ This command cannot be run during the execution of the following commands:

　　- swsrpvssbackup_exchange (the Exchange VSS backup execution command)

11.6 SQL Server Commands

This section explains the commands with which the backup and restore of SQL Server databases are performed.

It is necessary that only a user belonging to the Administrators group execute an SQL Server cooperation command.

The commands used by the backup management function and the replication management function are different. Refer to "Backup management function commands" when you use the backup management function. Refer to "Replication management function commands" when you use the replication management function.

🛈 Note

. . . .

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 11.29 Operating environment when executing SQL Server commands

Command	Operating environment of AdvancedCopy Manager
swstbackup_sqlsvr	In EC operation, Windows services required by the Storage Server must be running.
swstrestore_sqlsvr	-
swsrpbackup_sql	In intra-server replication and EC operation, Windows services required by the Storage Server must be running.

Command	Operating environment of AdvancedCopy Manager
	For inter-server replication, Windows services required by the Storage Servers in communication must be running (except when the -m option or -t option is specified).
swsrprestore_sql	-

Note

In cluster operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

   ```
   set SWSTGNODE=logical-node-name
   ```

2. Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 11.30 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstbackup_sqlsvr	Required	Transaction operation node	-
swstrestore_sqlsvr	Required	Transaction operation node	-
swsrpbackup_sql	Required	Transaction operation node	-
swsrprestore_sql	Required	Transaction operation node	-

Note

SQL Server commands do not support the SnapOPC function.

11.6.1 Backup Management Commands

Swstbackup_sqlsvr and swstrestore_sqlsvr are used in the backup operation of an SQL Server by the backup management function.

11.6.1.1   swstbackup_sqlsvr (SQL Server backup execution command)

NAME

swstbackup_sqlsvr - backup of SQL Server databases

SYNOPSIS

```
program-directory\bin\swstbackup_sqlsvr [-Xserver Server-Name] [-Xinstance Instance-Name] [-Xdevmap
Device-Map-File] [-suspend|-T] DB-Name-1 DB-Name-2,,,DB-Name-i
```

DESCRIPTION

This command backup SQL Server databases. The command, in cooperation with SQL Server, performs a copy of data on the target database volumes on to backup volumes by executing swstbackup (Backup execution command).

When swststartsync (Backup synchronous processing start command) is executed in advance of the backup synchronous processing and the Chapter 5 Backup Process That Uses the Suspend/Resume Function is used for synchronous high-speed backup, execute the backup command with -suspend specified and suspend the backup synchronous processing.

The database backup history information will be stored in msdb of SQL Server. The database volume backup history information will be stored in the management files of AdvancedCopy Manager.

OPTIONS

-Xserver *Server-Name*

Specifies the virtual server name of a connected SQL Server in the case of cluster operation. In the case of operation without cluster, this option need not be specified.

-Xinstance *Instance-Name*

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection will be made to the default instance.

-Xdevmap *Device-Map-File*

Specifies performing the backup to a specified backup volume. Specify a device map file name that describes combinations of database volumes and destination backup volumes. If this option is not specified, the target backup volume will be automatically selected. Specify a device map file name by using an absolute pathname.

-suspend

This results in synchronous high-speed backup using the Chapter 5 Backup Process That Uses the Suspend/Resume Function.

-T

Specifies that the differential snapshot high-speed backup is to be executed.
This option cannot be specified during synchronous processing.
This option is valid only for copying within a cabinet when the ETERNUS Storage System supports the QuickOPC function.
For snapshot high-speed backup without specifying this option, ordinary snapshot processing (i.e., OPC without using the QuickOPC function) is started. This option must always be specified to perform a backup operation using differential snapshots.

OPERANDS

DB-Name,,,DB-Name-i(i=1,2,,,,64)

Specifies database names. Delimit by a single blank or the tab character and specify the database names when you specify two or more databases. No more than 64 database names can be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Backup the databases DB01, DB02, and DB03 of virtual server VSERVER. (Assume that the logical node name of AdvancedCopy Manager is nodeAGT.)

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbackup_sqlsvr –Xserver VSERVER DB01 DB02 DB03
DB01 DB02 DB03 swstbackup_sqlsvr completed
C:\>
```

・ Backup the databases (DB01, DB02 and DB03) specifying the destination backup volumes by the device map file (G:\STGADM\devmap.txt).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbackup_sqlsvr -Xserver VSERVER -Xdevmap G:\STGADM
\DEV.map DB01 DB02 DB03
DB01 DB02 DB03 swstbackup_sqlsvr completed
C:\>
```

NOTES

・ This command uses swstbackup (Backup execution command) to back up database volumes where database files are located. The backup execution command locks database volumes during pre-processing, executes the backup process, and unlocks database volumes during post-processing. Transaction volumes where SQL Server database files are located cannot be locked because SQL Server uses these transaction volumes.

・ Therefore, create a transaction volume locking specification file for backups, and configure it so that the transaction volumes where SQL Server database files are located are not locked and the respective file system buffer is only flushed. For an explanation on how to configure this, refer to 9.3.1.3 Create a transaction volume locking specification file for backups

・ You cannot perform backup in the following cases:

  - A specified database does not exist (This includes the case where neither the virtual server nor the instance exist).

  - In the case that two or more databases are specified, not all of the specified databases are databases of the same instance (In the case where -Xinstance option is not used, the processing is done to the default instance. In the case where -Xinstance option is used, the processing is done to the specified named instance).

  - A volume where the specified database is placed is not registered as a transaction volume.

  - Backup policy is not set for a database volume to be backed up.

  - A backup that was executed one generation earlier was unsuccessful.

  - Restore is being performed using backup history information that will cause a generation overflow.

  - No unused backup volume could be found for use as the copy destination.

  - A drive letter has been assigned to a backup volume to be used as the copy destination.

  - The synchronous processing between the database volumes and the backup volumes is not in equivalency maintenance state.

  - After operation has begun, any of physical information (i.e., the box identifier, OLU number, EXTENT start position, or EXTENT size) of a volume has been changed.

  - If a database volume is an SDX object (SynfinityDISK), the state of the SDX object is not in the following states:

    - The mirror volume is ACTIVE or STOP.

    - The mirror slices are ACTIVE or STOP.

    - The state of SDX Disk is ENABLE.

  - 65 or more databases have been specified.

  - A backup volume could not be locked

  - The backup volume locking specification file for backups is invalid

・ You cannot specify a destination backup volume and perform backup if:

  - The backup volume specified in a device map file cannot be used as the destination backup volume for a corresponding database volume. In other words, not all the following conditions are met:

    - The specified backup volume is unused.

    - The database volume and the backup volume have the same partition size.

- The description on a target database volume of the device map file has an error.

・ If this command is executed during the execution of snapshot processing, stop the copy processing that is in progress and start the snapshot processing again.

・ This command backup two or more databases at the same time by specifying the operand. When, for example, two or more databases exist on one partition, or physical files of multiple databases exist together on volumes, perform the backup of all the databases which exist on the volumes by using this function.

・ This command freezes all the databases specified in operand by SQL Server until backup processing is completed. Thus, if the volumes where database files exist are independent in each database, back up each database two or more times to shorten the time they remain frozen as much as possible.

・ The advanced copy which makes an SDX object (SynfinityDISK) backup volume is not supported now. Therefore, only the advanced copy from a database volume which is an SDX object to a backup volume which is a non-SDX object can be used.

- Use the COPY command if you need to copy data to a SDX object.

・ Because the process of securing data consistency for database volumes when the backup is performed is done by SQL Server, the pre-processing and post-processing (i.e., volume lock and unlock) are not executed, as they would be with a typical file system volume.

・ If an error occurs while swsrpbackup_sql (SQL Server backup execution command) is processing a database consisting of two or more volumes with this command, processing is interrupted. When you perform synchronous type backup, restart the stopped synchronous processing by using swststartsync (the backup synchronous processing start command).

・ If an error occurs while swstbackup_sqlsvr (SQL Server backup execution command) is processing the database consisting of two or more volumes with swstbackup (Backup execution command), the backup history information on AdvancedCopy Manager may become inconsistent. In order to recover from such an inconsistent state, delete unnecessary history information using swsthistdel (a history information deletion command).

Figure 11.1 Recovery from history iformation inconsistency
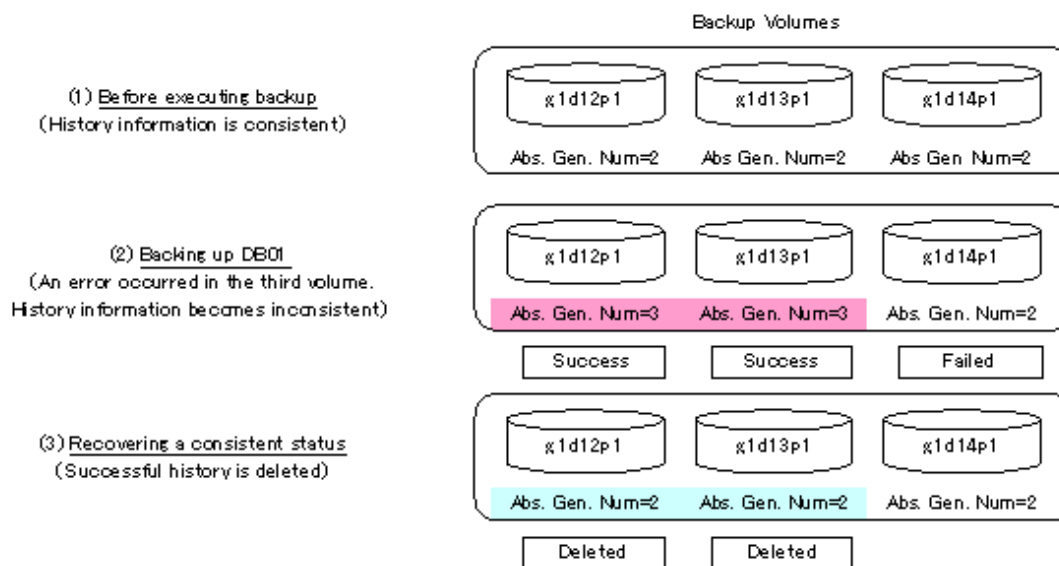
・ Normally, if the existing backup history reaches the maximum number of saved generations specified by swstbkpolset (backup policy setting command), then information on the oldest generation is automatically deleted from the backup history information during the backup process, and the backup volume is cleared. However, if -suspend is specified for the backup history information, then the backup volume with the Suspend state is not cleared and the backup volume remains in use.

・ The transaction volume on which the backup command is executed, one other transaction volume, and the suspended backup volume cannot be specified as backup destinations in the device map file.

・ Before replication is performed in snapshot-type replication, this command option prevents other processes from accessing the replication destination volume in order to protect the process that is accessing the volume. The command accomplishes this by locking

or dismounting the replication destination volume. In cases where the replication destination volume cannot be locked or dismounted, such as those described below, the command terminates with an error:

- The mount point has a directory for mounting another volume.

- The volume contains a file that is being used. If the replication destination volume is being used by a server that is not the server where the command was entered, prevent the replication destination volume from being accessed by canceling share settings or performing dismounting for the replication operation, using the Administrator's authority.

・ This command cannot be executed if any of the following commands are running:

- swstsvrset (Storage Server configuration information setting command)

- swstdevinfoset (Device information setting command)

- swstsrsemtch (Resource match command)

- swstresback (Resource backup command)

- swstresrst (Resource restore command)

11.6.1.2　swstrestore_sqlsvr (SQL Server restore execution command)

NAME

swstrestore_sqlsvr - restores of SQL Server database.

SYNOPSIS

```
program-directory\bin\swstrestore_sqlsvr [-Xserver Server-Name] [-Xinstance Instance-Name] [-Xnolog]
-Xmeta Meta-File-Name DB-Name
```

DESCRIPTION

This command restores a SQL Server database. Enter this command after restoring database files using swstrestore (Restore execution command). This command recreates a database from restored database files. To perform recovery after this command has been executed, apply logs using Enterprise Manager/Management Studio or Transact-SQL.

OPTIONS

-Xserver *Server-Name*

Specifies the virtual server name of a connected SQL Server in the case of cluster operation. In the case of operation without cluster, this option need not be specified.

-Xinstance *Instance-Name*

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection will be made to the default instance.

-Xnolog

Specifies restoring a DB to a backup point, without applying logs. If this option is not specified, the DB will be restored to a backup point but cannot be used until logs are applied to it. Apply logs using Enterprise Manager/Management Studio or Transact-SQL.

-Xmeta *Meta-File-Name*

Specifies a metadata file name, using an absolute pathname. A metadata file will be stored as "db-name.swst-dmp" in the same folder as the primary data file. To confirm file identification numbers of database files, use the Transact-SQL "USE DB-Name EXEC SP_HELPFILE". After this command closes, the metadata file is deleted.

OPERANDS

DB-Name

  Specifies a database name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

・ Restore a database (DB01) using its backup data. The file restore using swstrestore has been completed and a metadata file exists at D:\SQLSVR\DB01.swst-dmp.

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32\AdvancedCopyManager\bin\swstrestore_sqlsvr -Xserver VSERVER -Xmeta D:\SQLSVR
\DB01.swst-dmp DB01
DB01 swstrestore_sqlsvr completed
C:\>
```

NOTES

・ You cannot specify a target backup volume and perform backup if:

  - Neither the virtual server nor the instance exists

・ By choosing whether or not to apply logs, you can select one of the following two restore methods:

  - Restore to a backup point (i.e., only restoring backup data)

  - Restore to the latest point or a specific point (i.e., restoring backup data and then applying logs)

11.6.2 Replication Management Commands

Swsrpbackup_sql and swsrprestore_sql are used in the backup operation of SQL Server by the replication management function.

11.6.2.1 swsrpbackup_sql (SQL Server backup execution command)

NAME

swsrpbackup_sql - backup of SQL Server databases.

SYNOPSIS

```
program-directory\bin\swsrpbackup_sql  [-Xserver Server-Name] [-Xinstance Instance-Name] -Xdevmap
Device-Map-File [-m] [-t] [-T] DB-Name-1 DB-Name-2,,,DB-Name-i
```

DESCRIPTION

This command backup of SQL Server databases. This command, in cooperation with SQL Server, performs copy of data of the target database volumes on to backup volumes by executing swsrpmake (Replication creation command). The database backup history information will be stored in msdb of SQL Server.

OPTIONS

-Xserver *Server-Name*

Specifies the virtual server name of a connected SQL Server in the case of cluster operation. In case of operation without cluster, this option is not necessary.

-Xinstance *Instance-Name*

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection will be made to the default instance.

-Xdevmap *Device-Map-File*

Specify a device map file name that describes combinations of database volumes and destination backup volumes. Specify a device map file name using an absolute pathname.

-m

For backup server type operation (i.e., server-to-server replication), this option specifies that communication processing with the backup server (i.e., a non-operation server) is not performed. When it is specified, volume status check processing and pre-processing and post-processing are not performed for the backup volume. This option is valid only during backup server type operation.

-t

Specifies that the pre-processing and post-processing for a backup volume (i.e., the copy 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 unique pre-processing and post-processing scripts are inserted before and after the AdvancedCopy Manager command (respectively).

-T

Specifies that the differential snapshot high-speed backup will be executed.
This option cannot be specified during synchronous processing.
This option is valid only for copying within a cabinet when the ETERNUS Storage System supports the QuickOPC function.
For the snapshot high-speed backup without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be always specified to perform a backup operation using differential snapshots.

OPERANDS

DB-Name-1 DB-Name-2,,,DB-Name-i

Specifies database names. Delimit by the half-size blank or the tab character and specify the database names when you specify two or more databases. No more than 64 database names can be specified.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

· Backup the databases DB01, DB02, and DB03 of virtual server VSERVER. (Suppose that the logical node name of AdvancedCopy Manager is nodeAGT.)

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_sql -Xserver VSERVER -Xdevmap G:\STGADM
\devmap.txt DB01 DB02 DB03
DB01 DB02 DB03 swsrpbackup_sql completed
C:\>
```

NOTES

- You cannot perform backup in the following cases:

    - A specified database does not exist. (This includes the case where neither the virtual server nor the instance exists).

    - In the case of specifying two or more databases, all of the specified databases are not databases of the same instance (When the -Xinstance option is not used, the processing is performed on the default instance. When the -Xinstance option is used, the processing is performed on the specified named instance).

    - The specified device map file does not exist.

    - The description of the device map file on the target database volume has an error (refer to "9.4.1.3 Prepare a device map file")

    - The database volumes and backup volumes described in the device map file are not registered as original volumes and replica volumes, respectively.

    - Synchronous processing between the database volumes and the backup volumes described in the device map file is not in equivalency maintenance state.

    - After operation has begun, any of physical information (i.e., box identifier, OLU number, EXTENT start position, or EXTENT size) of a volume has been changed.

    - A database volume has multiple mount points.

    - If a database volume is an SDX object (when using SynfinityDISK), the state of the SDX object is not in the following states:

        - The mirror volume is ACTIVE or STOP.

        - The mirror slices are ACTIVE or STOP.

        - The state of SDX Disk is ENABLE.

    - When all the backup volumes are volumes on the database server, the m option is specified.

    - For backup server type operation (server-to-server replication), the Storage Server on which the command is executed is not the operation server of the corresponding replication volumes.

    - For backup server type operation (i.e., server-to-server replication), communication with a destination server fails.

    - Too many (i.e., 65 or more) databases were specified.

    - When the replication destination volume cannot be locked

    - When the contents of the replication destination volume lock operation specification file are invalid

- Perform drive letter release or dismount of copy destination volume before executing a command when the intended backup corresponds to either of the following conditions:

    - When a replication is performed between different OSs

    - When the sizes of the replication source volume and the replication destination volume differ

  If neither drive letter release nor dismount are performed in the above-mentioned case, post-processing of the copy target volume at the time of backup produces as an error.

- If this command is executed during the running of snapshot processing, stop the copy processing that is in progress and start the snapshot processing again.

- This command can back up two or more databases at the same time by specifying the operand. When, for example, two or more databases exist on one partition, physical files of multiple databases exist together on different volumes, perform the backup of all the databases which exist on the volumes by using this function.

- This command freezes all the databases specified by SQL Server until backup processing is completed. Thus, if the volumes where database files exist are independent for each database, back up each database two or more times to reduce the frozen time as much as possible.

- The advanced copy which makes an SDX object (SynfinityDISK) backup volume is not supported now. Therefore, only the advanced copy from a database volume which is an SDX object to a backup volume which is a non-SDX object can be used.

    - Use the COPY command when you need to copy data to an SDX object.

- Because the process of securing data consistency for database volumes when the backup is performed is done by SQL Server, the pre-processing and post-processing (i.e., volume lock and unlock) are not executed, as they would be in a typical file system.

- If an error occurs while swsrpbackup_sql (SQL Server backup execution command) is processing a database consisting of two or more volumes with this command, processing is interrupted. When you perform synchronous type backup, restart any stopped synchronous processing by using swsrpstartsync (Backup synchronous processing start command).

- Before replication is performed in snapshot-type replication, this command option prevents other processes from accessing the replication destination volume to protect the process that is accessing the volume. The command accomplishes this by either locking or dismounting the replication destination volume. In cases where the replication destination volume cannot be locked or dismounted, such as those described below, the command terminates with an error:

  - The mount point has a directory for mounting another volume.

  - The volume has a file that is being used. If the replication destination volume is being used by a server that is not the server where the command was entered, prevent the replication destination volume from being accessed by canceling share settings or performing a dismount for the replication operation, using the Administrator's authority.

- This command can be executed only while none of the following commands are running:

  - swsrpsetvol (Replication volume information setting command)

  - swsrpdelvol (Replication volume information deletion command)

  - swsrprecoverres (Resource adjustment command)

11.6.2.2   swsrprestore_sql (SQL Server restore execution command)

NAME

swsrprestore_sql - restores an SQL Server database

SYNOPSIS

```
program-directory\bin\swsrprestore_sql [-Xserver Server-Name] [-Xinstance Instance-Name] [-Xnolog] -
Xmeta Meta-File-Name DB-Name
```


DESCRIPTION

This command restores an SQL Server database. Enter this command after restoring database files using swsrpmake (Replication creation command). This command recreates a database from restored database files. To perform recovery after this command is executed, apply logs using Enterprise Manager/Management Studio or Transact-SQL.

OPTIONS

-Xserver *Server-Name*

Specifies the virtual server name of a connected SQL Server in case of cluster operation. In case of operation without cluster, this option need not be specified.

-Xinstance *Instance-Name*

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection will be made to the default instance.

-Xnolog

Specifies the restoration of a DB to a backup point, without applying logs. If this option is not specified, the DB will be restored to a backup point but cannot be used until logs are applied to it. Apply logs using Enterprise Manager/Management Studio or Transact-SQL.

-Xmeta *Meta-File-Name DB-Name*

Specifies a metadata file name, using an absolute pathname. A metadata file will be stored as "db-name.swsrp-dmp" in the same folder as the primary data file. To confirm file identification numbers of database files, use the Transact-SQL "USE DB-Name EXEC SP_HELPFILE". After this command closes, the metadata file is deleted.

OPERANDS

DB-Name

Specifies a database name.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Restore a database (DB01) using its backup data. The file restore using swstrestore has been completed and a metadata file exists at D:\SQLSVR\DB01.swsrp-dmp.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta D:\SQLSVR
\DB01.swsrp-dmp DB01
DB01 swsrprestore_sql completed
C:\>
```

NOTES

- You cannot specify a target backup volume and perform backup if:

  - Neither the virtual server nor the instance exist

- By choosing to apply logs or not, you can select one of the following two restoration methods:

  - Restore to a backup point (ie, only restoring backup data)

  - Restore to the latest point or to a specific point (ie, restoring backup data and then applying logs)

11.7 SnapOPC/SnapOPC+ Support Commands

This section explains the commands can be used to execute SnapOPC/SnapOPC+.

🔔 Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

Table 11.31 Operating environment when executing SnapOPC/SnapOPC+ support commands

Command	Operating environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

   ```
   set SWSTGNODE=logical-node-name
   ```

2. Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable.

Table 11.32 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstestupdate	Not required	Transaction operation node	-
swstsdv	Not required	Transaction operating node	-

11.7.1 swstestupdate (Update volume measurement command)

NAME

swstestupdate - measures the physical capacity of a Snap Data Volume

SYNOPSIS

When starting update volume measurements (setting up a pseudo session)

```
program-directory\bin\swstestupdate start Volume-Name
```

When looking up the update volume (displaying the status of the pseudo session)

```
program-directory\bin\swstestupdate status Volume-Name
```

When finishing update volume measurements (canceling the pseudo session)

```
program-directory\bin\swstestupdate stop Volume-Name
```

DESCRIPTION

This command measures the physical capacity of a Snap Data Volume using the pseudo session setting function.

When starting update volume measurements (setting up a pseudo session)

Specify "start" as the subcommand to start measure of the physical capacity of a Snap Data Volume.

When looking up the update volume (displaying the status of the pseudo session)

Specify "status" as the subcommand to display the physical capacity of a Snap Data Volume.
The following information will be displayed:

Title	Description
Volume-Name	The volume name.
Update	The amount of data that has been updated since measurements started in the number of blocks (1 block = 512 bytes).

Title	Description
	Displays "----" if there is no pseudo session. Displays "failed" if the pseudo session is error-suspended.

When finishing update volume measurements (canceling the pseudo session)

Specify "stop" as the subcommand to stop measure of the physical capacity of a Snap Data Volume

OPERANDS

Volume-Name

- Specifies the volume name.
  Specify a copy source volume that is used with SnapOPC/SnapOPC+ operations

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Measure the update volume

```
(Start taking measurements by starting a pseudo SnapOPC/SnapOPC+)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate start g1d1p1
g1d1p1 swstestupdate completed

(First measurement)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate status g1d1p1
Volume-Name Update
g1d1p1      644333

(Second measurement)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate status g1d1p1
Volume-Name Update
g1d1p1      1045000

(Stop taking measurements by canceling the pseudo SnapOPC/SnapOPC+)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate stop g1d1p1
g1d1p1 swstestupdate completed
C:\>
```

NOTES

- The amount of data updated cannot be measured in the following cases:

  - When the specified volume does not exist.

  - When the ETERNUS Storage System device does not support the SnapOPC/SnapOPC+ function.

  - When the pseudo session has already been set up (i.e., when the "start" option is specified).

  - When the pseudo session does not exist (i.e., when the "stop" option is specified).

11.7.2 swstsdv (Snap Data Volume operation/reference command)

NAME

swstsdv - Initialize or display the Snap Data Volume

SYNOPSIS

Snap Data Volume initialization

```
Program directory\swstsdv init Volume-Name
Program directory\swstsdv init -G Access-Path-Name LU-Number
```

Snap Data Volume status display

```
Program directory\bin\swstsdv stat Volume-Name
Program directory\bin\swstsdv stat -G Access-Path-Name LU-Number
```

Snap Data Pool status display

```
Program directory\swstsdv poolstat -G Volume-Name
```

DESCRIPTION

Snap Data Volume initialization/status display and Snap Data Pool status display are all possible. Specify one of the following subcommands according to the contents you want to operate on, and then execute the subcommand.

Snap Data Volume initialization

Specify "init" as the subcommand to initialize the Snap Data Volume.
Initialize the Snap Data Volume when SnapOPC/SnapOPC+ is not running.
All the data in the Snap Data Volume is destroyed in the initialization of the Snap Data Volume. For this reason, the following procedure is recommended.
(Creation of the access path and collection of the LU-Number must be completed before logical volume manager operations.)

1. If there is necessary data in the Snap Data Volume, back it up in advance using the relevant OS command.

2. Initialize the disk management information.
   Set the target Snap Data Volume (physical disk) outside logical volume manager management when there is a logical volume manager operation.

3. Initialize the Snap Data Volume using this command.
   Initialize the information using the access path when there is a logical volume manager operation.

Snap Data Volume status display

Specify "stat" as the subcommand to display Snap Data Volume logical capacity, physical capacity, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number on the ETERNUS Storage System. The format used for the display is "<decimal>(<hexadecimal>)".
Rate	Displays the Snap Data Volume usage as a percentage (%).
Logical	Displays the Snap Data Volume logical capacity. The unit used for display is 'sector'.
Physical	Displays the Snap Data Volume physical capacity. The unit used for display is 'sector'.
Used	Displays the amount of Snap Data Volume used space. The unit used for display is 'sector'. The capacity for both Copy usage (Note) and Host usage (Note) is displayed.

Title	Description
Copy	For the space used in the Snap Data Volume, Copy usage (Note) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Volume, Host usage (Note) is displayed. The unit used for display is 'sector'.
Pool	Displays the Snap Data Pool usage allocated to the Snap Data Volume. The unit used for display is 'sector'.

Note:
Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.
Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Snap Data Pool status display

Specify "poolstat" as the subcommand to display the Snap Data Pool total amount, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
Pool-Type	Displays the Snap Data Pool type. Normal Encrypted
Rate	Displays the Snap Data Pool usage rate (%).
Total	Displays the Snap Data Pool total amount. The unit used for display is 'sector'.
Used	Displays the Snap Data Pool used space capacity. The unit used for display is 'sector'. The capacity for both Copy usage (Note) and Host usage (Note) is displayed.
Copy	For the space used in the Snap Data Pool, Copy usage (Note) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Pool, Host usage (Note) is displayed. The unit used for display is 'sector'.
Free	Displays the Snap Data Pool unused space capacity. The unit used for display is 'sector'.

Note:
Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.
Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

OPTIONS

Specific options of Snap Data Volume initialization(init)

-G *Access-Path-Name*

Specifies the access path (Access-Path-Name).
For details on access paths, refer to "Creating an access path"

Specific options of Snap Data Volume status display(stat)

-G *Access-Path-Name*

Specifies the access path (Access-Path-Name).
For details on access paths, refer to "Creating an access path"

Specific options of Snap Data Pool status display(poolstat)

-G *Access-Path-Name*

Specifies the ETERNUS Storage System volume (Volume-Name).
If a Snap Data Volume is specified with insufficient capacity however, an error occurs in the command. In this case, specify an

access path for which there is sufficient capacity.

For details on access paths, refer to "Creating an access path"

OPERANDS

Specific operands of Snap Data Volume initialization(init)

Volume-Name

Specifies the volume name (AdvancedCopy Manager device name) of the Snap Data Volume to be initialized.
If a partition (slice) has been specified, the Logical Unit (disk) on which the partition (slice) exists is initialized.

LU-Number

Specifies the ETERNUS disk array logical unit number.
This value is specified as a decimal.

Specific operands of Snap Data Volume status display(stat)

Volume-Name

Specifies the Snap Data Volume volume name (AdvancedCopy Manager device name).
If a partition (slice) has been specified, the information about the Logical Unit (disk) on which the partition (slice) exists is displayed.

LU-Number

Specifies the ETERNUS Storage System logical unit number.
This value is specified as a decimal.

EXIT STATUS

=0:Completed successfully

>0:Terminated abnormally

EXAMPLES

- Snap Data Volume is initialized.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv init g3d110
swstsdv init completed
C:\>
```

- The LU-Number (110) volume is initialized using the access path following insufficient capacity.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv init -G g3d24 110
swstsdv init completed
C:\>
```

- The Snap Data Volume status is displayed.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv stat g3d110
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
0%   8388608         1048576          0            0            0            0
C:\>
```

- The LU-Number (110) status is displayed using the access path.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsdv stat -G g3d24 110
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
```

```
0%   8388608        1048576         0            0            0            0
C:\>
```

- The Snap Data Pool status is displayed by specifying the access path.

```
C:\>C:\Win32app\AdvancedCopyManager\bin>swstsdv poolstat -G g3d24
BoxID = 00E4000M3#####E450S20A####KD4030639004##
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
Normal    10%  20971520      2097152      0            2097152      18874368
Encrypted 0%   20971520      0            0            0            20971520
C:\>
```

NOTES

- When there is insufficient Snap Data Volume capacity, operations are possible using the access path and ETERNUS disk array logical unit number (LU-Number).
  When there is insufficient Snap Data Volume capacity, however, and "stat" is specified in the subcommand and an attempt is made to check the LU-Number of the Snap Data Volume with insufficient Snap Data Volume capacity, an access error occurs when the attempt to access the Snap Data Volume with insufficient Snap Data Volume capacity is made. In this case, an error occurs in the command and it is not possible to check the LU-Number.
  For this reason, you must check the LU-Number in advance and remember it.

11.8 Troubleshooting data collection command

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

11.8.1 acmcapture (Troubleshooting data collection command)

NAME

acmcapture - Collection of AdvancedCopy Manager troubleshooting dataacmcapture

SYNOPSIS

```
<ACM_executable_directory>\bin\acmcapture.bat dirname
<ACM_GUI_directory>\acmcapture.bat dirname
```

DESCRIPTION

This command collects AdvancedCopy Manager troubleshooting data. Data is collected for all ACM components installed on the server where this command is executed.

Only a user belonging to the Administrators group can execute this command. When collecting the data for GUI Client, login to the server in which it is installed and execute the command. When logging in to the server, use the account used to launch the GUI Client.

Troubleshooting data file name

Destination directory name for saving troubleshooting data

The collected data is stored in a directory with the "acmcapture_HOSTNAME_YYYYMMDD_ttmmss" format under the directory specified for "dirname".

The name of the host where the command is executed is used for HOSTNAME. If characters other than alphanumerics and hyphens are used in the host name, then "NOHOSTNAME" is used as the host name. Values are truncated to 15 characters.

- For YYYYMMDD, YYYY is the year, MM is the month, and DD is the day.

・ For ttmmss, tt is the hour, mm is minutes, and ss is seconds.

OPERANDS

dirname

> Directory where the troubleshooting data is stored.
>
> Specify a directory with plenty free space - 500MB or more is recommended. Regard 500MB as a rough guide, since the size of the troubleshooting data will vary depending on the system environment and conditions. If there is not enough free space, then this command will terminate abnormally without collecting troubleshooting data.
>
> Specify an existing directory, otherwise this command will terminate abnormally without collecting troubleshooting data.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

・ Collect data to the C:\temp directory.

```
C:\> C:\Win32app\AdvancedCopyManager\bin\acmcapture.bat C:\temp
Executing........................................
Completed.
OUTPUT=C:\temp\acmcapture_srv01_20090323_094614
```

NOTES

・ For systems with a cluster configuration, please mount the shared disk by either of node. to gather information on the shared disk. And execute this command. at both nodes.

・ Execute this command when other AdvancedCopy Manager commands are in the stopped state. Data collection may not be performed correctly if other AdvancedCopy Manager commands are running.

Chapter 12 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

12.1 Notes on Backup and Replication Operation

This section provides notes on backup and replication.

12.1.1 General notes

This section provides general notes on backup and replication.

12.1.1.1 Size of a Partition

A transaction volume and a backup volume must have the same size.

However, because the OS control space is automatically allocated, not all of the space specified on Disk Management will be usable for the following disks:

- Basic logical disk in the beginning of a disk (i.e., the leftmost on Disk Management)

- All the extended logical disks

Figure 12.1 Available Size of a Partition
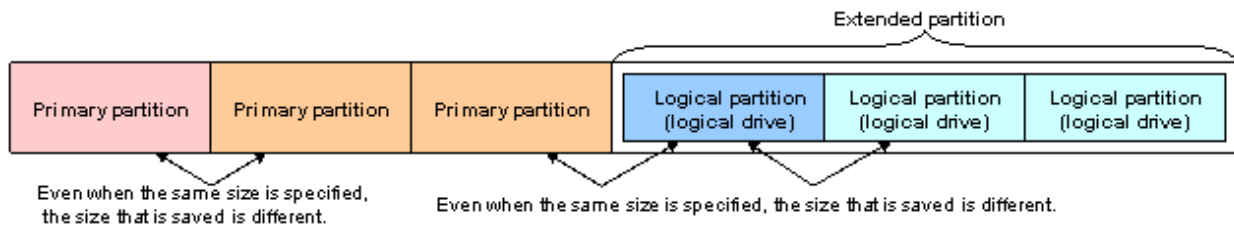
Create partitions for the transaction and backup volumes in the same size and combination as shown below.

Figure 12.2 Combination of Transaction and Backup Volume
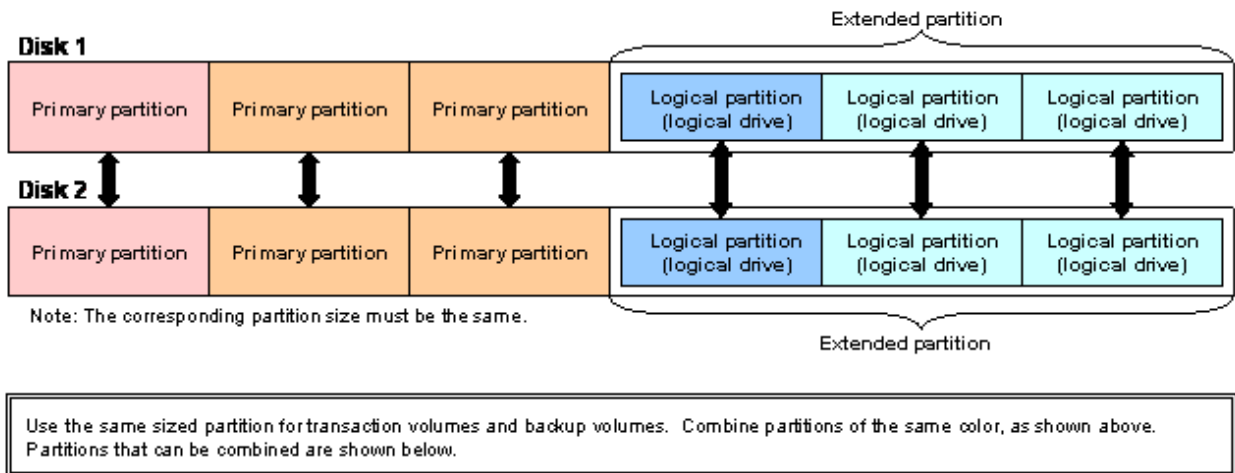
Combination patterns	Transaction volumes	Backup volumes
Combination 1	1st primary partition	1st primary partition
Combination 2	2nd-4th primary partition	2nd-4th primary partition
Combination 3	1st logical partition	1st logical partition
Combination 4	2nd logical partition and thereafter	2nd logical partition and thereafter

Figure 12.3 Example of a Disk with Partitions of Different Sizes
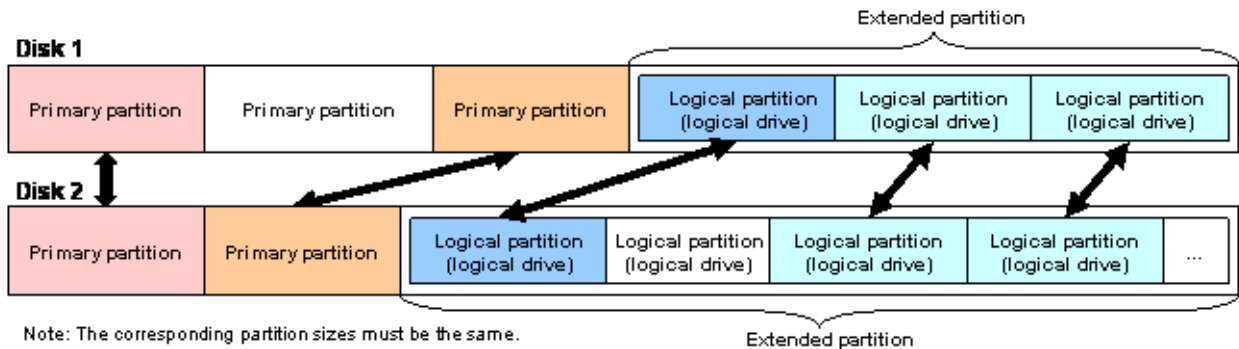
If you are creating the source and destination volumes in the same size for replication, create partitions in the combination as shown above.

🅿 Point
. . . .

To prevent an operational error, you are recommended to define as extended logical disks all the logical disks on an ETERNUS storage system to be managed by AdvancedCopy Manager.
If you cannot define all the logical disks as extended logical disks, you are recommended to use the same configuration for a partition, including a device defined as a transaction volume and a partition with a device defined as a backup volume.
. . . .

🅿 Point
. . . .

When performing replication with servers that use different Windows operating systems (e.g., WindowsNT, Windows Server 2003, or Windows Server 2008), even if it uses the same file definitions on each server, the size of the partition created by each OS may differ. In this case, please define it as a replication target that allows for expansion.
. . . .

12.1.1.2 Layout of Partition

If basic and extended logical disks are mixed in one Logical Unit (disk), be sure to create an extended logical disk after a basic logical disk (i.e., on the right side on Disk Management). Do not create a basic logical disk after an extended logical disk.

🛈 Note

If you do, a mismatch will occur between the order of logical disks output on Disk Management and the logical disk numbers on the device or block device name displayed on the management window of AdvancedCopy Manager. The following example provides detailed information:

Figure 12.4 Assigned Number for a Partition
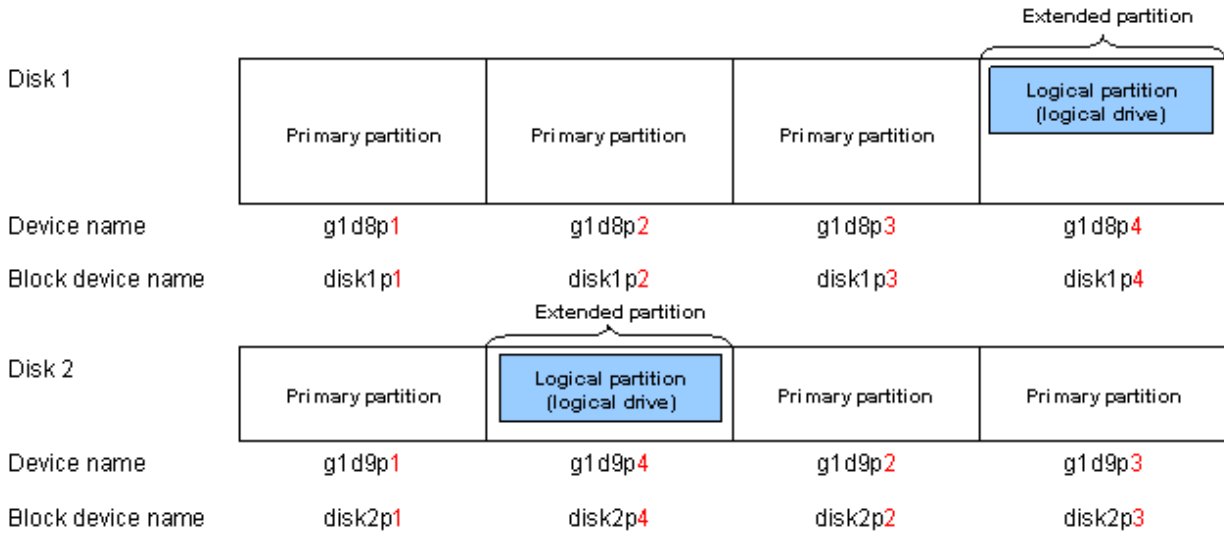
AdvancedCopy Manager sets the managed partition numbers in the following order.
1) Counted from the left of the primary partition to the right
2) The logical partition of the extended partition is counted from the left to the right
For this reason, if there is an extended partition before (to the left of) the primary partition, the disk manager display number and the partition number managed by AdvancedCopy Manager (shown in red above) do not match.

12.1.1.3 Backup and Replication Exclusions

The following devices must not be backed up or replicated:

- The device on which AdvancedCopy Manager has been installed

- The device on which the management list of AdvancedCopy Manager resides

12.1.1.4 Consistency of data on volumes

Table 12.1 Consistency of data on volumes

Data in transaction volume	Data consistency	Action to take
Oracle database space that is currently in use	Linkage with Oracle is required.	Use a sample script designed for linkage with Oracle. For details of sample scripts, refer to "Appendix B Sample Script for Backup Operations".

Data in transaction volume	Data consistency	Action to take
Exchange database space that is currently in use	AdvancedCopy Manager commands link with Exchange Server to ensure data consistency.	Refer to "Chapter 8 Backing Up and Restoring Exchange Server Databases".
SQL Server database space that is currently in use	AdvancedCopy Manager commands link with SQL Server to ensure data consistency.	Refer to "Chapter 9 Backup and Restore of an SQL Server Database".
Used for data other than the above	AdvancedCopy Manager commands lock volumes to ensure data consistency.	Refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration", and "Appendix C Pre-processing and Post-processing of Replication".

12.1.1.5 Fetching Device Information

Before starting either the backup or replication operation, 4.4.5 Fetching device information on a Storage Server that is managed by all the Storage Servers using the GUI client of AdvancedCopy Manager. The time taken to complete this operation is proportional to the total number of devices defined on the selected storage servers. If many devices are involved, perform this operation while the CPU or I/O load on the system is low.

As a guide, about 0.5 seconds are required per device (i.e., partition) when there is no load on the system.

However, when synchronous backup processing or synchronous replication processing is being performed, it may not be possible to accurately obtain device information. Therefore, only obtain device information when synchronous processing is not being performed.

12.1.1.6 Changing Device Configuration

The device configuration of a volume defined as a transaction, backup, or replication volume can be changed in the following ways:

- ・ Deleting a logical drive in the primary or extended partition

- ・ Adding a primary or extended partition or a logical drive

- ・ Changing the partition type (e.g., primary or extended partition)

- ・ Changing the capacity of the logical drive in the primary or extended partition

To change the device configuration of a transaction or backup volume, deregister the volume, change the device configuration, and then reregister it as a volume of AdvancedCopy Manager.

This processing applies to all the volumes in a disk that stores a volume with a device configuration that is to be changed.

For information on a detailed procedure to perform this, see "10.5.5 Changing the device configuration".

12.1.1.7 Running Software

All the devices are always in use while any of the following software is running. Therefore, before performing backup, restoration, or replication, perform the following steps:

Software which locks a disk (e.g., antivirus software, system surveillance software, etc.)

If you perform backup/restoration and replication, terminate this software temporarily. Do not introduce software which cannot be terminated when required.

SystemWalker/CentricMGR

Temporarily terminate the service of SystemWalker/CentricMGR (i.e., a service displaying as SystemWalker MpTrfExA) before performing backup, restoration, or replication.

SystemWalker/PerfMGR

If you perform backup/restoration and replication, please temporarily terminate the service (e.g., service display name: SystemWalker/PerfMGR DCM and SystemWalker/PerfMGR FCMAC) of SystemWalker/PerfMGR.

Distributed link tracking client service

If you perform backup/restoration and replication, please temporarily terminate the distributed link tracking client service (service display name: Distributed Link Tracking Client).

12.1.1.8 Maximum Number of Simultaneously Executing Operations

An upper limit (maximum value) applies to the number of Advanced Copy sessions in one LU (Logical Unit) that can be executed simultaneously. Ensure the number of volumes in one LU is the same or less than the maximum number of copy sessions per LU.

If a greater number of volumes than the maximum number of copy sessions per LU needs to be created in the LU for operational reasons, operations must be designed to prevent simultaneous execution of more than the maximum number of Advanced Copy sessions to volumes in the same LU.

Refer to the ETERNUS storage system SA/SE Handbook for the maximum number of copy sessions per LU.

12.1.1.9 Dynamic Volume

Dynamic volumes cannot be used as transaction volumes, backup volumes, original volumes, or replica volumes.

12.1.1.10 When mounting a volume to an NTFS folder

- ・ If mounting a volume for backup or replication to an NTFS folder, assign a drive character to a volume other than the volume for backup or replication, and then mount the volume for backup or replication to the subordinate NTFS folder.

- ・ A volume that has other disks mounted to cannot be used for backup or replication.

12.1.1.11 Failure and the mount point of backup

When synchronous high-speed backup is performed, mount point information may not be acquired correctly when you either reboot the system, restart the AdvancedCopy Manager service, or during the failover of the cluster operation.

If mount point information cannot be correctly acquired, the following messages are output and the transaction volume with the mount point cannot be backed up normally:

```
swst0754 The abnormal volume was detected. Volume=[VOLUME], Error=[ERROR]
```

In this case, perform the following steps:

For a transaction volume with a mount point:

Set the option to continue the process even if the mount point cannot be acquired. Create the following files to set the option:

For normal operation (not cluster operation)

```
<Environment settings directory>\etc\backup\data\DEFAULT\check.ini
```

For cluster operation

```
<Logical node environment settings directory>\etc\backup\data\DEFAULT\check.ini
```

The command format is as follows:

```
[check]
MountPointCheck=Force
```

An alert message is displayed when the backup is executed and processing continues.
If the transaction volume is not mounted to the volume that is displayed in the message, the backup is performed normally.
If the transaction volume is mounted to the volume that is displayed in the message, the backup pre-processing is not executed. Execute the backup again after repairing the volume where the problem occurred.

For a transaction volume without a mount point

Set the option to execute the process without acquiring the mount point. Create the following files to set the option:

For normal operation (not cluster operation):

```
<Environment settings directory>\etc\backup\data\DEFAULT\check.ini
```

For cluster operation:

```
<Logical node environment settings directory>\etc\backup\data\DEFAULT\check.ini
```

The command format is as follows:

```
[check]
MountPointCheck=Pass
```

Processing is performed without acquiring a mount point, if it backs up.

12.1.1.12 Error messages displayed an event viewer

· When an application or service accesses the copy destination volume during synchronous processing, the messages shown below as well as other similar messages may be displayed in the event viewer (i.e., in the system log). This occurs if the copy destination volume is set as read-only by the ETERNUS storage system. Since this is not a major problem, it can be ignored. These messages may be displayed frequently, especially when a SystemWalker/CentricMGR service (Service name: SystemWalker MpTrfExA) or a SystemWalker/PerfMGR service (Service name: SystemWalker/PerfMGR DCM and SystemWalker/PerfMGR FCMAC) are used.

Message 1:

[Type]: Warning
[Source]: disk
[Description]: An error was detected on device "\Device\Harddisk?\DR?" during a paging operation.

"?" is the disk number of the copy destination volume in the synchronous processing.

Message 2:

[Type]: Error
[Source]: ntfs
[Description]: The file system structure on the disk is corrupt and unusable. Please run the Chkdsk utility on the volume "Name".

Message 3:

[Type]: Warning
Source]: ftdisk
[Description]: The system failed to flush data to the transaction log. Corruption may occur.

· Although an error is logged to an event viewer (i.e., in an application log) as a replication problem when there is no entry for a display (e.g., during the execution of a command), please ignore, as it is not a problem you need to be concerned about.

12.1.1.13 The configuration of a disk

Since the disk must be exclusively accessed from only one server, it is necessary to either set it up so that two or more servers can detect the disk, or if this cannot be done, then so that the two or more servers cannot access the same logical disk.

As this restriction cannot be configured in Windows Server 2003/Windows Server 2008, it will be necessary to set up the appropriate hardware, such as the ETERNUS storage system and a fiber channel switch.

12.1.1.14 Mirroring in SynfinityDISK

In cabinet-to-cabinet mirroring, both systems involved in the mirroring cannot be backed up. If a failure occurs in one of the cabinets involved in the backup process, then the backup process must be switched to operate in another cabinet. Backup destination information must be saved in advance on a secondary medium, such as tape.

12.1.1.15 Notes on copying data

For backup, restoration or replication, lock the volumes to prohibit access to the data in order to ensure data consistency.
Since a volume that is currently in use cannot be locked, any backup, restoration or replication attempt will terminate in an error in this case.

Note the following points on the locking of volumes before making copies of data:

・ No other application should be using any of the volumes. If any of the volumes are being used by another application, terminate the application.

・ No user should be using any of the volumes. If a user is using any of the volumes, ask the user to temporarily stop using it.

・ Disk Management and the Logical Disk Manager Administrative Service should have not been activated. If either or both have been activated, temporarily stop them.

The volumes need to be locked only when a copy command is running. The volumes can resume live operations after the copy has been completed.

12.1.1.16 Notes on using the OS volume shadow copy function

Volumes are locked during backup/restore and replication to prevent data access in order to guarantee data consistency.
If a shadow copy storage area is created on AdvancedCopy Manager source and destination volumes, an error occurs when backup/restore or replication processes are executed because the operating system always uses the volume.
Therefore, create a shadow copy storage area on a volume other than the source and destination volumes.
Note that, if the shadow copy storage area is created on the source volume, a method such as using the -Xflush option to avoid source volume lock processing could be considered, but this is not recommended for the following reason.

・ If copies are made using this method, the shadow copy storage area is copied to the destination volume. The shadow copy storage area on the destination volume will then be recognized and used by the operating system after the operating system restarts. Since locking of the destination volume cannot be prevented, for example, by the use of options, backup/restore and replication processing will cause errors after the operating system restarts.

12.1.1.17 Use of large-capacity disks

If disks that exceed 2 terabytes are used, the GPT disk format must be used as the disk format.

12.1.1.18 Notes on executing Logical Unit (disk) unit copy

Logical Unit (disk unit) copy can be used for replication operations.
Note the following points if Logical Unit (disk unit) copy is executed:

Tape backup

Refer to "System volume backup and restore" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup" for details of the tape backup functions.

Inter-server copy

Both servers must run Version 13.1 or later.

Copying between Logical Units (disks) of different sizes

When copying between Logical Units (disks) of 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. 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.

Duplicate disk management information

Copying between Logical Units (disks) also copies the disk signature (MBR disk format), or the GUID (GPT disk format) disk management information that uniquely identifies disks and partitions, that is included in the Logical Unit (disk). Therefore, after the copy process is executed the system may contain duplicate disk management information.

Disk management information is duplicated when the following types of copying are performed:

- Copying between Logical Units (disks) within a server

- Copying between Logical Units (disks) on different servers, if there are multiple copy destinations within the same copy destination server for the same copy source

- Copying from a volume that has previously been copied to a Logical Unit (disk) that is not the copy source but is on the same server as the copy source

If the operating system detects duplicate disk management information, it changes these to unique values. This will occur if the above types of copying are executed.
If the events described above occur during backup, if a restore operation is required the disk where the disk management information was rewritten will be used.

This causes the following to occur:

- After restore, the drive character assigned to the partitions included in the Logical Unit (disk) may be different to the drive character at the time of backup.
In this case, please correct the drive character assignment after restore.

- If the target is an MSCS shared disk, or the maintenance mode in the WSFC shared disk is ON, MSCS or WSFC will no longer be able to recognize the disk after restore.
In MSCS, take the action described in the Microsoft Corporation Knowledge Base Q305793.

- If the target is a system disk, the following message dialog will be displayed when the system is restarted after the restore:
"Windows has finished installing new devices. The software that supports your device requires that you restart your computer. You must restart your computer before the new settings will take effect. Do you want to restart your computer now? "

In order to avoid the above occurrences, it is recommended to avoid operations that will result in the system containing duplicate disk management information.

Execution of the following types of copying does not result in duplicate disk management information:

- Copying between Logical Units (disks) on different servers, if there is only one copy destination within the same copy destination server for the same copy source

- Copying when the copy destination is a partition. (However, in this case, the copy destination cannot be referenced.)

Notes when executing copy

- If the replication source/destination volume areas for replication management, and the transaction/backup volume areas for backup management duplicate each other, replication management and backup management operations cannot be performed simultaneously for volumes that have duplicate areas.

- Do not create replicas while disk management is running. If a replica is created when disk management is running, the replication destination disk may not be updated correctly if "disk management" is updated. In this case, temporarily end "disk management", then restart it.

12.1.1.19 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:

Combinations for executing copy between different operating systems

		Copy destination	
		slices	Logical Unit (disk)
Copy source	Partition	Y	N
	Logical Unit (disk)	Y	ZN

Y: Possible
N: Not possible

12.1.1.20 Notes when using the -m option

When replication occurs between servers, the -m option can be specified in the following commands in order to avoid communication processing to non-operating servers:

- swsrpstartsync (Replication start command)

- swsrpmake (Replica create command)

- swsrpcancel (Replication cancel command)

When the -m option is specified, any one of the following conditions must apply in order to ensure that problems do not arise as a result of not performing volume pre-processing and post-processing at the non-operating server:

1. The non-operating server has been shut down.

2. Manual pre-processing and post-processing is performed for the volumes on the non-operating server.

3. The target volume is a RAW device (Oracle, etc., that does not need pre-processing and post-processing), rather than a file system.

12.1.1.21 Copy processing performance of Advanced Copy

The Advanced Copy processing is performed by the ETERNUS storage system. Therefore, direct enquiries concerning copy processing performance to the support department for the ETERNUS storage system.

12.1.2 Notes on snapshot high-speed backup

This section provides notes on snapshot backup operation.

Number of Required Backup Volumes

Snapshot high-speed backup requires as many backup volumes as the number of specified backup generations. Accordingly, snapshot backup is disabled if:

- All the specified number of generations have been backed up, and

- There is no new volume that can be used as a backup volume.

Simultaneous Backups

Performing snapshot high-speed backup simultaneously with the same transaction volume specified will perform two backups in parallel.
However, performing snapshot high-speed backup simultaneously more often than the number of preservation generations will cancel the backup operations starting from the oldest one. In other words, you cannot perform more simultaneous backups than the specified number of generations.

SDX Object Backup Operation

If the transaction volume is an SDX object, the backup operation may encounter a hardware problem. In this case, change the backup operation as follows:

1. Start the GUI client. For more information, see "4.4.3 Starting the GUI client".

2. Fetch all the device information from the storage server whose backup operation you wish to change. When you fetch device information, the system will detect a device with the same name as an SDX object whose backup operation can no longer be continued. Move the device to the [Additional instruction device] field. For information on fetching device information, see "4.4.5 Fetching device information on a Storage Server". At this time, do not delete the original SDX object that is displayed in the [Device not detected] field.

3. Set the added SDX object as a transaction volume. For more information, see 4.4.7 Setting the operation type for a device.

4. Set a backup policy for the added SDX object. For more information, see 4.4.9 Setting backup policies.

5. After specifying the added SDX object, perform the backup.

12.1.3 Notes on synchronous high-speed backup

This section provides notes on synchronous high-speed backup.

The processing of the backup

swstbackup (Backup execution command) cannot be executed until the transaction and backup volumes are in an equivalent state.

Backup policy settings

A backup policy can still be set up if the number of registered volumes is enough for snapshot type high-speed backup, even if the number is not enough for synchronous high-speed backup. In this case, synchronous high-speed backup cannot be performed.

The error: loss of delay write-in data

When backup synchronous processing starts, the error "loss of delay write-in data" may occur. If the volume which has generated the error is performing backup synchronous processing, you can ignore the error, since the problem is not in the adjustment of backup data.

12.1.4 Notes on restoration

This section provides notes on restoring data.

Timing of Restoration

If data on a transaction volume has been updated since the latest backup, then if a restore is performed from the backup volume, recently updated data will be overwritten.

Figure 12.5 Notes on restoration of AdvancedCopy Manager
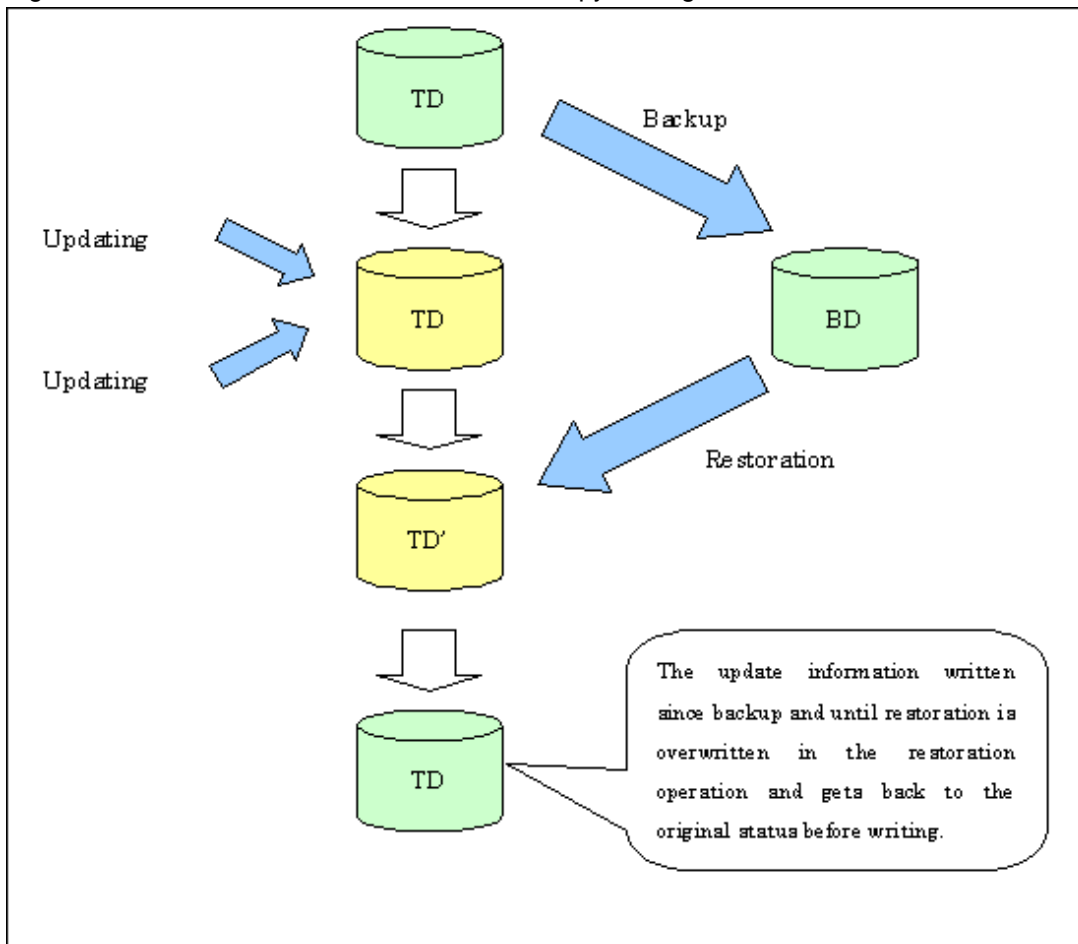
TD: Transaction volume

BD: Backup volume

12.1.5 Notes on cluster operation

When using MSCS or WSFC for 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.

- ・ For backup operations, register the transaction volume and backup volume as physical disk resources.

- ・ For replication operations, register the copy source volume and the copy destination volume (only for replication within a server) as physical disk resources.

- ・ AdvancedCopy Manager uses specific names (gXdXpX) for device administration. It associates the names of devices it is using with those identified by the operating system when its services start. At this time, all devices to be used must be identifiable.
  For cluster operation, set the dependency between volumes used for AdvancedCopy Manager and its services in order to start the disk resources before the services start.
  Set the dependency when you:

  a. Add a transaction to or delete a transaction from the cluster group, or

  b. Add a volume to or delete a volume from a transaction.

Set the dependency using the cluster administrator (MSCS) or failover cluster manager (WSFC) by performing the following steps:

MSCS

🛑 Note

- - If the cluster group to be handled is online, first change it to be offline.

- - Do not change any information other than the dependency.

1. Select the cluster group you want to handle in the cluster administrator window.

2. Double-click the resource (named AdvancedCopy COM Service_logical-node-name) of the communication service to open the properties window.

In the example below, the logical node name is "agent", the shared disk of AdvancedCopy Manager used for shared data is "Disk I", and the shared disk used for transactions for which a dependent resource is to be specified is "Disk J":
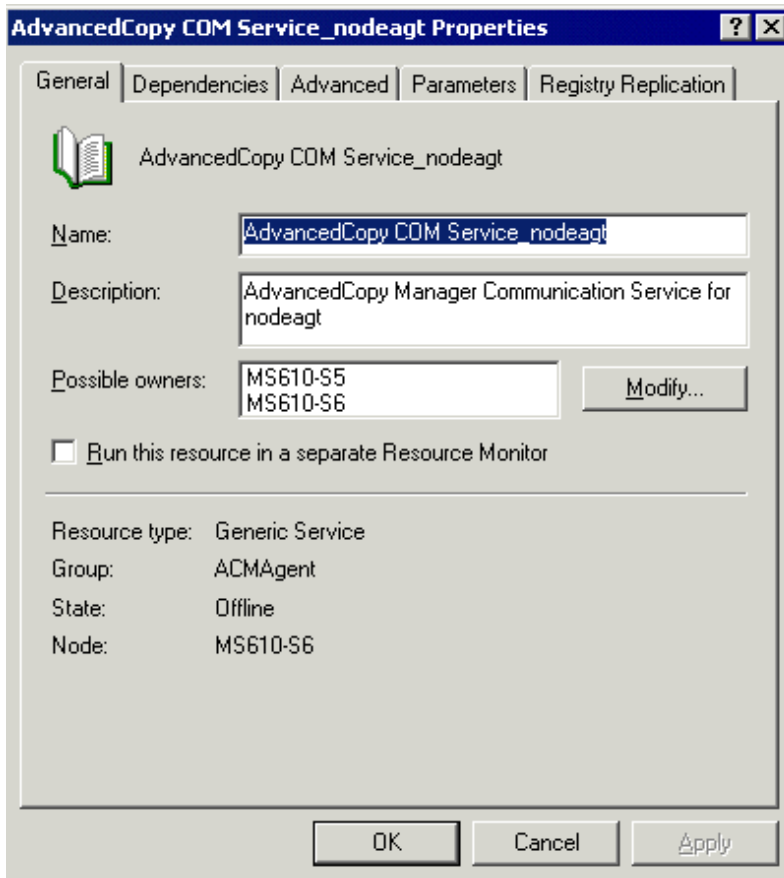
3. From the properties window, open the [Dependencies] tab.
   In the initial state, only the dependency with the shared disk of AdvancedCopy Manager used for shared data has been set.
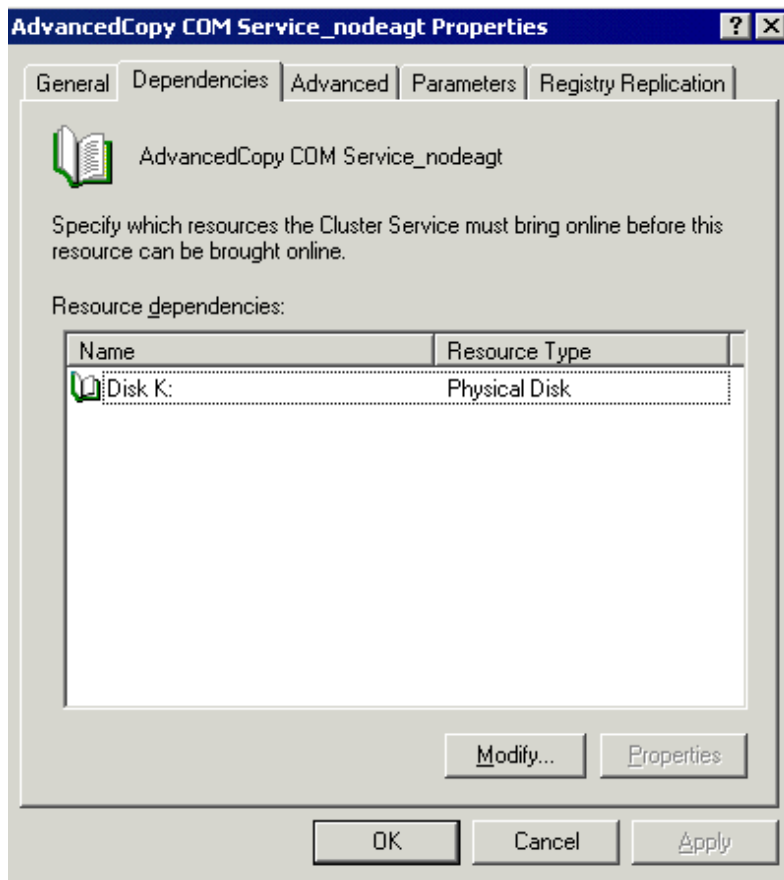
1. In the properties window for the [Dependencies] tab click the "Modify" button.

2. To add a dependency, select a resource (a shared disk resource) from the "Available Resources" list, and then click the "-->" button to add it to the "Dependencies" list.
   To delete a dependency, select a resource (a shared disk resource) in the [Dependencies] list, and then click the "<--" button to move it back to the "Available Resources" list.
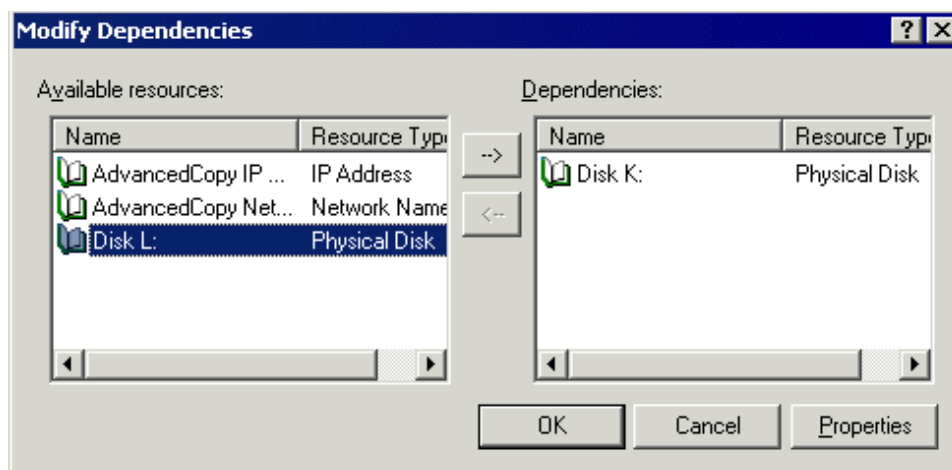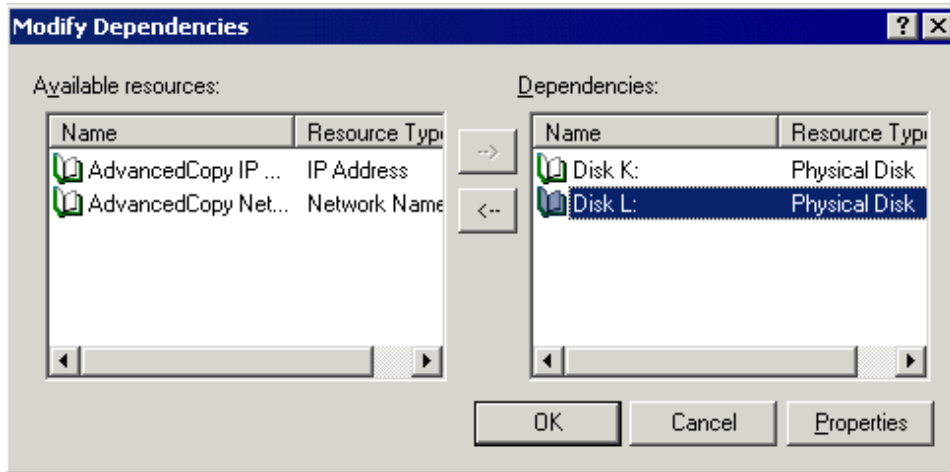
1. Click the "OK" button to complete the modifications.

2. Click the "OK" button again to close the properties window.

WSFC

📖 **Note**

. . . .

- Do not change any information other than the dependency.

. . . .

1. Select the cluster group you want to handle in the "Failover cluster manager" window.

2. In "Services and Applications", select the group to be used in AdvancedCopy Manager.

3. Select Services: [AdvancedCopy COM Service_<logical node name>], and in the [Operations] menu select [Properties].

4. Select the [Dependencies] tab. If the disk used in AdvancedCopy Manager has not been registered, select "Insert" to add the disk.

5. Click the "OK" button to close the properties window.

6. Close the "Failover cluster manager" window.

12.1.6 Notes on backups in cluster operation

When using MSCS or WSFC for cluster operation

For backups in a cluster system, note the following points that do not apply to regular operation:

- If failover occurs while running a backup command, you must ensure consistency by using the resource adjustment command as a recovery measure.

- You must perform backups on the active system of the cluster group because AdvancedCopy Manager is placed in the cluster group and operates as part of the cluster group.

  You cannot make a backup from a standby node or another cluster group.

📖 **Note**

. . . .

From a volume used as a backup volume, delete the drive letter by performing the following steps:
You must take these steps before fetching device information on a storage server:

1. On the primary node, use the Disk Management to delete the drive letter of the backup volume.

2. Change to the secondary node.

3. On the secondary node, use the Disk Management to delete the drive letter of the backup volume.

4. Change to the primary node.

The steps above prevent a drive letter from being assigned to the backup volume in case of MSCS or WSFC failover.

For Windows Server 2003(MSCS) or Windows Server 2008(WSFC)

Perform snapshot high-speed backup operations using OPC.
Use the procedure below to execute backups and restorations in the maintenance mode for physical disk resources.

P Point

Enter a command using the following syntax to check the maintenance mode status of a physical disk resource.

```
cluster [ClusterName] res DiskResourceName /maint
```

- If "Online" is displayed as the "Status", the maintenance mode is "OFF".

- If "Online (maintenance)" is displayed as the "Status", the maintenance mode is "ON".

1. Turn on the maintenance mode for physical disk resources (i.e., the transaction volumes and backup volumes).

```
> cluster [ClusterName] res <TransactionVolumePhysicalDiskResourceName> /maint:on
> cluster [ClusterName] res <BackupVolumePhysicalDiskResourceName> /maint:on
```

2. Execute the backup or restoration.

```
> C:\Win32app\AdvancedCopyManager\bin\swstbackup Device-Name
Device-Name swstbackup completed
>
```

3. Turn off the maintenance mode for physical disk resources (i.e., the transaction volumes and backup volumes).

```
> cluster [ClusterName] res <TransactionVolumePhysicalDiskResourceName> /maint:off
> cluster [ClusterName] res <BackupVolumePhysicalDiskResourceName> /maint:off
```

If EC is used, perform inter-server replication operations where the copy destination is connected to a non-cluster storage server.

12.1.6.1   Notes on an SQL Server database

For backup and restoration of an SQL Server database in cluster operation, note the following points:
Perform the following steps to operate the SQL Server backup function in MSCS or WSFC:

- Create SQL Server transactions and AdvancedCopy Manager transactions in one cluster group. Do not share a logical IP address with SQL Server and AdvancedCopy Manager.

- To execute swsrpbackup_sql (SQL Server backup execution command), specify the name of the logical node for AdvancedCopy Manager in the environment variable SWSTGNODE beforehand.

- To execute swstbackup_sqlsvr (SQL Server backup execution command) or swstrestore_sqlsvr (SQL Server restore execution command), use the -Xserver option and specify the virtual server name of the SQL Server as an argument.

- Place the device map file so that both the primary node and secondary node can reference it by placing it on a shared disk or local disks in both nodes.

12.1.6.2   Backup and restoration during the stoppage of a cluster

When using MSCS or WSFC for cluster operation

When a cluster group 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 the necessary resources, thus disabling backup operation. Likewise, if the cluster group has been stopped, the environment is not ready and it disables the backup.

However, the backup operation is re-enabled only when the cluster group has been stopped, by temporarily arranging the minimum resources.

Note

If any of the following resources cannot start (i.e., if they cannot be set online), the backup operation is disabled:

- AdvancedCopy ACL Service (only for a Storage Management Server transaction)

- AdvancedCopy GUI Service (only for a Storage Management Server transaction)

- SymfoWARE RDA RDBSWTF (only for a Storage Management Server transaction)
  There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008.

- SymfoWARE RDB RDBSWTF (only for a Storage Management Server transaction)

- AdvancedCopy COM Service_logical-node-name

- IP address resource (When created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_logical-node-name" format.)

- Disk resource for a shared disk for AdvancedCopy Manager shared data

- Disk resource for the shared disk for the AdvancedCopy Manager repository (only for Storage Management Server transaction)

- Backup operation disk (transaction volume/backup volume to operate)

Perform backup operation during the stoppage of a cluster group by taking the following steps:

1. Confirm that the cluster group has been stopped (i.e., that it has been set offline) on both nodes.
   For details on how to stop a cluster group, see the MSCS or WSFC manual.

2. Start (i.e., set online) the resources required for operation.
   Start the following resources:

   - AdvancedCopy ACL Service (only for a Storage Management Server transaction)

   - AdvancedCopy GUI Service (only for a Storage Management Server transaction)

   - SymfoWARE RDA RDBSWTF (only for a Storage Management Server transaction)
     There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008.

   - SymfoWARE RDB RDBSWTF (only for a Storage Management Server transaction)

   - AdvancedCopy COM Service_logical-node-name

   - IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_logical-node-name" format).

   - Disk resource for a shared disk for AdvancedCopy Manager shared data

   - Disk resource for the shared disk for the AdvancedCopy Manager repository (only for a Storage Management Server transaction)

   - Backup operation disk (the transaction volume/backup volume to operate)

Note

- Be sure to start the resources from one of the nodes only.

- Since the dependency between AdvancedCopy COM Service_logical-node-name and the transaction disk has been set, starting AdvancedCopy COM Service_logical-node-name starts all dependent disk resources.

- For details on how to start a resource, see the MSCS or WSFC manual.

3. Perform the backup.
   You can perform the backup in the same way as for regular cluster operations.

4. Stop (i.e., set offline) the resources you started in Step 2.
   For details on how to stop a resource, see the MSCS or WSFC manual.

5. Start (i.e., set online) the cluster group.
   Start the cluster group, if necessary.
   For details on how to start a cluster group, see the MSCS or WSFC manual.

12.1.7 Notes on replication in a cluster system

When using MSCS or WSFC for cluster operation

For replication in a cluster system, note the following points that do not apply to regular operation:

・ If failover occurs while running a replication command, you must ensure consistency by using swsrprecoverres (Resource adjustment command) as a recovery measure.

・ You must perform replication on the active system of the cluster group because AdvancedCopy Manager is placed in the cluster group and operates as part of it.
   You cannot perform replication from a standby node or another cluster group.

Note

To use synchronous replication, be sure to perform the following step before starting operation with swsrpstartsync (Replication start command):

・ After registering copy-destination volumes to disk groups, cancel the drive letters of the copy-destination volumes. You must do this on both the primary node and the secondary node.

In the case of failover occurring, step described above prevents the drive letter assignment made by MSCS or WSFC from being made to any copy-destination volume in synchronization. Therefore, if drive letters are assigned to copy-destination volumes while synchronization is suspended, be sure to cancel the drive letters after using the volumes.
Note that you need not perform the step described above when the target server of inter-server replication is not a virtual server of MSCS or WSFC. Snapshot replication also does not require the step described above.

For Windows Server 2003(MSCS) or Windows Server 2008(WSFC)

If the copy destination volume is connected to a system running Windows Server 2003 or Windows Server 2008 and has been registered as a disk resource for the cluster, perform snapshot replication using OPC.

Note

If the replication destination volume has been registered as cluster disk resources, it is recommended that you copy the partition unit. When cluster disk resources are copied in Logical Unit units and the disk management information signature (MBR disk format) or GUID (GPT disk format) is modified, it may make it impossible to recognize the replication destination disk resources from the cluster. Before copying in Logical Unit units, refer to "12.1.1.18 Notes on executing Logical Unit (disk) unit copy".

Use the procedure below to execute replication in the maintenance mode for physical disk resources.

Point

Enter a command using the following syntax to check the maintenance mode status of a physical disk resource.

```
cluster [ClusterName] res DiskResourceName /maint
```

- ・ If "Online" is displayed as the "Status", the maintenance mode is "OFF".

- ・ If "Online (maintenance)" is displayed as the "Status", the maintenance mode is "ON".

1. If the copy destination volume has been registered as a physical disk resource for the cluster, turn on the maintenance mode for physical disk resources.

```
> cluster [ClusterName] res <CopyDestinationVolumePhysicalDiskResourceName> /maint:on
```

2. If the copy source volume has been registered as a physical disk resource for the cluster, turn on the maintenance mode for physical disk resources.

```
> cluster [ClusterName] res <CopySourceVolumePhysicalDiskResourceName> /maint:on
```

3. Execute the replication.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpmake From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed
>
```

4. If the copy source volume has been registered as a physical disk resource for the cluster, turn off the maintenance mode for physical disk resources.

```
> cluster [ClusterName] res <CopySourceVolumePhysicalDiskResourceName> /maint:off
```

5. If the copy destination volume has been registered as a physical disk resource for the cluster, turn off the maintenance mode for physical disk resources.

```
> cluster [ClusterName] res <CopyDestinationVolumePhysicalDiskResourceName> /maint:off
```

If EC is used, perform inter-server replication by connecting the copy destination to a non-cluster storage server. For reverse replication, use snapshot replication using OPC.

For replication using EC, perform the following procedure using the maintenance mode for physical disk resources:

1. Start synchronous processing.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpstartsync From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpstartsync completed
>
```

2. Check the equivalency maintenance state.

3. Turn on the maintenance mode for physical disk resources (the copy source volume).

```
> cluster [ClusterName] res <CopySourceVolumePhysicalDiskResourceName> /maint:on
```

4. Execute the replication.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpmake From-Volume-Name To-Volume-Name
FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed
>
```

5. Turn off the maintenance mode for physical disk resources (the copy source volume).

```
> cluster [ClusterName] res <CopySourceVolumePhysicalDiskResourceName> /maint:off
> cluster [ClusterName] res DiskResourceName /maint
```

If REC is used, perform inter-server replication by connecting the copy destination to a non-cluster storage server. For reverse replication, use snapshot replication using ROPC.

For environments where ROPC cannot be used, synchronized replication using REC must be used for reverse replication.

For reverse replication using REC, perform the following procedure using the maintenance mode for physical disk resources:

1. Turn on the maintenance mode for physical disk resources (i.e., the copy destination volume).

    ```
    > cluster [ClusterName] res <CopyDestinationVolumePhysicalDiskResourceName> /maint:on
    ```

2. Start synchronous processing.

    ```
    > C:\Win32app\AdvancedCopyManager\bin\swsrpstartsync From-Volume-Name To-Volume-Name
    FROM=From-Volume-Name TO=To-Volume-Name swsrpstartsync completed
    >
    ```

3. Check the equivalency maintenance state.

4. Execute the replication.

    ```
    > C:\Win32app\AdvancedCopyManager\bin\swsrpmake From-Volume-Name To-Volume-Name
    FROM=From-Volume-Name TO=To-Volume-Name swsrpmake completed
    >
    ```

5. Turn off the maintenance mode for physical disk resources (i.e., the copy destination volume).

    ```
    > cluster [ClusterName] res <CopyDestinationVolumePhysicalDiskResourceName> /maint:off
    ```

Note that once physical disk resources have been set offline during synchronous processing (between step 2 and step 4) they cannot be set online again.

If physical disk resources have been set offline during synchronous processing, use the following procedure to resolve the problem:

1. Stop the synchronous processing from the non-cluster storage server.

    ```
    > C:\Win32app\AdvancedCopyManager\bin\swsrpcancel -m From-Volume-Name To-Volume-Name
    FROM=From-Volume-Name TO=To-Volume-Name swsrpcancel completed
    >
    ```

2. Set the physical disk resources online, and then execute the reverse replication again.

12.1.7.1 Notes on an Exchange 2003 database

For backup and restoration of an Exchange 2003 database in cluster operation, perform the following steps to operate the Exchange linkage function in MSCS:

・ Create Exchange transactions and AdvancedCopy Manager transactions in one cluster group

    - For Exchange Server 2003
      Do not use the same logical IP address for Exchange Server and AdvancedCopy Manager.

    - For Exchange Server 2007
      Use the same logical IP address for Exchange Server and AdvancedCopy Manager. (Create the Exchange transaction, and then create the AdvancedCopy Manager transaction.)

・ To execute an AdvancedCopy Manager's command, specify the name of the logical node for AdvancedCopy Manager in the environment variable SWSTGNODE beforehand.

・ To execute the Exchange linkage command (swsrpXXX_exchange,swsrpXXX_exchange2k3) of AdvancedCopy Manager, use the -evs option and specify the virtual server name of the Exchange Server as an argument.

・ Place the device map file so that both the primary node and secondary node can reference it (place it on a shared disk or local disks in both nodes).

Note

....

Exchange Server databases that run on Windows Server 2008 cannot be backed up/restored in AdvancedCopy Manager.

....

12.1.7.2   Notes on an SQL Server database

For backup and restoration of an SQL Server database in cluster operation, perform the following steps to operate the SQL Server backup function in MSCS or WSFC cluster operations:

- Create SQL Server transactions and AdvancedCopy Manager transactions in one cluster group. (Do not share a logical IP address with SQL Server and AdvancedCopy Manager.)

- To execute swsrpbackup_sql (SQL Server backup execution command), specify the name of the logical node for AdvancedCopy Manager in the environment variable SWSTGNODE beforehand.

- To execute swstbackup_sqlsvr (SQL Server backup execution command) or swstrestore_sqlsvr (SQL Server restore execution command), use the -Xserver option and specify the virtual server name of the SQL Server as an argument.

- Place the device map file so that both the primary node and secondary node can reference it. (i.e., place it on a shared disk or local disks in both nodes)

12.1.7.3   Replication during the stoppage of a cluster

When using MSCS or WSFC for cluster operation

When a cluster group to which AdvancedCopy Manager belongs is operating, replication operation is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for replication operation, thus disabling replication operation. Likewise, if the cluster group has been stopped, the environment is not ready and disables replication operation.
However, only when the cluster group has been stopped is the replication operation enabled by temporarily arranging the minimum essential resources.

Note

....

If any of the following resources cannot start (i.e., cannot be brought online), replication operation is disabled:

- AdvancedCopy ACL Service (only for a Storage Management Server transaction)

- AdvancedCopy GUI Service (only for a Storage Management Server transaction)

- SymfoWARE RDA RDBSWTF (only for a Storage Management Server transaction)
  There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008.

- SymfoWARE RDB RDBSWTF (only for a Storage Management Server transaction)

- AdvancedCopy COM Service_logical-node-name

- IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_logical-node-name" format.)

- Disk resource for a shared disk for AdvancedCopy Manager shared data

- Disk resource for the shared disk for the AdvancedCopy Manager repository (only for a Storage Management Server transaction)

- Replication operation disks (source volume/destination volume to operate)

....

Perform replication the operation during the stoppage of a cluster group by performing the following steps:

1. Confirm that the cluster group has been stopped (i.e., that it has been set offline) on both nodes. For details on how to stop a cluster group, see "Chapter 2 Starting and Stopping a Service".

2. Start (i.e., set online) the resources required for operation.
   Start the following resources:

   - AdvancedCopy ACL Service (only for a Storage Management Server transaction)

   - AdvancedCopy GUI Service (only for a Storage Management Server transaction)

   - SymfoWARE RDA RDBSWTF (only for a Storage Management Server transaction)

     There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008.

   - SymfoWARE RDB RDBSWTF (only for a Storage Management Server transaction)

   - AdvancedCopy COM Service_logical-node-name

   - IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_logical-node-name" format.)

   - Disk resource for a shared disk for AdvancedCopy Manager shared data

   - Disk resource for the shared disk for the AdvancedCopy Manager repository (only for a Storage Management Server transaction)

   - Replication operation disks (source volume/destination volume to operate)

Note

....

   - Be sure to start the resources from only one of these nodes.

   - Since the dependency between AdvancedCopy COM Service_logical-node-name and transaction disk has been set, starting AdvancedCopy COM Service_logical-node-name starts all dependent disk resources.

   - For details on how to start a resource, see the MSCS or WSFC manual.

....

3. Perform replication operation.
   You can perform replication operation in the same way as for regular cluster operations.

4. Stop (i.e., set to offline) the resources you started in Step 2.
   For details on how to stop a resource, see the MSCS or WSFC manual.

5. Start (i.e., set to online) the cluster group.
   Start the cluster group, if necessary.
   For details on how to start a cluster group, see the MSCS or WSFC manual.

12.1.8 Notes on using ETERNUS VS900 (virtualization switch)

Note the following points about the copying of virtual disks created in ETERNUS VS900, as explained in this section.

Copy function

EC/REC is the only copy function that can be used in ETERNUS VS900. For this reason, you should copy virtual disks using the synchronous-type replication of the replication function.
OPC functionality is not supported in ETERNUS VS900. Therefore, the backup function (that uses OPC for restore) cannot be used.

REC operation modes

Operation modes (Transfer mode, Recovery mode, Split mode) that can be used in ETERNUS VS900 are shown in the table below.

Table 12.2 Operation modes

Operation mode type	Operation mode that can be used
Transfer mode	Synchronous mode only
Recovery mode	Manual Recovery mode only
Split mode	Automatic Split mode only

Accordingly, the options for the operation mode that can be specified in swsrpstartsync (Synchronous processing start command) are different from the ETERNUS disk array.

Table 12.3 Transfer mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-i (Consistency mode specified)	Operation is possible	Operation is not possible
-k (Stack mode specified)	Operation is possible	Operation is not possible
-y (Synchronous mode specified)	Operation is possible	Operation is possible (*)
None of -i, -k, or -y options specified	Operation is possible (in Asynchronous mode)	Operation is not possible

Table 12.4 Recovery mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-g (Manual Recovery mode specified)	Operation is possible	Operation is possible (*)
-g option not specified	Operation is possible (in Automatic Recovery mode)	Operation is not possible

Table 12.5 Split mode-related options

Option	ETERNUS disk array	ETERNUS VS900
-a (Automatic Split mode specified)	Operation is possible	Operation is possible
-v (Manual Split mode specified)	Operation is possible	Operation is not possible
-a and -v options not specified	Operation is possible (in Automatic Split mode)	Operation is possible (in Automatic Split mode)

(*) In ETERNUS VS900, transfer mode and Recovery mode must be explicitly specified.

Consequently, specify the following format to start or restart REC when executing the replication start command. "-a" option can be omitted.

```
swsrpstartsync -y -a -g From-Volume-Name To-Volume-Name
```

The REC Operation modes that can be used in ETERNUS VS900 (Transfer mode, Recovery mode, Split mode) are fixed, however, therefore the operation mode cannot be modified using swsrpchsync (Synchronization mode change command).

EC/REC reversal

EC/REC reversal cannot be executed in ETERNUS VS900.

Displaying/modifying REC transfer buffer information

There is no REC transfer buffer in ETERNUS VS900. For this reason, the following commands cannot be executed for ETERNUS VS900:

- swsrprecbuffstat (REC transfer buffer information display command)
- swsrprecbuffset (REC transfer buffer settings change command)

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

This appendix provides information on pre-processing and post-processing of backup and restoration.

A.1 Overview

Pre-processing and post-processing of backup or restoration are started before and after backup or restoration when a backup or restore command is executed.

This processing is required by AdvancedCopy Manager to back up or restore a transaction volume.
This appendix describes the content and setup of pre-processing and post-processing.

A.2 Pre-processing and Post-processing of Backup

Backup in AdvancedCopy Manager must be performed while other processes are inhibited from access to a transaction volume.

As explained above, the transaction volume is usually locked by the pre-processing script. By specifying the Xflush option in the backup execution command or setting BufferFlushOnly to "on" in the transaction volume locking specification file for backups, you can flush the file system buffer without locking the volume.

The backup volume is also locked by the pre-processing script. The backup volume is locked when the backup synchronous processing or snapshot sequence starts and is unlocked after backup post-processing is complete.

Table A.1 For conventional backup operations the processing is as follows.

Pre-processing for synchronous processing (implemented with the backup synchronous processing start command)	Default operation ・ The backup volume is locked.
Post-processing for synchronous processing (implemented with the backup synchronous processing start command in a cluster system)	Default operations ・ The backup volume is dismounted. ・ The backup volume is unlocked.
Backup pre-processing (implemented with the backup execution command)	Default operations ・ For a snapshot backup or synchronous backup in a cluster system, the backup volume is locked. ・ The transaction volume is locked. When the Xflush option is specified or BufferFlushOnly is set to on ・ For a snapshot backup or synchronous backup in a cluster system, the backup volume is locked. ・ The file system buffer of the transaction volume is flushed.
Backup post-processing (implemented with the backup execution command)	Default operations ・ The transaction volume is unlocked. ・ The backup volume is dismounted. ・ The backup volume is unlocked. When the Xflush option is specified or BufferFlushOnly is set to on ・ The backup volume is dismounted.

	· The backup volume is unlocked.

To add user-specific processing to the pre-processing or post-processing, add the required processing to the appropriate backup script. These scripts are coded in the Jscript language and executed on a Windows Scripting Host (WSH).

When customizing a script, strictly observe the following rules regarding error codes:

Table A.2 Error code rules

Error code	Usage
0-99	Unusable (these are reserved for AdvancedCopy Manager)
100-255	Usable

Note

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If pre-processing was failed, execute swstsrsemtch (Resource match command) because the consistency of resource information may be incomplete.

. . . .

The figure below shows a diagram of the pre-processing and post-processing operations:

Figure A.1 Processing in a synchronous-type backup operation
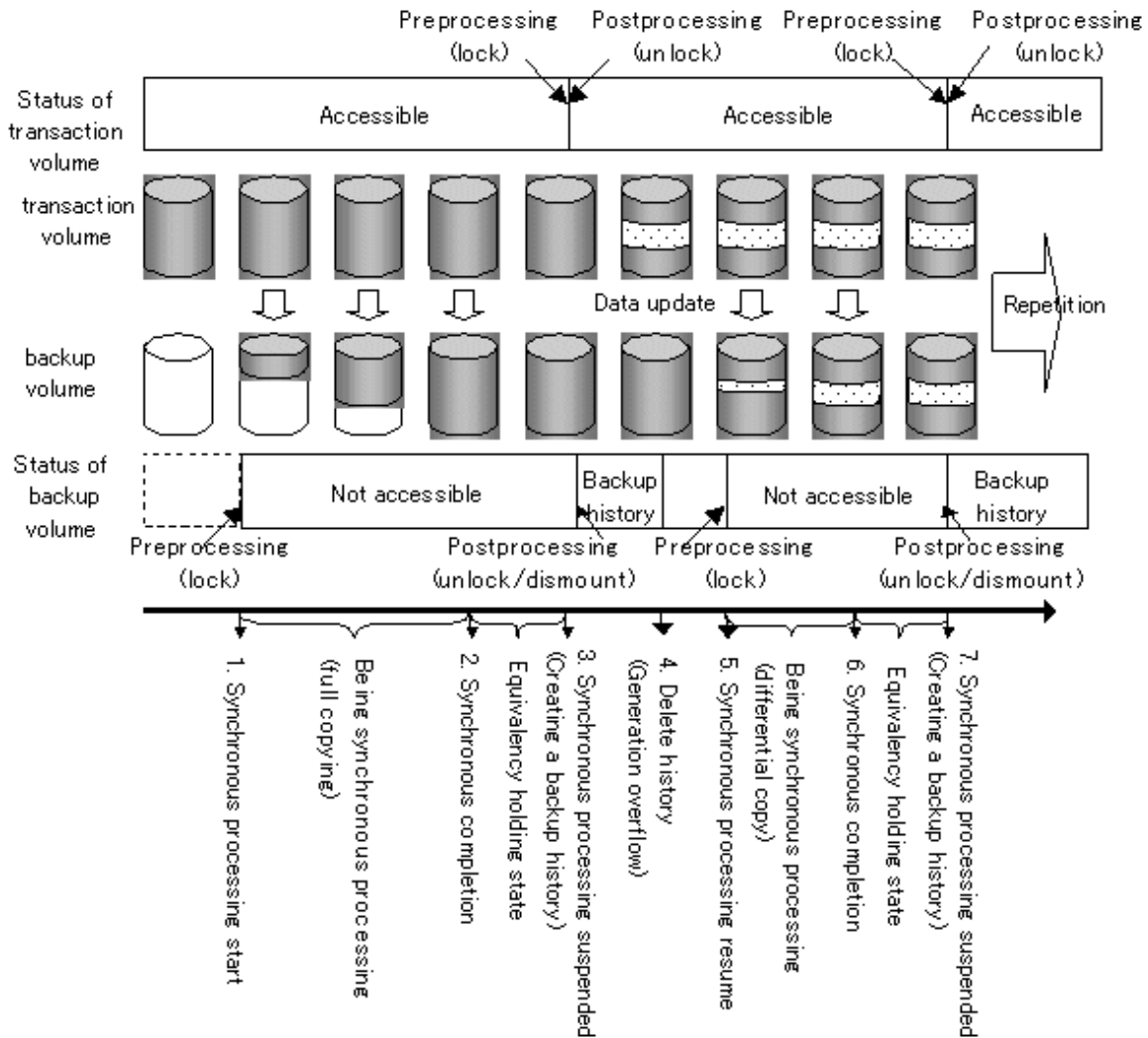
A.2.1 Pre-processing of backup

The name of a script file for pre-processing of a backup is as follows.

In the case of non-cluster operation

```
<environment-settings-directory>\etc\backup\scripts\OpcBackupPre.js
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcBackupPre.js
```

A.2.1.1 Pre-processing script for backup

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // OpcBackupPre.js: Pre-Processing Script for swstbackup
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of transaction volume
 8: // 2nd argument: device name of backup volume
 9: //
10: // [Return Values]
11: // 0: The script ended normally.
12: // 2: The number of the arguments is incorrect.
13: // (2-3): not used, but must not be used because older versions use these values.
14: // 4: An error other than the above occurred.
15:
16: try {
17:  // create global objects
18:  var WshShell = WScript.CreateObject("WScript.Shell");          // create Shell object
19:  var WshEnv  = WshShell.Environment("PROCESS");                 // create Environment object
20:  var fsObj= WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
21:
22:  // create SwstBackupPreProc object
23:  var proc = new SwstBackupPreProc();
24:
25:  // there is nothing to do if the pre/post-processing is not customized
26:  proc.doNothingForDriveLetter();
27:
28:  // if a backup volume is specified, .bd file is created.
29:  if (proc.bvName.length != 0) {
30:proc.writePostFile(proc.bdFileName, proc.bvName);
31:     }
32:  SwstQuit(0);
33: } catch (e) {
34:  SwstQuit(4);
35: }
36:
37: function SwstBackupPreProc()
38: {
39:  // member variables
40:  this.tvName = WScript.Arguments.length!=2?SwstQuit(1):WScript.Arguments.Item(0); // device name
of transaction volume
41:  this.postFileName = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".pre"; // name of
postprocessing file
42:  this.bvName = WScript.Arguments.Item(1);                                // device name
of transaction volume
43:  this.bdFileName = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".bd"; // name of
postprocessing file
44:
45:  // member functions
```

```
46:  this.doNothingForDriveLetter = doNothingForDriveLetter; // self-explanatory
47:  this.writePostFile      = writePostFile;      // self-explanatory
48: }
49:
50: function doNothingForDriveLetter()
51: {
52:  this.writePostFile(this.postFileName, "none");
53: }
54:
55: function writePostFile(postfile, postdata)
56: {
57:  var overwrite = true; // means to overwrite a file if it exists.
58:  var postFileStream = fsObj.CreateTextFile(postfile, overwrite);
59:  postFileStream.Write(postdata);
60:  postFileStream.Close();
61: }
62:
63: function SwstQuit(exitStatus)
64: {
65:  switch(exitStatus) {
66:  case 0:
67:WScript.Quit(0);
68:  case 1:
69:WScript.Echo("[Backup Preprocessing] The number of the arguments is incorrect.");
70:WScript.Quit(2);
71:  default:
72:WScript.Echo("[Backup Preprocessing] The script exited abnormally.");
73:WScript.Quit(4);
74:    }
75: }
76:
77: function getDataPathName()
78: {
79:  return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\backup\\data\\DEFAULT";
80: }
81:
82: function getBinPathName()
83: {
84:  return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
85: }
86:
87: function getSetupInfoKey()
88: {
89:  var nodeName = WshEnv.Item("SWSTGNODE");
90:  if( nodeName != "" ){
91:return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
92:    }
93:  return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
94: }
95:
96: function getPutFileName(deviceName){
97:  var fileName;
98:  if( isSafeDISKName(deviceName) ){
99:var re = /(\S+)\/(\S+):(\S+)/;
100:fileName = deviceName.replace(re, "$1_$2_$3");
101:    }else{
102:fileName = deviceName;
103:    }
104:  return(fileName);
105: }
106:
107: function getGXDXPX(deviceName){
```

```
108:  var gXdXpX;
109:  if( isSafeDISKName(deviceName) ){
110:var re = /(\S+)\/(\S+):(\S+)/;
111:gXdXpX = deviceName.replace(re, "$3");
112:    }else{
113:gXdXpX = deviceName;
114:    }
115:  return(gXdXpX);
116: }
117:
118: function isSafeDISKName(deviceName){
119:  var key = ":g";
120:  var s = deviceName.indexOf(key);
121:  if ( s < 0 ) {
122:return (false);
123:    } else {
124:return (true);
125:    }
126: }
```

A.2.2　Post-processing of backup

The name of a script file for post-processing of a backup is as follows.

In the case of non-cluster operation

```
environment-settings-directory \etc\scripts\OpcBackupPost.js
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcBackupPost.js
```

A.2.2.1　Post-processing script for backup

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // OpcBackupPost.js: Post-Processing Script for swstbackup
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of transaction volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3,5-8): not used, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");         // create Shell object
18:     var WshEnv   = WshShell.Environment("PROCESS");               // create Environment
object
19:     var fsObj= WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstBackupPostProc object
22:     var proc = new SwstBackupPostProc();
23:
24:     // do nothing if postprocessing file exists
25:     if (fsObj.FileExists(proc.postFileName) == false) {
26:  SwstQuit(0);
27:     }
```

```
28:
29:     // get postprocessing type
30:     var postProcType = proc.getPostProcData(proc.postFileName);
31:     switch(postProcType) {
32:     case "none":
33:  proc.doNothing();
34:  break;
35:     }
36:
37:     // do nothing if postprocessing file exists
38:     if (fsObj.FileExists(proc.bdFileName) == true) {
39:  var bvName = proc.getPostProcData(proc.bdFileName);
40:  proc.doNothing();
41:     }
42:
43:     // clear temporary files
44:     proc.deletePostFile(proc.postFileName);
45:     proc.deletePostFile(proc.bdFileName);
46:     SwstQuit(0);
47: } catch (e) {
48:     SwstQuit(6);
49: }
50:
51: function SwstBackupPostProc()
52: {
53:     // member variables
54:     this.tvName   = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of transaction volume
55:     this.postFileName = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".pre";     //
name of postprocessing file
56:     this.bdFileName   = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".bd";    // name
of postprocessing file
57:
58:     // member functions
59:     this.getPostProcData    = getPostProcData;      // self-explanatory
60:     this.doNothing       = doNothing;               // self-explanatory
61:     this.deletePostFile= deletePostFile;        // self-explanatory
62: }
63:
64: function getPostProcData(postfile)
65: {
66:     var iomode = 1; // means read-only mode
67:     var create = false; // means not to create a file
68:     var postFileStream = fsObj.OpenTextFile(postfile, iomode, create);
69:     var postData = postFileStream.ReadAll();
70:     postFileStream.Close();
71:     return postData;
72: }
73:
74: function doNothing()
75: {
76:     // do nothing
77: }
78:
79: function deletePostFile(postfile)
80: {
81:     if (fsObj.FileExists(postfile) == true) {
82:  fsObj.DeleteFile(postfile);
83:     }
84: }
85:
86: function SwstQuit(exitStatus)
87: {
```

```
 88:    switch(exitStatus) {
 89:    case 0:
 90:  WScript.Quit(0);
 91:    case 1:
 92:  WScript.Echo("[Backup Postprocessing] The number of the arguments is incorrect.");
 93:  WScript.Quit(2);
 94:    default:
 95:  WScript.Echo("[Backup Postprocessing] The script exited abnormally.");
 96:  WScript.Quit(4);
 97:    }
 98: }
 99:
100: function getDataPathName()
101: {
102:    return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\backup\\data\
\DEFAULT";
103: }
104:
105: function getBinPathName()
106: {
107:    return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
108: }
109:
110: function getSetupInfoKey()
111: {
112:    var nodeName = WshEnv.Item("SWSTGNODE");
113:    if( nodeName != "" ){
114:  return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
115:    }
116:    return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
117: }
118:
119: function getPutFileName(deviceName){
120:    var fileName;
121:    if( isSafeDISKName(deviceName) ){
122:  var re = /(\S+)\/(\S+):(\S+)/;
123:  fileName = deviceName.replace(re, "$1_$2_$3");
124:    }else{
125:  fileName = deviceName;
126:    }
127:    return(fileName);
128: }
129:
130: function getGXDXPX(deviceName){
131:    var gXdXpX;
132:    if( isSafeDISKName(deviceName) ){
133:  var re = /(\S+)\/(\S+):(\S+)/;
134:  gXdXpX = deviceName.replace(re, "$3");
135:    }else{
136:  gXdXpX = deviceName;
137:    }
138:    return(gXdXpX);
139: }
140:
141: function isSafeDISKName(deviceName){
142:    var key = ":g";
143:    var s = deviceName.indexOf(key);
144:    if ( s < 0 ) {
145:  return (false);
146:    } else {
147:  return (true);
```

```
148:    }
149: }
```

ℙ Point

. . . .

The transaction volume is locked/unlocked, and the buffer is flushed by the command, not by the script. Therefore, the backup pre-processing script and backup post-processing script are executed immediately before and after (respectively) the transaction volume is locked/unlocked and the buffer is flushed. The backup pre-processing and post-processing scripts do not perform any processing.

. . . .
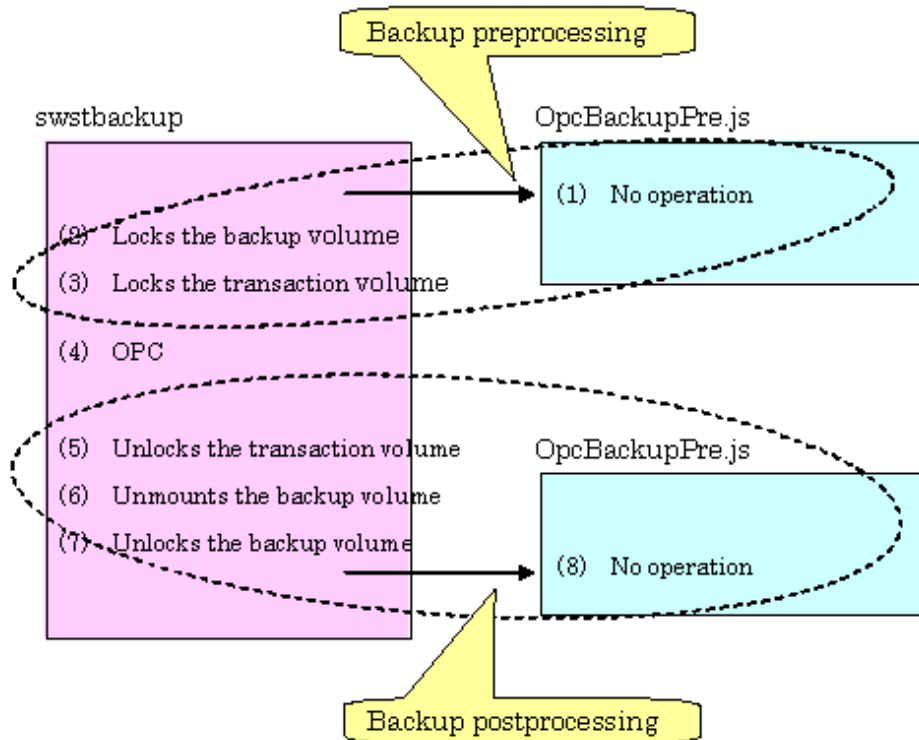
Figure A.2 Snapshot-type backup (OPC)

Figure A.3 Synchronous-type backup (EC) in a non-cluster system
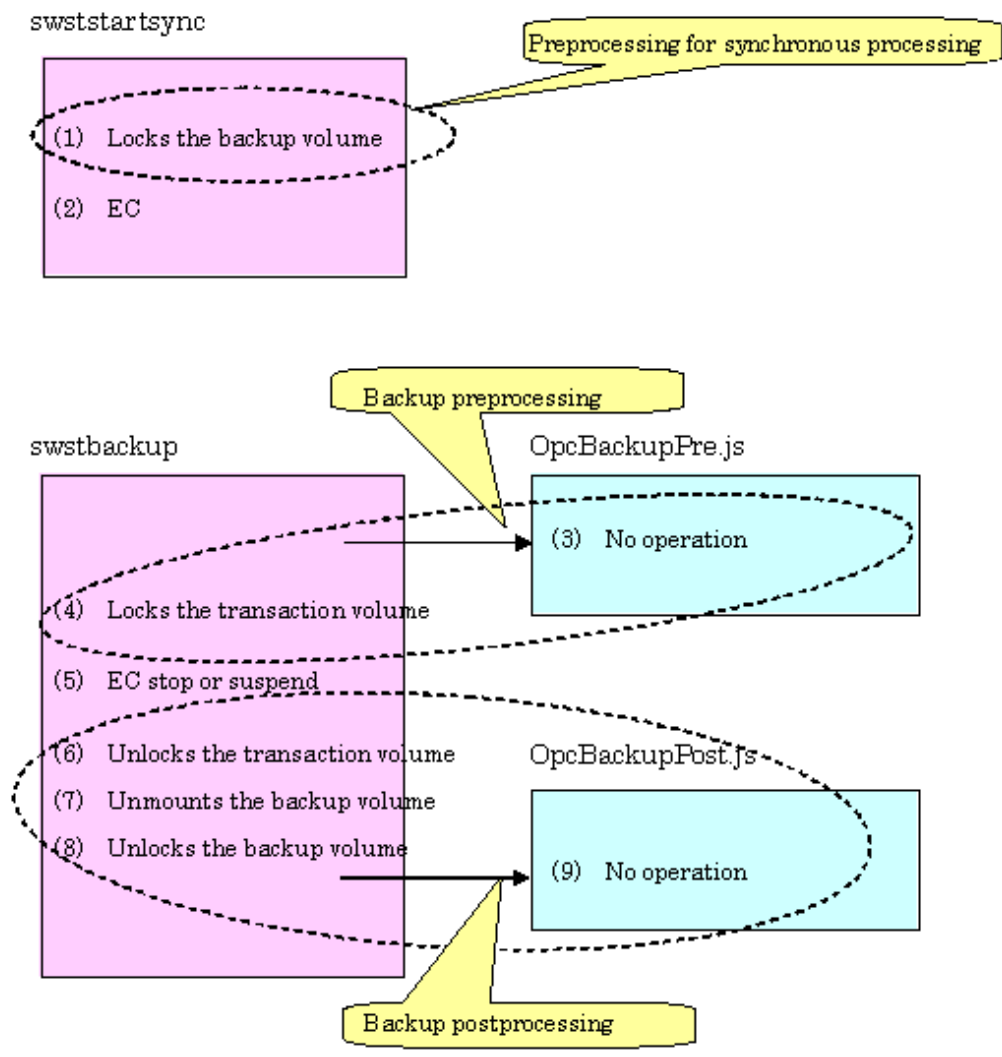
Figure A.4 Synchronous-type backup (EC) in a cluster system operation
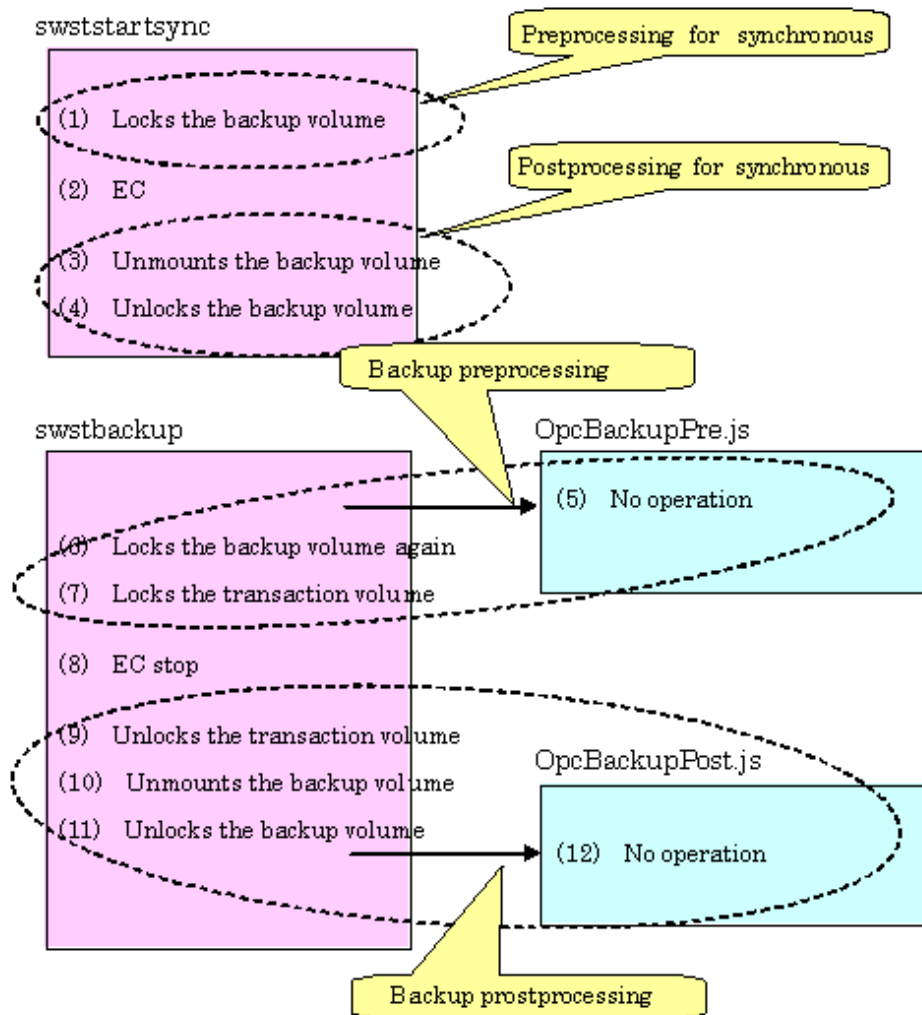
Note

. . . .

In the pre-processing for synchronous processing and the backup pre-processing, to avoid a temporary access contention with other applications, locking is retried if it cannot complete its operation. If the number of times the command is executed reaches the specified retry limit, locking ends abnormally.

If an abnormal end occurs, any process that is using the transaction volume or backup volume remains active. Stop all applications and services involved or take other appropriate measures so that the volume cannot be used by another process.

The retry limit can be changed by creating volume locking specification files and re-setting the limit (for details of these files, refer to the Transaction volume locking specification file for backups and to the Backup volume locking specification file for backups). However, the files do not need to be created if appropriate measures have been taken to prevent other processes from using the target volumes during backup processing execution.

. . . .

Note

. . . .

For a synchronous-type backup in a cluster system operation, in order to prevent the cluster system from being monitored, the backup volume is locked only while the backup synchronous processing start command and the backup execution command are running (refer to the figure above). That is, the backup volume remains unlocked from the time that the backup synchronous processing start command is executed to the time that the backup execution command is executed.

This may cause a message to be output to the event log. This message is described in "About the message outputted to an event viewer" in "General notes". Since there is no problem, the message can be ignored.

A.2.2.2 Transaction volume locking specification file for backups

If locking fails in the transaction volume backup pre-processing, locking is retried in order to avoid a temporary access conflict with other applications. The standard retry operations are as follows:

・ Locking is retried one second after locking fails.

・ If locking is not successful after 20 retries (that is, for a total of 21 locking attempts including the first attempt), then the processing is stopped and the command ends abnormally.

The maximum number of retries (the default value = 20 times) and retry interval (the default value = 1 second) can be changed by creating a setting file called the transaction volume locking specification file for backups. In this file, the following instructions can be specified for the transaction volume backup pre-processing:

・ Invalidate all file handles in the volume before locking is retried (this is the forced locking function)

・ Flush the file system buffer instead of locking/unlocking during the backup pre-processing (this is a function equivalent to the Xflush option)

Note

swstresback (resource backup command) cannot back up the transaction volume locking specification file for backups. In operations that use this file, the copy command, etc., must be executed to back up the transaction volume locking specification file for backups.

A.2.2.2.1 Creating a transaction volume locking specification file for backups

Use a name similar to the one below to create a transaction volume locking specification file for backups.

File name	In the case of non-cluster operation
	"environment-settings-directory\etc\backup\data\BTRANLOCK.INI
	In the case of cluster operation
	<Shared disk>:\etc\opt\swstorage\etc\backup\data\BTRANLOCK.INI

Examples of settings in this file are listed below.

```
[g1d1p1]
BufferFlushOnly=off
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=10
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=100
```

An explanation of how to create this file is given below.

・ Create a section for the volume (the one whose locking operation is to be changed) and code parameters. In the above example, the g1d1p1 and g1d1p2 sections are created. The four parameters listed in the table below may be changed. You do not need to code all of these four parameters: code only the parameters that you want to change. The default value is used for the parameters that are not coded.

- To change the default locking operation, create a section called "ANY" and create the code parameters. This enables the locking operation to be changed for all volumes except the volumes explicitly coded in the transaction volume locking specification file for backups. In the above example, the locking of all volumes except g1d1p1 and g1d1p2 depends on the value in the "ANY" section.

BTRANLOCK.INI parameter settings

Key	Explanation
BufferFlushOnly	Specifies flushing the file system buffer of the transaction volume instead of locking the transaction volume: off (default value) = the buffer is not flushed (locking) on = the buffer is flushed (no locking) If the Xflush option is specified in swstbackup or swstbackup_exchange and BufferFlushOnly=off, then the Xflush option has priority. If BufferFlushOnly is set to on, all other parameters (LockForceMode, LockRetryNumber, and LockRetryInterval) become invalid. Before this parameter is set to on, all write processing on the transaction volume must be stopped. If a replica is created without the write processing stopped, then the transaction volume data is not guaranteed. If on is specified for NoPrePost, then this parameter becomes invalid.
LockForceMode	If locking of the transaction volume fails, locking is retried. This parameter specifies that the volume be dismounted before locking is retried. off (default value) = no dismounting before locking is retried on = dismounting before locking is retried When the volume is dismounted, all handles opened for the volume become invalid. * If the volume is set in the used state immediately after it is dismounted, then locking may be impossible. If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.
LockRetryNumber	If locking of the transaction volume fails, locking is retried. This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified. The default value is 20 (retries). If the transaction volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally. If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.
LockRetryInterval	If locking of the transaction volume fails, locking is retried. This parameter specifies the retry interval (in milliseconds). A numeric value ranging from 1 to 600,000 (10 minutes) can be specified. The default value is 1,000 (1 second). If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.
NoPrePost	Specifies that the backup pre-processing and post-processing are not to be performed. off (default value) = The backup pre-processing and post-processing are performed. on = The backup pre-processing and post-processing are not performed. Setting NoPrePost to on disables all the other parameters (BufferFlushOnly, LockForceMode, LockRetryNumber, and LockRetryInterval).

A.2.2.3 Backup volume locking specification file for backups

If locking fails in the backup volume backup pre-processing, locking is retried to avoid a temporary access conflict with other applications. The standard retry operations are as follows:

・ Locking is retried one second after locking fails.

・ If locking is not successful after 20 retries (that is, a total of 21 locking attempts including the first attempt), then the processing is stopped and the command ends abnormally.

The maximum number of retries (the default value is 20 attempts) and the retry interval (the default value is 1 second) can be changed by creating a setting file called the backup volume locking specification file for backups. In this file, the following instructions can be specified for the backup volume backup pre-processing:

・ Making invalid all file handles in the volume before locking is retried (this is the forced locking function)

📝 Note

swstresback (resource backup command) cannot back up the backup volume locking specification file for backups. In operations that use this file, the copy command, etc., must be executed to back up this file.

A.2.2.3.1   Creating a backup volume locking specification file for backups

Use a name such as the one below to create a backup volume locking specification file for backups.

File name	For a non-cluster operation
	environment-setting-directory\etc\backup\data\BBACKLOCK.INI
	For a cluster operation
	<shared-disk>:\etc\opt\swstorage\etc\backup\data\BBACKLOCK.INI

Examples of settings in the backup volume locking specification file for backup are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=10
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=100
```

An explanation of how to create a backup volume locking specification file for backups is given below.

・ Create a section for the volume (the one whose locking operation is to be changed) and create code parameters. In the above example, the g1d1p1 section is created. The three parameters listed in the table below may be changed. Not all of these three parameters need to be coded: code only the parameters that you want to change. The default value is used for the parameters that are not coded.

・ To change the default locking operation, create a section called "ANY" and create the code parameters. This enables the locking operation to be changed for all volumes except the volumes explicitly coded in the backup volume locking specification file for backups In the above example, the locking of all volumes except g1d1p1 depends on the value in the "ANY" section.

BBACKLOCK.INI parameter settings

Key	Explanation
LockForceMode	If locking of the backup volume fails, locking is retried. This parameter specifies that the volume is to be dismounted before locking is retried.
	off (default value) = no dismount before locking is retried
	on = dismount before locking is retried
	When the volume is dismounted, all handles opened for the volume become invalid.

Key	Explanation
	* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.
LockRetryNumber	If locking of the backup volume fails, locking is retried. This parameter specifies the retry count. A numeric value ranging from 1 to 10,000 can be specified. The default value is 20 (retries). If the backup volume cannot be locked after locking is retried for the specified retry count, then the processing is suspended and the command ends abnormally.
LockRetryInterval	If locking of the backup volume fails, locking is retried. This parameter specifies the retry interval (in milliseconds). A numeric value ranging from 1 to 600,000 (10 minutes) can be specified. The default value is 1,000 (1 second).

A.3   Pre-processing and Post-processing of Restoration

Restoration with AdvancedCopy Manager requires backup-restored volumes to be inaccessible from other processes.

Therefore, in normal restoration pre-processing, the following is executed:

Pre-processing
The backup-restored volume is locked.

The post-processing determines what needs to be done according to what was previously done in the pre-processing.

Post-processing
The backup-restored volume is dismounted. The backup-restored volume is unlocked.

In addition, if extra pre-processing or post-processing is needed, add the required operation in the pre-processing script or post-processing script in the correct sequence.

These scripts are coded in the Jscript language and executed on a Windows Scripting Host (WSH).

When customizing a script, strictly observe the following rules regarding error codes:

Table A.3 Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

Note

If the post-processing fails, the resource information may have inconsistencies. Execute swstsrsemtch described in Section, "swstsrsemtch (Resource match command)".

The figure below shows an image of the pre-processing and post-processing operations:

Figure A.5 Operations for restoration
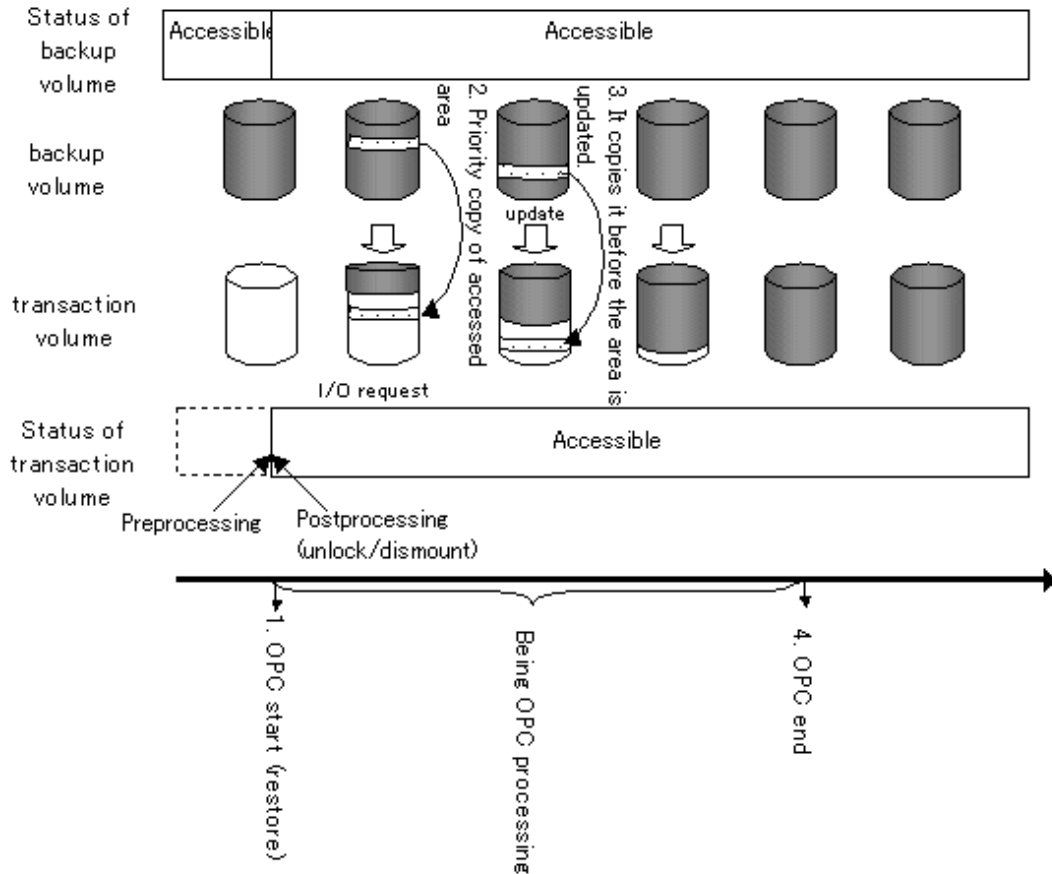
A.3.1   Pre-processing of restoration

The name of a script file for pre-processing of a restoration is as follows.

In the case of non-cluster operation

```
environment-settings-directory\etc\backup\scripts\OpcRestorePre.js
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcRestorePre.js
```

A.3.1.1   Pre-processing script for restoration

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // OpcRestorePre.js: Pre-Processing Script for swstrestore
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of transaction volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
```

```
12: // 3: not used, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:  // create global objects
17:  var WshShell = WScript.CreateObject("WScript.Shell");                // create Shell object
18:var WshEnv = WshShell.Environment("PROCESS");                        // create Environment object
19:var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:// create SwstRestorePreProc object
22:var proc = new SwstRestorePreProc();
23:
24:// there is nothing to do if the pre/post-processing is not customized
25:proc.doNothingForDriveLetter();
26:
27:SwstQuit(0);
28: } catch (e) {
29:SwstQuit(4);
30: }
31:
32: function SwstRestorePreProc()
33: {
34:// member variables
35:this.tvName   = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device name
of transaction volume
36:this.postFileName = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".pre";   // name of
postprocessing file
37:
38:// member functions
39:this.doNothingForDriveLetter = doNothingForDriveLetter; // self-explanatory
40:this.writePostFile        = writePostFile;        // self-explanatory
41: }
42:
43: function doNothingForDriveLetter()
44: {
45:this.writePostFile("none");
46: }
47:
48: function writePostFile(type)
49: {
50:var overwrite = true; // means to overwrite a file if it exists.
51:var postFileStream = fsObj.CreateTextFile(this.postFileName, overwrite);
52:postFileStream.Write(type);
53:postFileStream.Close();
54: }
55:
56: function SwstQuit(exitStatus)
57: {
58:switch(exitStatus) {
59:case 0:
60:    WScript.Quit(0);
61:case 1:
62:    WScript.Echo("[Restore Preprocessing] The number of the arguments is incorrect.");
63:    WScript.Quit(2);
64:default:
65:    WScript.Echo("[Restore Preprocessing] The script exited abnormally.");
66:    WScript.Quit(4);
67:     }
68: }
69:
70: function getDataPathName()
71: {
```

```
72:return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\backup\\data\\DEFAULT";
73: }
74:
75: function getBinPathName()
76: {
77:return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
78: }
79:
80: function getSetupInfoKey()
81: {
82:var nodeName = WshEnv.Item("SWSTGNODE");
83:if( nodeName != "" ){
84:    return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
85:    }
86:return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
87: }
88:
89: function getPutFileName(deviceName){
90:var fileName;
91:if( isSafeDISKName(deviceName) ){
92:    var re = /(\S+)\/(\S+):(\S+)/;
93:    fileName = deviceName.replace(re, "$1_$2_$3");
94:    }else{
95:    fileName = deviceName;
96:    }
97:return(fileName);
98: }
99:
100: function getGXDXPX(deviceName){
101:var gXdXpX;
102:if( isSafeDISKName(deviceName) ){
103:    var re = /(\S+)\/(\S+):(\S+)/;
104:    gXdXpX = deviceName.replace(re, "$3");
105:    }else{
106:    gXdXpX = deviceName;
107:    }
108:return(gXdXpX);
109: }
110:
111: function isSafeDISKName(deviceName){
112:var key = ":g";
113:var s = deviceName.indexOf(key);
114:if ( s < 0 ) {
115:    return (false);
116:    } else {
117:    return (true);
118:    }
119: }
```

A.3.2   Post-processing of restoration

The name of a script file for post-processing of a restoration is as follows.

In the case of non-cluster operation

    environment-settings-directory\etc\backup\scripts\OpcRestorePost.js

In the case of cluster operation

    <Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcRestorePost.js

A.3.2.1 Post-processing script for restoration

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // OpcRestorePost.js: Post-Processing Script for swstrestore
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of transaction volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (3,5): not used, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");          // create Shell object
18:     var WshEnv = WshShell.Environment("PROCESS");                  // create Environment
object
19:     var fsObj   = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstRestorePostProc object
22:     var proc = new SwstRestorePostProc();
23:
24:     // do nothing if postprocessing file exists
25:     if (fsObj.FileExists(proc.postFileName) == false) {
26: proc.doNothing();
27:     }
28:     // get postprocessing type
29:     else {
30: var postProcType = proc.getPostProcType();
31: switch(postProcType) {
32: case "none":
33:     proc.doNothing();
34:     break;
35:         }
36:     }
37:
38:     // clear temporary file
39:     proc.deletePostFile();
40:     SwstQuit(0);
41: } catch (e) {
42:     SwstQuit(6);
43: }
44:
45: function SwstRestorePostProc()
46: {
47:     // member variables
48:     this.tvName = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of transaction volume
49:     this.postFileName = getDataPathName() + "\\" + getPutFileName(this.tvName) + ".pre";   // name
of postprocessing file
50:
51:     // member functions
52:     this.getPostProcType= getPostProcType;                    // self-explanatory
53:     this.doNothing      = doNothing;                           // self-explanatory
54:     this.deletePostFile = deletePostFile;                      // self-explanatory
55: }
56:
57: function getPostProcType()
```

```
 58: {
 59:    var iomode = 1;    // means read-only mode
 60:    var create = false; // means not to create a file
 61:    var postFileStream = fsObj.OpenTextFile(this.postFileName, iomode, create);
 62:    var postProc = postFileStream.ReadAll();
 63:    postFileStream.Close();
 64:    return postProc;
 65: }
 66:
 67: function doNothing()
 68: {
 69:    // do nothing
 70: }
 71:
 72: function deletePostFile()
 73: {
 74:    if (fsObj.FileExists(this.postFileName) == true) {
 75:  fsObj.DeleteFile(this.postFileName);
 76:    }
 77: }
 78:
 79: function SwstQuit(exitStatus)
 80: {
 81:    switch(exitStatus) {
 82:    case 0:
 83:  WScript.Quit(0);
 84:    case 1:
 85:  WScript.Echo("[Restore Postprocessing] The number of the arguments is incorrect.");
 86:  WScript.Quit(2);
 87:    default:
 88:  WScript.Echo("[Restore Postprocessing] The script exited abnormally.");
 89:  WScript.Quit(4);
 90:    }
 91: }
 92:
 93: function getDataPathName()
 94: {
 95:    return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\backup\\data\
\DEFAULT";
 96: }
 97:
 98: function getBinPathName()
 99: {
100:    return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
101: }
102:
103: function getSetupInfoKey()
104: {
105:    var nodeName = WshEnv.Item("SWSTGNODE");
106:    if( nodeName != "" ){
107:  return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
108:    }
109:    return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
110: }
111:
112: function getPutFileName(deviceName){
113:    var fileName;
114:    if( isSafeDISKName(deviceName) ){
115:  var re = /(\S+)\/(\S+):(\S+)/;
116:  fileName = deviceName.replace(re, "$1_$2_$3");
117:    }else{
118:  fileName = deviceName;
```

```
119:    }
120:    return(fileName);
121: }
122:
123: function getGXDXPX(deviceName){
124:    var gXdXpX;
125:    if( isSafeDISKName(deviceName) ){
126:  var re = /(\S+)\/(\S+):(\S+)/;
127:  gXdXpX = deviceName.replace(re, "$3");
128:    }else{
129:  gXdXpX = deviceName;
130:    }
131:    return(gXdXpX);
132: }
133:
134: function isSafeDISKName(deviceName){
135:    var key = ":g";
136:    var s = deviceName.indexOf(key);
137:    if ( s < 0 ) {
138:  return (false);
139:    } else {
140:  return (true);
141:    }
142: }
```

🅿 Point

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The backup volume is locked/unlocked not by the script but by the command. Therefore, the restoration pre-processing and post-processing scripts are executed immediately before and after the backup volume is locked/unlocked.

・・

Figure A.6 Restoration
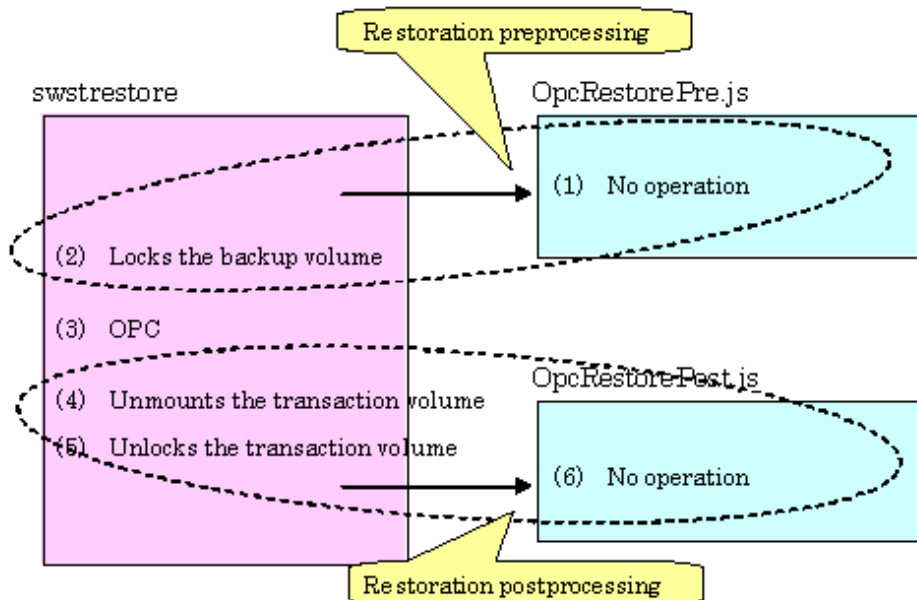
🅖 Note

・・

In the restoration pre-processing, to avoid a temporary access conflict with other applications, locking is retried if it cannot complete its operation. If the number of times the command is executed reaches the specified retry count limit, locking ends abnormally. If an abnormal end occurs, a process that is using the backup-restored volume remains active. Stop all applications and services involved or take other appropriate measures so that the volume cannot be used by another process.

Although the retry count limit can be changed by creating a volume locking specification file and resetting the count limit (for details on the file, refer to Backup-restored volume locking specification file), the files do not need to be created if appropriate measures have been taken to prevent other processes from using the target volume during restoration processing execution.

A.3.2.2 Backup-restored volume locking specification file

If locking fails in the backup-restored volume restore pre-processing, locking is retried to avoid a temporary access conflict with other applications. The standard retry operations are as follows:

- Locking is retried one second after locking fails.

- If locking is not successful after 20 retries (that is, a total of 21 locking attempts including the first attempt), then the processing is stopped and the command ends abnormally.

The maximum number of retries (the default value = 20 attempts) and retry interval (default value = 1 second) can be changed by creating a setting file called the backup-restored volume locking specification file for backups. In this setting file, the following instructions can be specified for the backup-restored volume backup pre-processing:

- Making invalid all file handles in the volume before locking is retried (this is the forcible locking function)

🍀 Note

swstresback (Resource backup command) cannot back up this file . In operations that use this file , the copy command, etc., must be executed to back up the backup-restored volume locking specification file for backups.

A.3.2.2.1 Creating a backup-restored volume locking specification file

Use a name such as the one below to create a backup-restored volume locking specification file for backups.

File name	For a non-cluster operation
	environment-setting-directory\etc\backup\data\RDSTLOCK.INI
	For a cluster operation
	<shared-disk>:\etc\opt\swstorage\etc\backup\data\RDSTLOCK.INI

Examples of settings in the backup-restored volume locking specification file for backup are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=10
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=100
```

An explanation of how to create a backup-restored volume locking specification file for restores is given below.

- Create a section for the volume (the one whose locking operation is to be changed) and create code parameters. In the above example, the g1d1p1 section is created. The three parameters listed in the table below may be changed. Not all of these three parameters need to be coded. Code only the parameters that you want to change. The default value is used for the parameters that are not coded.

- To change the default locking operation, create a section called "ANY" and create the code parameters. This enables the locking operation to be changed for all volumes except the volumes explicitly coded in the backup volume locking specification file for backups. In the above example, the locking of all volumes except g1d1p1 depends on the value in the "ANY" section.

RDSTLOCK.INI parameter settings

Key	Explanation
LockForceMode	If locking of the backup-restored volume fails, locking is retried. This parameter specifies that the volume be dismounted before locking is retried. off (default value) = no dismount before locking is retried on = dismount before locking is retried When the volume is dismounted, all handles opened for the volume become invalid. * If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.
LockRetryNumber	If locking of the backup-restored volume fails, locking is retried. This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified. The default value is 20 (retries). If the backup volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally.
LockRetryInterval	If locking of the backup-restored volume fails, locking is retried. This parameter specifies the retry interval in milliseconds. A numeric value ranging from 1 to 600,000 (ie, 10 minutes) can be specified. The default value is 1,000 (ie, 1 second).

Appendix B Sample Script for Backup Operations

This appendix provides information on sample scripts for AdvancedCopy Manager.
A sample script allows you to back up data on a transaction volume with AdvancedCopy Manager.

🅿 Point

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This section explains how the sample script is created for the backup management function. By using it as a reference when creating similar scripts for the replication management function, you can copy Oracle databases.

. . . .

B.1 Overview

Use AdvancedCopy Manager to back up a transaction volume.
AdvancedCopy Manager provides a sample scripts for backup. The manager of the backup operation should customize the sample scripts according to their specific requirements and apply them to the backup.

This document and the sample script show how to back up both of the drives on which all the physical data files in the table space in an instance to be backed up.
However, you can back up only one drive, with a table space to be backed up, by modifying the script.
A backup in AdvancedCopy Manager is performed in units of drives. If a drive with a data file in the table space to be backed up has data files in other table spaces, make an Oracle backup declaration for them also. To back up the SYSTEM table space shown in the figure below, for example, make Oracle backup declarations in all the five table spaces including other areas in the same volume.
A data file in the table space backed up without an Oracle backup declaration cannot be used for recovery because, even during backup, updating of the data file occurs and this generates inconsistencies.

Figure B.1 Relationship between an Oracle instance and data files in drive table spaces (in the case of this sample script)
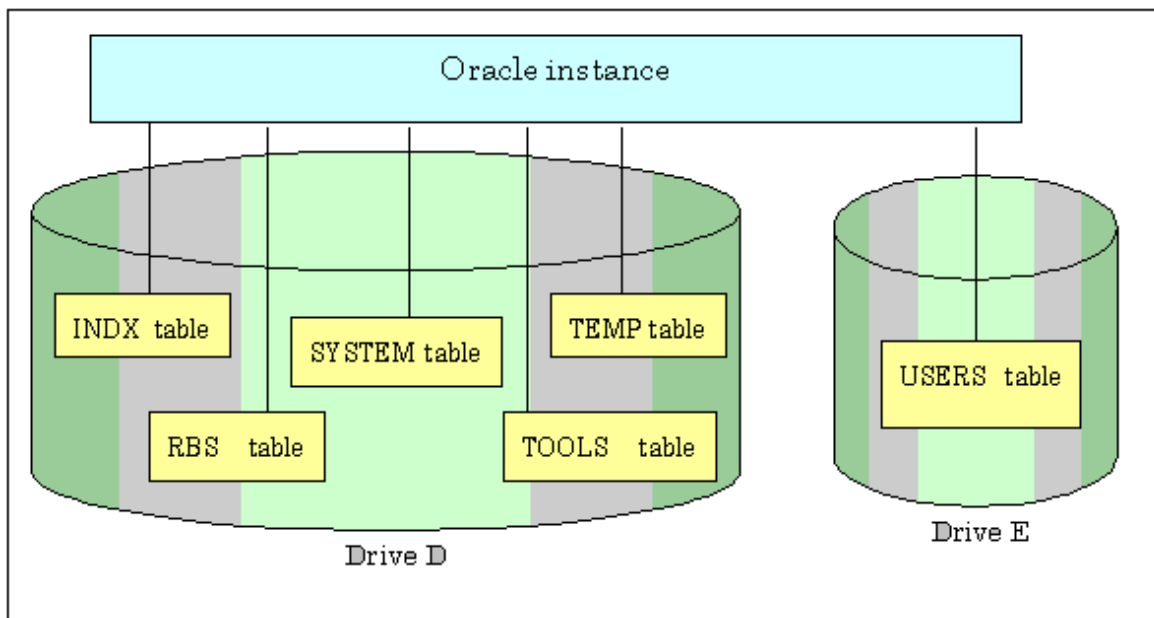
Sample scripts provided for AdvancedCopy Manager are created on the assumption that the following versions of Oracle are used. If you use any other version, you will need to customize the sample scripts as required.

- Oracle8i Release 8.1.x

B.2 Backup and Restoration of a Transaction volume

This section describes how to perform backup and restoration of an Oracle database using AdvancedCopy Manager.
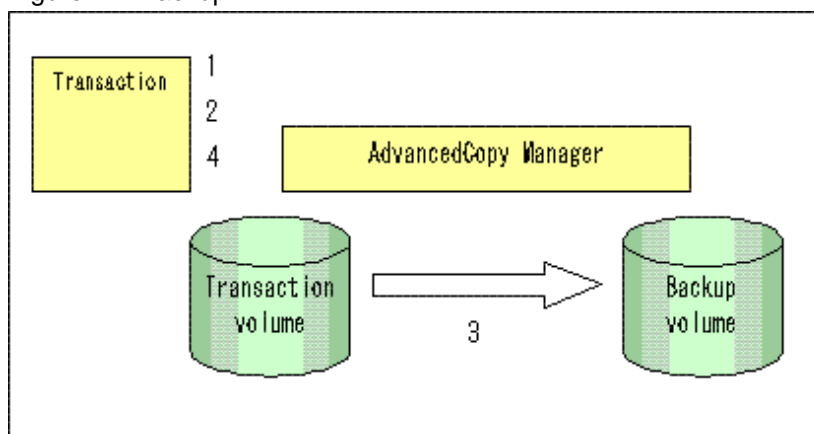
B.2.1 Backup procedure

The following provides an overview of the backup procedure.

1. Check the work operation status
   Check whether processing is in operation or not.

2. Stop processing
   If processing is found to be in operation in Step 1, declare the start of online backup for the database and stop updating data files to make the disk partition that stores processing data ready for online backup.

3. Back up (ie, copy) a disk partition
   Using the backup function of AdvancedCopy Manager, back up (ie, copy) a disk partition that stores processing data.

4. Restart processing
   If processing was found to be in operation in Step 1, declare the end of online backup for the database and restart updating the data files.

AdvancedCopy Manager provides a sample script that automatically performs Steps 2 through 5. For more information, see "B.3.1.2 Backup".

Figure B.2 Backup

B.2.2 Restoration procedure

The following provides an overview of how to perform restoration from a backup disk.

1. Checking the processing stop status
   Check that processing has stopped. If processing is in operation, stop the processing completely.

2. Performing restoration from a backup disk
   Using the restoration function of AdvancedCopy Manager, restore data from a backup disk to the transaction volume.

Figure B.3 Performing restoration from a backup disk
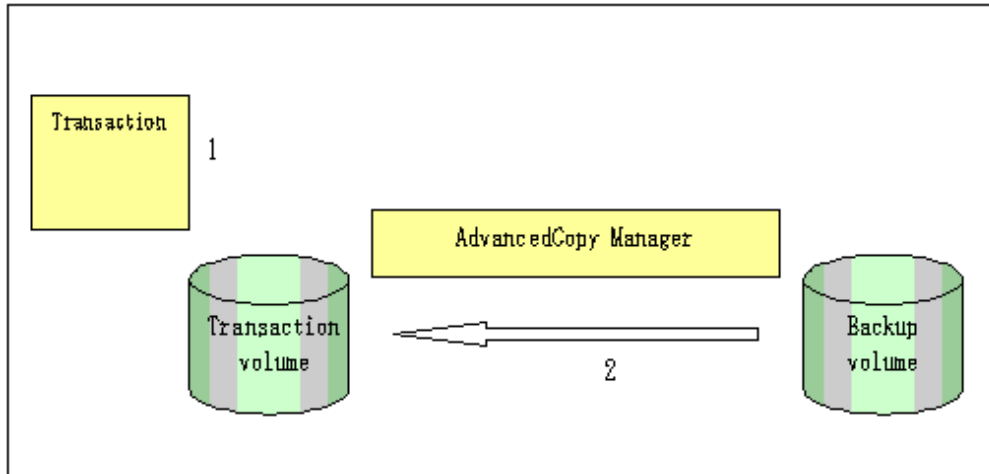
B.3   Sample Scripts for Oracle

This chapter describes samples scripts that are provided for AdvancedCopy Manager.

B.3.1   Overview of sample scripts

Sample scripts that are provided for AdvancedCopy Manager are stored under the "program-directory\etc\backup\sample" directory. The figure below shows the correlation chart of sample scripts.

Figure B.4 Correlation chart of sample scripts

1	Collecting DB information	swst_or_iv.sql
2	Script	swst_or_bk_as.js
3	SQL script	swst_first_st.sql
4	SQL script	swst_first_ed.sql
5	Xdevmap file	swst_xdevmap.txt

5 is used to define a backup destination in advance.
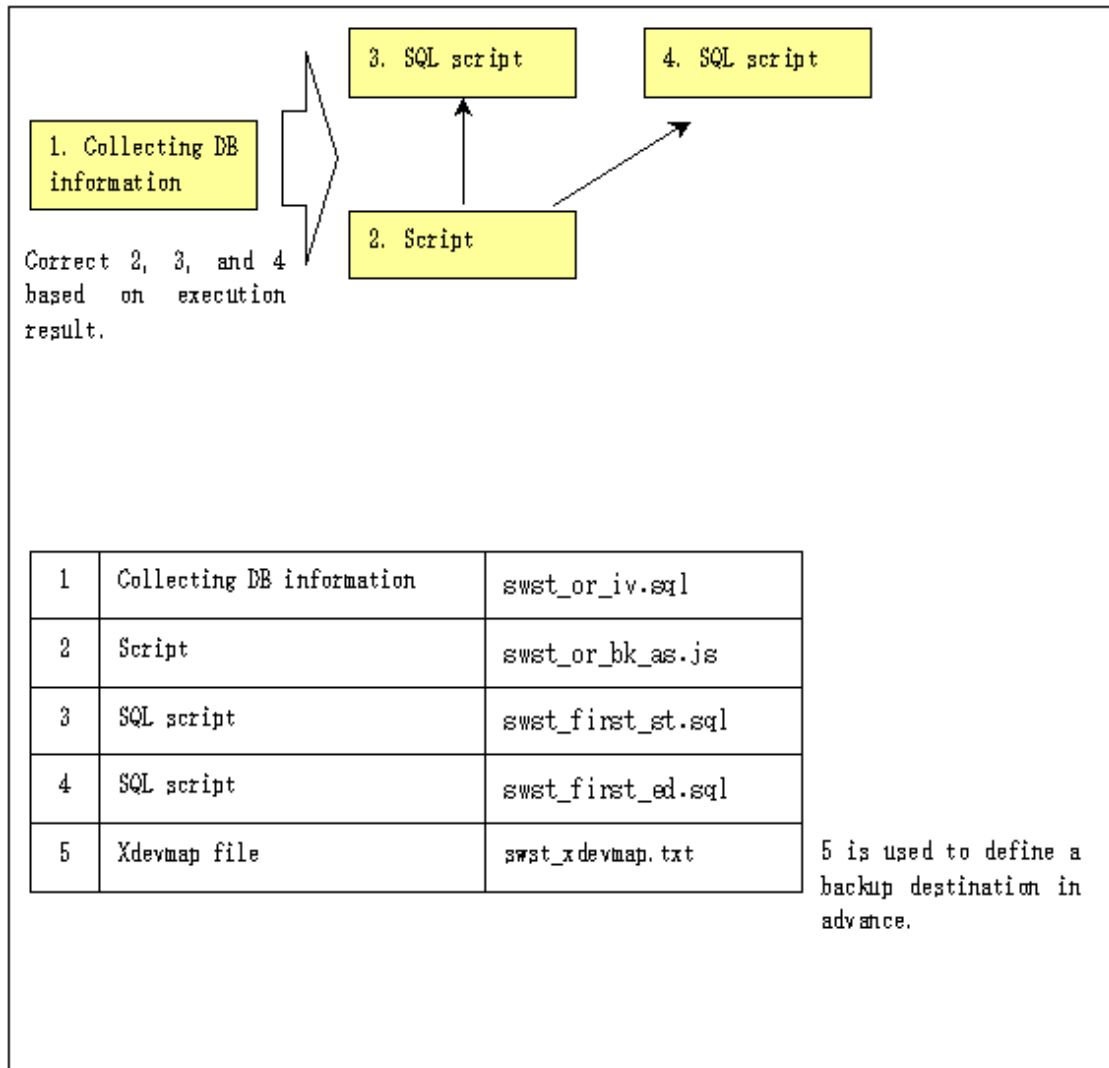
📌 Note

It is recommended that these sample scripts are copied to different folder before using them.

B.3.1.1 Collecting DB information

swst_or_iv.sql outputs the information from an Oracle database. This script outputs:

- ・ A list of table space names and storage destinations
- ・ Information from the log file of an Oracle database

Use the above database information as a reference for creating a script that performs backup.

Start method

```
sqlplus user-name/password@connection-string-for-DB-to-be-backed-up @swst_or_iv
```

Usage example

```
C:\>sqlplus system/manager@orcl @swst_or_iv
```

Result example

```
SQL*Plus: Release 8.1.6.0.0 - Production on Tue, May 22 21:33:21 2001
(c) Copyright 1999 Oracle Corporation.  All rights reserved.
Oracle8i Release 8.1.6.0.0 - Production
JServer Release 8.1.6.0.0 - Production
Connected to:
  TABLESPACE-NAME                    DEVICE-NAME
------------------- --------------------------------------------------
INDX                D:\ORACLE\ORADATA\CONTENTS\INDX01.DBF
RBS                 D:\ORACLE\ORADATA\CONTENTS\RBS01.DBF
SYSTEM              D:\ORACLE\ORADATA\CONTENTS\SYSTEM01.DBF
TEMP                D:\ORACLE\ORADATA\CONTENTS\TEMP01.DBF
TOOLS               D:\ORACLE\ORADATA\CONTENTS\TOOLS01.DBF
USERS               E:\ORACLE\ORADATA\CONTENTS\USERS01.DBF
SQL> show parameters log_archive_dest

NAME                                 TYPE
------------------------------------ --------------
VALUE
----------------------------
log_archive_dest                     string
D:\Oracle\oradata\contents\arc
hive
log_archive_dest_1                   string

log_archive_dest_2                   string

log_archive_dest_3                   string

log_archive_dest_4                   string

log_archive_dest_5                   string

log_archive_dest_state_1             string
enable
log_archive_dest_state_2             string
enable
log_archive_dest_state_3             string
enable
log_archive_dest_state_4             string
enable
log_archive_dest_state_5             string
enable
SQL>EXIT
Oracle8i Release 8.1.6.0.0 - Production
JServer Release 8.1.6.0.0 - Disconnect Production
```

🖐 **Note**

. . . .

The SQL*Plus tool comes in the following executable files, each of which corresponds to a version of Oracle.

Oracle version	Command-line-based version	Window-based version
Oracle7 Release7.3.x	PLUS33.EXE	PLUS33W.EXE
Oracle8 Release8.0.x	PLUS80.EXE	PLUS80W.EXE
Oracle8i Release8.1.x	SQLPLUS.EXE	SQLPLUSW.EXE

. . . .

B.3.1.2 Backup

swst_or_bk_as.js backs up processing data stored in an Oracle database on a file system, using AdvancedCopy Manager.
Processing data will be copied to a backup volume of AdvancedCopy Manager.
This script corresponds to Steps 2 through 5 described in "".

Start method

```
CSCRIPT.EXE swst_or_bk_as.js
```

Usage example

```
C:\>CSRIPT.EXE swst_or_bk_as.js
```

Result example

No result will be output if the processing ends normally.

Processing overview

```
Main processing
try {
    // create global objects
    var oracle_sid = "CONTENTS";                    // [[[ **1** TARGET INSTANCE NAME ]]]
    var ScriptPathName = "C:\\SCRIPT";              // [[[ **2** SCRIPT PATH ]]]
    var BinPathName = "C:\\WIN32APP\\AdvancedCopyManager\\bin"    // [[[ **3** SCRIPT PATH ]]]
    var OraclePathName = "D:\\Oracle\\Ora81\\bin";  // [[[ **4** ORACLE PATH ]]]
    var OracleServerManager9i = "sqlplus /nolog";   // [[[ ORACLE SERVER MANAGER  Oracle9i ]]]
    var OracleServerManager8i = "svrmgrl";          // [[[ ORACLE SERVER MANAGER Oracle8i ]]]
    var OracleServerManager8 = "svrmgr30";          // [[[ ORACLE SERVER MANAGER Oracle8.x ]]]
    var OracleServerManager7 = "svrmgr23";          // [[[ ORACLE SERVER MANAGER Oracle7.x ]]]
    var OracleSM = OraclePathName + "\\" + OracleServerManager8i;       // [[[ **5** PLEASE
SELECT ]]]               ----- One is chosen and described from above four.
    var FirstBusinessVolumeName = "g3d0p2";                             // [[[ **6** First Business
Volume Name ]]]
    var WorkBatchfile = ScriptPathName + "\\work" + FirstBusinessVolumeName + ".bat"; // [[[ Work
Batchfile ]]]
    var ErrorLogfile = ScriptPathName + "\\error" + FirstBusinessVolumeName + ".log"; // [[[ Error
Logfile ]]]

    // create Shell object
    var WshShell = WScript.CreateObject("WScript.Shell");
    ***** The backup file processing start of a one-eyed drive ******
//[[[ First Drive  - START - ]]]
    ExecSql("swst_first_st.sql", true);             // [[[ ***7*** FileName ]]]
    if (CheckErrorLog != 0) {
        ExecSql(swst_first_ed.sql", false);         // [[[ ***8*** FileName ]]]
        swstQuit (1);
    }
    var returnCode = WshShell.Run(BinPathName + "\\swstbackup g3d0p2 -Xdevmap " +
            ScriptPathName + "\\swst_devmap.txt", 0, true);     // [[[ ***9*** DeviceName
FileName ]]]
    ExecSql("swst_first_ed.sql", false);                        // [[[ ***10*** FileName ]]]
        if (returnCode != 0) {
                SwstQuit (2);
        } else if (CheckErrorLog() != 0) {
                SwstQuit (1);
    }
//[[[ First Drive  - END - ]]]
    ***** The backup file processing end of a one-eyed drive ******


    ***** The backup file processing start of the second drive ******
```

```
 //[[[ Second Drive  - START - ]]]
     ExecSql("swst_second_st.sql", false);                        // [[[ ***11*** FileName ]]]
     if (CheckErrorLog != 0) {
         ExecSql("swst_second_ed.sql, false");                    // [[[ ***12*** FileName ]]]
         swstQuit (1);
     }
           var returnCode = WshShell.Run(BinPathName + "\\swstbackup g3d0p3 -Xdevmap " +
                ScriptPathName + "\\swst_devmap.txt", 0, true);     // [[[ ***13*** DeviceName
 FileName ]]]
     ExecSql("swst_second_ed.sql", false);                        // [[[ ***14*** FileName ]]]
     if (CheckErrorLog != 0) {
                  SwstQuit (2);
         } else if (CheckErrorLog() != 0) {
                  SwstQuit (1);
     }
 //[[[ Second Drive  - END - ]]]
 ***** The backup file processing end of the second drive ******

     An error log is deleted at the time of a normal end, and it is completed.
         var fs = WScript.CreateObject("Scripting.FileSystemObject");
         var fs_d = fs.GetFile(ErrorLogfile);
         fs_d.Delete(true);

         SwstQuit(0);                    //Normal END

 } catch (e) {        In an error, it ends, without deleting an error log file.
     swstQuit(3);         //Abnomal END
 }


 function ExecSql(fileName, flg)      The SQL script file name to perform is received and it
 performs by the server manager. The 2nd argument is the overwrite propriety flag of a log.

 function CheckErrorLog()     It checks whether the inside of the log file acquired by the
 redirection after server manager execution is searched, and there is any error of an oracle.

 function swstQuit(exitStatus)                 Error processing
```

B.3.2   Applying a sample script

B.3.2.1   Updating a sample script

Customize a sample script so that it is appropriate for the actual operation being performed.

- swst_first_st.sql
  Customize this script to declare the start of the backup of each table space using a reference to the table space name as described in "B.3.1.1 Collecting DB information".
  Example: ALTER TABLESPACE xxxxx BEGIN BACKUP;Enter a table space name in xxxxx.
  If different storage destination drives are used, declare this item in a different file created with an arbitrary name on each of the drives.
  The user-name and the password described in the CONNECT sentence of the first line are customized to that of the user who has the ALTER authority.

- swst_first_ed.sql
  Customize this script to declare the end of backup of each table space using a table space name referenced as described in "B.3.1.1 Collecting DB information.
  Example: ALTER TABLESPACE xxxxx END BACKUP;Enter a table space name in xxxxx.
  If different storage destination drives are used, declare this item in a different file created with an arbitrary name on each of the drives.

The username and the password described in the CONNECT sentence of the first line are customized to that of the user who has the ALTER authority.

- swst_xdevmap.txt
  In one line, describe "AdvancedCopy Manager device names" of a transaction volume to be backed up (on the left) and a corresponding backup volume name (on the right), separating them with a space or tab character. If there are multiple backup targets, continue describing them using one line for each pair.

  Example:

  ```
  g1d0p3 g1d1p3
  ```

  Note: To specify the AdvancedCopy Manager device name of a transaction volume, use the volume name in the Device row displayed in the line of a drive to be backed up using the AdvancedCopy Manager command "swstexecstat".

  Example:
  In the following diagram, if the E drive should be backed up, the AdvancedCopy Manager device name of a transaction volume is "g1d1p4".

  ```
  C:\>C:\Win32app\AdvancedCopyManager\bin\swstexecstat
  Server Device Last-Backup-Date  Interval  Status  Mount-Point (Method) Execute
  Work1 g1d1p2 2000/12/11 12:20   OK        IDLE  C: (NTFS)            ----
  Work1 g1d1p3 2000/12/10 12:20   DELAY=1   EXEC  D: (FAT)             snapshot(22%)
  Work1 g1d1p4 2000/12/9  12:20   DELAY=2   EXEC  E: (NTFS)            snapshot(45%)
  :
  ```

- swst_or_bk_as.js
  Customize this sample script (swst_or_bk_as.js) in the following positions.
  An item number indicating a part to be customized corresponds to an item number provided in a comment in the script.

  1. Customize this item to the Oracle instance name of a backup target.

  2. Customize this item to a directory where the sample script is stored.

  3. Customize this item to AdvancedCopy Manager install-directory + "\\bin".

  4. Customize this item to ORACLE-install-directory + "\\bin".

  5. Select one of the three Oracle versions.

  6. This rewrites it in the business volume name of the first drive for the backup.

  7. Rewrite this item with an existing file name corresponding to "swst_first_st.sql".

  8. Rewrite this item with an existing file name corresponding to "swst_first_ed.sql".

  9. Rewrite this item with the transaction volume name of a drive to be backed up (ie, to a drive with a table space specified in Steps 7 and 8 above) and a file name corresponding to "swst_xdevmap.txt".

  10. The same as Step 8 above.

  11. Rewrite this item with an arbitrary file name provided for a different drive in "swst_first_st.sql".

  12. Rewrite this item with an arbitrary file name provided for a different drive in "swst_first_ed.sql".

  13. Rewrite this item with the name of a different transaction volume to be backed up than specified in Step 10 (a drive with a table space specified in Steps 12 and 13 above) and a file name corresponding to "swst_xdevmap.txt".

  14. The same as Step 12 above.

🐷 Note

This sample script assumes that the physical file of an instance is stored across two drives. If the information of an instance referenced (as described in "B.3.1.1 Collecting DB information") has only one drive, delete the two parts enclosed between the following lines. If more than two drives are used, copy the parts for the third and subsequent drives and modify each of them as appropriate.

```
//[[[ Second Drive  - START - ]]]
        XXXXXXX
        XXXXXXX
//[[[ Second Drive  - END - ]]]
```

Change the svrmgrl command to the sqlplus command (nolog/option specification) for Oracle9i.

・・

This script operates only on a Storage Server of AdvancedCopy Manager.

B.3.2.2 Creating a volume locking specification file

In the sample script (swst_or_bk_as.js), updated as described in "B.3.2.1 Updating a sample script", swstbackup (backup execution command) is executed. swstbackup (backup execution command) normally locks a volume to be backed up so that no file can be updated while being backed up.

As explained above, only flushing the file system buffer without locking the backup target volume is necessary for execution of swstbackup (backup execution command) with the backup target volume of the Oracle database specified as in "B.3.2.1 Updating a sample script" Therefore, change pre-processing and post-processing operations in the transaction volume locking specification file for backups. An example of the settings is shown below. If a machine in the SP-series is not used, then the pre-processing and post-processing operations can be changed by specifying the Xflush option in swstbackup (backup execution command).

Figure B.5 Transaction volume locking specification file for backups

B.3.3   Restoration methods

Use the restoration function of AdvancedCopy Manager to perform restoration.

In order to restore only some of the files on a transaction volume, use swstrestore (Restoration execution command) with the -r operand specified to restore backup data to a working drive. Then use the copy command of the OS to copy from the working drive to the transaction volume only the files that have been corrupted in the transaction volume.

B.3.4   Notes on using sample scripts

B.3.4.1   Location of Oracle resources

Store data files and other Oracle files on different disks or in different partitions.

B.3.4.2   Backup operation of Oracle resources

Note the following when performing this function.

・ Initialization parameter file
   Whenever a change is made, back up this file using the copy command, etc. of the OS.

- ・ Control files

    - You are recommended to mirror using Oracle.

    - If a change is made in the DB environment, use the following command to create a trace file. If a control file is corrupted, execute the SQL statement in the trace file to recover the control file.

    ```
    Alter database backup control file to trace;
    ```

- ・ Data files

    - Be sure to perform Oracle synchronous backup processing (begin backup/end backup) on all the table spaces to be backed up. No backup file created without synchronous processing can be used for recovery. Performing recovery using such a backup file is risky. If you do, an inconsistency may be generated in a database, which will then mean that it can no longer be opened.

    - When placing a data file in a file system, disable automatic data file extension (AUTOEXTEND OFF).

- ・ REDO files

    - You are recommended to mirror the online REDO log files and archive log files using Oracle or the OS.

    - No online REDO log file needs to be backed up.

 Note

For online backup operations, the target Oracle database must use an archive log.

B.3.4.3 Recovery of Oracle databases

To recover an Oracle database to the latest status, first restore the Oracle database and replace the files in which the error occurred with restored files, using the recovery function of Oracle.

Example:

```
recover tablespace
```

For information on the recovery function of Oracle databases, see "Oracle8i Backup and Recovery Guide" (if the database is Oracle8i).

Appendix C Pre-processing and Post-processing of Replication

The replication explains the replication pre-processing and post-processing that are performed in AdvancedCopy Manager.

C.1 Overview

The replication pre-processing and post-processing scripts are started before and after the replication (ie, the copy) processing.

AdvancedCopy Manager performs the processing required for a replication source volume and replication destination volume by executing these scripts.

This chapter describes the content and setup of pre-processing and post-processing.

C.2 Pre-processing and Post-processing of Replication

The pre-processing and post-processing needs to be performed for both the replication source volume and the replication destination volume. The purpose of each is as follows.

- Pre-processing and post-processing for a replication source volume
  This is intended to freeze the replication source data in a state in which consistency is temporarily ensured. In pre-processing, source data is temporarily frozen, and after the replication is complete, the frozen data is released in post-processing.

- Pre-processing and post-processing for a replication destination volume
  This is intended to prevent applications from accessing the copy destination volume during replication. In pre-processing, replication data for the destination is given an access-disabled status. This status is released in post-processing, after the replication is complete

The specific tasks executed during the pre-processing and post-processing differ according to the data contents of the volume. The next section explains the pre-processing and post-processing of the file system.

C.2.1 Pre-processing and post-processing for a file system

If the replication source and destination volumes are partitions, it is assumed that a file system has been constructed on the volumes and the following pre-processing and post-processing is performed.

Table C.1 When the copy source volume/copy destination volume are partitions

Copy source volume	Pre-processing	Default operation ・ The source volume is locked. When the Xflush option is specified or BufferFlushOnly is set to on ・ The file system buffer of the source volume is flushed. When the -f option is specified ・ No processing is performed (ie, the source pre-processing script is not executed).
	Post-processing	Default operation ・ The source volume is unlocked. When the Xflush option is specified ・ No processing is performed. When the -f option is specified ・ No processing is performed (ie, the source post-processing script is not executed).
Copy destination volume	Pre-processing	Default operation

		・ The destination volume is locked.
		When the -t option is specified
		・ No processing is performed (ie, the destination pre-processing script is not executed).
	Post-processing	Default operation
		・ The destination volume is unlocked.
		When the -t option is specified
		・ No processing is performed (ie, the destination post-processing script is not executed).

If the replication source volume and the replication destination volume are Logical Units (disks), the following pre-processing and post-processing is performed.

Table C.2 When the copy source volume/copy destination volume are Logical Units (disks)

Copy source volume	Pre-processing	Default operation
		・ The partition included in the Logical Unit (disk) is locked.
		When the Xflush option is specified or BufferFlushOnly is set to on
		・ The file system buffer of the partition included in the Logical Unit (disk) is flushed.
		When the -f option is specified
		・ No processing is performed (ie, the source pre-processing script is not executed).
	Post-processing	Default operation
		・ The partition included in the Logical Unit (disk) is unlocked.
		When the Xflush option is specified
		・ No processing is performed.
		When the -f option is specified
		・ No processing is performed (ie, the source post-processing script is not executed).
Copy destination volume	Pre-processing	Default operation
		1. The partition included in the Logical Unit (disk) is unlocked.
		2. The drive character or mount point assignment of the partition included in the Logical Unit (disk) is released.
		3. The partition included in the Logical Unit (disk) is deleted.
		When the -t option is specified
		・ No processing is performed (i.e., the destination pre-processing script is not executed).
	Post-processing	Default operation
		・ The operating system is notified that Logical Unit (disk) management information (partition table, etc.) has been updated. If C.2.6 Drive character mapping file contains settings for the copy destination disk, the following processing is executed:
		1. The system waits until the status of the partition in the Logical Unit (disk) allows assignment of a drive character or mount point.

		2. A drive character or mount point is assigned in accordance with the drive character mapping file. When the -t option is specified ・ No processing is performed (ie, the destination post-processing script is not executed).

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 C.3 Pre-processing and post-processing for a file system

Command	Copy status	Source/ Destination	Pre-processing	Post-processing
swsrpstartsync (Backup synchronous processing start command)	Copy not started, or replication establishment	Source	X	X
		Destination	O--*1	H--*2
swsrpmake (Replication creation command)	equivalency maintenance	Source	O	O
		Destination	H--*1	O--*2
swsrpcancel (Replication cancellation command)	Equivalency maintenance	Source	O	O
		Destination	H--*1	O--*2
	replication establishment	Source	X	X
		Destination	X	X
	copying	Source	X	X
		Destination	X	H--*2
swsrpmake (Replication creation command)	Copy not started	Source	O	O
		Destination	O	O

O: executed

H: Indicates execution when the destination volume is a shared volume in a cluster system (note, however, that no call is made to the destination post-processing script).

X: not executed

The post-processing for the pre-processing executed in step (*1) is executed in step (*2).

The pre-processing and post-processing for a file system can be customized. The processing is started in accordance with the table above when a replication management command is executed. For replication between servers, these scripts are executed by remote execution using TCP/IP in the pre-processing and post-processing of a volume that is not connected.

The operation image before and after processing is shown in the following figure.

Figure C.1 Synchronized replication processing
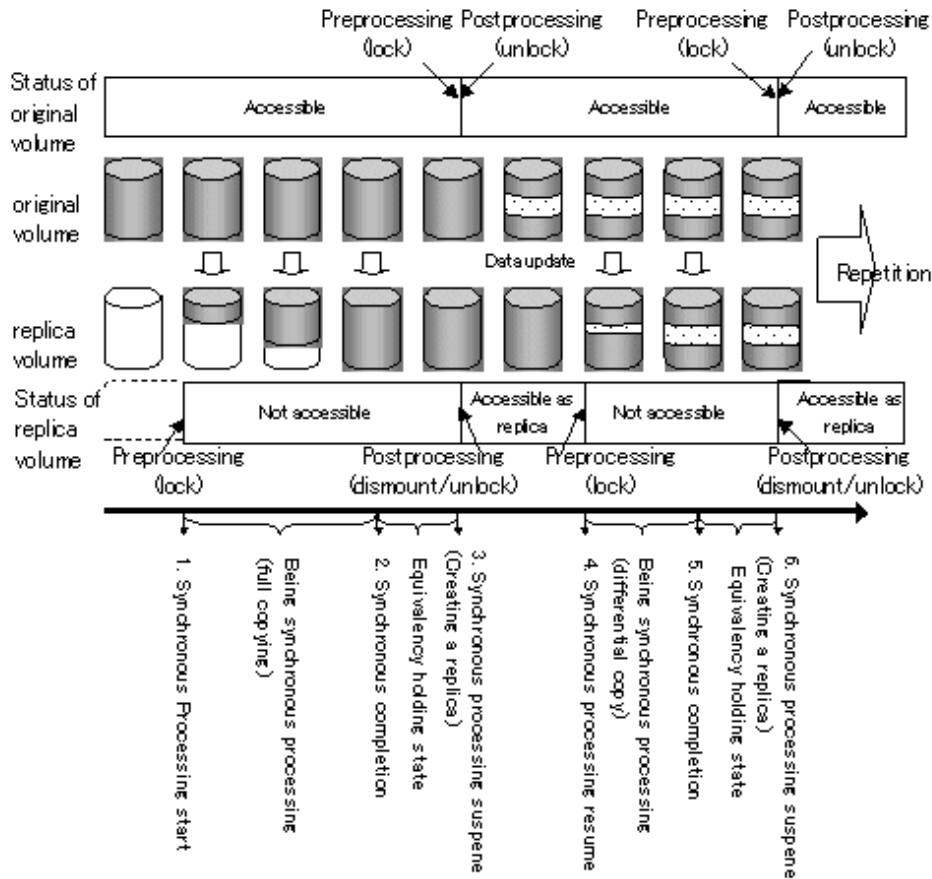
If processing other than the standard pre-processing and post-processing is required in the pre-processing and post-processing, customize the scripts.

When customizing a script, strictly observe the following rules regarding error codes:

Table C.4 Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

📝 **Note**

. . . .

AdvancedCopy Manager does not support pre-processing and post-processing of databases other than Oracle, SQL Server, and Exchange databases. Database pre-processing and post-processing must be executed uniquely before and after (respectively) the execution of the AdvancedCopy Manager command.

. . . .

C.2.2 Pre-processing when replication is executed

The replication source volume script (RepSrcPre.js) and the replication destination volume script (RepDstPre.js) are prepared for a pre-processing script, and it is stored in the following directory subordinates. Please customize these scripts according to the processing requirements.

In the case of non-cluster operation

```
<Environmental setting directory> \etc\repl\scripts directory subordinate
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\repl\scripts directory subordinate
```

C.2.2.1 replication source volume pre-processing sample script (RepSrcPre.js)

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // RepSrcPre.js: Pre-Processing Script for Replication(Source)
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of source volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3): unused, but must not be used because older versions use this value.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");              // create Shell object
18:     var WshEnv   = WshShell.Environment("PROCESS");                    // create Environment
object
19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstReplicationPreProc object
22:     var proc = new SwstReplicationPreProc();
23:
24:     // there is nothing to do if the pre/post-processing is not customized
25:     proc.doNothingForDriveLetter();
26:
27:     SwstQuit(0);
28: } catch (e) {
29:     SwstQuit(9);
30: }
31:
32: function SwstReplicationPreProc()
33: {
34:     // member variables
35:     this.svName        = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); //
device name of source volume
36:     this.postFileName = getDataPathName() + "\\" + getPutFileName(this.svName) + ".spre";  // name
of postprocessing file
37:
38:     // member functions
39:     this.doNothingForDriveLetter = doNothingForDriveLetter; // self-explanatory
40:     this.writePostFile           = writePostFile;           // self-explanatory
41: }
42:
43: function doNothingForDriveLetter()
44: {
45:     this.writePostFile(this.postFileName, "none");
46: }
47:
48: function writePostFile(postfile, postdata)
49: {
50:     var overwrite = true; // means to overwrite a file if it exists.
51:     var postFileStream = fsObj.CreateTextFile(postfile, overwrite);
52:     postFileStream.WriteLine(postdata);
53:     postFileStream.Close();
```

```
 54: }
 55:
 56: function SwstQuit(exitStatus)
 57: {
 58:     switch(exitStatus) {
 59:     case 0:
 60:         WScript.Quit(0);
 61:     case 1:
 62:         WScript.Echo("[Replication Preprocessing] The number of the arguments is incorrect.");
 63:         WScript.Quit(2);
 64:     default:
 65:         WScript.Echo("[Replication Preprocessing] The script exited abnormally.");
 66:         WScript.Quit(4);
 67:     }
 68: }
 69:
 70: function getDataPathName()
 71: {
 72:     return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\repl\\data\\DEFAULT";
 73: }
 74:
 75: function getBinPathName()
 76: {
 77:     return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
 78: }
 79:
 80: function getSetupInfoKey()
 81: {
 82:     var nodeName = WshEnv.Item("SWSTGNODE");
 83:     if( nodeName != "" ){
 84:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
 nodeName;
 85:     }
 86:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
 87: }
 88:
 89: function getPutFileName(deviceName){
 90:     var fileName;
 91:     if( isSafeDISKName(deviceName) ){
 92:         var re = /(\S+)\/(\S+):(\S+)/;
 93:         fileName = deviceName.replace(re, "$1_$2_$3");
 94:     }else{
 95:         fileName = deviceName;
 96:     }
 97:     return(fileName);
 98: }
 99:
100: function getGXDXPX(deviceName){
101:     var gXdXpX;
102:     if( isSafeDISKName(deviceName) ){
103:         var re = /(\S+)\/(\S+):(\S+)/;
104:         gXdXpX = deviceName.replace(re, "$3");
105:     }else{
106:         gXdXpX = deviceName;
107:     }
108:     return(gXdXpX);
109: }
110:
111: function isSafeDISKName(deviceName){
112:     var key = ":g";
113:     var s = deviceName.indexOf(key);
114:     if ( s < 0 ) {
115:         return (false);
```

```
116:    } else {
117:        return (true);
118:    }
119: }
```

C.2.2.2   replication destination volume pre-processing sample script (RepDstPre.js)

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // RepDstPre.js: Pre-Processing Script for Replication(Destination)
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of destination volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3): unused, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");                // create Shell
object
18:     var WshEnv   = WshShell.Environment("PROCESS");                      // create Environment
object
19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstReplicationPreProc object
22:     var proc = new SwstReplicationPreProc();
23:
24:     // there is nothing to do if the pre/post-processing is not customized
25:     proc.doNothingForDriveLetter();
26:
27:     SwstQuit(0);
28: } catch (e) {
29:     SwstQuit(9);
30: }
31:
32: function SwstReplicationPreProc()
33: {
34:     // member variables
35:     this.dvName      = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); //
device name of destination volume
36:     this.postFileName = getDataPathName() + "\\" + getPutFileName(this.dvName) + ".dpre";  // name
of postprocessing file
37:
38:     // member functions
39:     this.doNothingForDriveLetter = doNothingForDriveLetter; // self-explanatory
40:     this.writePostFile      = writePostFile;      // self-explanatory
41: }
42:
43: function doNothingForDriveLetter()
44: {
45:     this.writePostFile(this.postFileName, "none");
46: }
47:
48: function writePostFile(postfile, postdata)
49: {
50:     var overwrite = true; // means to overwrite a file if it exists.
51:     var postFileStream = fsObj.CreateTextFile(postfile, overwrite);
```

```
 52:     postFileStream.WriteLine(postdata);
 53:     postFileStream.Close();
 54: }
 55:
 56: function SwstQuit(exitStatus)
 57: {
 58:     switch(exitStatus) {
 59:     case 0:
 60:         WScript.Quit(0);
 61:     case 1:
 62:         WScript.Echo("[Replication Preprocessing] The number of the arguments is incorrect.");
 63:         WScript.Quit(2);
 64:     default:
 65:         WScript.Echo("[Replication Preprocessing] The script exited abnormally.");
 66:         WScript.Quit(4);
 67:     }
 68: }
 69:
 70: function getDataPathName()
 71: {
 72:     return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\repl\\data\\DEFAULT";
 73: }
 74:
 75: function getBinPathName()
 76: {
 77:     return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
 78: }
 79:
 80: function getSetupInfoKey()
 81: {
 82:     var nodeName = WshEnv.Item("SWSTGNODE");
 83:     if( nodeName != "" ){
 84:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
 nodeName;
 85:     }
 86:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
 87: }
 88:
 89: function getPutFileName(deviceName){
 90:     var fileName;
 91:     if( isSafeDISKName(deviceName) ){
 92:     var re = /(\S+)\/(\S+):(\S+)/;
 93:     fileName = deviceName.replace(re, "$1_$2_$3");
 94:     }else{
 95:     fileName = deviceName;
 96:     }
 97:     return(fileName);
 98: }
 99:
100: function getGXDXPX(deviceName){
101:     var gXdXpX;
102:     if( isSafeDISKName(deviceName) ){
103:     var re = /(\S+)\/(\S+):(\S+)/;
104:     gXdXpX = deviceName.replace(re, "$3");
105:     }else{
106:     gXdXpX = deviceName;
107:     }
108:     return(gXdXpX);
109: }
110:
111: function isSafeDISKName(deviceName){
112:     var key = ":g";
113:     var s = deviceName.indexOf(key);
```

```
114:    if ( s < 0 ) {
115:    return (false);
116:    } else {
117:    return (true);
118:    }
119: }
```

C.2.3   Post-processing when replication is executed

The replication source volume script (RepSrcPost.js) and the replication destination volume script (RepDstPost.js) are prepared for a post-processing script, which is stored in the following subdirectory. This script must be customized according to the processing requirements.

In the case of non-cluster operation

```
<Environmental setting directory> \etc\repl\scripts directory subordinate
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\repl\scripts directory subordinate
```

C.2.3.1   replication source volume post-processing sample script (RepSrcPost.js)

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // RepSrcPost.js: Post-Processing Script for Replication(Source)
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of source volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3): unused, but must not be used because older versions use this value.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");           // create Shell object
18:     var WshEnv   = WshShell.Environment("PROCESS");                 // create Environment
object
19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstReplicationPostProc object
22:     var proc = new SwstReplicationPostProc();
23:
24:     // do nothing if postprocessing file exists
25:     if (fsObj.FileExists(proc.postFileName) == false) {
26:         SwstQuit(0);
27:     }
28:
29:     // get postprocessing type
30:     var postProcType = proc.getPostProcData(proc.postFileName);
31:     switch(postProcType) {
32:     case "none":
33:         proc.doNothing();
34:         break;
35:     }
36:
37:     // clear temporary files
38:     proc.deletePostFile(proc.postFileName);
39:     SwstQuit(0);
```

```
 40: } catch (e) {
 41:    SwstQuit(9);
 42: }
 43:
 44: function SwstReplicationPostProc()
 45: {
 46:    // member variables
 47:    this.svName   = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of source volume
 48:    this.postFileName = getDataPathName() + "\\" + getPutFileName(this.svName) + ".spre"; // name
of postprocessing file
 49:
 50:    // member functions
 51:    this.getPostProcData   = getPostProcData;    // self-explanatory
 52:    this.doNothing         = doNothing;          // self-explanatory
 53:    this.deletePostFile    = deletePostFile;     // self-explanatory
 54: }
 55:
 56: function getPostProcData(postfile)
 57: {
 58:    var iomode = 1;    // means read-only mode
 59:    var create = false; // means not to create a file
 60:    var postFileStream = fsObj.OpenTextFile(postfile, iomode, create);
 61:    var postData = postFileStream.ReadLine();
 62:    postFileStream.Close();
 63:    return postData;
 64: }
 65:
 66: function doNothing()
 67: {
 68:    // do nothing
 69: }
 70:
 71: function deletePostFile(postfile)
 72: {
 73:    if (fsObj.FileExists(postfile) == true) {
 74:        fsObj.DeleteFile(postfile);
 75:    }
 76: }
 77:
 78: function SwstQuit(exitStatus)
 79: {
 80:    switch(exitStatus) {
 81:    case 0:
 82:        WScript.Quit(0);
 83:    case 1:
 84:        WScript.Echo("[Replication Postprocessing] The number of the arguments is incorrect.");
 85:        WScript.Quit(2);
 86:    default:
 87:        WScript.Echo("[Replication Postprocessing] The script exited abnormally.");
 88:        WScript.Quit(4);
 89:    }
 90: }
 91:
 92: function getDataPathName()
 93: {
 94:    return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\repl\\data\\DEFAULT";
 95: }
 96:
 97: function getBinPathName()
 98: {
 99:    return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
100: }
```

```
101:
102: function getSetupInfoKey()
103: {
104:     var nodeName = WshEnv.Item("SWSTGNODE");
105:     if( nodeName != "" ){
106:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
107:     }
108:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
109: }
110:
111: function getPutFileName(deviceName){
112:     var fileName;
113:     if( isSafeDISKName(deviceName) ){
114:         var re = /(\S+)\/(\S+):(\S+)/;
115:         fileName = deviceName.replace(re, "$1_$2_$3");
116:     }else{
117:         fileName = deviceName;
118:     }
119:     return(fileName);
120: }
121:
122: function getGXDXPX(deviceName){
123:     var gXdXpX;
124:     if( isSafeDISKName(deviceName) ){
125:         var re = /(\S+)\/(\S+):(\S+)/;
126:         gXdXpX = deviceName.replace(re, "$3");
127:     }else{
128:         gXdXpX = deviceName;
129:     }
130:     return(gXdXpX);
131: }
132:
133: function isSafeDISKName(deviceName){
134:     var key = ":g";
135:     var s = deviceName.indexOf(key);
136:     if ( s < 0 ) {
137:         return (false);
138:     } else {
139:         return (true);
140:     }
141: }
```

C.2.3.2   replication destination volume post-processing sample script (RepDstPost.js)

```
 1: // AdvancedCopy Manager for Windows
 2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2009
 3: //
 4: // RepDstPost.js: Post-Processing Script for Replication(Destination)
 5: //
 6: // [Parameters]
 7: // 1st argument: device name of destination volume
 8: //
 9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3,5-7): unused, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");                 // create Shell object
18:     var WshEnv   = WshShell.Environment("PROCESS");                        // create Environment
```

```
object
 19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
 20:
 21:     // create SwstReplicationPostProc object
 22:     var proc = new SwstReplicationPostProc();
 23:
 24:     // do nothing if postprocessing file exists
 25:     if (fsObj.FileExists(proc.postFileName) == false) {
 26:         SwstQuit(0);
 27:     }
 28:
 29:     // get postprocessing type
 30:     var postProcType = proc.getPostProcData(proc.postFileName);
 31:     switch(postProcType) {
 32:     case "none":
 33:         proc.doNothing();
 34:         break;
 35:     }
 36:
 37:     // clear temporary files
 38:     proc.deletePostFile(proc.postFileName);
 39:     SwstQuit(0);
 40: } catch (e) {
 41:     SwstQuit(9);
 42: }
 43:
 44: function SwstReplicationPostProc()
 45: {
 46:     // member variables
 47:     this.dvName    = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of destination volume
 48:     this.postFileName = getDataPathName() + "\\" + getPutFileName(this.dvName) + ".dpre";   //
name of postprocessing file
 49:
 50:     // member functions
 51:     this.getPostProcData   = getPostProcData;    // self-explanatory
 52:     this.doNothing         = doNothing;          // self-explanatory
 53:     this.deletePostFile    = deletePostFile;     // self-explanatory
 54: }
 55:
 56: function getPostProcData(postfile)
 57: {
 58:     var iomode = 1;    // means read-only mode
 59:     var create = false; // means not to create a file
 60:     var postFileStream = fsObj.OpenTextFile(postfile, iomode, create);
 61:     var postData = postFileStream.ReadLine();
 62:     postFileStream.Close();
 63:     return postData;
 64: }
 65:
 66: function doNothing()
 67: {
 68:     // do nothing
 69: }
 70:
 71: function deletePostFile(postfile)
 72: {
 73:     if (fsObj.FileExists(postfile) == true) {
 74:         fsObj.DeleteFile(postfile);
 75:     }
 76: }
 77:
```

```
 78: function SwstQuit(exitStatus)
 79: {
 80:     switch(exitStatus) {
 81:     case 0:
 82:         WScript.Quit(0);
 83:     case 1:
 84:         WScript.Echo("[Replication Postprocessing] The number of the arguments is incorrect.");
 85:         WScript.Quit(2);
 86:     default:
 87:         WScript.Echo("[Replication Postprocessing] The script exited abnormally.");
 88:         WScript.Quit(4);
 89:     }
 90: }
 91:
 92: function getDataPathName()
 93: {
 94:     return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\repl\\data\\DEFAULT";
 95: }
 96:
 97: function getBinPathName()
 98: {
 99:     return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
100: }
101:
102: function getSetupInfoKey()
103: {
104:     var nodeName = WshEnv.Item("SWSTGNODE");
105:     if( nodeName != "" ){
106:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
107:     }
108:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
109: }
110:
111: function getPutFileName(deviceName){
112:     var fileName;
113:     if( isSafeDISKName(deviceName) ){
114:         var re = /(\S+)\/(\S+):(\S+)/;
115:         fileName = deviceName.replace(re, "$1_$2_$3");
116:     }else{
117:         fileName = deviceName;
118:     }
119:     return(fileName);
120: }
121:
122: function getGXDXPX(deviceName){
123:     var gXdXpX;
124:     if( isSafeDISKName(deviceName) ){
125:         var re = /(\S+)\/(\S+):(\S+)/;
126:         gXdXpX = deviceName.replace(re, "$3");
127:     }else{
128:         gXdXpX = deviceName;
129:     }
130:     return(gXdXpX);
131: }
132:
133: function isSafeDISKName(deviceName){
134:     var key = ":g";
135:     var s = deviceName.indexOf(key);
136:     if ( s < 0 ) {
137:         return (false);
138:     } else {
139:         return (true);
```

```
140:     }
141: }
```

🅿 Point

....

The volume is locked/unlocked, and the buffer is flushed by the command, not by the script. Therefore, the source pre-processing and post-processing scripts are executed immediately before and after (respectively) the source/destination volumes are locked/unlocked and the buffer is flushed. The source/destination pre-processing and post-processing scripts do not perform any processing.

....

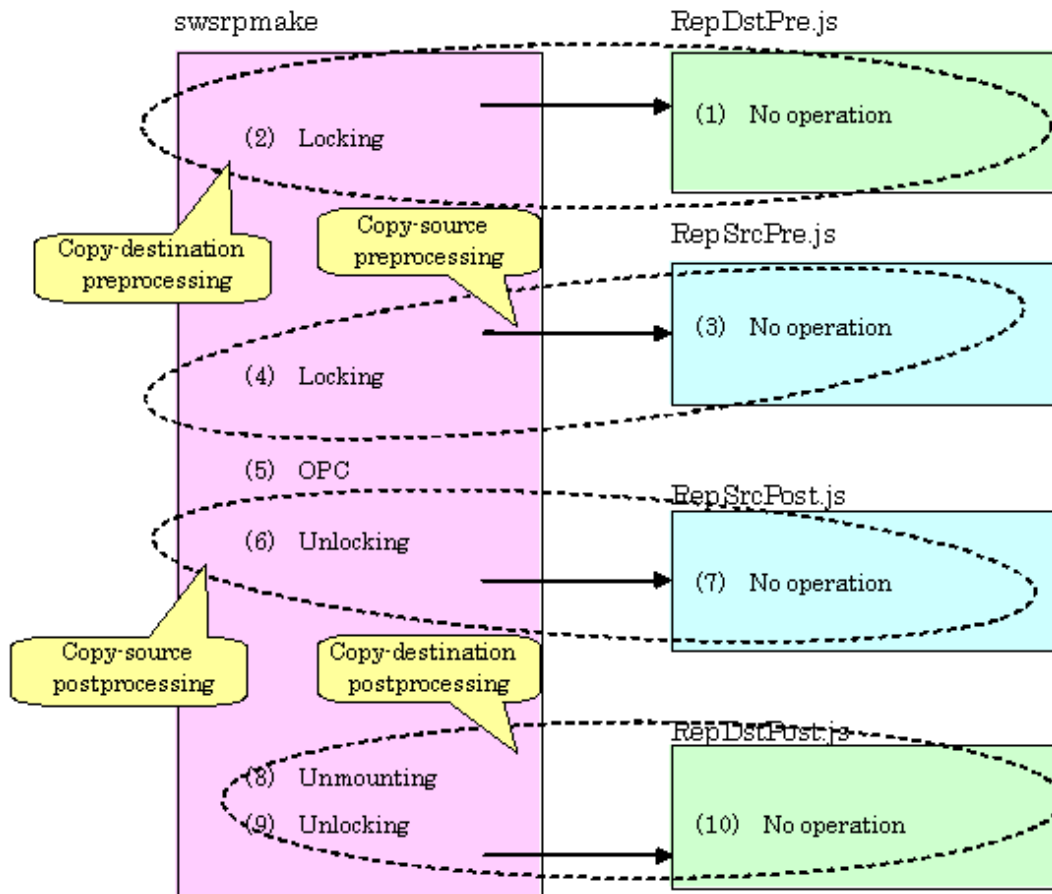Figure C.2 Snapshot-type replication (OPC)

Figure C.3 Synchronous-type replication (EC) (1): When the destination volume is not a shared volume in a cluster system
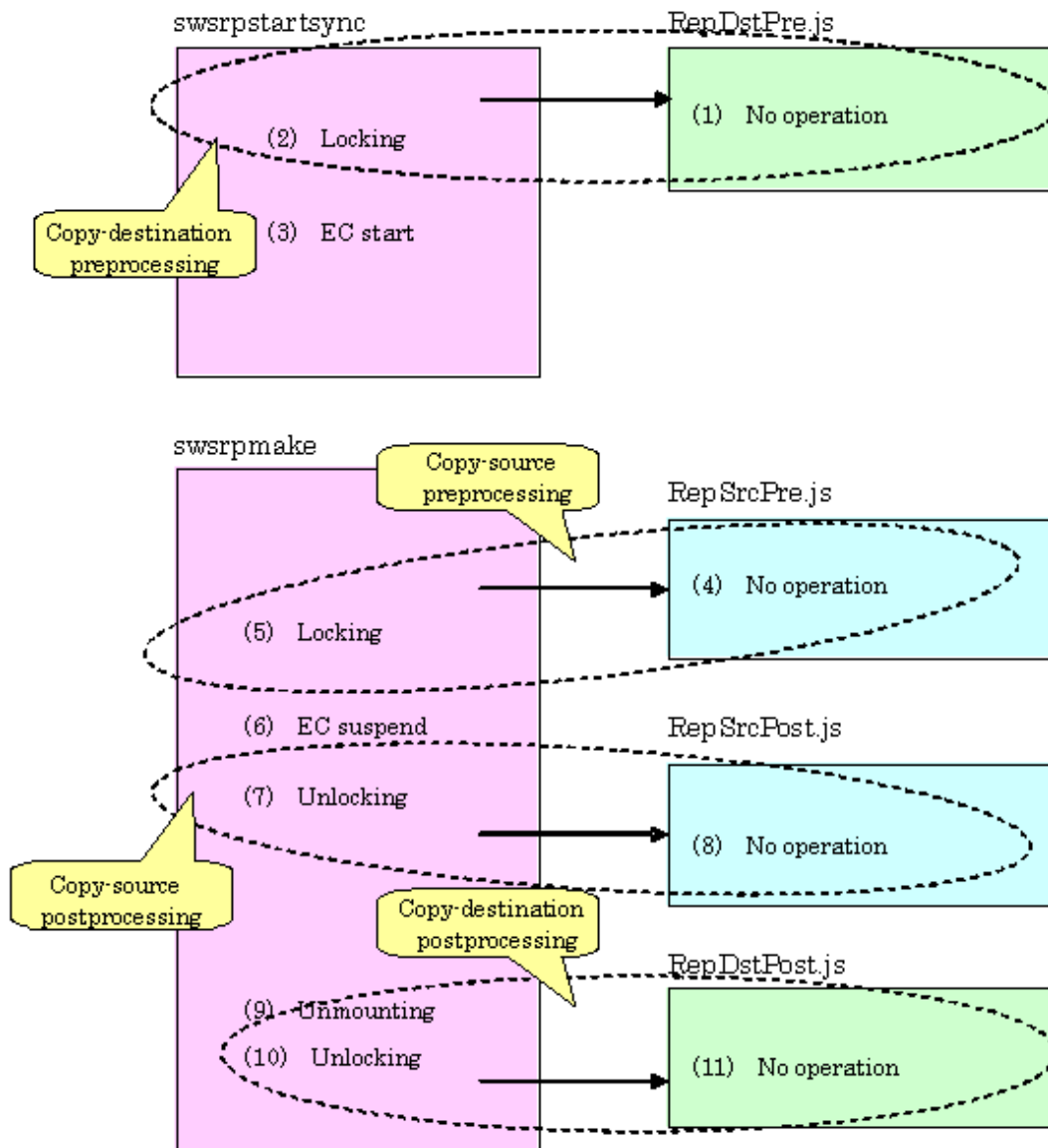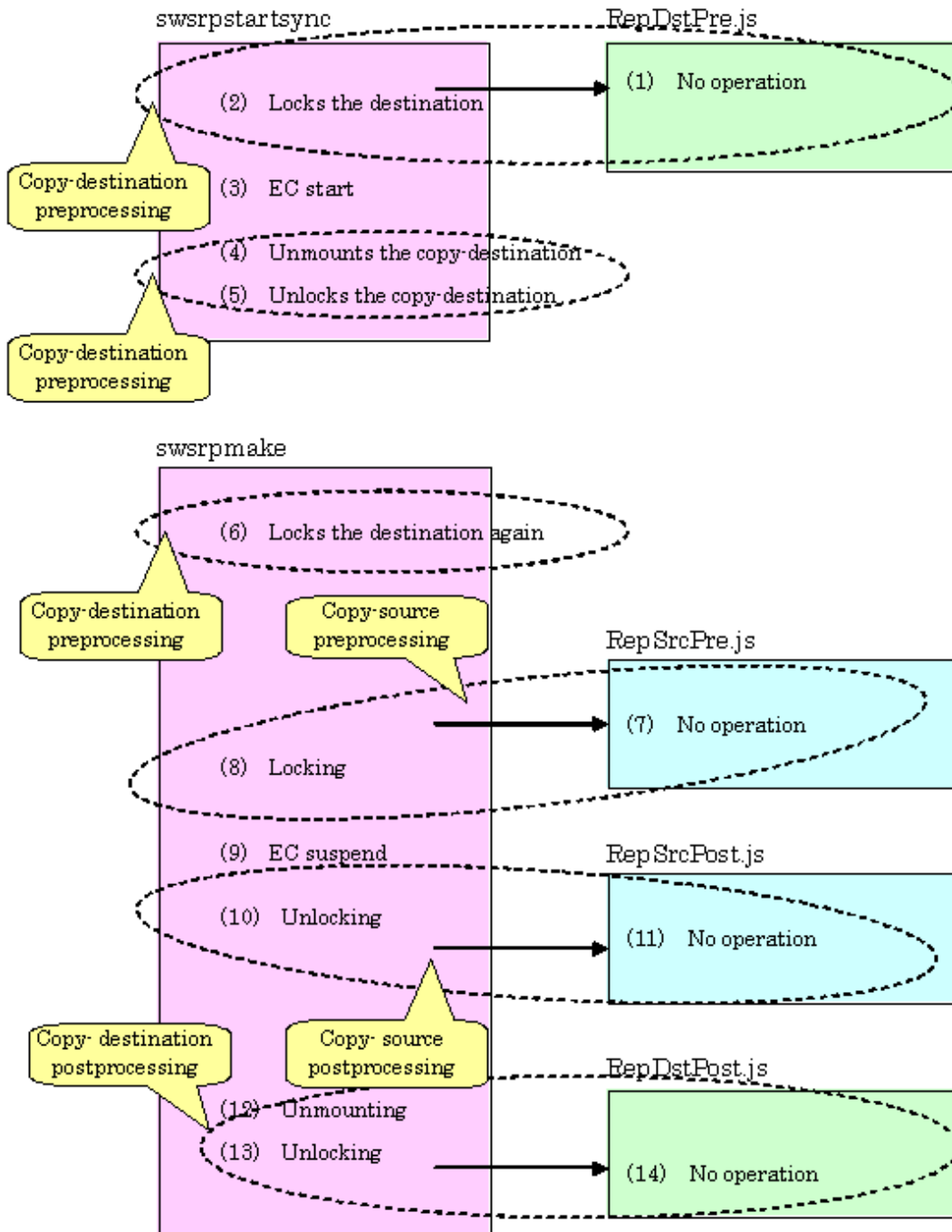
Figure C.4 Synchronous-type replication (EC) (2): When the destination volume is a shared volume in a cluster system

![Note icon] **Note**

. . . .

In replication pre-processing for the source volume and destination volume, to avoid a temporary access conflict with other applications, locking is retried if it cannot complete its operation. If the number of times that locking is executed reaches the specified retry count limit, the command ends abnormally. If an abnormal end occurs, a process that is using the source volume or destination volume remains active. Stop all applications and services involved, or take other appropriate measures so that the volume cannot be used by another process.

Although the retry count limit can be changed by creating volume locking specification files and re-setting the count (for details on the files, refer to "C.2.4 Copy source volume locking specification file", and " C.2.5 Copy destination volume locking specification file"), the files do not need to be created if appropriate measures have been taken to prevent other processes from using the target volumes during replication processing execution.

. . . .

For synchronous-type replication (ie, EC) in which the destination volume is a shared volume in a cluster system, to prevent the cluster system from being accessed by another process, the destination volume is locked only while swsrpstartsync (Backup synchronous processing start command) and swsrpmake (Replication creation command) are running (see the figure above). That is, the destination volume remains unlocked from the time that the start replication command is executed to the time that the create replication command is executed.

This may cause a message to be output to the event log. This message is described in "12.1.1.12 Error messages displayed an event viewer". However, this is not a major problem, and the message can be ignored.

C.2.4   Copy source volume locking specification file

If locking fails in copy source volume replication pre-processing, it should be retried in order to prevent a temporary access conflict with other applications. If a Logical Unit (disk) is specified as the copy source volume, locking is implemented for the partition contained in the Logical Unit (disk). If locking fails, it should be retried.
The standard retry operations are as follows:

- Locking is retried one second after locking fails.

- If locking is not successful after 20 retries (that is, for a total of 21 locking attempts including the first attempt), then the processing is stopped and the command ends abnormally.

The maximum number of retries (the default value = 20 attempts) and retry interval (the default value = 1 second) can be changed by creating a setting file called the copy source volume locking specification file. In this setting file, the following instructions can be specified for the copy source volume pre-processing:

- Invalidating all file handles in the volume before locking is retried (this is the forcible locking function)

- Flushing the file system buffer instead of locking/unlocking during the copy source pre-processing (this is a function equivalent to the Xflush option)

- If the AdvancedCopy Manager version is 13.1 or later, the user can specify, in the copy source volume lock operation specification file, that replication pre-processing and post-processing are not executed.

C.2.4.1   Creating a copy source volume locking specification file

Create a copy source volume locking specification file on the server that contains the copy source volume, naming it as follows:

File name	In the case of non-cluster operation
	"environment-settings-directory\etc\repl\data\SRCLOCK.INI
	In the case of cluster operation
	<Shared disk>:\etc\opt\swstorage\etc\repl\data\SRCLOCK.INI

Examples of settings in the copy source volume locking specification file are listed below.

```
[g1d1p1]
BufferFlushOnly=off
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=10
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=100
```

An explanation of how to create a copy source volume locking specification file is given below.

- Create a section for the volume whose locking operation is to be changed and code the parameters (in the above example, the g1d1p1 and g1d1p2 sections are created). The four parameters listed in the table below may be changed. Not all of these four parameters need to be coded: code only the parameters that you want to change. The default value is used for the parameters that are not coded.

- To change the default locking operation, create a section called "ANY" and code the parameters. This enables the locking operation to be changed for all volumes except the volumes explicitly coded in the copy source volume locking specification file. In the above example, the locking of all volumes except g1d1p1 and g1d1p2 depends on the value in the "ANY" section.

SRCLOCK.INI parameter settings

Key	Explanation
BufferFlushOnly	Specifies flushing the file system buffer of the copy source volume instead of locking the copy source volume: off (default value) = the buffer is not flushed (locking) on = the buffer is flushed (no locking) If the Xflush option is specified in swsrpmake or swsrpbackup_exchange and BufferFlushOnly=off, then the Xflush option has priority. If BufferFlushOnly is set to "on", all other parameters (LockForceMode, LockRetryNumber, and LockRetryInterval) become invalid. Before this parameter is set to "on", all write processing on the copy source volume must be stopped. If a replica is created without the write processing stopped, then the copy source volume data is not guaranteed. This parameter becomes invalid if "on" is specified for NoPrePost. If "on" is not specified for NoPrePost but is specified for BufferFlushOnly, other parameters (LockForceMode, LockRetryNumber, and LockRetryInterval) become invalid.
LockForceMode	If locking of the copy source volume fails, locking is retried. This parameter specifies that the volume be dismounted before locking is retried. off (default value) = no dismounting before locking is retried on = dismounting before locking is retried When the volume is dismounted, all handles opened for the volume become invalid. * If the volume is set in the used state immediately after it is dismounted, then locking may be impossible. If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.
LockRetryNumber	If locking of the copy source volume fails, locking is retried. This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified. The default value is 20 (attempts). If the transaction volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally. If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.
LockRetryInterval	If locking of the copy source volume fails, locking is retried. This parameter specifies the retry interval in milliseconds. A numeric value ranging from 1 to 600,000 (10 minutes) can be specified. The default value is 1,000 (1 second). If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.
NoPrePost	Specifies that replication pre-processing and post-processing are not executed. off (default value) = The replication pre-processing and post-processing are performed. on = The replication pre-processing and post-processing are not performed. If "on" is specified for NoPrePost, all other parameters (BufferFlushOnly, LockForceMode, LockRetryNumber, LockRetryInterval) are ignored. This parameter can be specified under AdvancedCopy Manager 13.1 and later.

C.2.5 Copy destination volume locking specification file

If locking fails in copy destination volume backup pre-processing, locking is retried to prevent a temporary access conflict with other applications. If a Logical Unit (disk) is specified as the copy destination volume, locking is implemented for the volume contained in the Logical Unit (disk). If locking fails, it should be retried.

The standard retry operations are as follows:

- Locking is retried one second after locking fails.

- If locking is not successful after 20 retries (that is, for a total of 21 attempts including the first locking attempt), then the processing is stopped and the command ends abnormally.

The maximum number of retries (default value = 20 attempts) and the retry interval (default value = 1 second) can be changed by creating a configuration file called the copy destination volume locking specification file. In this configuration file, the following instructions can be specified for the copy destination volume pre-processing:

- Invalidating all file handles in the volume before locking is retried (this is the forced locking function)

If the AdvancedCopy Manager version is 13.1 or later, the user can specify, in the destination source volume lock operation specification file, that replication pre-processing and post-processing are not to be executed.

C.2.5.1 Creating a copy destination volume locking specification file

Create this file on the server that contains the copy destination volume, naming it as follows:

File name	For a non-cluster operation
	environment-setting-directory\etc\repl\data\DSTLOCK.INI
	For a cluster operation
	<shared-disk>:\etc\opt\swstorage\etc\repl\data\DSTLOCK.INI

Examples of settings in this file are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=10
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=100
```

An explanation of how to create this file is given below:

- Create a section for the volume whose locking operation is to be changed and code the parameters (in the above example, the g1d1p1 and g1d1p2 sections are created). The four parameters listed in the table below may be changed. Not all of these four parameters need to be coded. Code only the parameters that you want to change. The default value is used for the parameters that are not coded.

- To change the default locking operation, create a section called "ANY" and create the code parameters. This enables the locking operation to be changed for all volumes except the volumes explicitly coded in the copy source volume locking specification file (in the above example, the locking of all volumes except g1d1p1 and g1d1p2 depends on the value in the "ANY" section).

DSTLOCK.INI parameter settings

Key	Explanation
LockForceMode	If locking of the copy destination volume fails, locking is retried. This parameter specifies that the volume be dismounted before locking is retried.
	off (default value) = no dismounting before locking is retried
	on = dismounting before locking is retried

Key	Explanation
	When the volume is dismounted, all handles opened for the volume become invalid.
	* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.
	If "on" is specified for NoPrePost, this parameter becomes invalid.
LockRetryNumber	If locking of the copy destination volume fails, locking is retried. This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified. The default value is 20 (attempts). If the transaction volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally. If "on" is specified for NoPrePost, this parameter becomes invalid.
LockRetryInterval	If locking of the copy destination volume fails, locking is retried. This parameter specifies the retry interval in milliseconds. A numeric value ranging from 1 to 600,000 (10 minutes) can be specified. The default value is 1,000 (1 second). If "on" is specified for NoPrePost, this parameter becomes invalid.
NoPrePost	Specifies that replication pre-processing and post-processing are not executed.
	off (default value) = The replication pre-processing and post-processing are performed.
	on = The replication pre-processing and post-processing are not performed.
	If "on" is specified for NoPrePost, all other parameters (LockForceMode, LockRetryNumber, LockRetryInterval) are ignored. This parameter can be specified under AdvancedCopy Manager 13.1 and later.

C.2.6   Drive character mapping file

If the replication destination volume is a Logical Unit (disk), the replication destination post-processing can assign a specific drive character or mount point to the partitions included in the Logical Unit (disk). To assign a drive character or mount point, perform the setting of the drive character or mount point in the replication destination post-processing.

The mount point assignment processing is performed as follows:

1. Check that the partitions included in the replication destination Logical Unit (disk) are in a state that allows drive character or mount point assignment.
   The operating system recognizes the partitions included in the Logical Unit (disk) immediately after replication, and it takes a while before the state that allows assignment of drive characters or mount points is reached.
   The systems checks whether the state that allows assignment is reached, then waits for a fixed time interval and checks again.
   This check process is repeated until the state that allows assignment is reached.

2. Drive characters and mount points are assigned in accordance with the drive character mapping file.

Note

AdvancedCopy Manager does not assign drive characters or mount points in the following cases:

・ There is no drive character mapping file.

・ The section name of the volume at the targeted replication destination disk is not in the drive character mapping file.

Note

Processing is stopped if there is something unsuitable (for example, if the drive character is currently in use, or if the directory specified as the mount point is incorrect) in the contents coded in the drive character mapping file.

C.2.6.1 Creating a drive character mapping file

Create a drive character mapping file on the server that contains the copy destination volume. Use the following filenames:

Filename	For non-cluster operation
	Environment settings directory\etc\repl\data\DRVMAP.INI
	For cluster operation
	<Shared disk>:\etc\opt\swstorage\etc\repl\data\DRVMAP.INI

Use the following method to create a drive character mapping file:

1. Create a section in the drive character mapping file for the targeted replication destination volume.

2. In this section, use the partition number of the targeted partition as the key, and specify the directory name that indicates the drive character or mount point to be assigned.

Note

・ Only one drive character or mount point can be specified for one partition.

・ The drive character or mount point assignment is cancelled if a partition does not have a specification.

The following is an example of a drive character mapping file:

```
[g1d1]
p1=D:
p2=C:\mnt
[g1d2]
p1=E:
```

Items set in the drive character mapping file

Key	Explanation
p? (At "?", specify the partition number)	Specifies the assigned drive character or mount point directory name.
MountableCheckCount	Specify the retry count to be used when the system checks whether the partitions in the replication destination Logical Unit (disk) are in the state that allows assignment of drive characters and mount points. A value from 1 to 10000 can be set. The default value is 120. Processing stops if the status still does not allow an assignment when the retry count is exceeded.
MountableCheckInterval	Specify the retry interval (in milliseconds) to be used when the system checks whether the partitions in the replication destination Logical Unit (disk) are in the state that allows assignment of drive characters and mount points. A value from 1 to 600000 (10 minutes) can be set. The default value is 500 (0.5 seconds).

Appendix D System Volume Backup Operation

For information on how to make a backup and how to restore a system volume using AdvancedCopy Manager, refer to "System volume backup operation" in the "ETERNUS SF AdvancedCopy Manager Operator's Guide for Tape Backup" .

Appendix E Backup Operations Using Power-Saving

E.1 Overview

Under the power-saving operation, the ETERNUS storage system eco mode functionality is used. The processing time of a specific disk drive (RAID group unit) is managed according to the schedule, and the disk drive's motor is stopped if there is no access to the disk for a certain period of time (the period can be set at 10 minutes, 20 minutes, 30 minutes, 40 minutes, 50 minutes and 60 minutes). In this way, power-saving can be achieved.

If there is an access to the disk after the motor has stopped, the disk drive is started again and the access is enabled in one to three minutes' time.

Moreover, the number of access is judged to be high if the number of operations of the disk drive in one day exceeds the set range (one to five times can be set). In this situation, the echo mode is not applied, and the operation will continue.

It is possible to save power consumption under the following operations.

- ・ Backup management

    - Snapshot type high-speed backup (OPC) with no access to the backup volume for a long period of time.

    - Suspend/Resume functionality of synchronous type high-speed backup (EC, REC) with a long suspend time.

- ・ Replication management

    - Snapshot type high-speed replication (OPC) with no access to the copied volume as the backup destination for a long period of time.

    - Suspend/Resume functionality of synchronous type high-speed replication with a long suspend time.

E.2 Structure

This section explains the overview of the structure.

Figure E.1 Overview of structure
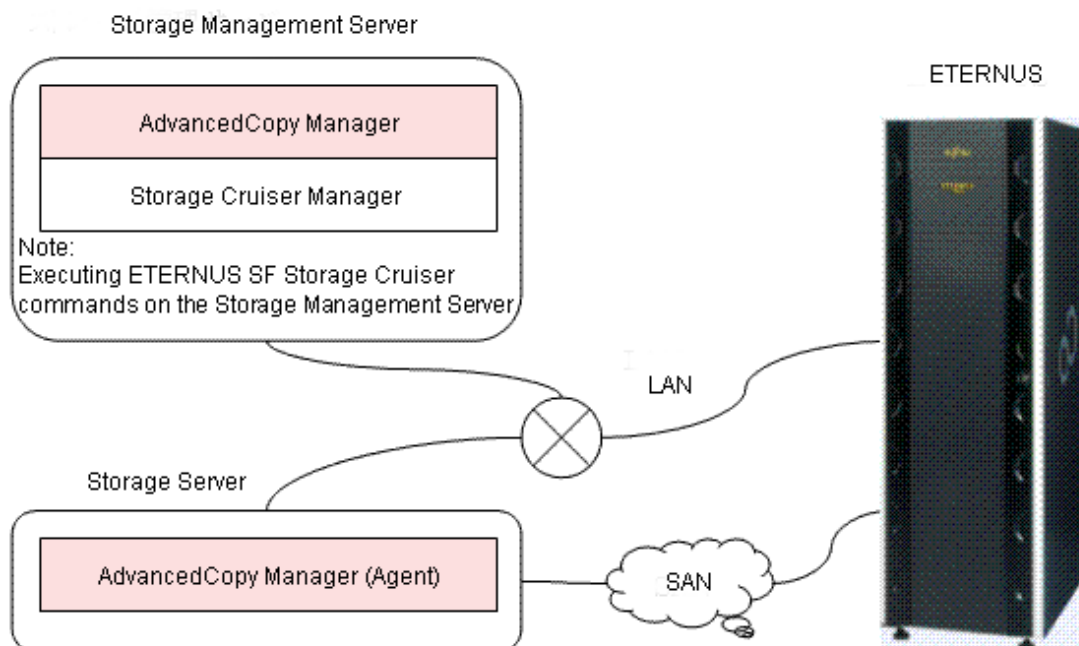
E.3   Operating Environment

This section explains the operating environment of the backup operation under the power-saving mode.

Device	Description
Storage Management Server	Required operating systems Operating systems that support both the Manager of AdvancedCopy Manager and ETERNUS SF Storage Cruiser 14.0 or later (the Operation Management Server (OMS) function). Required software ETERNUS SF Storage Cruiser 14.0 or later(Operation management server functionality) Note: For installation and setup of ETERNUS SF Storage Cruiser, refer to ETERNUS SF Storage Cruiser manual.
Storage Server	Required operating system Operating systems supported by AdvancedCopy Manager Required software None
ETERNUS storage system	ETERNUS DX60 ETERNUS DX80 ETERNUS2000 model 100 or higher ETERNUS4000 model 300 or higher ETERNUS8000 model 700 or higher Note: Firmware that can control eco mode software is required.

E.4   Environment Settings

E.4.1   Procedure for Configuring the Environment

This section describes how to configure the environment.

E.4.2   Settings for an ETERNUS Storage System

To use the eco mode, it is required to set the device eco mode, create the eco mode schedule, and then set the eco mode scheduling for the RAID group.
For details on how to configure an ETERNUS storage system, refer to the "ETERNUSmgr" manual.

Creating a RAID group and Logical Unit

The eco mode is applied and the RAID group is created.
A RAID group that is to store the data to be backed up (hereafter called "backup source RAID group") and a RAID group that is to

store the backup data (hereafter called "backup destination RAID group") are created. A logical Unit is allocated to each RAID group.

To effectively reduce power consumption, the backup destination RAID group sets a Logical Unit for each backup that is performed simultaneously. Other Logical Units should not be included in the backup destination RAID group.

The example below illustrates the procedure to simultaneously back up three Logical units (Backup operation A). There are no Logical Units other than the ones for backup operation A in the backup destination RAID group. Therefore, a disk drive can be stopped, except when a backup is running.
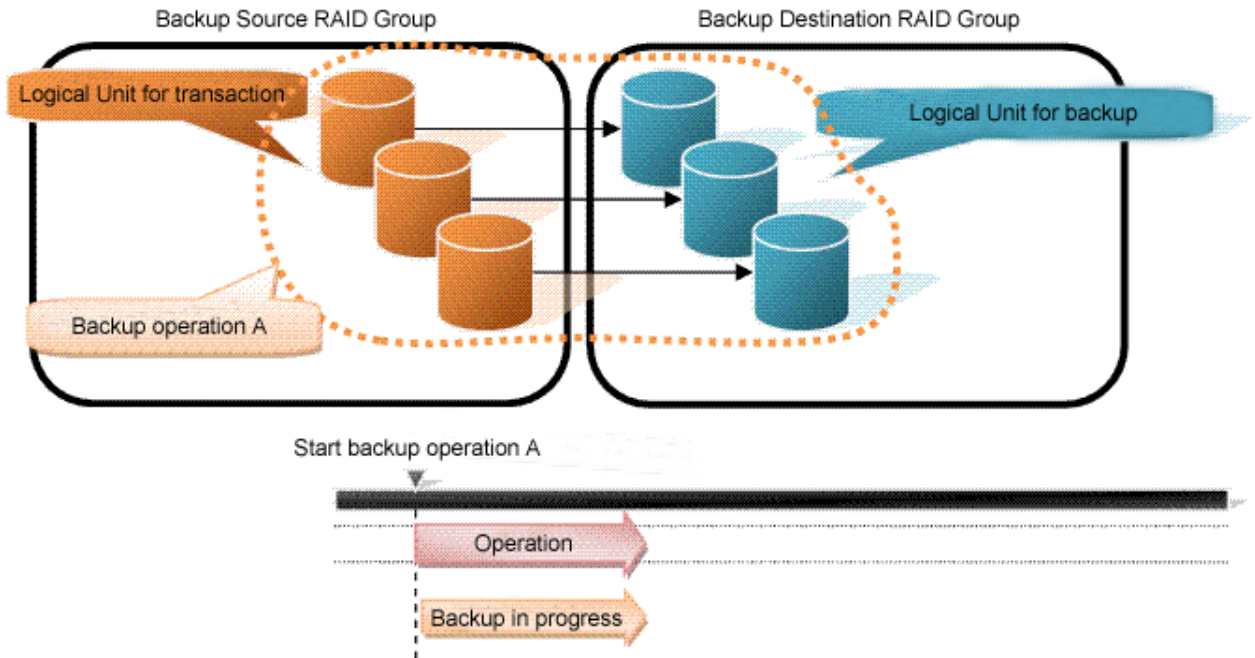

The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, a disk drive cannot be stopped, although backup operation A is ended if Logical Units for backup operation B and for business are running.
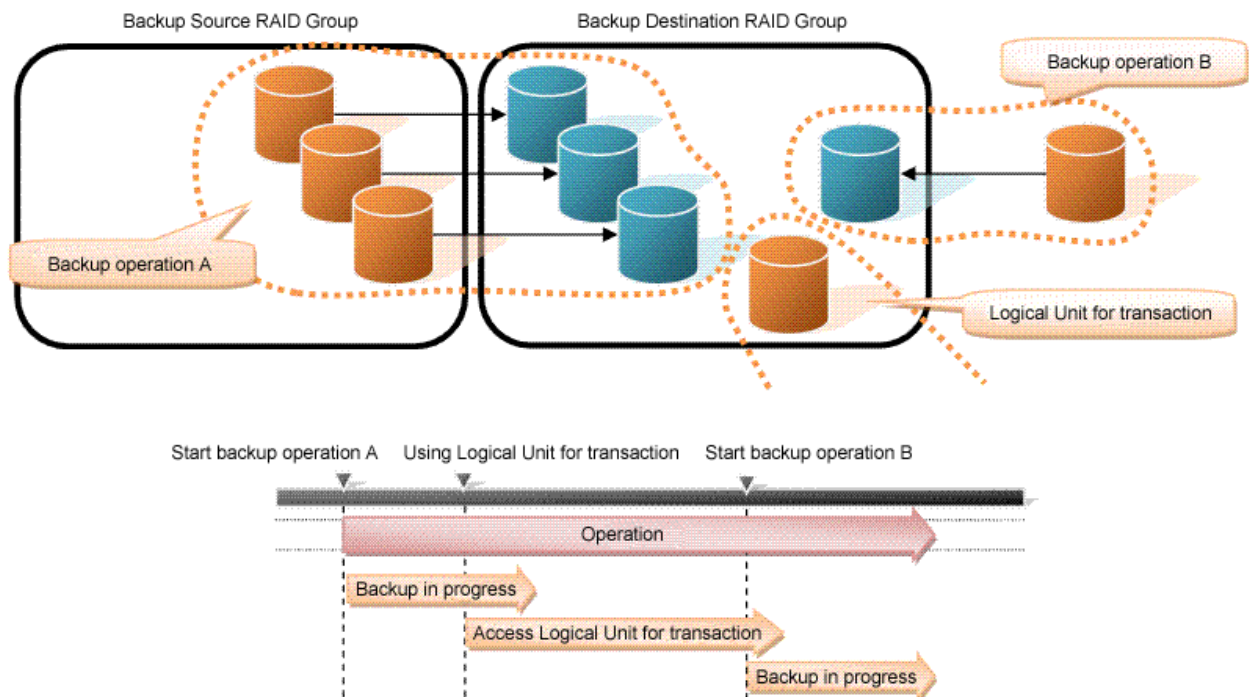
P Point

. . . .

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.

. . . .
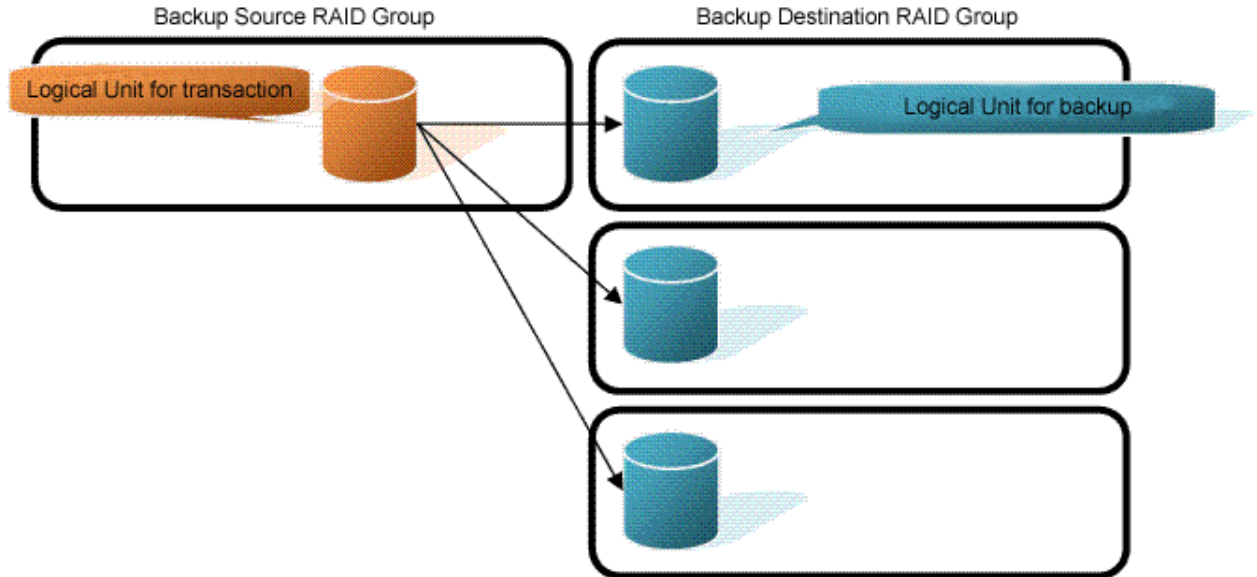
Note

. . . .

A Snap Data Volume and a Snap Data Pool should not be included in a backup destination RAID group.
The RAID group disk drive which includes a Snap Data Volume or a Snap Data Pool does not reach a stop status.

. . . .

Settings in the eco mode

This describes the setting details of the eco mode that supports RAID group.
For more details about the settings, refer to the ETERNUSmgr manual.

Table E.1 Eco mode common settings

Setting items	Details of settings
Eco mode settings	Starting the eco mode
Host I/O monitoring time (10,20,30,40,50,60 minutes)	Any
Limit of the number of starts/stops in one day (1 to 5 times)	Any

Table E.2 Backup source RAID group - Eco mode settings

Setting items	Details of settings
Eco mode schedule ON/OFF	OFF

Table E.3 Backup destination RAID group - Eco mode settings

Setting items	Details of settings
Eco mode schedule ON/OFF	ON

Setting items	Details of settings
Eco mode schedule	Software control

E.4.3　Settings for AdvancedCopy Manager

AdvancedCopy Manager needs to be configured so that the RAID group for the eco mode is used.

Using the backup operation

When assigning a backup volume, use a logical unit or partition (slice) that belongs to a RAID group for the eco mode.

Using the replication operation

For the destination volumes, use a logical unit or partition (slice) that belongs to a RAID group.

E.4.4　Settings for ETERNUS SF Storage Cruiser

An ETERNUS SF Storage Cruiser command is used for the power-saving operation. Therefore, ETERNUS SF Storage Cruiser needs to be set. For details, refer to the "ETERNUS SF Storage Cruiser" manual.

E.5　Operation

This section describes the procedure for establishing power-saving operations. This procedure is to be followed for the Storage Management Server.

1. E.5.1 Start the Disk Drive

2. E.5.2 Operate AdvancedCopy Manager

3. E.5.3 Stop the Disk Drive

E.5.1　Start the Disk Drive

A RAID group disk drive is started using ETERNUS SF Storage Cruiser disk control command. It is possible to wait for the start time of the disk drive by specifying the -sync option.

Example when the Storage Management Server is Windows

```
C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle start -
ipaddr <EternusIP> -raid <RaidGroup> -sync

<EternusIP>: ETERNUS storage system IP address
<RaidGroup>: RAID group number to be used for backup destination
```

Example when the Storage Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr <EternusIP> -raid <RaidGroup> -sync

<EternusIP>: ETERNUS storage system IP address
<RaidGroup>: RAID group number to be used for backup destination
```

For details on this command, refer to the "ETERNUS SF Storage Cruiser" manual.

E.5.2 Operate AdvancedCopy Manager

Backup, restoration and replication are performed using AdvancedCopy Manager commands. For details, refer to the description of each operation in this manual.

E.5.3 Stop the Disk Drive

Stopping of a RAID group disk drive is scheduled using the disk control command of the ETERNUS SF Storage Cruiser. This command returns control after the end of the stopping schedule of the disk drive.

Example when the Storage Management Server is Windows

```
C:\Program Files\ETERNUS-SSC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle stop -
ipaddr <EternusIP> -raid <RaidGroup> -s

<EternusIP>: ETERNUS storage system IP address
<RaidGroup>: RAID group number to be used for the backup destination
```

Example when the Storage Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr <EternusIP> -raid <RaidGroup> -s

<EternusIP>: ETERNUS storage system IP address
<RaidGroup>: RAID group number to be used for the backup destination
```

For details on this command, refer to the "ETERNUS SF Storage Cruiser" manual.

Note

Depending on the status of the back up destination RAID group, a disk drive may not stop immediately.

- While OPC physical copying
  If the OPC physical copy is in progress on the disk drive, the disk drive stops after a certain period once the physical copy is completed.

- While the disk is being accessed
  If the RAID group for backup destination is being accessed, for example when backing up to a tape, the drive stops after a certain period once the access is stopped.

Other than the above, there are cases that the disk does not stop. For details, refer to the "ETERNUS SF Storage Cruiser" manual.

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