ETERNUS SF

FUJITSU

**ETERNUS SF
AdvancedCopy Manager V15.3**

Operation Guide

Windows

Preface

Purpose

This manual describes the functionality of ETERNUS SF AdvancedCopy Manager (hereafter referred to as "AdvancedCopy Manager").

Intended Readers

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

Organization

This manual is composed as follows:

Notation

The names, abbreviations, and symbols shown below are used in this manual.

Operating systems

Formal name	Abbreviation	
Microsoft(R) Windows Server(R) 2003, Standard Edition Microsoft(R) Windows Server(R) 2003, Standard x64 Edition Microsoft(R) Windows Server(R) 2003, Enterprise Edition Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition	Windows Server 2003	Windows
Microsoft(R) Windows Server(R) 2008 Standard (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM) (32-bit)(64-bit)	Windows Server 2008	
Microsoft(R) Windows Server(R) 2008 R2 Foundation Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	Windows Server 2008 R2	
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter	Windows Server 2012	
Microsoft(R) Windows(R) XP Professional Edition Microsoft(R) Windows(R) XP Home Edition	Windows XP	
Windows Vista(R) Home Basic Windows Vista(R) Home Premium Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate	Windows Vista	
Windows(R) 7 Home Basic Windows(R) 7 Home Premium Windows(R) 7 Professional	Windows 7	

Formal name	Abbreviation	
Windows(R) 7 Enterprise Windows(R) 7 Ultimate		
Windows(R) 8 Windows(R) 8 Pro	Windows 8	
Solaris(TM) 9 Operating System	Solaris 9	Solaris or Solaris OS
Oracle Solaris 10	Solaris 10	
Oracle Solaris 11	Solaris 11	
Red Hat(R) Enterprise Linux(R) AS (v.4 for x86) Red Hat(R) Enterprise Linux(R) AS (v.4 for EM64T)	RHEL-AS4	Linux
Red Hat(R) Enterprise Linux(R) ES (v.4 for x86) Red Hat(R) Enterprise Linux(R) ES (v.4 for EM64T)	RHEL-ES4	
Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	RHEL5	
Red Hat(R) Enterprise Linux(R) 6 (for x86) Red Hat(R) Enterprise Linux(R) 6 (for Intel64)	RHEL6	
SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T	SUSE Linux Enterprise Server 11	
HP-UX 11.0 HP-UX 11i v1 HP-UX 11i v2 HP-UX 11i v3	HP-UX	
AIX 5L(TM) V5.1 AIX 5L(TM) V5.2 AIX 5L(TM) V5.3 AIX(R) V6.1 AIX(R) V7.1	AIX	
VMware(R) Infrastructure 3 Foundation VMware(R) Infrastructure 3 Standard VMware(R) Infrastructure 3 Enterprise	VMware Infrastructure 3	VMware
VMware(R) vSphere 4 Essentials Kit VMware(R) vSphere 4 Essentials Plus Kit VMware(R) vSphere 4 Standard Edition(TM) VMware(R) vSphere 4 Standard Plus Data Recovery VMware(R) vSphere 4 Advanced Edition(TM) VMware(R) vSphere 4 Enterprise Edition(TM) VMware(R) vSphere 4 Enterprise Plus Edition(TM)	VMware vSphere 4	
VMware(R) vSphere 5 Essentials Kit VMware(R) vSphere 5 Essentials Plus Kit VMware(R) vSphere 5 Standard Edition(TM) VMware(R) vSphere 5 Standard Plus Data Recovery VMware(R) vSphere 5 Enterprise Edition(TM) VMware(R) vSphere 5 Enterprise Plus Edition(TM)	VMware vSphere 5	

Oracle Solaris might be described as Solaris, Solaris Operating System, or Solaris OS.

Related products with Fujitsu Storage System ETERNUS and Storage Management Software ETERNUS SF

Formal name	Abbreviation		
ETERNUS DX60/DX60 S2 ETERNUS DX80/DX80 S2 ETERNUS DX90/DX90 S2	-	ETERNUS DX series	ETERNUS Disk storage system

Formal name		Abbreviation		
ETERNUS DX410 ETERNUS DX440	ETERNUS DX400 series	ETERNUS DX400/DX400 S2 series		
ETERNUS DX410 S2 ETERNUS DX440 S2	ETERNUS DX400 S2 series			
ETERNUS DX8100 ETERNUS DX8400 ETERNUS DX8700	ETERNUS DX8000 series	ETERNUS DX8000/DX8000 S2 series		
ETERNUS DX8100 S2 ETERNUS DX8700 S2	ETERNUS DX8000 S2 series			
ETERNUS2000 ETERNUS4000 ETERNUS8000	-			
Web GUI of ETERNUS DX series	ETERNUS Web GUI			
ETERNUSmgr				
ETERNUS LT20/LT20 S2 ETERNUS LT40/LT40 S2 ETERNUS LT60/LT60 S2 ETERNUS LT200 ETERNUS LT210 ETERNUS LT220 ETERNUS LT230 ETERNUS LT250 ETERNUS LT270	ETERNUS Tape library			

Software products

Formal name	Abbreviation
Microsoft(R) Internet Explorer(R)	Internet Explorer
Mozilla(R) Firefox(R)	Firefox
Microsoft(R) Cluster Service	MSCS
Microsoft(R) Windows Server(R) Failover Clustering	WSFC
Microsoft(R) Exchange Server	Exchange Server
Microsoft(R) SQL Server(TM)	SQL Server
PRIMECLUSTER Global Disk Services	GDS
PRIMECLUSTER Global File Services	GFS
Symfoware Server Enterprise Extended Edition Symfoware Server Enterprise Edition	Symfoware
VMware(R) ESX(R)	VMware ESX
VMware(R) ESXi(TM)	VMware ESXi
VMware(R) vCenter(TM) Server	VMware vCenter Server or vCenter Server

Manuals

Formal name	Abbreviation
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Release Notes	ETERNUS SF Release Notes
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Installation and Setup Guide	ETERNUS SF Installation and Setup Guide

Formal name	Abbreviation
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Migration Guide	ETERNUS SF Migration Guide
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Web Console Guide	ETERNUS SF Web Console Guide
ETERNUS SF Express / ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module	ETERNUS SF Operation Guide for Copy Control Module
ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Cluster Environment Setup Guide	ETERNUS SF Cluster Environment Setup Guide
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Messages	ETERNUS SF Messages
ETERNUS SF Express / ETERNUS SF Storage Cruiser Event Guide	ETERNUS SF Event Guide
ETERNUS SF Express / ETERNUS SF Storage Cruiser / ETERNUS SF AdvancedCopy Manager Glossary	ETERNUS SF Glossary

Others

- In this manual, the following products are collectively described as "Windows Server 2008 or later".

  - Windows Server 2008

  - Windows Server 2008 R2

  - Windows Server 2012

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Notes

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- This manual is subject to change without advance notice.

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Update history

Content of update	Updated section	Revision
Added a command.	11.3	2.1
Added the operation on Model upgrade for ETERNUS Disk storage system.	10.5.8	
Added explains operation using the KVM Support Function.	Appendix F	
Added Oracle Solaris 11, AIX V6.1 and AIX V7.1 in the operating systems.	Notation in Preface	3
Added the explanation for backup operations for Symfoware.	Chapter 4	
Added the explanation for the maintenance for database of ETERNUS SF Manager.	11.7	
Added the notes on combining cascade copy and Concurrent OPC operations.	13.1.2	
Added Windows Server 2012 and Windows 8 in the operating systems.	Notation in Preface	4
Updated SQL Server version to be supported.	1.4.1, 1.4.2	
Added the explanation for using with Offloaded Data Transfer (ODX).	1.7.5	

Content of update	Updated section	Revision
Added the description related to Windows Server 2012 in the volume lock error investigation function.	1.8.2, 1.8.3.2	
Added the explanation for backing up to secondary storage media.	1.9	
Added the operation required on the Web Console in the Managed Server deletion procedure.	3.6.4, 8.1.8.4, 8.2.8.3, 9.8.3, 11.6	
Added the explanation about backup and restore of Database Availability Group.	8.3	
Added the backup method of Exchange Server 2010 database using the Backup Wizard.	8.4	
Added the restoration method of replication management list.	11.1.2.3	
Changed the display of commands when a hardware error, etc. occurs.	11.3.1, 11.3.2, 11.4.1, 11.4.2, 12.2.2.2, 12,2,2,5, 12.2.2.6, 12.2.2.10, 12.2.2.11, 12.2.2.18	
Added a condition for the -Xvtoc option.	12.4.1.1	
Added the notes on executing copy from Logical Unit (disk) to partition using replication function.	13.1.1.20	
Added the explanation for the Tape library.	Notation in Preface	4.1
Added the explanation for Backup and Restore of Exchange Server 2013 Database.	1.4.2, 8.2, 8.3, 8.4, 12.5	
Deleted the [no folder is allocated to its mount point] of Supported volume configurations.	8.4.1.2	
Added the note for the required backup server software.	8.4.2.2	
Added the explanation for ServerView Resource Orchestrator.	F.3, F.7.4, F.9.3	
Added Red Hat Enterprise Linux 6.3 (for Intel64) in the operating systems, for Managed Server (host) using the KVM Support Function.	F.3	
Added the description of IPv6.	1.10, 11.1.2, 11.5.1, 12.3.1 - 12.3.13, 12.4.1.1, F.11.1	5
Added the description of Symfoware backup server operation.	4.2, 11.1, 11.1.1.6, 11.1.1.7, 12.1, 12.7	
Added the description of -reg option.	12.5.2	
Modified the description of use in combination with ODX (Offloaded Data Transfer).	13.1.8	
Added the description of use in combination with XCOPY (Extended Copy).	13.1.9	
Added the note for the characters that can be used for database name.	8.4.1.2	6
Added the description of the procedure to change the operating environment when operating AdvancedCopy Manager by the use of the Web Console.	11.5.9	6.1

Manual organization and reading suggestions

Manual organization

The following table describes the Manual organization of Express, Storage Cruiser and AdvancedCopy Manager.

When to read	Related manuals (abbreviated)	Related products (*1)			Explanation
		EXP	SC	ACM	
Before installation	Quick Reference	Yes	Yes	Yes	This manual is unique for each product. The following manuals are available: - Express Quick Reference - Storage Cruiser Quick Reference - AdvancedCopy Manager Quick Reference
	Release Notes	Yes	Yes	Yes	This manual is common for all products.
	Overview	-	-	Yes	This manual is unique for each product.
During installation	Installation and Setup Guide	Yes	Yes	Yes	This manual is common for all products.
	Cluster Environment Setup Guide	-	Yes	Yes	This manual is common for Storage Cruiser and AdvancedCopy Manager.
	Migration Guide	Yes	Yes	Yes	This manual is common for all products.
During operation	Operation Guide	Yes	Yes	Yes	This manual is unique for each product. The following manuals are available: - Express Operation Guide - Storage Cruiser Operation Guide - Storage Cruiser Operation Guide for Optimization Option - AdvancedCopy Manager Operation Guide (for Windows) - AdvancedCopy Manager Operation Guide (for Solaris) - AdvancedCopy Manager Operation Guide (for Linux) - AdvancedCopy Manager Operation Guide (for HP-UX) - AdvancedCopy Manager Operation Guide (for AIX) - AdvancedCopy Manager for Exchange Server Operation Guide
	Operation Guide for Copy Control Module	Yes	-	Yes	This manual is common for Express and AdvancedCopy Manager.
	Web Console Guide	Yes	Yes	Yes	This manual is common for all products.
Anytime	Event Guide	Yes	Yes	-	This manual is common for Express and Storage Cruiser.
	Messages	Yes	Yes	Yes	This manual is common for all products.
	Glossary	Yes	Yes	Yes	This manual is common for all products.

*1: "EXP" indicates Express, "SC" indicates Storage Cruiser and "ACM" indicates AdvancedCopy Manager.

How to read manuals

Please use the following table to find the most useful information in the Express, Storage Cruiser and AdvancedCopy Manager manuals to answer your inquiry.

Purpose	Related products (*1)	Manual	Main contents	How to read
Acquiring a product overview and basic operation knowledge	EXP	- Express Quick Reference	- Product overview - Installation decision - Overview of the necessary tasks from installation to first use	Please read if you want to acquire a fundamental knowledge of the product and its operation in order to decide to install it or not.
	SC	- Storage Cruiser Quick Reference		
	ACM	- AdvancedCopy Manager Quick Reference		
		- AdvancedCopy Manager Overview	- Main functions - Linkable applications - Procedure overview for Advanced Copy of ETERNUS Disk storage system	
Confirming the updated contents	common	- ETERNUS SF Release Notes	- New function overview - Incompatibilities with previous version - Fixed bugs	Please read if you want to know the updated contents from a previous version and if you perform the upgrade.
Deciding if a version upgrade is required	common	- ETERNUS SF Migration Guide	- Notes and cautions about version upgrade - Version upgrade procedure	Please read if you want to upgrade from a previous version.
Installing and correctly operating the product Setting up operating environment depending on purpose	common	- ETERNUS SF Installation and Setup Guide	- Operating environment - Installation procedure - Setup procedure - Uninstallation procedure	Please read if you want to install and setup the product.
	SC, ACM	- ETERNUS SF Cluster Environment Setup Guide	- Supported cluster software - Installation procedure for a clustered system - Setup procedure for a clustered system - Uninstallation procedure for a clustered system	Please read if you want to install and setup the product on a clustered system.
Administration and operation of the installed system	EXP	- Express Operation Guide	- Starting and stopping the software - Device monitoring - Data copy inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance	Please read if you want to start or shutdown the system, monitor the operation status, do backup/restore operations, etc.
	SC	- Storage Cruiser Operation Guide	- Starting and stopping the software - Device monitoring	

Purpose	Related products (*1)	Manual	Main contents	How to read
			- Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
		- Storage Cruiser Operation Guide for Optimization Option	- Operating environment construction - Operating status monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
	EXP, ACM	- ETERNUS SF Operation Guide for Copy Control Module	- Starting and stopping the software	
	ACM	- AdvancedCopy Manager Operation Guide (for Windows) - AdvancedCopy Manager Operation Guide (for Solaris) - AdvancedCopy Manager Operation Guide (for Linux) - AdvancedCopy Manager Operation Guide (for HP-UX) - AdvancedCopy Manager Operation Guide (for AIX)	- Data backup/restore inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
		- AdvancedCopy Manager for Exchange Server Operation Guide	- Restoring the Exchange Server database using the Restore Wizard	
	common	- ETERNUS SF Web Console Guide	- Operating environment - Screen layout description	Please read if you want to understand the ETERNUS SF Web Console.
Dealing with messages issued by the software	common	- ETERNUS SF Messages	- Messages and their explanations - Parameter (variable information) description - System action - Countermeasures	Please read if you want a practical way of investigating and dealing with messages issued by the software.
Dealing with events issued by the software	EXP, SC	- ETERNUS SF Event Guide	- Phenomenon of event - Countermeasures	Please read if you need to find a practical way of investigating and dealing with events.
Researching the meaning of	common	- ETERNUS SF Glossary	- Product specific terminology explanation	Please read if you want to learn the meaning of

Purpose	Related products (*1)	Manual	Main contents	How to read
specific terms related to the products and other important terms			- Explanation of important terminology appearing in the manual - Synonyms and related terms - Proper form of abbreviated terms	important terms, product specific terms or abbreviations used in the manuals.

*1: "EXP" indicates Express, "SC" indicates Storage Cruiser and "ACM" indicates AdvancedCopy Manager.

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 database backup
- 1.1.3 High-speed replication

1.1.1 High-speed backup (24-hour basis)

The Advanced Copy function of ETERNUS Disk storage system 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 applications, high-speed backup can be performed without interruption to live operational processing:

- Oracle
- SQL Server
- Symfoware

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

1.1.2 Non-stop database backup

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, SQL Server, or Symfoware databases:

- For Oracle: "B.3 Sample Scripts for Oracle"
- For SQL Server: "Chapter 10 Backup and Restore of SQL Server Database"
- For Symfoware: "Chapter 4 Backup Operations (Symfoware)"

1.1.3 High-speed replication

The Advanced Copy function of ETERNUS Disk storage system 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.
The Remote Advanced Copy function of ETERNUS Disk storage system enables copy operations to an ETERNUS Disk storage system at remote locations.

When using a script for linkage with below applications, high-speed copying (backup) of user data can be performed without interruption to live operational processing:

- Oracle
- SQL Server
- Exchange Server

- Hyper-V

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
AdvancedCopy Manager's manager	Operates on the Management Server, and manages two or more Managed Servers. Backup management and replication management are performed.
AdvancedCopy Manager's agent	Operates on the Managed Server with which the storage device is connected. Backup management and replication management are performed.
	This (Agent) can be managed by AdvancedCopy Manager's manager running on Solaris, Windows or Linux operating system.
ETERNUS SF Web Console	Monitors and/or manages the AdvancedCopy Manager environment by connecting to the Management Server.

📝 **Note**

The Manager program has also the Agent function.

The AdvancedCopy Manager's server type depends on the operating environment.

Managed Server

   The Managed 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 Managed Server. If a Managed Server is also to be used as the 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.

Management Server

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

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

- When only one Managed 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 Managed Server is installed
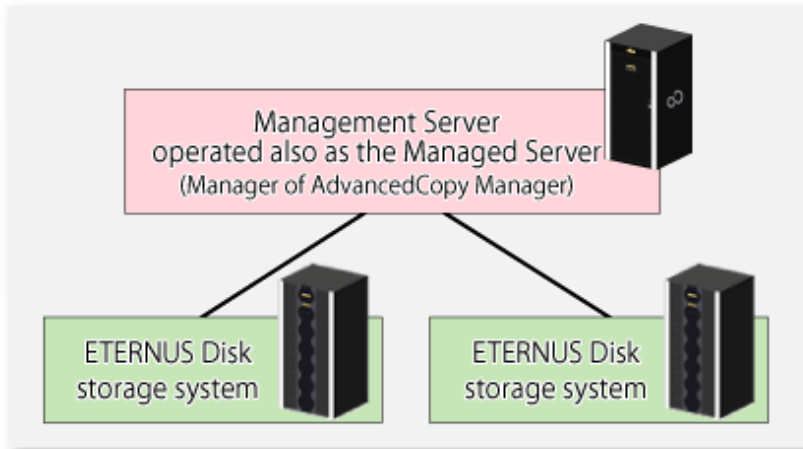
- When two or more Managed Servers are installed
  When two or more Managed Servers are available, set only one of them up as the Management Server or set up a new server with no ETERNUS Disk storage system connected as the Management Server. Each environment is explained below.

  a. When a Managed Server is operated as a Management Server:
     One of the servers functions as a Management Server. The Management Server has a repository where the information on operating and management of all Managed Servers is stored.
     When many Managed 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 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 Managed Server when it is also operating as the Management Server.

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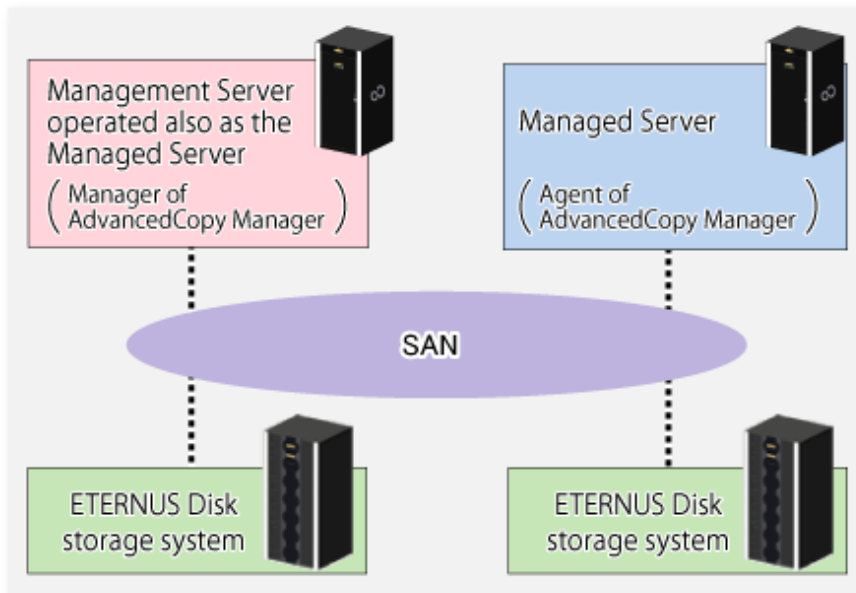
b. Setting up a dedicated Management Server:
This setup comprises two or more Managed Servers with a dedicated Management Server.

Figure 1.3 When a dedicated Management Server manages Managed Servers
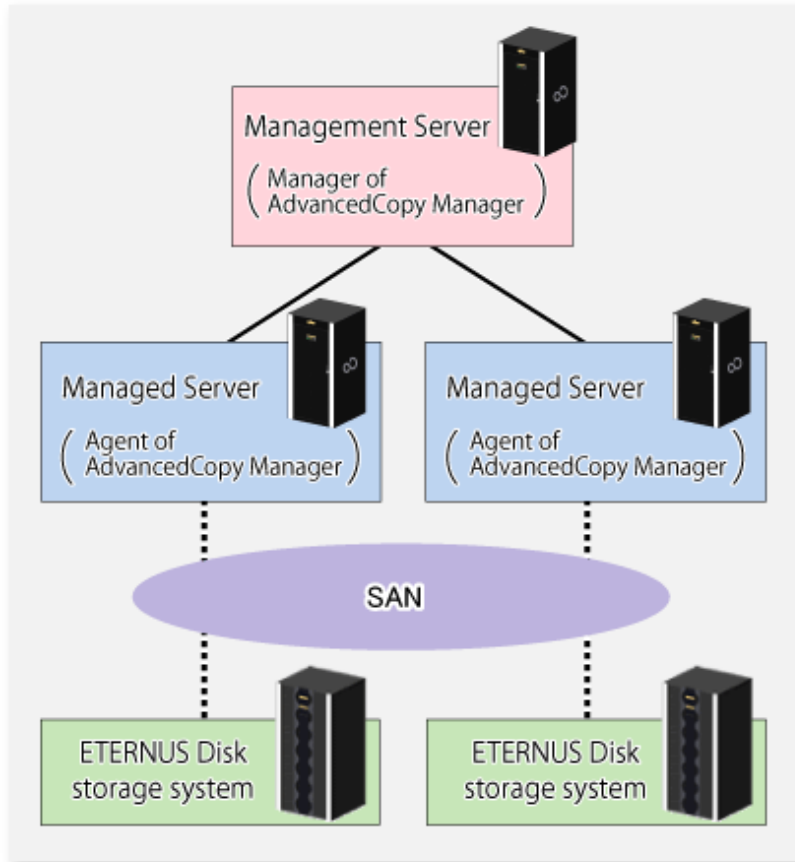
1.2.2 System configuration

The system configuration of AdvancedCopy Manager is shown below.

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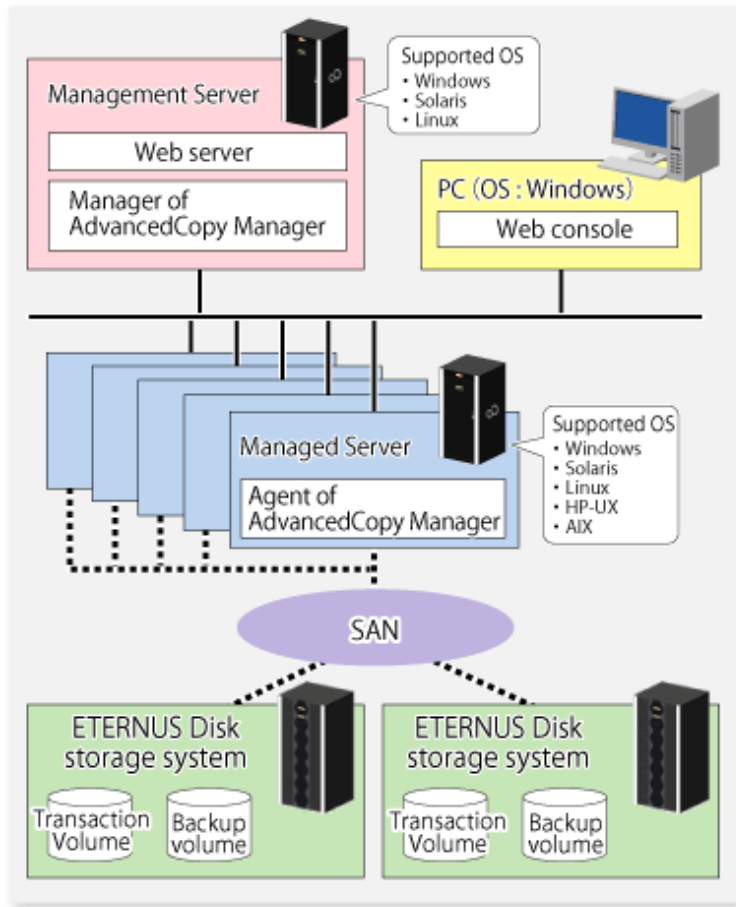
1.2.3 Combining the Agent and Manager

The following product level combinations are possible when using different levels of Agent and Manager.

Table 1.2 Combinations the Agent and Manager

Version level of Manager (Management Server)	Version level of Agent (Managed Server)		
	13.x	14.x	15.x
13.x	A	C	C
14.x	B	A	C
15.x	B	B	A

A: Connection possible

B: Connection possible (however, functions supported by the Managed 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 Managed 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 Advanced Copy function of ETERNUS Disk storage system.

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

High-speed backup operation

The Advanced Copy function of ETERNUS Disk storage system 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 Symfoware

If, in your transactions, you are using databases that were configured with Symfoware, you can implement fast backups without stopping your transactions.

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.

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 Advanced Copy function of ETERNUS Disk storage system.
As a result, the following replication operations become possible.

High-speed replication operation

The Advanced Copy function of ETERNUS Disk 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

The backup function provides policy and history management. These functions are not supported by the replication function.
The replication function replicates data between two volumes.

1.3.3 Web Console

The ETERNUS SF Web Console (hereafter referred to as "Web Console") 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.

Backup management and replication management can also be performed at the command line as well as the Web Console.
For more information about the Web Console, refer to the *ETERNUS SF Web Console Guide*.

1.3.4 Copy Control Module

When the AdvancedCopy Manager Copy Control Module is used, it is possible to perform back ups from the server where the Copy Control Module is installed, using the Advanced Copy function of ETERNUS Disk storage system.
As a result, the AdvancedCopy Manager's agent need not be installed.
For details, refer to the *ETERNUS SF Operation Guide for Copy Control Module*.

1.4 Operating Environment of AdvancedCopy Manager

This section explains the software requirements for the operation of AdvancedCopy Manager.

For the hardware requirements, refer to "Operating Environment" in the *ETERNUS SF Installation and Setup Guide*.
For browsers on which Web Console can run, refer to "Supported web browsers" in the *ETERNUS SF Web Console Guide*.

🅟 Point
. . . .

To perform the Advanced Copy function of ETERNUS Disk storage system, it is necessary to register the Advanced Copy license to ETERNUS Disk storage system.
For details, refer to "License Management" in the *ETERNUS SF Installation and Setup Guide*.
. . . .

1.4.1 Software requirement of AdvancedCopy Manager's manager

The following table lists the software requirements of AdvancedCopy Manager's manager.
For about the supported operating systems, refer to "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide*.

For information on cluster software that can be linked with OSes on which AdvancedCopy Manager's managers are running, refer to "Operating Environment of ETERNUS SF Manager" in the *ETERNUS SF Cluster Environment Setup Guide*.

Table 1.3 Software requirements of AdvancedCopy Manager's manager

Product name	Remarks
ETERNUS multipath driver V2.0L14 or later	When a Management Server operates as a Managed Server, and when it carries out multipath disk control and load distribution of a path.
SQL Server 2000 SP3 or SP4 SQL Server 2005 SQL Server 2005 SP1 or SP2 or SP3 SQL Server 2008 SQL Server 2008 SP1 or SP2 SQL Server 2008 R2 SQL Server 2012	If a Management Server operates as a Managed Server and the backup of an SQL Server database is carried out.
Exchange Server 2003 SP1 or SP2	If a Management Server operates as a Managed Server and backup of the Exchange database is carried out.
Exchange Server 2003 system management tool SP1 or SP2 Exchange Server 2007 Management Tools (32bit) (*1)	When a Management Server operates as a Managed Server, and is used as a backup server to back up the Exchange database using the replication management function.
Oracle 8i Oracle 9i Oracle 10g	In conjunction with Oracle.
Symfoware Server Enterprise Edition V10.1 Symfoware Server Advanced Backup Controller V10.1	When backup operation is used with Symfoware. When backing up Exchange databases on Windows Server 2008 or Windows Server 2008 R2, backup operations in link with Symfoware cannot be performed.
handle.exe tool	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 Software requirement of AdvancedCopy Manager's agent

The following table lists the software requirements of AdvancedCopy Manager's agent.
For about the supported operating systems, refer to "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*.

However, for information on the supported operating systems of KVM guest, refer to "F.3 Software requirements".

For information on cluster software that can be linked with OSes on which AdvancedCopy Manager's agent is running, refer to "Operating Environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Cluster Environment Setup Guide*.

Table 1.4 Software requirements of AdvancedCopy Manager's agent

Product name	Remarks
ETERNUS multipath driver V2.0L14 or later	For multipath disk control and path load balancing.
SQL Server 2000 SP3 or SP4 SQL Server 2005 SQL Server 2005 SP1 or SP2 or SP3 SQL Server 2008 SQL Server 2008 SP1 or SP2 SQL Server 2008 R2 SQL Server 2012	When the SQL Server database is backed up.
Exchange Server 2003 SP1 or SP2 Exchange Server 2007 Exchange Server 2007 SP1 or SP2 Exchange Server 2010 Exchange Server 2010 SP1 or SP2 or SP3 Exchange Server 2013	When the Exchange database is backed up. - AdvancedCopy Manager (64bit) for Windows Server 2008 / 2012 (x64) is required for Windows Server 2008 or later.
Exchange Server 2003 system management tool SP1 or SP2 Exchange Server 2007 Management Tools (32bit) (*1) Exchange Server 2010 Management Tools Exchange Server 2013 Management Tools	When using it as a backup server to back up the Exchange database with the replication management function. - AdvancedCopy Manager (64bit) for Windows Server 2008 / 2012 (x64) is required for Windows Server 2008 or later.
ETERNUS VSS Hardware Provider 2.1.x	This is required to back up Exchange server databases on Windows Server 2008 or later. (This program exists in DVD-ROM (Agent program and Manual)).
Oracle 8i Oracle 9i Oracle 10g	In conjunction with Oracle.
Symfoware Server Enterprise Edition V10.1 Symfoware Server Advanced Backup Controller V10.1	When backup operation is used with Symfoware. When backing up Exchange databases on Windows Server 2008 or Windows Server 2008 R2, backup operations in link with Symfoware cannot be performed.
handle.exe tool	When using this tool to collect troubleshooting data for volume locking error. (*1)

*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.

1.5 Managing a Device on AdvancedCopy Manager

AdvancedCopy Manager manages devices (physical disk) in ETERNUS Disk 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 1.5 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 Disk storage system 　The character "g" indicates a device number, "d" indicates a Logical Unit (LU) number, and "p" indicates a partition number. Non ETERNUS Disk storage system (*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 non ETERNUS Disk storage system <g?d?p?>
The character "g" is always 0 for non ETERNUS Disk storage system.
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 Disk storage system.

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 Web Console or stgxfwcmdispdev (Device information display command).

Note

- For information on using disks with a physical size of 2 terabytes and over, refer to "Using large capacity disks" under "13.1.1 General notes".

- If Logical Unit (disk unit) operations are used, refer to "13.1.1.18 Notes on executing Logical Unit (disk) unit copy".

Target file system

The following file system can be registered in transactions:

- NTFS (NT File System)

- ReFS (Resilient 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:

1. Run mountvol /e from the command prompt.

2. 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 or later

This section describes notes for operating with Windows Server 2008 or later.

1.7.1 Notes when using User Account Control (UAC)

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

The following describes the difference when UAC is enabled to when it is 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 1.6 Relationship between account and UAC

Account type	UAC: enabled	UAC: disabled
Built-in Administrator Account	Y	Y
User Account in the Administrators 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.

- Execute the program with the Command Prompt.

  - For Windows Server 2008 or Windows Server 2008 R2

    From the [Start] menu, select [All Programs]-[Accessories] and right-click on [Command Prompt]. Specify "Run as Administrator" to run the Command Prompt. Execute the program from the Command Prompt.

  - For Windows Server 2012

    Specify "Command Prompt (Admin)" to run the Command Prompt. Execute the program from the Command Prompt.

1.7.2 Notes about the online/offline status of disks

When an ETERNUS Disk storage system is first detected on the following versions of Windows Server 2008 or later, the disk might be "offline" status.

- Windows Server 2008 Enterprise

- Windows Server 2008 Datacenter

- Windows Server 2008 R2 Enterprise

- Windows Server 2008 R2 Datacenter

- Windows Server 2012 Datacenter

In Windows Server 2008 or later, it is possible to put the disk in the online/offline state using the "Disk Management" window and the DISKPART tool.

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

1.7.3 Notes about becoming unable to lock a volume

When operating under Windows Server 2008 or later, problems related to Windows Server 2008 or later 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/en

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 (Synchronous processing 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://technet.microsoft.com/en-us/sysinternals/bb896655.aspx

   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.2.3 Transaction volume locking specification file for backups

- A.2.4 Backup volume locking specification file for backups

- A.3.3 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:

- C.2.4 Copy source volume locking specification file

- C.2.5 Copy destination volume locking specification file

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 1.7 Features of handle.exe and openfiles.exe

Item	handle.exe	openfiles.exe
Method of obtaining	Obtainable from Microsoft website	Installed as standard in OS

Item	handle.exe	openfiles.exe
Setting method	Refer to "1.8.3.2 Setting handle.exe".	Refer to "1.8.3.3 Setting openfiles.exe". (Restarting the server is required on setup.)
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 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)

Since handle.exe is a powerful command for files to be displayed, it is recommended to use handle.exe.

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.
- The openfiles.exe cannot be used on Windows Server 2012.

Point

It is recommended to confirm if the processes causing "in-use lock error" exist by executing "handle.exe -a" or "openfiles.exe /query /v" manually before executing backup or replication. Refer to "1.8.6 How to investigate the process where volume is used".

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.

P Point
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For using Windows Server 2008 or later

Read "1.7.1 Notes when using User Account Control (UAC)" above, before setting an investigation tool.
....

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 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 the following URL and store it in <*Work_directory*>\var\HandleTool.

```
http://technet.microsoft.com/en-us/sysinternals/bb896655.aspx
```

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

Also after handle.exe is stored, perform the following tasks at all nodes where it is stored.
It is necessary to execute steps 7, 8, and 10 only when the operating system is Windows Server 2008 or later.

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 "Agree" if you agree with the conditions of use.

5. Prepare the service name unused in the system.
   Execute the following command to confirm whether its service name is used or not.

   ```
   sc qc "service_name_to_confirm"
   ```

   Example
   ....

   How to confirm whether the service name "ACMHandle" is used or not:

   ```
   C:\>sc qc "ACMHandle"
   ```
   ....

   On later steps, the service name prepared in this step is called "Unused service name".

6. Execute the following command.

   On Windows Server 2012, interactive services need to be enabled beforehand. Set the value of "NoInteractiveServices" contained in the following registry key to 0. If zero (0) is already set, this registry operation is not needed. If the registry operation is wrong, a serious problem can occur. Take good care to edit the registry.

   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Windows

```
sc create "Unused_service_name" binPath= "cmd.exe /k <Work_directory>\var\HandleTool\handle.exe"
type= own type= interact
sc start "Unused_service_name"
```

🖼 Example

When the Unused service name is "ACMHandle" and the Work directory is "C:\Win32app\AdvancedCopyManager":

```
C:\>sc create "ACMHandle" binPath= "cmd.exe /k C:\Win32app\AdvancedCopyManager\var\HandleTool
\handle.exe" type= own type= interact
C:\>sc start "ACMHandle"
```

7. Please display the window by clicking the icon that appears on the task bar.

8. Click the [Show me the message] or [View the message] button in the window.

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

10. Click the [Return now] button.

11. Execute the following command.

```
sc delete "Unused_service_name"
```

🖼 Example

When the Unused service name is "ACMHandle":

```
C:\>sc delete "ACMHandle"
```

If you have enabled the interactive services in step 6, disable it. Set 1 to the value of "NoInteractiveServices" contained in the registry key in step 6. If the registry operation is wrong, a serious problem can occur. Take good care to edit the registry.

🖼 Note

If the above tasks are not performed in advance, then commands stop responding when an "in-use lock error" occurs.
At this time, the "Handle License Agreement" dialog box is not displayed.
Use the Task Manager to forcibly end handle.exe processing.

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.

- The OS is Windows Server 2008(x64), Windows Server 2008 R2, or Windows Server 2012, and the 32-bit version 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 occurs, the output of the investigation tool is saved in the files displayed 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 automatically - 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 sub-section 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 cannot 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.

Example

[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
. . . .

[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 referring to tasklist /svc output information.

📝 Example
. . . .

[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, determine the service causing the error by stopping each corresponding service one by one. ("TrkWks" service, whose service display name is "Distributed Link Tracking Client", is using "X:\ $Extend\$ObjId".)
. . . .

1.9 Backup to secondary storage media

Combining AdvancedCopy Manager with software having the backup feature to tape media (hereinafter referred to as "Tape backup software") can back up to secondary storage media the AdvancedCopy Manager copied data in an ETERNUS Disk storage system.

To back up data to secondary media, on completion of copy operation by AdvancedCopy Manager, back up the Advanced Copy destination area by the tape backup software.

In backup operation in combination of AdvancedCopy Manager with tape backup software, take note of the following matter to design:

- Copy operation by AdvancedCopy Manager

  To ensure data consistency of backups, the Advanced Copy destination area should be kept out of access from other software than AdvancedCopy Manager. If copy operation is performed by AdvancedCopy Manager while the tape backup software is accessing or backing up the data in the Advanced Copy destination area, the copy operation will fail.

  Do not perform copy operation by AdvancedCopy Manager before keeping the Advance Copy destination area out of access from the tape backup software or making sure of that.

1.10 Operation with IPv6 address

This section describes the operation using IPv6 address.

1.10.1 Software requirements

The following are the basic software requirements to support the operation using IPv6 address in AdvancedCopy Manager:

Server type	Basic software
Management Server	Windows Server 2008 or later
Managed Server	Windows Server 2008 or later

See
. . . .
Refer to "Operating environment of ETERNUS SF Manager" and "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide* for information on support requirements of each basic software.
. . . .

1.10.2 Support target

For the IP address of the following servers, the operation using IPv6 address is supported:

- Management Server (manager)

- Managed Server (agent)

Note
. . . .
In operation with IPv6 address, only a global address is supported.
. . . .

1.10.3 Combination in IPv4/IPv6 addresses coexisting environment

When using AdvancedCopy Manager's manager and agent in an IPv4/IPv6 addresses coexisting environment, the following combinations are possible:

Table 1.8 Combination in an IPv4/IPv6 addresses coexisting environment

Management Server's IP address environment	Managed Server's IP address environment		
	IPv4	IPv6	IPv4/IPv6
IPv4	A (Connect with IPv4)	N/A	A (Connect with IPv4)
IPv6	N/A	A (Connect with IPv6)	A (Connect with IPv6)
IPv4/IPv6	A (Connect with IPv4)	A (Connect with IPv6)	A (Connect with IPv4/ IPv6(*1))

A: available; N/A: not available

*1: Connect with either IPv4 or IPv6 (IP address that the user registered on AdvancedCopy Manager).

P Point

If both IPv4 and IPv6 format IP addresses are set to the operating system and AdvancedCopy Manager in the Management Server, a Managed Server with IPv4 address and a Managed Server with IPv6 address can be managed by one Management Server.
Refer to stgxfwcmmodsrv (Server information change command) for information on setting method for IPv4 and IPv6 format IP addresses to AdvancedCopy Manager.

Note

- Since communication fails between a Managed Server with IPv4 and a Managed Server with IPv6, the following functions are not available in the IPv4/IPv6 addresses coexisting environment:

  - Inter-server replication between the Managed Server with IPv4 and the Managed Server with IPv6.

  - Management information batch backup with a Managed Server taken as a management information batch backup server.

- Even if both IPv4 and IPv6 format IP addresses are set to the operating system, the IP address of a Managed Server allowed to be registered on AdvancedCopy Manager is either IPv4 or IPv6.

If a Managed Server with IPv4 IP address and a Managed Server with IPv6 IP address are registered on AdvancedCopy Manager with IPv6 address, the range in which communication is allowed is as follows:

Figure 1.5 Communication failure in an IPv4/IPv6 addresses coexisting environment
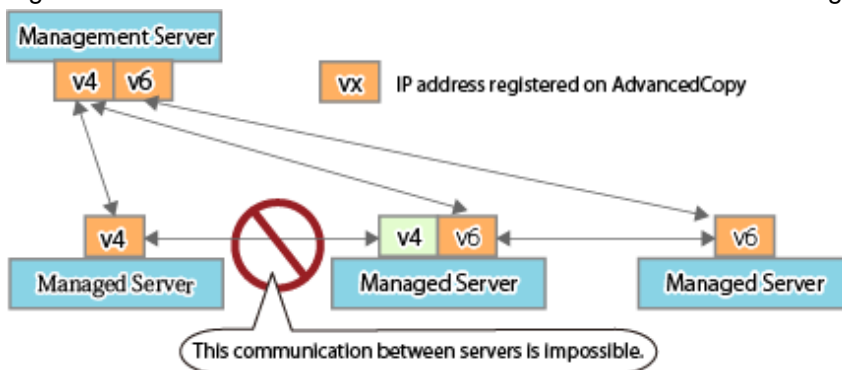
1.10.4 Combination in an environment where earlier version number and IPv6 unsupported operating system coexist

The earlier version number and the platform that does not support IPv6 supports the connection with IPv4.

When using AdvancedCopy Manager's manager and agent at a different version number, the following combinations are possible:

Table 1.9 Combinations on the operating system in which earlier version and IPv6 are not supported

Manager version No.	Agent version No.		
	15.2 or earlier	15.3 (IPv6 unsupported operating system)	15.3 (IPv6 supported operating system)
15.2 or earlier	A (Connect with IPv4)	N/A	N/A
15.3 (IPv6 unsupported operating system)	A (Connect with IPv4)	A (Connect with IPv4)	A (Connect with IPv4)
15.3 (IPv6 supported operating system)	A (Connect with IPv4)	A (Connect with IPv4)	A (Connect with IPv4/ IPv6(*1))

A: available; N/A: not available

*1: Connect with either IPv4 or IPv6 (IP address that the user registered on AdvancedCopy Manager).

1.10.5 About IPv6 address notation

In AdvancedCopy Manager, IPv6 address can be input in full notation and abbreviated notation. However, the following notation is not available:

- IPv4-mapped address

- IPv4-compatible address

- Format in which an interface number or name is added as "%" to the end of an IP address
  (e.g. fe80::1234%fx0)

Note
....
AdvancedCopy Manager displays IPv6 addresses with reference to RFC5952. For this reason, the input IP address notation may be different from the IP address notation displayed by command output and on the Web Console.
....

Chapter 2 Starting and Stopping Services

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

2.1 Services of AdvancedCopy Manager

The Manager consists of the following services:

Table 2.1 Services of Manager

Displayed service name	Description
AdvancedCopy Manager GUI Service	A service that manages GUI windows
AdvancedCopy Manager COM Service	A service that communicates with a Managed 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 when the operating system is Windows Server 2008 or later.

The Agent consists of the following service:

Table 2.2 Services of Agent

Displayed service name	Description
AdvancedCopy Manager COM Service	A service that communicates with a Management Server and other Managed Servers

When using MSCS or WSFC for cluster operations

When MSCS or WSFC is used for a clustered system, the following application resources are used in the Management Server transactions:

Table 2.3 Application resources used for 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 COM Service for *logical-node-name*	AdvancedCopy COM Service_*logical-node-name*	Transaction-oriented service for communication with Managed 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 when the operating system is Windows Server 2008 or later.

When MSCS or WSFC is used for a clustered system, the following application resources are used in Managed Server transactions:

Table 2.4 Application resource used for Managed 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 Management Servers and Managed Servers

Note

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

- AdvancedCopy Manager COM Service

2.2 Starting Services

Normally, it is unnecessary to manually start services of AdvancedCopy Manager, 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. Select [Control Panel] -> [Administrative Tools] -> [Services] to display the **Services** 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 a clustered system

This section describes how to start the services in a clustered system.
In a clustered 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

Displayed service name	Startup type
AdvancedCopy Manager GUI 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 when the operating system is Windows Server 2008 or later.

Table 2.6 Startup types of services for the Agent

Displayed service name	Startup type
AdvancedCopy Manager COM Service	Automatic
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 Management Server transactions or Managed Server transactions to 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 Services

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

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

📒 Note
. . . .

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

. . . .

When using MSCS or WSFC for a clustered system

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 Management Server transactions or Managed Server transactions to 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). Do not stop it from the **Services** window.

. . . .

Chapter 3 Backup Operation

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

Throughout this manual, a partition is referred to as a "volume".

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

3.1 Overview

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

AdvancedCopy Manager performs high-speed backup of volumes of ETERNUS Disk storage system, regardless of volume capacities, using the Advanced Copy functions, OPC and EC.

Backup that uses the OPC function is called "snapshot fast backup", while backup that uses the EC function is called "synchronized high-speed backup".

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

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

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 3.1 Managing backup volumes
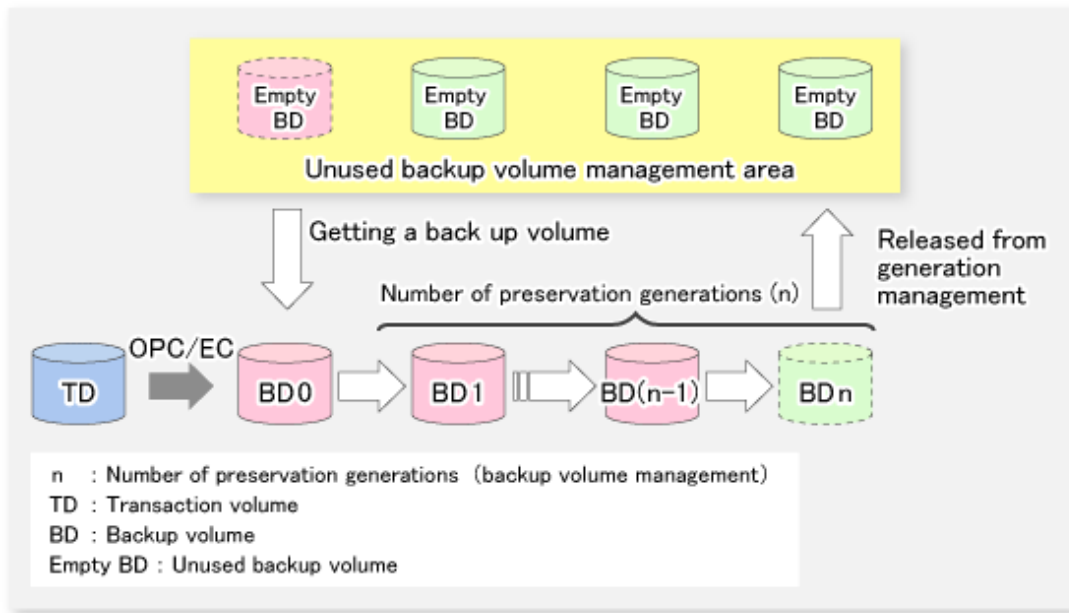
3.1.1 Snapshot backup processing

The OPC(One Point Copy) function of ETERNUS Disk 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. When swstbackup (Backup execution command) is executed ((1) in the following figure), an unused backup volume with the same size as the relevant transaction volume is selected from the unused backup volume management area.
   If the number of backup volumes exceeds the number of preservation generations by performing backup, the history of the oldest backup volume is deleted, and then the volume is selected as an unused backup volume.

2. Data on the transaction volume will be copied to the selected unused backup volume. The logical copy is instantly performed and the physical copy is started on the hardware ((2) to (4) in the following figure).

3. Backup carrier information will be set.

Figure 3.2 Snapshot fast backup processing
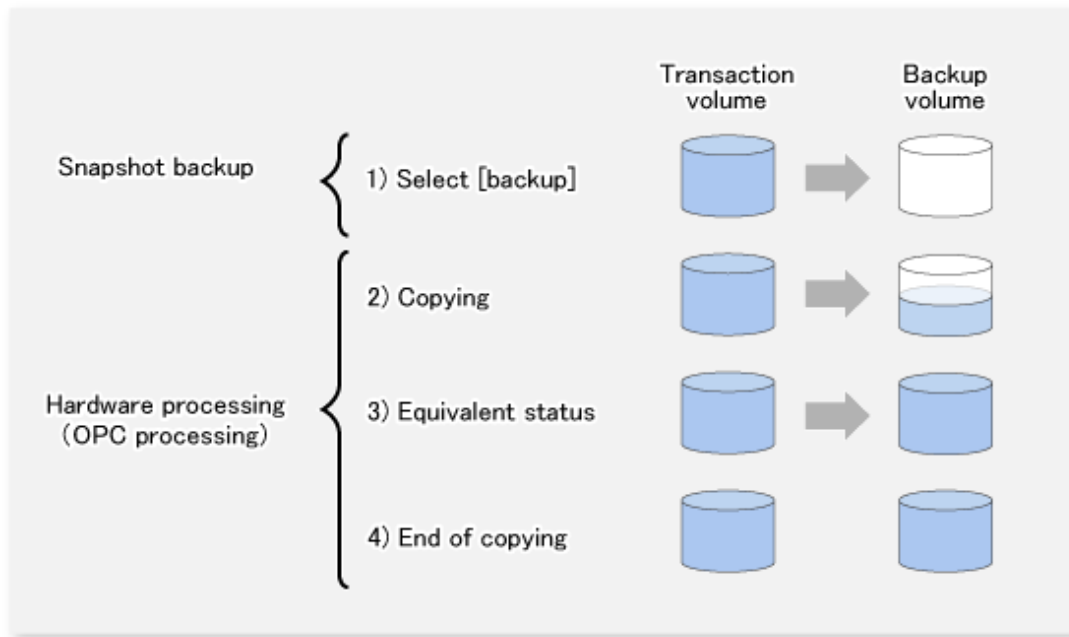
The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC function of ETERNUS Disk storage system.

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, refer to "Chapter 6 Backup Operation using 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.

. . . .

3.1.2 Synchronized high-speed backup processing

The EC function of ETERNUS Disk 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. When swststartsync (Backup synchronous processing start command) is executed ((1) in the following figure), an unused backup volume with the same size as the relevant transaction volume is selected from the unused backup volume management area and backup synchronous processing begins.

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. When swstbackup (Backup execution command) is executed ((4) in the following figure), the backup synchronization processing stops and the backup history information is registered.

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

. . . .

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

. . . .

Figure 3.3 Backup using the synchronized high-speed backup function
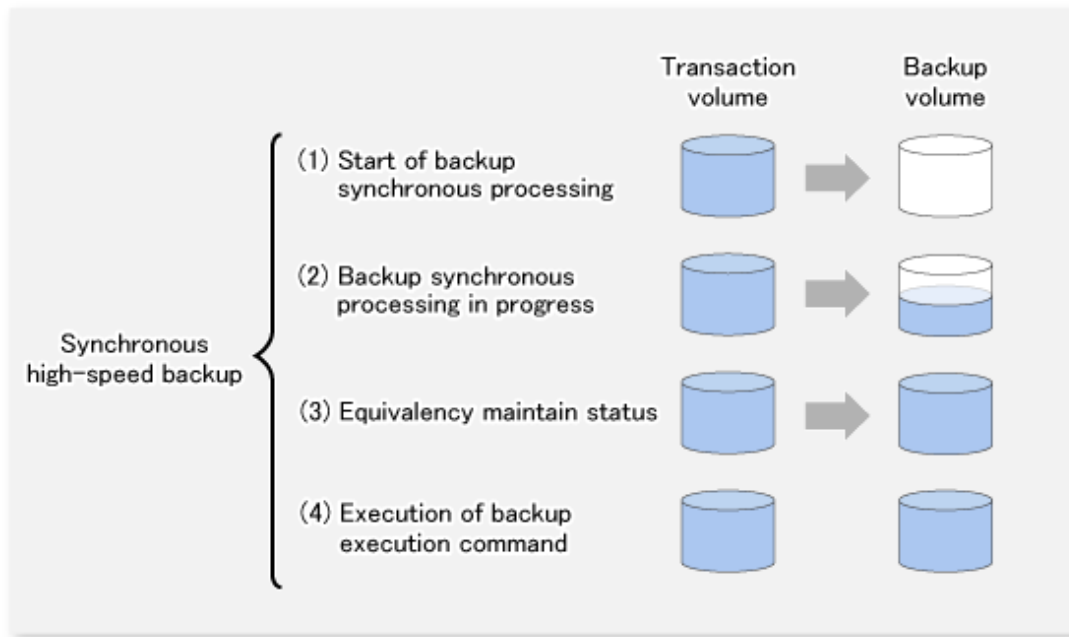
During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. The synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

For information on the Suspend/Resume function, refer to "Chapter 5 Backup Operation using 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.

3.1.3 Restoring Data

This section describes how data is restored in AdvancedCopy Manager.

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

Data restore from a backup volume refers to using the OPC function provided by ETERNUS Disk storage 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 3.4 Notes on restore operations in AdvancedCopy Manager
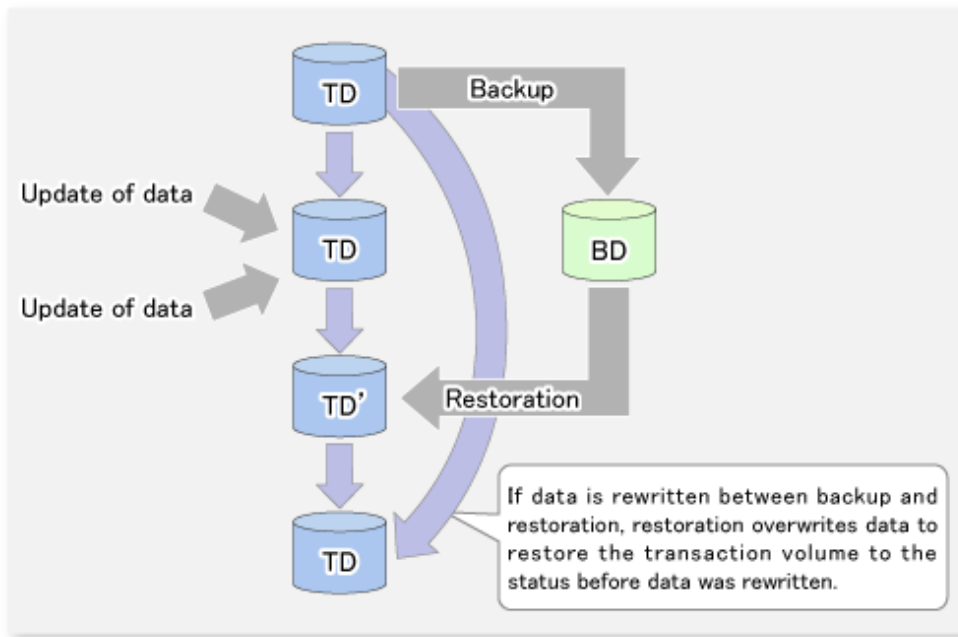
TD: Transaction volume
BD: Backup volume

3.1.4 Device name

The backup operation of AdvancedCopy Manager is performed at the device level (partition level) in ETERNUS Disk 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, refer to "1.5 Managing a Device on AdvancedCopy Manager".

3.2 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:

- 3.2.1 Selecting a server on which backups are performed

- 3.2.2 Selecting a backup source

- 3.2.3 Configuring a backup policy

- 3.2.4 Preparing a backup volume

- 3.2.5 Preparing the automatic backup operation

3.2.1 Selecting a server on which backups are performed

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

Management Server

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

Managed Server

AdvancedCopy Manager operations can be performed on the Managed Server.

🗒 **Note**

. . . .

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 Managed Server.
If the backup server operation is performed, then the replication management function must be used.

. . . .

Figure 3.5 Configuration of servers on which the backup operation should be performed
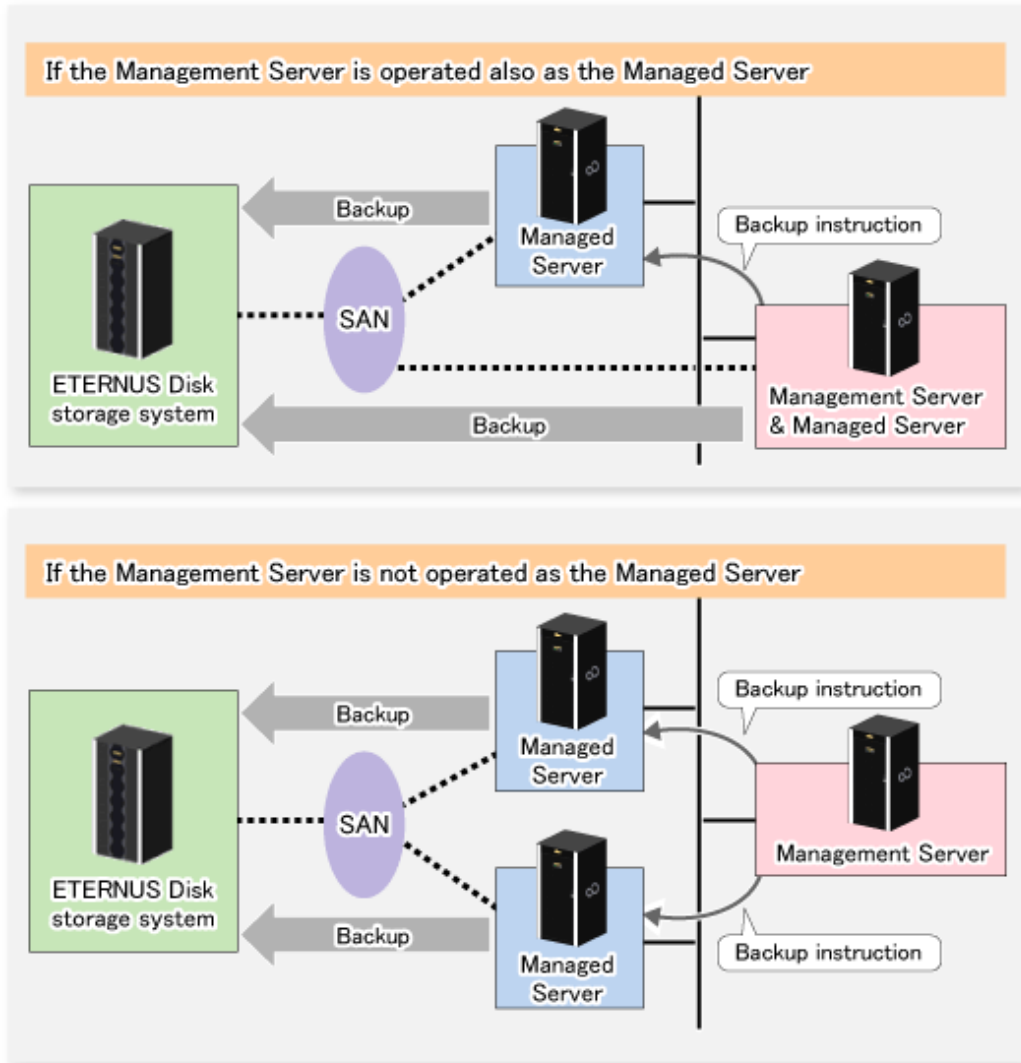
3.2.2 Selecting a backup source

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 ETERNUS Disk storage system.

For the supported units, refer to "1.5 Managing a Device on AdvancedCopy Manager".
For information on setting up a transaction volume, refer to "3.4.6 Setting the operation type for a device".

📙Note
. . . .

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

- Refer to "13.1.1 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:

    - 13.1.1.3 Backup and Replication Exclusions

    - 13.1.1.1 Size of a Partition

    - 13.1.1.2 Layout of Partition

    - 13.1.1.9 Dynamic Volume

    - 13.1.1.13 Configuration of a disk

    - 13.1.1.8 Maximum Number of Simultaneously Executing Operations

. . . .

3.2.3 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, refer to "3.4.7 Setting a backup policy".

3.2.4 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 backup volume.

A destination backup volume must be placed on the same ETERNUS Disk storage system.

A backup volume must have the same size as a transaction volume. For more information, refer to "13.1.1.1 Size of a Partition" under "13.1.1 General notes".

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

Table 3.1 Number of backup volumes required for backup operations

Backup method	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 3.2 Number of backup volumes required for backup operations (if a backup policy has been set)

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

For information on configuring a backup volume, refer to "3.4.6 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.

- 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.

3.2.5 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 3.6 Start in a job net
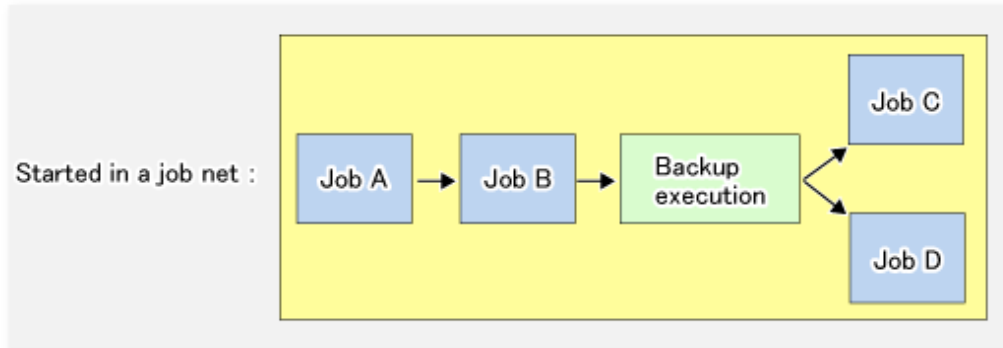
- Start the backup command at the specified time.

Figure 3.7 Start at a specified time
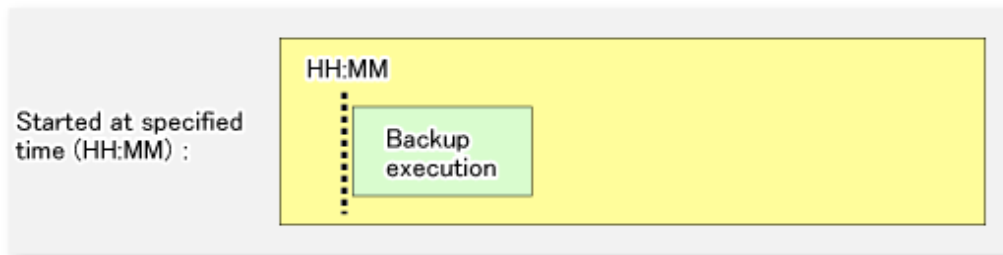
Automatic synchronized high-speed backup

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 3.8 Start in a job net
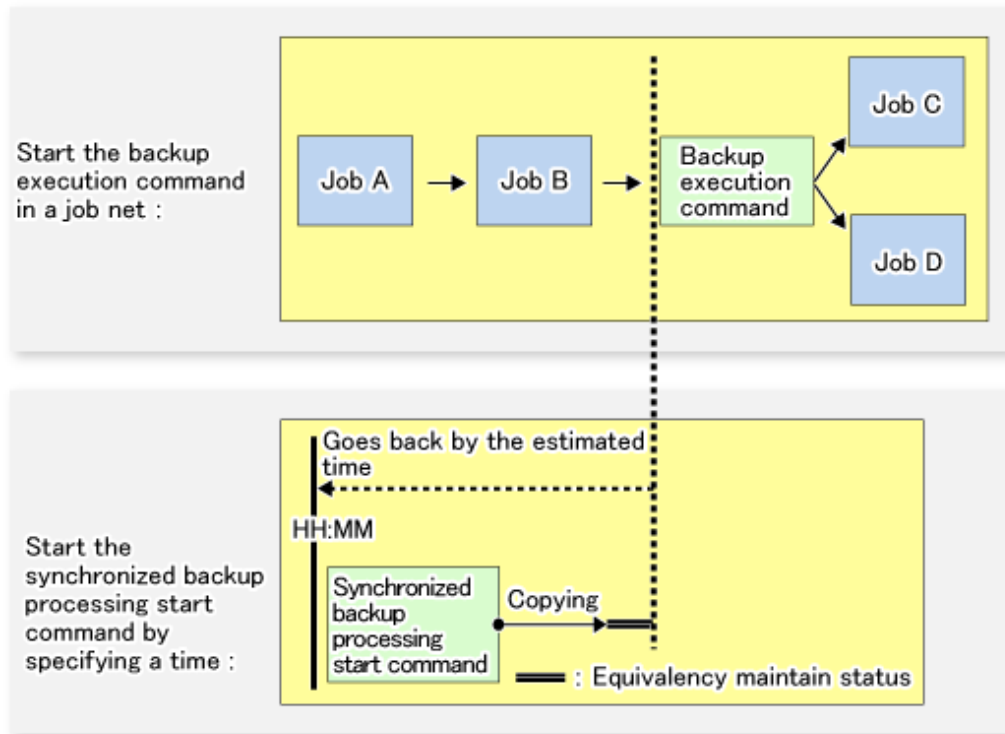
Note

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

- Start the backup execution command with the time specified.

Figure 3.9 Start at a specified time
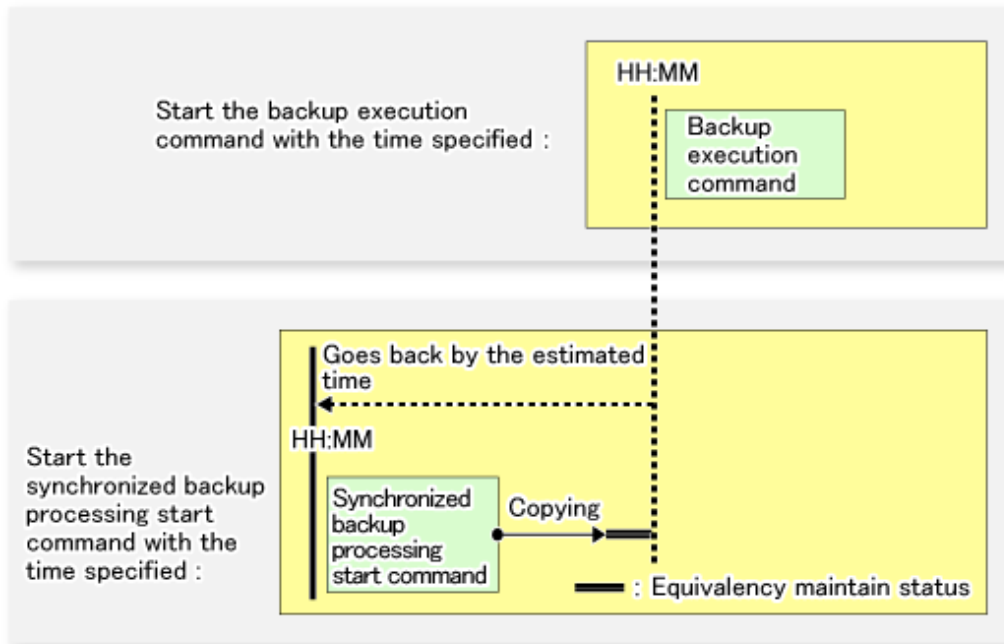
3.3 Flow of Operation

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

Figure 3.10 Flow of backup operation on a transaction volume
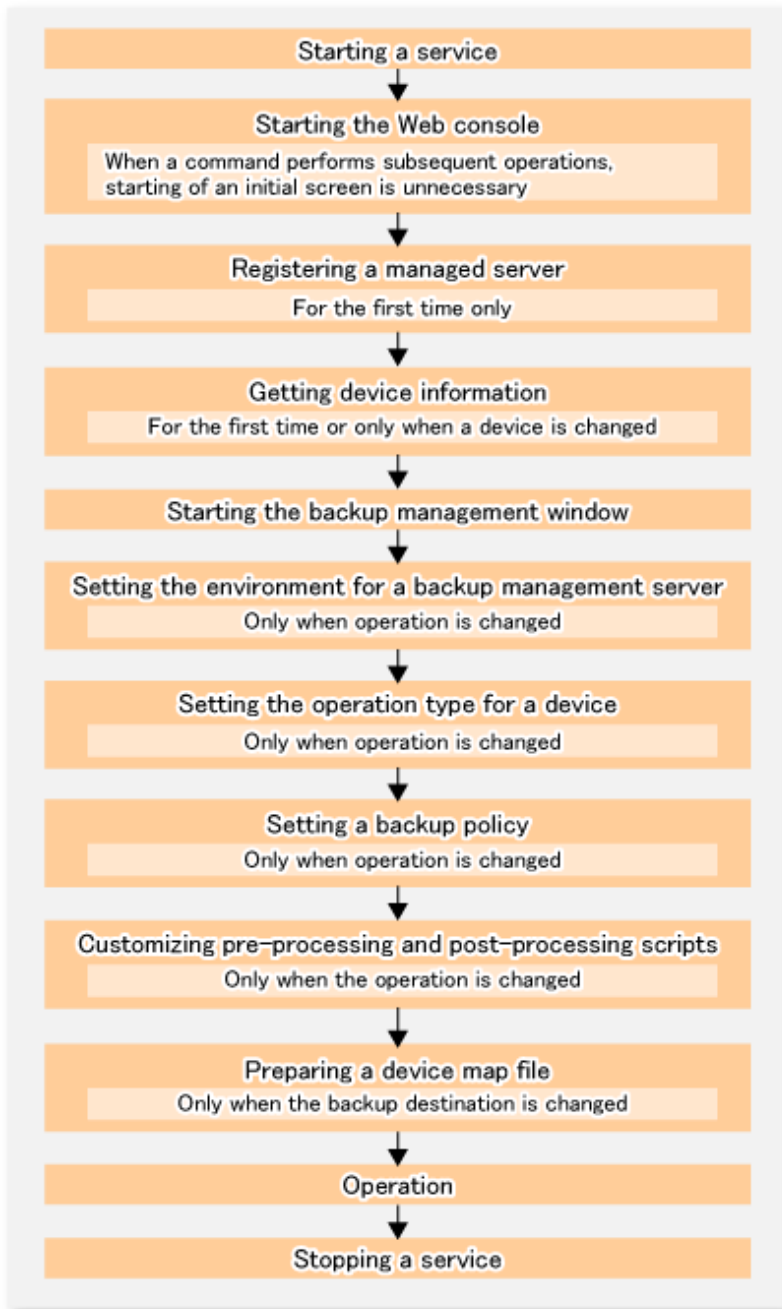
3.4 Preparing to Start the Backup

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

3.4.1 Starting services

Before the backup operation is started, the AdvancedCopy Manager services must be started on both the Management Server and the Managed 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, refer to "Chapter 2 Starting and Stopping Services".

3.4.2 Starting the Web Console

Start the Web Console. For details, refer to "How to start Web Console" in the *ETERNUS SF Web Console Guide*.

3.4.3 Registering a Managed Server

The Management Server registers the Managed Server that is to be managed.

This process is carried out using Web Console.

3.4.4 Fetching device information on a Managed Server

This process can be carried out using either Web Console or stgxfwcmsetdev (Device information collection/reflection command).

Note

- As part of replication management, device information on a Managed 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 Managed 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 "11.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.

- The time taken to add new devices is in proportion to the total number of devices defined in the selected Managed 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.

- 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 cancelled, and you can then acquire the device information.

3.4.5 Configuring the environment for a backup operation server

Configuring the environment for a backup server can be carried out using either Web Console or swstsvrset (Managed Server configuration information setting command).
When performing backup using commands only, the swstsvrset (Managed Server configuration information setting command) must be executed at the time that operations start.

Point

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

3.4.6 Setting the operation type for a device

Set up the volume type for a device that is connected to the Managed Server. The setting of the type is explained below.

- 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 3.3 Number of backup volumes required for backup operations

Backup method	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 either Web Console or swstdevinfoset (Device information setting command).

🔶 Note

- In order to set up a volume as a transaction volume, there are some points which should be taken into consideration. For more details, refer to "13.1.1 General notes".

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

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

    2. Attempt to "3.4.4 Fetching device information on a Managed Server".

    3. Register the information by executing swstdevinfoset (Device information setting command).

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

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

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

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

🅿 Point

The registered volumes can be confirmed using either Web Console or swstdevdisp (Device usage status display command).

3.4.7 Setting a backup policy

For all transaction volumes registered on a Managed 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 Web Console.

This process can be carried out using either Web Console or 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, refer to "3.2.4 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.

P Point

The registered backup policy can be confirmed using either Web Console or swstbkpoldisp (Backup policy display command).

3.4.8 Customizing pre-processing and post-processing

Pre-processing and Post-processing scripts for Backup need to be customized in the following conditions.

- The database space exists on a file system, and

- 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.

P Point

When AdvancedCopy Manager is upgraded

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

3.4.9 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 Managed 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.

P 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

- 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.
....

3.4.9.1 Describing a device map file

The following provides an example of a device map file:

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

# Normal Disks
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.

3.5 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 "3.4 Preparing to Start the Backup".

There are two kinds of backup in AdvancedCopy Manager:

- Snapshot type high-speed backup

- Synchronous high-speed backup

3.5.1 Performing snapshot high-speed backup

Snapshot high-speed backup can be carried out using either Web Console or swstbackup (Backup execution command).

To check the backup status, use swstbackstat (Backup execution status display command).

Note

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

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

3.5.2 Performing synchronized high-speed backup

This process can be carried out using either the Web Console or commands.
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 display command)

- Executing backup: swstbackup (Backup execution command)

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

Note

- The swstbackup (Backup execution command) causes an error if it is executed before the transaction and backup volumes have entered equivalency maintenance status.

- The device map cannot be specified while backup is processing.

- When the "Chapter 5 Backup Operation using Suspend/Resume Function" is used for synchronous high-speed backup, the operations listed below cannot be performed from the Web Console. 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).

3.5.3 Restoring Data

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

3.5.3.1 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 Web Console or swstrestore (Restore execution command).
To check the restore status, use swstreststat (Restore execution status display command).

3.5.3.2 Restoring an individual file

Restore an individual file as shown below. Note that you cannot restore an individual file from the Web Console.

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.

3.5.4 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.

3.5.4.1 Displaying a backup history

Backup history can be displayed using either Web Console or swsthistdisp (History information display command).

3.5.4.2 Deleting a backup history

Backup history can be deleted using either Web Console or swsthistdel (History information deletion command).

3.6 Changing the setting information

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

3.6.1 Adding a device

After a device is added to any Managed Server, incorporate it into the backup as described below.
This process can be carried out using either the Web Console or commands.
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 for operation" in "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup 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 "11.2.3 Troubleshooting: Failure in accessing a repository database" 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 "Estimation of database size" in the *ETERNUS SF Installation and Setup Guide* for details.
  If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a device. Refer to "11.2.1 Troubleshooting: Insufficient free space in a repository" for details.

3.6.2 Deleting a device

This section describes how to delete different types of devices.

3.6.2.1 Deleting a transaction volume

This process can be carried out using either the Web Console or commands.
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.

3.6.2.2 Deleting a backup volume

This process can be carried out using either the Web Console or commands.
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, those 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 backup volume for deletion.

3.6.3 Adding the Managed Server

The process of adding a Managed Server to the backup operation is carried out using Web Console.

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

1. Register a Managed Server. For more information, refer to "3.4.3 Registering a Managed Server".

2. Fetch all the information on the devices connected to the newly added Managed Server. For more information on this, refer to "3.4.4 Fetching device information on a Managed Server".

3. Set the environment information for the Managed Server. For more information on this, refer to "3.4.5 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 "3.4.6 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 "3.4.7 Setting a backup policy".

Note

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

  Refer to "Required resources for operation" in "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for details.

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

  Refer to step 2 of "11.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.

- The repository (directory for the DB space that stores repository data) may be too small when a Managed Server is added. Re-estimate the repository size before adding a Managed Server. Refer to "Estimation of database size" in the *ETERNUS SF Installation and Setup Guide* for details.
  If the estimation result is less than 65 megabytes, the size does not need to be increased. If it is more than 65 megabytes, extend the size before adding a Managed Server. Refer to "11.2.1 Troubleshooting: Insufficient free space in a repository" for details.

3.6.4 Deleting the Managed Server

The process of deleting a Managed Server can be carried out using either Web Console or stgxfwcmdelsrv (Server information deletion command).

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

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

1. Delete the backup history of all transaction volumes on the Managed Server to be deleted. For more information, refer to "3.5.4.2 Deleting a backup history".

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

   The process of deleting a backup policy can be carried out using either Web Console or swstbkpoldel (Backup policy deletion command).

3. Delete the volume type that was registered using "3.4.6 Setting the operation type for a device" for the device connected to the Managed Server.

4. Delete the Managed Server.

5. If you have deleted the Managed Server with stgxfwcmdelsrv (Server information deletion command), take the following actions to reflect to the Web Console depending on how the agent installed in the deleted Managed Server is used:

   - If both of AdvancedCopy Manager's agent and Storage Cruiser's agent are used:

     On the Web Console, execute [Reload Conf.] to update to the latest information.

   - If only AdvancedCopy Manager's agent is used:

     On the Web Console, delete the Managed Server that you have deleted.

3.7 Stopping the Operation

To stop the backup operation, stop the services on the Managed 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 Services".

📖 Note
....
- When the service on the Managed Server has stopped, all functions of AdvancedCopy Manager running on the Managed Server will stop.

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

Chapter 4 Backup Operations (Symfoware)

This chapter describes how to backup the Symfoware database and backup the Server.

4.1 Backup Operations for Symfoware

This section explains operations for backing up Symfoware.

> **Note**
> ....
> - Backup operations for Symfoware are possible only for Managed Servers running Linux or Windows operating systems. On the other hand, Symfoware backup server operation is enabled only when Managed Servers are Windows.
>
> - When backing up Exchange databases on Windows Server 2008 or later, backup operations in link with Symfoware cannot be performed.
> ....

4.1.1 Overview

AdvancedCopy Manager handles the Symfoware database spaces that are located on the disk volumes in the ETERNUS Disk storage system as transaction volumes. For this reason, AdvancedCopy Manager allows for backup and recovery in physically allocated structures called "database spaces", without you having to be aware of the storage structure for the Symfoware database spaces.

By creating database spaces and log groups allocated on Managed Servers for various transactional purposes, Symfoware can create multiple operating environments. This operating environment can be distinguished by the name "RDB system name". Based on this RDB system name, AdvancedCopy Manager implements backup and recovery without damaging the consistency of relations among database tables in the operating environment.

For a complete overview of Symfoware, refer to the *Symfoware Server RDB Operations Guide*.

Figure 4.1 Function Overview
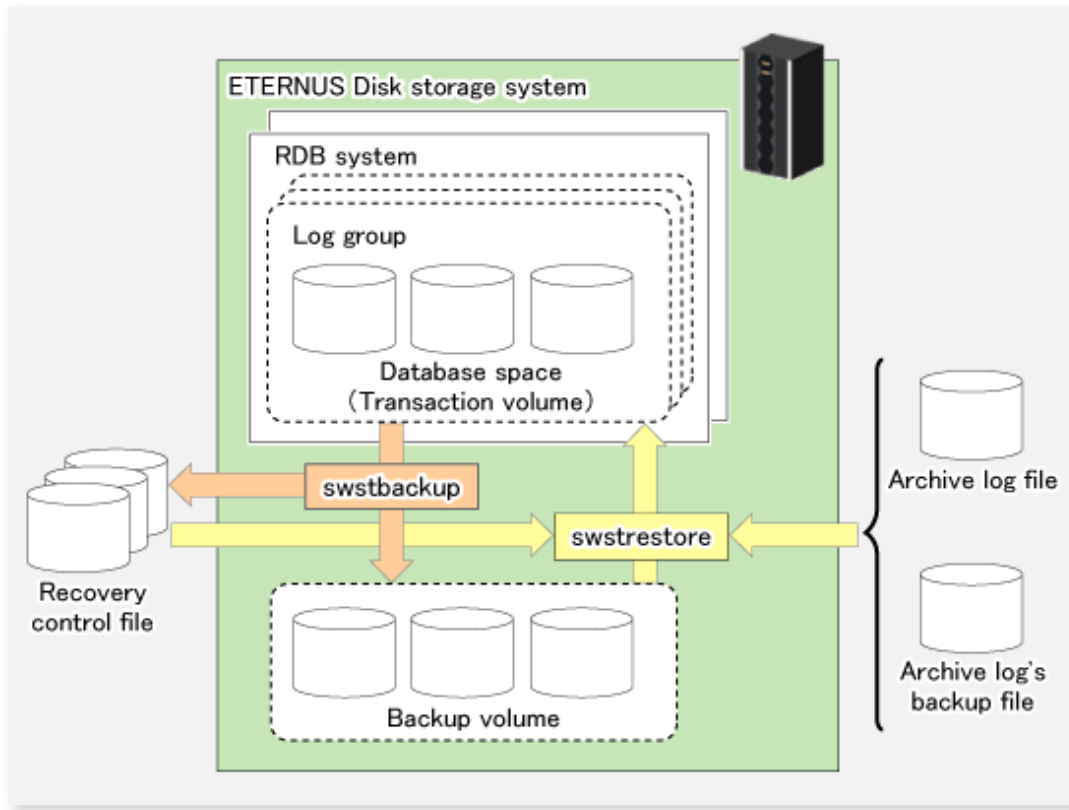
4.1.1.1 Backup

With AdvancedCopy Manager, you can back up Symfoware database spaces in units of either database spaces or log groups.

AdvancedCopy Manager handles the partitions to which the database spaces to be backed up are allocated as transaction volumes.

When backing up in units of database spaces, these transaction volumes are backed up to backup volumes.

When backing up in units of log groups, all database spaces included in a log group are defined as separate transaction volumes, and all transaction volumes are backed up.

📑 Note

. . . .

For backing up in units of log groups, all partitions to which database spaces included in a log group are allocated must be registered as transaction volumes beforehand. If a single partition remains unregistered, AdvancedCopy Manager cannot back up the unregistered database spaces and, as a consequence, not maintain consistency of relations among tables when recovering the database.

. . . .

During backup, AdvancedCopy Manager creates a recovery control file which contains the data required for recovery of the database and is managed separately for each backup generation.

4.1.1.2 Recovery

With AdvancedCopy Manager, you can recover Symfoware database spaces in units of either database spaces or log groups. Refer to notes described in "12.2.2.3 swstrestore (Restore execution command)" when recovering to two or more database space at the same time.

The recovery process with AdvancedCopy Manager is as follows:

1. Select the appropriate recovery control files and backup volumes.

2. Replicate the backup volumes on the transaction volumes.

3. For restoring the latest condition or a certain point in time, apply the archive log based on the recovery control file.

Point

When the archive log file has become full with archive logs, there may be no more response from Symfoware commands or from user applications that are using the database space. If this happens, you can backup archive logs on external media. AdvancedCopy Manager can implement recovery if you specify the name of the backup file for the archive log that is stored on an external medium (file that includes the name of the archive log's backup location).

Note

Recovery cannot be implemented if the specified "file that includes the name of the archive log's backup location" contains an archive backup file that is backed up on a MT (tape device).

Also, at the time of recovery, the working directory specified in swstsvrset (Managed Server configuration information setting command) will be used.

Note

Since you must use AdvancedCopy Manager to recover Symfoware database spaces that were backed up with AdvancedCopy Manager, you cannot directly recover from any backup volumes that were backed up on tape or other secondary media.

Backup Operation for Archive Logs

For backing up archive logs, it is necessary to understand the handling of the backup archive logs that are required for the recovery of database spaces.

AdvancedCopy Manager manages archive log backup processing that is implemented in the required units of log groups as well as the handling of backup and recovery that is implemented in units of database spaces. A recommended procedure is that the database administrator record the backup status of the archive logs. Further, Fujitsu recommends that you create shell scripts that define the backup work for archive logs, and to record the logs in a file on a Managed Server.

Figure 4.2 Backup operation for archive logs
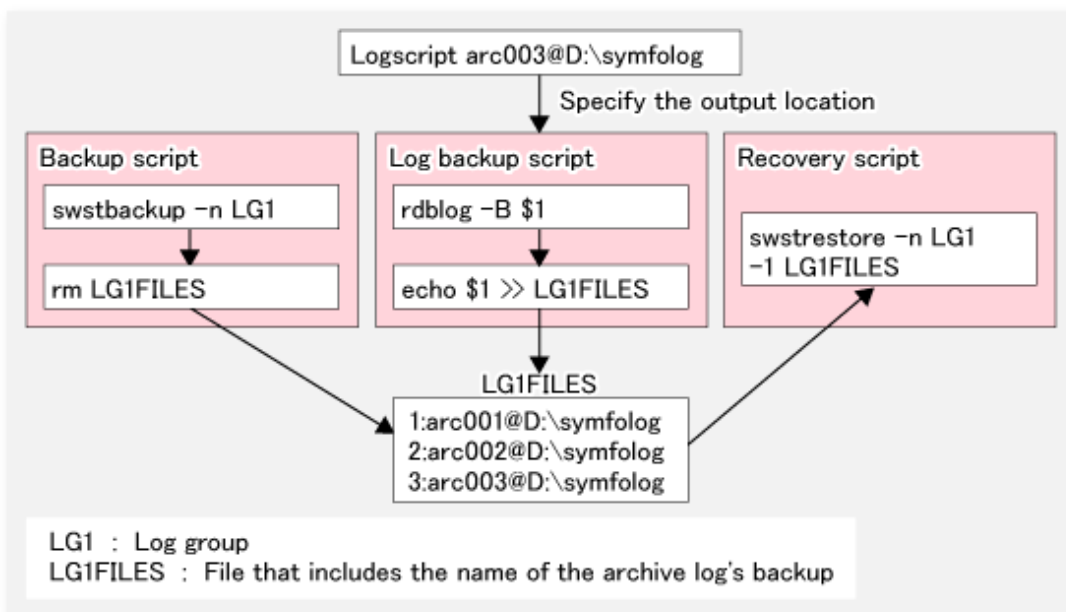
4.1.2 Operation Design

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

Note

. . . .

For creating an environment in which AdvancedCopy Manager can implement backup and recovery of Symfoware database spaces in units of either database spaces or log groups, the database administrator must, in advance, create an operating environment for Symfoware that is suitable for the transaction purposes.

. . . .

4.1.2.1 Design of backup operations for Symfoware databases

Refer to the Symfoware Server manuals when you configure a backup system. However, in designing it, you will have to observe the following restrictions regarding the allocation of database space.

Database space on a file system

The database space is allocated to file system.

AdvancedCopy Manager copies the data in units of volumes (partitions). Therefore, it is required to have exactly one database space file for each volume (partition). Assign a drive letter to the volume, and create only one database space file for the entire partition space. For information on how to create database space in a file system, refer to the *Symfoware Server RDB Operation Guide* and the *Symfoware(R) Server SQL Reference Guide*.

Figure 4.3 Database space on a file system
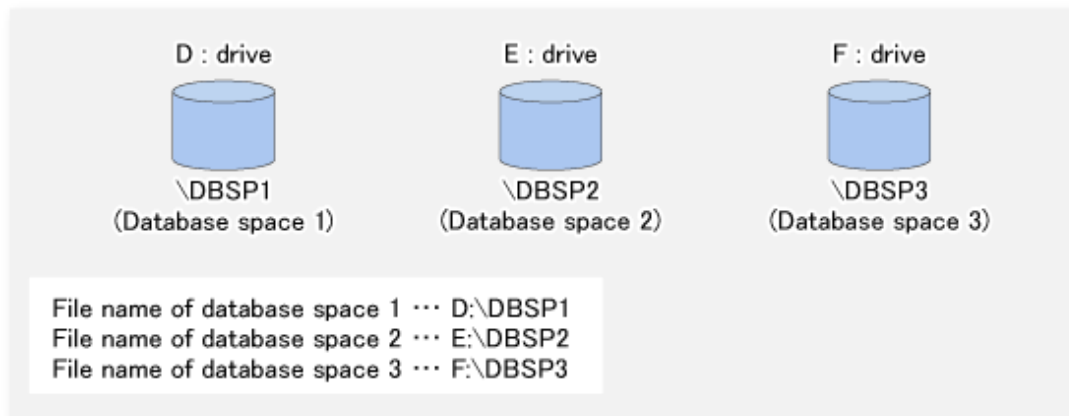
Note

. . . .

- Make sure not to place any other files than the relevant database space file on the volume on which the database space is allocated.

- If you create multiple database space files on the same volume, database space information will not be fetched.

. . . .

4.1.2.2 Selecting a server on which backups are performed

Select a server on which to perform backups.

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

- Management Server

  Multiple Managed Servers are unified and controlled centrally. The Management Server can also operate as a Managed Server.

- Managed Server

  AdvancedCopy Manager operations can be performed on the Managed Server.

4.1.2.3 Selecting a backup source

Select the partition to which the Symfoware database spaces are allocated as the backup source.

In AdvancedCopy Manager, the partitions to which the Symfoware database spaces to be backed up are allocated are called "transaction volumes".

Note

- For backing up in units of log groups, all partitions to which database spaces included in a log group are allocated must be registered as transaction volumes beforehand. If a single partition remains unregistered, AdvancedCopy Manager cannot back up the unregistered database spaces and, as a consequence, not maintain consistency of relations among tables when recovering the database.

- Do not designate partitions in which the system is stored or partitions on which AdvancedCopy Manager is installed as backup sources.

- Backup operation of Symfoware database spaces that are allocated to SDX objects is not supported.

  Refer to "13.1.1 General notes" for points to consider when deciding on a volume to be backed up. Relevant points to consider are as follows:

  1. "13.1.1.1 Size of a Partition"

  2. "13.1.1.2 Layout of Partition"

  3. "13.1.1.9 Dynamic Volume"

  4. "13.1.1.13 Configuration of a disk"

  5. "13.1.1.8 Maximum Number of Simultaneously Executing Operations"

4.1.2.4 Configuring a backup policy

Select a backup policy to be configured for the transaction volumes or log groups. A backup policy consists of below items.

If you set a backup policy for a log group, the same backup policy will be set for all transaction volumes that are included in that log group.

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 high-speed 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 device.

A synchronized 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

This item signifies a reference number of days after which a warning that backup is overdue is displayed.

If a period longer than the specified interval has passed since the last backup date, the delay will be displayed on the transaction list screen and by running the swstexecstat (Execution status display command).

Backups will not be performed automatically, even if you have specified the interval days.

4.1.2.5 Preparing a backup volume

This section describes how to prepare the backup volume.

In AdvancedCopy Manager, the partitions to which transaction volumes are backed up are called "backup volumes". Backup volumes must be located on the ETERNUS Disk storage system.

A backup volume must have exactly the same byte-size as a transaction volume. The number of backup volumes is determined by the type of backup operation as shown below:

Table 4.1 Number of backup volumes required for backup operations

Type of operation	Number of required backup volumes
Snapshot high-speed 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)

Type of operation	Number of required backup volumes
Snapshot high-speed 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

If you specify a log group for setting a backup policy, the following number of backup volumes is required:

Table 4.3 Number of backup volumes required for backup operations (if a log group is specified)

Type of operation	Number of required backup volumes
Snapshot high-speed backup	(Number of transaction volumes in the log group) * (number of generations in the backup policy being set)
Synchronized high-speed backup	(Number of transaction volumes in the log group) * (number of generations in the backup policy being set +1)

Note

In order to manage backup volumes with AdvancedCopy Manager, the automatic mount function must be enabled.

Since the automatic mount function is disabled by default in Windows Server 2003, Enterprise Edition, refer to "1.6 Operations on Windows Server 2003" to enable the automatic mount function.

4.1.2.6 Preparing the recovery control file and the working file

For backup operation for Symfoware, the following directories need to be set up:

- Target directory for output of the recovery control file

- Working directory

Target directory for output of the recovery control file

The target directory for output of the recovery control file is the storage destination for the recovery control file that is created during backup.

The required capacity for the recovery control file is approximately 1 MB per backup generation of each transaction volume.

For M backup generations of N transaction volumes, the required capacity is as follows:

Table 4.4 Required capacity for the recovery control file

Type of operation	Required capacity (unit: MB)
Snapshot high-speed backup	N * M
Synchronized high-speed backup	N *(M+1)

If, at the time of starting a backup operation, no target directory for output of the recovery control file is set up, the following directory will be used.

- In case of normal operation (non-clustered environment)

```
<Environment directory>\etc\SymfoWARE\Recovery
```

- In case of operation in clustered environment

```
<Environment directory for logical node>\etc\SymfoWARE\Recovery
```

Working directory

The working directory serves to carry out database recovery work when performing a restore.

If, at the time of starting a backup operation, no working directory is set up, the following directory will be used.

```
<Environment directory>\var\SymfoWARE
```

4.1.3 Flow of Operation

The flow of backup operations in Symfoware is shown below:

Figure 4.4 Flow of backup operations (Symfoware)
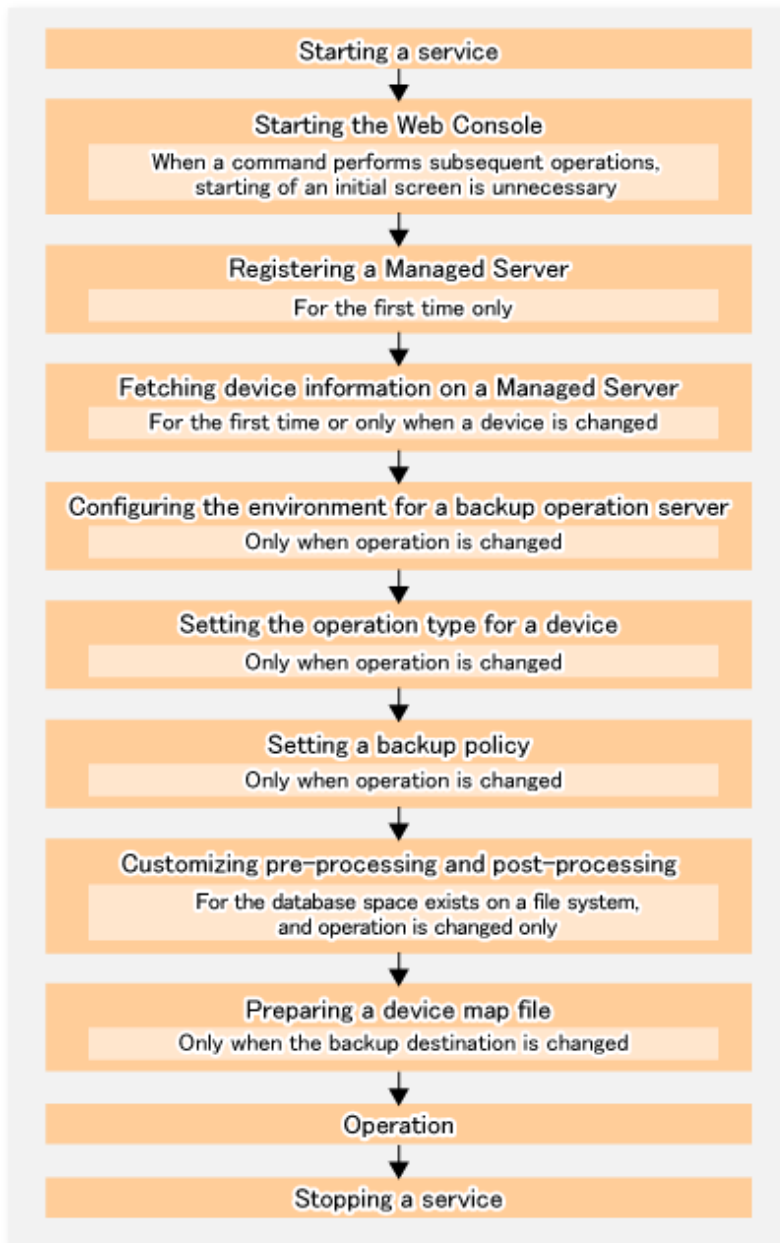
4.1.4 Preparing to Start the Backup

This section describes the preparations that are required for backup operation.

4.1.4.1 Activating services

In order to carry out backup operations, the services of AdvancedCopy Manager must be started on both the Management Server and the Managed Servers. Normally, these services are automatically started up when the system is started.

If the startup fails or a service has been stopped, start the service manually, referring to "Chapter 2 Starting and Stopping Services".

4.1.4.2 Starting the Web Console

For carrying out backup operations from the backup management window, start the Web Console, referring to "How to start Web Console" in the *ETERNUS SF Web Console Guide*.

4.1.4.3 Registering a Managed Server

On the Management Server, register the Managed Servers that are to be managed.

This process is carried out using the Web Console.

4.1.4.4 Fetching device information on a Managed Server

This process can be executed using either Web Console or the stgxfwcmsetdev (Device information collection/reflection command).

When the process is finished, use the Web Console or the displayed result for the stgxfwcmdispdev (Device information display command) to confirm that the Symfoware information is displayed on the corresponding device. You can also use the stgxfwcmsetdev (Device information collection/reflection command) for confirmation.

Note

- For fetching the configuration information for a Symfoware database, start the Symfoware database before you fetch the device information from the Managed Server.

- Device information on the Managed 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 Managed 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 "11.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.

- In order to be able to fetch Symfoware information, Symfoware Server Advanced Backup Controller must be running. If you have installed Symfoware Server Advanced Backup Controller after fetching the device information, you must fetch it again.
  Also, depending on the system environment on which it is installed, the software's version level may be different. For details, refer to the related software manuals.

- The time required for this operation depends on the total number of devices defined on the selected Managed 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.

- While backup synchronous processing or synchronous replication processing is being performed, device information may not be fetched correctly. Therefore, for fetching device information, cancel all synchronous processing beforehand.

4.1.4.5 Configuring the environment for a backup operation server

This process can be executed using either Web Console or the swstsvrset (Managed Server configuration information setting command).

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

Point

If the Management Server also works as a Managed Server, these environment settings are also required for the Management Server.

If the Managed Server environment setup has already been carried out, this process is not required.

4.1.4.6 Setting the operation type for a device

Define the partition on which the Symfoware database space to be backed up is configured as a transaction volume, and the target volume as a backup volume.

Settings for transaction volumes

Define the partition on which the Symfoware database space to be backed up is configured as a transaction volume by running the swstdevinfoset (Device information setting command).

For log groups, all partitions to which database spaces included in a log group are allocated must be registered separately as transaction volumes. If a single partition remains unregistered, AdvancedCopy Manager cannot back up the unregistered database spaces and, as a consequence, not maintain consistency of relations among tables when recovering the database.

Devices on which no Symfoware database space is set up cannot be set as transaction volumes for Symfoware.

Note

- If you have modified any RDB system names, database space names or log group names that are assigned to transaction volumes for Symfoware, follow the procedure below to register them as transaction volumes:

    1. Run the History information deletion command to delete the backup history information of all registered transaction volumes.

    2. Delete the backup policies of all registered transaction volumes.

    3. Run the Device information setting command to unregister them as transaction volumes.

    4. Redo the procedure described in "4.1.4.4 Fetching device information on a Managed Server".

    5. Run the Device information setting command to re-register devices as transaction volumes.

- For unregistering transaction volumes that are included in a log group, delete all backup policies and backup history information for these transaction volumes before you start to unregister them.

- Backup operation of Symfoware database spaces that are allocated to SDX objects is not supported.

Settings for backup volumes

Run the swstdevinfoset (Device information setting command) to configure a backup volume as a backup target. If backup volumes are already registered, this operation is not required.

For the number of backup volumes required by backup management, refer to "4.1.2.5 Preparing a backup volume".

Note

- Before you modify the configuration of partitions that are registered as backup volumes, unregister them as backup volumes, and after changing the configuration, redo the procedure described in "4.1.4.4 Fetching device information on a Managed Server" before you register them by running the swstdevinfoset (Device information setting command).

- The backup volume must have the same size as the transaction volume.

- Devices to which a drive letter or mount point is assigned cannot be configured as backup volumes.

4.1.4.7 Setting a backup policy

Run the swstbkpolset (Backup policy setting command) to set backup policies for the transaction volumes or log groups.

If you set a backup policy for a log group, the same backup policy will be set for all transaction volumes that are included in that log group.

For details on backup policies, refer to "4.1.2.4 Configuring a backup policy".

Note

When you set backup policies, the backup volumes required for backup operations must already be registered. For the number of backup volumes required for backup operation, refer to "4.1.2.5 Preparing a backup volume".

You can display the set backup policies by running the swstbkpoldisp (Backup policy display command).

If you add a database space to a log group for which a backup policy is specified and set it up as a transaction volume, you have to redo the backup policy settings for the entire log group.

4.1.4.8 Customizing pre-processing and post-processing

Pre-processing and Post-processing scripts for Backup need to be customized in the following conditions:

- The database space exists on a file system, and

- 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".

🅿 Point
. . . .
When AdvancedCopy Manager is upgraded

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

4.1.4.9 Preparing a device map file

From the backup of a group of volumes that are registered as backup volumes, AdvancedCopy Manager automatically selects a volume for use as a backup target volume which has the same capacity as the transaction volume.

However, when it is necessary to recognize a specific backup target volume for any operational reasons, a "device map file" that defines the relationship between a transaction volume and a backup volume must be created in advance.

Create the device map file in any suitable location on the Managed Server that carries out backup. Specifying this file when you start the backup enables you to recognize the backup targets during operation.

🅿 Point
. . . .
For managing multiple backup generations, you need multiple device map files.
Device map files to be used for starting backup or synchronization must fulfill one of the following conditions:

- A backup volume that is not yet in use must be specified.

- A backup volume must be specified that is used in the history which is going to be deleted in the backup process.

Therefore, if you operate with multiple backup volumes, you need different device map files for the different backup volume situations.
. . . .

4.1.4.9.1 Describing a device map file

The following provides an example of a device map file:

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

# Normal Disks
g1d0p1        g1d1p1
g1d0p2        g1d1p2
g1d0p3        g1d1p3


# LOG01/GRP1
  # A comment can be described here also.
g1d2p1        g1d3p1
g1d2p2        g1d3p2
g1d2p3        g1d3p3


# LOG02/GRP2
g1d4p1        g1d5p1
g1d4p2        g1d5p2
```

```
:
:
```

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

- Describe a transaction volume name and a corresponding output 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).

- Blank lines (spaces or tab characters) may be included in the file.

- Anything after the symbol '#' until the end of the line is regarded as a comment.

- 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 (Device-Name or Log-Group-Name). Refer to the description example provided in the beginning of this chapter.

- If you define a backup volume as the output target for a log group, the descriptions for all transaction volumes must be included in the same single file. The descriptions must not straddle across multiple lines.

4.1.5 Operation

This section explains operations for backing up Symfoware.

Before performing the backup operation, configure the environment settings that are required for the backup according to "4.1.4 Preparing to Start the Backup".

There are two kinds of backup in AdvancedCopy Manager:

- Snapshot high-speed backup

- Synchronized high-speed backup

4.1.5.1 Performing snapshot high-speed backup

For performing a snapshot high-speed backup of Symfoware, specify the transaction volumes or log groups and run the swstbackup (Backup execution command). If you specify backup for a log group, backup will be executed at once for all transaction volumes that are included in that log group.

The following backup methods are available:

Table 4.5 Types of snapshot high-speed backup

Backup method	Description
Normal dump	Databases are backed up while archive log operation (i.e. normal operation) is in progress.
Reference dump	For purposes such as long-term preservation, databases are backed up after detaching them from archive log operation.

📖 Note

. . . .

- If you specify backup for transaction volumes, you cannot specify reference dump for transaction volumes that include multi-database spaces (physical structures in which a single table or index is assigned to multiple database spaces).

- When you back up with reference dump, you have to execute Symfoware's rdbrtr command in order to set inhibition of updates (disable writing of data) for all DSI (instance that expresses the storage structures for tables) on the transaction volumes to be backed up.

- From the Web Console, you cannot specify backup of individual transaction volumes.

. . . .

4.1.5.2 Performing synchronized high-speed backup

For performing a synchronized high-speed backup of Symfoware, follow the procedure below:

1. Use the swststartsync (Backup synchronous processing start command) to specify the transaction volumes or log groups and start backup synchronous processing. If you specify a log group, backup synchronous processing will be executed for all transaction volumes that are included in that log group.
   After starting backup synchronous processing, you can cancel it with the swstcancelsync (Backup synchronous processing cancel command).

2. Run the swstsyncstat (Backup synchronous processing progress display command) to check that the transaction volumes are in the equivalency maintenance state while backup synchronous processing is in progress. If you have specified backup synchronous processing for a log group, check that all transaction volumes in the log group are in the equivalency maintenance state.

3. Specify the transaction volumes or log groups, and run the swstbackup (Backup execution command) to collect the backup. With the swstbackup (Backup execution command), you can use the backup methods shown below. On executing the swstbackup (Backup execution command), the current status at that time is registered in the backup history information, and backup synchronous processing is stopped.

Table 4.6 Types of synchronized high-speed backup

Backup method	Description
Normal dump	Databases are backed up while archive log operation (i.e. normal operation) is in progress.
Reference dump	For purposes such as long-term preservation, databases are backed up after detaching them from archive log operation.

Note

- If you specify backup for transaction volumes, you cannot specify reference dump for transaction volumes that include multi-database spaces (physical structures in which a single table or index is assigned to multiple database spaces).

- When you back up with reference dump, you have to execute Symfoware's rdbrtr command in order to set inhibition of updates (disable writing of data) for all DSI (function that expresses the storage structures for tables) on the transaction volumes to be backed up.

- If you run the swstbackup (Backup execution command) before the transaction and backup volumes are in an equivalent state, an error will occur.

- From the Web Console, you cannot specify backup of individual transaction volumes.

Point

With synchronized high-speed backup, backups are created by stopping or suspending synchronous processing. If you specify to suspend when you run the swstbackup (Backup execution command), the Suspend/Resume function performs the backup after suspending synchronous processing. For details on the Suspend/Resume function, refer to "Chapter 5 Backup Operation using Suspend/Resume Function".

4.1.5.3 Performing the recovery

For recovering the data backed up by snapshot high-speed backup or synchronized high-speed backup, execute the swstrestore (Restore execution command).

For recovery of Symfoware, from the backup volume where the history of backups by the swstbackup (Backup execution command) is managed, specify the transaction volumes or log groups when you run the swstrestore (Restore execution command).

Note

If you specify recovery for a log group, recovery will be executed at once for all transaction volumes that are included in that log group.

You can also use the -bundle option for batch recovery of multiple transaction volumes that are included in the same log group. This is called "bundle recovery".

If multiple database spaces are allocated in a RAID group, you can recover these database spaces in a single batch, which reduces the time required for applying logs and thereby the entire recovery time.

The following recovery methods are available:

- Recovery to the latest status

- Restoring of a specific point in time by specifying the end point of recovery (specifying the -e option when executing swstrestore (Restore execution command))

- Restoring of the point in time of backup (specifying the -a option when executing swstrestore (Restore execution command))

The available recovery methods depend on the backup method (normal dump or reference dump) that was used for the data to be recovered. You can specify the following combinations:

Table 4.7 Combinations of backup and recovery methods

Backup method	Recovery unit	Recovery method		
		Recovery to the latest status	Restoring of a specific point in time by specifying the end point of recovery (*1)	Restoring of the point in time of backup
Normal dump	Log group	A	A	A
	Multiple transaction volumes in the same log group	A	A	A
Reference dump	Transaction volume	A	N/A	N/A
	Log group	A	N/A	A
	Multiple transaction volumes in the same log group	A	N/A	A
	Transaction volume	A	N/A	N/A

A: available; N/A: not available

*1: For details on recovery points, refer to the Symfoware Server manuals. You have to memorize the recovery points until you carry out recovery of a database.

```
📌 Note
```
....

- All of the described methods require that access to the database spaces to be recovered is not permitted. In order to prohibit access, execute the rdbinh or the rdbexspc command provided by Symfoware. For details on these commands, refer to the *Symfoware Server RDB Operations Guide*.

- For individual recovery of transaction volumes in a log group, the only available method is recovery to the latest status. In such a case, it is required that the database administrator takes charge of matching the relations between tables within this log group.

- For performing "Recovery to the latest status" or "Restoring of a specific point in time by specifying the end point of recovery", when the archive log files are stored on external media, you have to create a file that contains the backup file names required during recovery on the Managed Server that includes the transaction volume to be recovered, and specify this file name when you start recovery. For information on how to describe this file, refer to the *Symfoware Server RDB Operations Guide*.

- If recovery started by the swstrestore (Restore execution command) fails due to insufficient space in the working directory, you can use the -w option to retry recovery with a different directory serving as a temporary working directory. For details on the -w option, refer to swstrestore (Restore execution command).

- If you perform "Restoring of a specific point in time by specifying the end point of recovery" or "Restoring of the point in time of backup", processing to restore Symfoware's management information will also be implemented. Since this processing is implemented as a portion of recovery processing, it takes time for commands to be processed.

- If the recovered data were originally backed up mixing both methods (normal dump and reference dump) within a log group, recovery cannot be carried out at once for the entire log group. In such a case, specify the -bundle option in the in order to recover multiple transaction volumes in the same log group in a batch.

- If you originally backed up in units of database spaces, for recovery in units of log groups or for bundle recovery, you have to specify the relative generation number in the generation specification. This is necessary because, as shown in below example of a backup that was implemented in units of database spaces, the situation may occur that, after updating the history of a specific transaction volume (database space), absolute generation numbers are not complete for the corresponding relative generation numbers.

. . . .

Example: For a log group (LOG1/RDB1) containing Database space 1 (DB1.DBSP1) and Database space 2 (DB1.DBSP2)

Day 1: Backup of Database space 1 (DB1.DBSP1)

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup g1d0p1
g1d0p1 swstbackup completed
```

Day 2: Separate backup of Database space 1 (DB1.DBSP1) and Database space 2 (DB1.DBSP2)

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup g1d0p1
g1d0p1 swstbackup completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup g1d0p2
g1d0p2 swstbackup completed
```

Display of history information

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdisp -n LOG1/RDB1
Server=SV01 Device= g1d0p1 Mount-Point=DB1.DBSP1/LOG1/RDB1 (SymfoWARE)
Generation  Version   Backup-Date        Backup-Disk      Status     Execute   ArcSerial
   1         2      2006/04/12 22:00    g1d1p2            succeeded   ----       5
   2         1      2006/04/11 22:00    g1d1p1            succeeded   ----       5
Server=SV01 Device= g1d0p2 Mount-Point=DB1.DBSP2/LOG1/RDB1 (SymfoWARE)
Generation  Version  Backup-Date        Backup-Disk       Status     Execute   ArcSerial
   1         1      2006/04/12 23:00    g1d1p3            succeeded   ----       5
```

For recovery in units of log groups or for bundle recovery using a history as shown above, depending on the specified option, different backup data are used. In the case described above, since, by specifying the relative generation numbers, both database spaces use the backup data of Day 2, consistency of databases after recovery can be ensured.

Table 4.8 Specified options and corresponding backup data used in recovery

Type of generation number	Specified option	Backup data used in recovery	
		DB1.DBSP1 (g1d0p1)	DB1.DBSP2 (g1d0p2)
Relative generation number	-g 1	Backup data of Day 2 (g1d1p2)	Backup data of Day 2 (g1d1p3)
Absolute generation number	-v 1	Backup data of Day 1 (g1d1p1)	

🛈 Note

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If you backed up in units of log groups, the situation may occur that absolute generation numbers are not complete for backups that were implemented in units of database spaces or due to deleting a history, but the absolute generation numbers of backup in units of log groups will be complete. As shown in the below example, this is due to the fact that the numbers for transaction volumes (database spaces) with smaller absolute generation numbers are matched with the numbers for transaction volumes (database spaces) with larger absolute generation numbers. Therefore, intermediate absolute generation numbers for transaction volumes (database spaces) with smaller absolute generation numbers are missing.

. . . .

Example: For a log group (LOG1/RDB1) containing Database space 1 (DB1.DBSP1) and Database space 2 (DB1.DBSP2)

Day 1: Backup of Database space 1 (DB1.DBSP1)

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup g1d0p1
g1d0p1 swstbackup completed
```

Day 2: Backup of Database space 1 (DB1.DBSP1) and Database space 2 (DB1.DBSP2) in units of log groups

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup -n LOG1/RDB1
LOG1/RDB1 swstbackup completed
```

Display of history information

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdisp -n LOG1/RDB1
Server=SV01 Device= g1d0p1 Mount-Point=DB1.DBSP1/LOG1/RDB1 (SymfoWARE)
Generation Version  Backup-Date       Backup-Disk       Status    Execute  ArcSerial
   1         2      2006/04/12 22:00  g1d1p2            succeeded  ----      5
   2         1      2006/04/11 22:00  g1d1p1            succeeded  ----      5
Server=SV01 Device= g1d0p2 Mount-Point=DB1.DBSP2/LOG1/RDB1 (SymfoWARE)
Generation  Version Backup-Date       Backup-Disk       Status    Execute  ArcSerial
   1         2      2006/04/12 22:00  g1d1p3            succeeded  ----      5
```

For recovery in units of log groups or for bundle recovery using a history as shown above, since all absolute generation numbers corresponding to the relative generation numbers are complete, the same backup data will be used regardless of which type of generation number you specify.

Table 4.9 Specified options and corresponding backup data used in recovery

Type of generation number	Specified option	Backup data used in recovery	
		DB1.DBSP1 (g1d0p1)	DB1.DBSP2 (g1d0p2)
Relative generation number	-g 1	Backup data of Day 2 (g1d1p2)	Backup data of Day 2 (g1d1p3)
Absolute generation number	-v 2		

However, if you specify "-v 1", the restore command will result in an error, because backup data for Database space 2 (DB1.DBSP2) do not exist.

Point
. . . .
Recovery can also be carried out using the Web Console. Bundle recovery, however, cannot be carried out using the Web Console.
. . . .

Point
. . . .
For executing a bundle recovery, a "Device list file" must be created in advance, defining the transaction volumes that are to be recovered in a batch. For details on device list files, refer to "4.1.5.3.1 Describing a device list file".
. . . .

4.1.5.3.1 Describing a device list file

Create the device list file in any suitable location on the Managed Server that carries out recovery. Specifying this file when you start recovery enables you to recover multiple transaction volumes in a batch.

The following provides an example of a device list file:

```
# A comment line starts with "#".
```

```
# LOG01/GRP1
g1d0p3        # A comment can be described here also.
g1d0p4
g1d0p5
g1d0p6
g1d0p7
:
:
```

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

- Describe a single transaction volume name in one line. 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 transaction volume name and the end of a line (new line character).

- Blank lines (spaces or tab characters) may be included in the file.

- Anything after the symbol '#' until the end of the line is regarded as a comment.

Note

If you run the Restore execution command with the -bundle option specified, all transaction volumes described in the device list file will be restored. In the following cases, restore processing will result in an error:

- When there is not a single description for a transaction volume

- When an existing description for a transaction volume contains a formal mistake

- When a transaction volume is not a Symfoware volume

- When transaction volumes are straddling across multiple log groups

- When the description for a transaction volume contains any incorrect lines other than descriptive lines

- When the same transaction volume is specified more than once, as shown in the following example:

```
# Example for multiple descriptions of same transaction volume
g1d0p4
g1d0p4
:
:
```

4.1.5.4 Managing a backup history

History information for backups that were performed with the swstbackup (Backup execution command) can be displayed and deleted.

4.1.5.4.1 Displaying a backup history

History information for backups that were performed with the swstbackup (Backup execution command) can be displayed using the Web Console or the swsthistdisp (History information display command).

4.1.5.4.2 Deleting a backup history

History information for backups that were performed with the swstbackup (Backup execution command) can be deleted using the Web Console or the swsthistdisp (History information display command).

Point

From the Web Console, you cannot specify deletion of backup history information for individual transaction volumes that are included in log groups.

4.1.6 Stopping the Operation

To stop a backup operation, stop the services running on the Managed Server.

Normally, these services are automatically stopped when the system is stopped. You can stop services manually if you need to do so for some reason. For more information, refer to "Chapter 2 Starting and Stopping Services".

![Note icon] **Note**

. . . .

- When all services on the Managed Server have stopped, all functions of AdvancedCopy Manager running on the Managed Server will stop.

- Stop services on a Management Server only after ensuring that all the Managed Servers that it manages have also been stopped.

. . . .

4.2 Symfoware Backup Server Operation

This section describes Symfoware backup server operation.

4.2.1 Overview

In "4.1 Backup Operations for Symfoware", the disks connected to the Symfoware server are taken as backup volumes, while in backup server operation, the disks connected to a backup server can be specified as backup volumes.

This configuration allows you to use tape backup software (ISV) to perform tape backup without putting any load on the business server.

Figure 4.5 System configuration
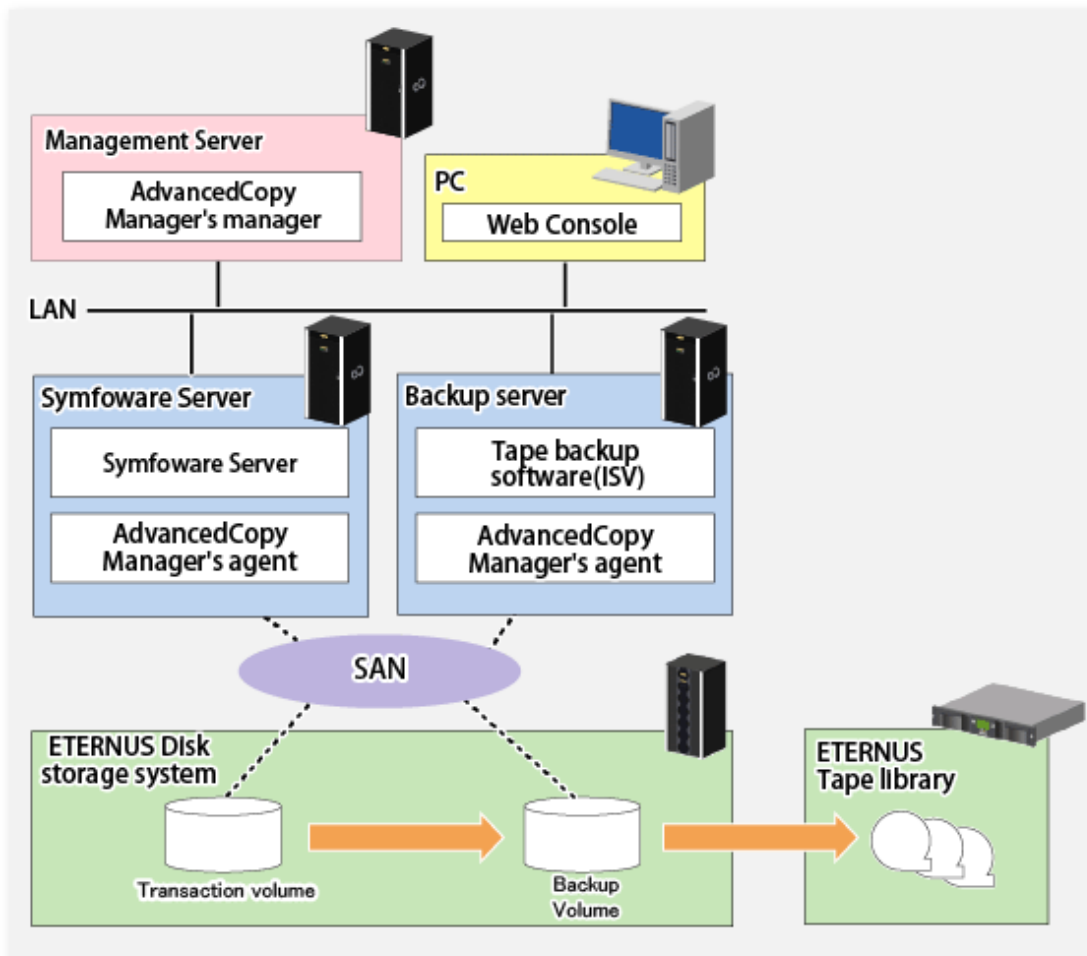
4.2.1.1 Backup

AdvancedCopy Manager can back up Symfoware database space on a per database space or per log group basis.

AdvancedCopy Manager takes as a transaction volume a partition to which database space to be backed up is allocated.

In backup operation on a per database space basis, the transaction volume is backed up to a backup destination volume (backup volume).

In backup operation on a per log group basis, all the database space contained in a log group is defined as transaction volumes respectively and all those transaction volumes are backed up.

In Symfoware backup server operation, transaction volumes and backup volumes should be registered as replication source and destination volumes respectively for replication management function.

📙 Note

- In backup operation on a log group basis, partitions to which all the database space contained in a log group is allocated should be registered as transaction volumes. If even one partition is not registered, AdvancedCopy Manager cannot back up that database space that is not registered and maintain consistency with inter-table relationships at database recovery time.

- AdvancedCopy Manager creates a recovery control file that stores data required for database recovery at backup time, and manages it on a per backup volume basis. Since the recovery control file is created on Symfoware server, when performing tape backup on a backup server, use the operating system's copy function or normal replication management function to save to the backup server.

- Archive log is not backed up. When backing up an archive log, see the Symfoware Server manual to do it.

4.2.1.2 Recovery

AdvancedCopy Manager can recover database space on a per Symfoware database space or per log group basis. Refer to notes described in "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)" when recovering to two or more database space at the same time.

AdvancedCopy Manager performs recovery processes as follows:

1. Copy a backup volume (copy destination volume) to a transaction volume (copy source volume).

2. When recovering to the most up-to-date status or a specific point in time, apply an archive file based on the recovery control file.

📗 Point

When backing up archive logs, specify the file to which archive log backup file names were written at recovery time (archive log backup destination names are listed) at recovery time to recover.

📙 Note

- Recovery cannot be implemented if the specified "file that includes the name of the archive log's backup location" contains an archive backup file that is backed up on a MT (tape device).

- Since you must use AdvancedCopy Manager to recover Symfoware database spaces that were backed up with AdvancedCopy Manager, you cannot directly recover from any backup volumes that were backed up on tape or other secondary media.

4.2.2 Operation design

Symfoware backup server operation is designed in the following procedure:

1. "4.2.2.1 Designing server configuration"

2. "4.2.2.2 Designing Symfoware database"

3. "4.2.2.3 Determining backup method"

4.2.2.1 Designing server configuration

Management Server

Management Server consolidates the management of multiple Managed Servers.

AdvancedCopy Manager's manager is installed in the Management Server.

Symfoware server

A Managed Server that uses Symfoware is called "Symfoware server".

- Install AdvancedCopy Manager's agent in a Windows Server 2008 or later environment. When installing it, select 32-bit agent.

- Connect a disk (transaction volume) to which database space to be backed up is allocated.

- The server supports cluster operation by WSFC or operation by a single node

- Database backup/recovery is performed from this server.

Backup server

A Managed Server that serves as backup destination is called "Backup server".

- Install AdvancedCopy Manager's agent in a Windows Server 2008 or later environment. When installing it, select a 32-bit agent.

- Connect a disk that serves as backup destination (backup volume).

- The backup server can serve as the Management Server, as well. To use it as a Management Server, as well, install AdvancedCopy Manager's manager in it.

Note

- A backup server is not available in a clustered configuration.

- In a backup server, the automount function should be set to be enabled.

- The Management Server and Symfoware Server cannot be used together.

- When backing up Exchange database, the Symfoware cooperation function is not available.

Figure 4.6 When a backup server is not used as Management Server:
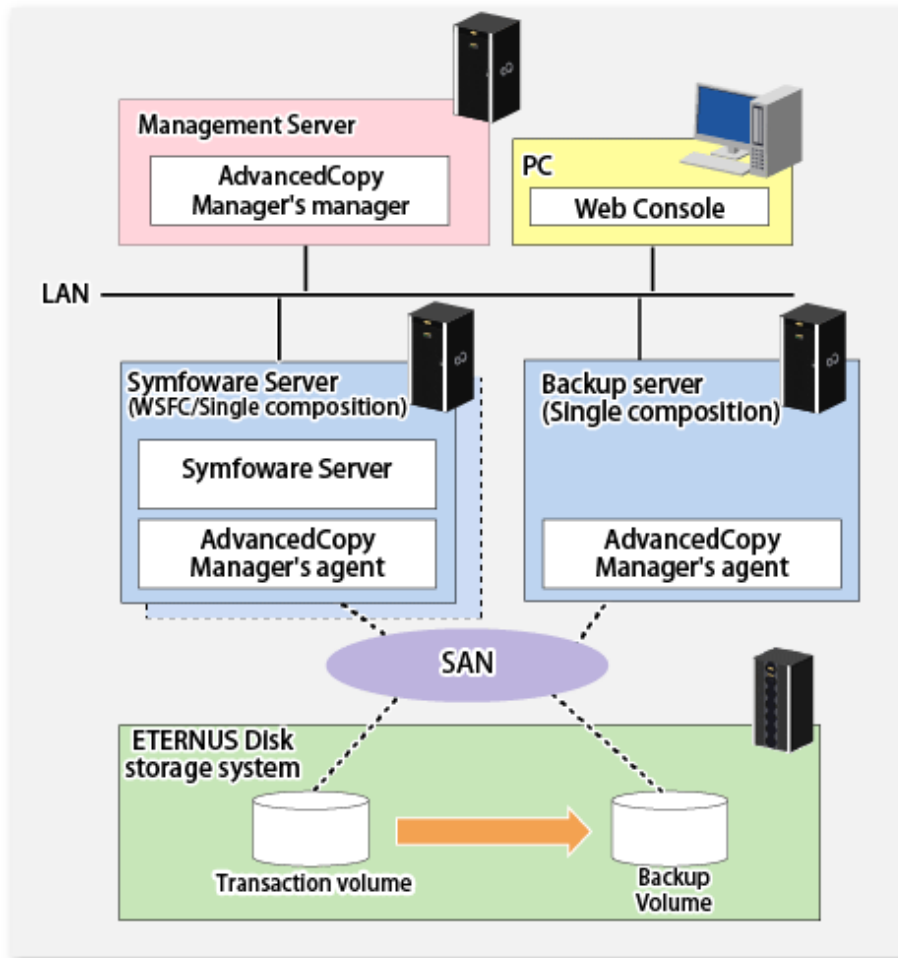
Figure 4.7 When a backup server is used as Management:
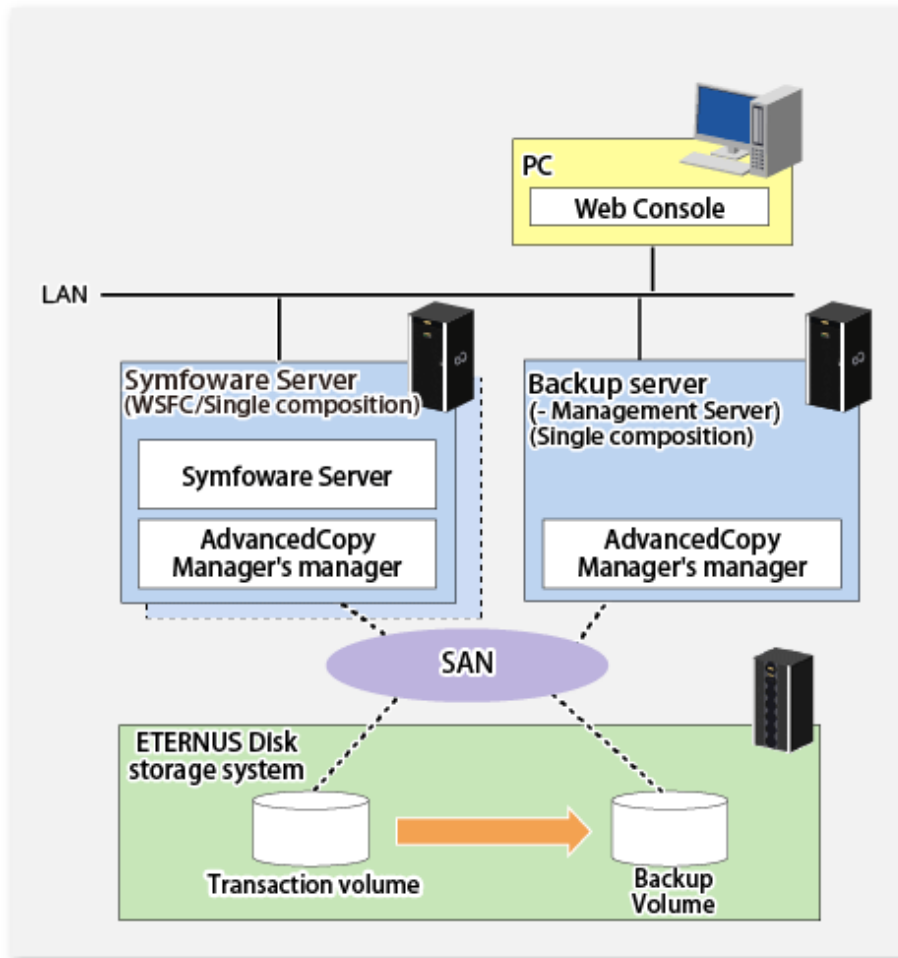
4.2.2.2 Designing Symfoware database

Refer to "4.1.2.1 Design of backup operations for Symfoware databases" for information on designing Symfoware database.

4.2.2.3 Determining backup method

Determine the type of Advanced Copy functions used for backup.

Either of the following is available for Symfoware backup server operation:

- OPC

- QuickOPC

4.2.2.4 Determining backup target

Determine a volume to which Symfoware database space to be backed up is allocated.

In AdvancedCopy Manager, the volume to which Symfoware database space to be backed up is allocated is called "Transaction volume".

📎 Note

. . . .

- When performing backup on a per log group basis, it is required to register as transaction volumes, all the volumes to which database space contained in the log group is allocated. If even one volume is not registered, AdvancedCopy Manager cannot back up the database space missing from registration and maintain consistency with inter-table relationships at database recovery time.

- Do not take as backup targets, a volume in which system is stored and a volume in which AdvancedCopy Manager is installed.

- When determining backup targets, you need to understand the notes mentioned in "Chapter 13 Notes on Operations". The related sections are as follows:

  - "13.1.1.1 Size of a Partition"

  - "13.1.1.2 Layout of Partition"

  - "13.1.1.8 Maximum Number of Simultaneously Executing Operations"

  - "13.1.1.9 Dynamic Volume"

  - "13.1.1.13 Configuration of a disk"

4.2.2.5 Preparing backup volumes

Prepare backup volumes for a backup server.

AdvancedCopy Manager calls the backup destination volume of a transaction volume "Backup volume". A transaction volume and a backup volume should exist in the same ETERNUS Disk storage system and be the same size.

- Backup on a per database space
  Backup volumes are required for the number of saved generations.

- Backup on a per log group basis

  The same number of backup volumes as transaction volumes contained in a log group is required per generation.

  To manage backup data for multiple generations, required is the number of backup volumes obtained by multiplying the number of backup volumes per generation by the number of saved generations.

Table 4.10 The number of backup volumes required for backup operation

Operation type	Required number of backup volumes
Backup per database space	Number of saved generations
Backup per log group	Number obtained by multiplying the number of transaction volumes contained in a log group by the number of saved generations

4.2.3 Flow of operation

The following is a description of a flow of Symfoware backup server operation.

Figure 4.8 Flow of backup server operation (Symfoware)

4.2.4 Pre-preparation

The following is a description of pre-preparation required for Symfoware backup server operation.

4.2.4.1 Starting services

To perform backup server operation for Symfoware, AdvancedCopy Manager services must be started on the Management Server and Managed Servers. Normally services are automatically started when the system starts.

If you failed in starting services or stopped them, refer to "Chapter 2 Starting and Stopping Services" to start services manually.

4.2.4.2 Starting the Web Console

Refer to "How to start Web Console" in the *ETERNUS SF Web Console Guide* to start the Web Console.

4.2.4.3 Registering Managed Servers

Register Managed Servers on the Management Server.

Perform this operation on the Web Console.

4.2.4.4 Collecting device information under Managed Server

For Collecting device information under Managed Server, refer to "4.1.4.4 Fetching device information on a Managed Server".

4.2.4.5 Registering database information

Register Symfoware database information by "12.7.1 swsrpdbinfo_symfoware(Symfoware database information register/delete/display command)".

(Example) When registering database information on log group (LOG1/RDB1):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware set LOG1/RDB1
LOG1/RDB1 swsrpdbinfo_symfoware completed
C:\>
```

(Example) When displaying database information on registered log group (LOG1/RDB1):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware disp LOG1/RDB1
Log-Group-Name/RDB-Name DB-Space-Name Device
LOG1/RDB1               DB1.DBS1      g1d1p1
LOG1/RDB1               DB1.DBS2      g1d2p1
LOG1/RDB1               DB1.DBS3      g1d3p1
C:\>
```

4.2.4.6 Creating a replication group

Set a pair of a transaction volume to which Symfoware database space is allocated and its backup destination volume as copy source and destination volumes of the replication management function. At that time, register replication volumes on the groups of replication management function (hereinafter called "Replication group").

In backup on a per log group basis, register all the pairs of a transaction volume to which database space contained in a log group is allocated and its backup destination volume in the same replication group.

Conditions for information on replication volumes making up a group

For conditions for information on replication volumes (pair of replication source volume/replication destination volume) that make up a replication group, refer to "7.4.7 Creating groups".

How to create a group

Create a replication group by "12.4.1.1 swsrpsetvol (Replication volume information setting command)".

The information for the created group can be referred to by "12.4.1.2 swsrpvolinfo (Replication volume information display command)".

In backup to another backup server, specify volumes on other Managed Server in the format of "volume name@Managed Server name" so that inter-server replication can be set. Also, set so that Symfoware server can be an operated server.

(Example) When creating a replication group (grp1) that backs up transaction volumes (g1d1p1, g1d2p1, g1d3p1) making up a log group (LOG1/RDB1) to backup volumes (one generation < g1d4p1, g1d5p1, g1d6p1>):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp1 g1d1p1 g1d4p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp1 g1d2p1 g1d5p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp1 g1d3p1 g1d6p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvolinfo -L
Server Original-Volume Size      Replica-Volume Size      Copy            Op-Server Group
SYM-SV g1d1p1@SYM-SV   7.5 Gbyte g1d4p1@BK-SV   7.5 Gbyte bi-direction both      grp1
SYM-SV g1d2p1@SYM-SV   7.5 Gbyte g1d5p1@BK-SV   7.5 Gbyte bi-direction both      grp1
SYM-SV g1d3p1@SYM-SV   7.5 Gbyte g1d6p1@BK-SV   7.5 Gbyte bi-direction both      grp1
```

Multiple-generation backup operation

When backing up multiple generations of a log group, create a replication group for each generation.

(Example) When creating replication groups (grp1, grp2) that back up transaction volumes (g1d1p1, g1d2p1, g1d3p1) making up a log group (LOG1/RDB1) to two-generation backup volumes ((1st generation<g1d4p1, g1d5p1, g1d6p1> / 2nd generation<g1d7p1, g1d8p1, g1d9p1>):
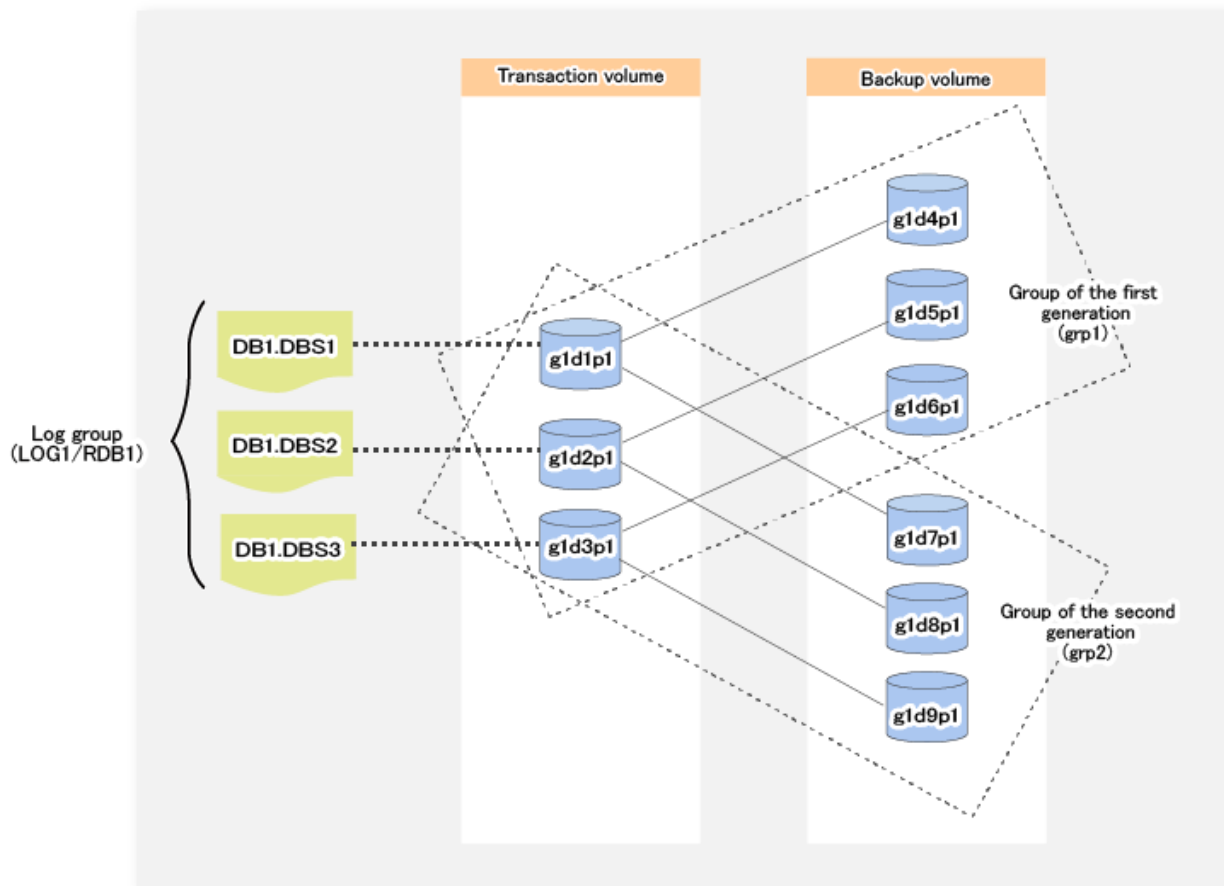
```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d1p1 g1d7p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d2p1 g1d8p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d3p1 g1d9p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvolinfo -L
Server Original-Volume Size          Replica-Volume Size          Copy            Op-Server Group
SYM-SV g1d1p1@SYM-SV    7.5 Gbyte    g1d4p1@BK-SV    7.5 Gbyte bi-direction both        grp1
SYM-SV g1d2p1@SYM-SV    7.5 Gbyte    g1d5p1@BK-SV    7.5 Gbyte bi-direction both        grp1
SYM-SV g1d3p1@SYM-SV    7.5 Gbyte    g1d6p1@BK-SV    7.5 Gbyte bi-direction both        grp1
SYM-SV g1d1p1@SYM-SV    7.5 Gbyte    g1d7p1@BK-SV    7.5 Gbyte bi-direction both        grp2
SYM-SV g1d2p1@SYM-SV    7.5 Gbyte    g1d8p1@BK-SV    7.5 Gbyte bi-direction both        grp2
SYM-SV g1d3p1@SYM-SV    7.5 Gbyte    g1d9p1@BK-SV    7.5 Gbyte bi-direction both        grp2
```

In backup on a per log group basis, a target log group and a replication group are specified at backup time.

In backup of the 1st generation log group (LOG1/RDB1), specify the log group (LOG1/RDB1) and the replication group (grp1) at backup time.
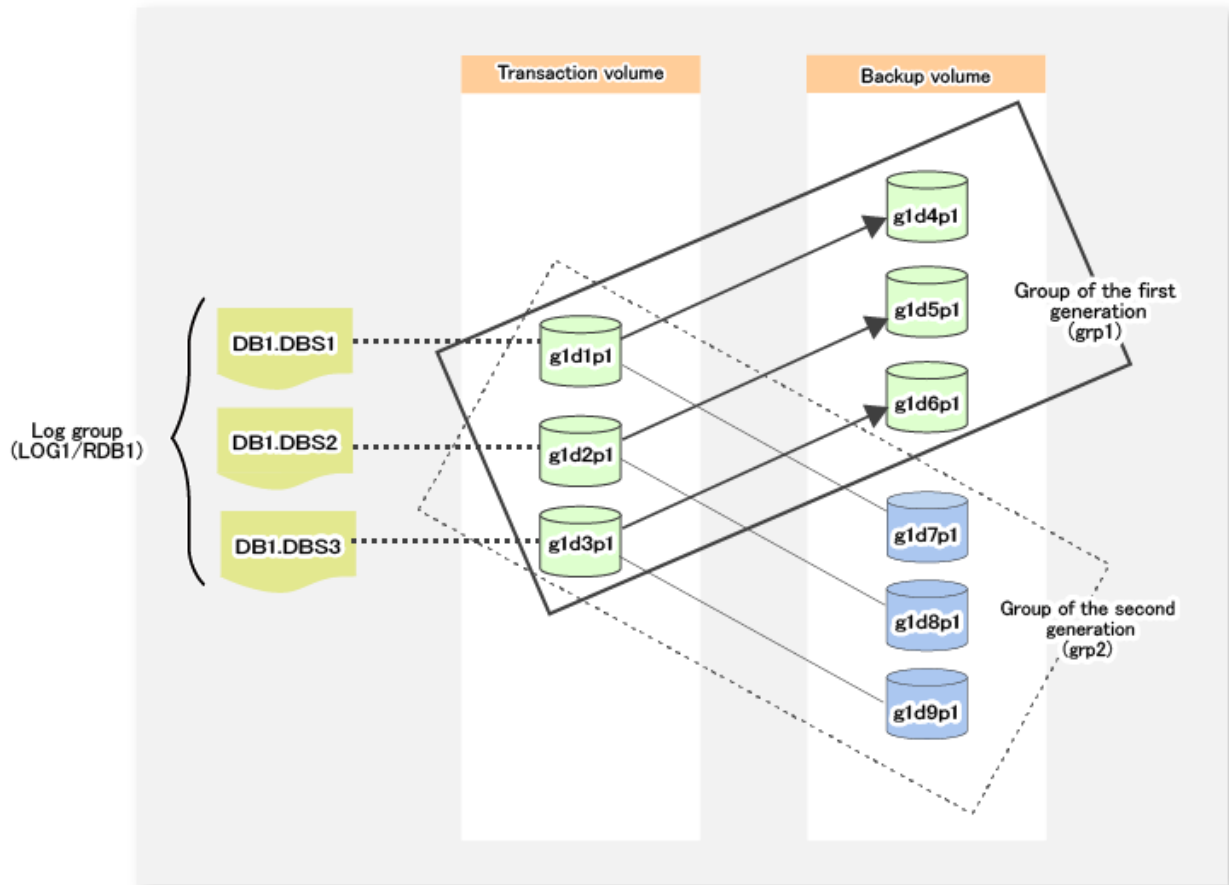
In backup of the 2nd generation log group (LOG1/RDB1), specify the log group (LOG1/RDB1) and the replication group (grp2) at backup time.
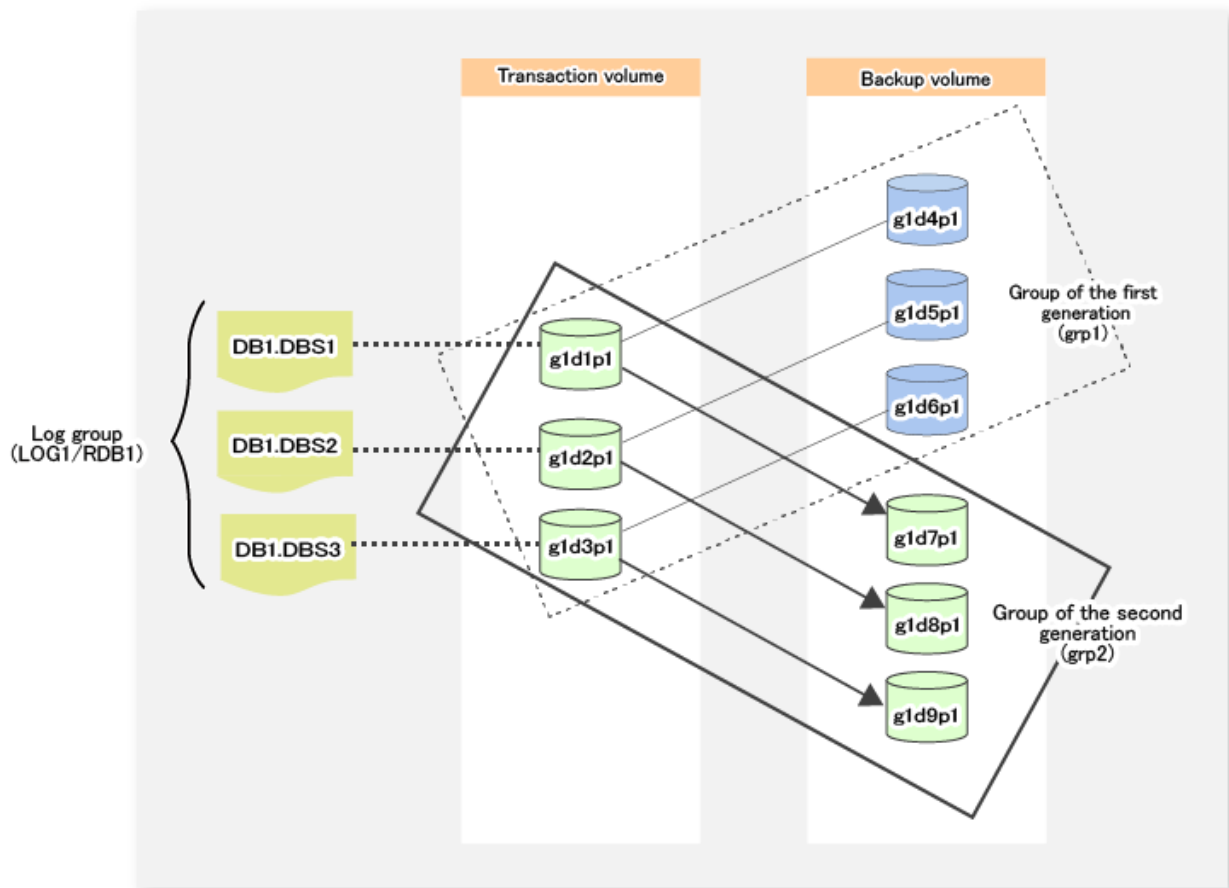
In backup on a per transaction volume basis, the target log group, replication group and transaction volume are specified at backup time.

In backup of database space ((DB1.DBS1(g1d1p1)), parts of the 1st generation log group (LOG1/RDB1), specify the log group (LOG1/RDB1), replication group (grp1) and transaction volume (g1d1p1) at backup time.
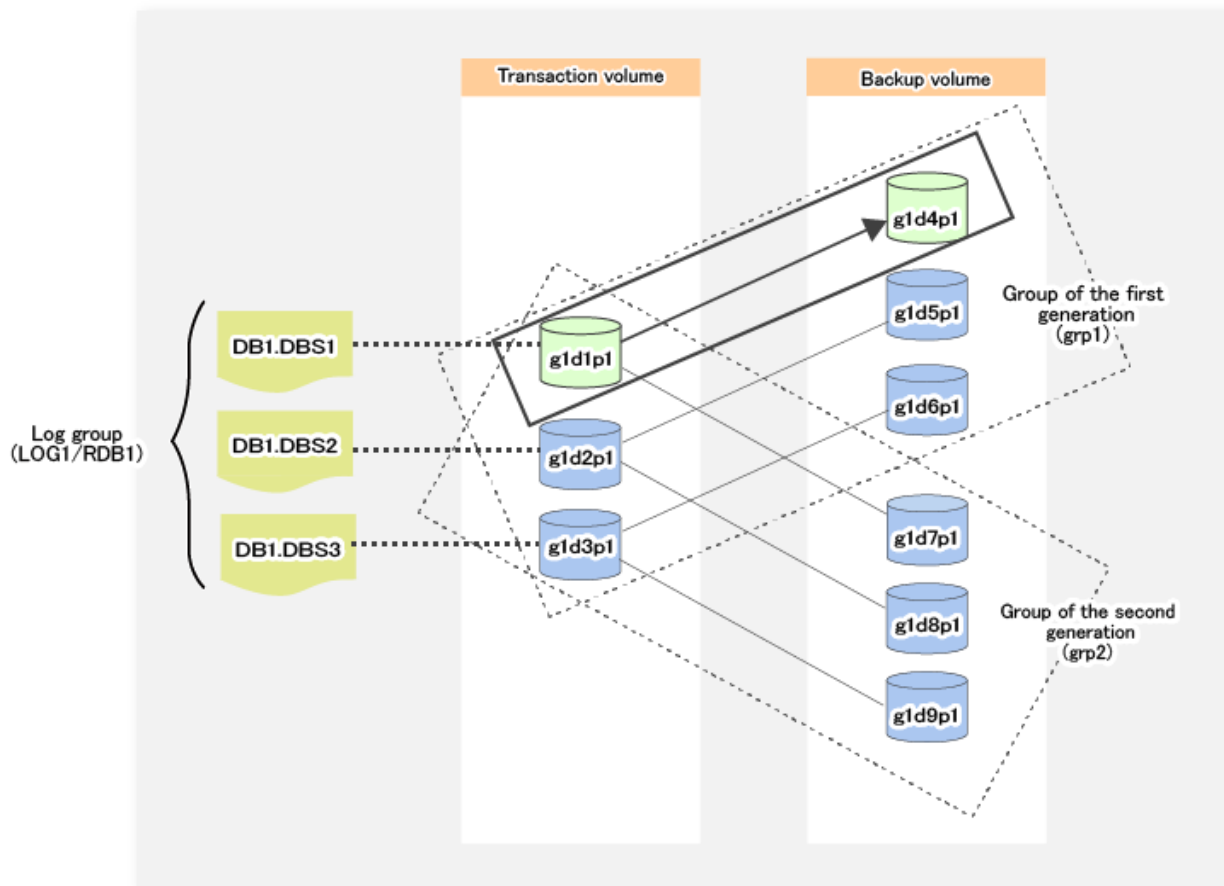
4.2.5 Operation

This section describes Symfoware backup server operation.

Before backup server operation, refer to "4.2.4 Pre-preparation" to configure the environment required for Symfoware backup server operation.

4.2.5.1 Performing backup

Perform backup by "12.7.2 swsrpbackup_symfoware(Symfoware backup command execution command)".

Specify a backup volume as backup destination in a replication group. In backup operation of multiple generations, perform backup operation while switching replication groups.

Unit of backup

Perform backup operation per either of the following backup units:

Unit of backup	Explanation
Log group	Back up transaction volumes contained in a log group at one time.
Transaction volume	Perform backup on a per transaction volume basis.

Backup method

Use either of the following methods for backup:

Backup method	Explanation
Normal dump	Back up database along with archive log (normal operation).

Backup method	Explanation
Reference dump	Back up database separated from archive log for the sake of long storage.

> **Note**
> ....
> - If you specify a transaction volume and perform backup, you cannot specify the reference dump of a transaction volume containing multi-database space (physical structure where one table and index are allocated to multiple database space).
>
> - If you perform backup by reference dump, you should use the Symfoware rdbrtr command to set Inhibit Update (data unwritable status) to all DSI (expressing the storage structure for a table) in a transaction volume to be backed up.
> ....

Backup to secondary media

At Symfoware backup time, the following files are output in the recovery control file output destination directory:

- Recovery control file

  This is a file used for recovery.

- Backup history file

  This is a file used to display backup history.

If you use tape backup software to back up a backup volume to secondary media, back up the above files, as well at the same time.

In backup to secondary media, take the following procedure:
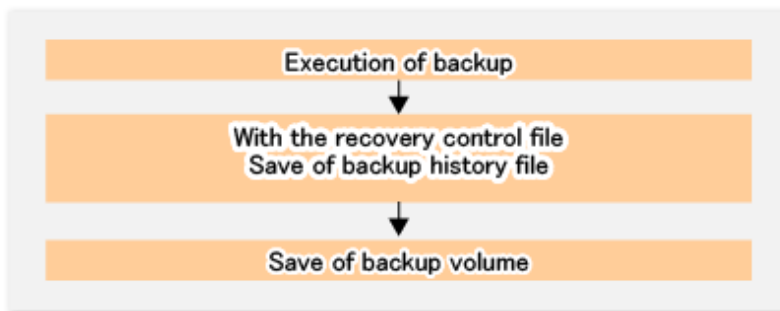
1. Perform backup

   Perform the steps mentioned in "4.2.5.1 Performing backup".

2. Back up a recovery control file and a backup history file.

   At backup time, a recovery control file and a backup history file are output in a folder next to the recovery control file output destination directory.

   Back up all the files under the following folder to the secondary media:

   ```
   < Recovery control file destination directory >\<LogGroupName_RdbName>\<RpGroupName>
     LogGroupName_RdbName ... Log group name (*1) + "_" + RDB system name (*1)
     RpGroupName ... Replication group name (*1)
   *1: Log group name, RDB system name, group name that were specified at backup time
   ```

   For recovery control file output destination directory, refer to "11.1.1.7.1 Backing up a target directory for output of the recovery control file".

> **Note**
> ....
> - At backup time, a recovery control file and a backup history file are output in the Symfoware server.
>   When backing up those files to the secondary media, copy them to the backup server from the Symfoware server to back up to the secondary media.

- The following is an example of using a network drive to copy to the backup server:

    1. Allocate a temporary area on the backup server as a network drive (z:).

    ```
    net use Z: \\BK-SV\<shared  name>
    ```

    2. Copy the file by the XCOPY command (file ownership and ACL information are also copied by I/O switch).

    ```
    xcopy < Recovery control file output destination directory >
    \<LogGroupName_RdbName>\<RpGroupName> Z:\<LogGroupName_RdbName>
    \<RpGroupName> /e /s /y /F /O /X /R /H
    ```

    3. On the backup server, back up the recovery control file and the backup history file onto the secondary media.

    4. Deallocate the network drive.

    ```
    net use Z: /delete
    ```

3. Back up backup volumes

    Back up backup volumes to the secondary media.

Point

Store as a set the information on the recovery control file and the backup history file that were backed up at step 2 and the backup volume information that was backed up at step 3.

4.2.5.2 Performing recovery

Recover the data saved as backup by "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)".Specify a backup volume as recovery source in a replication group.

Unit of recovery

Perform recovery operation per either of the following recovery units:

- Log group
  Recovery transaction volumes contained in a log group at one time.

- Multiple (or one) transaction volumes in the same log group
  Use a device list file to recover multiple (or one) transaction volumes in the same log group at one time.
  For the description method for device list file, refer to 4.1.5.3.1 Describing a device list file".

- Transaction volume
  Recover on a per transaction volume basis.

Recovery method

For data backed up by normal dump, use either of the following methods to recover:

- Recovery to the latest status

- Restoring of a specific point in time by specifying the end point of recovery
  Specify the recovery point by the -e option of "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)" to recover.
  For more information on recovery point, see the Symfoware Server manual.

- Restoring of the point in time of backup
  Specify the -a option for "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)".

  For data backed up by reference dump, do not specify the recovery method by "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)" (-e option or -a option not specified). Otherwise, specify the -a option to recover.

- At recovery time, the status of database space to be recovered should be access-inhibited. For how to make the status access-inhibited, refer to the Symfoware Server manual.

- When recovering transaction volumes contained in a log group individually, the database administrator should be responsible to make consistent inter-table relationships in the log group.

- When performing "Recovery to the latest status" or "Restoring of a specific point in time by specifying the end point of recovery", create on the Symfoware server a file in which archive log backup file names required for recovery are listed and specify it at recovery time. However, this is applicable only when archive log files are stored on external media. For the file description method, see the Symfoware Server manual.

- If recovery operation fails due to free space shortage in a working directory, use the -w option of "12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)" to use another directory as a temporary working directory and retry recovery.

- When performing "Restoring of a specific point in time by specifying the end point of recovery" or "Restoring of the point in time of backup", the process of recovering Symfoware management information is done. Since this process is performed as parts of the recovery processes, the command processing takes time.

- If a backup method for recovered data (normal dump or reference dump) exists in the log group, recovery cannot be done on a per log group basis.

Recovery from secondary media

In recovery from secondary media, recover to the backup volume at backup time to recover. You cannot recover it directly to the transaction volume from the secondary media.

The recovery procedure from secondary media is as follows:
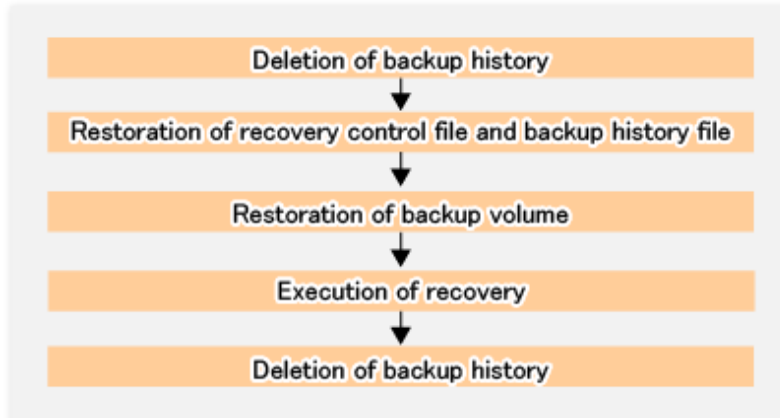
1. Delete backup history.

   If backup history exists in the same log group and replication group as when backup was taken, delete the backup history beforehand.

2. Recover a recovery control file and a backup history file.

   Recover the recovery control file and the backup history file that were backed up in "Backup to secondary media".

   Recover them to the following directory:

   ```
   < Recovery control file output destination directory >\<LogGroupName_RdbName>
   \<RpGroupName>
     LogGroupName_RdbName ... log group name (*1) + "_" + RDB system name (*1)
     RpGroupName ... Replication group name (*1)
   *1: Symfoware server name, Log group name, RDB system name, group name that were
   specified at backup time
   ```

For the recovery control file output destination directory, refer to "11.1.1.7.1 Backing up a target directory for output of the recovery control file".

> 📵 **Note**
> ....
> - Recover the recovery control file and the backup history file so that the ownership and access right to the files become the same as backup time.
>
> - When recovering to the backup server the recovery control file and the backup history file that were backed up in "Backup to secondary media", make a copy from the backup server to the recovery control file output destination on the Symfoware server.
>
>   The following is an example of using a network drive to make a copy to the Symfoware server:
>
>   1. Allocate a temporary area on the backup server as a network drive (Z:). (Perform on Symfoware server)
>
>    ```
>    net use Z: ¥¥BK-SV¥<shared name>
>    ```
>
>   2. Recover from the secondary media to the temporary area the recovery control file and the backup history file that were backed up in "Backup to secondary media". (Perform on backup server)
>
>   3. Copy the files by the XCOPY command. Copy the file ownership and ACL information as well by I/O switch. (Perform on Symfoware server)
>
>    ```
>    xcopy Z:\<LogGroupName_RdbName>\<RpGroupName> < Recovery control file
>    output destination directory >\<LogGroupName_RdbName>
>    \<RpGroupName> /e /s /y /F /O /X /R /H
>    ```
>
>   4. Deallocate the network drive. (Perform on Symfoware server)
>
>    ```
>    net use Z: /delete
>    ```
> ....

3. Recover backup volume

   Recover backup data from the secondary media to the backup volume in the group used for backup.

4. Perform recovery.

   Specify the same log group and replication group as backup time to perform recovery.

5. Delete backup history.

   Deleting backup history deletes the recovery control file and the backup history file that were used for recovery.

4.2.5.3 Managing backup history information

Refer to and delete backup history information.

Display backup history

   Perform this action by "12.7.4 swsrphistory_symfoware(Symfoware backup history delete/display command)".

Delete backup history

   Perform this action by "12.7.4 swsrphistory_symfoware(Symfoware backup history delete/display command)".

4.2.6 Changing operation

4.2.6.1 Changing database information

- When adding database space to a log group:
  Take the following procedure:

    1. Add database space to a log group.

2. To reflect changes in a log group configuration to the management directory of AdvancedCopy Manager, refer to "4.2.4.4 Collecting device information under Managed Server" to change device information.

3. Re-register Symfoware database information by "12.7.1 swsrpdbinfo_symfoware(Symfoware database information register/delete/display command)" to reflect the changed contents.

4. Add volumes to the replication group by "12.4.1.1 swsrpsetvol (Replication volume information setting command)".

- When deleting database space from a log group:
  Take the following procedure:

  1. Delete database space from a log group.

  2. Delete the backup history of the database space deleted by "12.7.4 swsrphistory_symfoware(Symfoware backup history delete/display command))".

  3. Delete the volumes from the replication group by "12.4.1.3 swsrpdelvol (Replication volume information deletion command)".

  4. To reflect changes in the log group configuration to the management directory of AdvancedCopy Manager, refer to "4.2.4.4 Collecting device information under Managed Server" to change device information.

  5. Re-register Symfoware database information by "12.7.1 swsrpdbinfo_symfoware(Symfoware database information register/delete/display command))" to reflect the changed contents.

4.2.6.2 Other environment change

For other environment change, refer to "11.5 Changing the Operating Environment".

4.2.7 Stopping operation

To stop Symfoware backup server operation, stop the services on Managed Servers.

Normally, services stop automatically when the system stops. If you want to stop the services for some reason, you may stop them manually. For more information, refer to "Chapter 2 Starting and Stopping Services".

Note

. . . .

- If the services on Managed Servers stop, all the functions of AdvancedCopy Manager running on the Managed Servers are stopped.

- Before stopping services on the Management Server, check that the operations of all the Managed Servers are stopped.

. . . .

Chapter 5 Backup Operation using Suspend/Resume Function

This chapter provides details of the backup operation using the Suspend/Resume function.

5.1 Overview

The Suspend/Resume function sets Suspend/Resume for the equivalency maintenance status using 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, 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 using the 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
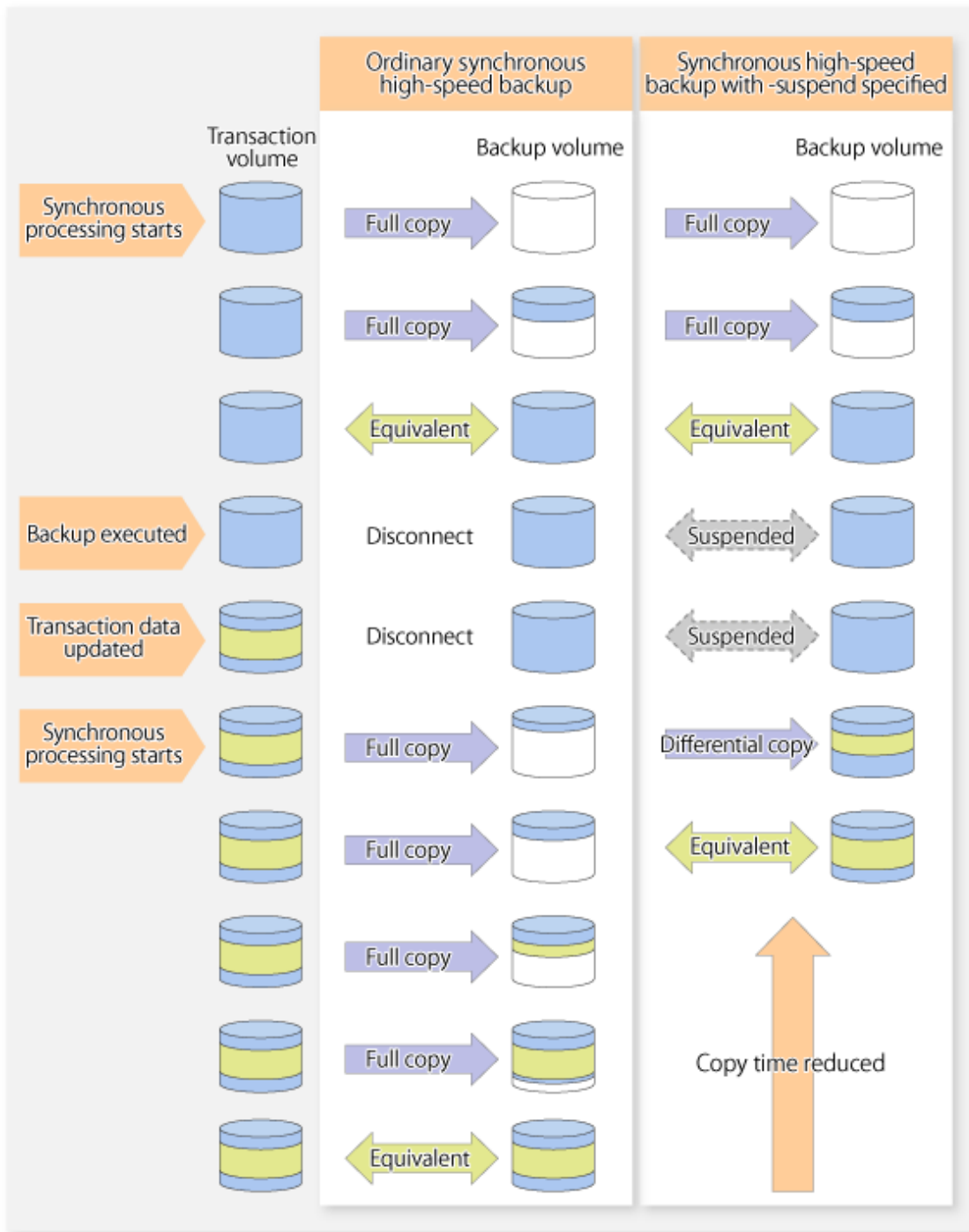
5.2 Backup Operation Design

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 (refer to "3.2 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 option 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.

P 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
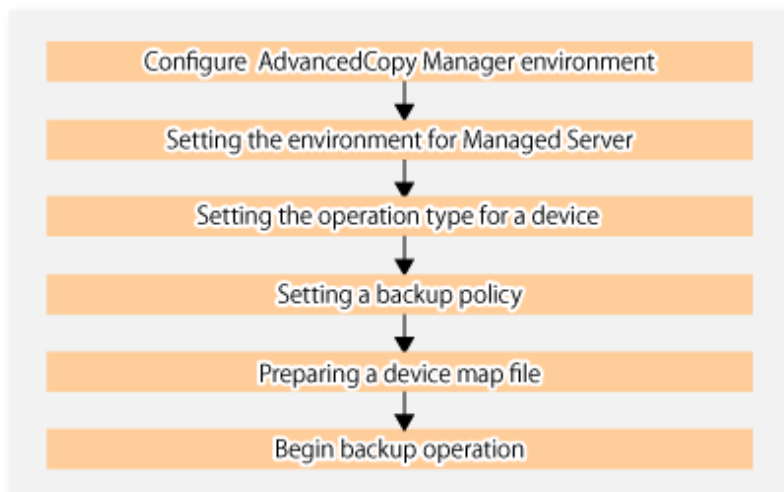
5.4 Preparations

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

5.4.1 Configuring the AdvancedCopy Manager environment

For information on the sequence of processes from the installation to the operating environment configuration of AdvancedCopy Manager, refer to the *ETERNUS SF Installation and Setup Guide* and the *ETERNUS SF AdvancedCopy Manager Operation Guide*.

5.4.2 Setting the environment for Managed Server

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

This process can be carried out using either Web Console or swstsvrset (Managed Server configuration information setting command).

In addition, once it is set, you can display the Managed Server configuration information by executing swstsvrdisp (Managed Server configuration information display command).

5.4.3 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 either Web Console or 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** column.
. . . .

5.4.4 Setting a backup policy

Before 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 either the Web Console or commands.

- 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 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 becomes 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 Web Console.

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
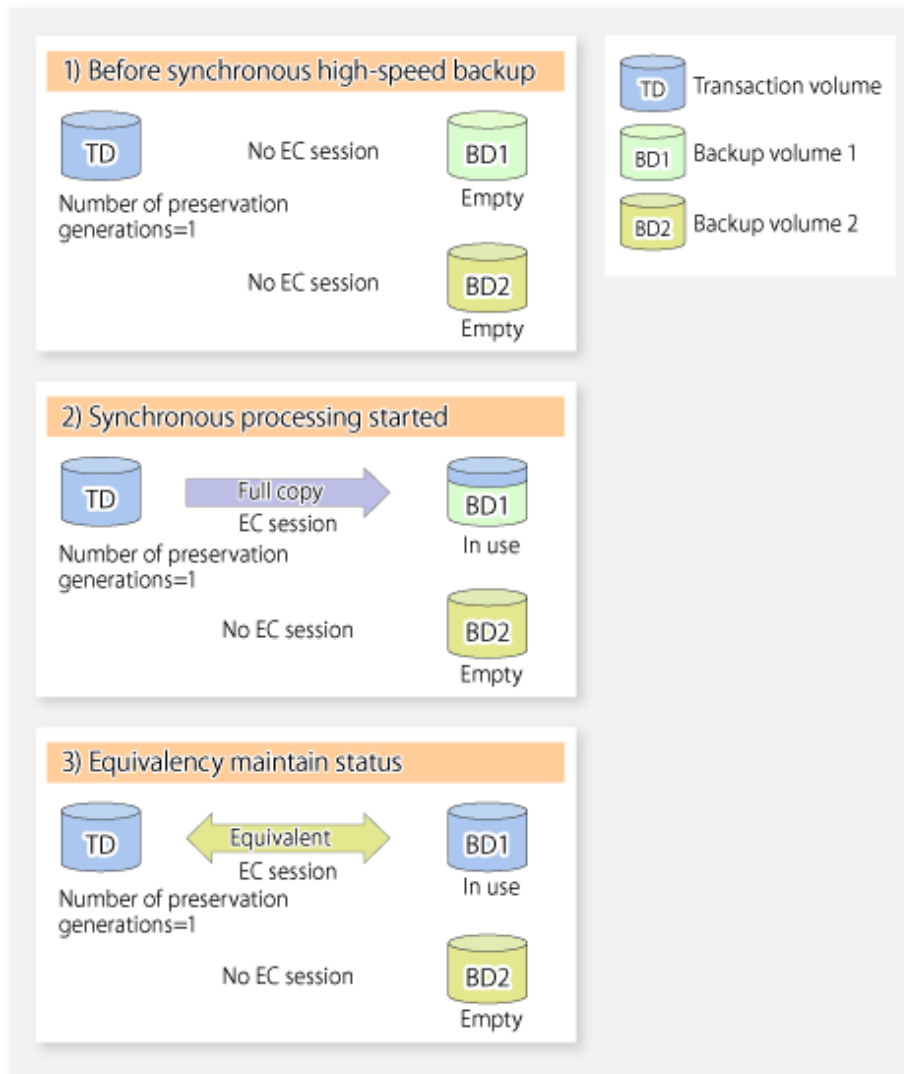
4) Execution of the backup command with -suspend specified

TD ←Suspended EC session→ **BD1** (With history information) In use

Number of preservation generations=1

No EC session — **BD2** Empty

5) Synchronous processing started

TD ←Suspended EC session→ **BD1** (With history information) In use

Number of preservation generations=1

Full copy EC session → **BD2** In use

6) Equivalency maintain status

TD ←Suspended EC session→ **BD1** (With history information) In use

Number of preservation generations=1

←Equivalent EC session→ **BD2** In use
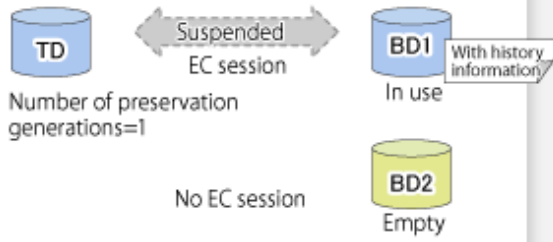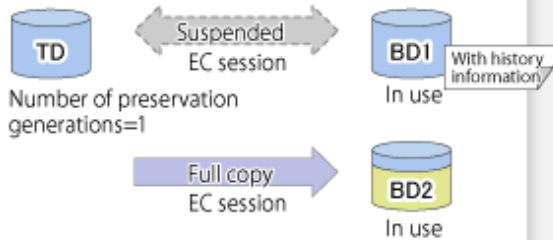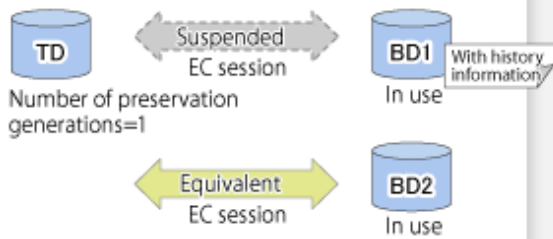
7) Backing up with the suspend specification

TD ←Suspended EC session→ **BD1** Usable

Number of preservation generations=1

←Suspended EC session→ **BD2** (With history information) In use

History information deleted because number of generations exceeded (*1) at backup command execution
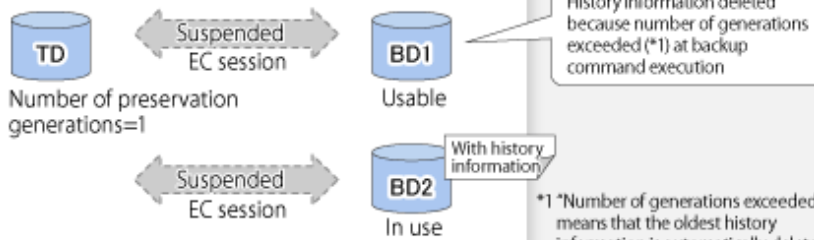
*1 "Number of generations exceeded" means that the oldest history information is automatically deleted if existing history information has certain number of saved generations when the backup command is executed.

8) Transaction volume data updated

TD Data updated ←Suspended EC session→ **BD1** Usable

Number of preservation generations=1

←Suspended EC session→ **BD2** (With history information) In use
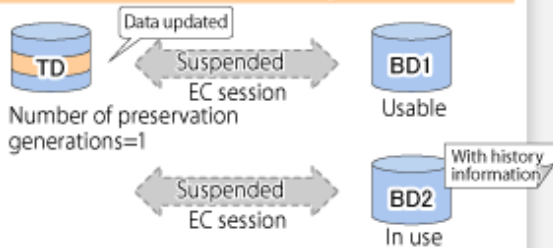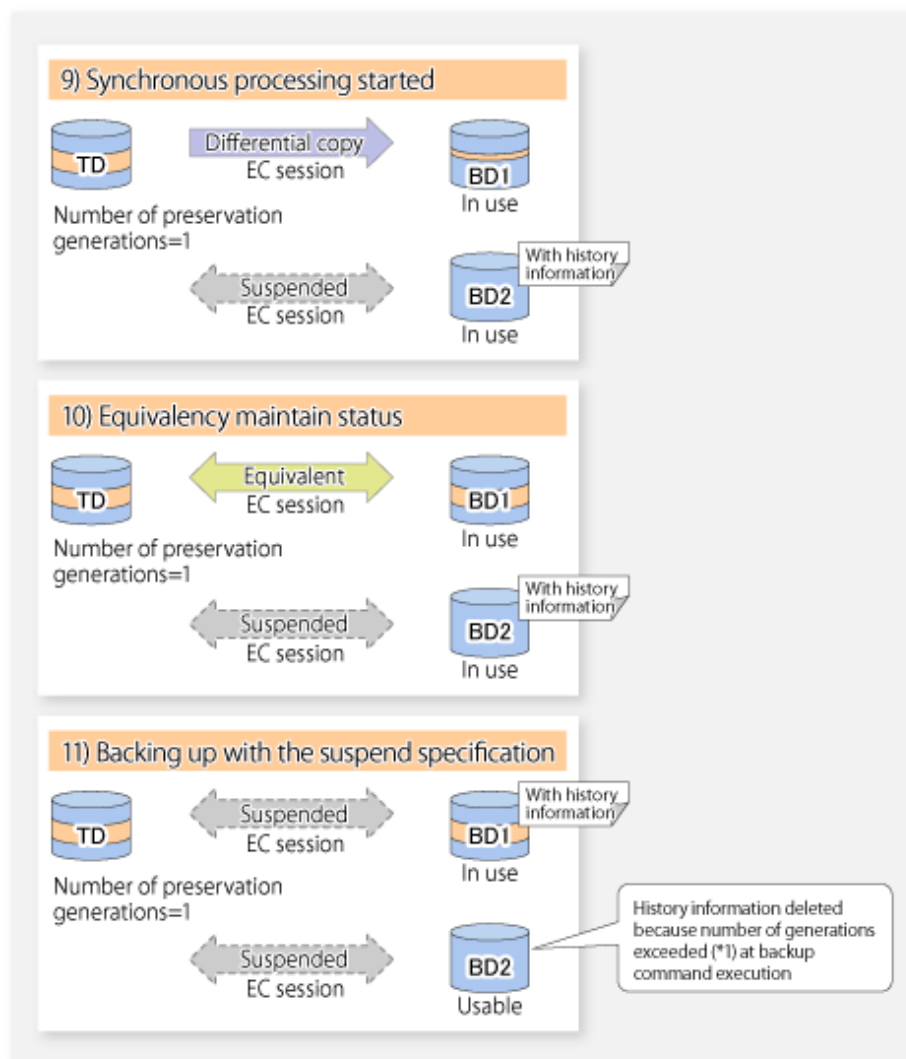
5.5.1 Starting synchronous processing

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

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

- The suspended backup volume without history information.

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

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

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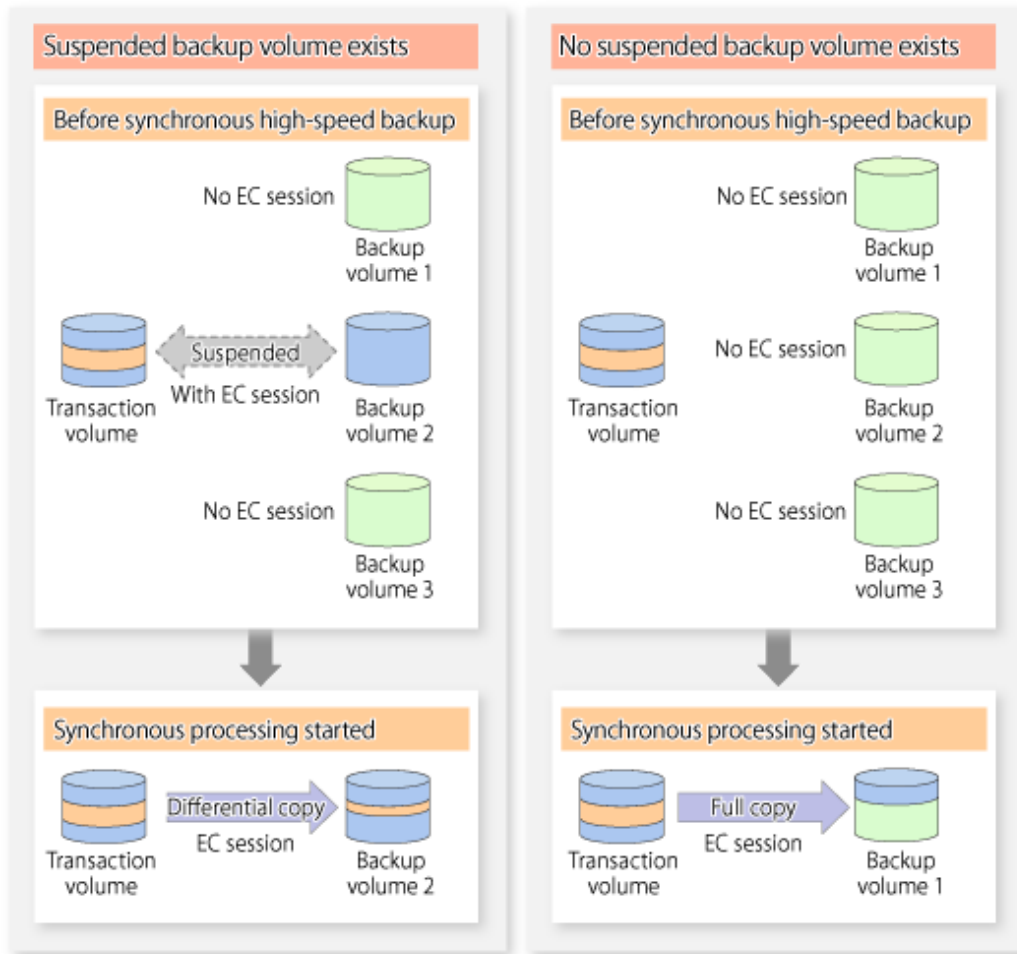
![Note icon] **Note**

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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 (Backup 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 the suspend specification (using -suspend option).

In synchronous high-speed backup, executing the backup command without the suspend specification releases the EC session. Executing it with the suspend specification 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
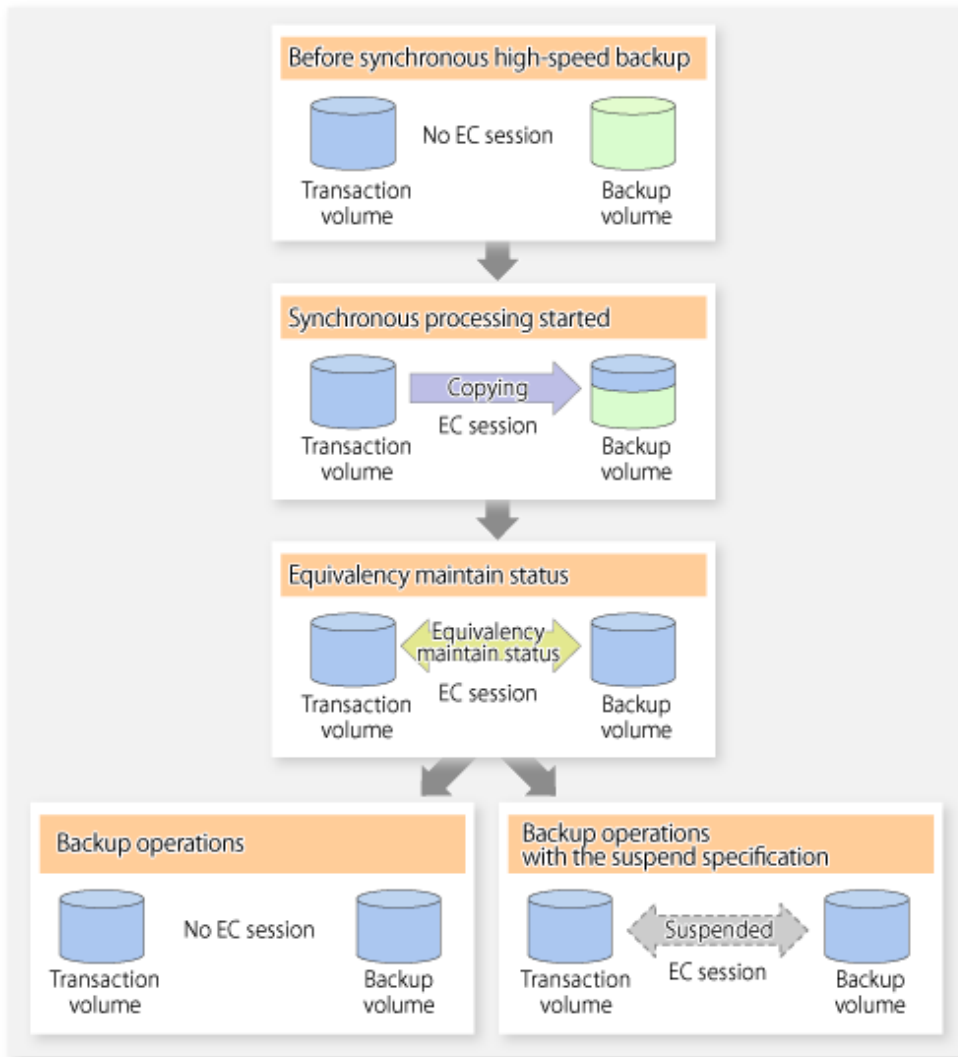
5.5.3 Displaying the synchronous processing execution status

To check the status of synchronous high-speed backup that uses the Suspend/Resume function, execute swstsyncstat (Backup 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 maintain 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
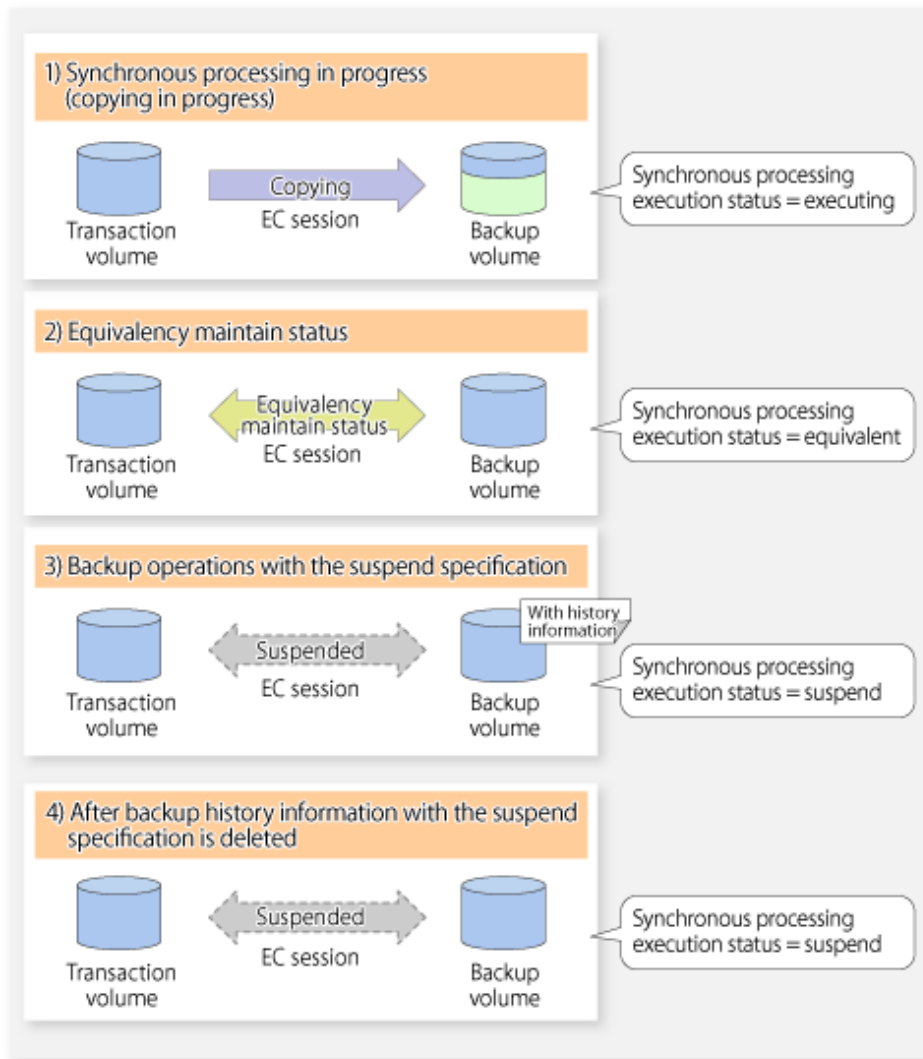
5.5.4 Cancelling synchronous processing

To cancel synchronous processing (during an EC session), execute swstcancelsync (Backup 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 maintain status

- suspend : Suspended processing

After the backup command with -suspend option 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

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

. . . .

🅿 Point

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- 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

5.5.5 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).

🄿 Point

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- 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** column by swstdevdisp (Device usage 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** column by swstdevdisp (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
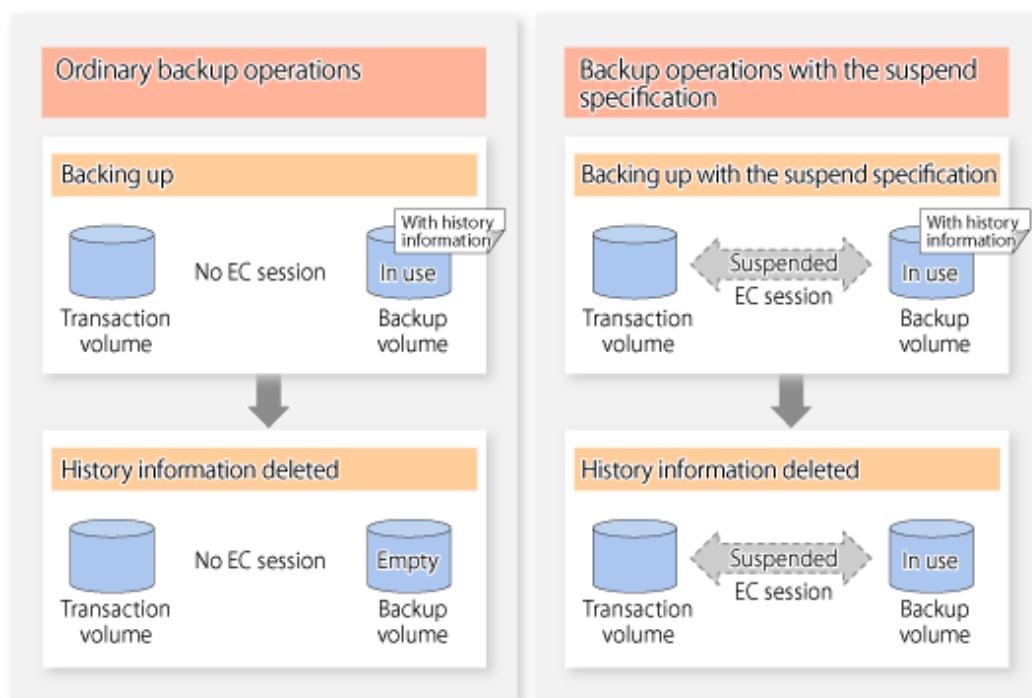
5.5.6 Restoring

Before restoration, swstcancelsync (Backup 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 (Backup 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

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- 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.

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Chapter 6 Backup Operation using QuickOPC Function

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

6.1 Overview

For a snapshot high-speed backup using 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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The QuickOPC function cannot be used for backing up SDX objects in units of logical volumes.

. . . .

🅿 Point

. . . .

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

. . . .

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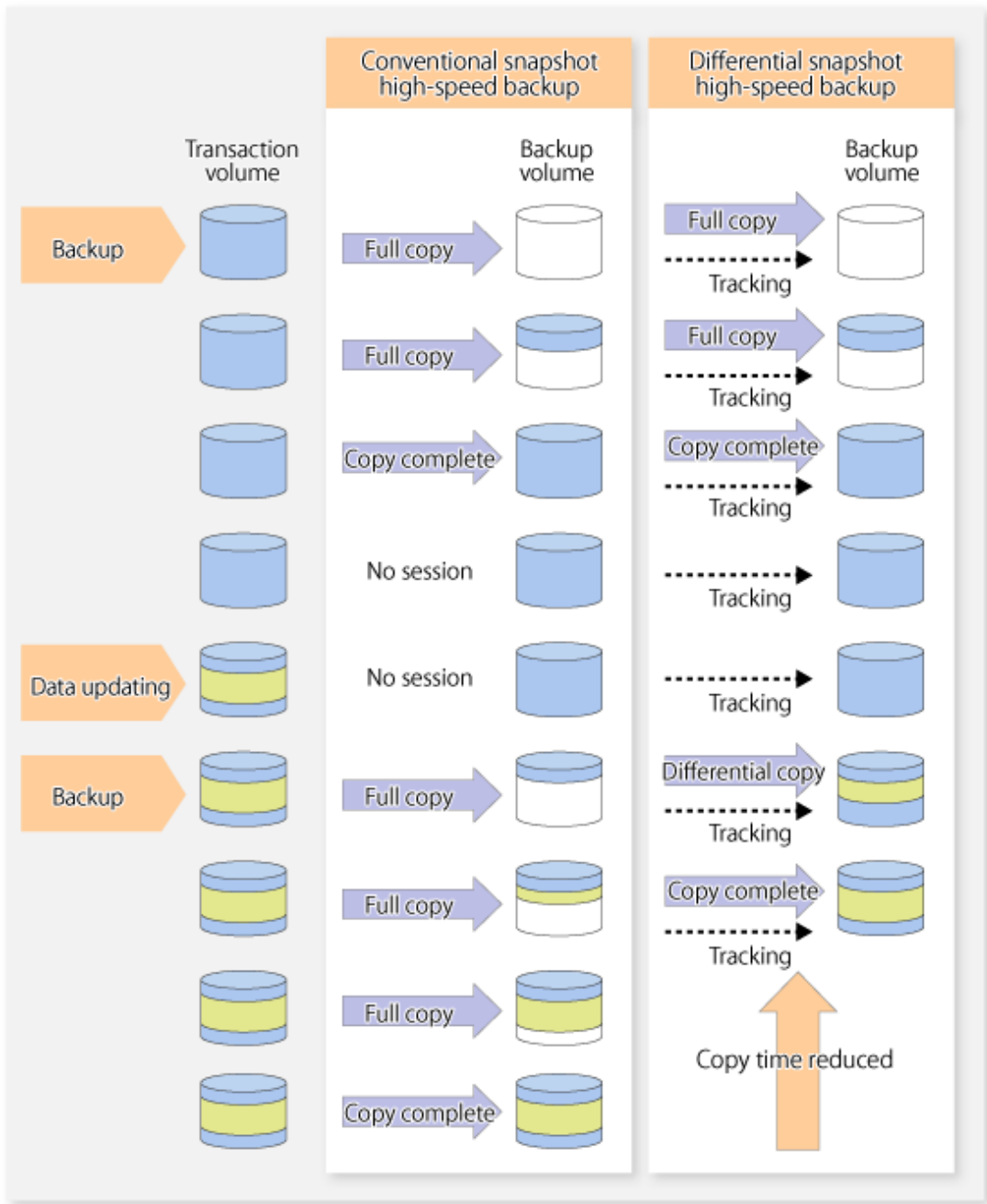
6.2 Configuring Backup Operation

Configure the differential snapshot high-speed backup using the QuickOPC function using information provided in the section relating to "3.2 Operation Design" for backup management with consideration to the following notes:

🈁 **Note**

. . . .

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

- In a backup operation using the QuickOPC function, an OPC session remains active even after the physical copy has been completed. Operators should specify the number of preservation generations so that the maximum number of OPC sessions that can be defined for the same logical unit cannot be exceeded.

- Operators must prepare a backup volume in the same box as the transaction volume to be backed up.

6.3 Operation Flow

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

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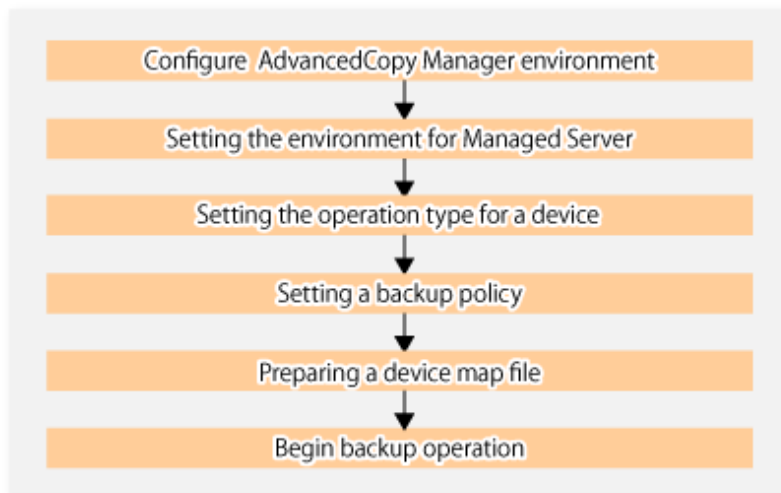
6.4 Preparation

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, refer to the *ETERNUS SF Installation and Setup Guide* and the *ETERNUS SF AdvancedCopy Manager Operation Guide*.

6.4.2 Setting the environment for Managed Server

Set the configuration information of the Managed Server processing the backup operations.

This process can be carried out using either Web Console or swstsvrset (Managed Server configuration information setting command).

In addition, once it is set, you can display the Managed Server configuration information by executing swstsvrdisp (Managed 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 either Web Console or 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
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- 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 both -b and -u options can be specified in swstdevdisp (Device usage 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

Before 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 either the Web Console or commands.

- 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 "device map file" that defines the relationship between a transaction volume and backup volume must be created in advance. By specifying the "device map file" when starting the backup, the backup can always be performed because the backup destination has already been specified.

📘 Point
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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 Web Console.

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
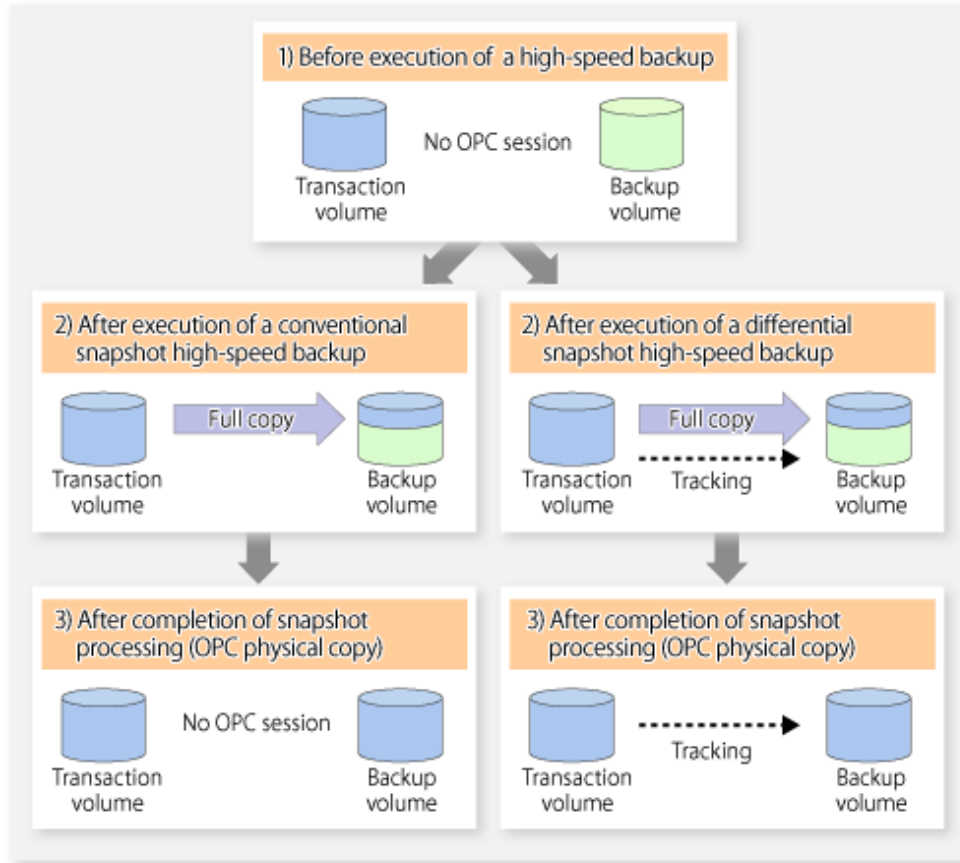
After history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history information 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
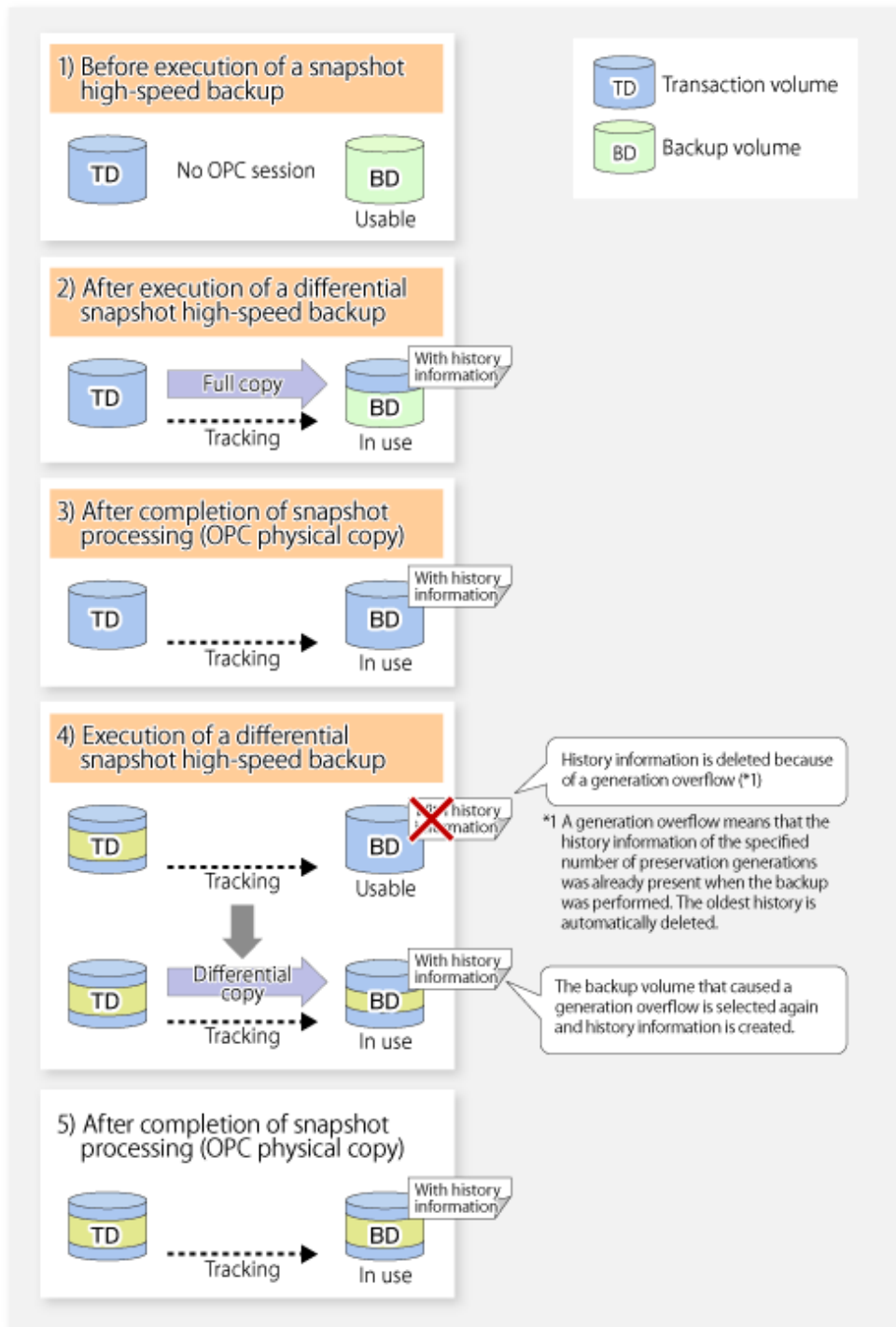
6.5.2 History management

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 usage 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 usage 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
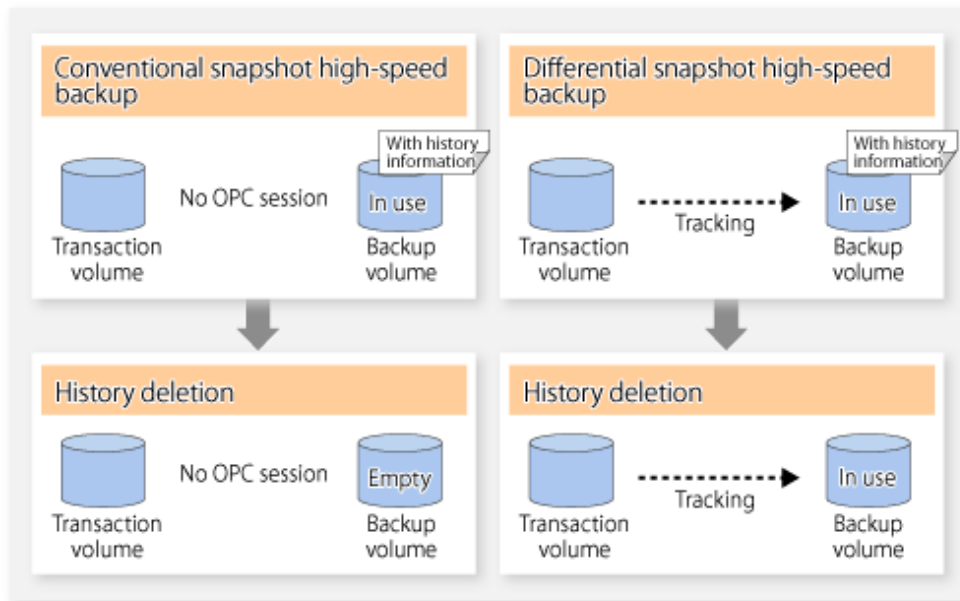
6.5.3 Restoration

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
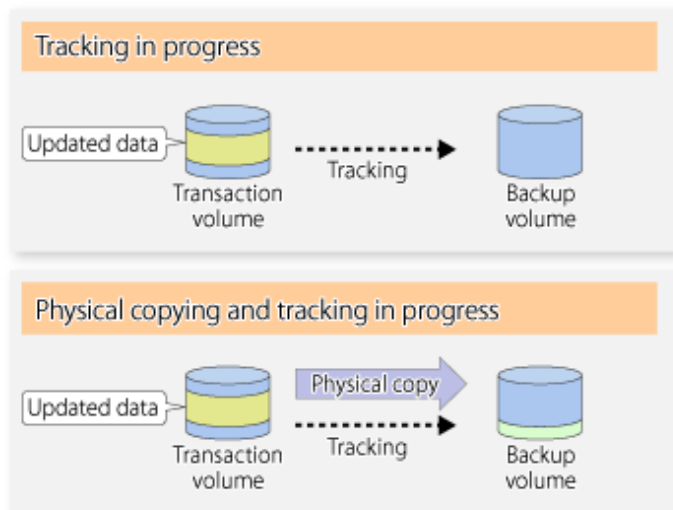
When restoration is executed, normal OPC from the backup volume to the transaction volume is started while the tracking state from the transaction volume to the backup volume is maintained.

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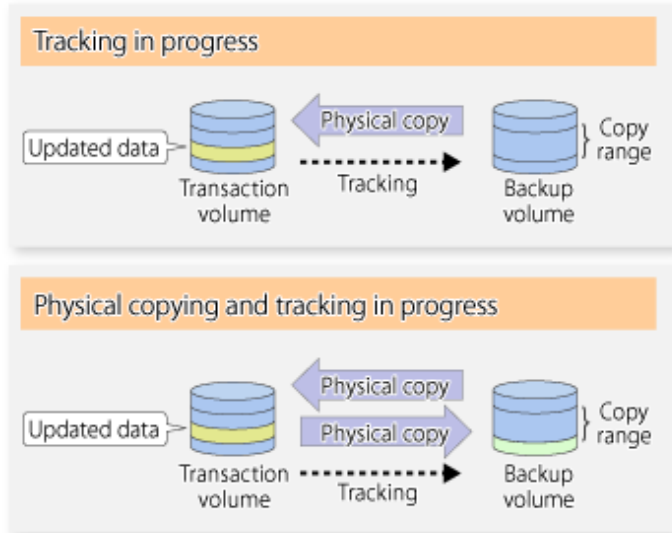
While tracking processing is performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes is required, the following operational steps must be performed in advance:

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
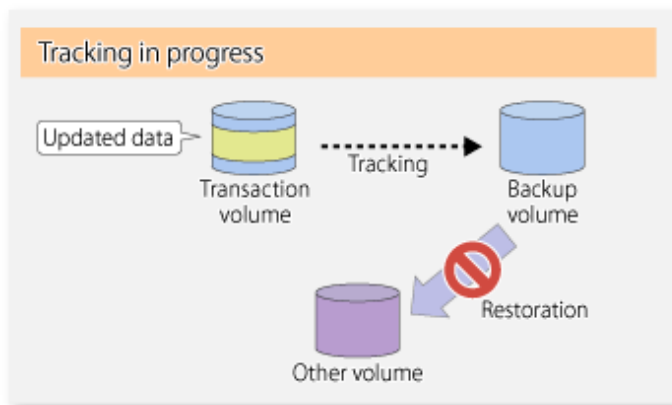
Note

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 Cancelling restoration

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

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.

Chapter 7 Replication

This chapter provides details of AdvancedCopy Manager replication in a Windows Server 2003, Windows Server 2008 or later.

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 function of ETERNUS Disk storage system, 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 OPC function of ETERNUS Disk storage system.

Synchronized Replication is where either the EC or 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 function of ETERNUS Disk storage system.

The ordinary snapshot replication using OPC performs the following two types of processing:

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

   swsrpmake (Replication creation command) flushes the file system buffer of 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). and (2). 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 Ordinary snapshot replication processing
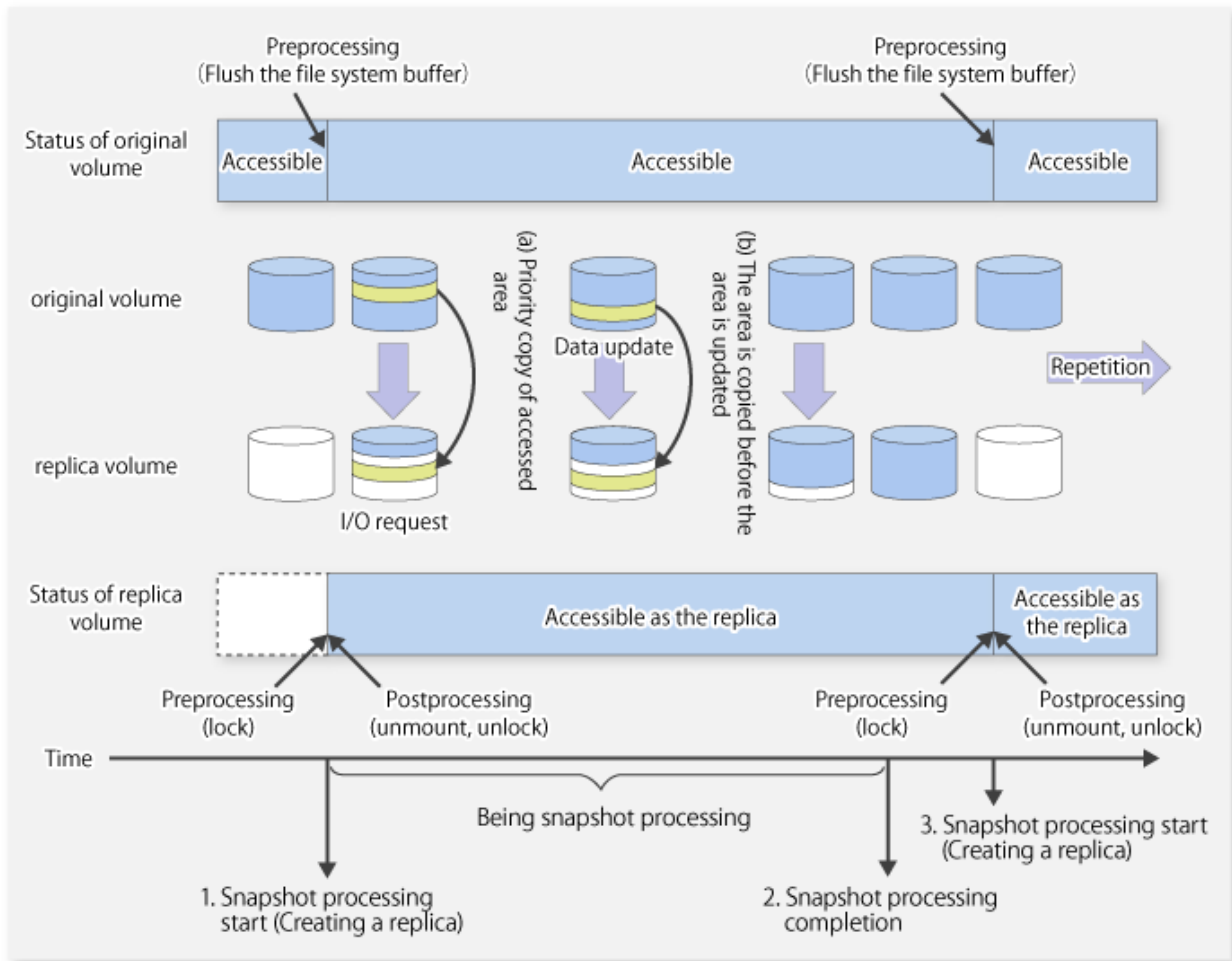
Snapshot replication is completed when the replication creation command is issued. During snapshot processing performed internally by the ETERNUS Disk storage system, if there is an attempt to access an area where copying is not yet complete at the replication destination, priority is given to copying the accessed area and, after it is copied, access is permitted ((a) in the figure).

If there is an attempt to update the replication source data, the pre-update data at the replication source is first copied to the replication destination, and then the replication source data is updated ((b) in the figure).

These operations make it seem that creation of the replica is completed almost instantly.

7.1.1.1 Types of snapshot replication

The following types of snapshot replication are available, depending on the used Advanced Copy functions:

- Ordinary snapshot replication

- QuickOPC type replication

- SnapOPC type replication

- SnapOPC+ type replication

Ordinary snapshot replication

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

Figure 7.2 Ordinary snapshot replication
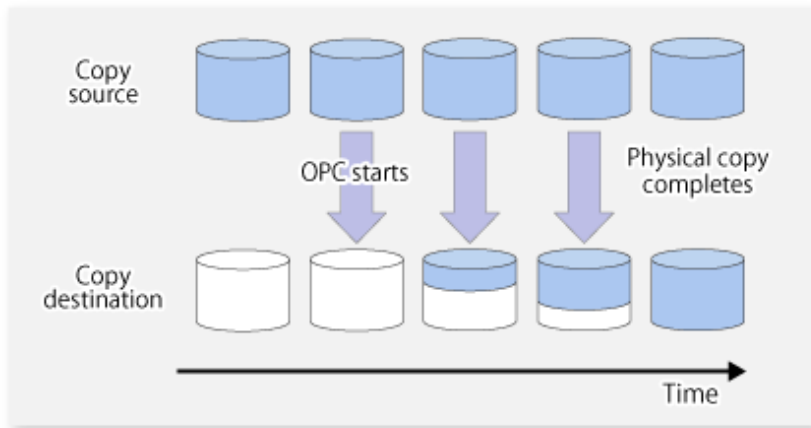
🅿 Point

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

QuickOPC type replication

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
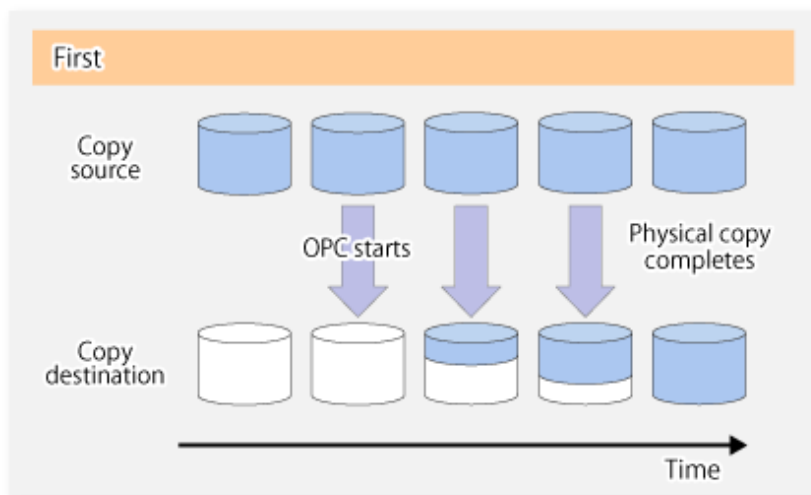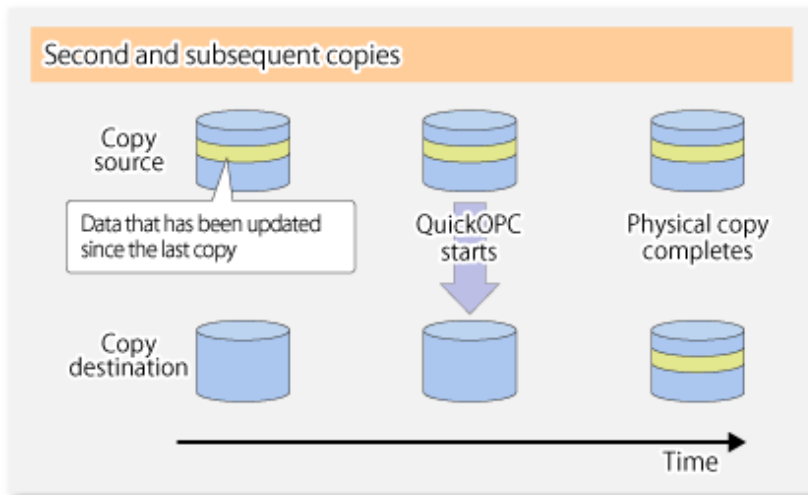
Point

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

- 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 "tracking status".

Note

The QuickOPC function cannot be used for replicating SDX objects in the units of logical volumes.

SnapOPC type replication

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

Figure 7.4 SnapOPC replication
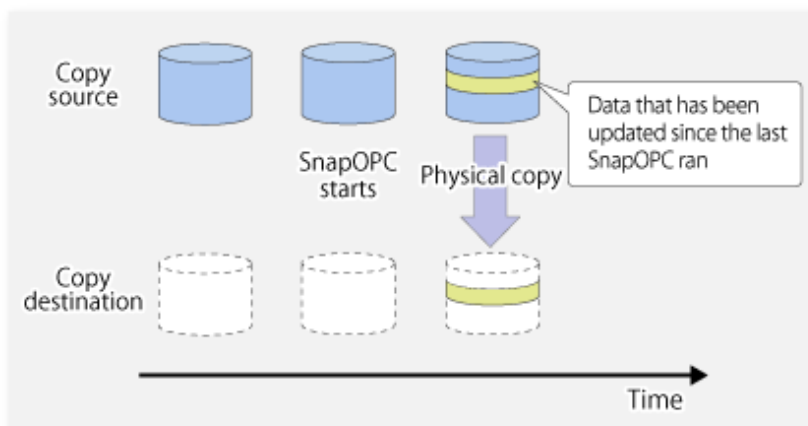
Figure 7.5 SnapOPC mechanism
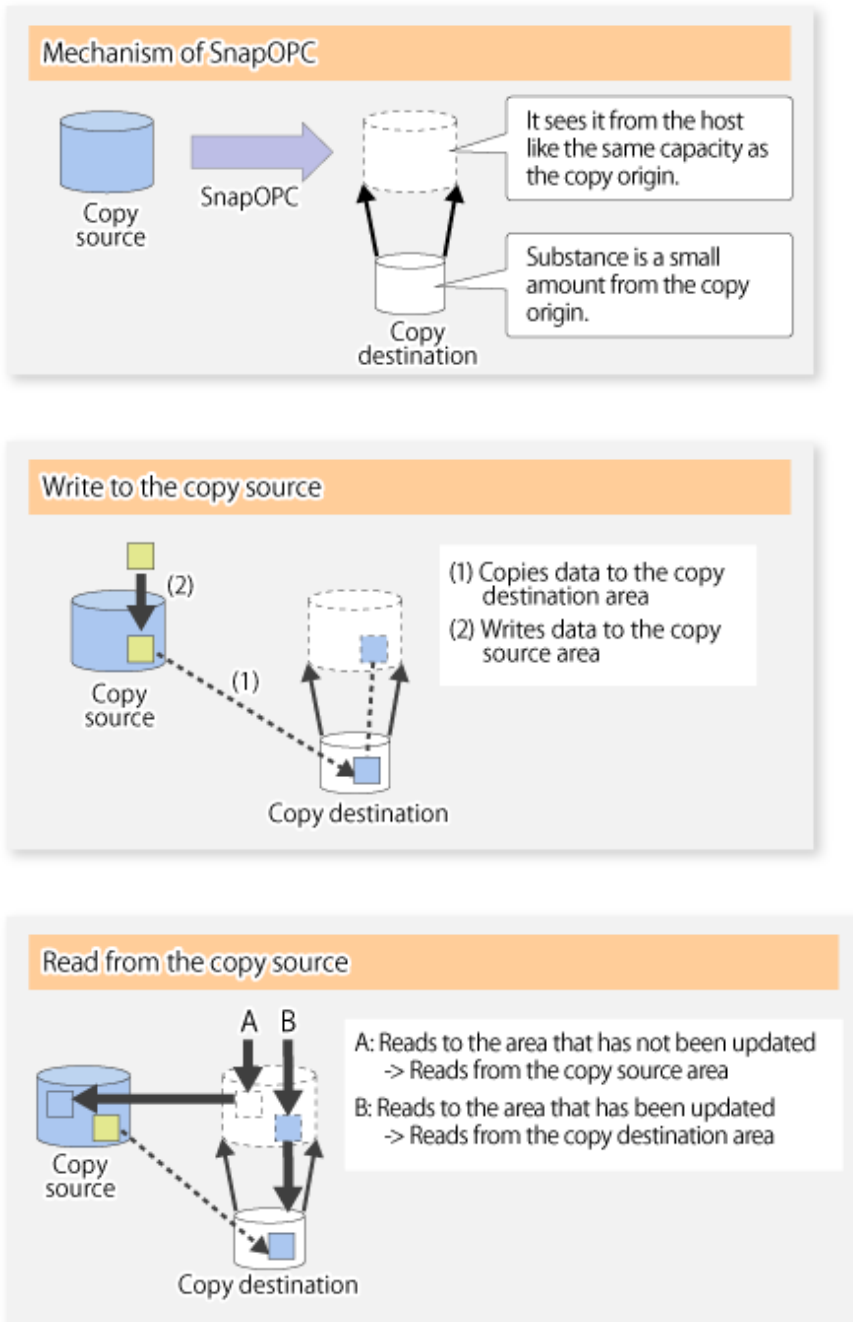
In some ways, SnapOPC is superior to conventional OPC, since copy times are shorter and copy destination volumes can have a smaller capacity. However, there are problems in terms of access performance and the reliability of copy data, as explained in the following:

Access performance

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

Reliability of copy data

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

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

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

SnapOPC+ type replication

When data is changed, the SnapOPC+ function copies only the original data of the changed data set, and saves it in snap generation units. The following figure shows the processing flow of the SnapOPC+ function.

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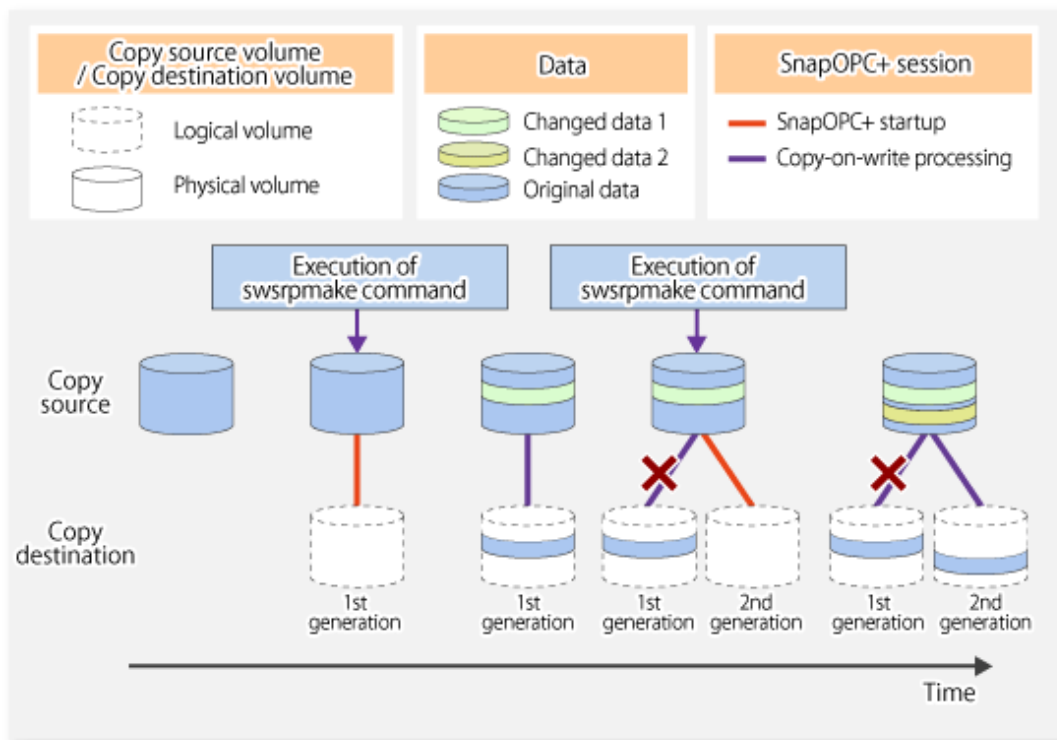
1. Logical copy is performed from the copy source to the copy destination.

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

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

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

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

6. Each time a copy destination volume is created, a snap generation number is assigned to that volume.
   (Snap generation numbers are assigned in sequence from 1, starting with the oldest.)

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

In addition, space at the copy destination volume is required only for the amount of original data (for data updated immediately prior) and for hardware management. Thus, use of SnapOPC+ enables the saved data area to be kept to the minimum area required.
Snapshot replication that uses SnapOPC+ is called "SnapOPC+ replication".

🅿 Point

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It is recommended to set the Snap Data Pool using the ETERNUS Web GUI when using SnapOPC+.
For details, refer to "7.1.1.2 Snap Data Volume and Snap Data Pool".

. . . .

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

Figure 7.7 1:3 replication operations using SnapOPC+
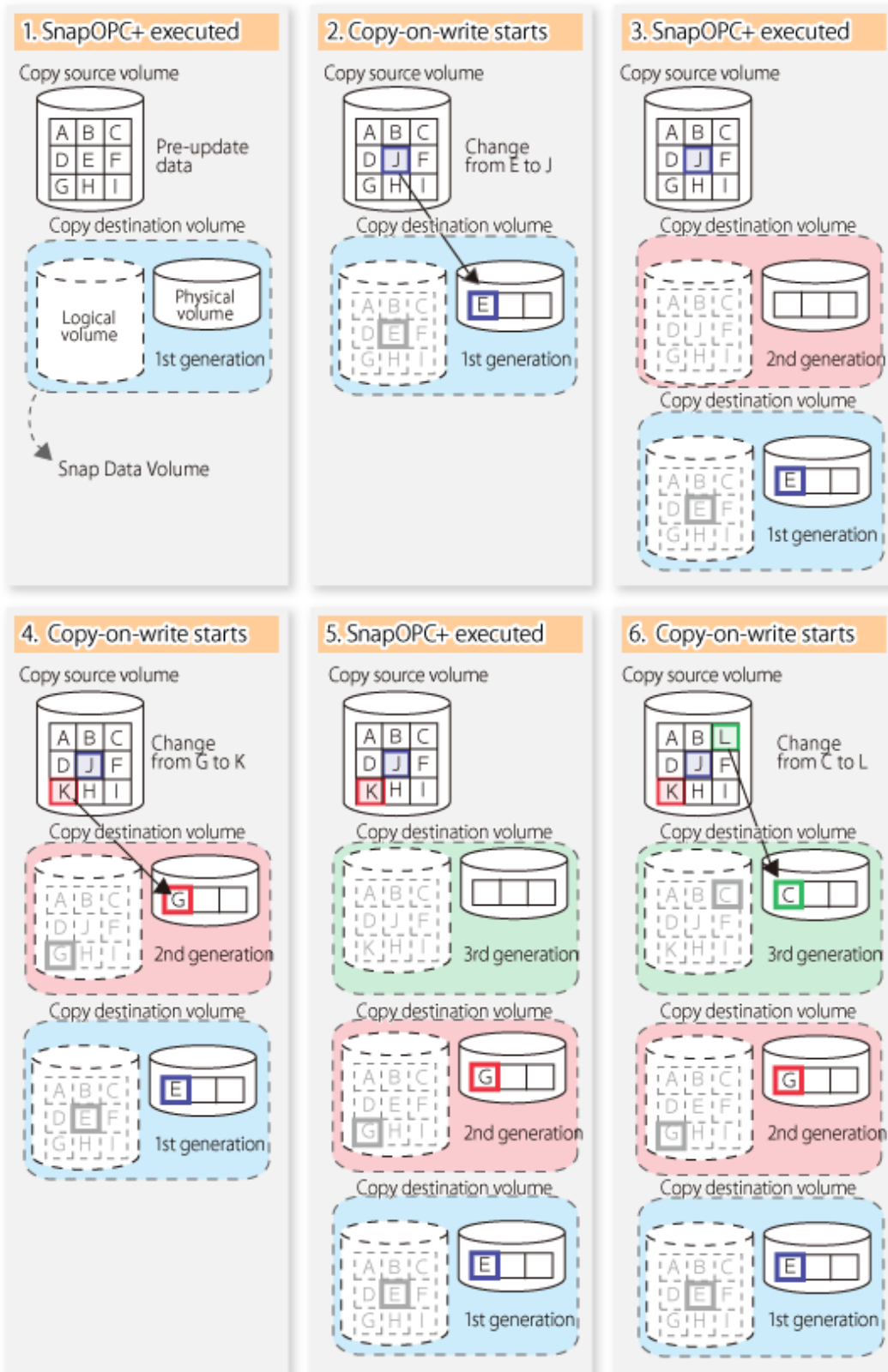
Due to the mechanism and features of SnapOPC+, it is assumed that it will be used as a backup to enable recovery from minor errors, such as operator mistakes and software errors. In order to be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all 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	Available	Available (recommended): Access performance to the copy source volume is better than with SnapOPC. Also, compared with SnapOPC, less physical space is required at the copy destination volume.
Snap generation numbers	No	Yes
Restoration using the replication function	Yes	Yes (*1)
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

*1: Only available when using ETERNUS Disk storage system that supports restoration using replication.

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 "11.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Snap Data Pool

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

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

Note

When there is insufficient Snap Data Pool capacity, it is not possible to access the copy destination (Snap Data Volume).
When there is insufficient capacity, refer to "11.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

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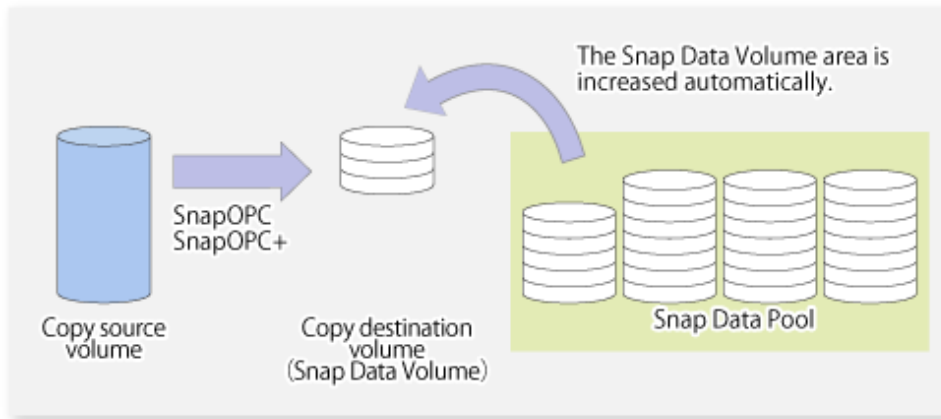
7.1.2 Synchronized replication processing

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

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.

   swsrpmake (Replication creation command) flushes the file system buffer of 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 swsrpstartsync (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 swsrpmake (Replication creation command). Refer to step (6) in the figure below.

Figure 7.9 Synchronized replication processing
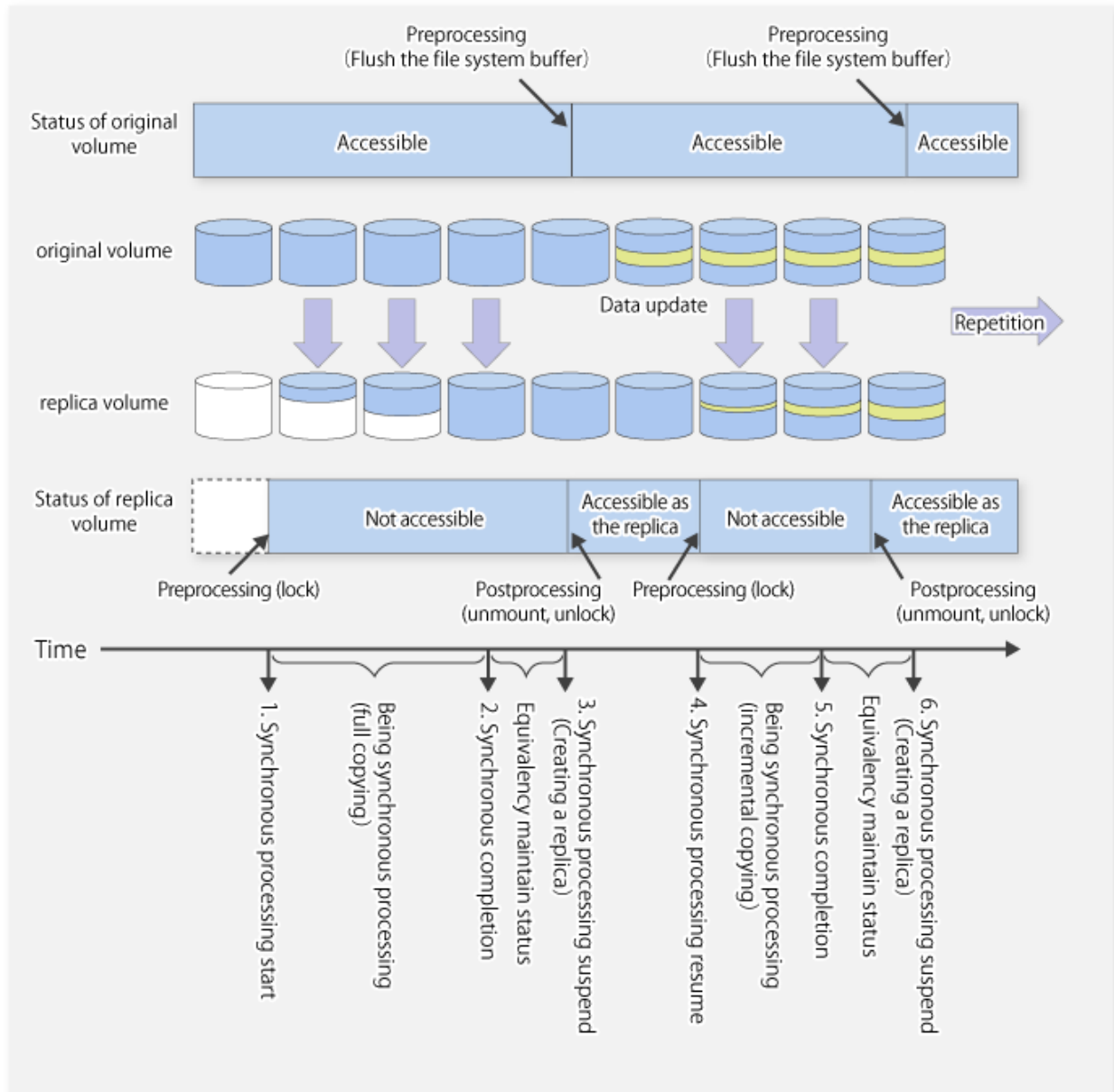
Note

- When using the EC or REC function in synchronized replication, ETERNUS Disk storage 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 ETERNUS Disk storage system is the target of replication. The 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:

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 "Appendix D System Volume Backup Operation".

7.2.1 Determining the server that performs replication

Determine the server that performs replication.

The following servers are used to perform replication:

Management Server

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

Managed Server

AdvancedCopy Manager operations are performed.

Figure 7.10 Configuration of the servers that perform replication
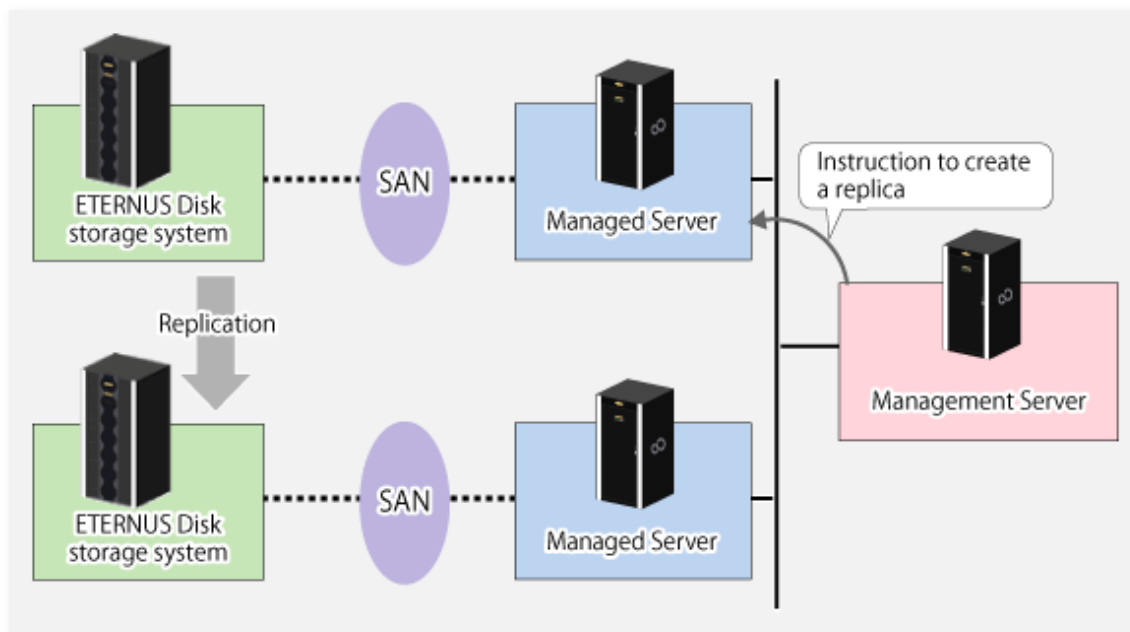
📄 Note

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- The following requirements apply when an inter-box replication is performed using the REC function of ETERNUS Disk storage system:

  - The REC function must be supported in both ETERNUS Disk storage systems.

  - Both ETERNUS Disk storage 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.

- 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.

7.2.2 Determining a replication target

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

Point

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

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

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

- 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.

- 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 Managed Server with the source volume that was connected as the operational server.

   Replica server

      Sets the Managed 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
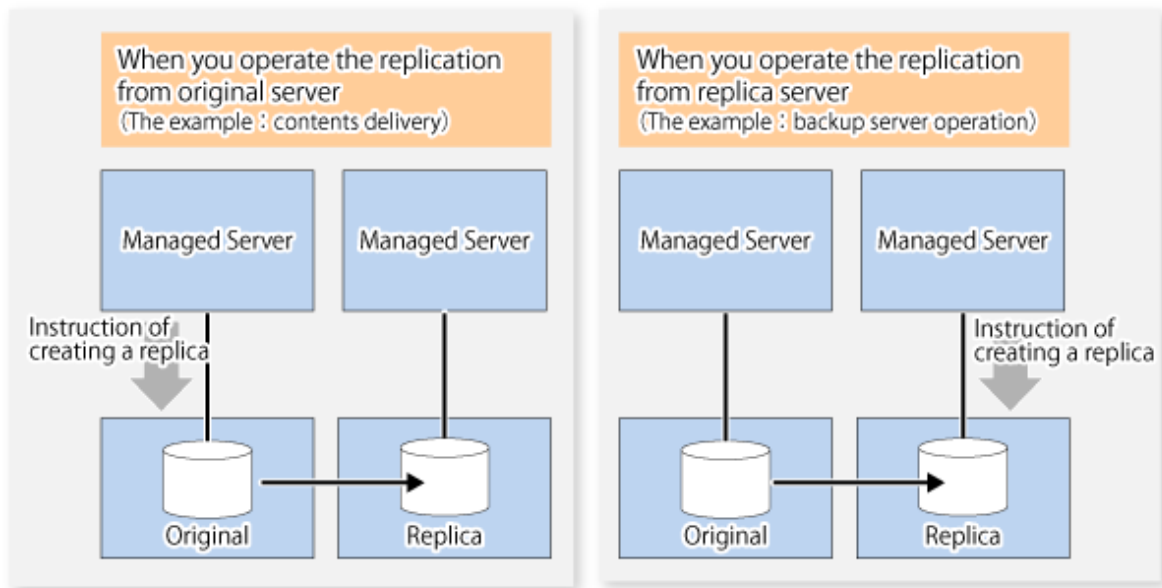
In this manual, a Managed Server used to perform replication is called the operational server. An original server or replica server is specified as the operational server.

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

Note

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

- In order to set up a volume as a source volume, there are some points which should be taken into consideration. For details, please refer to "13.1.1 General notes", for notes on determining a replication target.

    - 13.1.1.3 Backup and Replication Exclusions

    - 13.1.1.1 Size of a Partition

    - 13.1.1.8 Maximum Number of Simultaneously Executing Operations

    - 13.1.1.2 Layout of Partition

    - 13.1.1.9 Dynamic Volume

    - 13.1.1.13 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 "13.1.1.18 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
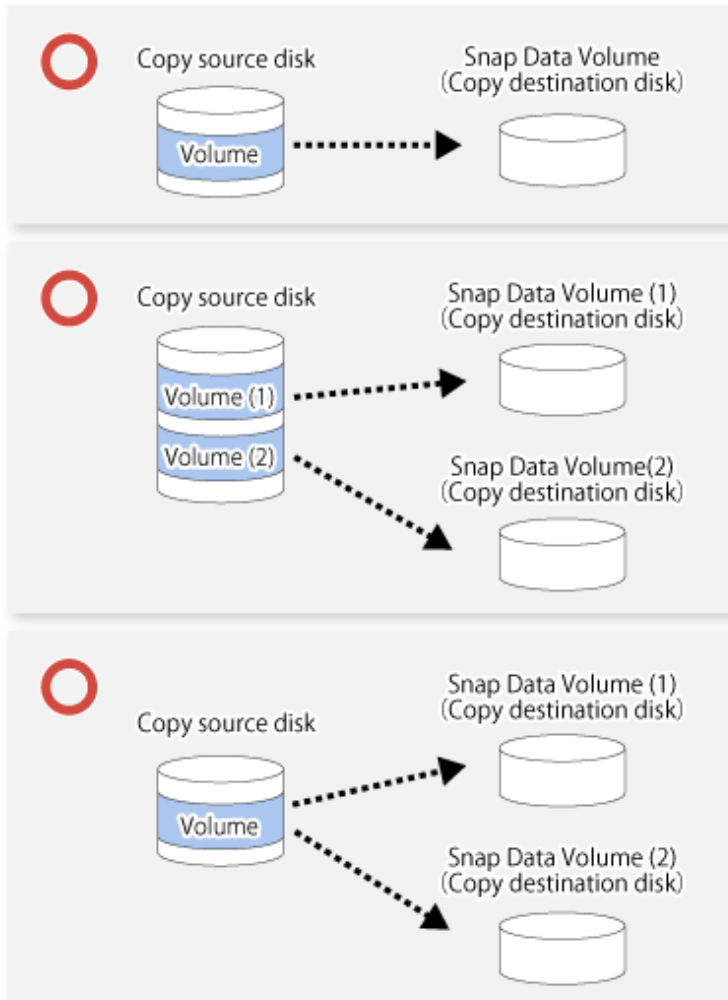
Accordingly, multiple sessions cannot be set up for a single Snap Data Volume, as shown in the following figure:

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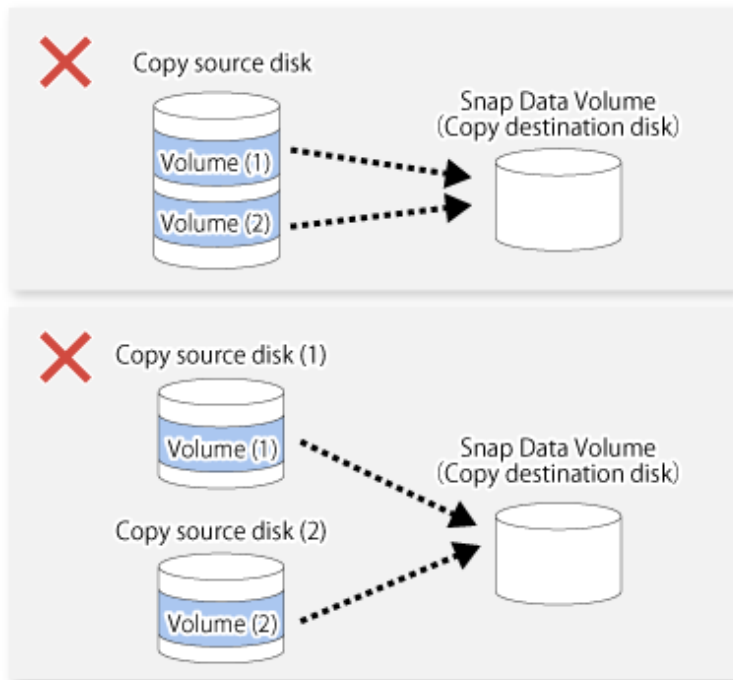
The following additional restrictions apply:

- 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
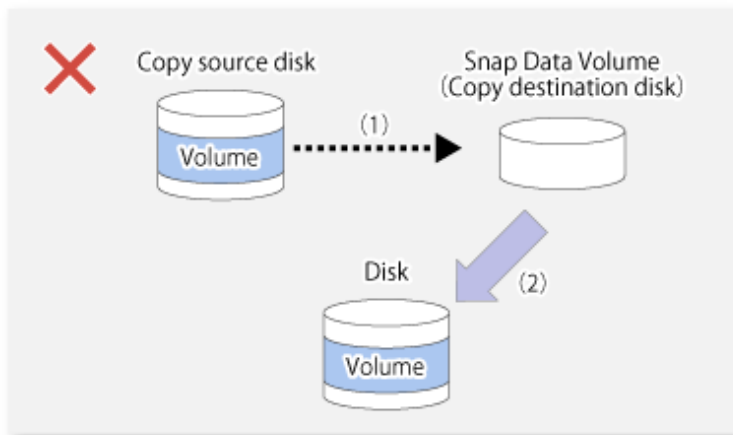
7.2.3.2 Creating a Snap Data Volume

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

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

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

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

Define and initialize the Snap Data Volume

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

Connect to the host

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

Create partitions and 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.

・・

7.2.3.3 Creating a Snap Data Pool

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

Note

- In the basic operation, copying is completed inside the Snap Data Volume capacity estimated/calculated as appropriate for the copying capacity. The Snap Data Pool is only an auxiliary area; when copying, make sure that no area is added from the Snap Data Pool to the Snap Data Volume.

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

7.2.3.4 Snap Data Volume/Snap Data Pool monitoring

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

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

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

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

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

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

When there is insufficient Snap Data Volume or Snap Data Pool capacity, refer to "11.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

Creating an access volume

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 volume) that is separate from the Snap Data Volume.
The volume that is used as the access volume is created on the same ETERNUS Disk storage system 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 volume.

The following operations can be executed using the access volume:

- Snap Data Volume initialization

- Snap Data Volume status display
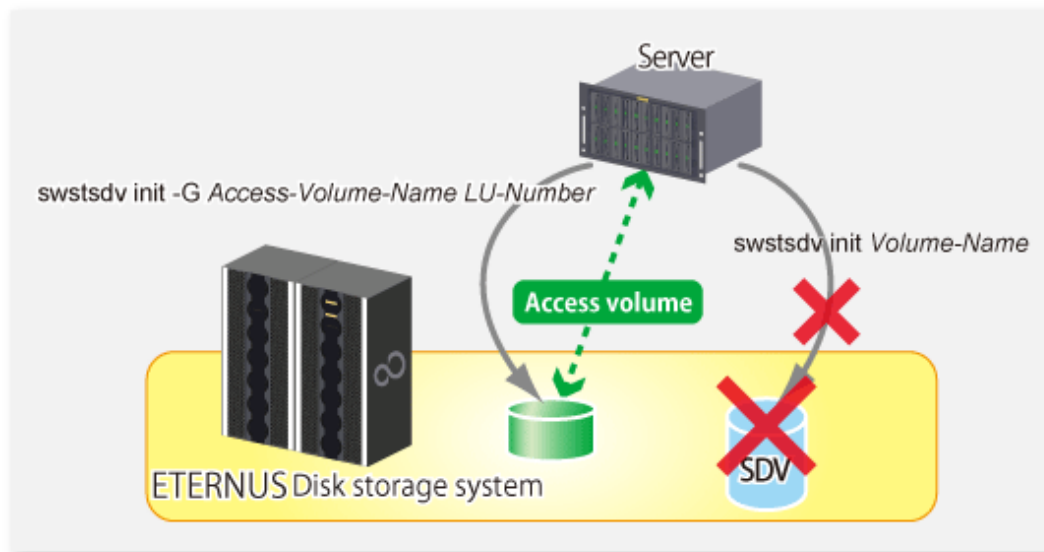
7.2.3.5 Cluster Operations

Do not use Snap Data Volume as shared disks in a clustered system. This is to avoid the danger of the clustered system failing over when the physical capacity of the Snap Data Volume is insufficient.

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

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

7.3 Flow of Operations

The following figure shows the flow of the replication.

Figure 7.15 Flow of replication operations
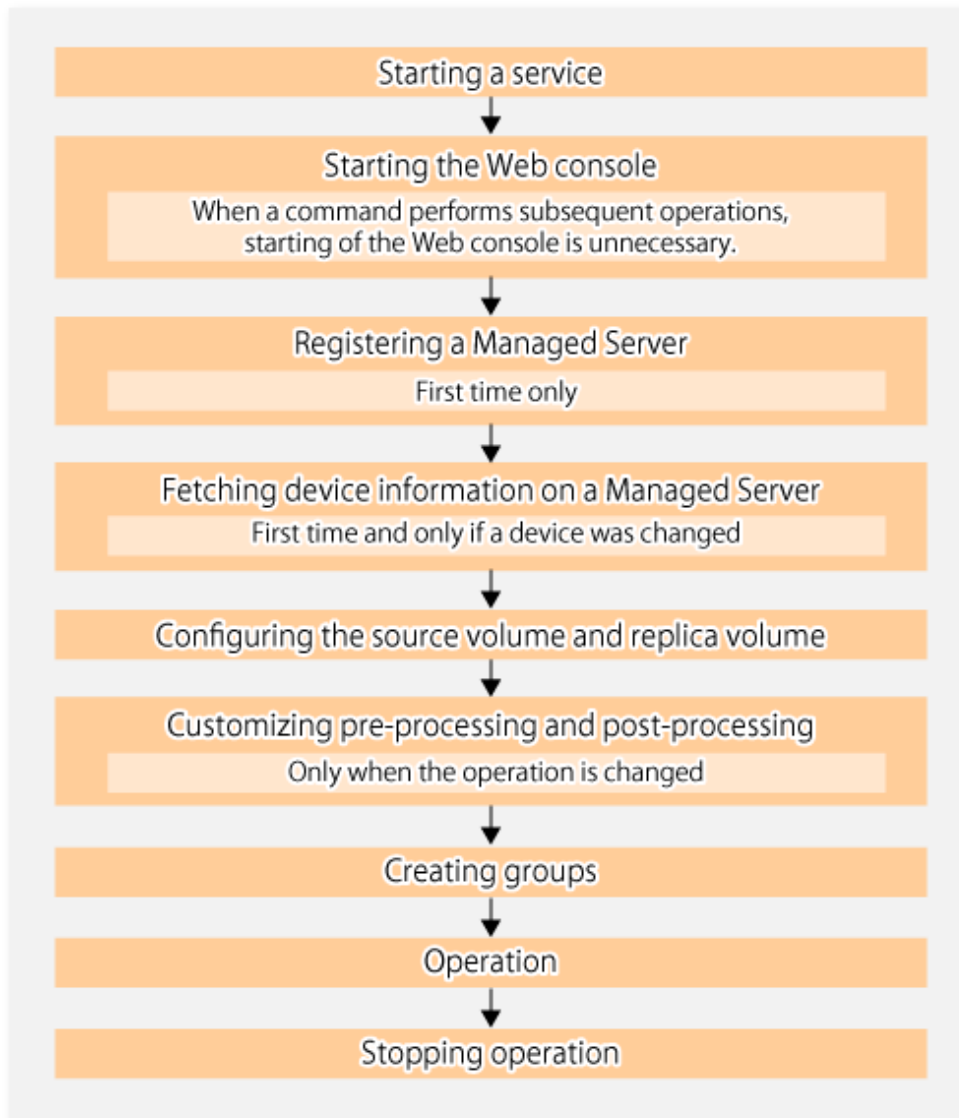
7.4 Preparations

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 Management Server and Managed 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 Services".

7.4.2 Starting the Web Console

Start the Web Console. For details, refer to "How to start Web Console" in the *ETERNUS SF Web Console Guide*.

7.4.3 Registering a Managed Server

The Management Server registers the Managed Server to be managed.
This process can be executed using Web Console.

7.4.4 Fetching device information on a Managed Server

This process can be executed using either Web Console or stgxfwcmsetdev (Device information collection/reflection command).

📑 Note

- Device information on the Managed 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 Managed 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 "11.2.3 Troubleshooting: Failure in accessing a repository database" for details on checking the required area.

- The time required for this operation depends on the total number of devices defined on the Managed 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.

- 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 cancelled.

7.4.5 Configuring the source volume and replica volume

Use swsrpsetvol (Replication volume information setting 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 Managed Server in server-to-server replication, specify the volume in the format "*Volume-Name@Managed-Server-name*".

7.4.6 Customizing pre-processing and post-processing

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.

🅿 Point

When AdvancedCopy Manager is upgraded

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

7.4.7 Creating groups

7.4.7.1 Conditions for the replication volumes that make up the group

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

- The copy source servers and destination servers must have matching attributes such as size and device configuration.
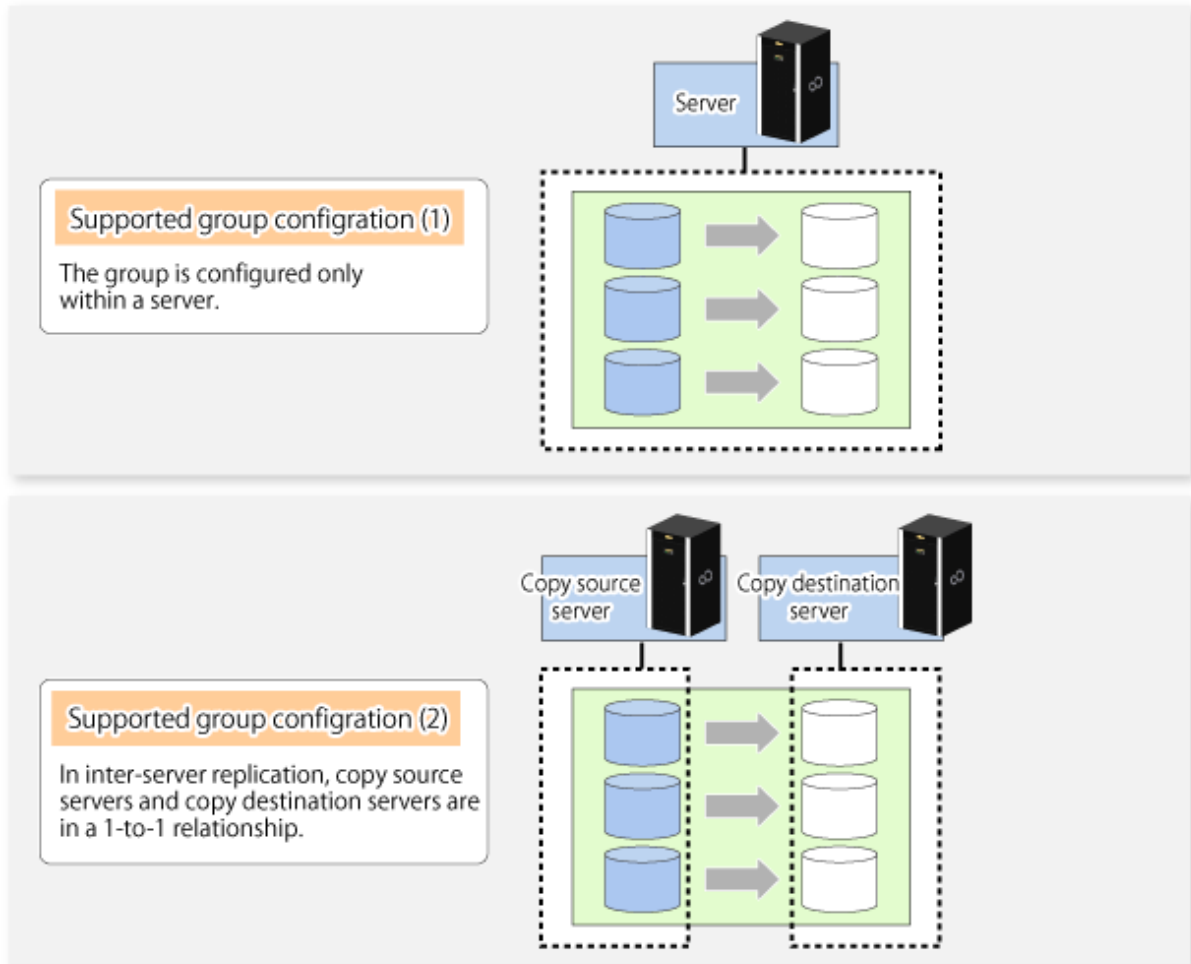
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the **Op-Server** and **Copy** columns displayed by executing swsrpvolinfo (Replication volume information display command).
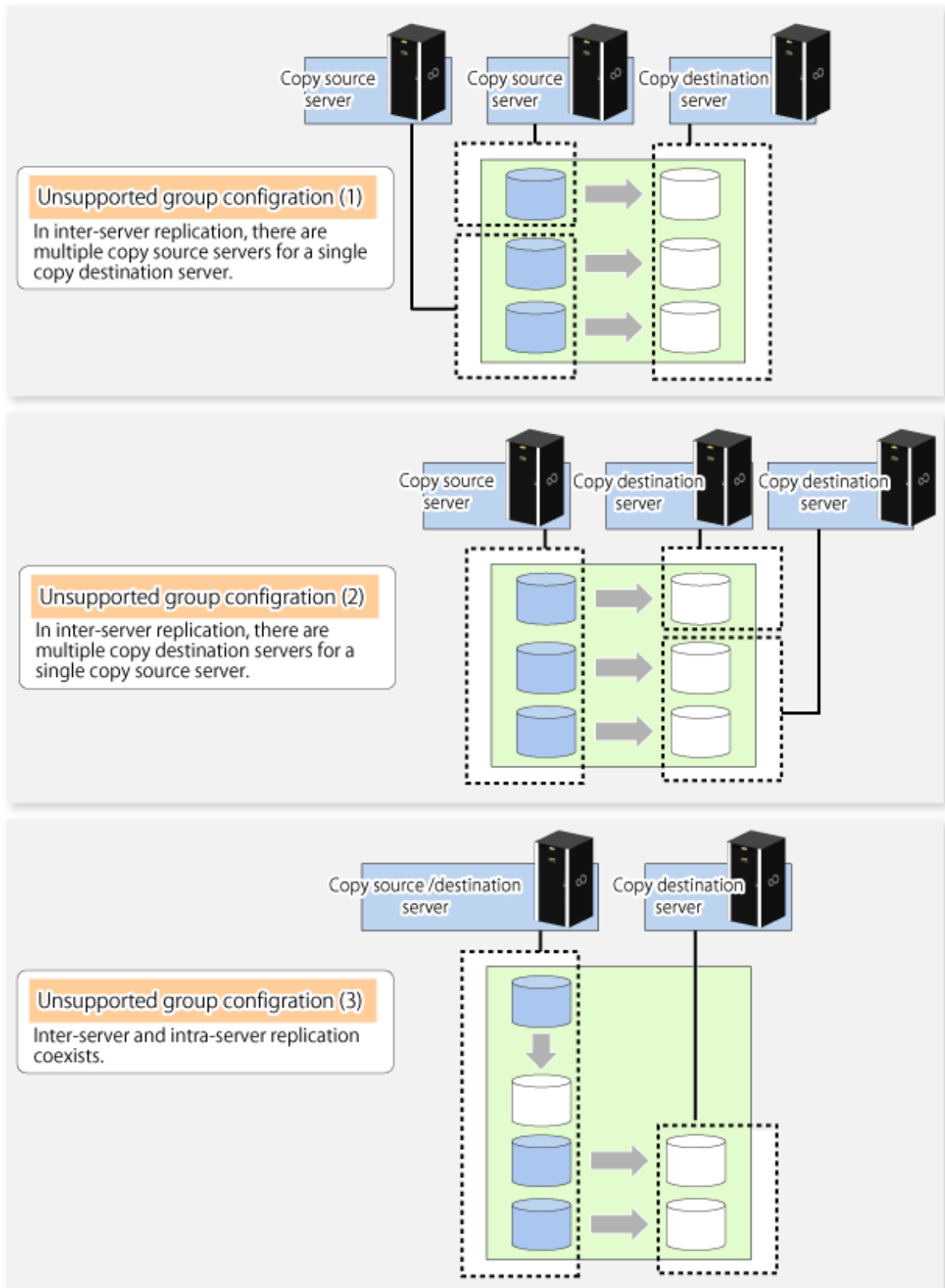
- The replication volume information being registered must not be registered in any other group.
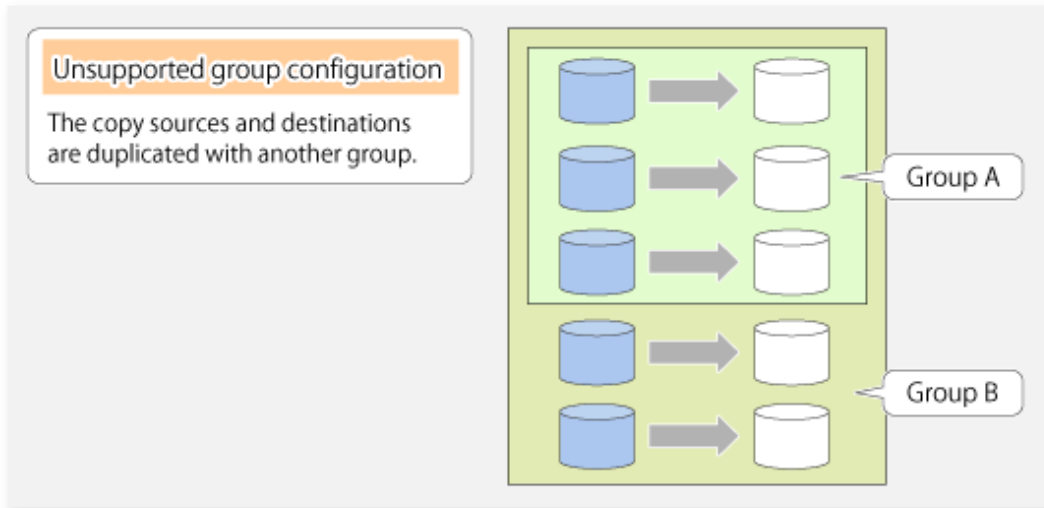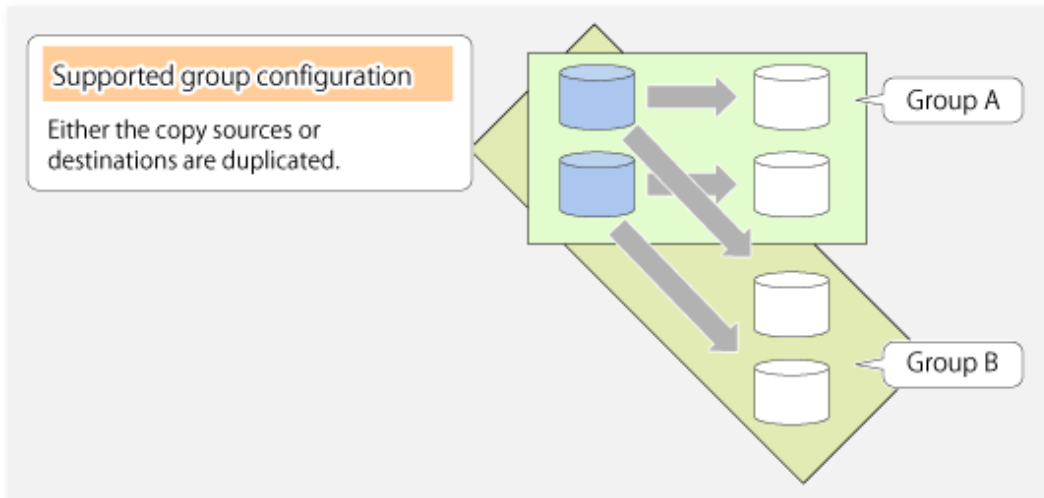
- Source volumes and destination volumes must not be duplicated within the group.
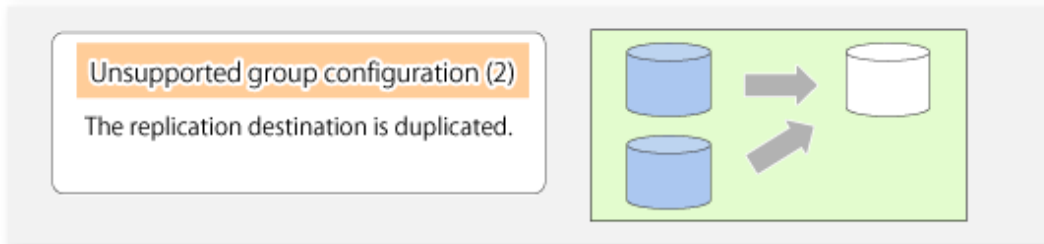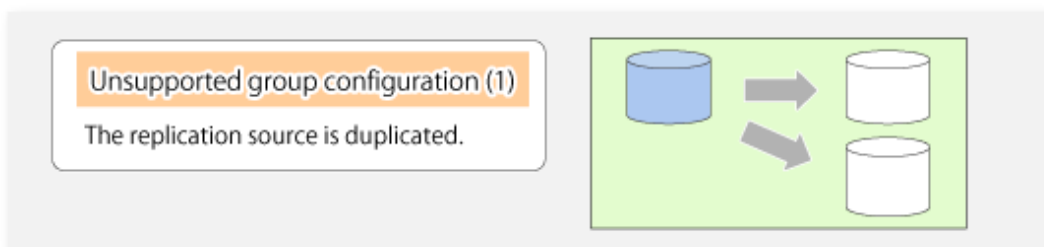
- If a Logical Unit (disk) is specified, the information of the replication volume in a partition included in the Logical Unit (disk) must not be registered to another group.

- 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 setting 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:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -Xgroup GRP1 g1d1p1@SRC
g1d11p1@TARG-1
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -Xgroup GRP1 g1d2p1@SRC
g1d12p1@TARG-1
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvolinfo -L
Server Original-Volume Size     Replica-Volume Size     Copy         Op-Server
Group
SRC    g1d1p1@SRC      4.0 Gbyte g1d11p1@TARG-1 4.0 Gbyte bi-direction both
GRP1
SRC    g1d2p1@SRC      4.0 Gbyte g1d12p1@TARG-1 4.0 Gbyte bi-direction both
GRP1
C:\>
```

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.

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 type replication

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

Figure 7.16 When replication creation command is executed (first time)
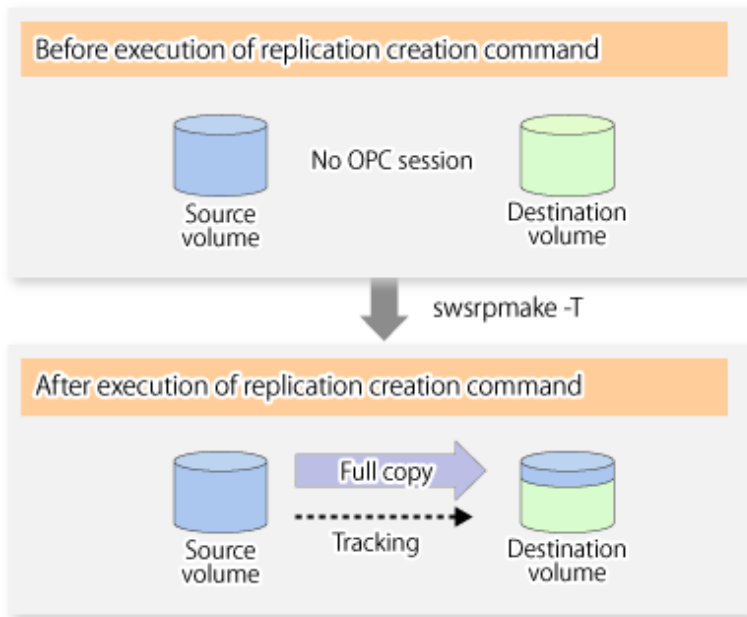
To check the execution status of physical copying, use swsrpstat (Operation status display command) in the same way as for an ordinary snapshot replication.
After snapshot processing (OPC physical copy) is complete, only tracking processing is active.
To check the tracking status, use swsrpstat (Operation status display command) with the -L option.

Figure 7.17 When snapshot processing is completed
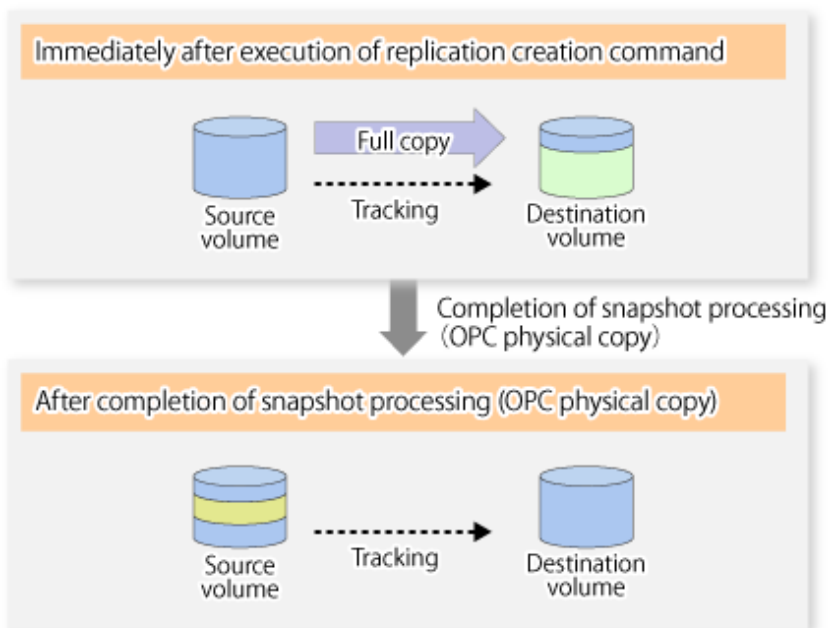
Entering swsrpmake (Replication creation command) with the -T option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

Figure 7.18 When replication creation command is executed (second time)
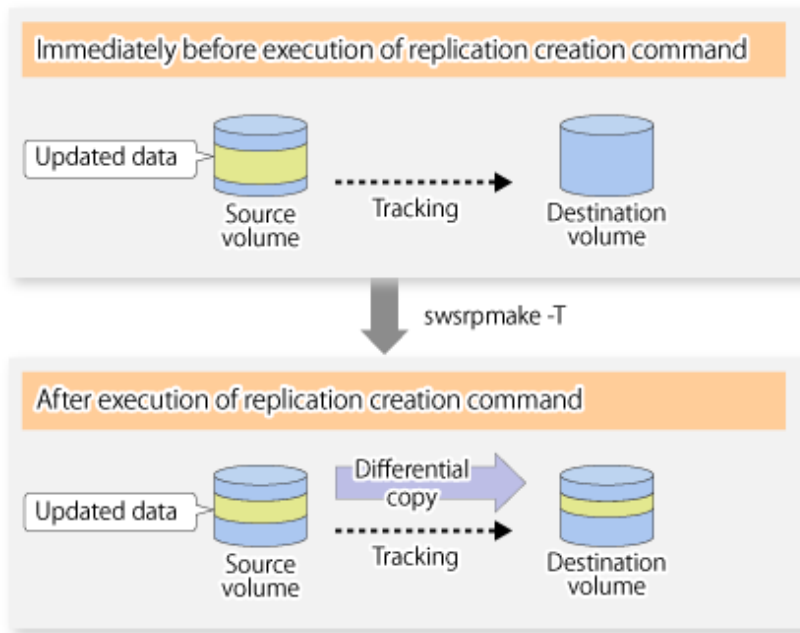
When you want to perform a restoration while tracking processing is being executed, you need to perform a restoration by OPC (to achieve this, you need to execute swsrpmake (Replication creation command) without the -T option). QuickOPC cannot be executed in the reverse direction while tracking processing 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 swsrpmake (Replication creation command) is executed, a SnapOPC session will be set up between the copy source volume and the copy destination volume.

Example

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake -C g1d1p1 g1d2p1
FROM=g1d1p1@SV1,TO=g1d2p1@SV1 swsrpmake completed
C:\>
```

Figure 7.19 When the replication creation command is executed
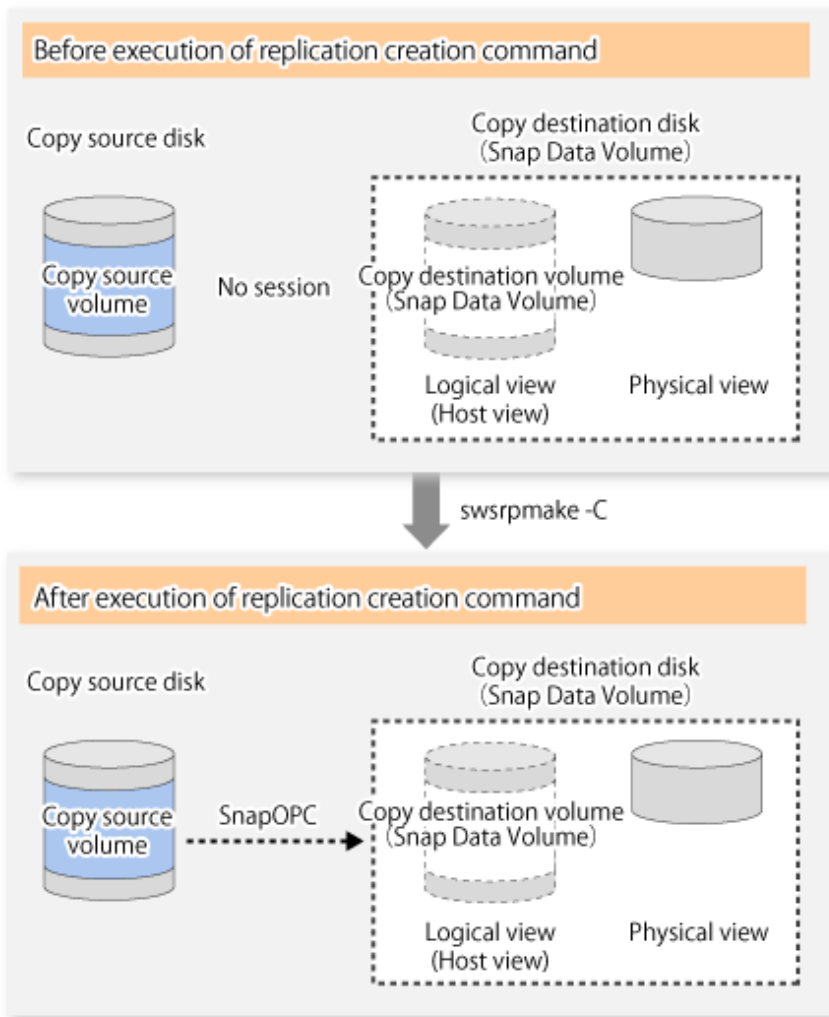
Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the source volume, but instead copy only the data that has been updated on the source or destination since SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure 7.20 When the copy source volume is updated
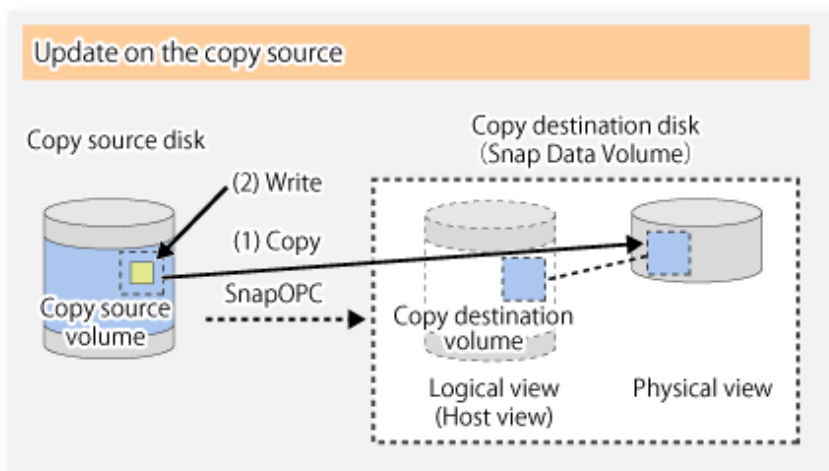
Figure 7.21 When the copy destination volume is updated
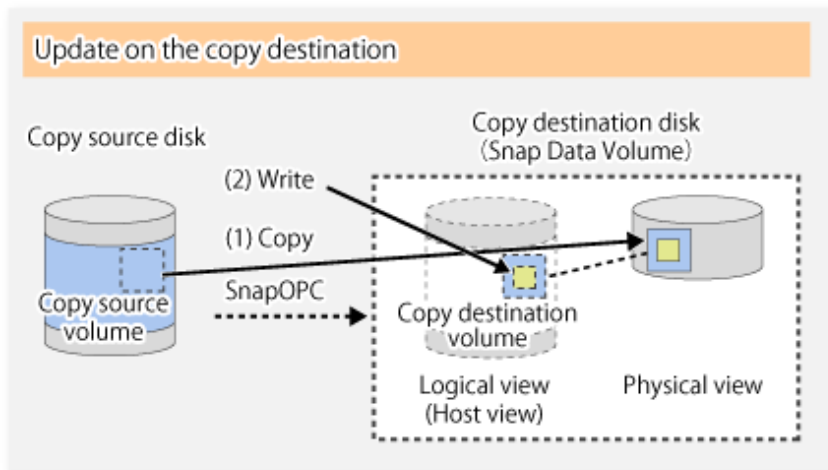
> **Note**: The units for host I/O and storage device copies are different (512 bytes for host I/O and 8 kilobytes for storage device copies), and therefore data copies also occur when the copy destination is updated.

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

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       g1d1p1@SV1     regular   copy-on-write ----    off  0%       ---- ---- ----
---- ----
C:\>
```

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

Note

When there is insufficient Snap Data Volume or Snap Data Pool capacity, the SnapOPC+ execution status changes to error suspend status ("failed"), and replication volume cannot be used.
The SnapOPC execution status can be checked in swsrpstat (Operation status display command) output result Status column.

Example

```
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  ----  ---- ----  ---- ---- ----
C:\>
```

When the SnapOPC execution status is error suspend status ("failed"), refer to "11.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

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

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake g1d2p1 g1d1p1
FROM=g1d2p1@SV1,TO=g1d1p1@SV1 swsrpmake completed
C:\>
```

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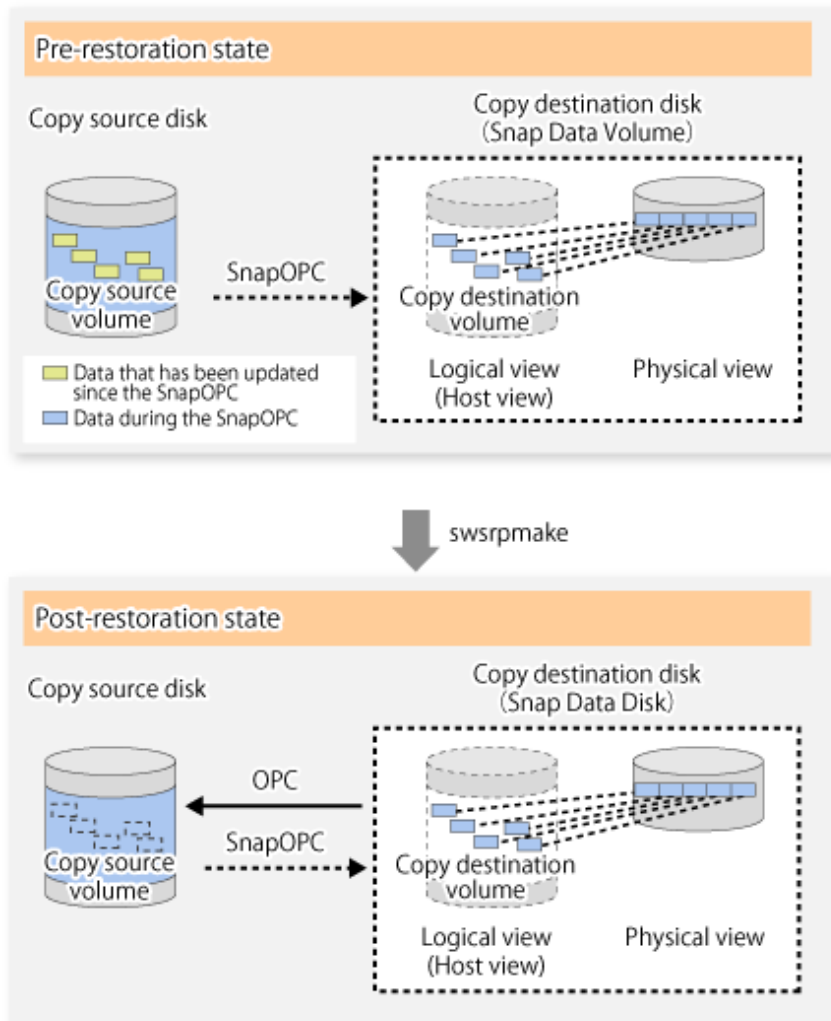
The execution status of restorations can be checked by specifying the -E option with swsrpstat (Operation status display command).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstat -E g1d1p1
Server Original-Volume Replica-Volume Direction Status Execute
SV1    g1d1p1@SV1      g1d2p1@SV1     reverse   snap   80%
C:\>
```

Note

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

Figure 7.23 When restoring to a volume other than the copy source volume
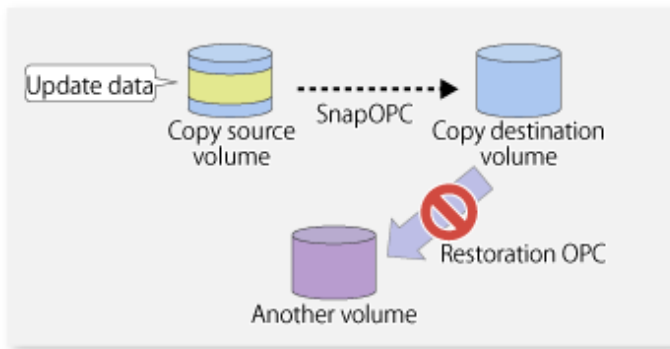
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure 7.24 When SnapOPC is performed for multiple copy destination volumes
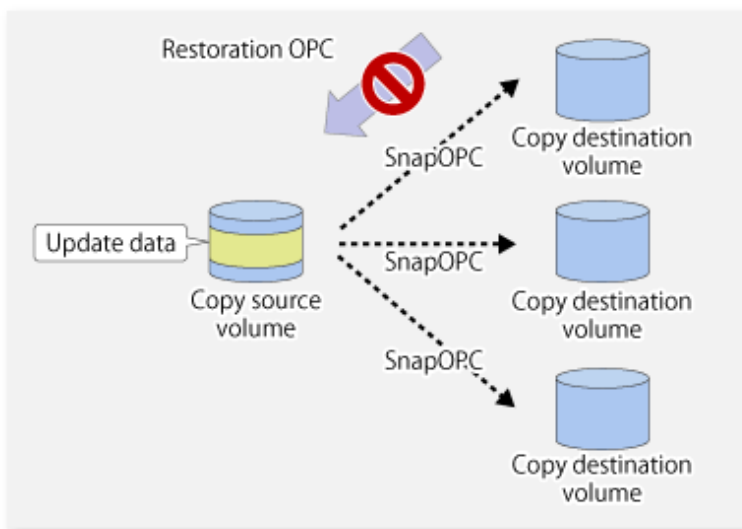
In this case, restoration using an OPC can be performed by cancelling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were cancelled will be lost.

Figure 7.25 When SnapOPC session cancelled to perform restoration
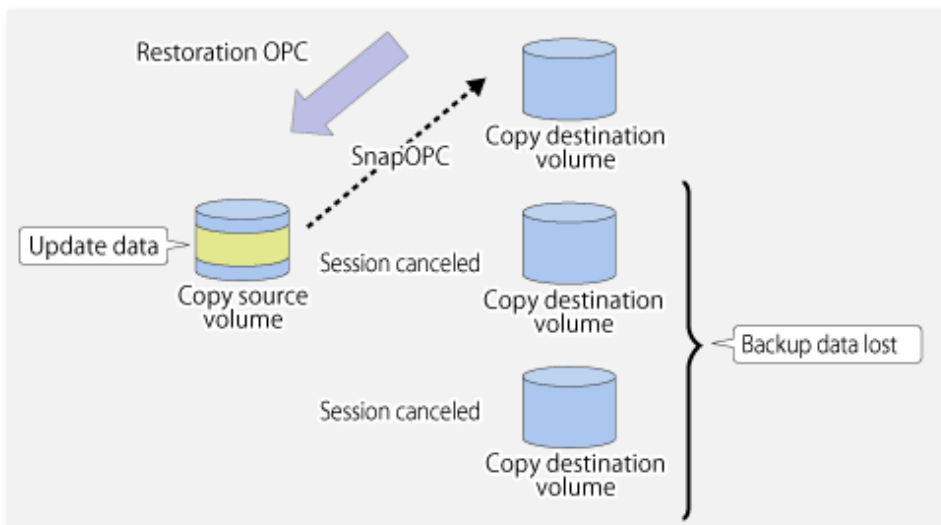
To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration.

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
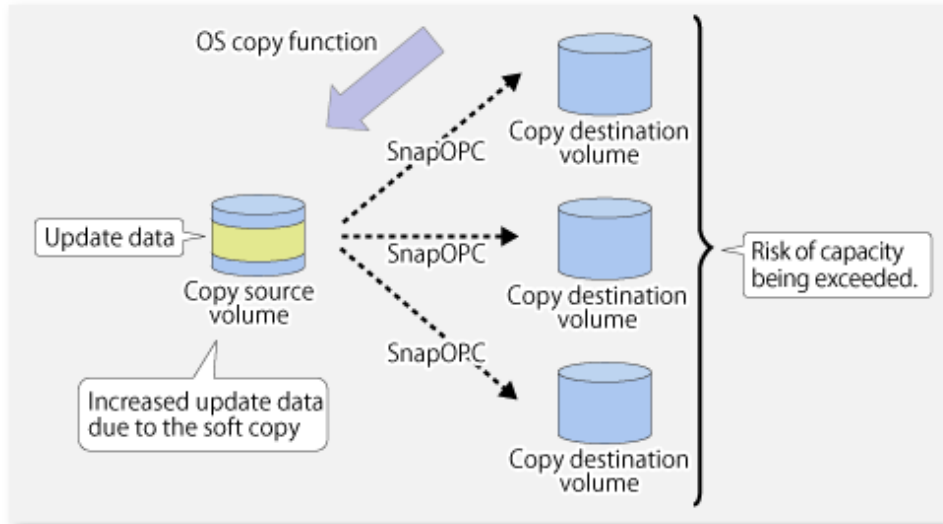
SnapOPC+ type replication

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 swsrpmake (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 swsrpmake (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.

:

Note

. . . .

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when swsrpmake (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

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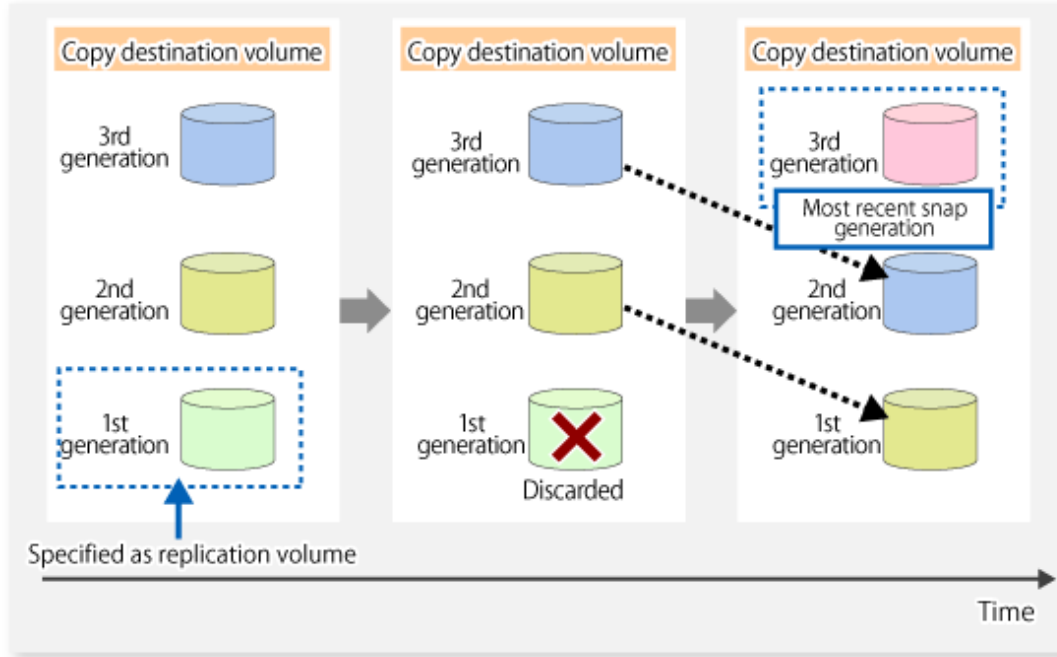
The operation status of SnapOPC+ replication can be checked by executing swsrpstat (Operation status display command) with the -L option.

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 "11.4.2.3 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 (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
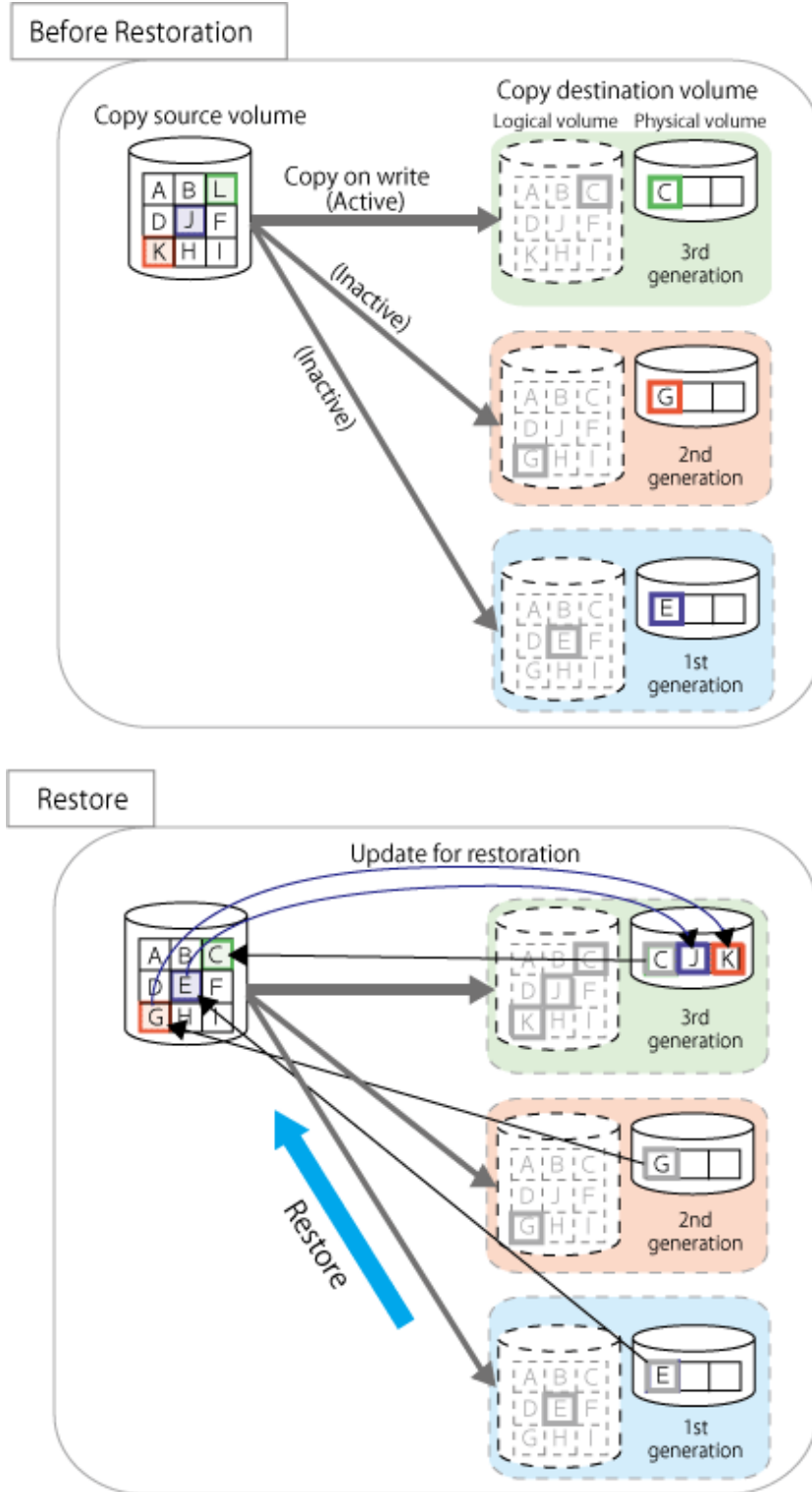
To check the restoration execution status, execute swsrpstat (Operation status display command) with the -E option.

```
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:\>
```

Note

....

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

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

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

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

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

```
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 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.
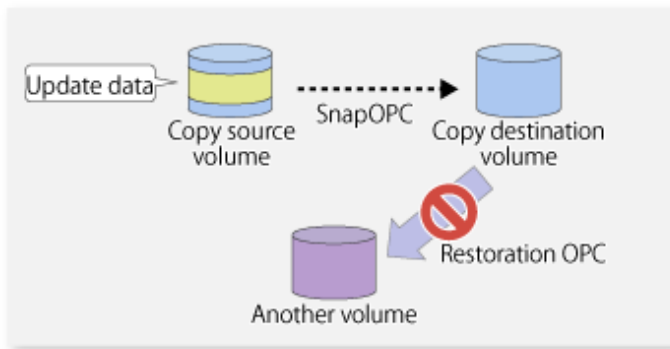
Point

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).
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

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

QuickOPC copy destination volume ×2

Copy source volume

Vol01

Vol02

Vol03

One QuickOPC performed per week

Sunday : swsrpmake -T Vol01 Vol02(or Vol03)

Execution of Vol02 and Vol03 are switched every week for a hardware error during the physical copy.

SnapOPC+ destination volume (SDV) ×6

SDD01 SDD04

SDD02 SDD05

SDD03 SDD06

One SnapOPC+ performed per day

Monday   : swsrpmake -P Vol01 SDD01
Tuesday   : swsrpmake -P Vol01 SDD02
Wednesday : swsrpmake -P Vol01 SDD03
Thursday : swsrpmake -P Vol01 SDD04
Friday   : swsrpmake -P Vol01 SDD05
Saturday : swsrpmake -P Vol01 SDD06

If a hardware error occurs at the copy source volume, performs restoration from the QuickOPC copy destination volume.

QuickOPC copy destination volume ×2

Copy source volume

Vol01

Vol02

Vol03

3) After the hardware error is resolved, execute copy from the QuickOPC copy destination volume.

1) A hardware error occurs at the copy source volume. Copy source volume is unusable.

SnapOPC+ copy destination volume (SDV) ×6

SDD01 SDD04

SDD02 SDD05

SDD03 SDD06

2) The SnapOPC+ copy destination volume (Snap Data Volume) is also unusable.

7.5.1.1 Concurrent OPC functions

Concurrent OPC function is one of ETERNUS Disk Storage system's function which creates snapshots of the multiple logical volumes simultaneously. This function allows backup the replication of the database consisting of multiple volumes in a consistent state. This function is available to use in one of these replications; OPC, QuickOPC, SnapOPC, or SnapOPC+.

The following diagram shows the operation in ETERNUS Disk Storage system.

Figure 7.30 Operations in ETERNUS Disk Storage system
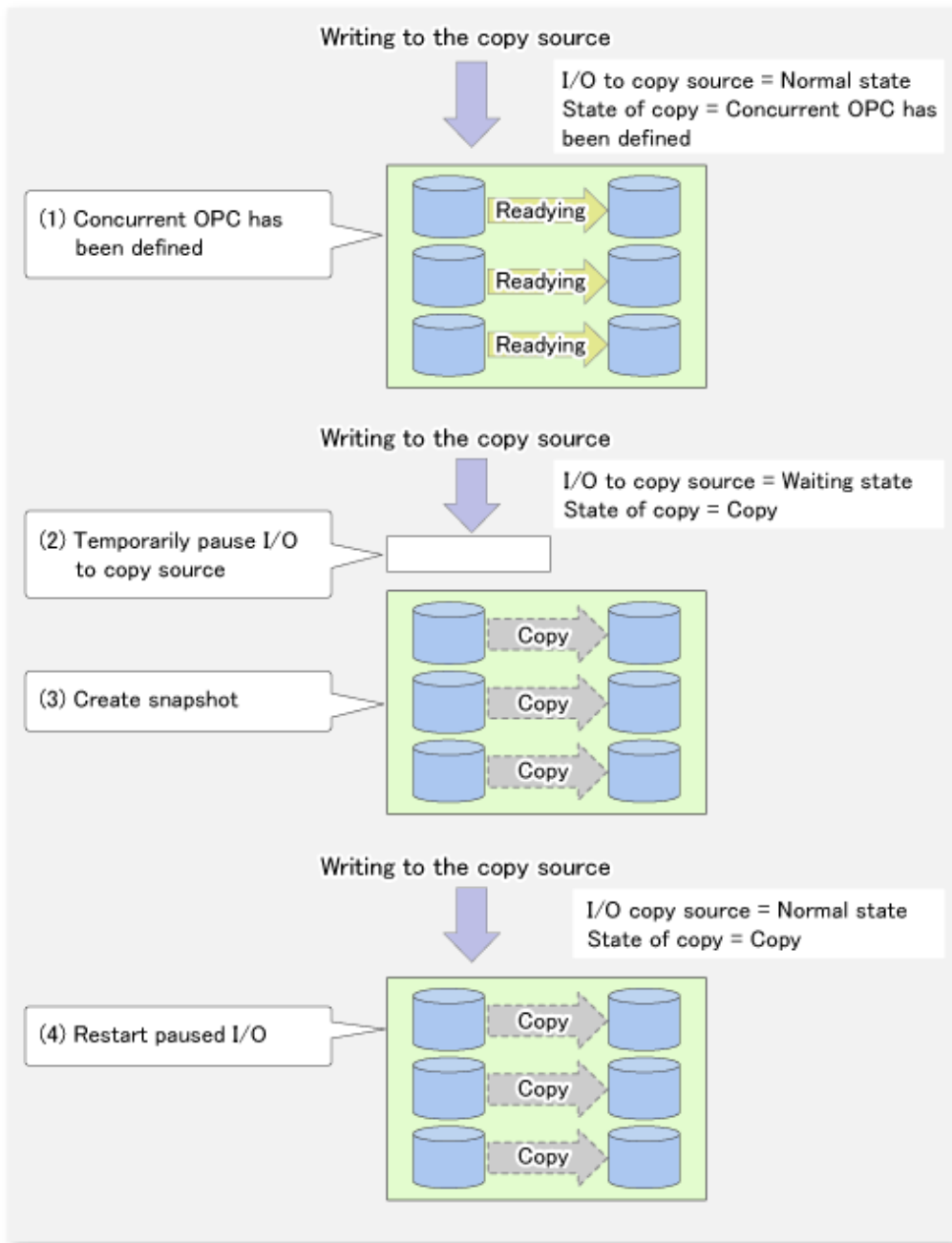
> **Note**
>
> - If you force-quit swsrpcancel (Replication cancellation command) with task manager or Ctrl-C, the session may remain defined concurrent OPC. In this case, execute the command again, or stop the session with swsrpcancel (Replication cancellation command).
>
> - The maximum number of copy pairs that performs concurrent OPC simultaneously is 1024.

7.5.2 Executing synchronized replication

To perform synchronized replication, use the following procedure:

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

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

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

7.5.2.1 Intra-box synchronous replication

Intra-box synchronous replication creates a replication from a source volume to a destination volume by using the EC function of ETERNUS Disk storage 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 mode).
It is also possible to reverse the copy direction from suspend status using the EC functionality.

7.5.2.2 Inter-box synchronous replication

Inter-box synchronous replication creates a replication from a source volume to a destination volume by using the REC function of ETERNUS Disk storage 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

Transfer method	Transfer mode	Explanation
Synchronous transfer method	Synchronous	In this mode, responses to write requests from the server do not return as "complete" until data has been written to the copy source volume and copied to the destination volume.
		Synchronizing data copies with writes to the copy source guarantees the integrity of the data on both the copy source volume and the copy destination volume when the copy completes.
		This mode is suitable to RECs within sites with short delay times, because it has a large impact on the performance of write accesses from the server.
Asynchronous transfer methods	Stack	This mode has only a small impact on the time taken to respond to the server because it only records the position of the block that has been updated before returning "complete" to the server. The data for this block is transferred using an independent transfer engine.
		Copies can be executed even when there is only limited bandwidth, but in this case the amount of data that has not been transferred may build up.
	Consistency	This mode guarantees the sequence of transfers between copy sessions for the copy destination ETERNUS Disk storage system, and is suitable for operations, such as on databases, that perform mirroring using copies that consist of multiple areas.

Transfer method	Transfer mode	Explanation
		This mode uses part of cache memory for transfer buffers. Data is transferred to the copy destination by first "storing" a block of data to be copied in a transmission transfer buffer and then using a reception transfer buffer to "expand" the data that has been transferred.
	Through	This mode is for transferring data that has not been transferred when copies in Stack mode or Consistency mode are stopped or suspended.

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

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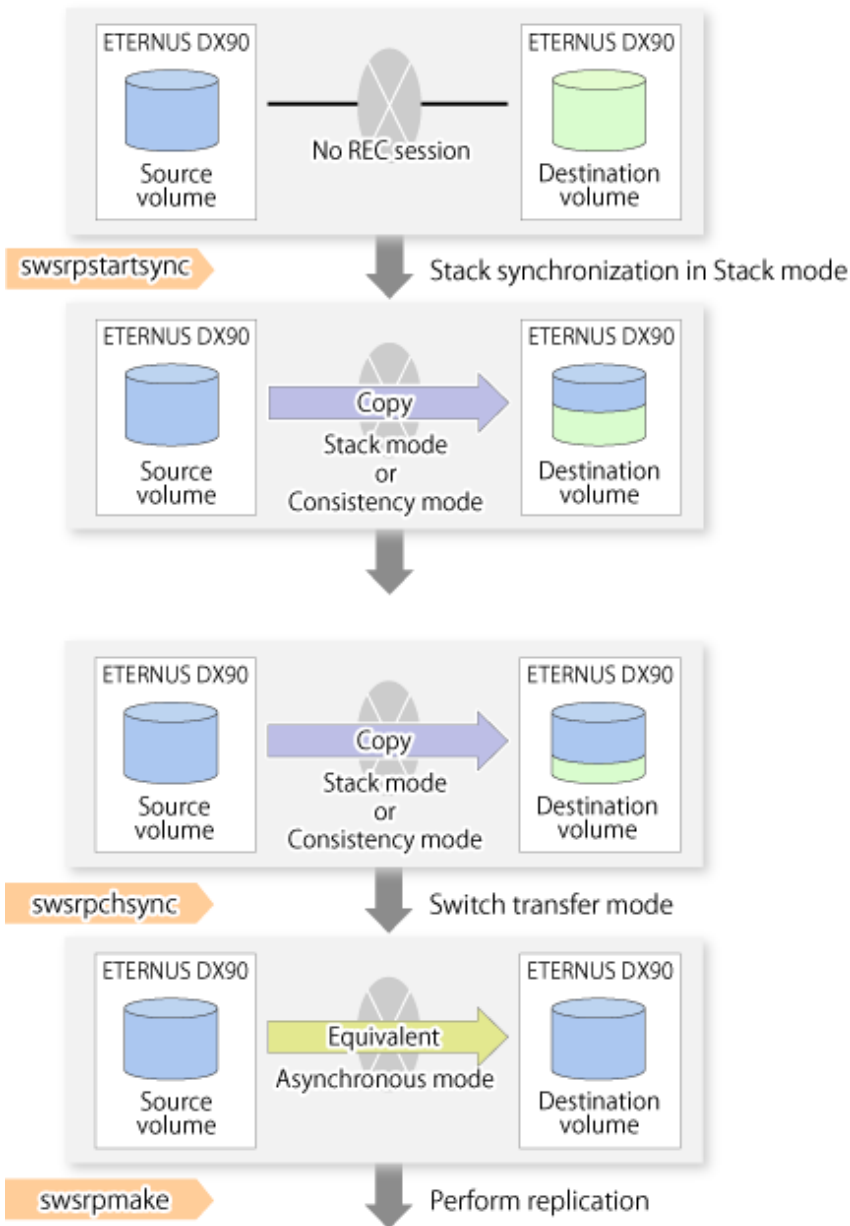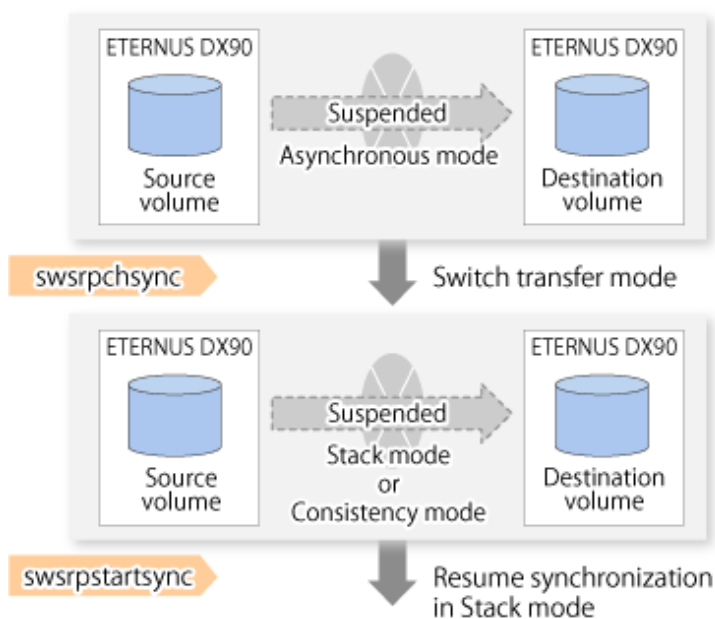
> 📌 **Note**
> ....
> If the equivalency maintain status REC operating mode is changed, after the operating mode is changed, the user must wait until the equivalency maintain status is attained.
> ....

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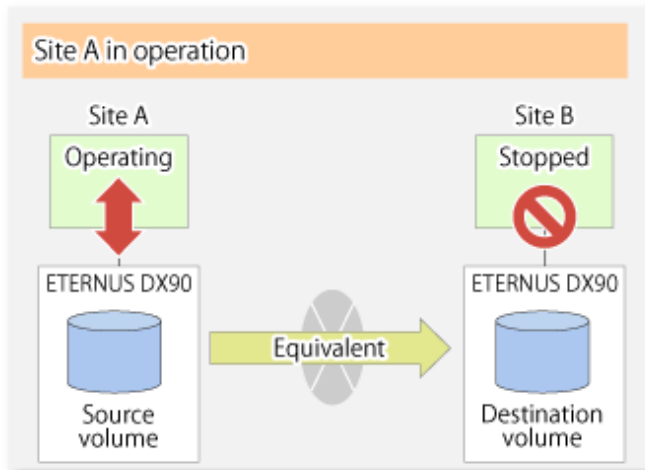
2. To switch the sites, execute swsrpmake (Replication creation command) to make a replication to Site B. Then, stop operating Site A.

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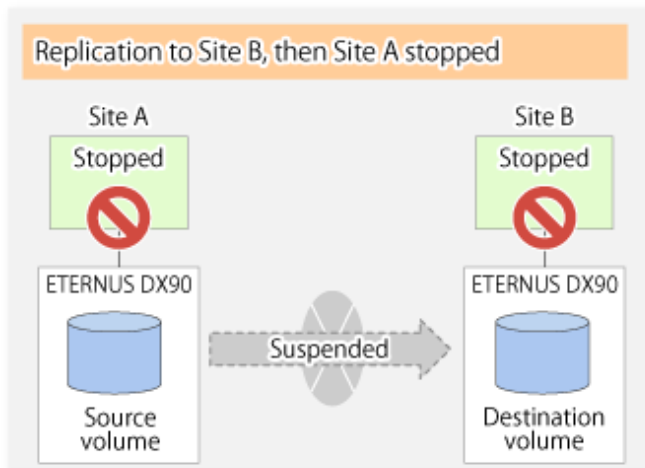
3. Execute swsrprevsync (Synchronization reverse command) to reverse the copy direction.

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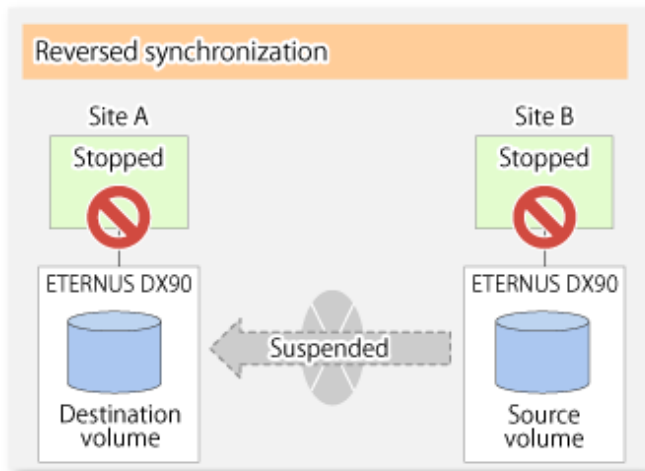
4. Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

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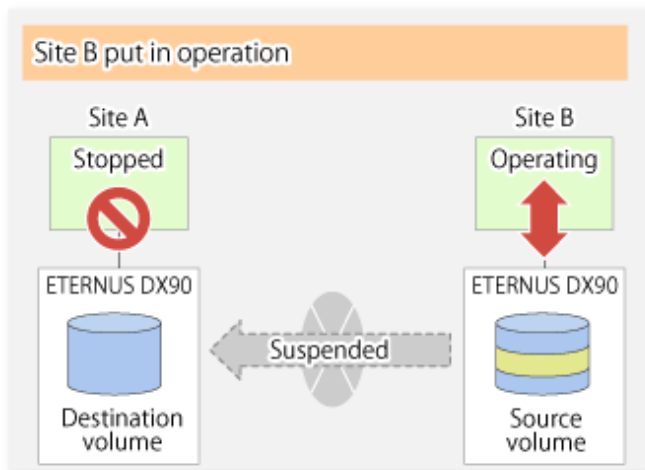
5. Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected in Site A with differential copies.

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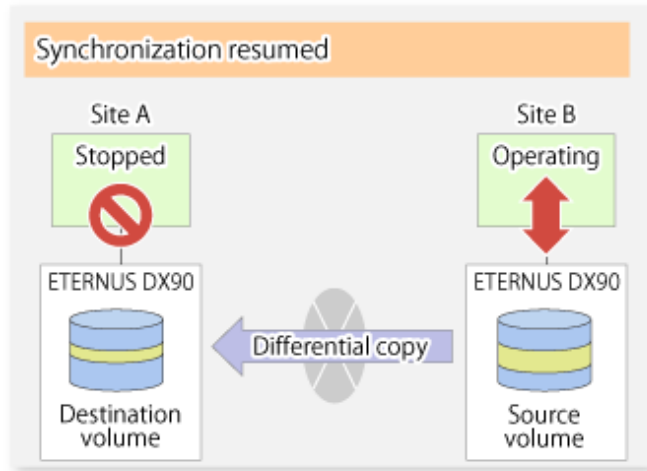
7.5.2.2.1 Initial copy skip function

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

1. Suppose that operations at Site A have stopped.

Figure 7.37 If operations at Site A have stopped
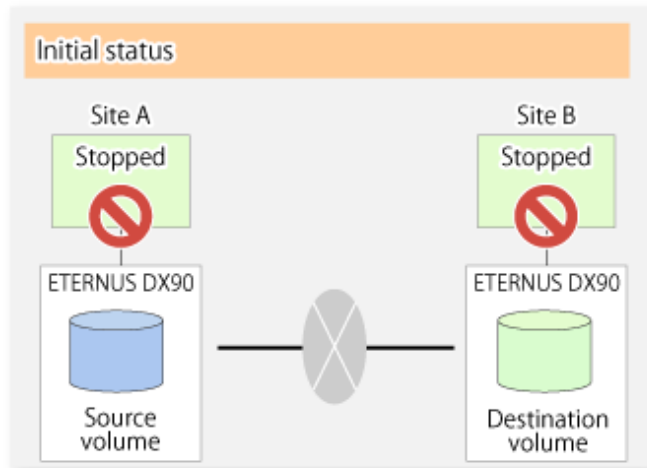
2. Next, synchronous processing begins, using the initial copy skip function. At this point, a REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

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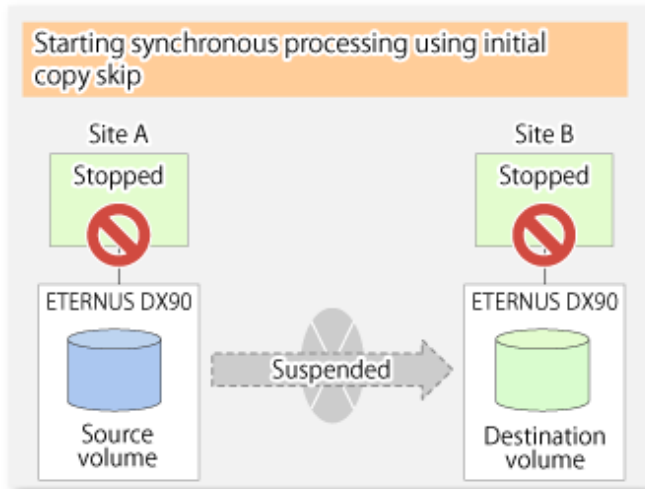
3. Next, the data on the copy source volume is backed up to tape.

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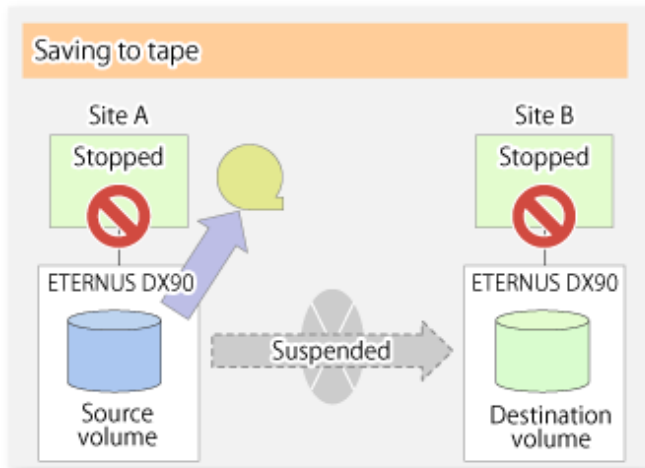
4. The tape medium is sent to Site B and jobs at Site A restart.

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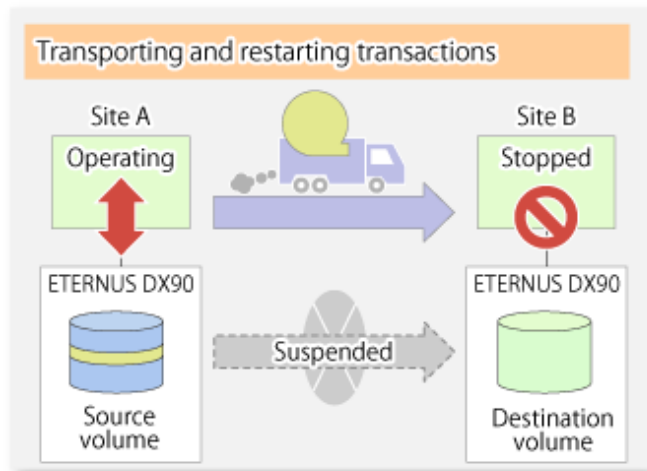
5. The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

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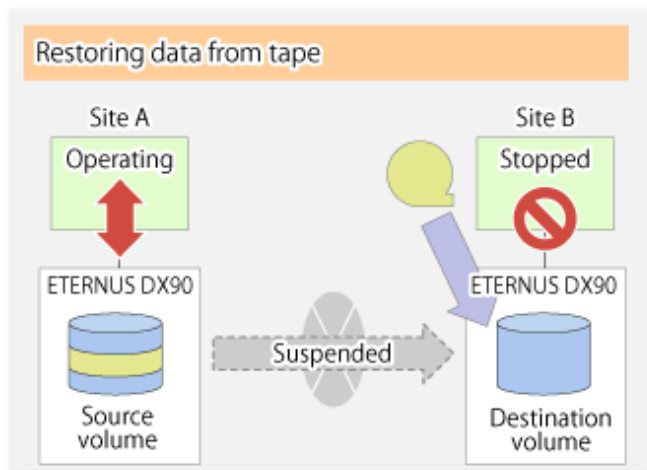
6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied.

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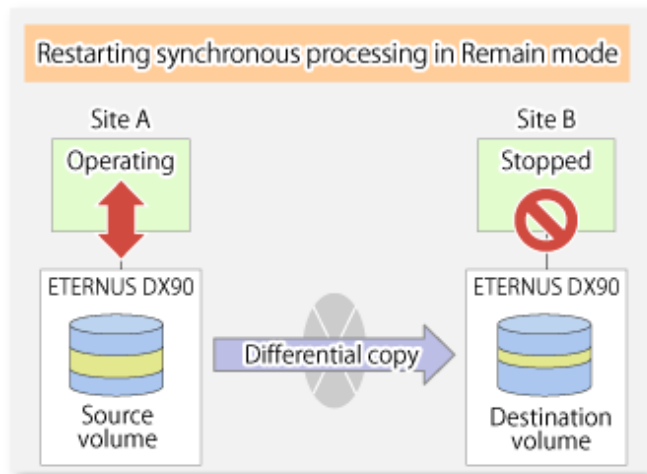
7.5.2.3 Concurrent suspend function

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

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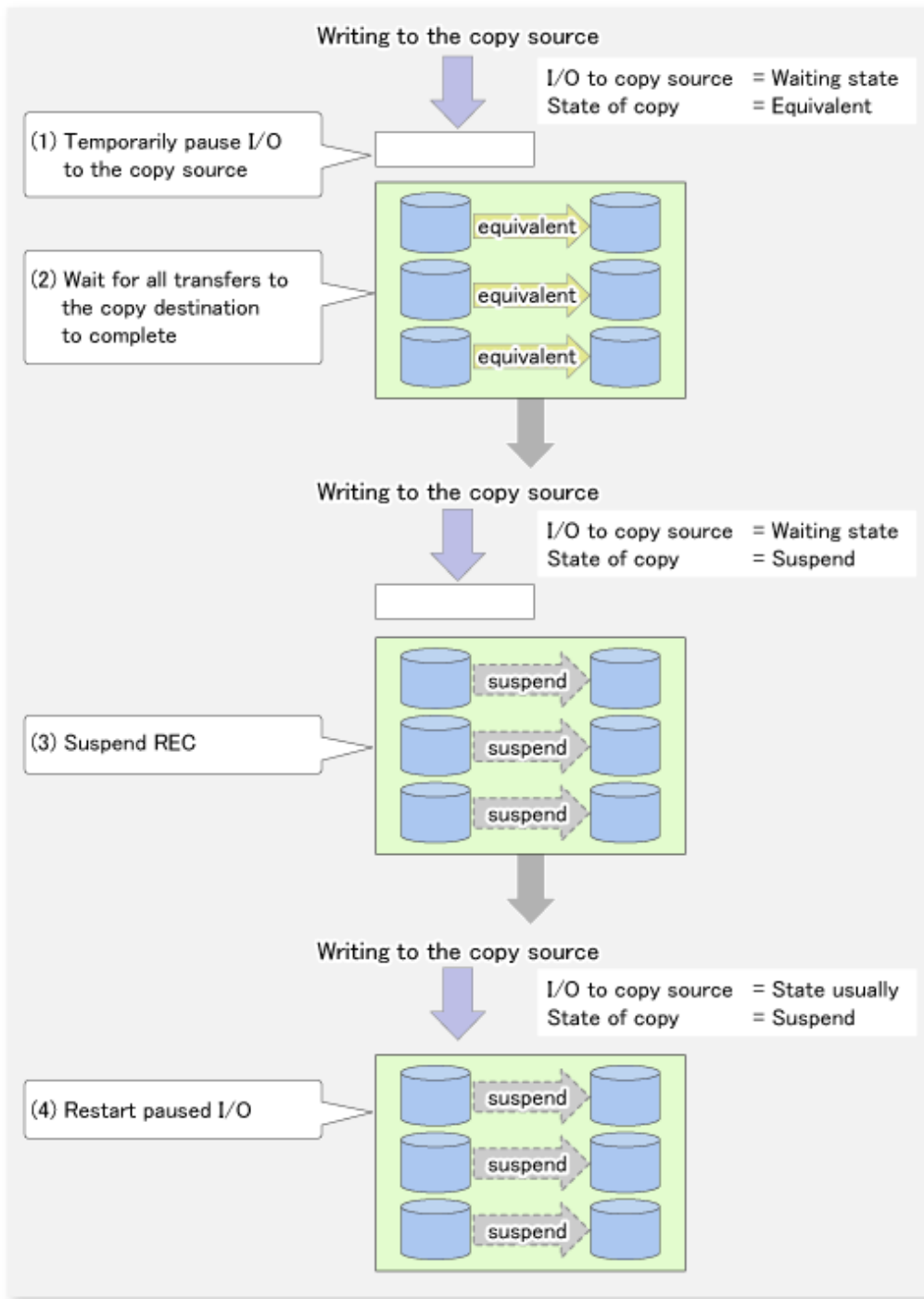
Replication using the concurrent suspend function is performed by specifying the -Xconcur option for swsrpmake (Replication creation command).

Additionally, if concurrent suspend 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 suspend is executed in Consistency mode is the same as the procedure for Through mode and Synchronous mode.

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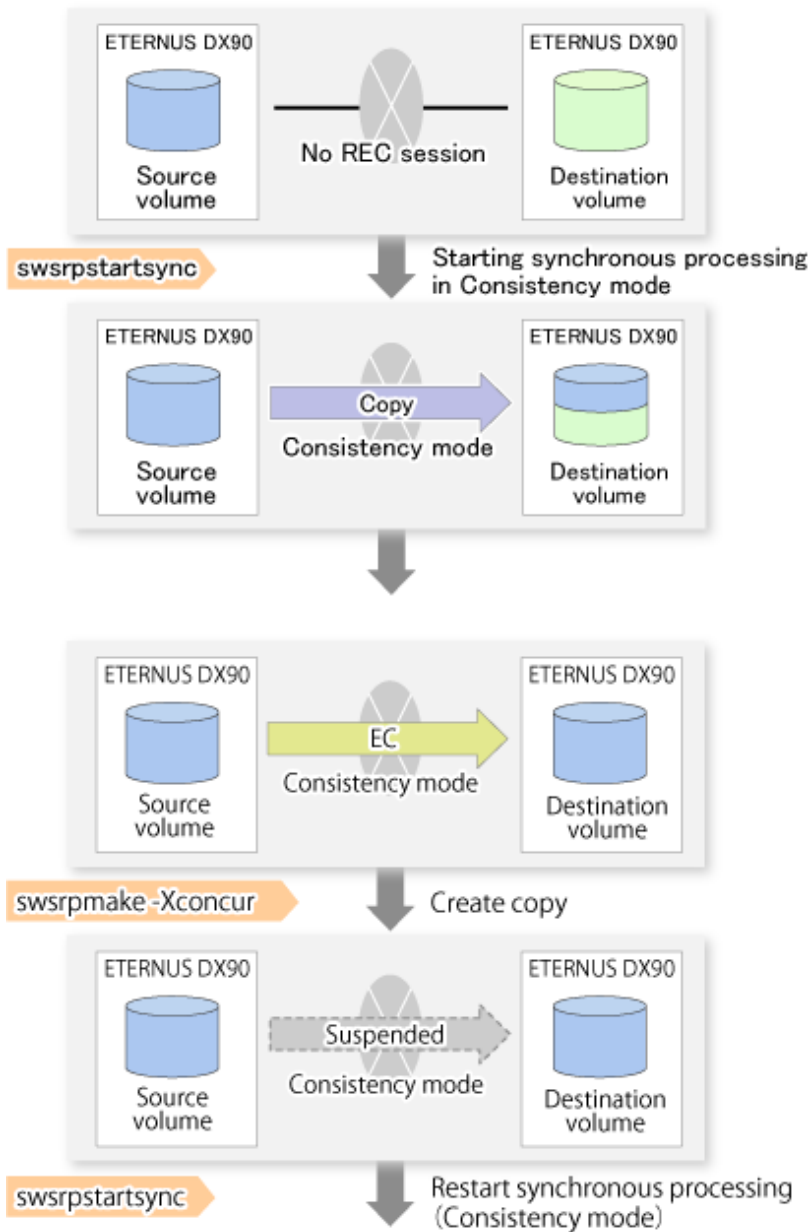
7.5.2.3.1 Changing the timeout value for the concurrent suspend function

A timeout may occur before suspend is completed if there is a large quantity of data, if the communication link is poor, or if the REC Disk buffer is used for inter-box synchronous replication (REC function) in Consistency mode.
If the REC Disk buffer is used, refer to "7.5.2.3.2 Concurrent suspend when the REC Disk buffer is used".
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 directory>\etc\repl\data\DEFAULT\check.ini

In case of operation in clustered environment

```
<Environment directory for logical node>\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.
		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.

7.5.2.3.2 Concurrent suspend when the REC Disk buffer is used

If the REC Disk buffer is used for inter-box synchronous replication (REC function) in Consistency mode, check that no transferred data exists in the REC Disk buffer before executing the concurrent suspend.
If you execute the concurrent suspend when any data to be transferred exists in the REC Disk buffer, timeout may occur.

You can check the data volume of the REC Disk buffer in the **DiskRate** column when you execute swsrprecbuffstat (REC buffer information display command) with specifying -L option.

7.5.2.4 Destination Access Permission function

The Destination Access Permission function serves to inhibit user access to replication target volumes when copying is in progress and any access would therefore be inappropriate.

It starts synchronization (EC/REC) from the replication source volume to the replication target volume, and when full or differential copying is complete, they are maintained in a state of equivalency.
In the state of maintained equivalency, any upgrades on the replication source volume are successively reflected on the replication target volume, so that any access to the replication target volume would possibly be inappropriate.
The Destination Access Permission function can be used to inhibit access from users to the replication target in such unsuitable moments.
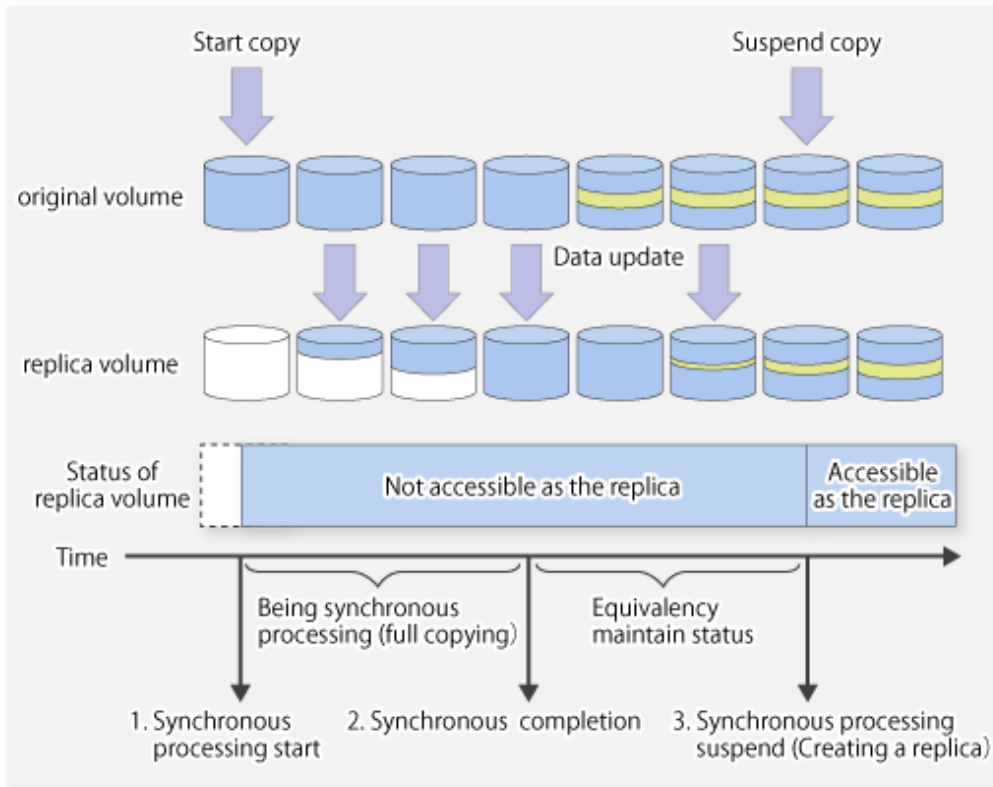
To set the Destination Access Permission function, execute swsrpstartsync (Synchronous processing start command) with specifying the -Xda option. Until replication processing is stopped by swsrpcancel (Replication cancellation command) neither WRITE nor READ access to the replication target volume can be performed.

For changing this setting, once the replication operation has been stopped by swsrpcancel (Replication cancellation command), execute swsrpstartsync (Synchronous processing start command) again.

Whether access is inhibited can be checked by performing swsrpstat (Operation status display command).
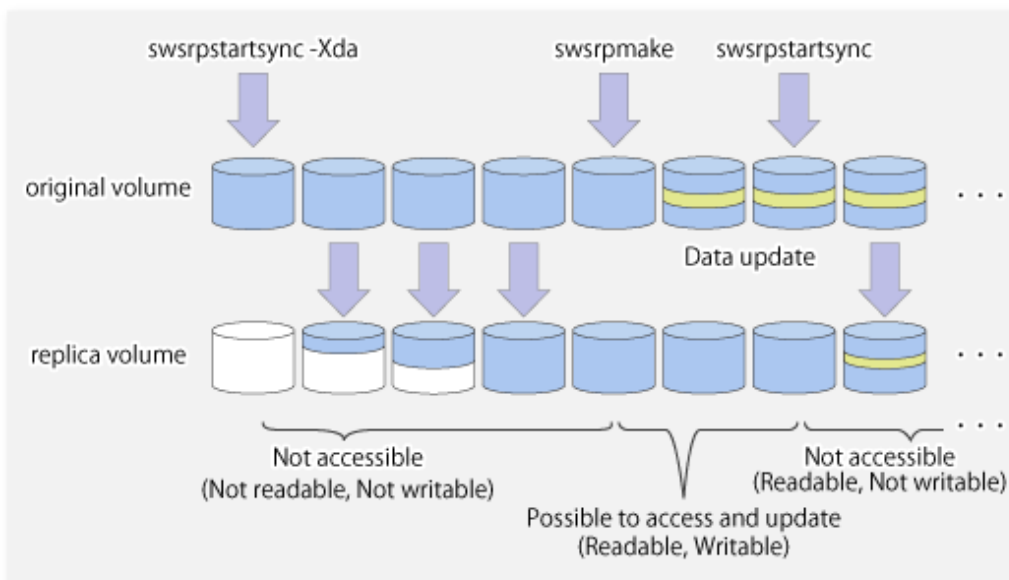
7.5.3 Backup and restoration using the replication function

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 setting 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. For the backup operation that uses QuickOPC/SnapOPC/SnapOPC+, execute swsrpmake (Replication creation command) without specifying the -T, -C and -P option.

![Note icon] **Note**

. . . .

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

Figure 7.45 Manual restoration with SnapOPC+

. . . .
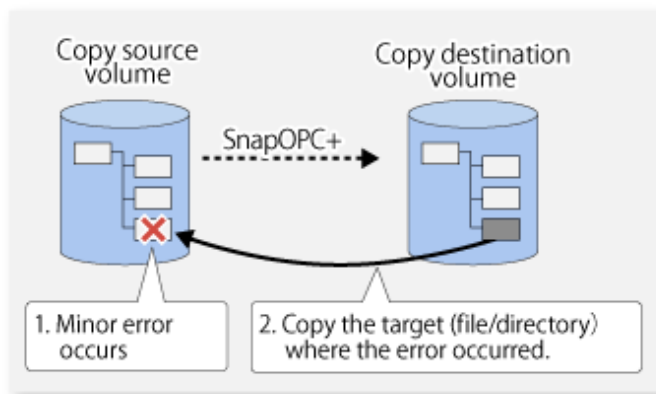
7.5.4 Execution of synchronization reversal

Using swsrprevsync (Synchronization reverse command) the physical copy amount can be greatly reduced and the AdvancedCopy time shortened for restore when there is a small amount of differential data.
Additionally, it is also possible to execute restore without cancelling other copy jobs in operations that match multiple copy jobs. Therefore, there is no need for overall copy after restore, so operations can be restarted with the load on ETERNUS Disk storage system kept to a minimum.

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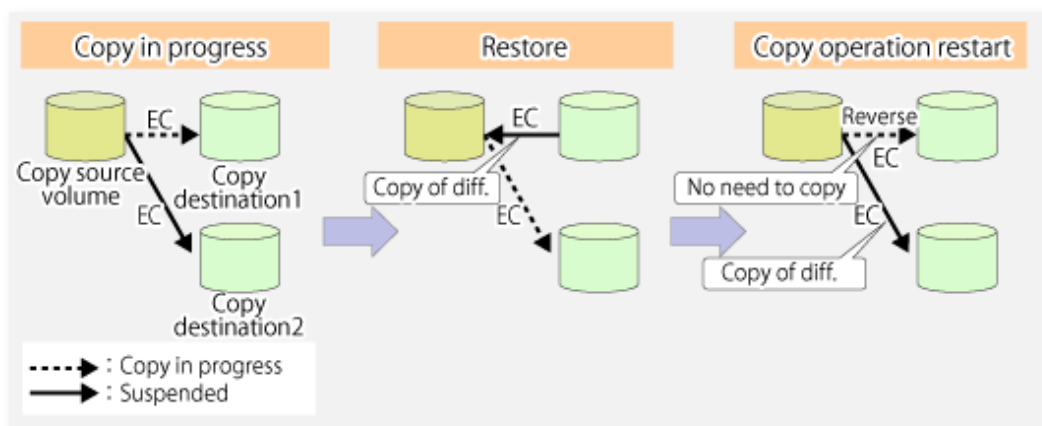
7.6 Changing the Configuration Information

When a Managed 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 setting 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 on a Managed 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] **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 Managed 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, refer to "Chapter 2 Starting and Stopping Services".

 Note

. . . .

When the daemon/service on the Managed Server has stopped, all functions of AdvancedCopy Manager running on the Managed Server will stop.
Before stopping the Management Server daemon/service, make sure that operations on all Managed Servers under management have been stopped.

. . . .

Chapter 8 Backup and Restore of Exchange Server Databases

This chapter explains the procedure for backing up or restoring the Exchange Server databases.

To understand the contents of this chapter, the reader should have a basic knowledge of Exchange Server and Volume Shadow Copy Service (VSS), in addition to AdvancedCopy Manager.

Additionally, before reading this chapter, the user is recommended to read the following documents issued by Microsoft Corporation.

- Exchange Server 2003 Disaster Recovery Guide

- "Microsoft Exchange Server 2007" > Operations > Disaster Recovery in the "Microsoft Exchange Server 2007 Help"

- "Exchange Server 2010" > High Availability and Site Resilience > Understanding Backup, Restore and Disaster Recovery in the "Microsoft Exchange Server 2010 Help"

- "Exchange Server 2013" > High Availability and Site Resilience > Backup, Restore, and Disaster Recovery in the "Microsoft Exchange Server 2013 Help"

The latest versions of these documents can be downloaded from the following URLs:

- Exchange Server 2003 Disaster Recovery Guide:

```
http://technet.microsoft.com/en-us/library/bb125070(v=exchg.65).aspx
```

- Microsoft Exchange Server 2007 Help:

```
http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=386
```

- Microsoft Exchange Server 2010 Help:

```
http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=22392
```

- Microsoft Exchange Server 2013 Help:

```
http://www.microsoft.com/en-us/download/details.aspx?id=35395
```

8.1 Backup and restore of Exchange database in Windows Server 2003

This section explains the procedure for backing up or restoring the Exchange Server 2003 and Exchange Server 2007 databases.

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 section, has described the terminology of Exchange Server 2007 by the terminology of Exchange Server 2003:

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

8.1.1 Overview

8.1.1.1 Backing up Exchange server databases

The Advanced Copy function of ETERNUS Disk 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 hardware provider. (*1)

- Storage group configuration files (ie, those with extensions *.edb, *.stm, *.log or *.chk) are copied to the backup volume.

    *1: Only the hardware provider for ETERNUS bundled to the AdvancedCopy Manager package for Windows Server 2003 is used in this function. The provider of other companies and ETERNUS VSS Hardware Provider 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

- 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 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 hardware provider, which manages the copy destination disk (LUN).

8.1.1.2 Restoring Exchange server databases

The Advanced Copy function of the ETERNUS Disk 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., swsrpmake (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
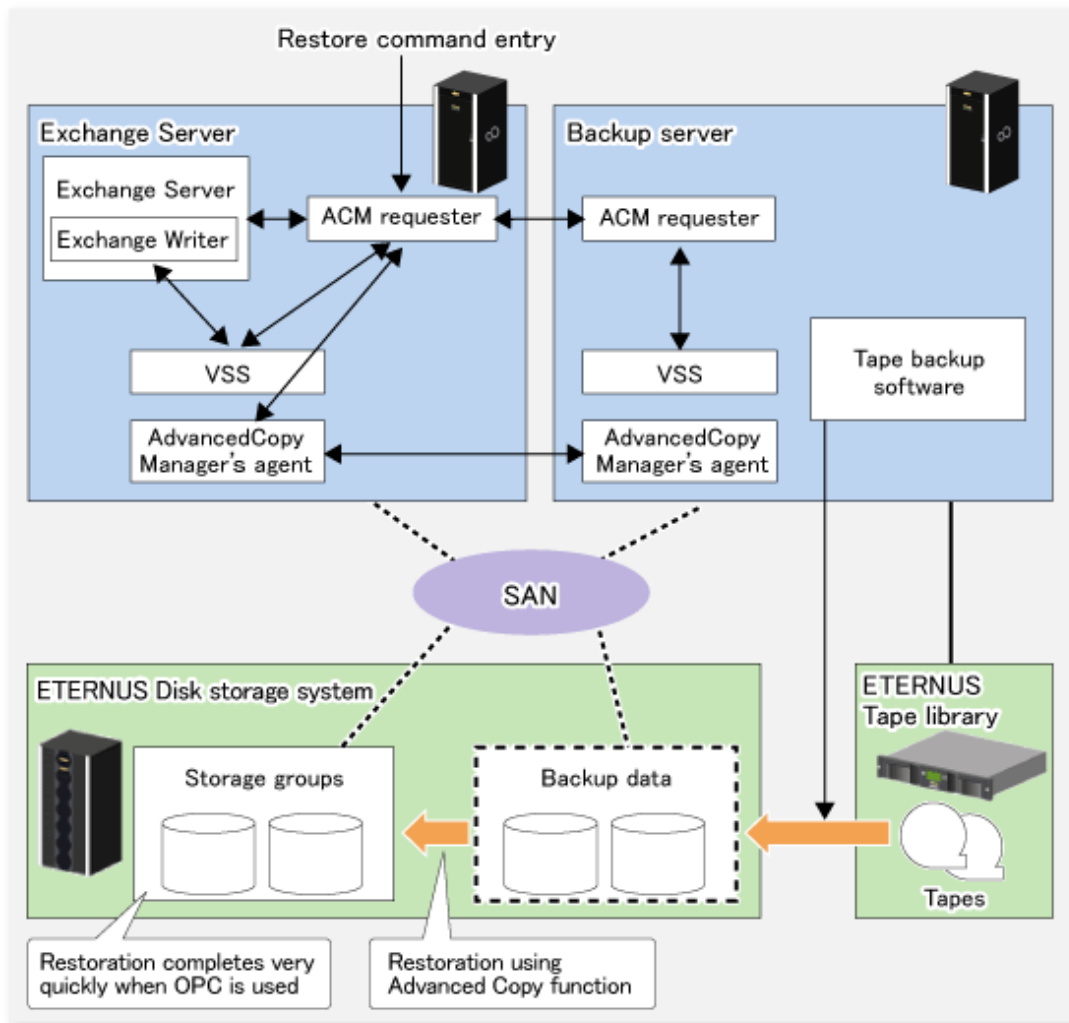
*1: With VSS, the requester restores the necessary files without using a hardware provider for file copying in the restoration processing.

The requester performs restorations using existing functions (swsrpstartsync and swsrpmake).

Figure 8.3 Snapshot restoration (restoration by OPC)
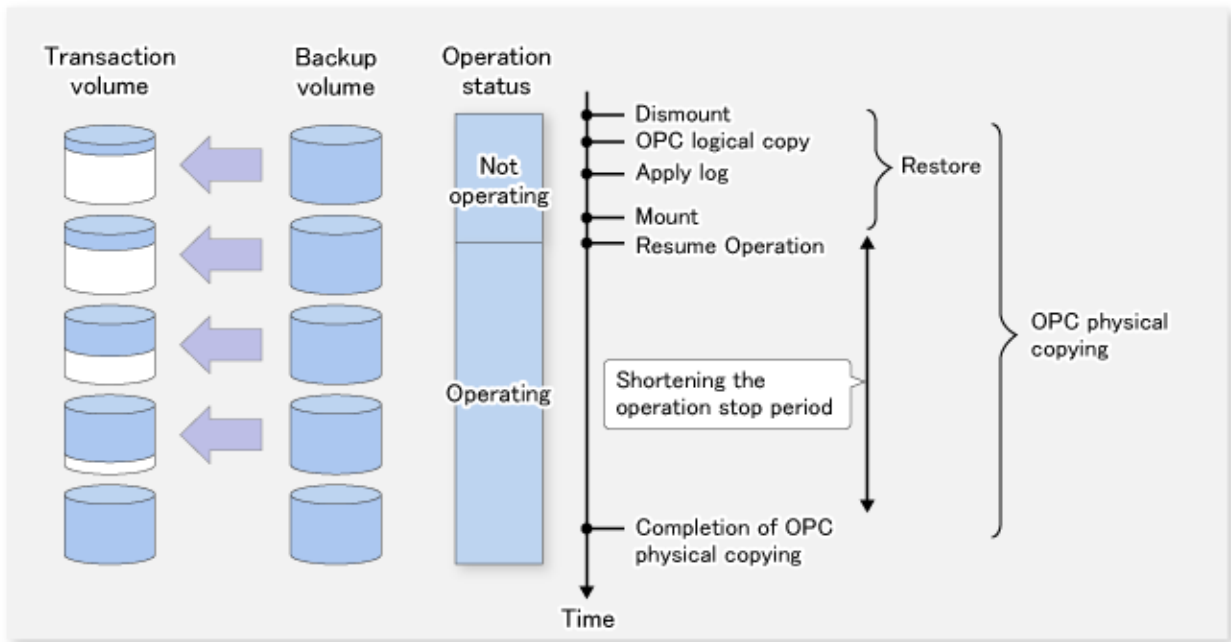
Figure 8.4 Synchronous restoration (restoration by EC/REC)
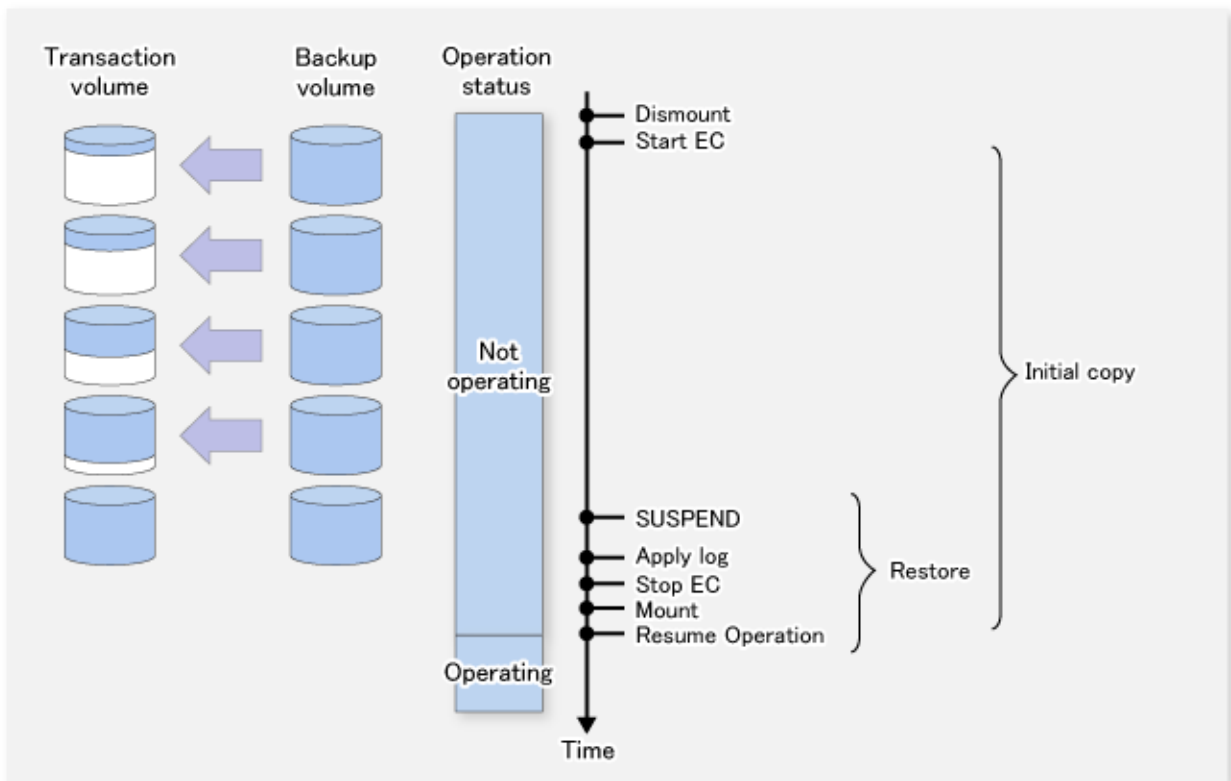
8.1.1.2.1 Point-in-time restoration

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

Management Server

The Management Server centrally manages and operates multiple Managed Servers.
Install the Manager function on this server. The Management Server can also work as a Managed Server.

Managed Server (Exchange server)

This Managed Server is used for the Exchange server operation.
Install the Agent function on this server. 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 MSCS or single nodes.

Note

- When disks of two or more ETERNUS Disk storage systems are connected to an Exchange server, configure the connected disk's OLU numbers so that there are no duplicate OLU numbers.

- It is necessary to apply the following service packs to the Managed 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

Managed Server (Backup server)

This Managed Server is used for the backup server operation.
Install the AdvancedCopy Manager's agent function on this server.
In addition, install the Exchange server system management tool to check the backup data.
The disks (i.e., 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.

- 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.

- For use with disks of two or more ETERNUS Disk storage systems connected to a Backup server, configure the OLU numbers of the disks to be connected so as to be no duplicate of any other disk's OLU number.

- It is necessary to apply the following service packs to the Managed Server (Backup server).

    - Microsoft Windows Server 2003, Enterprise Edition SP1 or later

    - Microsoft Windows Server 2003, Standard Edition SP2 or later

Figure 8.5 System configuration
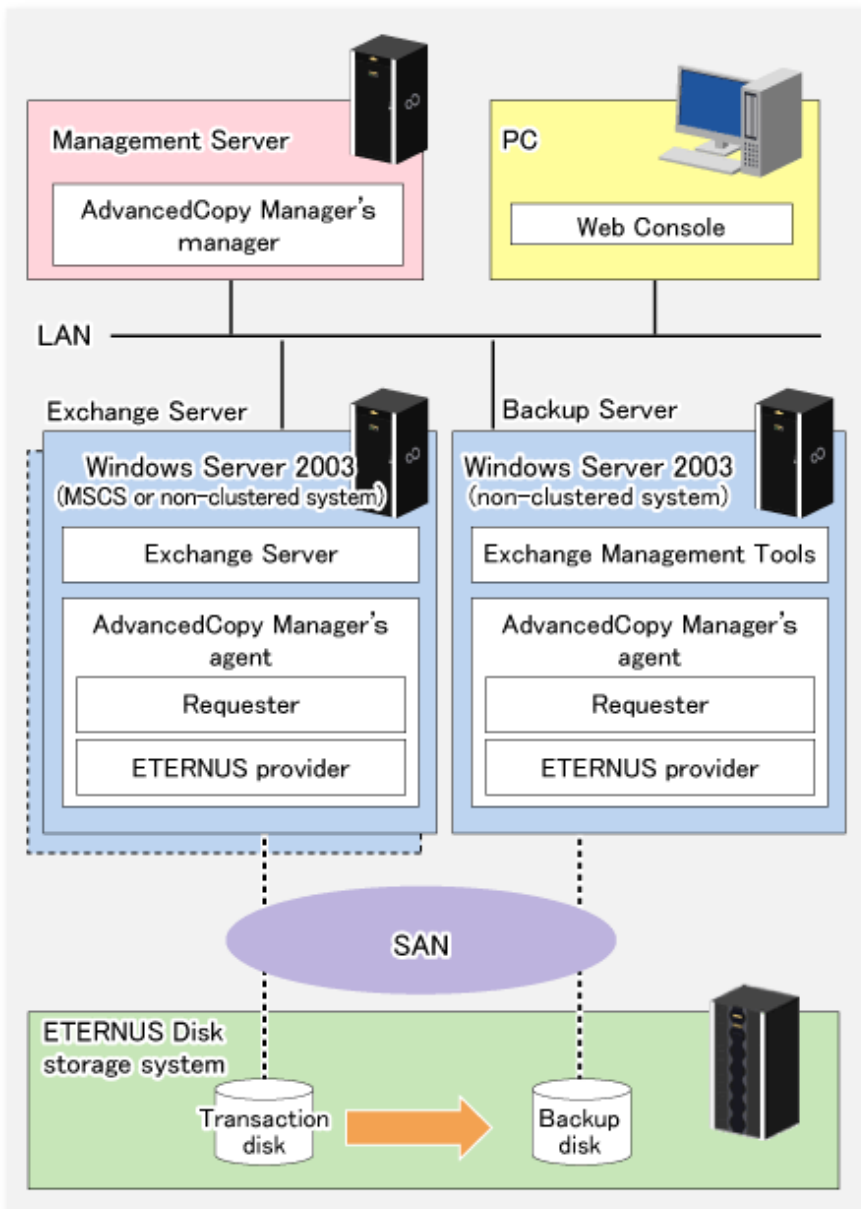
8.1.2.2 Designing storage groups

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
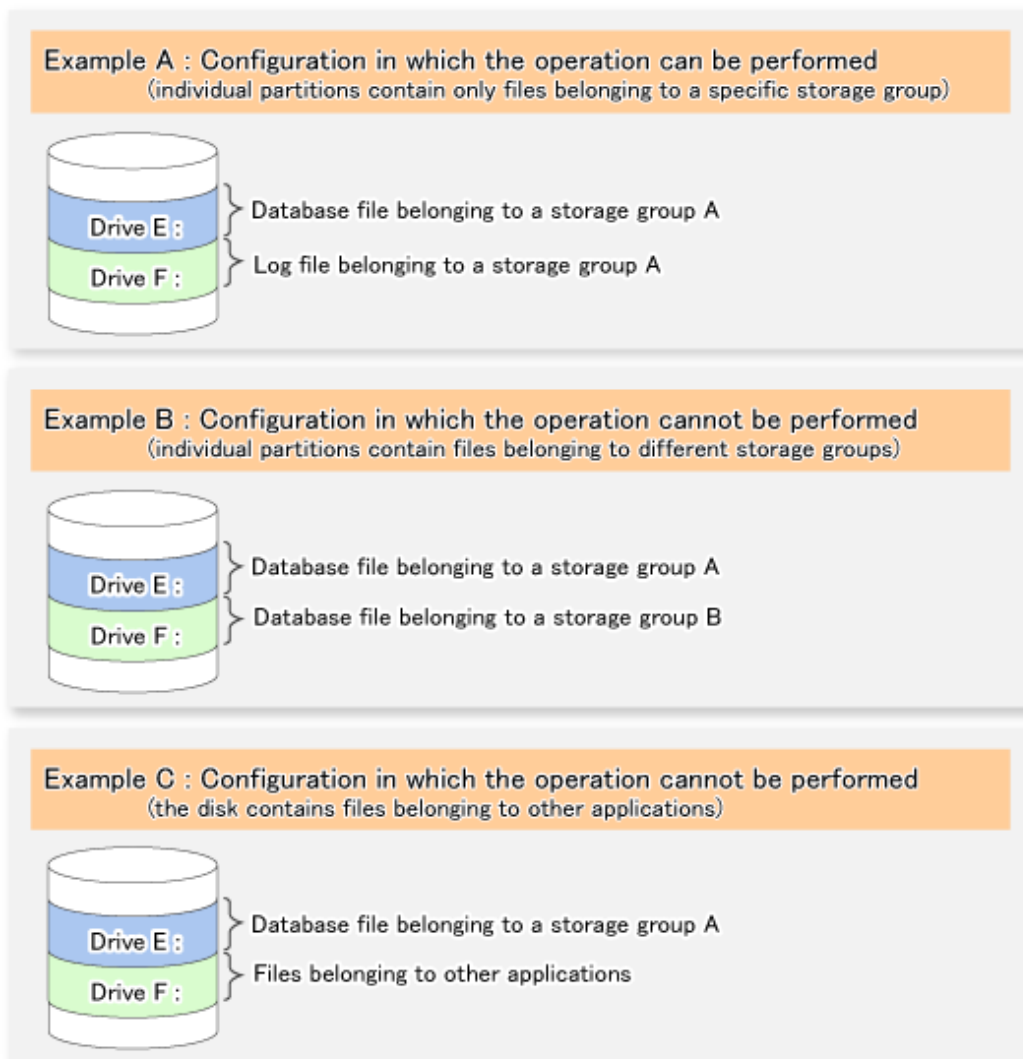
The operation can be performed in the configuration shown in Example A.

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
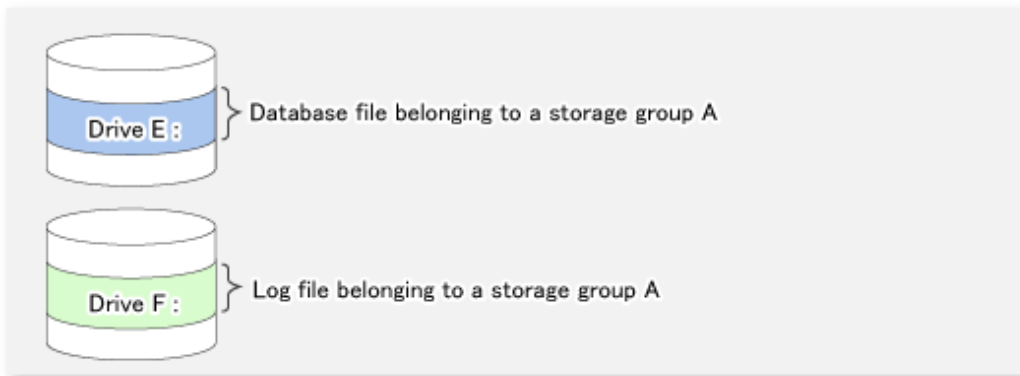
> **Note**
> ....
> GPT disks cannot be used.
> ....

> **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 location

Database file location

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 executes restoration 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 located. 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
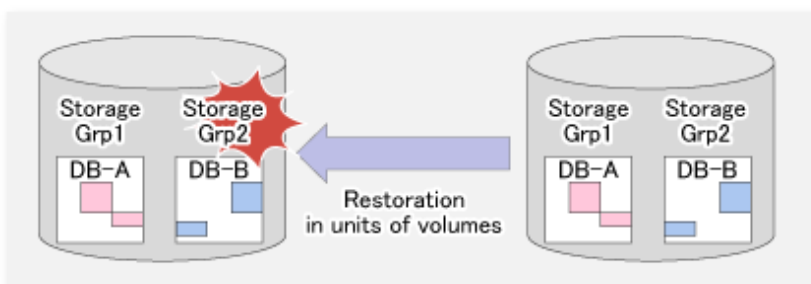
Note

- 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 cannot be allocated to the volume that contains the Exchange server executable and control files.

- Locate a database file in the database to be backed up so that its file path is 213 bytes or less.

- Locate a log file in the database to be backed up so that its directory path is 197 bytes or less.

Point

To copy an already allocated database file, use the Exchange system manager.

Transaction log file location

Figure 8.9 Relationship between log file allocation and feasible restoration modes
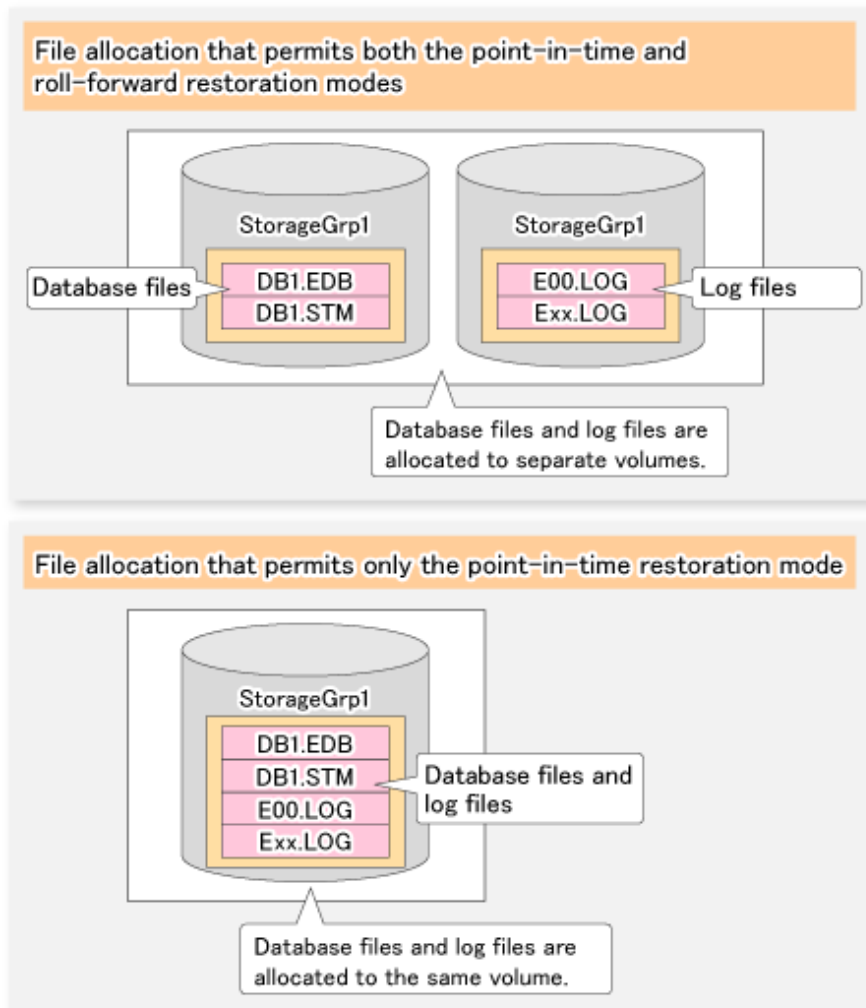
Table 8.3 Relationship between log file location and feasible restoration modes

Log files location	Restoration mode	
	Point-in-time	Roll-forward
Same volume with database files	Enabled	Disabled
Separate volume from database files	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, locate 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 location 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
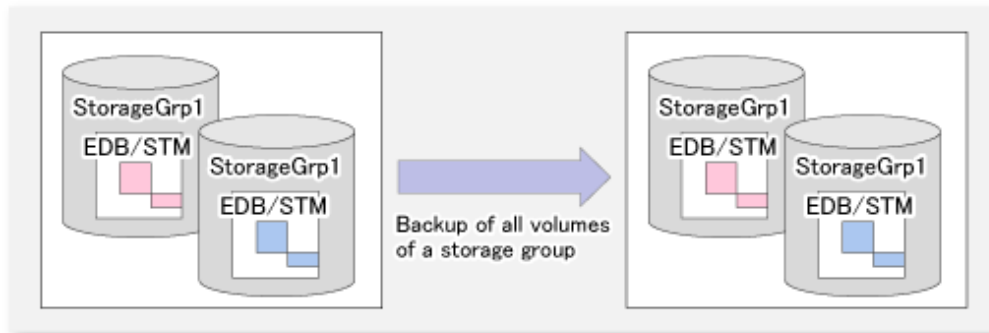
8.1.2.3 Designing circular logs

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 backup disks (LUN) and backup volumes (partitions)

Placement of the backup disk

Backup disks must be placed on the ETERNUS Disk storage system.
If the backup disk is placed on the same ETERNUS Disk storage system as the transaction volume, the OPC, EC, and QuickOPC functions can be used. If the backup disk is placed on a different ETERNUS Disk storage system 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 "3.4.4 Fetching device information on a Managed 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
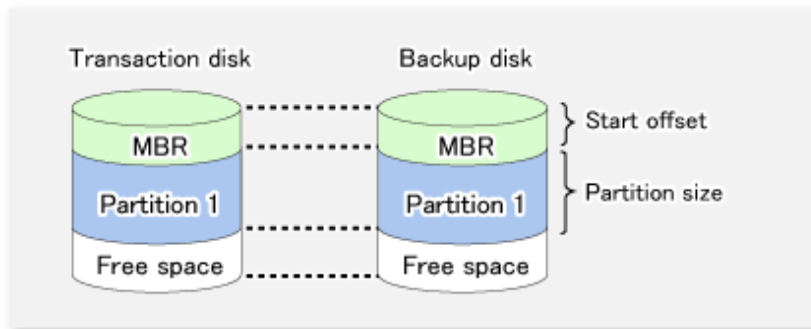
8.1.2.5 Designing copy set groups

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
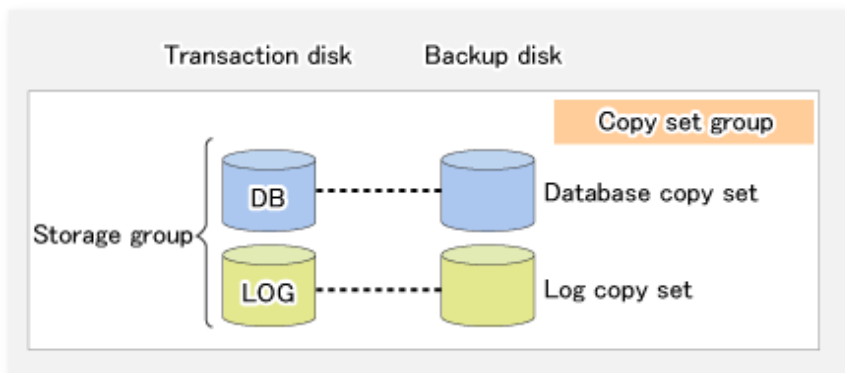
Only one transaction disk can be registered with a copy set group. Copy sets with the same transaction disk but different backup disks cannot be registered in the same copy set group.

Figure 8.13 When registration to a copy set group is not possible
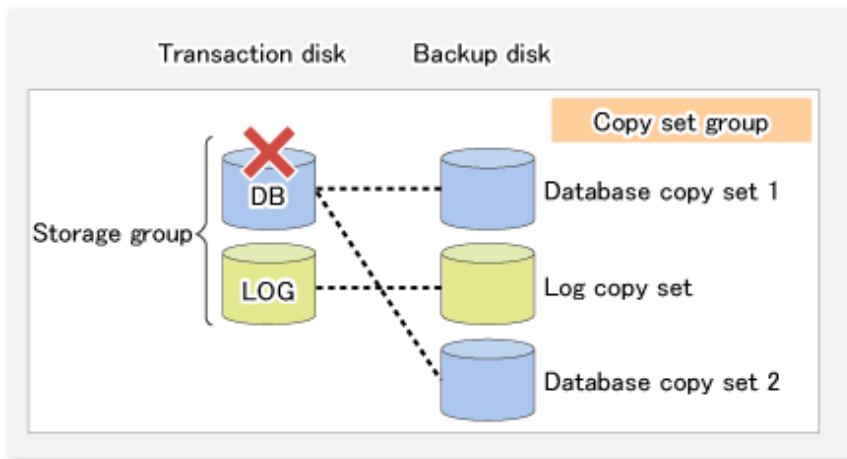
To keep multiple generations of shadow copies, prepare multiple copy set groups.

Figure 8.14 When saving multiple shadow copy generations
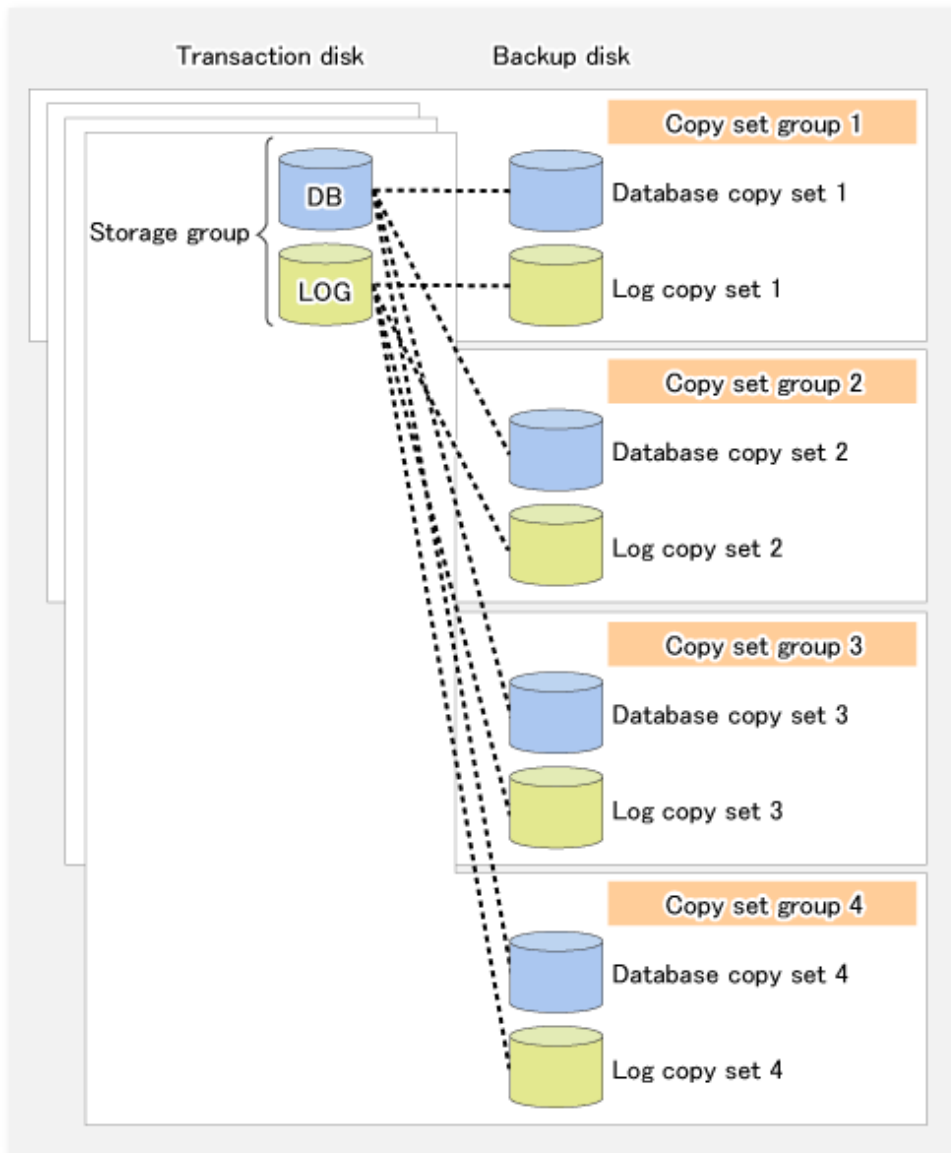
Exchange linkage commands (swsrpXXX_exchange) perform processing on particular copy sets based on the storage group name and the copy set group name. Accordingly, multiple storage groups can be registered in a single copy set group.

Figure 8.15 When multiple storage groups are registered
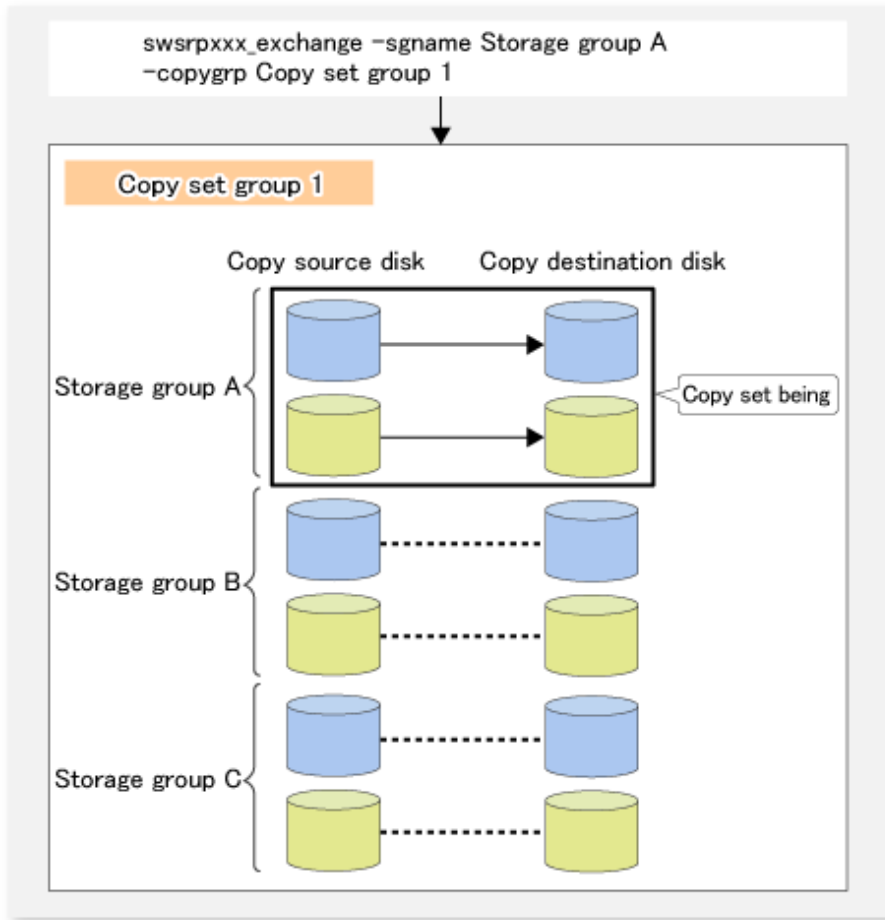
To keep multiple generations of shadow copies, create a copy set group for each generation you wish to keep.

Figure 8.16 When saving multiple shadow copy generations
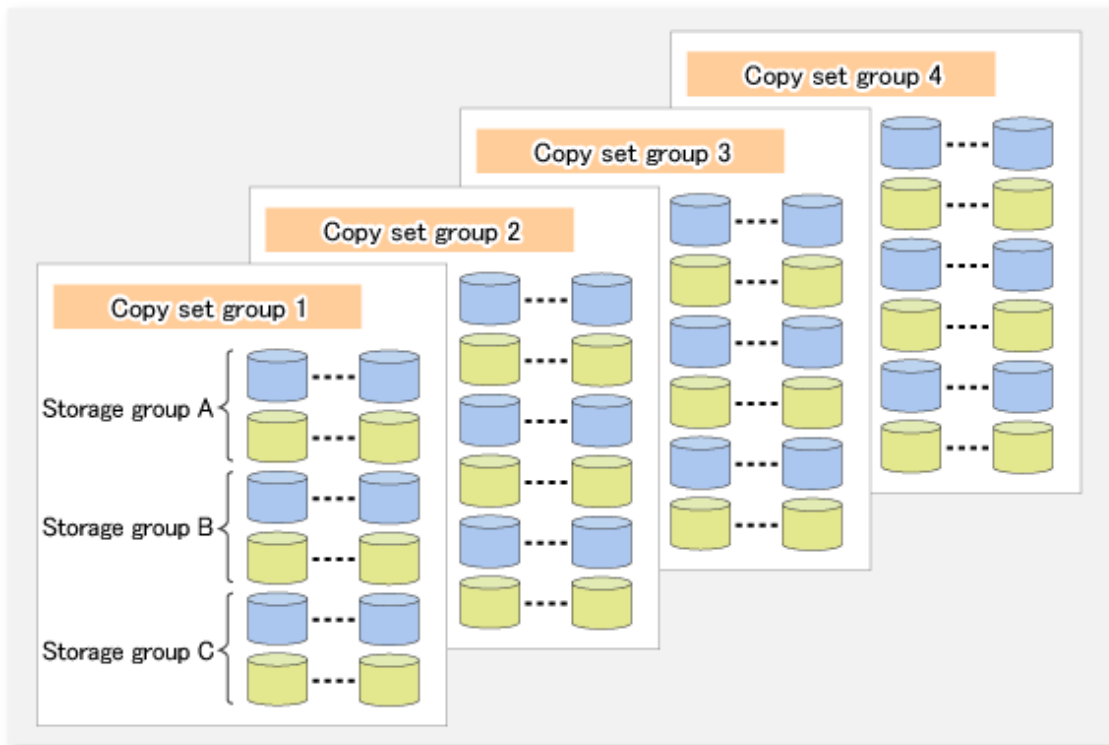
If separate copy set groups are created for each storage group, the number of copy set groups required is given by the formula <number of storage groups> x <number of generations kept>.

Figure 8.17 When creating a copy set group for each storage group
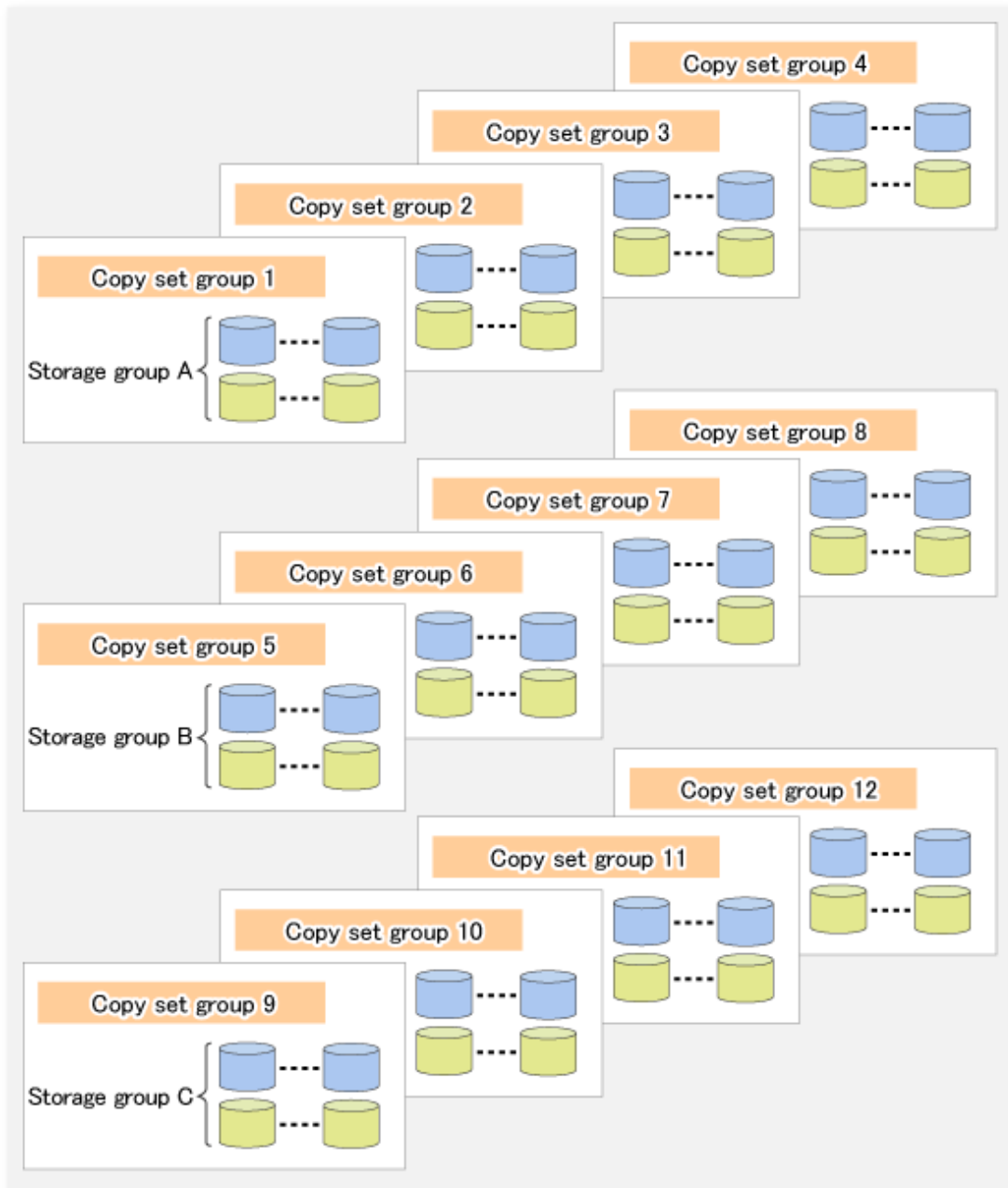
There must be only one backup server for storage groups. If storage groups are made up of multiple disks, it is not possible to back up each disk to a different backup server.

Figure 8.18 When a storage group is comprised of multiple disks
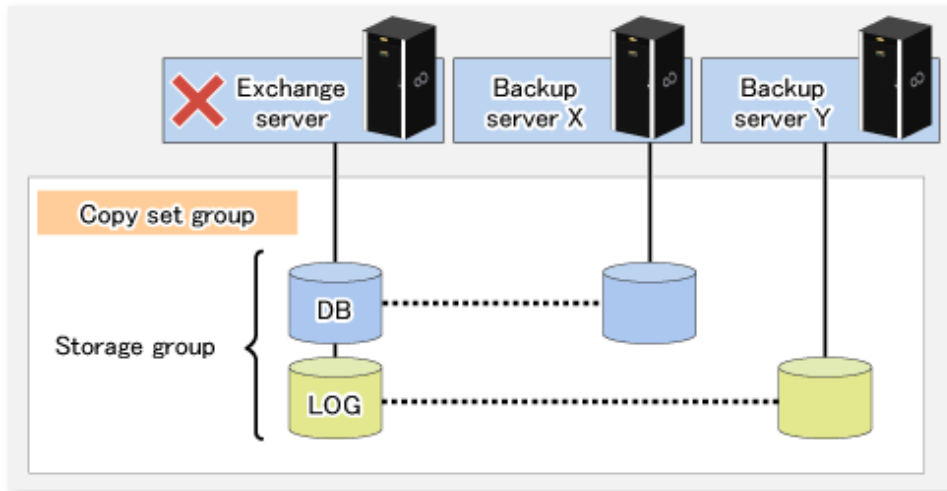
However, if a copy set group includes multiple storage groups, each storage group can use a separate backup server.

Figure 8.19 When multiple storage groups are included in a copy set group
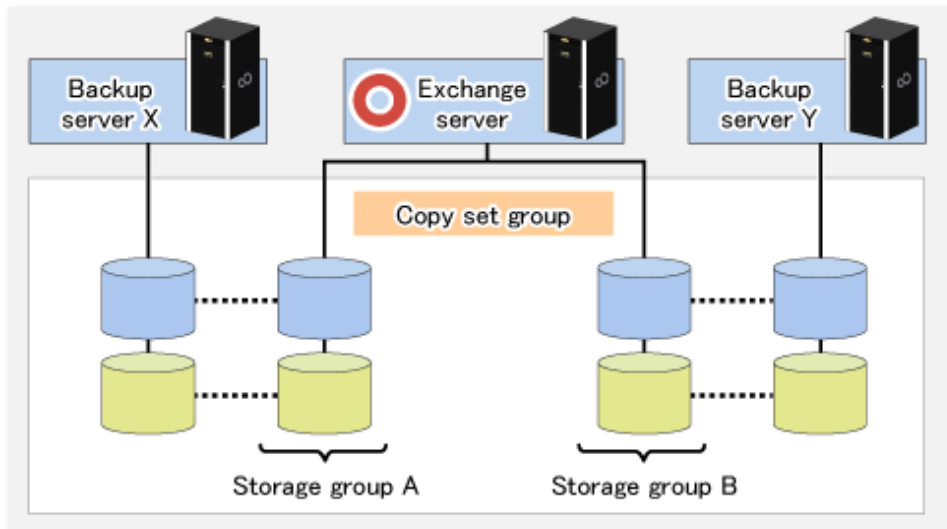
If multiple backup servers are used for a single storage group, use a different backup server for each copy set group.

Figure 8.20 When multiple backup servers are used for one storage group
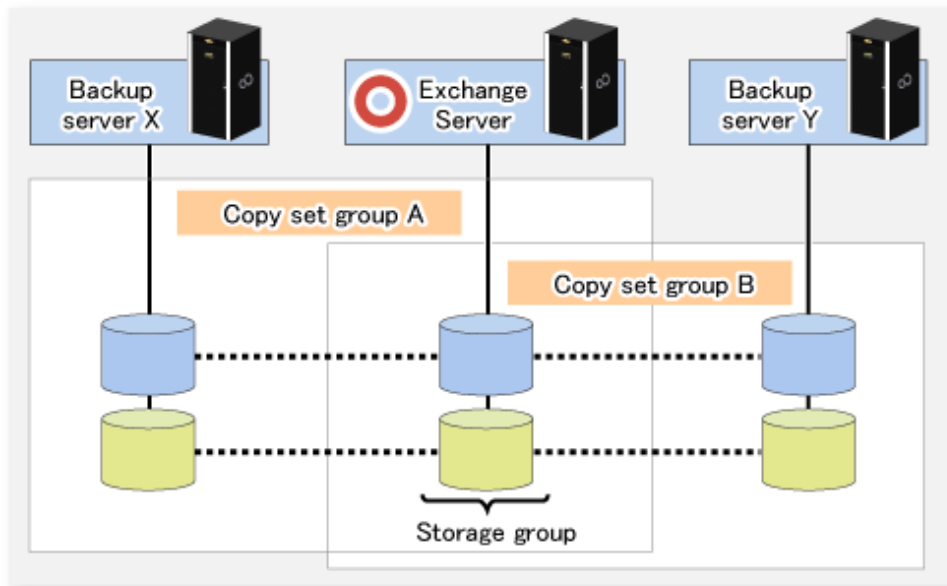
8.1.3 Preparation

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 definition file

- Save the device definition 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 Managed Server transactions at the Exchange Server.

Refer to the following manuals for transaction details:

- *ETERNUS SF Cluster Environment Setup Guide*

- 13.1.5 Notes on cluster operation

- 13.1.7 Notes on replication in a clustered 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:

```
<Environment 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

    <Environment 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 (Copy target 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].
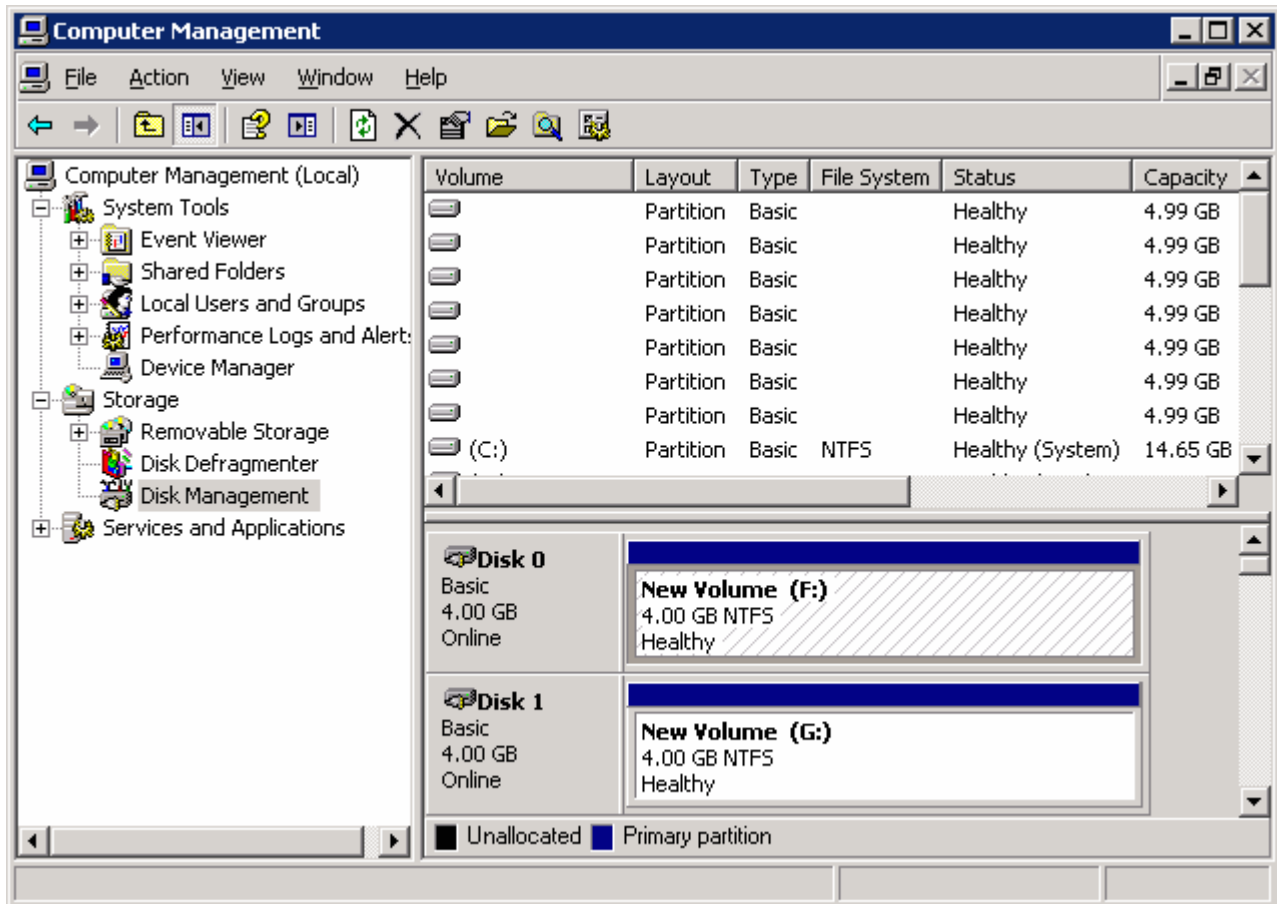
b. Select [Disk Management] from [Computer Management] to display the properties of the device subject to a backup. Confirm the location (Bus Number, Target ID, LUN).
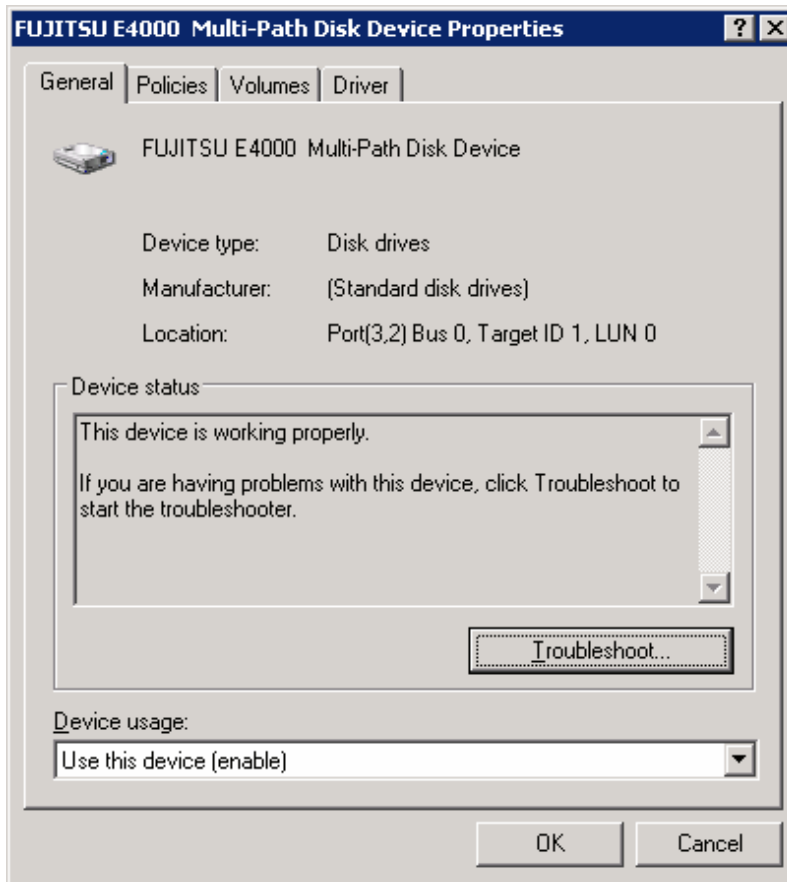
c. From [Computer Management], select [Device Manager] -> [Disk Drive] to display the disk drives.
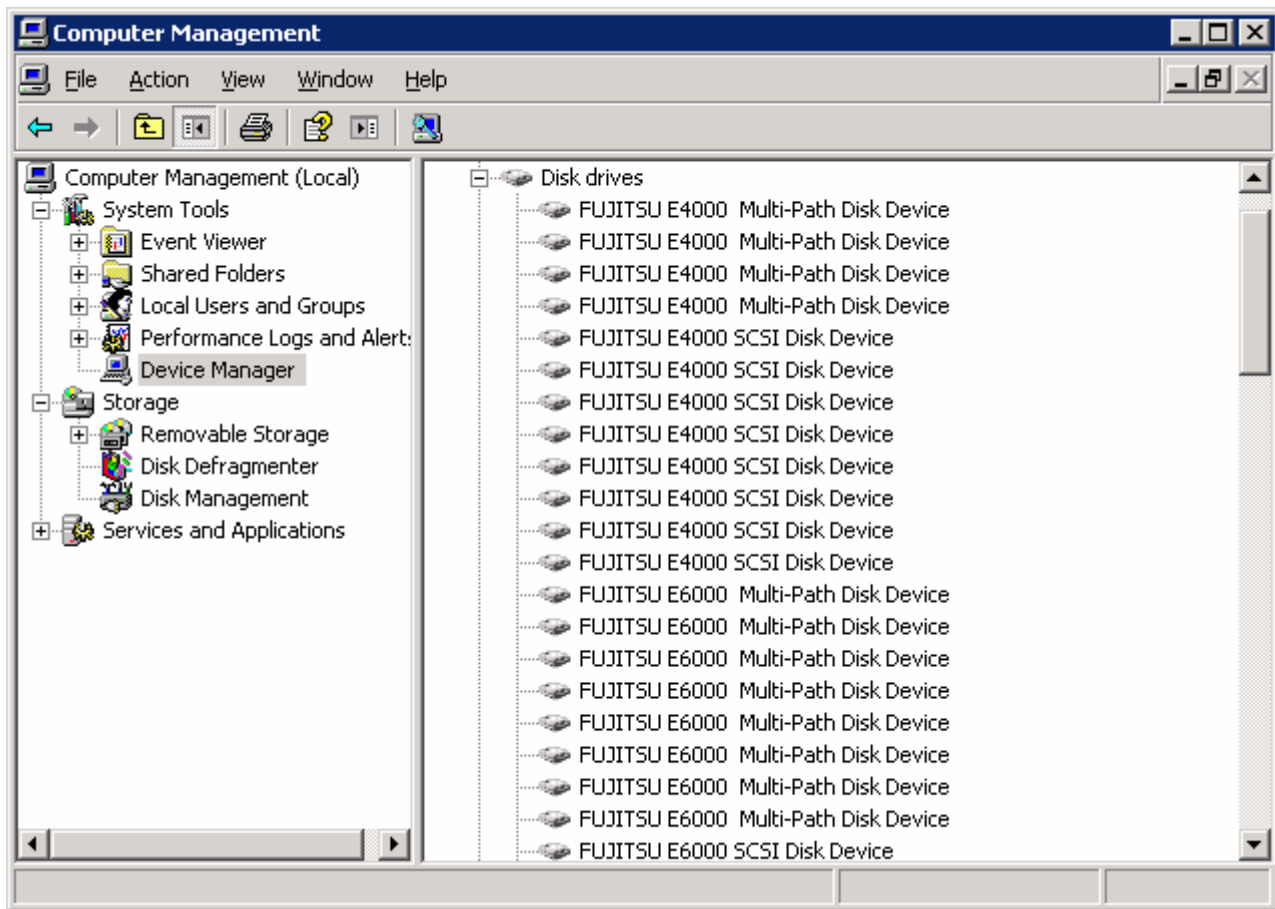
d. Select Disk Device (such as FUJITSU E4000 Multi-Path Disk Device) from [Disk Drive] to confirm the device subject to a backup.
Select Disk Device (such as FUJITSU E4000 Multi-Path Disk Device) and right-click, and then select Properties. Confirm

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.
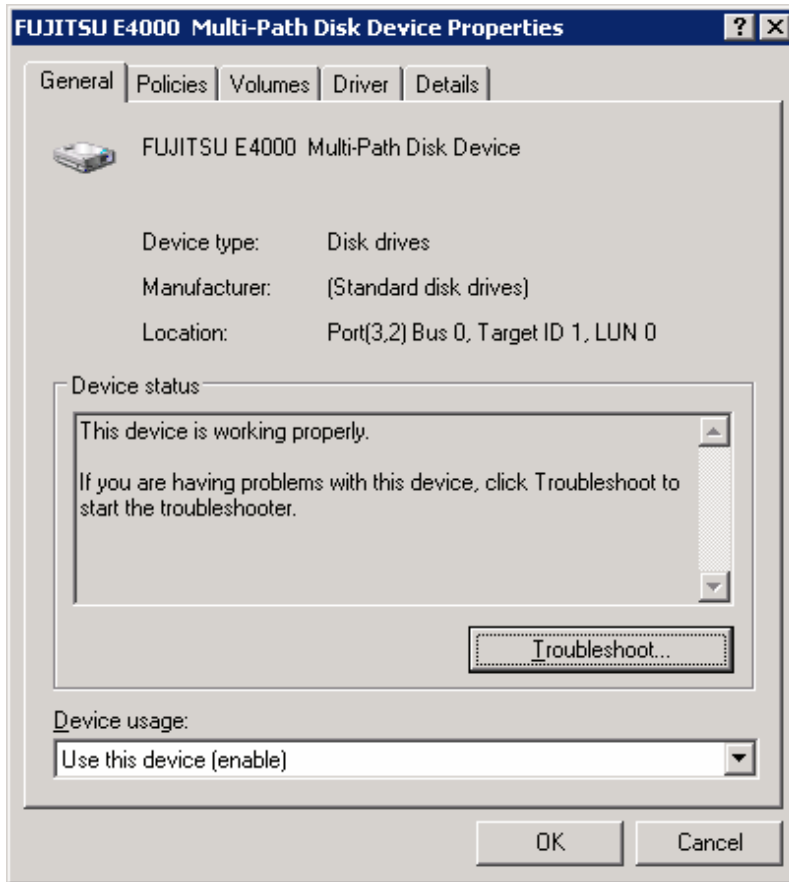
e. When the location that was confirmed in b) of step 2 matches a location confirmed in d) of step 2, select Detail to confirm the device instance ID.
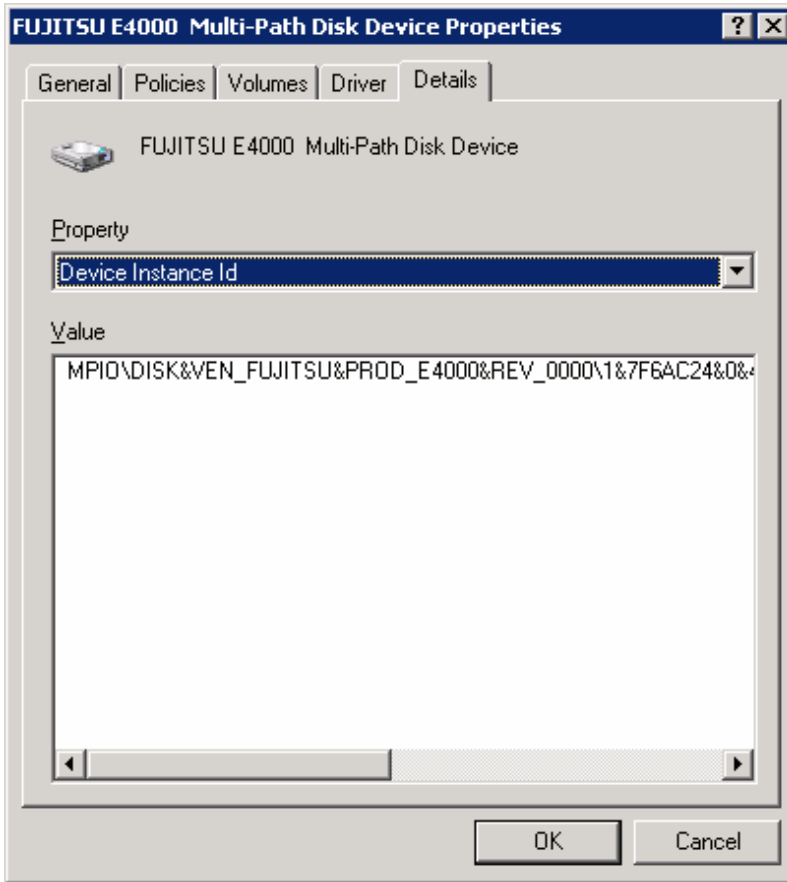
f. Save the combination of the physical disk number and the device instance ID confirmed in point e) of step 2 to a text file.
The device instance ID can be displayed by executing eternus_getins (Device instance ID display command).

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:

```
<Environment directory>\etc\eternus_hardope.def
```

Enter the combination of OLU number and the device instance ID in one line in the format below.

```
OLU number, device instance ID <Enter>
```

Example:

```
53,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
203641303030323330333033330000
54,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
203641303030323330333033330001
55,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
203641303030323330333033330002
56,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
203641303030323330333033330003
```

```
57,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
20364130303032333033303330004
58,MPIO
\DISK&VEN_FUJITSU&PROD_E8000&REV_0000\1&7F6AC24&0&4538393053323041232323232020202020
20364130303032333033303330005
```

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:

```
<Environment 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 volume definition file (only for Exchange Server single configuration)

If the Exchange Server has a non-clustered system, an Advanced Copy control disk (access volume) must be created for the Exchange Server.

This section is not required for clustered system because the shared disk for AdvancedCopy Manager shared data is used as the access volume.
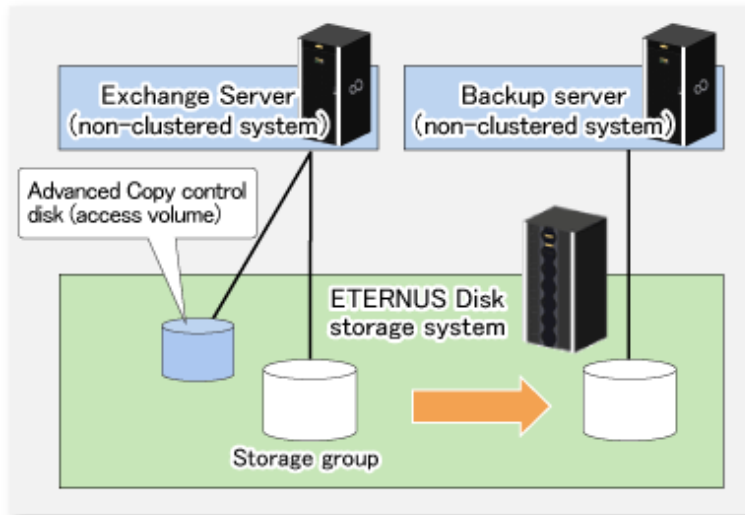
The following table shows the procedures for creating an Advanced Copy control disk.

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 storage system 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 Advanced Copy control disk is created, create a new access volume definition file under the following filename on the Exchange Server:

```
<Environment directory>\etc\eternus_accdrv.ini
```

The format for the access volume definition file is as follows:

```
Drive=<drive letter>
```

The following example show an access volume 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 execution 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): *<Environment directory>*\etc\repl\data\exchange\\<*Exchange server Managed Server name*>\metadoc\<*storage group name*>.wmd.xml - If the copy set group name is anything other than "BkupGroup" (the default name): *<Environment directory>*\etc\repl\data\exchange\\<*Exchange server Managed 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): *<Environment directory>*\etc\repl\data\exchange\\<*Exchange server Managed Server name*>\metadoc \<*storage group name*>.bcd.xml - If the copy set group name is anything other than "BkupGroup" (the default name): *<Environment directory>*\etc\repl\data\exchange\\<*Exchange server Managed Server name*>\metadoc \<*storage group name*>.<*copy set 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 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
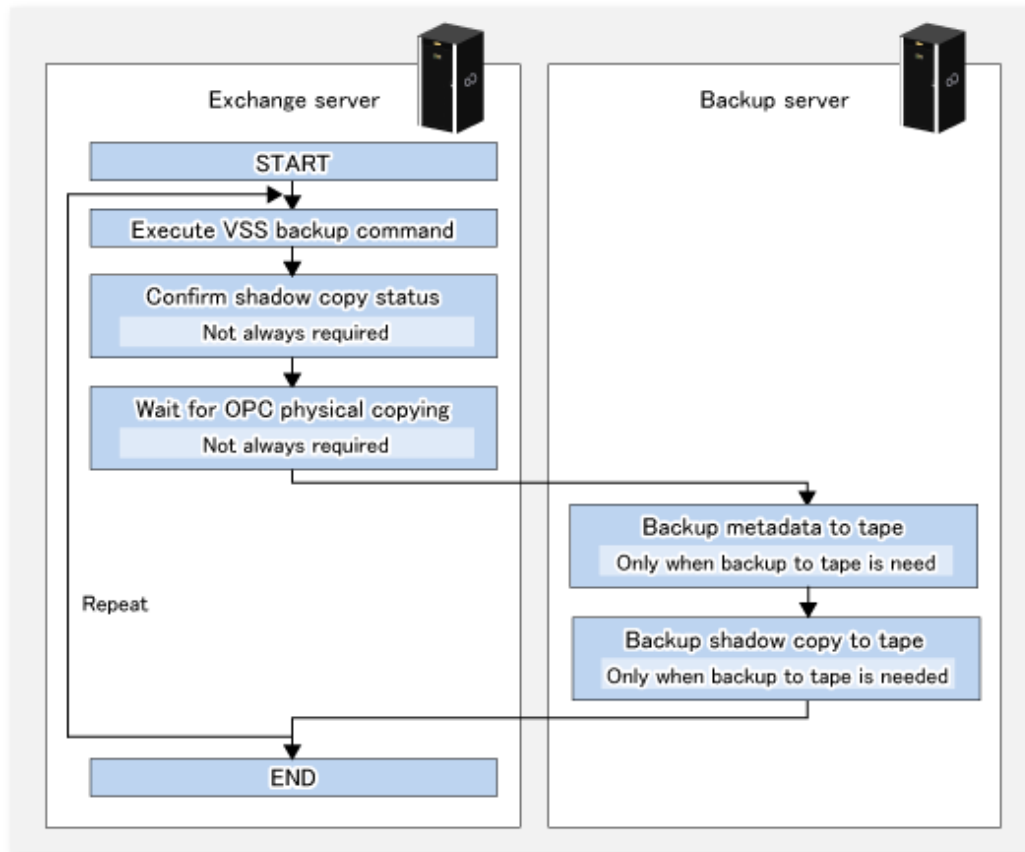
Figure 8.22 For synchronous type backups
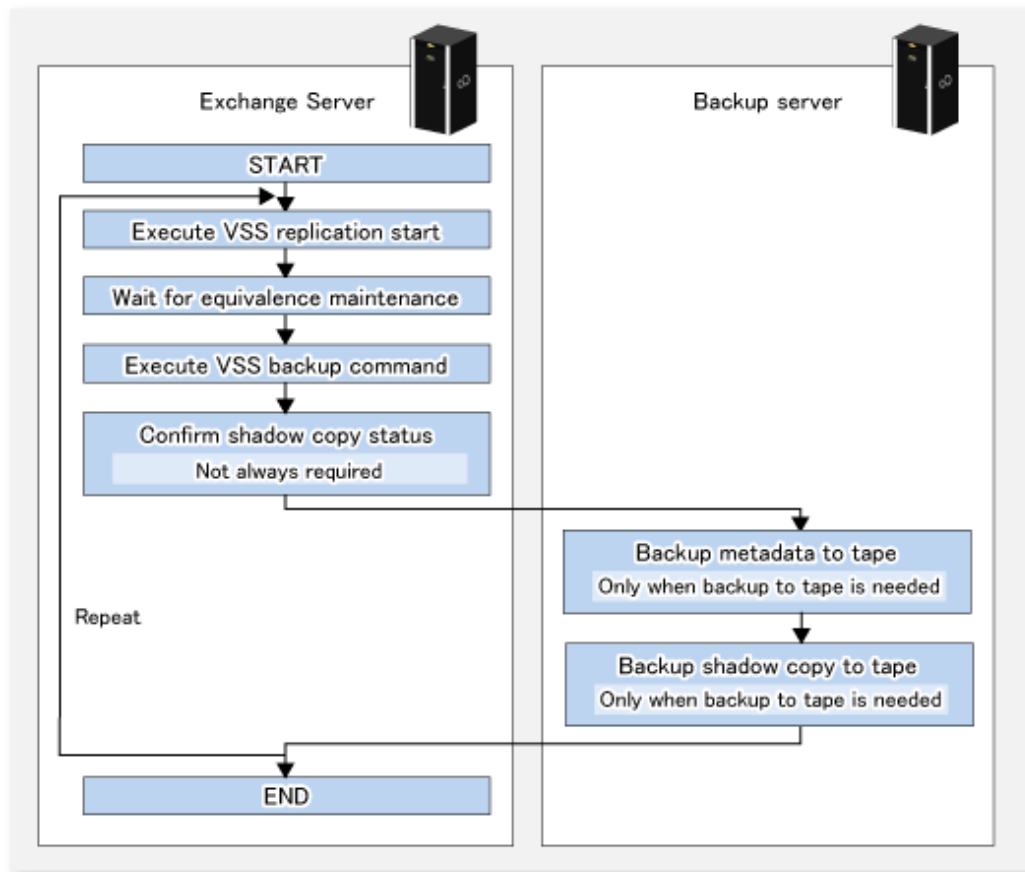
8.1.4.3 States of the backup disk

If a backup disk (LUN) uses volumes (i.e., 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 (i.e., 21 times including the first attempt), processing is cancelled 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:

```
<Environment 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
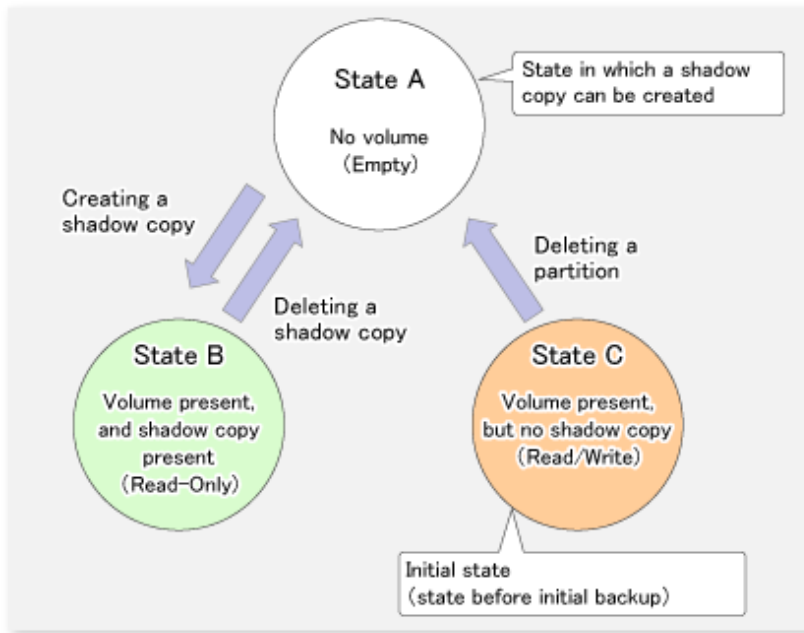
Because the backup disk is never put in state C except before the initial backup, it moves between states A and B during the backup.

Figure 8.24 For snapshot type backups
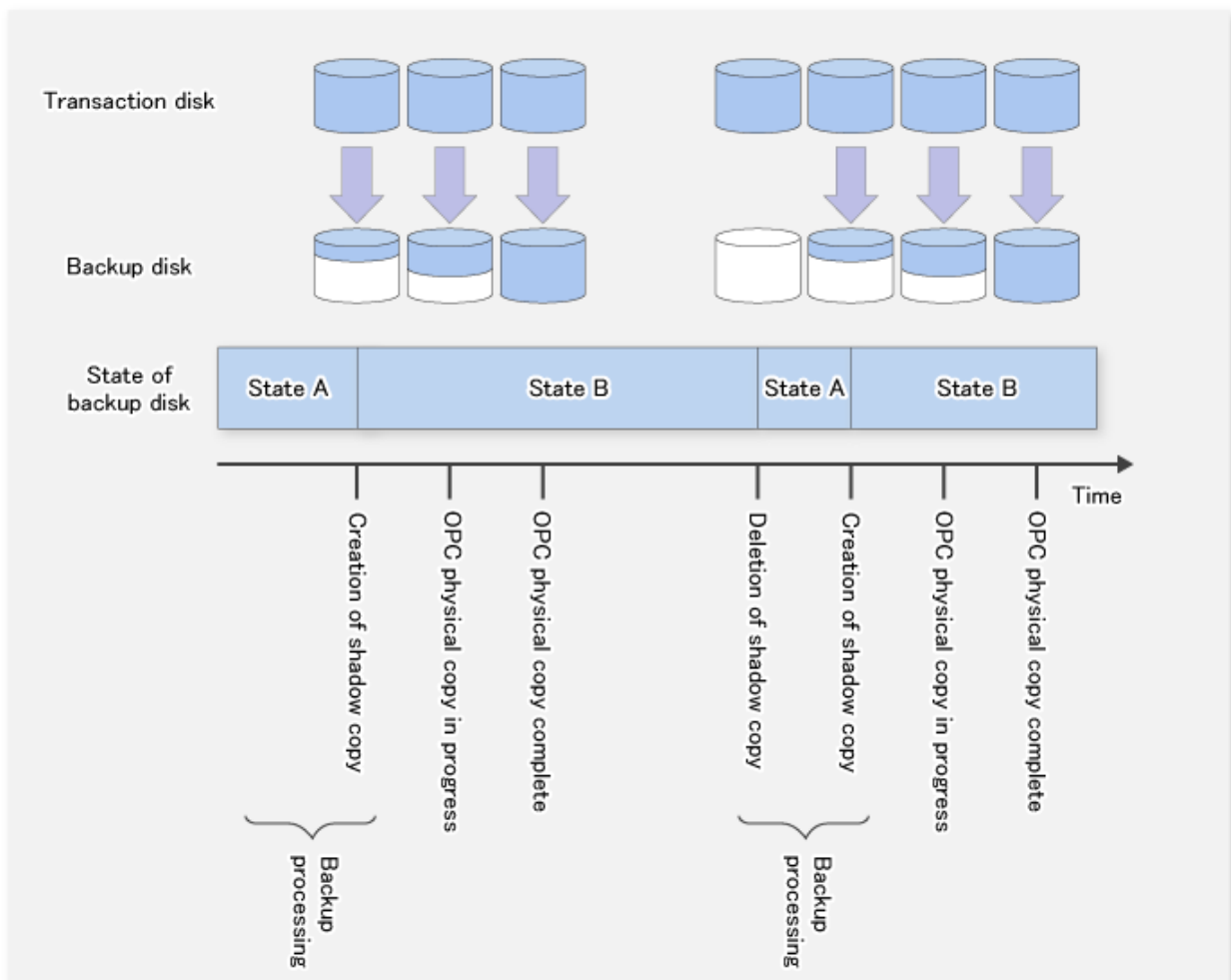
Figure 8.25 For synchronous type backups
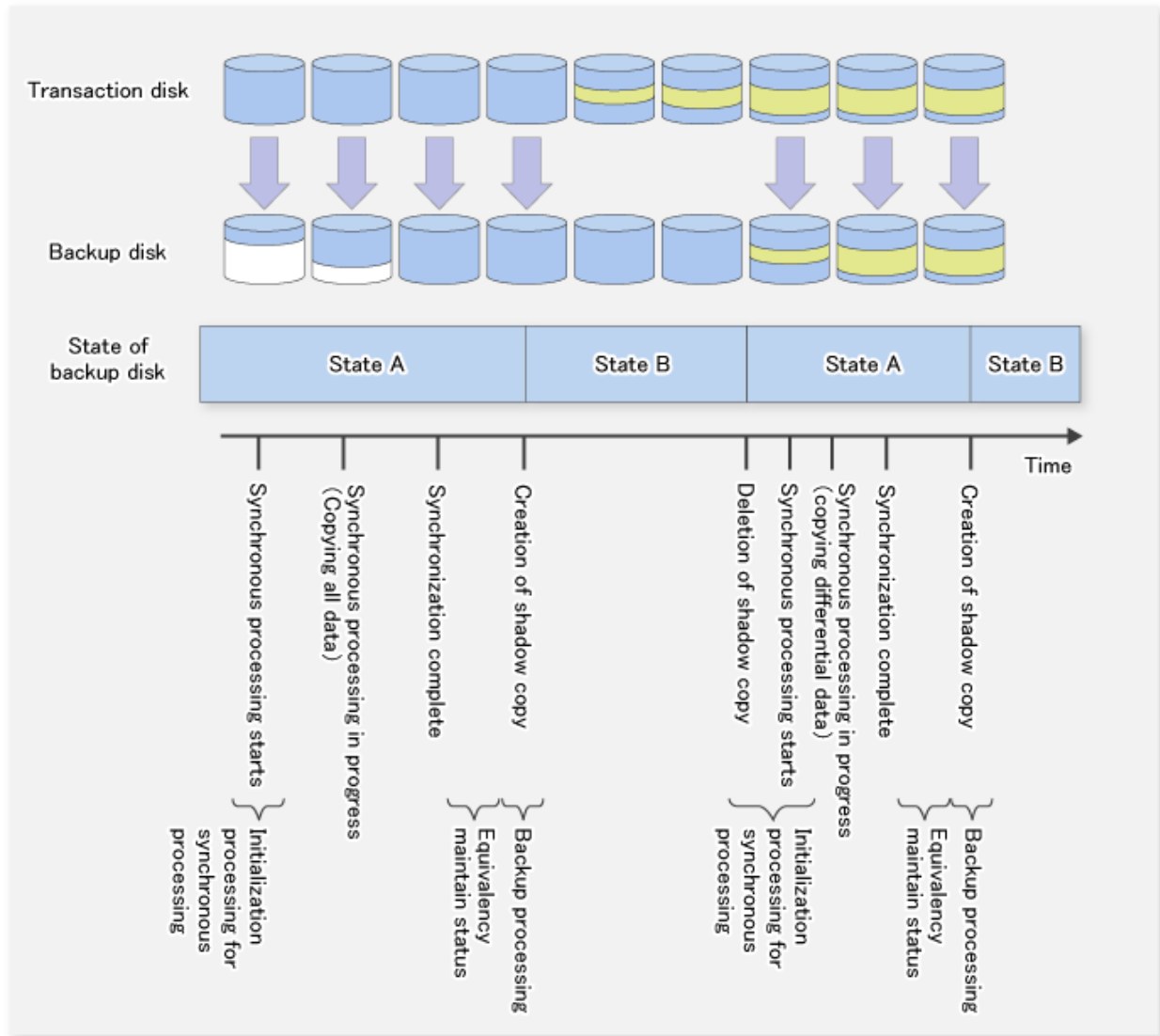
8.1.5 Restoration

8.1.5.1 Preparation

The following steps must be completed before performing a restoration:

- 8.1.5.1.1 Confirmation of environmental setting

- 8.1.5.1.3 Dismounting the storage group (when performing a synchronous restoration, or with Exchange Server 2007)

- 8.1.5.1.4 Stopping resource monitoring for the physical disk (only when MSCS is operating)

- 8.1.5.1.5 Stopping the EC/REC session (only for synchronous type backups)

- 8.1.5.1.6 Stopping the QuickOPC session (only for differential snapshot type backups)

- 8.1.5.1.7 Starting restoration synchronous processing and coordinating equivalence 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
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 Confirmation of environmental setting

Confirm an environmental setting is done by the same composition as the backup referring to "8.1.3 Preparation".

8.1.5.1.2 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.

8.1.5.1.3 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.

8.1.5.1.4 Stopping resource monitoring for the physical disk (only when MSCS is operating)

When the Exchange Server 2007 is running on MSCS, the transaction volume that is the restoration destination 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, failover will happen for the cluster group.

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, *.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:\>
```

8.1.5.1.5 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.

8.1.5.1.6 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 cancelled 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.

8.1.5.1.7 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.

![Note icon] **Note**

. . . .

The volumes that are subject to restoration synchronous processing are dependent on the restoration method.

. . . .

8.1.5.2 Executing the restoration

Restoration is performed separately for each storage group, using swsrpvssrestore_exchange (Exchange VSS restore 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 Copy functions, 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 restore 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
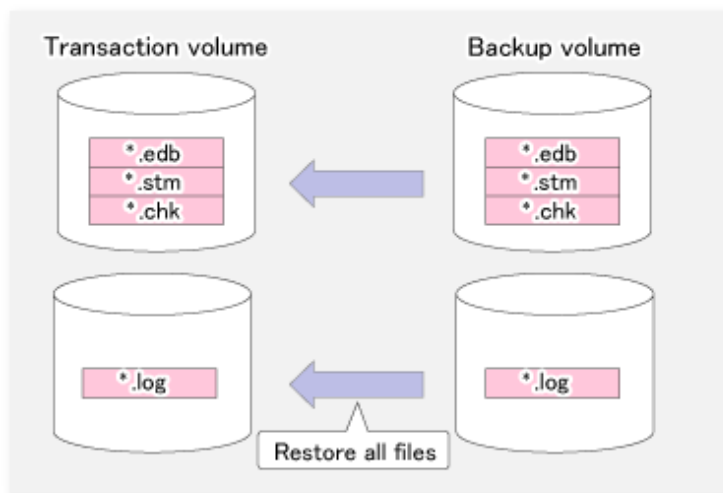
Example:

```
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 restore 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
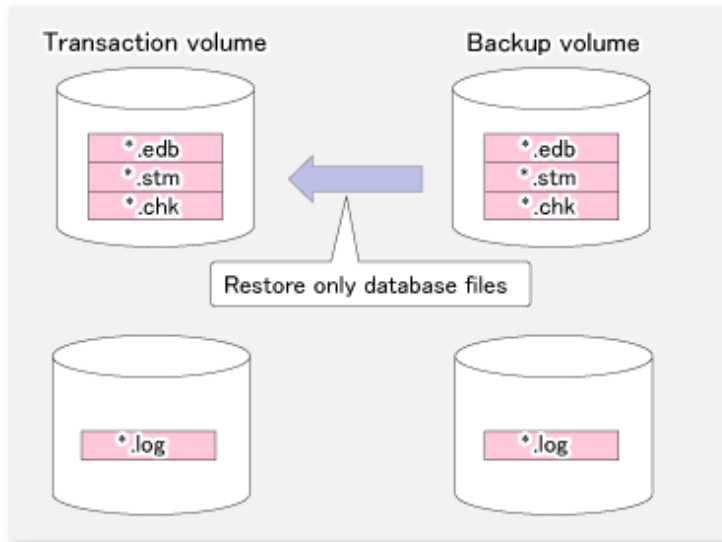
Example:

```
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 (For Exchange Server 2007, the "XXXXXXXX" part of the EnnXXXXXXXX.log, and for Exchange Server 2003, "XXXXX" part of E0nXXXXX.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 (only when WSCS is operating)

When the Exchange server is running on MSCS, restart resource monitoring by cancelling 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 swsrpvssrestore_exchange (Exchange VSS restore execution 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)
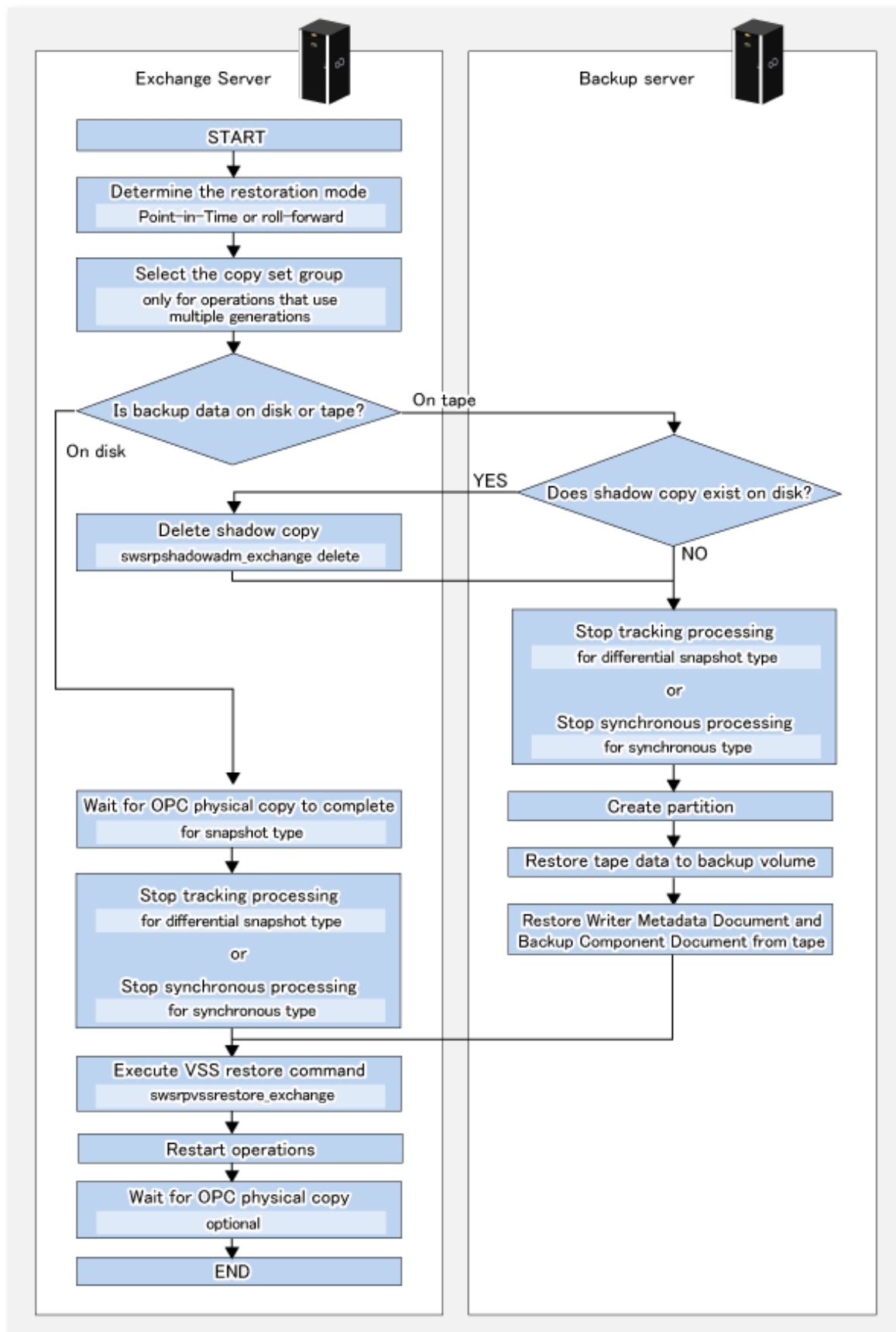
Figure 8.29 Synchronous restoration (restoration performed using EC or REC)
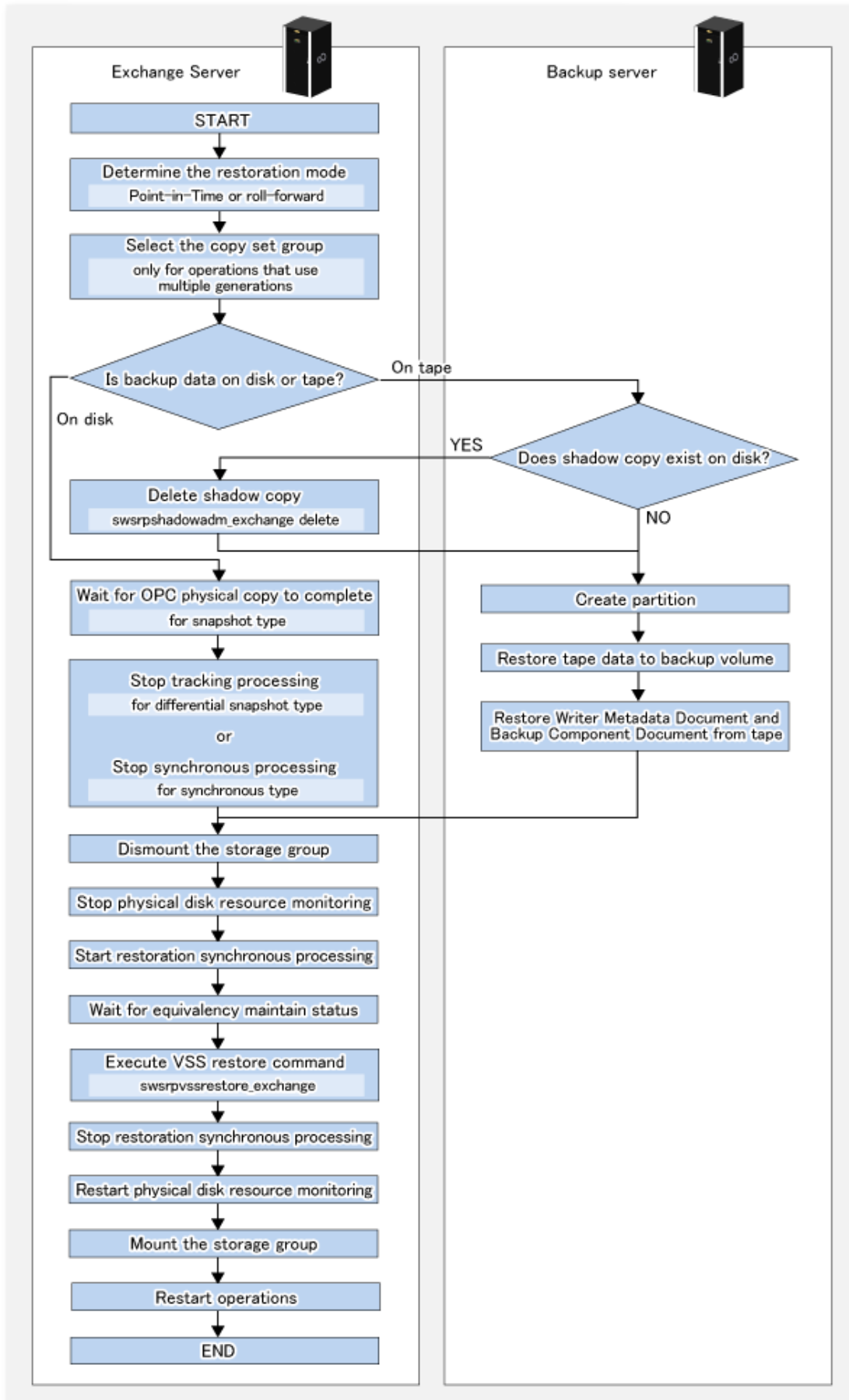
8.1.6 Reconfiguration

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 on a Managed 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 (i.e., 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 on a Managed 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 Managed Server name

To change the Managed 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 Managed Server name. For details, refer to "11.5.4 Changing the server name of Management Server or Managed 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 Managed 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 registration/deletion/reference 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 (Replication volume information deletion command) for information on how to delete the source and replica volumes.

8.1.8.4 Delete the Managed Server

Delete the Managed Server to be uninstalled from the control of AdvancedCopy Manager.
The process of deleting a Managed Server can be carried out using either Web Console or stgxfwcmdelsrv (Server information deletion command).

If you have deleted the Managed server with stgxfwcmdelsrv (Server information deletion command), take the following actions to reflect to the Web Console depending on how the agent installed in the deleted Managed Server is used:

- If both of AdvancedCopy Manager's agent and Storage Cruiser's agent are used:

    On the Web Console, execute [Reload Conf.] to update to the latest information.

- If only AdvancedCopy Manager's agent is used:

    On the Web Console, delete the Managed Server that you have deleted.

8.1.8.5 Cancel the cluster settings for AdvancedCopy Manager

If the Exchange Server has a cluster configuration, delete the Managed Server transactions and the Management Server transactions from the Exchange Server.
Refer to the *ETERNUS SF Cluster Environment Setup Guide* for more information about cancelling 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 eternus_provider (Provider registration/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 "Uninstalling ETERNUS SF Manager" and "Uninstalling AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide* to delete AdvancedCopy Manager.

8.2 Backup and restore of Exchange Server database in Windows Server 2008 or later

This section explains the procedure for backing up or restoring the Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013 databases.

The Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013 databases are referred to as "Exchange databases".

There are differences in terminology between Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013. In this section, has described the terminology of Exchange Server 2013 by the terminology of Exchange Server 2007 and Exchange Server 2010:

Table 8.8 Correspondence between Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013

Server 2007 or Exchange Server 2010	Exchange Server 2013
Exchange Management Console	Exchange Administration Center

For backup and restoration of Database Availability Group, refer to "8.3 Backup and restore of Database Availability Group".

8.2.1 Overview

8.2.1.1 Backing up Exchange databases

The Advanced Copy function of the ETERNUS Disk storage system can link with VSS to implement a high-speed online backup of the Exchange databases.

When backing up an Exchange Server 2010 or Exchange Server 2013 database, the backup can easily be configured using a wizard. Refer to "8.4 Backup using the Backup Wizard for Exchange Server" for details.

The backup data of an Exchange database includes the backups of the following files that constitute the Exchange database:

- EDB file (database files)
  This file is used to configure databases. 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 (for Exchange Server 2007) or database (for Exchange Server 2010 or Exchange Server 2013).

- 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 (for Exchange Server 2007) or database (for Exchange Server 2010 or Exchange Server 2013).

Online backup

A linkage with VSS enables the online backup of the Exchange database.

- Backup is performed in units of storage groups (for Exchange Server 2007) or in units of databases (for Exchange Server 2010 or Exchange Server 2013). 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)

- Files for backup (ie, those with extensions *.edb, *.log or *.chk) are copied to the backup volume.

    *1: The provider of other companies and the hardware provider for ETERNUS bundled to the AdvancedCopy Manager package for Windows Server 2003 cannot be used in this function.

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
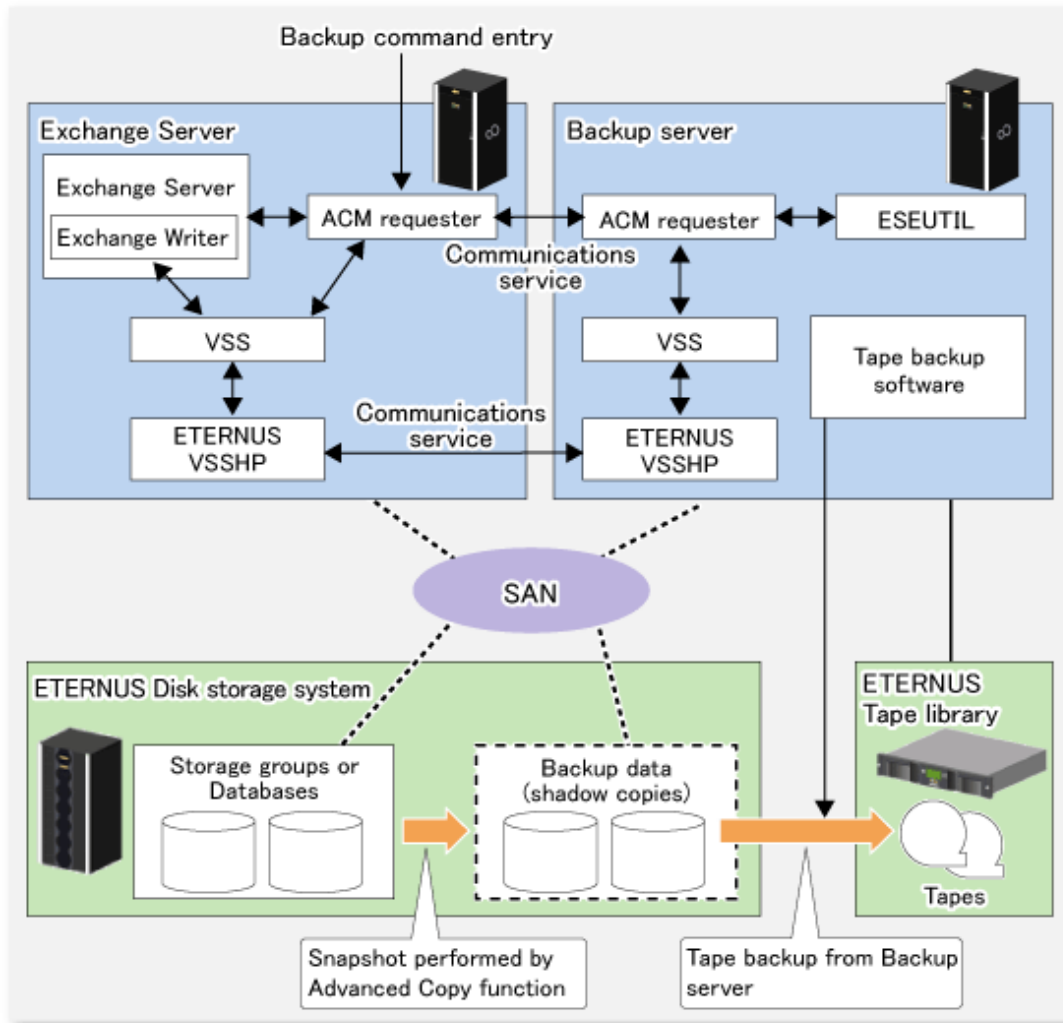
Table 8.9 Exchange server and backup server functions

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 Advanced Copy functions to provide a shadow copy creation function.

8.2.1.2 Restoring Exchange databases

The Advanced Copy function of the ETERNUS Disk storage system can link with VSS to restore the Exchange databases from the online backup data.

Figure 8.31 Exchange database restoration processing image
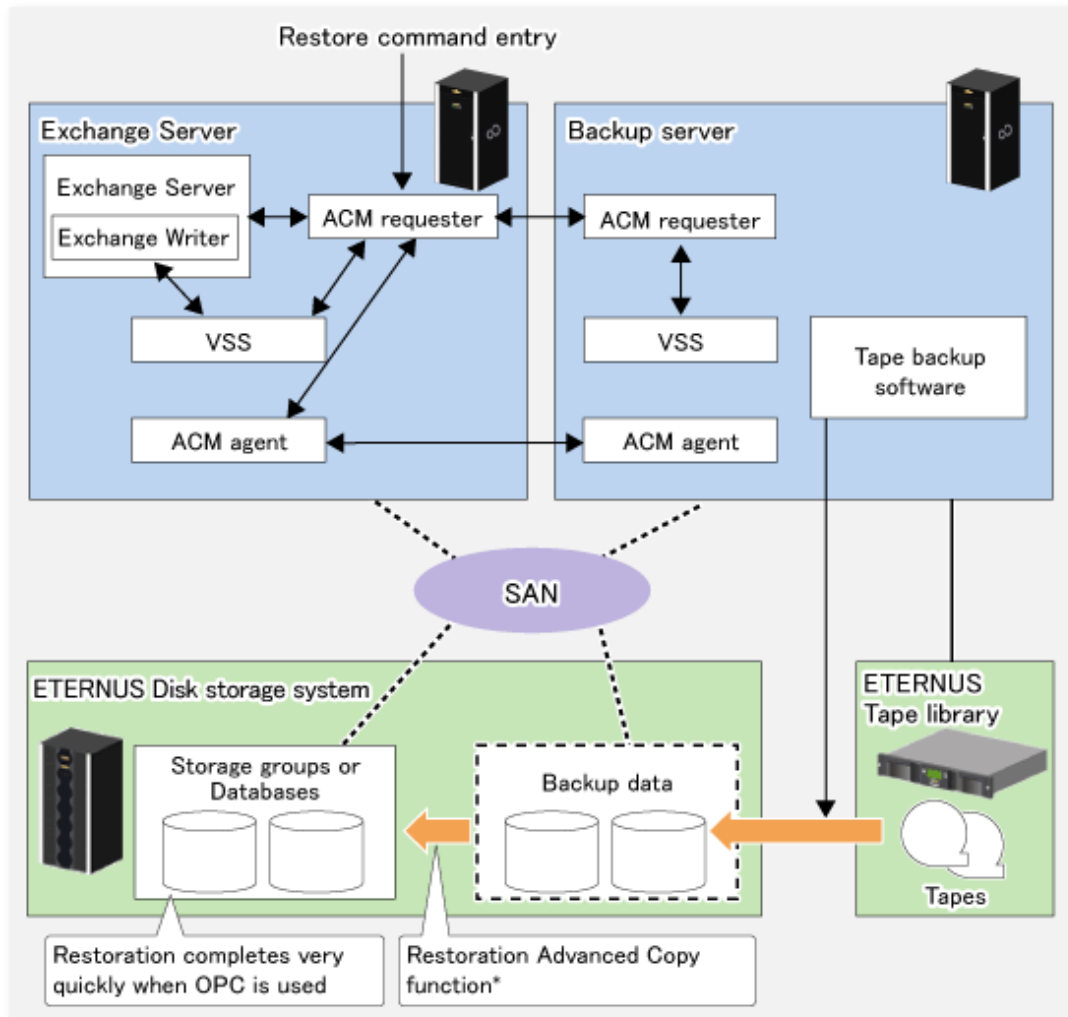
VSS and the restoration processing file copying restore the files required by the requestor without using the provider.

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 (for Exchange Server 2007) or in units of databases (for Exchange Server 2010 or Exchange Server 2013). Databases (ie, stores) to be restored must be dismounted before 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 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., swsrpmake (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)
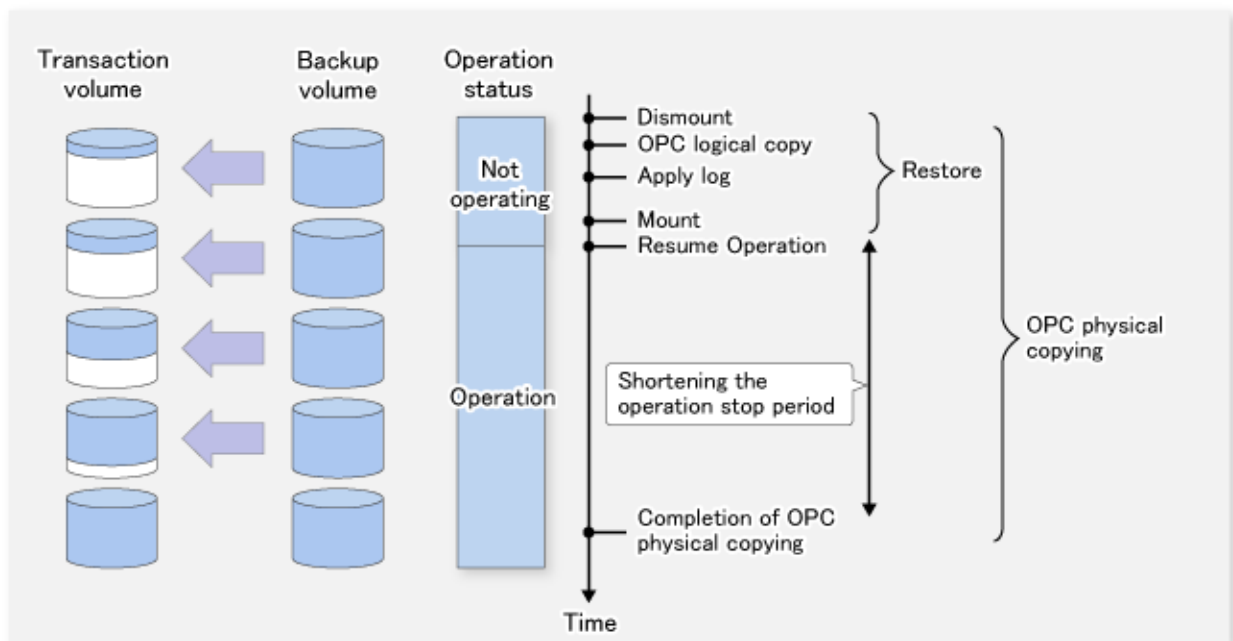
8.2.1.2.1 Point-in-time restoration

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:

8.2.2.1 Designing server configurations

Management Server

The Management Server centrally manages and operates multiple Managed Servers.
Install the AdvancedCopy Manager function on this server. The Management Server cannot also work as the Managed Server (Exchange server or backup server) that performs Exchange database backup.

Managed Server (Exchange server)

This Managed Server is used for the Exchange server operation.
In a Windows Server 2008 or later 64bit environment, install the AdvancedCopy Manager's agent function on this server.
Execute database backup or restoration from this server.

- For Exchange Server 2007

    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 2007 supports operations using Windows Server Failover Clustering (hereafter referred to as WSFC) or single nodes.

- For Exchange Server 2010 or Exchange Server 2013

    Databases subject to a backup and the disks (i.e., the transaction volumes) to which the databases are allocated must be connected to this server.
    The Exchange Server 2010 or Exchange Server 2013 supports operations using cluster environment by Database Availability Group or single nodes.

Managed Server (Backup server)

This Managed Server is used for the backup server operation.
In a Windows Server 2008 or later 64bit environment, install the AdvancedCopy Manager's agent function on this server.
In addition, install the Exchange management tools 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.

- The Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013 backup server cannot both be on the one backup server machine.
  If an environment contains both Exchange Server 2007, Exchange Server 2010 and Exchange Server 2013 a separate Exchange Server 2007 backup server and a separate Exchange Server 2010 backup server and a separate Exchange Server 2013 backup server must be provided.

The following figure shows a server configuration example. The minimum configuration contains three machines, a Management Server, an Exchange Server, and a backup server, as well as one ETERNUS Disk storage system.

Figure 8.33 System configuration example (For Exchange Server 2007)
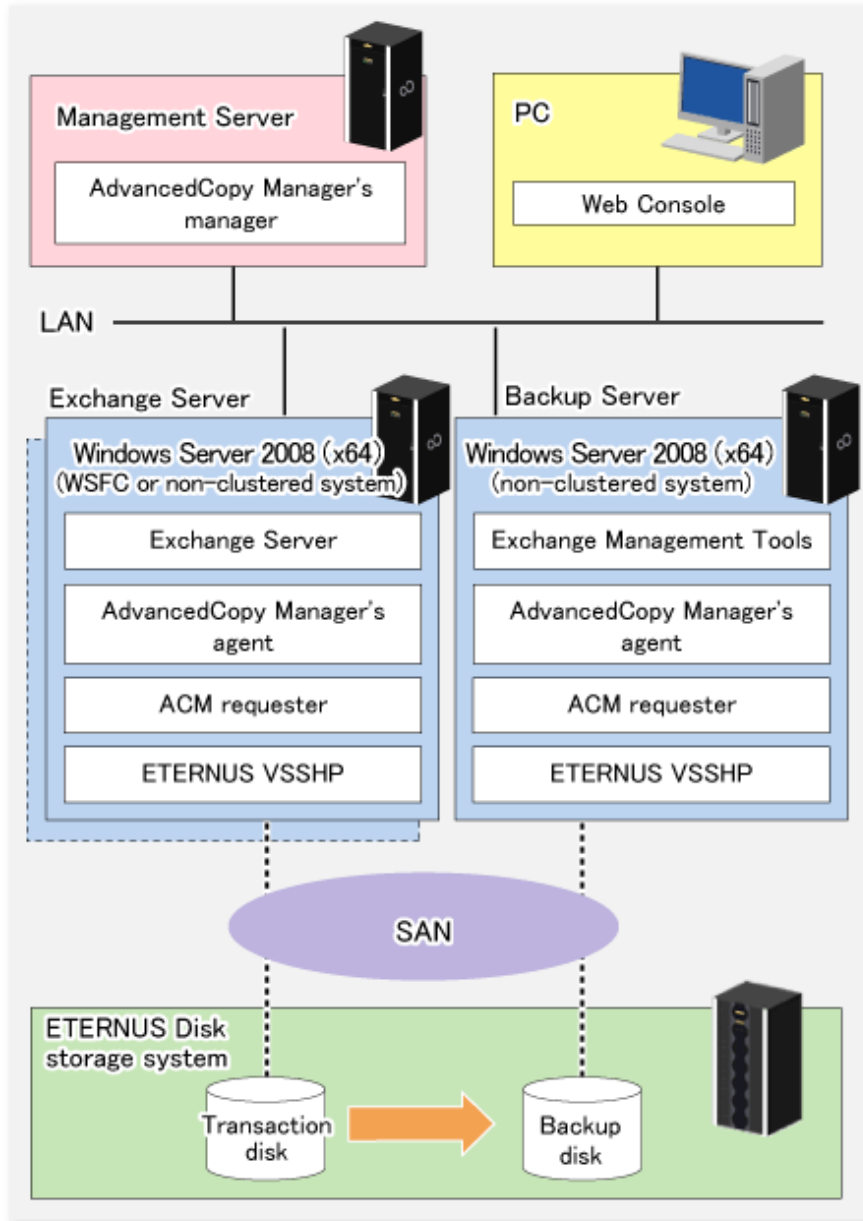
Figure 8.34 System configuration example (For Exchange Server 2010 or Exchange Server 2013)
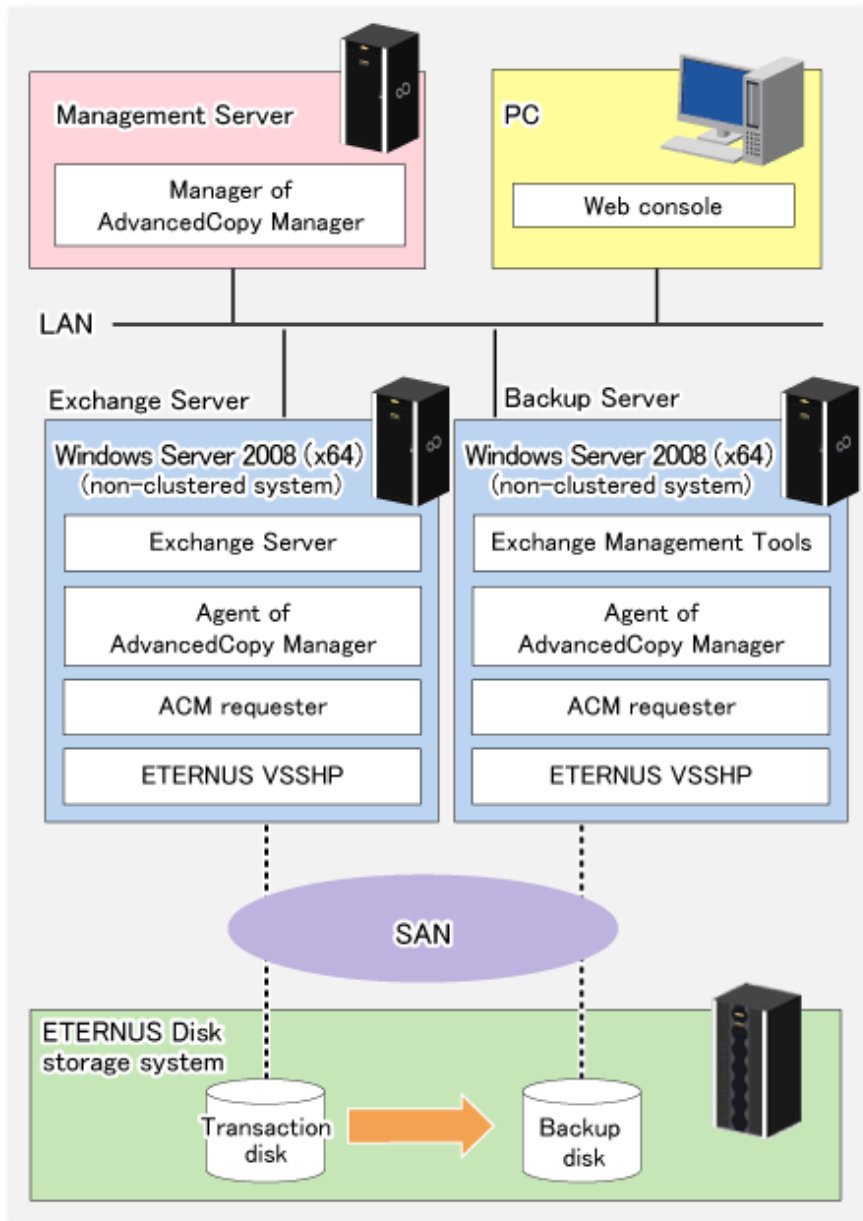
8.2.2.2 Designing storage groups or databases

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 or a database (refer to Example A below). An operation cannot be performed with a configuration in which one disk contains files belonging to different storage groups or databases (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 8.35 Partition configuration

Example A : Configuration in which the operation can be performed
(individual partitions contain only files belonging to a specific storage group or database)

Drive E : Database file belonging to a storage group A (or database A)
Drive F : Log file belonging to a storage group A (or database A)

Example B : Configuration in which the operation cannot be performed
(individual partitions contain files belonging to different storage groups)

Drive E : Database file belonging to a storage group A (or database A)
Drive F : Database file belonging to a storage group B (or database 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 (or database 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 8.36 Recommended partition configuration (multiple disk configuration)
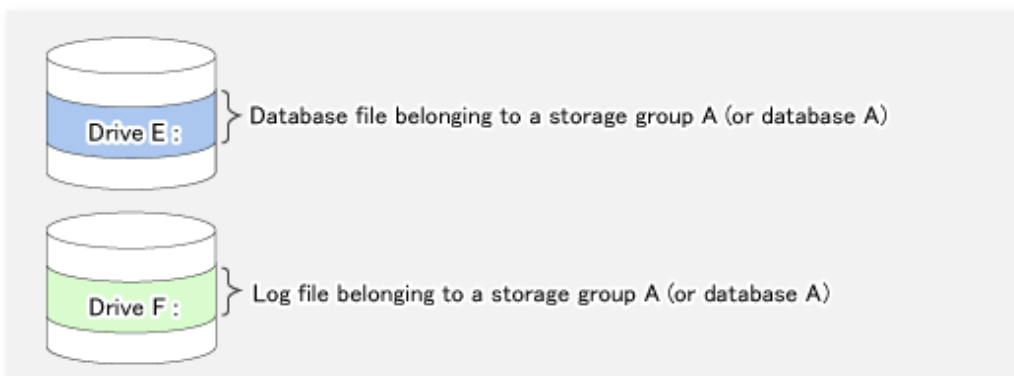
Drive E : Database file belonging to a storage group A (or database A)

Drive F : Log file belonging to a storage group A (or database A)

Assign drive letters (or mount points) to the volume (partition) that configures the storage group or the database. AdvancedCopy Manager supports both drive letters and mount points.

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 or database file location

Database file location

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 or databases. AdvancedCopy Manager executes restoration in units of volumes (partitions). For this reason, if two or more storage groups or databases 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 or databases:

1. Only store Exchange server database files that are to be backed up in the volume in which the database files are to be located. 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 or database 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 8.37 Data destruction example
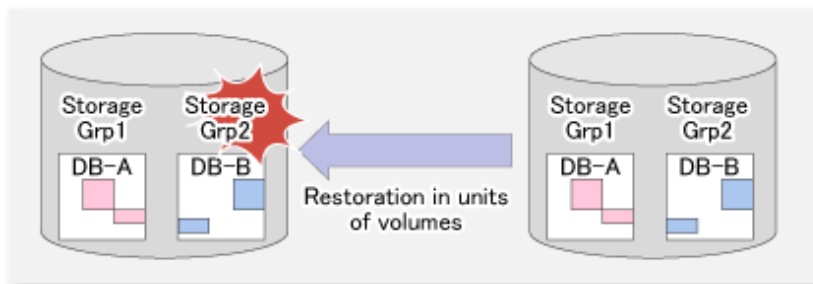
- When a backup is performed from a volume that contains a database that is subject to a backup and a database that is not subject to a backup, the data integrity of the database that is not subject to a backup is not guaranteed.

- A database cannot be allocated to the volume that contains the Exchange server and AdvancedCopy Manager executable and control files.

- Locate a database file in the database to be backed up so that its file path is 213 bytes or less.

- Locate a log file in the database to be backed up so that its directory path is 197 bytes or less.

P Point

. . . .

For Exchange Server 2007 or Exchange Server 2010

    To copy an already allocated database file, use the Exchange Management Console to move the file.

For Exchange Server 2013

    To copy an already allocated database file, use the Exchange Management Shell to move the file.

. . . .

Transaction log file allocation

Figure 8.38 Relationship between log file location and feasible restoration modes
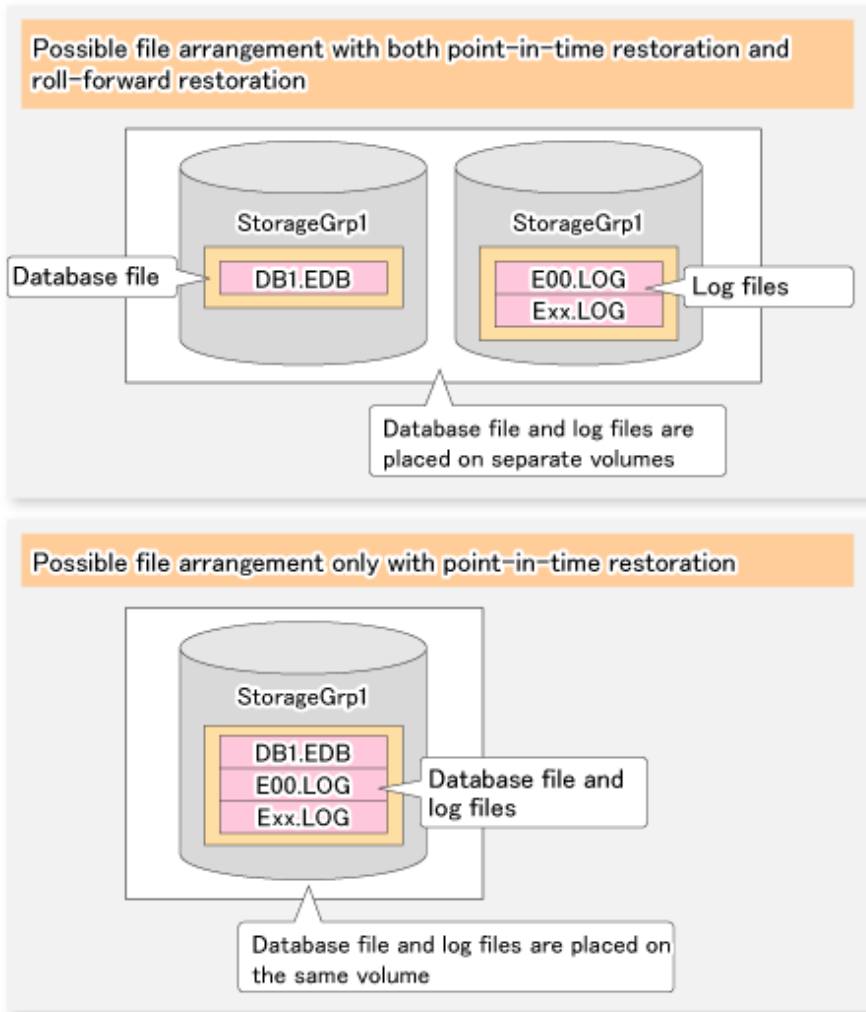
Table 8.10 Relationship between log file location and feasible restoration modes

Log files location	Restoration mode	
	Point-in-time	Roll-forward
Same volume with database files	Enabled	Disabled
Separate volume from database files	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, locate 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 Management Console (for Exchange Server 2007 or Exchange Server 2010) or the Exchange Management Shell (for Exchange Server 2013) can be used to move the transaction log files to another volume.

Distributed location of an EDB file (For Exchange Server 2007)

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 8.39 Distributing a database file to multiple volumes
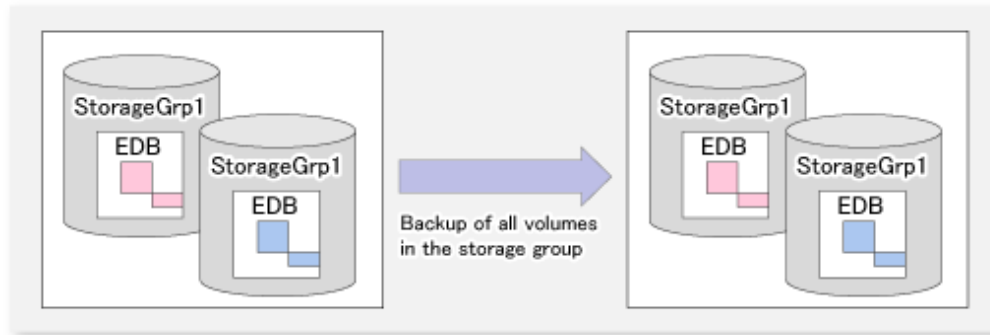
8.2.2.3 Designing circular logs

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 Preparing backup disks (LUN) and 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 storage system.

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 "3.4.4 Fetching device information on a Managed 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 8.40 Creating a backup volume
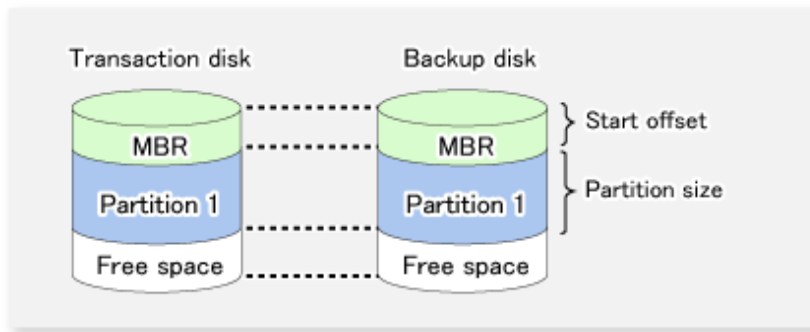
Note that a backup disk LUN and a transaction disk LUN of the same size must be prepared.
Supported disk partition formats are MBR and GPT. However, the transaction disk and backup disk partitions must have the same format.

8.2.2.5 Designing copy sets

Design copy sets so that there is a 1:1 relationship between backup disks and all the transaction disks related to the storage group or database being backed up.

Figure 8.41 Copy set registration
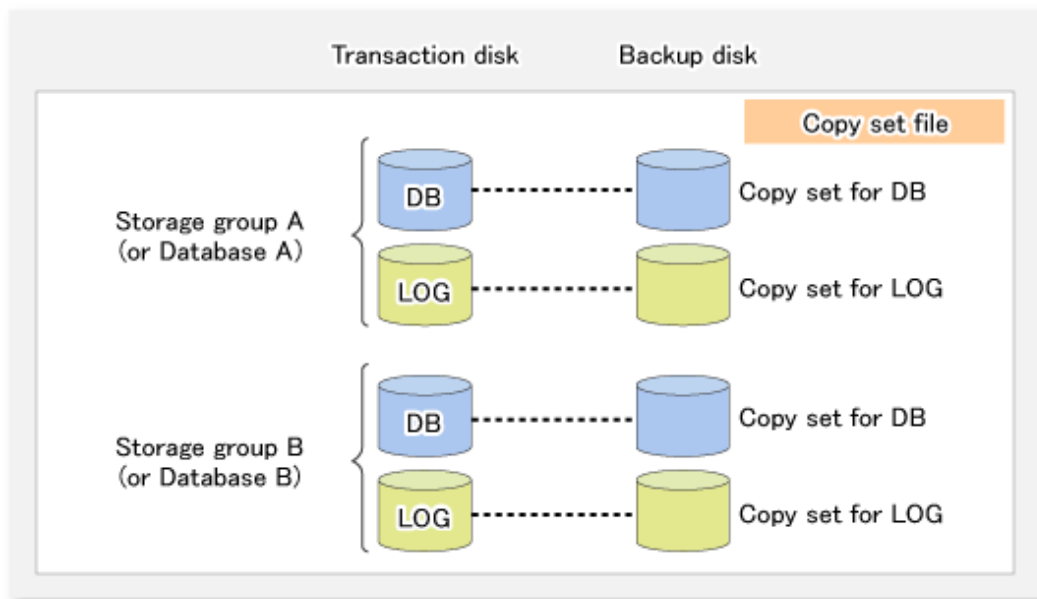
Copy sets with the same transaction disk but different backup disks cannot be registered at the same time.

Figure 8.42 When registration to a copy set is not possible
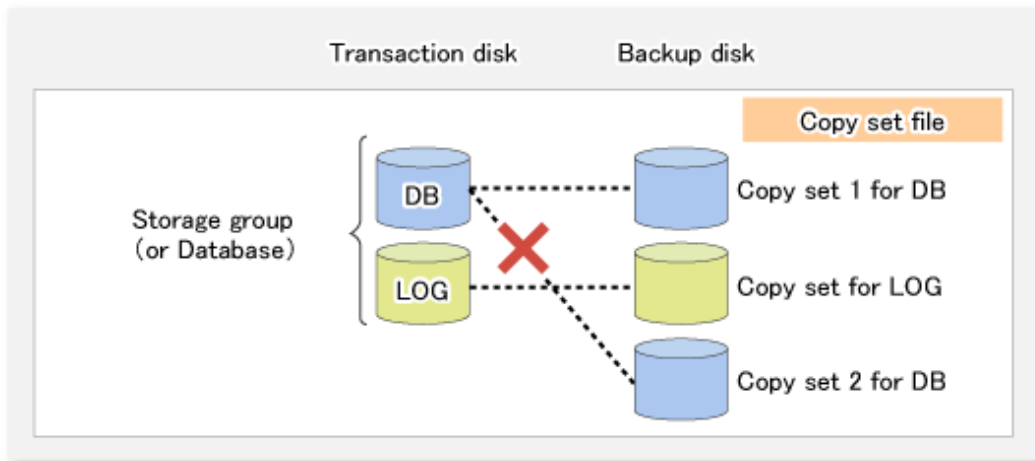
Exchange linkage commands (swsrpXXX_exchange) perform processing on particular copy sets based on the storage group name (for Exchange Server 2007) or database name (for Exchange Server 2010 or Exchange Server 2013).

Figure 8.43 When multiple storage groups or databases are registered
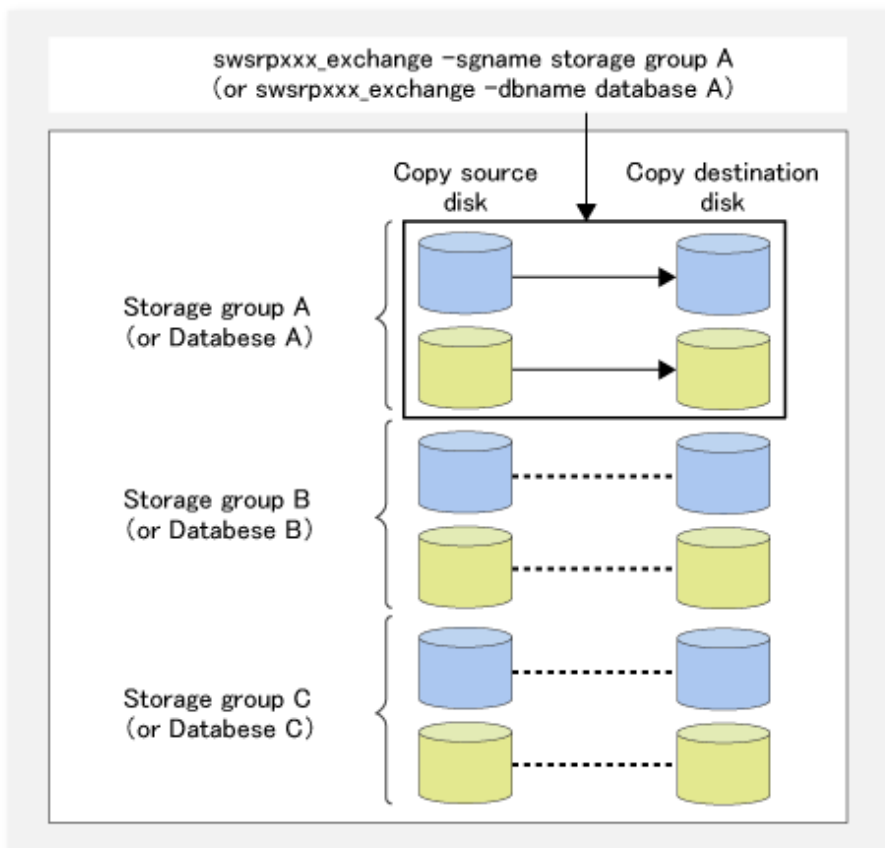
For one Exchange Server machine (one cluster environment), there must be one backup server machine and a non-cluster environment.

Figure 8.44 Exchange Server and backup server example
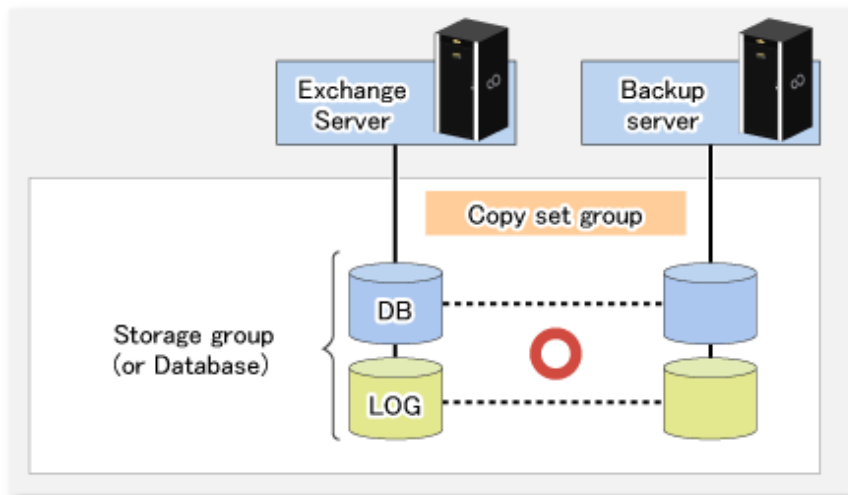
8.2.3 Preparation

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 8.45 Installation task flow
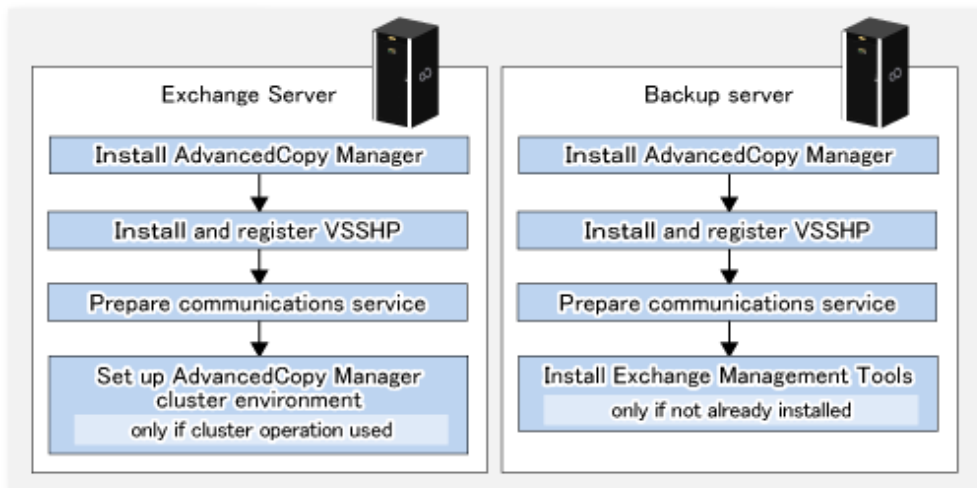
8.2.3.1.1 Installing AdvancedCopy Manager

Refer to the *ETERNUS SF Installation and Setup Guide* for details of installing AdvancedCopy Manager. In order to use this function, the AdvancedCopy Manager's agent must be installed in a Windows Server 2008 or later 64bit environment at both the Exchange Server and the backup server.

Installation must be to a LUN that is not subject to backup.

8.2.3.1.2 Installing and registering VSSHP

Refer to "Transportable Copy Configuration Installation" in the *ETERNUS VSS Hardware Provider Copy Set Operation Technical 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 DVD-ROM "Agent Programs & Manuals".

- *<DVD-ROM drive>*:\Agent_windows\AdvancedCopy_Manager\VSSHP\win2008_x64\install\setup.exe

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.

....

8.2.3.1.3 Installing Exchange management tools

Install the Exchange management tools.

8.2.3.1.4 Setting up an AdvancedCopy Manager cluster (For Exchange Server 2007)

If the Exchange Server has a cluster configuration, customize the Managed Server transactions at the Exchange Server.

Refer to the following manuals for transaction details:

- *ETERNUS SF Cluster Environment Setup Guide*

- 13.1.5 Notes on cluster operation

- 13.1.7 Notes on replication in a clustered system

8.2.3.2 Environment setup

This section describes the environment settings to be performed before backup operations are started.

Figure 8.46 Environment setup flow
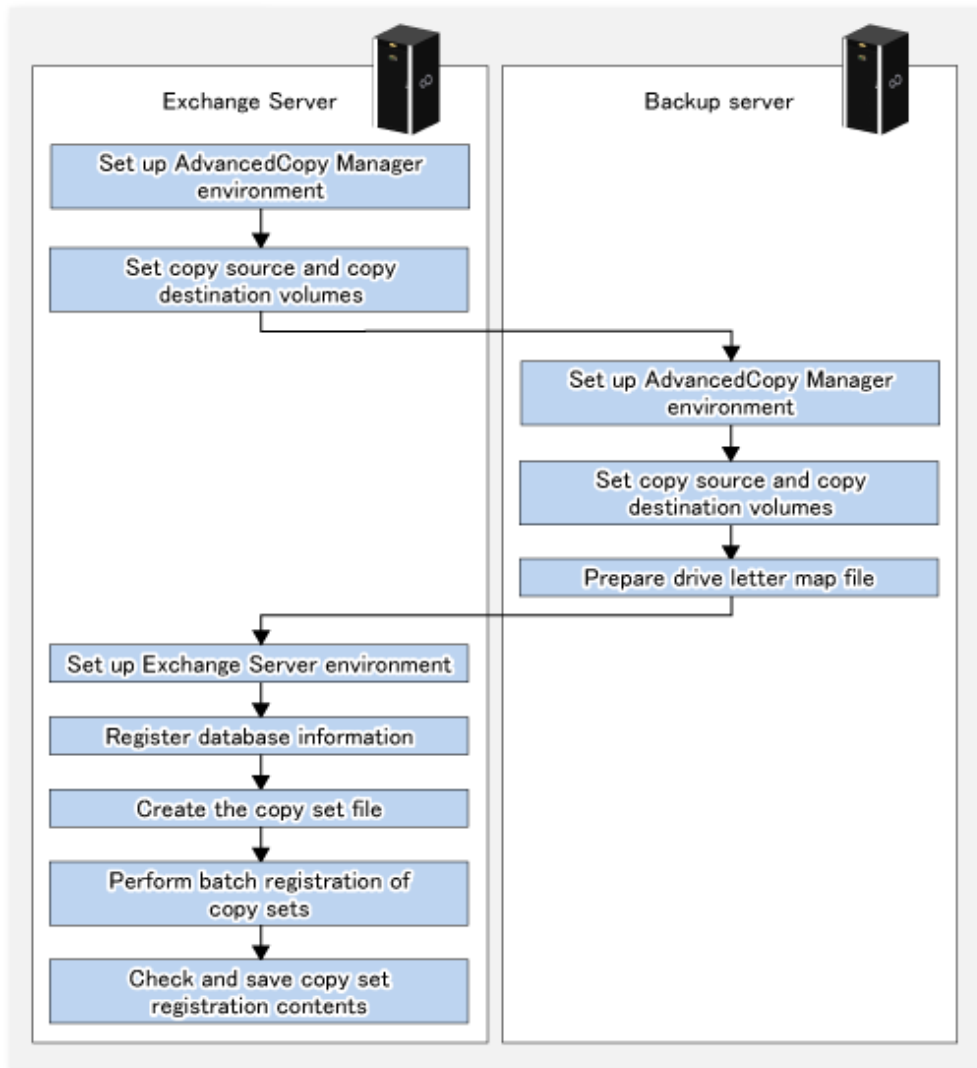
8.2.3.2.1 AdvancedCopy Manager environment setup

Perform the following tasks:

- 7.4.1 Starting a service
- 7.4.2 Starting the Web Console
- 7.4.3 Registering a Managed Server
- 7.4.4 Fetching device information on a Managed Server

8.2.3.2.2 Setting up the source and replica volumes

Use swsrpsetvol (Replication volume information setting 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:

```
<Environment 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).

8.2.3.2.4 Configuring the Exchange server environment

Set up the Exchange server or either of storage groups or databases based on the results of the operations design.

Allocating EDB, CHK, and LOG files

Allocate the Exchange server EDB, CHK, and LOG files.
Refer to "8.2.2.2 Designing storage groups or databases" for details.

Installing Exchange management tools

Be sure to install the Exchange server 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 with Exchange Server 2007).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -evs VSVR -sgname
FirstStorageGroup
swsrpdbinfo_exchange successfully completed
C:\>
```

Example: This example registers the database MailBox1. (if the command is executed from the business server with Exchange Server 2010 or Exchange Server 2013).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname MailBox1
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 Copy Set Operation Technical 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####YYYYYYYYYYYYY##
QOPC,,6,0x00c1,00E8000M9#####XXXXXXXX####YYYYYYYYYYYYY##
```

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 Copy Set Operation Technical 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 information display command) can be executed at the Exchange Server to check the registration contents. Refer to "Copy Set Registration Information Display Command (stxvcopyprt)" in the *ETERNUS VSS Hardware Provider Copy Set Operation Technical 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 execution command) on the Exchange server. This command backs up the databases in units of storage groups (for Exchange Server 2007) or in units of databases (for Exchange Server 2010 or Exchange Server 2013).

> **Note**
> ....
> When backups are executed, databases (i.e., stores) to be backed up must be mounted. If any databases are not mounted, the backup processing will terminate abnormally.
> ....

Example:

- For Exchange Server 2007

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -evs VSVR -sgname
FirstStorageGroup
swsrpvssbackup_exchange successfully completed
C:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname Mailbox1
swsrpvssbackup_exchange successfully completed
C:\>
```

When this command is executed, the following processing is performed:

1. Shadow copies of the files to be backed up (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.

   - 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 execution 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	- For Exchange Server 2007 *<Environment directory>*\etc\repl\data\exchange*<Exchange server Managed Server name>*\metadoc*<storage group name>*.wmd.xml - For Exchange Server 2010 or Exchange Server 2013 *<Environment directory>*\etc\repl\data\exchange*<Exchange server Managed Server name>*\metadoc*<database name>*.wmd.xml
Backup components document	- For Exchange Server 2007 *<Environment directory>*\etc\repl\data\exchange*<Exchange server Managed Server name>*\metadoc *<storage group name>*.bcd.xml - For Exchange Server 2010 or Exchange Server 2013 *<Environment directory>*\etc\repl\data\exchange*<Exchange server Managed Server name>*\metadoc *<database 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 backup targets (storage groups or databases) 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.

- 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.

- Notes on communication timeout error of VSSHP

  Due to machine load, network load and so on, backup may fail by the communication timeout error of VSSHP.
  This event can be identified by verifying the following a) and b).

  a. swsrpvssbackup_exchange (Exchange VSS backup execution command) terminated abnormally with the following error message.

     ```
     An error occurred in VSS processing. Processing Phase=[BACKUP] Creation of Shadow
     Copy Set, Detected API=DoSnapshotSet, Error=0x80042306
     ```

  b. The above error message and the following error message of VSSHP were written to the Windows application log.

     ```
     STXV2004 ERROR Timeout occurred.
     ```

  If this event occurs frequently, edit the following VSSHP environment file to change the value of the communication timeout.

  File name

  ```
  "Installation folder of VSSHP in the Exchange server"\etc\vss\vsshp.ini
  ```

The value of the communication timeout is set to the item name "TimeOut" on the second time scale. The value from 1 to 86400 can be set to the item name "TimeOut". (Default value is 60)

The recommended value is 3600(1 hour).

. . . .

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 Exchange Server 2007

```
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:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname Mailbox1
[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 8.47 For snapshot type backups
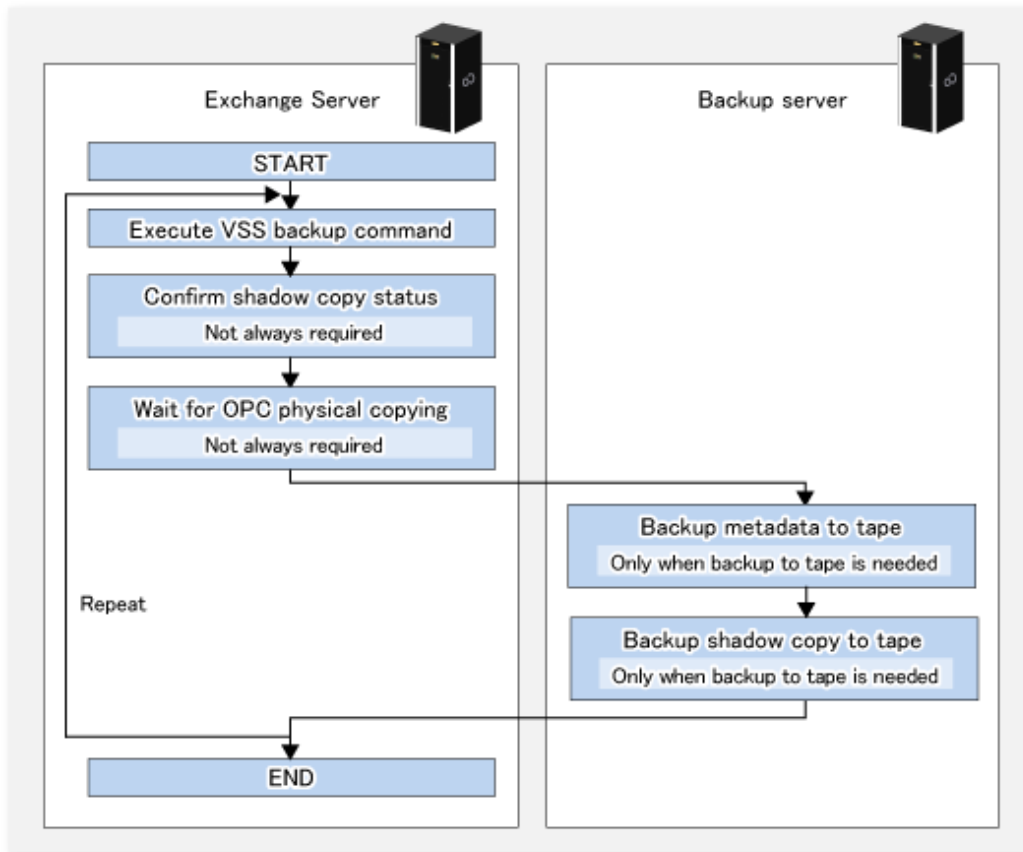
8.2.4.3 States of the backup disk

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 or later 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 8.48 Backup disk state transition
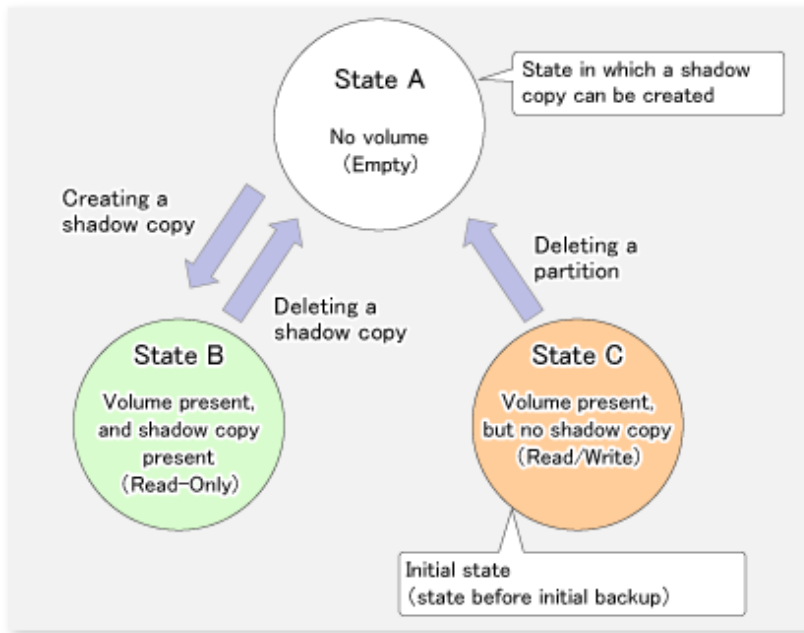
Because the backup disk is never put in the initial state except before the initial backup, it moves between states A and B during the backup.

Figure 8.49 For snapshot type backups
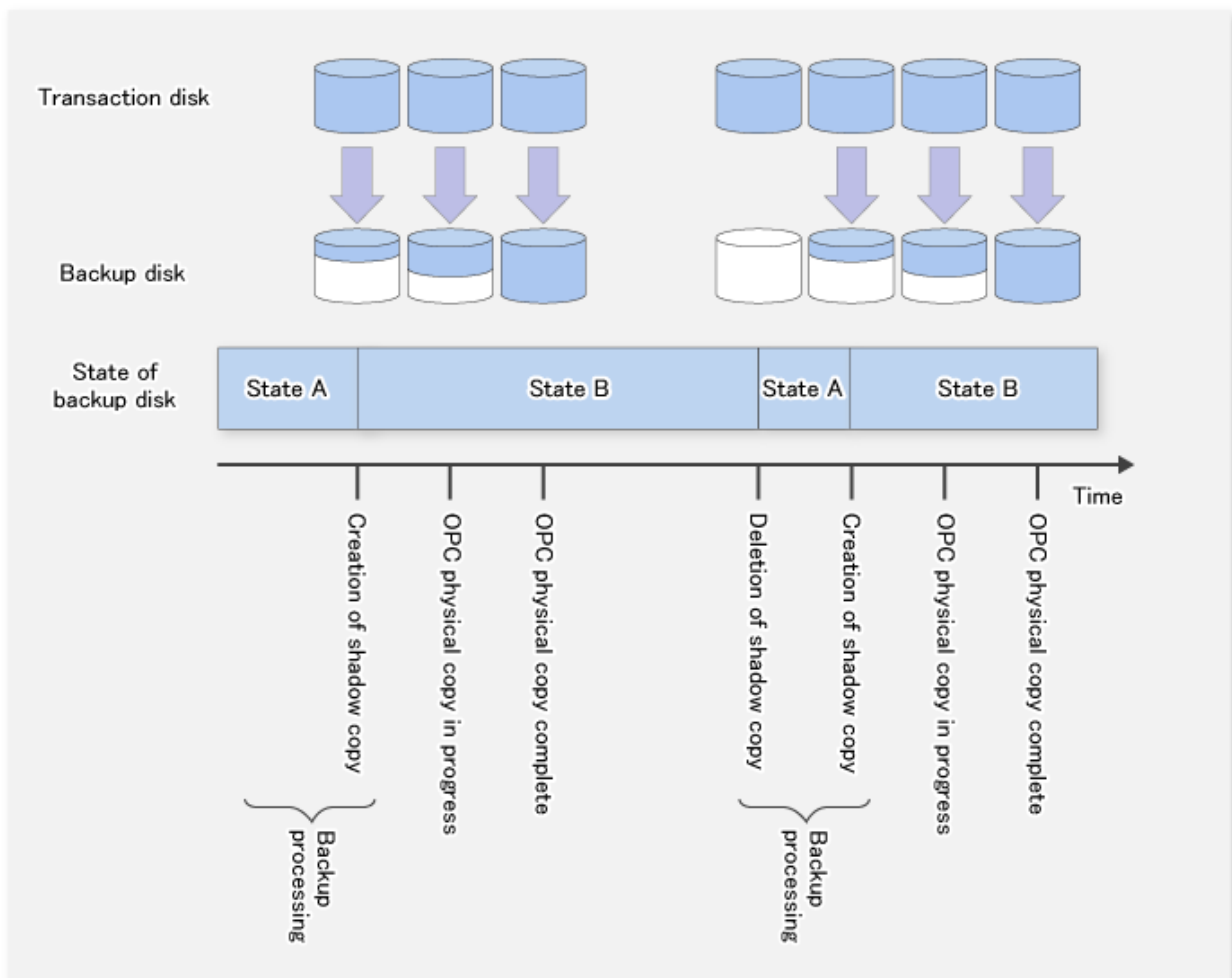
If swsrpshadowadm_exchange (Exchange VSS shadow copy management command) or swsrpshadowadm (Shadow copy management command) is used to delete all shadow copies from a disk, the disk status might change to "offline". Since AdvancedCopy Manager cannot execute copy for a disk that is offline, change the 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 "1.7.2 Notes about the online/offline status of disks" for information about the online and offline status of disks under Windows Server 2008 or later.

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:

- 8.2.5.1.1 Confirmation of environmental setting

- 8.2.5.1.2 Permitting overwrite of database during restoration

- 8.2.5.1.3 Dismounting the database

- 8.2.5.1.4 Stopping resource monitoring for the physical disk (only when Exchange Server 2007 and WSFC is operating)

- 8.2.5.1.5 Stopping the QuickOPC session (only for differential snapshot type backups)

- 8.2.5.1.6 Stop the Microsoft Exchange Search Host Controller service(only for Exchange Server 2013)

8.2.5.1.1 Confirmation of environmental setting

Confirm an environmental setting is done by the same composition as the backup referring to "8.2.3 Preparation".

8.2.5.1.2 Permitting overwrite of database during restoration

Use the Exchange Management Console and set the "Overwrite this database when restoring" option for database to be restored.

8.2.5.1.3 Dismounting the database

Use the Exchange Management Console and dismount database to be restored. After dismounting the stores, close the Exchange Management Console.

8.2.5.1.4 Stopping resource monitoring for the physical disk (only when Exchange Server 2007 and WSFC is operating)

When the Exchange Server 2007 is running on WSFC, the transaction volume that is the restoration destination is a WSFC 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, failover will happen for the cluster group.

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 or databases (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 the Log file or CHK file is 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:\>
```

8.2.5.1.5 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 cancelled 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.

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.

8.2.5.1.6 Stop the Microsoft Exchange Search Host Controller service(only for Exchange Server 2013)

For Exchange Server 2013, stop the Microsoft Exchange Search Host Controller service on the restore destination server. However, stopping the Microsoft Exchange Search Host Controller service may affect the creation or search of index.

In consideration of the impact of stopping this service, recommend to take the action.

8.2.5.2 Executing the restoration

Restoration is performed separately for each storage group (for Exchange Server 2007) or for each database (for Exchange Server 2010 or Exchange Server 2013), using swsrpvssrestore_exchange (Exchange VSS restore execution command) on the Exchange server. When this command is executed, all of the databases (i.e. stores) to be restored must be 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 databases 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 restore execution command). If the -point option is specified, this command will restore the database to the point when the backup was taken by restoring all of the backup files (files with extensions *.edb, *.log and *.chk).

Figure 8.50 Point-in-time restoration
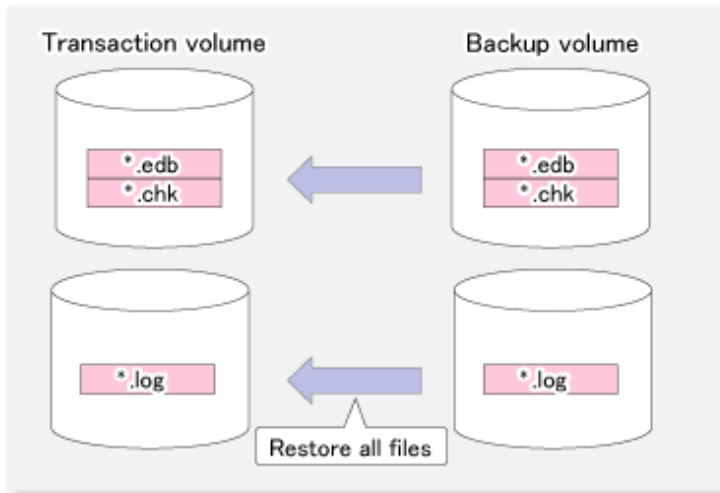
Example:

- For Exchange Server 2007

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -point -sgname
FirstStorageGroup
swsrpvssrestore_exchange successfully completed
C:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -point -dbname Mailbox1
swsrpvssrestore_exchange successfully completed
C:\>
```

8.2.5.2.2 Roll forward restoration (restoring to the latest point)

Roll forward restorations restore databases to the latest point.
Roll forward restorations are executed by specifying the -roll option with swsrpvssrestore_exchange (Exchange VSS restore 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 8.51 Roll forward restoration
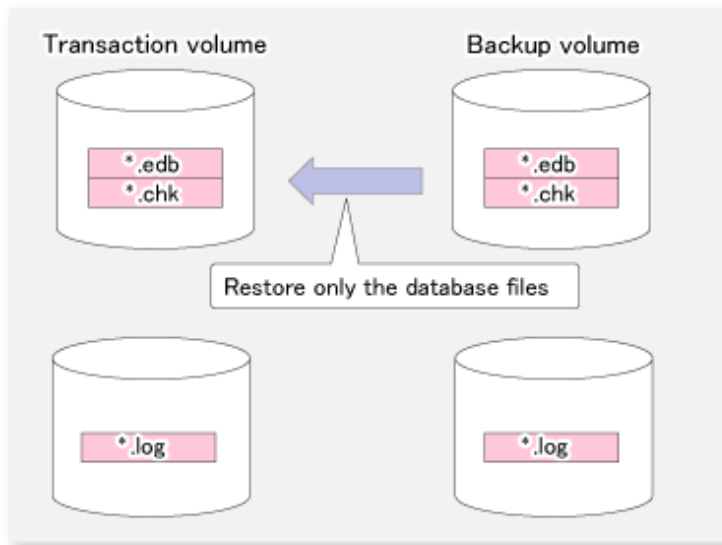
Example:

- For Exchange Server 2007

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -evs VSVR -roll -sgname
FirstStorageGroup
swsrpvssrestore_exchange successfully completed
C:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -roll -dbname Mailbox1
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 "XXXXXXXX" part of EnnXXXXXXXX.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. (Only for Exchange Server 2007)
. . . .

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)]

- For Exchange Server 2007

```
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:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -dbname Mailbox1
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:

- Start the Microsoft Exchange Search Host Controller service (only for Exchange Server 2013)

- Restart resource monitoring for physical disks (only when Exchange Server 2007 and WSFC is operating)

- Mounting the database

8.2.5.4.1 Start the Microsoft Exchange Search Host Controller servce (only for Exchange Server 2013)

For the Exchange Server 2013, start the Microsoft Exchange Search Host Controller service on the restore destination server.

8.2.5.4.2 Restarting resource monitoring for physical disks (only when Exchange Server 2007 and WSFC is operating)

When the Exchange Server 2007 is running on WSFC, restart resource monitoring by cancelling 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:\>
```

8.2.5.4.3 Mounting the database

For point-in-time restore, use the Exchange Management Console to mount 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 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 8.52 Snapshot restoration (restoration performed using OPC)
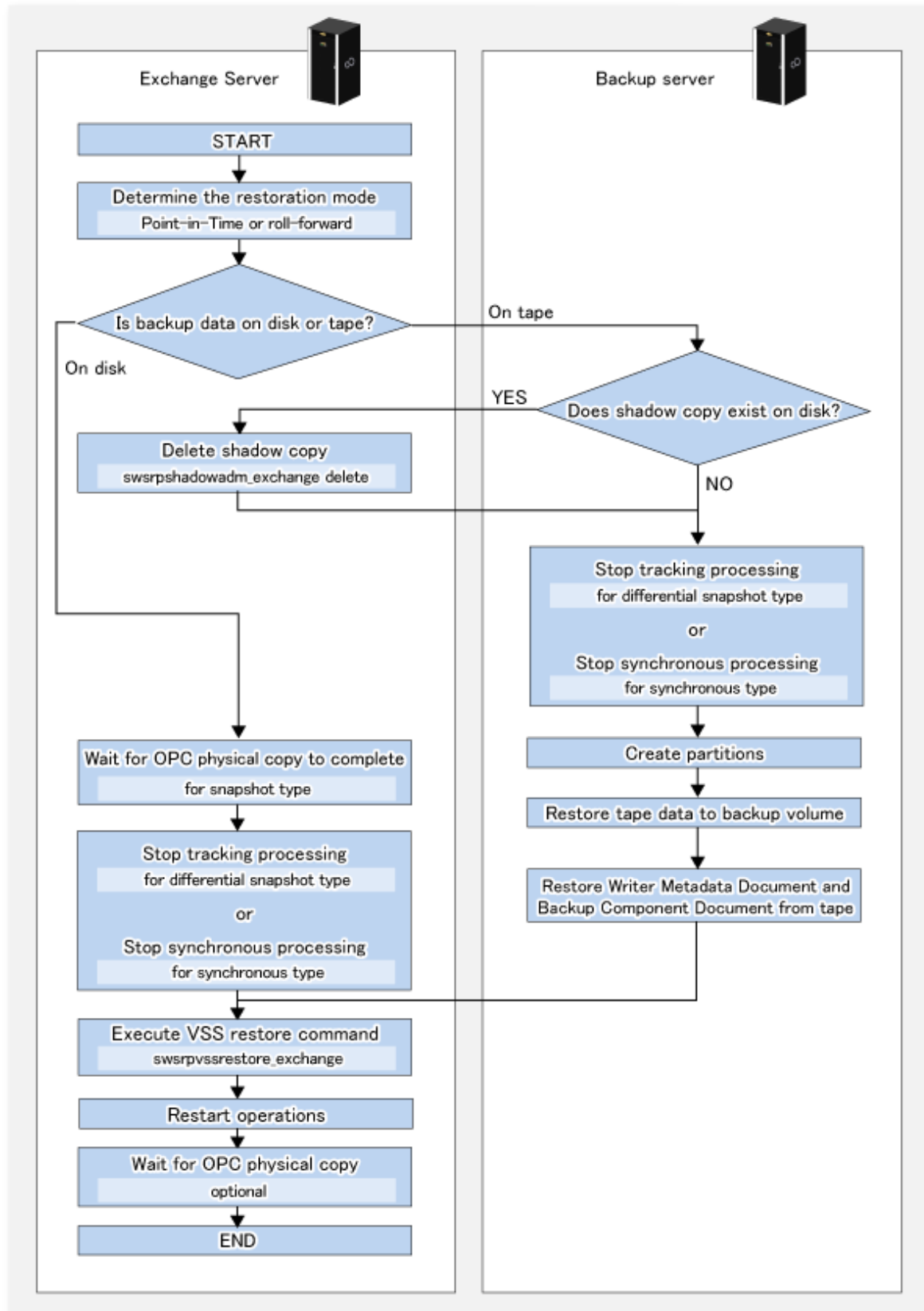
8.2.6 Reconfiguration

To change resources that make up the backup configuration, the AdvancedCopy Manager settings need to be changed.
In addition, if the partition configuration is to be changed, for example by adding or deleting partitions, in a disk where Exchange Server databases 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 on a Managed 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 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 on a Managed Server" for information about this operation.

6. On the Exchange server, execute "8.2.3.2.6 Creating a copy set file" and "8.2.3.2.7 Registering copy sets as a batch" to change the copy set information.

7. On 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 or database information

If the storage group information or database 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 or database 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.

- For Exchange Server 2007, perform the tasks described in "Move Database Path" and "Move Storage Group Path" and move the data to a different disk on the Exchange Management Console. For Exchange Server 2010, perform the tasks described in "Move Database Path" and move the data to a different disk on the Exchange Management Console. For Exchange Server 2013, move the data to a different disk using the Move-DatabasePath command of Exchange Management Shell.

- 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 Managed Server name

To change the Managed 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 Managed Server name. For details, refer to "11.5.4 Changing the server name of Management Server or Managed Server".

3. Specify the source or replica volume.

8.2.6.6 Changing the copy type

1. On 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 Exchange Server, use "8.2.3.2.6 Creating a copy set file" and "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 or the backup server:

1. Change the IP address of the Managed Server (Exchange server or backup server). Refer to "11.5.1 Changing the IP address of Management Server" for details.

2. Change the settings of ETERNUS VSS Hardware Provider Communication Server service in the Exchange Server and the backup server. Refer to "When Changing the Communication Environment" in the *ETERNUS VSS Hardware Provider User's Guide* for details.

8.2.6.8 Other environment changes

Refer to "11.5 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:

- For Exchange Server 2007

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -evs VSVR -sgname
FirstStorageGroup
swsrpshadowadm_exchange delete successfully completed
C:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -dbname Mailbox1
swsrpshadowadm_exchange 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.

- If all shadow copies are deleted from a disk, the disk status might change 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 "1.7.2 Notes about the online/offline status of disks" for information about the online and offline status of disks under Windows Server 2008 or later.

••

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:

- For Exchange Server 2007

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -evs VSVR -
sgname FirstStorageGroup
swsrpshadowadm_exchange successfully completed
C:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -dbname Mailbox1
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:

- For Exchange Server 2007

```
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:\>
```

- For Exchange Server 2010 or Exchange Server 2013

```
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:\>
```

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 8.53 Uninstallation task flow
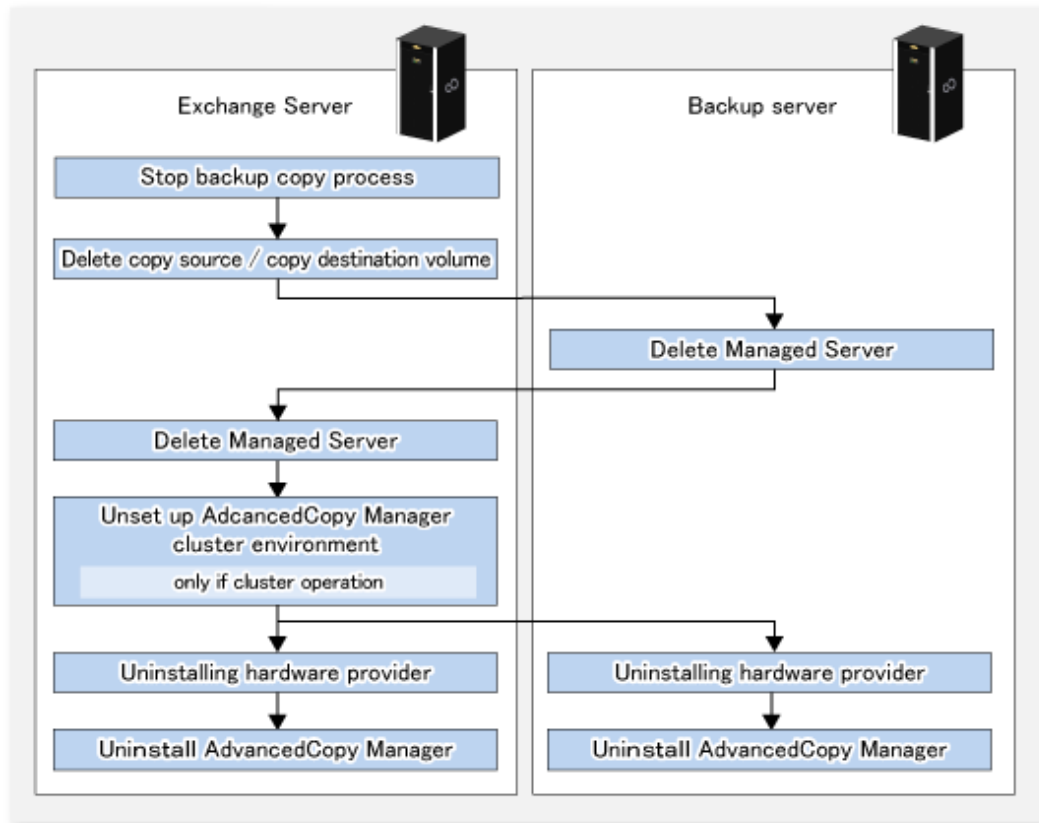
8.2.8.1 Stopping backup copy process

On 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 (Replication 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 Managed Server

Delete the Managed Server to be uninstalled from the control of AdvancedCopy Manager.
The process of deleting a Managed Server can be carried out using either Web Console or stgxfwcmdelsrv (Server information deletion command).

If you have deleted the Managed server with stgxfwcmdelsrv (Server information deletion command), take the following actions to reflect to the Web Console depending on how the agent installed in the deleted Managed Server is used:

- If both of AdvancedCopy Manager's agent and Storage Cruiser's agent are used:

  On the Web Console, execute [Reload Conf.] to update to the latest information.

- If only AdvancedCopy Manager's agent is used:

  On the Web Console, delete the Managed Server that you have deleted.

8.2.8.4 Cancel the cluster settings for AdvancedCopy Manager (Only for Exchange Server 2007)

If the Exchange Server has a cluster configuration, delete the Managed Server transactions and the Management Server transactions from the Exchange Server.
Refer to the *ETERNUS SF Cluster Environment Setup Guide* for more information about cancelling cluster settings.

8.2.8.5 Uninstalling hardware provider

If VSSHP will no longer be used, refer to "VSSHP Uninstallation" in the *ETERNUS VSS Hardware Provider User's Guide* and uninstall the VSSHP on both the Exchange server and the backup server.

📒 Note
. . . .
Do not uninstall VSSHP if there are other storage groups on the backup or Exchange servers where operations may use this hardware provider registration.
. . . .

8.2.8.6 Deleting AdvancedCopy Manager

Refer to "Uninstalling ETERNUS SF Manager" and "Uninstalling AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide* to delete AdvancedCopy Manager.

8.3 Backup and restore of Database Availability Group

This section describes the procedures for online backup and restore from online backup data in an Exchange Server Database Availability Group (hereinafter referred to as "DAG") environment using AdvancedCopy Manager.

8.3.1 Overview

- Online backup

  AdvancedCopy Manager performs online backup of Exchange database, working with VSS.

- Restore from online backup data

  AdvancedCopy Manager performs restore from online backup data, working with VSS.

📘 Point
. . . .
This section presents execution examples using Exchange Management Shell.
For more information about Exchange Management Shell, refer to "Help" in Exchange Server 2010 or Exchange Server 2013.
. . . .

8.3.2 Configuration

This section focuses on the following configurations.

Figure 8.54 Server configuration
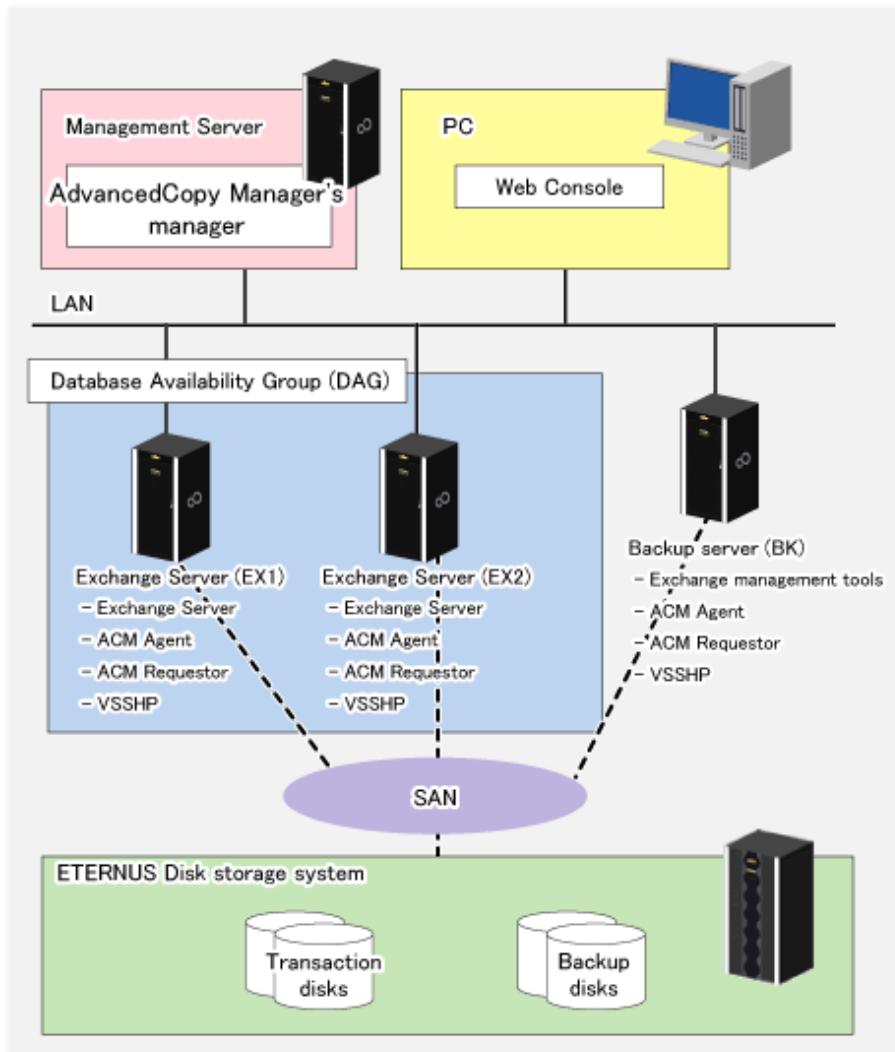
Figure 8.55 Database configuration
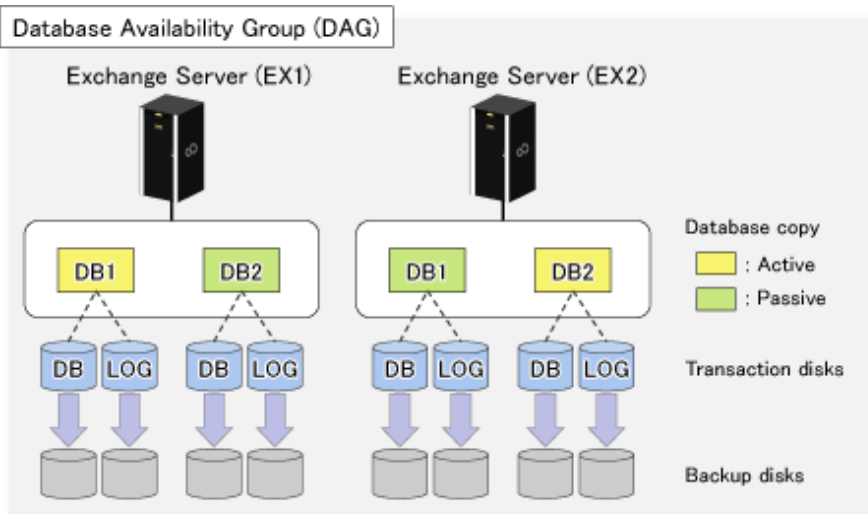
> **Note**
>
> - The database file and log file in a database copy are allocated to the same file path on each server. AdvancedCopy Manager does not recommend the fact that the database copy which differs is made on the same drive. The database for each server must be placed on different disks.
>
> - Those files also must be allocated in such a configuration as described in "8.2.2.2 Designing storage groups or databases".
>
>   The restriction example of DB1 and DB2 is described below.
>
> | | DB | LOG |
> |-------------|-------------------|----------|
> | EX1 of DB1 | E:\DB1\DB1.edb | F:\LOG |
> | EX2 of DB2 | G:\DB2\DB2.edb | H:\LOG |
>
>   - Restriction of drive letter
>
>   - As for EX1, G/H drives must be existed. G/H drives must be ahead the arranging DB2.
>
>   - As for EX2, E/F drives must be existed. E/F drives must be ahead the arranging DB1.
>
>   For DAG, the database copy of DB1 is formed to EX2. In this time, it is copied to the same path on EX1.
>
>   - Restriction of the transaction disk
>
>   - On EX1, E/F drives of DB1 and G/H drives of DB2 must be existed in the transaction disk which differs.
>
>   - On EX2, G/H drives of DB2 and E/F drives of DB1 must be existed in the transaction disk which differs.
>
> - Considering backup operations on an arbitrary server, it is recommended prepare backup disks corresponding to database copy on each server.

8.3.3 Installation and setup

For a Management Server and PC, refer to the *ETERNUS SF Installation and Setup Guide* to install and set up their respective components.

For the Exchanger Server that performs backups and Backup server, install and set up AdvancedCopy Manager's agent.

For more information, refer to "8.2.2 Operation Design" and "8.2.3 Preparation".

8.3.3.1 Registering database information

Register the database information of each database copy on a server of DAG members that performs backups.
For more information, refer to "8.2.3.2.5 Registering database information".

1. Activate a target database copy.

2. Specify the database and execute swsrpdbinfo_exchange (Exchange database information registration command).
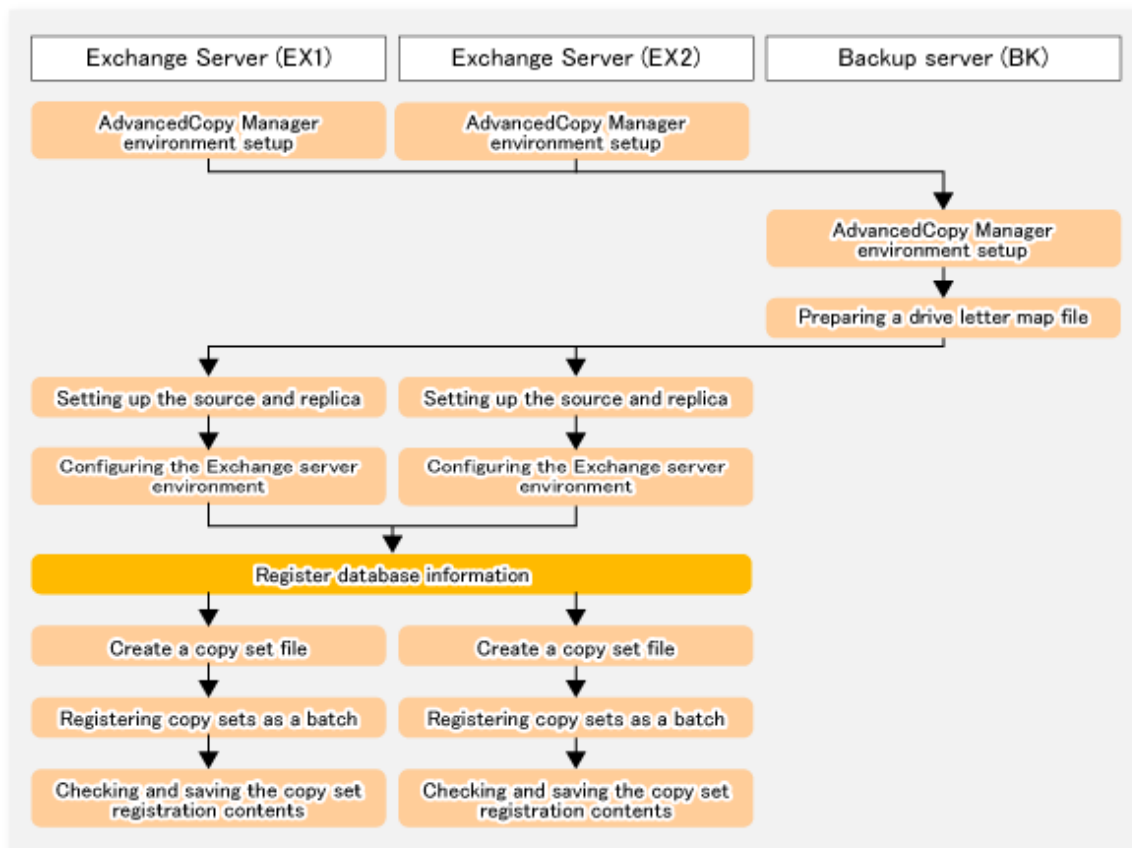
Note

- After performing this procedure, do not execute swsrpdbinfo_exchange (Exchange database information registration command) with -clean or -delete option. If the command has been executed, it is necessary to register the database information again.

- If any change has been made in a database configuration, it is necessary to register its database information again.

Execution example

Register the database information of DB1 and DB2 on EX1 and EX2.

1. Activate the database copy of DB1 on EX1.

```
Move-ActiveMailboxDatabase DB1 -ActivateOnServer EX1
```

2. Activate the database copy of DB2 on EX2.

```
Move-ActiveMailboxDatabase DB2 -ActivateOnServer EX2
```

3. Register the database information of DB1 on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname DB1
```

4. Register the database information of DB2 on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname DB2
```

5. Register the database information of DB1 on EX2.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname DB1
```

6. Register the database information of DB2 on EX2.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname DB2
```

8.3.4 Backup

Perform online backup of Exchange database. For backup, use one of active database copy or passive database copy.
For details about database backup, refer to "8.2.4 Backup".

Figure 8.56 Backup of Exchange database
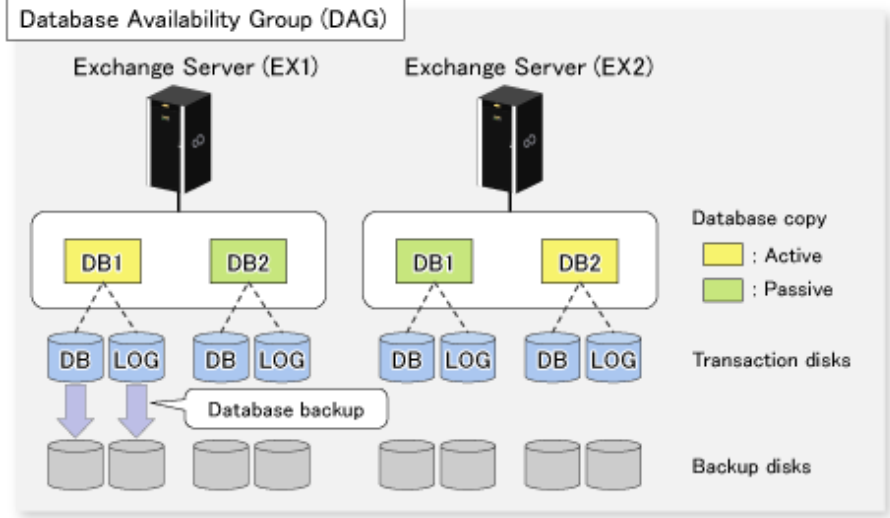
Execution example1

Perform backup of DB1 (active) on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname DB1
```

Execution example2

Perform backup of DB2 (passive) on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname DB2
```

8.3.5 Restore

Perform restore from the backup data on the server on which backup was performed.

Figure 8.57 Restore of Exchange database
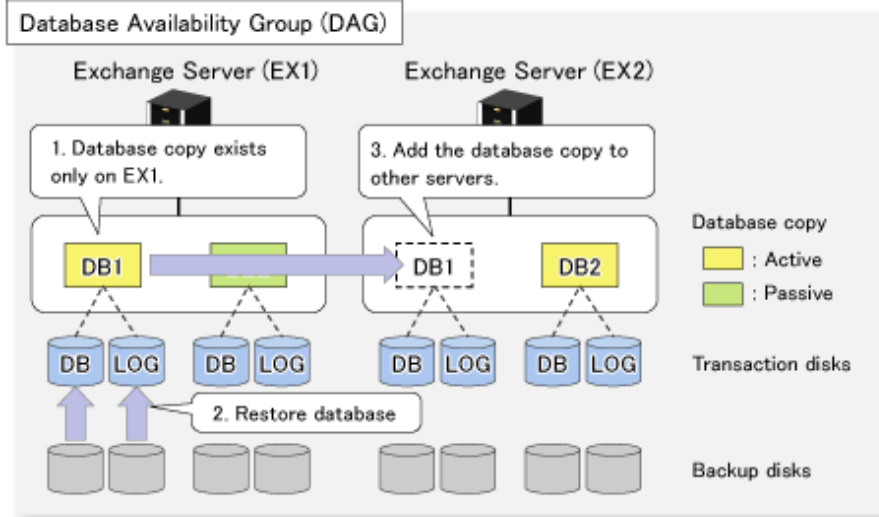
For Exchange Server 2010

1. Let the database copy of a target database exist only on a restore destination server.

2. Using AdvancedCopy Manager, restore the database.
   For more information about restore, refer to "8.2.5 Restoration".

3. Add the database copy to other servers than the restore destination server.

For Exchange Server 2013

1. Let the database copy of a target database exist only on a restore destination server.

2. Stop the Microsoft Exchange Search Host Controller service on the restore destination server.
   However, in consideration of the impact of stopping this service, recommend to take the action.

3. Using AdvancedCopy Manager, restore the database.
   For more information about restore, refer to "8.2.5 Restoration".

4. Start the Microsoft Exchange Search Host Controller service on the restore destination server.

5. Add the database copy to other servers than the restore destination server.

📝 Note

Backup data cannot be restored to any other server than the server on which backup was performed.

Execution example 1

Perform restore from the DB1 that was backed up on EX1.

1. Activate the database copy of DB1 on EX1.

```
Move-ActiveMailboxDatabase DB1 -ActivateOnServer EX1
```

2. Delete the database copy of DB1 on EX2.

```
Remove-MailboxDatabaseCopy -Identity DB1\EX2
```

3. Delete the database file and log file in DB1 on EX2.

4. Perform pre-restore operation on EX1.

   - Permit to restore the database from backup.

   ```
   Set-MailboxDatabase -Identity DB1 -AllowFileRestore $true
   ```

   - Dismount DB1.

   ```
   Dismount-Database -Identity DB1
   ```

   - If QuickOPC is in use for backup, stop the QuickOPC session.

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -
   dbname DB1
   ```

   - For Exchange Server 2013, stop theMicrosoft Exchange Search Host Controller service on the restore destination server. However, in consideration of the impact of stopping this service, recommend to take the action.

5. Perform restore of DB1 on EX1.

   - In the case of Point-in-Time restoration:

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB1 -
   point
   ```

   - in the case of roll-forward restoration:

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB1 -
   roll
   ```

6. Perform post-restore operation on EX1.
   For Exchange Server 2013, start the Microsoft Exchange Search Host Controller service on the restore destination server after restore is performed.

7. Mount DB1.
   If the roll-forward restoration was performed at step 5, it is necessary to delete or rename the CHK file before performing this step. For more information, refer to "8.2.5.4.3 Mounting the database".

   ```
   Mount-Database -Identity DB1
   ```

8. Add the database copy of DB1 to EX2.

   ```
   Add-MailboxDatabaseCopy -Identity DB1 -MailboxServer EX2
   ```

Execution example 2

   Perform restore from the DB2 that was backed up on EX1.

   1. Activate the database copy of DB2 on EX1.

   ```
   Move-ActiveMailboxDatabase DB2 -ActivateOnServer EX1
   ```

   2. Delete the database copy of DB2 on EX2.

   ```
   Remove-MailboxDatabaseCopy -Identity DB2\EX2
   ```

   3. Delete the database file and log file in DB2 on EX2.

4. Perform pre-restore operation on EX1.

   - Permit to restore the database from backup.

   ```
   Set-MailboxDatabase -Identity DB2 -AllowFileRestore $true
   ```

   - Dismount DB2.

   ```
   Dismount-Database -Identity DB2
   ```

   - If QuickOPC is in use for backup, stop the QuickOPC session.

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -
   dbname DB2
   ```

   - For Exchange Server 2013, stop the Microsoft Exchange Search Host Controller service on the restore destination server.
     However, in consideration of the impact of stopping this service, recommend to take the action.

5. Perform restore of DB2 on EX1.

   - In the case of Point-in-Time restoration:

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB2 -
   point
   ```

   - in the case of roll-forward restoration:

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB2 -
   roll
   ```

6. Perform post-restore operation on EX1.
   For Exchange Server 2013, start the Microsoft Exchange Search Host Controller service on the restore destination server after restore is performed.

7. Mount DB2.
   If the roll-forward restoration was performed at step 5, it is necessary to delete or rename the CHK file before performing this step. For more information, refer to "8.2.5.4.3 Mounting the database".

   ```
   Mount-Database -Identity DB2
   ```

8. Add the database copy of DB2 to EX2.

   ```
   Add-MailboxDatabaseCopy -Identity DB2 -MailboxServer EX2
   ```

Execution example 3

   If no database copy of DB1 is available in DAG due to a double failure, perform restore from the backup data obtained on EX1.

   For using Exchange Server 2010(non SP)

   1. Delete the database copy of DB1 on EX2.

   ```
   Remove-MailboxDatabaseCopy -Identity DB1\EX2
   ```

   2. Delete the database file and log file in DB1 on EX2.

   3. Delete the database copy of DB1 on EX1.

   ```
   Remove-MailboxDatabase -Identity DB1
   ```

   4. Delete the database file and log file in DB1 on EX1.

5. Create DB1 with the same configuration as before failure on EX1.

6. Perform pre-restore operation.

   - Permit to restore the database from backup.

   ```
   Set-MailboxDatabase -Identity DB1 -AllowFileRestore $true
   ```

   - Dismount DB1. This procedure, when at procedure 5 DB1 is mounted only, is necessary.

   ```
   Dismount-Database -Identity DB1
   ```

   - If QuickOPC is in use for backup, stop the QuickOPC session.

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -
   dbname DB1
   ```

7. Perform restore of DB1 on EX1.

   - Point-in-Time restoration:

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB1 -
   point
   ```

8. Mount DB1.

   ```
   Mount-Database -Identity DB1
   ```

9. Add the database copy of DB1 to EX2.

   ```
   Add-MailboxDatabaseCopy -Identity DB1 -MailboxServer EX2
   ```

For using Exchange Server 2010 SP1, SP2, SP3 or Exchange Server 2013

1. Check the mount status of DB1 database.

   ```
   Get-MailboxDatabaseCopyStatus -Identity DB1
   ```

2. Dismount the DB1 database if mounted.

   ```
   Dismount-Database -Identity DB1
   ```

3. Delete the database copy of DB1 on EX2.

   ```
   Remove-MailboxDatabaseCopy -Identity DB1\EX2
   ```

4. If any folder of database file or log file for DB1 exists on EX1 or EX2, delete it manually.

5. Perform pre-restore operation.

   - Permit to restore the database from backup.

   ```
   Set-MailboxDatabase -Identity DB1 -AllowFileRestore $true
   ```

   - If QuickOPC is in use for backup, stop the QuickOPC session.

   ```
   C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -
   dbname DB1
   ```

- For Exchange Server 2013, stop the Microsoft Exchange Search Host Controller service on the restore destination server. However, in consideration of the impact of stopping this service, recommend to take the action.

6. Perform restore of DB1 on EX1.

    - Point-in-Time restoration:

    ```
    C:\Win32app\AdvancedCopyManager\bin\swsrpvssrestore_exchange -dbname DB1 -
    point
    ```

7. Perform post-restore operation on EX1.
For Exchange Server 2013, start the Microsoft Exchange Search Host Controller service on the restore destination server after restore is performed.

8. Mount DB1.

    ```
    Mount-Database -Identity DB1
    ```

9. Add the database copy of DB1 to EX2.

    ```
    Add-MailboxDatabaseCopy -Identity DB1 -MailboxServer EX2
    ```

8.4 Backup using the Backup Wizard for Exchange Server

This section explains how to back up Exchange Server 2010 or Exchange Server 2013 databases using the Backup Wizard for Exchange Server.

The Exchange Server 2010 or Exchange Server 2013 database is referred to as the "Exchange database".

For restore of Exchange database using the wizard, refer to the *ETERNUS SF AdvancedCopy Manager for Exchange Server Operation Guide*. If you do not use the wizard, refer to the following:

- Restore of Exchange database: "8.2.5 Restoration"

- Restore of Database Availability Group (DAG): "8.3.5 Restore"

See
. . . .
Refer to "8.1 Backup and restore of Exchange database in Windows Server 2003" and "8.2 Backup and restore of Exchange Server database in Windows Server 2008 or later" for information on the procedure to back up Exchange Server 2003, Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013 databases without using the Backup Wizard.
. . . .

8.4.1 Overview

The Backup Wizard for Exchange Server simplifies the backup operation for Exchange databases.

When the Backup Wizard for Exchange Server is used, the Exchange database backup settings and operations, both of which require complex procedures, can be simplified by users even without specialist knowledge.

In the Backup Wizard for Exchange Server, the following functions are provided:

- Backup Settings and Modification of those Settings using the Wizard

- Automatic Generation of Backup Execution Script

- Automatic Generation of Backup Settings Deletion Script

8.4.1.1 System configuration

The configuration of the Backup Wizard for Exchange Server is shown below.

Figure 8.58 System configuration of the Backup Wizard for Exchange Server
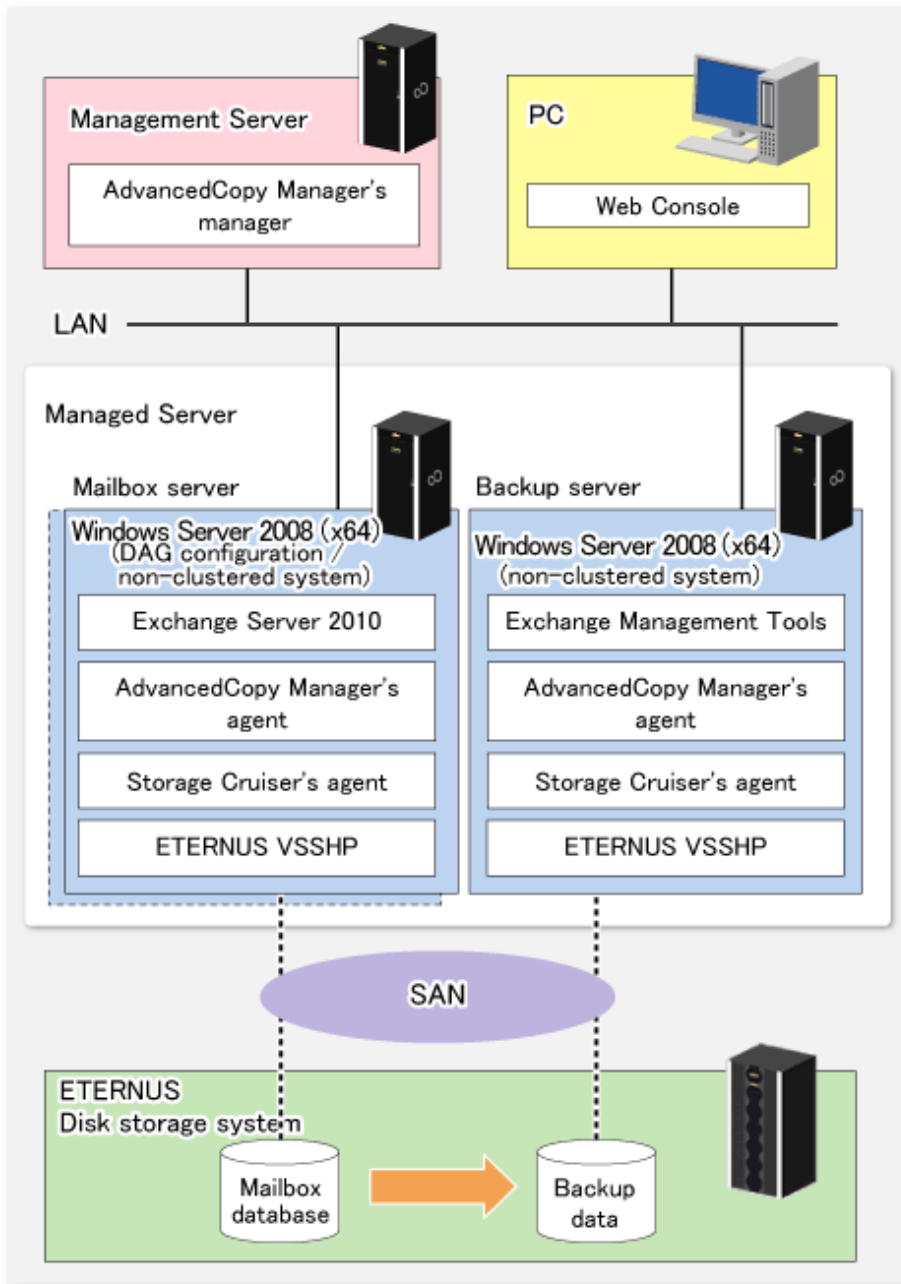
Management Server

    The Management Server manages the Managed Servers (Mailbox Server and backup server). Only one Management Server is installed in the system.

    Install the AdvancedCopy Manager's manager on this server.

Mailbox Server (Managed Server)

    The Mailbox Server is the server which the ETERNUS Disk storage system on which the mailbox database is stored is connected to.

    It is the backup source server for backup operations using the Backup Wizard for Exchange Server.

    Install the AdvancedCopy Manager's agent, Storage Cruiser's agent, and ETERNUS VSS Hardware Provider on this server.

Information

The Database Availability Group (DAG) can be configured on two Mailbox Servers.

Backup Server (Managed Server)

The backup server is the server which the mailbox database backup destination ETERNUS Disk storage system is connected to.

It is the backup destination server for backup operations using the Backup Wizard for Exchange Server.

Install the AdvancedCopy Manager's agent, Storage Cruiser's agent, and ETERNUS VSS Hardware Provider on this server.

8.4.1.2 Supported configurations

Refer to "8.2.2.1 Designing server configurations" about supported server configurations.
The server configuration conditions different from "8.2.2.1 Designing server configurations" are shown below:

- Only the Management Server can be used in cluster configurations. Other server cluster configurations are not supported.

- DAG configurations of four or less Mailbox Servers are supported. DAG configurations of five or more Mailbox Servers are not supported.

Information

With the Backup Wizard, both the Mailbox Server and the backup server are available as an operation server.

DAG configuration support range

The copying of the active mailbox databases shown below is also supported in those configurations which are located on each Mailbox Server.

Figure 8.59 Mixed active mailbox databases and passive mailbox databases (DAG configuration)
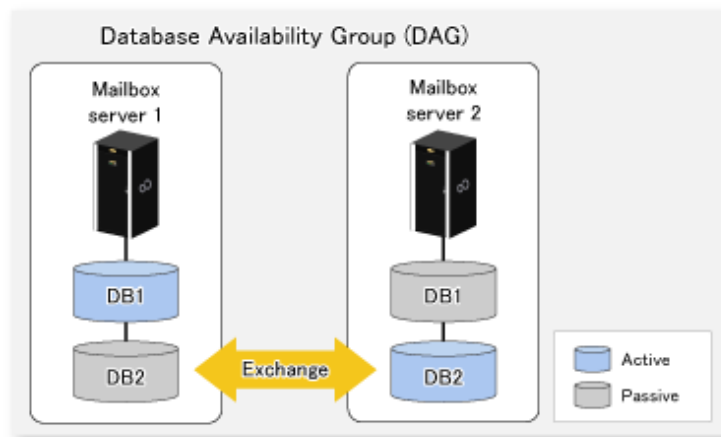
Supported volume configurations

In the backup using the Backup Wizard for Exchange Server, volume configurations which satisfy all of the following conditions are supported:

- The volumes connected to the Mailbox server and the volumes connected to the backup server are the same size. (even bytes as a unit should be the same)

- Volumes are configured in one partition for each LUN.

- The mailbox database (.edb) and public folder database (.edb) are located in separate volumes.

- The mailbox database, public folder database, and volumes where each transaction log and checkpoint are located have not been used for another purpose.

- A drive letter or folder is allocated to the mount point of LUN.
  LUN can be mounted to a drive letter or Windows empty NTFS folder.

- To one volume to which databases are allocated, other databases are not allocated.

- To one volume to which transaction log and checkpoint file are allocated, other transaction log and checkpoint file are not allocated.

- Backup source volume and backup destination volume exist in the same ETERNUS Disk storage system.

Figure 8.60 Backup Wizard for Exchange Server supported volume configurations
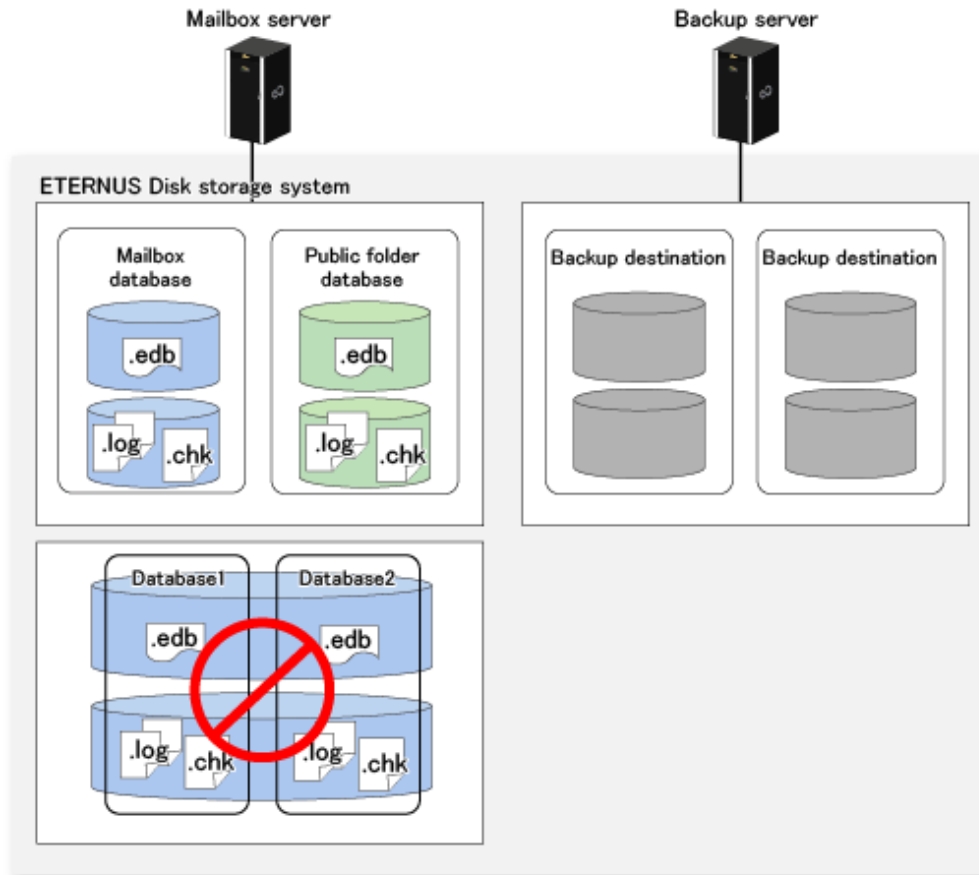
🖐 Note

- If the following conditions are not met, the volumes are not displayed in the Select list on the "Backup source / destination volume mapping" screen in the backup wizard:

  - The volumes connected to the Mailbox server and the volumes connected to the backup server are the same size. (even bytes as a unit should be the same)

  - For the volumes that are connected to the backup server, a drive letter or folder is allocated to the mount point of LUN.

  - Backup source volume and backup destination volume exist in the same ETERNUS Disk storage system.

- In the case of a volume configuration that satisfies the following conditions, since the most up-to-date log file is lost by restore, roll-forward restoration cannot be performed. Only point-in-time restoration is possible:

  - The mailbox database, and transaction log and checkpoint of the mailbox database, are located in the same volumes.

  - The public folder database, and transaction log and checkpoint of the public folder database, are located in the same volumes.

- In an environment where the version of AdvancedCopy Manager's agent in the mailbox server or backup server is 15.2, the volume configuration that satisfies the following conditions is not supported:

  - The mailbox database, and transaction log and checkpoint of the mailbox database, are located in the same volumes.

- The public folder database, and transaction log and checkpoint of the public folder database, are located in the same volumes.

- Any database whose database name contains the following characters cannot be backed up:

  * ? : < > | &

- It is recommended not to use the following characters for the database name of a database to be backed up. If the following characters are used, they should be escaped for Backup Execution Script created by the Backup Wizard:

  . % @ ` ~ ' ! ( ) ^ - $ [ ] { } + #

8.4.2 Operating Environments

This section explains the Backup Wizard for Exchange Server operating environments.

8.4.2.1 Required Hardware

Management Server

Refer to "Hardware requirements" in "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the required Management Server hardware.

Backup Server

The required backup server hardware must satisfy all of the following conditions:

- "Hardware requirements" in "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*

- The operating systems shown in "Backup Server" are running.

Mailbox Server

The required Mailbox Server hardware must satisfy both of the following conditions:

- "Hardware requirements" in "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*

- The operating systems shown in "Mailbox Server" are running.

Note

The supported devices are those supported by AdvancedCopy Manager and ETERNUS VSS Hardware Provider. For more information on supported devices, see below:

- "Devices supported by AdvancedCopy Manager" in "Supported devices" in the *ETERNUS SF Installation and Setup Guide*

- "Supported Environment" in the *ETERNUS VSS Hardware Provider User's Guide*

8.4.2.2 Required Software

Operating System

Management Server

Refer to "Supported operating systems" in "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide* for information on the required Management Server software.

Backup Server

The required backup server software is as follows:

- Windows Server 2008 R2

- Windows Server 2008 SP2 (x64)

- Windows Server 2012

> **Note**
>
> The Exchange management tools needs to be installed in the Backup Server. Its version must be the same as Exchange Server that will be installed in the Mailbox Server.

Mailbox Server

The required Mailbox Server software is as follows:

- Windows Server 2008 R2

- Windows Server 2008 SP2 (x64)

- Windows Server 2012

> **Note**
>
> - The following software is required for Mailbox Server DAG configurations:
>
>   - Windows Server 2008 R2 Enterprise
>
>   - Windows Server 2008 Enterprise SP2 (x64)
>
>   - Windows Server 2012
>
> - Exchange Server 2010 SP2, SP3 or Exchange Server 2013 needs to be installed in the Mailbox Server.

> **Note**
>
> - When running the Mailbox Server and the Backup Server on the guest OS in a virtual environment, it is required to use VMware and install VMware Tools, as well.
>
> - If version 15.2 Storage Cruiser's agent has been installed in the environment where version 15.3 or later AdvancedCopy Manager's agent is installed, execute the following command from the Command Prompt after installing Storage Cruiser's agent.
>
> ```
> <AdvancedCopy Manager program directory>\Wizard\etc\applinkINST.bat
> ```
>
> Restart the Storage Cruiser's agent after executing the above command. Refer to "Starting and Stopping the Agent" in "Command References" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on how to start and stop the Storage Cruiser's agent.

Incompatible Software

Refer to the following for information on incompatible software:

Management Server

"Incompatible software" in "Operating environment of ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide*

Backup Server and Mailbox Server

- "For Windows environment" in "Incompatible software" in "Operating environment of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*

- "For Windows environment" in "Incompatible software" in "Operating environment of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide*

8.4.3 Prerequisites

Checking Mailbox Server and Backup Server environments

Check whether the conditions listed in "Supported volume configurations" of "8.4.1.2 Supported configurations" are met.

Installation

This section explains the software installation that is required to use the Backup Wizard for Exchange Server.

The Mailbox Server and backup server installation flow is shown below.

ⓘ Note

Before performing the installation, check the behavior types shown below. If they are not running, ensure that they are:

- Check that Exchange Server has been installed on the Mailbox Server, and is running.

- In DAG configurations, check that the DAG environment is running.

Figure 8.61 Installation task flow
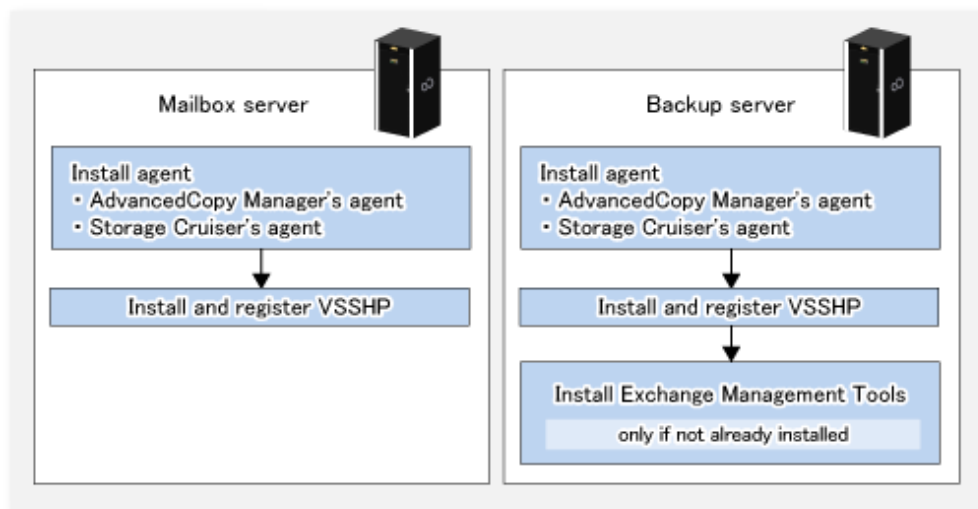
It is necessary to install the AdvancedCopy Manager's agent, Storage Cruiser's agent, and ETERNUS VSS Hardware Provider into the Mailbox Server and backup server. For information on the installation procedure, refer to the following manuals:

- AdvancedCopy Manager's agent
  "Installation of AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*

- Storage Cruiser's agent
  "Installation of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide*

- ETERNUS VSS Hardware Provider
  "Transportable Copy Configuration Installation" in the *ETERNUS VSS Hardware Provider Copy Set Operation Technical Guide*

  The installer is stored on the DVD-ROM "Agent Programs & Manuals":
  <DVD-ROM drive>:\Agent_windows\AdvancedCopy_Manager\VSSHP\win2008_x64\install\setup.exe

ⓘ Note

Install the each software on a LUN which is not a backup target. In addition, install it according to the following instructions:

- For the AdvancedCopy Manager's agent, install "64bit version agent".

- Install ETERNUS VSS Hardware Provider with attention to the following matters:

  - If the firewall is enabled, the port (TCP/IP) used by ETERNUS VSS Hardware Provider must be registered as an exception. Refer to the manual for the relevant firewall for information concerning changing firewall settings.

  - When the ETERNUS VSS Hardware Provider is installed, it is necessary to specify the server type in the [Select Server Type]. Specify the following according to the installed server.

    - For the Mailbox Server: Production Server(Transportable copy)

- For the backup server: Backup Server(Transportable copy)

During the installation process, on the screen to register a shadow copy destination in the target disk pool management file (screen displayed as "Disk list" immediately after VSS Hardware Provider), do not register on the copy destination volume but press the [CANCEL] button.

Environment setup

Backup Server and Mailbox Server

1. Refer to "Setup of AdvancedCopy Manager's agent" and "Setup of Storage Cruiser's agent" in the *ETERNUS SF Installation and Setup Guide* before setting up the backup server and Mailbox Server.

2. Start the AdvancedCopy Manager's agent service and Storage Cruiser's agent service on each server.

   Refer to "8.4.4 Start and Stop" for information on how to start these services.

Management Server

1. Set up the Management Server.

   Refer to "Product common settings" and "Setup of AdvancedCopy Manager's manager" in the *ETERNUS SF Installation and Setup Guide* for information on the setup procedure. If the Management Server is cluster construction, refer to "Customization for Management Server Transaction" in the *ETERNUS SF Cluster Environment Setup Guide*, too.

   Note

   In "Setting up user account", create a user account for the Backup Wizard for Exchange Server.
   The user that was created must belong to ESFAdmin of the ETERNUS SF role group.

2. Register the backup server and Mailbox Server.

   Refer to "Register the server" in the *ETERNUS SF Web Console Guide* for information on the procedure to register the servers.

   Point

   - Check that the backup server and Mailbox Server are running, before registering the servers.

   - In server registration, register them as Managed Servers that use AdvancedCopy Manager's agent functions.

   - In server registration in a virtual environment, register the VMware host to Server on which Mailbox and backup servers are running. Refer to "8.4.8 Virtual environment" for more information. In addition, the VMware host should be registered to Server with AdvancedCopy Manager's agent and Storage Cruiser's agent services started, in the Mailbox and backup servers.

8.4.4 Start and Stop

When the Backup Wizard for Exchange Server is used, it is necessary to restart the AdvancedCopy Manager's agent service and Storage Cruiser's agent service with each agent installed.
Each agent service will start/stop automatically when the system starts/stops. For this reason, normally there is no need to start/stop these services manually.

The ETERNUS SF Manager service must be started. However, this service starts automatically. For this reason, there is no need to start/stop this service manually. (It is not necessary to restart.)

The method used to start and stop each service manually is as follows:

- ETERNUS SF Manager

  - How to start the service

    - For Windows environment

      Execute the "$INS_DIR\Common\bin\Start_ESFservice.bat" file.
      ($INS_DIR is the "Program Directory" that was specified when ETERNUS SF Manager was installed.)

    - For Solaris or Linux environment

      Execute the "/opt/FJSVesfcm/bin/startesf.sh" file.

  - How to stop the service

    - For Windows environment

      Execute the "$INS_DIR\Common\bin\Stop_ESFservice.bat" file.
      ($INS_DIR is the "Program Directory" that was specified when ETERNUS SF Manager was installed.)

    - For Solaris or Linux environment

      Execute the "/opt/FJSVesfcm/bin/stopesf.sh" file.

- AdvancedCopy Manager's agent

  Refer to "Chapter 2 Starting and Stopping Services".

- Storage Cruiser's agent
  Refer to "Starting and Stopping the Agent" in "Command References" in the *ETERNUS SF Storage Cruiser Operation Guide*.

8.4.5 Backup Operations

This section explains the operations which use the Backup Wizard for Exchange Server.

8.4.5.1 Creating the Backup Execution Script

The Backup Wizard for Exchange Server generates the following scripts:

- Backup Execution Script

- Configuration Removal Script

See

Refer to "Create an Exchange Server backup script and script execution environment setting by wizard" in the *ETERNUS SF Web Console Guide* for information on how to operate these scripts.

The Backup Execution Script specification is shown below:

Table 8.11 Backup Execution Script specification

Backup Execution Script storage destination server	Mailbox Server
Backup Execution Script file name	`<Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat \execute_backup_<DBname>_<Date>.bat`
Backup Execution Script encoding	ASCII
Backup Execution Script exit status	0: Exits normally Value except 0: Exits with an error

DBname: Mailbox database name or public folder database name.
Date: Date/time file is created. Format: "yyyymmddhhmmss".

The Backup Execution Script file content is shown below:

```
@echo off

setlocal enabledelayedexpansion

set CMDPATH=<CMDpathPATH>
set BACKUP_DB=<DBname>

set CHECK="swsrpvssbackup_exchange successfully completed"
set CMD=%CMDPATH%swsrpvssbackup_exchange -dbname %BACKUP_DB%
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD%`) do (if "%%i"==%CHECK% set RET=OK)
if not "%RET%"=="OK" echo execute_backup is failed. & exit /b 1

echo execute_backup is successfully completed.
exit /b 0
```

DBname: Backup source mailbox database name or public folder database name.
CMDpathPATH: Program Directory path that was specified when AdvancedCopy Manager's agent was installed.

Note

When the Backup Execution Script of the same Mailbox Server is created again, if a Backup Execution Script was created previously this will not be removed or overwritten.

Information

- Running the Backup Execution Script performs backups by QuickOPC.

- Running the Backup Wizard for Exchange Server performs the following settings:

    - Registering the devices of the Mailbox Server and backup server in AdvancedCopy Manager.

    - Registering the backup source volume and backup destination volume of the Mailbox Server and backup server in the replication capabilities.

    - Registering the Exchange database information to be backed up in the AdvancedCopy Manager's management file.

    - Creating a drive letter map file in the Backup Server.

    - Registering the copy set file in VSS Hardware Provider.

8.4.5.2 Execution of the Backup

The script that was generated in "8.4.5.1 Creating the Backup Execution Script" can easily be registered in Task Scheduler of the operating system and executed manually to back up the mailbox database.

The procedures to execute the backup registered in Task Scheduler of the operating system automatically, and to execute the backup manually, are shown below.

Executing the backup automatically using Task Scheduler

1. Copy the script file that was generated in "8.4.5.1 Creating the Backup Execution Script" to any location.

2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.

See

Refer to "Creating user accounts for executing command" in the *ETERNUS SF Installation and Setup Guide* for information on the user which executes the command.

3. Start Task Scheduler.

   The methods to start this are as follows:

   - Windows Server 2008:

     System and Maintenance > **Administrative Tools** > **Task Scheduler**

   - Windows Server 2008 R2:

     System and Security > **Administrative Tools** > **Task Scheduler**

   - Windows Server 2012:

     Start > **Administrative Tools** > **Task Scheduler**

4. In Task Scheduler, configure the following:

   - Task name

   - Date/time task will start

   - Configure the script file which was copied in step 1 in the program which is to be executed.

     Configuration example in which the error message is output to execute_MailBoxDB01.log:

     ```
     C:\EXCHANGE_SERVER\BACKUP\execute_backup_MailBoxDB01_20121201071234.bat > C:\EXCHANGE_SERVER
     \BACKUP\execute_MailBoxDB01.log 2>&1
     ```

Executing the backup manually

1. Copy the script file that was generated in "8.4.5.1 Creating the Backup Execution Script" to any location.

2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.

See
. . . .
Refer to "Creating user accounts for executing command" in the *ETERNUS SF Installation and Setup Guide* for information on the user which executes the command.
. . . .

3. Start the command prompt, and execute the script file that was copied in step 1.

   Example:

   ```
   C:\EXCHANGE_SERVER\BACKUP\execute_backup_MailBoxDB01_20121201071234.bat
   ```

8.4.5.3 Backup to tape

To perform the tape backup, take the following procedure:

Figure 8.62 Procedures of tape backup
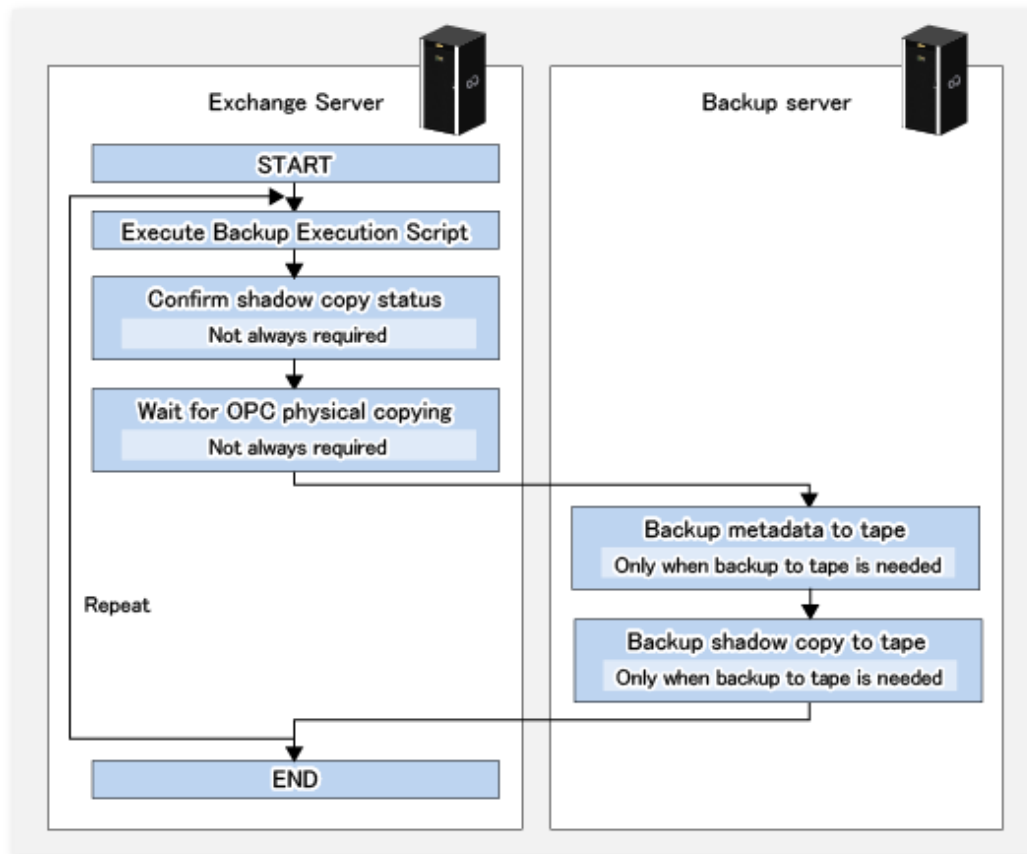
8.4.6 Changing a Configuration

In addition to the Backup Execution Script, the Backup Wizard for Exchange Server generates the following script:

- Configuration Removal Script

Using the configuration removal script that was generated, the backup configuration can be changed.

The backup configuration can be changed according to the following procedure:

1. Remove the current configuration.
   Using the configuration removal script that was generated in "8.4.5.1 Creating the Backup Execution Script", remove the current configuration.
   Refer to "Removing a configuration" for information on the procedure for removing the configuration.

2. Change the Mailbox Server database configuration and backup server volume configuration.

3. Generate the backup script.

🖐 Note
. . . .
When you change the database configuration of the Mailbox Server or the volume configuration of backup server, please change within the range of the composition described in "Supported volume configurations" in "8.4.1.2 Supported configurations"

After changing database configuration, perform the procedure described in "Reload the server configuration information" in the *ETERNUS SF Web Console Guide*.
. . . .

The configuration removal script specification is shown below:

Table 8.12 Configuration removal script specification

Configuration removal script storage destination server	Mailbox Server
Configuration removal script file name	*<Program directory when AdvancedCopy Manager's agent is installed>*\Wizard\bat \delete_backup_*<DBname>*_*<Date>*.bat
Configuration removal script encoding	ASCII
Configuration removal script exit status	0: Exits normally Value except 0: Exits with an error

    DBname: Mailbox database name or public folder database name.
    Date: Date/time file is created. Format: "yyyymmddhhmmss".

The configuration removal script file content is shown below:

```
@echo off

setlocal enabledelayedexpansion

set CMDPATH=<CMDpath>
set BACKUP_DB=<DBname>
set DBORG=<DBORGVolume>
set DBREP=<DBREPVolume>
set LOGORG=<LOGORGVolume>
set LOGREP=<LOGREPVolume>

set CHECK="swsrpshadowadm_exchange successfully completed"
set ERRCODE_OK=swsrp4723
set CMD=%CMDPATH%swsrpshadowadm_exchange stopqopc -dbname %BACKUP_DB%
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD% 2^>^&1`) do (if "%%i"==%CHECK% (set RET=OK) else
(call :CHECK %ERRCODE_OK% %%i))
if not "%RET%"=="OK" echo delete_backup is failed. & exit /b 1

set CHECK="swsrpdbinfo_exchange successfully completed"
set CMD=%CMDPATH%swsrpdbinfo_exchange -delete -dbname %BACKUP_DB%
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD%`) do (if "%%i"==%CHECK% set RET=OK)
if not "%RET%"=="OK" echo delete_backup is failed. & exit /b 2

set CHECK="swsrpdelvol completed"
set CMD=%CMDPATH%swsrpdelvol %DBORG% %DBREP%
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD%`) do (if "%%i"==%CHECK% set RET=OK)
if not "%RET%"=="OK" echo delete_backup is failed. & exit /b 3

set CMD=%CMDPATH%swsrpdelvol %LOGORG% %LOGREP%
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD%`) do (if "%%i"==%CHECK% set RET=OK)
if not "%RET%"=="OK" echo delete_backup is failed. & exit /b 4

echo delete_backup is successfully completed.
exit /b 0
```

```
:CHECK
if %1==%2 set RET=OK
exit /b
```

CMDpath: Program Directory path that was specified when AdvancedCopy Manager's agent was installed.
DBname: Backup source mailbox database name or public folder database name.
DBORGVolume: Copy source Exchange database volume name.
DBREPVolume: Copy destination Exchange database volume name.
LOGORGVolume: Copy source log volume name
LOGREPVolume: Copy destination volume name.

📙 Note

. . . .

- When the same Mailbox Server script is created again, if a configuration removal script was created previously this will not be removed or overwritten.

- In an error occurs in the execution of the configuration removal script, refer to the *ETERNUS SF Messages* of this version before taking the action that is required for the corresponding message. After taking the required action, re-execute the script.

. . . .

Removing a configuration

The configuration removal script that was generated in "8.4.5.1 Creating the Backup Execution Script" can easily be executed manually to remove the configuration that was set. The procedures to remove the configuration manually are shown below.

1. Copy the script file that was generated in "8.4.5.1 Creating the Backup Execution Script" to any location.

2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.

📘 Information

. . . .

Refer to "Creating user accounts for executing command" in the *ETERNUS SF Installation and Setup Guide* for information on the user which executes the command.

. . . .

3. Start the command prompt, and execute the script file that was copied in step 1.

Example:

```
C:\EXCHANGE_SERVER\BACKUP\delete_backup_MailBoxDB01_20121201071234.bat
```

📘 Information

. . . .

In the configuration removal script, execute the following commands:

- "swsrpshadowadm_exchange stopqopc (stop QuickOPC)"

- "swsrpdbinfo_exchange delete (delete Exchange database information)"

- "swsrpdelvol (delete replica volume information)"

If an error occurs in the execution of the configuration removal script, it may be possible to resolve the error by taking the actions shown below.
For this reason, it is recommended that these actions be performed when the error first occurs.
Execute the following command immediately after executing the configuration removal script to obtain the exit status when the configuration removal script is executed.

```
echo %ERRORLEVEL%
```

According to the exit status obtained, take the following actions:

- Error in swsrpshadowadm_exchange stopqopc (stop QuickOPC): (Exit status: 1)

  Execute the following command:

```
cd <Program directory path which installed AdvancedCopy Manager's agent>\bin\
swsrpshadowadm_exchange stopqopc -dbname <Name of database to be deleted>
swsrpdbinfo_exchange -delete -dbname <Name of database to be deleted>
swsrpdelvol <backup_source_volume> <backup_destination_volume>
```

- Error in swsrpdbinfo_exchange delete (delete Exchange database information): (Exit status: 2)

  Execute the following command:

```
cd <Program directory path which installed AdvancedCopy Manager's agent>\bin\
swsrpdbinfo_exchange -delete -dbname <Name of database to be deleted>
swsrpdelvol <backup_source_volume> <backup_destination_volume>
```

- Error in swsrpdelvol (delete replica volume information): (Exist status: 3 or 4)

  Execute the following command:

```
cd <Program directory path which installed AdvancedCopy Manager's agent>\bin\
swsrpdelvol <backup_source_volume> <backup_destination_volume>
```

8.4.7 Troubleshooting

If an error occurred when the Backup Wizard for Exchange Server was used, collect the required diagnostic data and contact a Fujitsu system engineer.
Refer to "11.2.2 Collecting maintenance information" for how to collect the required diagnostic data.

8.4.7.1 Recovery procedure for failure in rollback of Backup Wizard for Exchange Server

If running the Backup Wizard for Exchange Server failed for any cause, reset the backup done halfway to restore to the state before the Backup Wizard was run. (This restore is hereinafter referred to as "Rollback of Backup Wizard").

The following is a description of the recovery procedure used when Rollback of Backup Wizard fails:

Procedure to determine whether Rollback of Backup Wizard failed

If running the Backup Wizard still fails despite having taken corrective actions against all the errors caused when the Backup Wizard for Exchange Server was run, it may possibly be attributed to a failure in Rollback of Backup Wizard. Take the following recovery procedure:

Recovery procedure

1. Of Management Server, Mailbox Server and Backup server, if any server is not started, start it.

2. Check whether any files exist in the following folder of the Mailbox Server. If any, delete all the files:

   `<Program directory when AdvancedCopy Manager's agent is installed>\wizard\tmp`

3. Check whether the scripts to run and delete backups of the target mailbox database or public folder database are created in the following folder of the Mailbox Server. If so, delete them:

   `<Program directory when AdvancedCopy Manager's agent is installed>\wizard\bat`

Note

If the execution of the previous Backup Wizard terminates normally, the error may be attributed to the correctly created scripts to execute and delete backups. Check whether the date of the deleted file is the date when the Backup Wizard failed.

For example, if you select "MB2_ENG" to run the Backup Wizard at 20:49 on 10/29/2012, resulting in failure in the Rollback of Backup Wizard, delete the following files. Do not delete other files than those listed below:

```
execute_backup_MB2_ENG_20121029204931.bat
delete_backup_MB2_ENG_20121029204931.bat
```

4. As for the database selected by the Backup Wizard, delete the backup definition of AdvancedCopy Manager.

   Take the following procedure as many times as the number of selected databases.

   ## Check the volumes used by the mailbox database

   To display the volumes used by the selected database, execute the following command on the Mailbox Server:

   <Program directory when AdvancedCopy Manager's agent is installed>\bin\swsrpdevdisp_exchange -dbname *<database_name>*

   The following is the example of command execution:

   ```
   C:\Win32app\AdvancedCopyManager\bin>swsrpdevdisp_exchange -dbname MB1_ENG
   Store: MB1_ENG
    EDB=F:\MB1_ENG\MB1_ENG.edb            AdvancedCopy Manager Device:g1d61p1
    TransactionLog=G:\MB1_ENG\E02.log             AdvancedCopy Manager Device:g1d62p1
    CheckPointFile=G:\MB1_ENG\E02.chk             AdvancedCopy Manager Device:g1d62p1

   C:\Win32app\AdvancedCopyManager\bin>
   ```

   The volume displayed after [AdvancedCopy Manager Device:] is a backup source volume used as database. In the above command execution example, g1d61p1 and g1d62p1 are backup source volumes.

   After executing the above commands, perform the following steps:

   - If the information is displayed: "Delete the mailbox database information"

   - If the information is not displayed: "Obtain volume pair definition (Pattern 1)"

   ## Delete the mailbox database information

   To delete the definition of the selected database, execute the following command on the Mailbox Server:

   <Program directory when AdvancedCopy Manager's agent is installed>\bin\swsrpdbinfo_exchange -delete *<database_name>*

   The following is the example of command execution:

   ```
   C:\Win32app\AdvancedCopyManager\bin>swsrpdbinfo_exchange -delete -dbname MB1_ENG
   swsrpdbinfo_exchange successfully completed

   C:\Win32app\AdvancedCopyManager\bin>
   ```

   On completion of the above-mentioned command, perform the step "Obtain volume pair definition (Pattern 2)".

   ## Obtain volume pair definition (Pattern 1)

   Execute the following commands on the Mailbox Server:

   <Program directory when AdvancedCopy Manager's agent is installed>\bin\swsrpvolinfo

   The following is the example of command execution:

   ```
   C:\Win32app\AdvancedCopyManager\bin>swsrpvolinfo
   Server Original-Volume Size         Replica-Volume Size         Copy          Op-Server
   VM-23  g1d61p1@VM-23       4.9 Gbyte g1d86p1@VM-32     4.9 Gbyte bi-direction both
   VM-23  g1d62p1@VM-23       4.9 Gbyte g1d97p1@VM-32     4.9 Gbyte bi-direction both

   C:\Win32app\AdvancedCopyManager\bin>
   ```

   Of the pairs displayed above, perform the step "Delete volume pair definition" as to a volume pair to be used as backup source and backup destination volumes if any error should occur in the Backup Wizard.

   In the above command execution example, g1d61p1@VM-23 and g1d62p1@VM-23 are backup source volumes and g1d86p1@VM-32 and g1d97p1@VM-32 are backup destination volumes.

   ## Obtain volume pair definition (Pattern 2)

   Execute the following commands on the Mailbox Server:

```
<Program directory when AdvancedCopy Manager's agent is installed>\bin\swsrpvolinfo
```

The following is the example of command execution:

```
C:\Win32app\AdvancedCopyManager\bin>swsrpvolinfo
Server Original-Volume Size         Replica-Volume Size         Copy          Op-Server
VM-23  g1d61p1@VM-23     4.9 Gbyte g1d86p1@VM-32     4.9 Gbyte bi-direction both
VM-23  g1d62p1@VM-23     4.9 Gbyte g1d97p1@VM-32     4.9 Gbyte bi-direction both


C:\Win32app\AdvancedCopyManager\bin>
```

Of the pairs displayed above, determine the pair in which the volumes displayed in the step "Check the volumes used by the mailbox database" are included as a volume pair specified by this wizard and perform the step "Delete volume pair definition".

In the above command execution example, g1d61p1@VM-23 and g1d62p1@VM-23 are backup source volumes and g1d86p1@VM-32 and g1d97p1@VM-32 are backup destination volumes.

Delete volume pair definition

Execute the following commands on the Mailbox Server:

```
<Program directory when AdvancedCopy Manager's agent is installed>\bin\swsrpdelvol
<backup_source_volume> <backup_destination_volume>
```

For <*backup_source_volume*> and <*backup_destination_volume*>, specify the volume pair obtained in the step "Obtain volume pair definition (Pattern 1)" or "Obtain volume pair definition (Pattern 2)". The following is the example of command execution:

```
C:\Win32app\AdvancedCopyManager\bin>swsrpdelvol g1d61p1@VM-23 g1d86p1@VM-32
swsrpdelvol completed

C:\Win32app\AdvancedCopyManager\bin>swsrpdelvol g1d62p1@VM-23 g1d97p1@VM-32
swsrpdelvol completed

C:\Win32app\AdvancedCopyManager\bin>
```

8.4.8 Virtual environment

For virtual environment, there are some notes as shown below:

- When registering a guest OS on VMware in the Management Server, register the VMware host.
  The guest OS is automatically registered by registering the VMware host in the server. The VMware host should be registered to Server with or without the ETERNUS SF Storage Cruiser Standard Edition license.

- To obtain the information of VM guest (Virtual machine and guest OS), install VMware Tools on guest OS. For the specification of VM guest display in the ETERNUS SF system, refer to [Note] of "VMware Infrastructure 3 Version 3.5 (or later), VMware vSphere 4 (or later) or VMware ESXi 3.5 (or later)" in "Environment Configuration" in the *ETERNUS SF Storage Cruiser Operation Guide*.

- After registering the guest OS on VMware in the Management Server, change the following server information in the server screen of the Web Console with respect to the registered guest OS:

  - Select [Yes] in the [Use AdvancedCopy Manager] field.

- Before registering the VMware host to Server, perform the following operations with respect to the Mailbox server on the guest OS:
  Check whether the IP address assigned to the largest number network adapter of valid network adapters defined for VM guests is the IP address of the management LAN.
  If it is not the IP address of the management LAN, edit the VM guest settings to add an Ethernet adapter and specify the IP address of the management LAN for the largest number network adapter. Take the following procedure:

  1. Login to the VMware host on the VM client.

  2. Select a target VM guest.

  3. Select [Edit virtual machine settings].

  4. Select [Add...] on the [Hardware] tab.

  5. Select [Ethernet Adapter]. (e.g. Type: E1000, Label: VM Network)

6. Login to the VM guest and specify the IP address of management LAN for added NIC.

Note

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The above procedure is required not only when registering the initial VMware host server but also when network configuration is changed during operation (required also immediately before executing "Reload the server configuration information").

In addition, if any change is made in server configuration in a virtual environment, it is required to execute "Reload the server configuration information" to the VMware host.

．．

- To use the backup wizard after starting to use AdvancedCopy Manager in an environment in which the ETERNUS SF Storage Cruiser Standard Edition license is not registered, the following procedure is required to migrate the server registered environment:

  1. As for a VMware guest registered as a physical server, use the resource backup function of AdvancedCopyvManager to back up the AdvancedCopy Manager definitions(backup operation, replication operation).
  Refer to "11.1.1.1.1 Backing up a backup management list and recovery control file" for how to back up resources for backup operation. Refer to "11.1.1.2.1 Backing up a replication management list" for how to back up resources for replication operation.

  2. Delete the AdvancedCopy Manager definitions(backup operation, replication operation).
  To delete the definition of backup operation, use steps 1 to 3 in "3.6.4 Deleting the Managed Server". To delete the definition of replication operation, perform "7.6.2 Deleting a source volume or replica volume" for all the registered copy source/ destination volumes.

  3. Delete all the VMware guests registered as physical servers onto the Management Server.

  4. Register the VMware host to Server.

  5. Select an automatically discovered VMware guest by clicking [Yes] in [Use AdvancedCopy Manager] on the Modify Server window.

  6. Fetch the device information on a Managed Server.
  Refer to "7.4.4 Fetching device information on a Managed Server" for how to fetch the device information.

  7. Use the resource restore function of AdvancedCopy Manager to restore the resources backed up in step 1.
  Refer to "11.1.1.1.2 Restoring a backup management list and recovery control file" for how to restore resources for backup operation. Refer to "11.1.1.2.2 Restoring a replication management list" for how to restore resources for replication operation.

- Do the following before registering the VMware host in the server when you operate DAG of Exchange Server in the VM guest environment.

  - The procedure for the single network adaptor environment is shown below.

    1. Allocate the network adaptor to the VM guest newly.

    2. Set IP address for DAG and IP address for the management of the VM guest to separate network adaptors. Allocate the IP address for the management of the VM Guest to the highest numbered adaptor.

  - The procedure for the two or more network adaptor environment is shown below.

    - Set IP address for DAG and IP address for the management of the VM guest to separate network adaptors. Allocate the IP address for the management of the VM Guest to the highest numbered adaptor.

IP address displayed on the server screen of the Web Console is IP address allocated in the network adaptor of the biggest number among effective network adaptors being defined by the VM guest. IP address for DAG might be displayed in IP address of the VM guest displayed to compose DAG. In that case, add a new network adaptor to the VM guest, and set IP address for the management of the VM guest to the added network adaptor again. On the Web Console, execute [Reload Conf.] to update to the latest information.

Chapter 9 Backup and Restore of Hyper-V

This chapter explains the procedures for backing up and restoring Hyper-V Guest OSes.

9.1 Overview

9.1.1 Backing Up Hyper-V

The Advanced Copy function of the ETERNUS Disk storage system can link with VSS and the Hyper-V VSS writer to implement backup of Hyper-V Guest OSes.

Figure 9.1 Backup processing image
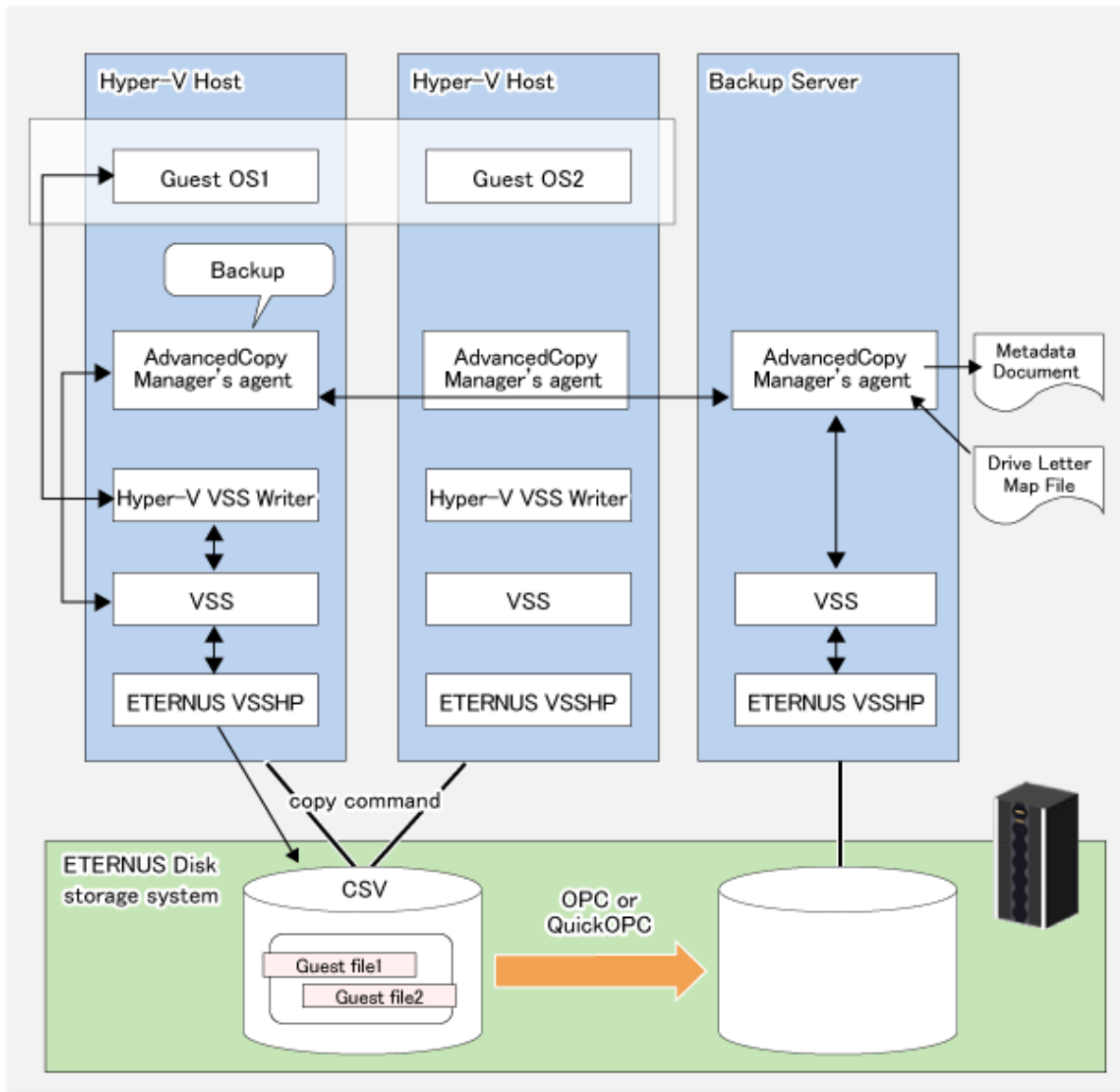
9.1.1.1 Objects of backup and restoration

Objects of backup and restoration by this function are Hyper-V Guest OSes that are configured within CSV (Cluster Shared Volume). Backup and restoration of Guest OSes that are configured on volumes other than CSV are not supported.

Also, "Initial Store" (authentication storing) of Hyper-V cannot be backed up with this function.
For backing up and restoring Initial Store, please use Windows Server backup.

9.1.1.2 Backup using Advanced Copy

By using Advanced Copy functions (OPC or QuickOPC), backups can be created instantly without placing a burden on servers.

- Advanced Copy functions are executed by the ETERNUS VSS Hardware Provider.

- The files to be backed up (Guest OS configuration files) are copied to the backup volume.

9.1.1.3 Online and offline backup

For online backup of a Guest OS while it is operating, all of the following conditions must be met.

- In the Hyper-V Guest OS, one of the following operating systems must be installed:

    - Windows Server 2003

    - Windows Server 2008

    - Windows Server 2012 (when the Hyper-V Host OS is Windows Server 2012)

    - Windows Vista

    - Windows 7

    - Windows 8 (when the Hyper-V Host OS is Windows Server 2012)

- "Integration Services" must be installed in the Guest OS. (excluding Windows Server 2012)

- Within the "Integration Services", "Backup (Volume Snapshot)" must be enabled.

- All disks used by the Guest OS must be basic disks formatted as NTFS.

If any of the above conditions is not met, the Guest OS will be backed up offline.
When a Guest OS is backed up offline while it is operating, the Hyper-V VSS writer temporarily puts the Guest OS in standby mode.

9.1.2 Restoring Hyper-V

The Advanced Copy function of the ETERNUS Disk storage system can link with VSS and the Hyper-V VSS writer to implement restoration of backed up Hyper-V Guest OSes.

Figure 9.2 Restoration processing image
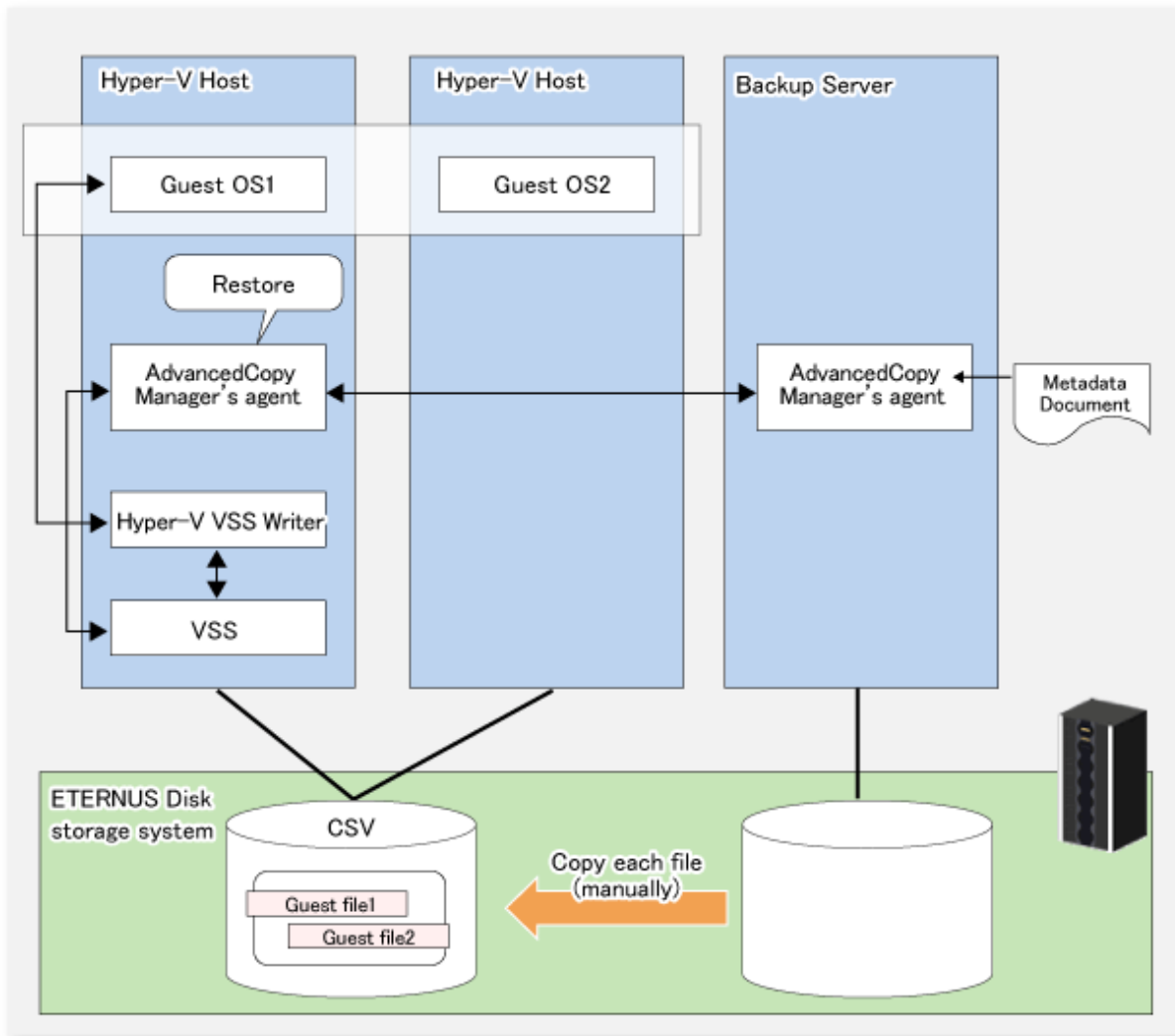
- If the Guest OS to be restored is currently operating, it will be stopped and deleted.

- When restoration is completed, the Guest OS will be re-registered.

- If the online backup data are stored on tape, restore the files directly from the tape to the transaction volume.

Note

The Guest OS cannot be restored to a location (file path) that is different from the original backup location.
Restoration is possible only to the originally backed up location.

9.2 Operation Design

This section explains the operation design for backup and restoration of Hyper-V Guest OSes.

9.2.1 Designing Server Configurations

Management Server

The Management Server centrally manages and operates multiple Managed Servers.

Install the Manager function of AdvancedCopy Manager on this server. A Managed Server (Hyper-V host, backup server) that performs backup of a Hyper-V Guest OS cannot also work as a Management Server.

Managed Server (Hyper-V host)

The Managed Server is used for Hyper-V operation.

Install the AdvancedCopy Manager's agent in the Windows Server 2008 (x64), Windows Server 2008 R2, or Windows Server 2012 environment.

The disk (transaction volume) on which the Guest OS to be backed up is located and the backup volume must be connected.
Also, the disk on which the Guest OS is located must be a Cluster Shared Volume (CSV).

Managed Server (backup server)

This server operates as the backup server.

Install the AdvancedCopy Manager's agent in the Windows Server 2008 (x64), Windows Server 2008 R2, or Windows Server 2012 environment.

The disks (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 Hyper-V host (one cluster service).

- The Hyper-V host cannot have a double role to also work as a backup server.

The following figure shows a server configuration example. The minimum configuration contains 4 machines, a Management Server, 2 clustered Hyper-V host servers, and 1 backup server, as well as 1 ETERNUS Disk storage system.

Figure 9.3 System configuration example
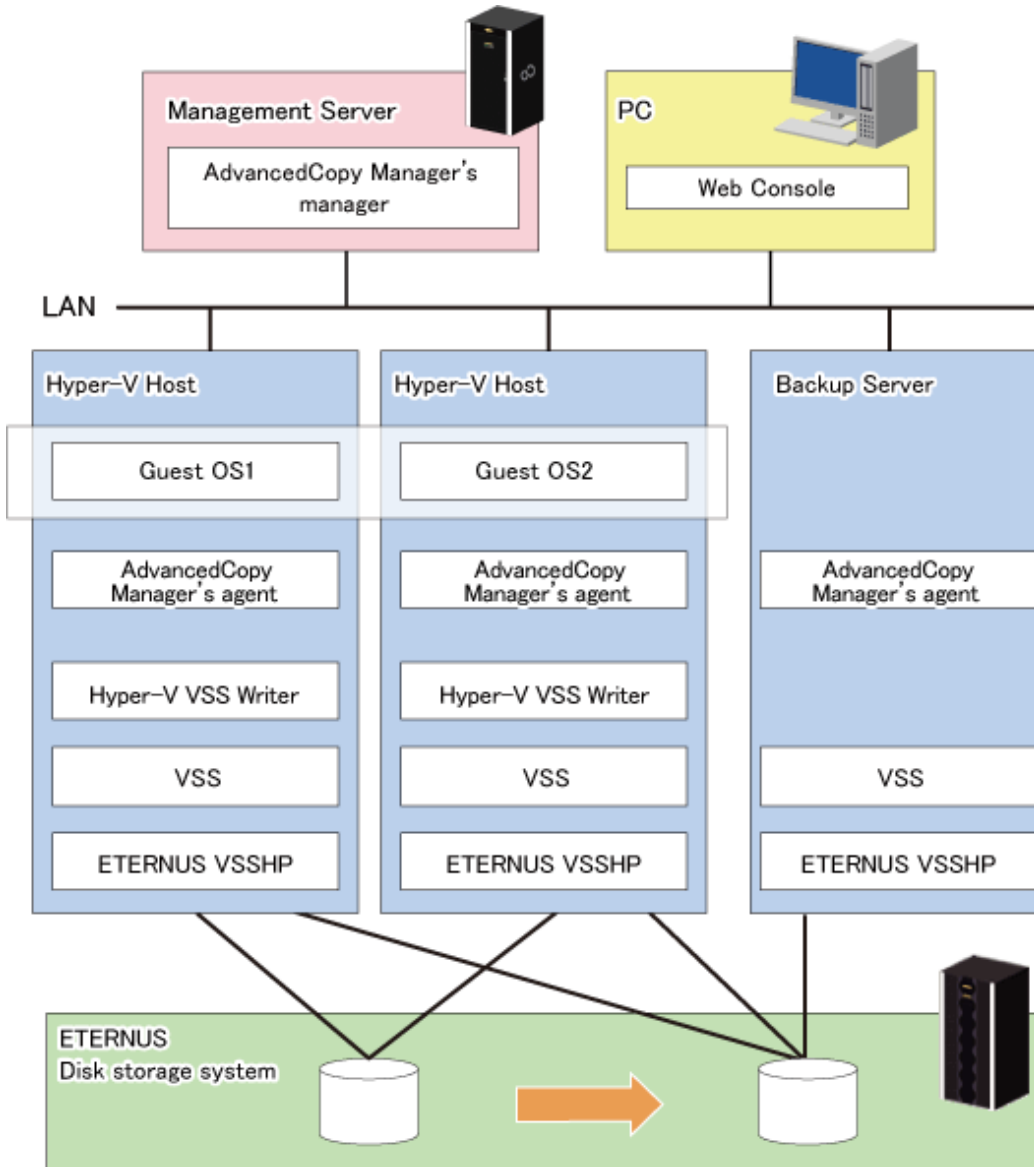
9.2.2 Designing Disk Configurations

Pay attention to the following points when you design a disk configuration:

- The disks of transaction and backup volumes must be allocated to the same ETERNUS Disk storage system.

- Make sure that transaction and backup volumes have the same disk sizes.

- Only basic disks are supported. Dynamic disks are not supported.

- Usable disk formats are MBR and GPT.

Point

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Multiple partitions can be created on a single disk.
Backup, however, is performed disk by disk, so all partitions on a disk will be backed up simultaneously.
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9.3 Preparation

Below figure shows the flow of preparation tasks.
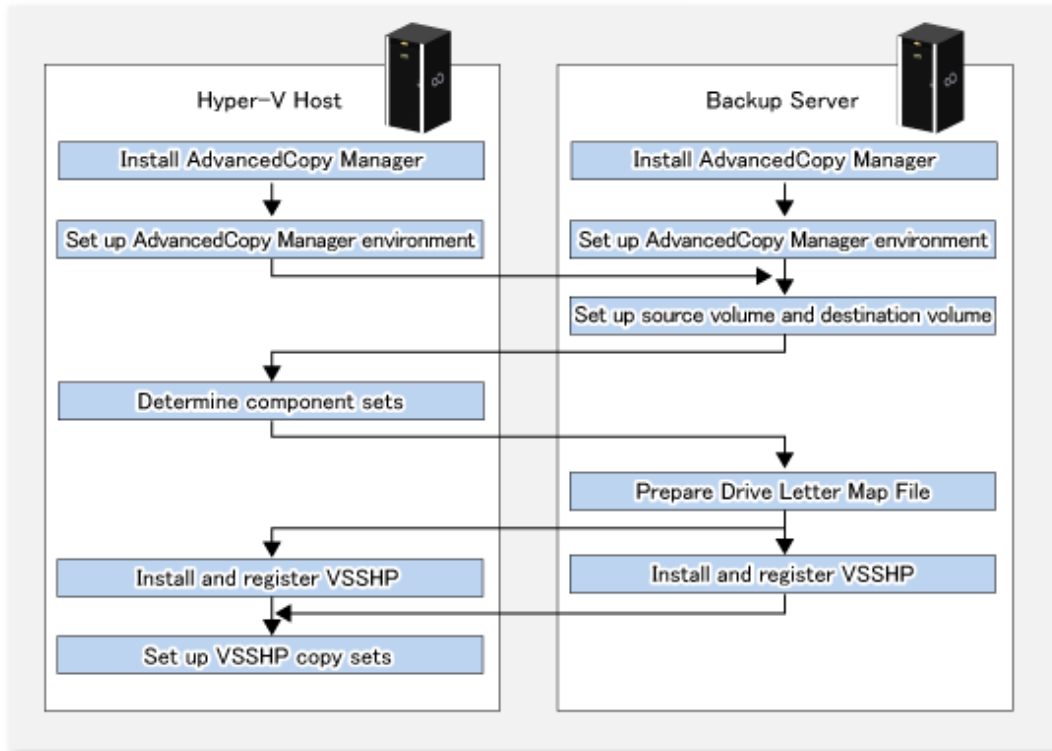
The examples of command execution given in this section presume an environment as shown in below figure.

Figure 9.4 Environment for using command execution examples
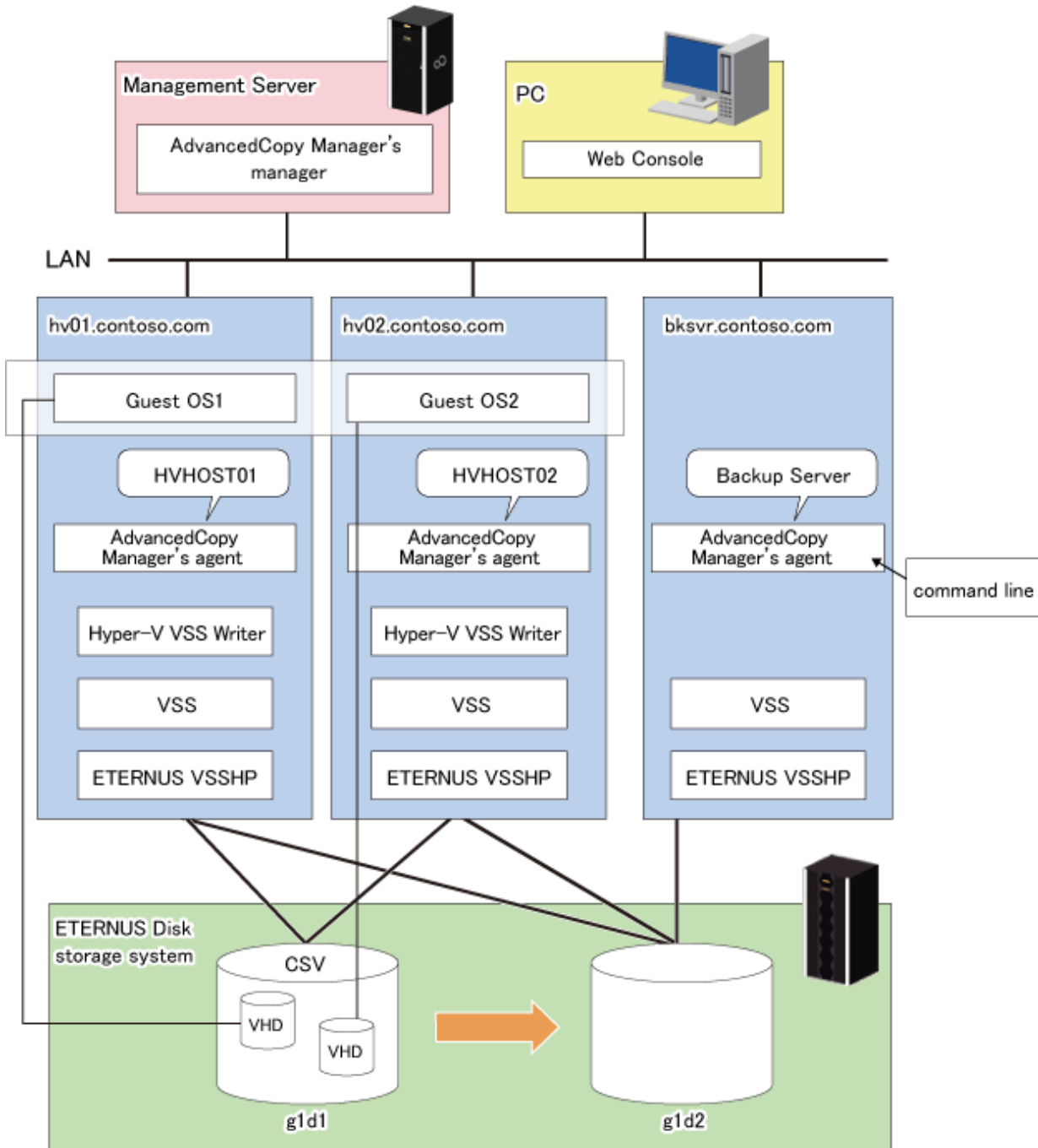
9.3.1 Installing AdvancedCopy Manager

Install AdvancedCopy Manager (managers and agents) on all servers in the storage system.
For an explanation of installation methods, refer to "Installing ETERNUS SF Manager" and "Installing AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*.

Note that AdvancedCopy Manager's agents to be installed on the Hyper-V host and the backup server must be either of the following.

- All agents are for Windows Server 2008 (x64).

- All agents are for Windows Server 2008 R2.

- All agents are for Windows Server 2012.

Select the 64bit version agent program when you install the AdvancedCopy Manager's agent.

9.3.2 Registering the Copy License

Register a local copy license in the ETERNUS Disk storage system.
For details, refer to "Registering Licenses" in the *ETERNUS SF Installation and Setup Guide*.

For backing up Hyper-V Guest OSes, you can use OPC or QuickOPC.

9.3.3 Installing and Registering VSSHP

Install and register VSSHP.
For details, refer to "8.2.3.1.2 Installing and registering VSSHP".

9.3.4 Hyper-V Environment Settings for VSSHP

Perform the following work after installation of VSSHP.

1. Using the Hyper-V Environment Setup Command (stxvhyperv), set up the Hyper-V environment for VSSHP.
   For details on the command, refer to "Hyper-V Environment Setup Command (stxvhyperv)" in the *ETERNUS VSS Hardware Provider User's Guide*.

2. Connect the Hyper-V host with backup disks, and set the status of backup disks to offline.

9.3.5 Environment Settings for AdvancedCopy Manager

Perform the following work on the Hyper-V host and the backup server.

- "7.4.1 Starting a service"

- "7.4.2 Starting the Web Console"

- "7.4.3 Registering a Managed Server"

- "7.4.4 Fetching device information on a Managed Server"

9.3.6 Setting Up the Source and Replica Volumes

Use swsrpsetvol (Replication volume information setting command) to register the source volumes (transaction volumes) and replica volumes (backup volumes) in the replication volume information.

🛈 Note

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- Register all transaction and backup volumes to be used in VSS backup.

- Set transaction volumes as source volumes and backup volumes as replica volumes. (Do not reverse the source and replica volumes.)

- Set both Hyper-V host and backup servers as operation servers (by specifying "BOTH" as an argument for the -o option in swsrpsetvol (Replication volume information setting command).

- Register the volumes disk-wise (gXdY).Do not register them partition-wise (gXdYpZ).

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The information about the registered source and replica volumes can be checked by swsrpvolinfo (Replication volume information display command).

Example:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH g1d1@HVHOST01 g1d2@BKSVR
swsrpsetvol completed

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvolinfo
Server Original-Volume Size        Replica-Volume Size        Copy         Op-Server
BKSVR  g1d1@HVHOST01   100.0 Gbyte g1d2@BKSVR     100.0 Gbyte bi-direction both

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH g1d1@HVHOST02 g1d2@BKSVR
swsrpsetvol completed

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvolinfo
Server Original-Volume Size        Replica-Volume Size        Copy         Op-Server
BKSVR g1d1@HVHOST01    100.0 Gbyte g1d2@BKSVR     100.0 Gbyte bi-direction both
BKSVR g1d1@HVHOST02    100.0 Gbyte g1d2@BKSVR     100.0 Gbyte bi-direction both
```

9.3.7 Creating Component Sets

A component set is a group of Hyper-V VSS writer components.

In the case of Hyper-V, Guest OSes and Initial Store are VSS components.

Backup and restoration of Hyper-V Guest OSes are performed component set-wise.

Follow below procedure to create the component set required for backing up and restoring Hyper-V Guest OSes.

1. Use swsrpvrq componentset create (Component set create command) to create a blank component set.

    Example (execution from backup server):

    ```
    C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset create -h HVHOST -cs VMSet1
    'swsrpvrq componentset create' completed
    ```

2. Use swsrpvrq component add (Component add command) to add a Guest OS to the component set. In that case, move the Guest OS to the command execution server.
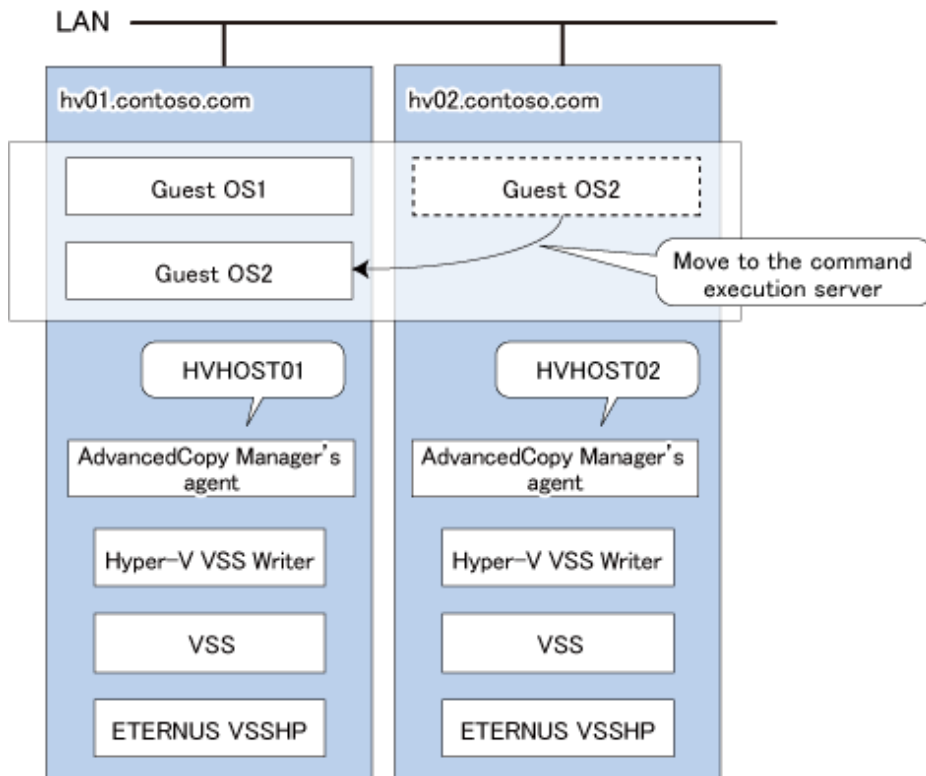
Example (execution from backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq component add -h HVHOST -cs VMSet1 -hv-guest
Guest1
'swsrpvrq component add' completed

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq component add -h HVHOST -cs VMSet1 -hv-guest
Guest2
'swsrpvrq component add' completed
```

The contents of a component set can be checked by swsrpvrq componentset info (Component set information display command).

Example (execution from backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset info -h HVHOST -cs VMSet1
Component-Set: Name=VMSet1, Count=2
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3
    Friendly-Name=Guest1
      Volume: Name=C:\ClusterStorage1\Volume1, Logical-Unit=g1d1
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4
    Friendly-Name=Guest2
      Volume: Name=C:\ClusterStorage1\Volume1, Logical-Unit=g1d1
```

Note

- Register Guest OSes that are on the same disk in the same component set. Any unregistered components will not be backed up.
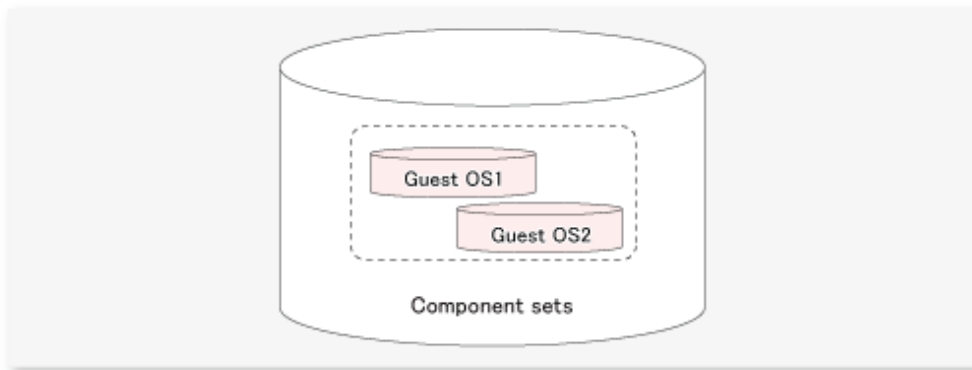
- Initial Store cannot be registered in component sets.
  For backing up and restoring Initial Store, use the Windows Server backup function.

9.3.8 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 (i.e. backup volumes).

Create a drive letter map file with the following file name on the backup server:

```
<Environment directory>\etc\repl\data\vrq\VRQDMAP.INI
```

An example of the settings in the drive letter map file is shown below.

```
[DRVMAP]
g1d2p1=C:\MountPoint\Volume1
```

During backup processing, a drive letter is assigned to a backup volume based on the settings in the drive letter map file.

No drive letter will be assigned if there is no drive letter defined in the drive letter map file, or if the file contains a settingerror (e.g., the relevant drive letter is already in use, or an invalid directory is specified for a mount point).

9.3.9 Registering Copy Sets

9.3.9.1 Creating a Copy Set File

Create a set from the disk information included, respectively, in the source and in the replica volumes that were set up as described in "9.3.6 Setting Up the Source and Replica Volumes", and write this information into a copy set file to be used as VSSHP copy set information.

For checking the setup 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 destination devices. Use this information to write the copy set information into a text file in below format. Store the created file in a specific folder recognized by VSSHP under a filename recognized by VSSHP. Alternatively, use commands to specify the file name (path name).

Refer to "Creating a Copy Set File" in the *ETERNUS VSS Hardware Provider Copy Set Operation Technical Guide* for details.

- Format (write each copy set into a single 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####YYYYYYYYYYYYY##
QOPC,,6,0x00c1,00E8000M9#####XXXXXXXX####YYYYYYYYYYYYY##
```

9.3.9.2 Registering Copy Sets In a Batch

Refer to "8.2.3.2.7 Registering copy sets as a batch" to perform batch registration of the copy set information that has been entered in the VSSHP copy set file.

9.3.9.3 Checking and Backing Up Copy Set Registration Contents

Refer to "8.2.3.2.8 Checking and saving the copy set registration contents" to check and back up contents of copy set registration.

9.4 Backup

This section explains how to implement set-wise backup components.

To perform a backup, execute swsrpvrq shadow backup-hyperv (Hyper-V backup command).

Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow backup-hyperv -h HVHOST01 -cs VMSet1
swsrp5209 This component is included in the backup target. Component Name=Guest1
swsrp5210 This component is excluded from the backup target. Component Name=Guest2
'swsrpvrq shadow backup-hyperv' completed
```

When this command is executed, the following processing is performed:

1. Of the components defined in the component set, only guest OS running on a server which this command is executed is backed up. The guest OSes included in the backup target and excluded from the backup target are displayed as like the message swsrp5209 and swsrp5210 of the above example.

2. Shadow copies of the volumes to be backed up are created on the backup destination disk. After the backup, the backup volume becomes a read-only volume.

3. If you have created a drive letter map file, a drive letter or a mount point is assigned to the backup volume based on the map file contents.

4. A "Writer Metadata Document" and a "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	<Environment directory>\etc\repl\data\vrq\<Hyper-V host Managed Server name>\componentset\metadoc\<Component set name>.wmd.xml
Backup Components Document	<Environment directory>\etc\repl\data\vrq\<Hyper-V host Managed Server name>\componentset\metadoc\<Component set name>.bcd.xml

Information about the created shadow copies and the current progress of Advanced Copy can be checked by executing swsrpvrq shadow query (Shadow copy status display command).

Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow query -h HVHOST01 -cs VMSet1
Volume: C:\ClusterStorage\Volume1
Snapshot-ID: {671777B8-3CE2-4dd9-B5E6-046827C0C0A5}
Snapshot-Set-ID: {77ADA582-1BA6-4581-8049-C27325ECBA2E}
Original-Volume: \\?\Volume{3C5C593B-AB79-4bb9-8B57-4A318658A9D4}\
Original-Machine: hvhost01.contoso.com
Snapshot-Volume: \\?\Volume{560FDCCC-81F1-4503-972D-E983E37CEE73}\
Snapshot-Machine: bksvr.contoso.com
Exposed-Path: C:\MountPoint\Volume1
Creation-Time: 2011/04/01:01:01
Guest-OS: Guest1, Guest2
```

Alternatively, it can also be checked by executing swsrpvrq advcopy query (Advanced Copy status display command).

Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy query -h HVHOST01 -cs VMSet1
Type Original-Disk Replica-Disk Direction Status Execute Trk  Update
QOPC g1d1@HVHOST01 g1d2@BKSVR   regular   snap   4%      ---- ----
```

 Note
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The backup target of the VSS linkage is only guest OS running on a server which this command is executed.

As in the diagram below, when executing backup with the HVHOST01, data consistency for only the guest OS1 is assured. The guest OS2 is not covered for VSS backup, so although file copying is executed, data consistency is not assured.
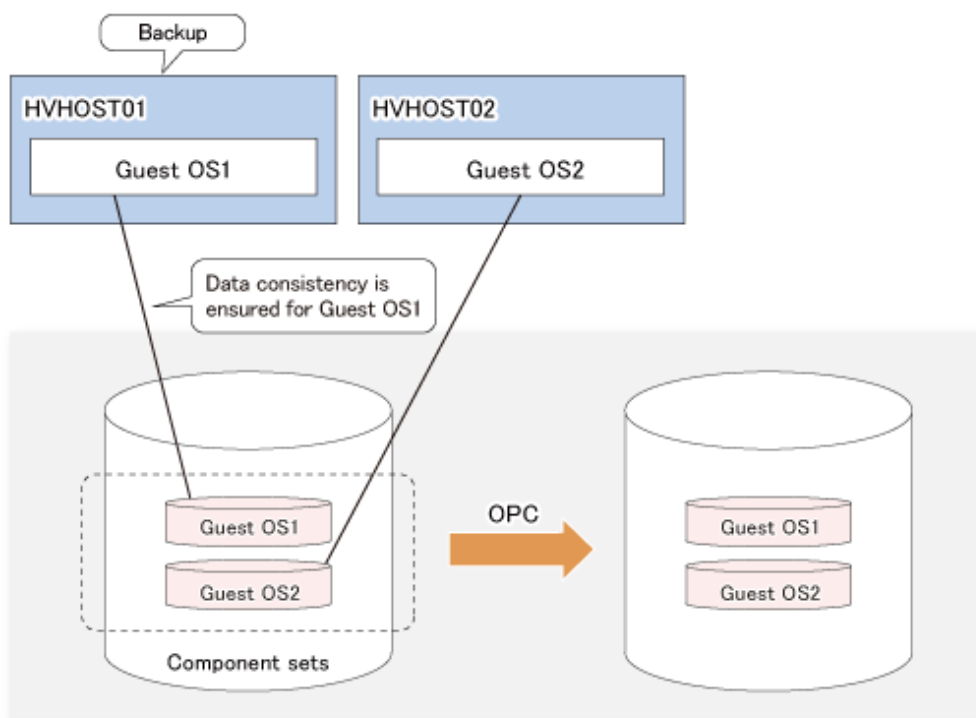
If multiple volumes in one CSV are operated on different Hyper-V hosts, perform backup for each Hyper-V host. It is not possible to perform backup simultaneously from multiple Hyper-V hosts for one CSV.

For backups on another Hyper-V hosts, perform the backup after the backing up data and metadata documents from the previous backup store to another disk or tape for each Hyper-V host.
• •

 Example
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For backups both Guest OS1 and Guest OS2:

This example explains how to back up both Guest OS1 and Guest OS2 under the condition that two Guest OSes (Guest OS1 and Guest OS2) is running on the command execution server.
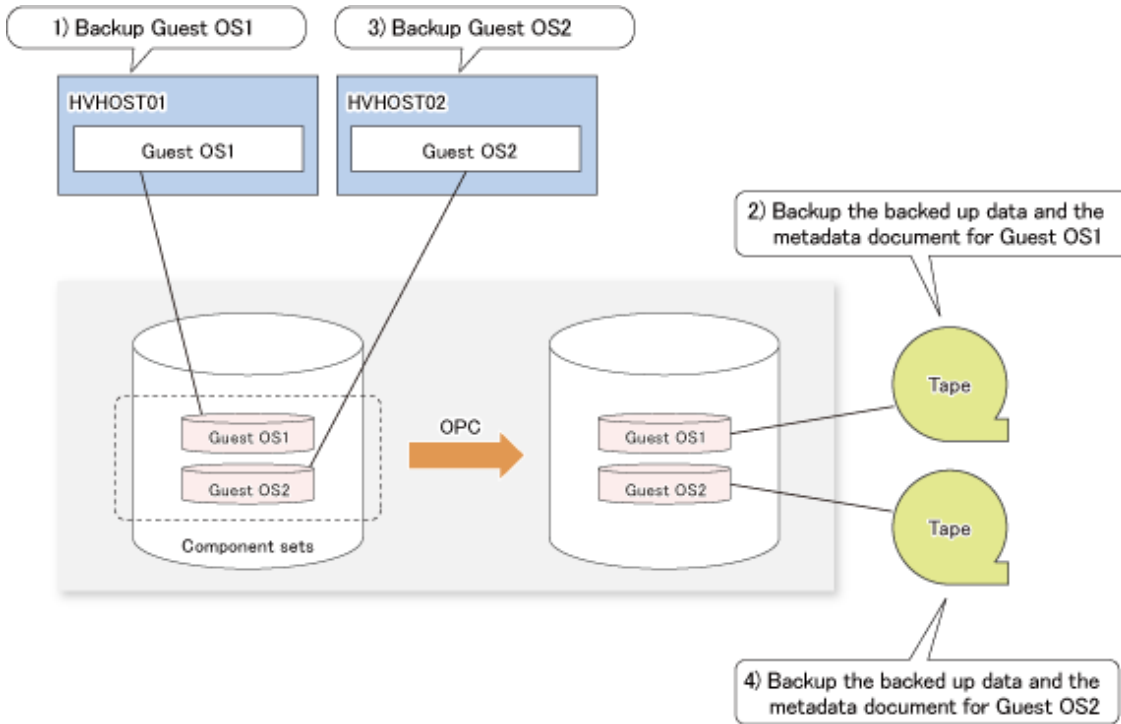
1. Backup the Guest OS1 on the HVHOST01.

2. Backup the backed up data and the metadata document for Guest OS1 to tape.

3. Backup the Guest OS2 on the HVHOST02.

4. Backup the backed up data and the metadata document for Guest OS2 to tape.

・・・

9.4.1 Backing Up Specific Guest OSes

Of the guest OSes running on a Hyper-V host which backup command is executed, a specific Guest OS can be backed up by executing swsrpvrq shadow backup-hyperv (Hyper-V backup command) with the -hv-guests option.

In the -hv-guests option, specify the file (Guest OS list file) that contains the name of the Guest OS to be backed up.
In the Guest OS list file, write each Guest OS name into a separate line.

Example (execution on a Hyper-V host):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\type GUEST.DAT
Guest1

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow backup-hyperv -cs VMSet1 -hv-guests GUEST.DAT
'swsrpvrq shadow backup-hyperv' completed
```

The swsrpvrq shadow backup-hyperv (Hyper-V backup command) with the -hv-guests option specified operates as follows.

1. Only the disk on which the Guest OS specified in the -hv-guests option is located will be copied for backup.

2. If the disk on which the Guest OS specified in the -hv-guests option is located contains another Guest OS that is not specified in the -hv-guests option, data consistency for that Guest OS cannot be ensured.

![Example

Backup of Guest OS 1 only

As in the example of below diagram, only the disk on which Guest OS 1 is located will be backed up by AdvancedCopy (OPC).
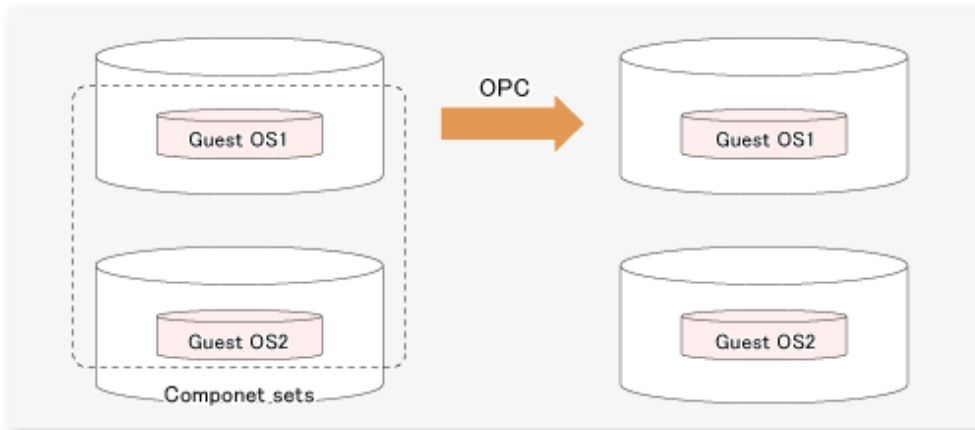
In contrast, the example of the next diagram shows when another Guest OS (Guest OS 2) is located on the same disk as Guest OS 1.In this case, data consistency is ensured for Guest OS 1.For Guest OS 2, however, as it is not set as an object of backup from which to copy any files, data consistency cannot be ensured.
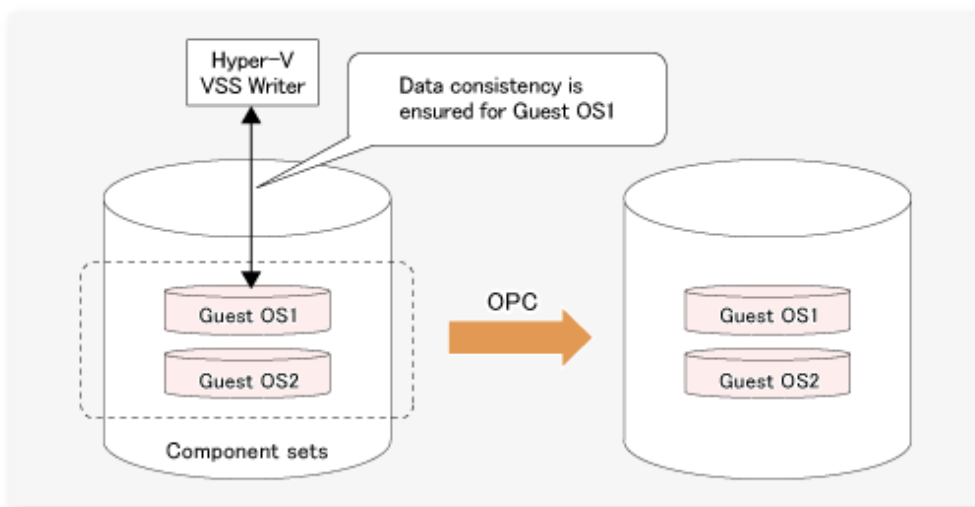
9.5 Restoration

This section explains how to implement restoration component set-wise.

To perform restoration, execute swsrpvrq shadow restore-hyperv (Hyper-V restore command).

Follow below procedure for restoring Guest OSes.

1. Execute swsrpvrq componentset info (Component set information display command).
   Confirm the name of the component set that contains the Guest OS to be restored.

   Example (execution on a Hyper-V host):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset info
Component-Set: Name=VMSet1, Count=2
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3
    Friendly-Name=Guest1
      Volume: Name=C:\ClusterStorage\Volume1, Logical-Unit=g1d1
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4
    Friendly-Name=Guest2
      Volume: Name=C:\ClusterStorage\Volume1, Logical-Unit=g1d1

Component-Set: Name=VMSet2, Count=1
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B5
    Friendly-Name=Guest3
      Volume: Name=C:\ClusterStorage2, Logical-Unit=g1d2
      Volume: Name=C:\ClusterStorage3, Logical-Unit=g1d3
```

2. Execute swsrpvrq shadow restore-hyperv (Hyper-V restore command) with the name of the component set to be restored specified in the -cs option.
   All Guest OSes which has been backup target during backup will be restored.

   Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow restore-hyperv -h HVHOST -cs VMSet1 -
manual-restore
swsrp5204 The processing for PreRestore event has been completed.
swsrp5205 Restore the following files.
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-
CB02-454F-8369-2E5C0CA783B3.xml
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3\*
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1-Disk.vhd
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1.vhd
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-
CB02-454F-8369-2E5C0CA783B4.xml
C:\ClusterStorage\Volume1\Hyper-V\Guest2\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4\*
C:\ClusterStorage\Volume1\Hyper-V\Guest2\Guest2-Disk.vhd
C:\ClusterStorage\Volume1\Hyper-V\Guest2\Guest2.vhd

swsrp5206 Press 'Y' key to continue when restoration is completed. If you are to cancel
restoration, press 'Q' key.
swsrp5208 The processing for PostRestore event is performed.
'swsrpvrq shadow restore-hyperv' completed
```

3. When restoration is completed, press the 'Y' key.
   Post-processing for restoration is executed.

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- Restoration uses the "Writer Metadata Document" and the "Backup Component Document" that were saved during backup.

- The current version supports restoration only by manually copied files.
  When copying files manually, be sure to copy the file ownership and access control list information together.
  The following is an example of allocating a backup volume as a network drive and restoring it by the XCOPY command:

  1. Assign the backup volume in which a shadow copy exists as a network drive (Z:).

  ```
  net use Z: \\bksvr.contoso.com\<shared name>
  ```

  2. Copy a file. (By specifying /O of XCOPY command, file ownership and access control list information are also copied.)

  ```
  xcopy Z:\<file path> C:\ClusterStorage\Volume1\<file path> /e /s /y /F /O /X /R /H
  ```

  3. Disconnect a network drive after the restoration procedure is completed.

  ```
  net use Z: /delete
  ```

9.5.1 Restoring Specific Guest OSes

You can restore only a specific Guest OS in a component set by executing swsrpvrq shadow restore-hyperv (Hyper-V restore command) with the -hv-guests option specified.

In the -hv-guests option, specify the file (Guest OS list file) that contains the name of the Guest OS to be restored.
In the Guest OS list file, write each Guest OS name into a separate line.

Example (execution on a Hyper-V host):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\type GUEST.DAT
Guest1

C:\>C:\Win32App\AdvancedCopyManager\bin\set SWSTGNODE=ACMAgt
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow restore-hyperv -cs VMSet1 -hv-guests
GUEST.DAT -manual-restore
swsrp5204 The processing for PreRestore event has been completed.
swsrp5205 Restore the following files.
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3.xml
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3\*
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1-Disk.vhd
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1.vhd

swsrp5206 Press 'Y' key to continue when restoration is completed. If you are to cancel restoration,
press 'Q' key.
swsrp5208 The processing for PostRestore event is performed.
'swsrpvrq shadow restore-hyperv' completed
```

9.6 Reconfiguration

To change resources that make up the backup configuration, the AdvancedCopy Manager settings need to be changed.

In addition, if the partition configuration is to be changed, for example by adding or deleting partitions, in a disk where backup and restoration of a Hyper-V Guest OS 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.

9.6.1 Changing 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 source or replica volume, then change the disk configuration. After that, perform setup processing for the source or replica volume, and then 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 source or replica volumes may not be possible after the device configuration is changed.

1. In the Hyper-V Guest OS, check the copy status using the VSSHP status lookup command (stxvquery). If any copying is in progress, or if QuickOPC is in the tracking state, use the VSSHP "backup control command (stxvcopy)" or the VSSHP "batch stop command (stxvstopall)" to stop copying or the 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 "9.8.2 Deleting Source and Replica Volumes" for more information.

3. If there are changes in the configuration of source or replica 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 on a Managed Server" for information about this operation.

6. Perform "8.2.3.2.6 Creating a copy set file" and "8.2.3.2.7 Registering copy sets as a batch" to change the copy set information.

7. On the Hyper-V host, perform "8.2.3.2.8 Checking and saving the copy set registration contents".

8. Set up the source and replica volumes.

9.6.2 Changing Component Set Information

If any information on a component registered in the component set has changed, execute swsrpvrq component add (Component add command) and swsrpvrq component remove (Component remove command) to reflect the changes in AdvancedCopy Manager.

9.6.3 Changing the Managed Server Name

To change the Managed Server name, follow the procedure below:

1. Delete the source or replica volume. Refer to "9.8.2 Deleting Source and Replica Volumes" for more information.

2. Change the server name of the Managed Server. For details, refer to "11.5.4 Changing the server name of Management Server or Managed Server".

3. Set up the source and replica volumes.

9.6.4 Changing the IP Address of the Managed Server

Use the following procedure to change the IP address of the Managed Server:

1. Change the IP address of the Managed Server (Hyper-V host or backup server).Refer to "11.5.2 Changing the IP address of Managed Server" for details.

2. Change the settings for ETERNUS VSS Hardware Provider Communication Server services on the Hyper-V host and the backup server. Refer to "When Changing the Communication Environment" in the *ETERNUS VSS Hardware Provider User's Guide* for details.

9.6.5 Changing the Copy Type

1. On the Hyper-V host, execute the VSSHP "stxvquery (Backup status lookup command)" to check the copy status. If any copying is in progress, use the VSSHP "backup control command (stxvcopy)" to stop copying.

2. On the Hyper-V host, perform "8.2.3.2.6 Creating a copy set file" and "8.2.3.2.7 Registering copy sets as a batch" to change the copy type. Then perform the tasks described in "8.2.3.2.8 Checking and saving the copy set registration contents".

9.7 Stopping Operation

Backup operation can be stopped by performing the following steps:

1. Delete the shadow copy

2. Stop the copy process that is currently being executed

9.7.1 Deleting the Shadow Copy

Delete the shadow copy by executing swsrpvrq shadow delete (Shadow copy delete command) on the backup server.

Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow delete -all
'swsrpvrq shadow delete' completed
```

Note

- OPC/QuickOPC physical copying and tracking are not stopped even if the shadow copy is deleted.

- If all shadow copies are deleted from a disk, the disk status might change to "offline". Since AdvancedCopy Manager cannot copy any 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 "1.7.2 Notes about the online/offline status of disks" for information about the online and offline status of disks.

9.7.2 Stopping an Ongoing Copy Process

If you are using QuickOPC, stop tracking.

To stop tracking, execute swsrpvrq advcopy stop (Advanced Copy stop command).

Example (execution on a backup server):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy stop -h HVHOST -cs VMSet1
'swsrpvrq advcopy stop' completed
```

9.8 Uninstallation

This section describes how to perform the uninstallation.
Below figure shows the flow of uninstallation tasks.

Figure 9.5 Uninstallation task flow
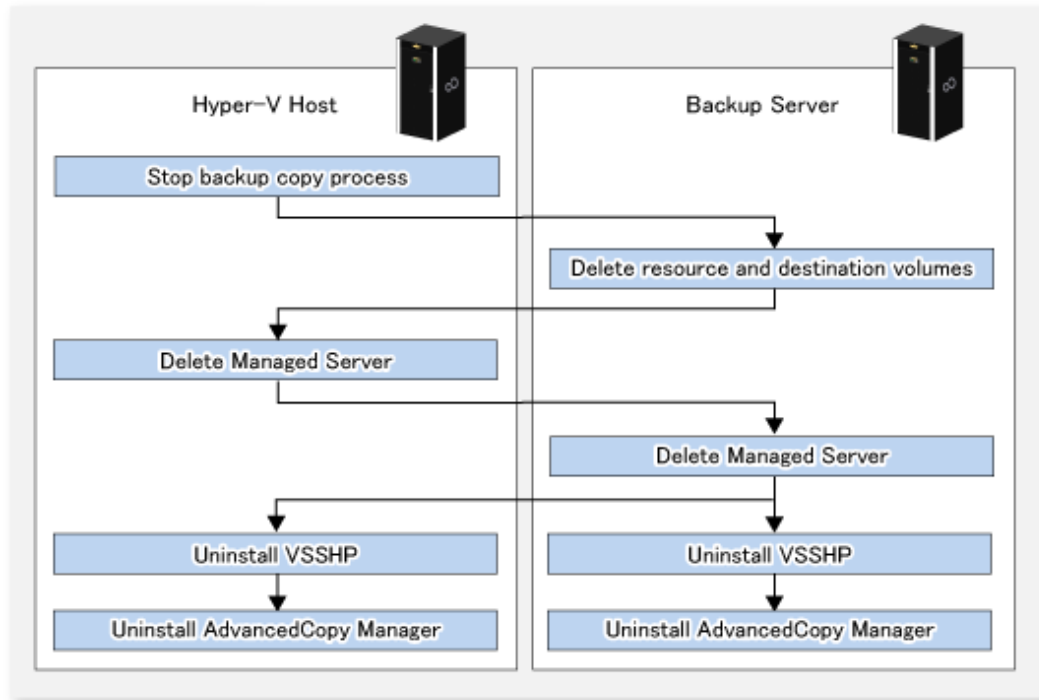
9.8.1 Stopping a Backup Copy Process

On the Hyper-V host, execute the VSSHP "stxvquery (Backup status lookup command)" to check the copy status. If any copying is in progress, use the VSSHP "backup control command (stxvcopy)" to stop copying.

9.8.2 Deleting Source and Replica Volumes

Delete the source and replica volumes that have been set up.

Refer to swsrpdelvol (Replication volume information deletion command) for more information.

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 details.

9.8.3 Deleting a Managed Server

Delete the Managed Server to be uninstalled from the control of AdvancedCopy Manager.

You can delete a Managed Server either from the Web Console or by executing stgxfwcmdelsrv (Server information deletion command).

If you have deleted the Managed server with stgxfwcmdelsrv (Server information deletion command), take the following actions to reflect to the Web Console depending on how the agent installed in the deleted Managed Server is used:

 - If both of AdvancedCopy Manager's agent and Storage Cruiser's agent are used:

   On the Web Console, execute [Reload Conf.] to update to the latest information.

 - If only AdvancedCopy Manager's agent is used:

   On the Web Console, delete the Managed Server that you have deleted.

9.8.4 Uninstalling VSSHP

If VSSHP will no longer be used, refer to "VSSHP Uninstallation" in the *ETERNUS VSS Hardware Provider User's Guide* and uninstall VSSHP from both the Hyper-V host and the backup server.

9.8.5 Uninstalling AdvancedCopy Manager

Uninstall AdvancedCopy Manager (managers and agents) from each server in the storage system.
For an explanation of uninstallation methods, refer to "Uninstalling ETERNUS SF Manager" and "Uninstalling AdvancedCopy Manager's agent" in the *ETERNUS SF Installation and Setup Guide*.

Chapter 10 Backup and Restore of 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 database names of SQL Server 2000, and SQL Server 2005 or later have different names in the GUI. In this chapter, has described the terminology of Exchange Server 2005 by the terminology of Exchange Server 2000:

Table 10.1 Database names of SQL Server 2000, SQL Server 2005 or later

SQL Server 2000	SQL Server 2005 or later
Enterprise Manager	Management Studio

SQL Server is a trademark or registered trademark of Microsoft Corporation in the United States and other countries.

10.1 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 ETERNUS Disk 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

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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.

Table 10.2 SQL Server backup execution commands and SQL Server restore execution commands

Command type	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

. . . .

10.1.1 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 "database backup" or "full backup".
Backing up only the log files is called "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 10.1 Backup Function Overview
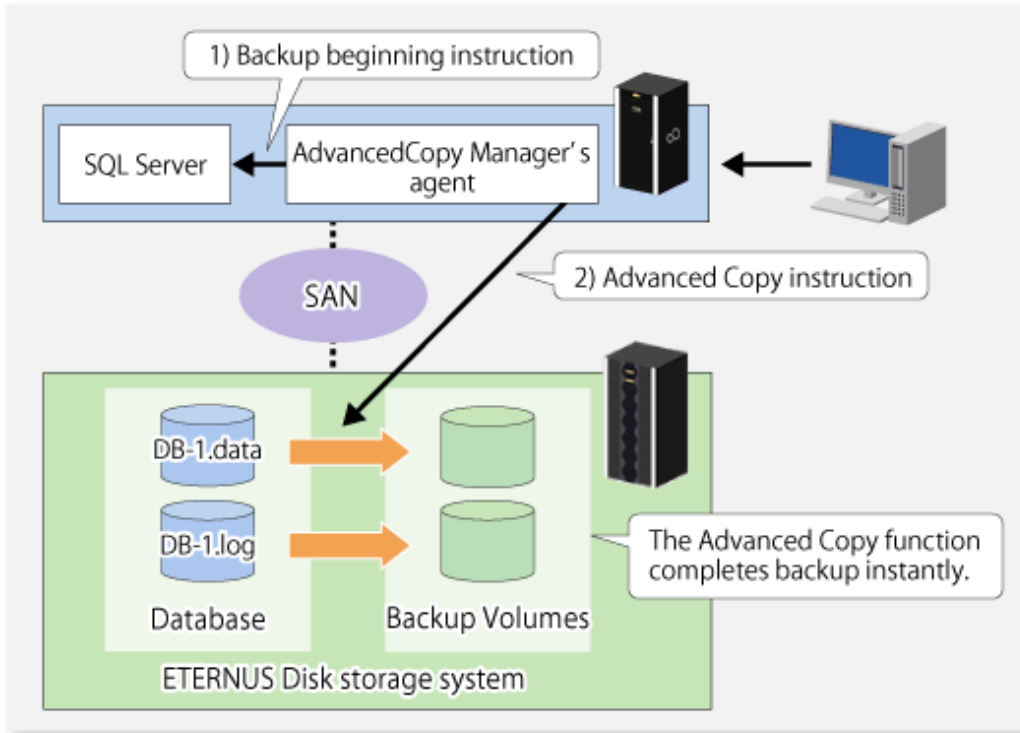
In the backup of SQL Server, generally both the "database backup" and the "log backup" are performed, although not necessarily with the same frequency.

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 10.2 Example of backup operation
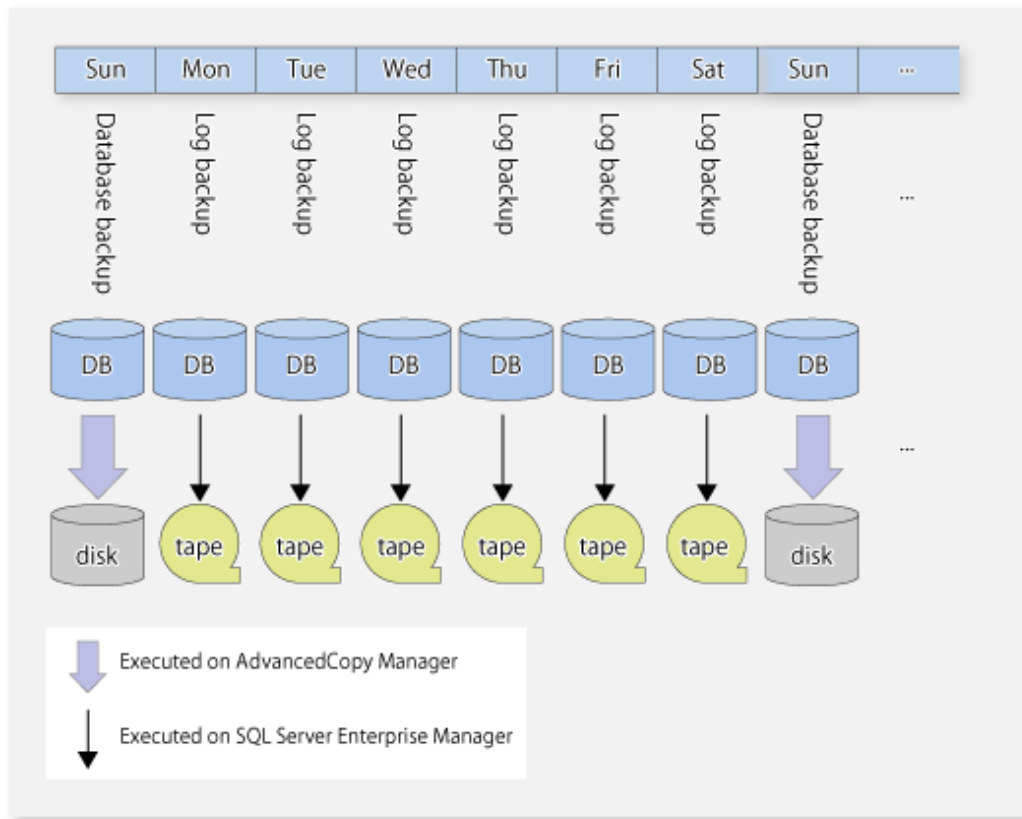
AdvancedCopy Manager provides the "database backup" function. Therefore, backup and restore (i.e., recovery) of a transaction log should be performed by SQL Server's Enterprise Manager and Transact-SQL, etc.

The databases which can be backed up with AdvancedCopy Manager are only user databases, and so system databases (i.e., master, msdb, model and distribution) cannot be backed up with AdvancedCopy Manager. Backup of the system databases should be performed with SQL Server.

Table 10.3 SQL Server and AdvancedCopy Manager backup

Database type		Backup method	
		SQL Server	AdvancedCopy Manager
System Databases (master, msdb, model, distribution)		Provided	Not provided
User Databases	Database backup	Provided	Provided
	Log backup	Provided	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.

. . . .

10.1.2 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 of the Advanced Copy function:

1. restoring database files

2. recreating a database

3. applying transaction logs

Figure 10.3 Restore Function Overview
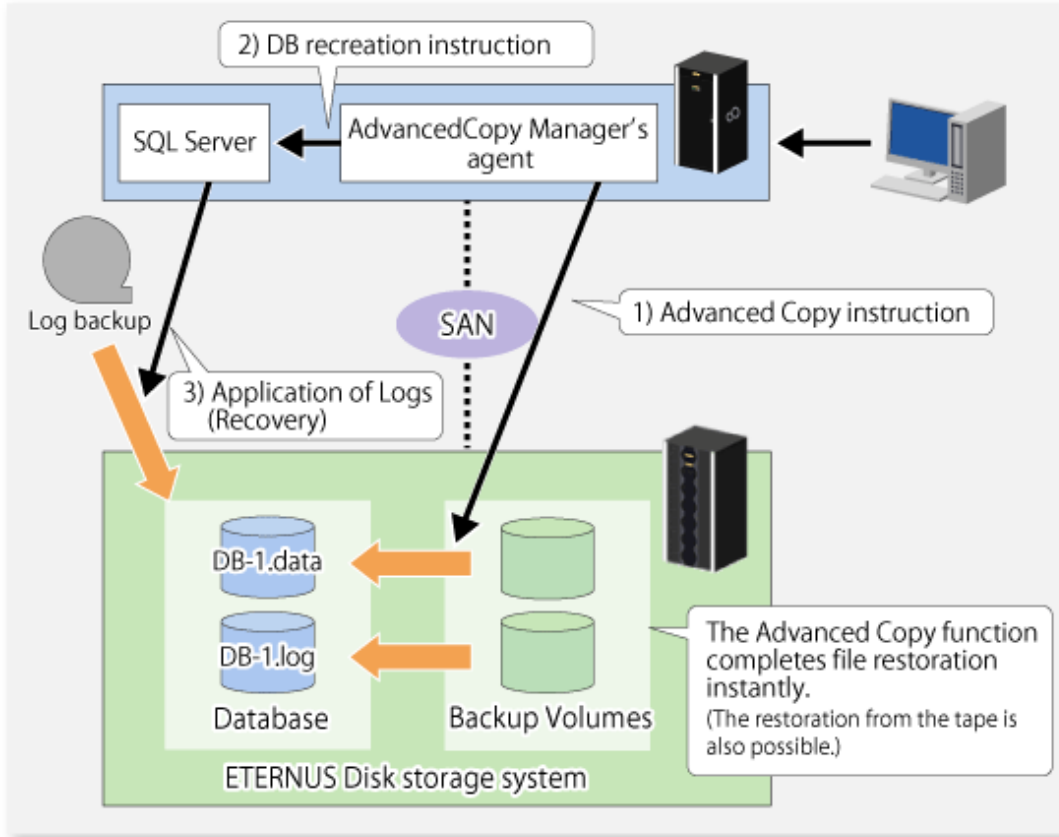
Using the "Figure 10.2 Example of backup operation", the diagram below shows how to perform restore up to the latest point when a failure occurs before the log backup on Friday:

Figure 10.4 Example of restore
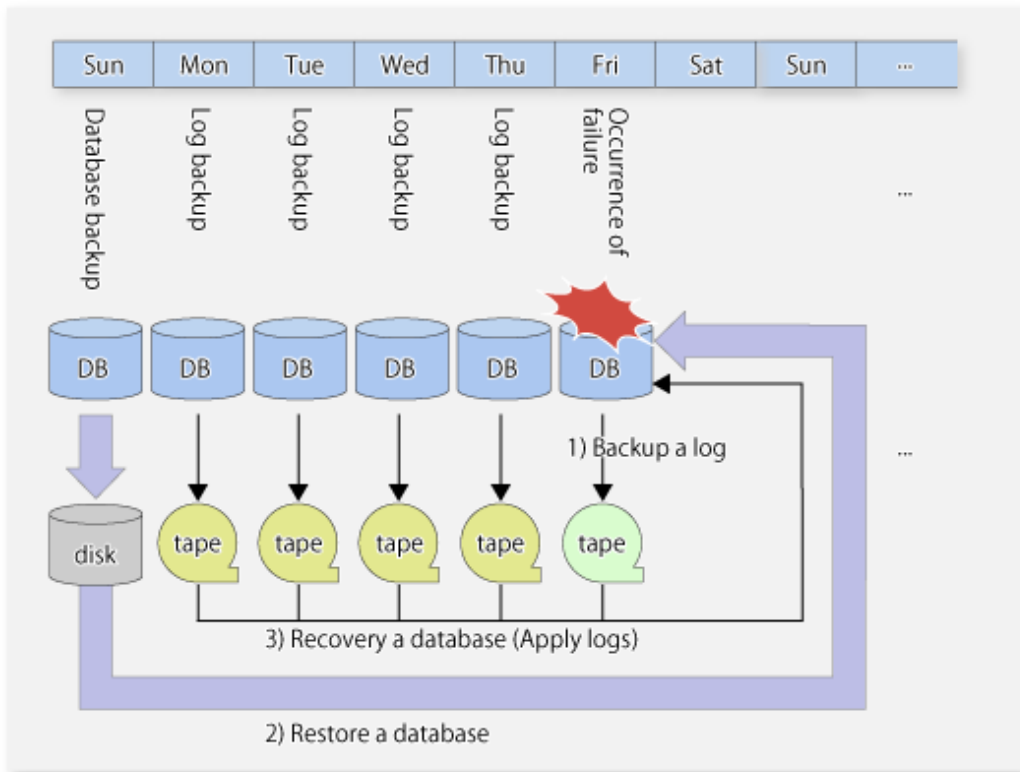
10.2 Operational Overview

This section describes the backup designs that are required before performing the backup of SQL Server.

10.2.1 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.

10.2.1.1 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.

10.2.1.2 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.

Note

- If a file that is not a part of the database files is placed in a volume to be backed up, not only the data of the file but also the entire file system might be corrupted.

- In particular, do not place any database file on the system drive or on the volume that stores the executable files and management files of SQL Server and AdvancedCopy Manager.

🅿 Point

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 10.5 N databases on one volume
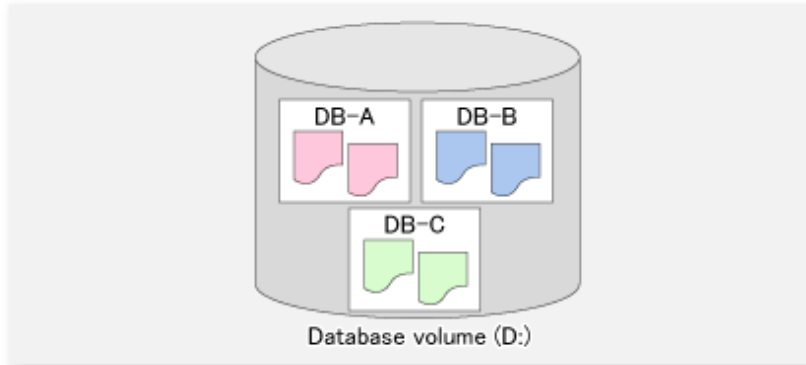
Figure 10.6 N databases on M volumes
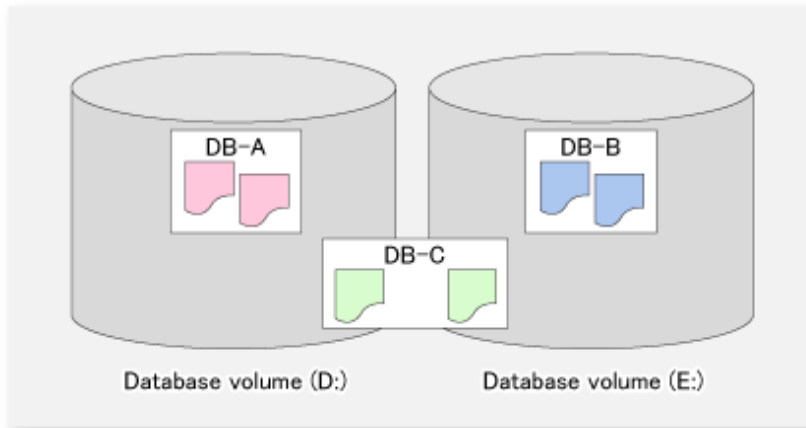
If you perform the backup of the database with such a configuration, specify all the databases which exist on the volumes. After SQL Server secures the data consistency by freezing all the specified databases, AdvancedCopy Manager executes the copy processing to all the volumes where the files are placed. 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 10.7 Distributed placement of database files
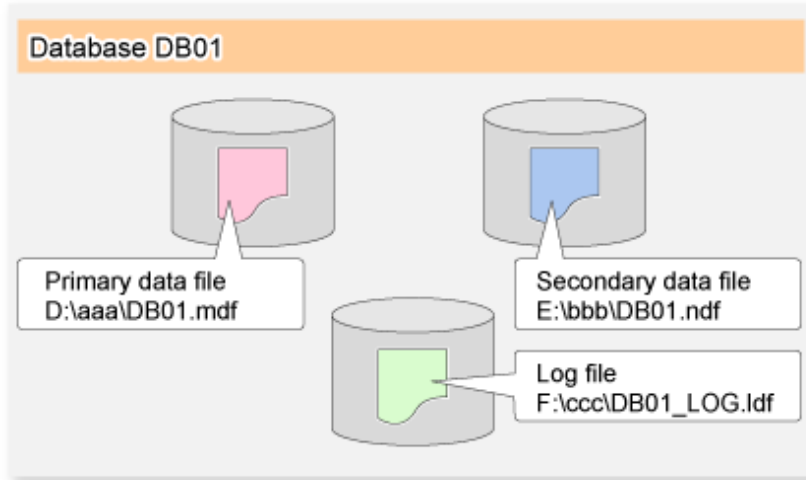
10.2.1.2.1 Full text catalogue assignment (under SQL Server 2005 or later)

If a full text catalogue is used under SQL Server 2005 or later, 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.

10.2.1.3 Determining the servers to perform backup

Determine the servers that are required to perform backup.
The following servers are used to perform backup:

Management Server

Multiple Managed Servers are unified, and are operated centrally. The manager function of AdvancedCopy Manager should be installed. A Management Server can also be used as a Managed Server.

Managed 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.

Managed Server (a Backup server: only if the replication management function is used)

The Managed 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.

10.2.1.4 Determining a backup target

Determine the databases to be backed up and the volumes (i.e., the database volumes) where their database files are located.
All the database volumes must be placed on the ETERNUS Disk storage system.

10.2.1.5 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 function of the ETERNUS Disk storage system. The backup is obtained by starting OPC.

P Point
. . . .
For information on the differential snapshot high-speed backup, refer to "Chapter 6 Backup Operation using QuickOPC Function".
. . . .

Synchronous type backup

This is a backup method using the EC/REC functions of the ETERNUS Disk storage systems 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.

P Point
. . . .
When the backup management function is used, a backup is created by stopping or suspending EC/REC under the equivalency maintenance status. When swstbackup_sqlsvr (SQL Server backup execution command) is executed with -suspend option 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 Operation using Suspend/Resume Function".
. . . .

10.2.1.6 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 ETERNUS Disk storage system.

10.3 Operation by backup management function

10.3.1 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 (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 10.8 SQL Server backup environment example
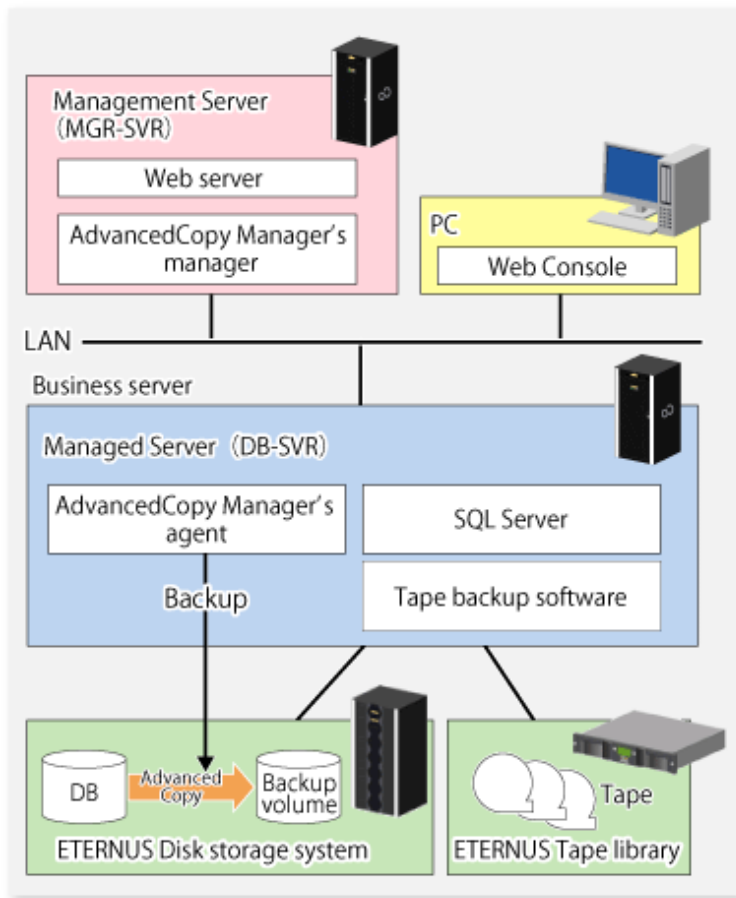
Table 10.4 Server configuration

Server type	Server name	comment
Management Server	MGR-SVR	
Managed Server	DB-SVR	- Business server - operating on MSCS (AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)

Table 10.5 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

Database name	Database file name	Database file type
	F:\SQLSVR\DB03.ldf	Transaction log file

Table 10.6 Database volume configuration

Drive letter	AdvancedCopy Manager device name
D:	g1d1p1
E:	g1d2p1
F:	g1d3p1

10.3.1.1 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".

10.3.1.2 General preparation

Perform the steps described in "3.4 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
```

10.3.1.3 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 "3.4.9 Preparing a device map file".

10.3.1.4 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 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.

P 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.

10.3.1.5 Prepare the automated operation of backup

You can automate the backup using the job creation wizard of SQL Server or Systemwalker Operation Manager. Automate the backup using commands provided by AdvancedCopy Manager.

10.3.2 Performing backup and restore

This section explains how to perform backup and restore of an SQL Server database.

10.3.2.1 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 start 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 start command).

Figure 10.9 Recovery from a backup history information inconsistency
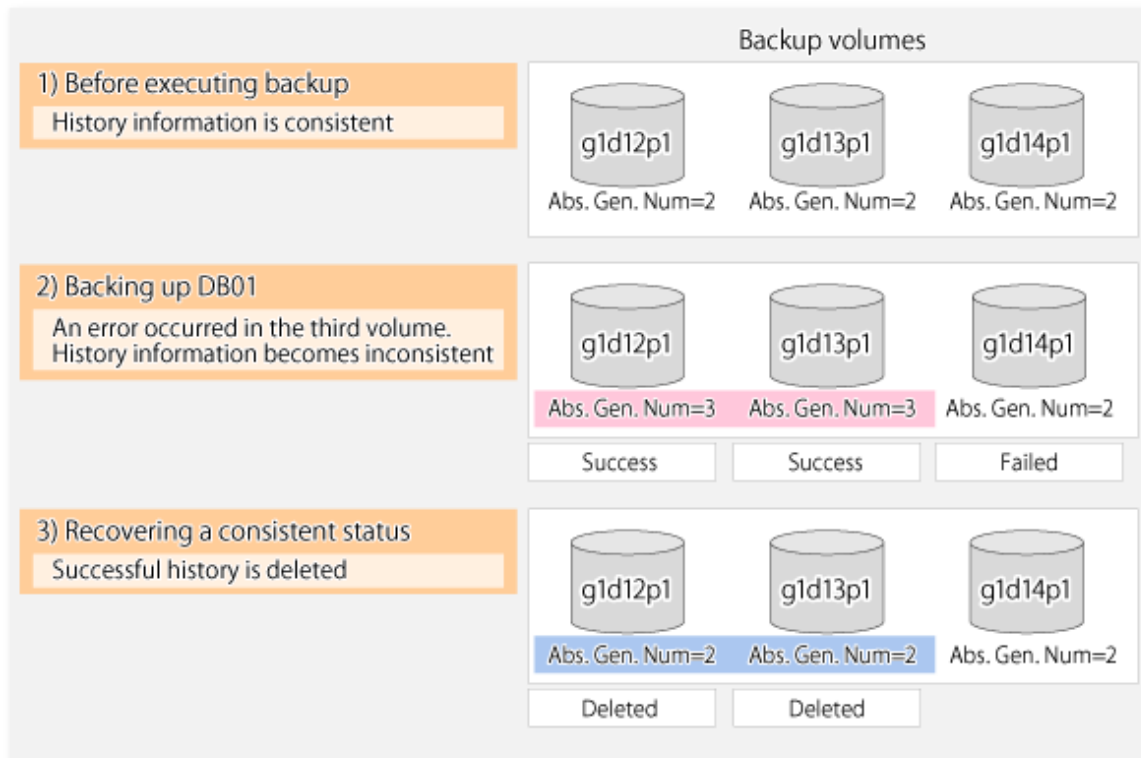
Example

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:\>
```

🅿 Point
. . . .
When the SQL Server backup execution command (swstbackup_sqlsvr) is executed with -suspend option 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 Operation using Suspend/Resume Function".
. . . .

Backing up a transaction log

Back up the transaction log with Enterprise Manager or Transact-SQL of SQL Server.

10.3.2.2 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 10.7 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

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".

10.3.2.3 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.

10.3.2.4 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:\>
```

10.3.2.5 Operation by Cluster

AdvancedCopy Manager supports MSCS or WSFC. For more information on this, refer to "13.1.5 Notes on cluster operation".

10.4 Operation using replication management function

10.4.1 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 10.10 SQL Server backup environment example
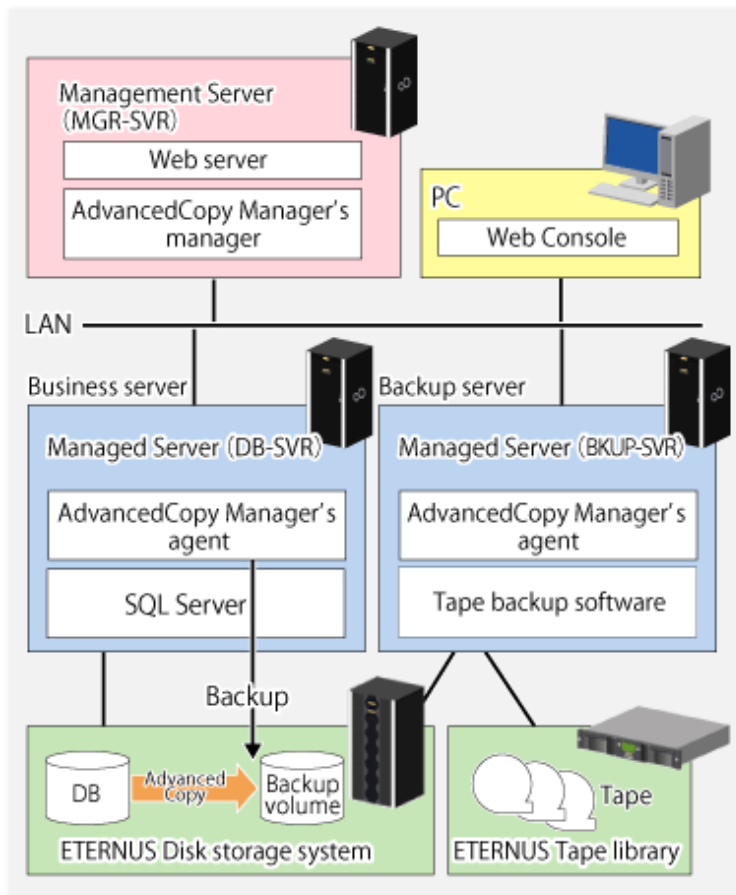
Table 10.8 Server configuration

Server type	Server name	Comment
Management Server	MGR-SVR	
Managed Server	DB-SVR	- Business server - operating on MSCS (AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)

Server type	Server name	Comment
Managed Server	BKUP-SVR	Backup server

Table 10.9 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 10.10 Database volume configuration

Drive letter	AdvancedCopy Manager device name
D:	g1d1p1@DB-SVR
E:	g1d2p1@DB-SVR
F:	g1d3p1@DB-SVR

10.4.1.1 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".

10.4.1.2 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 (i.e., the database volume) to the replica volume (i.e., 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:\>
```

10.4.1.3 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 (i.e., 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.)

10.4.1.4 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.

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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.
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10.4.1.5 Prepare the automated operation of backup

You can automate the backup by using the job creation wizard of SQL Server or Systemwalker Operation Manager. In either case, this is achieved with commands provided by AdvancedCopy Manager.

10.4.2 Performing backup and restore

This section explains how to perform backup and restore of an SQL Server database.

10.4.2.1 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 (Synchronous processing start 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 icon] **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 (Synchronous processing start 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.

10.4.2.2 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
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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").

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Restoring files

Restore all the database files (ie, data and log files).

 Note
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- You cannot restore log files alone.

- Restore all the database files as follows:

Table 10.11 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 box Executing swsrpmake (Replication creation command), copy all the database files from the backup volumes to the database volumes. - For backup between boxes

Step	Step name	Description
		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.

 P Point

- 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 box)

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 boxes)

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\swsrpstartsync 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

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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".

10.4.2.3 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.

10.4.2.4 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:\>
```

10.4.2.5 Operation by Cluster

AdvancedCopy Manager supports MSCS or WSFC. For more information, refer to "13.1.5 Notes on cluster operation".

Chapter 11 Operation Maintenance

This chapter provides information on how to maintain a database, perform troubleshooting, and change the operation information.

11.1 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 11.1 Databases on a Management Server

Type	When a backup to be created	Backup method (references)	Size
Database	A Managed 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.	"11.1.1.4.1 Saving a database" or "11.1.2 Making a package backup of databases"	Refer to "11.1.1.4.1 Saving a database".
Registry	DB setup has been performed on a Management Server (a Management Server transaction has been created in a clustered system), or the storage management information (server name, IP address or port number) has changed.	"11.1.1.5.1 Backing up a registry" or "11.1.2 Making a package backup of databases"	Refer to "11.1.1.5.1 Backing up a registry".

Table 11.2 Databases on a Managed Server

Type	When a backup to be created	Backup method (references)	Size
Registry	A Managed Server has been added or Management Server information (server name, IP address, or port number) has changed.	"11.1.1.5.1 Backing up a registry" or "11.1.2 Making a package backup of databases"	Refer to "11.1.1.5.1 Backing up a registry".
Backup management list	A backup transaction has been completed.	"11.1.1.1.1 Backing up a backup management list and recovery control file" or "11.1.2 Making a package backup of databases"	Refer to "11.1.1.1.1 Backing up a backup management list and recovery control file".
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 "11.1.2 Making a package backup of databases"	Check the size of the pre-processing and post-processing script file for backup management.

Type	When a backup to be created	Backup method (references)	Size
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 "11.1.2 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 "11.1.2 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 "11.1.2 Making a package backup of databases"	Check the size of the file to be backed up.
Replication management list	A replication transaction has been completed.	"11.1.1.2.1 Backing up a replication management list" or "11.1.2 Making a package backup of databases"	Refer to "11.1.1.2.1 Backing up a replication management list".
Pre-processing and post-processing scripts for replication management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or "11.1.2 Making a package backup of databases"	Check the size of the pre-processing and post-processing script file for replication management.
Copy-source volume locking specification file	The copy-source volume locking specification file has changed.	Saving a database by using the copy command or "11.1.2 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 "11.1.2 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 "11.1.2 Making a package backup of databases"	Check the size of the policy file for management information package backup.
Symfoware database information file	The database information has changed for Symfoware backup server operation.	"11.1.1.6.1 Backing up Symfoware database information file"	Check the size of the file to be backed up.
Target directory for output of the recovery control file	The backup has been performed for Symfoware backup server operation.	"11.1.1.7.1 Backing up a target directory for output of the recovery control file"	Check the size of the file to be backed up.

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You can create backups of databases either individually or as a whole.

If a Managed Server also operates as a Management Server, the Managed Server contains a database for the Management Server as well as for the Managed Server.

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- If you make backups of databases individually, perform the operations with an account that belongs to the Administrators group.

- If you make backups of databases individually, do it so that the file ownership and access right at restore time are the same as backup time.

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11.1.1 Making individual backups of databases

11.1.1.1 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.

11.1.1.1.1 Backing up a backup management list and recovery control file

A backup management list and a recovery control file created at the time of backing up the Symfoware database spaces are 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 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
```

For backing up Symfoware databases, check the file sizes in the following directories:

```
Target directory for output of the recovery control file
```

. . . .

When you execute swstresback (Resource backup command) by using the same directory used before to save data, the file system in which these directories exist should be at least three times greater than the size returned in query above.

This is because swstresback (Resource backup command) executes backup in the state holding the data saved before.

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11.1.1.1.2 Restoring a backup management list and recovery control file

A backup management list and a recovery control file created at the time of backing up the Symfoware database spaces are restored. For details of this, refer to swstresrst (Resource restore command).

11.1.1.2 Maintaining a replication management list

This section describes the maintenance of a replication management list.

11.1.1.2.1 Backing up a replication management list

To back up a replication management list, back up the repository of the Management Server. For information about backing up a repository, refer to "Saving a database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

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- Operational information for replication management is saved in a repository.

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

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11.1.1.2.2 Restoring a replication management list

Perform the following steps to restore a replication management list:

1. Restore the repository to the Management Server. For information about restoring a repository, refer to "Recovering a database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

   - If the Management Server is Windows
     Select "RDB dictionary and DSI recovery (LOAD Mode)" as the recovery method.

   - If the Management Server is Solaris or Linux
     Specify 0 for stgdbrcv -m option (recovery mode) as the recovery method.

2. On the Managed Server, execute swsrprecoverres (Resource adjustment command) with the -r option.

P **Point**
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- When above 2 steps are performed, operational information for replication management of a repository is copied to a Managed 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 Managed Server is incorrect (for some reason), perform only step 2.

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11.1.1.3 Maintaining the VSS backup management list

This section explains maintenance methods for the VSS backup management list that is used in the Hyper-V backup function.
Perform them on servers that are using Hyper-V's VSS backup function (Hyper-V host and backup servers).

Make sure that no commands of the Hyper-V backup function are being executed, and perform the backup and restore of the VSS backup management list manually.

11.1.1.3.1 Backing up the VSS backup management list

For backing up the VSS backup management list, copy the files that are in below directory to any other directory as needed.

```
<Environment directory>\etc\repl\data\vrq
```

11.1.1.3.2 Restoring the VSS backup management backup list

For restoring the VSS backup management list, copy the files that you copied according to "11.1.1.3.1 Backing up the VSS backup management list" back to below directory.

```
<Environment directory>\etc\repl\data\vrq
```

11.1.1.4 Maintaining a database

This section describes the maintenance of a database used by a Management Server.

11.1.1.4.1 Saving a database

Saving a database can be performed either through functionality provided Using a GUI or Using the database save command.

An explanation of each method is provided below.

After saving a database, refer to "11.7 Maintaining a database of ETERNUS SF Manager" and save a database of ETERNUS SF Manager as well.

📝 Note

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- Executing this process with the service listed below must be paid attention.

    - Terminal service (via a remote desktop connection)

      If the Management Server is running on Windows Server 2003, the Terminal Service must 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/947723/en
      http://support.microsoft.com/kb/278845/en

  Do not use service listed below, as it will not work properly.

    - Telnet server service

- When the Management Server is in cluster operation, you should prepare directories into which data is saved on shared disks.

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Using a 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.
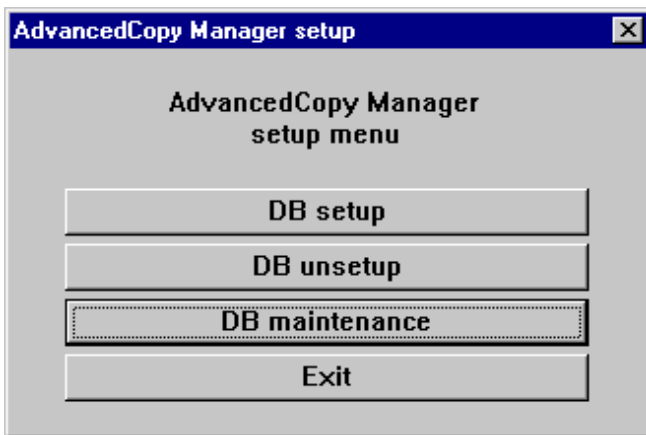
3. The following DB maintenance window will be displayed. Click the [DB save] button.
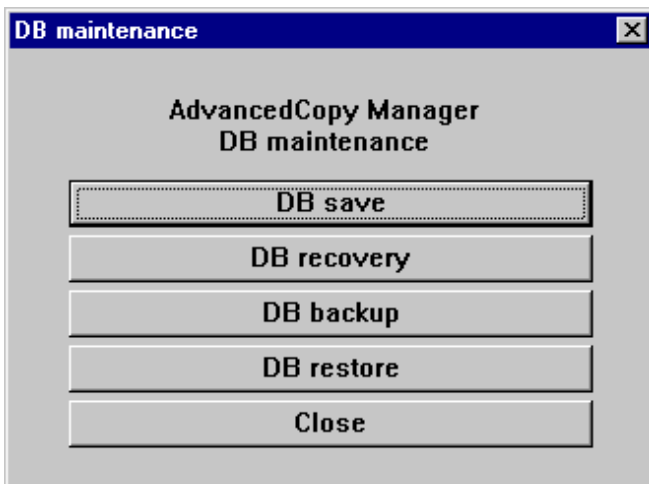
4. The save directory specification window will be displayed. To specify a save directory, enter the directory name and click the [OK] button. To overwrite an already saved directory, click in the [Overwrite if there is any previous save data in the save directory] checkbox.
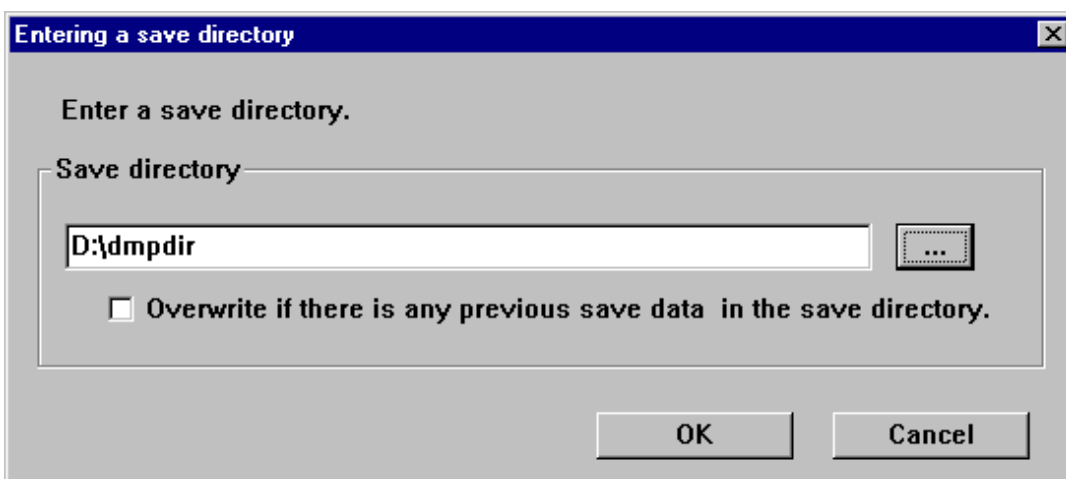
Note

. . . .

Create the save directory in advance.

The blank space and the following characters [" | : * ? / . < > , % & ^ = ! ; # ' @] cannot be used in the save directory name.
. . . .

5. The DB save processing confirmation window will be displayed. Check that the information entered is correct and click the [Start] button.
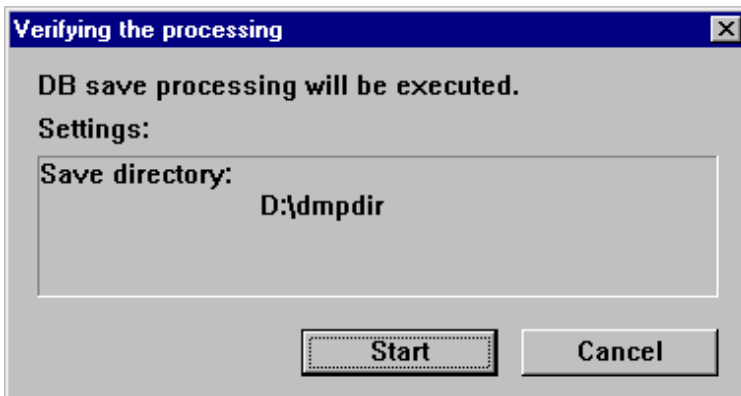
6. When the DB save has completed successfully, the following window will be displayed. Click the [Close] button.
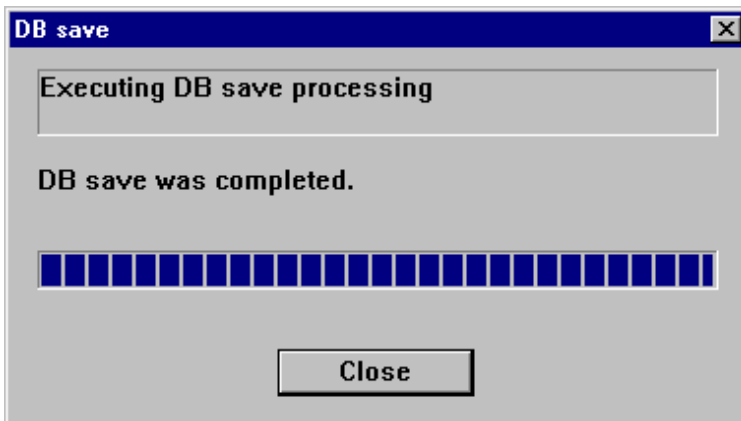
Using the database save command

Execute this command on the Management Server.

For details on this command, refer to stgdbdmp (Database save command).

Point

. . . .
- Use this save method only when the configuration information is changed due to the addition of a Managed 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.
. . . .

Note

. . . .
If no data is saved by this command or by using screens, the database cannot be recovered with the "11.1.1.4.3 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

11.1.1.4.2 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. The below table 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 "11.1.1.4.3 Recovering a database".

Table 11.3 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		
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.

- The swstsrsemtch (Resource match command) with -x option will need to be executed on all Managed Servers on which the backup is performed, after which swsrprecoverres (Resource adjustment command) with -r option will need to be executed on the Managed Servers on which the replication is performed.

. . . .

11.1.1.4.3 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 the service listed below must be paid attention.

  - Terminal service (via a remote desktop connection)

    If the Management Server is running on Windows Server 2003, the Terminal Service must 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/947723/en
    http://support.microsoft.com/kb/278845/en

  Do not use service listed below, as it will not work properly.

  - Telnet server service

- When the 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 Management Server transaction may remain faulty on the cluster administrator. In this case, set the 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.
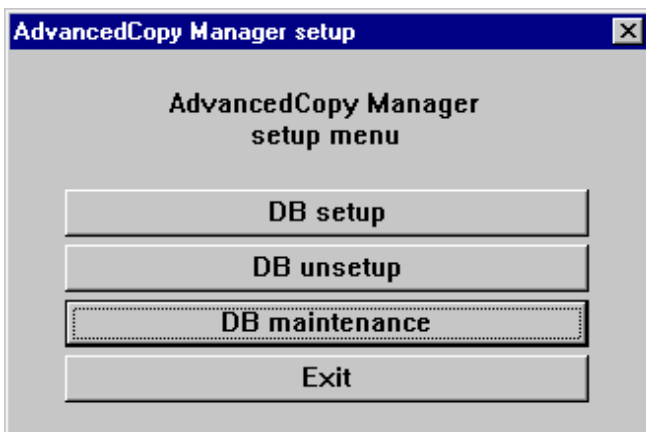
3. The following DB maintenance window will be displayed. Click the [DB recovery] button.
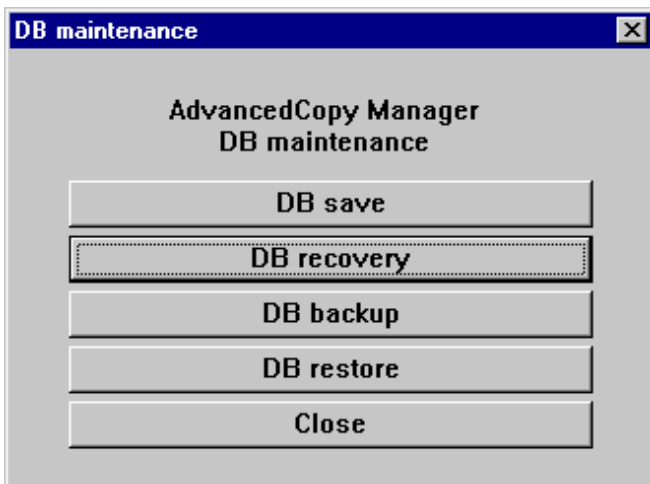
4. The recover mode selection window will be displayed. Select a recovery mode and click the [OK] button. For information on deciding on a recovery method, refer to "11.1.1.4.2 Finding an error in a database".
When selecting "Log management file recovery" or "Archive log file recovery", go to step 6. The window of step 5 is not displayed.
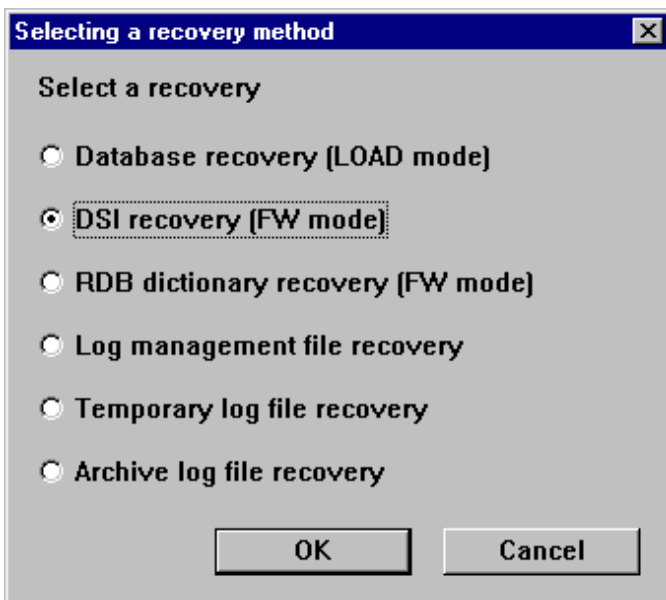
5. The window for entering a save data storage directory will be displayed. Specify a directory in which save data has been stored and click the [OK] button.
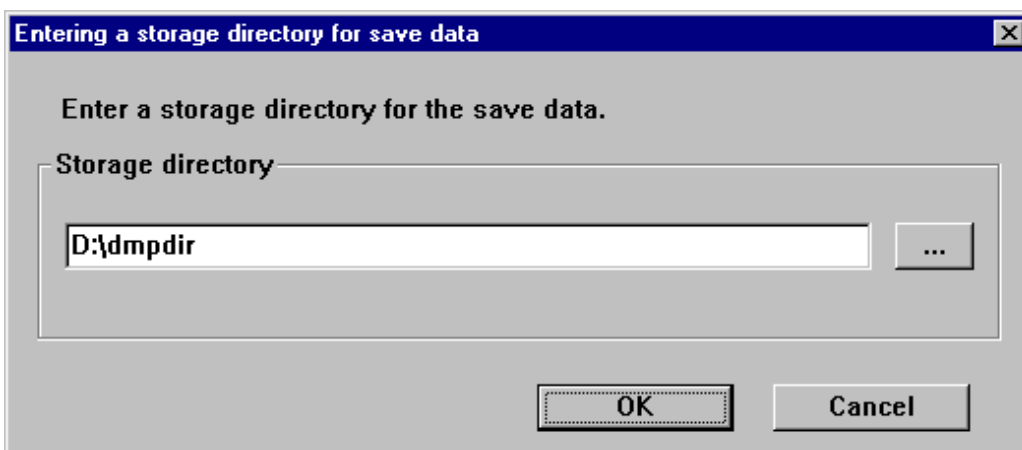
6. The processing confirmation window will be displayed. Check that the entered information is correct and click the [Start] button.
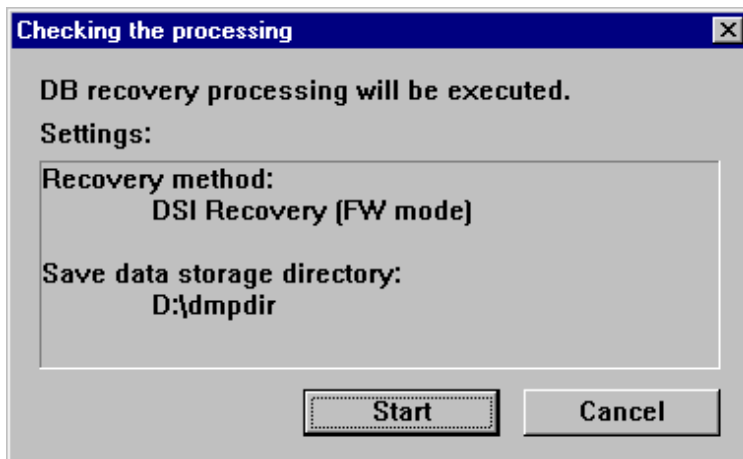
```
Checking the processing                              [X]

DB recovery processing will be executed.

Settings:

Recovery method:
        DSI Recovery (FW mode)

Save data storage directory:
        D:\dmpdir


                [  Start  ]        [  Cancel  ]
```

7. When the DB recovery process is completed, the following completion window will be displayed. Click the [Close] button.

```
DB recovery processing                               [X]

Executing DB recovery


DB recovery was completed.


[||||||||||||||||||||||||||||||||||||]


                [  Close  ]
```
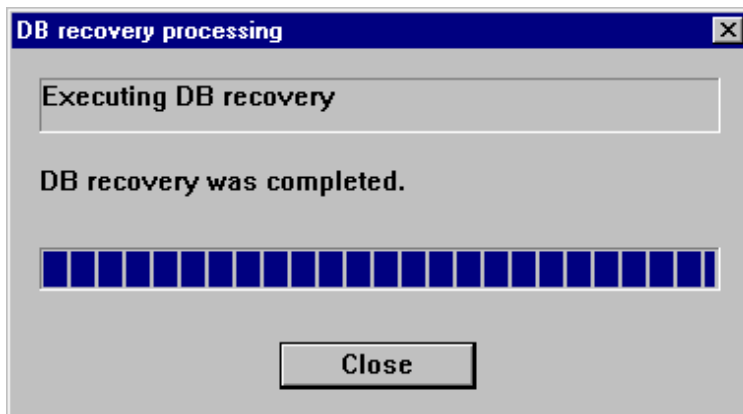
8. When the DB recovery process is completed, save the database. It is recommended to save the database in a different location than previously. For information on the save methods, refer to "11.1.1.4.1 Saving a database".

9. Restart all the services on the Management Server. For information on stopping and starting a service, refer to "Chapter 2 Starting and Stopping Services".

11.1.1.5 Maintaining a registry

This section describes the maintenance of a registry. Perform this procedure on a Management Server or a Managed Server.

11.1.1.5.1 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 directory>\etc\swnode.ini
<Environment directory>\etc\device.ini
```

In the case of a cluster

```
<Drive letter of the shared disk for AdvancedCopy Manager share data>:\etc\opt\swstorage\etc
\swnode.ini
```

```
<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:\ETERNUS_SF.

```
C:\>copy C:\ETERNUS_SF\ACM\etc\swnode.ini D:\backup\
C:\>copy C:\ETERNUS_SF\ACM\etc\device.ini D:\backup\
```

Registry backup data size

Check the size of the file to be backed up.

11.1.1.5.2 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 directory>\etc\swnode.ini
<Environment directory>\etc\device.ini
```

In the case of a cluster

```
<Drive letter of the shared disk for AdvancedCopy Manager share data>:\etc\opt\swstorage\etc
\swnode.ini
<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:\ETERNUS_SF\ACM\etc\
C:\>copy D:\backup\device.ini C:\ETERNUS_SF\ACM\etc\
```

11.1.1.6 Maintaining Symfoware database information file

This section describes the maintenance of Symfoware database information file.

11.1.1.6.1 Backing up Symfoware database information file

Back up Symfoware database information file used for Symfoware backup server operation.

For backing up Symfoware database information file, copy the files that are in below directory to any other directory as needed.

- In case of normal operation (non-clustered environment)

```
<Environment directory>\etc\repl\data\DEFAULT\symfo
```

- In case of operation in clustered environment

```
<Environment directory for logical node>\etc\repl\data\DEFAULT\symfo
```

11.1.1.6.2 Restoring Symfoware database information file

Restore Symfoware database information file used for Symfoware backup server operation.

Copy the file backed up in "11.1.1.6.1 Backing up Symfoware database information file" into the following directories:

- In case of normal operation (non-clustered environment)

```
<Environment directory>\etc\repl\data\DEFAULT\symfo
```

- In case of operation in clustered environment

```
<Environment directory for logical node>\etc\repl\data\DEFAULT\symfo
```

11.1.1.7 Maintaining a target directory for output of the recovery control file

This section describes the maintenance of a target directory for output of the recovery control file.

11.1.1.7.1 Backing up a target directory for output of the recovery control file

Back up a target directory for output of the recovery control file that is used for Symfoware backup server operation.

In the target directory for output of the recovery control file are stored a recovery control file and a backup history file that are created at backup time.

Copy the files in the target directory for output of the recovery control file into any directory.

- In case of normal operation (non-clustered environment)

```
<Environment directory>\etc\SymfoWARE\Rep
```

- In case of operation in clustered environment

```
<Environment directory for logical node>\etc\SymfoWARE\Rep
```

11.1.1.7.2 Restoring a target directory for output of the recovery control file

Restore a target directory for output of the recovery control file that is used for Symfoware backup server operation.

Copy the file backed up in "11.1.1.7.1 Backing up a target directory for output of the recovery control file" into the target directory for output for output of the recovery control file.

- In case of normal operation (non-clustered environment)

```
<Environment directory>\etc\SymfoWARE\Rep
```

- In case of operation in clustered environment

```
<Environment directory for logical node>\etc\SymfoWARE\Rep
```

11.1.2 Making a package backup of databases

This section describes the function of making a backup of management information (e.g., databases) from just one Managed Server or Management Server.

With a package backup of management information, you can make a backup of management information for all Managed Servers and Management Server from just one Managed Server or Management Server. Executing a package backup of management information runs backup commands (making backups of backup management resources and databases) for the databases of other Managed Servers and Management Server, 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 11.1 Management Server and Managed Server
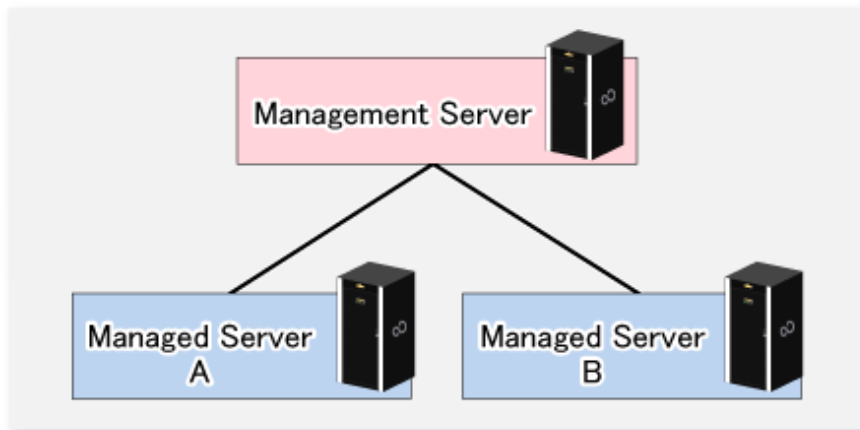
Example

Assume that the package backup of management information function has been used to back up the management information on a Management Server, Managed Server A, and Managed Server B onto Managed Server B in the diagram above. In this case, Managed Server B is the backup execution server. The Management Server, Managed Server A, and Managed Server B are the backup target servers. That is, Managed 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 11.4 Types of management information backed up by package backup of management information

Function	Type of data
Database	- Database
Registry	- Registry
Backup management	- Backup management list, or backup management list and recovery control file - 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
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

Note

- Managed Server management information created by Softek AdvancedCopy Manager Version 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 *ETERNUS SF AdvancedCopy Manager Operation Guide* applicable to the Managed Server.

- In an environment where the Managed Server with IPv4 address and the Managed Server with IPv6 address coexist, register the Management Server as a "package-backup-of-the-management-information execution server".

11.1.2.1 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 Operation Guide* for the operating system running on the 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 Operation 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 *ETERNUS SF AdvancedCopy Manager Operation 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

     - 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

   - 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

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 clustered system). The sizes described below are needed only when a package backup of management information is being created. Use the largest value of the sizes of the databases to be backed up from the management information package backup target servers. The required sizes are as follows:

   - The required size for the databases is the size of the database backup data multiplied by 2.2.
     For the backup data size, refer to "Maintaining a database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the Management Server.

   - The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2.
     For the backup data size, refer to "Maintaining a database" in the *ETERNUS SF AdvancedCopy Manager Operation 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.

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 11.5 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 directory>*\etc\stgmgrinfo_policy.ini
	Cluster	*<AdvancedCopy-Manager-shared-data>*:\etc\opt\swstorage\etc\stgmgrinfo_policy.ini
Solaris, Linux, HP-UX, AIX	Non-cluster	/etc/opt/FJSVswstf/stgmgrinfo_policy.ini
	Cluster	/etc/opt/FJSVswstf/*<logical-node-name>*/stgmgrinfo_policy.ini

Note

- Do not specify more than one Managed Server as a management information package backup execution server.

- When this server is used for executing transactions on the Managed Server in a clustered system, create a directory for storing backup data on a shared disk.

- For databases and backup management, backup commands are executed on the corresponding management information package backup target servers. In addition, for database backups and backup management (ie, backup management lists) 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 log file.

Table 11.6 Policy file format

Section name	Key name	Description (*1)	Whether specifiable on	
			Management Server	Managed 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.	A	C
	BkupData	Specifies whether to make a backup of the backup management. Yes: Make a backup of the backup management. No: Do not make a backup of the backup management.	B	B
	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.	B	B

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

*1: If this key is not specified or if "Yes" is not in the form "Y" (uppercase) + "es" (lowercase), then "No" is set.

Example

Set up a policy file as follows:

- The Management Server named ACMMGR creates backups for the database and backup management.

- The Managed Server named ACMAGT1 creates backups for backup management.

- The Managed Server named ACMAGT2 creates backups for replication management.

```
[ACMMGR]
DBData=Yes
BkupData=Yes
[ACMAGT1]
BkupData=Yes
[ACMAGT2]
ReplData=Yes
```

![Note icon] **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.

11.1.2.2 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 11.7 Directory structure for execution of management information package backup and data types

Directory			Data type
*1	Server name	DBData	- Database
		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
			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
		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

*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 policy file backup operations are described below. Backup of registries which are not included in the backup targets when a policy file is used to perform backup are also detailed. 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 Managed 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

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 Operation 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 Managed 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 Managed 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 Managed 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 Managed 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 Managed 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 Managed Server.

3. On the management information package backup execution server, set up a policy for the renamed Managed 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 Managed 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.

11.1.2.3 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 *ETERNUS SF AdvancedCopy Manager Operation 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>\<management-server-name>\RegiData
   ```

   Solaris, Linux, HP-UX or AIX version:

   ```
   <Directory-determined-in-step1>/<management-server-name>/RegiData
   ```

3. Transfer the backup of the database that was copied in step 2 to the Management Server in binary mode.

4. On the Management Server, expand the database backup transferred in step 3.

   - On the Windows version Management Server:

     Expand the database backup using the stgarcext (Backup data expansion command) in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.

   - On a Solaris/Linux version Management Server:

     Expand the database backup by using the tar command supported by the operating system.

5. On the Management Server, restore the database.

   For details on restoring a database, refer to "Restoring a database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the 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 a replication management list

1. Perform the procedure of "Restoring a database" to restore a database.

   If you have performed it, this step is not needed.

2. On the target server, execute the swsrprecoverres (Resource adjustment command) with the -r option.

   For details on the command, refer to "swsrprecoverres (Resource adjustment command)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server.

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 Operation Guide (for 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 Operation 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

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 copied in step 2 to the target server in binary mode.

4. Transfer the backups of the backup management pre-processing/post-processing scripts copied in step 3 to the directory in which the scripts will be executed on the target server in binary mode. For the directory in which the pre-processing and post-processing scripts for backup management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and post-processing for backup/restoration" in the *ETERNUS SF AdvancedCopy Manager Operation 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 "Pre-processing and Post-processing of Backup and Restoration" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for 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 "Appendix C Pre-processing and Post-processing of Replication" in the *ETERNUS SF AdvancedCopy Manager Operation 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 Operation Guide (for 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 "11.1.2.1 Preliminaries".

11.2 Troubleshooting

11.2.1 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 Management Server.
Perform this procedure on a Management Server.

Increase the amount of repository space as follows:

1. Back up the registry of a Management Server (refer to "11.1.1.5.1 Backing up a registry")

2. Perform stored data backup processing (refer to "11.2.1.1 Database backup")

3. Perform database unsetup (refer to "11.2.1.4 Database configuration removal")

4. Re-estimate the database size (refer to "Estimation of database size" in the *ETERNUS SF Installation and Setup Guide*)

5. Perform database setup (refer to "11.2.1.3 Database configuration")

6. Start the services "SymfoWARE RDA RDBSWSTF" and "SymfoWARE RDB RDBSWSTF" (refer to "Chapter 2 Starting and Stopping Services")

7. Perform saved data restoration processing (refer to "11.2.1.2 Database restoration")

8. Perform restoration of the registry of a Management Server (refer to "11.1.1.5.2 Restoring a registry")

11.2.1.1 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 "11.1.1.4.1 Saving a database".

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.
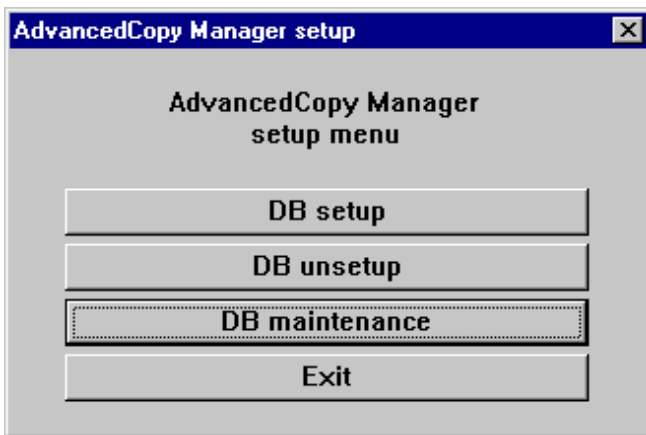
3. The following DB maintenance window will be displayed. Click the [DB backup] button.
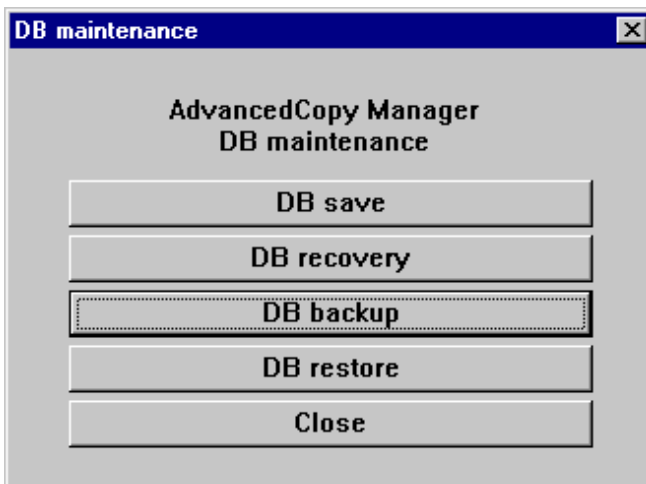
4. The following window for entering a backup directory will be displayed. Enter a backup directory and click the [OK] button.
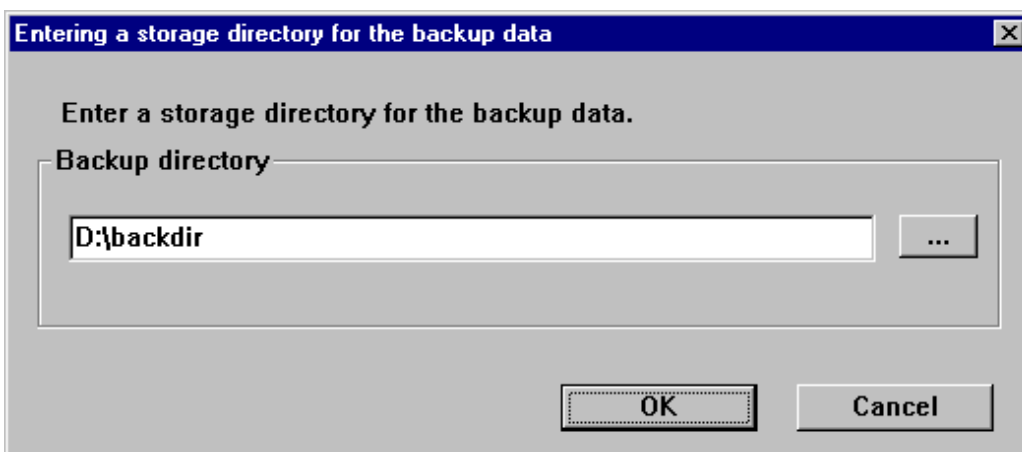
📌 **Note**

....

Create the backup directory in advance.

The blank space and the following characters [" | : * ? / . < > , % & ^ = ! ; # ' @] cannot be used in the backup directory name.

....

5. The following window will be displayed. Check that the displayed information is correct and click the [Start] button.
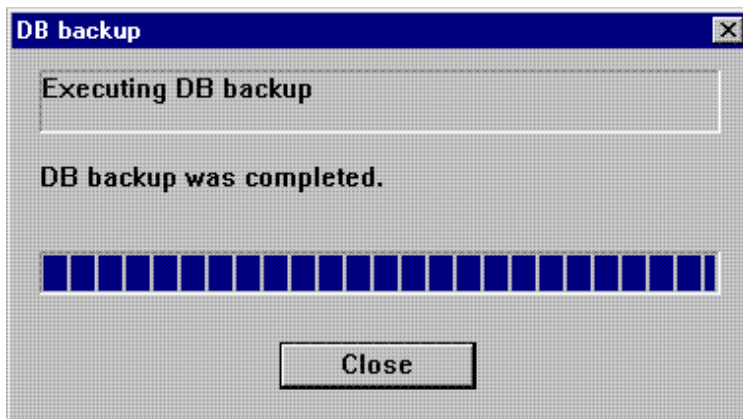
6. When the backup is completed, the following window will be displayed. Click [Close].
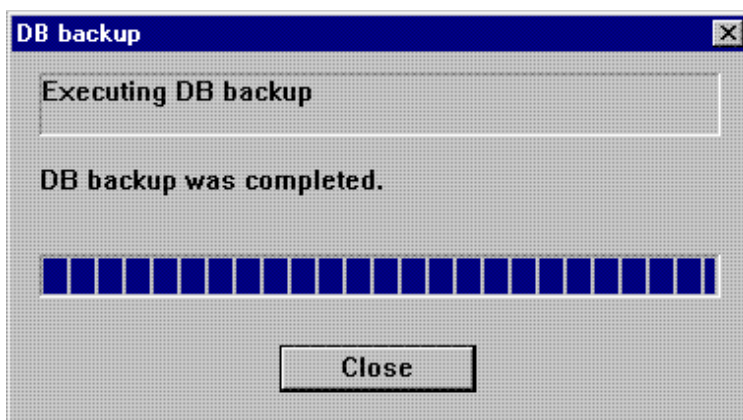
11.2.1.2 Database restoration

This section describes the restoration of a database. You can restore data that has been saved as described in "11.2.1.1 Database backup" to a database as shown below.

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 "11.1.1.4.1 Saving a database".

- Executing this process with the service listed below must be paid attention.

    - Terminal service (via a remote desktop connection)

    If the Management Server is running on Windows Server 2003, the Terminal Service must 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/947723/en
    http://support.microsoft.com/kb/278845/en

  Do not use service listed below, as it will not work properly.

    - Telnet server service

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.

   AdvancedCopy Manager setup

   AdvancedCopy Manager
   setup menu

   DB setup

   DB unsetup

   DB maintenance

   Exit
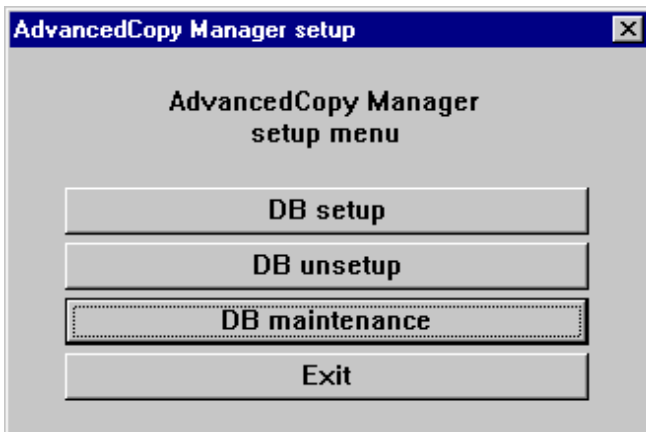
3. The following DB maintenance window will be displayed. Click the [DB restore] button.

   DB maintenance

   AdvancedCopy Manager
   DB maintenance

   DB save

   DB recovery

   DB backup

   DB restore

   Close
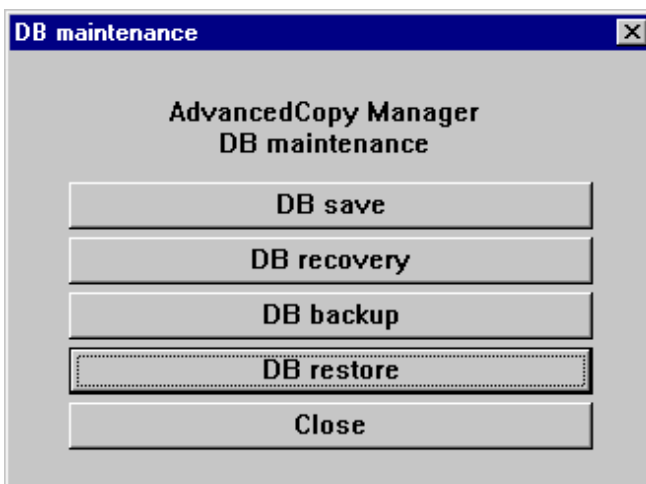
4. The following window for specifying a backup data storage directory will be displayed. Specify a directory in which backup data has been stored and click the [OK] button.
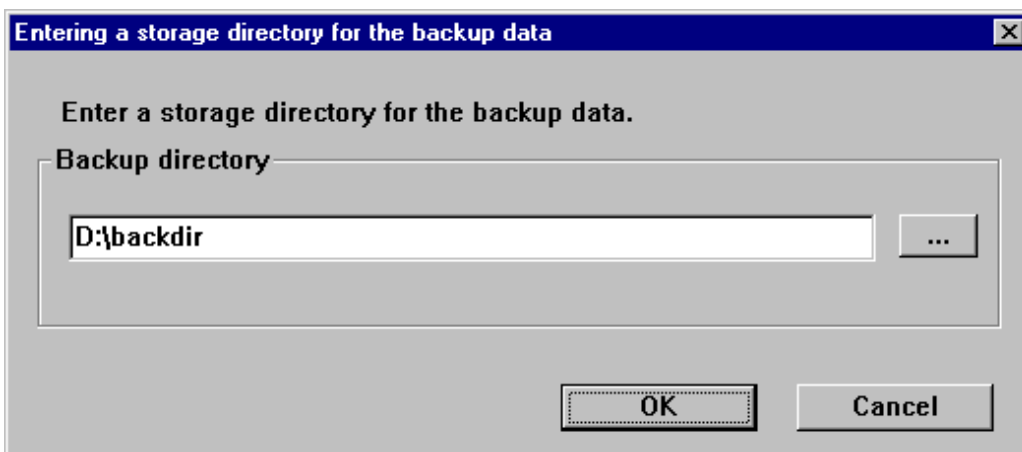
   Entering a storage directory for the backup data

   Enter a storage directory for the backup data.

   Backup directory

   D:\backdir   ...

   OK   Cancel

5. The following window will be displayed. Check that the displayed information is correct and click the [Start] button.

Verifying the processing

DB restore processing will be executed.
Settings:

DSI data storage directory:
    D:\backdir

[Start] [Cancel]

6. When the restoration is completed, the following completion window will be displayed. Click [Close].

DB restore

Executing DB restore processing

DB restore was completed.

[Close]
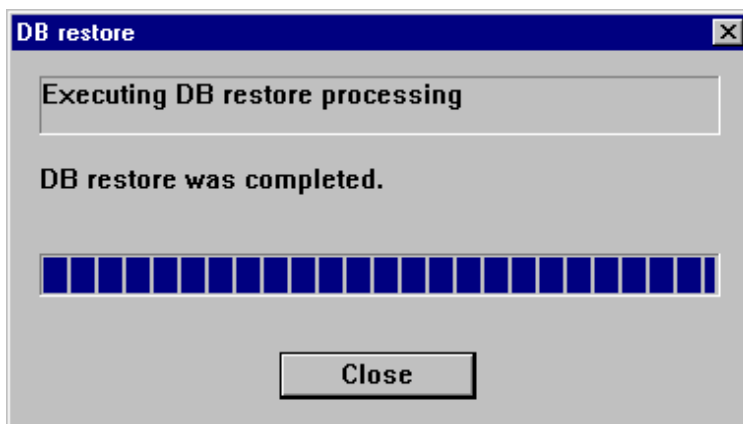
11.2.1.3 Database configuration

This section describes how to configure a database.

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Please record the logon user who set the database information.
This logon user is needed for the unsetup the database information.

The unsetup the database information may be failed, when the unsetup is executed by a user different from the user who executed the setup.

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Note

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Executing this process with the service listed below must be paid attention.

- Terminal service (via a remote desktop connection)

  If the Management Server is running on Windows Server 2003, the Terminal Service must 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/947723/en
  http://support.microsoft.com/kb/278845/en

Do not use service listed below, as it will not work properly.

- Telnet server service

. . . .

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.
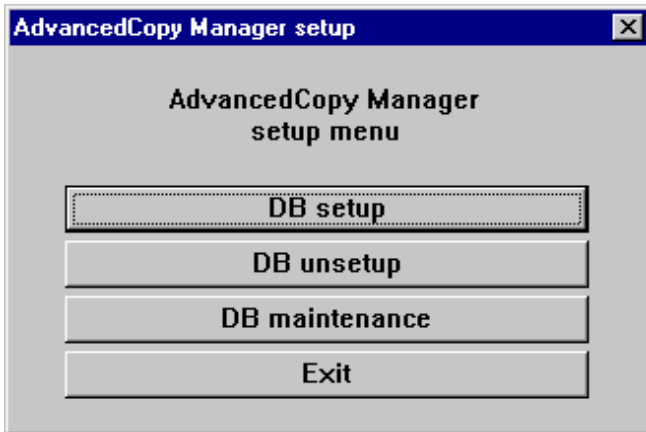
3. The following window will be displayed. Enter the necessary items and click the [Continue] button.
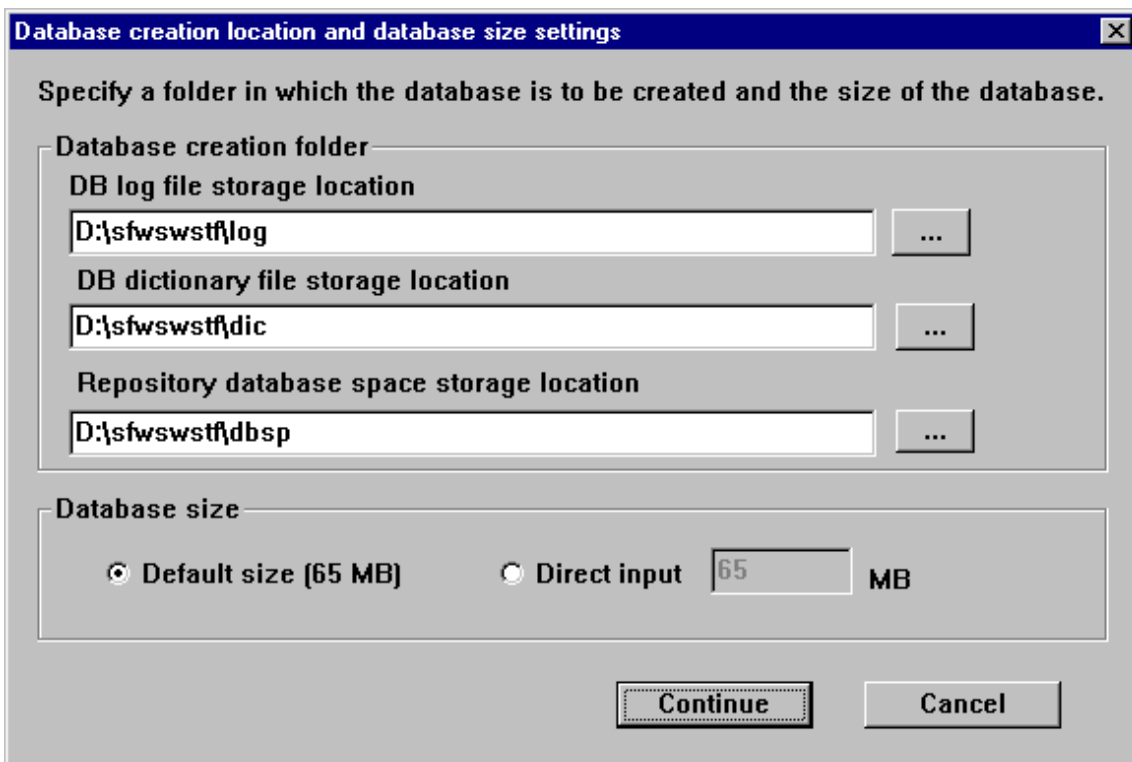
Note

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- The number of characters in a folder name must be between 4 and 80. The blank space and the following characters [" | : * ? / . < > , % & ^ = ! ; # ' @] cannot be used in folder names.

- Do not check the option [Compress drive to save disk space] in the **General** tab for any of these drives.
  If the drive is compressed, performance overhead is generated compared to a non-compressed drive, and depending on the I/O amount access error may occur in low OS resources conditions.

- Do not check the [Compress or Encrypt Attributes] in the [Advanced Attributes] section of the [Properties] or [Advanced] part of the **General** tab.
  If the compression property is checked, as with the drive compression performance overhead is generated compared to normal I/O and access error may occur in low OS resources conditions.
  If the encryption property is checked access error may occur when decryption cannot be performed.

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.

In addition, specify the user shown in the table below according to each server type to be used for the user name.

Server type		
Domain controller	Machine belonging to a domain	WORKGROUP (not belonging to a domain)
Domain user	Local user	Local user

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.
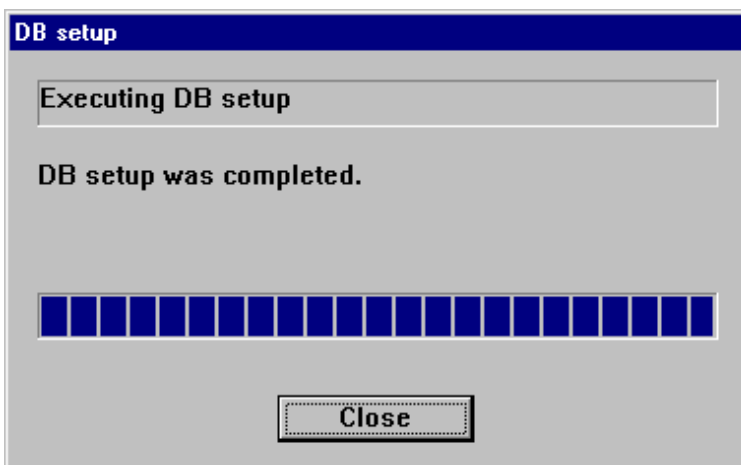
11.2.1.4 Database configuration removal

Remove the setup of a database as follows:

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Remove the setup of a database by a user who executed its setup.

The remove may be failed, when it executed by a different user.

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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.
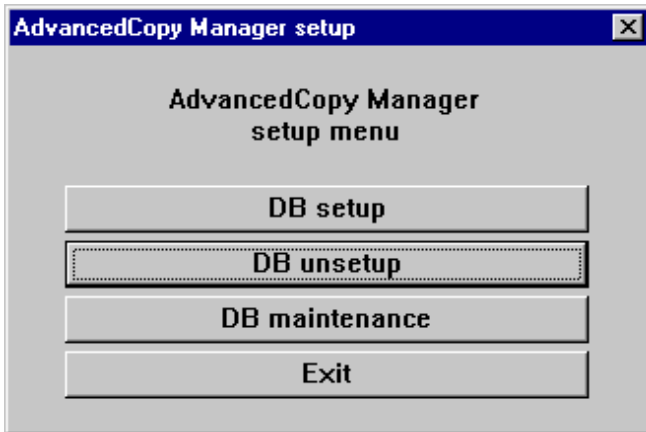
3. The following confirmation window will be displayed. Click the [Start] button.
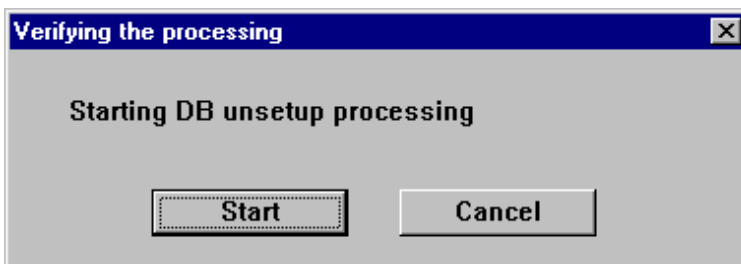
4. When the removal of the setup is completed, the following completion window will be displayed. Click [Close].
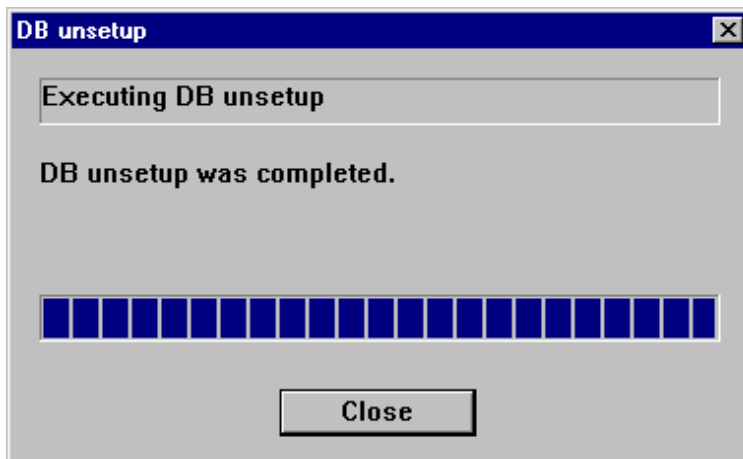
11.2.2 Collecting maintenance information

11.2.2.1 Collecting error survey information

Collecting error survey information on the Management Server

The collecting error survey information on the Management Server can be performed using either the command or Web Console.

When using the command, login to the Management Server and execute esfsnap (AdvancedCopy Manager's manager troubleshooting data collection command).
When using Web Console, refer to "Collecting troubleshooting data" in the *ETERNUS SF Web Console Guide*.

Send the collected error survey information to a Fujitsu system engineer.

Collecting error survey information on the Managed Server

Login to the Managed Server and execute acmcapture (AdvancedCopy Manager's agent troubleshooting data collection command) on each server.

Please send the collected error survey information to a Fujitsu system engineer.

See
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If VSSHP (ETERNUS VSS Hardware Provider) is used for backing up the Exchange database, refer to "How to Obtain Error Information" in the *ETERNUS VSS Hardware Provider User's Guide*.
. . . .

Note
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- 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).

- If an error occurs during installing ETERNUS SF, esfsnap (AdvancedCopy Manager's manager troubleshooting data collection command) may not exist. In this case, collect the following data.

  - Event logs

    Collect the data of application, security, and system logs as plain text format or as CSV text format.

    The procedure to collect event logs is as follows.

    1. Select a target event log on the event viewer.

    2. Execute [Save under a log file name] in the [Action] tab.

    3. Save [File type] in the Save dialog, changing to [text (tab-delimited)(*.txt)] or [CSV(comma-separated)(*.csv)].

  - Collect the files under the following directories.

    - <Program directory during installing>\ACM\var

    - <Environment setup directory during installing>\ACM\env

    - <Work directory during installing>\ACM\etc

- If you are using Backup Wizard for Exchange Server or Restore Wizard for Exchange Server, collect troubleshooting data for Storage Cruiser's agent, too. Refer to "Collecting information on the Managed Server node (Windows)" in "Information for further investigation" in the *ETERNUS SF Storage Cruiser Operation Guide* for how to collect troubleshooting data.

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11.2.3 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 Management Server.

1. Check that the following repository access services are running.

   - SymfoWARE RDA RDBSWSTF

   - SymfoWARE RDB RDBSWSTF

   ### 🅿 Point
   . . . .
   For Windows Server 2008 or later, 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 Services".

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 "11.1.1.4.1 Saving a database". After doing this, there will be sufficient free space required to update a repository.

After saving a database, restart (i.e., stop and then start) the repository access services. For information on stopping and starting a service, refer to "Chapter 2 Starting and Stopping Services".
Perform this step again.

3. Check whether the "11.1.1.4.1 Saving a database" processing is in progress.

   Check method

   Log into the 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 "11.2.1 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 "11.1.1.4.2 Finding an error in a database".

   Required action

   Recover a database according to "11.1.1.4.3 Recovering a database".
   After performing the recovery, perform this step again.

6. Collect survey information according to "11.2.2 Collecting maintenance information".
   Then contact your Fujitsu system engineer.

11.3 Troubleshooting: Hardware error during backup

This section describes the actions to perform if a hardware error, etc. occurs during a backup using AdvancedCopy Manager.

11.3.1 Overview

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

- swstbackstat (Backup execution status display command) displays "failed" or "?????" in the Status column.

- swstsyncstat (Backup synchronous processing progress display command) displays "failed" or "?????" in the Status column.

- swstreststat (Restore execution status display command) displays "failed" or "?????" in the Status column.

- swsthistdisp (History information display command) displays "failed" or "?????" in the Status column.

- swstexecstat (Execution status display command) displays "sync(failed)", "snapshop(failed)", "restore(failed)", or "?????" in the Status column.

- swsttrkstat (Tracking status display command) displays "failed" or "?????" in the Status column.

- The message swst0603, 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 the message swst0603, swst0634, swst0719, or swst0740 is displayed during command execution and the same error occurs even if the command is re-executed, a hardware error, etc. has occurred, causing Advanced Copy to fail.

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.

11.3.2 Troubleshooting

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

Figure 11.2 Troubleshooting flow (for faults during backup)
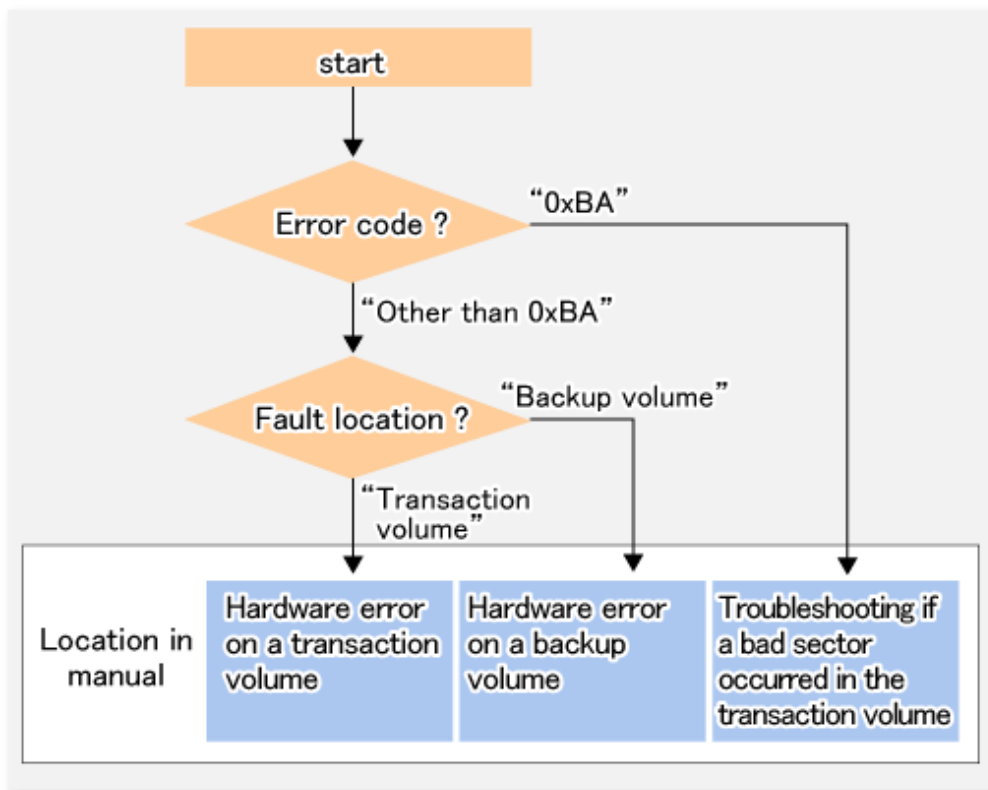
Note

- Refer to "11.3.1 Overview" for details of the Status column and "fault location".

  If the Status column is "?????", check if the copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt") using ETERNUS Web GUI.
  If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
  In other cases, take the action checked in the following points.

    - If device information is unusual:

      Restore the device information.

- If a device is not accessible:

  Check if the device exists.

- If no dependency is configured between volumes and AdvancedCopy Manager service:

  Configure the dependency. For details, refer to "13.1.5 Notes on cluster operation".

- If there is anything unusual with Managed Server, switches, etc.:

  Contact a Fujitsu system engineer.

- Use ETERNUS Web GUI to check the copy process error codes. Use the following method to check the error codes:

  - On the [Display status] menu, click [Advanced Copy 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 11.8 Meanings of error codes

Error code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) **Note**: If a bad sector is created in a transaction volume when a) or b) applies, the ETERNUS Disk storage 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 Disk storage system:

- ETERNUS4000 and ETERNUS8000 (firmware version V11L30-0000 or later)

For ETERNUS Disk storage system 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.)

11.3.2.1 Hardware error on a transaction volume

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

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.

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 (Restore 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 (Restore execution command) to restore the transaction volume.

11.3.2.2 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)

   If the processing cannot be cancelled using one of the above commands, use ETERNUS Web GUI to cancel it.

2. Execute swstsrsemtch (Resource match command).

3. Cancel the processing in which the error occurred. At this point, the execution status display commands (swstbackstat (Backup execution status display command), swstreststat (Restore execution status display command) and swsthistdisp (History information display command)) 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 cancelled, 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)

4. Execute the execution status display commands (swstbackstat (Backup execution status display command), swstsyncstat (Backup synchronous processing progress display command), swstreststat (Restore execution status display command), swsttrkstat (Tracking status display command) and swsthistdisp (History information display command)) to verify that no other errors have occurred.

5. Use swstdevinfoset (Device information setting command) to delete the backup volume in which the error occurred.

6. 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 Web Console, and store the information again in the backup volume.

7. Re-execute the processing in which the error occurred.

11.3.2.3 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 (Restore 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 system command (for example, the UNIX dd command or the Windows format command) to write to the area.

 - Restoration method 3:

    Use swstrestore (Restore 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 by this method, if there is no backup history information.

11.4 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.

11.4.1 Overview

If a hardware error, etc. occurs during the replication, the following symptoms are displayed:

 - swsrpstat (Operation status display command) displays "failed" or "?????" in the Status column.

 - The message swsrp2606 is output during command execution.

 - The message swsrp0603, 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 the message swsrp0603, swsrp0634, swsrp0719, or swsrp0740 is displayed during command execution, and the same error occurs even if the command is re-executed, a hardware error, etc. has occurred, causing Advanced Copy 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.

 - The message swsrp2648 is displayed during command execution.

If the operation status display command displays "halt" in the Status column, and the message swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy processing may have failed.
If any of these messages, statuses or symptoms is generated, a hardware error or path close 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.

11.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure 11.3 Troubleshooting flow (when a fault occurs during replication)
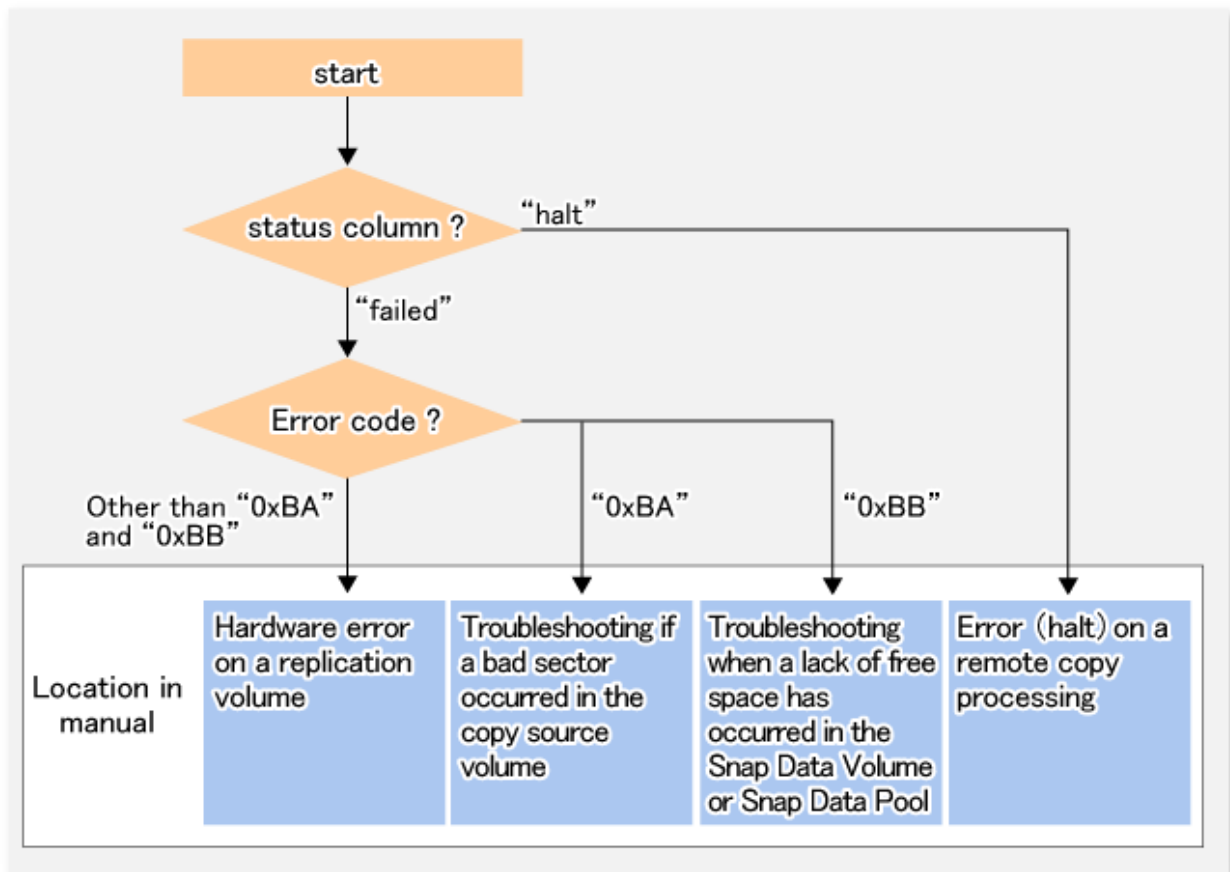
📌 **Note**

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- Refer to "11.4.1 Overview" for details of the Status column and "fault location".

  If the Status column is "?????", check if the copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt") using ETERNUS Web GUI.
  If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
  In other cases, take the action checked in the following points.

  - If device information is unusual:

    Restore the device information.

  - If a device is not accessible:

    Check if the device exists.

  - If no dependency is configured between volumes and AdvancedCopy Manager service:

    Configure the dependency. For details, refer to "13.1.5 Notes on cluster operation".

  - If there is anything unusual with Managed Server, switches, etc.:

    Contact a Fujitsu system engineer.

- Use ETERNUS Web GUI to check the error codes. Use the following two methods to check.

  - Checking with swsrpstat (Operation status display command)

    Execute the command with the -O option.

  - Checking with ETERNUS Web GUI

    1. On the [Display status] menu, click [Advanced Copy 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 11.9 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 Disk 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 copy destination volume from being overwritten with invalid copy source volume data.
0xBB	A lack of free space has occurred in the Snap Data Volume or Snap Data Pool
Other than 0xBA and 0xBB	An error other than the above occurred.

Error codes 0xBA and 0xBB are returned only for the following ETERNUS Disk storage system:

- ETERNUS4000 and ETERNUS8000 (firmware version V11L30-0000 or later)

For ETERNUS Disk storage system other than the above, the events indicated by error code 0xBA and 0xBB are identified by the following methods:

Table 11.10 Error code events

Event	Identification method
Events indicated by 0xBA	These events do not occur. In cases a) and b) above, the copy status does not change even if a bad sector occurs at the copy source volume.
Events indicated by 0xBB	Use ETERNUS Web GUI to check the capacity already used on the Snap Data Volume in order to determine whether or not a lack of free space has occurred. - On the [Display status] menu, click [Volume list] in the status display. - Click the link to Snap Data Volume in the "Volume type" column of the relevant volume. - Refer to the value shown in the "Capacity already used" column. If this event applies, refer to "11.4.2.3 Troubleshooting when a lack of free space has occurred in the Snap Data Volume or Snap Data Pool".

11.4.2.1 Hardware error on a replication volume

When a hardware error occurs in a duplicate volume, perform the repair work on the error according to the following procedures.

1. Use swsrpcancel (Replication cancellation command) to cancel the processing in which the error occurred. If the processing cannot be cancelled from the operation server when inter-server replication is performed, cancel it from a non-operational server.

2. If the processing cannot be cancelled by using the command, use ETERNUS Web GUI to cancel it.

3. Execute swsrprecoverres (Resource adjustment command)

4. Execute swsrpstat (Operation status display command) to verify that no other errors have occurred.

5. Use swsrpdelvol (Replication volume information deletion command) to delete the replication volume in which the error occurred.

6. Use swsrpsetvol (Replication volume information setting 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 Web Console and store the information again in the replication volume.

7. Re-execute the processing in which the error occurred.

11.4.2.2 Troubleshooting if a bad sector occurred in the copy source volume

If a bad sector occurred in the copy source volume, use the following procedure to restore the copy source volume:

1. Use swsrpcancel (Replication cancellation command) to cancel processing for which the error occurred.
   If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.
   If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

2. Execute swsrpstat (Operation status display command) to check for other errors.

3. Restoration is performed by overwriting the area containing the bad sector. Select the appropriate method, in accordance with the usage or use status of the copy source volume, from the methods below.

   - Restoration method 1
     If the area can be reconstructed from high-level software (file system, DBMS, or similar), reconstruct the area.

   - Restoration method 2
     If the area containing the bad sector is an area that is not being used, such as an unused area or a temporary area, use a system command (for example, the UNIX dd command or the Windows format 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.)

11.4.2.3 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.
If a lack of free space occurs of Snap Data Volume or Snap Data Pool, refer to the following sections to recover it according to the Snap Data Pool usage condition:

  - When not using the Snap Data Pool : "Recovery of insufficient free space in Snap Data Volume"

  - When using the Snap Data Pool : "Recovery of insufficient free space in Snap Data Pool"

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The use status of the Snap Data Pool can be checked by specifying "poolstat" subcommand in swstsdv (Snap Data Volume operation/reference command).
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Recovery of insufficient free space in Snap Data Volume

When a lack of free space has occurred in the Snap Data Volume, follow these steps to undertake recovery:

  - Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command) command.

  - If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The likely causes of a lack of free space in the Snap Data Volume are as follows:

a. The estimate of the physical size of the Snap Data Volume is not accurate.

b. The estimate of the physical size of the Snap Data Volume is accurate but, as a result of a large volume being updated in the Snap Data Volume when the SnapOPC/SnapOPC+ session does not exist, the physical capacity of the Snap Data Volume is being used up.

The usage status of the Snap Data Volume can be checked by specifying "stat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the physical size of the Snap Data Volume, and recreate the Snap Data Volume.
If "b." applies, use ETERNUS Web GUI or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, and then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Volume.

Recovery of insufficient free space in Snap Data Pool

When a lack of free space has occurred in the Snap Data Pool, follow these steps to undertake recovery:

- Cancel the processing in which the error occurred with swsrpcancel (Replication cancellation command).

- If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The likely causes of a lack of free space in the Snap Data Pool are as follows:

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 the SnapOPC/SnapOPC+ session does not exist, the capacity of the Snap Data Pool is being used up.

The use status of the Snap Data Pool can be checked by specifying "poolstat" in swstsdv (Snap Data Volume operation/reference command) subcommand.

If "a." applies, re-estimate the size of the Snap Data Pool, and after increasing the size of the Snap Data Pool, recreate the Snap Data Volume.

If "b." applies, use ETERNUS Web GUI or, specify "init" in swstsdv (Snap Data Volume operation/reference command) subcommand, then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Pool.

11.4.2.4 Error (halt) on a remote copy processing

The REC restart (Resume) method varies, depending on the halt status.

Execute swsrpstat (Operation status display command) with the -H option specified to check the halt status, and then implement the relevant countermeasure.

- For "halt(use-disk-buffer)" or "halt(use-buffer)"

This status means that data is saved to the REC Disk buffer or REC buffer because data cannot be transferred due to a path closure (halt). In order to restart REC, perform path recovery before a space shortage occurs for the REC Disk buffer or REC buffer.
After recovery, the ETERNUS Disk storage system restarts REC automatically.

If a space shortage has already occurred for the REC Disk buffer or REC buffer, the "halt(sync) or halt (equivalent)" status shown below occurs. Implement the countermeasures for that status.

- For "halt(sync) or halt(equivalent)"

This status means that data transfer processing was discontinued due to a path closure (halt).

The REC restart 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 storage system 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>
   ```

11.5 Changing the Operating Environment

Server information batch change operations preserve the consistency of server information in systems managed by AdvancedCopy Manager. All Managed Server services and transactions in the systems that include a Management Server and Management Server transactions must be running when these changes are made.

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- 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 Management Server that executes stgxfwcmmodsrv (Server information change command), nor at any of the Managed Servers managed by 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 commands.

  - 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.

- When node degeneracy has occurred in load sharing using Symfoware, the operating environment cannot be changed.

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When operating AdvancedCopy Manager by the use of the Web Console, refer to "11.5.9 Changing operating environment using the Web Console".

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11.5.1 Changing the IP address of Management Server

Change (including addition and deletion) the IP address of a Management Server as follows:

If IPv4 address or IPv6 address is added, the following step 1 and step 6 are not required:

If only a physical IP address needs to be changed and the Management Server uses a logical IP address, then perform steps 6 only. Otherwise, perform all steps.

1. If replication management function was used at the Management Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. On the Management Server, change the system IP address.

3. Restart the various AdvancedCopy Manager services on the Management Server. Refer to "Chapter 2 Starting and Stopping Services" for the restart method.
   Note that this step is not required if the system was restarted in step 1.

4. On the Management Server, create a server information change instruction file, and then execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the IP address.

5. On the Management Server, restart the services of AdvancedCopy Manager. For information on restarting a service, refer to "Chapter 2 Starting and Stopping Services".

6. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

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For information about making the above change in a cluster operation, refer to "11.5.7.1 Changing the IP address of Management Server transaction".
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Note
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If you change or delete the IP version of the Management Server, take the following actions for the Managed Servers registered with pre-changed or pre-deleted IP version:

- When changing the IP version (change from IPv4 to IPv6 or from IPv6 to IPv4):

  1. Delete the target Managed Server

  2. Change the IP address of the Management Server according to the procedure.

  3. Re-register the target Managed Server with changed IP version.

- When deleting the IP version (change from both IPv4 and IPv6 to either one of IPv6 and IPv4):

  1. Change the IP address of the target Managed Server to the changed IP version.

  2. Change the IP address of the Management Server according to the procedure.
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11.5.2 Changing the IP address of Managed Server

Change the IP address of a Managed Server as follows:

1. If replication management function was used at the target Managed Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. On the target Managed Server, stop the services of AdvancedCopy Manager. For information on stopping services, refer to "Chapter 2 Starting and Stopping Services".

3. On the target Managed Server, change the system IP address.

4. On the target Managed Server, start the services of AdvancedCopy Manager. For information on this, refer to "Chapter 2 Starting and Stopping Services".
   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. On the Management Server, create a server information change instruction file, and then execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the IP address.

8. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

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For information about performing the above change in cluster operation, refer to "11.5.7.2 Changing the IP address of Managed Server transaction".

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11.5.3 Changing the port number of Management Server or Managed Server

Change the port number of a Management Server or Managed Server as follows:

1. If replication management function was used at the target Management Server or Managed Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. On the Management Server or Managed 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 %SystemRoot%\system32\drivers\etc\services.

3. On the Management Server or Managed Server targeted for change, restart the services of AdvancedCopy Manager. For information on this, refer to "Chapter 2 Starting and Stopping Services".

4. On the Management Server, create a server information change instruction file, and then execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the port number.

5. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

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For information about performing the above change in cluster operation, refer to "11.5.7.3 Changing the port number of Management Server transaction or Managed Server transaction".

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11.5.4 Changing the server name of Management Server or Managed Server

Change the server name of a Management Server or Managed Server as follows:

1. If replication management function was used at the target Management Server or Managed Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. Change the system server name at the Management Server or Managed Server that is to be changed.
   If the server name to be changed is only that of a Management Server or Managed Server managed by AdvancedCopy Manager, this step is not required.

3. On the Management Server, create a server information change instruction file, and then execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the server name.

4. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

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For information about performing the above change in a cluster operation, refer to "11.5.7.4 Changing the server name of Management Server transaction or Managed Server transaction".
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11.5.5 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 (i.e., 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.

- For correct backup management, the backup volume and the transaction volume must be the same size. For more information on this, refer to "13.1.1.1 Size of a Partition" in "13.1.1 General notes".
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11.5.5.1 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 "3.6.2.1 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 "3.6.2.2 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 "3.4.4 Fetching device information on a Managed Server", for details on changing the device information.

5. Reset the deleted transaction or backup volume in the backup. Refer to "3.4.6 Setting the operation type for a device", for details on adding the transaction volume or backup volume.

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).

11.5.5.2 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 on a Managed 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.

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).

11.5.6 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 stguserset (Repository access user change command).

For information about performing the above change in a cluster operation, refer to "11.5.7.5 Deleting a repository accessible user or changing a repository accessible user's password".

11.5.7 Changing the configuration in cluster operation

This section describes how to make a change to the operational configuration in cluster operation.

11.5.7.1 Changing the IP address of Management Server transaction

Refer to "Changing the IP address of Management Server transaction" in "Changing the Operation Environment for Windows version" in the *ETERNUS SF Cluster Environment Setup Guide*.

11.5.7.2 Changing the IP address of Managed Server transaction

Change the IP address of a Managed Server transaction by performing the following steps:

1. If replication management function was used at the target Managed Server transaction to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. Stop the Managed 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 Managed Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

5. On the Management Server that manages the Managed Server transactions, create a server information change instruction file, and then execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the IP address.

6. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

11.5.7.3 Changing the port number of Management Server transaction or Managed Server transaction

For changing the port number of Management Server transaction, refer to "Changing the port number of Management Server transaction" in "Changing the Operation Environment for Windows version" in the *ETERNUS SF Cluster Environment Setup Guide*.

Change the port number of a Managed Server transaction by performing the following steps:

1. If replication management function was used by the target Managed Server transaction to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. Stop the Management Server transaction or Managed Server transaction.
   For details on how to stop it, refer to the relevant cluster software manual.

3. On the primary node and secondary node of the target Managed Server transaction, change the port number of the AdvancedCopy Manager communication service (stgxfws_logical-node-name) specified in the %SystemRoot%/system32/drivers/etc/services

4. Start the targeted Managed 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 Management Server that manages the Managed Server. Then, execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the port number.

6. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

11.5.7.4 Changing the server name of Management Server transaction or Managed Server transaction

For changing the server name of Management Server transaction, refer to "Changing the server name of Management Server transaction" in "Changing the Operation Environment for Windows version" in the *ETERNUS SF Cluster Environment Setup Guide*.

Change the server name of a Managed Server transaction by performing the steps below.

1. If replication management function was used by the target Managed Server transaction to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

2. Create a server information change instruction file at the Management Server that manages the Managed Server. Then, execute stgxfwcmmodsrv (Server information change command) with the -f option specified to change the port number.

3. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks).

11.5.7.5 Deleting a repository accessible user or changing a repository accessible user's password

For changing the deleting a repository accessible user or changing a repository accessible user's password of Management Server transaction, refer to "Deleting a repository accessible user or changing a repository accessible user's password" in "Changing the Operation Environment for Windows version" in the *ETERNUS SF Cluster Environment Setup Guide*.

11.5.7.6 Changing the logical node name

For changing the logical node name of Management Server transaction, refer to "Changing the logical node name" in "Changing the Operation Environment for Windows version" in the *ETERNUS SF Cluster Environment Setup Guide*.

Change the logical node name of a Managed Server transaction by performing the following steps:

1. Check whether the target Managed Server transaction is operating.
   If the transaction is not operating, start the Managed Server transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

2. Delete the configuration of the Managed Server transaction.
   When using the backup management function, delete the transaction volume and backup volume by referring to "3.6.2 Deleting a device".
   When it is defined as a copy source or copy destination volume by using the replication management function, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

3. Save the following AdvancedCopy Manager data.

   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication management.

   - 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 a "package-backup-of-the-management-information execution server" 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 "11.1.2.1 Preliminaries".

4. Delete <*shared disk*>:\etc\opt\swstorage\etc\swnode.ini on the node operating the transaction.

5. Delete the cluster environment of the target transaction.

   For details about how to delete, refer to "Deletion of Cluster Environment for Managed Server Transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

   Note

   Do not perform the following step in the *ETERNUS SF Cluster Environment Setup Guide*.

   - Step 1 described in "Deleting for Windows version MSCS/WSFC"

6. Create the cluster environment of the target transaction.

   For details on how to create, refer to "Customization of Managed Server transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

   Note

   - For the -n option of the cluster setup command, specify the name of the new logical node.

   - Do not perform the following step in the *ETERNUS SF Cluster Environment Setup Guide*.

      - Step 31 in "Customization Procedure" on "Customization for Windows version MSCS/WSFC"

7. Start the target transaction.
   For details on how to start it up, refer to the relevant cluster software manual.

8. Restore the following AdvancedCopy Manager data.

   - Pre-processing/post-processing scripts
     Restore the pre-processing and post-processing scripts for backup management and replication management.

   - 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 "11.1.2.1 Preliminaries".

9. Change the server name.

   Perform the procedure described in "11.5.7.4 Changing the server name of Management Server transaction or Managed Server transaction".

10. To use the backup management or replication management function, rebuild the backup management or replication management environment. (For backup management, perform the "3.4.5 Configuring the environment for a backup operation server" task and subsequent tasks. For replication management, perform the "7.4.5 Configuring the source volume and replica volume" task and subsequent tasks.)

11. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute stgmgrinfoset (Management information package backup server registration/deletion command) to register as its server.

11.5.7.7 Changing the transaction name

Change the name of a Managed Server transaction by performing the following steps:

1. Check whether the target Managed Server transaction is operating.
   If the transaction is not operating, start the Managed Server transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

2. Save the following AdvancedCopy Manager data.

 - AdvancedCopy Manager management file

   On the node operating the transaction, save *<shared disk>*:\etc\opt\swstorage\etc\swnode.ini.

 - Backup management list
   Make a backup of the backup management list.
   For details about how to do this, refer to "11.1.1.1.1 Backing up a backup management list and recovery control file".

 - Pre-processing/post-processing scripts
   Save the pre-processing and post-processing scripts for backup management and replication management.

 - 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 a "package-backup-of-the-management-information execution server" 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 "11.1.2.1 Preliminaries".

3. 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 "Deletion of Cluster Environment for Managed Server Transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

Do not perform the following step of "Deletion of Cluster Environment for Managed Server Transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

 - Step 1 described in "Deleting for Windows version MSCS/WSFC"

5. On the clustered system, change the cluster group name (MSCS/WSFC).
   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 "Customization of Managed Server transaction" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

 - Do not perform the following step in the *ETERNUS SF Cluster Environment Setup Guide*.

   - Step 31 in "Customization Procedure" on "Customization for Windows version MSCS/WSFC"

 - Do not change any information other than the transaction name 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 following AdvancedCopy Manager data.

   - AdvancedCopy Manager management file

     On the node operating the transaction, restore <*shared disk*>:\etc\opt\swstorage\etc\swnode.ini.

   - Backup management list
     Restore the backup management list.
     For details about how to do this, refer to "11.1.1.1.2 Restoring a backup management list and recovery control file".

   - Pre-processing/post-processing scripts
     Restore the pre-processing and post-processing scripts for backup management and replication management.

   - When using the replication management function, restore the environment by using swsrprecoverres (Resource adjustment command) with the -r option.

   - Lock operation specification file
     If lock operation specification files were saved in step 2, 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 "11.1.2.1 Preliminaries".

9. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute stgmgrinfoset (Management information package backup server registration/deletion command) to register as its server.

11.5.7.8 Changing a shared disk for shared data

Change a shared disk that is used for Managed Server transaction by performing the following steps:

1. Check whether the target Managed Server transaction is operating.
   If the transaction is not operating, start the Managed Server transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

2. Save the following AdvancedCopy Manager data.

   - AdvancedCopy Manager management file

     On the node operating the transaction, save <*shared disk*>:\etc\opt\swstorage\etc\swnode.ini.

   - Backup management list
     Make a backup of the backup management list.
     For details about how to do this, refer to "11.1.1.1.1 Backing up a backup management list and recovery control file".

   - Pre-processing/post-processing scripts
     Save the pre-processing and post-processing scripts for backup management and replication management.

   - 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

   For a "package-backup-of-the-management-information execution server" 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 "11.1.2.1 Preliminaries".

3. 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 "Deletion of Cluster Environment for Managed Server Transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

   ### 📑 Note

   Do not perform the following step of "Deletion of Cluster Environment for Managed Server Transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

   - Step 1 described in "Deleting for Windows version MSCS/WSFC"

   ....

5. Create the cluster environment of the target transaction.

   For details about how to do this, refer to "Customization of Managed Server transactions" in the *ETERNUS SF Cluster Environment Setup Guide*.

   ### 📑 Note

   - Change the configuration of a shared disk in the clustered system.

   - Do not perform the following step in the *ETERNUS SF Cluster Environment Setup Guide*.

     - Step 31 in "Customization Procedure" on "Customization for Windows version MSCS/WSFC"

   ....

6. Start the target transaction.
   For details about how to start it up, refer to the relevant cluster software manual.

7. Restore the following AdvancedCopy Manager data.

   - AdvancedCopy Manager management file

     On the node operating the transaction, restore <*shared disk*>:\etc\opt\swstorage\etc\swnode.ini.

   - Backup management list
     Restore the backup management list.
     For details about how to do this, refer to "11.1.1.1.2 Restoring a backup management list and recovery control file".

   - Pre-processing/post-processing scripts
     Restore the pre-processing and post-processing scripts for backup management and replication management.

   - When using the replication management function, restore the environment by using swsrprecoverres (Resource adjustment command) with the -r option.

   - Lock operation specification file
     If lock operation specification files were saved in step 2, 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 "11.1.2.1 Preliminaries".

8. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute stgmgrinfoset (Management information package backup server registration/deletion command) to register as its server.

11.5.8 Operation on Model upgrade for ETERNUS Disk storage system

Perform the procedure of "Operation on Model upgrade for ETERNUS Disk storage system" in the *ETERNUS SF Web Console Guide*.

11.5.9 Changing operating environment using the Web Console

The following is a description of the procedure to change the operating environment when operating AdvancedCopy Manager by the use of the Web Console:

This procedure applies to the following cases:

- The replication management function is in use, and

- The IP address or server name of the Managed Server in normal operating environment (non-cluster environment) is to be changed.

1. If replication management function was used at the target Managed Server to define it as a copy source or copy destination volume, delete the copy source or copy destination volume settings by referring to "7.6.2 Deleting a source volume or replica volume".

P Point
....
When deleting only the settings while maintaining copy sessions, use the emergency operation mode to delete the replication volume. For the emergency operation mode, refer to "12.4.1.3 swsrpdelvol (Replication volume information deletion command)".
....

2. Refer to "Delete the server" in the *ETERNUS SF Web Console Guide* to delete the server.

Note
....
When deleting from the Web Console, do not delete the access path. (Select "No" for "Delete Access Path" in "Access Path Elimination Mode".)
....

3. On the target Managed Server, stop the services of AdvancedCopy Manager. For information on stopping services, refer to "Chapter 2 Starting and Stopping Services".

4. On the target Managed Server, change the system IP address or server name.

5. On the target Managed Server, start the services of AdvancedCopy Manager. For information on this, refer to "Chapter 2 Starting and Stopping Services".

6. Refer to "Register the server" in the *ETERNUS SF Web Console Guide* to register the server with the changed IP address or server name.

Note
....
When registering on the Web Console, select "Yes" for "Use AdvancedCopy Manager".
....

7. When adding HBA from the Web Console, refer to "Add the HBA" in the *ETERNUS SF Web Console Guide* to add the HBA.

8. If the replication management function is used, reconstruct the replication management environment (perform the "7.4.4 Fetching device information on a Managed Server" task and subsequent tasks).

9. Refer to "Reload the server configuration information" in the *ETERNUS SF Web Console Guide* to reload the server configuration information.

11.6 Action when Managed Server information cannot be deleted

If it becomes necessary to delete Managed Server information under the circumstances specified below, this section provides a way to delete the Managed Server information forcibly from the Management Server.

- The operating system on the Managed Server cannot be started because of a hardware failure or another similar reason. From that point, the server will not be used for operations.

- The Managed Server has been physically removed without performing the Managed Server deletion procedure ("3.6.4 Deleting the Managed Server").

- The Managed Server is managed by AdvancedCopy Manager and has been physically removed without being deleted in AdvancedCopy Manager.

For cases other than these, refer to "3.6.4 Deleting the Managed Server" to delete the Managed Server.

Note

- When this procedure is performed, the specified Managed Server is forcibly deleted regardless of the backup or replication status. Therefore, this procedure should be used only for Managed Server that are not planned to be used afterwards.

- Please do not execute a backup or replication while this procedure is performed.

- The components and management information of AdvancedCopy Manager on the forcibly deleted Managed Server are not deleted. When the forcibly deleted server is to be used again, uninstall the AdvancedCopy Manager from the deleted server before it is reconnected to the network. If its server is reconnected to the networks without uninstalling first AdvancedCopy Manager, the AdvancedCopy Manager functions of other servers on the network may not work correctly.

The procedure to delete forcibly a Managed Server is described below:
Confirm that the Managed Server will not be used afterwards or that it will be removed before starting the procedure.

1. Check the status of AdvancedCopy Manager on the Managed Server to be deleted forcibly.
   If AdvancedCopy Manager is operable, use the normal deletion procedure for deleting the Managed Server instead of the forcible deletion procedure. For details of the normal deletion procedure, refer to "3.6.4 Deleting the Managed Server".

   How to check the status of Managed Server

   On the Management Server, execute stgxfwcmsetdev (Device information collection/reflection command) with -n option. Specify the target Managed Server with an operand of -n option.
   After executing the command, check the status of Managed Server as follows.
   Go to step 2, only when the Managed Server cannot be started.

   - When the Managed Server cannot be started:

     The following message is displayed:
     "swstf5405 The acquisition of device information caused a failure.
     Reason=swstf2111 Connection to Storage Server failed."

   - When the Managed Server can be started:

     The following message is displayed:
     "swstf5408 There is no change in information currently being managed."
     Alternatively the command may be waiting for input of the device information confirmation. If the command is waiting for input, enter 'q' or 'n' to prevent updating the device information and end the stgxfwcmsetdev command execution.

2. Stop the Advanced Copy sessions.
   Even if the Managed Server information has been deleted, the Advanced Copy sessions for the connected disks (Logical Units) may not be stopped.
   For the unnecessary Advanced Copy sessions, stop its sessions by using ETERNUS Web GUI.

3. Back up the database.
   For the procedures, refer to "11.2.1.1 Database backup".

4. Delete the Managed Server information forcibly.
   Execute stgforcedelsrv (Managed Server forcibly deletion command).

Note

If the stgforcedevsrv command terminated abnormally, please do not proceed from step 5 onwards.
If the steps after step 5 are executed an incorrect database is restored and normal system operation may not be performed adequately afterwards.

5. Restore the database.
   Restore the database from the directory that the database is stored. Its directory must be a directory of "after-dir" specified with -a

option in stgforcedelsrv (Managed Server forcibly deletion command) at step 4. For the procedures, refer to "11.2.1.2 Database restoration".

6. Perform the following operation according to the status of the forcibly deleted Managed Server.

    - If a replication operation has been done:

        - If the forcibly deleted Managed Server was part of a server-to-server replication:

          On the Management Server, execute swsrprecoverres (Resource adjustment command) with the -h and -r options. For the operand of -h option, specify the name of the server used for the replication with the forcibly deleted Managed Server. If several servers where used for replication, the swsrprecoverres command has to be executed for each of those servers.

        - If the forcibly deleted Managed Server was not part of a server-to-server replication:

          No operation is required.

    - If a backup operation has been done:

      No operation is required.

7. Take the following actions to reflect to the Web Console depending on how the agent installed in the forcibly deleted Managed Server is used:

    - If both of AdvancedCopy Manager's agent and Storage Cruiser's agent are used:

      On the Web Console, execute [Reload Conf.] to update to the latest information.

    - If only AdvancedCopy Manager's agent is used:

      On the Web Console, delete the Managed Server that you have deleted.

11.7 Maintaining a database of ETERNUS SF Manager

This section explains the maintenance for database of ETERNUS SF Manager.

11.7.1 Saving a Storage Cruiser's manager environment

To save a Storage Cruiser's manager environment, refer to "Backup of Manager" in the *ETERNUS SF Storage Cruiser Operation Guide*.

11.7.2 Maintaining a common control repository

This section explains the maintenance of common control repository.

11.7.2.1 Backup of common control repository

Save the common control repository.

📖 Information
. . . .
About the notation in procedure

Directory name	Explanation
$BAK_DIR	Backup destination directory.
$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

. . . .

1. Stop the ETERNUS SF Express Tomcat service.

   Open Service Control Manager to stop the following service.

    - ETERNUS SF Manager Tomcat Service

2. Create a backup data.

   1. Using Explorer, create the following backup directories:

      - $BAK_DIR\Common

   2. Execute the following command to create a backup data with OS Administrator privilege.

      If you did not change the port number, specify 15432 for <*port number*>. If you did change the port number, specify the changed port number for <*port number*>.
      The file name of the created backup data is <*file_name*>.

      ```
      $INS_DIR\Common\sys\postgres\bin\pg_dump -U esfpostgres -C --attribute-inserts -p <port
      number> -f $BAK_DIR\Common\<file_name> esfdb
      ```

   3. The prompt is displayed, and waiting for input. Input the following strings.

      ```
      master01!
      ```

3. Start the ETERNUS SF Express Tomcat service.

   Open Service Control Manager to start the following service.

   - ETERNUS SF Manager Tomcat Service

11.7.2.2 Restore of common control repository

Restore the common control repository.

📘 **Information**

. . . .

About the notation in procedure

Directory name	Explanation
$BAK_DIR	Backup destination directory.
$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

. . . .

1. Stop the ETERNUS SF Express Tomcat service.

   Open Service Control Manager to stop the following service.

   - ETERNUS SF Manager Tomcat Service

2. Restore a backup data. The following procedure must be implemented by a user with administrator privileges for the operating system.

   1. Execute the following command.

      If you did not change the port number, specify 15432 for <*port number*>. If you did change the port number, specify the changed port number for <*port number*>.

      ```
      $INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p <port number> postgres
      ```

   2. The prompt is displayed, and waiting for input. Input the following strings in order.

      ```
      master01!
      drop database esfdb;
      \q
      ```

   3. Execute the following command to restore the backup data.
      If you did not change the port number, specify 15432 for <*port number*>. If you did change the port number, specify the

changed port number for <*port number*>.

The <*file_name*> is the file name specified when the backup data was created.

```
$INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p <port number> -f $BAK_DIR\Common
\<file_name> postgres
```

4. The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

3. Start the ETERNUS SF Express Tomcat service.

Open Service Control Manager to start the following service.

- ETERNUS SF Manager Tomcat Service

📗 Note

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After restoring the shared control repository, it takes approximately 2 minutes before the Web Console becomes available.

. . . .

11.7.3 Maintaining a license management database

This section explains the maintenance of license management database.

11.7.3.1 Backup of license management database

Save the license management database.

📘 Information

. . . .

About the notation in procedure

Directory name	Explanation
$BAK_DIR	Backup destination directory.
$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

. . . .

1. Using Explorer, create the following backup directories:

- $BAK_DIR\LM

2. Execute the following command to create a backup data with OS Administrator privilege.
The file name of the created backup data is <*file_name*>.

```
$INS_DIR\LM\bin\esflm backup $BAK_DIR\LM\<file_name>
```

11.7.3.2 Restore of license management database

Restore the license management database.

📘 Information

. . . .

About the notation in procedure

Directory name	Explanation
$BAK_DIR	Backup destination directory.
$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

Execute the following command with administrator privileges for the operating system.

The <*file_name*> is the file name specified when the backup data was created.

```
$INS_DIR\LM\bin\esflm restore $BAK_DIR\LM\<file_name>
```

11.7.4 Saving an AdvancedCopy Manager CCM environment settings files

If AdvancedCopy Manager CCM is used by the server where ETERNUS SF Manager is installed, save an AdvancedCopy Manager CCM environment settings files.

For details, refer to "How to back up environment settings files" in the *ETERNUS SF Operation Guide for Copy Control Module*.

If AdvancedCopy Manager CCM environment settings files are already saved, it is unnecessary to perform this task.

Chapter 12 Commands

This chapter describes using commands.

The path name of all the commands provided in this chapter is explained by using the default directory on the system where the software has been installed.

12.1 Command list

The commands are classified as follows:

Backup management commands

Environment definition commands

Table 12.1 List of environment definition commands for backup management

Function	Command name	Explanation
Managed Server configuration information setting command	swstsvrset	Sets the configuration information of a Managed Server.
Managed Server configuration information display command	swstsvrdisp	Displays the configuration information of a Managed 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 12.2 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 backup history.

Function	Command name	Explanation
History information deletion command	swsthistdel	Deletes the backup history.
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 volume information locked by AdvancedCopy Manager.
Tracking cancel command	swstcanceltrk	Stops tracking processing.
Tracking execution status display command	swsttrkstat	Displays the status of tracking processing.

Maintenance commands

Table 12.3 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 12.4 List of configuration management commands

Function	Command name	Explanation
Management Server information change command	stgcmmodnode	Changes the server information of the 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 AdvancedCopy Manager's manager
Server information addition command	stgxfwcmaddsrv	Adds information for a Managed 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

Function	Command name	Explanation
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	Backs up Managed Server and Management Server management information
Management information batch backup status display command	stgmgrinfodisp	Displays the execution status of the management information batch backup command
Information collection mode setup command	stgxfwcmsetmode	Sets the information collection mode. This command is executed from the Managed Server.
Backup data expansion command	stgarcext	Expands the Windows AdvancedCopy Manager Management Server and Managed Server backup data that was collected by the management information batch backup command
Repository update area busy rate command	stgdbloginf	Checks the busy rate at the area required when a repository is updated
Database save command	stgdbdmp	Saves the database to the specified directory
Repository data migration command	stgrepocnv	Recovers the targeted repository data in a new version repository
Managed Server forcibly deletion command	stgforcedelsrv	Forcibly deletes the information of a Managed Server

Replication management commands

Environment definition commands

Table 12.5 List of environment definition commands for replication management

Function	Command name	Explanation
Replication volume information setting command	swsrpsetvol	Sets the information for a replication volume.
Replication volume information display command	swsrpvolinfo	Displays the information for a replication volume.

Function	Command name	Explanation
Replication volume information deletion command	swsrpdelvol	Deletes replication volume information that has been set.
REC buffer information display command	swsrprecbuffstat	Displays information for the REC buffer.
REC buffer settings change command	swsrprecbuffset	Changes the settings for the REC buffer.

Operation commands

Table 12.6 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 which is in suspended status.

Maintenance commands

Table 12.7 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 associated commands

Table 12.8 List of Exchange Server associated commands

Function	Command name	Explanation
Exchange database information registration command	swsrpdbinfo_ex2k3 / swsrpdbinfo_exchange	Registers or deletes storage group information or database information
Exchange device information display command	swsrpdevdisp_ex2k3 / swsrpdevdisp_exchange	Displays information registered on swsrpdbinfo_ex2k3/ swsrpdbinfo_exchange (Exchange database information registration command)
Exchange VSS synchronous processing command	swsrpvsssync_exchange	Performs synchronous processing operations for storage groups
Exchange VSS backup execution command	swsrpvssbackup_exchange	In conjunction with VSS, performs online backup of storage groups or databases
Exchange VSS restore executioncommand	swsrpvssrestore_exchange	In conjunction with VSS, restores storage groups or databases

Function	Command name	Explanation
Exchange VSS shadow copy management command	swsrpshadowadm_exchange	Manages shadow copy of storage groups or databases
Exchange operation status display command	swsrpstat_exchange	Displays the restoration execution status of a specified storage group or databases
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 associated commands

Backup management function commands

Table 12.9 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 12.10 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

Symfoware cooperation command

Table 12.11 List of Symfoware cooperation commands used for Symfoware backup server operation

Function	Command name	Explanation
Symfoware database information register/delete/display command	swsrpdbinfo_symfoware	Registers, deletes and displays Symfoware database information.
Symfoware backup execution command	swsrpbackup_symfoware	Executes online backup of database space cooperating with Symfoware.

Function	Command name	Explanation
Symfoware recovery execution command	swsrprestore_symfoware	Recovers database space cooperating with Symfoware.
Symfoware backup history delete/display command	swsrphistory_symfoware	Displays and deletes Symfoware backup history.

Hyper-V commands

Table 12.12 Hyper-V command list

Function	Command name	Explanation
Component set create command	swsrpvrq componentset create	Creates component sets
Component set info command	swsrpvrq componentset info	Displays information on component sets
Component set remove command	swsrpvrq componentset remove	Removes component sets
Component add command	swsrpvrq component add	Adds Guest OSes to component sets
Component remove command	swsrpvrq component remove	Removes Guest OSes from component sets
Hyper-V backup command	swsrpvrq shadow backup-hyperv	Backs up Hyper-V Guest OSes
Hyper-V restore command	swsrpvrq shadow restore-hyperv	Restores Hyper-V Guest OSes
Shadow copy query command	swsrpvrq shadow query	Displays shadow copy status
Shadow copy delete command	swsrpvrq shadow delete	Deletes shadow copies
Advanced Copy query command	swsrpvrq advcopy query	Displays Advanced Copy status
Advanced Copy stop command	swsrpvrq advcopy stop	Stops Advanced Copy

SnapOPC/SnapOPC+ support commands

Table 12.13 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 12.14 List of Troubleshooting data collection commands

Function	Command name	Explanation
AdvancedCopy Manager's manager troubleshooting data collection command	esfsnap	This command collects troubleshooting data for AdvancedCopy Manager's manager.

Function	Command name	Explanation
AdvancedCopy Manager's agent troubleshooting data collection command	acmcapture	This command collects troubleshooting data for AdvancedCopy Manager's agent.

12.2 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.

- 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 12.15 Operating environment for executing backup management commands

Command	Operating environment of AdvancedCopy Manager
swstbackstat	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations: - -h option specified - No device name specified
swstbackup	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows and is in EC operation, Windows services required by the Managed Server must be running.
swstbkpoldel	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstbkpoldisp	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations: - -h option specified - No device name specified
swstbkpolset	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.

Command	Operating environment of AdvancedCopy Manager
swstcancelrest	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstcancelsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
	When the Managed Server runs on Windows and is in EC operation, Windows services required by the Managed Server must be running.
swstcanceltrk	When this command is executed with the -h option specified on the Management Server, tservices must be active.
swstdevdisp	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option specified
	- No device name specified
	To execute this command with the -o option specified, the daemons and services of the Management Server must be operating.
swstdevinfoset	To execute this command on a Managed Server, Windows services required by the Management Server must be running.
	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstexecstat	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option specified
	- No device name specified
swsthistdel	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsthistdisp	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option specified
	- No device name specified
swstresback	-
swstresrst	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
	When the Managed Server runs on Windows, Windows services required by the Managed Server must be running.
	To execute this command with the -x option specified, Windows services required by the Management Server must be running.
swstrestore	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstreststat	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option specified
	- No device name specified

Command	Operating environment of AdvancedCopy Manager
swstsrsemtch	Windows services required by the Management Server must be running.
	To execute this command on a Management Server with the -h option specified, Windows services required by the target Managed Server must be running.
	When the Managed Server runs on Windows, Windows services required by the Managed Server must be running.
swststartsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
	When the Managed Server runs on Windows, Windows services required by the Managed Server must be running.
swstsvrdisp	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstsvrset	To execute this command on a Managed Server, Windows services required by the Management Server must be running.
	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swstsyncstat	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option specified
	- No device name specified
swsttrkstat	Windows services required by the Management Server and target Managed Server must be running in order to execute this command on a Management Server with either of the following parameter designations:
	- -h option is specified
	- No device name is specified
swstvolunlock	Windows services required by the Management Server must be running.
swstvollockstat	Windows services required by the 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 12.16 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstsvrset	Required	Transaction operation node	-
swstsvrdisp	Required	Transaction operation node	-

Command	Environment variable	Command execution node	Remarks
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	-
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 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 12.17 Display contents of the display-type commands in Management Server

-h option	Device name specified	Display contents
Does not exist	No	Displays all Managed Server information registered using the Backup management functionality. If an error occurs on any of the Managed Servers during display processing, the processing will be terminated.
	Yes	Displays only the specified Management Server device information.
Exists	No	Displays all Managed Server information specified using the -h option.

-h option	Device name specified	Display contents
	Yes	Displays only the specified device information for the Managed Server specified using the -h option.

12.2.1 Environment definition commands

This section describes the environment definition commands for backup management.

12.2.1.1 swstsvrset (Managed Server configuration information setting command)

NAME

swstsvrset - sets configuration information of a Managed Server

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swstsvrset [-c RecCtrlFile-Directory] [-w Work-Directory]
```

To be executed on the Management Server

```
<program-directory>\bin\swstsvrset [-h Server-Name] [-c RecCtrlFile-Directory] [-w Work-Directory]
```

DESCRIPTION

This command sets configuration information of a Managed Server. Execution of this command declares that the Managed Server on which the command is executed is a server that performs backup operations.

For backup and recovery of Symfoware databases, register the storage location of the recovery control file created during backup (target directory for output of the recovery control file) as well as the working directory that is used for the recovery of the databases during restore.

For modifying the target directory for output of the recovery control file or the working directory, specify the directory name to be changed and run the command again.

After modifying the target directory for output of the recovery control file, transfer the recovery control file from the previous directory to the new one. If the transfer fails due to insufficient space, the target directory for output of the recovery control file will not be changed. In that case, the recovery control file will be kept in the directory where it was before the modification.

OPTIONS

-h *Server-Name*

Specifies the name of a Managed Server to be subject to the backup operation.
This option can be specified only on a Management Server.
If this option is omitted, the Managed Server on which the command is entered will be subject to the processing.

-c *RecCtrlFile-Directory*

Specifies the name of the target directory for output of the recovery control file. As the output target, specify an empty directory.
If this option is omitted at the time of first registration, the following directories will be used.

Non-cluster operation: <*Environment directory*>\etc\SymfoWARE\Recovery
Cluster operation: <*Environment directory for logical node*>\etc\SymfoWARE\Recovery

If this option is omitted during an update, the previously set values will be carried over.

Do not use this option when Symfoware is not installed.

-w *Work-Directory*

Specifies the name of the working directory.

If this option is omitted at the time of first registration, the following directories will be used.

Non-cluster operation: <*Environment directory*>\var\SymfoWARE

Cluster operation: <*Environment directory for logical node*>\var\SymfoWARE

If this option is omitted during an update, the previously set values will be carried over.

Do not use this option when Symfoware is not installed.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Set the configuration information of a Managed Server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrset
swstsvrset completed
C:\>
```

- Set the configuration information for the Managed Server on which Symfoware is installed:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrset -c C: \Win32app\AdvancedCopyManager\etc
\SymfoWARE -w C: \Win32app\AdvancedCopyManager\etc\SymfoWARE
swstsvrset completed
C:\>
```

- Set the configuration information of a Managed Server named job1 from a Management Server:

```
C:\>C:\ETERNUS_SF\ACM\bin\swstsvrset -h job1
swstsvrset completed
C:\>
```

NOTES

- In cluster operation, as the target directory for output of the recovery control file specified by the -c option, you must specify a directory that is located on a shared disk.

- The configuration information for the Managed Server cannot be set if:

  - The -w or the -c option was specified although Symfoware is not installed.

  - The directory specified in the -w option does not exist.

  - The directory specified in the -c option does not exist.

  - The directory name specified in the -w or -c option contains double-byte characters (as used in Asian languages).

- This command can only be executed if none of the following commands are running:

  - swstsvrset (Managed 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)

12.2.1.2 swstsvrdisp (Managed Server configuration information display command)

NAME

swstsvrdisp - displays configuration information of a Managed Server

SYNOPSIS

To be executed on the Managed Server

    <program-directory>\bin\swstsvrdisp

To be executed on the Management Server

    <program-directory>\bin\swstsvrdisp [-h Server-Name]

DESCRIPTION

This command displays configuration information of a Managed Server that has been set using swstsvrset (Managed Server configuration information setting command).

The following information will be displayed:

Title	Description
Storage-Server	Displays a Managed Server name.
RecCtrlFile-Dir	Displays the name of the target directory for output of the recovery control file.
Work-Dir	Displays the name of the working directory.

OPTIONS

-h Server-Name

Specifies a Managed Server name.
This option can be specified only on a Management Server.

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Display configuration information of a Managed Server named Work1:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrdisp
Storage-Server  = Work1
C:\>
```

- Display the configuration information for the Managed Server named Work2 on which Symfoware is installed:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrdisp
Storage-Server  = Work2
RecCtrlFile-Dir = C:\Win32app\AdvancedCopyManager\etc\SymfoWARE\Recovery\
Work-Dir        = C:\Win32app\AdvancedCopyManager\var\SymfoWARE\
C:\>
```

NOTES

- The directory name for outputting recovery control file and the working directory name are displayed only when Symfoware is already installed.

12.2.1.3 swstdevinfoset (Device information setting command)

NAME

swstdevinfoset - sets the device information

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swstdevinfoset -t | -b | -o Device-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swstdevinfoset [-h Server-Name] -t | -b | -o Device-Name
```

DESCRIPTION

Set a volume that has been allocated to the ETERNUS Disk 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)

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 file system can be used is NTFS and ReFS.

You may want to change information (partition size, drive letter, and ETERNUS Disk storage system box 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 ETERNUS Web GUI provided by the ETERNUS Disk 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 Managed Server on Windows, use the "getting and reflecting information of all devices" option on the Web Console 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 "3.2.2 Selecting a backup source" for information on a transaction volume, and "3.2.4 Preparing a backup volume" for information on a backup volume.

If you want to perform the backup operation for Symfoware, refer to "4.1.2.3 Selecting a backup source" for information on a transaction volume, and "4.1.2.5 Preparing a backup volume" for information on a backup volume.

OPTIONS

-h *Server-Name*

> Specifies a Managed Server name.
> This option can be specified only on a 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 box 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 to be set up contains a Symfoware database space in its configuration.

    - The device is an FT drive.

    - The device is a dynamic volume.

    - The device is a Logical Unit (disk).

    - The file system is FAT or FAT 32.

    - The license for the ETERNUS Disk storage system that contains the specified transaction volume is one of the following:

        - The license is not registered in the license management function.

        - The license is expired.

- A device cannot be registered as a backup volume if:

    - Another device with the same box 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 an FT drive.

    - The device is a dynamic volume.

    - The device is a Logical Unit (disk).

    - The device is an SDX object.

    - The file system is FAT or FAT 32.

- You must delete related backup history information before:

    - Changing a backup volume to a transaction volume

    - Cancelling 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

    - Cancelling 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 cancelled 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 (Managed 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)

12.2.1.4 swstdevdisp (Device usage status display command)

NAME

swstdevdisp - displays the device information

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swstdevdisp [-t] [-b [-u]] [-o] [Device-Name]
```

To be executed on the 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 Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
Size	Displays the size of a partition allocated to a device.
Device-Mode	Displays a character string by which a device can be identified:

Title	Description
	"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 option 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. If the device is a transaction volume used for Symfoware, the names of Symfoware database spaces and log groups as well as the RDB system names are displayed, followed by "SymfoWARE" in parentheses.
Backup-Engine	Displays the operation type: "AdvancedCopy" : Backup operation using AdvancedCopy Manager

- For transaction volumes used for Symfoware, the display in the "Mount-Point (Method)" column has the following format:

```
DB-Name  DBS-Name  /  LogGroup  /  RDB-Name  (SymfoWARE)
(1)      (2)          (3)          (4)        (5)


(1) Displays the database name.
(2) Displays the database space name.
(3) Displays the log group name.
(4) Displays the RDB system name. If there is no RDB system name, the display shows "-".
(5) Displays that the volume is a Symfoware volume.
```

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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** column.

-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  g1d1p1  1.0 Gbyte  Transaction   E: (NTFS)              AdvancedCopy
Work2  g1d1p3  1.0 Gbyte  Transaction   DB1.DBS6/LOG01/RDB01 (SymfoWARE) AdvancedCopy
Work2  g1d1p4  1.0 Gbyte  Transaction   DB1.DBS2/LOG02/RDB01 (SymfoWARE) 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:\>
```

12.2.1.5 swstbkpolset (Backup policy setting command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

Setting a backup policy by specifying the transaction volume

To be executed on the Managed Server

<program-directory>\bin\swstbkpolset [-i *Interval-Days*] [-s *Save-Number*] [*Device-Name*]

To be executed on the Management Server

<program-directory>\bin\swstbkpolset [-h *Server-Name*] [-i *Interval-Days*] [-s *Save-Number*] [*Device-Name*]

Setting a backup policy by specifying a log group

To be executed on the Managed Server

<program-directory>\bin\swstbkpolset -n [-i *Interval-Days*] [-s *Save-Number*] *Log-Group-Name*[*/RDB-Name*]

To be executed on the Management Server

<program-directory>\bin\swstbkpolset -n [-h *Server-Name*][-i *Interval-Days*][-s *Save-Number*] *Log-Group-Name*[*/RDB-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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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.

-n

Specifies that the setting is being made for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\>
```

- To set a backup policy with 3 backup generations for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpolset -n -s 3 LOG01/RDB1
g1d1p2 swstbkpolset completed
g1d1p1 swstbkpolset completed
  :
LOG01/RDB1 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 "3.2.4 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.

    - You have specified individual transaction volumes that are included in a log group.

    - The replication management function is executing a process for 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 (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.1.6 swstbkpoldisp (Backup policy display command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

Displaying a backup policy by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstbkpoldisp [Device-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbkpoldisp [-h Server-Name] [Device-Name]
```

Displaying a backup policy by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstbkpoldisp -n Log-Group-Name[/RDB-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbkpoldisp -n [-h Server-Name] Log-Group-Name[/RDB-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 Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
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. If the device is a transaction volume used for Symfoware, the names of Symfoware database spaces and log groups as well as the RDB system names are displayed, followed by "SymfoWARE" in parentheses.

- For transaction volumes used for Symfoware, the display in the "Mount-Point (Method)" column has the following format:

```
DB-Name  DBS-Name  /  LogGroup  /  RDB-Name  (SymfoWARE)
(1)      (2)          (3)          (4)          (5)


(1) Displays the database name.
(2) Displays the database space name.
(3) Displays the log group name.
(4) Displays the RDB system name. If there is no RDB system name, the display shows "-".
(5) Displays that the volume is a Symfoware volume.
```

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-n

Specifies that the item being displayed is a log group.
In the operand, specify the log group name and the RDB system name.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\>
```

- Display the backup policy for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpoldisp -n LOG01/RDB1
Server Device    Interval-Days  Save-Number Mount-Point (Method)
Svr02 g1d1p2     30             2           DB1.DBS6/LOG01/RDB1 (SymfoWARE)
Svr02 g1d1p1     30             2           DB2.DBS2/LOG01/RDB1 (SymfoWARE)
   :
C:\>
```

12.2.1.7 swstbkpoldel (Backup policy deletion command)

NAME

swstbkpoldel - deletes the backup policy

SYNOPSIS

Deleting a backup policy by specifying the transaction volume

To be executed on the Managed Server

> *<program-directory>*\bin\swstbkpoldel *Device-Name*

To be executed on the Management Server

> *<program-directory>*\bin\swstbkpoldel [-h *Server-Name*] *Device-Name*

Deleting a backup policy by specifying a log group

To be executed on the Managed Server

> *<program-directory>*\bin\swstbkpoldel -n *Log-Group-Name*[/*RDB-Name*]

To be executed on the Management Server

> *<program-directory>*\bin\swstbkpoldel -n [-h *Server-Name*] *Log-Group-Name*[/*RDB-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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-n

Specifies that deletion is going to be made for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\>
```

- To delete the backup policy for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbkpoldel -n LOG01/RDB1
g1d1p2 swstbkpoldel completed
g1d1p1 swstbkpoldel completed
    :
LOG01/RDB1 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 management function is executing a process for the target transaction volume.

- This command can only be executed while none of the following commands are running:

    - swstsvrset (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.2 Operation commands

This section describes operation commands for backup management.

12.2.2.1 swstbackup (Backup execution command)

NAME

swstbackup - backup

SYNOPSIS

Executing a backup by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstbackup [-suspend|-T] [-k] Device-Name [-Xdevmap Device-Map-File] [-
Xflush]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbackup [-h Server-Name] [-suspend|-T] [-k] Device-Name [-Xdevmap
Device-Map-File] [-Xflush]
```

Executing a backup by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstbackup -n [-suspend|-T] [-k] Log-Group-Name[/RDB-Name] [-Xdevmap
Device-Map-File]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbackup -n [-h Server-Name] [-k] [-suspend|-T] Log-Group-Name[/RDB-
Name] [-Xdevmap Device-Map-File]
```

DESCRIPTION

When using this command, the operation changes according to different states of the Advanced Copy that is being executed.

- When synchronous processing (EC) is not performed
  Snapshot processing (OPC) is performed and the processing of information, such as the TimeStamp and backup volume of a copy target, is registered into backup history information.

- When synchronous processing (EC) is performed
  The state of synchronous processing is checked and, in the case of an equivalent maintenance state, backup synchronous processing is suspended. Information such as time and backup volume of a copy target is simultaneously registered into backup history information. A backup of this form is called synchronous high-speed backup. Note that it aborts when an equivalent maintenance state

is not reached. To use the "Chapter 5 Backup Operation using Suspend/Resume Function" for synchronous high-speed backup, execute the backup command with -suspend option 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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-k

Specifies implementation of backup with reference dump.
If you omit this option, backup will be implemented with normal dump.

When you back up with reference dump, you have to execute Symfoware's "rdbrtr" command in order to set inhibition of updates (disable writing of data) for all DSI (function that expresses the storage structures for tables) on the transaction volumes to be backed up. It cannot specify this option for the transaction volumes other than Symfoware.

-n

Specifies that the item being backed up is a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

-Xdevmap *Device-Map-File*

Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a "device map file" in which a combination of a transaction volume and a target backup volume 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 Managed 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. 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.
When this option is omitted, the flushing of file system buffer of the transaction volume and locking of the transaction volume are based on the value of 'BufferFlushOnly' in the transaction volume locking specification file for backups. For details, refer to "A.2.3 Transaction volume locking specification file for backups".
When the Symfoware database space is built on the filesystem, the file system buffer is flushed regardless of the specifying of this option.

-suspend

This results in synchronous high-speed backup using the "Chapter 5 Backup Operation using 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 box when the ETERNUS Disk 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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Back up a transaction volume:

```
C:\>C:\ETERNUS_SF\ACM\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:\>
```

- Back up log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstbackup -n LOG01/RDB1
LOG01/RDB1 swstbackup completed
C:\>
```

NOTES

- When the following settings are being done, this command sets the transaction volume to a state in which it cannot be accessed from processes before a backup is created. Therefore, the command locks the transaction volume.

    - The -Xflush option is not specified, and

    - The value of 'BufferFlushOnly' in the transaction volume locking specification file for backups is 'on'.

  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, use the default setting that the file system buffer is flushed.

- 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 box 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 management function is executing a process for the target transaction volume.

- The replication management function is executing a process for the target backup volume.

- The replication management function is executing a process for 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.

- 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.

- An error was detected during backup of Symfoware database spaces.

- When during backup of transaction volumes with Symfoware's reference dump specified, multi-database spaces are being used.

- 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 "3.4.9.1 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 option 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.

- This command can be executed only while none of the following commands are running:

    - swstsvrset (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.2.2 swstbackstat (Backup execution status display command)

NAME

swstbackstat - displays the completion status of a backup

SYNOPSIS

Displaying the backup execution status by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstbackstat [Device-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbackstat [-h Server-Name] [Device-Name]
```

Displaying the backup execution status by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstbackstat -n Log-Group-Name[/RDB-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstbackstat -n [-h Server-Name] Log-Group-Name[/RDB-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 Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Backup-Disk	Displays a backup volume name. If no backup has been collected, "----" will be displayed.
Status	Displays a backup completion status using one of the following character strings: "----" : No backup has been collected (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 is halt status. "?????" : Failed to get copy status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status column. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-n

Specifies that the item being displayed is a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

OPERANDS

Device-Name

Specifies the "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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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 ETERNUS Web GUI while the snapshot fast backup is in progress. If you do use the OPC stop function of ETERNUS Web GUI, it will display "succeeded" whether or not the backup has actually been successful.

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "11.3 Troubleshooting: Hardware error during backup" for information about this.

12.2.2.3 swstrestore (Restore execution command)

NAME

swstrestore - restore

SYNOPSIS

For restore of a regular transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstrestore [-g Generation-No | -v Version-No] [-r Restore-Device-Name]
Device-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swstrestore [-h Server-Name] [-g Generation-No | -v Version-No][-r
Restore-Device-Name] Device-Name
```

For recover of a Symfoware database space by specifying a transaction volume

To be executed on the Managed Server

`<program-directory>\bin\swstrestore [-g Generation-No | -v Version-No] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] Device-Name`

To be executed on the Management Server

`<program-directory>\bin\swstrestore [-h Server-Name] [-g Generation-No | -v Version-No] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] Device-Name`

For bundle recovery by specifying multiple transaction volumes

To be executed on the Managed Server

`<program-directory>\bin\swstrestore -bundle [-g Generation-No | -v Version-No] [-a | -e EndPoint] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] DeviceListFile`

To be executed on the Management Server

`<program-directory>\bin\swstrestore -bundle [-h Server-Name] [-g Generation-No | -v Version-No] [-a | -e EndPoint] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] DeviceListFile`

For recovery of a Symfoware database space by specifying a log group

To be executed on the Managed Server

`<program-directory>\bin\swstrestore -n [-g Generation-No | -v Version-No] [-a | -e EndPoint] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] Log-Group-Name[/RDB-Name]`

To be executed on the Management Server

`<program-directory>\bin\swstrestore -n [-h Server-Name] [-g Generation-No | -v Version-No] [-a | -e EndPoint] [-l ArchiveLogFileList-FileName] [-w Work-Directory] [-nolog Work-RecCtrlFile-Directory] Log-Group-Name[/RDB-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.

For transaction volumes of Symfoware, restoring to devices other than the original transaction volumes is not available.

During recovery of database spaces, access to the relevant database spaces must not be permitted. In order to prohibit access, execute the "rdbinh" command provided by Symfoware. For details on these commands, refer to the *Symfoware Server RDB Operations Guide*.

If recovery of a database space fails due to insufficient space in the working directory, you can use the -w option to retry recovery temporarily specifying a different directory.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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.

Cannot be specified for a Symfoware transaction volume.

-a

Specifies that the entire database resources managed by a recovery control file shall be recovered up to the point in time of backup collection.
Cannot be specified at the same time as the -e option.
Cannot be specified when recovering individual transaction volumes in a log group.
Cannot be specified for the transaction volumes other than Symfoware.

-e *EndPoint*

Specifies that the entire database resources managed by a recovery control file shall be recovered up to a specific recovery point. For details on recovery points, refer to the Symfoware Server manuals.
Cannot be specified at the same time as the -a option.
Cannot be specified at the same time as the -nolog option.
Cannot be specified when recovering individual transaction volumes in a log group.
Cannot be specified for the transaction volumes other than Symfoware.

-l *ArchiveLogFileList-FileName*

Specifies the absolute path of the file stating the names of the backup locations for the archive logs that are required for recovery of Symfoware.
The file stating the name of the backup locations for the archive logs must be stored on the Managed Server that contains the transaction volumes to be restored.
If you execute this command on a Management Server, the file must be stored on the Managed Server that contains the transaction volumes to be restored.
Cannot be specified at the same time as the -nolog option.
Cannot be specified for the transaction volumes other than Symfoware.

-w *Work-Directory*

Specifies the absolute path to the name of a temporary working directory.
The directory must be located on the Managed Server that contains the transaction volumes to be restored.
If you execute this command on a Management Server, the directory must be located on the Managed Server that contains the transaction volumes to be recovered.
If this option is omitted, the working directory specified in swstsvrset (Managed Server configuration information setting command) will be used.
Cannot be specified for the transaction volumes other than Symfoware.

-n

Specifies that the item being restored is a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

-bundle

Specifies bundle recovery of multiple database spaces.
In the operand, specify the file (DeviceListFile) stating the device names corresponding with the database spaces to be recovered in a batch.

-nolog *Work-RecCtrlFile-Directory*

During recovery of Symfoware, archive logs are not applied.
If you want to specify an output directory for the recovery control files that are required when applying the log, and then apply the log

by Symfoware's "rdbmrrcv" command, you can specify this directory.

If you perform recovery with this option specified, the database will not be available for use until you apply the log with Symfoware's "rdbmrrcv" command.

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 the AdvancedCopy Manager device name corresponding to a transaction volume.

Refer to "1.5 Managing a Device on AdvancedCopy Manager" for the devices to be specified.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").

If there is no RDB system name, you can omit it.

DeviceListFile

Specify the device list file that states the device names corresponding with the database spaces to be recovered in a batch.

If you execute this command on a Management Server, this file must be stored on the Managed Server that contains the transaction volumes to be recovered.

For information on how to describe device list files, refer to "4.1.5.3.1 Describing a device list file".

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:\>
```

- Restore data with relative generation number 2 for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstrestore -n -g 2 LOG01/RDB1
LOG01/RDB1 swstrestore completed
C:\>
```

- If the "Chapter 5 Backup Operation using 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 progress 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 cancelling 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 box information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume to be restored has been changed.

  - The replication management function is executing a process for the target transaction volume.

  - The replication management function is executing a process for 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.

  - Different backup methods (normal dump or reference dump) to recover data exist in the same log group, when you specify a log group or you perform recovery of multiple volumes in a batch.

  - When an SDX object has been specified in a parameter with the -r option.

  - When the -a, -e, -l, -w, -bundle, or -nolog option was specified for setting transaction volumes other than Symfoware.

  - When a directory name specified in the -w, -l, -bundle, or -nolog option contains double-byte characters (as used in Asian languages).

  - An error was detected when during recovery of Symfoware.

  - When the file stating the names of the archive log backup files contains an archive log backup file that is backed up on an MT (tape device).

- 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).

- When the archive log files are stored on a different device at the time of recovering database spaces, the file which states the names of the backup locations for the archive logs and is required for recovery, must be stored beforehand on the Managed Server that contains the transaction volumes to be recovered. For information on how to describe this file, refer to the *Symfoware Server RDB Operations Guide*.

- Recovery cannot be performed if the specified "file that includes the name of the archive log's backup location" contains an archive log backup file that is backed up on an MT (tape device). For recovery using an archive log that is backed up on an MT, use one of the following methods:

  - Deploy all backed up archive logs from the MT to the working directory.

  - Perform recovery without applying the log by specifying the -nolog option, and apply the archive log afterwards.

    In order to apply the archive log after recovery without the log, execute the Symfoware's "rdbmrrcv" command. For details on applying archive logs, refer to the *Symfoware Server RDB Operations Guide*.

- If you perform "recovery of a specific point in time by specifying the end point of recovery" or "recovery of the point in time of backup" during recovery of database spaces, processing to restore Symfoware's management information will also be implemented. Since this processing is implemented as a portion of recovery processing, it takes time for commands to be processed.

- This command can only be executed while none of the following commands are running:

  - swstsvrset (Managed Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

- For recovering the database space, simultaneously issuing this command two or more times will result in some of the commands terminating abnormally when they meet the following requirements. The order of command execution is dependent on the OS. Which command(s) will terminate abnormally is not predictable. For instance, the command executed first might terminate abnormally.

  - When multiple commands specify a transaction volume:

    Command(s) will terminate abnormally when multiple commands specify the same transaction volume or the specified transaction volumes use the same DSI. Details:

    - When multiple commands specify the same transaction volume.

    - When multiple commands specify different transaction volumes, but the transaction volumes use the same DSI.
      (A DSI contains information for two or more transaction volumes.)

    - When DSI of the table relates to DSI of INDEX even if the different transaction volumes (transaction volume where DSI of the table is stored and transaction volume where DSI of INDEX is stored) are specified by each command.

- When multiple commands specify two or more transaction volumes:

    Command(s) will terminate abnormally when multiple commands specify transaction volumes that use the same log group. Details:

    - When the transaction volumes specified by different commands contain at least one of the same transaction volumes.

    - When the transaction volumes specified by different commands use the same log group, even though the transaction volumes do not contain any of the same transaction volumes.

- When multiple commands specify a log group:

    - When multiple commands specify the same log group.

- When a command specifies a transaction volume and another command specifies two or more transaction volumes:

    - When both commands specify a transaction volume that is included the same log group.

- When a command specifies a log group and another command specifies other than log group:

    Command(s) will terminate abnormally when multiple commands specify resources in the same log group. Details:

    - When the log group specified by a command and the log group that includes transaction volume(s) specified by another command is the same log group.

12.2.2.4 swstcancelrest (Restore cancellation command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

Canceling a restore by specifying transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstcancelrest [-g Generation-No │ -v Version-No] [-r Restore-Device-
Name] [-emergency] Device-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swstcancelrest [-h Server-Name][-g Generation-No │ -v Version-No][-r
Restore-Device-Name] [-emergency] Device-Name
```

Canceling a restore by specifying a log group (Symfoware)

To be executed on the Managed Server

```
<program-directory>\bin\swstcancelrest -n [-g Generation-No │ -v Version-No ] [-emergency] Log-
Group-Name[/RDB-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstcancelrest -n [-h Server-Name] [-g Generation-No │ -v Version-No ]
[-emergency] Log-Group-Name[/RDB-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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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).

It cannot specify this option for the transaction volumes of Symfoware.

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

-n

Specifies that the restore is being cancelled for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

Note: The restoration of the latest history information will be cancelled 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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- 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:\>
```

- Cancel restoration of log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelrest -n -g 1 LOG01/RDB1
LOG01/RDB1 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.

    - The replication management function is executing a process for 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 state, then unmanaged sessions remain. In this case, ETERNUS Web GUI must be used to cancel these sessions.

- This command can only be executed while none of the following commands are running:

    - swstsvrset (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.2.5 swstreststat (Restore execution status display command)

NAME

swstreststat - displays the execution status of restoration

SYNOPSIS

Displaying the restore execution status by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstreststat [-g Generation-No | -v Version-No] [Device-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstreststat [-h Server-Name] [-g Generation-No | -v Version-No]
[Device-Name]
```

Displaying the restore execution status by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstreststat -n [-g Generation-No | -v Version-No] Log-Group-Name[/RDB-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstreststat -n [-h Server-Name] [-g Generation-No | -v Version-No] Log-Group-Name[/RDB-Name]
```

DESCRIPTION

This command displays the execution status of restoration.
The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Generation	Displays the relative generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Version	Displays the absolute generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Backup-Disk	Displays the name of a backup volume from which data should be copied and restored. "----" will be displayed if restoration is not in progress.
Restore-Device	Displays a 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 halt status. "?????" : Failed to get copy status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status column. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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.

-n

Specifies that the execution status of restoration being displayed is for a log group.

In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").

If there is no RDB system name, you can omit it.

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 ETERNUS Web GUI while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUS Web GUI, this command displays "succeeded" whether or not the restoration has actually been successful.

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "11.3 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 columns other than "Server" and "Transaction-Disk".

12.2.2.6 swsthistdisp (History information display command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

Displaying the backup history information by specifying the transaction volume

To be executed on the Managed Server

<program-directory>\bin\swsthistdisp [Device-Name]

To be executed on the Management Server

<program-directory>\bin\swsthistdisp [-h Server-Name] [Device-Name]

Displaying the backup history information by specifying a log group

To be executed on the Managed Server

<program-directory>\bin\swsthistdisp -n Log-Group-Name[/RDB-Name]

To be executed on the Management Server

<program-directory>\bin\swsthistdisp -n [-h Server-Name] Log-Group-Name[/RDB-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 Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
Mount-Point	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.
	If the "Device" is a transaction volume used for Symfoware, the names of Symfoware database spaces and log groups as well as the RDB system names are displayed, followed by "SymfoWARE" in parentheses.
Generation	Displays a relative generation number. This item will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a TimeStamp reflecting when backup has been completed. This item will not be displayed if no backup history information exists.
Backup-Disk	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 halt status. "?????" : Failed to get copy 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 column. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.
ArcSerial	Displays the serial number of the archive log. The history information for backups performed by reference dump displays "reference".

Title	Description
	Information other than for Symfoware transaction volumes is not displayed. This item will not be displayed if no backup history information exists.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.

This option can be specified only on a Management Server.

-n

Specifies that the backup history information being displayed is for a log group.

In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").

If there is no RDB system name, you can omit it.

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-Disk   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: (NTFS)
Generation Version Backup-Date     Backup-Disk   Status    Execute
1         13      1999/11/12 23:00 g1d3p1        succeeded ----
2         12      1999/11/11 23:00 g1d3p2        succeeded ----

Server=StrgSV01 Device=/dev/dsk/c1t0d5s6 Mount-Point=DB1.DSB01/LOG01/RDB01 (SymfoWARE)
Generation Version Backup-Date     Backup-Disk   Status    Execute ArcSerial
1         13      2000/11/12 23:00 g1d4p1        succeeded ----    reference
2         12      2000/11/11 23:00 g1d4p2        succeeded ----    8
  :
C:\>
```

NOTES

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "11.3 Troubleshooting: Hardware error during backup" for information about this.

12.2.2.7 swsthistdel (History information deletion command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

Deleting the backup history information by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swsthistdel -g Generation-No | -v Version-No | -z [-emergency] Device-
Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsthistdel [-h Server-Name] -g Generation-No | -v Version-No | -z [-
emergency] Device-Name
```

Deleting the backup history information by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swsthistdel -n -g Generation-No | -v Version-No | -z [-emergency] Log-
Group-Name[/RDB-NAME]
```

To be executed on the Management Server

```
<program-directory>\bin\swsthistdel -n [-h Server-Name] -g Generation-No | -v Version-No | -z [-
emergency] Log-Group-Name[/RDB-NAME]
```

DESCRIPTION

This command deletes backup history information.
The backup volume of the deleted history is released and becomes an empty backup volume.

When you delete the history information for Symfoware transaction volumes, the recovery control files will also be deleted.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can only be specified on a 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 option.
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 option.
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 option.

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

-n

Specifies that the backup history being deleted is for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\>
```

- Delete the backup history of absolute generation number 10 for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsthistdel -n -v 10 LOG01/RDB1
g1d1p2 swsthistdel completed
g1d1p1 swsthistdel completed
    :
LOG01/RDB1 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.

- The replication management function is executing a process for the target transaction volume.

- The replication management function is executing a process for the target backup volume.

- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state, then unmanaged sessions remain. In this case, ETERNUS Web GUI must be used to cancel these sessions.

- Deleting the suspended history information does not cancel the synchronous processing (in an EC session).
  Deleting the tracking history information does not cancel the tracking processing (in an OPC session).

- In synchronous high-speed backup with -suspend option specified, the backup volume remains in use even after the history information is deleted.
  In differential snapshot high-speed backup with -T option 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 (Managed Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

12.2.2.8 swststartsync (Backup synchronous processing start command)

NAME

swststartsync - starts backup synchronous processing

SYNOPSIS

Starting backup synchronous processing by specifying the transaction volume

  To be executed on the Managed Server

```
<program-directory>\bin\swststartsync Device-Name [-Xdevmap Device-Map-File]
```

  To be executed on the Management Server

```
<program-directory>\bin\swststartsync [-h Server-Name] Device-Name [-Xdevmap Device-Map-File]
```

Starting backup synchronous processing by specifying a log group

  To be executed on the Managed Server

```
<program-directory>\bin\swststartsync -n Log-Group-Name[/RDB-NAME][-Xdevmap Device-Map-File]
```

  To be executed on the Management Server

```
<program-directory>\bin\swststartsync -n [-h Server-Name] Log-Group-Name[/RDB-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.

If you execute this command with specifying a log group name, backup synchronous processing will be executed for all transaction volumes that are included in the specified log group. If execution of this command terminates with an error, backup synchronous processing that was performed so far will be cancelled. However, if the status was "suspend" before command execution, even after terminating with an error, synchronous processing will not be cancelled.
Also, you can run this command specifying individual transaction volumes that are included in a log group.

OPTIONS

-h *Server-Name*

> Specify the name of a Managed Server.
> This option can be specified only on the Management Server.

-Xdevmap *Device-Map-File*

> Specifies a target backup volume to perform the backup synchronous processing. In the operand, specify a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, 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 Managed Server using an absolute pathname. A file name specified in *Device-Map-File* must not include any national characters.

-n

> Specifies that backup synchronous processing is being started for a log group.
> In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

> Specify the name of the log group.

RDB-Name

> Specify the RDB system name after the log group name, delimited by a slash ("/").
> If there is no RDB system name, you can omit it.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- To start the backup synchronous processing for a transaction volume:

```
C:\>C:\ETERNUS_SF\ACM\bin\swststartsync -h Work2 g1d0p0
g1d0p0 swststartsync completed.
C:\>
```

- To start backup synchronous processing for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swststartsync -n LOG01/RDB1
LOG01/RDB1 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 or log group to which the backup synchronous processing is already being executed, the message "swst0301 Backup synchronous processing is already in progress." is output. (When you specify a log group, the message id is "swst0302".)
  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.

  - The replication management function is executing a process for 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 (Managed Server configuration information setting command)

  - swstdevinfoset (Device information setting command)

  - swstsrsemtch (Resource match command)

  - swstresback (Resource backup command)

  - swstresrst (Resource restore command)

12.2.2.9 swstcancelsync (Backup synchronous processing cancel command)

NAME

swstcancelsync - cancels the backup synchronous processing

SYNOPSIS

Canceling backup synchronous processing by specifying the transaction volume

To be executed on the Managed Server

> *<program-directory>*\bin\swstcancelsync [-emergency] [-bd *Backup-Device-Name* | -all] *Device-Name*

To be executed on the Management Server

> *<program-directory>*\bin\swstcancelsync [-h *Server-Name*] [-emergency] [-bd *Backup-Device-Name* | -all] *Device-Name*

Canceling backup synchronous processing by specifying a log group

To be executed on the Managed Server

> *<program-directory>*\bin\swstcancelsync [-emergency] -n *Log-Group-Name*[*/RDB-NAME*] [-all]

To be executed on the Management Server

> *<program-directory>*\bin\swstcancelsync [-h *Server-Name*] [-emergency] -n *Log-Group-Name*[*/RDB-NAME*] [-all]

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 *Server-Name*

> Specify the name of a Managed Server.
> This option can be specified only with a 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 AdvancedCopy Manager device name 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.

-n

> Specifies that backup synchronous processing is being cancelled for a log group.
> In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\>
```

- To cancel backup synchronous processing for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync -n LOG01/RDB1
LOG01/RDB1 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, ETERNUS Web GUI must be used to cancel these sessions.

- You cannot cancel synchronous backup processing in the following case:

    - The replication management function is executing a process for the target transaction volume.

- This command cannot be executed when any of the following commands are running:

    - swstsvrset (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.2.10 swstsyncstat (Backup synchronous processing progress display command)

NAME

swstsyncstat - displays the execution status of the backup synchronous processing

SYNOPSIS

Displaying the execution status of backup synchronous processing by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstsyncstat [Device-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstsyncstat [-h Server-Name] [Device-Name]
```

Displaying the execution status of backup synchronous processing by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstsyncstat -n Log-Group-Name[/RDB-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstsyncstat -n [-h Server-Name] Log-Group-Name[/RDB-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 Managed Server.
Transaction-Disk	Displays the AdvancedCopy Manager device name 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 halt status. "?????" : Failed to get copy 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 *Server-Name*

Specify the name of a Managed Server.
This option can be specified only with the Management Server.

-n

Specifies that the execution status of backup synchronous processing being displayed is for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

- 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:\>
```

- To display information on the execution status of backup synchronous processing for log group (LOG01/RDB1):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat  -n LOG01/RDB1
Server Transaction-Disk Backup-Disk Status     Execute
Svr01  g1d1p2          g1d2p2      executing  75%
Svr01  g1d1p3          g1d3p3      equivalent 100%
C:\>
```

NOTES

- If "failed", "halt", or "?????" is indicated as the status of the backup synchronous processing (in the Status column), a hardware failure, etc. has possibly occurred. Refer to "11.3 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 column), resource information having inconsistency is a possible cause. Use swstsrsemtch (Resource match command) to remove the inconsistency from the resource information.

12.2.2.11 swstexecstat (Execution status display command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

Displaying an execution status by specifying the transaction volume

To be executed on the Managed Server

```
<program-directory>\bin\swstexecstat [-j] [Device-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swstexecstat [-j] [-h Server-Name] [Device-Name]
```

Displaying an execution status by specifying a log group

To be executed on the Managed Server

```
<program-directory>\bin\swstexecstat -n [-j] Log-Group-Name[/RDB-NAME]
```

To be executed on the Management Server

```
<program-directory>\bin\swstexecstat -n [-h Server-Name] [-j] Log-Group-Name[/RDB-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 Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
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) - swstcanceltrk (Tracking cancel command)
Mount-Point (Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses. If the "Device" is a transaction volume used for Symfoware, the names of Symfoware database spaces and log groups as well as the RDB system names are displayed, followed by "SymfoWARE" in parentheses.
Execute	Displays the name of the command being executed or the progress of copying. "----" : Neither a command nor OPC/EC is being executed. "swststartsync" : The backup synchronous processing start command is being processed. "swstcancelsync" : The backup synchronous processing cancel command is being processed. "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 ended abnormally. "sync(halt)" : EC is halt status. "snapshot(xxx%)" : The progress of OPC backup. "snapshot(failed)" : OPC backup ended abnormally. "snapshot(halt)" : OPC backup is halt status.

Title	Description
	"restore(xxx%)" : The progress of restoration.
	"restore(failed)" : OPC restoration ended abnormally.
	"restore(halt)" : OPC restoration is halt status.
	"?????" : Failed to get copy status.
	During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.

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 column conforms to the following rules:

- The display of a command name takes priority if both copying and command executions are in progress.

- When a disk copy of the snapshot backup and a disk copy of the backup synchronous processing are being handled simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. A disk copy for restoration is not performed during disk copy of the snapshot backup or backup synchronous processing due to a restriction of ETERNUS Disk storage system.

The following information will be displayed when -j option is specified:

Title	Description
Server	Displays a Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
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) - swstcanceltrk (Tracking cancel command)
Mount-Point (Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses. If the "Device" is a transaction volume used for Symfoware, the names of Symfoware database spaces and log groups as well as the RDB system names are displayed, followed by "SymfoWARE" in parentheses.
Execute	Displays the name of the command being executed or the progress of copying. "----" : Neither a command nor OPC/EC is being executed. "swststartsync" : The backup synchronous processing start command is being processed. "swstcancelsync" : The backup synchronous processing cancel command is being processed. "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.

Title	Description
	"sync(xxx%)" : EC progress rate.
	"sync(failed)" : EC ended abnormally.
	"snapshot(xxx%)" : The progress of OPC backup.
	"snapshot(failed)" : OPC backup ended abnormally.
	"restore(xxx%)" : The progress of restoration.
	"restore(failed)" : OPC restoration ended abnormally.
	"restore(halt)" : OPC restoration is halt status.
	"?????" : Failed to get copy status.
	During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-j

Specifies to display information in another format.

-n

Specifies that the command execution status being displayed is for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

OPERANDS

Device-Name

Specifies the AdvancedCopy Manager device name corresponding to a transaction volume.
If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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:\ETERNUS_SF\ACM\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)", "restore(halt)", or "?????" is displayed in the **Execute** column, a hardware error may have occurred. Refer to "11.3 Troubleshooting: Hardware error during backup" for more information about this.

12.2.2.12 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.

12.2.2.13 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 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.

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.

- When this command is used for a physical disk resource on a clustered system, enable the maintenance mode of a physical disk resource.

12.2.2.14 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

- Dismount the device:

```
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.

12.2.2.15 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 clustered system, set the name of the logical node for the transaction in the environment variable SWSTGNODE.

12.2.2.16 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 volume information locked by AdvancedCopy Manager.
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

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, information about all volumes locked by AdvancedCopy Manager 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 clustered system, set the name of the logical node for the transaction in the environment variable SWSTGNODE.

12.2.2.17 swstcanceltrk (Tracking cancel command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swstcanceltrk [-copy | -emergency] Device-Name (-bd Backup-Device-Name | -
all)
```

To be executed on the 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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on the Management Server.

-copy

Specifies that physical copying, if active, should also be stopped (the OPC session should be cancelled).
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 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 *Backup-Device-Name*

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 cancelled. A session that is not managed remains in operation if the command is entered during tracking. The session must be cancelled using ETERNUS Web GUI.

- Tracking processing cannot be stopped under the following condition. In this case, take action according to "System administrator response" provided for the message output.

    - When tracking processing is not performed for the specified copy source and destination volumes.

- This command cannot be executed while one of the following commands is being executed:

    - swstsvrset (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.2.2.18 swsttrkstat (Tracking status display command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

Displaying the execution status of tracking by specifying the transaction volume

   To be executed on the Managed Server

      <program-directory>\bin\swsttrkstat [*Device-Name*]

   To be executed on the Management Server

      <program-directory>\bin\swsttrkstat [-h *Server-Name*] [*Device-Name*]

Displaying the execution status of tracking by specifying a log group

   To be executed on the Managed Server

      <program-directory>\bin\swsttrkstat -n *Log-Group-Name*[/*RDB-Name*]

To be executed on the Management Server

```
<program-directory>\bin\swsttrkstat -n [-h Server-Name] Log-Group-Name[/RDB-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 Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name 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.) "?????" : Failed to get copy status.
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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on the Management Server.

-n

Specifies that the execution status of tracking being displayed is for a log group.
In the operand, specify the log group name and the RDB system name. If there is no RDB system name, you can omit it.

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.

Log-Group-Name

Specify the name of the log group.

RDB-Name

Specify the RDB system name after the log group name, delimited by a slash ("/").
If there is no RDB system name, you can omit it.

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          g1d15p1    nosession ----   ----
job1  g1d20p1          g1d25p1    executing 75%    ----
job1  g1d30p1          g1d35p1    failed    ----   ----
job1  g1d40p1          g1d45p1    ?????     ----   ----
job1  g1d50p1          g1d55p1    tracking  ----   12%
job1  g1d60p1          ----       ----      ----   ----
   :
C:\>
```

NOTES

- When the execution status (ie, the value displayed in the "Status" column) is "failed" or "?????", a hardware problem, etc. has occurred. Refer to "11.3 Troubleshooting: Hardware error during backup" for more information about this.

- 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.

12.2.3 Maintenance commands

This section describes the backup management maintenance commands.

12.2.3.1 swstsrsemtch (Resource match command)

NAME

swstsrsemtch - recovers resource information

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swstsrsemtch [-x]
```

To be executed on the 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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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

- Recover 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 (Managed 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)

12.2.3.2 swstresback (Resource backup command)

NAME

swstresback - backup of backup management file and recovery control file

SYNOPSIS

```
<program-directory>\bin\swstresback Backup-Directory
```

DESCRIPTION

A backup management file and a recovery control file are backed up to the specified directory.

- Backup management file
  Management information, such as Managed Server configuration information

- Recovery control file
  File that was created when backing up Symfoware database spaces

The information backed up by this command can be restored by swstresrst (Resource restore command).

Note that with this command, a replication management file is 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

- Backup of the backup management file and the recovery control 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 (Managed 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)

12.2.3.3 swstresrst (Resource restore command)

NAME

swstresrst - restore of backup management file and recovery control file

SYNOPSIS

```
<program-directory>\bin\swstresrst Backup-Directory
```

DESCRIPTION

A backup management file and a recovery control file are restored from the specified directory.

- Managed resources information
  Management information, such as Managed Server configuration information

- Recovery control file
  File that was created when backing up Symfoware database spaces

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 backup management file and the recovery control file:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstresrst C:\backup
swstresrst completed
C:\>
```

NOTES

- Before the backup management file and the recovery control file is restored by this command, swstsvrset (Managed Server configuration information setting command) must be executed. For the name of the target directory for output of the recovery control file that is specified by the -c option of swstsvrset (Managed Server configuration information setting command), specify the directory that was set when you performed the resource backup.

- 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 (Managed 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)

12.3 Configuration Management Commands

This section explains the operation of the configuration management command. This manages the information on a server device which performs backup and replication, or is a candidate for being used for backup or replication.

Note

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 12.18 Operating environment for executing configuration management commands

Command	Operating environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a Management Server (Management Server transaction), the Management Server (Management Server transaction) must be running.
stguserset	In cluster operation, the Management Server transaction must be running.

Command	Operating environment of AdvancedCopy Manager
stgxfwcmaddsrv	The Management Server (Management Server transaction) and target Managed Server (Managed Server transaction) must be running.
stgxfwcmmodsrv	The Management Server (Management Server transaction) and target Managed Server (Managed Server transaction) must be running.
stgxfwcmdelsrv	The Management Server (Management Server transaction) must be running.
stgxfwcmsetdev	The Management Server (Management Server transaction) and target Managed Server (Managed Server transaction) must be running.
stgxfwcmdeldev	The Management Server (Management Server transaction) and target Managed Server (Managed Server transaction) must be running.
stgxfwcmdispsrv	The Management Server (Management Server transaction) must be running.
stgxfwcmdispdev	The Management Server (Management Server transaction) must be running.
stgxfwcmdisppat	The Management Server (Management Server transaction) must be running.
stgenvdisp	This command is executable when both Management Server (Management Server transaction) and Managed Server (Managed Server transaction) are not operating. Note that when the cluster service (which is named differently in different clustered 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 Management Server (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.
stgxfwcmsetmode	-
stgarcext	This command is executable when both Management Server (Management Server transaction) and Managed Server (Managed Server transaction) are not operating.
stgdbloginf	The Management Server (Management Server transaction) must be running.
stgdbdmp	The Management Server (Management Server transaction) must be running.
stgrepocnv	The Management Server (Management Server transaction) must be running.
stgforcedelsrv	The Management Server (Management Server transaction) must be running. This command is executable when target Managed Server is not 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 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 12.19 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
stgcmmodnode	Required	Transaction operating node	-
stguserset	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmaddsrv	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmmodsrv	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmdelsrv	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmsetdev	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmdeldev	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmdispsrv	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmdispdev	Not required	Transaction operating node	Executable only on Management Server transaction
stgxfwcmdisppat	Not required	Transaction operating node	Executable only on Management Server transaction
stgenvdisp	Not required	Transaction operating node	-
stgmgrinfobkup	Required	Transaction operating node	-
stgmgrinfodisp	Required	Transaction operating node	-
stgxfwcmsetmode	-	-	-
stgmgrinfoset	Required	Transaction operating node	-
stgarcext	Not required	Transaction operating node	-
stgdbloginf	Not required	Transaction operating node	Executable only on Management Server transaction
stgdbdmp	Not required	Transaction operating node	Executable only on Management Server transaction
stgrepocnv	Not required	Transaction operating node	Executable only on Management Server transaction
stgforcedelsrv	Not required	Transaction operating node	Executable only on Management Server transaction

12.3.1 stgcmmodnode (Management Server information change command)

NAME

stgcmmodnode - changes or displays 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 Management Server information specified on the Managed Server on which this command is currently executed

- Changes Management Server information.

This command changes the following information on a Management Server:

- IP address of a Management Server

- PORT number used by a communication service that runs on a Management Server

- Server name of a Management Server

Refer to the following for the change procedure which uses this command:

- "11.5.1 Changing the IP address of Management Server"

- "11.5.3 Changing the port number of Management Server or Managed Server"

- "11.5.4 Changing the server name of Management Server or Managed Server"

OPTIONS

None

Displays the server information currently being managed.

-i *IP-Address*

Specifies the IP address of a Management Server, to change the IP address of the Management Server.

-p *PORT-Number*

Specifies the port number of a Management Server, to change the port number of the Management Server.

-n *Server-Name*

Specifies the server name of a Management Server to change the server name of the Management Server. This option cannot be specified if this command is executed on a Management Server.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Display server information:

```
C:\>C:\ETERNUS_SF\ACM\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 Management Server to 10.12.13.14:

```
C:\>C:\ETERNUS_SF\ACM\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 or by a domain account belonging to the Domain Admins group of the domain.

- For the port number of a 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 Management Server. An error will occur in the operation if an invalid value is specified.

- This command is not available in an IPv6 environment. When changing IP address information in an IPv6 environment, use stgxfwcmmodsrv (Server information change command).

12.3.2 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 ETERNUS SF Manager was installed. This command must be executed on a Management Server.

The change in the username and the password is executed according to the following procedures:

1. Close the Web Console.

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.

Password

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:\ETERNUS_SF\ACM\bin\stguserset a1234 Yfd1fz3
Password for accessing the repository has been registered.
C:\>
```

NOTES

- When using special characters, such as "!" for password, surround the entire password with single quotaion marks so as to make special characters recognized by the command line.

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- The user name to be specified in this command must already be registered in the system and must be the user shown in the table below for the type of server to which login is being performed.

Server type		
Domain controller	Machine belonging to a domain	WORKGROUP (not belonging to a domain)
Domain user	Local user	Local user

12.3.3 stgxfwcmaddsrv (Server information addition command)

NAME

stgxfwcmaddsrv - adds Managed Server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmaddsrv [-n Server-Name] -i IP-Address -p Port-Number
```

DESCRIPTION

This command adds Managed Server information to be managed by AdvancedCopy Manager. This command can only be executed from the Management Server.

OPTIONS

-n *Server-Name*

Specifies the name of the Managed 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.

Note that the server name is case-sensitive. When specifying the server name in other commands or Web Console, enter the server name exactly as entered in this command, including the case.

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*

Specifies the IP address of an added Managed Server.
IPv4 address or IPv6 address can be specified.

- IPv4 address
Format that separates decimal digits with periods ".". (Values according to the IPv4 rules)

- IPv6 address
Format that separates hexadecimal digits with colons ":".

Specify a physical IP address if the Managed 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 Managed Server side to communicate with the Managed 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

- Use IPv4 addresses to add servers:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmaddsrv -i 10.10.10.10 -p 1226
stgxfwcmaddsrv completed
C:\>
```

- Use IPv6 addresses to add servers:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmaddsrv -i 2001:db8::1234:0:0:1 -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:\ETERNUS_SF\ACM\bin\stgxfwcmaddsrv -n Server1 -i 10.10.10.20 -p 1227
stgxfwcmaddsrv completed
C:\>
```

NOTES

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- Please perform the command in the location specified at the time of product installation.

- Do not specify broadcast IP address to the IP address of the Managed Server to be added.

- Do not specify a server which another Management Server is managing as a Managed Server.

- Because a Management Server and a logical server for a 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 commands are being executed:

    - stgxfwcmaddsrv (Server information addition command)

    - stgxfwcmmodsrv (Server information change command)

    - stgxfwcmdelsrv (Server information deletion command)

    - stgxfwcmsetdev (Device information collection/reflection command)

    - stgxfwcmdeldev (Device information deletion command)

- This command cannot be executed while the following operations are being performed in the initial window by using the Web Console:

    - 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

12.3.4 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 Management Server.

- A Managed Server IP address

- A Managed Server port number

- The server name of a Management Server

- The server name of a Managed Server

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:

- Management Server IP address

- Managed Server IP address

- Management Server port number

- Managed Server port number

- Server name of the Management Server

- Server names of Managed Servers

OPTIONS

-n *Server-Name*

Specify a server name that is currently being managed.
Specify a server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

-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.)
Note that the new server name is case-sensitive. When specifying the server name in other commands or Web Console, enter the server name exactly as entered in this command, including the case.
Specify at the same time as the -n option.

-i *New-IP-Address*

Specifies changed IP addresses.
IPv4 address or IPv6 address can be specified.

- IPv4 address
  Format that separates decimal digits with periods ".". (Values according to the IPv4 rules)

- IPv6 address
  Format that separates hexadecimal digits with colons ":".

Specify a physical IP address if the Managed 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

- For IP address, specify the following values according to the server type:

  For Management Server

  Specify either one or both of IPv4 address and IPv6 address.
  When specifiying both IP addresses, separate them with commas "," (IPv4 and IPv6 in that order).
  If both IP addresses are set but either of the IP addresses is to be changed, both IP addresses should be written as follows. Any IP address that is not written is deleted:

  ```
  Manager    I  10.10.20.10, 2001:db8::1234:0:0:1
  ```

For Managed Server

Specify either one of IPv4 address and IPv6 address.

- 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 Managed Server (with server name: Server1) is changed to 10.20.30.40:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmmodsrv -n Server1 -i 10.20.30.40
stgxfwcmmodsrv completed
C:\>
```

- The server name of a Managed Server (with server name: Server1) is changed to Agent5:

```
C:\>C:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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 Management Server

- The port number of a Management Server

- When changing server information by this command, the definition information contained in the machine and AdvancedCopy Manager should be changed beforehand. Refer to "11.5 Changing the Operating Environment" for information on executing the processing.

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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 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 Management Server information is changed, execute stgcmmodnode (Management Server information change command) at the Managed Servers to set the changed Management Server information.

- The following notes apply to changing the Managed 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 server name to be changed is case-sensitive. Specify a new server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

    - The new server name is case-sensitive. When specifying the server name in other commands or Web Console, enter the server name exactly as entered in this command, including the case.

    - The Management Server that executes this command and the AdvancedCopy Manager services and Managed Server transactions at all Managed Servers managed by Management Server transactions must be running.

    - Backup management commands and replication management commands must not be executed at the Management Server that executes this command nor in the AdvancedCopy Manager services and Managed Server transactions at all Managed Servers managed by 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 commands are being executed:

    - stgxfwcmaddsrv (Server information addition command)

    - stgxfwcmmodsrv (Server information change command)

    - stgxfwcmdelsrv (Server information deletion command)

    - stgxfwcmsetdev (Device information collection/reflection command)

    - stgxfwcmdeldev (Device information deletion command)

- This command cannot be executed while the following operations are being performed in the initial window by using the Web Console:

    - 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

12.3.5 stgxfwcmdelsrv (Server information deletion command)

NAME

stgxfwcmdelsrv - deletes the Managed Server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdelsrv -n Server-Name
```

DESCRIPTION

This command deletes the Managed Server information that AdvancedCopy Manager is currently managing. It is necessary to execute this command on the Management Server.

OPTIONS

-n *Server-Name*

Specify the Managed Server name to be deleted.

Specify a server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- A Managed Server (server name: Server1) information is deleted:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdelsrv -n Server1
stgxfwcmdelsrv completed
C:\>
```

NOTES

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- Perform this command in the location specified at the time of product installation.

- The 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 while the following commands are being executed:

  - stgxfwcmaddsrv (Server information addition command)

  - stgxfwcmmodsrv (Server information change command)

  - stgxfwcmdelsrv (Server information deletion command)

  - stgxfwcmsetdev (Device information collection/reflection command)

  - stgxfwcmdeldev (Device information deletion command)

- This command cannot be executed when the following operations are being performed in the initial window by using the Web Console:

  - 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

12.3.6 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 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 *Server-Name*

Specify the server name whose device information is to be collected or reflected.
Specify a server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

-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:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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' key.

- 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 only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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 box 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.

```
> The partitions that comprise the following device are already managed.
> Do you want to continue the processing? [y or n]
```

  This message may be displayed in the following case.
  Check the following before continuing the processing: whether the device will be subject to duplicated registration. This message is also displayed when the -y option is specified.

  - In the case two or more logical servers running on the same physical server are managed on the clustered system operating environment.

  - In the case a device with the other name that indicates a physical disk in ETERNUS Disk storage system is reflected into the management information of AdvancedCopy Manager.

- 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 while the following commands are being executed:

  - stgxfwcmaddsrv (Server information addition command)

  - stgxfwcmmodsrv (Server information change command)

  - stgxfwcmdelsrv (Server information deletion command)

  - stgxfwcmsetdev (Device information collection/reflection command)

  - stgxfwcmdeldev (Device information deletion command)

- This command cannot be executed by using the Web Console 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

12.3.7 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 Management Server.

stgxfwcmsetdev (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 *Server-Name*

Specify the name of the server that is managing the device to be deleted.
Specify a server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

-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 Managed Server is deleted:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdeldev -n Server1 -d g1d18p1
stgxfwcmdeldev completed
C:\>
```

NOTES

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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 while the following commands are being executed:

    - stgxfwcmaddsrv (Server information addition command)

    - stgxfwcmmodsrv (Server information change command)

    - stgxfwcmdelsrv (Server information deletion command)

    - stgxfwcmsetdev (Device information collection/reflection command)

    - stgxfwcmdeldev (Device information deletion command)

- This command cannot be executed by using the Web Console 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

12.3.8 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 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" : Management Server "Server" : Managed Server
Tape	"---" is always displayed.
OS-Type	An operating system type is displayed.
OS-Version	An operating system version is displayed.

Title	Description
Version	The version of this product is displayed.
IP-Address	The IP address for communication with the server is displayed. - For Management Server - If the number of registered IP addresses is one: Registered information is displayed. - If the number of registered IP addresses is two: Registered IP addresses are displayed, IPv4 address and IPv6 address in that order separated with commas. IPv6 address is expressed in abbreviated notation. - For Managed Server Registered IP address is displayed.
Port-Number	The port number for communication with the server is displayed.

OPTIONS

-n *Server-Name*

Specify the server name whose information is to be displayed.

Specify a server the same name entered at stgxfwcmaddsrv (Server information addition command) or stgxfwcmmodsrv (Server information change command) exactly, including the case.

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:\ETERNUS_SF\ACM\bin\stgxfwcmdispsrv
Server  Server-Type       Tape OS-Type              OS-Version Version IP-Address           Port-Number
Manager Management-Server ---  Windows Server 2008 ---      V15.3   10.10.10.10          1226
Server1 Server            ---  Windows Server 2008 ---      V15.3   10.10.10.20          1226
Server2 Server            ---  Windows Server 2008 ---      V15.3   2001:db8::1234:0:0:1 1226
C:\>
```

- The information for a Managed Server(server name: Server1) is displayed:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdispsrv -n Server1
Server  Server-Type Tape OS-Type            OS-Version Version IP-Address  Port-Number
Server1 Server      ---  Windows Server 2008 ---       V15.3   10.10.10.20 1226
C:\>
```

- The information for a Management Server(server name: Manager) is displayed:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdispsrv -n Manager
Server  Server-Type       Tape OS-Type            OS-Version Version IP-Address
Port-Number
Manager Management-Server ---  Windows Server 2008 ---       V15.3
10.10.10.10,2001:db8::1234:0:0:1 1226
C:\>
```

NOTES

- In "OS-Version", the OS version that is displayed refers to the following time:
  In the case of the Management Server: the time when the database was created.
  In the case of the Managed Server: the time when the Managed 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 Managed Server was added.

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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.

12.3.9 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 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 box containing this device.) 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 ETERNUS Disk storage system)
	    d? : Disk number(*1)
	    p? : Logical disk number(*2)
	
	    (*1)This is a number given uniquely within the ETERNUS Disk storage system.
	    This number differs from the disk number in Disk Management.

Title	Description
	(*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 the 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, HP-UX, AIX and Linux server: A mount point name is displayed. Windows server: A drive character is displayed.
File-System	A file system name is displayed.
Device-Type	A device type is displayed. Normal/SDX(slice)/LVM/VxVM/SDX(volume)
Size(MB)	The capacity (in megabytes) allocated to a device is displayed.
RDB-Name	Windows and Linux server: The Symfoware RDB system name is displayed. Solaris, HP-UX and AIX server: "---" is always displayed.
Log-Group-Name	Windows and Linux server: The Symfoware log group name is displayed.

Title	Description
	Solaris, HP-UX and AIX server: "---" is always displayed.
DB-Space-Name	Windows and Linux server: The Symfoware database space name is displayed. Solaris, HP-UX and AIX server: "---" is always displayed.

OPTIONS

-n *Server-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:\ETERNUS_SF\ACM\bin\stgxfwcmdispdev -n Server1 -d g1d19p1
S Device  Block-Device  Mount-Point File-System Device-Type Size(MB) RDB-Name Log-Group-Name DB-
Space-Name
  g1d19p1 disk19p1      J:          NTFS        Normal       2000     ---      ---            ---
C:\>
```

- The information for each device of a server is displayed:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdispdev -n Server1
S Device  Block-Device Mount-Point File-System Device-Type Size(MB) RDB-Name Log-Group-Name DB-
Space-Name
  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:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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.

- "RDB-Name", "Log-Group-Name" and "DB-Space-Name" are displayed under the following conditions:

    - The Managed Server's OS is Linux or Windows.

    - The Symfoware Server Advanced Backup Controller V10.0 or later is installed in the Managed Server.

    - The target device to be displayed exists in the ETERNUS Disk storage system.

    - When collecting the device information, the target RDB operating environment is running.

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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.

12.3.10 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 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 ETERNUS Disk storage system, the same contents as stgxfwcmdispdev (Device information display command) are displayed. When the device is not installed in the ETERNUS Disk storage system, the name is displayed in the following formats.
	
	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 (i.e., 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 (i.e., 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

Title	Description
	AIX server:
	A block device name or a volume group name under LVM is displayed.
Physical-Disk	Solaris, HP-UX, Linux, or AIX server:
	"---" is always displayed.
	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 ETERNUS Disk storage system, "GR" is displayed.
	When the device is not installed in the ETERNUS Disk storage system, "---" is displayed.
	Solaris or Linux server:
	When the device is an SDX object in units of logical volumes, "---" is displayed.
LU-Number	When the device is installed in the ETERNUS Disk storage system, a logical unit number is displayed.
	When the device is not installed in the ETERNUS Disk storage system, "---" is displayed.
	Solaris or Linux server:
	When the device is an SDX object in units of logical volumes, "---" is displayed.

OPTIONS

-n *Server-Name*

Specify the server name that manages a device whose information is to be displayed.
Specify a server name displayed by stgxfwcmdispsrv (Server information display command) exactly as displayed, including the case.

-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:\ETERNUS_SF\ACM\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 only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- 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.

12.3.11 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 : Management Server or Management Server transaction Server : Managed Server or Managed Server transaction
Cluster system	The type of clustered system is displayed as follows: VERITAS Cluster Server : VERITAS Cluster Server MSCS : MSCS or WSFC HACMP : High Availability Cluster Multi-Processing GENERAL : Clustered system on Solaris, Linux, or HP-UX environment
Node type	The node type is displayed as follows: Primary : Primary node Secondary : Secondary node
Node name	The logical node name is displayed. Local-Service indicates a local transaction.
Service name	The transaction name is displayed.
Cluster name	The cluster name is displayed.
Mount point	The mount point for AdvancedCopy Manager shared data is displayed.
Disk resource	The name of the shared disk resource used for AdvancedCopy Manager shared data is displayed.
Drive	The drive letter used for AdvancedCopy Manager shared data is displayed.
Network name	The network name used for AdvancedCopy Manager is displayed.
External connection	The external connection network name is displayed.
Subnet mask	The subnet mask is displayed.
IP address resource	IP address resource information is displayed.
IP by cluster setup	The IPv4 format 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 in either "11.5.7.1 Changing the IP address of Management Server transaction" or "11.5.7.2 Changing the IP address of Managed Server transaction" is changed during operation.
IPv6 by cluster setup	The IPv6 format 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 in either "11.5.7.1 Changing the IP address of Management Server transaction" or "11.5.7.2 Changing the IP address of Managed Server transaction" is changed during operation.
Manager IP address	The IP address of the Management Server is displayed. Displayed information varies with the Server type.

Title	Description
	- For "Management server" The IP address of the Management Server is displayed. If both IPv4 address and IPv6 address are set, they are displayed in two lines. - For "Managed server" The IP address of the Management Server to which this Managed Server is registered is displayed. IPv4 address or IPv6 address is displayed. However, if the Managed Server is not registered on the Management Server (operation of adding servers is not done), "????" is displayed in the value field. IPv6 address is expressed in abbreviated notation.
Repository user	The name of the user accessing the repository is displayed.
DB log file	Windows Version only: The name of the DB log file storage destination folder is displayed.
DB dictionary file	Windows Version only: The name of the DB dictionary file storage destination folder is displayed.
Repository database	Windows Version only: The name of the repository DB storage destination folder is displayed.
DB file	Solaris Version: The name of the DB file system device or directory is displayed. Linux Version: The DB file directory name is displayed.
RDB dictionary	Solaris Version: The RDB dictionary raw device name is displayed. Linux Version: The RDB dictionary directory name is displayed.
RDB log file	Solaris Version: The name of the RDB log file raw device or directory is displayed. Linux Version: The RDB log file directory name is displayed.
Database space	Solaris Version: The name of the raw device containing the repository data storage DB is displayed. Linux Version: The name of the directory containing the repository data storage DB is displayed.
Database size	Windows and Linux Version only: The database size 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.

Title	Description
Repository	Windows and Solaris Version only: The repository service port number (the service name in the services file: rdaswstf) is displayed.
Program install directory	Displays the "Program directory" specified during installation.
Fixed configuration directory	Displays the "Environment directory" specified during installation.
Modifying configuration directory	Displays the "Work directory" specified during installation.
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type. JAPANESE : Japanese version ENGLISH : English version
Code	Solaris and Linux Version only: Displays the encoding specified during installation.

OPTIONS

-n *Server-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 swstf6002 is output and processing ends. Otherwise, information is output.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Information in a non-clustered system is displayed:

  [For Management Server using IPv4 address]

```
C:\>C:\ETERNUS_SF\ACM\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
  Communication         : 1226
  Remote access         : 9851
  Exclusive control     : 9852
  Repository            : 2004
 ------------------------------------------------------------------
  Version               : V15.3
  Language              : ENGLISH
```

```
  Program install directory      : C:\ETERNUS_SF\ACM
  Fixed configuration directory   : C:\ETERNUS_SF\ACM
  Modifying configuration directory : C:\ETERNUS_SF\ACM
C:\>
```

[For Management Server using IPv4 address and IPv6 address]

```
C:\>C:\ETERNUS_SF\ACM\bin\stgenvdisp
  Server type            : Management server
  Manager IP address      : 10.10.10.10
  Manager IP address      : 2001:db8::1234:0:0:1
  Repository user         : acm
  DB log file             : R:\acmdb\log
  DB dictionary file      : R:\acmdb\dic
  Repository database     : R:\acmdb\spa
  Database size           : 65MB
  Communication           : 1226
  Remote access           : 9851
  Exclusive control       : 9852
  Repository              : 2004
------------------------------------------------------------------------
  Version                 : V15.3
  Language                : ENGLISH
  Program install directory      : C:\ETERNUS_SF\ACM
  Fixed configuration directory   : C:\ETERNUS_SF\ACM
  Modifying configuration directory : C:\ETERNUS_SF\ACM
C:\>
```

[For Managed Server using IPv4 address]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type            : Server
  Manager IP address      : 10.10.10.10
  Communication           : 1226
------------------------------------------------------------------------
  Version                 : V15.3
  Language                : ENGLISH
  Program install directory      : C:\Win32app\AdvancedCopyManager
  Fixed configuration directory   : C:\Win32app\AdvancedCopyManager
  Modifying configuration directory : C:\Win32app\AdvancedCopyManager
C:\>
```

[For Managed Server using IPv6 address]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgenvdisp
  Server type            : Server
  Manager IP address      : 2001:db8::1234:0:0:1
  Communication           : 1226
------------------------------------------------------------------------
  Version                 : V15.3
  Language                : ENGLISH
  Program install directory      : C:\Win32app\AdvancedCopyManager
  Fixed configuration directory   : C:\Win32app\AdvancedCopyManager
  Modifying configuration directory : C:\Win32app\AdvancedCopyManager
C:\>
```

- Information on all transactions in a clustered system (WSFC) is displayed.
  The information input by the cluster setup command is output.

[For Managed Server using IPv4 address]

```
C:\>C:\ETERNUS_SF\ACM\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
   Communication         : 11000
   Remote access         : 9851
   Exclusive control     : 9852
   Repository            : 2004
-------------------------------------------------------------------------
   Server type           : Server
   Node name             : Local-Service
   Manager IP address    : 10.10.10.10
   Communication         : 1226
-------------------------------------------------------------------------
   Version               : V15.3
   Language              : ENGLISH
   Program install directory        : C:\ETERNUS_SF\ACM
   Fixed configuration directory    : C:\ETERNUS_SF\ACM
   Modifying configuration directory : C:\ETERNUS_SF\ACM
C:\>
```

[For Management Server using IPv4 address and IPv6 address]

```
C:\>C:\ETERNUS_SF\ACM\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
   IP by cluster setup   : 10.10.10.10
   IPv6 by cluster setup : 2001:db8::1234:0:0:1
   Manager IP address    : 10.10.10.10
   Manager IP address    : 2001:db8::1234:0:0:1
   Repository user       : acm
   DB log file           : R:\acmdb\log
   DB dictionary file    : R:\acmdb\dic
   Repository database   : R:\acmdb\spa
   Database size         : 65MB
   Communication         : 11000
   Remote access         : 9851
   Exclusive control     : 9852
   Repository            : 2004
-------------------------------------------------------------------------
   Server type           : Server
   Node name             : Local-Service
   Manager IP address    : 10.10.10.10
   Communication         : 1226
-------------------------------------------------------------------------
   Version               : V15.3
   Language              : ENGLISH
```

```
  Program install directory        : C:\ETERNUS_SF\ACM
  Fixed configuration directory    : C:\ETERNUS_SF\ACM
  Modifying configuration directory  : C:\ETERNUS_SF\ACM
C:\>
```

[For Managed Server and Windows Server 2003]

```
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      : 10.10.10.11
  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      : 10.10.10.12
  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                  : V15.3
  Language                 : ENGLISH
  Program install directory          : C:\Win32app\AdvancedCopyManager
  Fixed configuration directory      : C:\Win32app\AdvancedCopyManager
  Modifying configuration directory  : C:\Win32app\AdvancedCopyManager
C:\>
```

[For Managed Server using IPv4 address and Windows Server 2008 or later]

```
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      : 10.10.10.11
  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 by cluster setup  : 10.10.10.12
   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              : V15.3
   Language             : ENGLISH
   Program install directory        : C:\Win32app\AdvancedCopyManager
   Fixed configuration directory    : C:\Win32app\AdvancedCopyManager
   Modifying configuration directory : C:\Win32app\AdvancedCopyManager
C:\>
```

[For Managed Server using IPv6 address]

```
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
   IPv6 by cluster setup : 2001:db8::1234:0:0:2
   Manager IP address   : 2001:db8::1234:0:0:1
   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
   IPv6 by cluster setup : 2001:db8::1234:0:0:3
   Manager IP address   : 2001:db8::1234:0:0:1
   Communication        : 12000
------------------------------------------------------------------------
   Server type          : Server
   Node name            : Local-Service
   Manager IP address   : 2001:db8::1234:0:0:1
   Communication        : 1226
------------------------------------------------------------------------
   Version              : V15.3
   Language             : ENGLISH
   Program install directory        : C:\Win32app\AdvancedCopyManager
   Fixed configuration directory    : C:\Win32app\AdvancedCopyManager
```

```
   Modifying configuration directory  : C:\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 clustered system, 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 Management Server or Managed Server) or cluster type.

12.3.12 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 *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 *management-server-encoding*

Specify the encoding designated when the 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 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 Managed Server or Management Server as the management information package backup execution server.

- Set the name of the logical node in the environment variable SWSTGNODE when the Managed Server registered as the management information package backup execution server is in a clustered system.

- Create the directory specified in the -d option in advance.

- In an environment where a Managed Server with IPv4 address and a Managed server with IPv6 address coexist, register the Management Server as a management information package backup execution server.

12.3.13 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 Managed Server and the Management Server.

OPTIONS

-n *Server-Name*

Creates backups of the management information stored on the specified server.
If this option is not specified, the management information on all Managed Server (including the 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
BkupData : Backup management
ReplData : Replication management

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 "11.1.2.1 Preliminaries".

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Back up the management information on all the Managed 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 Managed 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 Managed 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 Managed 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 environment variable SWSTGNODE when the management information package backup execution server is in a clustered system.

- Do not execute other AdvancedCopy Manager commands or Web Console operations while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a Web Console operation is running.

- Do not execute this command again if it is already running.

- If this command was executed under one of the following circumstances from a Managed Server on which AdvancedCopy Manager Version 14.2 or earlier is installed, backup of authentication data will not be implemented.

    - When AuthData was specified in the -t option

    - When the value "YES" was specified for the AuthData key in the Management Server section of the policy file for batch backup of management data

- 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 Managed Server with Softek AdvancedCopy Manager Version 10.4 (V10.0L50) or earlier.

- In an environment where a Managed Server with IPv4 address and a Managed Server with IPv6 address coexist, register the Management Server as a management information package backup execution server to execute management information package backup from the Management Server.

12.3.14 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
BkupData	Date and time at which the management information package backup command created a backup of the backup management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
ReplData	Date and time at which the management information package backup command created a backup of replication management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	Date and time at which the management information package backup command created a backup of the policy file for management information package backup (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss

OPTIONS

-n *Server-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 Managed Server for which the management information package backup command was executed is displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

- Output the information about all the Managed Server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfodisp
Server:        acm01
   DBData:       04/08/02 16:11:26
   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
C:\>
```

- Output the information about Managed Server named acm01:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfodisp -n acm01
Server:        acm01
   DBData:       04/08/02 16:11:26
   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 clustered system, set the name of the logical node in the environment variable SWSTGNODE.

12.3.15 stgxfwcmsetmode(Information collection mode configuration command)

NAME

stgxfwcmsetmode - sets the collection mode for information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmsetmode -virt {kvm | none | disp}
```

DESCRIPTION

This command sets the Virtual Environment Support Function.
It also displays the status of Virtual Environment Support Function that is currently set.

When this command is completed successfully, "(SWSTGNODE=*configuration variable*)" is displayed at the end of the line after the command. The following string is displayed in "*configuration variable*":

- If environment variable SWSTGNODE is set: value of environment variable SWSTGNODE

- If environment variable SWSTGNODE is not set: null

OPTIONS

-virt {kvm | none | disp}

Specifies whether to use the Virtual Environment Support Function. The following values can be specified:

kvm : The KVM Support Function is used.
none : The Virtual Environment Support Function is not used.
disp : Check the current setup status of Virtual Environment Support Function.

Information output when disp is specified

virt : kvm The KVM Support Function is used.
virt : none The Virtual Environment Support Function is not used.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- To specify that the KVM Support Function is used:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\stgxfwcmsetmode -virt kvm
stgxfwcmsetmode completed (SWSTGNODE=null)
C:\>
```

- To check the current setup status of Virtual Environment Support Function:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\stgxfwcmsetmode -virt disp
virt:kvm (SWSTGNODE=null)
C:\>
```

12.3.16 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 Management Server and Managed 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.

12.3.17 stgdbloginf (Repository update area busy rate check command)

NAME

stgdbloginf - check repository update area busy rate

SYNOPSIS

```
<program-directory>\bin\stgdbloginf
```

DESCRIPTION

This command checks the busy rate of the area required when a repository is updated.

It is necessary to execute this command in the Management Server.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

```
C:\>C:\ETERNUS_SF\ACM\bin\stgdbloginf
80%
```

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

12.3.18 stgdbdmp (Database save command)

NAME

stgdbdmp - saves the database

SYNOPSIS

```
<program-directory>\bin\stgdbdmp -d Directory-Name [-y]
```

DESCRIPTION

This command saves the database to the specified directory.
It is necessary to execute this command in the Management Server.

OPTION

-d *Directory-Name*

Specifies the name of the directory where the database area is saved.
This directory must already have been created.

-y

If the specified directory contains contents that have already been saved, this option overwrites that content when the database area is saved.
If this option is omitted and if the specified directory contains contents that have already been saved, the save processing is not performed and processing ends.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Save the database in a directory (c:\dmpdir):

```
C:\>C:\ETERNUS_SF\ACM\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

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- You need to be careful to execute this process with the following service:

    - Terminal Service (use via a remote desktop connection)

    If the Management Server is running on 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/947723/en
    http://support.microsoft.com/kb/278845/en

    Executing this process with the service listed below causes an error. Do not use the following service:

    - Telnet server service

- If the Management Server operates in a clustered system, it is recommended that the directory used to save the database be prepared on a shared disk.

- 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.

12.3.19 stgrepocnv (Repository data migration command)

NAME

stgrepocnv - migrates the repository data

SYNOPSIS

```
<program-directory>\bin\stgrepocnv -d Directory-Name
```

DESCRIPTION

This command recovers the migration target repository data to the current version repository.
It is necessary to execute this command in the Management Server.

OPTION

-d *Directory-Name*

Specify the absolute path of the directory where the migration target repository data is stored.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
C:\>C:\ETERNUS_SF\ACM\bin\stgrepocnv -d C:\backdir
...............
stgrepocnv completed
```

NOTES

- This command can be executed only by a local account belonging to the Administrator's group or by a domain account belonging to the Domain Admins group of the domain.

- You need to be careful to execute this process with the following service:

    - Terminal Service (use via a remote desktop connection)

    If the Management Server is running Windows Server 2003, the Terminal Service can be used by making a console session connection to it.

    If no console session connection to the Terminal Service has been made, this processing may not be performed normally with messages like "Failed to define the database name".

    Refer to the following link for information on how to make console session connections:

    http://support.microsoft.com/kb/947723/en
    http://support.microsoft.com/kb/278845/en

  Executing this process with the service listed below causes an error. Do not use the following service:

    - Telnet server service

- For Management Server transactions, execute this command at a currently operating server. The environment variable SWSTGNODE need not be set.

12.3.20 stgforcedelsrv (Managed Server forcibly deletion command)

NAME

stgforcedelsrv - deletes the information of Managed Server forcibly

SYNOPSIS

```
<program-directory>\bin\stgforcedelsrv -n Managed-Server -b before-dir -a after-dir
```

DESCRIPTION

This command deletes the Managed Server information forcibly. This command must be executed on a Management Server.

As this command deletes the backup/replication settings of the Managed Server, it must be performed with caution. Before performing the command always refer to "11.6 Action when Managed Server information cannot be deleted".

OPTIONS

-n *Managed-Server*

  Specify the server name of Managed Server to be deleted forcibly.

-b *before-dir*

  Specify the full path name of the directory containing the database backup.
  The command deletes the Managed Server information forcibly from the database in the directory specified with the -b option and stores the database after deletion in the directory specified with -a option.

-a *after-dir*

> Specify the full path name of the directory that will store the database after the Managed Server information has been deleted. Please note the following important points:
>
>   - If the specified directory does not exist, it must be created before executing the command.
>
>   - Specify an empty directory, containing no subdirectories or files.
>
>   - Specify a directory that will not disappear after the server has rebooted.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Delete the information of Managed Server (Server1). After deleting its information, the database is created under the "C:\afterDB" folder.

```
C:\>C:\ETERNUS_SF\ACM\bin\stgforcedelsrv -n Server1 -b C:\beforeDB -a C:\afterDB
Begin the forcing deletion? (y/n) : y
stgforcedelsrv completed
C:\>
```

NOTES

  - Only an account which belongs to the Administrator's group can execute this command.

  - Please perform the command in the location specified at the time of product installation.

  - The Management Server information cannot be deleted.

  - Do not perform AdvancedCopy Manager operations (backup, replication, modifications to the operating environment, etc.) while executing this command.

  - If the command terminates abnormally, temporary files may remain under the directory specified with -a option. When the command terminates abnormally, delete all the files under the directory specified with the -a option before executing the command again.

  - Several instances of the command cannot be executed simultaneously.

  - In Windows Server 2008 or later, launch a command prompt in "Run as Administrator" mode and execute this command from there.

12.4 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 12.20 Operating environment when executing replication management commands

Command	Operating environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows and is in EC operation, Windows services required by the copy destination Managed Server must be running (except when the -m 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 Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpdelvol	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. For inter-server replication, Windows services required by the Managed Server in communication must be running (except when the -d option is specified).
swsrprecbuffstat	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrprecbuffset	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpmake	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows and is engaged in intra-server replication and EC operation, Windows services required by the Managed Server must be running. For inter-server replication, Windows services required by the Managed Server in communication must be running (except when the -m or -t option is specified).
swsrprecoverres	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows, Windows services required by the Managed Server must be running. To specify the -r option, Windows services required by the Management Server must be running.
swsrprevsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpsetvol	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. For inter-server replication, Windows services required by the Managed Server in communication must be running.
swsrpstartsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows, Windows services required by the Managed 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 Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.

Command	Operating environment of AdvancedCopy Manager
swsrpvolinfo	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed 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 12.21 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	-

12.4.1 Environment definition commands

This section describes environment definition commands for replication management.

12.4.1.1 swsrpsetvol (Replication volume information setting command)

NAME

swsrpsetvol - sets the replication source volumes and replication destination volumes

SYNOPSIS

To be executed on the Managed 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 the 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 *Server-Name*

Specifies the name of a Managed Server that is subject to the replication operation.
This option can be specified only on a Management Server.
If this option is omitted, the Managed 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 Version 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

- Under Solaris, an EFI-labeled disk MPxIO device 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@Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name 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@Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Set replication volume information by specifying volume g1d1p1 of Managed Server SRC-SV as the replication source volume, and volume g2d1p1 of Managed 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 box information (ie, box identifier, OLU number, EXTENT start position, and EXTENT size) as the box information of the specified two volumes have already been set as replication volumes.

  - The replication destination volume has been registered as a backup volume by the backup management function.

  - The replication source volume has been registered as a backup volume by the backup management function and bi-directional copying is specified as a replication volume attribute.

  - The specified replication destination volume and replication source volume are volumes belonging to other servers (at least one volume must be a volume on the local server).

  - If the replication source volume and the replication destination volume are located on another ETERNUS Disk storage system, the remote copy function of the ETERNUS Disk storage system is not correctly set.

  - Communication with the Management Server fails.

  - Communication with a destination server fails for replication between servers.

  - The IP version registered on AdvancedCopy Manager differs between the replication source server and the replication destination server.

  - At least one of the replication source and target volumes has a FAT or FAT32 file system.

  - The license for the ETERNUS Disk storage system that contains the specified replication source/target volume is one of the following:

    - The license is not registered in the license management function.

    - The license is expired.

- When you change physical information on volumes (ie, partition size, box information on ETERNUS Disk storage system, and Logical Unit (disk) size) using such functions as an OS management tool (for example, Disk Management) or ETERNUS Web GUI provided by the ETERNUS Disk 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 Web Console, "information acquisition/reflection" of all devices is performed. Otherwise stgxfwcmsetdev (Device information collection/reflection command) is executed in a Management Server.

  3. Reset the replication volume information with swsrpsetvol (Replication volume information setting command).

Also, when you add a new device or delete a device (including general devices other than ETERNUS Disk storage system), perform the "acquire and reflect all device information" operation listed in the Web Console 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 buffer settings change 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)

    - swsrpbackup_sql (SQL Server backup execution command)

    - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

    - swsrpvssbackup_exchange (Exchange VSS backup execution command)

    - swsrpvssrestore_exchange (Exchange VSS restore execution command)

    - swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

    - swsrpshadowadm (Shadow copy management command)

12.4.1.2 swsrpvolinfo (Replication volume information display command)

NAME

swsrpvolinfo - displays the replication volume information

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrpvolinfo [-L] [Original-Volume-Name]
```

To be executed on the 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 Managed 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 the -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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-L

Specifies that information will be displayed using the extended format.
For the items displayed by this option, refer to the table in the description above.
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@Managed-Server-Name."
Specifies the AdvancedCopy Manager device name 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 Managed 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 Management Server is to be displayed on Managed Server SRC-SV:

```
C:\>C:\ETERNUS_SF\ACM\bin\swsrpvolinfo -h SRC-SV
Server Original-Volume    Size      Replica-Volume    Size      Copy          Op-Server
SRC-SV g1d1p1@SRC-SV      4.0 Gbyte g2d1p1@TARG-SV    4.0 Gbyte uni-direction original
SRC-SV g1d2p1@SRC-SV      4.0 Gbyte g2d2p1@TARG-SV    5.0 Gbyte bi-direction  original
SRC-SV g1d3p1@SRC-SV      9.1 Gbyte g2d3p1@TARG-SV    9.1 Gbyte bi-direction  replica
SRC-SV g1d4p1@SRC-SV      7.5 Gbyte g2d4p1@TARG-SV    7.5 Gbyte 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)

12.4.1.3 swsrpdelvol (Replication volume information deletion command)

NAME

swsrpdelvol - deletes the replication volume

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsrpdelvol -h Server-Name [-e] [-d] Original-Volume-Name Replica-Volume-
Name
```

DESCRIPTION

This command deletes the replication volume information that has been set.
If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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@ Managed-Server-Name*".

Specifies the AdvancedCopy Manager device name 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@ Managed-Server-Name*".

Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Delete replication volume information on Managed 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 Managed Server that executed the command is not the operation server of the replication volume.

  - Communication with a 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, then unmanaged sessions remain. In this event, ETERNUS Web GUI 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 buffer settings change command)

  - swsrpstartsync (Synchronous processing start command)

12.4.1.4 swsrprecbuffstat (REC buffer information display command)

NAME

swsrprecbuffstat - displays information for the REC buffer

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrprecbuffstat [-L] Volume-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsrprecbuffstat -h Server-Name [-L] Volume-Name
```

DESCRIPTION

This command displays information for the REC buffer used by ETERNUS Disk storage system when REC is performed in Consistency mode.
The following information will be displayed:

Title	Description
BoxID	The box identifier for the box connected to the server where the command was executed.
ID	The ID for the REC buffer.
Use	The attribute (usage) for the REC buffer. SEND : REC buffer for sending data RECV : REC buffer for receiving data
Rate	The usage rate of the REC buffer as a percentage. If the usage is SEND Displays the usage rate of the REC buffer as a percentage. This will never be 0%, even if REC is not being performed in Consistency mode. If the usage is RECV "0%" will always be displayed.

Title	Description
	"----" will be displayed if the REC buffer cannot be used.
RemoteBoxID	The box identifier for the box performing a remote copy.

DiskBuff	Displays the REC Disk buffer status only when -L option is specified:
	
	  - --- : REC buffer is used for receiving
	
	  - active : REC Disk buffer is available for use
	
	  - invalid : REC Disk buffer is not set
	
	  - warning(code=xx) : REC Disk buffer is available for use but there is a disk fault
	
	  - inactive(code=xx) : REC Disk buffer cannot be used
	
	  - not_support : REC Disk buffer is not supported
	
	The following codes are displayed at code=xx in the case of warning or inactive:
	
	  - 04 : Rebuild or other recovery operation is in progress (REC Disk buffer is available for use)
	
	  - 05 : RAID that comprises the REC Disk buffer has a fault
	
	  - 06 : The REC Disk buffer RAID group is being formatted
	
	  - 07 : Copy destination does not support REC Disk buffer
	
	  - 08 : A RAID that comprises the REC Disk buffer has no redundancy

DiskRate	Displays the busy rate as a percentage if the REC Disk buffer state is "active" or "warning" only when -L option is specified. If the REC Disk buffer is not being used, 0% is displayed. In cases other than the above, "---" is displayed.

OPTIONS

-h *Server-Name*

Specifies the name of a Managed Server.
This option can be specified only on a Management Server.

-L

This option specifies to display in extended format.
For the items displayed by this option, refer to the table in the description above.
Note that additional items corresponding to new functions in future versions might be displayed in future when this option is specified.

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 Managed Server where the command is executed.

Specifies the AdvancedCopy Manager device name as the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Display information for the REC buffer used by the REC, and replication is performed within the Managed Server "Server1":

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                              DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active   50%
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                              DiskBuff DiskRate
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA ---      ---
C:\>
```

- Display information for the REC buffer used by the REC in an environment where replication is being performed between Managed Server "Server1" and Managed Server "Server2":

  [Command executed on Managed Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                              DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active   0%
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB ---      ---
C:\>
```

  [Command executed on Managed Server "Server2"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d30p1@Server2 -L
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                              DiskBuff DiskRate
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA ---      ---
2  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA active   0%
C:\>
```

- Display information for the REC buffer used by the REC if a box where the copy source volume is located has been set up to make remote copies to multiple boxes, and replication is being performed between Managed Server "Server1" and Managed Server "Server2":

  [Command executed on Managed Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                              DiskBuff           DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB warning(code=08)   0%
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB ---                ---
3  SEND 12%  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC active             50%
4  RECV 0%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC ---                ---
5  SEND 12%  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD invalid            ---
6  RECV 0%   EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE ---                ---
7  SEND 12%  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF inactive(code=05)  ---
8  SEND 12%  GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG active             0%
C:\>
```

NOTES

- Information is displayed only for boxes that contain replication volumes for the server where the command was executed.

  If inter-box 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 REC buffers in both boxes.

- It will take a short time for changes to REC buffer settings to take effect, during which time the buffer may become unusable (the Rate column 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)

12.4.1.5 swsrprecbuffset (REC buffer settings change command)

NAME

swsrprecbuffset - changes the settings of the REC buffer

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} Volume-Name
```

To be executed on the 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 REC buffer used by ETERNUS Disk storage system when REC is performed in Consistency mode.
For information about the setting method of REC buffer, refer to "User's Guide Setup / Maintenance" of ETERNUS Web GUI.

OPTIONS

-h *Server-Name*

Specifies the name of a Managed Server.
This option can be specified only on a Management Server.

-Xbuffid *buffer-id*

Specifies the ID for the REC buffer.

-Xbuffuse {SEND|RECV}

Specifies the usage for the REC buffer.

SEND : REC buffer for sending data
RECV : REC 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 Managed Server where the command is executed.

Specifies the AdvancedCopy Manager device name as the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Change the attributes for the REC buffer used by the REC, and replication is being performed within the Managed Server "Server1":

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse RECV g1d10p1@Server1
swsrprecbuffset 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 = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND g1d20p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>
```

- Change the connected box for the REC buffer of the copy source volume , and replication is being performed between Managed Server "Server1" and Managed Server "Server2":

[Command executed on Managed Server "Server1"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND g1d20p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 2 -Xbuffuse RECV g1d20p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>
```

NOTES

- Settings for dedicated REC buffers must be made in advance.
  Change the settings while there are no Consistency mode sessions in either the ACTIVE or ERROR SUSPEND state.

  Information can be changed only for boxes 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 REC 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 (Synchronous processing start command)

12.4.2 Operation commands

This section describes operation commands for replication management.

12.4.2.1 swsrpstartsync (Synchronous processing start command)

NAME

swsrpstartsync - starts synchronous processing

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t]
[-Xda] From-Volume-Name To-Volume-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsrpstartsync -h Server-Name [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip |
-Xremain] [-t] [-Xda] From-Volume-Name To-Volume-Name
```

To be executed on the Managed Server: group specification

```
<program-directory>\bin\swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t]
[-Xda] [-Xreverse] -Xgroup Group-Name
```

To be executed on the Management Server: group specification

```
<program-directory>\bin\swsrpstartsync -h Server-Name [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip |
-Xremain] [-t] [-Xda] [-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 *Server-Name*

> This option is valid only on a Management Server.
> This option can be specified only on a Management Server.

-y

> Specifies inter-box synchronization in synchronous mode. This option is valid only when total copy is started for inter-box replication.
> Specify this option together with the -a option to start the split mode for inter-box synchronization in Automatic Split mode.
> Specify this option together with the -v option to start the mode in Manual Split mode.
> Specifying the -y option without the -a or -v option starts the mode in Automatic Split mode.
> Not specifying the -y, -k, and -i options sets Through mode.
> Synchronization in intra-box replication is always handled in synchronous 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.

-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.
> 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 Through 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 Through 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-operational servers is not performed.
> When this option is specified, volume status check processing and the pre-processing for the replication destination volume of a non-operational server are not performed.
> This option is valid only during server-to-server replication.

-t

> Specifies that pre-processing for the replication destination volume is not performed.
> Use this option 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 boxes is restarted after a forcible suspend.

*: If you specify this option to start or resume synchronous processing, specify the -t option also when executing swsrpmake (Replication creation command).

-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.

-Xda

Disables update (WRITE) and access (READ) to the replication destination volume from the synchronous processing start until the replication has been completed.
This option is valid only when synchronous processing is started.
If the option is omitted, only update (WRITE) to the replication destination volume is disabled.

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 the AdvancedCopy Manager device name 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 the AdvancedCopy Manager device name for the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Start replication from g1d1p1 of a Management Server to g2d1p1@TARG-SV of Managed Server SRC-SV:

```
C:\>C:\ETERNUS_SF\ACM\bin\swsrpstartsync -h SRC-SV g1d1p1 g2d1p1@TARG-SV
FROM=g1d1p1@SRC-SV,TO=g2d1p1@TARG-SV swsrpstartsync completed
C:\>
```

- Start replication from g1d1p1 of a Management Server to g2d1p1@TARG-SV of a Managed Server SRC-SV with replication destination volume access disabled.

```
C:\>C:\ETERNUS_SF\ACM\bin\swsrpstartsync -h SRC-SV -Xda 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 Managed 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.

    - The -g option is specified, except for a remote copy.

    - The backup management function is executing a process for 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 above mentioned 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 12.22 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 "13.1.1 General notes" for notes about starting replication.

- An error will occur if the synchronous process is restarted with -Xda option. When changing the access permission for replication destination volume, please first cancel the current replication processing with swsrpcancel (Replication cancellation command) and then restart this command.

- This command will terminate abnormally with the following error message if the -Xda option is set for an ETERNUS Disk storage system that does not support the Destination Access Permission function.

```
swsrp0719 EC cannot be run. Error=17(not support.)
```

- 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 buffer settings change command)

    - swsrprecoverres (Resource adjustment command)

    - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

12.4.2.2 swsrpmake (Replication creation command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To be executed on the Managed Server

Synchronized replication

> `<program-directory>`\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur | -C | -P]) *From-Volume-Name To-Volume-Name*

Snapshot replication

> `<program-directory>`\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) *From-Volume-Name To-Volume-Name*

To be executed on the Management Server

Synchronized replication

> `<program-directory>`\bin\swsrpmake -h *Server-Name* [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur | -C | -P])*From-Volume-Name To-Volume-Name*

Snapshot replication

> `<program-directory>`\bin\swsrpmake -h *Server-Name* [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) *From-Volume-Name To-Volume-Name*

To be executed on the Managed Server: group specification

Synchronized replication

> `<program-directory>`\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -Xgroup *Group-Name*

Snapshot replication

> `<program-directory>`\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-Xreverse] -Xgroup *Group-Name*

To be executed on the Management Server: group specification

Synchronized replication

> `<program-directory>`\bin\swsrpmake -h *Server-Name* [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -Xgroup *Group-Name*

Snapshot replication

> `<program-directory>`\bin\swsrpmake -h *Server-Name* [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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 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 when applied to either of the following conditions:

- Pre-processing and post-processing for copy destination volume is not performed by AdvancedCopy Manager but independent pre-processing and post-processing is added in before and after AdvancedCopy Manager commands.

- Pre-processing and post-processing for copy destination volume is determined to be unnecessary (e.g. Database created on RAW device)

If you specify the -t option to execute swsrpstartsync (Synchronous processing start command), specify the -t option also when executing this command.

-Xflush

Specifies the flushing of the file system buffer of 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.

When this option is omitted, the flushing of file system buffer of the copy source volume and locking of the copy source volume are based on the value of 'BufferFlushOnly' in the copy source volume locking specification file. 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 intra-box replication. This option can only be used for intra-box replication; if attempted for intra-box 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 boxes, execute swsrpstartsync (Synchronous processing start command) with the -t option specified.

-T

Specifies that differential snapshot processing will be executed.

This option cannot be specified while synchronous processing is performed.

This option is valid only for a replication within the ETERNUS Disk storage system and when the ETERNUS Disk 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 suspend function.

This option is not supported when GDS Snapshot linkage is being used.

Xconcur-opc

Specifies that a replication will be created using the concurrent OPC function.

This option is not supported when linking with GDS Snapshot.

-C

Specifies that SnapOPC will be started.
This option is only valid for intra-box replications and for ETERNUS Disk storage system that supports 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-box replications and for ETERNUS Disk storage system that supports 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.

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 the AdvancedCopy Manager device name 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 the AdvancedCopy Manager device name for the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- On a Management Server, direct replication of g1d1p1 to g2d1p1@TARG-SV for Managed Server SRC-SV:

```
C:\>C:\ETERNUS_SF\ACM\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:\>
```

- Creates a copy for the group "GRP1" by using the concurrent OPC:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -Xgroup GRP1 -Xconcur-opc
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 Managed 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.

  - 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 is executing a process for a specified source or destination volume

  - From the copy destination server, the command was executed with both -Xconcur and -m options specified simultaneously for any of the following ETERNUS Disk storage systems:

    - ETERNUS DX80/DX80 S2 (for firmware version numbers before V10L30)

    - ETERNUS DX90/DX90 S2 (for firmware version numbers before V10L30)

    - ETERNUS DX400/DX400 S2 series (for firmware version numbers before V10L30)

    - ETERNUS DX8000/DX8000 S2 series (for firmware version numbers before V10L30)

    - ETERNUS2000

    - ETERNUS4000

    - ETERNUS8000

- If the -Xgroup option is specified, processing will be terminated without creating a copy if the operation statuses of the replication volumes being processed include both snapshot-type replication and synchronous-type replication. Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

- Note the following when you specify the -Xconcur-opc option:

  - Specify this option together with the -Xgroup option.

  - If an error is detected by the preliminary check for the replication volumes to be processed, processing will be terminated without creating a copy.
    Refer to the following table for details of the preliminary checks:

Type	Details of the preliminary checks
Common	Check if a pair of synchronized replications is not exist in the group.

Type	Details of the preliminary checks
When the - T option is specified	Check if a pair of volumes which is in the tracking state and a pair of volumes on which the tracking is not executed are not mixed in the group.

- If this command is executed during the snapshot processing, start or restart the snapshot processing. Refer to the following table for details of copy operation:

OPC/SnapOPC/SnapOPC+

Operation status (Display by swsrpstat -L)	Copy operation
When the operation status of the replication volume in the group is in one of the following: - The concurrent OPC is defined. (Status is "readying".) - Copy is not executed. (Status is "----" and Trk is "----".) - Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".) - Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".) - Tracking is in progress. (Status is "----" and Trk is "on".) - SnapOPC is in progress. (Status is "copy-on-write".) - SnapOPC+ is in progress. (Status is "copy-on-write(active)" or "copy-on-write(inactive)".) - Error suspend status (Status is "failed".)	1. Copying that is in progress is terminated. 2. Define the concurrent OPC. Snapshot processing is newly started with the concurrent OPC specified.t

QuickOPC

Operation status (Display by swsrpstat -L)	Copy operation
When the operation status of the replication volume in the group is in one of the following: - The concurrent OPC is defined. (Status is "readying".) - Copy is not executed. (Status is "----" and Trk is "----".) - Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".) - SnapOPC is processing (Status is "copy-on-write") - SnapOPC+ is processing (Status is "copy-on-write(active)" or "copy-on-write(inactive)")	1. Copying that is in progress is terminated. 2. Define the concurrent OPC. 3. Differential snapshot processing is newly started with the concurrent OPC specified.

Operation status (Display by swsrpstat -L)	Copy operation
- Error suspend status (Status is "failed".)	

When the operation status of the replication volume in the group is in one of the following:
 	
  - Snapshot processing is in progress and tracking is in progress.
    (Status is "snap" and Trk is "on".)
 	
  - Tracking is in progress.
    (Status is "----" and Trk is "on".)
	Differential snapshot processing is restarted with the concurrent OPC specified.

- 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 the -f or -t option is specified, the pre-processing and post-processing are not performed.

- 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.

- When the -Xflush option is omitted and the value of 'BufferFlushOnly' in the copy source volume locking specification file is 'off', this command sets the replication source volume before creating a replica so that other processes cannot access the volume. The replication source volume is locked in order to disable to access it. If you cannot lock the source volume 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, use the default setting that the file system buffer is flushed.

    - 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.

- 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 cancelling 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 12.23 Copy operation when command is executed during snapshot processing

Operation status (Display by swsrpstat -L)	-T option specification	Copy operation
Copy is not executed. (Status is "----" and Trk also is "----".)	No	Ordinary snapshot processing is started.
Copy is not executed. (Status is "----" and Trk also is "----".)	Yes	Differential snapshot processing is started.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	No	Copying that is in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	Yes	Copying in progress is terminated and differential snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	No	Copying in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	Yes	Differential snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	No	Tracking processing is terminated and ordinary snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	Yes	Differential snapshot processing is restarted.

- Refer to "13.1.1 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 buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

12.4.2.3 swsrpstat (Operation status display command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrpstat [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O] [Original-
Volume-Name]
```

To be executed on the Management Server

```
<program-directory>\bin\swsrpstat -h Server-Name [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O]
[Original-Volume-Name]
```

To be executed on the Managed Server: group specification

```
<program-directory>\bin\swsrpstat [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O] -Xgroup Group-
Name
```

To be executed on the Management Server: group specification

```
<program-directory>\bin\swsrpstat -h Server-Name [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-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 Managed Server name.
Original-Volume	Displays a replication source volume name.
Replica-Volume	Displays a replication destination volume name.
Direction	Displays the copy direction if a copy session exists. regular : Copying from the replication source to the replication destination is being performed. reverse : Copying from the replication destination to the replication source is being performed. ---- : Copying is not being performed.
Status	Displays the execution status. ---- : Copying is not being performed. readying : The concurrent OPC has been defined. 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). halt(use-buffer) : A line fault occurred and the REC buffer is in use. (*1) halt(use-disk-buffer) : A line fault occurred and the REC Disk buffer is in use. (*1) snap : OPC or QuickOPC processing is being performed. ????? : Failed to get copy status.

Title	Description

	*1: "halt(use-buffer)" and "halt(use-disk-buffer)" are output when the following two conditions are fulfilled:
	
	   - The -H option was specified, and
	
	   - In inter-server replication, this command was executed on the replication source server of REC.

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. sync : Synchronous mode async : Through 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. 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.
Copy-DA (Copy Destination Access)	Displays the access permission for the replication destination volume. on : Access is not being permitted. off : Access is being permitted. When an ETERNUS Disk storage system does not support the Destination Access Permission function or the SDX objects is specified with the units of logical volumes, 'off' is displayed.
Date	If a copy session exists, a timestamp in the [yyyy/mm/dd hh:mm:ss] format is displayed for the last status transition of the copy session as described below. The timestamp is relative to the time zone settings of the specified storage system.

Title	Description

	[For the OPC and QuickOPC]
	
	  - Starting the logical copy (Execution the "swsrpmake" or "swsrpmake -T")
	
	  - Changing to error suspend status (The Status is "failed")
	
	[For the SnapOPC and SnapOPC+]
	
	  - Starting the logical copy (Execution the "swsrpmake -C" or "swsrpmake -P")
	
	  - Changing to error suspend status (The Status is "failed")
	
	[For the EC]
	
	  - Suspend (Execution the "swsrpmake")
	
	  - Concurrent suspend (Execution the "swsrpmake -Xconcur")
	
	  - Changing to error suspend status (The Status is "failed")
	
	[For the REC]
	
	  - Starting the REC by initial copy skip function (Execution the "swsrpstartsync -Xskip")
	
	  - Suspend (Execution the "swsrpmake") (*1)
	
	  - Concurrent suspend (Execution the "swsrpmake -Xconcur")
	
	  - Changing to error suspend status (The Status is "failed")
	
	  - Changing to hard suspend status (The Status is "halt")
	
	*1: When a forced suspend is performed on a REC session in hardware suspend condition, the timestamp of the last execution is initialized as "----/--/-- --:--:--". When a forced suspend is performed while copy is executing, its timestamp is not updated.
	
	"----/--/-- --:--:--" is displayed in the following situations:
	
	  - There is no copy session (Status column is "----")
	
	  - Copy status could not be obtained from the storage system (Status column is "?????")
	
	  - Transition between no copy session and start of a synchronous EC/REC initial copy (swsrpstartsync) is started under the condition of no copy session.
	
	  - The REC session is recovered automatically from the hardware suspend status (The Status is "halt")
	
	  - The storage system where last execution timestamp function is not supported
	
	  - The SDX objects being set per logical volume

OPTIONS

-h *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a Management Server.

-L

Specifies that display will be in extension format.
For the items displayed by this option, refer to the table in the description above.

-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 column 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.

If the transfer mode is Consistency mode and a REC Disk buffer is set, "halt(use-disk-buffer)" will be displayed when issue of a hard suspend causes transfer data to be saved to the REC Disk buffer.

If the transfer mode is Consistency mode and a REC buffer is set, "halt(use-buffer)" will be displayed when issue of a hard suspend causes transfer data to be saved to the REC buffer.

-O

Changes the error suspend(failed) status Status column 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)"

-Xda

Displays the access permission settings for copy destination volume.

-Xdate

Displays the timestamp of the last copy session status transition.

-Xall

Displays the all information.
For the items displayed by this option, refer to the example following.
Note that the items displayed by this option may be subject to change in a future release.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "*Volume-Name*@*Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name 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 Managed 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 Managed Server (SRC-SV) be displayed on the Management Server:

```
C:\>C:\ETERNUS_SF\ACM\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 regular   ----                  ----
```

```
SRC-SV g1d3p1@SRC-SV   g2d3p1@TARG-SV reverse   snap                    45%
SRC-SV g1d1p1@SRC-SV   g1d2p1@TARG-SV regular   copy-on-write(inactive) ----
SRC-SV g1d1p1@SRC-SV   g1d3p1@TARG-SV regular   copy-on-write(inactive) ----
SRC-SV g1d1p1@SRC-SV   g1d4p1@TARG-SV regular   copy-on-write(active)   ----
C:\>
```

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -L option specified):

```
C:\>C:\ETERNUS_SF\ACM\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 regular   ----                   ----    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:\>
```

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -Xall option specified):

```
C:\>C:\ETERNUS_SF\ACM\bin\swsrpstat -h SRC-SV -Xall
Server Original-Volume Replica-Volume Direction Status    Execute Trk  Update Rcv  Split Xfer
Snap-Gen Copy-DA Date
SRC-SV g1d1p1@SRC-SV   g2d1p1@TARG-SV regular   replicated ----    ---- ----  auto ---- async
----     on     2010/10/20 22:00:45
SRC-SV g1d2p1@SRC-SV   g1d4p1@TARG-SV ----      ----       ----    on   6%    ---- ---- ----
----     off    2010/10/20 22:10:39
SRC-SV g1d3p1@SRC-SV   g1d5p1@TARG-SV reverse   snap       45%     off  ----  ---- ---- ----
----     on     2010/10/21 22:00:23
#
```

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -Xdate option specified):

```
C:\>C:\ETERNUS_SF\ACM\bin\swsrpstat -h SRC-SV -Xdate
Server Original-Volume Replica-Volume Direction Status     Execute Date
SRC-SV g1d1p1@SRC-SV   g2d1p1@TARG-SV regular   replicated ----    2010/10/20 22:00:45
SRC-SV g1d2p1@SRC-SV   g1d4p1@TARG-SV ----      ----       ----    2010/10/20 22:10:39
SRC-SV g1d3p1@SRC-SV   g1d5p1@TARG-SV reverse   snap       45%     2010/10/21 22:00:23
#
```

NOTES

- When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to "11.4 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 buffer settings change command)

- swsrprecoverres (Resource adjustment command)

12.4.2.4 swsrpcancel (Replication cancellation command)

NAME

swsrpcancel - stops snapshot processing and synchronization processing

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrpcancel [-c] {([-f] [-t] [-m] [-b])|[-T]} [-Xflush] [-Xforce] From-
Volume-Name To-Volume-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsrpcancel -h Server-Name [-c] {([-f] [-t] [-m] [-b])|[-T]} [-Xflush] [-
Xforce] From-Volume-Name To-Volume-Name
```

To be executed on the Managed Server: group specification

```
<program-directory>\bin\swsrpcancel [-c] {([-f] [-t] [-m] [-b])|[-T]} [-Xreverse] [-Xflush] [-
Xforce] -Xgroup Group-Name
```

To be executed on the Management Server: group specification

```
<program-directory>\bin\swsrpcancel -h Server-Name [-c] {([-f] [-t] [-m] [-b])|[-T]} [-Xreverse] [-
Xflush] [-Xforce] -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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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 cancelled 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 being 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 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.

When this option is omitted, the flushing of file system buffer of the copy source volume and locking of the copy source volume are based on the value of 'BufferFlushOnly' in the copy source volume locking specification file.

For details, refer to "C.2.4 Copy source volume locking specification file".

-b

Specifies that the inter-box copy operation in the halt status be stopped.
For replication on a single server, the copying is cancelled for both boxes.
For replication between servers, the copying is cancelled only for the box 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 the AdvancedCopy Manager device name 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 the AdvancedCopy Manager device name for the volume name.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- On the Management Server, direct that copying from g1d1p1 to g2d1p1@TARG-SV will be stopped for Managed Server SRC-SV:

```
C:\>C:\ETERNUS_SF\ACM\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 boxes.

- 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 Managed 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 backup management function is executing a process for 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 cancelling 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 cancelled 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 12.24 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.

  - 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 12.25 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.

Operation status (Display by swsrpstat -L)	Processing
Equivalency maintained status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.
Snapshot processing complete status and tracking processing in progress. (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

- When the -T option is specified

  command processing varies depending on the operation status of the source and destination volumes.

Table 12.26 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 buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

12.4.2.5 swsrpchsync (Synchronization mode change command)

NAME

swsrpchsync - changes the operation mode

SYNOPSIS

To be executed on the Managed 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 the 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 the Managed 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 the 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 *Server-Name*

Specifies the name of a Managed Server.
This option can be specified only on a 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 Through 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 the AdvancedCopy Manager device name 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 the AdvancedCopy Manager device name for the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- From Management Server to Managed 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 Through mode:

```
C:\>C:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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:\ETERNUS_SF\ACM\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 Through 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 Managed Server on which you execute the command is not the operation server for the replica volume.

  - Synchronization from the specified source volume to the destination volume is not secured.

  - Synchronization from the specified source volume to the destination volume is in error-suspended status (with "failed" indicated as the Status by swsrpstat (Operation status display command) or hard-suspended status (with "halt" indicated as the Status by swsrpstat (Operation status display command).

  - The ETERNUS Disk storage system in which the specified original/replica volume is placed do 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 buffer settings change command)

  - swsrprecoverres (Resource adjustment command)

  - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

12.4.2.6 swsrprevsync (Synchronization reverse command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrprevsync From-Volume-Name To-Volume-Name
```

To be executed on the Management Server

```
<program-directory>\bin\swsrprevsync -h Server-Name From-Volume-Name To-Volume-Name
```

To be executed on the Managed Server: group specification

```
<program-directory>\bin\swsrprevsync [-Xreverse] -Xgroup Group-Name
```

To be executed on the 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 *Server-Name*

Specifies the name of a Managed Server.
This option can be specified only on a 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 the AdvancedCopy Manager device name 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 the AdvancedCopy Manager device name for the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- From Management Server to Managed Server: Instruct SRC-SV to reverse the copying direction of synchronization between g1d2p1@SRC-SV and g2d2p1@TARG-SV:

```
C:\>C:\ETERNUS_SF\ACM\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 Managed Server on which you execute the command is not the operation server for the replica volume.

    - Replication has not been established in synchronization from the specified source volume to the destination volume.

    - The ETERNUS Disk storage system in which the specified original/replica volume is placed do 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 buffer settings change command)

    - swsrprecoverres (Resource adjustment command)

    - swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

12.4.3 Maintenance commands

This section describes the maintenance commands for replication management.

12.4.3.1 swsrprecoverres (Resource adjustment command)

NAME

swsrprecoverres - executes recovery to make replication management information

SYNOPSIS

To be executed on the Managed Server

```
<program-directory>\bin\swsrprecoverres [-r] [-p]
```

To be executed on the 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 *Server-Name*

Specifies a Managed Server name.
This option can be specified only on a 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 Management Server repository is downloaded to the Managed Server, and the replication volume information is restored.
The ETERNUS Disk 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 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 Managed 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 Managed Server on which the processing was performed and on the Managed 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 swsrpmake (Replication creation command) is interrupted without completing its process and the remaining processing must be completed, the replication post-processing is executed.

- This command cannot be executed while any of the following commands are running:

    - swsrpsetvol (Replication volume information setting command)

    - swsrpvolinfo (Replication volume information display command)

    - swsrpdelvol (Replication volume information deletion command)

    - swsrprecbuffset (REC buffer settings change command)

    - swsrpstartsync (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)

    - swsrpvssrestore_exchange (Exchange VSS restore execution command)

    - swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

    - swsrpshadowadm (Shadow copy management command)

12.5 Exchange Server Associated Commands

This section explains the command which AdvancedCopy Manager Exchange support software provides.

It is necessary to execute an Exchange Server associated 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 12.27 Operating environment when executing Exchange Server associated 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.

Command	Operating environment of AdvancedCopy Manager
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	-
eternus_provider	-
eternus_copyset	The services of the Management Server, Managed 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 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 12.28 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.

Command	Environment variable	Command execution node	Remarks
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.
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

Available copy functions in the backup operation are different depending on the version of Exchange Server.

- For Exchange Server 2003

  Backup operation by OPC, QuickOPC, EC, or REC is available.

- For Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013

  Backup operation by OPC or QuickOPC is available.

12.5.1 swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command)

NAME

swsrpdbinfo_ex2k3/swsrpdbinfo_exchange - registers or deletes information about a storage group or database.

SYNOPSIS

For Exchange Server 2003:

To register information of Exchange database

```
<program-directory>\bin\swsrpdbinfo_ex2k3 [-evs Virtual-Server-Name] [-sgname Storage-Group-
Name]
```

To delete information of Exchange database

```
<program-directory>\bin\swsrpdbinfo_ex2k3 [-evs Virtual-Server-Name] -clean
```

For Exchange Server 2007:

To register information of Exchange database

```
<program-directory>\bin\swsrpdbinfo_exchange [-evs Virtual-Server-Name] [-sgname Storage-Group-
Name]
```

To delete information of Exchange database that is not mounted or does not exist

```
<program-directory>\bin\swsrpdbinfo_exchange [-evs Virtual-Server-Name] -clean
```

To delete information of Exchange database regardless of the database status

```
<program-directory>\bin\swsrpdbinfo_exchange -delete [-sgname Storage-Group-Name]
```

For Exchange Server 2010, Exchange Server 2013:

To register Exchange database information

```
<program-directory>\bin\swsrpdbinfo_exchange [-dbname Database-Name]
```

To delete information of Exchange database that is not mounted or does not exist

```
<program-directory>\bin\swsrpdbinfo_exchange -clean
```

To delete information of Exchange database regardless of the database status

```
<program-directory>\bin\swsrpdbinfo_exchange -delete [-dbname Database-Name]
```

DESCRIPTION

This command registers or deletes information about a storage group or database.

The command is used before Exchange Server backup/restore is performed, or after the file configuration of a storage group (database) is changed.

Executing the command registers or deletes information about the files that constitute a storage group (database) 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 when registering the Exchange database information, information on all storage groups are registered.
If this option is omitted when deleting the Exchange database information with -delete option, information on all storage groups are deleted.
The database name containing a space needs to attach double quotation marks (" ")

-dbname *Database-Name*

Specifies the database name.
If this option is omitted when registering the Exchange database information, information on all databases are registered.
If this option is omitted when deleting the Exchange database information with -delete option, information on all databases are deleted.
The database name containing a space needs to attach double quotation marks (" ")

-clean

Specifies when deleting information of the database that is not mounted or does not exist.
If you delete the database information of Exchange Server 2013, execute this command after deleting the Exchange database information.

-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.

-delete

Specifies when deleting information of the registered storage groups or database whether or not they are mounted.
This option is available for Windows Server 2008 or later 64bit environment.

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:\>
```

- Register database MailBox1:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname MailBox1
swsrpdbinfo_exchange successfully completed
C:\>
```

- Delete unnecessary storage group information or database information:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -clean
swsrpdbinfo_exchange successfully completed
C:\>
```

- Delete the database MailBox2, regardless of the database status:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -delete -dbname MailBox2
swsrpdbinfo_exchange successfully completed
C:\>
```

NOTES

- The command cannot register database information if:

  - The specified storage group does not exist.

  - The specified database does not exist.

- For Exchange Server 2007, in condition that all the stores (databases) in the storage groups 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.

- For Exchange Server 2010 or Exchange Server 2013, mount databases before execute this command.

- 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)

- swsrpvssrestore_exchange (Exchange VSS restore execution command)

- swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

- swsrpshadowadm (Shadow copy management command)

12.5.2 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]`

To display information on all storage groups registered by swsrpdbinfo_exchange (Exchange database information registration command)

> `<program-directory>\bin\swsrpdevdisp_exchange -reg`

For Exchange Server 2010, Exchange Server 2013:

To display information on a specific storage group

> `<program-directory>\bin\swsrpdevdisp_exchange -dbname Database-Name`

To display information on all storage groups used for Exchange

> `<program-directory>\bin\swsrpdevdisp_exchange`

To display information on all databases registered by swsrpdbinfo_exchange (Exchange database information registration command)

```
<program-directory>\bin\swsrpdevdisp_exchange -reg
```

DESCRIPTION

This command displays the information registered with swsrpdbinfo_ex2k3/swsrpdbinfo_exchange (Exchange database information registration command). The command displays the files constituting a storage group or database and the AdvancedCopy Manager device name.

OPTIONS

-sgname *Storage-Group-Name*

Specifies the storage group name.
If this option is omitted, information on all storage groups is displayed.
The database name containing a space needs to attach double quotation marks (" ")

-dbname *Database-Name*

Specifies the database name.
If this option is omitted, information on all databases are registered.
The database name containing a space needs to attach double quotation marks (" ")

-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.

-reg

Displays all the database information registered by swsrpdbinfo_exchange (Exchange database information registration command).
Even if some database existing in Exchange are not registered, only the registered database is displayed.
This option is available for Windows Server 2008 or later 64bit environment.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- 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:

```
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:\>
```

- With Exchange Server 2010 or Exchange Server 2013, display device information on database Mailbox1:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdevdisp_exchange -dbname Mailbox1
Store: Mailbox1
  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:\>
```

- Display all the database information registered by swsrpdbinfo_exchange (Exchange database information registration command):

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdevdisp_exchange -reg
Store: Mailbox1
  EDB:F:\db\Mailbox1.edb              AdvancedCopy Manager Device:g1d401p1
  TransactionLog=G:\log\E01.log        AdvancedCopy Manager Device:g1d394p1
  CheckPointFile=G:\log\E01.chk        AdvancedCopy Manager Device:g1d394p1
Store: Mailbox2
  EDB:E:\db\Mailbox2.edb              AdvancedCopy Manager Device:g1d400p1
  TransactionLog=H:\log\E02.log        AdvancedCopy Manager Device:g1d400p2
  CheckPointFile=H:\log\E02.chk        AdvancedCopy Manager Device:g1d400p2
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.

  - When you attempt to display all database information without registering all of them in AdvancedCopy Manager.

  - No database information is registered when displaying all the database information registered by swsrpdbinfo_exchange (Exchange database information registration command) using the -reg option.

- This command cannot be executed while the following command is being executed:

  - swsrprecoverres (Resource adjustment command)

12.5.3 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, Exchange Server 2010 or Exchange Server 2013, 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 ETERNUS Disk storage system 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.

12.5.4 swsrpvssbackup_exchange (Exchange VSS backup execution command)

NAME

swsrpvssbackup_exchange - backup of a Storage group or a database

SYNOPSIS

For Exchange Server 2003, Exchange Server 2007:

```
<program-directory>\bin\swsrpvssbackup_exchange [-evs Virtual-Server-Name] [-skipchk] -sgname
Storage-Group-Name [-copygrp Copyset-Group-Name]
```

For Exchange Server 2010, Exchange Server 2013:

```
<program-directory>\bin\swsrpvssbackup_exchange [-skipchk] -dbname Database-Name
```

DESCRIPTION

This command cooperates with VSS to perform an on-line backup of a Storage group or a database.

The command performs the following processing:

1. By using VSS and AdvancedCopy, the backup data of a Storage group or a database 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.

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	- Windows Server 2003 - If the copy set group name is "BkupGroup" (the default name) *<Environment directory>*\etc\repl\data\exchange*<Managed 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 directory>*\etc\repl\data\exchange*<Managed Server name of Exchange server>*\metadoc*<Storage group name>*.*<Copy set group name>*.wmd.xml

File	Output place
	- Windows Server 2008 or later *<Environment directory>*\etc\repl\data\exchange*<Managed Server name of Exchange server>*\metadoc*<storage group name or database name>*.wmd.xml
Backup component Document	- Windows Server 2003 - If the copy set group name is "BkupGroup" (the default name) *<Environment directory>*\etc\repl\data\exchange*<Managed Server name of Exchange server>*\metadoc*<Storage group name>*.bcd.xml - If the copy set group name is anything other than "BkupGroup" (the default name) *<Environment directory>*\etc\repl\data\exchange*<Managed Server name of Exchange server>*\metadoc*<Storage group name>*.*<Copy set group name>*.bcd.xml - Windows Server 2008 or later *<Environment directory>*\etc\repl\data\exchange*<Managed Server name of Exchange server>*\metadoc*<storage group name or database name>*.bcd.xml

OPTIONS

-sgname *Storage-Group-Name*

A Storage group name is specified.
The storage group name containing a space needs to attach double quotation marks (" ")

-dbname *Database-Name*

A database 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 Windows Server 2008 or later.

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:\>
```

- Back up database Mailbox1:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname Mailbox1
swsrpvssbackup_exchange successfully completed
C:\>
```

NOTES

- Backup cannot be executed in the following cases:

  - When the database information on the specified Storage group or database is not registered by swsrpdbinfo_ex2k3/ swsrpdbinfo_exchange (Exchange database information registration command).

  - When the database composition of the specified Storage group or database 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 or database.

  - When a copy set which cannot be used for the target Exchange server exists in the specified storage group or database.

  - When not all of the copy set synchronous processes for the storage group are in an equivalency maintenance state.

  - When an error occurs with a hardware provider processing.

  - When an error is caused by a hardware provider command.

  - 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 "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") (*1)

```
 http://support.microsoft.com/kb/822896/en
```

   (*1) For Exchange Server 2007, Exchange Server 2010 or Exchange Server 2013 verification for "*.stm" file is not required.

- When the command is cancelled
  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 or a database 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).

12.5.5 swsrpvssrestore_exchange (Exchange VSS restore execution command)

NAME

swsrpvssrestore_exchange - restore of a Storage group or a database

SYNOPSIS

For Exchange Server 2003, Exchange Server 2007:

```
<program-directory>\bin\swsrpvssrestore_exchange [-evs Virtual-Server-Name] (-point|-roll) -sgname
Storage-Group-Name [-copygrp Copyset-Group-Name]
```

For Exchange Server 2010, Exchange Server 2013:

```
<program-directory>\bin\swsrpvssrestore_exchange (-point|-roll) -dbname Database-Name
```

DESCRIPTION

This command cooperates with VSS to perform the restoration of a Storage group or a database.
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 or a database from the backup volume, a Storage group is restored to the time that the backup was created.

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.

OPTIONS

-sgname *Storage-Group-Name*

A Storage group name is specified.

The storage group name containing a space needs to attach double quotation marks (" ")

-dbname *Database-Name*

A database name is specified.

The database 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 Windows Server 2008 or later.

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:\>
```

- For the database Mailbox1, roll-forward restoration is performed:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -roll -dbname Mailbox1
swsrpvssrestore_exchange successfully completed
C:\>
```

- When the following conditions occur, this command terminates abnormally:

    - When the database information on the specified Storage group or database 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).

    - 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 or database.

    - 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. (Applies under Windows Server 2008 or later)

- 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)

12.5.6 swsrpshadowadm_exchange (Exchange VSS shadow copy management command)

NAME

swsrpshadowadm_exchange - shadow copy management of a Storage group or a database

SYNOPSIS

For Exchange Server 2003, Exchange Server 2007:

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]
```

For Exchange Server 2010, Exchange Server 2013:

When the state display of a shadow copy is performed

```
<program-directory>\bin\swsrpshadowadm_exchange status [-copy | -shadow] -dbname Database-Name
```

When a shadow copy is deleted

```
<program-directory>\bin\swsrpshadowadm_exchange delete -dbname Database-Name
```

When a QuickOPC is stopped

```
<program-directory>\bin\swsrpshadowadm_exchange stopqopc -dbname Database-Name
```

DESCRIPTION

This command allows management of the shadow copy of a Storage group or a database.

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 ETERNUS Disk storage system provider, respectively.

The contents of a display are described below.

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.

Title	Description
	OPC : OPC QOPC : QuickOPC EC : EC or 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.

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.

- An OPC physical copy is stopped by the hardware provider when a dedicated provider for AdvancedCopy Manager is used in Windows Server 2003.
  When ETERNUS VSS Hardware Provider is used in Windows Server 2008 or later, OPC physical copy is not stopped.

  The synchronous processing and QuickOPC are not stopped in both of the above.

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 (" ")

-dbname *Database-Name*

> A database name is specified.
> The database 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.

-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 Windows Server 2008 or later.

Specific options of the state display (i.e., the status) of a shadow copy

> **-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.

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 ----    ----     ----  ----
```

- For the database "Mailbox1", the status of the shadow copies is displayed:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname Mailbox1
[Shadow Copy Status]
Original-Volume                  Replica-Volume                   Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2010/07/04 07:23
{XXXX}     {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2010/07/04 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 database "Mailbox1", the status of the shadow copies is displayed (when -shadow option is specified):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -shadow -dbname Mailbox1
Original-Volume                  Replica-Volume                   Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2010/07/04 07:23
{XXXX}     {XXXX}
g1d2p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d12p1@BKUP-SVR(\\?\Volume{XXXX}\) 2010/07/04 07:23
{XXXX}     {XXXX}
C:\>
```

- For the database "Mailbox1", the status of the shadow copies is displayed (when -copy option is specified):

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -copy -dbname Mailbox1
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 database "Mailbox1", the shadow copies are deleted:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -dbname Mailbox1
swsrpshadowadm_exchange successfully completed
C:\>
```

- For the database "Mailbox1", the QuickOPC is stopped:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname Mailbox1
[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 -dbname Mailbox1
swsrpshadowadm_exchange successfully completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname Mailbox1
[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 ----   ----    ---- ----
C:\>
```

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 session has a fault (this only affects the state display function).

    - When an error occurs with a hardware provider processing.

    - When an error is caused by a hardware provider command.

    - 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)

12.5.7 swsrpstat_exchange (Exchange operation status display command)

NAME

swsrpstat_exchange - displays restoration status of a Storage group or a database.

SYNOPSIS

For Exchange Server 2003, Exchange Server 2007:

```
<program-directory>\bin\swsrpstat_exchange [-Xdevmap Device-Map-File ] -sgname Storage-Group-Name
```

For Exchange Server 2010, Exchange Server 2013:

```
<program-directory>\bin\swsrpstat_exchange [-Xdevmap Device-Map-File] -dbname Database-Name
```

DESCRIPTION

This command displays restoration status of the specified storage group or database.

Refer to swsrpstat (Operation status display command) for display information and notes.

OPTIONS

-sgname *Storage-Group-Name*

Specifies the storage group name.

-dbname *Database-Name*

Specifies the database name.
The database name containing a space needs to attach double quotation marks (" ").

-Xdevmap *Device-Map-File*

Specifies the name of the device map file that defines the combinations of transaction 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 or database 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
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%
C:\>
```

- Display the operation status of the database "Mailbox1". Assume that the device map file that defines the associations between transaction volumes (i.e., the database volumes) and backup volumes is K:\DB\DEV.map:

```
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -Xdevmap K:\DB\DEV.map -dbname
Mailbox1
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%
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 (Replication cancellation command) to stop operation.
halt	A hardware error has occurred during replication between boxes. Fix the hardware error and use swsrpcancel (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)

12.5.8 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 ETERNUS Disk storage system 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.

Title	Description
Original-Machine	The machine name (computer name) in which reproducing agency volume exists is displayed.
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 ETERNUS Disk storage system provider is deleted from the VSS of a backup server.
An OPC physical copy is stopped by the hardware provider when a dedicated provider for AdvancedCopy Manager is used in Windows Server 2003.
When ETERNUS VSS Hardware Provider is used in Windows Server 2008 or later, OPC physical copy is not stopped.
The synchronous processing and QuickOPC are not stopped in both of the above.

OPTIONS

-id *Snapshot-ID*

A shadow copy with the specified snapshot ID is deleted.

-all

All the shadow copies created by the ETERNUS Disk storage system 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:\>
```

- 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)

12.5.9 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 the ETERNUS Disk storage system 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 clustered 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.

12.5.10 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 Server-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 *Server-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 AdvancedCopy Manager

Server-Name

The server name of the Managed Server registered in AdvancedCopy Manager 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 AdvancedCopy Manager

Server-Name

The server name of the Managed Server registered in AdvancedCopy Manager 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 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 (Exchange VSS backup execution command)

12.5.11 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 (Exchange VSS backup execution command)

12.5.12 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 (Exchange VSS backup execution command)

12.5.13 eternus_query (Status query command)

NAME

eternus_query - displays the status of OPC, EC, or QuickOPC

SYNOPSIS

`<program-directory>\bin\eternus_query Server-Name`

DESCRIPTION

This command displays the status of OPC, EC, or 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 Copy 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). halt(equivalent) : Hard-suspended status for the REC (occurs during REC equivalency maintenance state). 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.

Title	Description
	Displays "----" during physical copying or when tracking is not in progress

OPERANDS

Server-Name

Specifies the server name for the Managed Server registered with AdvancedCopy Manager.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display the status of 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 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 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 (Exchange VSS backup execution command)

12.5.14 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 Managed 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 Managed 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 (Exchange VSS backup execution command)

12.5.15 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 Managed 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 Management Server.

- This command cannot be run during the execution of the following commands:

    - swsrpvssbackup_exchange (Exchange VSS backup execution command)

12.6 SQL Server Associated 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 associated 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 12.29 Operating environment when executing SQL Server associated commands

Command	Operating environment of AdvancedCopy Manager
swstbackup_sqlsvr	In EC operation, Windows services required by the Managed Server must be running.
swstrestore_sqlsvr	-
swsrpbackup_sql	In intra-server replication and EC operation, Windows services required by the Managed Server must be running. For inter-server replication, Windows services required by the Managed Servers in communication must be running (except when the -m 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 12.30 Commands when cluster operation is used

Command	Environment variable	Command execution node	Remarks
swstbackup_sqlsvr	Required	Transaction operation node	-

Command	Environment variable	Command execution node	Remarks
swstrestore_sqlsvr	Required	Transaction operation node	-
swsrpbackup_sql	Required	Transaction operation node	-
swsrprestore_sql	Required	Transaction operation node	-

> ⚑ **Note**
>
> SQL Server associated commands do not support the SnapOPC function.

12.6.1 Backup Management Commands

Swstbackup_sqlsvr and swstrestore_sqlsvr are used in the backup operation of an SQL Server by the backup management function.

12.6.1.1 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 Operation using 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 Operation using 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 box when the ETERNUS Disk 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

- 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 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 with a typical file system volume.

- If an error occurs while this 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 (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 12.1 Recovery from history information inconsistency
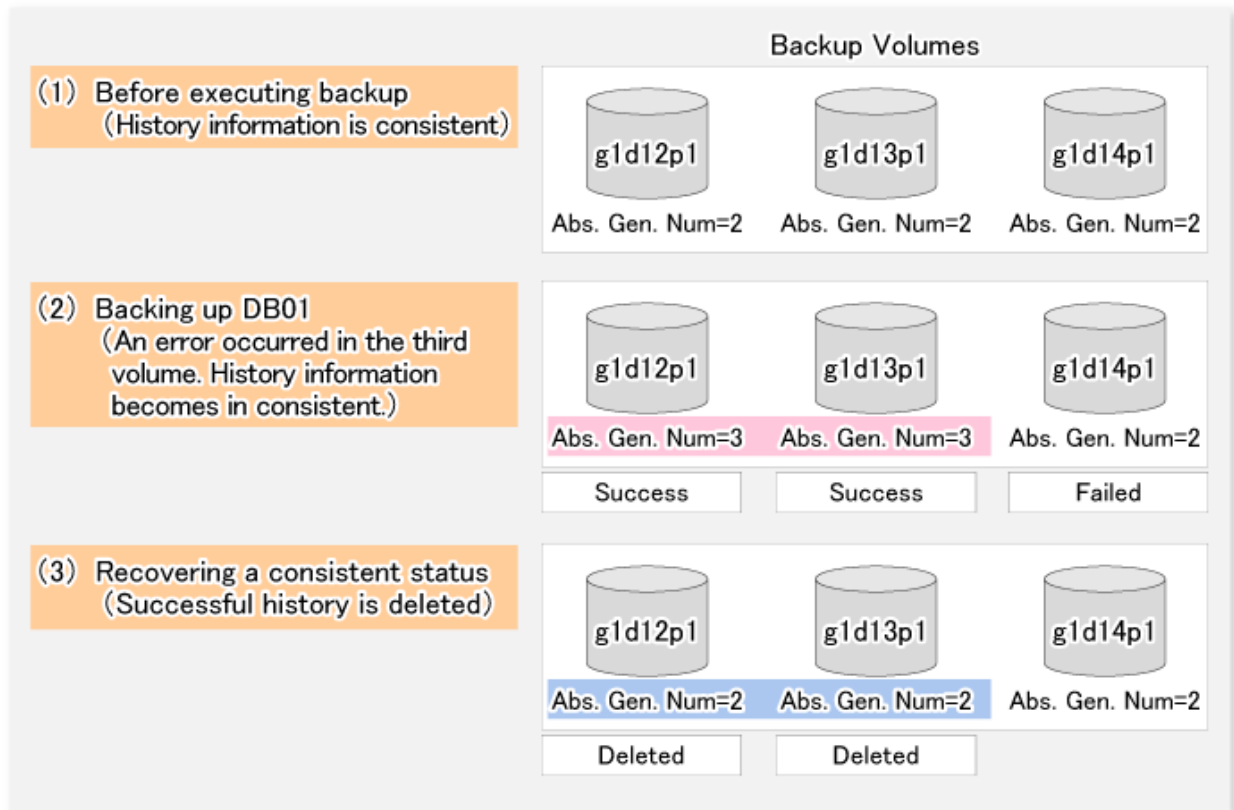
- Normally, if the existing backup history reaches the maximum number of saved generations specified by swstbkpolset (Backup policy setting command), then information on the oldest generation is automatically deleted from the backup history information during the backup process, and the backup volume 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 cancelling 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 (Managed Server configuration information setting command)

    - swstdevinfoset (Device information setting command)

    - swstsrsemtch (Resource match command)

    - swstresback (Resource backup command)

    - swstresrst (Resource restore command)

12.6.1.2 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)

12.6.2 Replication Management Commands

Swsrpbackup_sql and swsrprestore_sql are used in the backup operation of SQL Server by the replication management function.

12.6.2.1 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 box when the ETERNUS Disk 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 "10.4.1.3 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 Managed 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 this 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 (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 cancelling 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)

12.6.2.2 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

- 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)

12.7 Symfoware Cooperation Command

This section describes the Symfoware cooperation command used for Symfoware backup server operation.

Note

This command can be executed only with the users that belong to the Administrators group.

If the commands are executed with other user, "swsrp0601" error message is output and they end in error.

Note

Required environment for command execution

The environment required for command execution is shown in the table below:

Table 12.31 Required environment for Symfoware cooperation command execution

Command name	Required environment for AdvancedCopy manager
swsrpdbinfo_symfoware	This command is run on the Symfoware server. The Management Server daemon/services should be running.
swsrpbackup_symfoware	This command is run on the Symfoware server. In backup to a backup volume in the backup server, the backup server daemon/ services should be running (excluding when specifying the -m and -t options).
swsrprestore_symfoware	This command is run on the Symfoware server. In recovery from a backup volume in the backup server, the backup server daemon/ services should be running.
swsrphistory_symfoware	This command is run on the Symfoware server.

> **Note**

....

For cluster operation

For the commands in a cluster operation, take the following procedure:

1. As necessary, set the logical node name of a target service to SWSTGNODE, an environment variable. The environment variable setting method is as follows:

```
set SWSTGNODE= logica node name
```

2. Execute the command.

The commands, necessity of environment variable setting and command executed nodes in a cluster operation are shown in the table below. The notes for executing commands are mentioned in the Remarks column:

Table 12.32 Command when cluster is operated

Command name	Necessity of environment variable	Command executed node	Remarks
swsrpdbinfo_symfoware	Necessary	Service running node	Run on Symfoware server
swsrpbackup_symfoware	Necessary	Service running node	Run on Symfoware server
swsrprestore_symfoware	Necessary	Service running node	Run on Symfoware server
swsrphistory_symfoware	Necessary	Service running node	Run on Symfoware server

....

12.7.1 swsrpdbinfo_symfoware(Symfoware database information register/delete/display command)

NAME

swsrpdbinfo_symfoware(Symfoware database information register/delete/display command)

SYNOPSIS

Register Symfoware database information

```
<program-directory>\bin\swsrpdbinfo_symfoware set Log-Group-Name[/RDB-Name]
```

Delete Symfoware database information

```
<program-directory>\bin\swsrpdbinfo_symfoware delete Log-Group-Name[/RDB-Name]
```

Display Symfoware database information

```
<program-directory>\bin\swsrpdbinfo_symfoware disp [Log-Group-Name[/RDB-Name]]
```

DESCRIPTION

This command includes three functions.

- Registers Symfoware database information.

If the command is re-executed, database information is updated.

- Deletes Symfoware database information.

- Displays Symfoware database information.

  The following information is displayed:

Title	Explanation
Log-Group-Name/RDB-Name	Log group name and RDB system name are displayed. If there is no RDB system name, it is displayed as "-".
DB-Space-Name	Database space name is displayed.
Device	AdvancedCopy Manager device name is displayed.

This command is run on the Symfoware server.

OPERANDS

Log-Group-Name

Specify log group name.
Specify "system" for the database space that is not defined in a log group.
If *Log-Group-Name*[/*RDB-Name*] is omitted if Symfoware database information is displayed, specify Symfoware database information.

RDB-Name

Specify RDM system name after log group name with slash "/" as a separator character.
If there is no RDB system name, it is omitted.

EXIT STATUS

=0 : Completed successfully
>0 : Terminated abnormally

EXAMPLES

- Register log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware set LOG1/RDB1
LOG1/RDB1 swsrpdbinfo_symfoware completed
C:\>
```

- Delete database information for log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware delete LOG1/RDB1
LOG1/RDB1 swsrpdbinfo_symfoware completed
C:\>
```

- Display database information for log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware disp LOG1/RDB1
Log-Group-Name/RDB-Name DB-Space-Name Device
LOG1/RDB1               DB1.DBS1      g1d1p1
LOG1/RDB1               DB1.DBS2      g1d2p1
LOG1/RDB1               DB1.DBS3      g1d3p1
C:\>
```

- Display all database information.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_symfoware disp
Log-Group-Name/RDB-Name DB-Space-Name Device
LOG1/RDB1               DB1.DBS1      g1d1p1
LOG1/RDB1               DB1.DBS2      g1d2p1
LOG1/RDB1               DB1.DBS3      g1d3p1
LOG2/RDB1               DB2.DBS1      g1d11p1
LOG2/RDB1               DB2.DBS2      g1d12p1
```

```
LOG2/RDB1                  DB2.DBS3        g1d13p1
C:\>
```

12.7.2 swsrpbackup_symfoware(Symfoware backup command execution command)

NAME

swsrpbackup_symfoware(Symfoware backup command execution command)

SYNOPSIS

```
<program-directory>\bin\swsrpbackup_symfoware [-m] [-t] [-T] [-k] -Xgroup Group-Name [-Xdev Device-
Name] Log-Group-Name[/RDB-Name]
```

DESCRIPTION

This command performs online backup of database space cooperating with Symfoware.

This command is run on the Symfoware server.

OPTIONS

-m

n backup server operation (inter-server replication), specify not performing communication processing with a backup server (inactive server). If this option is specified, no volume status check and pre- and post-processing are not performed with respect to the backup volume.
This option is valid only for backup server operation.

-t

Specify not performing pre- and post-processing to a backup volume (copy destination volume).
AdvancedCopy Manager does not perform pre- and post-processings on the copy destination volume. Use this option only if unique pre- and post-processings are embedded before and after AdvancedCopy Manager commands.

-k

Perform backup by referecnce dump.
If this option is omitted, bakup is performed by normal dump.
In backup by reference dump, it is required to use the Symfoware "rdbrtr" command and set "Inhibit Update" (data unwritable status) to all DSI (expressing the storage structure of an actual table) within a transaction volume to be backed up.

-T

Specify performing differential snapshot high speed backups.
In snapshot high-speed backup for which this option is not specified, the existing snapshot processing (existing OPC) is started.

-Xgroup *Group-Name*

Specify group name of replication management function.

-Xdev *DeviceName*

Specify a device name corresponding to database space to be backed up.
Specify this option in either of the following cases:

- Back up database space contained in a log group individually.

- Back up the database space that is not defined in a log group.
  In this case, specify "system" for *Log-Group-Name*.

OPERANDS

Log-Group-Name

Specify log group name
Specify "system" for the database space that is not defined in a log group.

RDB-Name

Specify RDB system name after log group name with slash "/" as a separator character.
If there is no RDB system name, it is omitted.

EXIT STATUS

=0 : Completed successfully
>0 : Terminated abnormally

EXAMPLES

- Back up log group (LOG1/RDB1) by group (grp1) of replication management function.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_symfoware -Xgroup grp1 LOG1/RDB1
LOG1/RDB1 swsrpbackup_symfoware completed
C:\>
```

- Back up database space (DB1.DBS1(g1d1p1)) contained in log group (LOG1/RDB1) by group (grp1) of replication management function.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_symfoware -Xgroup grp1 -Xdev g1d1p1 LOG1/RDB1
LOG1/RDB1 swsrpbackup_symfoware completed
C:\>
```

NOTES

- swsrpmake (Replication creation command) is executed in this command. Please confirm notes of swsrpmake (Replication creation command) beforehand.

- In the following cases, the backup cannot be executed. Please deal according to "System administrator response" of the output message.

  - An error was detected during backup of Symfoware database spaces.

  - When during backup of transaction volumes with Symfoware's reference dump specified, multi-database spaces are being used.

12.7.3 swsrprestore_symfoware(Symfoware recovery execution command)

NAME

swsrprestore_symfoware(Symfoware recovery execution command)

SYNOPSIS

```
<program-directory>\bin\swsrprestore_symfoware [-a | -e EndPoint] [-l ArchiveLogFileList-FileName] [-
w Work-Directory] [-Xnolog Work-RecCtrlFile-Directory] -Xgroup Group-Name [-Xdev Device-Name | -
Xdevlist DeviceListFile] Log-Group-Name[/RDB-Name]
```

DESCRIPTION

This command performs database space recovery cooperating with Symfoware.

This command is run on the Symfoware server.

During recovery of database spaces, access to the relevant database spaces must not be permitted. In order to prohibit access, execute the "rdbinh" command provided by Symfoware. For details on these commands, refer to the *Symfoware Server RDB Operations Guide*.

If recovery of a database space fails due to insufficient space in the working directory, you can use the -w option to retry recoverytemporarily specifying a different directory.

OPTIONS

-a

Specify so that the entire database resource managed by the recovery control file is recovered to the point in time when backup was collected.
This option cannot be specified at the same time with the -e option.

-e *EndPoint*

Specify so that the entire database resource managed by the recovery control file is recovered to a specific point in time specified for end point.
For recovery end point, refer to the Symfoware Server manual.
This option cannot be specified at the same time with the -a option.
This option cannot be specified at the same time with the -Xnolog option, either.

-l *ArchiveLogFileList-FileName*

Specify with the absolute path a file in which archive log backup destination names required for Symforware recovery are listed.
The file in which archive log backup names are listed and the archive backup destinations written on the file should be stored in the Managed Server in which a transaction volume performing revocrey exists.
This option cannot be specified at the same time with the -Xnolog option.

-w *Work-Directory*

Specify a temporary working directory with the absolute path.
The directory name should be on the Managed Server in which a transactiom volume performing recovery exists.
When running the command on the Management Server, the directory should be on the Managed Server in which the transaction volume performing recovery exists.

-Xnolog *Work-RecCtrlFile-Directory*

An archive log is not applied at Symfoware recovery time.
Specify the directory that outputs the recovery control file required to apply the log and specify this directory when applying the log by the Symfoware command (rdbmrrcv).
If this option is specified to do recovery, database cannot be used till the log is applied by the Symfoware command (rdbmrrcv).

-Xdev *DeviceName*

Specify a device name corresponding to the database space to be recovered.
Specify this option in either of the following cases:

- Recover the database space contained in a log group.

- Recover the database space that is not defined in a log group.
  In this case, specify "system" for Log-Group-Name.

-Xdevlist *DeviceListFile*

Specify a device list file in which device names corresponding to database space to be recovered at one time are listed.
The device list file is allocated on the Symfoware server.
For the device list file description method, refer to "How to describe device list file".

OPERANDS

Log-Group-Name

Specify log group name.

Specify "system" for the database space that is not defined in a log group.

RDB-Name

Specify RDB system name after log group name with slash "/" as a separator character.

If there is no RDB system name, it is omitted.

EXIT STATUS

=0 : Completed successfully

>0 : Terminated abnormally

EXAMPLES

- Recover log group (LOG1/RDB1) by replication management function group (grp1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_symfoware -Xgroup grp1 LOG1/RDB1
LOG1/RDB1 swsrprestore_symfoware completed
C:\>
```

- Recover database space (DB1.DBS1(g1d1p1)) contained in log group (LOG1/RDB1) by replication management function group (grp1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_symfoware -Xgroup grp1 -Xdev g1d1p1 LOG1/RDB1
LOG1/RDB1 swsrprestore_symfoware completed
C:\>
```

- Recpver multiple database space contained in log group (LOG1/RDB1) by replication management function group (grp1). Multiple database space contained in the log group is specified in a device list file.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_symfoware -Xgroup grp1 -Xdevlist c:
\devlist.txt LOG1/RDB1
LOG1/RDB1 swsrprestore_symfoware completed
C:\>
```

NOTES

- swsrpmake (Replication creation command) is executed in this command. Please confirm notes of swsrpmake (Replication creation command) beforehand.

- Restoration or recovery cannot be executed in the following situations:

    - An error was detected when during recovery of Symfoware.

    - When the file stating the names of the archive log backup files contains an archive log backup file that is backed up on an MT (tape device).

- When the archive log files are stored on a different device at the time of recovering database spaces, the file which states the names of the backup locations for the archive logs and is required for recovery, must be stored beforehand on the Managed Server that contains the transaction volumes to be recovered. Refer to the *Symfoware Server RDB Operations Guide* for information on how to describe this file.

- Recovery cannot be performed if the specified "file that includes the name of the archive log's backup location" contains an archive log backup file that is backed up on an MT (tape device). For recovery using an archive log that is backed up on an MT, use one of the following methods:

    - Deploy all backed up archive logs from the MT to the working directory.

- Perform recovery without applying the log by specifying the -nolog option, and apply the archive log afterwards.

  In order to apply the archive log after recovery without the log, execute the Symfoware's "rdbmrrcv" command. Refer to the *Symfoware Server RDB Operations Guide* for details on applying archive logs.

- If you perform "recovery of a specific point in time by specifying the end point of recovery" or "recovery of the point in time of backup" during recovery of database spaces, processing to restore Symfoware's management information will also be implemented. Since this processing is implemented as a portion of recovery processing, it takes time for commands to be processed.

- For recovering the database space, simultaneously issuing this command two or more times will result in some of the commands terminating abnormally when they meet the following requirements. The order of command execution is dependent on the OS. Which command(s) will terminate abnormally is not predictable. For instance, the command executed first might terminate abnormally.

  - When multiple commands specify a transaction volume:

    Command(s) will terminate abnormally when multiple commands specify the same transaction volume or the specified transaction volumes use the same DSI. Details:

    - When multiple commands specify the same transaction volume.

    - When multiple commands specify different transaction volumes, but the transaction volumes use the same DSI.
      (A DSI contains information for two or more transaction volumes.)

    - When DSI of the table relates to DSI of INDEX even if the different transaction volumes (transaction volume where DSI of the table is stored and transaction volume where DSI of INDEX is stored) are specified by each command.

  - When multiple commands specify two or more transaction volumes:

    Command(s) will terminate abnormally when multiple commands specify transaction volumes that use the same log group. Details:

    - When the transaction volumes specified by different commands contain at least one of the same transaction volumes.

    - When the transaction volumes specified by different commands use the same log group, even though the transaction volumes do not contain any of the same transaction volumes.

  - When multiple commands specify a log group:

    - When multiple commands specify the same log group.

  - When a command specifies a transaction volume and another command specifies two or more transaction volumes:

    - When both commands specify a transaction volume that is included the same log group.

  - When a command specifies a log group and another command specifies other than log group:

    Command(s) will terminate abnormally when multiple commands specify resources in the same log group. Details:

    - When the log group specified by a command and the log group that includes transaction volume(s) specified by another command is the same log group.

12.7.4 swsrphistory_symfoware(Symfoware backup history delete/display command)

NAME

swsrphistory_symfoware(Symfoware backup history delete/display command)

SYNOPSIS

Delete Symfoware backup history

```
<program-directory>\bin\swsrphistory_symfoware delete (-Xgroup Group-Name [-Xdev Device-Name]| -z)
Log-Group-Name[/RDB-Name]
```

Display Symfoware backup history

```
<program-directory>\bin\swsrphistory_symfoware disp [Log-Group-Name[/RDB-Name]]
```

DESCRIPTION

This command includes the following two functions:

- Deletes Symfoware backup history.

- Displays Symfoware backup history.
  The following information is displayed:

Title	Explanation
Log-Group-Name/RDB-Name	Log group name and RDB system name are displayed. If there is no RDB system name, it is displayed as "-".
Group	Group name is displayed.
DB-Space-Name	Database space name is displayed.
Original-Volume	Transaction volume name (replication source volume name) is displayed.
Replica-Volume	Backup volume name (replication destination volume name) is displayed.
Backup-Date	Time and date of backup finish is displayed.
ArcSerial	Archive log serial number is displayed. For history information for backup done by reference dump, "reference" is displayed.

This command is run on the Symfoware server.

OPTIONS

-Xgroup *Group-Name*

Specify replication management function group name.
If the -Xdev option is omitted, delete all the backup histories backed up using Group-Name.

-Xdev *DeviceName*

Specify a device name corresponding to database space.
Specify this option at the same time with the -Xgroup option. Delete only the backup history of the specified device name among backup histories backed up using Group-Name.

-z

Delete all the backup histories in a log group.

OPERANDS

Log-Group-Name

Specify log group name.
Specify "system" for the database space that is not defined in a log group.

RDB-Name

Specify RDB system name after log group name with slash "/" as a speparator character.
If there is no RDB system name, it is omitted.

EXIT STATUS

=0 : Completed successfully
>0 : Terminated abnormally

EXAMPLES

- Delete all the Symfoware backup histoires in a log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_symfoware delete -z LOG1/RDB1
LOG1/RDB1 swsrphistory_symfoware completed
C:\>
```

- Delete Symfoware backup history by replication management function group (grp1) in log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_symfoware delete -Xgroup grp1 LOG1/RDB1
LOG1/RDB1 swsrphistory_symfoware completed
C:\>
```

- Delete Symfoware backup history by replication management function group (grp1) in database space (DB1.DBS1(g1d1p1)) contained in log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_symfoware delete -Xgroup grp1 -Xdev g1d1p1
LOG1/RDB1
LOG1/RDB1 swsrphistory_symfoware completed
C:\>
```

- Display backup history of log group (LOG1/RDB1).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_symfoware disp LOG1/RDB1
Log-Group-Name/RDB-Name Group DB-Space-Name Original-Volume Replica-Volume  Backup-Date
ArcSerial
LOG1/RDB1               grp1  DB1.DBS1      g1d1p1@SYMSRV   g1d4p1@BKSRV     2012/12/12 03:03 1
LOG1/RDB1               grp1  DB1.DBS2      g1d2p1@SYMSRV   g1d5p1@BKSRV     2012/12/12 03:02 1
LOG1/RDB1               grp1  DB1.DBS3      g1d3p1@SYMSRV   g1d6p1@BKSRV     2012/12/12 03:03 1
LOG1/RDB1               grp2  DB1.DBS1      g1d1p1@SYMSRV   g1d7p1@BKSRV     2012/12/13 03:03 3
LOG1/RDB1               grp2  DB1.DBS2      g1d2p1@SYMSRV   g1d8p1@BKSRV     2012/12/13 03:03 3
LOG1/RDB1               grp2  DB1.DBS3      g1d3p1@SYMSRV   g1d9p1@BKSRV     2012/12/13 03:03 3
C:\>
```

- Display all backup histories.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_symfoware disp
Log-Group-Name/RDB-Name Group DB-Space-Name Original-Volume Replica-Volume  Backup-Date
ArcSerial
LOG1/RDB1               grp1  DB1.DBS1      g1d1p1@SYMSRV   g1d4p1@BKSRV     2012/12/12 03:03 1
LOG1/RDB1               grp1  DB1.DBS2      g1d2p1@SYMSRV   g1d5p1@BKSRV     2012/12/12 03:02 1
LOG1/RDB1               grp1  DB1.DBS3      g1d3p1@SYMSRV   g1d6p1@BKSRV     2012/12/12 03:03 1
LOG1/RDB1               grp2  DB1.DBS1      g1d1p1@SYMSRV   g1d7p1@BKSRV     2012/12/13 03:03 3
LOG1/RDB1               grp2  DB1.DBS2      g1d2p1@SYMSRV   g1d8p1@BKSRV     2012/12/13 03:03 3
LOG1/RDB1               grp2  DB1.DBS3      g1d3p1@SYMSRV   g1d9p1@BKSRV     2012/12/13 03:03 3
LOG2/RDB1               grp3  DB2.DBS1      g1d11p1@SYMSRV  g1d14p1@BKSRV    2012/12/12 03:03 1
LOG2/RDB1               grp3  DB2.DBS2      g1d12p1@SYMSRV  g1d15p1@BKSRV    2012/12/12 03:03 1
LOG2/RDB1               grp3  DB2.DBS3      g1d13p1@SYMSRV  g1d16p1@BKSRV    2012/12/12 03:03 1
LOG2/RDB1               grp4  DB2.DBS1      g1d11p1@SYMSRV  g1d17p1@BKSRV    2012/12/13 03:03 3
LOG2/RDB1               grp4  DB2.DBS2      g1d12p1@SYMSRV  g1d18p1@BKSRV    2012/12/13 03:03 3
LOG2/RDB1               grp4  DB2.DBS3      g1d13p1@SYMSRV  g1d19p1@BKSRV    2012/12/13 03:03 3
C:\>
```

12.8 Hyper-V Commands

This section explains commands for backing up and restoring Hyper-V Guest OSes.

Operating environment for command execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 12.33 Operating environment for executing Hyper-V commands

Command	Operating environment of AdvancedCopy Manager
swsrpvrq componentset create	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq componentset info	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq componentset remove	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq component add	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq component remove	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq shadow backup-hyperv	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating. Also, the services of a backup server must be operating.
swsrpvrq shadow restore-hyperv	The services of a backup server must be operating.
swsrpvrq shadow query	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating. To execute this command with the -cs option specified, the services of a backup server must be operating.
swsrpvrq shadow delete	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating. To execute this command with the -cs option specified, the services of a backup server must be operating.
swsrpvrq advcopy query	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.
swsrpvrq advcopy stop	To execute this command on a backup server with the -h option specified, the services of the target Managed Server must be operating.

In cluster operation

In this function, it is unnecessary to specify the environment variable SWSTGNODE. Perform the Hyper-V commands without specifying the environment variable SWSTGNODE.

12.8.1 swsrpvrq componentset create (Component set create command)

NAME

swsrpvrq componentset create - creates a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrq componentset create [-h HyperV-Host] -cs Component-Set
```

DESCRIPTION

This command creates an empty component set.

OPTIONS

-h *HyperV-Host*

> For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host in which to create the component set.

-cs *Component-Set*

> Specifies the name of the component set to be created.
> Usable characters for the component name are single-byte alphanumeric characters, minus signs (-), underscores (_), number signs (#) and periods (.), with the first character being a single-byte alphanumeric character. The maximum number of characters is 64.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to create a component set.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset create -h HVHOST01 -cs VMSet1
'swsrpvrq componentset create' completed
C:\>
```

12.8.2 swsrpvrq componentset info (Component set information display command)

NAME

swsrpvrq componentset info - displays component set information

SYNOPSIS

```
<program-directory>\bin\swsrpvrq componentset info [-h HyperV-Host] [-cs Component-Set]
```

DESCRIPTION

This command displays the component set information.
The displayed information is as follows:

Title	Description
Component-Set	Displays the name of the component set.
Component-Number	Displays the number of components registered in the component set.
Component	Displays the name of the component.
Friendly-Name	Displays the name of the Guest OS.
Volume	Displays the name of the volume to which the component is allocated.
Logical-Unit	Displays the name of the logical unit to which the component is allocated.

OPTIONS

-h *HyperV-Host*

> For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host in which to display the component set information.

-cs *Component-Set*

> Specifies the name of the component set to be displayed.
> If this option is omitted, the information for all component sets will be displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to display a component set information.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset info -h HVHOST01
Component-Set: Name=VMSet1, Count=2
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3
    Friendly-Name=Guest1
      Volume: Name=C:\ClusterStorage\Volume1, Logical-Unit=g1d1
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4
    Friendly-Name=Guest2
      Volume: Name=C:\ClusterStorage\Volume1, Logical-Unit=g1d1

Component-Set: Name=VMSet2, Count=1
  Component:
    Writer=Microsoft Hyper-V VSS Writer
    Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B5
    Friendly-Name=Guest3
      Volume: Name=C:\ClusterStorage\Volume2, Logical-Unit=g1d3
      Volume: Name=C:\ClusterStorage\Volume3, Logical-Unit=g1d5
C:\>
```

12.8.3 swsrpvrq componentset remove (Component set remove command)

NAME

swsrpvrq componentset remove - removes a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrq componentset remove [-h HyperV-Host] -cs Component-Set
```

DESCRIPTION

This command removes a component set.

OPTIONS

-h *HyperV-Host*

> For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host in which to remove the component set.

-cs *Component-Set*

> Specifies the name of the component set to be removed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to remove a component set.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq componentset remove -h HVHOST01 -cs VMSet1
'swsrpvrq componentset remove' completed
C:\>
```

12.8.4 swsrpvrq component add (Component add command)

NAME

swsrpvrq component add - adds a Guest OS to a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrq component add [-h HyperV-Host] -cs Component-Set -hv-guest Guest-OS
```

DESCRIPTION

This command adds a Guest OS to a component set.

OPTIONS

-h *HyperV-Host*

For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host in which to add a Guest OS.

-cs *Component-Set*

Specifies the name of the component set to which to add a Guest OS.

-hv-guest *Guest-OS*

Specifies the Guest OS to be added.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to add a component.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq component add -h HVHOST01 -cs VMSet1 -hv-guest Guest1
'swsrpvrq component add' completed
C:\>
```

12.8.5 swsrpvrq component remove (Component remove command)

NAME

swsrpvrq component remove - removes a Guest OS from a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrq component remove [-h HyperV-Host] -cs Component-Set -hv-guest Guest-
OS
```

DESCRIPTION

This command removes a Guest OS from a component set.

OPTIONS

-h *HyperV-Host*

For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host from which to remove a Guest OS.

-cs *Component-Set*

Specifies the name of the component set from which to remove a Guest OS.

-hv-guest *Guest-OS*

Specifies the Guest OS to be removed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to remove a component.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq component remove -h HVHOST01 -cs VMSet1 -hv-guest
Guest1
'swsrpvrq component remove' completed
C:\>
```

12.8.6 swsrpvrq shadow backup-hyperv (Hyper-V backup command)

NAME

swsrpvrq shadow backup-hyperv - backs up a Hyper-V Guest OS

SYNOPSIS

```
<program-directory>\bin\swsrpvrq shadow backup-hyperv [-h HyperV-Host] -cs Component-Set [-hv-guests
Guest-OS-List-File]
```

DESCRIPTION

This command backs up Hyper-V Guest OSes per component set.

When execution of this command completes successfully, the metadocuments required for restoring will be output to the following directories on the backup server:

File	Output place
Writer metadata Document	*<Environment directory>*\etc\repl\data\vrq*<Hyper-V host name for Managed Server>*\componentset \metadoc*<Component set name>*.wmd.xml
Backup component Document	*<Environment directory>*\etc\repl\data\vrq*<Hyper-V host name for Managed Server>*\componentset \metadoc*<Component set name>*.bcd.xml

OPTIONS

-h *HyperV-Host*

For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host which is to be backed up.

-cs *Component-Set*

Specifies the name of the component set which is to be backed up.

-hv-guests *Guest-OS-List-File*

For backing up only specific Guest OSes in a component set, specify the files (Guest OS list files) in which the relevant Guest OSes are listed.
In the Guest OS list files, describe only one Guest OS per line.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to back up a Hyper-V Guest OS.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow backup-hyperv -h HVHOST01 -cs VMSet1
'swsrpvrq shadow backup-hyperv' completed
C:\>
```

12.8.7 swsrpvrq shadow restore-hyperv (Hyper-V restore command)

NAME

swsrpvrq shadow restore-hyperv - restores a Hyper-V Guest OS

SYNOPSIS

```
<program-directory>\bin\swsrpvrq shadow restore-hyperv -cs Component-Set [-hv-guests Guest-OS-List-
File] -manual-restore
```

DESCRIPTION

This command restores Hyper-V Guest OSes per component set.

OPTIONS

-cs *Component-Set*

Specifies the name of the component set which is to be restored.

-hv-guests *Guest-OS-List-File*

For restoring only specific Guest OSes in a component set, specify the files (Guest OS list files) in which the relevant Guest OSes are listed.
In the Guest OS list files, describe only one Guest OS per line.

-manual-restore

This option can be specified for restoring a backed up data manually.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

On the Managed Server (HVHOST01), the restoring a Hyper-V Guest OS is performed.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow restore-hyperv -cs VMSet1 -manual-restore
swsrp5204 The processing for PreRestore event has been completed.
swsrp5205 Restore the following files.
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3.xml
```

```
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3\*
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1-Disk.vhd
C:\ClusterStorage\Volume1\Hyper-V\Guest1\Guest1.vhd

swsrp5206 Press 'Y' key to continue when restoration is completed. If you are to cancel restoration,
press 'Q' key.
swsrp5208 The processing for PostRestore event is performed.
'swsrpvrq shadow restore-hyperv' completed
C:\>
```

12.8.8 swsrpvrq shadow query (Shadow copy status display command)

NAME

swsrpvrq shadow query - displays the status of shadow copy

SYNOPSIS

Display of information per component

```
<program-directory>\bin\swsrpvrq shadow query [-h HyperV-Host] -cs Component-Set
```

Display of information per server (executed on backup server)

```
<program-directory>\bin\swsrpvrq shadow query
```

DESCRIPTION

This command displays the status of shadow copy.
The displayed information is as follows:

Title	Description
Volume	Displays the volume names that are registered in the shadow copy group. Nothing will be displayed if the command is executed from a backup server.
Snapshot-ID	Displays the shadow copy IDs if there are shadow copies on the backup volume. Nothing will be displayed if there is no shadow copy on the backup volume.
Snapshot-Set-ID	Displays the shadow copy set IDs if there are shadow copies on the backup volume. Nothing will be displayed if there is no shadow copy on the backup volume.
Original-Volume	Displays the names of transaction volumes (\\?\Volume{GUID}\). Nothing will be displayed if there is no shadow copy on the backup volume.
Original-Machine	Displays the names of the source machines from which shadow copies were created if there are shadow copies on the backup volume. Nothing will be displayed if there is no shadow copy on the backup volume.
Snapshot-Volume	Displays the names of shadow copy volumes (\\?\Volume{GUID}\) if there are shadow copies on the backup volume. Nothing will be displayed if there is no shadow copy on the backup volume.
Snapshot-Machine	Displays the names of the target machines on which shadow copies were created if there are shadow copies on the backup volume. Nothing will be displayed if there is no shadow copy on the backup volume.
Exposed-Path	Displays the drive letters or mount points if all of the following conditions are fulfilled. - If there is shadow copy on the backup volume

Title	Description
	- If drive letters or mount points were assigned to the shadow copy volume when creating the shadow copies
Creation-Time	Displays the time of creating shadow copies if there are shadow copies on the backup volume.
Guest-OS	Displays Guest OSes on the volume that have resources. In the case of multiple Guest OSes, the displayed values are delimited by commas. Nothing will be displayed if the command is executed from a backup server.

OPTIONS

-h *HyperV-Host*

For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host for which to display the shadow copy status.

-cs *Component-Set*

Specifies the name of the component set for which to display the shadow copy status.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to display the shadow copy status.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow query -h HVHOST01 -cs VMSet2
Volume: C:\ClusterStorage\Volume2
Snapshot-ID: {7A05A8BF-233F-44d2-A52A-42C74497721A}
Snapshot-Set-ID: {150D4330-6B98-4d2f-94CB-E4A0462C2594}
Original-Volume: \\?\Volume{7FAAF7C3-8A85-4b56-99AF-F97FC449A4FB}\
Original-Machine: hv01.contoso.com
Snapshot-Volume: \\?\Volume{C6C7E69A-2461-4324-AFBA-AB91CCE37688}\
Snapshot-Machine: bksvr.contoso.com
Exposed-Path: C:\MountPoint\Volume2
Creation-Time: 2011/04/01:02:01
Guest-OS: Guest3

Volume: C:\ClusterStorage\Volume3
Snapshot-ID:
Snapshot-Set-ID:
Original-Volume:
Original-Machine:
Snapshot-Volume:
Snapshot-Machine:
Exposed-Path:
Creation-Time:
Guest-OS: Guest3
C:\>
```

12.8.9 swsrpvrq shadow delete (Shadow copy delete command)

NAME

swsrpvrq shadow delete - deletes shadow copy

SYNOPSIS

Deletion per component set

```
<program-directory>\bin\swsrpvrq shadow delete [-h HyperV-Host] -cs Component-Set
```

Deletion by specifying a shadow copy ID (executed on backup server)

```
<program-directory>\bin\swsrpvrq shadow delete -snap-id Snapshot-ID
```

Deletion by specifying a shadow copy set ID (executed on backup server)

```
<program-directory>\bin\swsrpvrq shadow delete -snap-set-id Snapshot-Set-ID
```

Deletion of all shadow copies (executed on backup server)

```
<program-directory>\bin\swsrpvrq shadow delete -all
```

DESCRIPTION

This command deletes shadow copy.

OPTIONS

-h *HyperV-Host*

For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host from which to delete the shadow copy.

-cs *Component-Set*

Specifies the name of the component set from which to delete the shadow copy.

-snap-id *Snapshot-ID*

Specifies the shadow copy ID that is to be deleted.
The shadow copy with the specified ID will be deleted.

-snap-set-id *Snapshot-Set-ID*

Specifies the shadow copy set ID that is to be deleted.
The shadow copy set with the specified ID will be deleted.

-all

Deletes all shadow copies in the system that has been created by VSSHP.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to delete a shadow copy.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq shadow delete -h HVHOST01 -cs VMSet1
'swsrpvrq shadow delete' completed
C:\>
```

12.8.10 swsrpvrq advcopy query (Advanced Copy status display command)

NAME

swsrpvrq advcopy query - displays the status of Advanced Copy

SYNOPSIS

Status display per component set

```
<program-directory>\bin\swsrpvrq advcopy query [-h HyperV-Host] -cs Component-Set
```

Status display for all copy sets

```
<program-directory>\bin\swsrpvrq advcopy query [-h HyperV-Host]
```

DESCRIPTION

This command displays the processing status of Advanced Copy.
The displayed information is as follows:

Title	Description
Type	Displays the copy type of the copy set. - OPC : OPC - QOPC : QOPC
Original-Disk	Displays the name of the replication source disk.
Replica-Disk	Displays the name of the replication target disk.
Direction	Displays the direction of copying. - regular : Copying from transaction volume to backup volume in progress - ---- : Not yet copied
Status	Displays the running status of Advanced Copy from the replication source disk to the replication target disk. - ---- : Not yet copied - failed : Suspended due to error - snap : Snapshot processing in progress - ????? : Failed to retrieve copy status
Execute	Displays the progress of copying as a percentage. Displays "----" if copying is not yet executed.
Trk	Displays whether tracking is carried out. - on : Tracking in progress - off : No tracking in progress - ---- : Snapshot processing not yet executed
Update	Displays the amount of data that were updated after the most recent replication as a percentage. If both the Status column displays "----" and the Trk column displays "on" (i.e., tracking is in progress and no physical copying is in progress) Displays "----" when physical copying is in progress or when tracking is "off".

OPTIONS

-h *HyperV-Host*

> For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host for which to display the Advanced Copy status.

-cs *Component-Set*

> Specifies the name of the component set for which to display the Advanced Copy status.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

Give the command from a backup server to Managed Server (HVHOST01) to display the processing status of Advanced Copy.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy query -h HVHOST01 -cs VMSet1
Type Original-Disk Replica-Disk Direction Status Execute Trk  Update
QOPC g1d1@SV1     g1d2@BKSV    regular   snap  23%      ---- ----
C:\>
```

12.8.11 swsrpvrq advcopy stop (Advanced Copy stop command)

NAME

swsrpvrq advcopy stop - stops Advanced Copy

SYNOPSIS

<program-directory>\bin\swsrpvrq advcopy stop [-h *HyperV-Host*] -cs *Component-Set*

DESCRIPTION

This command stops Advanced Copy.

OPTIONS

-h *HyperV-Host*

> For execution from a backup server, this option specifies the name of the Managed Server for the Hyper-V host on which to stop Advanced Copy.

-cs *Component-Set*

> Specifies the name of the component set on which to stop Advanced Copy.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

Give the command from a backup server to Managed Server (HVHOST01) to stop Advanced Copy.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy stop -h HVHOST01 -cs VMSet1
'swsrpvrq advcopy stop' completed
C:\>
```

12.9 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 12.34 Operating environment when executing SnapOPC/SnapOPC+ support commands

Command	Operating environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-

Note

In cluster operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

   ```
   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 12.35 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	-

12.9.1 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 (cancelling 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). Displays "----" if there is no pseudo session. Displays "failed" if the pseudo session is error-suspended.

When finishing update volume measurements (cancelling 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 cancelling 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 Disk 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).

12.9.2 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-Volume-Name LU-Number
```

Snap Data Volume status display

```
<program-directory>\bin\swstsdv stat Volume-Name
<program-directory>\bin\swstsdv stat -G Access-Volume-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 volume 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 volume when there is a logical volume manager operation.

Snap Data Volume status display

Specify "stat" as the subcommand to display Snap Data Volume logical capacity, physical capacity, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number on the ETERNUS Disk storage 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 (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Volume, Copy usage (*1) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Volume, Host usage (*1) 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'.

*1:
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 (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Pool, Copy usage (*1) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Pool, Host usage (*1) 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'.

*1:
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-Volume-Name*

Specifies the access volume.
For details on access volume, refer to "Creating an access volume".

Specific options of Snap Data Volume status display(stat)

-G *Access-Volume-Name*

Specifies the access volume.
For details on access volume, refer to "Creating an access volume".

Specific options of Snap Data Pool status display(poolstat)

-G *Volume-Name*

Specifies the ETERNUS Disk storage system volume.
If a Snap Data Volume is specified with insufficient capacity however, an error occurs in the command. In this case, specify an access volume for which there is sufficient capacity.
For details on access volume, refer to "Creating an access volume".

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 logical unit number in the ETERNUS Disk storage system.
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 logical unit number in the ETERNUS Disk storage system.
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 Snap Data Volume is initialized using the access volume 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 volume:

```
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 volume:

```
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 volume and logical unit number (LU-Number) in the ETERNUS Disk storage system.
  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 record it.

12.10 Troubleshooting data collection command

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

12.10.1 esfsnap (AdvancedCopy Manager's manager troubleshooting data collection command)

NAME

esfsnap - Collection of AdvancedCopy Manager's manager troubleshooting data

SYNOPSIS

```
<program-directory>\Common\bin\esfsnap -dir dirname [-all]
```

DESCRIPTION

This command collects AdvancedCopy Manager troubleshooting data. Data is collected for AdvancedCopy Manager's manager installed on the Management Server where this command is executed.

Only a user belonging to the Administrators group can execute this command.

Please send the collected data to a Fujitsu system engineer.

OPERANDS

-dir *dirname*

Specify a directory where the troubleshooting data is stored. It is necessary to specify the full path name that begins with a drive letter for *dirname*.

The maximum length that can be specified for *dirname* is 70 bytes.

The collected troubleshooting data is stored in the directory which its name begins with "esfsnap_". Before executing this command, please check that *dirname* directory has the following free space.

Collected information	Required free space
Initial investigation information	more than 40MB
All troubleshooting information	more than "80 + (2 * number of registered device)" MB

-all

Collects all troubleshooting data on servers. Data includes lots of information, which will increase the size of the data. This option is not necessary for initial investigation.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Collect data to the D:\temp directory:

```
C:\>C:\ETERNUS_SF\Common\bin\esfsnap D:\temp
```

- Refer to [NOTES] of "esfsnap (CCM Server troubleshooting data collection command)" in the *ETERNUS SF Operation Guide for Copy Control Module*.

12.10.2 acmcapture (AdvancedCopy Manager's agent troubleshooting data collection command)

NAME

acmcapture - Collection of AdvancedCopy Manager's agent troubleshooting data

SYNOPSIS

```
<program-directory>\bin\acmcapture.bat dirname
```

DESCRIPTION

This command collects AdvancedCopy Manager's agent troubleshooting data. Data is collected for AdvancedCopy Manager's agent installed on the Managed Server where this command is executed.

Only a user belonging to the Administrators group can execute this command.

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

- In a clustered system, execute this command at all nodes. To gather information on the shared disk, mount the shared disk on a node and execute this command on that node.

- 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 13 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

13.1 Notes on Backup and Replication Operation

This section provides notes on backup and replication.

13.1.1 General notes

This section provides general notes on backup and replication.

13.1.1.1 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 13.1 Available Size of a Partition
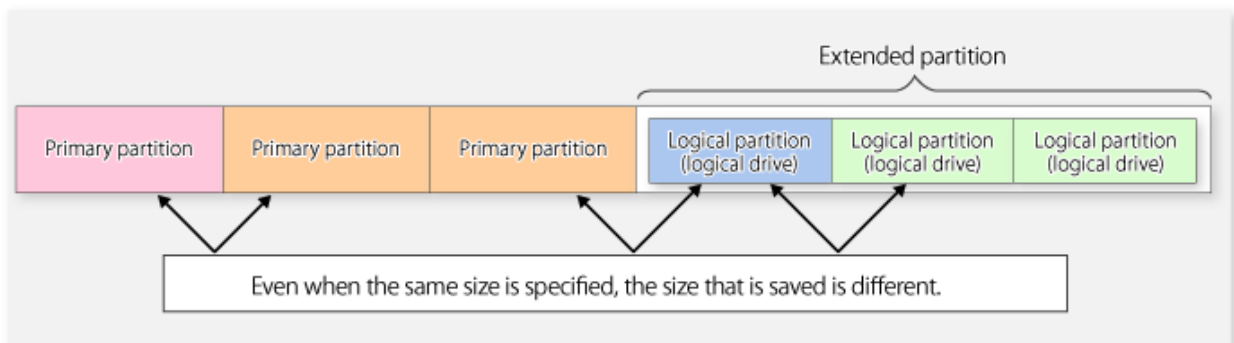
Create partitions for the transaction and backup volumes in the same size and combination as shown below.

Figure 13.2 Combination of Transaction and Backup Volume
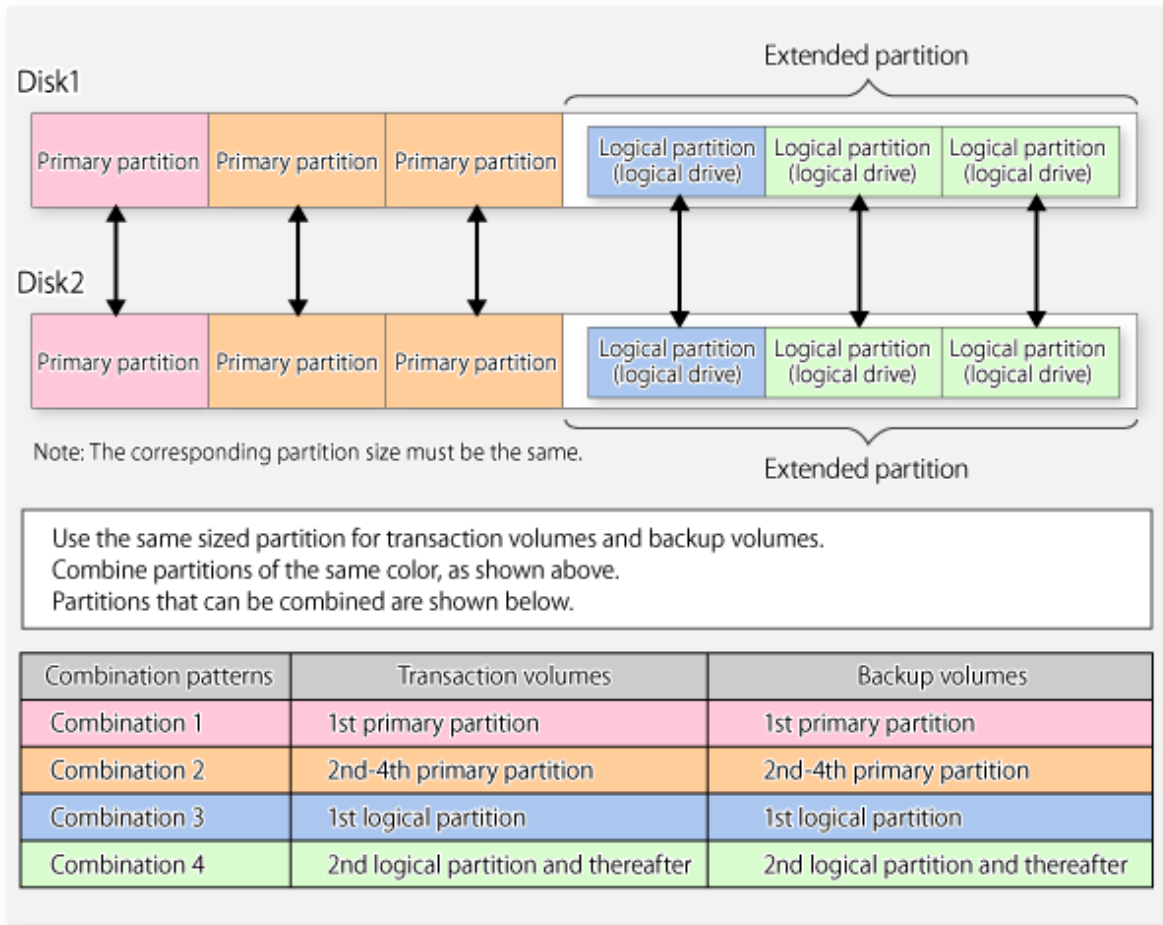
Figure 13.3 Example of a Disk with Partitions of Different Sizes
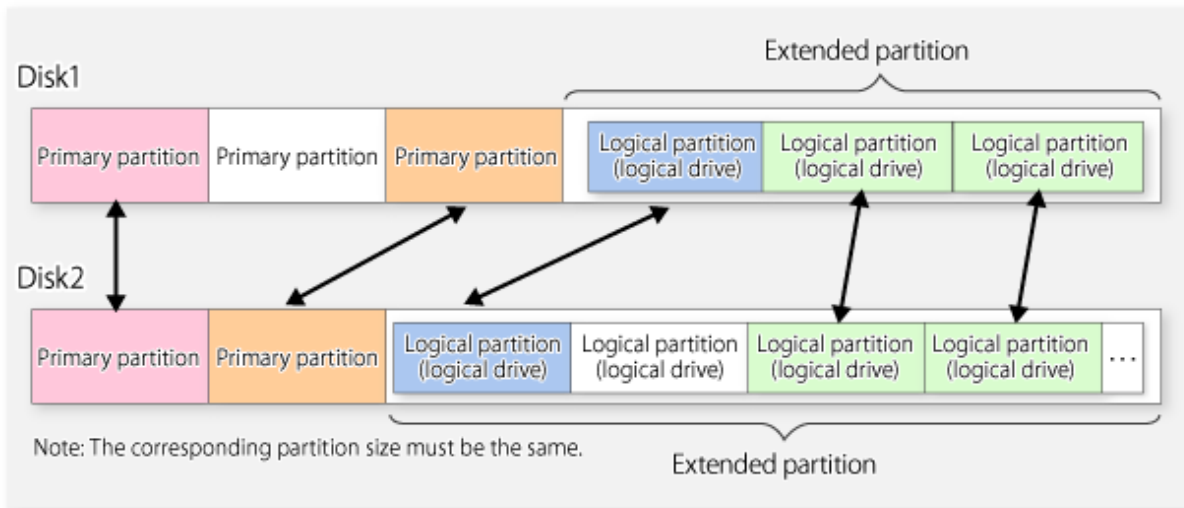
If you are creating the source and destination volumes in the same size for replication, create partitions in the combination as shown above.

P Point
....

To prevent an operational error, you are recommended to define as extended logical disks all the logical disks on the ETERNUS Disk 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 (Windows Server 2003, Windows Server 2008 or later), 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.

⋯⋯

13.1.1.2 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

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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 13.4 Assigned Number for a Partition

⋯⋯
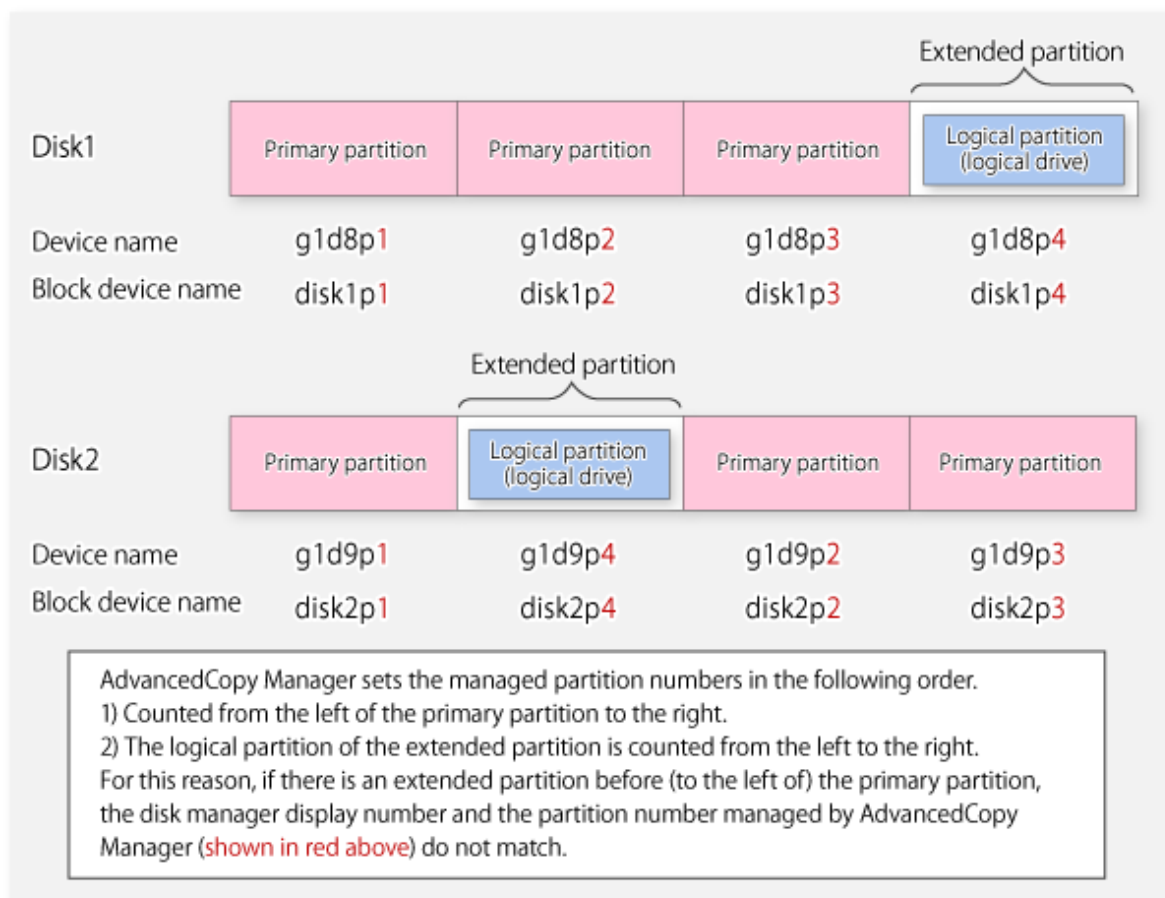
13.1.1.3 Backup and Replication Exclusions

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

13.1.1.4 Consistency of data on volumes

Table 13.1 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".
Exchange database space that is currently in use	AdvancedCopy Manager commands link with Exchange Server to ensure data consistency.	Refer to "Chapter 8 Backup and Restore of 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 10 Backup and Restore of SQL Server Database".
Symfoware database space that is currently in use	AdvancedCopy Manager commands link with Symfoware to ensure data consistency.	Refer to "Chapter 4 Backup Operations (Symfoware)".
Hyper-V Guest OS that is currently in use	AdvancedCopy Manager commands link with Hyper-V to ensure data consistency.	Refer to "Chapter 9 Backup and Restore of Hyper-V".
Used for data other than the above	AdvancedCopy Manager commands flush the file system buffer 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".

13.1.1.5 Fetching Device Information

Before starting either the backup or replication operation, "3.4.4 Fetching device information on a Managed Server" that is managed by all Managed Servers using the Web Console. The time taken to complete this operation is proportional to the total number of devices defined on the selected Managed 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.

13.1.1.6 Changing Device Configuration

The device configuration of a volume defined by backup management or replication management 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, refer to "11.5.5 Changing the device configuration".

13.1.1.7 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 Centric Manager

Temporarily terminate the service of Systemwalker Centric Manager (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.

Systemwalker Service Quality Coordinator

If you perform backup/restoration and replication, please temporarily terminate the service (i.e., service display name: Systemwalker SQC DCM) of Systemwalker Service Quality Coordinator.

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).

13.1.1.8 Maximum Number of Simultaneously Executing Operations

An upper limit (maximum value) applies to the number of Advanced Copy sessions in one Logical Unit (LU) 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.

When you create more volumes in one LU than the maximum number of copy sessions per LU, for the volumes in that LU, an operational configuration is required that does not implement Advanced Copy simultaneously in excess of the maximum number of copy sessions per LU.

Refer to the ETERNUS Disk storage system SA/SE Handbook for the maximum number of copy sessions per LU.

13.1.1.9 Dynamic Volume

Dynamic volumes cannot be used as transaction volumes, backup volumes, original volumes, or replica volumes.

13.1.1.10 When mounting a volume to a folder

- If mounting a volume for backup or replication to a 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 folder.

- A volume that has other disks mounted to cannot be used for backup or replication.

13.1.1.11 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 to continue the process even if the mount point cannot be acquired. Create the following file:

For normal operation (not cluster operation)

> `<Environment directory>\etc\backup\data\DEFAULT\check.ini`

For cluster operation

> `<Environment directory for logical node>\etc\backup\data\DEFAULT\check.ini`

The description format of the file is as follows:

```
[check]
MountPointCheck=Force
```

In the case of the above description, 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 to execute the process without acquiring the mount point. Create the following file:

For normal operation (not cluster operation):

> `<Environment directory>\etc\backup\data\DEFAULT\check.ini`

For cluster operation:

> `<Environment directory for logical node>\etc\backup\data\DEFAULT\check.ini`

The description format of the file is as follows:

```
[check]
MountPointCheck=Pass
```

In the case of the above description, processing is performed without acquiring a mount point, if it backs up.

13.1.1.12 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 Disk storage system. Since this is not a major problem, it can be ignored. These messages may

be displayed frequently, especially when a Systemwalker Centric Manager 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.

13.1.1.13 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 or later, it will be necessary to set up the appropriate hardware, such as the ETERNUS Disk storage system and a fiber channel switch.

13.1.1.14 Mirroring in SynfinityDISK

In box-to-box mirroring, both systems involved in the mirroring cannot be backed up. If a failure occurs in one of the boxes involved in the backup process, then the backup process must be switched to operate in another box. Backup destination information must be saved in advance on a secondary medium, such as tape.

13.1.1.15 Notes on copying data

For backup, restoration or replication, lock the volumes to execute the pre-processing and post-processing.
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.

13.1.1.16 Notes on using the OS volume shadow copy function

Volumes are locked during backup/restore and replication to execute the pre-processing and post-processing.
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.

13.1.1.17 Use of large-capacity disks

If disks that have 2 terabytes and over are used, the GPT disk format must be used as the disk format.

13.1.1.18 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:

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.

About GPT disks

To copy the GPT disks by each Logical Unit (disk), create the source and destination volumes in the same size for replication in the unit of bytes.
When copying between volumes of different sizes, the GPT label of the destination volume may be changed. If you restore the destination volume whose GPT label is changed, you cannot use the destination volume.

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, the following processing is performed:

- For Windows Server 2003 or Windows Server 2008
  Disk management information of a copy destination disk will be changed so that the system contains unique disk management information.

- For Windows Server 2008 R2 or Windows Server 2012
The copy destination disk will be offline. You need to manually bring the destination copy disk online. When the destination copy disk is online, disk management information of the copy destination disk is changed so that the system contains unique disk management information.

Therefore, if the disk management information is duplicated, the disk management information of a copy destination disk will be updated.

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.

13.1.1.19 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:

Table 13.2 Combinations for executing copy between different operating systems

Copy source	Copy destination	
	slices	Logical Unit (disk)
Partition	A	N/A
Logical Unit (disk)	A	N/A

(A=Available, N/A=Not Available)

13.1.1.20 Notes on executing copy from Logical Unit (disk) to partition using replication function

Do not create a file system on a copy destination volume (partition).

13.1.1.21 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 (Synchronous processing start command)

- swsrpmake (Replication creation command)

- swsrpcancel (Replication cancellation 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:

- The non-operating server has been shut down.

- Manual pre-processing and post-processing is performed for the volumes on the non-operating server.

- The target volume is a RAW device (Oracle, etc., that does not need pre-processing and post-processing), rather than a file system.

13.1.1.22 Notes when using the -t option

When you execute swsrpstartsync (Synchronous processing start command) with the -t option, volume lock fails with swsrpmake (Replication creation command) and the swsrp3607 message may be output.

If you execute swsrpstartsync (Synchronous processing start command) with the -t option to perform independent pre-processing, check whether the pre-processing has properly been done.

If you determine that pre-processing and post-processing for replication destination volume is not needed and execute swsrpstartsync (Synchronous processing start command) with the -t option, execute swsrpmake (Replication creation command) with the -t option.

13.1.1.23 Copy processing performance of Advanced Copy

The Advanced Copy processing is performed by the ETERNUS Disk storage system. Therefore, direct enquiries concerning copy processing performance to the support department for the ETERNUS Disk storage system.

13.1.1.24 Restarting the system during synchronization processing

Restarting the system during synchronization processing may take quite a while if the system has many volumes currently being synchronized.
This is because file system initialization takes time when the system starts if the disk storage device has set the copy destination volume status to write prohibited. This problem can be avoided by disabling the automatic mount function of the system.

Disabling the automatic mount function avoids initialization of the file system when the server starts.

As a result, drive letters are not assigned automatically, but these can be assigned manually.

<Execution example>

```
mountvol /n
```

Note

Enable the automatic mount function when implementing the procedure described in "3.2.4 Preparing a backup volume".

13.1.2 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 Web Console. For more information, refer to "3.4.2 Starting the Web Console".

2. Fetch all the device information from the Managed 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, refer to "3.4.4 Fetching device information on a Managed 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, refer to "3.4.6 Setting the operation type for a device".

4. Set a backup policy for the added SDX object. For more information, refer to "3.4.7 Setting a backup policy".

5. After specifying the added SDX object, perform the backup.

Notes on combining cascade copy and Concurrent OPC in operation

If you specify a volume used in cascade copy as the copy source and then execute a Concurrent OPC by swsrpmake (Replication creation command), it may not be possible to preserve the sequence of data updates across multiple volumes.
In this case, an error message will be displayed and the command terminates in an error.

If the error cannot be resolved by responding to the message, we recommend you change the operating method of Advanced Copy or reconfigure the system.

If you cannot change the operating method of Advanced Copy or reconfigure the system, create a file (check.ini) that sets the sequence of data updates across multiple volumes. Then, disable sequence preservation before you retry Concurrent OPC. The sequence of data updates will not be preserved across multiple volumes.

Create check.ini in the following path of the server on which to execute swsrpmake (Replication creation command):

- In a non-cluster environment

```
<Environment directory>\etc\repl\data\DEFAULT
```

- In a cluster environment

```
<Environment directory for logical node>\etc\repl\data\DEFAULT
```

Table 13.3 File format of the check.ini

Section name	Key name	Value
[check]	ConcurOPCCascade	Set preservation of the sequence of data updates across multiple volumes. By setting "No", preservation of the sequence will be disabled. By setting any value other than "No", preservation of the sequence will be enabled.

[Example for disabling sequence preservation]

```
[check]
ConcurOPCCascade=No
```

Point

For any of the below ETERNUS Disk storage systems, Concurrent OPC can be executed regardless of sequence preservation of data updates. However, the sequence of data updates will not be preserved across multiple volumes.

- ETERNUS DX80/DX80 S2 (for firmware version numbers before V10L30)

- ETERNUS DX90/DX90 S2 (for firmware version numbers before V10L30)

- ETERNUS DX400/DX400 S2 series (for firmware version numbers before V10L30)

- ETERNUS DX8000/DX8000 S2 series (for firmware version numbers before V10L30)

13.1.3 Notes on synchronous high-speed backup

This section provides notes on synchronous high-speed backup.

The processing of the backup

The 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.
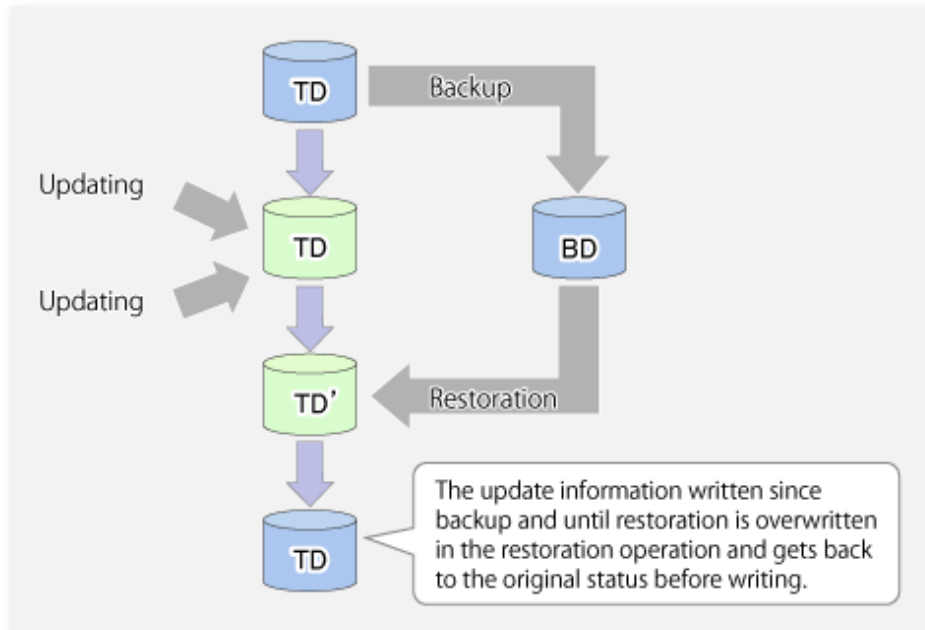
13.1.4 Notes on restoration

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 13.5 Notes on restoration of AdvancedCopy Manager

TD: Transaction volume
BD: Backup volume

13.1.5 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

- 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":

```
AdvancedCopy COM Service_nodeagt Properties          [?] [X]

 General | Dependencies | Advanced | Parameters | Registry Replication |

   [icon]    AdvancedCopy COM Service_nodeagt

 Name:           AdvancedCopy COM Service_nodeagt

 Description:    AdvancedCopy Manager Communication Service for
                 nodeagt

 Possible owners:  MS610-S5                        Modify...
                   MS610-S6

 [ ] Run this resource in a separate Resource Monitor

 ─────────────────────────────────────────────────

 Resource type:  Generic Service
 Group:          ACMAgent
 State:          Offline
 Node:           MS610-S6

                       OK        Cancel      Apply
```

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.
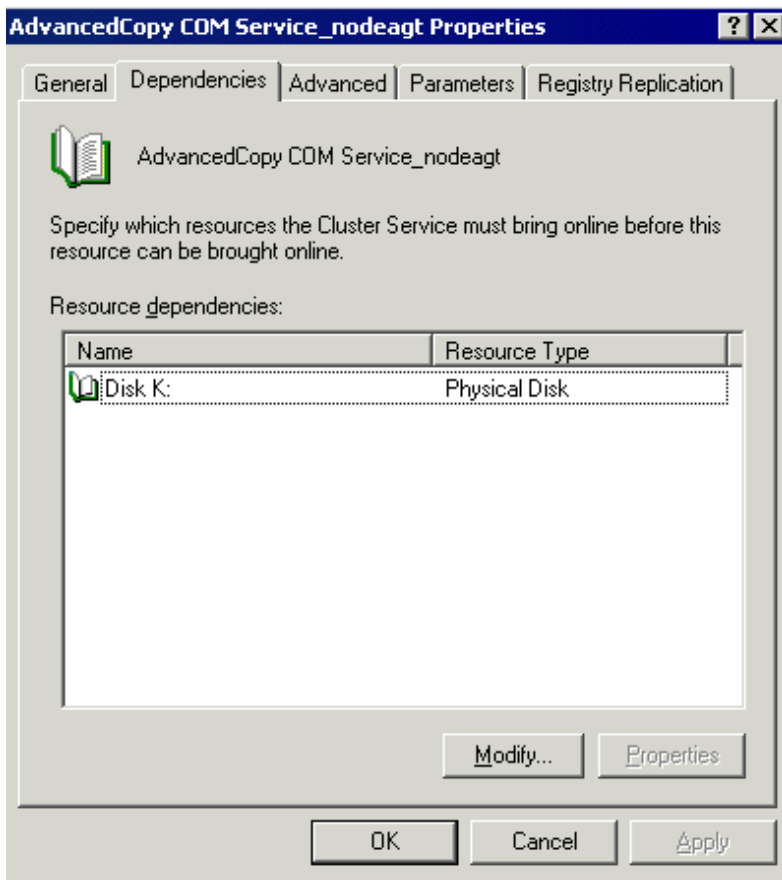
4. In the properties window for the [Dependencies] tab click the [Modify] button.

5. 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.
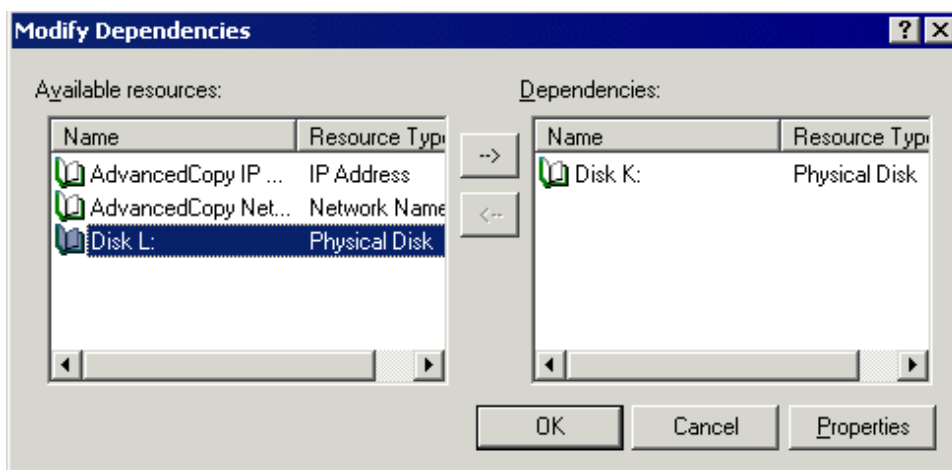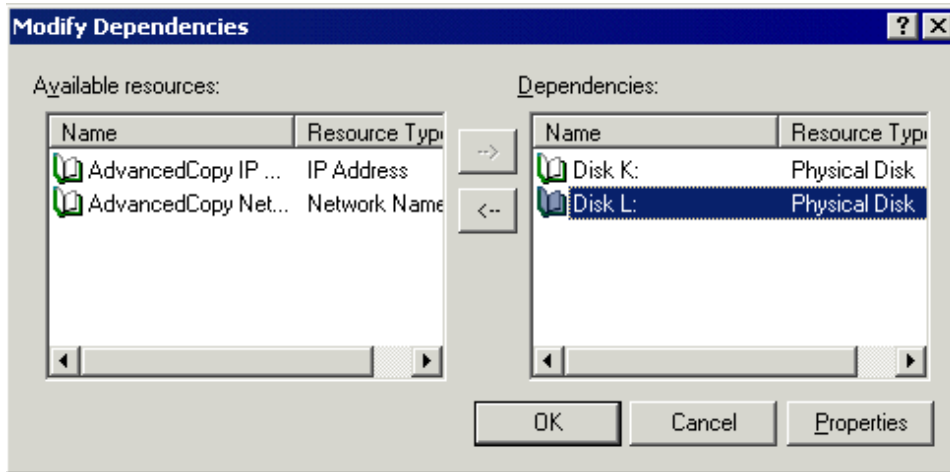
6. Click the [OK] button to complete the modifications.

7. Click the [OK] button again to close the properties window.

WSFC

📎 Note

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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.

13.1.6 Notes on backup in a clustered system

When using MSCS or WSFC for cluster operation

For backups in a clustered 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

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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 Managed 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.

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 Managed Server.

13.1.6.1 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.

13.1.6.2 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 GUI Service (only for a Management Server transaction)

- SymfoWARE RDA RDBSWSTF (only for a Management Server transaction)
  There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008 or later.

- SymfoWARE RDB RDBSWSTF (only for a 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 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, refer to the MSCS or WSFC manual.

2. Start (i.e., set online) the resources required for operation.
   Start the following resources:

   - AdvancedCopy GUI Service (only for a Management Server transaction)

   - SymfoWARE RDA RDBSWSTF (only for a Management Server transaction)

     There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008 or later.

   - SymfoWARE RDB RDBSWSTF (only for a 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 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, refer to the MSCS or WSFC manual.

3. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
   Set the environment variable as shown below.
   <Execution example>

   ```
   set SWSTGNODE=logical-node-name
   ```

4. Perform the backup.
   You can perform the backup in the same way as for regular cluster operations.

5. Stop (i.e., set offline) the resources you started in step 2.
   For details on how to stop a resource, refer to the MSCS or WSFC manual.

6. Start (i.e., set online) the cluster group.
   Start the cluster group, if necessary.
   For details on how to start a cluster group, refer to the MSCS or WSFC manual.

13.1.7 Notes on replication in a clustered system

When using MSCS or WSFC for cluster operation

For replication in a clustered 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.

If the copy destination volume is registered as a disk resource for the cluster, run a snapshot replication with 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 "13.1.1.18 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 Managed 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 Managed Server. For reverse replication, use synchronized replication using REC.

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 Managed 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.

13.1.7.1 Notes on an Exchange 2003/2007 database

For backup and restoration of an Exchange 2003/2007 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 (swsrp*XXX*_exchange, swsrp*XXX*_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).

13.1.7.2 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)

13.1.7.3 Notes on Hyper-V

For backups and restorations performed with a Hyper-V guest OS operating under the clustered system, there are the following items of caution.
If performing cluster operation of the Hyper-V backup function with WSFC, please do the following.

- Use the AdvancedCopy Manager's agent installed to each physical server. As such, please do not set the environment variable SWSTGNODE when executing commands.

- Place the guest OS list files such that it is possible to refer to them from both the primary node and the secondary node.
  Please place the files either on a shared disk or on the local disks of both nodes.

13.1.7.4 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 GUI Service (only for a Management Server transaction)

- SymfoWARE RDA RDBSWSTF (only for a Management Server transaction)
  There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008 or later.

- SymfoWARE RDB RDBSWSTF (only for a 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 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, refer to "Chapter 2 Starting and Stopping Services".

2. Start (i.e., set online) the resources required for operation.
   Start the following resources:

   - AdvancedCopy GUI Service (only for a Management Server transaction)

- SymfoWARE RDA RDBSWSTF (only for a Management Server transaction)

  There is no "SymfoWARE RDA RDBSWSTF" resource if it is running under Windows Server 2008 or later.

- SymfoWARE RDB RDBSWSTF (only for a 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 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, refer to the MSCS or WSFC manual.

3. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
   Set the environment variable as shown below.
   <Execution example>

```
set SWSTGNODE=logical-node-name
```

4. Perform replication operation.
   You can perform replication operation in the same way as for regular cluster operations.

5. Stop (i.e., set to offline) the resources you started in step 2.
   For details on how to stop a resource, refer to the MSCS or WSFC manual.

6. Start (i.e., set to online) the cluster group.
   Start the cluster group, if necessary.
   For details on how to start a cluster group, refer to the MSCS or WSFC manual.

13.1.8 Use in combination with ODX (Offloaded Data Transfer)

When using an ETERNUS Disk storage system that supports the Offloaded Data Transfer (hereinafter referred to as "ODX") function, ODX session starts within the ETERNUS Disk storage system by Windows Server 2012 Offloaded Data Transfer function when files are copied or transferred. However, Advanced Copy cannot be performed by AdvancedCopy Manager on the condition that a volume on which ODX session is running is taken as copy destination. For this reason, if Advanced Copy is performed by AdvancedCopy Manager on the condition that a volume containing the files or areas being copied or transferred by the Offloaded Data Transfer function is taken as copy destination, an error message is displayed and the command may terminate abnormally.

If the command terminates abnormally, check on the Web Console that no ODX session exists on the copy destination volume and then re-execute the command.

If the error is not resolved:

Review the volume to be copied or take either of the following procedures to temporarily prevent ODX session from running and then re-execute the command.

- Disabling Windows Server 2012 Offloaded Data Transfer (ODX)

  Refer to the procedure released by Microsoft at the following URL for how to disable:

  ```
  http://technet.microsoft.com/en-us/library/jj200627.aspx
  ```

  This setting affects only the servers on which the operation is performed.

- Stopping the Offloaded Data Transfer function of the ETERNUS Disk storage system

    Refer to the ETERNUS Disk storage system manual for how to stop.
    This setting affects all the servers that use the ETERNUS Disk storage system.

Figure 13.6 Use in combination with ODX
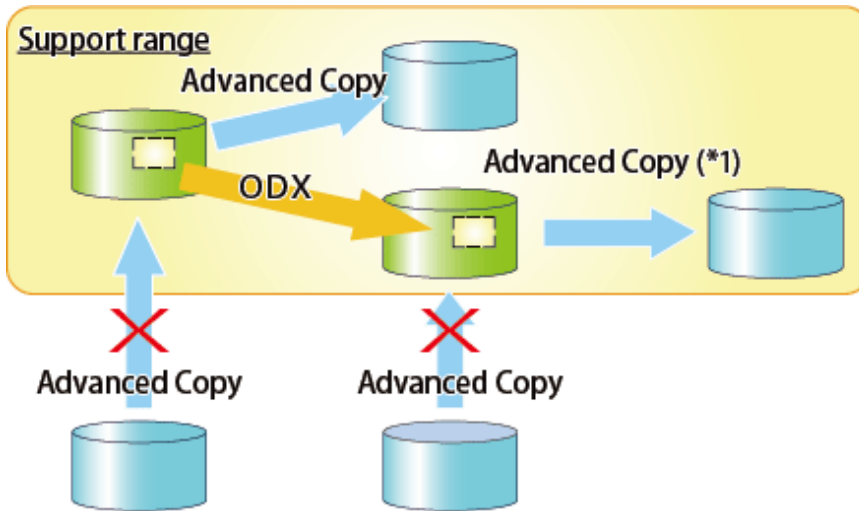
*1: In the following ETERNUS Disk storage systems whose firmware version number is V10L50 or earlier, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which ODX session is running.
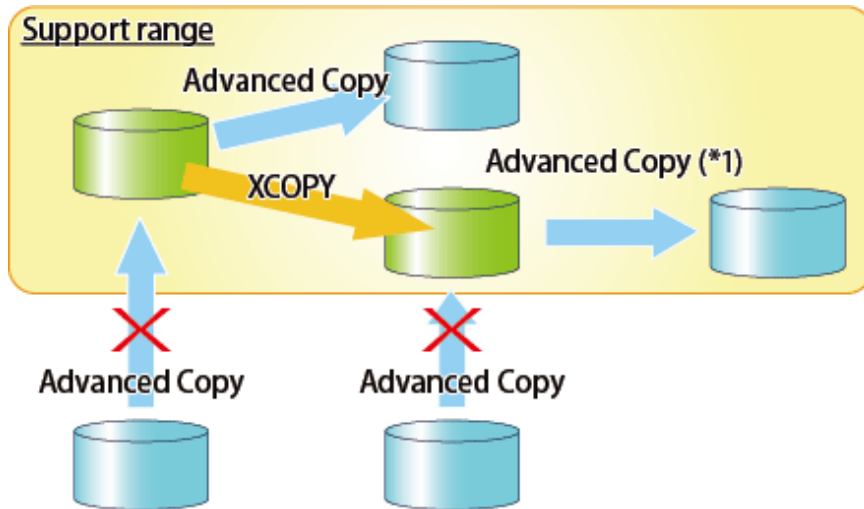
- ETERNUS DX80/DX80 S2

- ETERNUS DX90/DX90 S2

- ETERNUS DX400/DX400 S2 series

- ETERNUS DX8000/DX8000 S2 series

13.1.9 Use in combination with XCOPY (Extended Copy)

When copying data by replicating VMware vSphere virtual machines or running Storage vMotion, Extended Copy (hereinafter referred to as "XCOPY") session starts by the Full Copy function of VMware vStorage APIs for Array Integration (VMware VAAI). However, Advanced Copy cannot be performed by AdvancedCopy Manager on the condition that a volume on which XCOPY session is running is taken as copy destination. For this reason, if Advanced Copy is performed by AdvancedCopy Manager on the condition that a volume on which data is being copied by replicating a virtual machine or running Storage vMotion is taken as copy destination, an error message is displayed and the command may terminate abnormally.

If the command terminates abnormally, check on the Web Console that no XCOPY session exists on the copy destination volume and then re-execute the command.

Figure 13.7 Use in combination with XCOPY

*1: In the following ETERNUS Disk storage systems whose firmware version number is V10L50 or earlier, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which XCOPY session is running.

- ETERNUS DX80/DX80 S2

- ETERNUS DX90/DX90 S2

- ETERNUS DX400/DX400 S2 series

- ETERNUS DX8000/DX8000 S2 series

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

By specifying the -Xflush option in swstbackup (Backup execution command) or setting BufferFlushOnly to "on" in the transaction volume locking specification file for backups, the backup of AdvancedCopy Manager flushes the file system buffer without locking the transaction volume.

If you want to lock the transaction volume, set BufferFlushOnly to "off" in the transaction volume locking specification file for backups and execute the backup execution command without the -Xflush option.

The backup volume is 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 Pre-processing and post-processing for conventional backup operations

Type	Detail of operations
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 clustered system)	Default operations: 1. The backup volume is dismounted. 2. The backup volume is unlocked.
Backup pre-processing (implemented with the backup execution command)	Default operations: 1. For a snapshot backup or synchronous backup in a clustered system, the backup volume is locked. 2. The file system buffer of the transaction volume is flushed. When the -Xflush option is not specified and BufferFlushOnly is set to off: 1. For a snapshot backup or synchronous backup in a clustered system, the backup volume is locked. 2. The transaction volume is locked.
Backup post-processing (implemented with the backup execution command)	Default operations: 1. The backup volume is dismounted. 2. The backup volume is unlocked. When the -Xflush option is not specified and BufferFlushOnly is set to off:

Type	Detail of operations
	1. The transaction volume is unlocked. 2. The backup volume is dismounted. 3. The backup volume is unlocked.

Table A.2 Pre-processing and post-processing for Symfoware backup operations

Type	Detail of operations
Pre-processing for synchronous processing	The backup volume is locked.

Post-processing for synchronous processing	- In the case of a clustered system:
	
	    1. The backup volume is dismounted.
	
	    2. The backup volume is unlocked.
	
	- In the case of a non-clustered system:
	
	  Take no action.

Backup pre-processing	- For a snapshot backup:
	
	    1. The backup volume is locked.
	
	    2. The file system buffer of the transaction volume is flushed.
	
	- For a synchronous backup:
	
	  - In the case of a clustered system:
	
	      1. The backup volume is locked.
	
	      2. The file system buffer of the transaction volume is flushed.
	
	  - In the case of a non-clustered system:
	
	    The file system buffer of the transaction volume is flushed.
	
	The file system buffer of the transaction volume is flushed regardless of the -Xflush option specification or the value of BufferFlushOnly.

Backup post-processing	1. The backup volume is dismounted. 2. 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.3 Error code rules

Error code	Usage
0-99	Unusable (these are reserved for AdvancedCopy Manager)
100-255	Usable

Note

....

If pre-processing 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 (flushing the file system buffer of transaction volume)

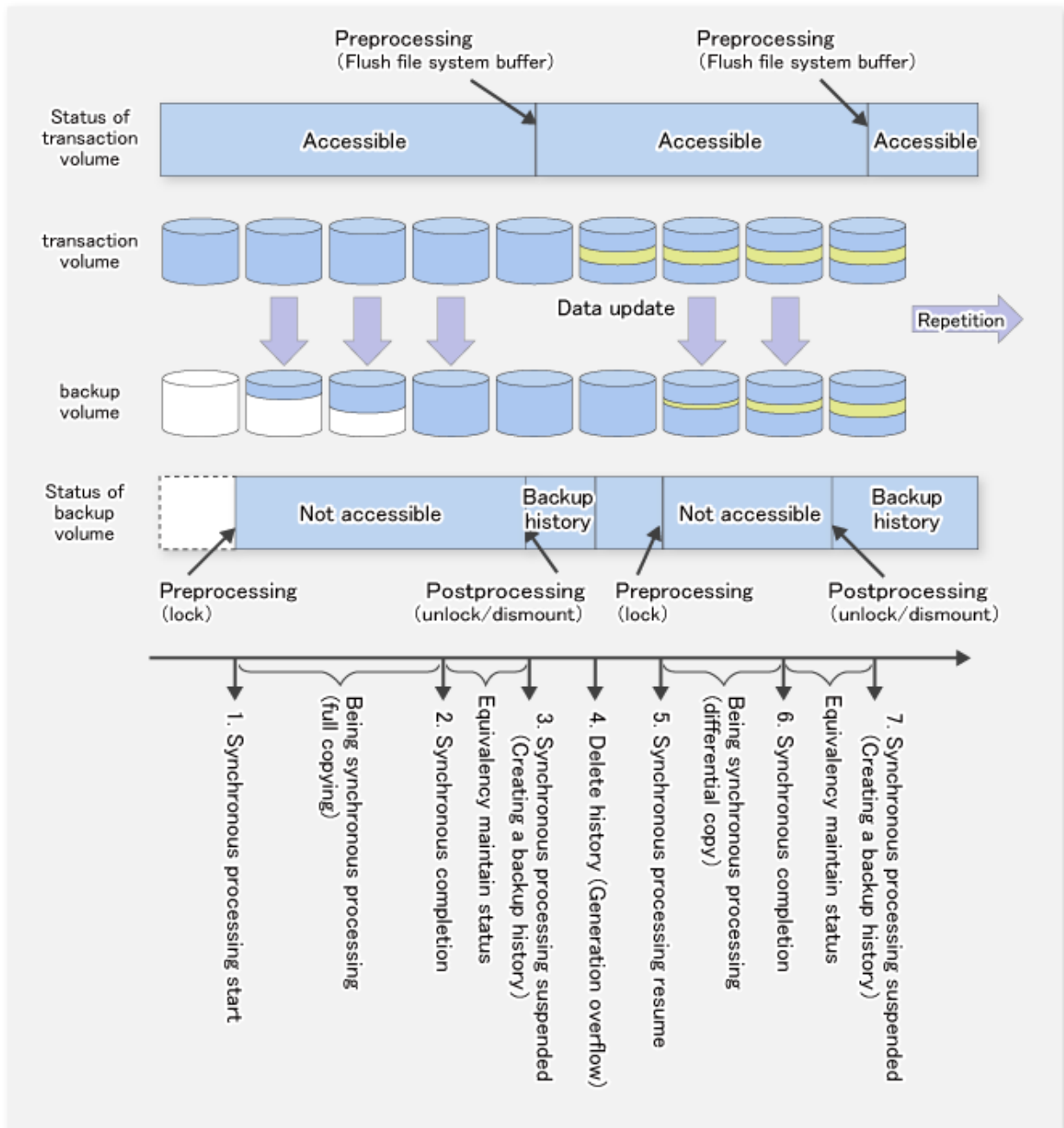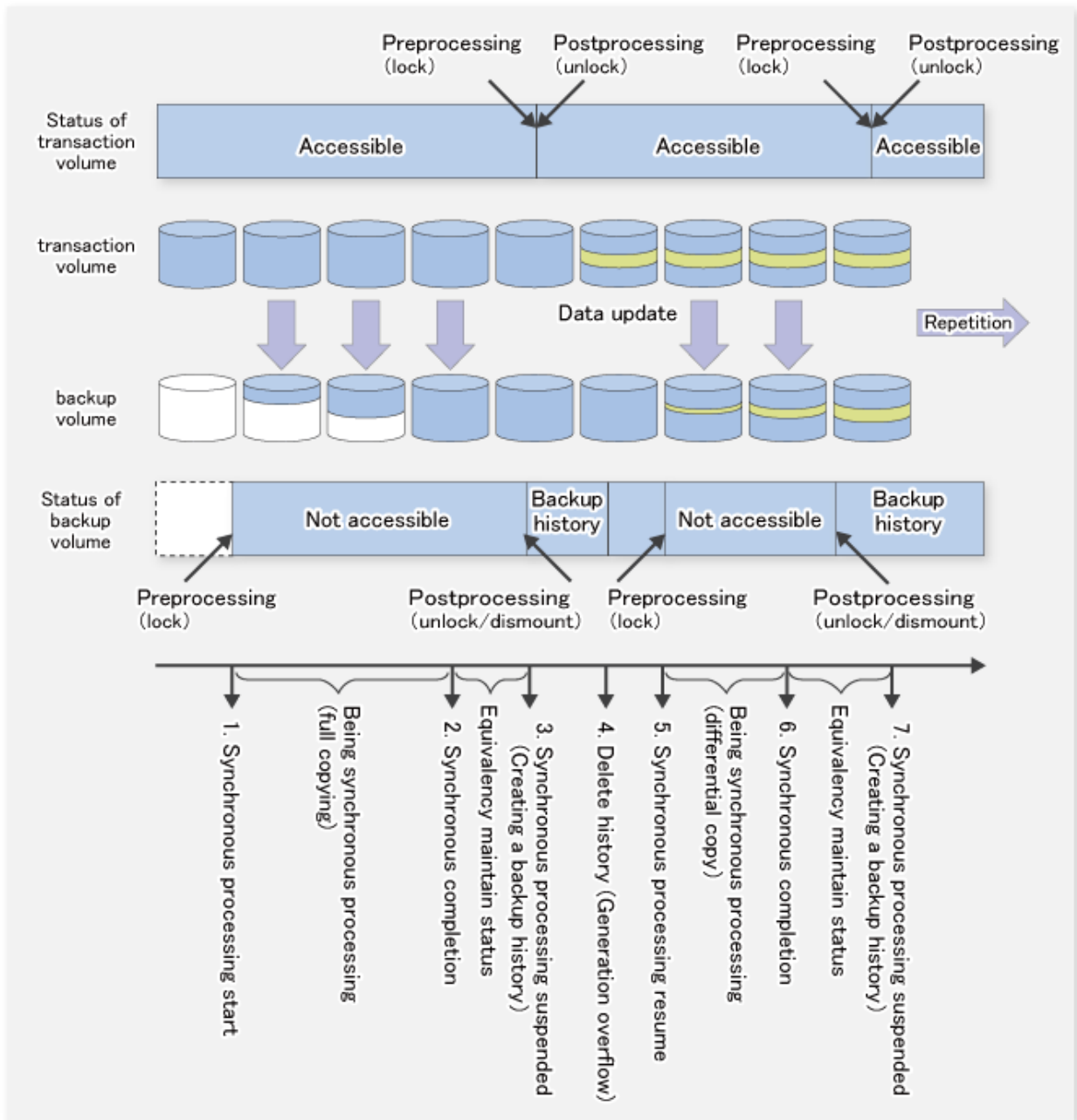Figure A.2 Processing in a synchronous-type backup operation (locking the transaction volume)

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 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 directory*>\etc\backup\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: }
```

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.3 Snapshot-type backup (OPC)

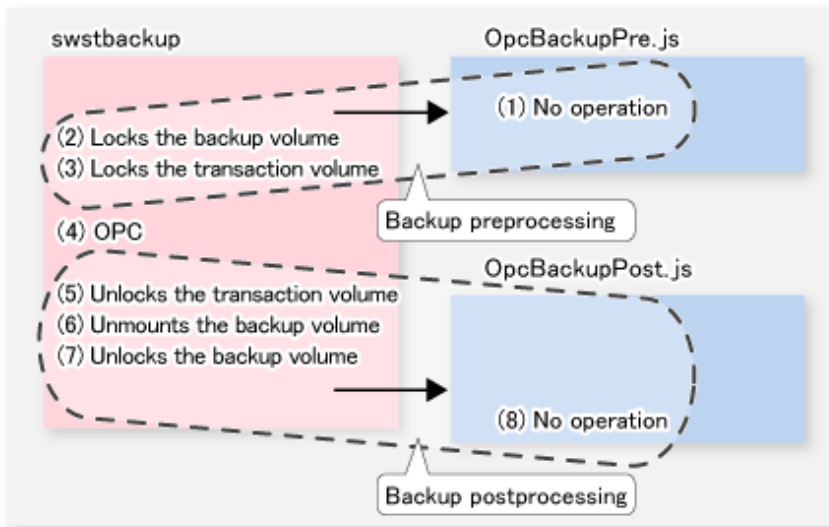

Figure A.4 Synchronous-type backup (EC) in a non-clustered system
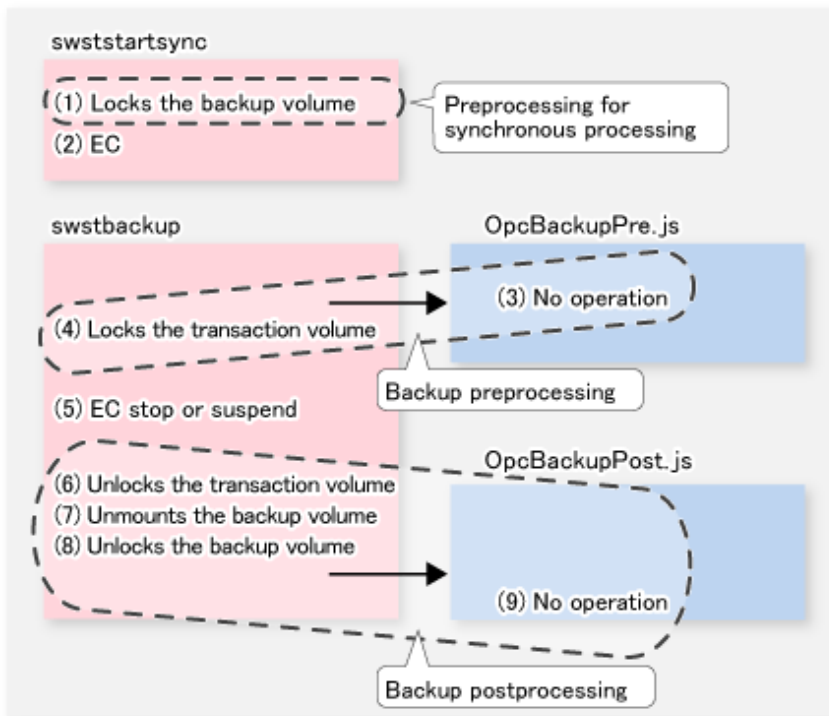
Figure A.5 Synchronous-type backup (EC) in a clustered system operation
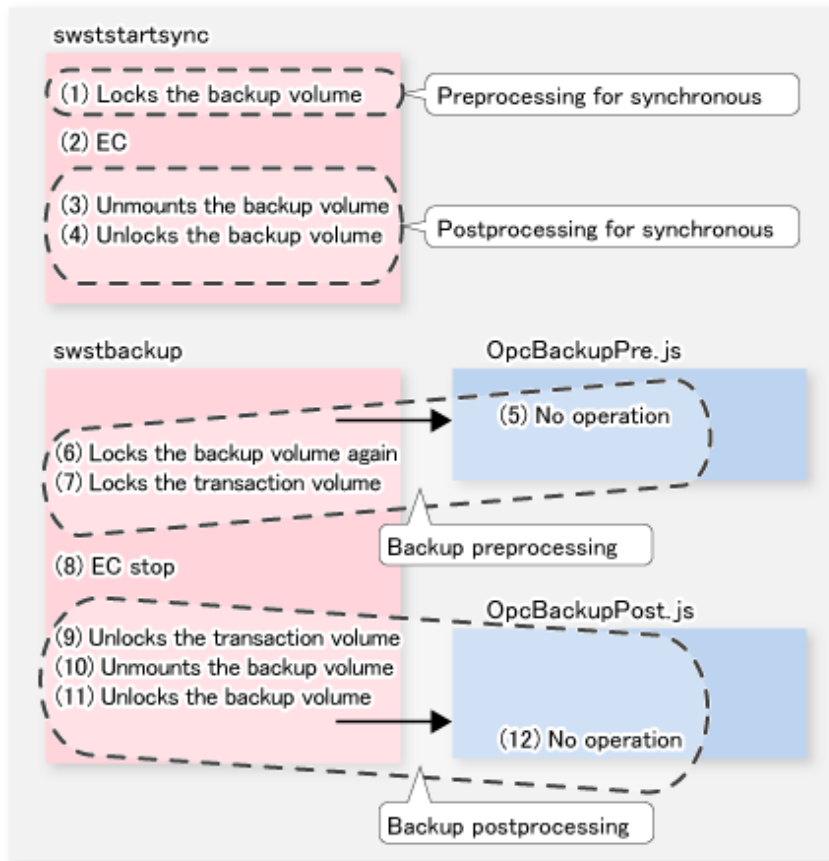
> 📝 **Note**
> ....
> - In the pre-processing for synchronous processing and the backup pre-processing, to avoid a temporary access contention with other applications, locking is retried if it cannot complete its operation. If the number of times the command is executed reaches the specified retry limit, 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 "A.2.3 Transaction volume locking specification file for backups" and to "A.2.4 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.
> - For a synchronous-type backup in a clustered system operation, in order to prevent the clustered 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 "13.1.1.12 Error messages displayed an event viewer" in "13.1.1 General notes". Since there is no problem, the message can be ignored.
> ....

A.2.3 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 and retry interval can be changed by 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 (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.

File name and directory

Use a name similar to the one below to create a transaction volume locking specification file for backups.

In the case of non-cluster operation

    <Environment directory>\etc\backup\data\BTRANLOCK.INI

In the case of cluster operation

    <Shared disk>:\etc\opt\swstorage\etc\backup\data\BTRANLOCK.INI

Example and description rules

Examples of settings in this file are listed below.

```
[g1d1p1]
BufferFlushOnly=off
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=5000
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
```

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.

Table A.4 BTRANLOCK.INI parameter settings

Key	Explanation
BufferFlushOnly	Specifies flushing the file system buffer of the transaction volume instead of locking the transaction volume:

Key	Explanation
	on (default value) = the buffer is flushed (no locking) off = the buffer is not flushed (locking) If the -Xflush option is specified in swstbackup and BufferFlushOnly=off, then the -Xflush option has priority. If BufferFlushOnly is not set to off, 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 backup is executed 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	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	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	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.2.4 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 and the retry interval can be changed by 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.

File name and directory

Use a name such as the one below to create a backup volume locking specification file for backups.

In the case of non-cluster operation

> *\<Environment directory\>*\etc\backup\data\BBACKLOCK.INI

In the case of cluster operation

> *\<Shared-disk\>*:\etc\opt\swstorage\etc\backup\data\BBACKLOCK.INI

Example and description rules

Examples of settings in the backup volume locking specification file for backup are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=5000
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
```

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.

Table A.5 BBACKLOCK.INI parameter settings

Key	Explanation
LockForceMode	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. * If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.
LockRetryNumber	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	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:

- 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.

- 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.6 Error code rules

Error code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable

Note

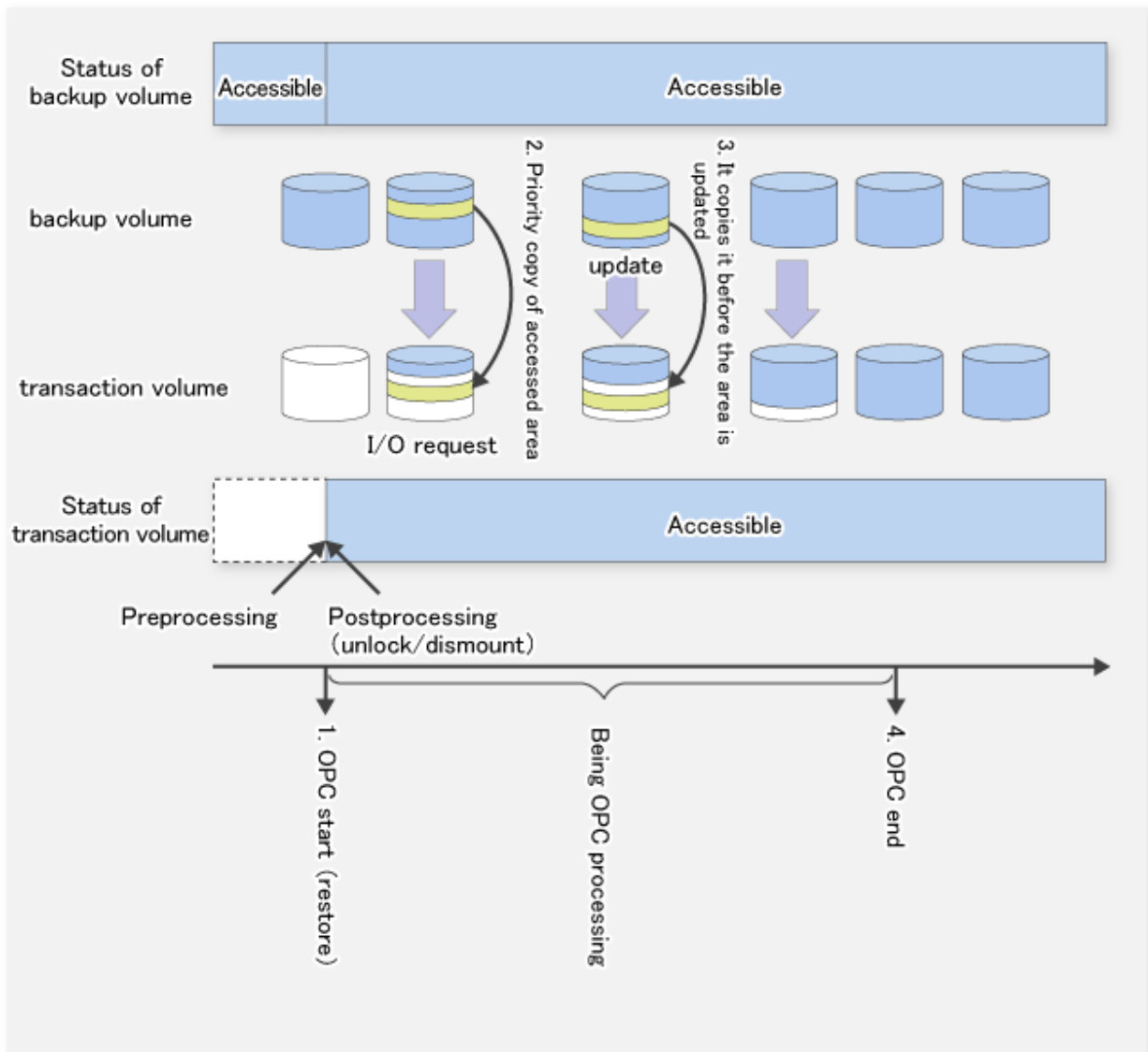. . . . .
If the post-processing fails, the resource information may have inconsistencies. Execute swstsrsemtch (Resource match command).
. . . .

The figure below shows an image of the pre-processing and post-processing operations:

Figure A.6 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 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 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: }
```
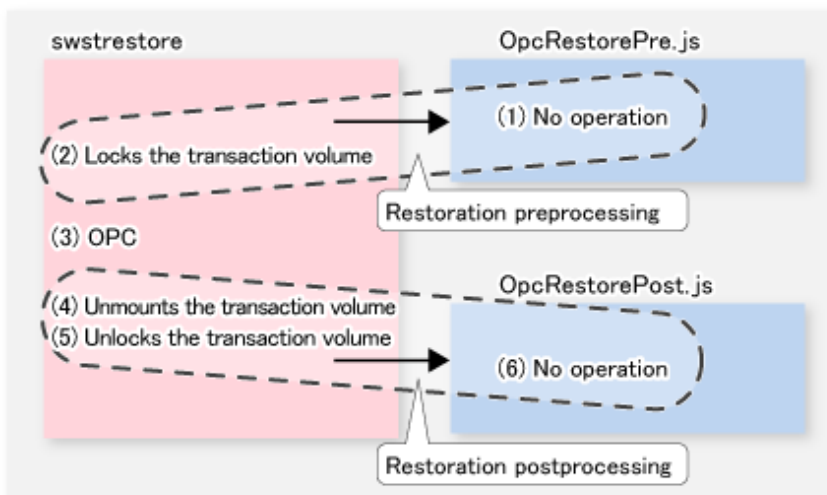
P Point

. . . .

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.7 Restoration

A.3.3 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 and retry interval can be changed by 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)

File name and directory

Use a name such as the one below to create a backup-restored volume locking specification file for backups.

In the case of non-cluster operation

```
<Environment directory>\etc\backup\data\RDSTLOCK.INI
```

In the case of cluster operation

```
<Shared-disk>:\etc\opt\swstorage\etc\backup\data\RDSTLOCK.INI
```

Example and description rules

Examples of settings in the backup-restored volume locking specification file for backup are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=5000
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
```

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.

Table A.7 RDSTLOCK.INI parameter settings

Key	Explanation
LockForceMode	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	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	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
....
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)
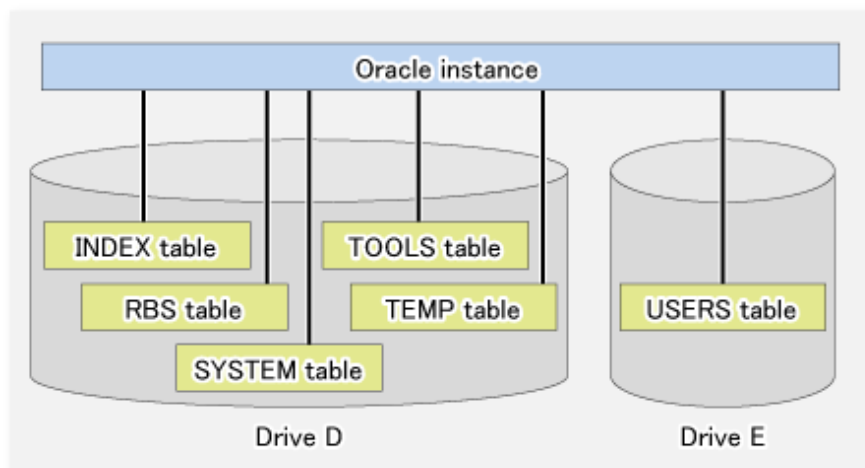
Sample scripts provided for AdvancedCopy Manager are created on the assumption that the following versions of Oracle are used. If you use any other version, you will need to customize the sample scripts as required.

- 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.
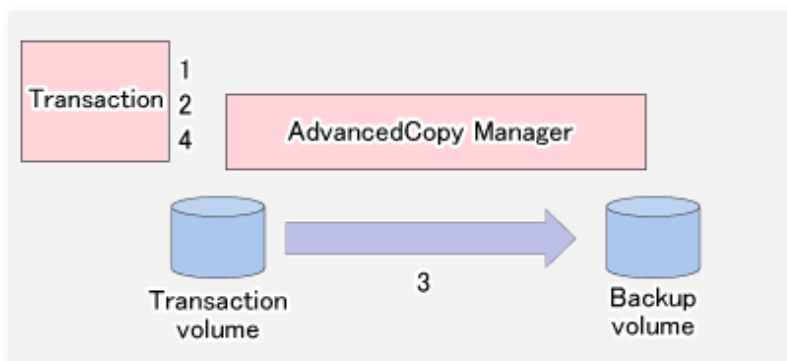
B.2.1 Backup procedure

The following provides an overview of the backup procedure.

1. Check the work operation status
   Check whether processing is in operation or not.

2. Declare the start of online backup
   If processing is found to be in operation in step 1, declare the start of online backup for the database to stop updating data files to make the disk partition that stores processing data ready for online backup.

3. Back up (i.e., copy) a disk partition
   Using the backup function of AdvancedCopy Manager, back up (i.e., copy) a disk partition that stores processing data.

4. Declare the end of online backup
   If processing was found to be in operation in step 1, declare the end of online backup for the database to resume updating the data files.

AdvancedCopy Manager provides a sample script that automatically performs steps 2 through 4. For more information, refer to "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 volume.

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 volume
   Using the restoration function of AdvancedCopy Manager, restore data from a backup volume to the transaction volume.

Figure B.3 Performing restoration from a backup volume
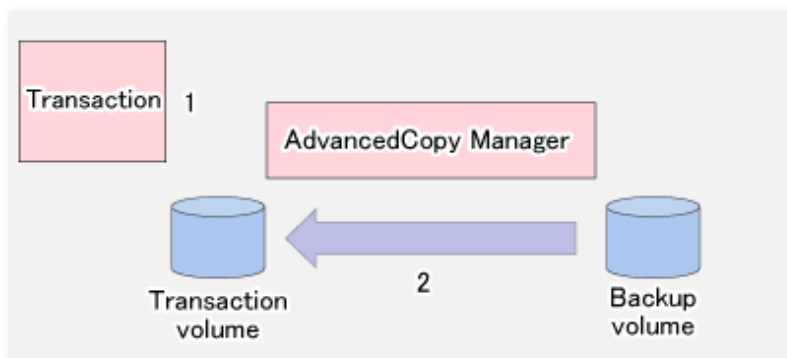
B.3 Sample Scripts for Oracle

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 "<*Environment directory*>\etc\backup\sample" directory. The figure below shows the correlation chart of sample scripts.

Figure B.4 Correlation chart of sample scripts

> ## ⚐ Note
> ....
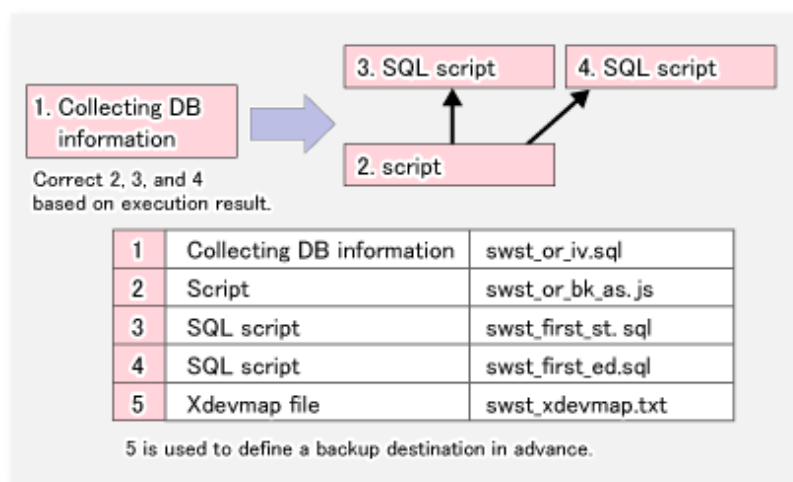> It is recommended that these sample scripts are copied to different folder before using them.
> ....

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	GUI 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 "B.2.1 Backup procedure".

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: (NTFS)              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.

- When BufferFlushOnly in the transaction volume locking specification file for backups is set to "off", it is failed to lock the transaction volumes because the active transaction volumes has been locked by the Oracle database during the backup processing.
  Therefore, set the either of following methods to flush the file system buffer of the transaction volume:

  - Set BufferFlushOnly to "on", or

  - Execute swstbackup (Backup execution command) with the -Xflush option.

This script operates only on a Managed Server of AdvancedCopy Manager.

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 (Restore execution command) with the -r option 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 (i.e., the copy) processing.

AdvancedCopy Manager performs the processing required for a replication source volume and replication destination volume by executing these scripts.

This section 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 need 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, the file system buffer of replication source volume is flushed.

- 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 sub section explains the pre-processing and post-processing of the file system.

C.2.1 Pre-processing and post-processing for a file system

Pre-processing and post-processing for a replication source volume are performed to guarantee a replication destination volume. Pre-processing and post-processing for a replication destination volume is performed to prevent other processes from accessing to the volume during synchronization processing or snapshot copy.

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 are performed.

Table C.1 When the replication source/destination volume are partitions

Target	Type	Details

Replication source volume	Pre-processing	- Default operation:
		
		  The file system buffer of replication source volume is flushed.
		
		- When the -Xflush option is not specified and BufferFlushOnly is set to off:
		
		  The replication source volume is locked.
		
		- When the -f option is specified:
		
		  No processing is performed (i.e., the source pre-processing script is not executed).

	Post-processing	- Default operation: No processing is performed.

Target	Type	Details
		- When the -Xflush option is not specified: The replication source volume is unlocked. - When the -f option is specified: No processing is performed (i.e., the source post-processing script is not executed).
Replication destination volume	Pre-processing	- Default operation: The replication destination volume is locked. - 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 replication destination volume is unlocked. - When the -t option is specified: No processing is performed (i.e., 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 are performed.

Table C.2 When the replication source/destination volume are Logical Units (disks)

Target	Type	Details
Replication source volume	Pre-processing	- Default operation: The file system buffer of the partition included in the Logical Unit (disk) is flushed. - When the -Xflush option is not specified and BufferFlushOnly is set to off: The partition included in the Logical Unit (disk) is locked. - When the -f option is specified: No processing is performed (i.e., the source pre-processing script is not executed).
	Post-processing	- Default operation: No processing is performed. - When the -Xflush option is not specified: The partition included in the Logical Unit (disk) is unlocked. - When the -f option is specified: No processing is performed (i.e., the source post-processing script is not executed).

Replication 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:

Target	Type	Details
		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 (i.e., 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 at the time of the command execution.

Table C.3 Pre-processing and post-processing for a file system

Command	Copy status	Source/Destination	Pre-processing	Post-processing
swsrpstartsync (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 clustered 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 (flushing the file system buffer of replication source volume)
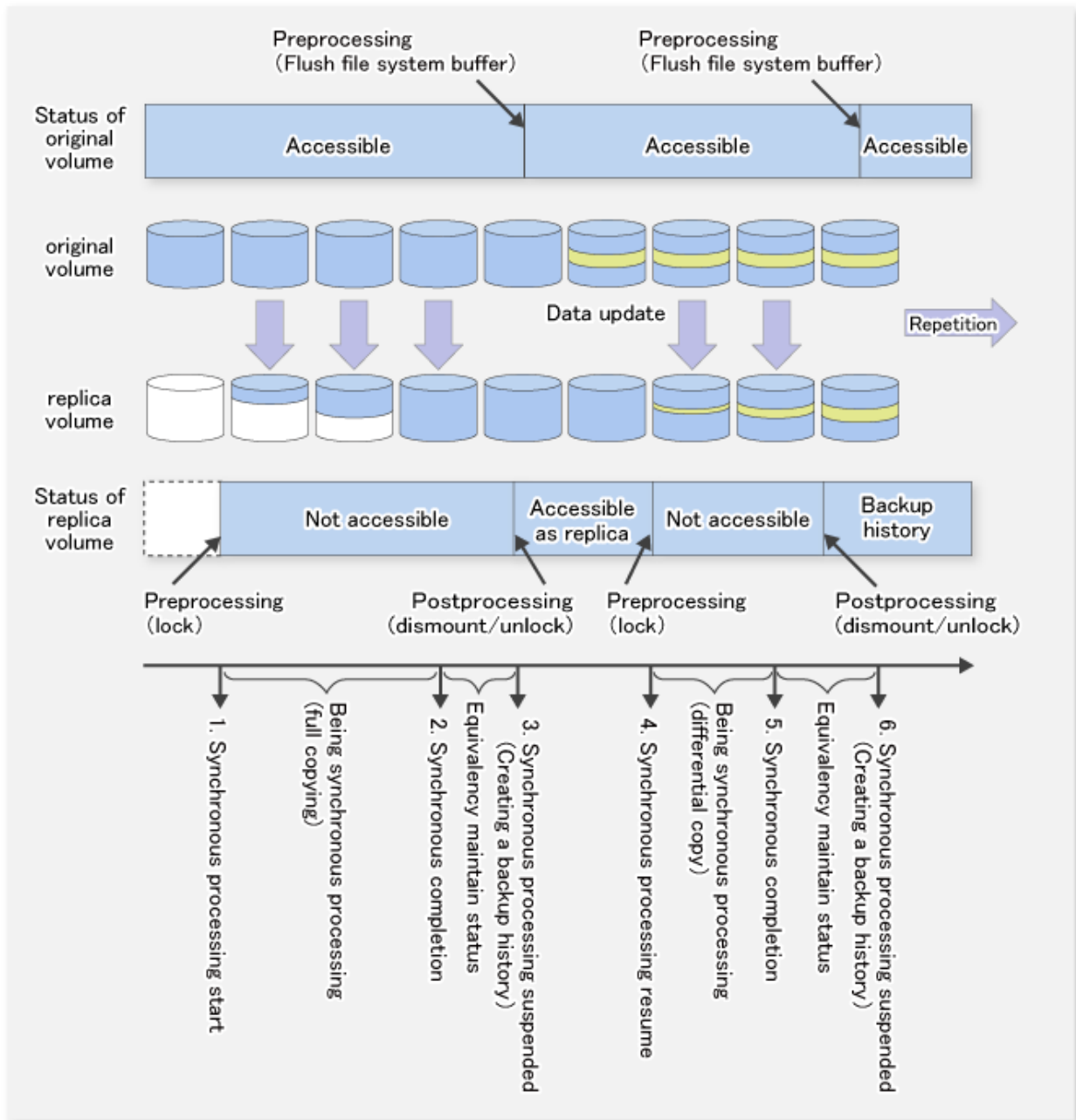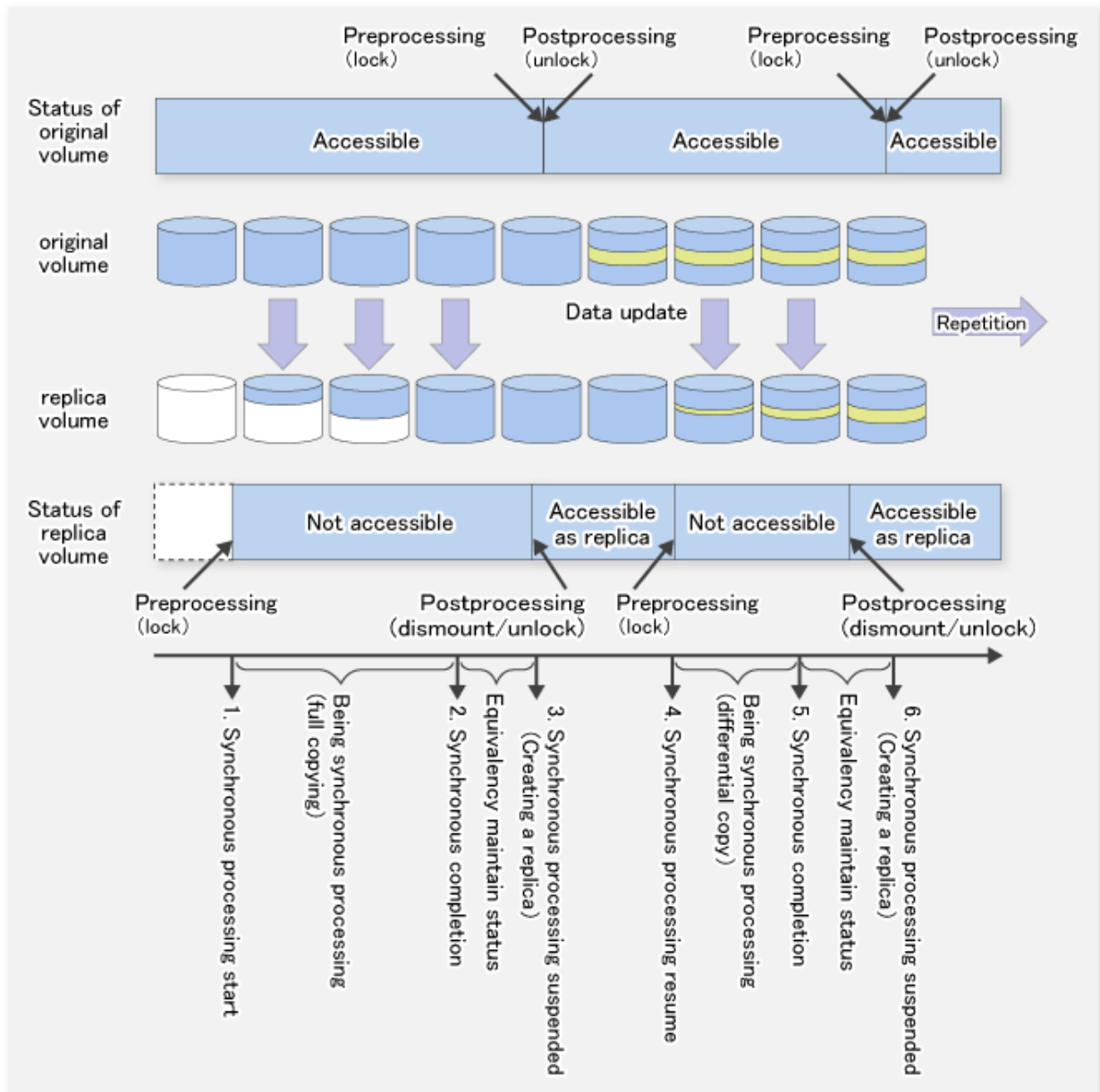
Figure C.2 Synchronized replication processing (locking the replication source volume)

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 provides pre-processing and post-processing for Oracle, SQL Server, Exchange and Hyper-V applications. In case of using any other application than these, if needed, 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. Please customize these scripts according to the processing requirements.

In the case of non-cluster operation

    <*Environment directory*>\etc\repl\scripts

In the case of cluster operation

    <*Shared disk*>:\etc\opt\swstorage\etc\repl\scripts

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 directory. This script must be customized according to the processing requirements.

In the case of non-cluster operation

```
<Environment directory>\etc\repl\scripts
```

In the case of cluster operation

```
<Shared disk>:\etc\opt\swstorage\etc\repl\scripts
```

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: }
```

P 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.

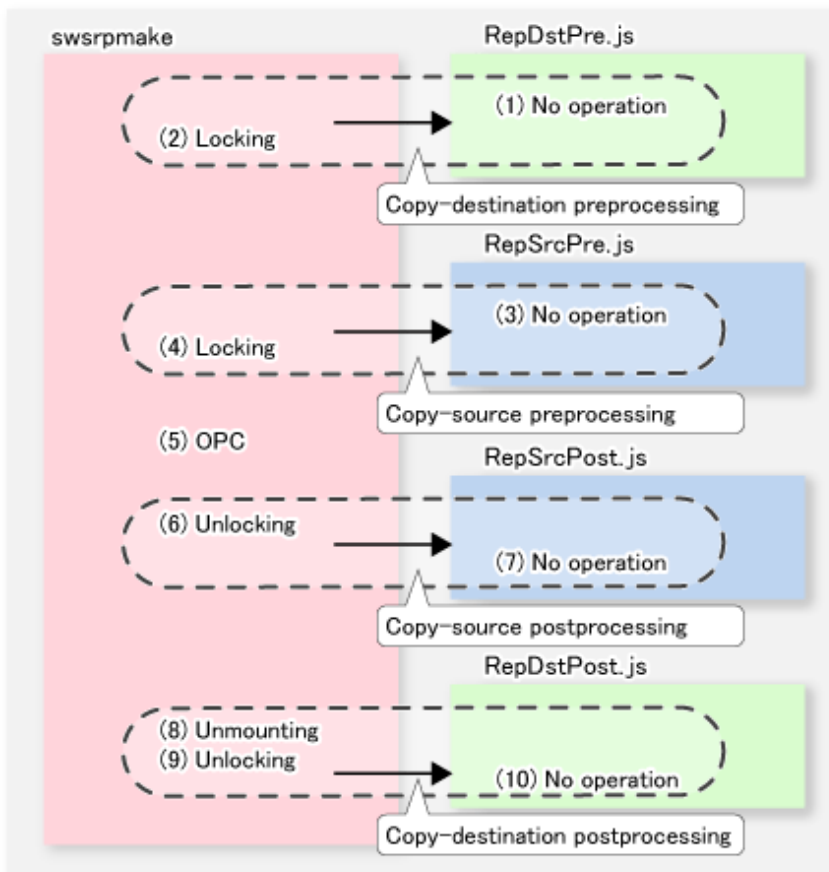Figure C.3 Snapshot-type replication (OPC)

Figure C.4 Synchronous-type replication (EC) (1): When the destination volume is not a shared volume in a clustered system
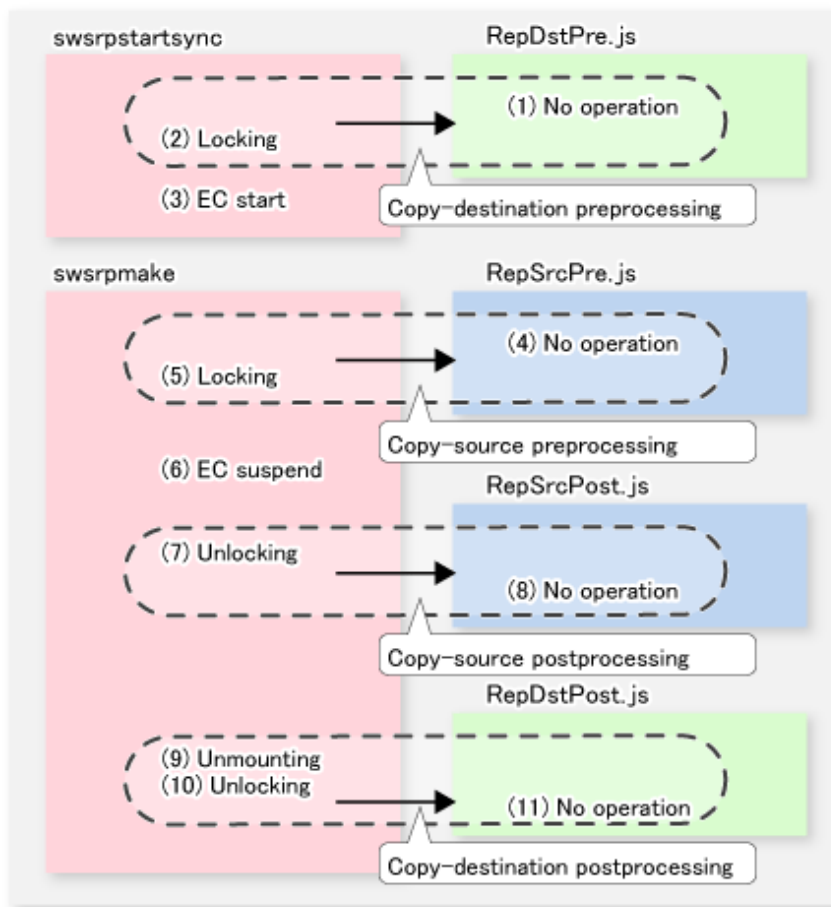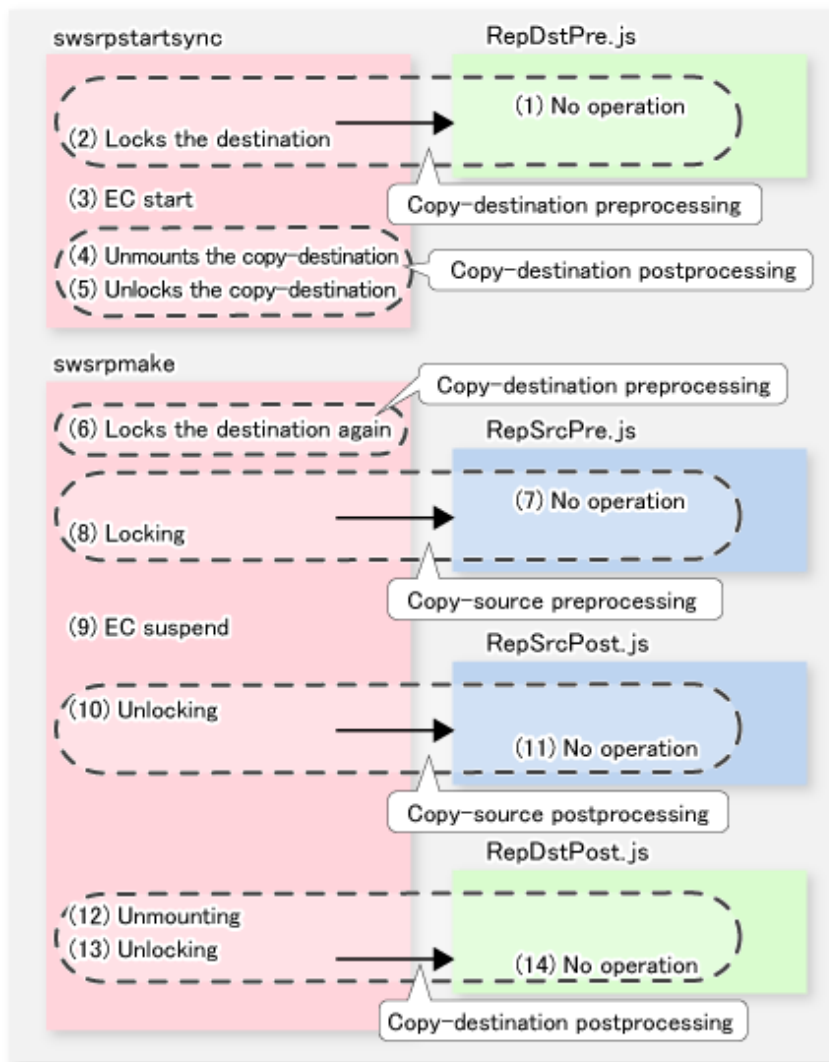
Figure C.5 Synchronous-type replication (EC) (2): When the destination volume is a shared volume in a clustered system

![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 (i.e., EC) in which the destination volume is a shared volume in a clustered system, to prevent the clustered system from being accessed by another process, the destination volume is locked only while swsrpstartsync (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 "13.1.1.12 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 and retry interval can be changed by 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 (this is a function equivalent to the -Xflush option)

If the AdvancedCopy Manager Version 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.

File name and directory

Create a copy source volume locking specification file on the server that contains the copy source volume, naming it as follows:

In the case of non-cluster operation

> *<Environment directory>*\etc\repl\data\SRCLOCK.INI

In the case of cluster operation

> *<Shared disk>*:\etc\opt\swstorage\etc\repl\data\SRCLOCK.INI

Example and description rules

Examples of settings in the copy source volume locking specification file are listed below.

```
[g1d1p1]
BufferFlushOnly=off
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=5000
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
```

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.

Table C.5 SRCLOCK.INI parameter settings

Key name	Explanation
BufferFlushOnly	Specifies flushing the file system buffer of the copy source volume instead of locking the copy source volume: on (default value) = the buffer is flushed (no locking) off = the buffer is not flushed (locking) If the -Xflush option is specified in swsrpmake command and BufferFlushOnly=off, then the -Xflush option has priority. If BufferFlushOnly is not set to "off", 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 and "off" is not specified for BufferFlushOnly, other parameters (LockForceMode, LockRetryNumber and LockRetryInterval) become invalid.
LockForceMode	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	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	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 Version 13.1 or 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 and the retry interval can be changed by 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 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.

File name and directory

Create this file on the server that contains the copy destination volume, naming it as follows:

In the case of non-cluster operation

```
<Environment directory>\etc\repl\data\DSTLOCK.INI
```

In the case of cluster operation

```
<Shared-disk>:\etc\opt\swstorage\etc\repl\data\DSTLOCK.INI
```

Example and description rules

Examples of settings in this file are listed below.

```
[g1d1p1]
LockForceMode=on
LockRetryNumber=10
LockRetryInterval=5000
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
```

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).

Table C.6 DSTLOCK.INI parameter settings

Key name	Explanation
LockForceMode	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 NoPrePost, this parameter becomes invalid.
LockRetryNumber	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,

Key name	Explanation
	then the processing is suspended and the command ends abnormally. If "on" is specified for NoPrePost, this parameter becomes invalid.
LockRetryInterval	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 and LockRetryInterval) are ignored. This parameter can be specified under AdvancedCopy Manager Version 13.1 or 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.

- 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.

File name and directory

Create a drive character mapping file on the server that contains the copy destination volume. Use the following filenames:

In the case of non-cluster operation

    <Environment directory>\etc\repl\data\DRVMAP.INI

In the case of cluster operation

    <Shared disk>:\etc\opt\swstorage\etc\repl\data\DRVMAP.INI

Example and description rules

The following is an example of a drive character mapping file:

```
[g1d1]
p1=D:
p2=C:\mnt
[g1d2]
p1=E:
```

An explanation of how to create a drive character mapping file is given below.

- Create a section in the drive character mapping file for the targeted replication destination volume.

- 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.

. . . .

Table C.7 DRVMAP.INI parameter settings

| Key name	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

This appendix provides how AdvancedCopy Manager can be used to back up and restore system volumes.

D.1 Overview

In a SAN boot environment where the system volume is allocated to a machine in the ETERNUS Disk storage system, the system volume can be backed up and restored using the replication function.

Figure D.1 Overview of backup and restoration of a system volume
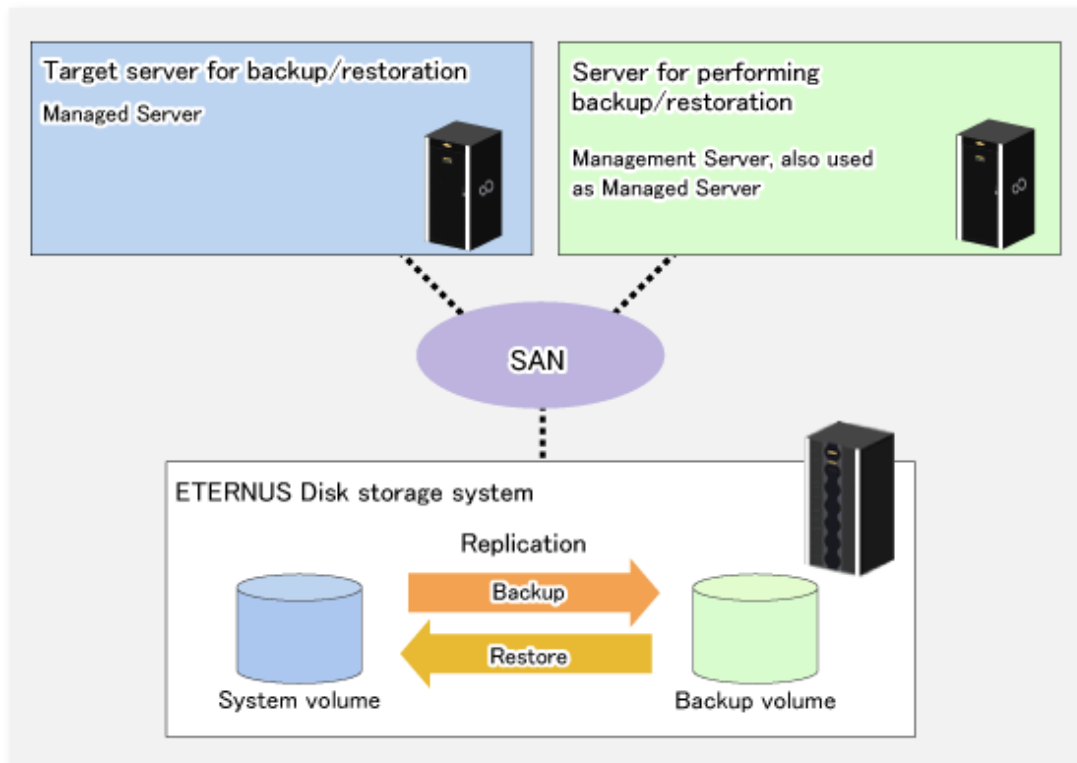
![Note]

- A hardware device that supports SAN boot is required.

- The backup target server must be in the stopped state to back up or restore the system volume.
  This is to ensure the consistency between the data in the backup process and the backed up data.

D.2 Preparation

The server must be stopped in order to back up or restore its system volume, so a separate server is required for backup operations.

That is, at least two servers are required for this operation.

A configuration example for backup and restoration of a system volume is shown below.

Figure D.2 Configuration example for backup and restoration of a system volume
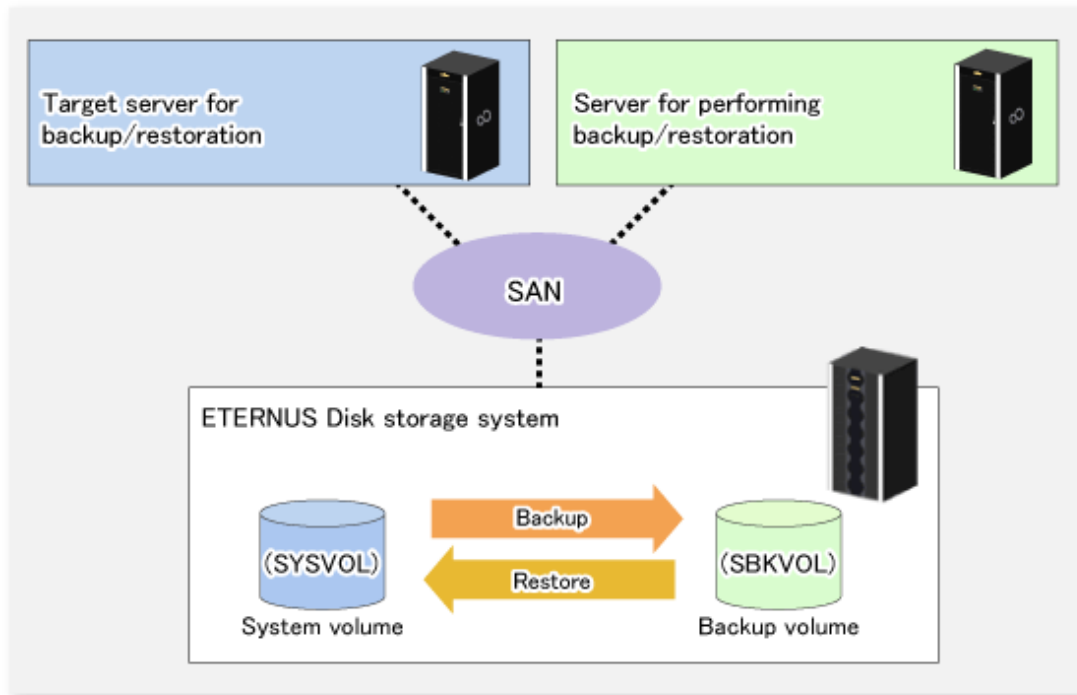
Point
....

If the backup source server and the server used for backup operations have different operating systems, refer to "13.1.1.19 Notes on executing copy between different operating systems" in "13.1.1 General notes".
....

D.2.1 Registration the Managed Server

The server being backed up and the server used for backup operations must be registered as Managed Servers.

Refer to "7.4.3 Registering a Managed Server" to register Managed Servers.

D.2.2 Registration of device information

The system volume on the server being backed up and the device information of the backup volume on the server used for backup operations must be registered.

Refer to "7.4.4 Fetching device information on a Managed Server" to register the device information.

D.2.3 Settings of replication volume information

In replication volume information, the system volume to be backed up must be set as the source volume and the backup destination volume as the replica volume.

Refer to "7.4.5 Configuring the source volume and replica volume" to set the replication volume information.

Point
....

Register the backup volume as a volume without a mount point.

Specify the server used for backup operations as the replication destination.

```
# C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpsetvol -o REP SYSVOL@TRG-SV SBKVOL@SBK-SV
```

D.3 Backing up the system volume

The replication function is used to back up the system volume.

Stop the server that is to be backed up before performing backup.

Note

If backup is performed while the backup target server is running, the backup may take place while a data update is in progress and without maintaining data consistency. Even though backup is completed, the correct data may not have been backed up.

If the incorrect backed up data is restored, the system may not operate correctly.

Figure D.3 Backing up the system volume
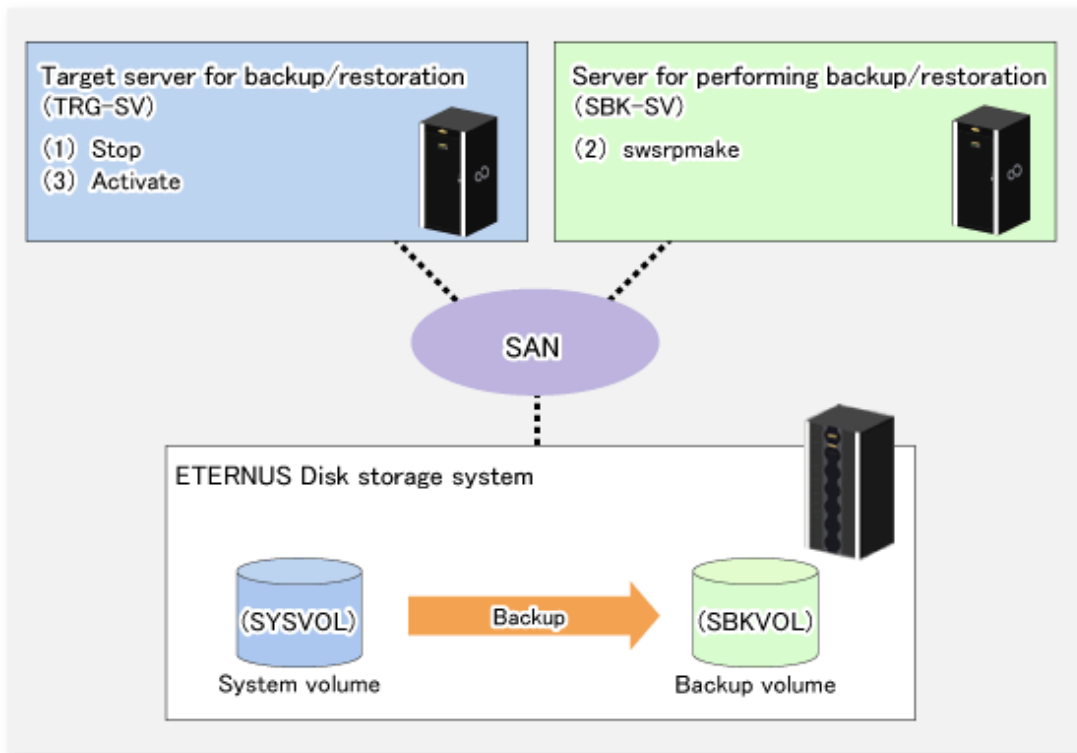
The backup procedure is as follows:

1. Stop the backup target server.

   After the server stops, check that the server power is off.

2. Execute swsrpmake (Replication creation command) on the server used for backup.

   ```
   C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -m SYSVOL@TRG-SV SBKVOL@SBK-SV
   ```

   (*) The command operand was specified in the format "volume name@Managed Server name", as shown in the examples below.
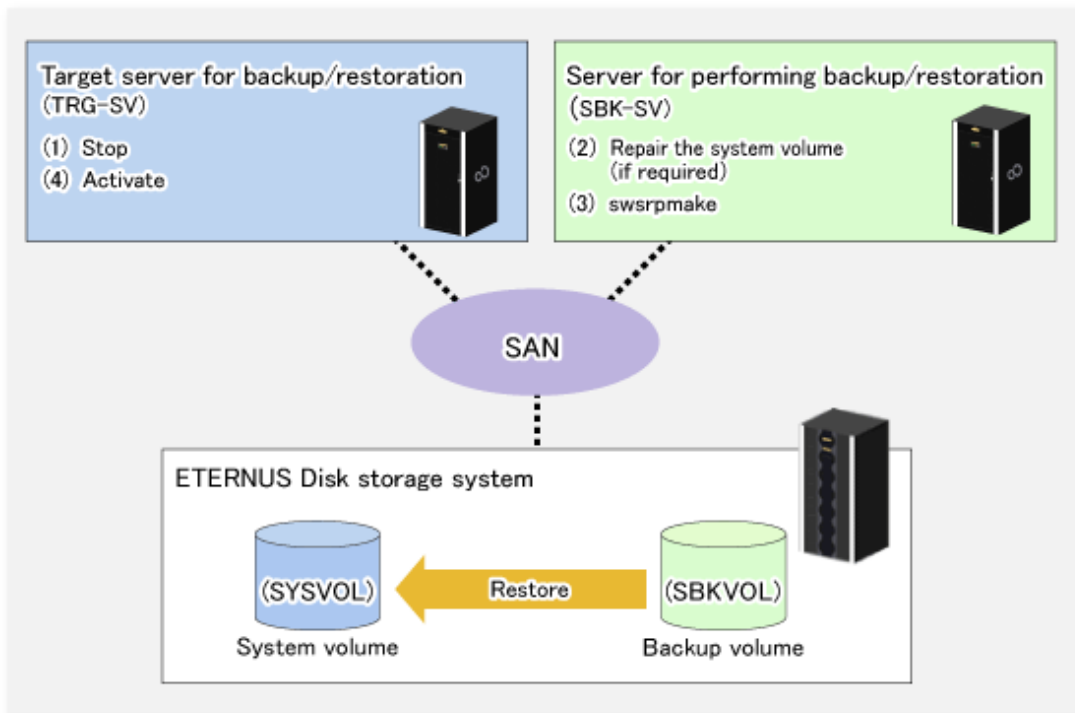
- name of backup/restore target server: TRG-SV

- name of system volume: SYSVOL

- name of server that performs the backup/restore operation: SBK-SV

- name of backup volume: SBKVOL

3. Activate the backup target server.

D.4 Restoring a system volume

The replication function is used to restore a system volume.

Figure D.4 Restoring a system volume

The restoration procedure is as follows:

1. Stop the restoration target server.

   After the server stops, check that the server power is off.

2. If the system volume on the restoration target server is unusable because of a hardware failure, recover the system volume so that the data can be restored.

3. On the server used for restore operations, execute swsrpmake (Replication creation command) with replication in the reverse direction.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -m SBKVOL@SBK-SV SYSVOL@TRG-SV
```

(*) The command operand was specified in the format "volume name@Managed Server name", as shown in the examples below.

- name of backup/restore target server: TRG-SV

- name of system volume: SYSVOL

- name of server that performs the backup/restore operation: SBK-SV

- name of backup volume: SBKVOL

4. Activate the restoration target server.

Appendix E Backup Operations Using Power-Saving

E.1 Overview

Under the power-saving operation, the ETERNUS Disk 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 accesses 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
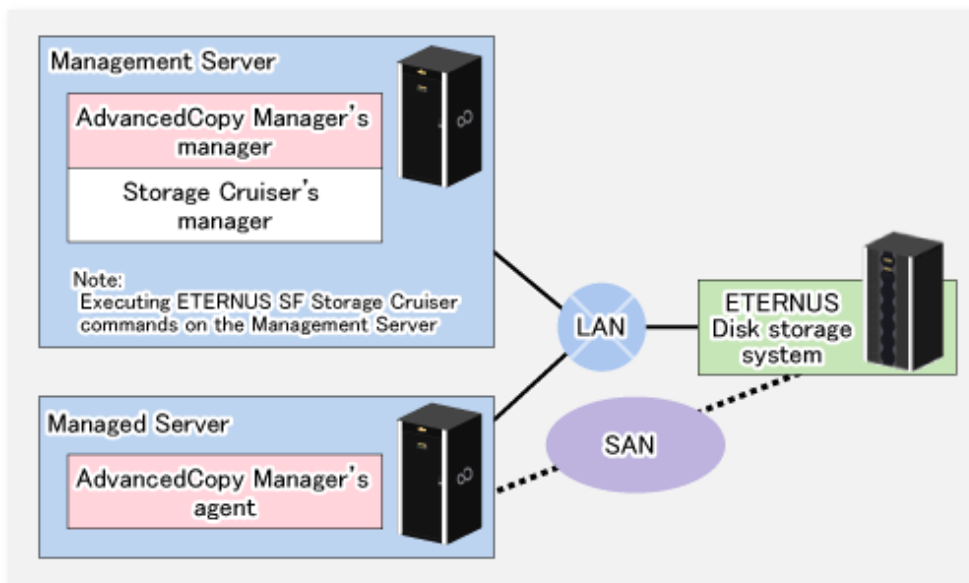
E.3 Operating Environment

This section explains the operating environment of the backup operation under the power-saving mode.

Device	Description
Management Server	Required operating systems Operating systems that support both the AdvancedCopy Manager's manager and Storage Cruiser Version 14.0 or later (the Management Server function). Required software Storage Cruiser Version 14.0 or later(the Management Server function) **Note**: For installation and setup of Storage Cruiser, refer to Storage Cruiser manual.
Managed Server	Required operating system Operating systems supported by AdvancedCopy Manager Required software None
ETERNUS Disk storage system	For information on the supported ETERNUS Disk storage system, refer to "Supported devices" in the *ETERNUS SF Installation and Setup Guide*. For ETERNUS8000, the Eco-mode functionality is available only on 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.

1. E.4.2 Settings for ETERNUS Disk storage system
2. E.4.3 Settings for AdvancedCopy Manager
3. E.4.4 Settings for Storage Cruiser

E.4.2 Settings for ETERNUS Disk 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 Disk storage system, refer to the ETERNUS Web GUI manual.

Creating a RAID group and Logical Unit

The Eco-mode is applied and the RAID group is created.
A RAID group that is to store the data to be backed up (hereafter called "backup source RAID group") and a RAID group that is to store the backup data (hereafter called "backup destination RAID group") are created. A logical Unit is allocated to each RAID group. To effectively reduce power consumption, the backup destination RAID group sets a Logical Unit for each backup that is performed simultaneously. Other Logical Units should not be included in the backup destination RAID group.
The example below illustrates the procedure to simultaneously back up three Logical units (Backup operation A). There are no Logical Units other than the ones for backup operation A in the backup destination RAID group. Therefore, a disk drive can be stopped, except when a backup is running.
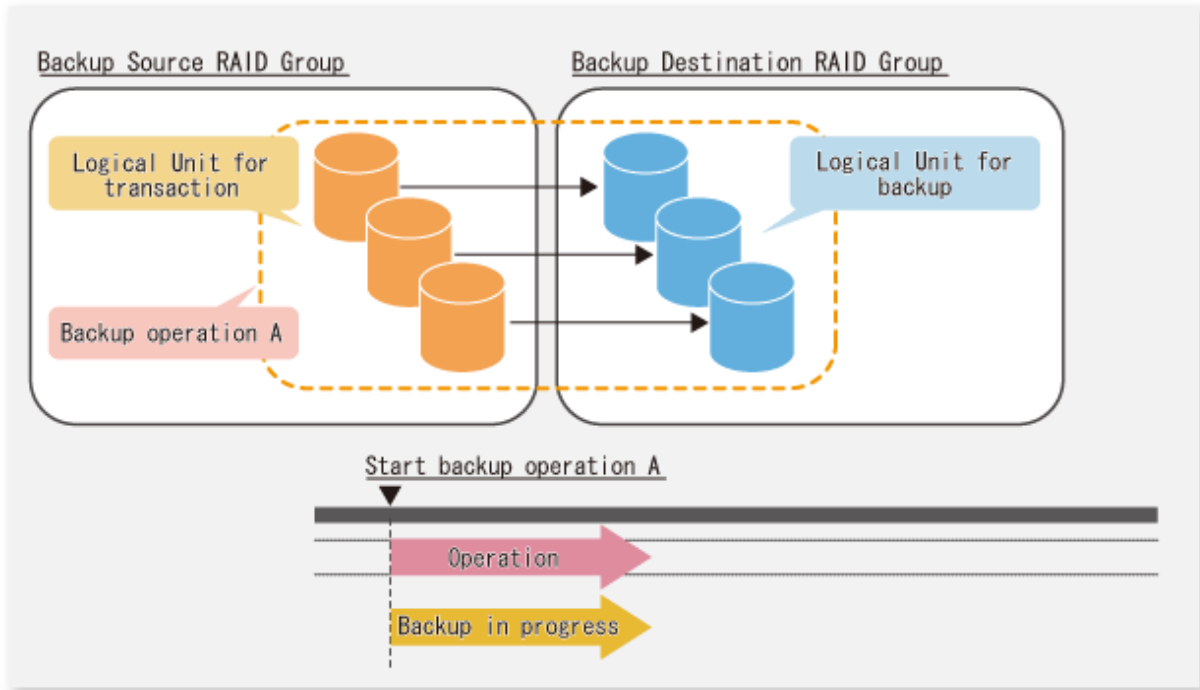
The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, although backup operation A has ended, the Logical Units for backup operation B and for business applications are required to be running.
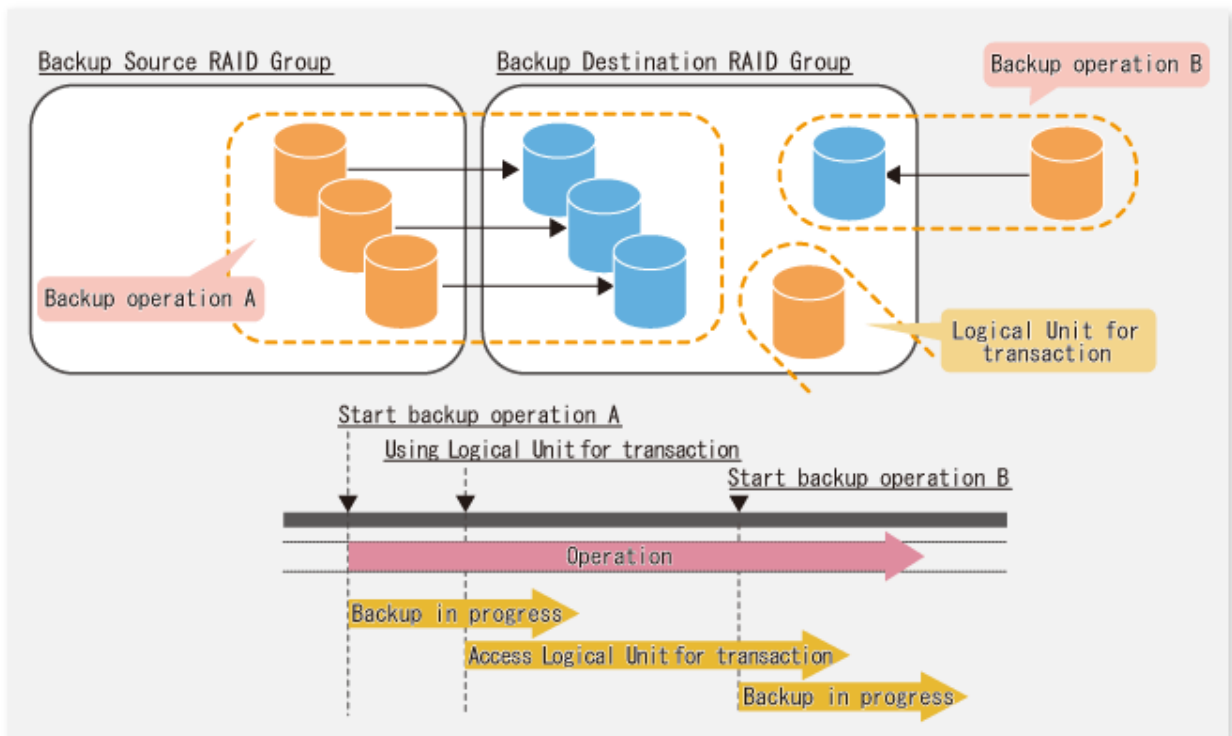
P Point

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.
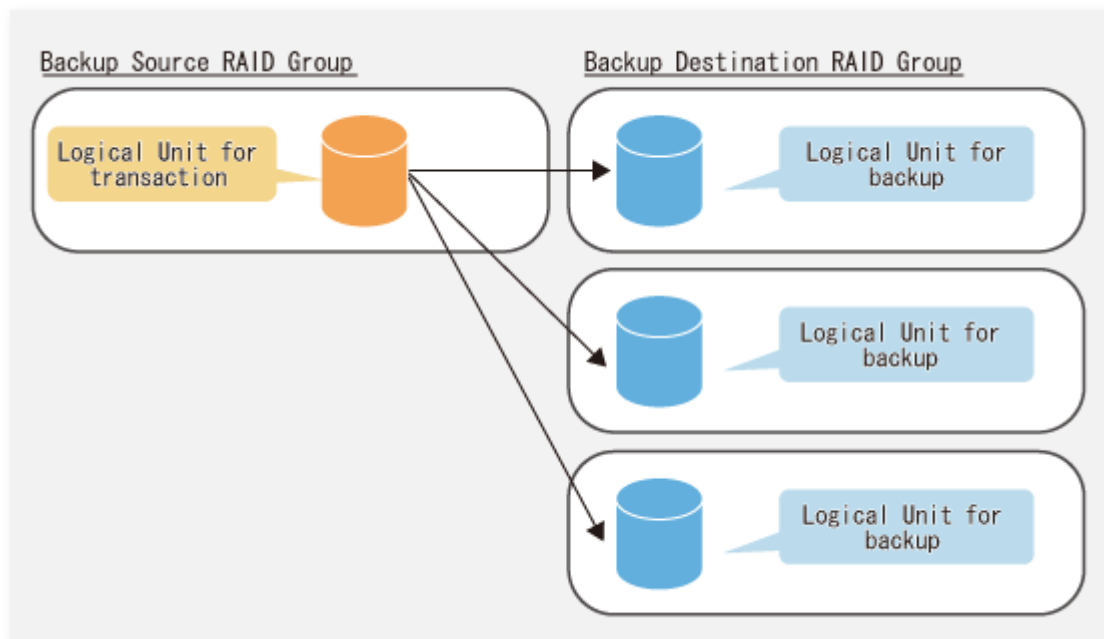
Note

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 ETERNUS Web GUI 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
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 Storage Cruiser

A Storage Cruiser command is used for the power-saving operation. Therefore, Storage Cruiser needs to be set. For details, refer to the Storage Cruiser manual.

E.5　Operation

This section describes the procedure for establishing power-saving operations. This procedure is to be followed for the 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 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 Management Server is Windows

```
C:\ETERNUS_SF\ESC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle start -ipaddr <EternusIP> -
raid <RaidGroup> -sync
```

<EternusIP>: IP address of ETERNUS Disk storage system
<RaidGroup>: RAID group number to be used for the backup destination

Example when the Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle start -ipaddr <EternusIP> -raid <RaidGroup> -sync
```

<EternusIP>: IP address of ETERNUS Disk storage system
<RaidGroup>: RAID group number to be used for the backup destination

For details on this command, refer to the 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 Storage Cruiser. This command returns control after the end of the stopping schedule of the disk drive.

Example when the Management Server is Windows

```
C:\ETERNUS_SF\ESC\Manager\opt\FJSVssmgr\sbin\storageadm.exe spindle stop -ipaddr <EternusIP> -raid
<RaidGroup> -s
```

<*EternusIP*>: IP address of ETERNUS Disk storage system
<*RaidGroup*>: RAID group number to be used for the backup destination

Example when the Management Server is Solaris or Linux

```
/opt/FJSVssmgr/sbin/storageadm spindle stop -ipaddr <EternusIP> -raid <RaidGroup> -s
```

<*EternusIP*>: IP address of ETERNUS Disk storage system
<*RaidGroup*>: RAID group number to be used for the backup destination

For details on this command, refer to the 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 Storage Cruiser manual.

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Appendix F Operation on KVM Guests

This appendix explains operation using the KVM Support Function.

F.1 Overview

The KVM Support Function serves to execute Advanced Copy functions from a Linux KVM guest OS via the AdvancedCopy Manager's agent on a KVM host.
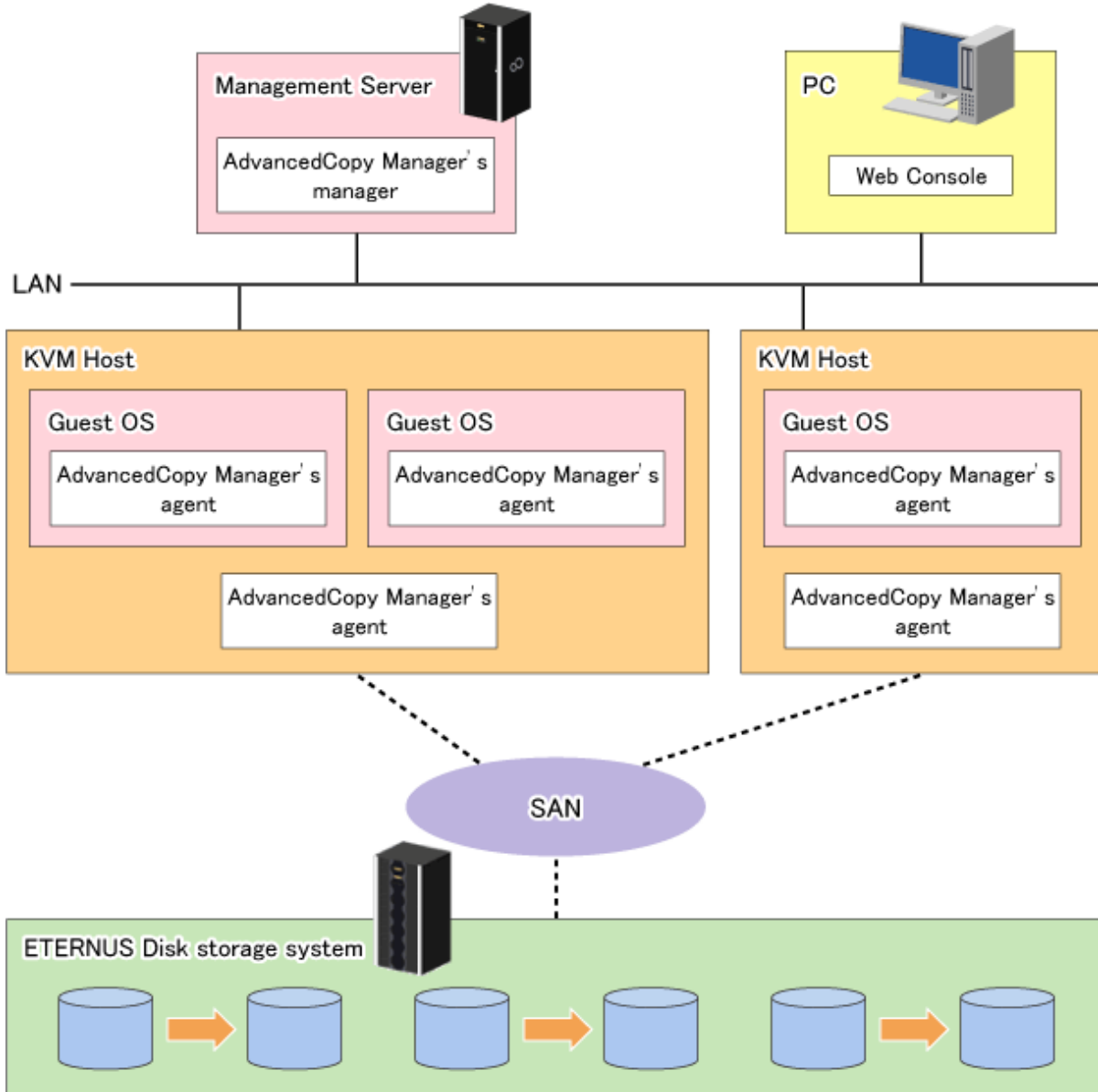
Figure F.1 Overview of KVM Support Function
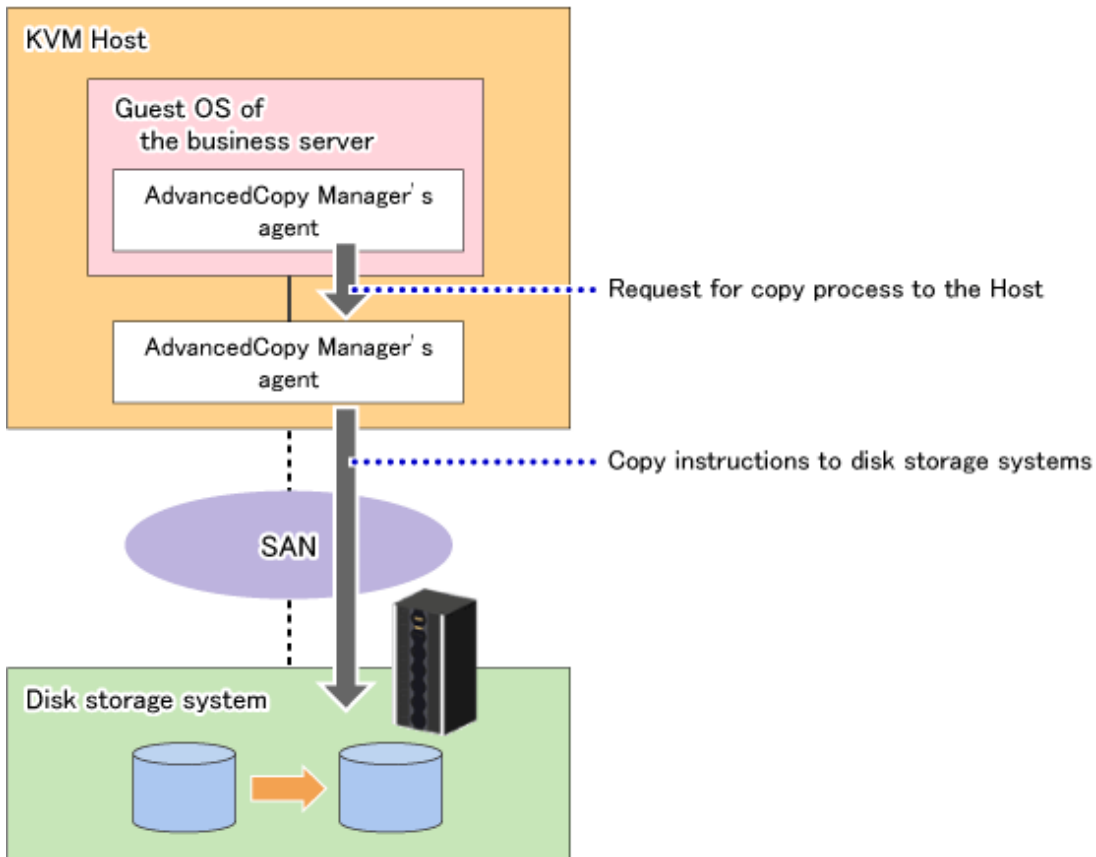
F.2 Configuration

The diagram below shows the configuration for using the KVM Support Function.

Figure F.2 Configuration for Using KVM Support Function

- Install ETERNUS SF Manager or AdvancedCopy Manager's agents on both of the following servers:

  - KVM host server

  - Guest server that is used for backup or replication operations

F.3   Software requirements

The table below shows the operating systems requirements for using the KVM Support Function.

Supported operating systems

Server type	Operating system
Management Server	No requirements.
Managed Server (guest)	Windows Server 2008 R2 Standard SP1 Windows Server 2008 R2 Enterprise SP1 Windows Server 2008 R2 Datacenter SP1 Windows Server 2008 R2 Standard

Server type	Operating system
	Windows Server 2008 R2 Enterprise Windows Server 2008 R2 Datacenter
Managed Server (host)	Red Hat Enterprise Linux 6.2 (for Intel64) Red Hat Enterprise Linux 6.3 (for Intel64)
Server where ServerView Resource Orchestrator's manager exists (*1)	Red Hat Enterprise Linux 6 (for Intel64) Red Hat Enterprise Linux 6 (for x86)

*1: This is required for setting Host information setting file and Guest information setting file automatically.

Related software

No.	Related software name	Version	Remarks
1	ServerView Resource Orchestrator Cloud Edition	3.0 or later	This is required for setting Host information setting file and Guest information setting file automatically.

F.4 Available functions

This section explains the functions that are available with the KVM Support Function.

F.4.1 AdvancedCopy Manager functions

With the KVM Support Function, the following AdvancedCopy Manager functions can be utilized:

- Advanced Copy function

- Backup function

- Replication function

Out of the Advanced Copy functions, the following types of copy can be utilized:

- OPC

- QuickOPC

- EC

- REC

- SnapOPC

- SnapOPC+

See
....
For detailed information on the AdvancedCopy Manager functions, refer to "AdvancedCopy Manager Functions" in the *ETERNUS SF AdvancedCopy Manager Overview*.
....

F.4.2 Online backup

With the KVM Support Function, online backup is available in link with the following application:

- SQL Server

F.4.3 Cluster operations

Cluster operation is not supported on KVM guest OSes.

F.5 Supported devices

This section explains devices that can utilize the KVM Support Function.

F.5.1 Configuration of Virtual disks

The following notes show the precautions to be observed for adding a virtual disk.

- Specify "virtio" as the bus type and create a virtual disk as a VirtIO device.

  If you use Virtual Machine Manager to create the virtual disk, select "Virtio Disk" as the device type.

  Virtual IDE disks (bus type "IDE") are not supported.

  Furthermore, for using the VirtIO device, it is necessary to install the KVM Windows para-virtualized driver (virtio-win) on the guest.

  For details on the KVM Windows para-virtualized driver, refer to a relevant Linux manual.

- As the disk area on the host side, you can specify the device names below:

    - Device names generated by the Linux udev facility (udev device names)

      Example: /dev/disk/by-id/xxxxxxxx (for a disk)
      Example: /dev/disk/by-id/xxxxxxxx-part1 (for a partition)

    - SDX object names of PRIMECLUSTER GDS

      Example: /dev/sfdsk/class0001/dsk/volume0001

- If you are using an SDX object of PRIMECLUSTER GDS, you can only use a volume in a single configuration.

  Non-single configuration volumes (mirrored volumes, striped volumes, concatenation volumes, or volumes consisting of tiered disk groups) cannot be used.

- Allocate a disk or partition of the host to the guest.

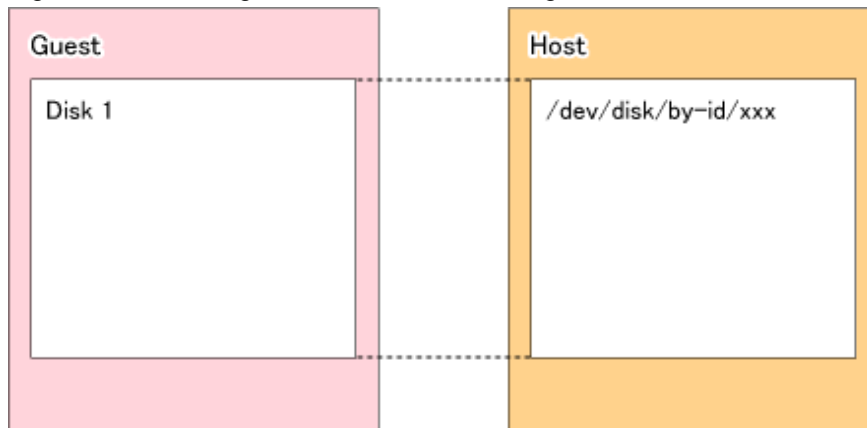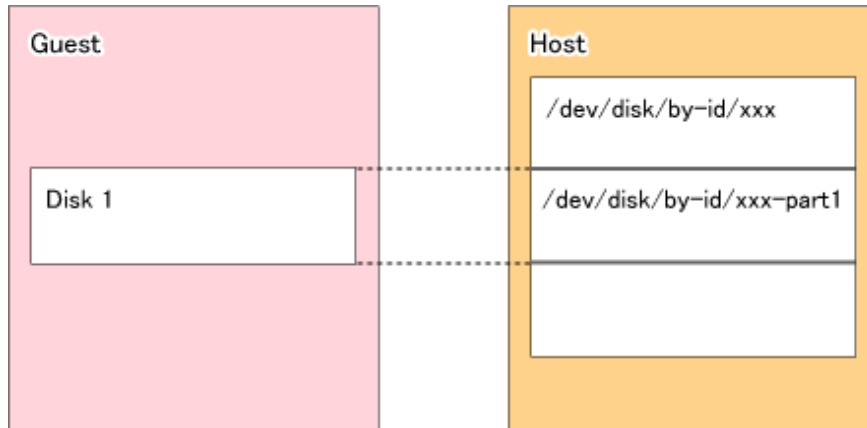Figure F.3 Allocating a disk of the host to the guest

Figure F.4 Allocating a partition of the host to the guest

- If you allocate partitions of the host to the guest, do not connect multiple partitions on the same disk to the same guest.

Figure F.5 Connecting multiple partitions on the same disk to different guests (OK)
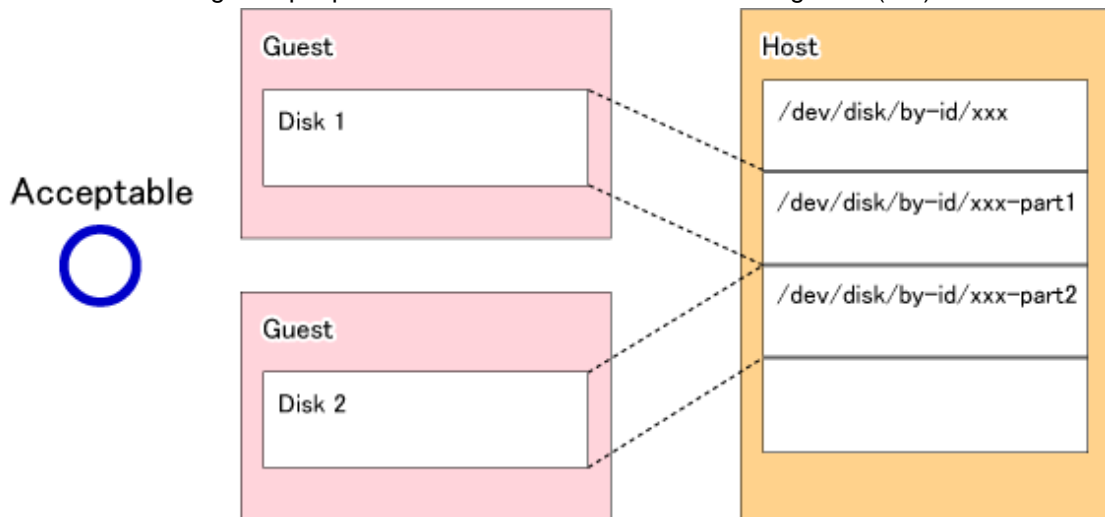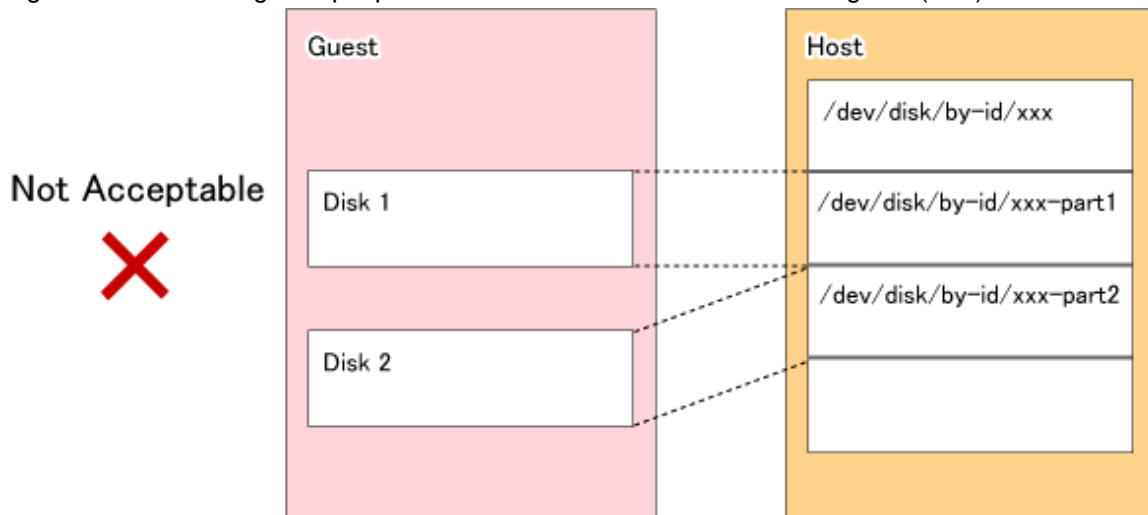

Figure F.6 Connecting multiple partitions on the same disk to the same guest (Bad)

## F.5.2 Devices that can be specified in AdvancedCopy Manager

Device names that can be specified by AdvancedCopy Manager on KVM guests are either g?d? or g?d?p? (AdvancedCopy Manager device names).

For details on AdvancedCopy Manager device names, refer to "1.5 Managing a Device on AdvancedCopy Manager".

F.6   Flow of operation

This section explains the flow of operations utilizing the KVM Support Function.

Figure F.7 Flow of operations utilizing the KVM Support Function
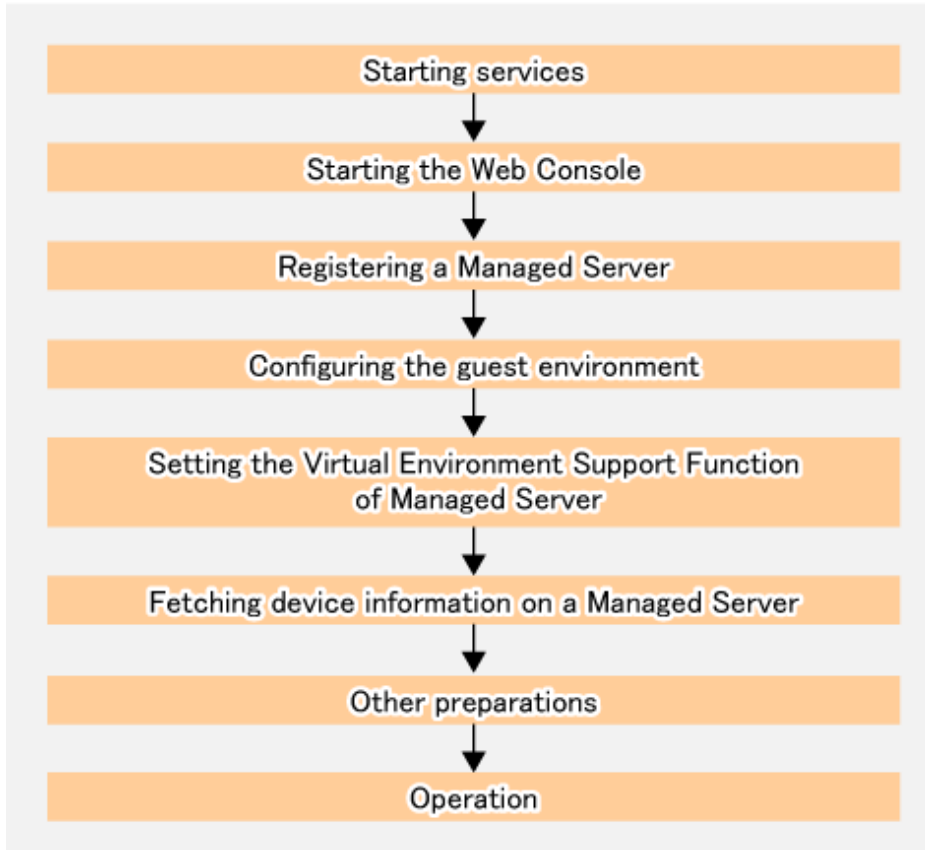
Above work is carried out for the following servers to be controlled and processed.

No.	Contents of work	Object of control	Server to be processed
1	"F.7.1 Starting services"	- Management Server - All guests and hosts	- Management Server - All guests and hosts
2	"F.7.2 Starting the Web Console"	PC	PC
3	"F.7.3 Registering a Managed Server"	- Web Console (when using the GUI) - Management Server (when using the CLI)	All guests and hosts
4	"F.7.4 Configuring the guest environment"	All guests	All guests
5	"F.7.5 Setting the Virtual Environment Support Function of Managed Server"	All guests	All guests
6	"F.7.6 Fetching device information on a Managed Server"	- Web Console (when using the GUI) - Management Server (when using the CLI)	All guests

No.	Contents of work	Object of control	Server to be processed
7	"F.7.7 Other preparations"	- Web Console (when using the GUI) - Management Server (when using the CLI)	All guests

F.7 Preparations

This section explains the preparations required before using the KVM Support Function.

F.7.1 Starting services

The AdvancedCopy Manager services must be started on both the Management Server and the Managed 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, refer to "Chapter 2 Starting and Stopping Services".

F.7.2 Starting the Web Console

Start the Web Console. For details of this, refer to "How to start Web Console" in the *ETERNUS SF Web Console Guide*.

F.7.3 Registering a Managed Server

Register all guests and hosts used for KVM Support Function as the Managed Server.

This process is carried out using Web Console.

F.7.4 Configuring the guest environment

Create the following 2 setting files on all guests.

Table F.1 Setting files for KVM Support Function

Setting file	Description	File path
Host information setting file	This file sets the IP addresses and port numbers of the communication daemon for Managed Servers (hosts) to which copying instructions are sent from guests.	*<Environment directory>*\etc\vstxapi_hostacm.ini
Guest information setting file	This file sets the domain names of virtual machines on which local guests are started.	*<Environment directory>*\etc\vstxapi_domname.ini

[Example of Host information setting file]

```
ipaddr=10.10.10.22
port=1226
```

[Example of Guest information setting file]

```
domname=domain_1
```

For details about the setting files, refer to "F.11 Setting file specifications".

🅿 Point

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- For confirming domain names of virtual machines, execute the virsh list --all command on a KVM host.

- If KVM guest operating systems are automatically allocated by ServerView Resource Orchestrator, AdvancedCopy Manager's Host information setting file and Guest information setting file can be created or updated on the KVM guest operating systems in conjunction with ServerView Resource Orchestrator. For more information, refer to "Operation on KVM Guests" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Linux)*.

F.7.5 Setting the Virtual Environment Support Function of Managed Server

Use stgxfwcmsetmode (Information collection mode configuration command) to enable the KVM Support Function on all guests.

[Example]

```
C:\> C:\Win32App\AdvancedCopyManager\bin\stgxfwcmsetmode -virt kvm
stgxfwcmsetmode completed (SWSTGNODE=null)
C:\>
```

F.7.6 Fetching device information on a Managed Server

Fetch the device information that is stored on Managed Servers (guests).
It is not required to carry out this work for Managed Servers (hosts).

For the control procedure, refer to "7.4.4 Fetching device information on a Managed Server".

F.7.7 Other preparations

Carry out the preparations that are required for your particular method of operation.

For the control procedure, refer to "7.4.5 Configuring the source volume and replica volume" or later.

F.8 Operation

This section explains operation of AdvancedCopy Manager using the KVM Support Function.

Refer to the following sections for details on your particular method of operation. However, that there is no need to implement any of the preparations that are described in these reference sections:

- For backup operation on normal transaction volumes: "3.5 Operation"

- For replication operation: "7.5 Operations"

📑 Note

When you use the KVM Support Function, data communication with the ETERNUS Disk storage system is carried out via the host. Therefore, compared to a physical server environment, processing takes more time, in proportion with the number of volumes to be processed.

📙 Point

For details on implementing live migration while AdvancedCopy Manager is operating, refer to "F.9.3 Implementing Live Migration".

F.9 Changing the operating environment

The following section shows how to modify the operating environment for using the KVM Support Function.

For other procedures for modifying the operating environment, refer to "11.5 Changing the Operating Environment".

- "F.9.1 Changing the IP address of Managed Server"

- "F.9.2 Changing the port number of Managed Server"

F.9.1   Changing the IP address of Managed Server

For details on changing the IP address of a Managed Server (host), refer to "Changing the IP address of Managed Server" in "Operation on KVM Guests" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Linux)*.

F.9.2   Changing the port number of Managed Server

For details on changing the port number of a Managed Server (host), refer to "Changing the port number of Managed Server" in "Operation on KVM Guests" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Linux)*.

F.9.3   Implementing Live Migration

If you implement live migration while AdvancedCopy Manager is operating, afterwards, you will have to update all Host information setting files.

🅿 Point
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If you know the target hosts before live migration, you can update Host information setting files without editing them during implementation of live migration by preparing templates for Host information setting files in advance. The following is a sample procedure for this update:

1. Before live migration, create a Host information setting file for each target host.

   Store the created Host information setting file in a different folder from the path described in "F.11.1 Host information setting file (vstxapi_hostacm.ini)".

2. Implement live migration.

3. After live migration, update the Host information setting file for the target host.

   Run the OS commands to copy the Host information setting file that you created in step 1 and overwrite the file on the path described in "F.11.1 Host information setting file (vstxapi_hostacm.ini)".

However, if KVM guest operating systems are automatically allocated by ServerView Resource Orchestrator, AdvancedCopy Manager's Host information setting file and Guest information setting file can be updated on the KVM guest operating systems in conjunction with ServerView Resource Orchestrator. For more information, refer to "Operation on KVM Guests" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Linux)*.

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F.10   Available commands

The following are the commands that are available with the KVM Support Function.

- "12.2 Backup Management Commands"

- "12.3 Configuration Management Commands"

- "12.4 Replication Management Commands"

- "12.6 SQL Server Associated Commands"

- "12.9 SnapOPC/SnapOPC+ Support Commands"

- "12.10 Troubleshooting data collection command"

F.11   Setting file specifications

This section explains the setting files that are used by the KVM Support Function.

F.11.1　Host information setting file (vstxapi_hostacm.ini)

The Host information setting file sets the IP addresses and port numbers of the communication daemon for Managed Servers (hosts) to which Advanced Copy instructions are sent. This file has to be created and edited by the users.

Create the Host information setting file so as to be on the following path:

[Path for Host information setting file]

```
<Environment directory>\etc\vstxapi_hostacm.ini
```

[Contents of Host information setting file]

```
ipaddr=xxx.xxx.xxx.xxx
port=xxxxx
```

Parameter	Value to be set
- IPv4 format 　ipaddr=xxx.xxx.xxx.xxx - IPv6 format 　ipaddr=n:n:n:n:n:n:n:n (*1)	IP address of the communication daemon for Managed Server (host) to which Advanced Copy instructions are sent. One IP address in either IPv4 format or IPv6 format can be specified.
port=xxxxx	Port number (1 - 65535) of the communication daemon for Managed Server (host) to which Advanced Copy instructions are sent.

　*1: Full notation and abbreviated notation are available. Refer to "1.10.5 About IPv6 address notation" for more information.

F.11.2　Guest information setting file (vstxapi_domname.ini)

The Guest information setting file sets the domain names of virtual machines on which local guests are started. This file has to be created and edited by the users.

Create the Guest information setting file so as to be on the following path:

[Path for Guest information setting file]

```
<Environment directory>\etc\vstxapi_domname.ini
```

[Contents of Guest information setting file]

```
domname=xxxxxx
```

Parameter	Value to be set
domname=xxxxxx	Domain name of virtual machine on which local guest is started (max. 50 characters).

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