

FUJITSU Storage ETERNUS SF AdvancedCopy Manager V16.9A

Operation Guide

Windows

B1FW-6010-11ENZ0(00)
September 2023

Preface

Purpose of This Manual

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

Intended Readers

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

Structure of This Manual

The structure of this manual is as follows.

[Chapter 1 Overview](#)

This chapter provides an overview of AdvancedCopy Manager.

[Chapter 2 Starting and Stopping Services](#)

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

[Chapter 3 Backup Operation](#)

This chapter describes how to back up data.

[Chapter 4 Backup Operations \(Symfoware\)](#)

This chapter describes how to back up the Symfoware database.

[Chapter 5 Backup Operation Using Suspend/Resume Function](#)

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

[Chapter 6 Backup Operation Using QuickOPC Function](#)

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

[Chapter 7 Replication](#)

This chapter describes the replication operation.

[Chapter 8 Backup and Restore of Exchange Server Databases](#)

This chapter describes how to back up and restore the Exchange Server database.

[Chapter 9 Backup and Restore of Hyper-V](#)

This chapter describes how to back up and restore the Hyper-V.

[Chapter 10 Backup and Restore of SQL Server Database](#)

This chapter describes how to back up and restore the SQL Server database.

[Chapter 11 Scheduler](#)

This chapter explains the scheduler feature which simplifies the backup operation.

[Chapter 12 Storage Cluster Continuous Copy Function](#)

This chapter describes the replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function.

[Chapter 13 Operation Maintenance](#)

This chapter describes how to perform configuration and system maintenance tasks and troubleshooting on the system management information database.

[Chapter 14 Command References](#)

This chapter describes commands.

Chapter 15 Notes on Operations

This chapter describes additional operational notes on Backup and Replication.

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

This appendix describes the script used for pre-processing and post-processing of backup and restore functionality.

Appendix B Sample Script for Backup Operations

This appendix describes some sample scripts using AdvancedCopy Manager.

Appendix C Pre-processing and Post-processing of Replication

This appendix describes the script used for pre-processing and post-processing replication.

Appendix D System Volume Backup Operation

This appendix describes how to back up and restore the system volume.

Appendix E Backup Operations Using Power-Saving

This appendix describes backup operations using the power-saving features of disks in ETERNUS Disk storage system.

Appendix F Operation on KVM Guests

This appendix describes operation using the KVM Support function.

Conventions

- "FUJITSU Storage" and "Fujitsu Storage" are omitted from the names of the products and manuals.
- This manual abides by the conventions listed in "Conventions" in the *ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Documentation Road Map*.

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Update History

Content of Update	Updated Section	Revision
The version information has been changed to 16.9A.	Cover page	11
Information related to the following software has been deleted. - Windows 8.1 - Windows 8	9.1.1.3	10.2
The ETERNUS DX S5 series has been added to the supported storage devices.	13.5.8	
The following software has been added to the Managed Server (host). - Red Hat Enterprise Linux 9 (for Intel64)	F.3	
The following software has been added to the Managed Server (guest).		

Content of Update	Updated Section	Revision
<ul style="list-style-type: none"> - Microsoft Windows Server 2022 - Microsoft Windows Server 2019 		
Information related to the following software has been added. <ul style="list-style-type: none"> - Microsoft Windows Server 2022 	General	10.1
The description has been modified.	1.3, 14.3.1.4	
Information related to the following software has been added. <ul style="list-style-type: none"> - SQL Server 2019 Information related to the following software has been deleted. <ul style="list-style-type: none"> - Red Hat Enterprise Linux 6 (for x86) - Symfoware Server Enterprise Edition V10.x or earlier - Symfoware Server Advanced Backup Controller V10.x or earlier 	General	10
The articles about the product configuration and function overview have been deleted from this manual and they have been moved to the <i>Overview</i> .		
The description indicating that the available software version level may vary depending on the system environment has been clarified.	1.1.1, 1.1.2	
Unnecessary notation has been deleted.	7.2.1	
The adapter name "FCRA" has been changed to "RA".	7.5.2.2	
The work procedure has been modified.	13.6	
The command execution example has been modified.	14.3.1.4	
The description related to the privileges required to execute commands has been modified.	14.5	
The explanation has been added in "Maintenance Mode".	15.1.7.1, 15.1.8.1	
The manual to refer the details of the AdvancedCopy Manager functions has been changed.	F.4.1	
In the Figure 14.4, the explanation of the "stgxfwcmdelsrv" command has been modified.	14.2	9.3
A new sub section has been added.	15.1.1.26	
The URL of the web site for downloading the "handle.exe" file has been modified.	1.8.2.2	9.2
The section title has been changed.	Chapter 1, 1.1, 1.1.1, 1.2, 1.2.1, 1.2.2, 1.3, 1.8.2, 1.8.4, 1.10.3	9.1
In [Point], the explanation has been added.	1.10.3	
The section "1.10.4 Combination in Environment Where Earlier Version Number and IPv6 Unsupported Operating System Coexist" of previous version has been deleted.	-	
Information related to the following software has been deleted. <ul style="list-style-type: none"> - Windows 7 	9.1.1.3	
The explanation related to article on creating a guests OS has been modified.	F.2	
Information related to the following software has been added. <ul style="list-style-type: none"> - Red Hat Enterprise Linux 8 (for Intel64) 	General	9

Content of Update	Updated Section	Revision
Information related to the following devices and software has been deleted. <ul style="list-style-type: none"> - ETERNUS DX60, DX400 series, DX8000 series - Microsoft Windows Server 2008 R2 - Microsoft Windows Server 2008 - SQL Server 2008 SP4 - SQL Server 2008 R2 SP3 - Oracle 8i, 9i, 10g - Exchange Server 2007 SP3 - SynfinityDISK 		
The description for Conventions has been changed so that the <i>ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Documentation Road Map</i> is referenced.	"Conventions" in Preface	
The "Manual Organization and Reading Suggestions" section has been deleted from Preface.	Preface	
The explanation in "Work Directory" has been added.	1.8.2.2, 1.8.3, 1.8.4.2	
The explanation related to starting and stopping the ETERNUS SF Manager service has been modified.	Chapter 2	
The explanation in stop the SnapOPC+ has been added.	7.1.1.3, 7.7, 14.3.2.2 - 14.3.2.4, 15.1.5.2	
Condition of online backup has been added.	9.1.1.3	
In the table "Processing Differences in Accordance with Operating Status" of [NOTES], information has been added.	14.3.2.4	
The explanation related to article on creating guests has been added.	F.2	
Information related to Microsoft Windows Server 2019 has been added.	"Notation" and "Others" in Preface, 1.5.2, 1.6.2, 8.3.2.2, 9.1.1.1, 9.1.1.3, 9.3.1, 10.5.2.2	8.1
Information related to Exchange Server 2019 has been added.	"Others" in Preface, 1.3.2	
A note for Windows Defender has been added.	1.5.4	
In [Note] in the "Recreating Database", information has been modified.	10.3.2.2, 10.4.2.2	
The work procedure has been modified.	13.6, 13.7.2.1, 13.7.2.2	
Information related to the ETERNUS DX8900 S4 has been added.	"Notation" in Preface	8
Software requirements for SQL Server have been added.	1.3.1, 1.3.2	
Information related to Microsoft Windows Server 2016 has been added.	F.3	
The precaution to be observed for adding a virtual disk has been added.	F.5.1	
Information related to Solaris 9 has been deleted.	"Notation" in Preface	7
Information related to the ETERNUS DX500 S4/DX600 S4 has been added.	"Notation" in Preface	
Information related to the ETERNUS AF250 S2/AF650 S2 has been added.	"Notation" in Preface, 13.5.8	
[Point] has been added.	7.5.2.2	
The explanation in the table 13.1 and the table 13.2 has been modified.	13.1	

Content of Update	Updated Section	Revision
Information related to Microsoft Windows Server 2016 has been added.	"Notation" and "Others" in Preface, 1.3.2, 1.5.2, 1.6.2, 8.3.2.2, 9.1.1.1, 9.1.1.3, 9.3.1, 10.5.2.2	6
Information related to Windows Vista has been deleted.	"Notation" in Preface, 9.1.1.3	
Information related to SUSE Linux Enterprise Server 11 has been deleted and information related to SUSE Linux Enterprise Server 12 for AMD64 & Intel64 has been added.	"Notation" in Preface	
Information related to the ETERNUS DX60 S4/DX100 S4/DX200 S4 has been added.	"Notation" in Preface	
The reference destination related to the combination of the manager program and the agent program has been changed.	1.1.2	
The supported versions of Exchange Server and SQL Server have been modified.	1.3.1, 1.3.2	
In [Note], information has been modified.	1.6.2	
The description has been modified to "Workable only through the Command Line Interface".	4.1.4.5	
In [Note], information has been added.	7.1.2	
A new condition has been added.	7.4.7.1	
The description has been modified so that Microsoft Windows Server 2016 is listed.	8.3.1.4, 8.3.4.2, 9.2.1, 10.5.1.3, 10.5.4.2	
The explanation in [Note] for Mailbox Server has been modified.	8.3.2.2	
In [Point] for the Management Server, information has been added.	8.3.3	
A new section has been added.	13.5.8	
In NOTES, the description of the command execution when the maintenance mode of the physical disk resource cannot be set to ON has been modified.	14.1.2.1, 14.1.2.3, 14.1.3.1, 14.3.2.1, 14.3.2.2, 14.3.2.4, 14.3.3.1, 14.4.4, 14.5.1.1, 14.5.2.1, 14.6.2, 14.6.3	
In DESCRIPTION, information has been modified.	14.2.10	
In NOTES, the factors that cannot set the replication volume information have been added.	14.3.1.1	
Information related to HP-UX 11i v1/v2 has been deleted.	"Notation" in Preface	5
Information related to VMware vSphere 4 is deleted.	"Notation" in Preface	
Information related to the ETERNUS DX80/DX90 has been deleted.	"Notation" in Preface, 14.3.2.2, 15.1.2, 15.1.8, 15.1.9	
Information related to the ETERNUS AF250/AF650 has been added.	"Notation" and "Others" in Preface	
Information related to the ETERNUS LT60 has been deleted.	"Notation" in Preface	
The description has been modified so that SQL Server 2016 is listed.	"Others" in Preface, 1.3.1, 1.3.2, 10.1, 10.5, 10.5.2.2	
The description has been modified so that Exchange Server 2016 is listed.	"Others" in Preface, 1.3.2, Chapter 8, 8.1, 8.1.1.1, 8.1.1.2, 8.1.2.1, 8.1.2.2.2, 8.1.2.5, 8.1.3.2.5, 8.1.4.1, 8.1.5.1, 8.1.5.1.6, 8.1.5.2, 8.1.5.2.1, 8.1.5.2.2, 8.1.5.3, 8.1.5.4,	

Content of Update	Updated Section	Revision
	8.1.5.4.1, 8.1.6.4, 8.1.7.1 - 8.1.7.3, 8.2.1, 8.2.5, 8.3, 8.3.2.2, 8.3.5.1, 14.4.1 - 14.4.6	
Information related to SQL Server 2005 has been deleted.	1.3.1, 1.3.2	
In [Note], information has been added. In addition, [Note] has been added.	1.4	
The description of referring to the <i>ETERNUS SF Web Console Guide</i> has been added.	3.4.4, 4.1.4.4, 5.4.4, 6.4.4, 7.4.4	
The explanation of the command that performs a recovery to the latest state has been added.	4.1.5.3, 4.2.5.2, 14.1.2.3, 14.6.3	
The explanation related to SnapOPC/SnapOPC+ has been modified.	7.1.1.1, 7.1.1.2, 7.2.3.1 - 7.2.3.5, 7.5.1, 13.4.2, 13.4.2.3, 14.3.2.2, 14.11.1	
The operations to change the device configuration have been added.	13.5.5	
The explanation of the item "Manager IP address" has been modified.	14.2.10	
The explanation has been modified.	15.1.1.20	
A new section has been added.	15.1.1.26	
Information related to Microsoft Windows Server 2003 has been deleted.	"Notation" in Preface, Chapter1 - 4, Chapter7 - 10, Chapter12 - 15, Appendix A, Appendix C	4
Information related to Windows 10 has been added.	"Notation" in Preface	
A note has been added.	3.4.3, 4.1.4.3, 4.2.4.3, 5.4.3, 6.4.3, 7.4.3, F.7.3	
The explanation of the supported configurations has been modified.	8.1.2.1, 8.3.1.4, 8.3.3, 9.2.1, 11.2.2	
The reference destination has been modified.	8.4.4.2, 8.4.6, 10.5.4.2	
The explanation related to the "stgxfwcmmodsrv" command execution has been modified.	13.5.1 - 13.5.4, 13.5.6.2 - 13.5.6.4	
The explanation related to the operating environment during a command execution has been modified.	14.1, 14.3	
Information related to the ETERNUS DX8700 S3/DX8900 S3 has been added.	"Notation" in Preface	3.2
The reference destination manual has been modified.	4.1.2.1, 4.1.5.3, 14.1.2.3, 14.6.3	
The term "VMware Virtual Volumes" has been changed to "VMware vSphere Virtual Volumes" according to the terms used by VMware, Inc.	Throughout this manual	3.1
Information related to VMware vSphere(R) 6 has been added.	"Notation" in Preface	
The setting procedure of handle.exe has been corrected.	1.7.3.2	
The command name of Figure 7.30 has been corrected.	7.5.2.2	
The Copyright has been modified.	A.2.1.1, A.2.2.1, A.3.1.1, A.3.2.1, C.2.2.1, C.2.2.2, C.2.3.1, C.2.3.2	
Information related to the ETERNUS DX200F has been modified.	"Others" in Preface	3
Notes for the Advanced Copy function that uses TFOV's have been added.	1.2.1, Chapter3, 4.1.1, Chapter5, Chapter6	

Content of Update	Updated Section	Revision
The explanation of Storage Cluster Continuous Copy function has been added.	1.2.2, 1.4.1	
Software requirements for SQL Server have been added.	1.3.1, 1.3.2, 10.5.2.2	
Notes when using the handle.exe have been added.	1.7.2	
The configuration method for the handle.exe has been corrected.	1.7.3.2	
The explanation of preparations has been modified.	5.4, 6.4	
The term "Exchange server" has been changed to "Business server".	Chapter8, 14.4	
The explanation of the replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function has been added.	1.2.1, 1.2.2, 1.4.1, Chapter3, 4.1, Chapter5, Chapter6, Chapter12, 14.1, 14.1.1.3, 14.1.2.1, 14.1.2.3, 14.1.2.8, 14.3.1.1, 14.3.1.4, 14.3.1.5, 14.3.2.1, 14.3.2.2, 14.3.2.3, 14.3.2.4, 14.3.2.6, 14.4.9, 14.8.1, 14.8.2, F.2	
The corrective procedure when hardware failure occurs in volumes has been modified.	13.3.2.2, 13.4.2.1	
The explanation when migrating from ETERNUS SF Manager V16.1 or later has been added to options.	14.2.16	
Kernel Transaction Manager has been added to running software in general notes.	15.1.1.7	
Point when using the KVM Support function has been added.	F.2	
Red Hat Enterprise Linux 7 (for Intel64) has been added to the supported OSs.	F.3	
The explanation for the Oracle Database systems has been added.	1.2.1, 1.2.2, 1.3.1, 1.3.2	2
The paths for Symfoware coordination have been modified.	4.1.2.6, 13.1.1.1, 13.1.1.2	
Points for installation of the Symfoware Server Advanced Backup Controller after configuration of the server environment have been added.	4.1.4.5	
Notes regarding the number of simultaneous executions of Concurrent OPC and Concurrent Suspend processes have been modified.	7.5.1.1, 7.5.2.3	
The section regarding the transfer mode of the inter-box synchronous replication has been modified.	7.5.2.2	
The steps for changing the drive letter mapping file have been added.	7.6.3, 8.2.6.1, 8.2.6.2, 9.6.1, 12.5.5.2	
The section on the stop of resource monitoring in relation to physical disks has been modified.	8.1.5.1.4, 8.2.5.1.4	
The points of the execution of restoring have been added.	8.1.5.2, 8.2.5.2	
The section on the restart of resource monitoring in relation to physical disks has been modified.	8.1.5.3.1, 8.2.5.4.2	
Precautions in cases when a partition cannot be created have been added.	8.1.5.4, 8.2.5.5, 8.4.5.2	
Notes of the prerequisites have been added.	8.4.3	
Precautions when performing backup have been added.	9.4	
An overview of the backup / restoration of an SQL Server database has been added.	10.1	

Content of Update	Updated Section	Revision
Precautions regarding the file of the database to back up have been added.	10.2.1.2	
The explanation in regard to the features supported from version 16.1 has been described.	10.3, 10.4, 10.5, 12.6.2	
The explanation for upfront preparations before starting the backup operation of an SQL Server has been modified.	10.3.1, 10.4.1	
The section in regard to registration of volumes has been added.	10.4.1.6, 10.4.1.7	
The explanation for backup and restoration of an SQL Server database using wizards has been added.	10.5	
The explanation in regard to the Scheduler feature has been added.	Chapter 11	
The explanation of backup of databases has been modified.	12.1.2.2	
The steps for backing up the data base have been added.	12.1.2.2	
The explanation to restore the data base has been modified.	12.1.2.3	
Notes of the collecting error survey information in the cluster environment have been modified.	12.2.1.1	
The explanation in regard to how to correspond to certain situations has been modified.	12.3.2.2, 12.4.2.1, 13.1.1.3, 13.3.1.1	
The explanation on changing the port number of the Management Server / Managed Server has been added.	12.5.3	
The operating environments of AdvancedCopy Manager for the "swstresrst" command and the "swstsrsemitch" command have been modified.	13.1	
"-Xallserver" and "-Xallinstance" have been added to the formats of the SQL Server backup history display / delete commands.	13.5.2.2	
Notes of the "swsrphistory_sql" command have been added.	13.5.2.2	
The explanation in regard to the distributed transaction coordinator service has been added.	14.1.1	
The explanation in regard to the maintenance mode has been added.	14.1.6.1, 14.1.7.1	
The processes for before and after backup operation have been added.	A.2, A.3.3, C.2.1, C.2.4, C.2.5	
The explanation in regard to energy-saving operation (eco-mode) has been altered.	Appendix E	
Supported OS version numbers in operation as a KVM guest have been added.	F.3	
Information related to the ETERNUS DX200F has been added.	"Others" in Preface	1.1

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Chapter 1 Overview

1.1 Operating Environment

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



See

- For the hardware requirements, refer to "Operating Environment" in the *Installation and Setup Guide*.
- For browsers on which Web Console can run, refer to "Supported Web Browsers" in the *Web Console Guide*.
- Refer to "Notes on Combining Versions and Levels" in the *Release Notes* for the supported combinations of the manager and the agent.



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 *Installation and Setup Guide*.

1.1.1 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 *Installation and Setup Guide*.

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

Table 1.1 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 path load balancing.
SQL Server 2019 SQL Server 2017 SQL Server 2016 SP2 SQL Server 2016 SQL Server 2014 SP2 SQL Server 2014 SP1 SQL Server 2014 SQL Server 2012 SP4 SQL Server 2012 SP3	When a Management Server operates as a Managed Server, and when the SQL Server database is backed up.
Symfoware Server Advanced Backup Controller V11 or later	When a Management Server operates as a Managed Server, and when backup operation is used with Symfoware.
Oracle 11g or later	When a Management Server operates as a Managed Server, it is necessary to link it to Oracle.
handle.exe tool	When using this tool to collect troubleshooting data for volume locking error. (*1)

*1: This software can be downloaded from the following URL:

<https://docs.microsoft.com/sysinternals/downloads/handle>

Note that the software version level may differ depending on the system environment for installing the software (such as the server OS and storage devices connected to the server). For details about the system environments of the software and supported devices, refer to the relevant software manual.

1.1.2 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 *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 OSs on which AdvancedCopy Manager's agent is running, refer to "Operating Environment of AdvancedCopy Manager's Agent" in the *Cluster Environment Setup Guide*.

Table 1.2 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 2019 SQL Server 2017 SQL Server 2016 SP2 SQL Server 2016 SQL Server 2014 SP2 SQL Server 2014 SP1 SQL Server 2014 SQL Server 2012 SP4 SQL Server 2012 SP3	When the SQL Server database is backed up.
Exchange Server 2019 Exchange Server 2016 Exchange Server 2013 SP1 Exchange Server 2010 SP3	When the Exchange Server database is backed up. - "ETERNUS SF AdvancedCopy Manager (x64) - Agent" is required.
Exchange Server 2019 Management Tools Exchange Server 2016 Management Tools Exchange Server 2013 Management Tools Exchange Server 2010 Management Tools	When using it as a backup server to back up the Exchange Server database with the replication management function. - "ETERNUS SF AdvancedCopy Manager (x64) - Agent" is required.
ETERNUS VSS Hardware Provider 2.1.x	This is required when performing backup operation of the Exchange Server database, or when performing backup operation of Hyper-V. - The VSSHP installer is stored on the DVD "ETERNUS SF SC/ACM/Express Mediapack (V16.9 or higher) Agent Program and Manual". - While there is the backup disk Pool operation and the copy set operation as operation formats of the ETERNUS VSS Hardware Provider, the AdvancedCopy Manager utilizes the copy set operation. This cannot be used together with other products using the backup disk Pool operation.
Symfoware Server Advanced Backup Controller V11 or later	When backup operation is used with Symfoware.
Oracle 11g or later	It is necessary to link to Oracle.
handle.exe tool	When using this tool to collect troubleshooting data for volume locking error. (*1)

*1: This software can be downloaded from the following URL:

Note that the software version level may differ depending on the system environment for installing the software (such as the server OS and storage devices connected to the server). For details about the system environments of the software and supported devices, refer to the relevant software manual.

1.2 Managing Device on AdvancedCopy Manager

This section describes how to manage the devices with AdvancedCopy Manager.

Refer to "3.2.2 Selecting Backup Source" for devices that can be used for the backup operation and to "7.2.2 Determining Replication Target" for devices that can be used for the replication operation.

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 1.3 Device Name of AdvancedCopy Manager

Device Name	Description
g?d?p? or g?d?	<p>Characters "g," "d," and "p" Indicate Following:</p> <ul style="list-style-type: none"> - For ETERNUS Disk Storage Systems (*1) The character "g" indicates a device number, "d" indicates a Logical Unit (LU) number, and "p" indicates a partition number. - For Non ETERNUS Disk Storage Systems (*2) The character "g" indicates a fixed value of 0, "d" indicates a serial number used on the server, and "p" indicates a partition number. <p>For Logical Units (Disk Units) A device name of "g?d?" with no "p?" attached indicates a Logical Unit (disk unit).</p>

(*1) About the device name of the ETERNUS Disk storage system regarding the Storage Cluster Continuous Copy function

The characters "g" and "d" indicate a device number and a Logical Unit(LU) number respectively on Primary Storage.

(*2) 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 are not 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 Web Console or the [stgxfwcmdispdev](#) command.

Note

- For information on using disks with a physical size of 2 terabytes and over, refer to "Using large capacity disks" under "[15.1.1 General Notes](#)".
- If Logical Unit (disk unit) operations are used, refer to "[15.1.1.17 Notes on Executing Logical Unit \(Disk\) Unit Copy](#)".
- For backup operation and replication operation, dynamic volumes cannot be used.

Target File System

The following file system can be registered in transactions:

- NTFS (NT File System)
- ReFS (Resilient File System)

Note

Any NTFS that is set with the data deduplication function implemented in Microsoft Windows Server 2012 or later operating systems cannot be used.

1.3 Notes When Using User Account Control (UAC)

User Account Control (hereinafter referred to as "UAC") affects the execution of a process or program that requires administrator privileges to enhance the security of Microsoft Windows Server.

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

- When UAC is enabled

When any user other than the Administrator account (including accounts in the Administrators group) executes a process or program that requires administrator privileges, the "Permissions granted/authorized dialog" is displayed. Permissions granted or authorized must be confirmed.

- When UAC is disabled

A process or program that requires administrator privileges must be executed by either an Administrator account or a user account in the Administrators group.

Operating requirements are described below.

Table 1.4 Relationship Between account and UAC

Account Type	UAC: Enabled	UAC: Disabled
Administrator account	Y	Y
User account in the Administrators group	N (*1)	Y
Standard user account	N (*1)	N

Y: A process or program runs without displaying the permissions granted/authorized dialog.

N: A process or program does not run because the user does not have administrator privileges.

*1: The permissions granted/authorized dialog is displayed and the process or program runs if the user is authorized. However, the message output by the process or program is not displayed.

When UAC is enabled and a process or program is executed by any user other than the Administrator account, use one of the methods below to execute that process or program with administrator privileges:

Table 1.5 How to Disable Interactive Processes in the Permissions Granted/Authorized Dialog

Disabling Interactive Processes	User Account in the Administrators Group	Standard User Account
Specify "Command Prompt (Admin)" to run the Command Prompt. Execute the program from the Command Prompt.	Can Disable	Can Disable
In the task scheduler, start the process with "Execute with maximum permissions" specified.	Can Disable	Cannot Disable

1.4 Notes about Online/Offline Status of Disks

When an ETERNUS Disk storage system is first detected on Microsoft Windows Server, the disk might be "offline" status.

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

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

1.5 Notes for Windows Defender

If AdvancedCopy Manager is used on Microsoft Windows Server 2019 or later, the AdvancedCopy Manager commands are blocked and terminate with an error if the Controlled folder access feature of Windows Defender Exploit Guard is enabled. Therefore, disable the Controlled folder access feature of Windows Defender Exploit Guard.

Refer to the steps provided by Microsoft Corporation at the following URL for information on how to disable the setting.

<https://support.microsoft.com/en-za/help/4046851/windows-10-allow-blocked-app-windows-security>

1.6 Volume Lock Error Investigation Function

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 management function and replication management function commands output the error messages shown below and terminate abnormally.

- Message output by the backup management function commands

```
swst3607 Locking the volume failed. Please confirm that the volume is being used by other processes. Error=5(FSCTL_LOCK_VOLUME), Volume Name=volumeName
```

- Message output by the replication management function commands

```
swsrp3607 Locking the volume failed. Please confirm that the volume is being used by other processes. Error=5(FSCTL_LOCK_VOLUME), Volume Name=volumeName
```

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

1.6.1 Selecting Investigation Tool

The handle.exe and openfiles.exe list the processes using file handles.

Table 1.6 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 " 1.6.2.2 Setting handle.exe ".	Refer to " 1.6.2.3 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)

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 is 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 does 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 handle.exe cannot be used on Microsoft Windows Server 2016 or later environments.
- The openfiles.exe cannot be used on Microsoft Windows Server 2012 R2 or Microsoft Windows Server 2012 environments.
- If handle.exe and Process Explorer are used together, cases have been confirmed where the system stops. Use handle.exe only during examinations, not for operations.

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 "[1.6.5 How to Investigate Process Where Volume Is Used](#)".

1.6.2 Enabling the Volume Lock Error Investigation Function

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

Point

Read "1.3 Notes When Using User Account Control (UAC)" above, before setting an investigation tool.

1.6.2.1 When to Set 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.

1.6.2.2 Setting `handle.exe`

To use `handle.exe`, download it from the Microsoft Corporation URL (<https://docs.microsoft.com/sysinternals/downloads/handle>) and store it in the following directory.

Server Type	Location
Managed Server	<code>workDirectory\var\HandleTool</code> The <i>workDirectory</i> means "Work Directory" specified at the AdvancedCopy Manager's agent installation. "C:\Win32app\AdvancedCopyManager" is the default installation destination directory.
Management Server also serves as a Managed Server	<code>workDirectory\ACM\var\HandleTool</code> The <i>workDirectory</i> means "Work Directory" specified at the ETERNUS SF Manager installation. "C:\ETERNUS_SF" is the default installation destination directory.

In a clustered environment, store `handle.exe` at all nodes that comprise the clustered system.

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

1. Grant a license for the account that executes the AdvancedCopy Manager command.
 - a. Log into the operating system using the user account that executes AdvancedCopy Manager commands.
 - b. At the command prompt, go to the directory where `handle.exe` is stored.
 - c. Execute `handle.exe` from the command prompt.
 - d. If the "Handle License Agreement" dialog box is displayed, then click **Agree** if you agree with the conditions of use.
2. Grant a license for the AdvancedCopy Manager COM Service account.
 - a. Prepare the service name unused in the target server.
You can use 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:

```
> sc qc "ACMHandle"
```

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

- b. Enable interactive services of the target server.

Set the value of "NoInteractiveServices" contained in the registry key "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Windows" to 0. If zero (0) is already set, this registry operation is not needed.

Note

If the registry operation is wrong, a serious problem can occur. Take good care to edit the registry.

- c. Execute the following commands.

```
> sc create "Unused_service_name" binPath= "%systemroot%\system32\cmd.exe /k <handle.exe
stored directory>\handle.exe" type= own type= interact
> sc start "Unused_service_name"
```

Example

When the Unused service name is "ACMHandle" and the handle.exe stored directory is "C:\Win32app\AdvancedCopyManager\var\HandleTool":

```
> sc create "ACMHandle" binPath= "%systemroot%\system32\cmd.exe /k C:\Win32app
\AdvancedCopyManager\var\HandleTool\handle.exe" type= own type= interact
> sc start "ACMHandle"
```

- d. Display the window by clicking the icon that appears on the task bar.
- e. Click **Show me the message** or **View the message** in the window.
- f. If the "Handle License Agreement" dialog box is displayed, then click **Agree** if you agree with the conditions of use.
- g. Click **Return now**.
- h. Execute the following command.

```
> sc delete "Unused_service_name"
```

Example

When the Unused service name is "ACMHandle":

```
> sc delete "ACMHandle"
```

- i. Disable interactive services of the target server.
- Set the value of "NoInteractiveServices" contained in the registry key "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Windows" to 1.

Note

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.

1.6.2.3 Setting openfiles.exe

To use openfiles.exe to track information on files opened locally, perform the following procedure to enable the 'maintain objects list' option. In a clustered environment, perform the following procedure at all nodes that comprise the clustered system.

1. Execute "openfiles /local on" from the command prompt.
2. Restart the operating system.

1.6.3 Output File

The output of the investigation tool is saved in the files displayed below. Refer to the files in the following directory and determine the process that is using the volume.

Server Type	Location
Managed Server	<i>workDirectory</i> \var\D2D The <i>workDirectory</i> means "Work Directory" specified at the AdvancedCopy Manager's agent installation. "C:\Win32app\AdvancedCopyManager" is the default installation destination directory.
Management Server also serves as a Managed Server	<i>workDirectory</i> \ACM\var\D2D The <i>workDirectory</i> means "Work Directory" specified at the ETERNUS SF Manager installation. "C:\ETERNUS_SF" is the default installation destination directory.

Tool to be Executed	File Name
handle.exe -a	<volumeName>_Handle_<date and time>.txt
openfiles.exe /query /v	<volumeName>_Openfiles_<date and time>.txt
tasklist.exe /v	<volumeName>_Tasklist-v_<date and time>.txt
tasklist.exe /svc	<volumeName>_Tasklist-svc_<date and time>.txt
net.exe start	<volumeName>_Net-start_<date and time>.txt
mountvol	<volumeName>_Mountvol_<date and time>.txt

Point

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

Information

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.

1.6.4 Disabling the Volume Lock Error Investigation Function

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

1.6.4.1 Releasing handle.exe Setting

Delete (or rename) the handle.exe file stored in the following directory.

Server Type	Location
Managed Server	<i>workDirectory</i> \var\HandleTool The <i>workDirectory</i> means "Work Directory" specified at the AdvancedCopy Manager's agent installation. "C:\Win32app\AdvancedCopyManager" is the default installation destination directory.
Management Server also serves as a Managed Server	<i>workDirectory</i> \ACM\var\HandleTool The <i>workDirectory</i> means "Work Directory" specified at the ETERNUS SF Manager installation. "C:\ETERNUS_SF" is the default installation destination directory.

In a clustered environment, delete handle.exe at all nodes that comprise the clustered system.

1.6.4.2 Releasing openfiles.exe Setting

Perform the following procedure. In a clustered environment, perform the following procedure at all nodes that comprise the clustered system.

1. Execute "openfiles /local off" from the command prompt.
2. Restart the operating system.

1.6.5 How to Investigate 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

Output Example of 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
      :
      :

```

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	Alertter, 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".)



1.7 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 fails.

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.

1.8 Operation with IPv6 Address

1.8.1 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	Microsoft Windows Server 2012 or later
Managed Server	Microsoft Windows Server 2012 or later



See

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

1.8.2 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.

1.8.3 System Configurations in Mixed IPv4/IPv6 Environments

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

Table 1.7 Available Combination in Mixed IPv4/IPv6 Environments

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).



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](#)" for information on setting method for IPv4 and IPv6 format IP addresses to AdvancedCopy Manager.
- This product supports IPv6 from version 15.3. For this reason, the Management Server connects to the Managed Server with an IPv4 address if the version of the AdvancedCopy Manager's agent is 15.2 or earlier even if the Managed Server OS supports operations using an IPv6 address.



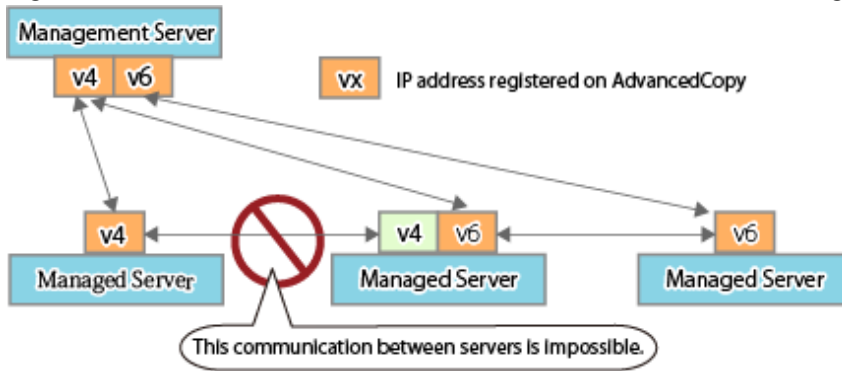
Note

- 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 1.1 Communication Failure in IPv4/IPv6 Addresses Coexisting Environment



1.8.4 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 Web Console.

Chapter 2 Starting and Stopping Services

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

Point

.....
If the procedure described in "Starting and Stopping Manager" in the *Storage Cruiser Operation Guide* has already been completed, it is not necessary to perform the following procedure on the Management Server.
.....

2.1 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 must manually start a service if:

- The startup of the service has failed for some reason.
- The service has been intentionally stopped.

To manually start the services, perform the following procedure.

Note

- Be sure the AdvancedCopy Manager cluster service (application resource) is started from the failover cluster manager. Do not start it from the Windows services screen.
 - 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".
-

How to Start Services on the Management Server

- When the Management Server is not used for a cluster operation
 1. Start the ETERNUS SF Manager services.
From the Windows services screen, start the following four services in the order shown below.
 - a. ETERNUS SF Manager Apache Service
 - b. ETERNUS SF Manager Tomcat Service
 - c. ETERNUS SF Storage Cruiser Optimization Option (Only if not already started)
 - d. AdvancedCopy Manager COM Service (Only if not already started)
 2. To use the SNMP Trap function and the ETERNUS SF SNMP Trap service, start the ETERNUS SF SNMP Trap service from the Windows services screen.
 3. To use the ETERNUS VASA Provider function, start the ETERNUS Information Provider service from the Windows services screen.
- When the Management Server is used for a cluster operation
 1. Start the ETERNUS SF Manager services.
Use the Failover Cluster Manager to start the transactions of ETERNUS SF Manager.
 2. To use the SNMP Trap function and the ETERNUS SF SNMP Trap service, start the ETERNUS SF SNMP Trap service from the Windows services screen.

How to Start Services on the Managed Server

- When the Managed Server is not used for a cluster operation
Start the AdvancedCopy Manager COM service from the Windows services screen.
- When the Managed Server is used for a cluster operation
Use the failover cluster manager to start the business server where AdvancedCopy Manager's agent is installed.

2.2 Stopping Services

AdvancedCopy Manager services are automatically stopped when the system is stopped. If you must stop an individual service for some reason, manually stop the service as follows.



Be sure to stop AdvancedCopy Manager as a resource in a cluster from the failover cluster manager. Do not stop it from the Windows services screen.

How to Stop Services on the Management Server

- When the Management Server is not used for a cluster operation
 1. If the ETERNUS VASA Provider function is used, stop the ETERNUS Information Provider service from the Windows services screen.
 2. Stop the ETERNUS SF Manager services.
From the Windows services screen, stop the following five services in the order shown below.
 - a. ETERNUS SF Manager Apache Service
 - b. ETERNUS SF Manager Tomcat Service
 - c. ETERNUS SF Manager Postgres Service
 - d. ETERNUS SF Storage Cruiser Optimization Option
 - e. AdvancedCopy Manager COM Service
 3. If the SNMP Trap function and the ETERNUS SF SNMP Trap service are used, stop the ETERNUS SF SNMP Trap service from the Windows services screen.
- When the Management Server is used for a cluster operation
 1. Stop the ETERNUS SF Manager services.
Use the Failover Cluster Manager to stop the transactions of ETERNUS SF Manager.
 2. If the SNMP Trap function and the ETERNUS SF SNMP Trap service are used, stop the ETERNUS SF SNMP Trap service from the Windows services screen.



If the ETERNUS SF Manager services are stopped, other ETERNUS SF products that share the services cannot be operated.

How to Stop Services on the Managed Server

- When the Managed Server is not used for a cluster operation
Stop the AdvancedCopy Manager COM service from the Windows services screen.

- When the Managed Server is used for a cluster operation

Use the failover cluster manager to stop the business server where AdvancedCopy Manager's agent is installed.

Chapter 3 Backup Operation

This chapter provides details of the backup operation performed by AdvancedCopy Manager. 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 "[1.2 Managing Device on AdvancedCopy Manager](#)".



Note

For backup operations, the Advanced Copy function enabled for TFOVs is not available.

3.1 Overview

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

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

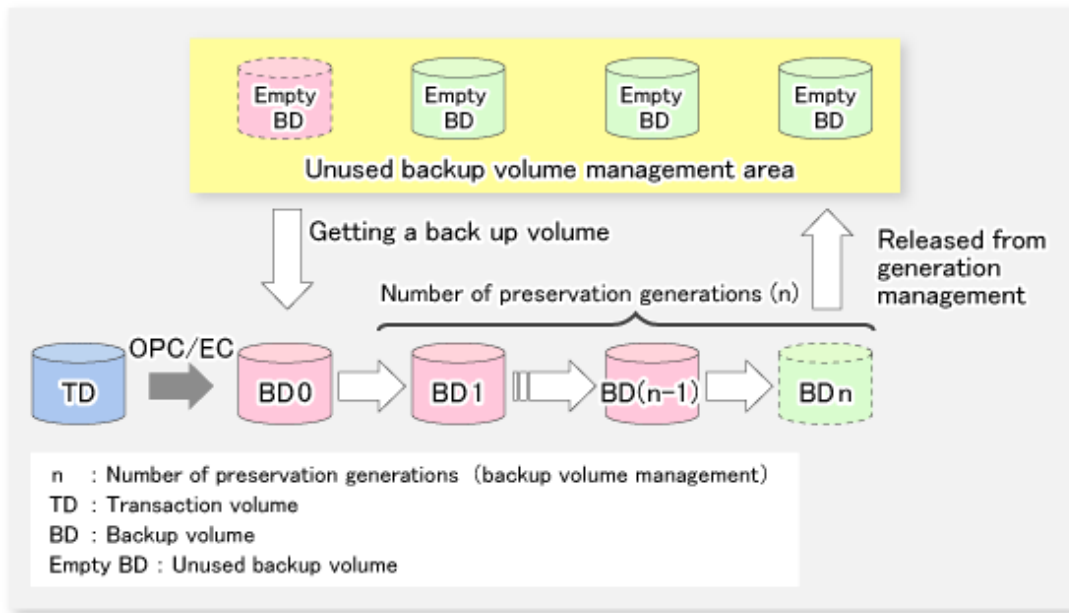
Automatic snapshot backup can be scheduled without first estimating the time required, because it does not use synchronous backup processing. However, when the save number is 1, a state may occur in which there is no backup data because a snapshot backup deletes the history prior to copy processing.

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 require one more backup volume generation than is required by snapshot fast backup. Synchronized high-speed backup also requires synchronized backup processing before the backup execution command is entered. Therefore, execution of automatic synchronized high-speed backup must be scheduled to allow enough time for synchronized processing to finish first. Synchronized backup processing is then started based on the estimated time, and the backup execution command is entered after equivalency maintained status has been achieved.

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

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

Figure 3.1 Managing Backup Volumes



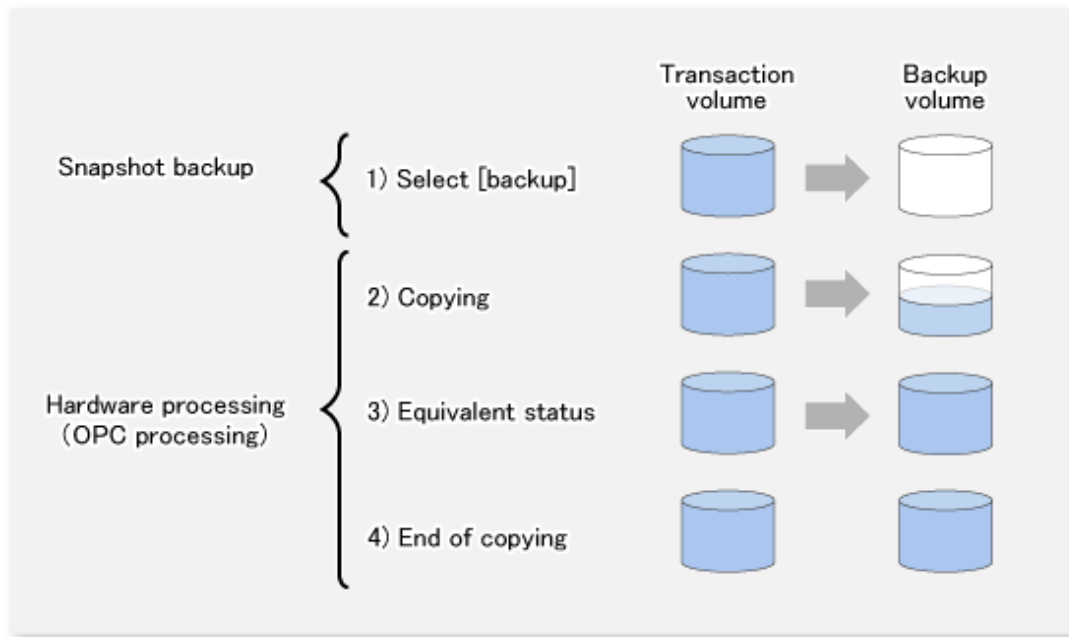
3.1.1 Snapshot Backup Processing

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 the `swstbackup` 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 is 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 is 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 is 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.

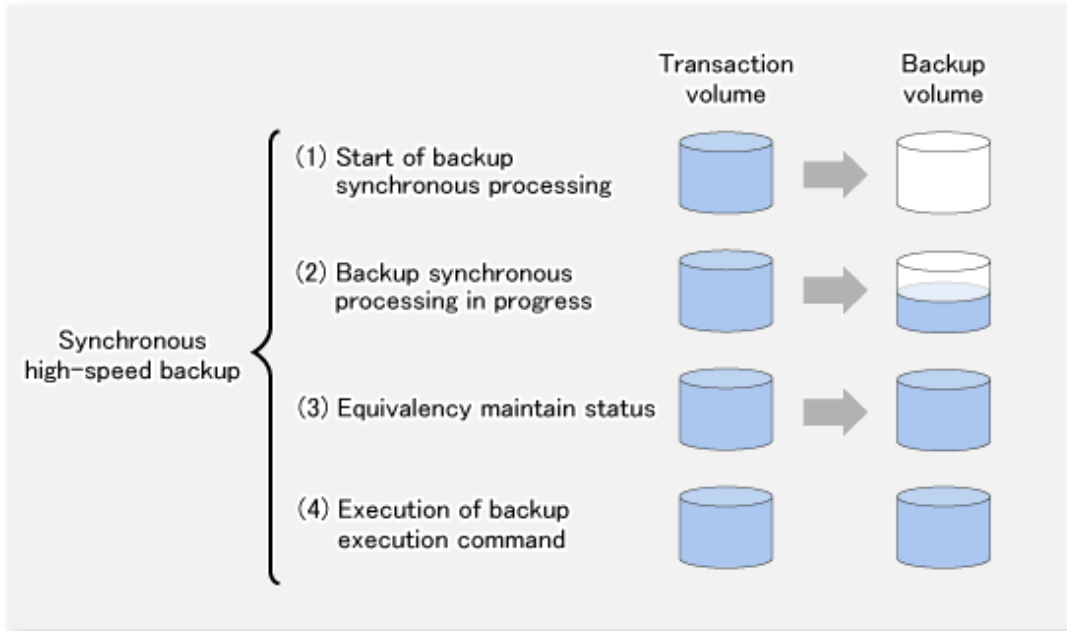
To perform synchronized high-speed backup, take the following steps:

1. When the [swststartsync](#) 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. After the synchronous copy completes, the volumes enter equivalency maintain state which maintains the equivalency of the transaction volume and backup volume. ((3) in the following figure).
Note that the equivalency maintain state does not guarantee equivalency of the transaction volume and backup volume.
3. When the [swstbackup](#) 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` command cannot be executed before the transaction and backup volumes have become equivalency maintain state.

Figure 3.3 Backup Using 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.

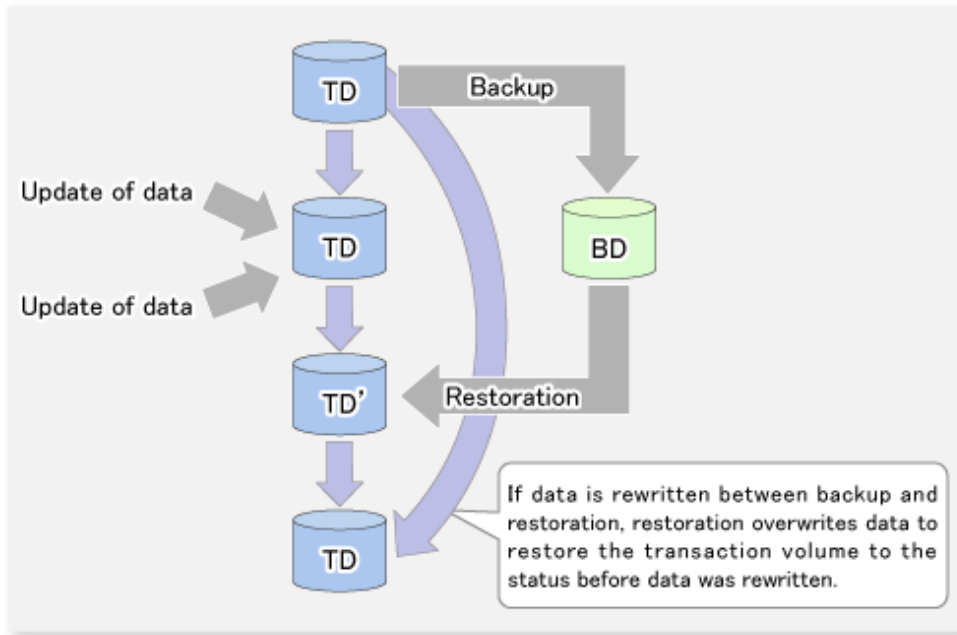
If the data on a backup volume under carrier management is restored to a transaction volume, the carrier management information does not change.

Note that data is 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 is 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 "1.2 Managing Device on AdvancedCopy Manager".

3.2 Operation Design

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

- [3.2.1 Selecting Server on Which Backups Are Performed](#)
- [3.2.2 Selecting Backup Source](#)
- [3.2.3 Configuring Backup Policy](#)
- [3.2.4 Preparing Backup Volume](#)
- [3.2.5 Preparing Automatic Backup Operation](#)

3.2.1 Selecting Server on Which Backups Are Performed

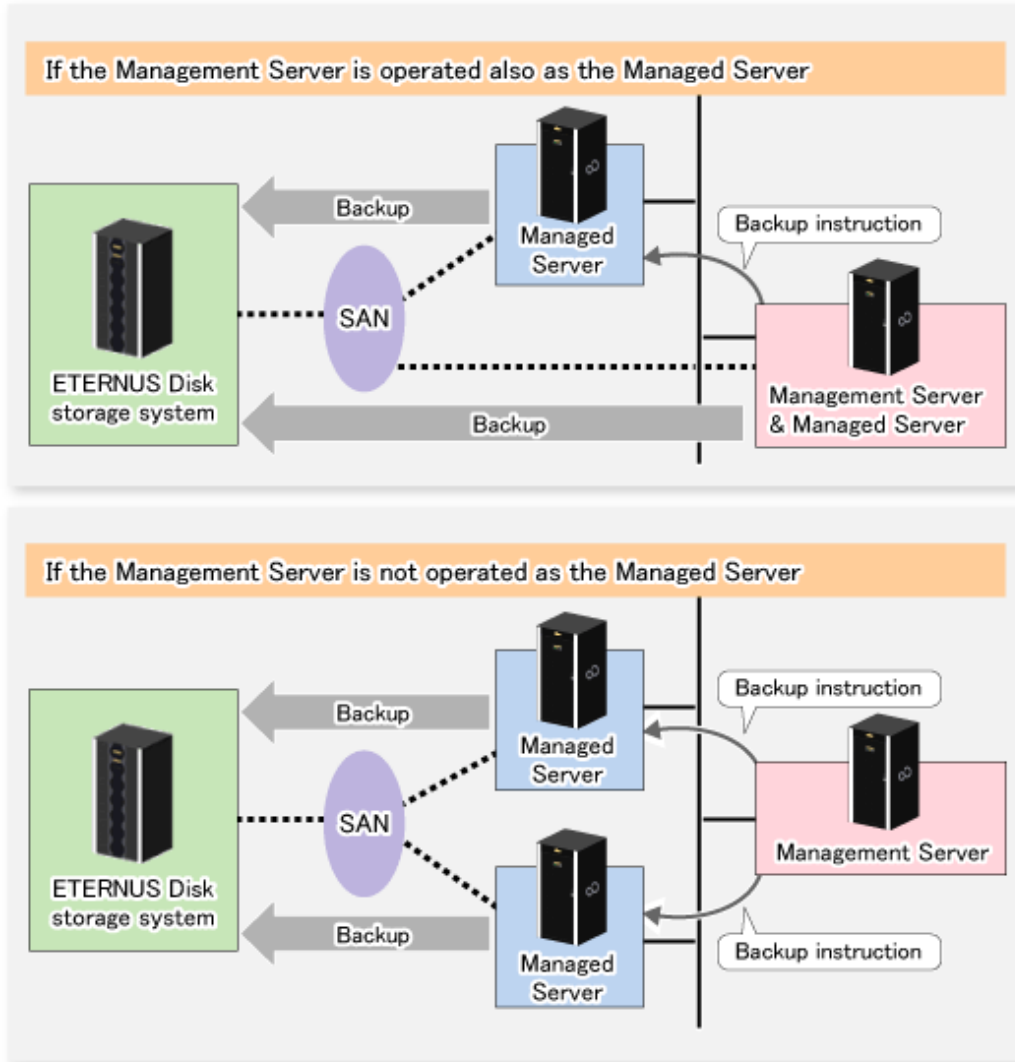
The backup operation can be performed on one of the following servers:

- 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 Backup Operation Should Be Performed



3.2.2 Selecting 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 "[1.2 Managing Device on AdvancedCopy Manager](#)".

For information on setting up a transaction volume, refer to "[3.4.6 Setting Operation Type for Device](#)".

Note

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

- Refer to "[15.1.1 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:
 - [15.1.1.3 Backup and Replication Exclusions](#)
 - [15.1.1.1 Size of Partition](#)
 - [15.1.1.2 Layout of Partition](#)
 - [15.1.1.9 Dynamic Volume](#)
 - [15.1.1.13 Configuration of Disk](#)
 - [15.1.1.8 Maximum Number of Simultaneously Executing Operations](#)

3.2.3 Configuring Backup Policy

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

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, it is recommended 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, it is recommended that 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 is 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 Backup Policy](#)".

3.2.4 Preparing 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 "[15.1.1.1 Size of Partition](#)".

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 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 Operation Type for Device".

 **Note**

- Do not configure AdvancedCopy Manager to back up 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.

 **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 Automatic Backup Operation

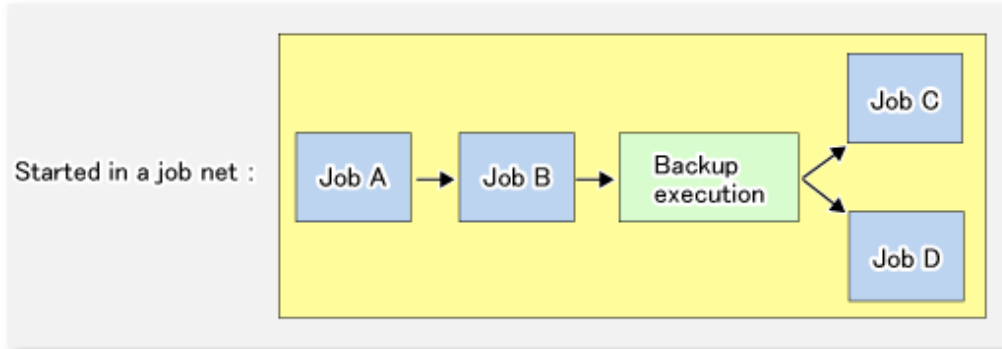
The backup operation of AdvancedCopy Manager can be automated by using Systemwalker Operation Manager.

Automatic Snapshot Fast Backup

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

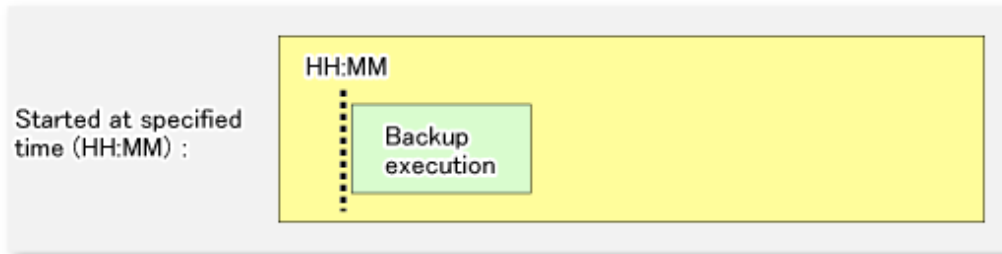
- Start the backup command as part of a batch job.

Figure 3.6 Start in Job Net



- Start the backup command at the specified time.

Figure 3.7 Start at 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 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 then have maintained equivalency status when backup is executed.

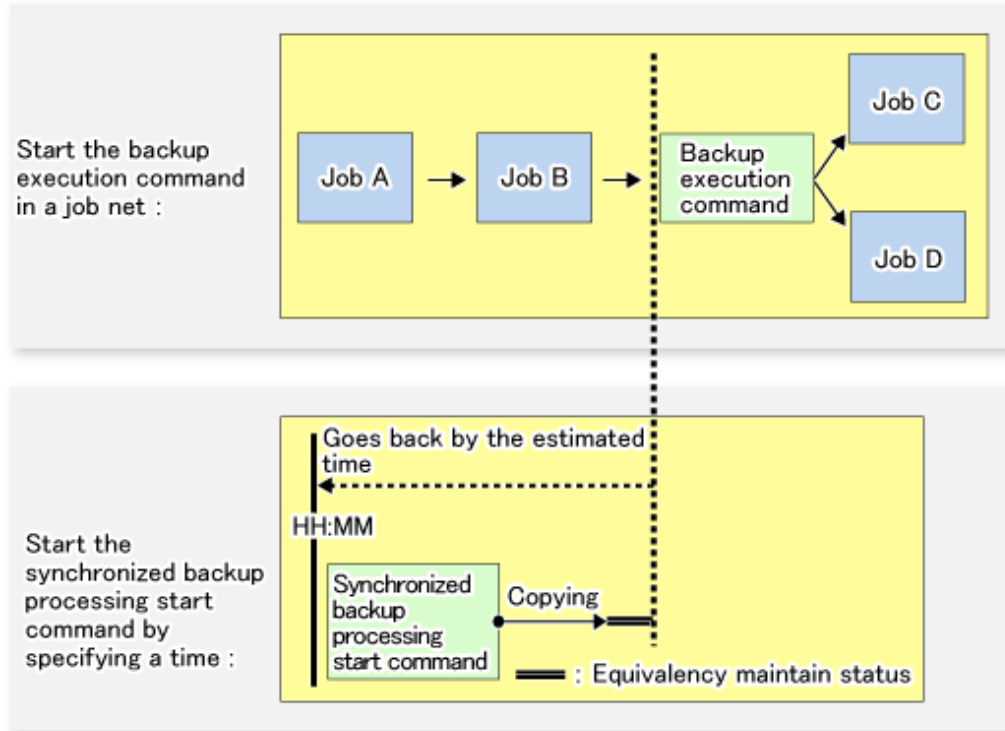
The time between the start of synchronized backup processing and the transition to maintenance equivalency status depends on the capacity of the volume to be copied.

Starting 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 Job Net

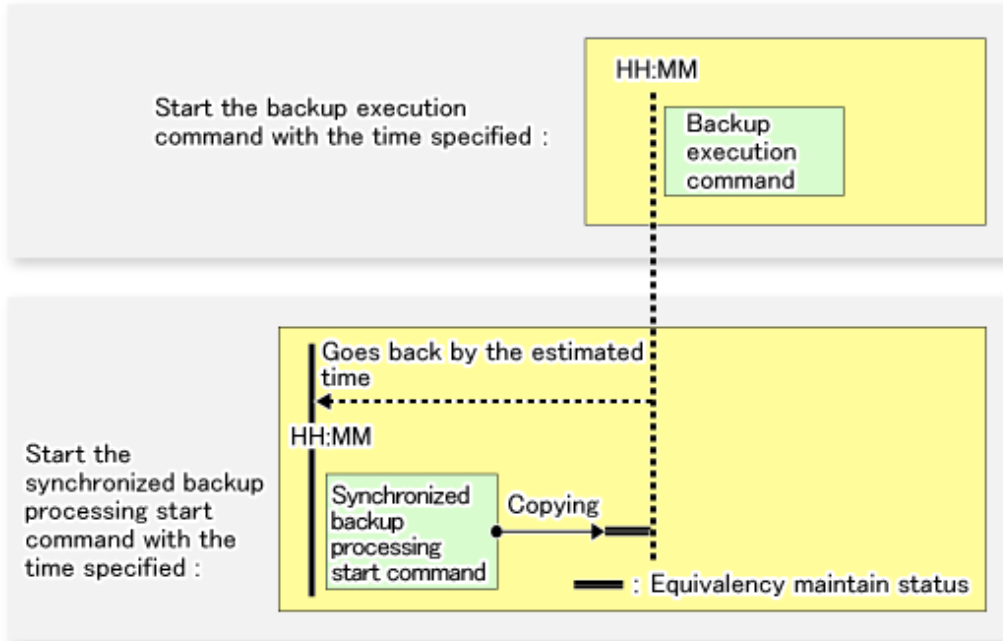


 Note

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.

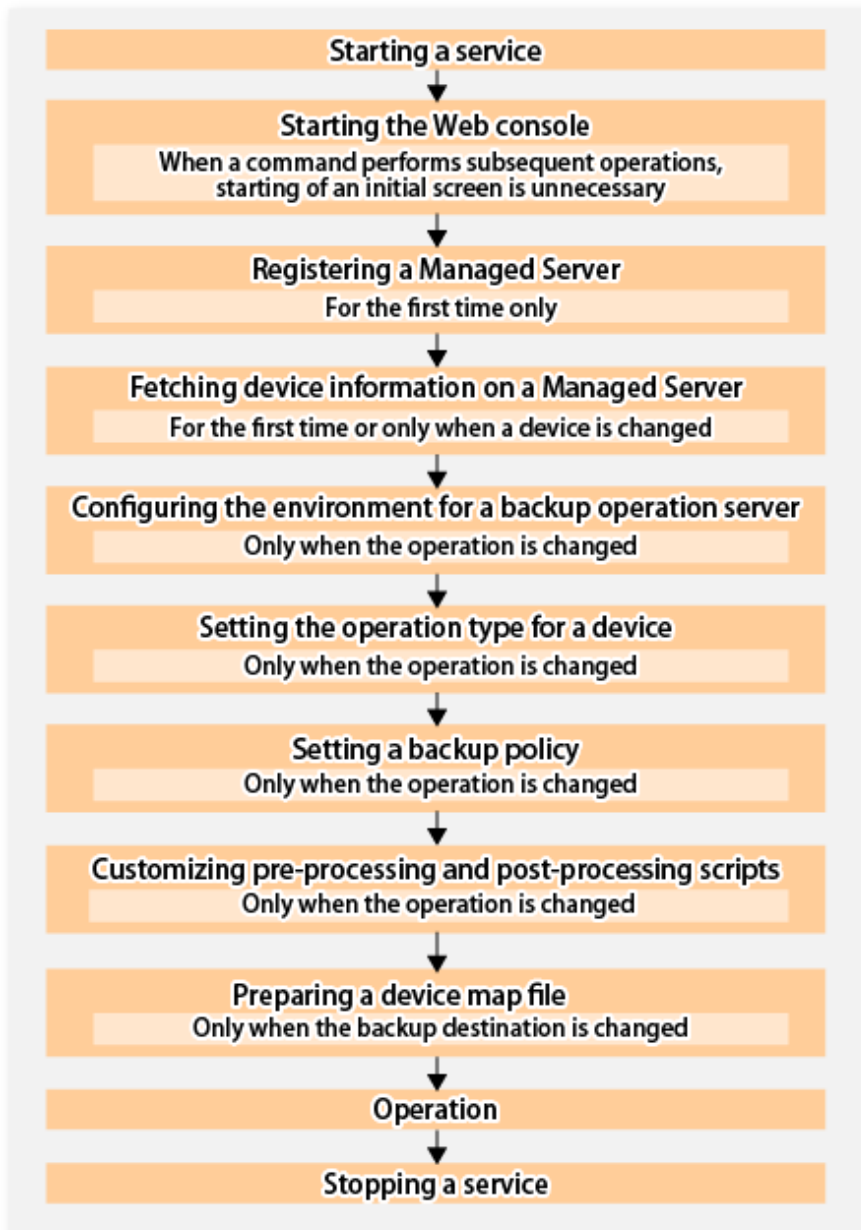
Figure 3.9 Start at Specified Time



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 Transaction Volume



3.4 Preparing to Start Backup

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 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 Web Console

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

3.4.3 Registering Managed Server

With Web Console, register Managed Servers that are to be managed.

Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the `stgxfwcmdisprv` command.

3.4.4 Fetching Device Information on Managed Server

This process can be carried out using either Web Console or the `stgxfwcmsetdev` command. Refer to "Add/Reload Device" in the *Web Console Guide* for information on the operating procedures of Web Console.

Note

- Device information on a Managed Server must first be stored in the repository.
- 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 Environment for Backup Operation Server

This process can be executed using either Web Console or the `swstsvrset` command.

Point

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

3.4.6 Setting Operation Type for 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 the `swstdevinfo` 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 "[15.1.1 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 Managed Server](#)".
 3. Execute the `swstdevinforeset` command to register the information.
- 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 the `swstdevdisp` command.

3.4.7 Setting 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 are prompted to perform a backup in Web Console.

This process can be carried out using either Web Console or the `swstbkpolset` 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 Backup Volume](#)".
- Even though the number of backup volumes required for the backup may not have been registered when backup policies for synchronized high-speed backup were set, this number can be set by default provided the number of backup volumes required for snapshot fast backup has been previously registered. Otherwise, it may not be possible to execute synchronized high-speed backup.

 **Point**

.....
The registered backup policy can be confirmed using either Web Console or the `swstbkpoldisp` 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.

 **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 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.

 **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 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 is still read, subsequent occurrences are 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

Before performing the backup operation, configure the environment settings that are required for the backup according to "3.4 Preparing to Start 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 the [swstbackup](#) command.

To check the backup status, use the [swstbackstat](#) command.



Note

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

Enter the appropriate command for each operation.

- Execute the backup command with the -T option specified the [swstcanceltrk](#) command.

3.5.2 Performing Synchronized High-speed Backup

This process can be carried out using either 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. Use the following commands:

- Starting backup synchronous process: [swststartsync](#) command
- Checking the status of backup synchronous process: [swstsyncstat](#) command
- Executing backup: [swstbackup](#) command
- Checking backup status: [swstbackstat](#) command

Note

- The [swstbackup](#) command causes an error if it is executed before the transaction and backup volumes have entered equivalency maintain state.
 - 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 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](#) 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 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 the [swstrestore](#) command.

To check the restore status, use the [swstreststat](#) command.

Note

If restoring for a general file system, stop operations.

3.5.3.2 Restoring Individual File

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

1. Execute the [swstdrvset](#) command to 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, execute the [swstdrvunset](#) command to remove assignment of that drive letter from the backup volume.

3.5.4 Managing 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 is automatically deleted.
-

3.5.4.1 Displaying Backup History

Backup history can be displayed using either Web Console or the [swsthistdisp](#) command.

3.5.4.2 Deleting Backup History

Backup history can be deleted using either Web Console or the [swsthistdel](#) command.

3.6 Changing Setting Information

It is 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 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 Web Console or commands.

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

1. Execute the [stgxfwcmsetdev](#) command to acquire information for the newly added device, and accept management information.
2. Execute the [swstdevinfofet](#) command to set up the operation type of the added device.
3. If the added device was defined as a transaction volume, execute the [swstbkpolset](#) 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 *Installation and Setup Guide* for details.

3.6.2 Deleting Device

This section describes how to delete different types of devices.

3.6.2.1 Deleting Transaction Volume

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

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

1. Execute the [swsthistdel](#) command to delete the backup history.
2. Execute the [swstbkpoldel](#) command to delete the backup policy.
3. Execute the [swstdevinfofet](#) 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 Backup Volume

This process can be carried out using either 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 execute the [swstbkpoldisp](#) 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. Execute the [swsthistdel](#) 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. Execute the [swstdevinfofet](#) 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 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 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 Managed Server](#)".
3. Set the environment information for the Managed Server. For more information on this, refer to "[3.4.5 Configuring Environment for 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 Operation Type for 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 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 *Installation and Setup Guide* for details.

3.6.4 Deleting Managed Server

The process of deleting a Managed Server can be carried out using either Web Console or the [stgxfwcmdelsrv](#) 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 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 the [swstbkpoldel](#) command.
3. Delete the volume type that was registered using "[3.4.6 Setting Operation Type for Device](#)" for the device connected to the Managed Server.
4. Delete the Managed Server.
5. If you have deleted the Managed Server with the [stgxfwcmdelsrv](#) command, take the following actions to reflect to 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:
With Web Console, execute the **Reload Conf.** operation to update to the latest information.
 - If only AdvancedCopy Manager's agent is used:
With Web Console, delete the Managed Server that you have deleted.

3.7 Stopping 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 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 back up the Symfoware database and backup the Server.

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 Server databases, backup operations in link with Symfoware cannot be performed.

4.1 Backup Operations for Symfoware

This section explains operations for backing up Symfoware.

Note

For backup operations for Symfoware, the Advanced Copy function enabled for TFOVs is not available.

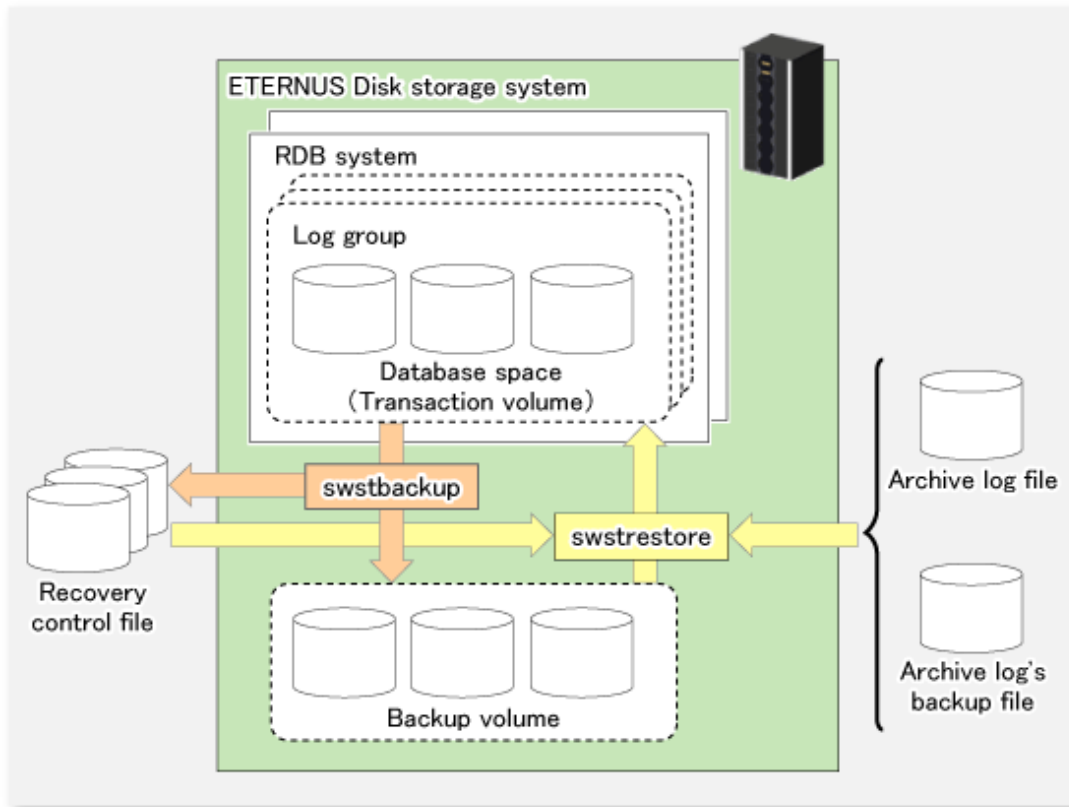
4.1.1 Overview

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 "[14.1.2.3 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 media).

Also, at the time of recovery, the working directory specified in "[14.1.1.1 swstsvrset \(Managed Server Configuration Information Setting Command\)](#)" is used.

Note

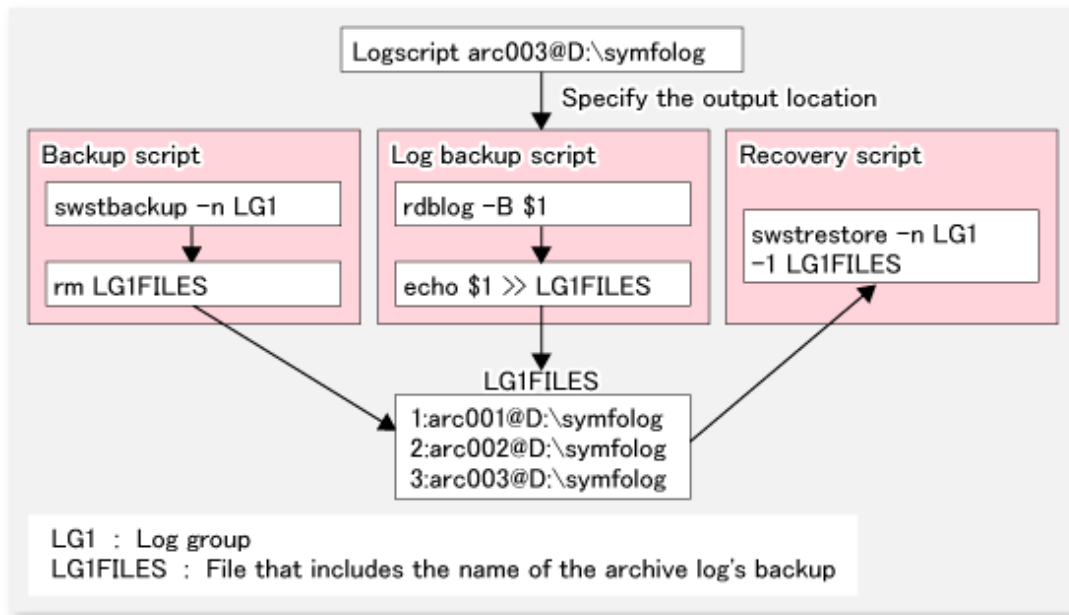
Since you must use AdvancedCopy Manager to recover Symfoware database spaces that were backed up with AdvancedCopy Manager, you cannot directly recover from any backup volumes that were backed up on tape or other secondary media.

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 need to consider the following issues:

1. "4.1.2.1 Design of Backup Operations for Symfoware Databases"
2. "4.1.2.2 Selecting Server on Which Backups Are Performed"
3. "4.1.2.3 Selecting Backup Source"
4. "4.1.2.4 Configuring Backup Policy"
5. "4.1.2.5 Preparing Backup Volume"
6. "4.1.2.6 Preparing Recovery Control File and Working File"

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

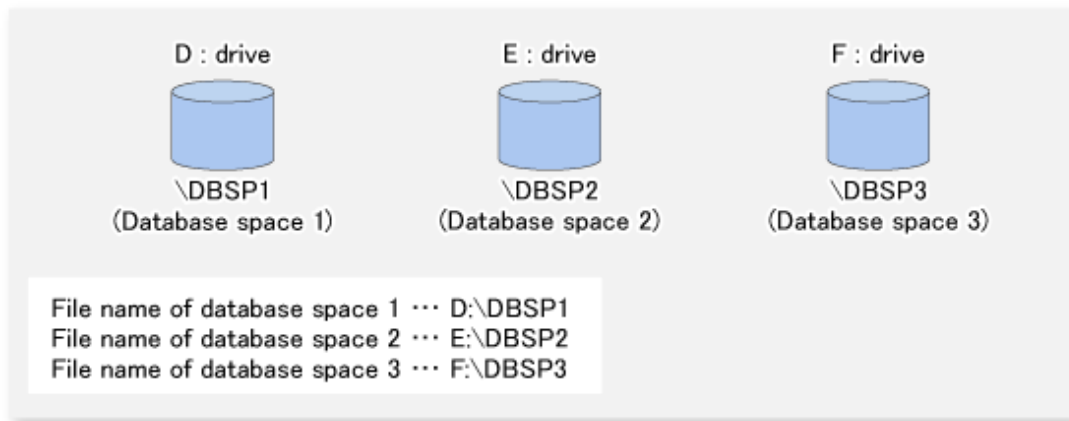
Refer to the Symfoware Server manuals when you configure a backup system. However, in designing it, you have to observe the following restrictions regarding the allocation of database space.

Database Space on 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 Server SQL Reference Guide*.

Figure 4.3 Database Space on 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 is not fetched.

4.1.2.2 Selecting 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 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.
- Refer to "[15.1.1 General Notes](#)" for points to consider when deciding on a volume to be backed up. Relevant points to consider are as follows:
 - "[15.1.1.1 Size of Partition](#)"
 - "[15.1.1.2 Layout of Partition](#)"

- "15.1.1.9 Dynamic Volume"
- "15.1.1.13 Configuration of Disk"
- "15.1.1.8 Maximum Number of Simultaneously Executing Operations"

4.1.2.4 Configuring 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 is 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 media.

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 is displayed on the transaction list screen and by executing the [swstexecstat](#) command.

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

4.1.2.5 Preparing 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 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

Type of Operation	Number of Required Backup Volumes
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 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.

4.1.2.6 Preparing Recovery Control File and 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 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 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 is used.

- In case of operation in non-clustered environment

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

- In case of operation in clustered environment

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

Working Directory

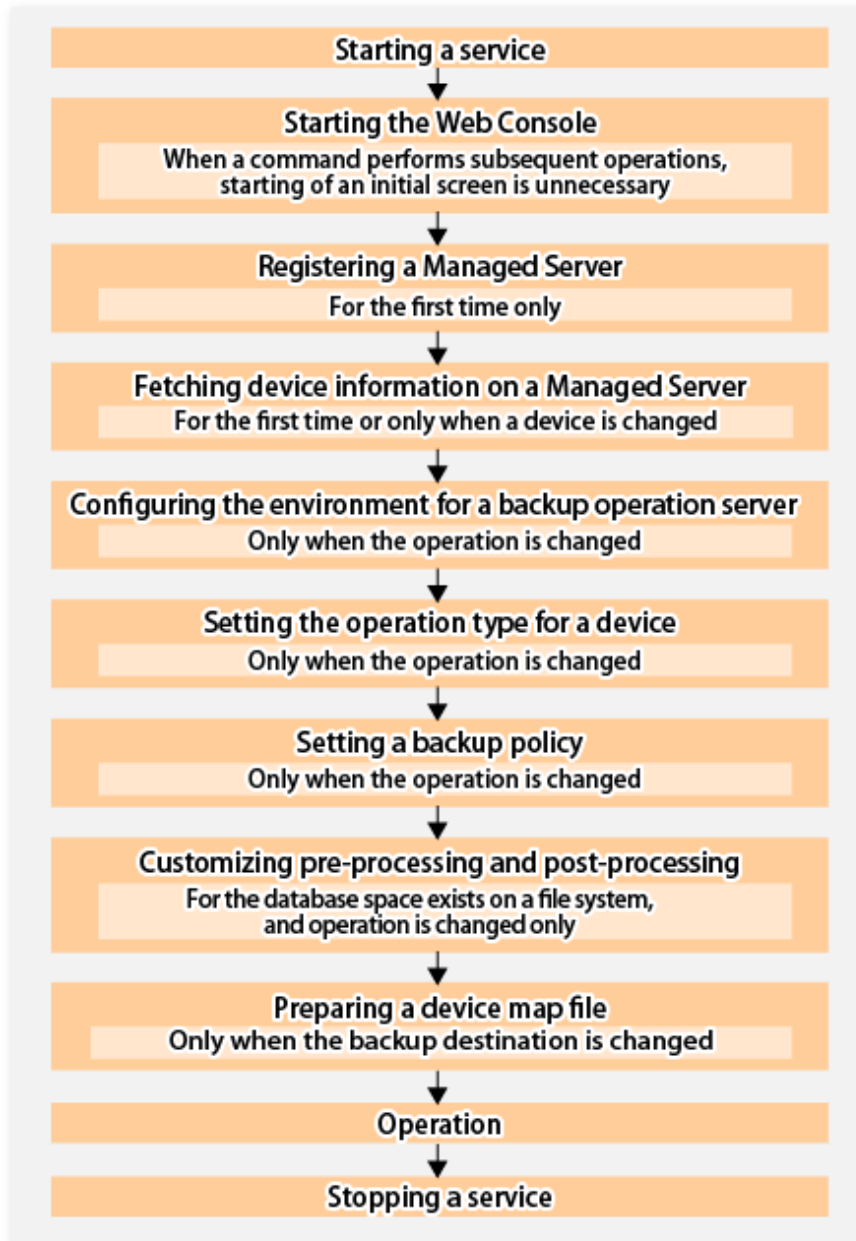
The working directory serves to carry out database recovery work when performing a restore.

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

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 Backup

4.1.4.1 Starting 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 Web Console

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

4.1.4.3 Registering Managed Server

With Web Console, register Managed Servers that are to be managed.

Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the [stgxfwcmdispsrv](#) command.

4.1.4.4 Fetching Device Information on Managed Server

This process can be executed using either Web Console or the [stgxfwcmsetdev](#) command.

Refer to "Add/Reload Device" in the *Web Console Guide* for information on the operating procedures of Web Console.

When the process is finished, use Web Console or the displayed result for the [stgxfwcmdispdev](#) command to confirm that the Symfoware information is displayed on the corresponding device. You can also use the [stgxfwcmsetdev](#) 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.
- 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 Environment for Backup Operation Server

To perform this process, execute the [swstsvrset](#) command.

Point

- If the Management Server also works as a Managed Server, these environment settings are also required for the Management Server.
- Symfoware Server Advanced Backup Controller must be running beforehand. If Symfoware Server Advanced Backup Controller is installed after having configured server environments, configure the server environments again.

4.1.4.6 Setting Operation Type for 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 executing the `swstdevinfoaset` 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. Execute the `swsthistdel` command to delete the backup history information of all registered transaction volumes.
 2. Delete the backup policies of all registered transaction volumes.
 3. Execute the `swstdevinfoaset` command to unregister them as transaction volumes.
 4. Redo the procedure described in "[4.1.4.4 Fetching Device Information on Managed Server](#)".
 5. Execute the `swstdevinfoaset` 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.

Settings for Backup Volumes

Execute the `swstdevinfoaset` 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 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 Managed Server](#)" before you register them by executing the `swstdevinfoaset` 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 Backup Policy

Execute the `swstbkpolset` 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 is set for all transaction volumes that are included in that log group.

For details on backup policies, refer to "[4.1.2.4 Configuring 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 Backup Volume](#)".

You can display the set backup policies by executing the `swstbkpoldisp` 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 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 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 is still read, subsequent occurrences are 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

Before performing the backup operation, configure the environment settings that are required for the backup according to "4.1.4 Preparing to Start 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 Symfaware, specify the transaction volumes or log groups and execute the `swstbackup` command. If you specify backup for a log group, backup is 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 rdbtr 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 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. Execute the [swststartsync](#) command to specify the transaction volumes or log groups and start backup synchronous processing. If you specify a log group, backup synchronous processing is executed for all transaction volumes that are included in that log group.
After starting backup synchronous processing, you can cancel it with the [swstcancelsync](#) command.
2. Execute the [swstsyncstat](#) 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 execute the [swstbackup](#) command to collect the backup. With the [swstbackup](#) command, you can use the backup methods shown below. On executing the [swstbackup](#) 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 rdbtr 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 execute the [swstbackup](#) command before the transaction and backup volumes are in the equivalent maintain state, an error occurs.
- From 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 execute the [swstbackup](#) 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 Recovery

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

For recovery of Symfoware, from the backup volume where the history of backups by the [swstbackup](#) command is managed, specify the transaction volumes or log groups when you execute the [swstrestore](#) command.

Note

If you specify recovery for a log group, recovery is 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 log 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 state (by executing the [swstrestore](#) command without specifying the `-e` option and the `-a` option)
- Restoring of a specific point in time by specifying the end point of recovery (by executing the [swstrestore](#) command with the `-e` option)
- Restoring of the point in time of backup (by executing the [swstrestore](#) command with the `-a` option)

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 Latest State	Restoring of Specific Point in Time by Specifying End Point of Recovery (*1)	Restoring of 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 Command Reference*.

- For individual recovery of transaction volumes in a log group, the only available method is recovery to the latest state. 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 Latest State" or "Restoring of Specific Point in Time by Specifying 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` 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.
- If you perform "Restoring of Specific Point in Time by Specifying End Point of Recovery" or "Restoring of Point in Time of Backup", processing to restore Symfoware's management information is also 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 `swstrestore` command 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**

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 are 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 is 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 results in an error, because backup data for Database space 2 (DB1.DBSP2) do not exist.

Point

- Recovery can also be carried out using Web Console. Bundle recovery, however, cannot be carried out using Web Console.
- 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 Device List File](#)".

4.1.5.3.1 Describing 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 are restored. In the following cases, restore processing results 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 Backup History

History information for backups that were performed with the `swstbackup` command can be displayed and deleted.

4.1.5.4.1 Displaying Backup History

History information for backups that were performed with the [swstbackup](#) command can be displayed using Web Console or the [swsthistdisp](#) command.

4.1.5.4.2 Deleting Backup History

History information for backups that were performed with the [swstbackup](#) command can be deleted using Web Console or the [swsthistdisp](#) command.



Point

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

4.1.6 Stopping 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

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

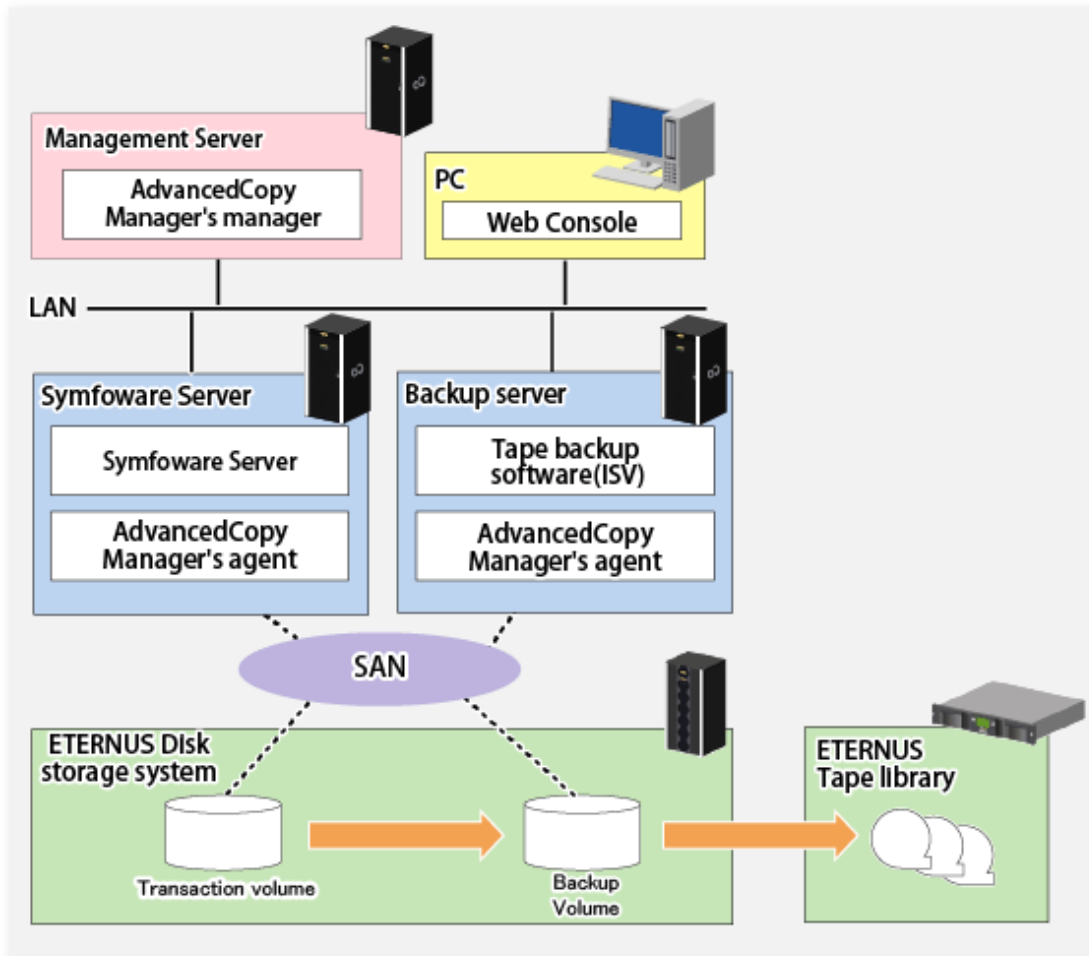
This section describes Symfoware backup server operation.

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 volume 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, volumes to which all the database space contained in a log group is allocated should be registered as transaction volumes. If even one volume 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, refer to the Symfoware Server manuals 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 "[14.6.3 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 media).
- 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. "[4.2.2.4 Determining Backup Target](#)"
5. "[4.2.2.5 Preparing Backup Volumes](#)"

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. 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. 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 Symfaware Server cannot be used together.
- When backing up Exchange Server database, the Symfaware cooperation function is not available.

Figure 4.6 When Backup Server Is Not Used as Management Server:

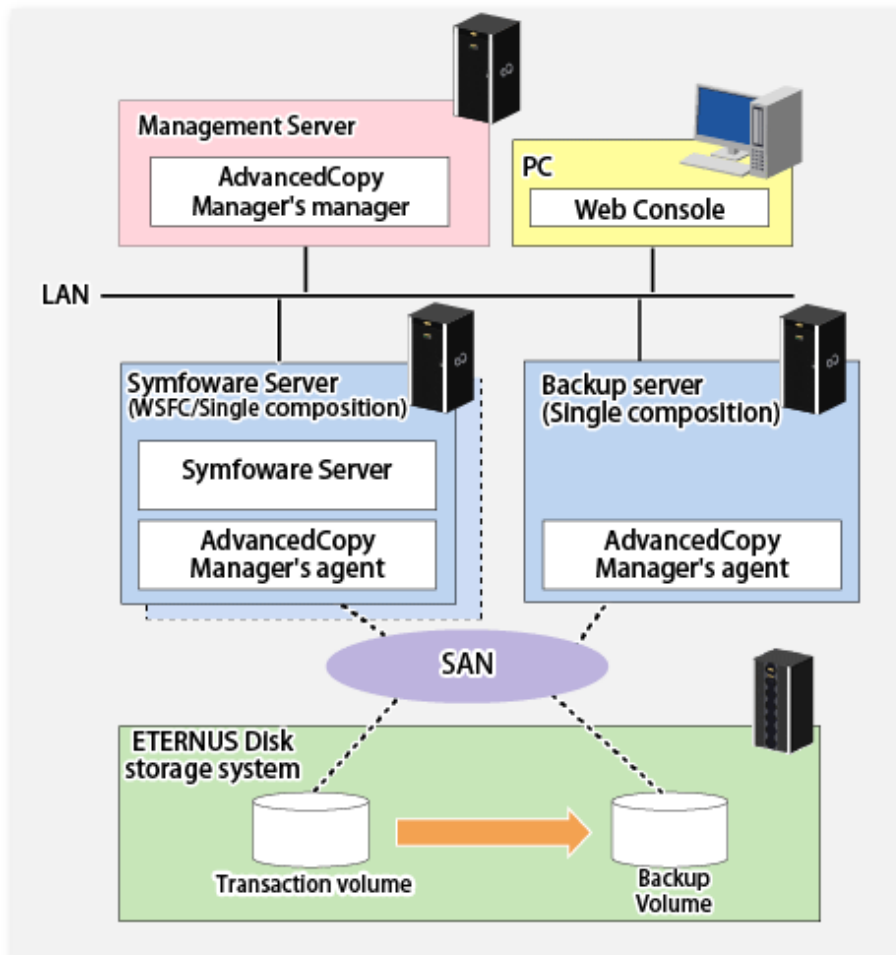
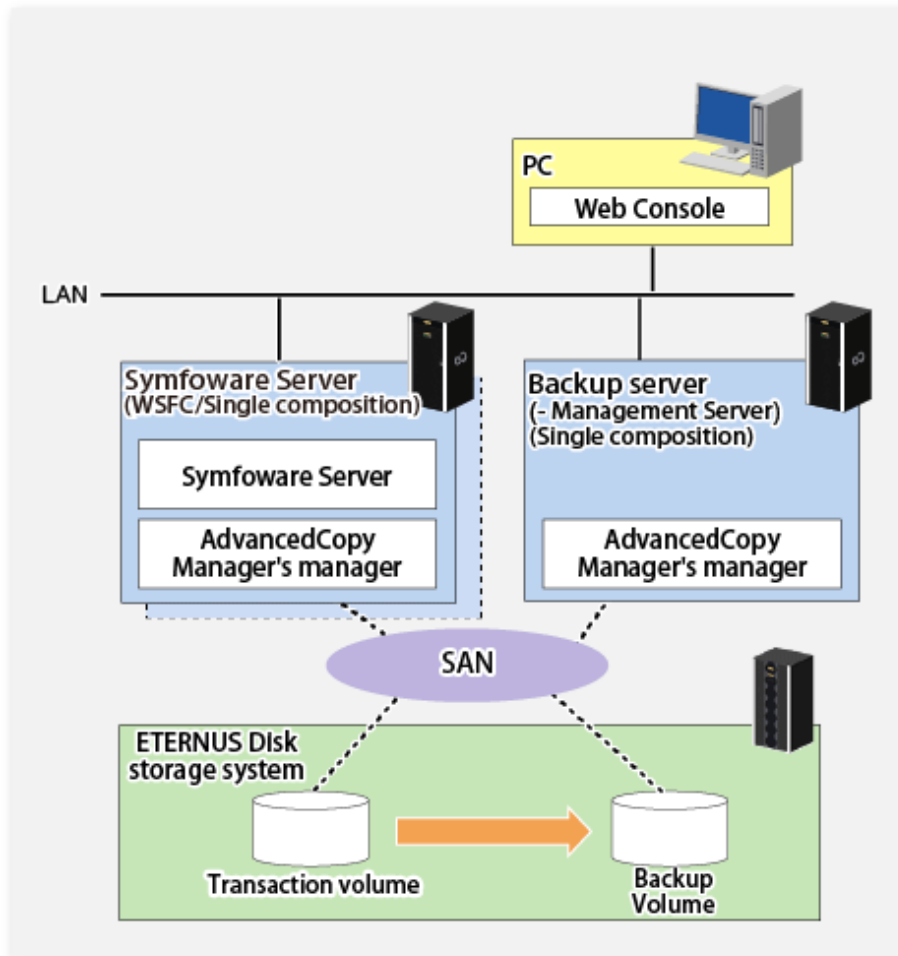


Figure 4.7 When Backup Server Is Used as Management Server:



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 15 Notes on Operations](#)". The related sections are as follows:
 - "[15.1.1.1 Size of Partition](#)"
 - "[15.1.1.2 Layout of Partition](#)"
 - "[15.1.1.8 Maximum Number of Simultaneously Executing Operations](#)"
 - "[15.1.1.9 Dynamic Volume](#)"
 - "[15.1.1.13 Configuration of 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.

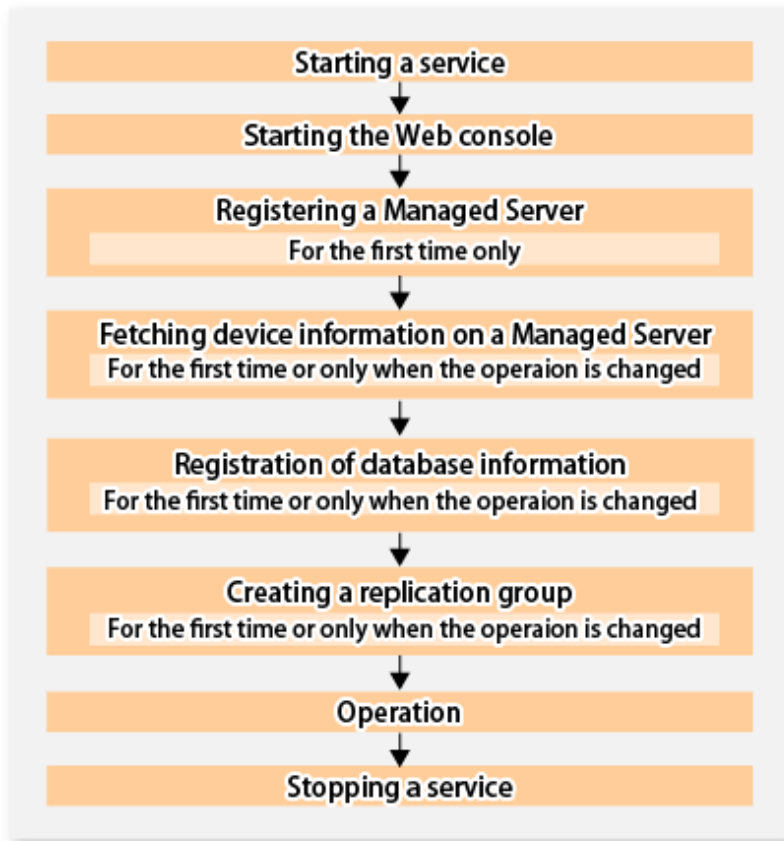
Table 4.10 Number of Backup Volumes Required for Backup Operation

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 Symfaware backup server operation.

Figure 4.8 Flow of Backup Server Operation (Symfoware)



4.2.4 Pre-preparation

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 Web Console

Refer to "How to Start Web Console" in the *Web Console Guide* and start Web Console.

4.2.4.3 Registering Managed Servers

With Web Console, register Managed Servers that are to be managed.



Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the `stgxfwcmdisprv` command.

4.2.4.4 Fetching Device Information on Managed Server

For fetching device information on a Managed Server, refer to "[4.1.4.4 Fetching Device Information on Managed Server](#)".

4.2.4.5 Registering Database Information

Register Symfoware database information by the `swsrpdbinfo_symfoware` 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 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 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 Group

Create a replication group by the `swsrpsetvol` command.

The information for the created group can be referred to by the `swsrpvoinfo` 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.

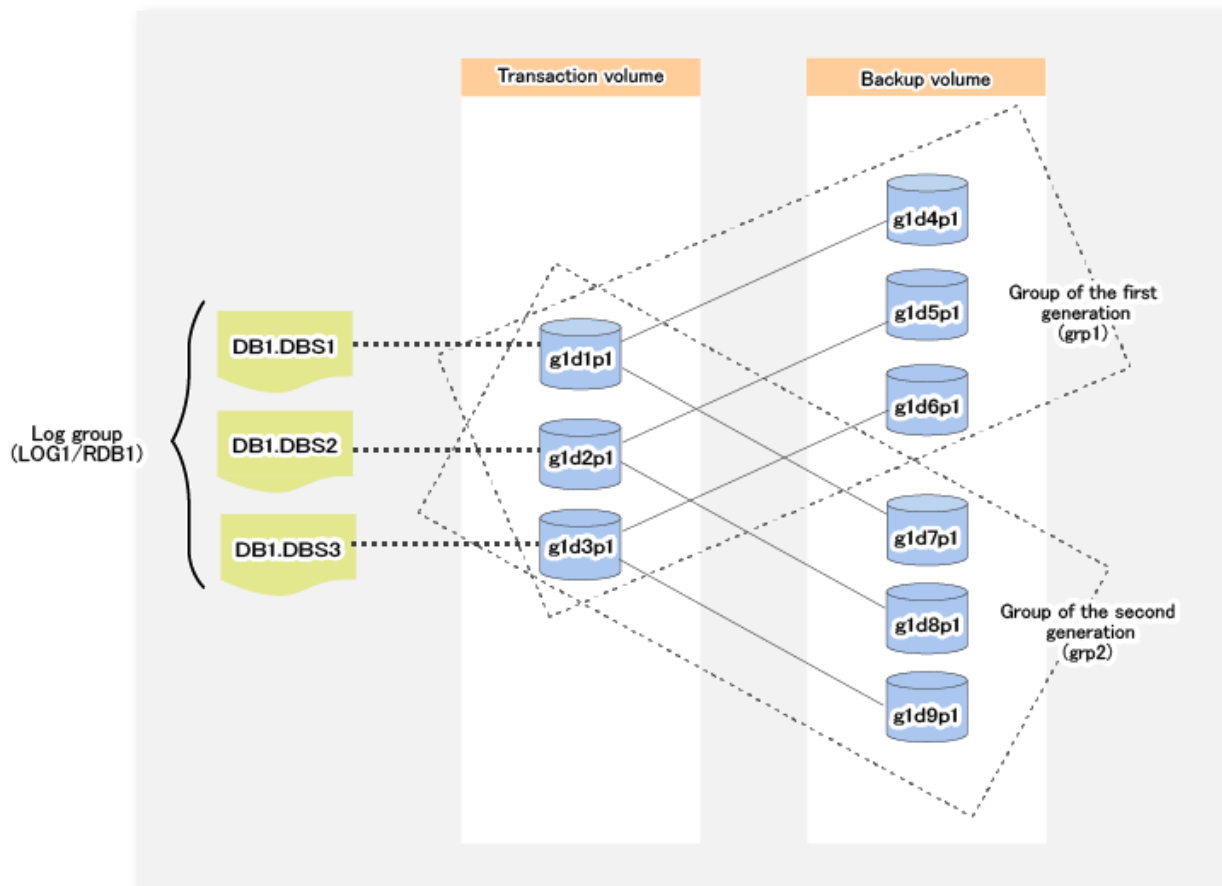
(Example) When creating a replication group (grp1) that backs up transaction volumes (g1d1p1, g1d2p1, g1d3p1) making up a log group (LOG1/RDB1) to backup volumes (one generation < g1d4p1, g1d5p1, g1d6p1>):

```
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\swsrpvoinfo -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>):

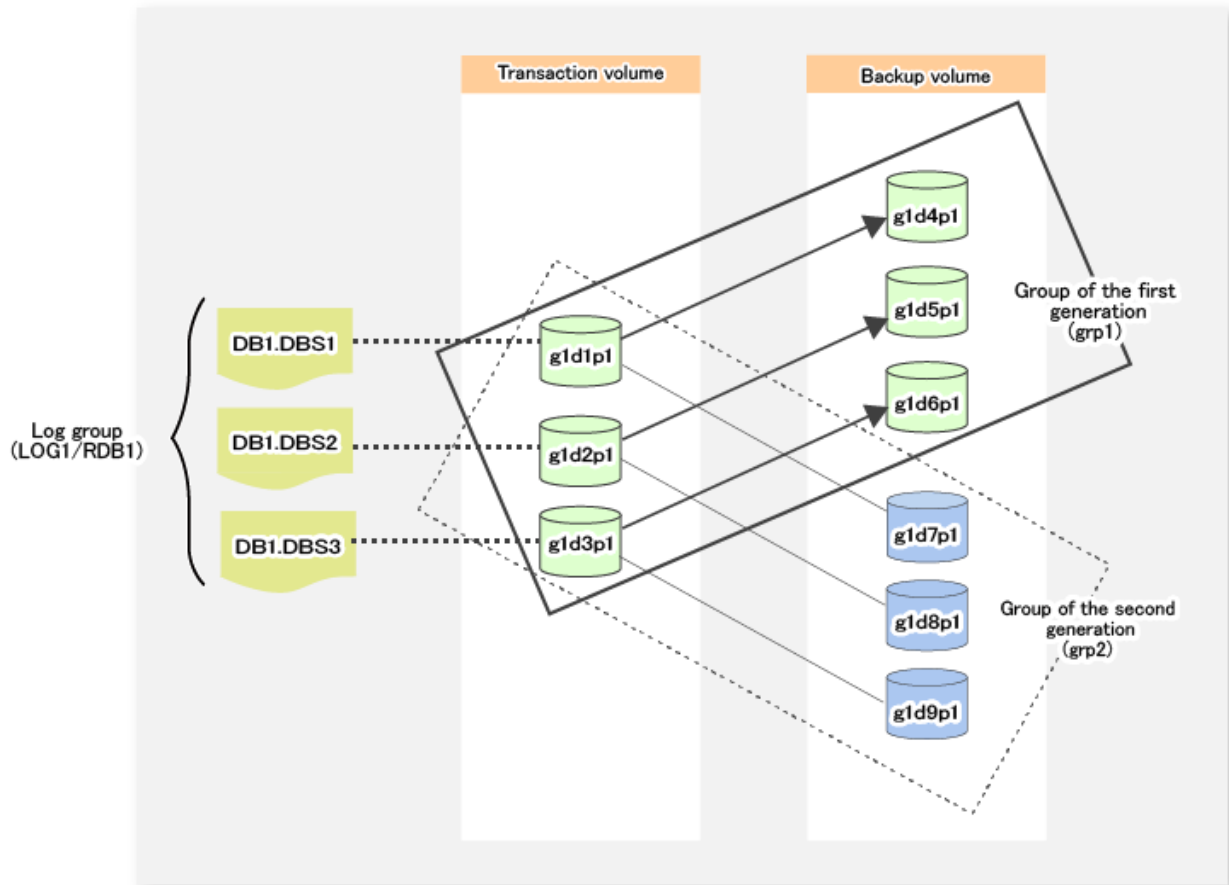


```

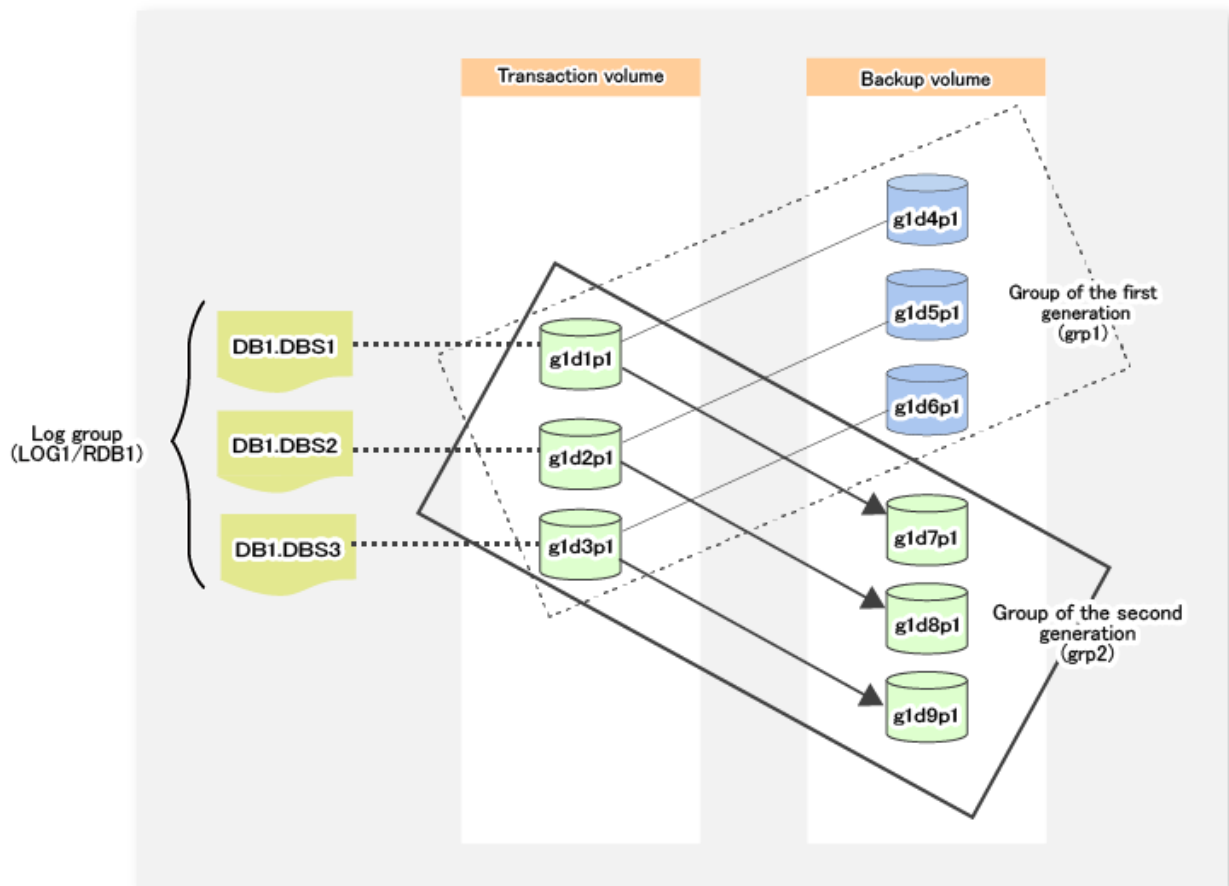
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d1p1 g1d7p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d2p1 g1d8p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH -Xgroup grp2 g1d3p1 g1d9p1@BK-SV
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvoinfo -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.

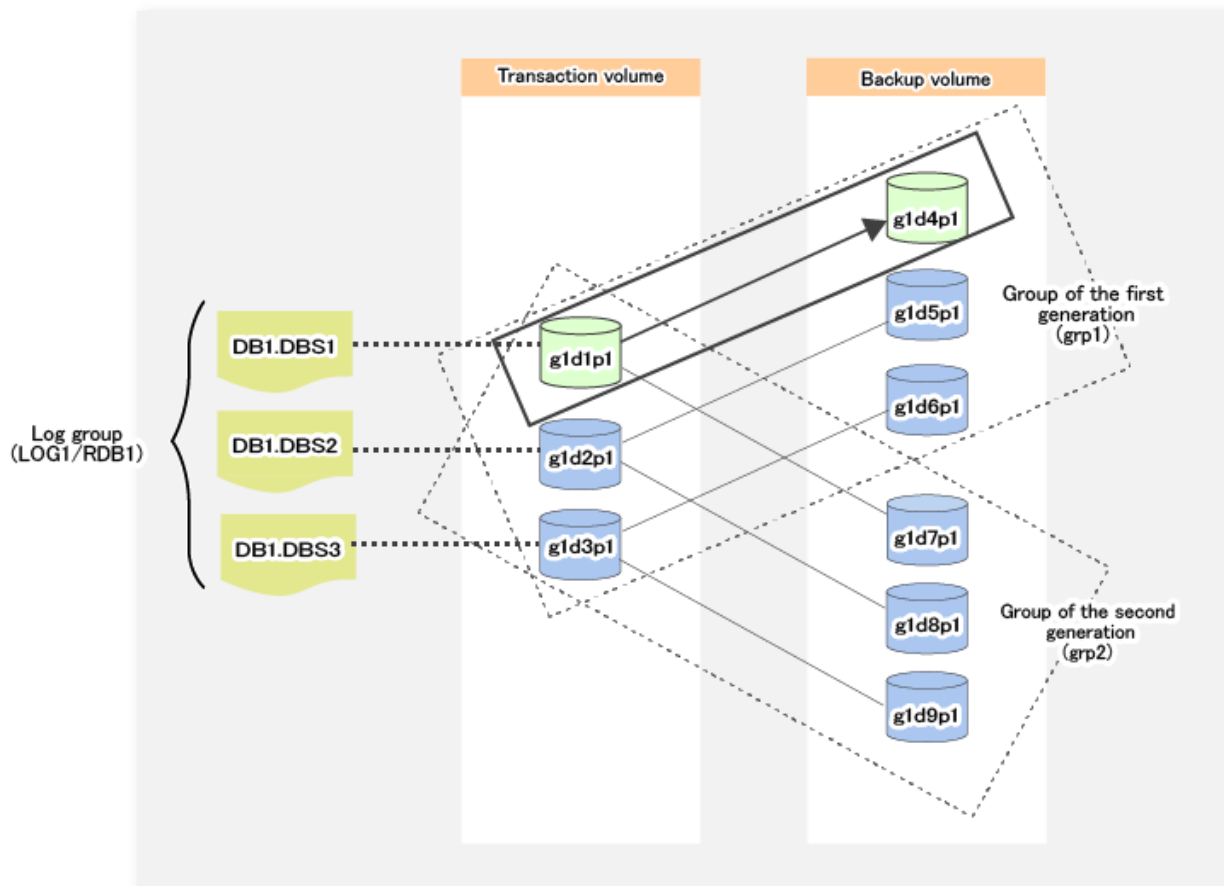


In backup of the 2nd generation log group (LOG1/RDB1), specify the log group (LOG1/RDB1) and the replication group (grp2) at backup time.



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

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

4.2.5.1 Performing Backup

Perform backup by the `swsrpbackup_symfaware` 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).
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 rdbtr 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.

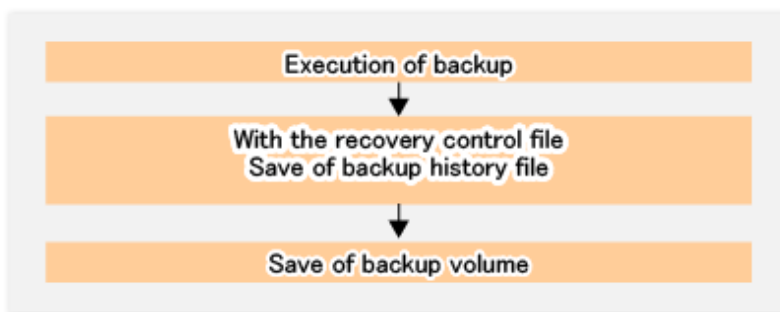
Backup to Secondary Media

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 output 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 "[13.1.1.7.1 Backing Up Target Directory for Output of 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 files by the XCOPY command. The file ownership and ACL information are also copied by /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.



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 the `swsrprestore_symfoware` 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 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 state
Execute the `swsrprestore_symfoware` command without the `-e` option and the `-a` option.
- Restoring of a specific point in time by specifying the end point of recovery
Execute the `swsrprestore_symfoware` command by specifying the recovery point to the `-e` option. For more information on the recovery point, refer to the Symfoware Server manuals.
- Restoring of the point in time of backup
Execute the `swsrprestore_symfoware` command with the `-a` option.

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

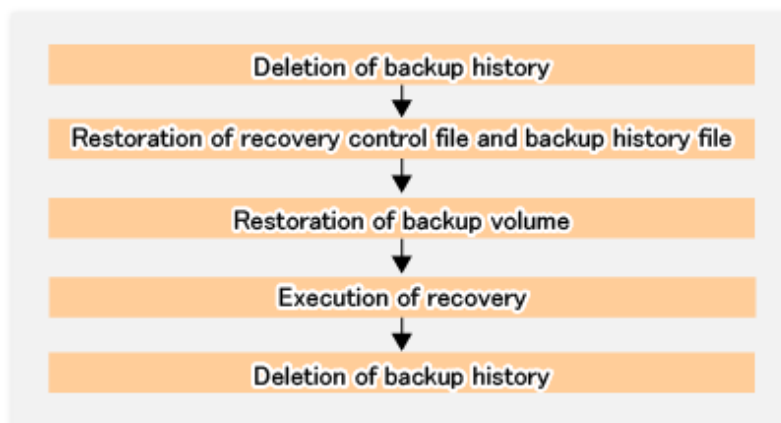
Note

- 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 manuals.
- 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 Latest State" or "Restoring of Specific Point in Time by Specifying 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, refer to the Symfoware Server manuals.
- If recovery operation fails due to free space shortage in a working directory, use the `-w` option of the `swsrprestore_symfoware` command to use another directory as a temporary working directory and retry recovery.
- When performing "Restoring of Specific Point in Time by Specifying End Point of Recovery" or "Restoring of 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 "[13.1.1.7.1 Backing Up Target Directory for Output of 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 the recovery control file and the backup history file that were backed up in "[Backup to Secondary Media](#)" from the secondary media to the temporary area. (Perform on backup server)
3. Copy the files by the XCOPY command. The file ownership and ACL information are also copied by /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 the [swsrphistory_symfoware](#) command.

Delete Backup History

Perform this action by the [swsrphistory_symfoware](#) 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 Fetching Device Information on Managed Server](#)" to change device information.
 3. Re-register Symfoware database information by the `swsrpdbinfo_symfoware` command to reflect the changed contents.
 4. Add volumes to the replication group by the `swsrpsetvol` 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 the `swsrphistory_symfoware` command.
 3. Delete the volumes from the replication group by the `swsrpdelvol` command.
 4. To reflect changes in the log group configuration to the management directory of AdvancedCopy Manager, refer to "[4.2.4.4 Fetching Device Information on Managed Server](#)" to change device information.
 5. Re-register Symfoware database information by the `swsrpdbinfo_symfoware` command to reflect the changed contents.

4.2.6.2 Other Environment Change

For other environment change, refer to "[13.5 Changing 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.

Note

For backup operations with the Suspend/Resume function, the Advanced Copy function enabled for TFOVs is not available.

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.

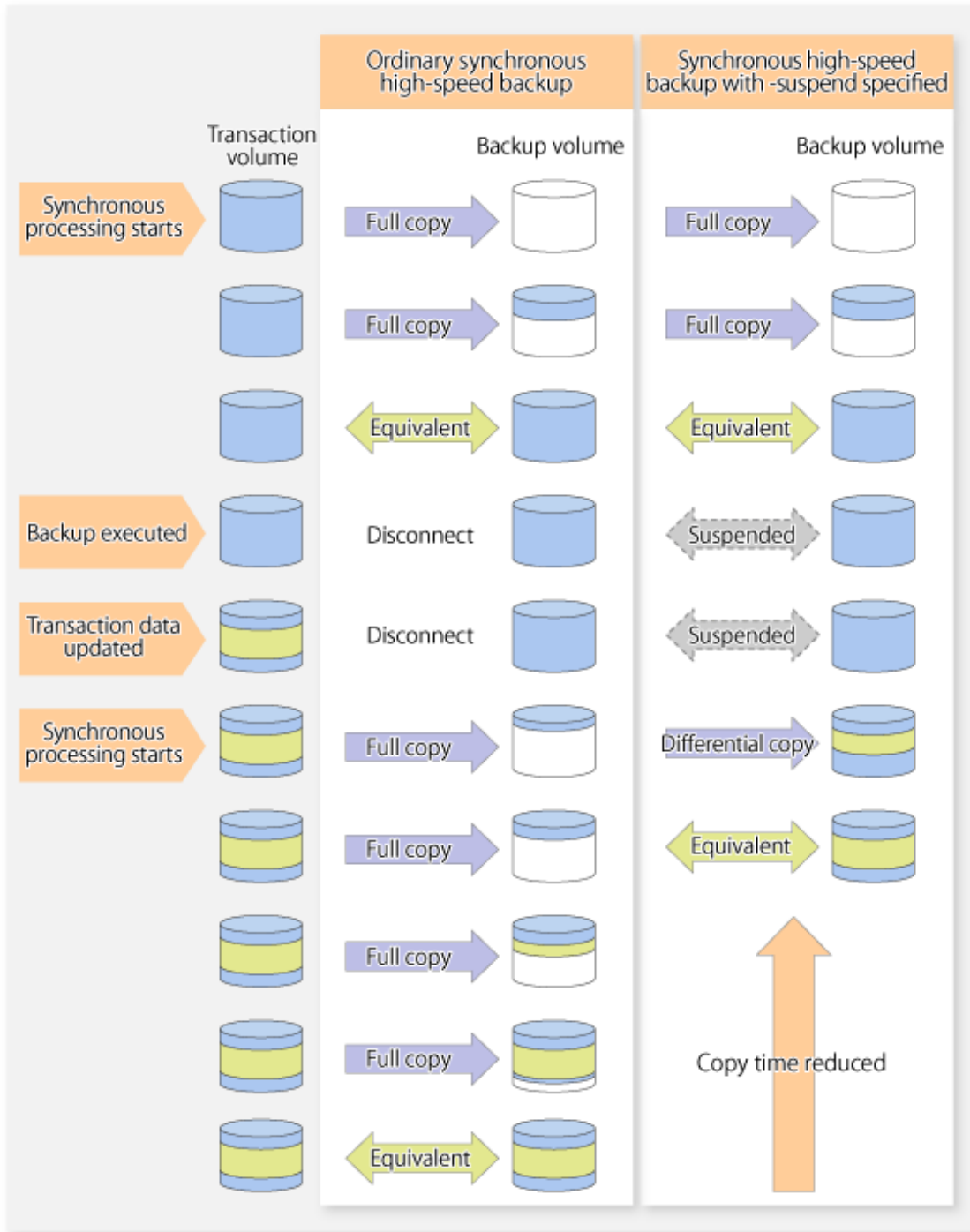
AdvancedCopy Manager provides two backup functions: snapshot high-speed backup and synchronous high-speed backup. In snapshot high-speed backup, OPC is used to create a backup. In synchronous high-speed backup, EC is used to create a backup. The Suspend/Resume function can be thought of as a kind of 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 keeps the equivalency 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 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 the `-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.

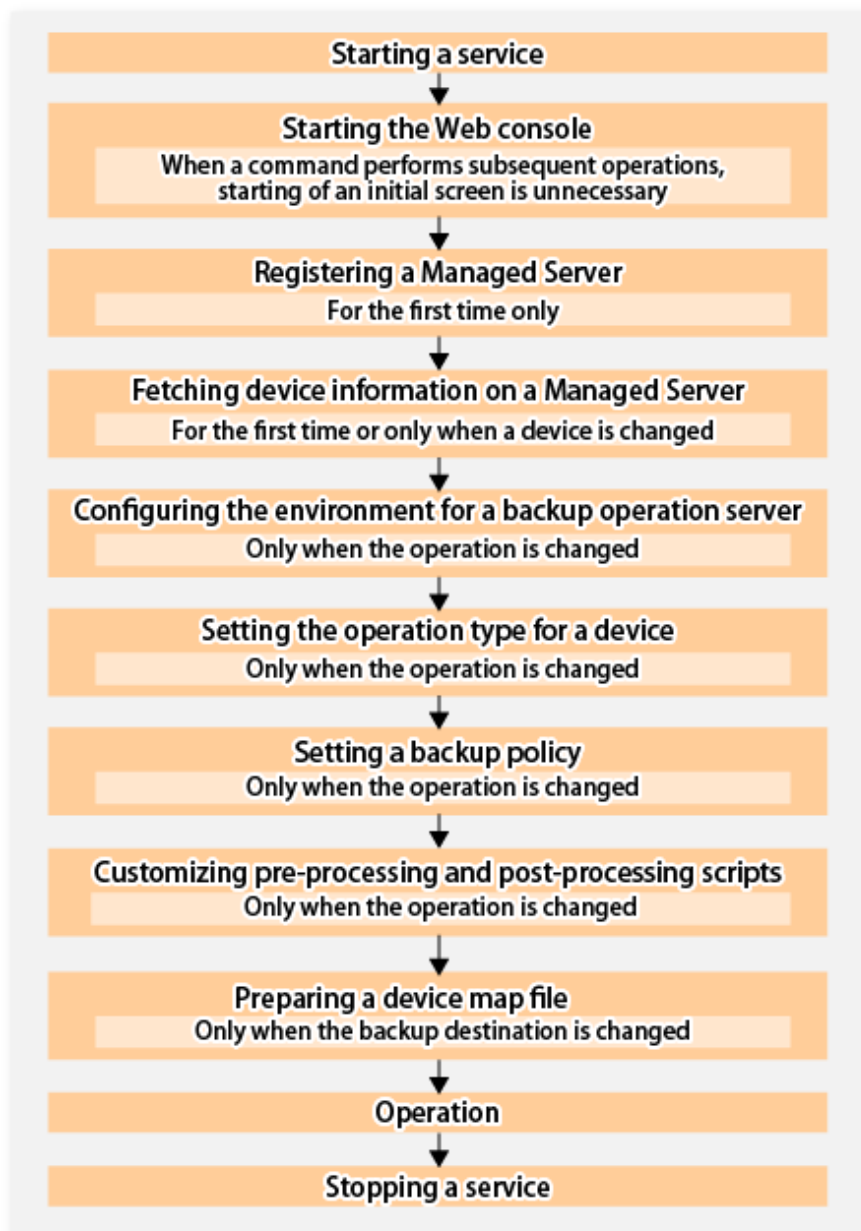
Point

.....
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 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 need to start the service on each server.

For information on starting a service, refer to "[Chapter 2 Starting and Stopping Services](#)".

5.4.2 Starting Web Console

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

5.4.3 Registering Managed Server

With Web Console, register Managed Servers that are to be managed.



Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the `stgxfwcmdisprv` command.

5.4.4 Fetching Device Information on Managed Server

This process can be carried out using either Web Console or the `stgxfwcmsetdev` command. Refer to "Add/Reload Device" in the *Web Console Guide* for information on the operating procedures of Web Console.



- Device information on a Managed Server must first be stored in the repository.
 - 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.
-

5.4.5 Configuring Environment for Backup Operation Server

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

This process can be carried out using either Web Console or the `swstsvrset` command.

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

5.4.6 Setting Operation Type for 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 the `swstdevinfo` command.

In addition, to display the registered volume information, execute the `swstdevdisp` 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.

5.4.7 Setting 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 Web Console or the following commands.

- Backup Policy Setup: [swstbkpolset](#) command
- Check Backup Policy that has been set up: [swstbkpoldisp](#) command
- Backup Policy Deletion: [swstbkpoldel](#) command

5.4.8 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.

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.

5.4.9 Preparing 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.

P Point

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

5.5 Backup Operations

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

Then suspend the synchronous processing.

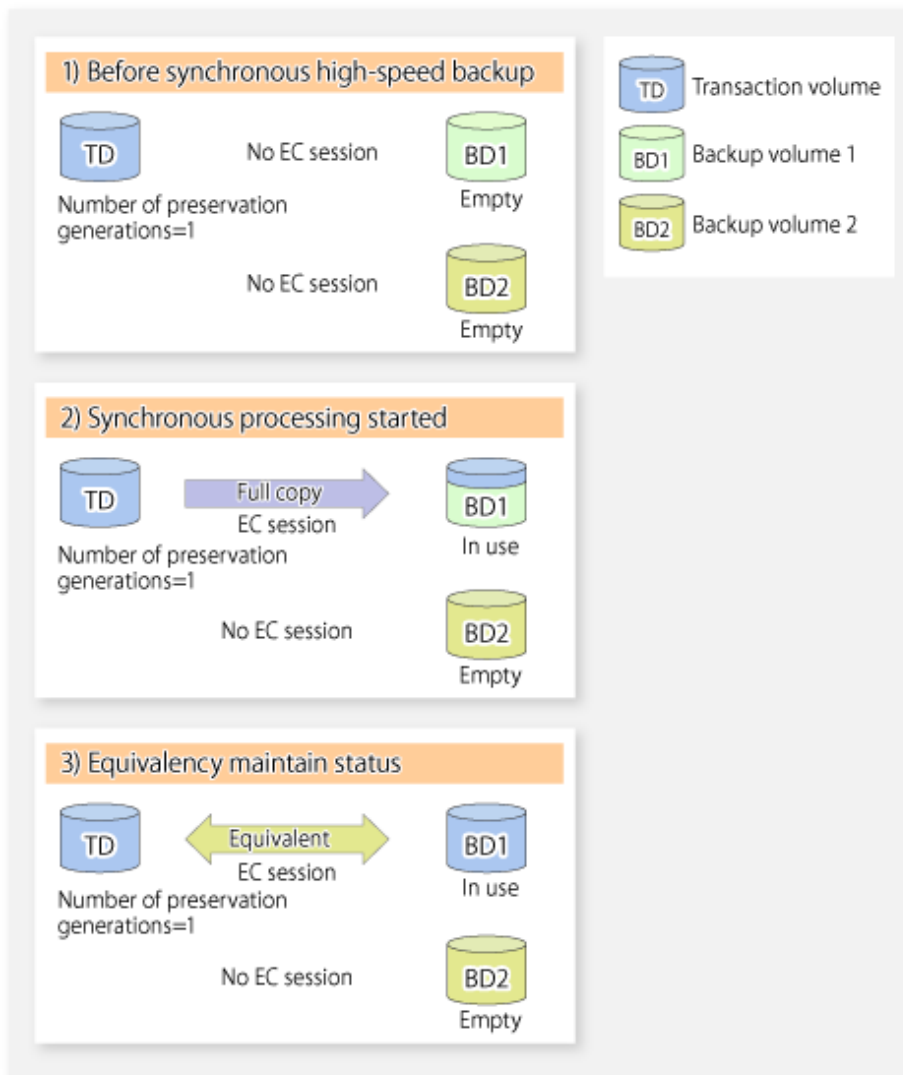
When history information is deleted because the number of generations has been exceeded or when the `swsthistdel` command is executed, the backup volume becomes the Suspend state without any history information.

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.

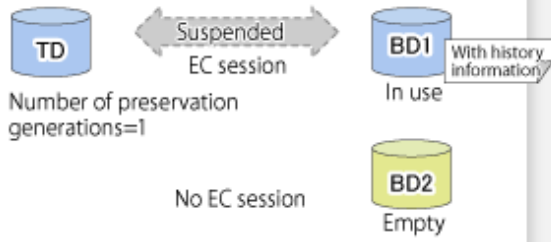
Note that synchronous high-speed backup using the Suspend/Resume function can also be operated from Web Console.

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

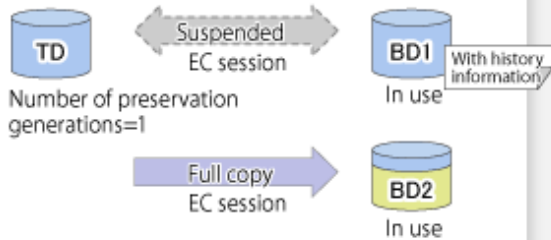
Figure 5.3 Synchronous High-speed Backup Operations Using Suspend/Resume Function



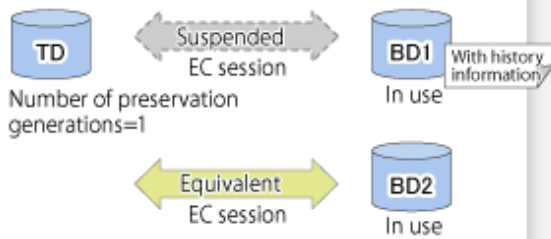
4) Execution of the backup command with -suspend specified



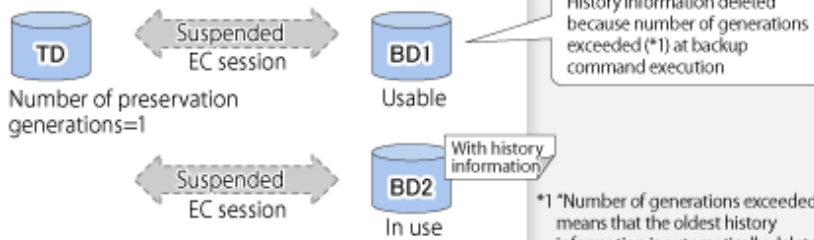
5) Synchronous processing started



6) Equivalency maintain status

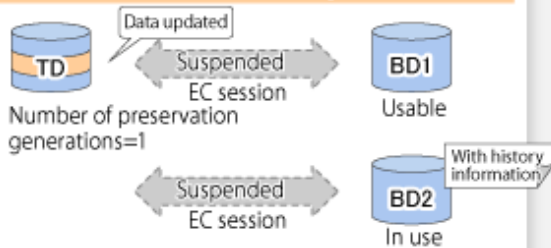


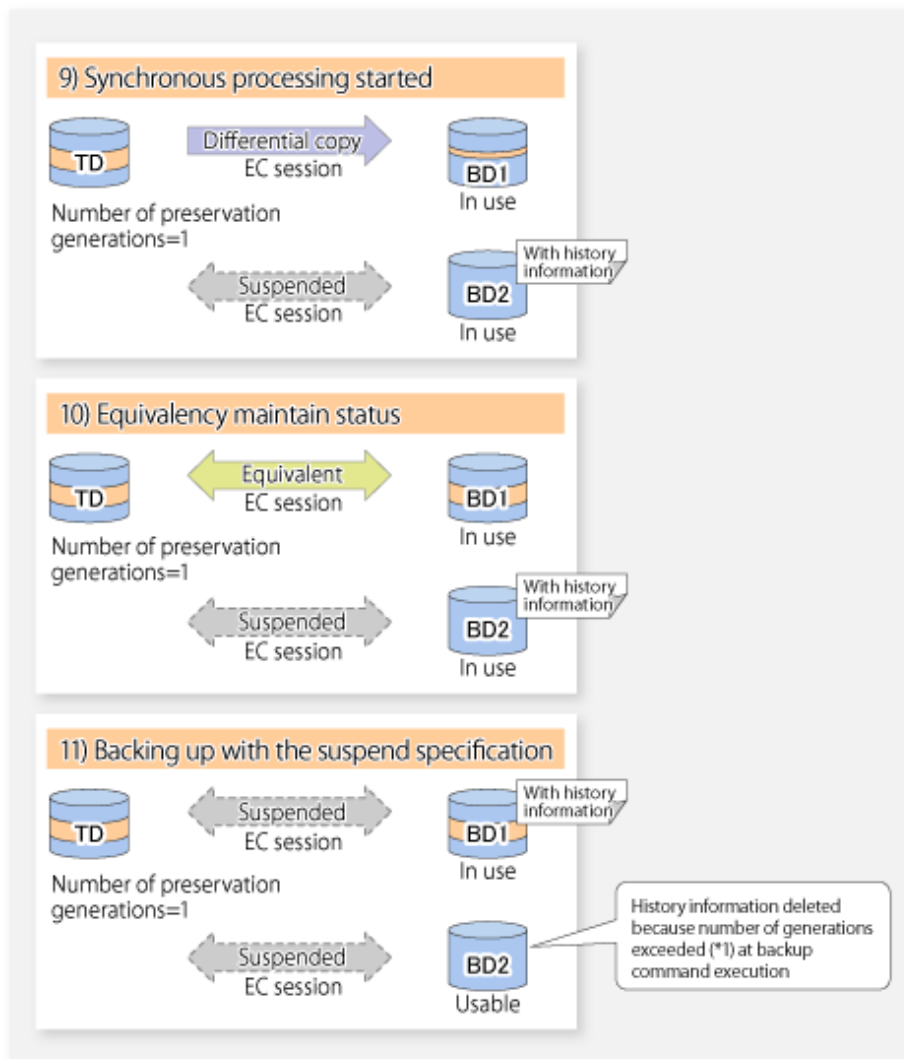
7) Backing up with the suspend specification



*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





5.5.1 Starting Synchronous Processing

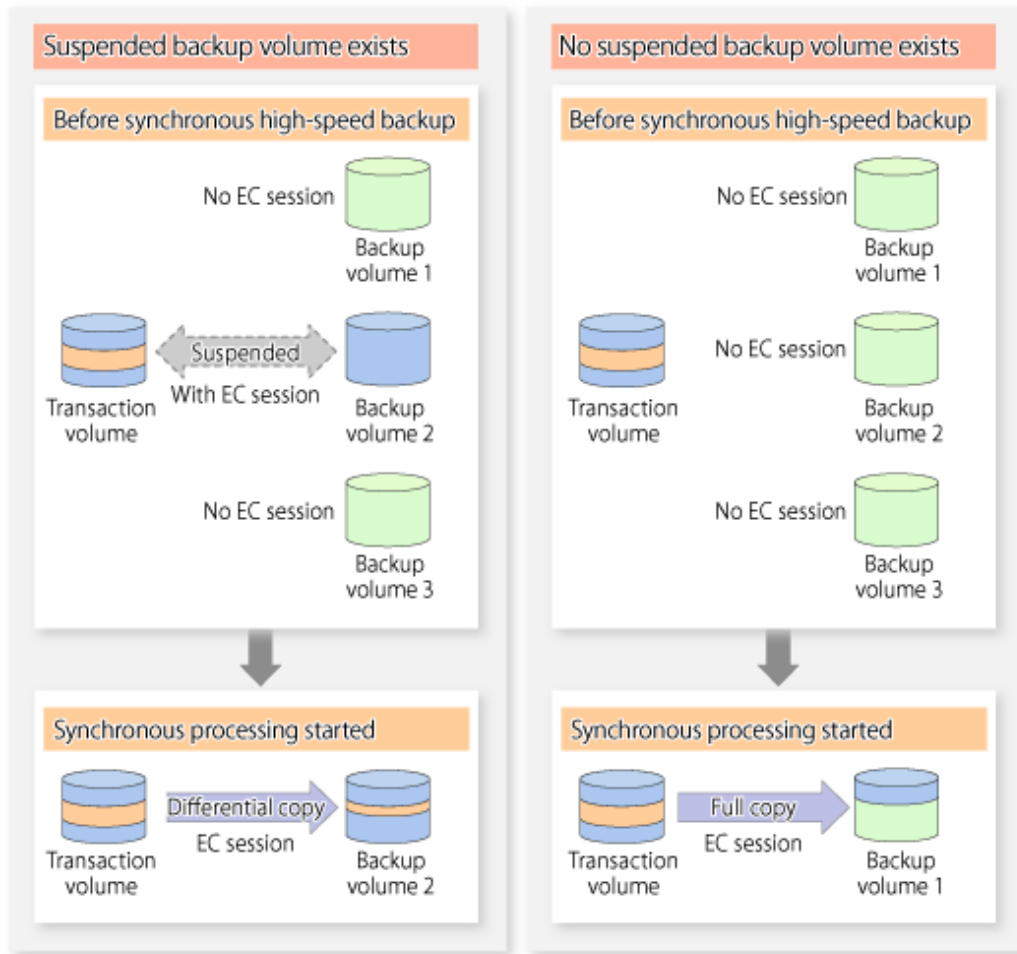
For synchronous high-speed backup, execute the `swststartsync` command to start the synchronous processing. If there is a suspended backup volume at the start of the synchronous processing, then the following devices are selected first, and EC resumes (i.e., the Resume function causes differential copying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



 Note

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

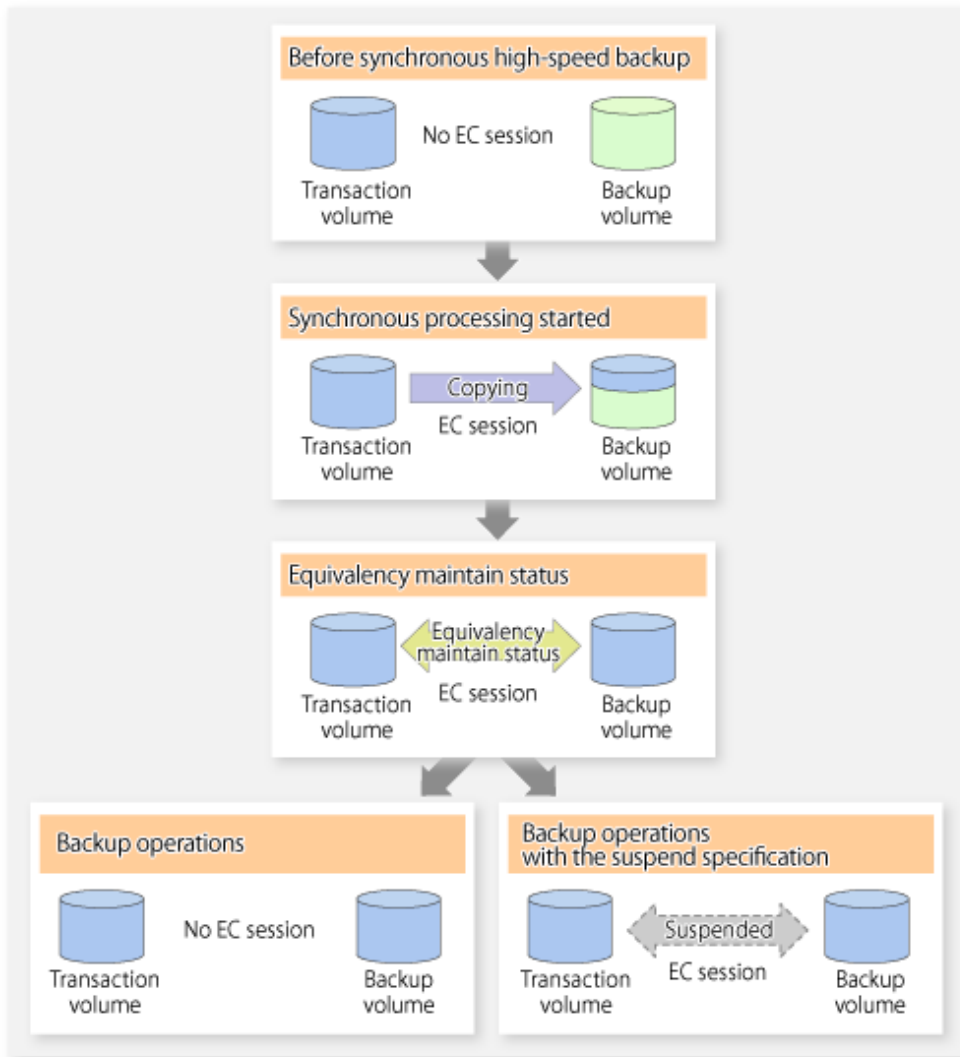
5.5.2 Backing Up

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 the [swstbackup](#) 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 Suspend Specification



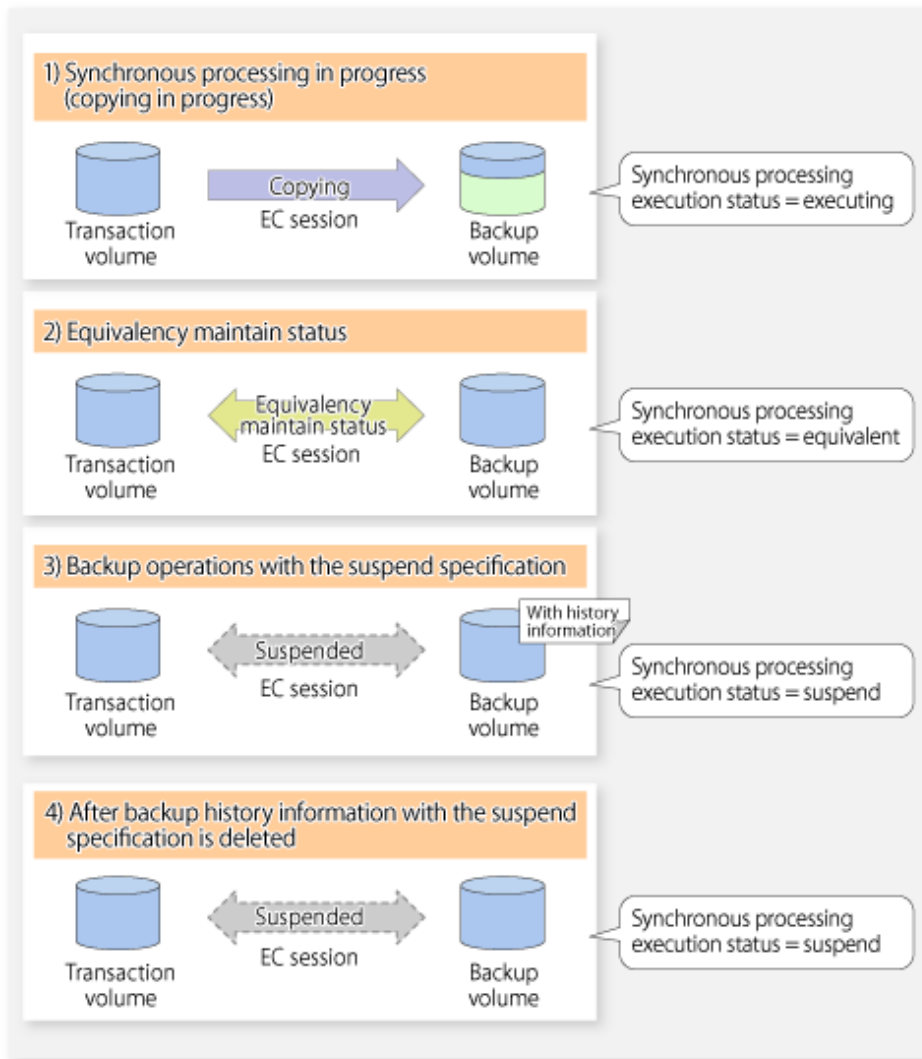
5.5.3 Displaying Synchronous Processing Execution Status

To check the status of synchronous high-speed backup that uses the Suspend/Resume function, execute the [swstsyncstat](#) 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 Suspend Specification



5.5.4 Cancelling Synchronous Processing

To cancel synchronous processing (during an EC session), execute the `swstcancelsync` 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**

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

P Point

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

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

Figure 5.7 Operational States in Synchronous Processing Caused by Cancellation



5.5.5 History Management

Backup history information can be referenced using the `swsthistdisp` command.

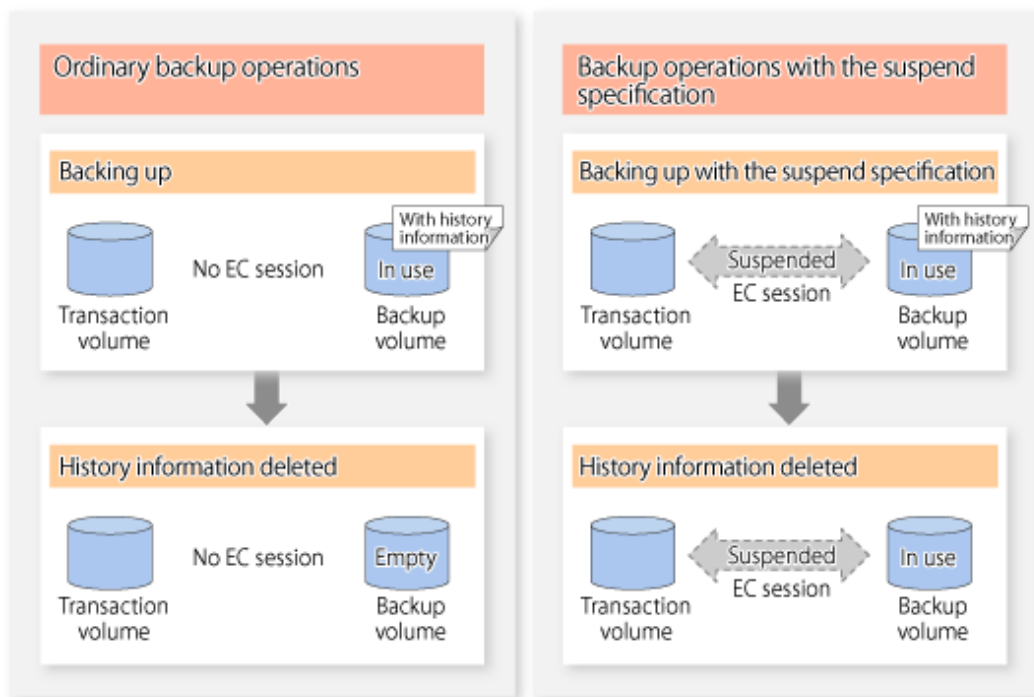
Backup history information can be deleted using the `swsthistdel` command.

Point

- Even when the history information created during backup operations with the suspend specification is deleted, an associated EC session is not released.
- Deleting history information during ordinary synchronous high-speed backup releases the backup volume, and "Backup(free)" is displayed in the **Device-Mode** column by the `swstdevdisp` 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 the `swstdevdisp` 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 Suspend Specification



5.5.6 Restoring

Before restoration, the `swstcancelsync` 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 the `swstsyncstat` command.

To restore data from a backup volume, execute the `swstrestore` command.

To cancel restoration or to delete management information associated with restoration that ended abnormally, execute the `swstcancelrest` command.

Note

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

Chapter 6 Backup Operation Using QuickOPC Function

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

Note

For backup operations with the QuickOPC function, the Advanced Copy function enabled for TFOVs is not available.

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.

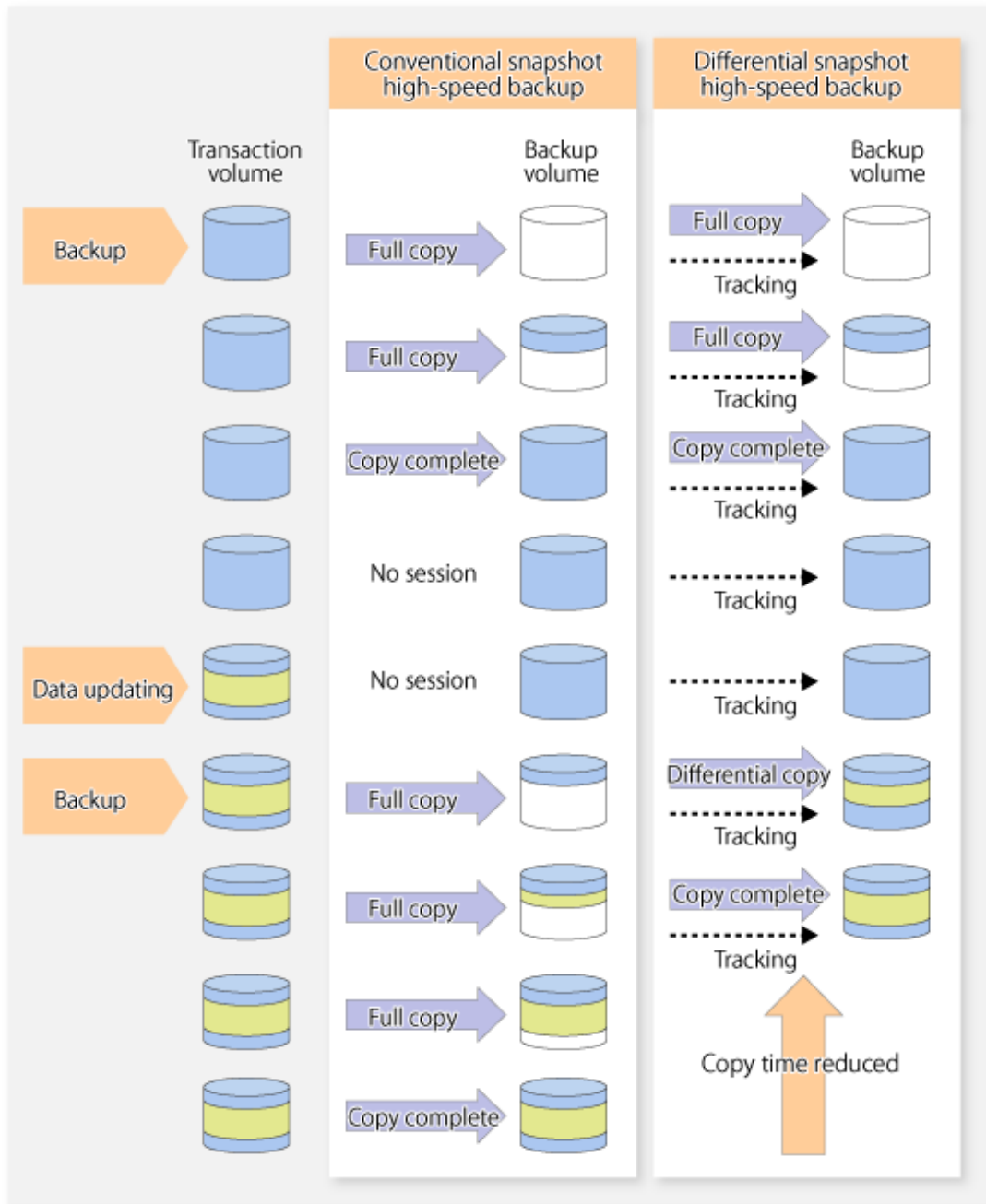
The snapshot high-speed backup using the QuickOPC function is referred to as the differential snapshot high-speed backup.

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

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:

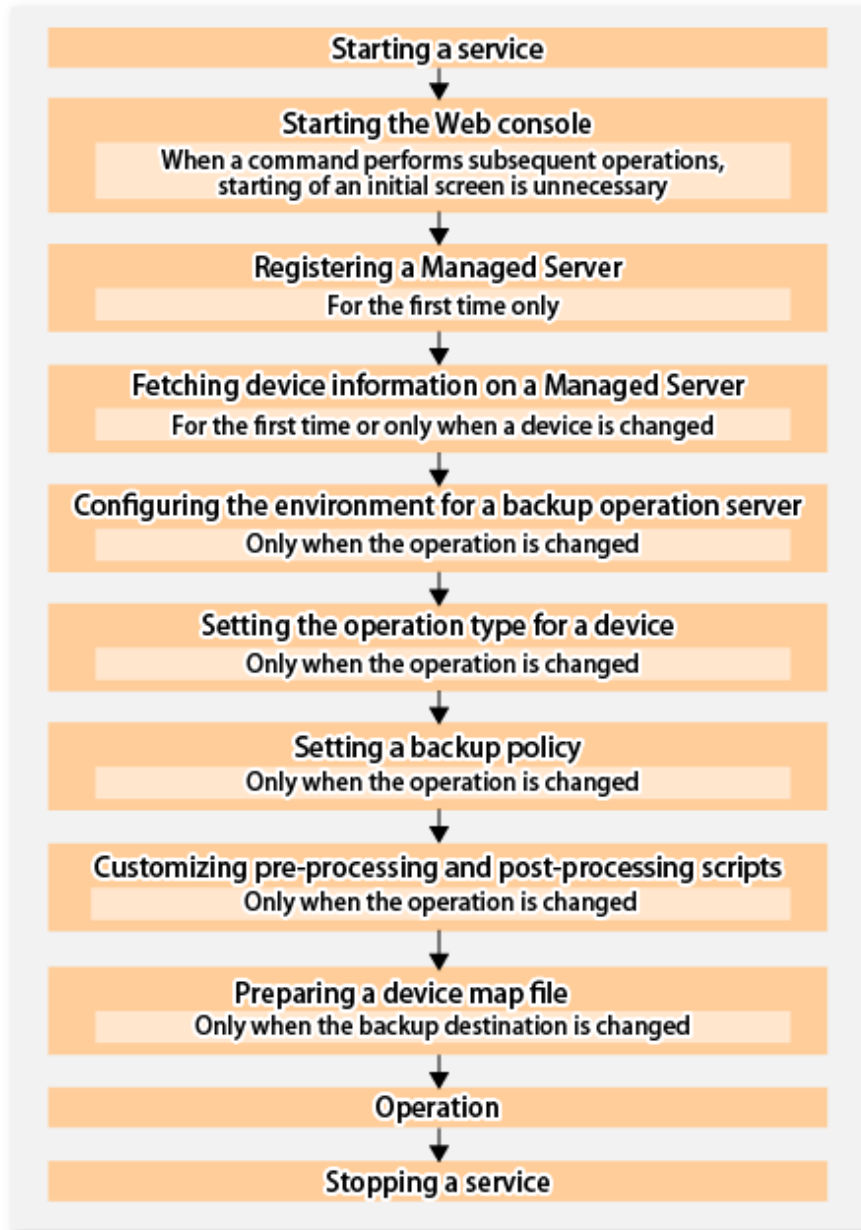
- In a backup operation using the QuickOPC function, an OPC session remains active even after the physical copy has been completed. Operators should specify the number of preservation generations so that the maximum number of OPC sessions that can be defined for the same logical unit cannot be exceeded.

- 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 QuickOPC Function



6.4 Preparation

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

6.4.1 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 need to start the service on each server.

For information on starting a service, refer to "[Chapter 2 Starting and Stopping Services](#)".

6.4.2 Starting Web Console

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

6.4.3 Registering Managed Server

With Web Console, register Managed Servers that are to be managed.



Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the [stgxfwcmdispsrv](#) command.

6.4.4 Fetching Device Information on Managed Server

This process can be carried out using either Web Console or the [stgxfwcmsetdev](#) command.

Refer to "Add/Reload Device" in the *Web Console Guide* for information on the operating procedures of Web Console.



Note

- Device information on a Managed Server must first be stored in the repository.
- 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.

6.4.5 Configuring Environment for Backup Operation Server

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

This process can be carried out using either Web Console or the [swstsvrset](#) command.

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

6.4.6 Setting Operation Type for 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 the [swstdevinfoaset](#) command.

In addition, to display the registered volume information, execute the [swstdevdisp](#) command. The transaction volume in the tracking state can be checked with the [swstrkstat](#) command.



Note

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

 **Point**

The both -b and -u options can be specified in the [swstdevdisp](#) command to check for backup volumes, where relevant histories have been deleted, in the suspend or tracking state.

6.4.7 Setting 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 Web Console or the following commands.

- Backup Policy Setup: [swstbkpolset](#)
- Check Backup Policy that has been set up: [swstbkpoldisp](#)
- Backup Policy Deletion: [swstbkpoldel](#)

6.4.8 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.

 **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.

6.4.9 Preparing 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**

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

6.5 Operation

6.5.1 Invoking Backup

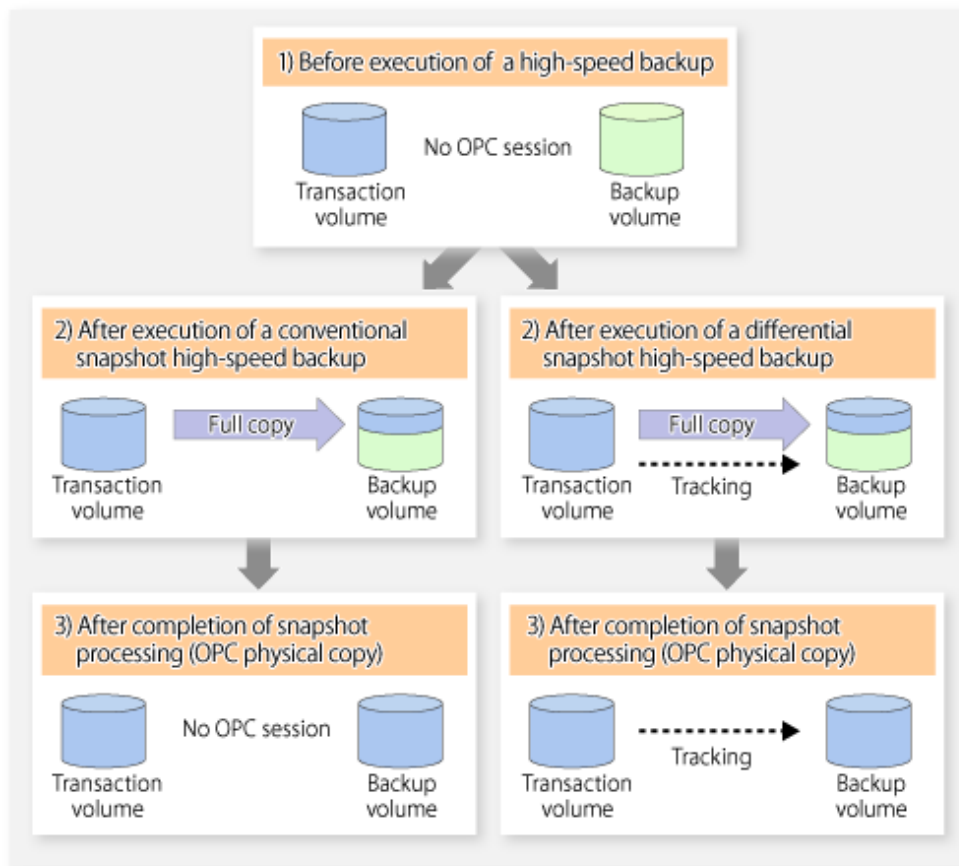
Invoke the differential snapshot high-speed backup by specifying the -T option in the `swstbackup` command.

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.

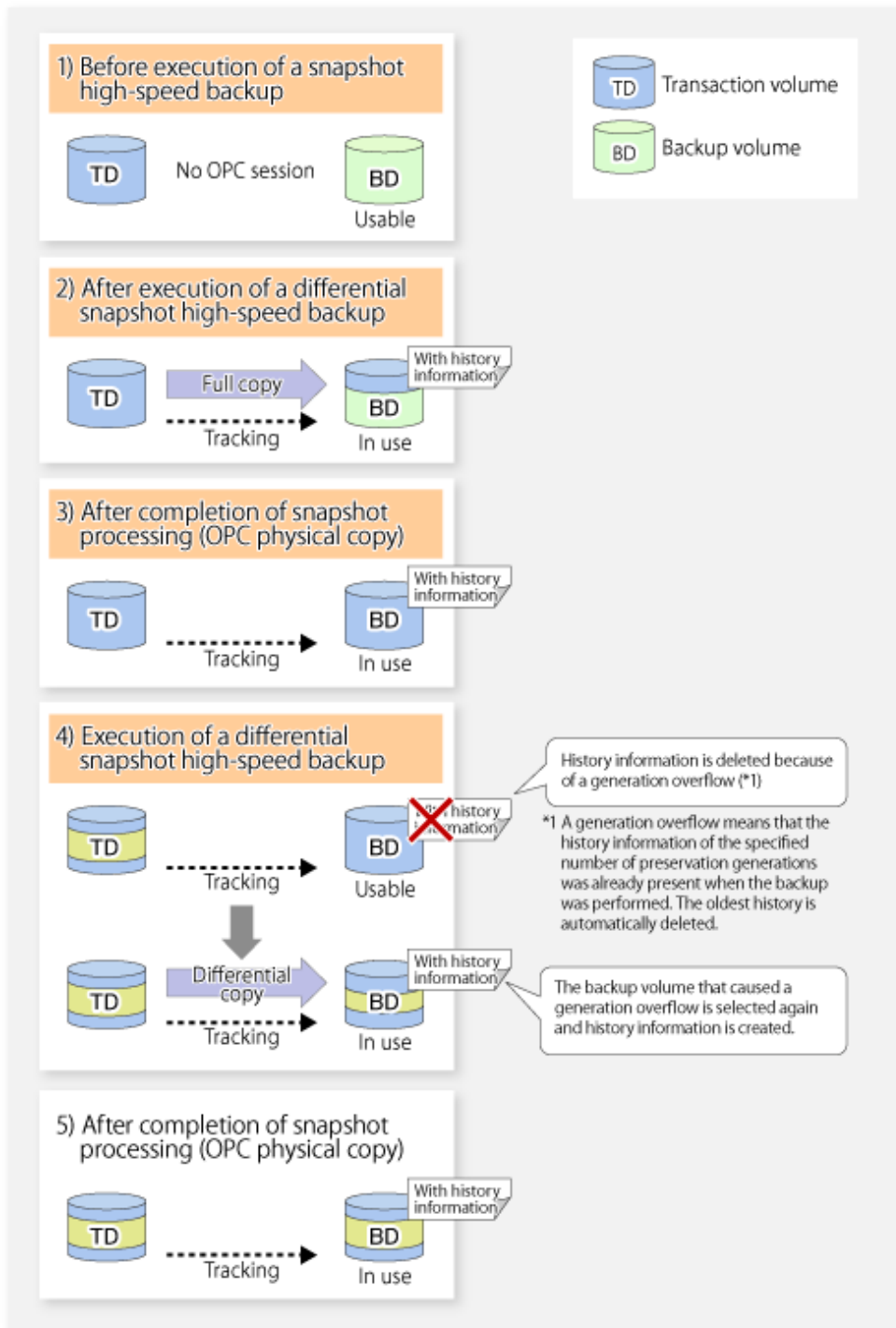
Figure 6.3 Conventional Snapshot High-speed Backup and Differential Snapshot High-speed Backup



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 the [swsthistdisp](#) command.

Backup history information can be deleted using the [swsthistdel](#) 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).

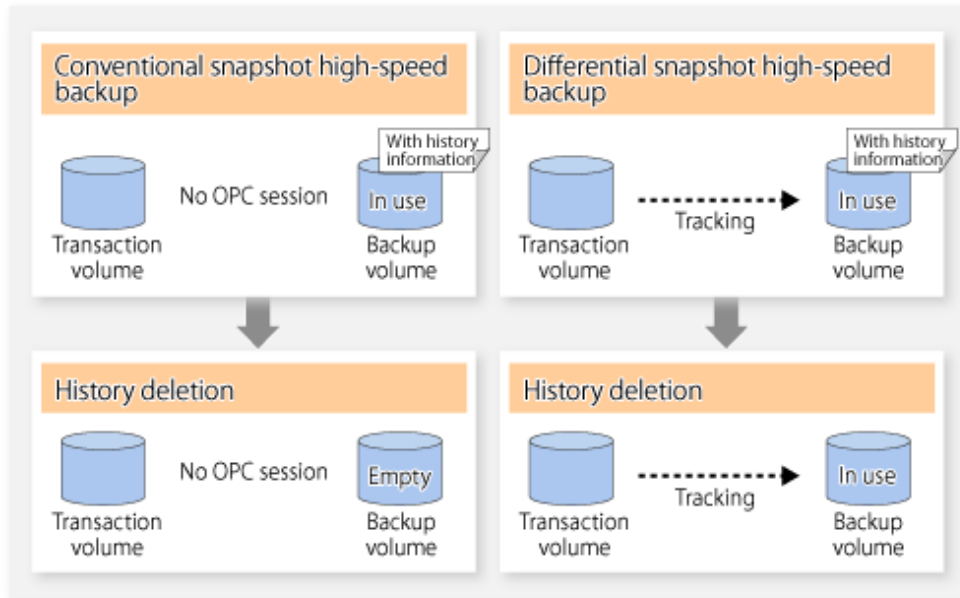
In the conventional snapshot high-speed backup, after the history information is deleted, the backup volume is released and "Backup (free)" is displayed in the **Device-Mode** column by the [swstdevdisp](#) command. In the differential

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 the `swstdevdisp` 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

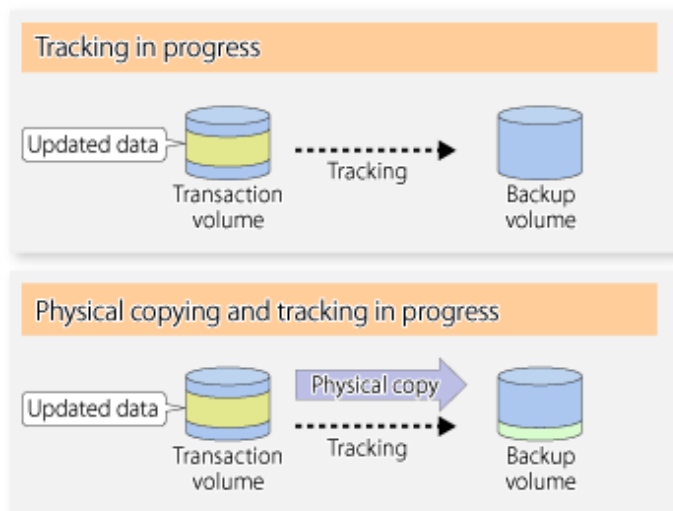


6.5.3 Restoration

The section explains how to use the `swstrestore` command for restoration.

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

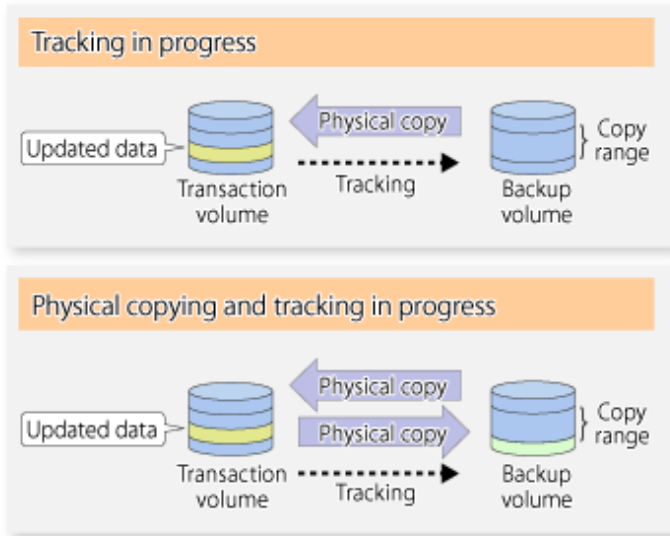
Figure 6.6 Tracking of Differential Snapshot High-speed Backup Operations



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.

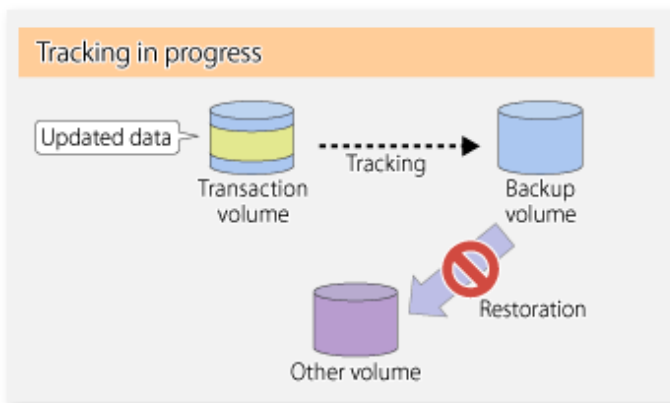
Figure 6.7 Restoration from Backup Volume to Transaction Volume



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 the `swstcanceltrk` 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

Execute the `swstcancelrest` command to cancel the restoration.

 Point

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

6.5.5 Displaying Execution Status of Tracking Processing

The execution status of tracking processing by the QuickOPC function can be checked with the [swstrkstat](#) 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

Execute the [swstcanceltrk](#) command to stop tracking processing.

 Point

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

Chapter 7 Replication

This chapter provides details of AdvancedCopy Manager replication in Windows.

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

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 management 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 management 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:

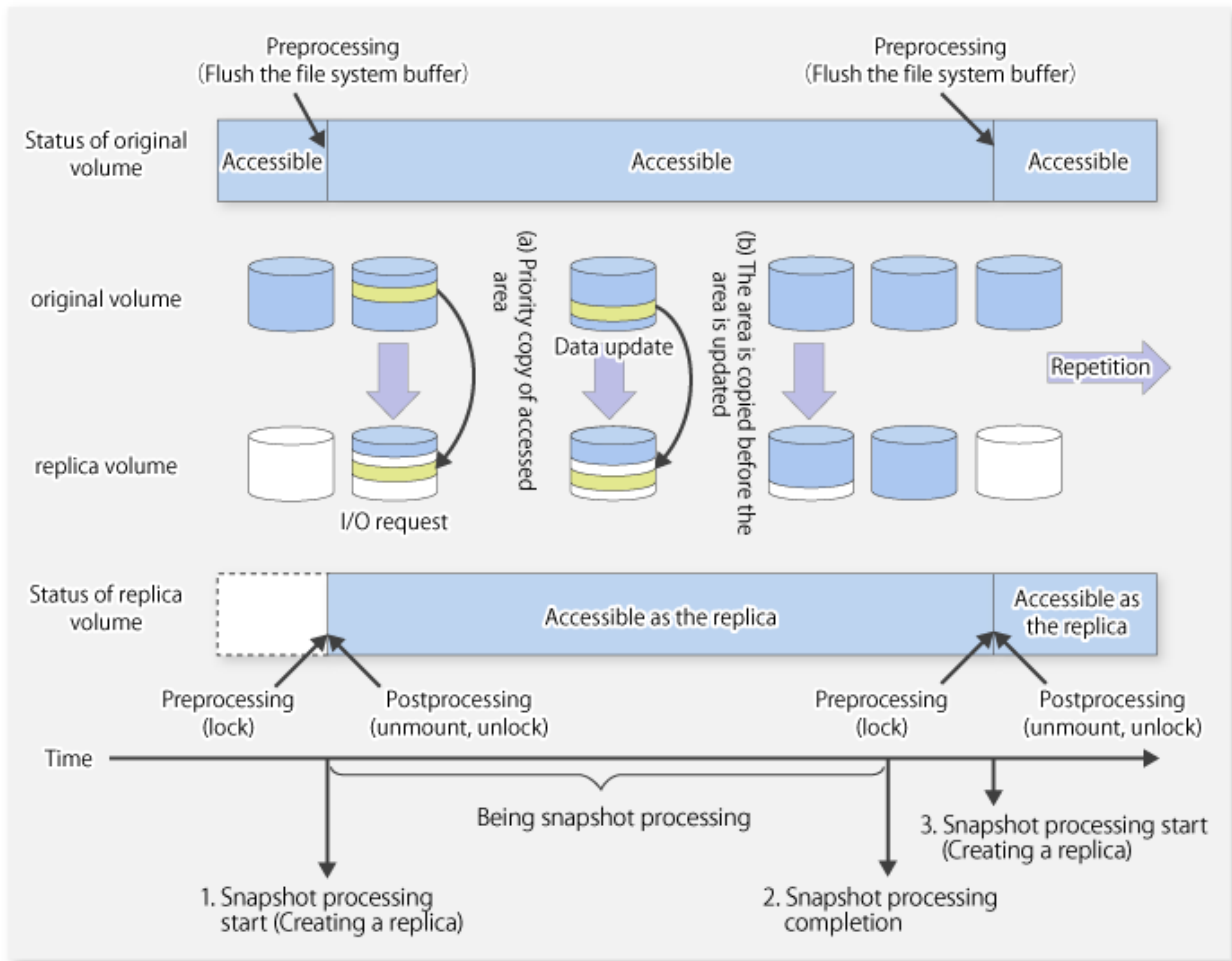
1. When a copy is created, the snapshot processing (OPC) from the source volume to the replica volume is executed with the [swsrpmake](#) command.

The [swsrpmake](#) 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 the [swsrpmake](#) 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

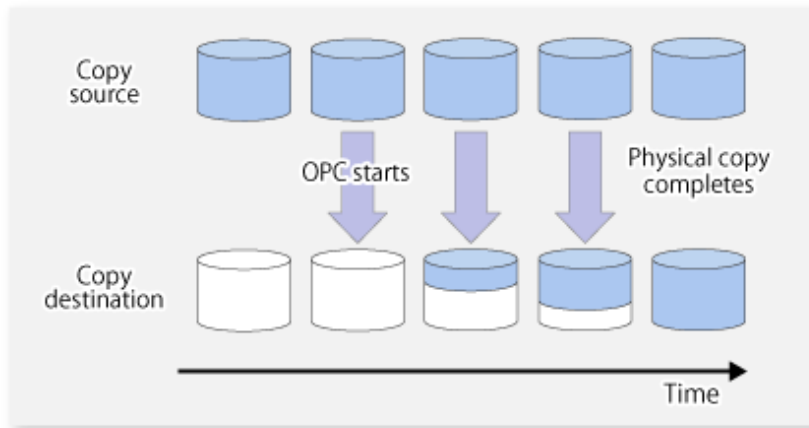
The following types of snapshot replication are available, depending on the used Advanced Copy functions:

- [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



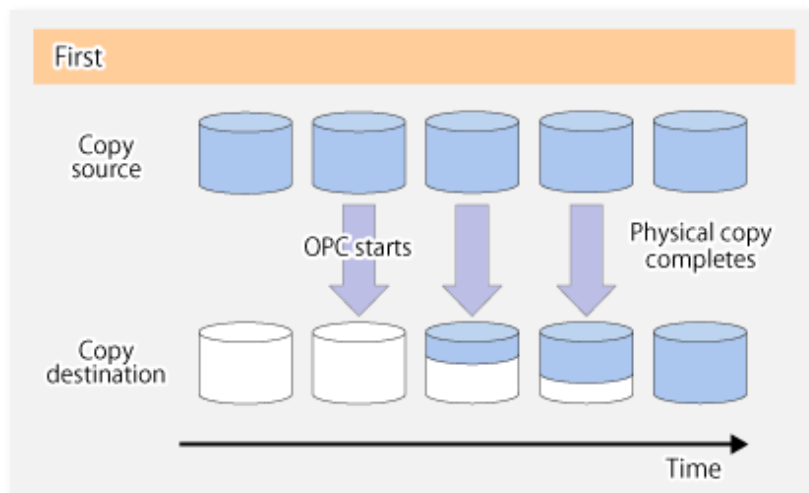
Point

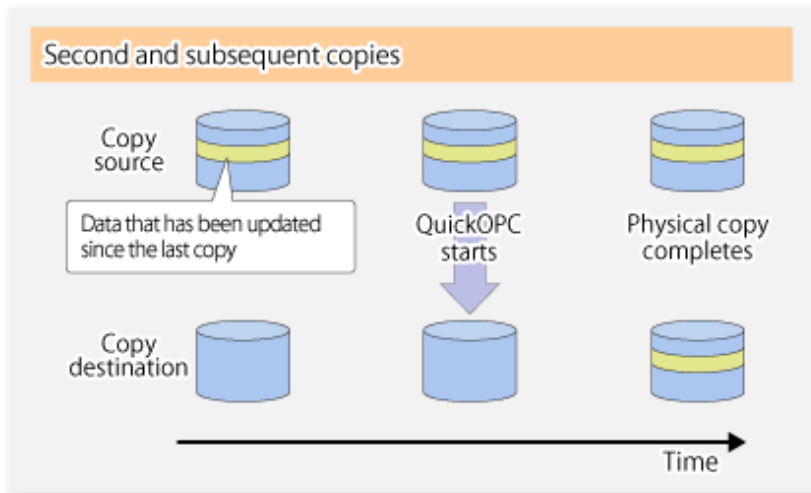
The copy destination disk must be the same size or larger than the copy source disk.
The copying time is the time taken to copy all the data.

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





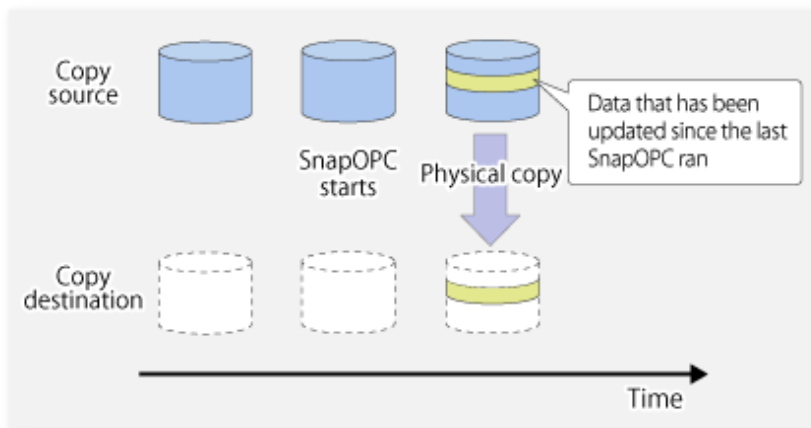
P Point

- 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".

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.

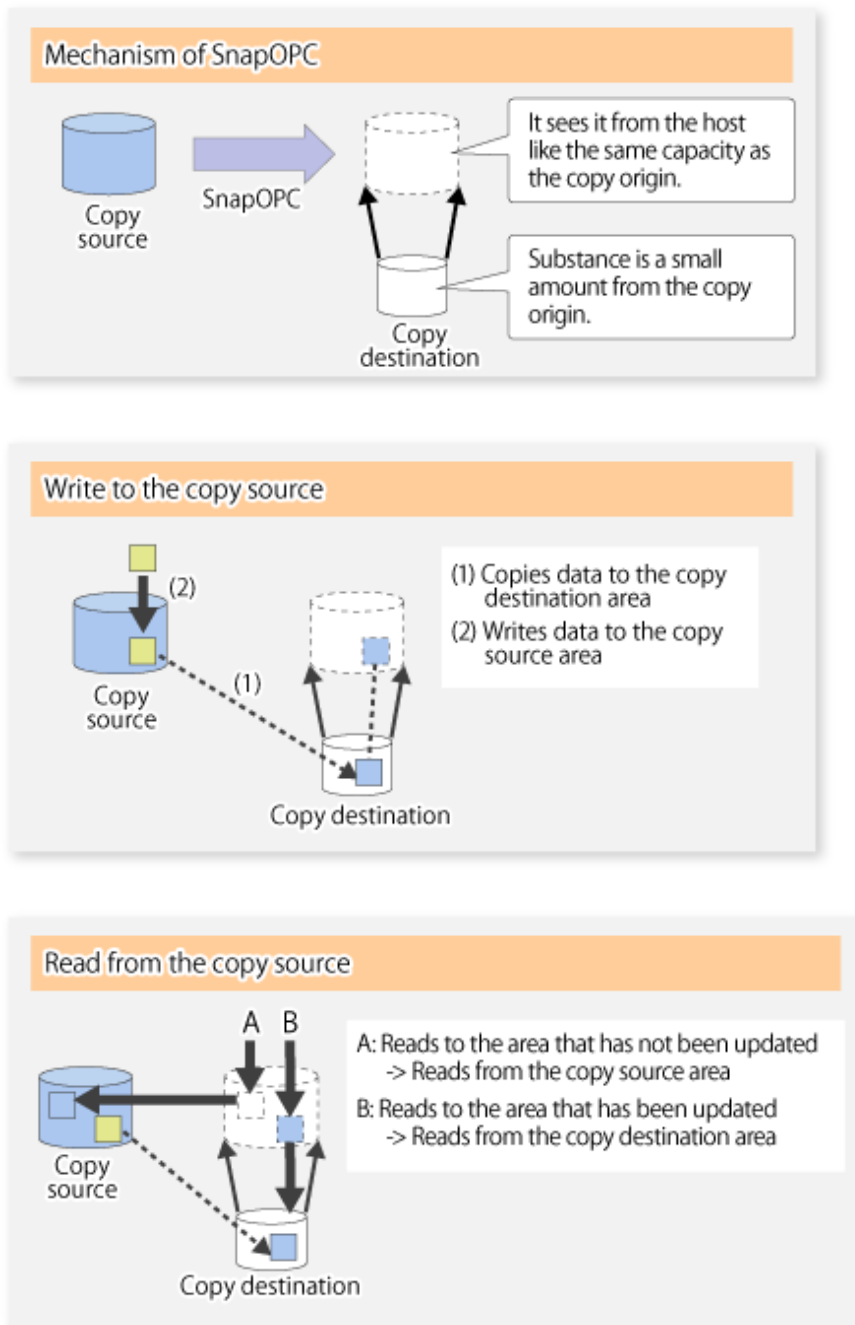
Figure 7.4 SnapOPC Replication



P Point

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

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.

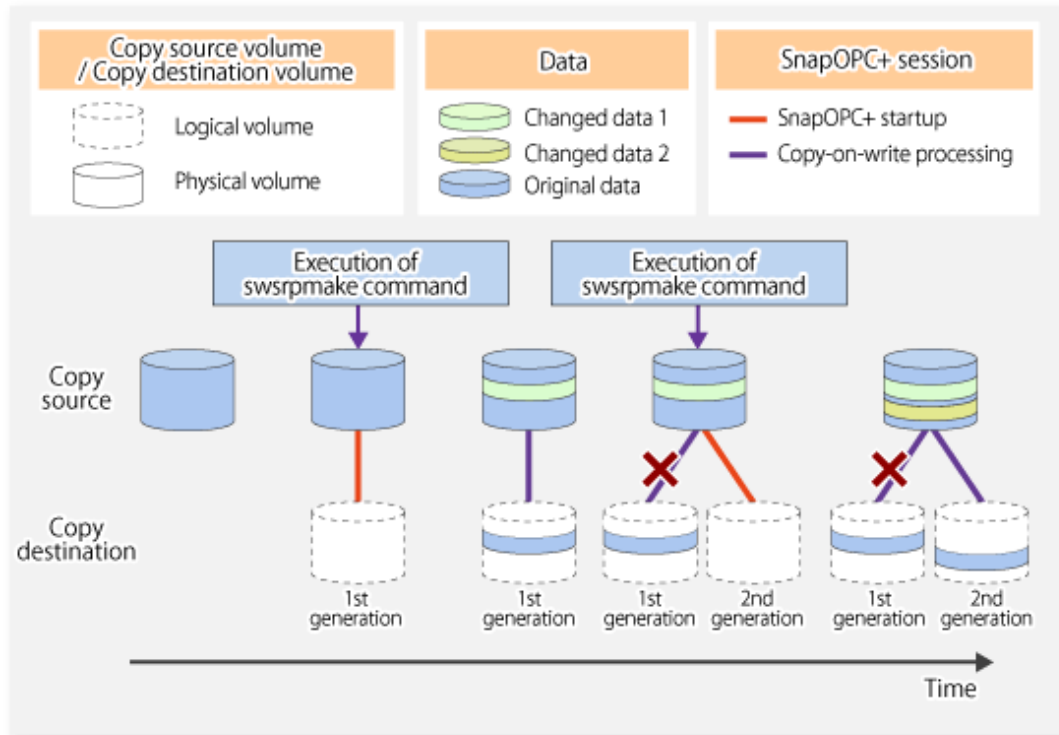
These points suggest that SnapOPC should be used in temporary areas for tape backups, for systems where access performance is not an important consideration.

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.)

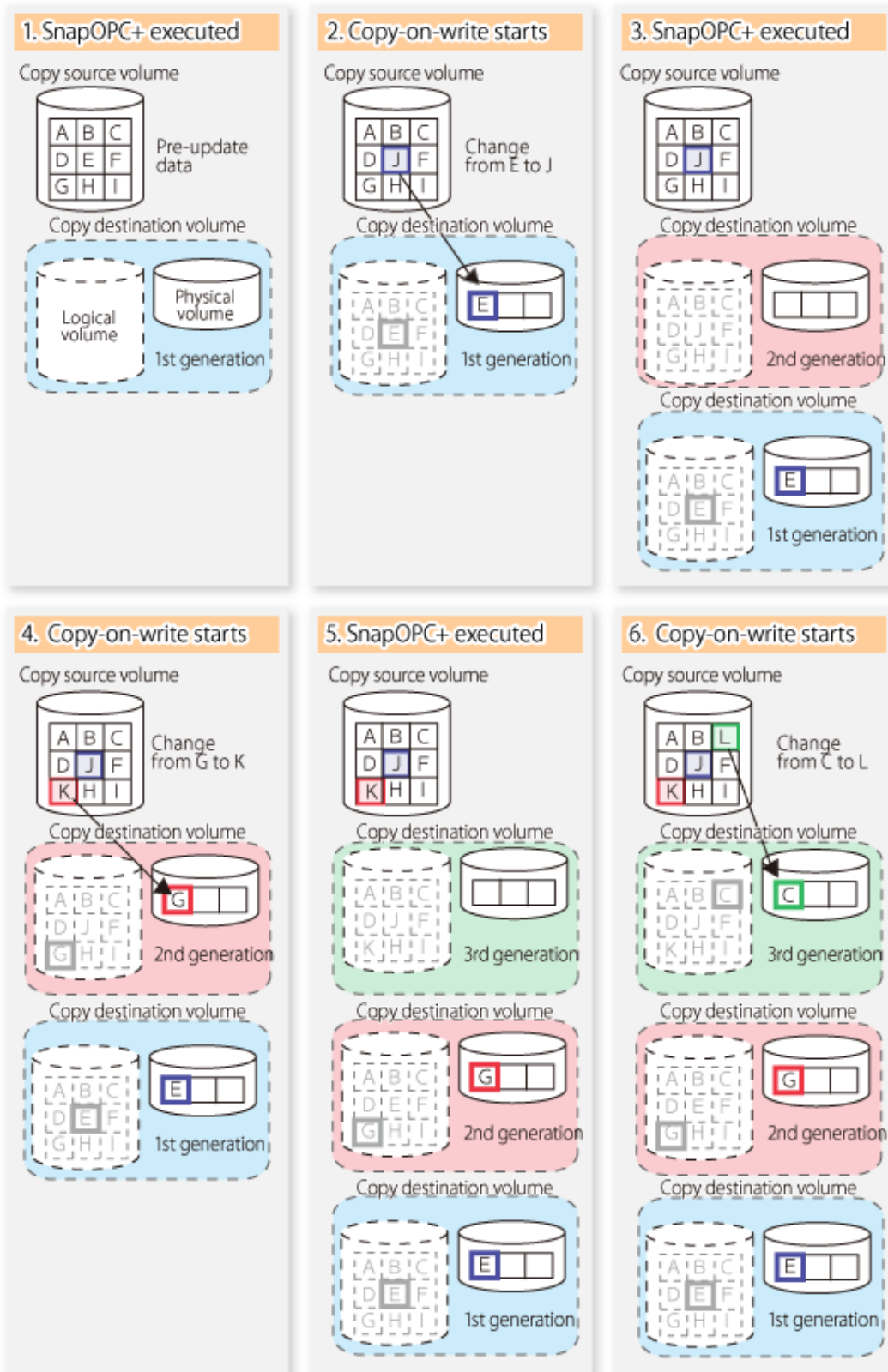
Since SnapOPC+ copy-on-write processing is performed only between the copy source volume and the latest copy destination volume, there is no effect on access performance to the copy source volume even when the number of copy destination volumes increases.

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".

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 is 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, it is recommended 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 (SDV), Thin Provisioning Volume (TPV), Flexible Tier Volume (FTV)	Snap Data Volume (SDV), Thin Provisioning Volume (TPV), Flexible Tier Volume (FTV)
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	<ul style="list-style-type: none"> - Tape backup temporary area - Backup of file servers or similar that have a small amount of updates 	<ul style="list-style-type: none"> - Tape backup temporary area - Backup of file servers or similar that have a small amount of updates

*1: Only available when using ETERNUS Disk storage systems that support the restoration using replication.

Information

For the following storage devices, SDV is the only copy destination volume type that can be used:

- ETERNUS DX S3 series (for earlier than V10L60 firmware)
- ETERNUS DX S2 series

7.1.1.2 SnapOPC/SnapOPC+ Copy Destination Volume

Regarding the SnapOPC/SnapOPC+ copy destination volume, the capacity that can be seen in the host is called "logical capacity" and the capacity that is physically configured is called "physical capacity".

Configure the logical capacity so that it is greater than or equal to the copy source capacity.

Prepare the total physical capacity of the backup data stored capacity and the control information (conversion table) stored capacity for managing the backup data. Estimate the capacity required to store the backup data from the update amount in the copy source volume using the `swstestupdate` command. The size of the control information is 0.1 % of the logical capacity.

If the physical capacity of the copy destination volume is insufficient, you cannot access the copy destination volume. For this reason, you must monitor the use of the copy destination volume so that a capacity shortage of the physical space in the copy destination volume does not occur during operation. If SDV is used as the SnapOPC+ copy destination volume, it is recommended that the Snap Data Pool (SDP) is set.

See

- Refer to "[7.2.3.3 Monitoring Usage of Copy Destination Volume](#)" for information on how to monitor the usage of the copy destination volume.

- If the physical capacity of the copy destination volume is insufficient, refer to "[13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.
- If SDV is used as the copy destination volume and SDP is set, the capacity is automatically added from SDP when the physical capacity of SDV is insufficient. In addition, if the SDP capacity is insufficient, you cannot access the copy destination volume contrary when the physical capacity of SDV is insufficient.
If the SDP capacity is insufficient, refer to "[13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action. Refer to the storage device manuals for details about SDV and SDP.

7.1.1.3 Deletable SnapOPC+ Snap Generations

With SnapOPC+, only specific snap generations can be deleted from multiple snap generations. The following table shows the snap generations that can be deleted (refer to the storage device manual for details).

Table 7.2 Deletable SnapOPC+ Snap Generations

Storage Device Firmware Version	Copy Destination Volume	Oldest Snap Generation	Snap Generations Other than the Oldest
Earlier than V11L10-2000	TPV FTV SDV	Can be deleted	Cannot be deleted
V11L10-2000 or later	TPV FTV	Can be deleted	Can be deleted (*1)
	SDV	Can be deleted	Can be deleted only if each snap generation is created as a copy by Logical Unit (disk) (*1)

*1: Cannot be deleted if the copy ratio of the snap generation to be deleted is different from the copy ratio of the snap generation prior to it.

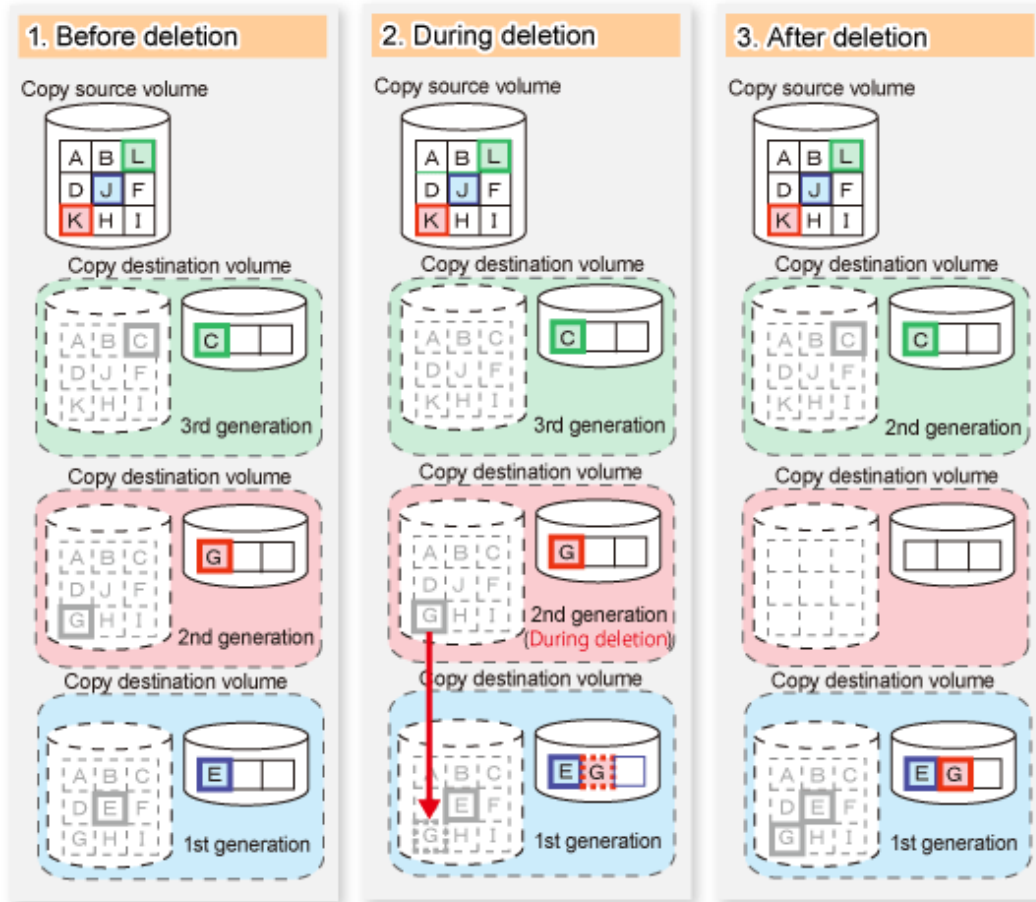
Snap generations are deleted as follows:

- Oldest snap generation

The SnapOPC+ session is stopped synchronously with the snap generation deletion operation using the command. Therefore, the SnapOPC+ session is stopped when the command is completed.

- Snap generations other than the oldest

Figure 7.8 Process Image When Deleting Snap Generations Other than the Oldest



When a snap generation that is not the oldest is deleted, the data stored in the deleted snap generation is migrated to the generation prior to it. For the deleted snap generation, the SnapOPC+ session that has the snap generation in the "deleting" state remains until this migration process is completed.

This process is performed asynchronously with the snap generation deletion operation using the command in the storage device. Therefore, when a snap generation other than the oldest is deleted with a command, the SnapOPC+ session that is being stopped may remain for a while even after the command has responded.

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).

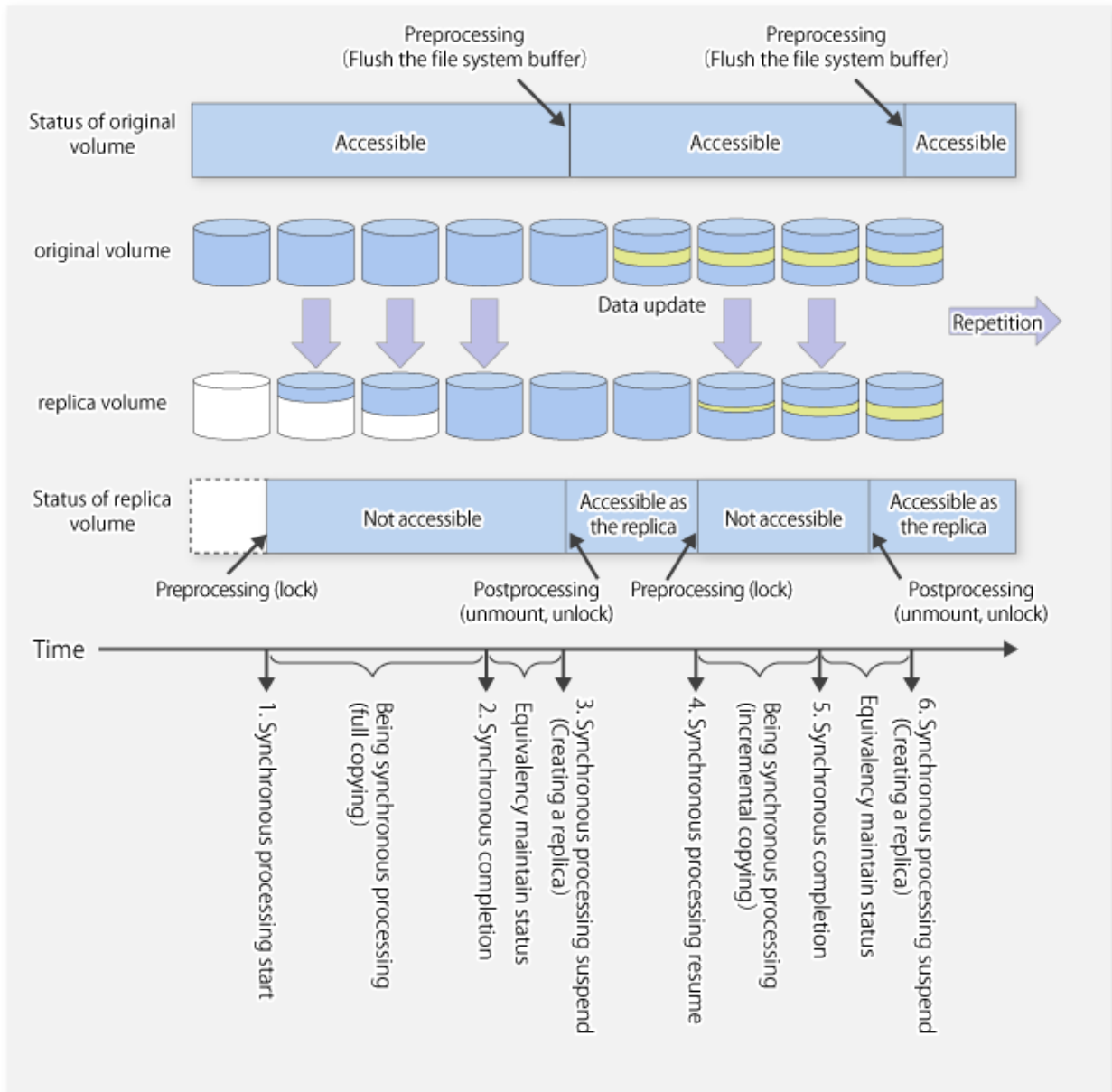
The procedure for synchronized replication incorporates the following steps:

1. Full copying starts when synchronized processing that has been invoked using the [swsrpstartsync](#) command starts copying from the source volume to the replica volume. Refer to step (1) in the figure below.
2. The overall copy by synchronous processing is completed, updates in the source volume are subsequently reflected in the replica volume, so that data equivalence is always maintained (equivalency maintenance state). Refer to the states in steps (2) and (3) in the figure below.
Note that, this state is not a state that guarantees the equivalence of the replication source volume and the replication destination volume.
3. Synchronized processing is temporarily stopped with the [swsrpmake](#) command to create a copy of the source volume.

The [swsrpmake](#) command flushes the file system buffer of the source volume.

This processing determines the scope of original data (for details about this, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)"). After execution of the replication creation command, the replica volume can be accessed (copy established status). Refer to the states in steps (3) and (4) in the figure below.
4. To create another copy, the synchronized processing that has been temporarily stopped is restarted with the [swsrpstartsync](#) command. In the case of this copy, the only data copied to the replica volume is the data on the source volume that has been updated since the previous copy was made. Refer to step (4) in the figure below. When the replica volume has been updated after the previous copy is made, the contents of the update of the replica volume are cleared.
5. When the incremental data has been copied, the status returns to the equivalency maintenance state. Refer to the states in steps (5) and (6) in the figure below.
6. When this status has been set, the copy is re-created with the [swsrpmake](#) 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.
- The `swsrpmake` command cannot be executed unless both the source volume and replica volume are in the equivalency maintenance state.
- If the replication destination volume is being synchronized or in the equivalency maintenance state, it is not accessible.

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 about the device name, refer to "1.2 Managing Device on AdvancedCopy Manager".

7.2 Configuration

This section explains the operation of replication.

Configure replication using the following procedure:

1. [7.2.1 Determining Server That Performs Replication](#)
2. [7.2.2 Determining Replication Target](#)

Refer to "[7.2.3 Notes on 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 Server That Performs Replication

Determine the server that performs replication.

The following servers are used to perform replication:

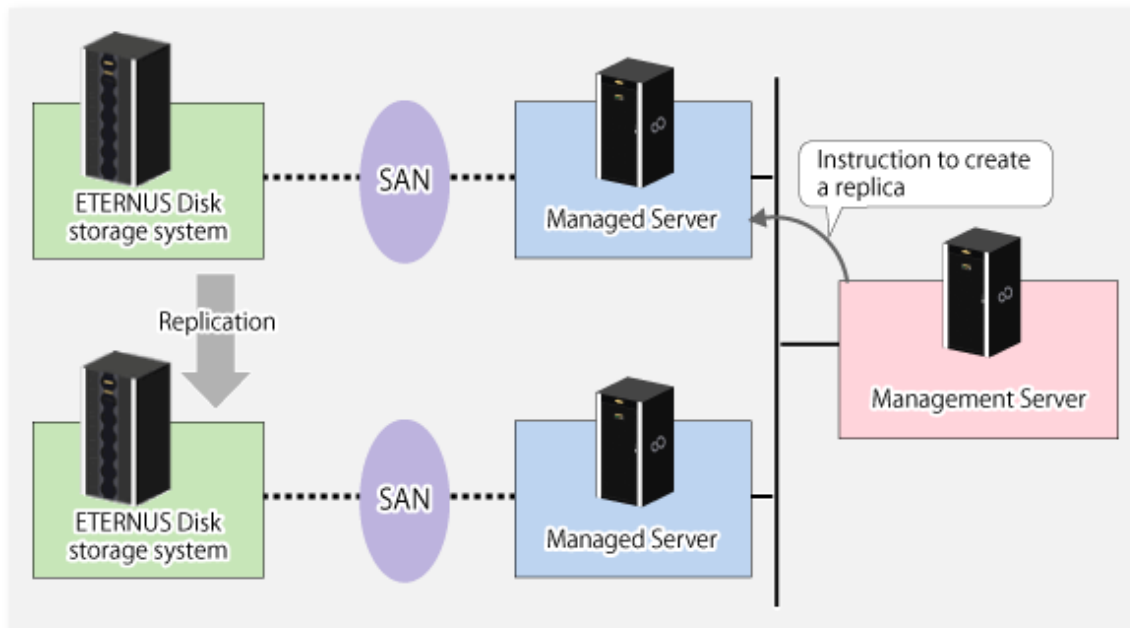
Management Server

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 Servers That Perform Replication



Note

When performing a server-to-server replication, 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 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 server-to-server replication, 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.

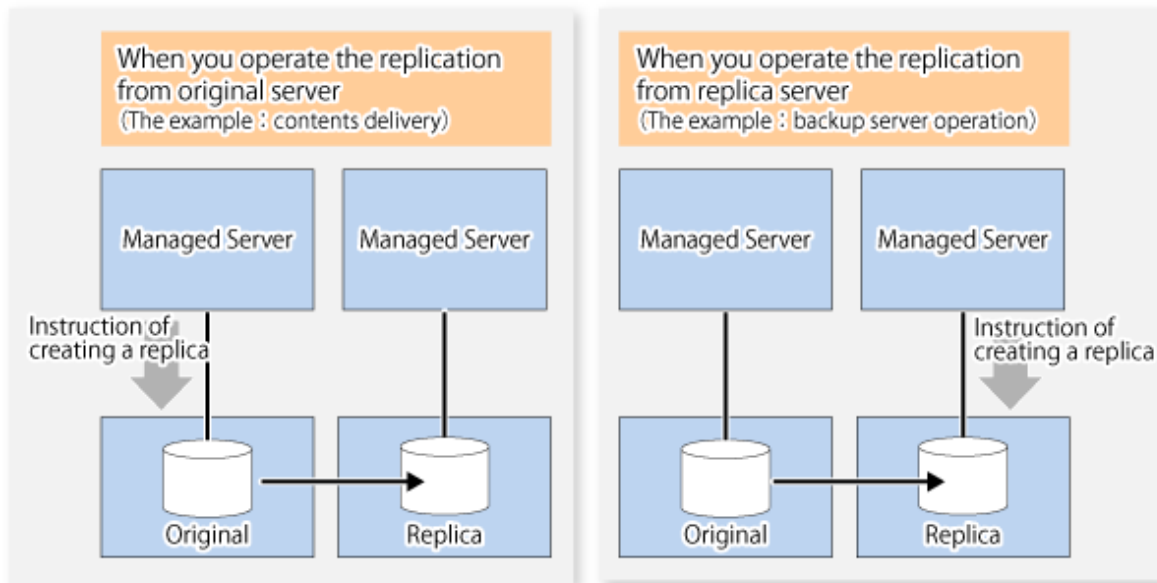
Both Servers

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, refer to "[15.1.1 General Notes](#)", for notes on determining a replication target.
 - [15.1.1.3 Backup and Replication Exclusions](#)
 - [15.1.1.1 Size of Partition](#)
 - [15.1.1.8 Maximum Number of Simultaneously Executing Operations](#)
 - [15.1.1.2 Layout of Partition](#)
 - [15.1.1.9 Dynamic Volume](#)
 - [15.1.1.13 Configuration of 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

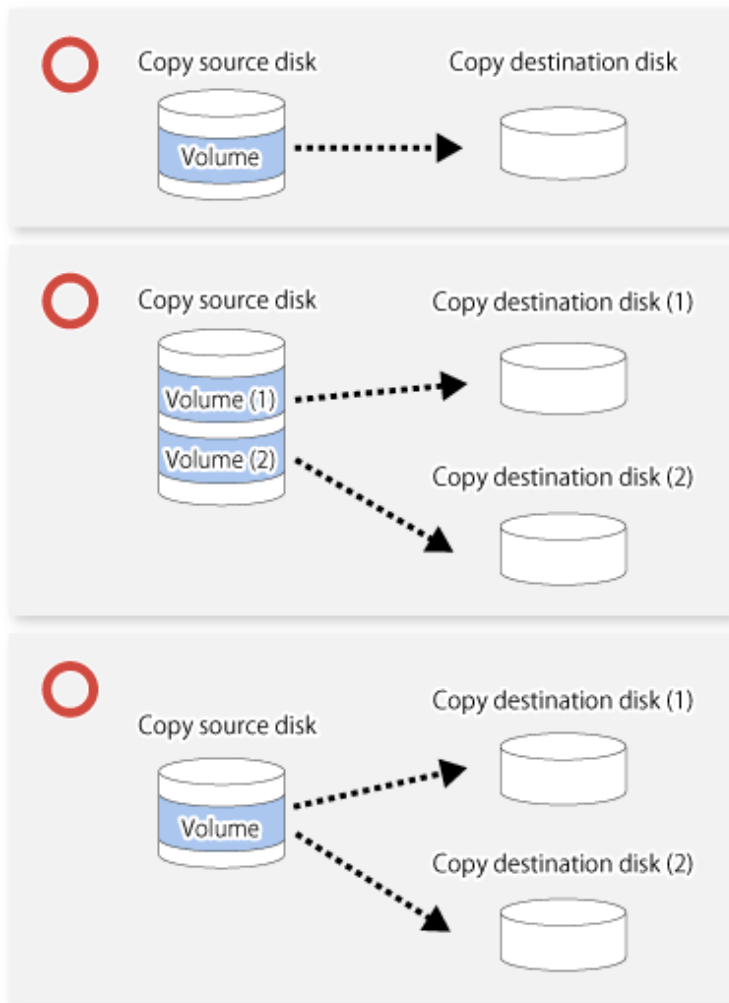
To execute Logical Unit (disk unit) copy, refer to "[15.1.1.17 Notes on Executing Logical Unit \(Disk\) Unit Copy](#)".

7.2.3 Notes on Configuration of SnapOPC/SnapOPC+ Replication

7.2.3.1 Notes on Session Configurations

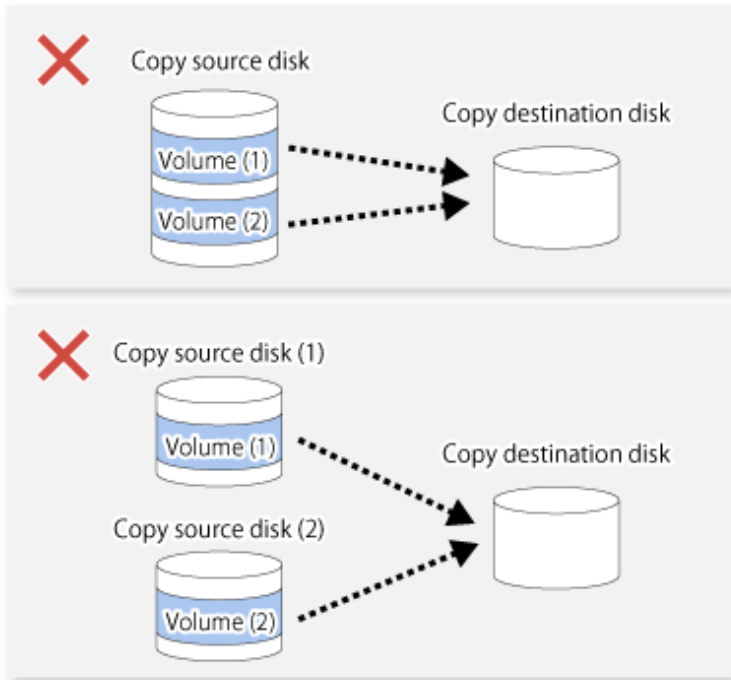
Only a single session can be set for the copy destination disk of SnapOPC/SnapOPC+.

Figure 7.12 When a Single Session Is Set for Copy Destination Disk



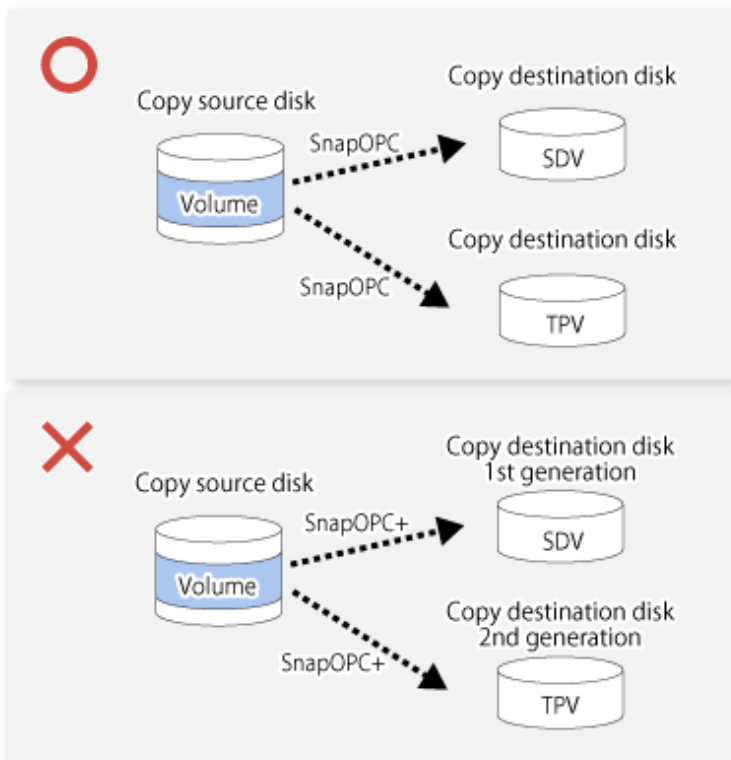
Multiple sessions cannot be set for a single copy destination disk, as shown in the following figure.

Figure 7.13 When Multiple Sessions Are Set for a Single Copy Destination Disk



For a SnapOPC copy source disk, you can set the session mixed with an SDV copy destination disk and a TPV/FTV copy destination disk. However, for a SnapOPC+ copy source disk, that session cannot be set.

Figure 7.14 When Multiple Sessions Mixed with SDV and TPV Are Set for Copy Destination Disk



7.2.3.2 Notes on Copy Destination Disk

If the physical capacity of the copy destination volume is insufficient, you cannot access the copy destination volume. Because of that, after estimating the physical capacity required for the copy destination volume according to the following procedure, create the copy destination disk.

1. [Estimated Required Capacity for Copy Destination Volumes](#)
2. [Creating of Copy Destination Disk](#)

Estimated Required Capacity for Copy Destination Volumes

To estimate the physical capacity required for the copy destination volume, you need to measure the update amount of the copy source volume. The measurement methods vary depending on the operation.

- In the case of one-to-one replication operation (SnapOPC/SnapOPC+)
Start a session in relation to the pair, and measure the update amount that is generated in relation to the replication source volume up until the session is stopped or a new session is started.
- In the case of one-to-many replication operation (SnapOPC)
Start a session in relation to all of the pairs, measure the update amount that is generated in relation to the replication source volume up until the session is stopped or a new session is started, and total all of the update amounts.
- In the case of one-to-many replication operation (SnapOPC+)
Start a session in relation to all of the pairs, measure the update amount that is generated in relation to the replication source volume up until SnapOPC+ is performed to the next generation, and total all of the update amounts.

For the update amount of the copy source volume, measure the following procedure using the [swstestupdate](#) command:

1. Start measuring the update amount by configuring a monitor 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 are 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 monitor session.

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

The formula for estimating the capacity is as follows.

```
(Updated volume of replication source volume) * (safety coefficient) < (Physical capacity of the copy destination volume)
```

Point

.....

If an advance estimation is difficult, it is recommended that the physical capacity of the copy destination volume is 30 to 50 % of the total capacity of the copy source. As this is a recommended value, you must adjust according to the operational status.

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Creating of Copy Destination Disk

To create a copy destination disk, use Storage Cruiser or ETERNUS Web GUI.

Point

-
- Make logical space on a copy destination volume equal to that on a copy source volume.
 - Consider a disk expansion from the required physical capacity in the copy destination volume.
 - If TPV is used as the copy destination volume

Use Storage Cruiser or ETERNUS Web GUI to check the status of the Thin Provisioning Pool and expand the capacity of the Thin Provisioning Pool.

For the operation procedure when using Storage Cruiser, refer to "Display Thin Provisioning Pool" and "Expand Capacity of/Format/Change Threshold Value of/Delete Thin Provisioning Pool" in the *Web Console Guide*.
 - If FTV is used as the copy destination volume

Use Storage Cruiser or ETERNUS Web GUI to check the status of the Tier pool and expand the sub-pool capacity of the Tier pool.

For the operation procedure when using Storage Cruiser, refer to "Display Tier Pool" and "Expand Capacity of Sub-Pool in Tier Pool" in the *Web Console Guide*.
 - If SDV is used as the copy destination volume

Use the `swstsdv` command or ETERNUS Web GUI to check the status of the SDP and expand the SDP capacity. Creating an exclusive volume named Snap Data Pool Volume (SDPV) enables the SDP and the created SDPV is automatically incorporated in the SDP. Creating an SDPV of the physical capacity that is assigned to a copy destination volume expands the SDP capacity.

The operation procedure when using the `swstsdv` command is as follows:

 1. Execute the command with the "poolstat" subcommand and check the status of the SDP.
 2. Create the SDPV with ETERNUS Web GUI.
 - If you use an SDV as the copy destination volume, initialize the SDV. To avoid wasting the physical space of the SDV, limit the creation of partitions and assignment of drive letters, and create the file system with quick formatting after initializing the SDV.
-

See

.....

Refer to "Create Volume" in the *Web Console Guide* for information on how to create TPV/SDV/SDPV using Storage Cruiser. Refer to "Create FTV" in the *Web Console Guide* for information on how to create FTV.

.....

7.2.3.3 Monitoring Usage of Copy Destination Volume

If the physical capacity of the copy destination volume is insufficient, you cannot access the copy destination volume. This status makes it impossible to read data from the copy destination volume and write data into the copy destination volume. As for SnapOPC+, read/write is not allowed not only on the copy destination volume, but also on earlier generation's copy destination volumes.

For this reason, you must monitor so that a capacity shortage of the physical space in the copy destination volume does not occur during operation.

Monitoring When Using TPV/FTV as Copy Destination Volume

The physical space on the TPV/FTV is assigned per block. This may require more physical space than estimated. To prevent a capacity shortage of the physical space in the copy destination volume, use Storage Cruiser to change the settings of capacity threshold as required and monitor the usage.

Refer to "Thin Provisioning Management" in the *Storage Cruiser Operation Guide* for details about TPV monitoring. Refer to "Automated Storage Tiering Management" in the *Storage Cruiser Operation Guide* for details about FTV monitoring.

Point

When you use the TPV/FTV as a copy destination volume, if the free space of the pool to which the TPV/FTV of the copy destination is created (Thin Provisioning Pool for TPV, Tier pool for FTV) is insufficient, you cannot access the copy destination volume. For this reason, when you use TPV/FTV as a copy destination volume, monitor so that a capacity shortage of the free space in the TPV/FTV and the pool to which the TPV/FTV of the copy destination is created does not occur.

Monitoring When Using SDV as Copy Destination Volume

- If only the SDV is used (the SDP is not configured)
Execute the [swstsdv](#) command with the "stat" subcommand to periodically monitor whether there is a shortage in the SDV capacity.
- If the SDP is used (the SDP is configured)
Execute the [swstsdv](#) command with the "poolstat" subcommand to periodically monitor whether there is a shortage in the SDP capacity.

In the SDP area, if there is an area that exceeds 50 % of usage ratio regardless of the encryption, consider increasing SDPVs. In addition, increase the monitoring frequency of the SDP area.

In the SDP area, if there is an area that exceeds 70 % of usage ratio regardless of the encryption, increase SDPVs immediately.

Point

If the physical capacity of the copy destination volume is insufficient, refer to "[13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.

7.2.3.4 Notes When Using SDV as Copy Destination Volume

Creating Access Volume

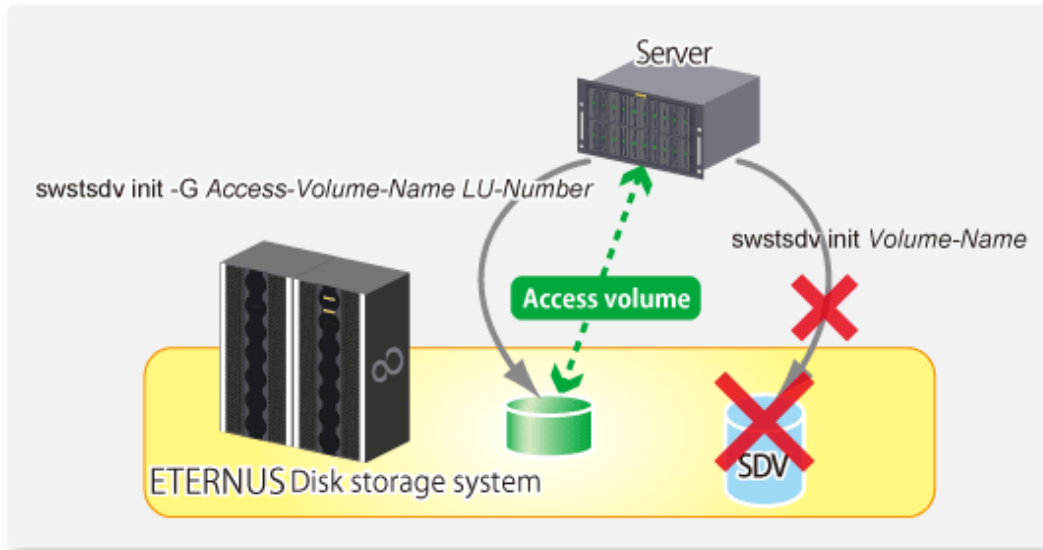
If the capacity of the SDV or the SDP is insufficient, you cannot access the copy destination volume. In the following cases, you cannot access the copy destination volume either:

- Access to the SDV after the SDV initialization
- Access to the SDV after the disk management information initialization

For this reason, it is recommended that you reserve a volume (Access volume) that is separate from the SDV. Create the volume that is used as the Access volume in the ETERNUS Disk storage system that the SDV has been created. Since the Access volume 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 by creating the Access volume:

- [Snap Data Volume Initialization](#)
- [Snap Data Volume Status Display](#)
- [Snap Data Pool Status Display](#)



7.2.3.5 Notes on Cluster Operations

Do not use the copy destination volume of SnapOPC/SnapOPC+ as the shared disks in a clustered system. This is to avoid the clustered system failing over when the physical capacity is insufficient.

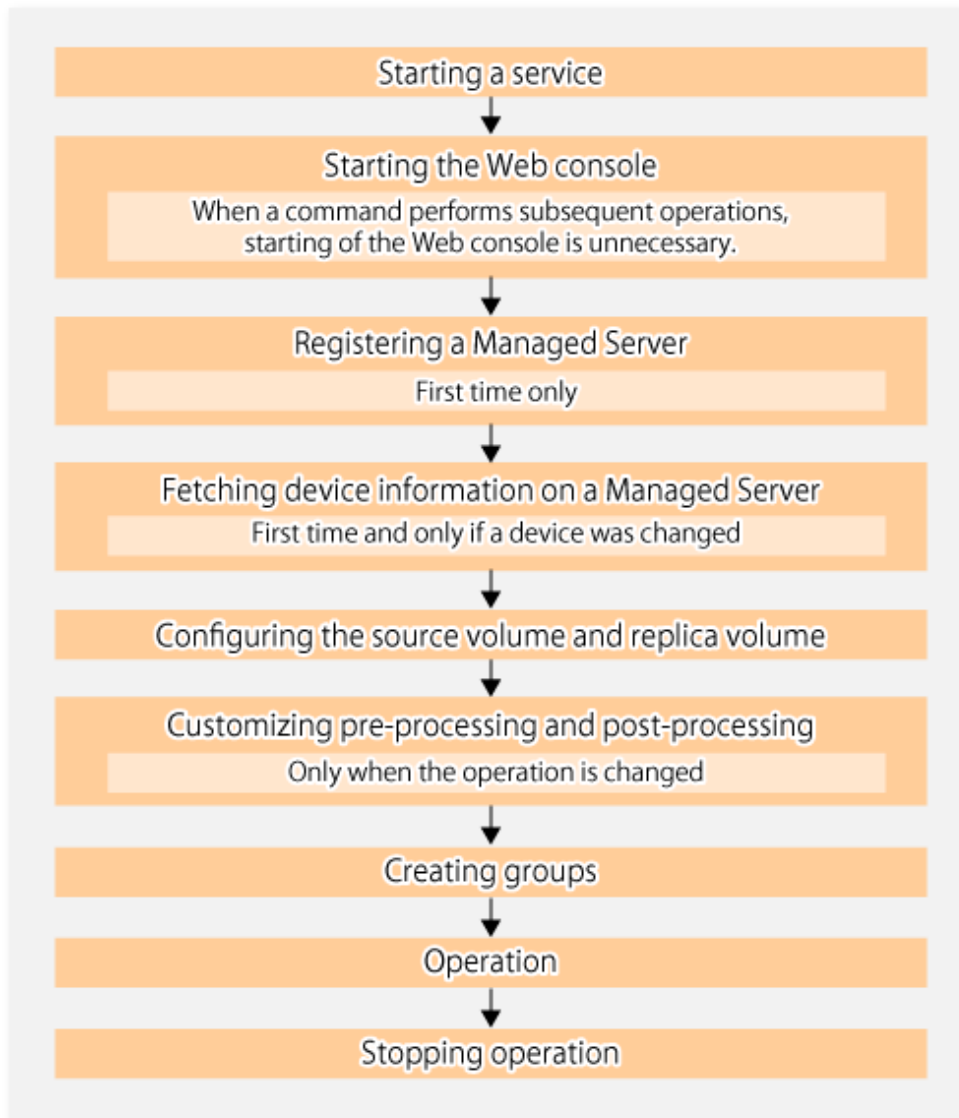
In cluster operations, use the following methods to prevent the copy destination volume of SnapOPC/SnapOPC+ from being used as a shared disk:

- 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 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 Web Console

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

7.4.3 Registering Managed Server

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

Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the [stgxfwcmdispsrv](#) command.

7.4.4 Fetching Device Information on Managed Server

This process can be executed using either Web Console or the [stgxfwcmsetdev](#) command. Refer to "Add/Reload Device" in the *Web Console Guide* for information on the operating procedures of Web Console.

Note

- Device information on the Managed Server must briefly be stored in the repository.
- 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, take this into consideration when synchronous processes are cancelled.

7.4.5 Configuring Source Volume and Replica Volume

Execute the [swsrpsetvol](#) command to set the source volume and replica volume that are used in the replication. The information on the registered source volume and replica volume can be checked with the [swsrpvoinfo](#) 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.

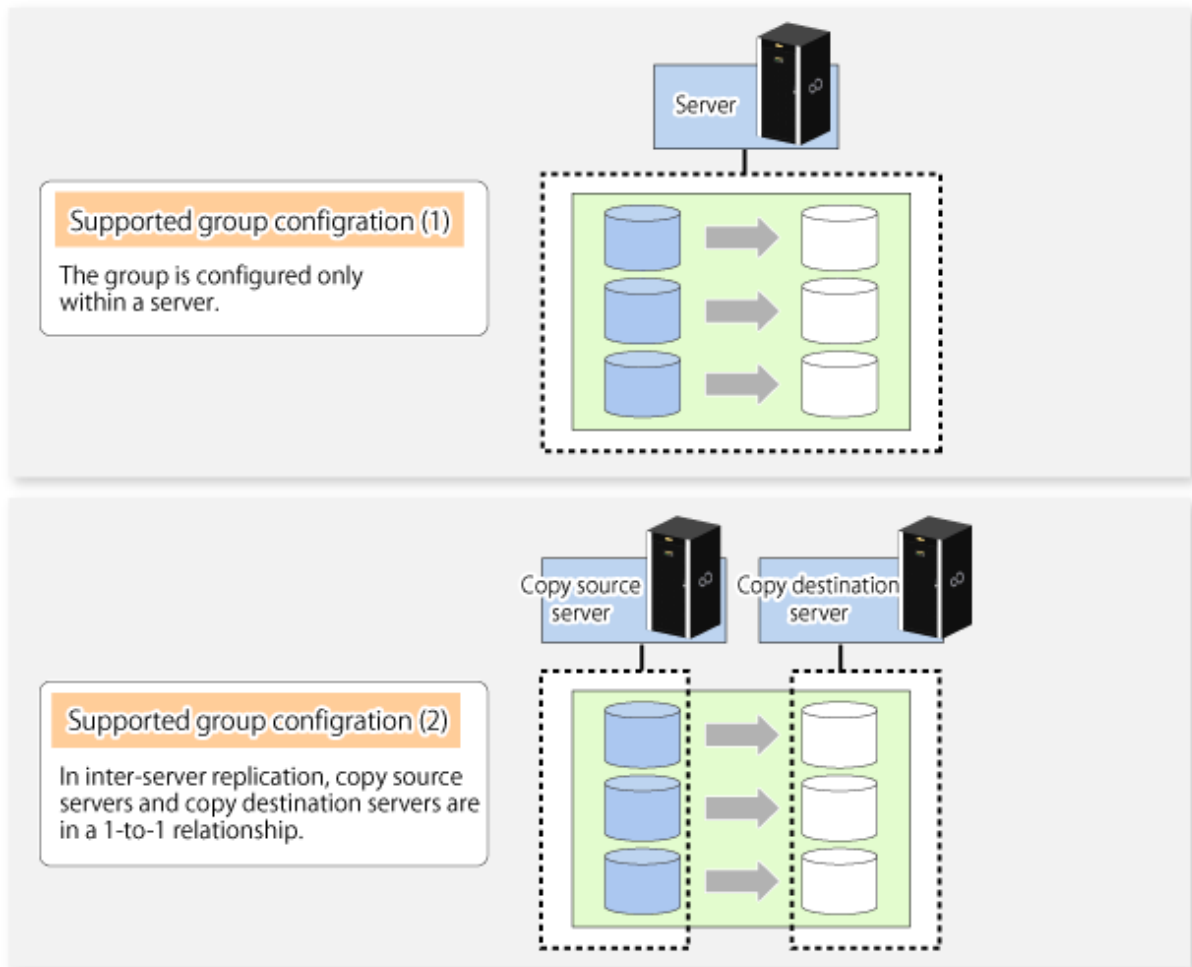
Therefore, you should check the script after any upgrade to ensure it is compatible with newer versions.

7.4.7 Creating Groups

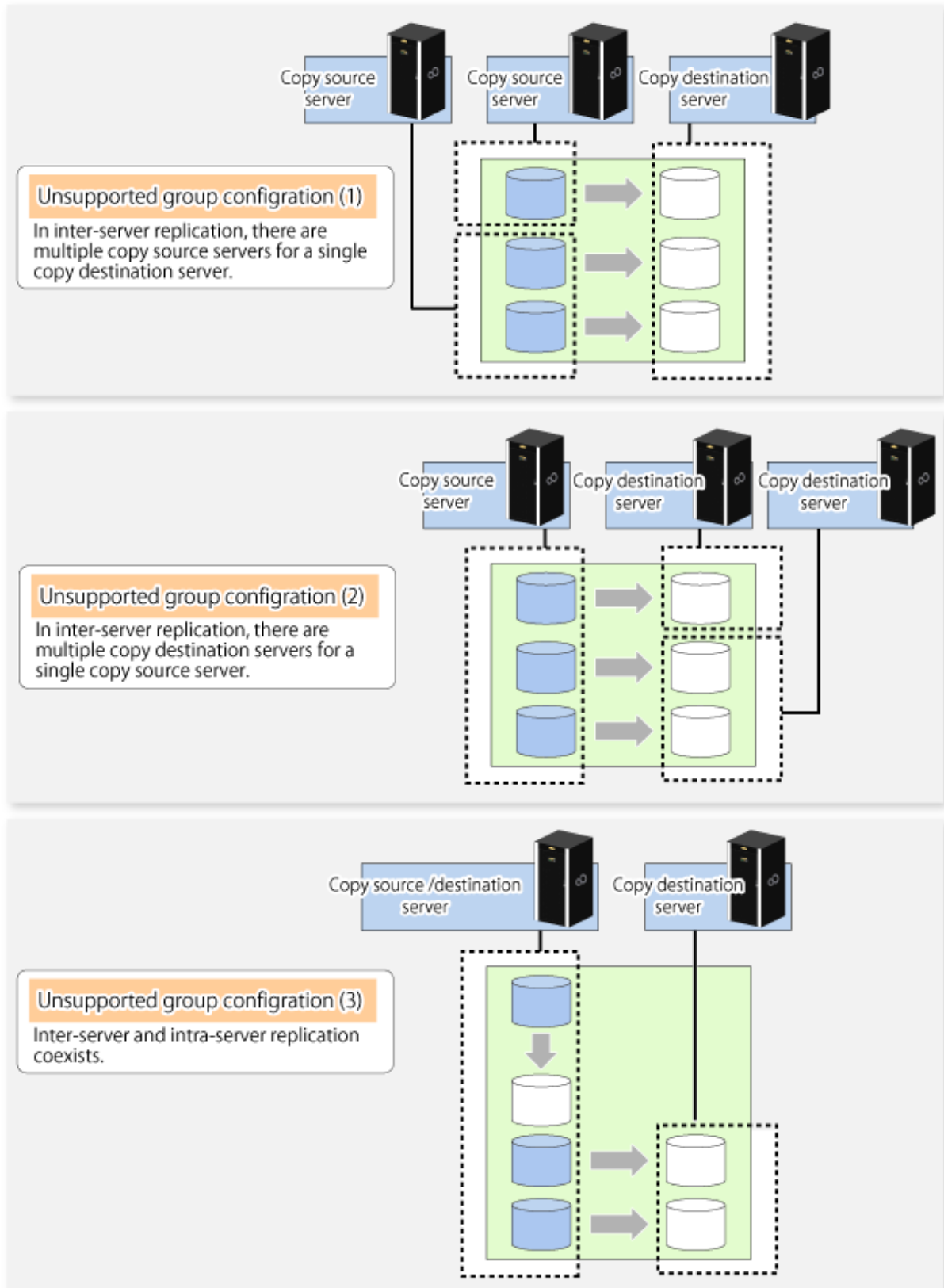
7.4.7.1 Conditions for Replication Volumes That Make Up Group

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

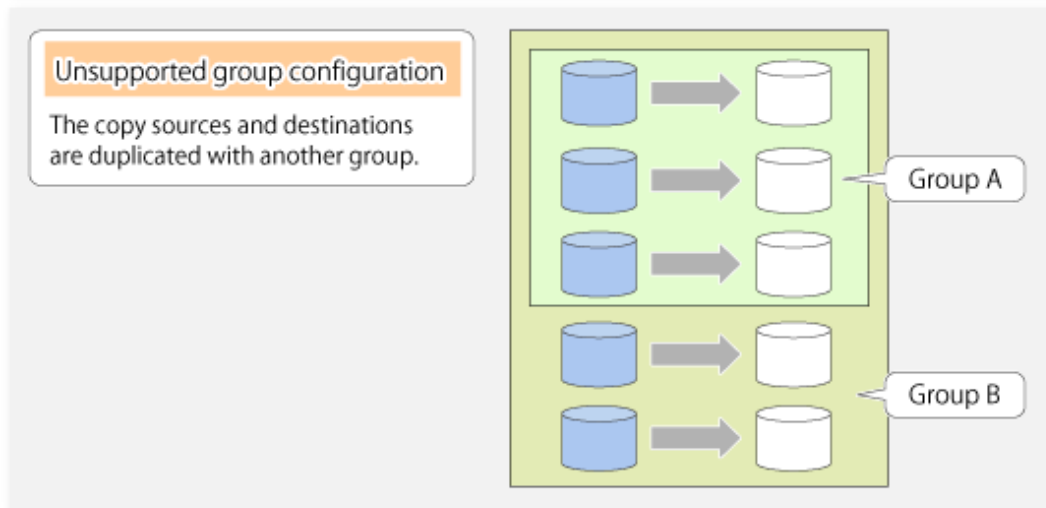
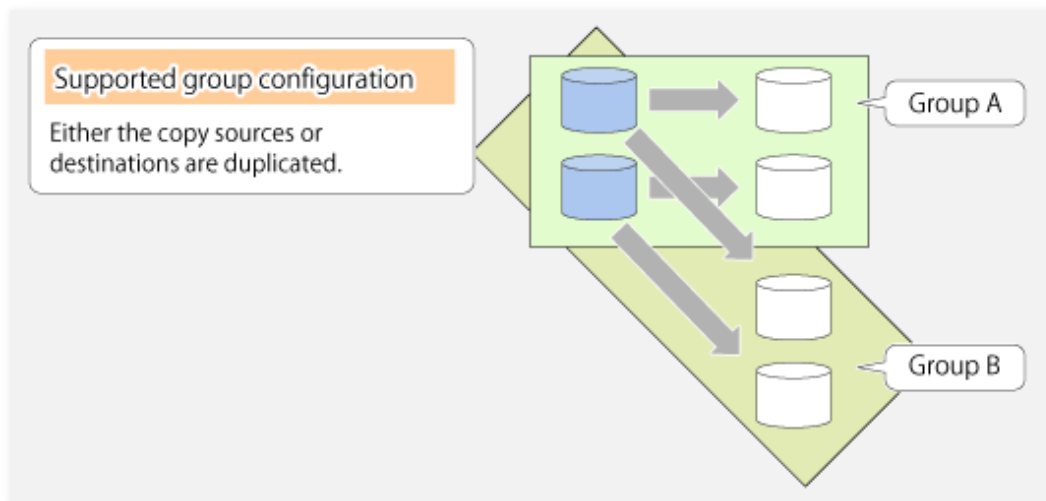
- The copy source servers and destination servers must have matching attributes such as size and device configuration.



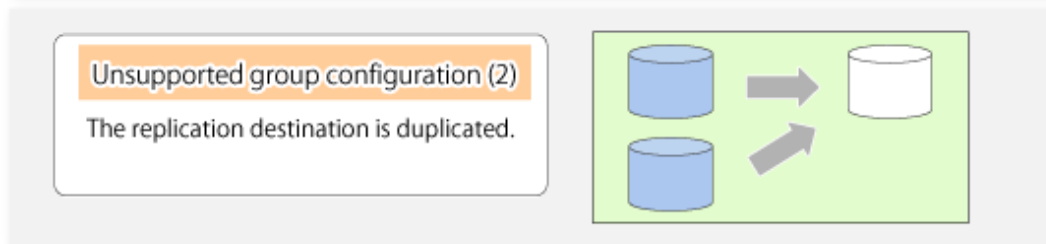
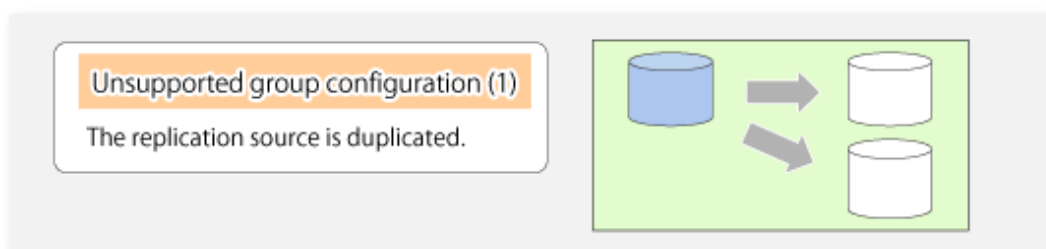
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the **Op-Server** and **Copy** columns displayed by executing the `swsrpvolinfo` command.



- 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.
- If the Storage Cluster Continuous Copy function is used, all of the replication volume information in the group must belong to the same TFO group.

7.4.7.2 How to Create Groups

Groups are created using the [swsrpsetvol](#) command.
Information for created groups can be displayed using the [swsrpvoinfo](#) 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\swsrpvoinfo -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 the [swsrpmake](#) command to perform snapshot replication.

Refer to "[7.1.1 Snapshot Replication Processing](#)" for an explanation of snapshot replication.

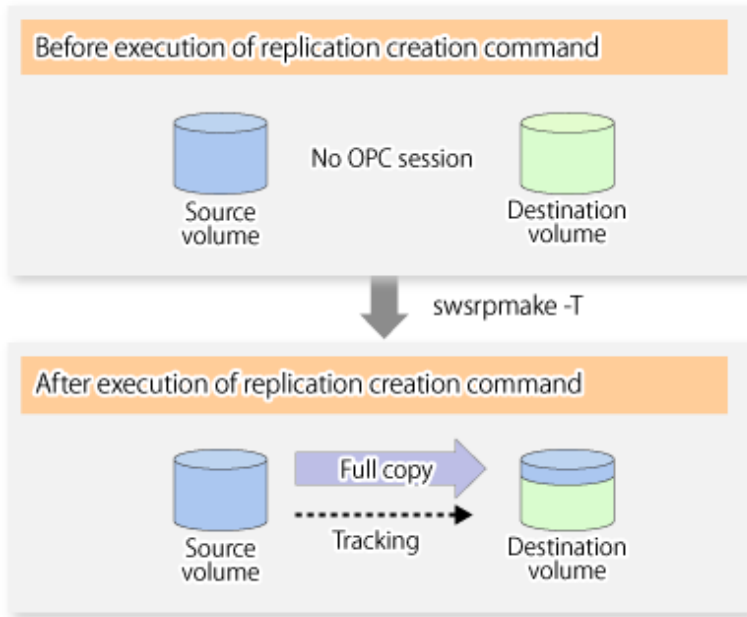
The operation status of a physical copy can be checked by executing the [swsrpstat](#) command.

QuickOPC Type Replication

Execute QuickOPC replication by specifying the -T option in the [swsrpmake](#) command.

If no OPC session exists when the [swsrpmake](#) 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 (1st Time)

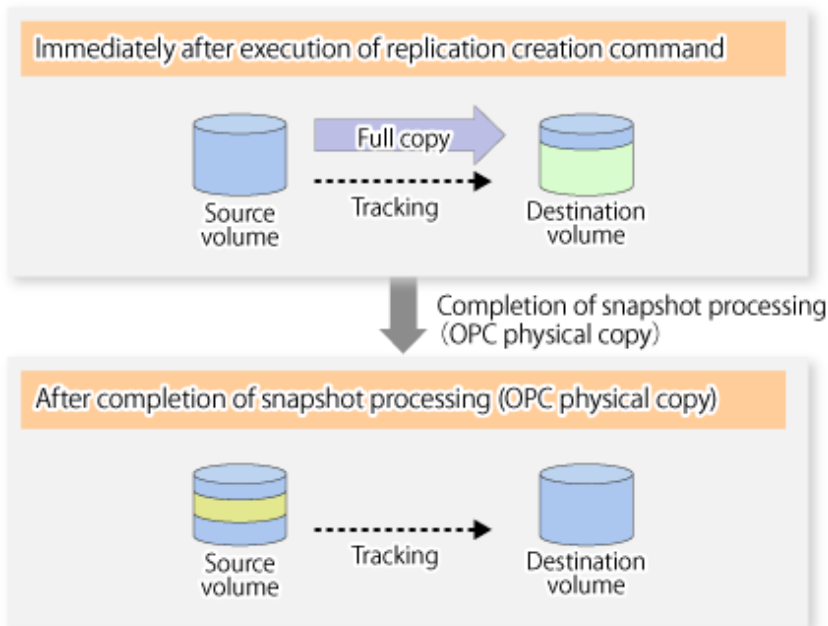


To check the execution status of physical copying, use the [swsrpstat](#) command in the same way as for an ordinary snapshot replication.

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

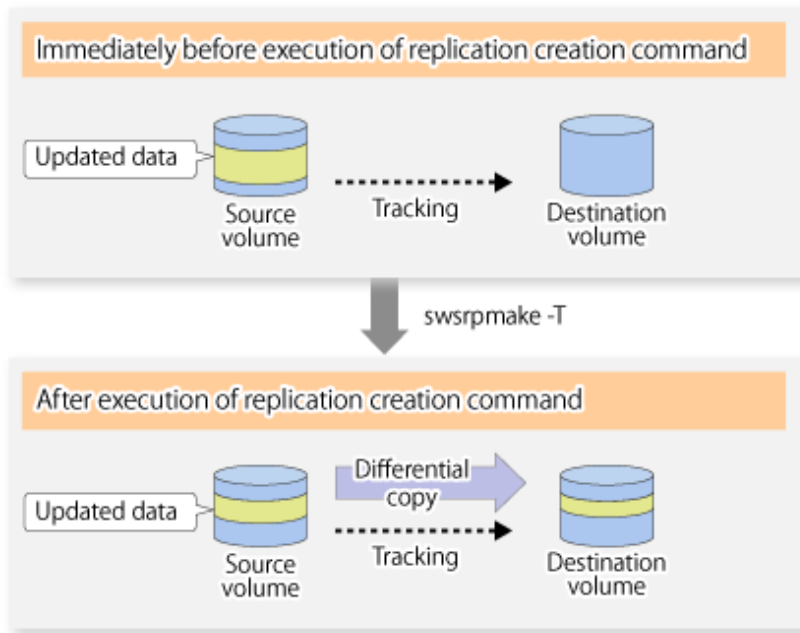
To check the tracking status, execute the [swsrpstat](#) command with the -L option.

Figure 7.17 When Snapshot Processing Is Completed



Entering the [swsrpmake](#) 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 (2nd Time)



When you want to perform a restoration while tracking processing is being executed, you need to perform a restoration by OPC (to achieve this, you need to execute the [swsrpmake](#) 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 the [swsrpstat](#) command with the -E option specified.

SnapOPC Type Replication

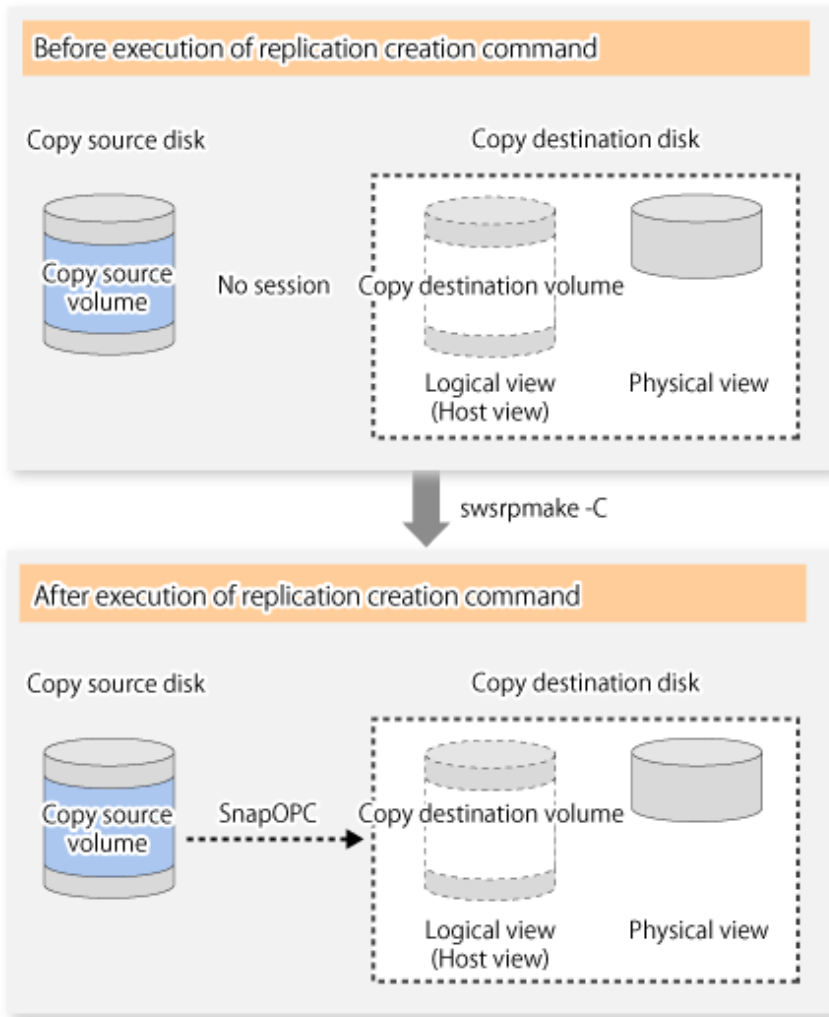
Execute SnapOPC type replications with the -C option specified in the [swsrpmake](#) command.

When the [swsrpmake](#) command is executed, a SnapOPC session is set up between the copy source volume and the copy destination volume.

[Execution Example]

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

Figure 7.19 When 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 Copy Source Volume Is Updated

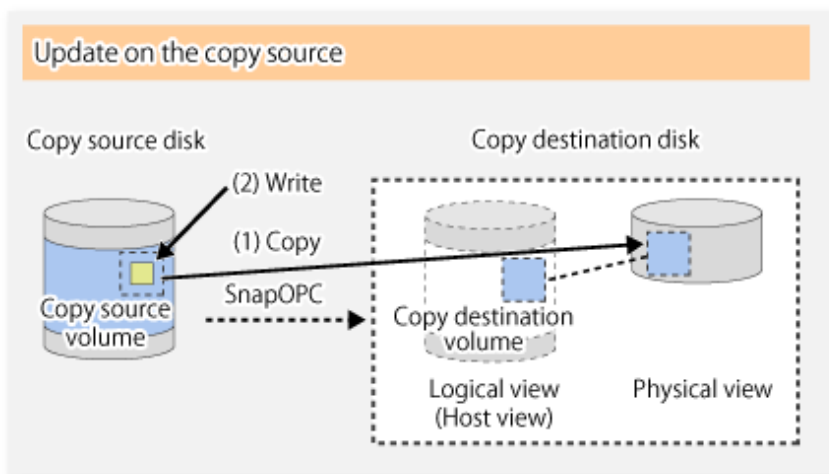
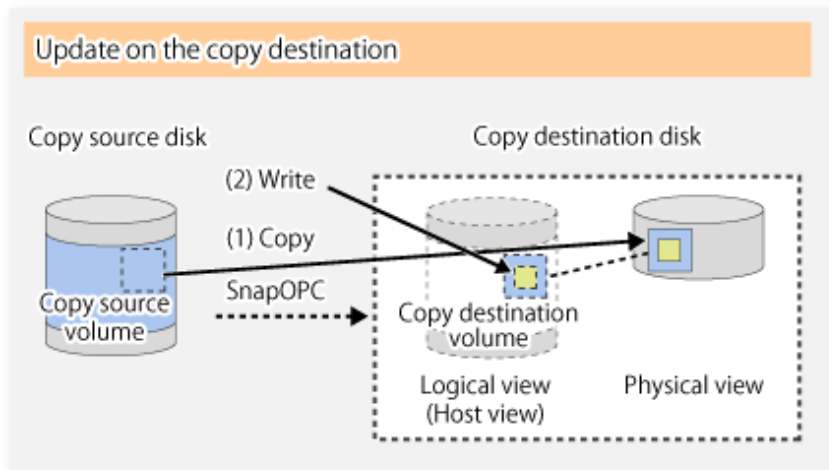


Figure 7.21 When Copy Destination Volume Is Updated



Note: The units for host I/O and storage device copies are different, and therefore data copies also occur when the copy destination is updated.

The status of SnapOPC sessions can be checked using the `swsrpstat` command.

The following example shows the execution of the `swsrpstat` 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.

[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 ----  off  0%    ----  ----  ----  ----
----
C:\>
```

If the `swsrpmake` command is executed again during SnapOPC processing, the SnapOPC session that has already been set up is cancelled, and a new session is set up.

Note

If the physical capacity of the copy destination volume is insufficient, the SnapOPC execution status changes to error suspend status ("failed"), and replication volume cannot be used.

The SnapOPC execution status can be checked in the `swsrpstat` 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  ----  ----  ----  ----  ----
C:\>
```

When the SnapOPC execution status is error suspend status ("failed"), refer to "[13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.

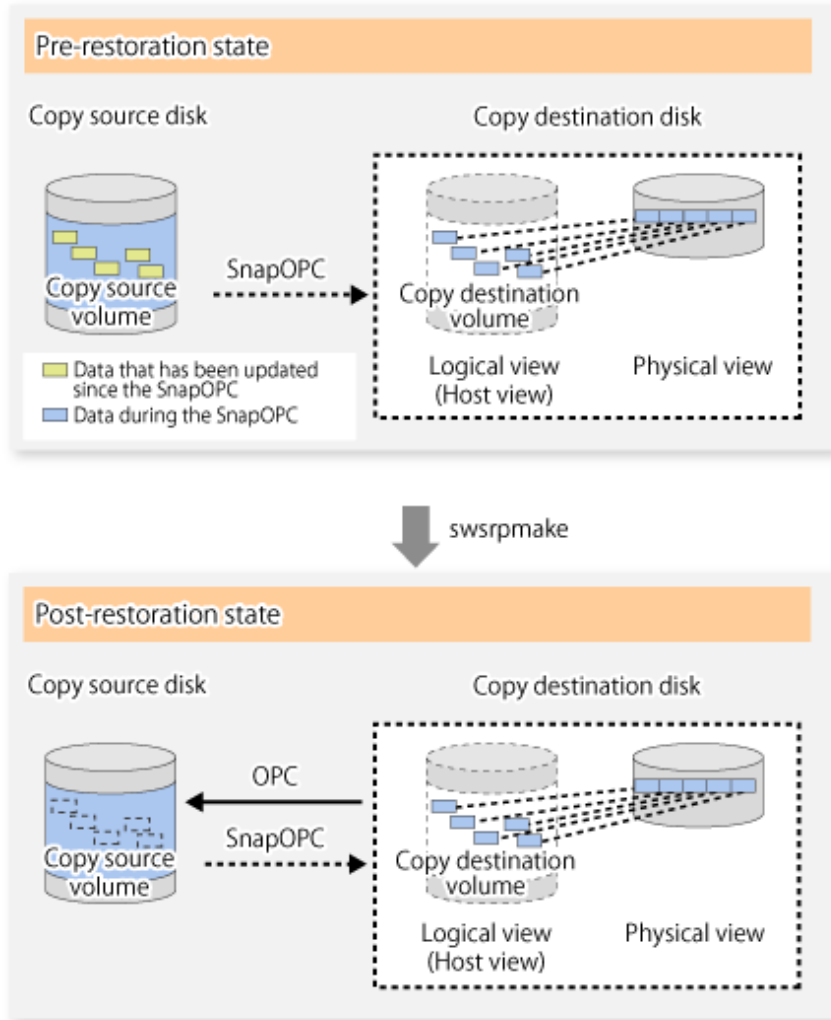
Perform restorations from the copy destination volume by running an OPC using the `swsrpmake` command.

[Execution Example]

```
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 the `swsrpstat` command.

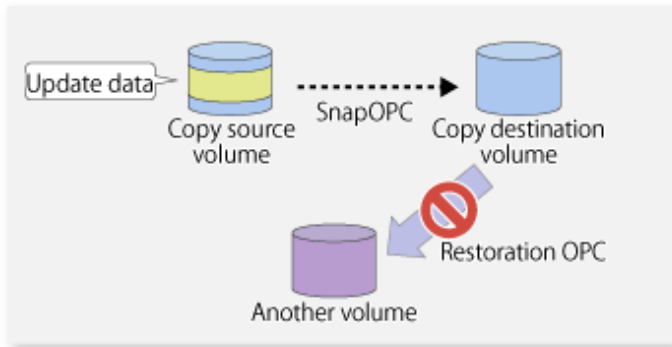
[Execution Example]

```
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

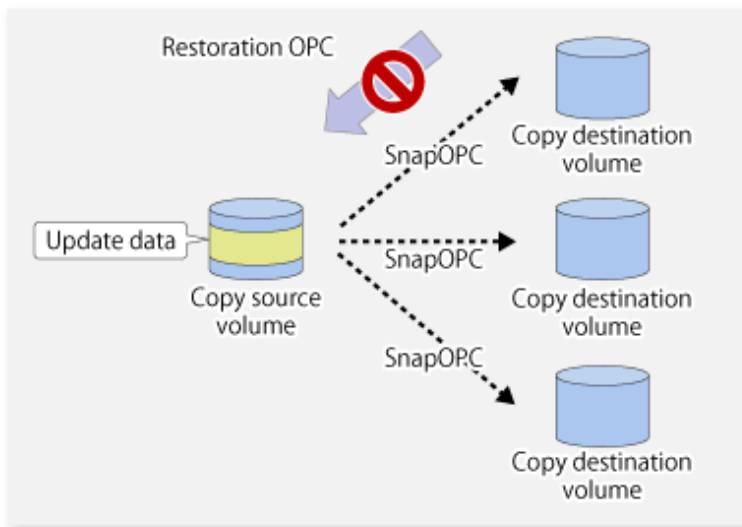
If a SnapOPC is being performed between the source volume and the destination volume, restorations to volumes other than the source volume cannot be executed. To restore to a volume other than the source volume, operating system copy functions (such as the `cp` command or the `copy` command) must be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

Figure 7.23 When Restoring to Volume Other Than Copy Source Volume



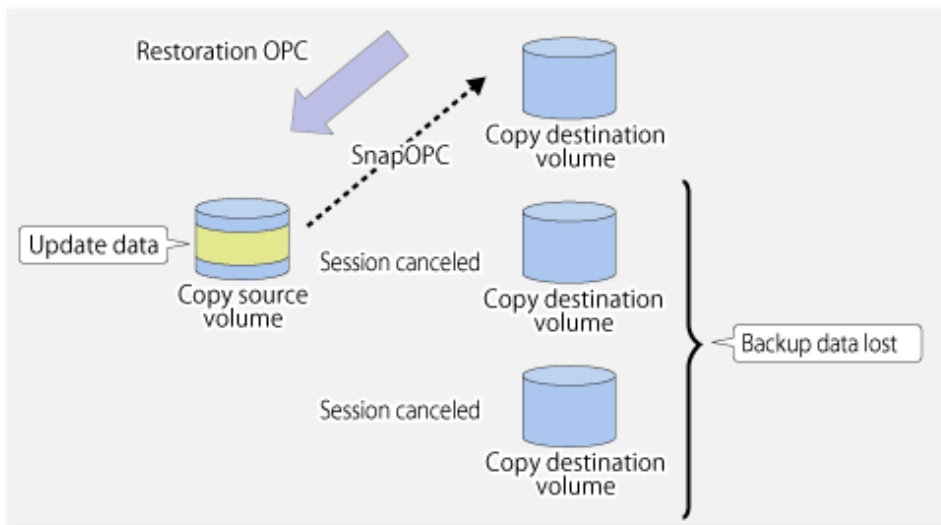
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

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 is lost.

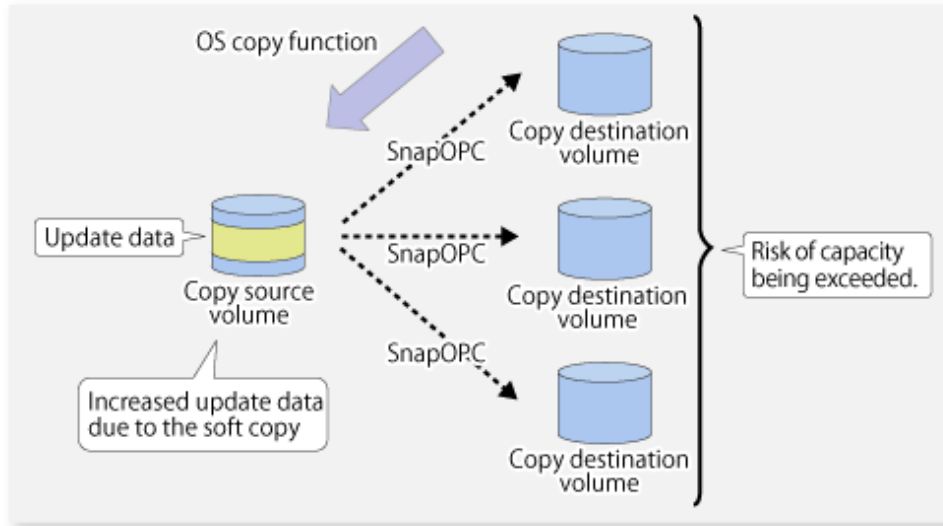
Figure 7.25 When SnapOPC Session Cancelled to Perform Restoration



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 increases, and there is a risk that the capacity of the SnapOPC volume is insufficient.

Figure 7.26 When Performing Restoration without Cancelling SnapOPC Session



SnapOPC+ Type Replication

Execute the `swsrpmake` 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 execution example of the `swsrpmake` command with 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 execution example of the `swsrpmake` command with the `-P` option for the newly specified copy destination volume is shown below.

[Execution Example]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpmake -P g1d1p1@SV1 g1d3p1@SV1
FROM=g1d1p1@SV1,TO=g1d3p1@SV1 swsrpmake completed
C:\>
```

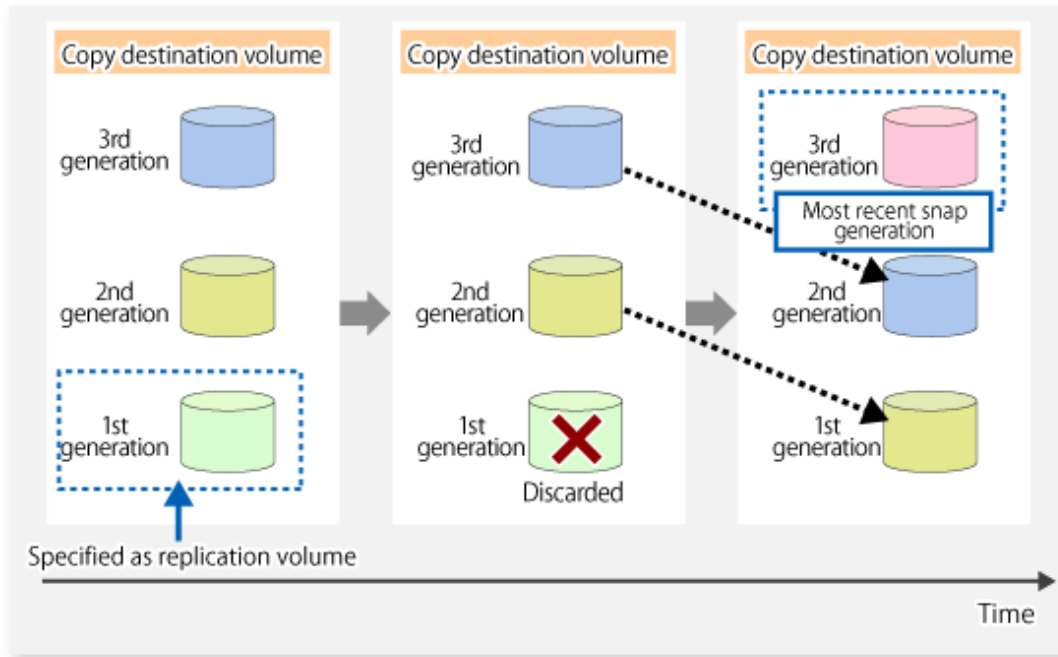
This time, the (logically copied) copy destination volume is saved as snap generation number 2. Similarly, each time there is a new copy destination volume, a snap generation number is assigned.

Note

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when the `swsrpmake` 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 Oldest Snap Generation Number Is Specified as Replication Volume



The operation status of SnapOPC+ replication can be checked by executing the `swsrpstat` 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

If the physical capacity of the copy destination volume is insufficient, the SnapOPC+ execution status changes to error suspend status ("failed"), and the execution status of SnapOPC+ that was executed before it also changes to error suspend status ("failed"). Replication volume of error suspend status ("failed") cannot be used.

The SnapOPC+ execution status can be checked in the `swsrpstat` 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 "[13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.

To restore from the copy destination volume, execute the `swsrpmake` command to start OPC.

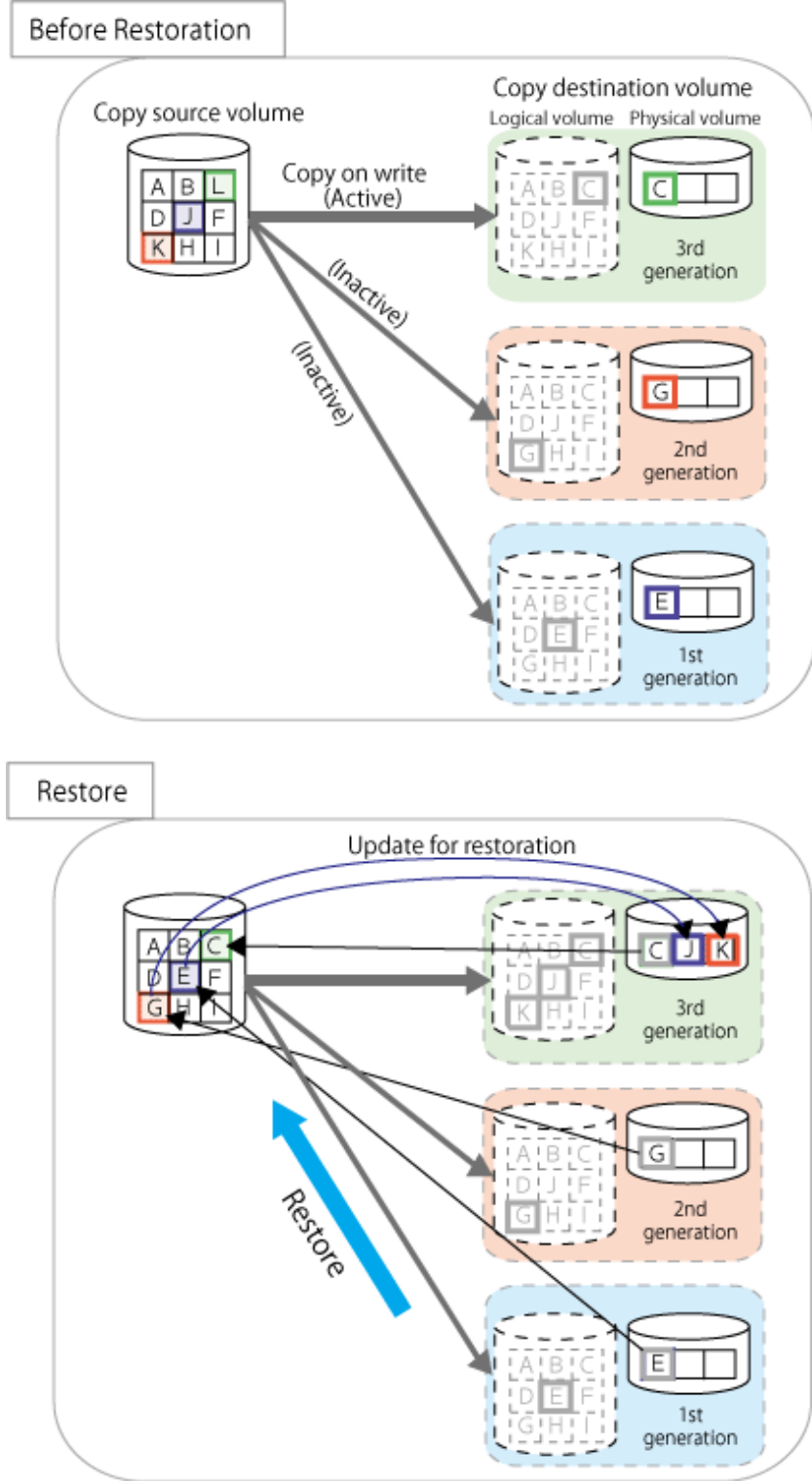
[Execution Example]

```
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 the `swsrpstat` command with the `-E` option.

[Execution Example]

```
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 capacity shortage of the copy destination volume, 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 copy destination volume 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 check when restoring from snap generation (**Snap-Gen** 2) is displayed below.

Use the procedure below to check that there is enough free space in the copy destination volume usage area:

1. Execute the `swsrpstat` 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
C:\>
```

In this example, g1d3p1 and g1d4p1 are targeted.

2. Calculate the total usage capacity of the devices that was checked in step 1.

- If the copy destination volume is TPV

Use Storage Cruiser or ETERNUS Web GUI to calculate the total usage capacity of the devices in step 1.

If you use Storage Cruiser, the used capacity can be checked in the **Used Capacity** column in the **Volume** tab of the Thin Provisioning Details screen on Web Console. Refer to "Display Thin Provisioning Pool" in the *Web Console Guide* for information on how to check the used capacity.

- If the copy destination volume is FPV

Use Storage Cruiser or ETERNUS Web GUI to calculate the total usage capacity of the devices in step 1.

If you use Storage Cruiser, the used capacity can be checked in the **Used Capacity** column of the FTV screen on Web Console. Refer to "Display FTV" in the *Web Console Guide* for information on how to check the used capacity.

- If the copy destination volume is SDV

Execute the `swstsdv` command with the "stat" subcommand to calculate the total used capacity of the devices in step 1.

If SDP is used, also add the SDP 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
C:\>
```

[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
C:\>
```

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

3. Check the free capacity of the copy destination volume.

- If the copy destination volume is TPV

Use Storage Cruiser or ETERNUS Web GUI to check the free capacity of the Thin Provisioning Pool.

If you use Storage Cruiser, the free capacity can be checked in the **Total Capacity** column and the **Used Capacity** column of the Thin Provisioning Overview screen on Web Console. Refer to "Display Thin Provisioning Pool" in the *Web Console Guide* for information on how to check the capacity.

- If the copy destination volume is FTV

Use Storage Cruiser or ETERNUS Web GUI to check the free capacity of the Tier pool.

If you use Storage Cruiser, the free capacity can be checked in the **Total Capacity** column and the **Used Capacity** column of the Tier pool detail screen that is displayed by selecting the target Tier pool in the Tier pool Overview screen on Web Console. Refer to "Display Tier Pool" in the *Web Console Guide* for information how to check the capacity.

- If the copy destination volume is SDV

Execute the `swstsdv` command with the "poolstat" subcommand to check the total capacity and the used capacity of SDP.

If SDV is not encrypted, check the total capacity and the used capacity where [Pool-Type] is "Normal".

If SDV is encrypted, check the total capacity and the used capacity where [Pool-Type] is "Encrypted".

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

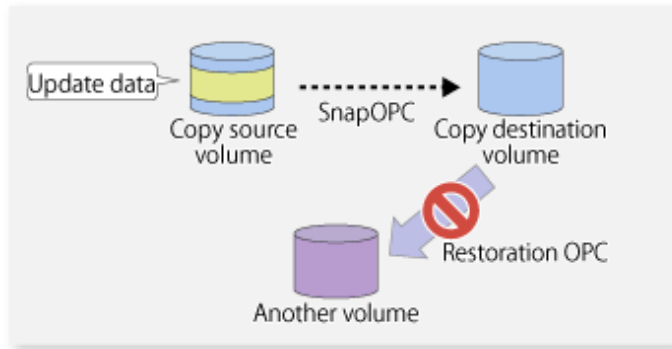
The disk usage in this example is 15% = $\sim (2097152 + 1049040) / 20971520 \times 100$

If the update amount with a restore is less than the free capacity of the copy destination volume, a restoration is possible. However, in order to safely perform a restoration, it is recommended that you increase the free capacity with a disk expansion if the disk usage after the restoration is predicted to exceed 70 %.

Since the required physical capacity is increased depending on the restoration, the capacity of the copy destination volume may be insufficient. Therefore, in order to prevent the physical capacity of the copy destination volume from becoming insufficient, refer to "[7.2.3.3 Monitoring Usage of Copy Destination Volume](#)" to review how to monitor the used capacity of the copy destination volume. In addition, consider increasing the number of disks as required.

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.

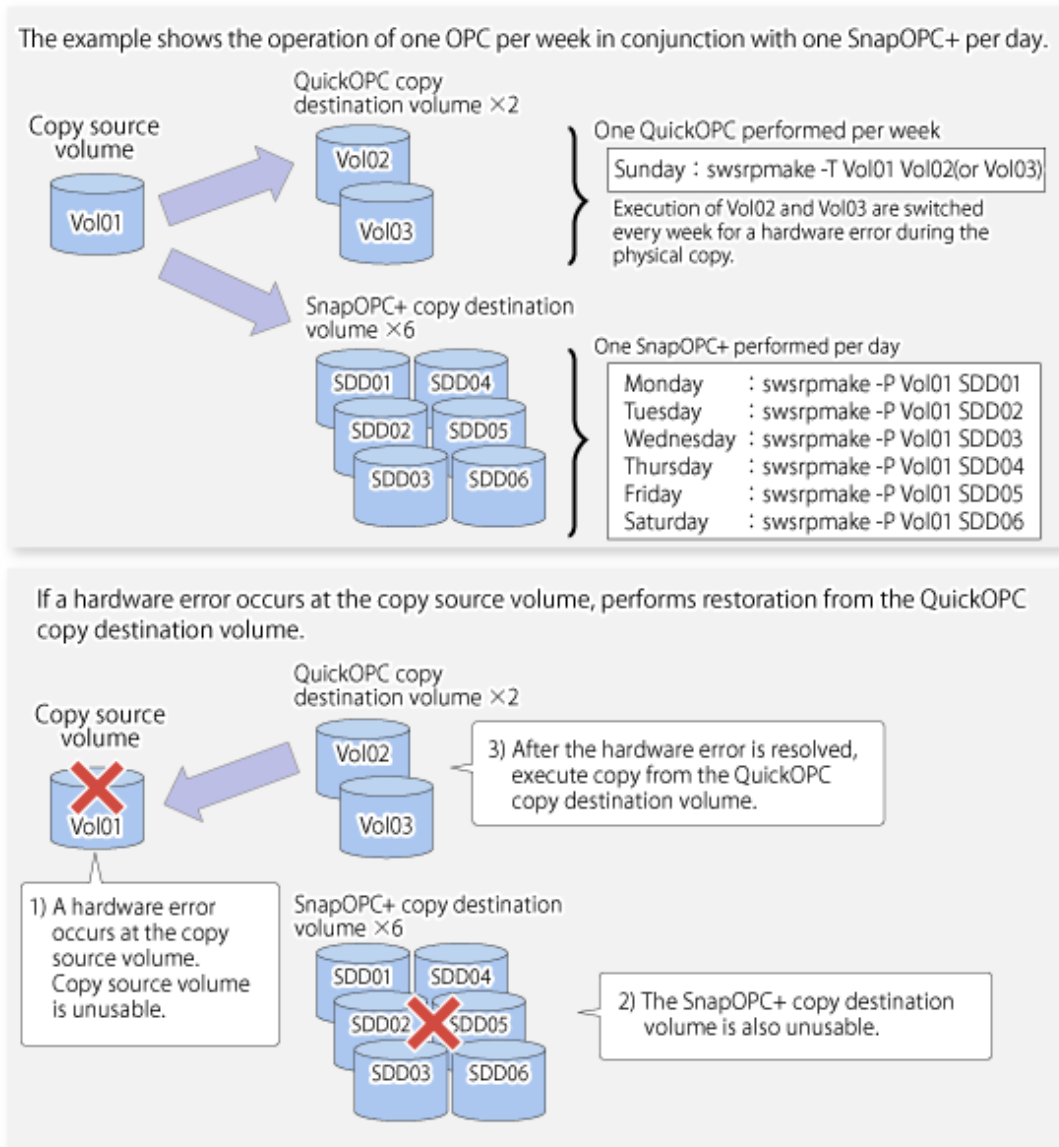


Point

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

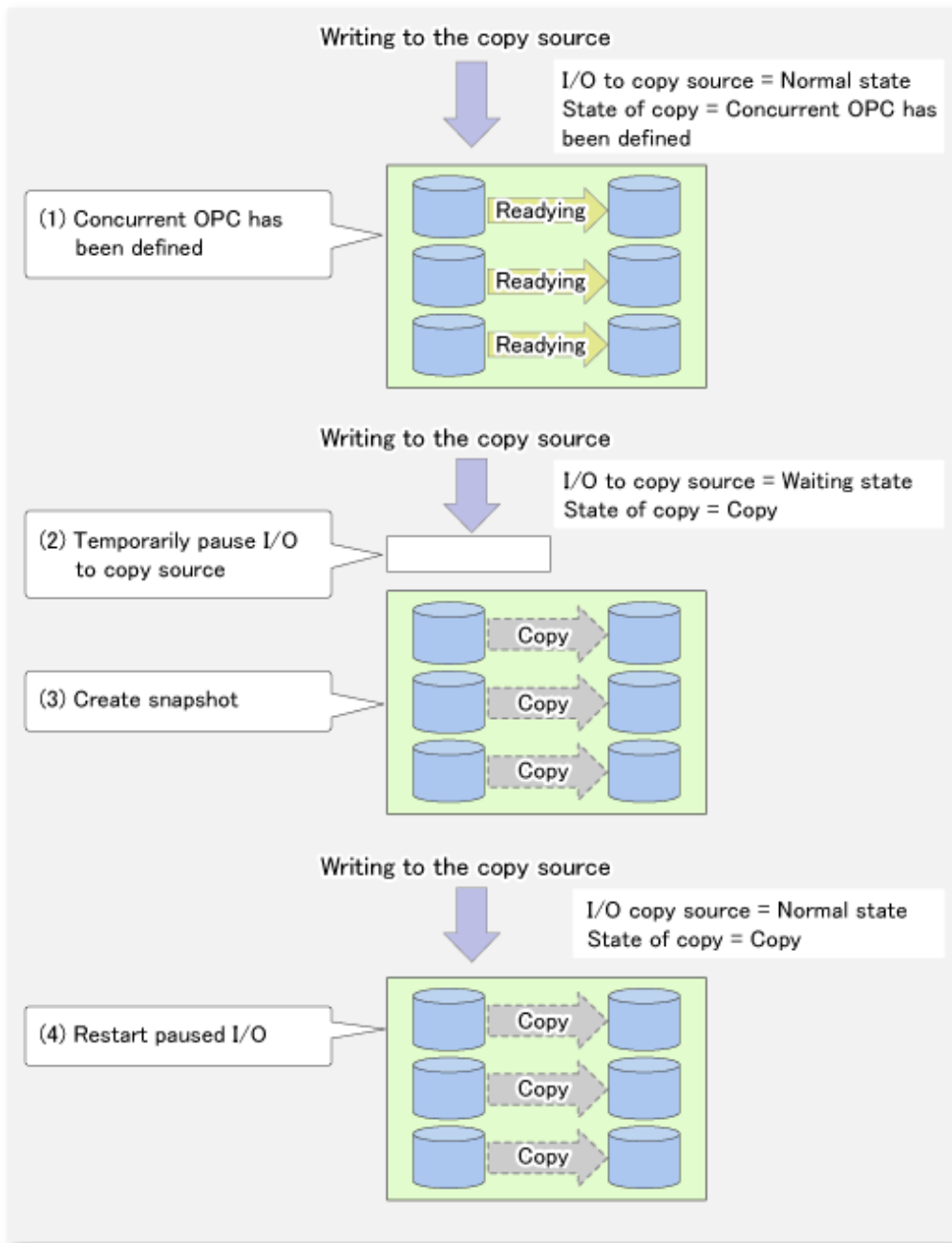


7.5.1.1 Concurrent OPC Functions

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 the `swsrpmake` 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 the `swsrpcancel` command.
- The maximum number of pairs that can simultaneously implement Concurrent OPC depends on the specifications of the ETERNUS Disk storage system.

7.5.2 Executing Synchronized Replication

To perform synchronized replication, use the following procedure:

1. Start synchronized processing using the [swsrpstartsync](#) command. To cancel synchronized processing that has already started, execute the [swsrpcancel](#) command.
2. After making sure that equivalency maintenance state has been established with the [swsrpstat](#) command, temporarily stop synchronized processing with the [swsrpmake](#) command to create a replica of the source volume.
3. To copy the updated (ie, incremental) data, restart synchronized processing with the [swsrpstartsync](#) 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 transfer modes described below.

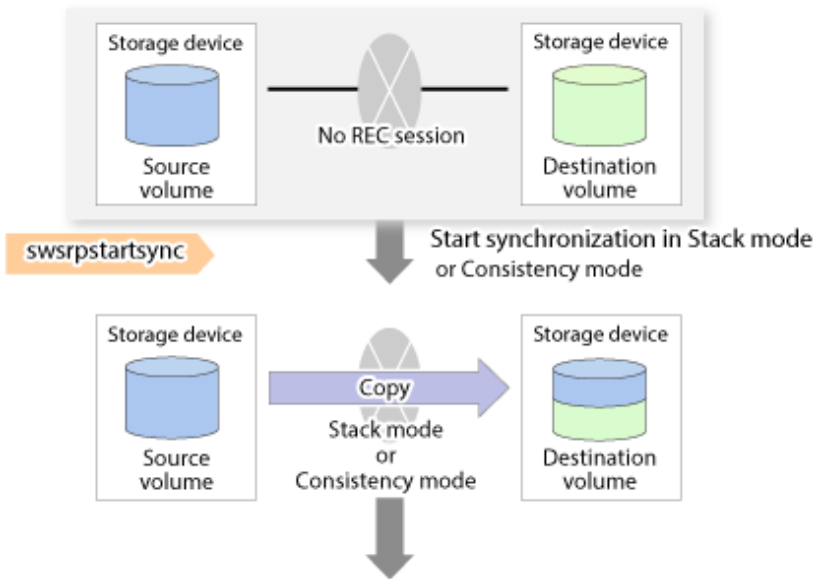
Table 7.3 Transfer Mode Types

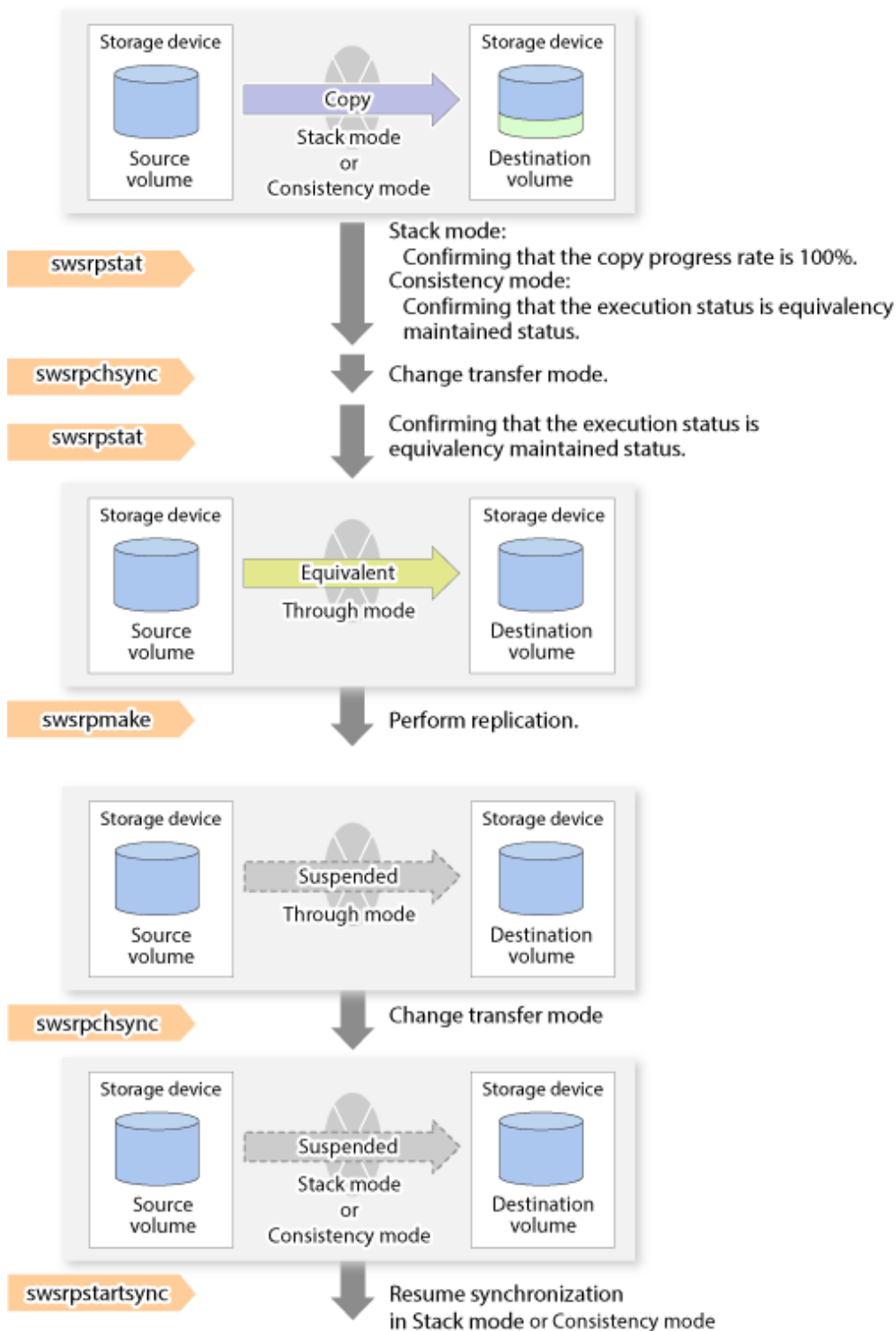
Transfer Method	Transfer Mode	Explanation
Synchronous transfer method	Synchronous	<p>In this mode, responses to write requests from the server do not return as "complete" until data has been written to the copy source volume and copied to the destination volume.</p> <p>Synchronizing data copies with 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.</p> <p>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.</p>
Asynchronous transfer method	Stack	<p>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.</p> <p>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.</p>
	Consistency	<p>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.</p> <p>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</p>

Transfer Method	Transfer Mode	Explanation
		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. If any data is updated on a replication volume, copy processing to transfer untransferred data may be given priority, delaying the response to Write request. Therefore, it is not recommended to use this mode during normal operations.

To perform a synchronous replication in Stack mode or Consistency mode, use the [swsrpstartsync](#), [swsrpmake](#) and [swsrpchsnc](#) commands. To check the execution status, use the [swsrpstat](#) 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)





P Point

- When changing the transfer mode from the Consistency mode to the Through mode, implement the operations for changing the mode after confirming that the execution status is equivalency maintenance state. There may be cases when the execution state does not enter the equivalency maintenance state immediately after changing the mode. When the transfer mode has been changed, create a replication after confirming that the execution status is equivalency maintenance state.
- When changing the transfer mode from the Stack mode to the Through mode, implement the operations for changing the mode after confirming that the copy progress rate is 100%. Although the mode may be changed even

when not in a state where the copy progress rate is 100% (a state where data that has not yet been transferred is remaining), the period of the Through mode is longer as the data that has not yet been transferred is transferred after the transfer mode has been changed.

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 7.4 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 RA 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 RA path is recovered. Manually resume copying. This mode is used, for example, when operating a standby database.

Point

The REC restart method varies, depending on the halt status. Refer to "[13.4.2.4 Error \(halt\) on Remote Copy Processing](#)" for details.

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 7.5 Split Mode Types

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

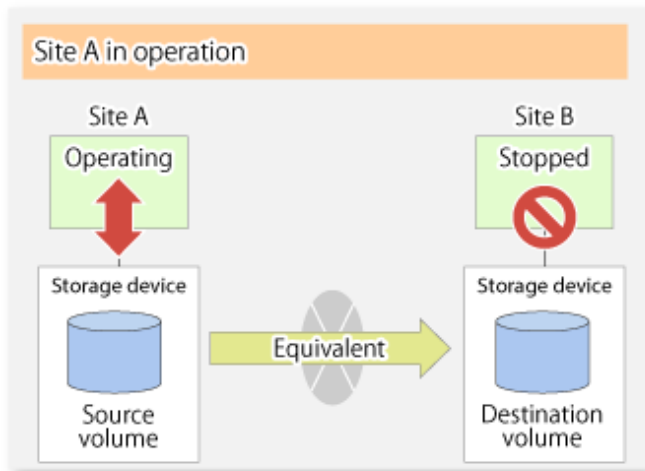
Copy Direction Reverser

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:

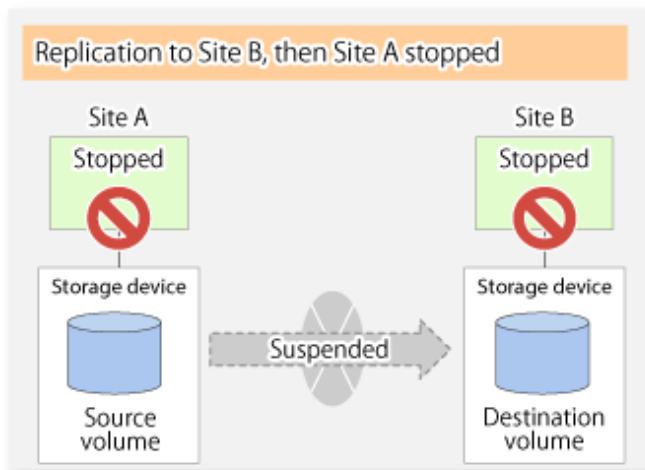
1. Assume that Site A is operating and REC is operating from Site A to Site B.

Figure 7.32 When REC Performed from Site A to Site B



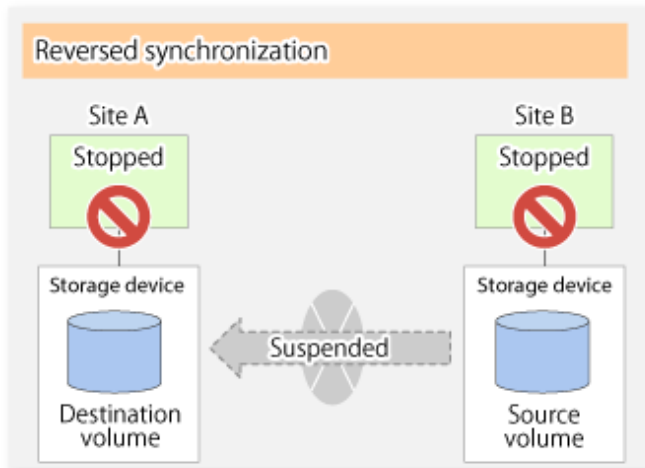
2. To switch the sites, execute the `swsrpmake` command to make a replication to Site B. Then, stop operating Site A.

Figure 7.33 When Replication Creation Command Used to Create Replica at Site B



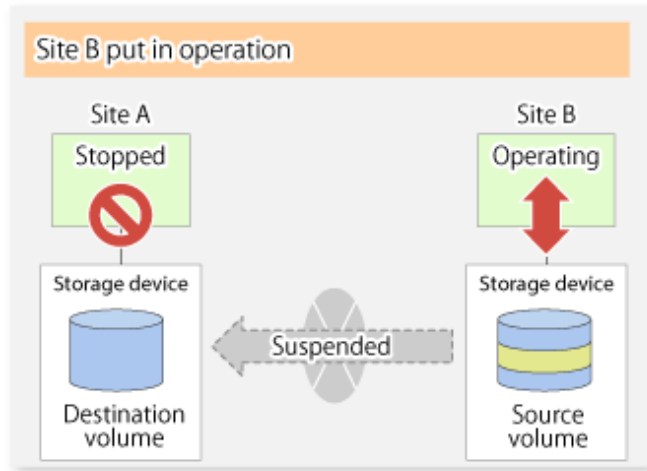
3. Execute the `swsrprevsync` command to reverse the copy direction.

Figure 7.34 When Synchronization Reverse Command Is Executed



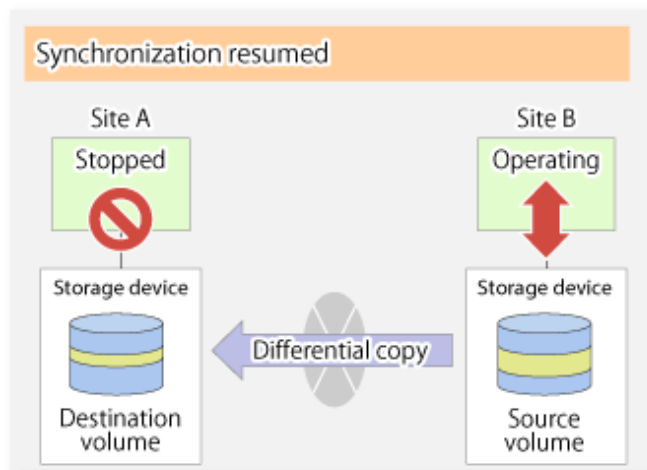
- Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure 7.35 When Operation Is Started at Site B (Synchronization Suspend State)



- 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)

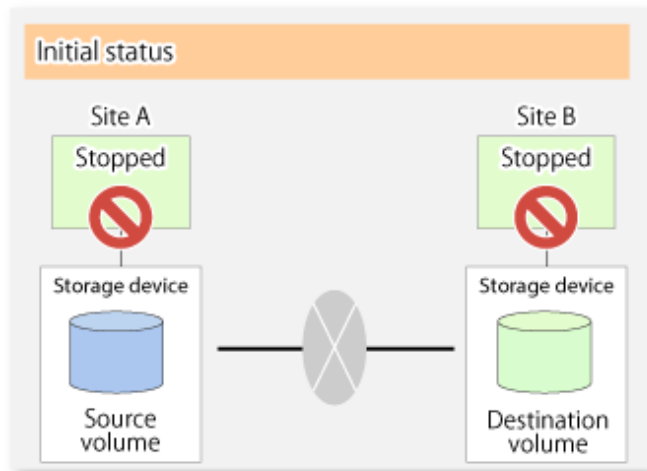


7.5.2.2.1 Initial Copy Skip Function

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.

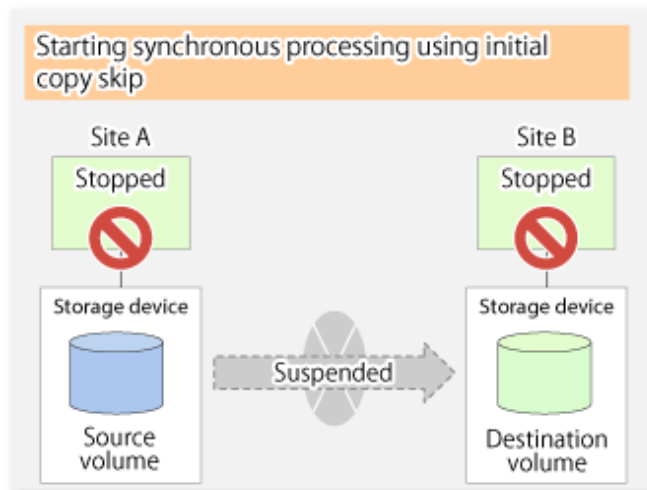
1. Suppose that operations at Site A have stopped.

Figure 7.37 If Operations at Site A Have Stopped



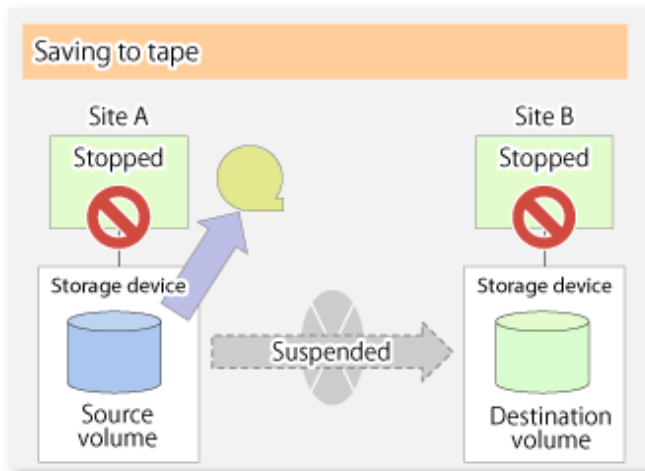
2. Next, synchronous processing begins, using the initial copy skip function. At this point, a REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

Figure 7.38 When Synchronization Is Started by Initial Copy Skip Function



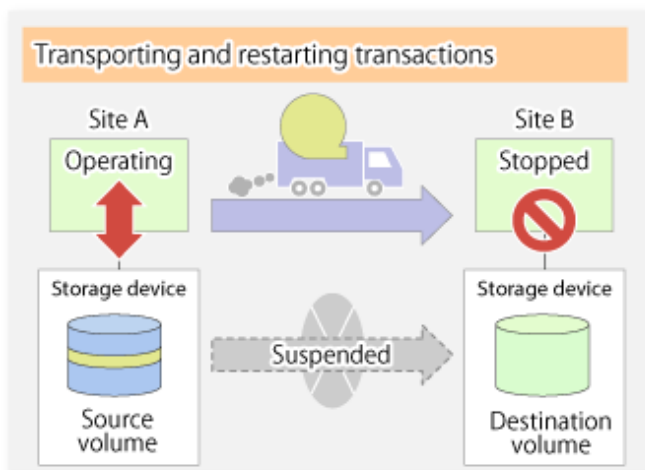
- Next, the data on the copy source volume is backed up to tape.

Figure 7.39 When Copy Source Data Is Backed Up to Tape



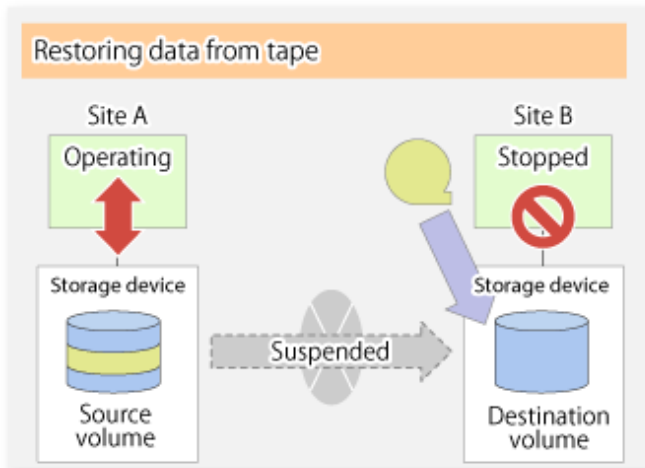
- The tape media is sent to Site B and jobs at Site A restart.

Figure 7.40 When Site A Operations Restart



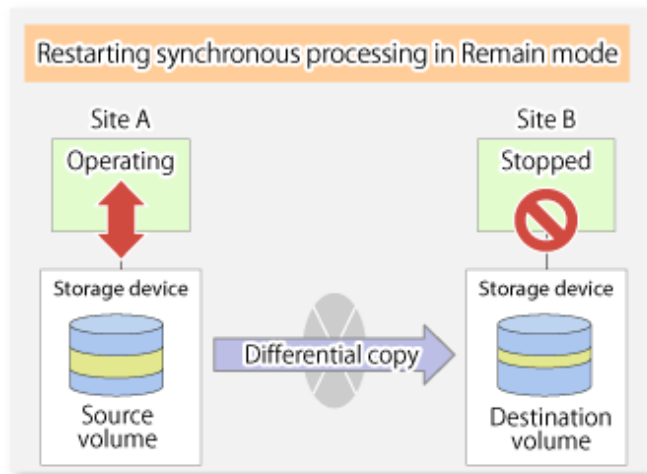
- The data on the tape media is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure 7.41 When Data Is Restored from Tape to Copy Destination



- 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

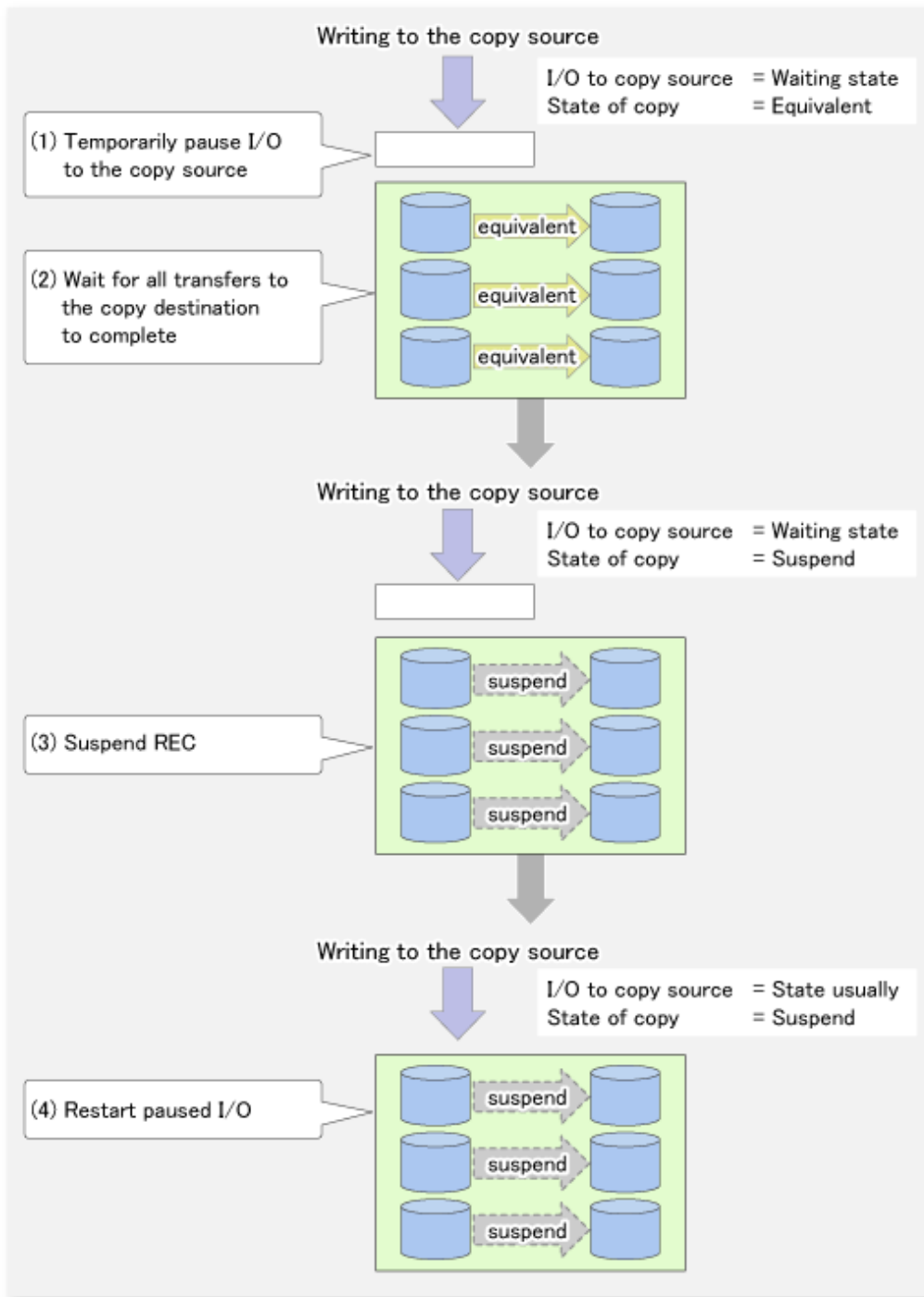
The Concurrent Suspend function simultaneously suspends multiple EC/REC sessions for ETERNUS Disk storage system.

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 place within the ETERNUS Disk storage system is shown below.

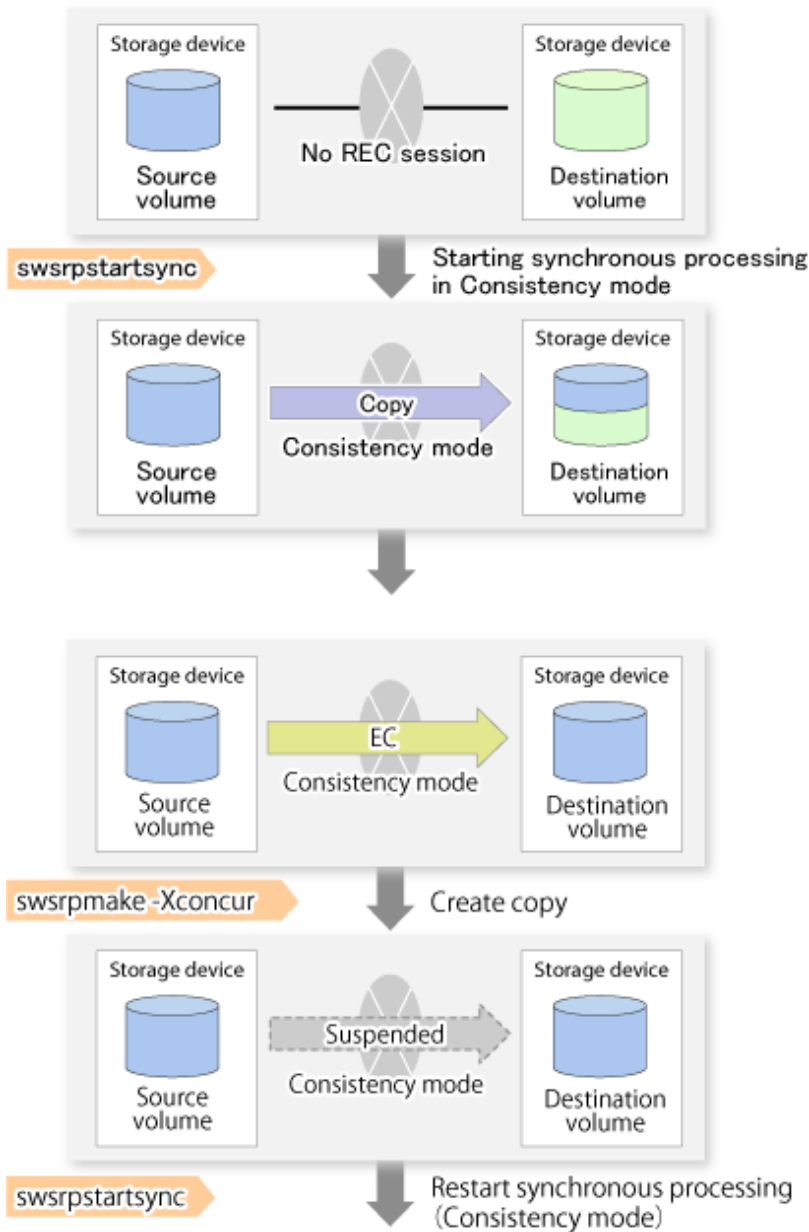
Figure 7.43 Internal Operation of ETERNUS Disk Storage System



Replication using the Concurrent Suspend function is performed by specifying the `-Xconcur` option for the `swsrpmake` 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



 Note

The maximum number of pairs that can simultaneously implement Concurrent Suspend depends on the specifications of the ETERNUS Disk storage system.

7.5.2.3.1 Changing Timeout Value for 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 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.

```
<Environment directory>\etc\repl\data\DEFAULT\check.ini
```

- In the case of operation in a clustered environment

```
<Environment directory for logical node>\etc\repl\data\DEFAULT\check.ini
```

Table 7.6 File Format of 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 2,147,483,647 seconds. If you set a value beyond this range, the default value (60 seconds) is 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) is applied.

7.5.2.3.2 Concurrent Suspend When REC Disk buffer Is Used

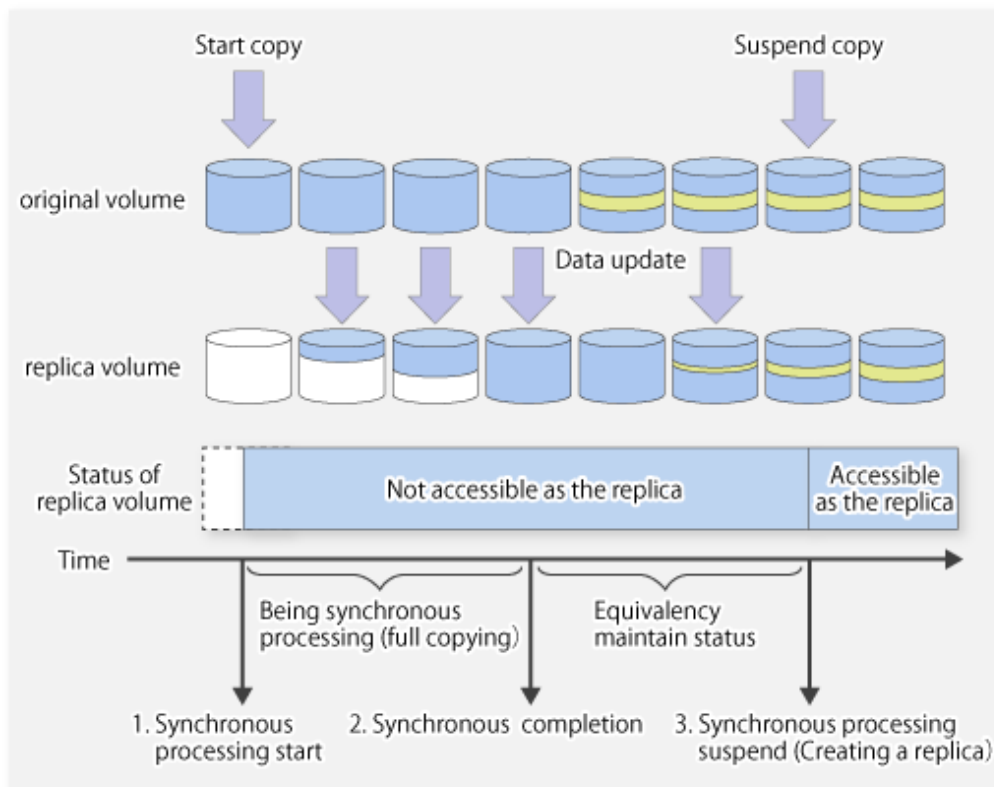
If the REC Disk buffer is used for inter-box synchronous replication (REC function) in Consistency mode, check that no transferred data exists in the REC Disk buffer before executing the Concurrent Suspend. If you execute the Concurrent Suspend when any data to be transferred exists in the REC Disk buffer,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

You can check the data volume of the REC Disk buffer in the **DiskRate** column when you execute the [swsrprecbuffstat](#) 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.

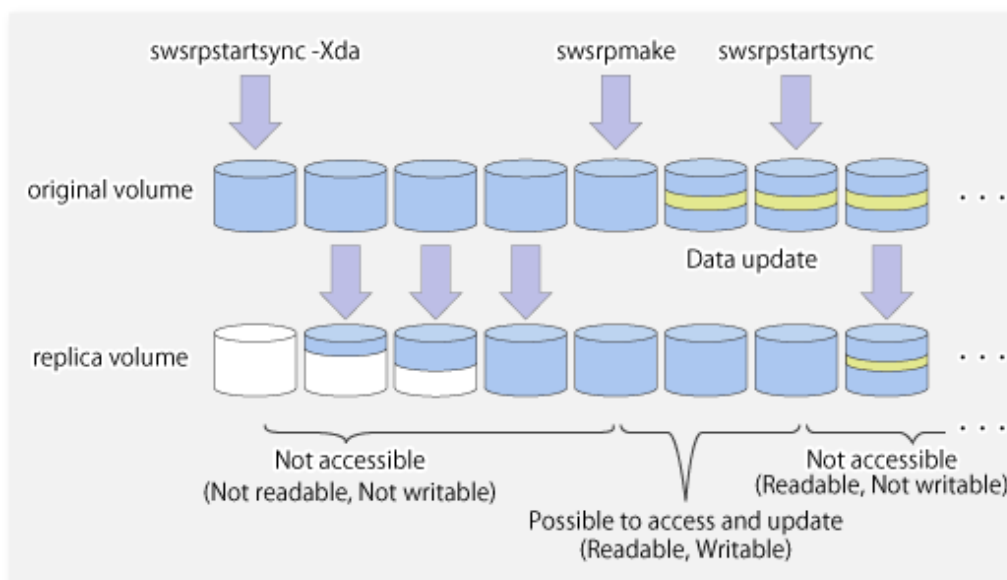
It starts synchronization (EC/REC) from the replication source volume to the replication target volume, and when full or differential copying is complete, they are in a equivalency maintenance state. In the equivalency maintenance state, any upgrades on the replication source volume are successively 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 the [swsrpstartsync](#) command with the `-Xda` option. Until replication processing is stopped by the [swsrpcancel](#) 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 the [swsrpcancel](#) command, execute the [swsrpstartsync](#) command again.

Whether access is inhibited can be checked by performing the [swsrpstat](#) command.



7.5.3 Backup and Restoration Using 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 the [swsrpsetvol](#) command.

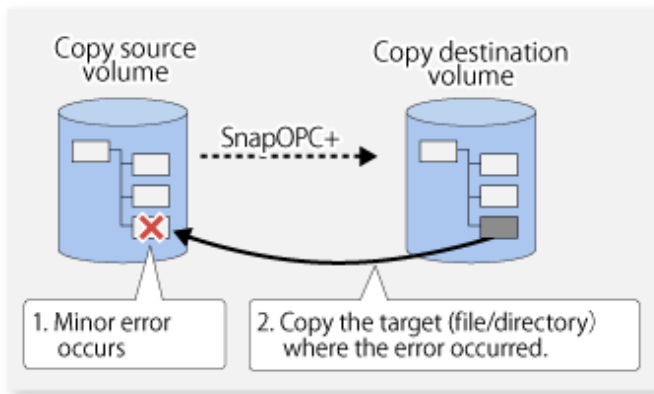
Restoration can be executed according to the following procedures:

1. Execute the `swsrpcancel` command when the target volume for restoration has an EC session.
2. Execute the `swsrpmake` 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 the `swsrpmake` command without specifying the `-T`, `-C` and `-P` option.

 **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+

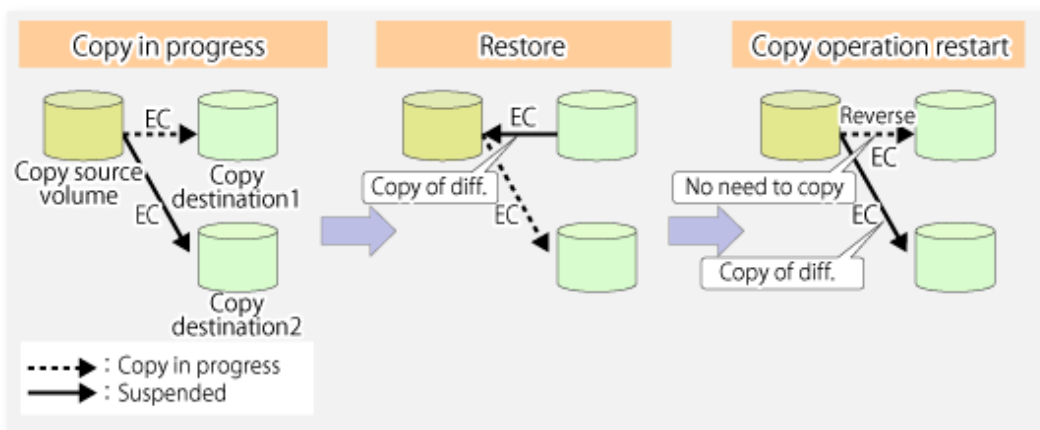


7.5.4 Execution of Synchronization Reversal

Using the `swsrprevsync` 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 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 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 the [swsrpdelvol](#) command and then execute the [swsrpsetvol](#) command again.

7.6.2 Deleting Source Volume or Replica Volume

To delete the source volume or the replica volume that have been configured, use the [swsrpdelvol](#) command.

7.6.3 Changing Device Information of 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 about this, refer to "[7.6.2 Deleting Source Volume or Replica Volume](#)".
2. Change the device configuration.
3. Perform any additional steps that may be required in the processing of a device. For more information on this, refer to "[7.4.4 Fetching Device Information on Managed Server](#)".
4. Configure the source/replica volume with the new information.
5. Edit a drive letter map file.

7.7 Stopping Operation

To stop replication processing that is in progress, or to change synchronized replication into snapshot replication, use the [swsrpcancel](#) command.



Note

Depending on factors such as the firmware version of the storage device and the volume type of the replication destination, how the SnapOPC+ replication process is stopped varies. Refer to "[7.1.1.3 Deletable SnapOPC+ Snap Generations](#)" for details.

To forcibly delete the second or subsequent snap generations, use the -Xforce option with the [swsrpcancel](#) command. This deletes 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 deleted, and all the snap generations and snap generations before it in the group are also deleted.

To stop the replication, stop the service on the Managed Server. Normally the service stops 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 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, it is recommended that you read the documents that are published by Microsoft Corporation.

The documents have been published to the following URL.

[https://technet.microsoft.com/en-us/library/aa996058\(v=exchg.150\).aspx](https://technet.microsoft.com/en-us/library/aa996058(v=exchg.150).aspx)

Check the version of Exchange Server that is in use and refer to the following section.

Exchange Server Version	Reference Destination
Exchange Server 2010	High Availability and Site Resilience > Understanding Backup, Restore and Disaster Recovery
Exchange Server 2013 or later	High Availability and Site Resilience > Backup, Restore, and Disaster Recovery

8.1 Backup and Restore of Exchange Server Database

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

For Exchange Server, the terms vary depending on the version. In this section, the terms of Exchange Server 2013 or later are described using the terms in Exchange Server 2010.

Table 8.1 Correspondence Table for Exchange Server Terms

Exchange Server 2010	Exchange Server 2013 or later
Exchange Management Console	Exchange Administration Center

For backup and restoration of Database Availability Group, refer to "[8.2 Backup and Restore of Database Availability Group](#)".

8.1.1 Overview

8.1.1.1 Backing Up Exchange Server 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 Server databases.

When backing up an Exchange Server database, the backup can easily be configured using a wizard. Refer to "[8.3 Backup and Restore Using Wizard for Exchange Server](#)" for details.

The backup data of an Exchange Server database includes the backups of the following files that constitute the Exchange Server 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 database.
- 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 database.

Online Backup

A linkage with VSS enables the online backup of the Exchange Server database.

- Backup is performed in units of databases. 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 business 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 cannot be used in this function.

Backup to 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 business server.

Figure 8.1 Exchange Server Database Backup Processing Image

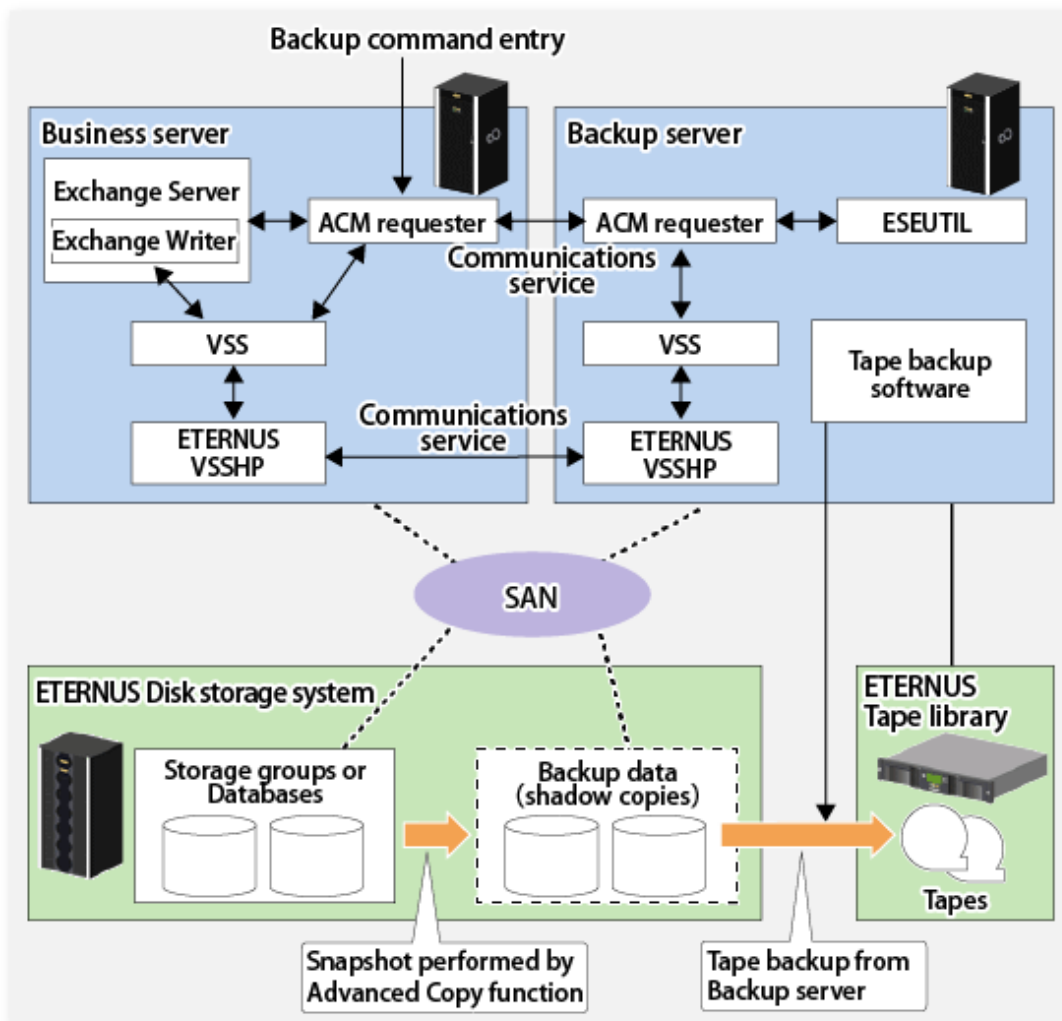


Table 8.2 Business Server and Backup Server Functions

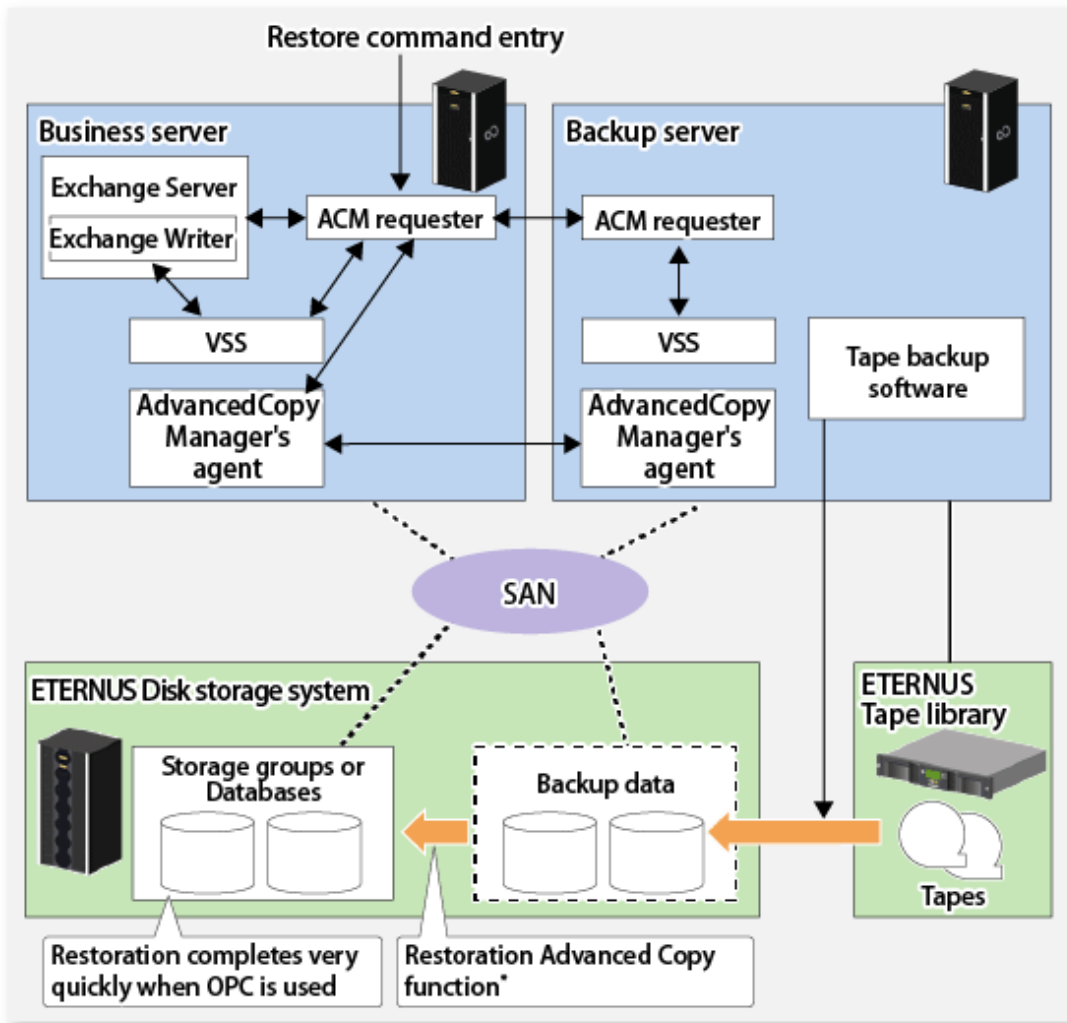
Server	Component	Description
Business server	Exchange Writer	Exchange writer
	ACM Requester	The AdvancedCopy Manager Exchange requester that provides backup and restore functions for Exchange.
	ETERNUS VSSHP	ETERNUS VSS hardware provider that offers a shadow copy creation function using Advanced Copy 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 business server.
	ETERNUS VSSHP	ETERNUS VSS hardware provider, which uses Advanced Copy functions to provide a shadow copy creation function.

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.

When restoring an Exchange Server database, the wizard can be used to simplify this process. Refer to "[8.3 Backup and Restore Using Wizard for Exchange Server](#)" for details.

Figure 8.2 Exchange Server 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](#) 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 databases. 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

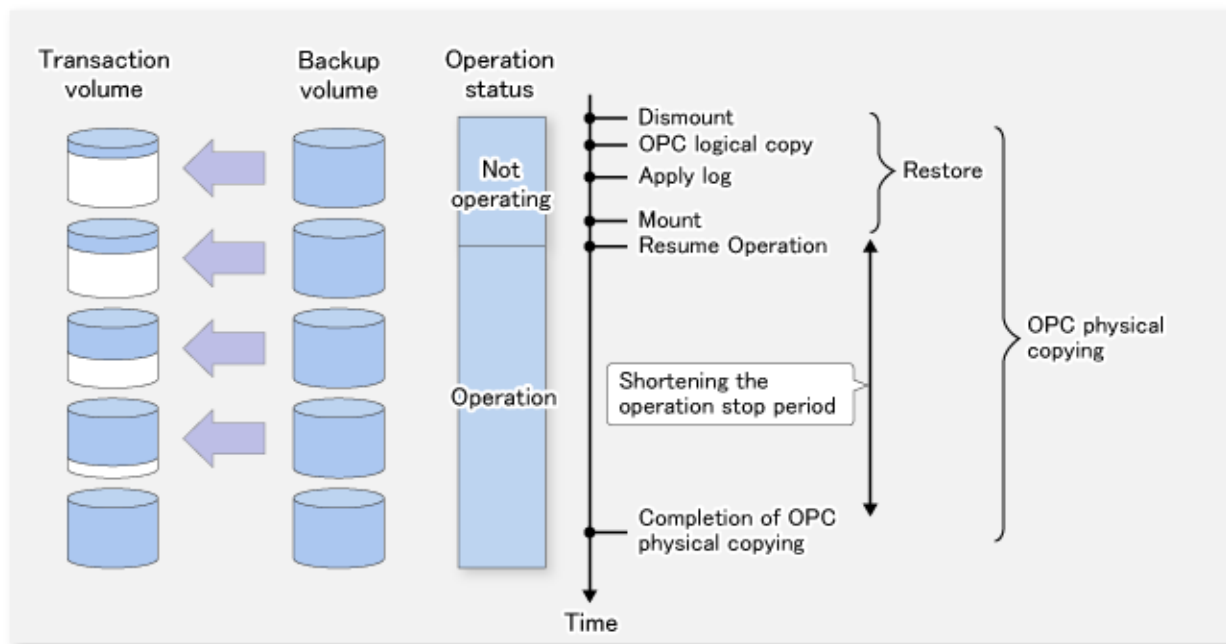
Exchange Server supports a function that allows restoration to a location that is different from the original path, but AdvancedCopy Manager does not support this function. Therefore, the original disk is the only restore destination that can be selected under AdvancedCopy Manager.

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 business server.

- OPC is executed by a conventional AdvancedCopy Manager function (e.g., [swsrpmake](#) 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 8.3 Snapshot Restoration (Restoration by OPC)



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:

- [8.1.2.1 Designing Server Configurations](#)
- [8.1.2.2 Designing Storage Groups or Databases](#)
- [8.1.2.3 Designing Circular Logs](#)
- [8.1.2.4 Preparing Backup Disks \(LUs\) and Backup Volumes \(Partitions\)](#)
- [8.1.2.5 Designing Copy Sets](#)

8.1.2.1 Designing Server Configurations

Management Server

The Management Server centrally manages and operates multiple Managed Servers. Install the AdvancedCopy Manager function on this server. A business server cannot serve as a Management Server. However, a backup server can serve as a Management Server.

Managed Server (Business Server)

This Managed Server is used for the Exchange Server operation. In a Microsoft Windows Server 2012 or later 64bit environment, install the AdvancedCopy Manager's agent function on this server. Execute database backup or restoration from this server. 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 supports operations using cluster environment by Database Availability Group or single nodes.

Managed Server (Backup Server)

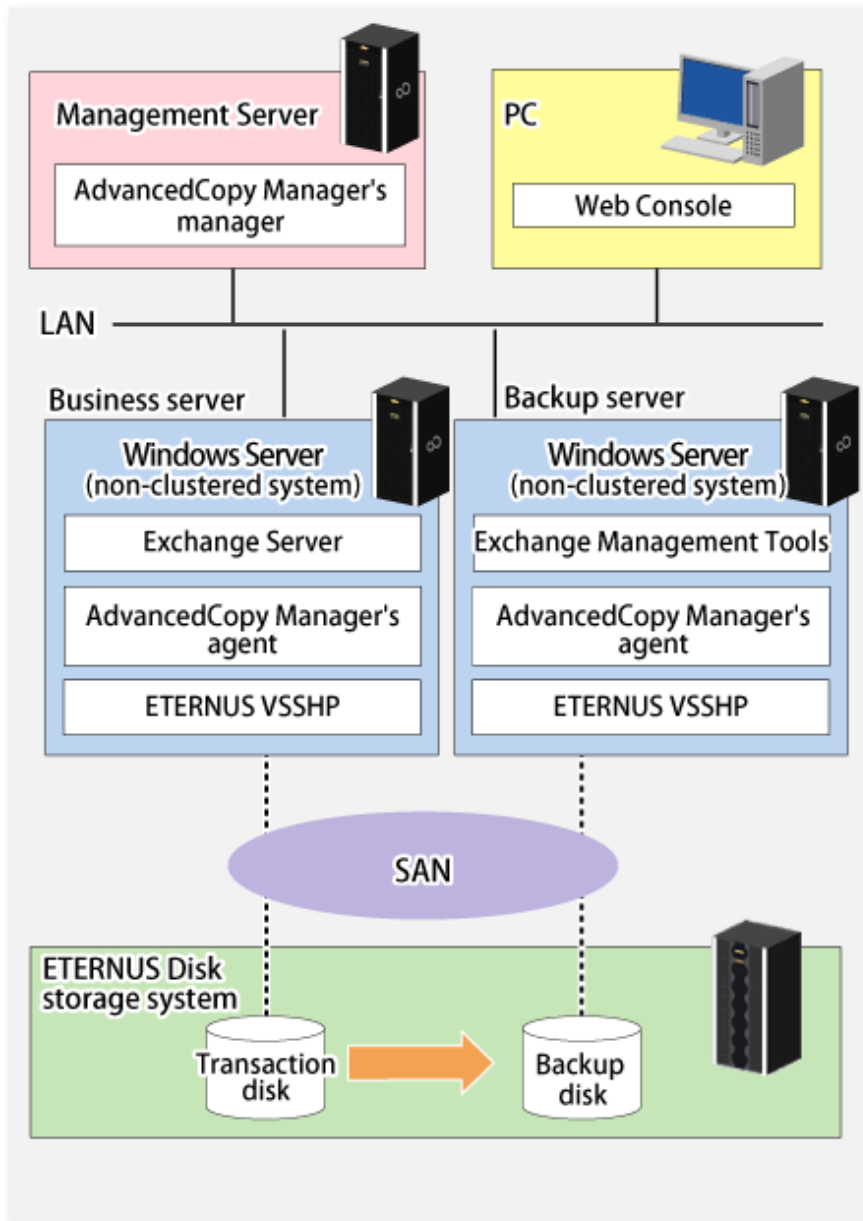
This Managed Server is used for the backup server operation. In a Microsoft Windows Server 2012 or later 64bit environment, install the AdvancedCopy Manager's agent function on this server. In addition, install the Exchange management tools to check the backup data. The disks (ie, the backup volumes) 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) business server.
- One backup server cannot serve as the backup server for different versions of Exchange Server. In an environment where different versions of Exchange Server coexist, prepare a backup server for each version of Exchange Server.

The following figure shows a server configuration example.

Figure 8.4 System Configuration Example

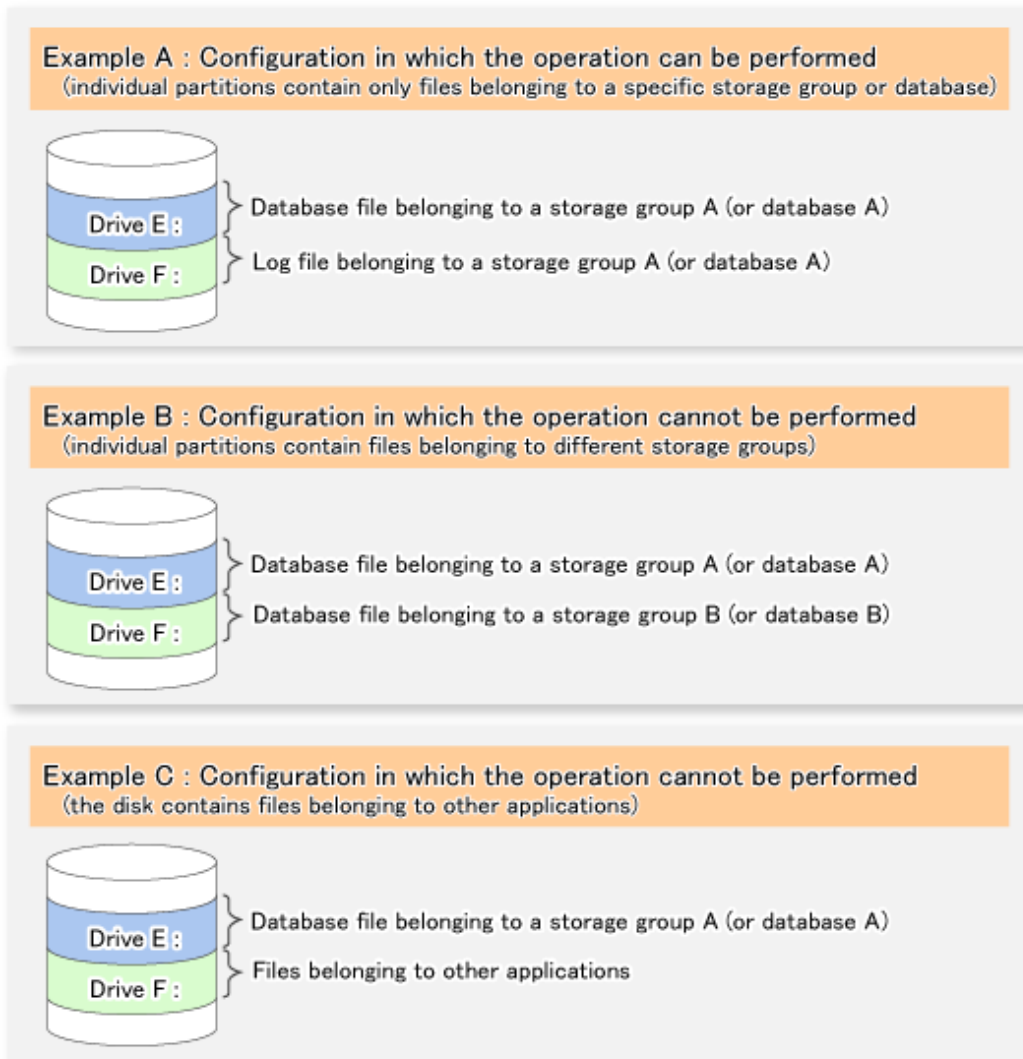


8.1.2.2 Designing Storage Groups or Databases

8.1.2.2.1 Partition Configuration

Advanced Copy for backup is performed in units of disks (i.e., LUs), 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.

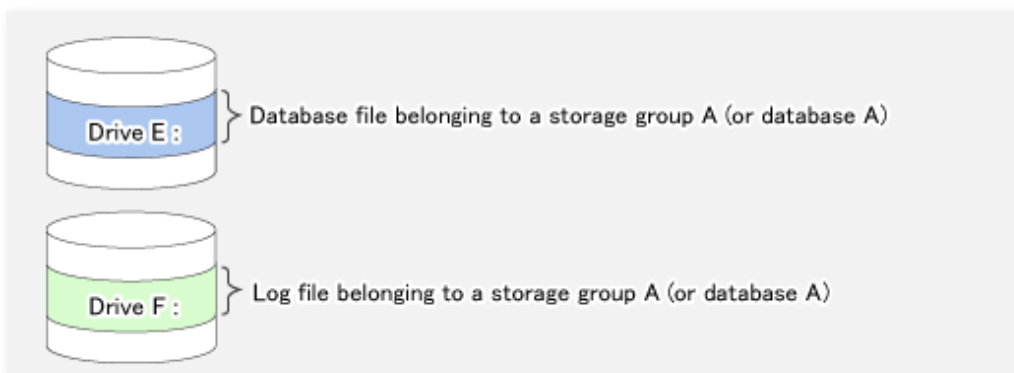
Figure 8.5 Partition Configuration



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 8.6 Recommended Partition Configuration (Multiple Disk Configuration)



Point

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.

Note

Use copy source and copy destination disks in their initial state, in which Exchange Server linkage function backup has not been performed. Refer to "8.1.6.4 Initializing Disk" for details of disk initialization.

8.1.2.2 Storage Group or Database File Location

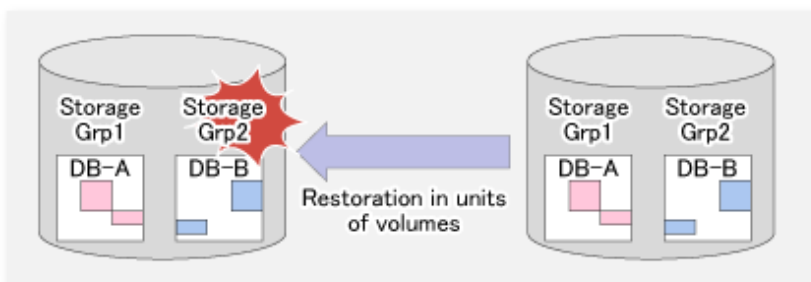
Database File Location

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 is 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 8.7 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 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.

For Exchange Server 2010

To copy an allocated database file, use the Exchange Management Console to move the file.

For Exchange Server 2013 or Later

To copy an allocated database file, use the Exchange Management Shell to move the file.

Transaction Log File Allocation

Figure 8.8 Relationship Between Log File Location and Feasible Restoration Modes

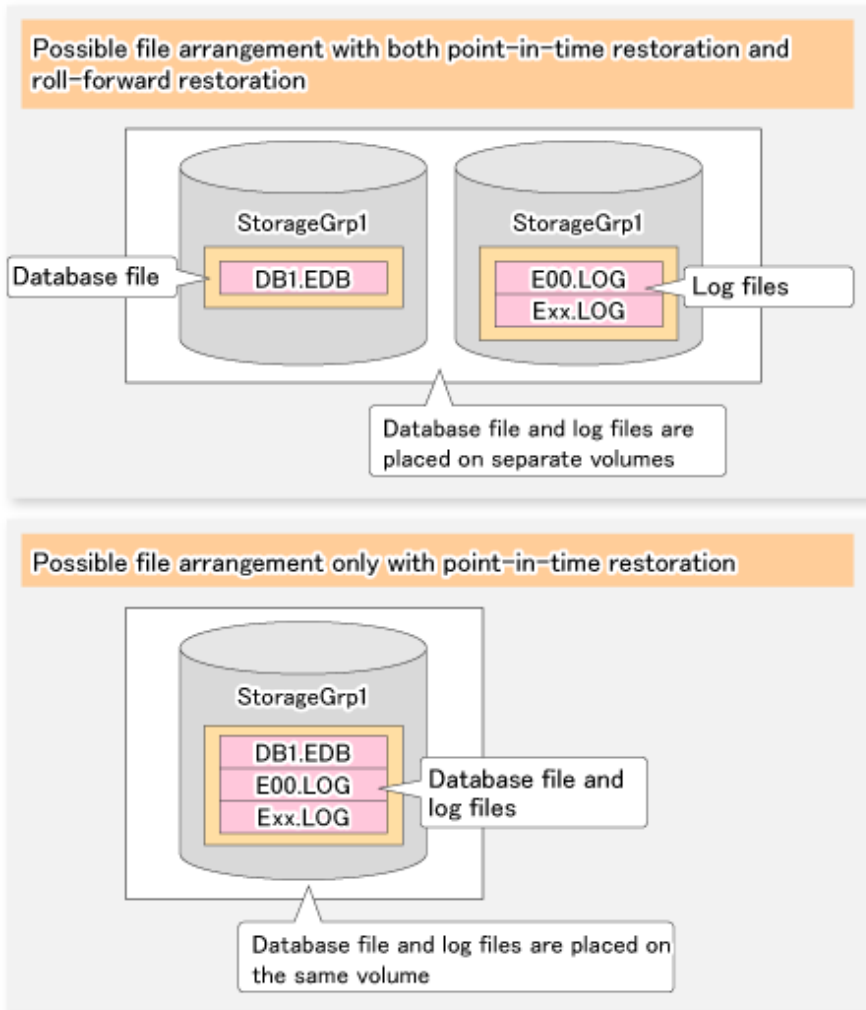


Table 8.3 Relationship Between Log File Location and Feasible Restoration Modes

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 (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 2010) or the Exchange Management Shell (for Exchange Server 2013 or later) can be used to move the transaction log files to another volume.

8.1.2.3 Designing Circular Logs

Circular logging must be disabled to implement AdvancedCopy Manager 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 (LUs) and Backup Volumes (Partitions)

Placement of Backup Disk

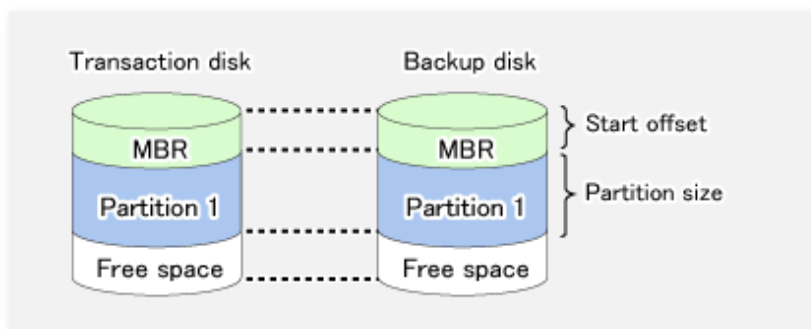
The backup disks and the disks used by transactions must be placed on the same ETERNUS Disk storage system.

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 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 8.9 Creating Backup Volume

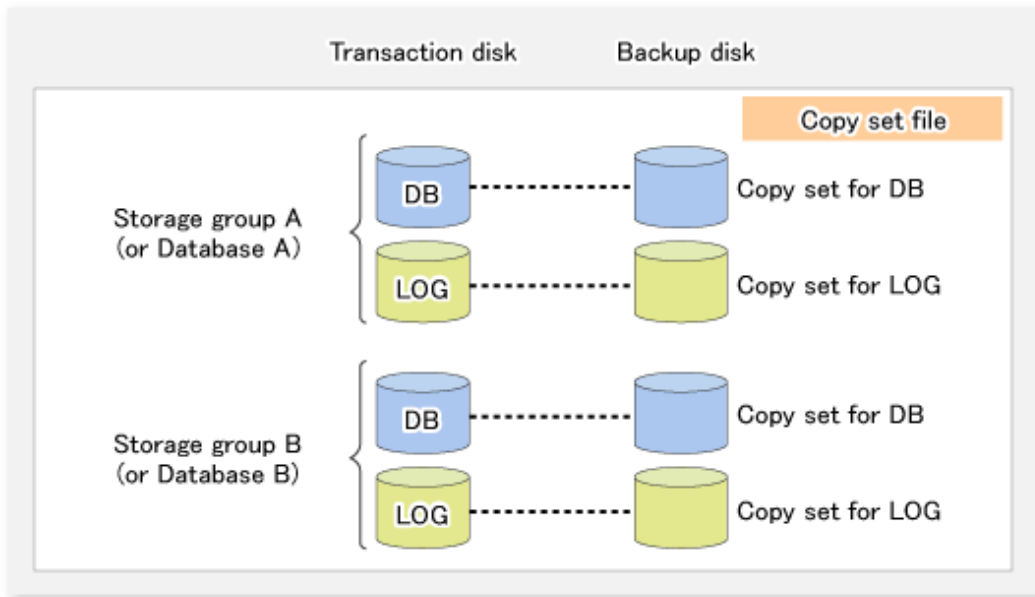


Note that a backup disk LUN and a transaction disk LUN of the same size must be prepared. Supported disk partition formats are MBR and GPT. However, the transaction disk and backup disk partitions must have the same format.

8.1.2.5 Designing Copy Sets

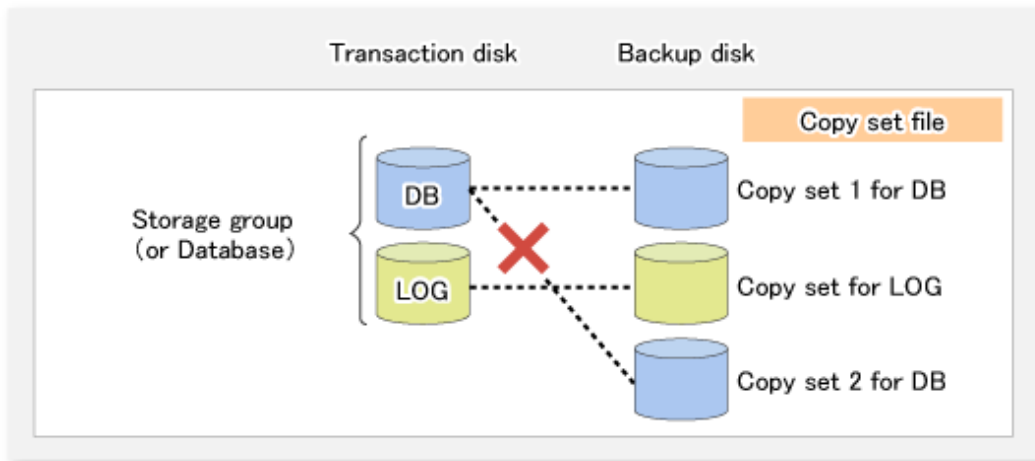
Design copy sets so that there is a 1:1 relationship between backup disks and all the transaction disks related to the storage group or database being backed up.

Figure 8.10 Copy Set Registration



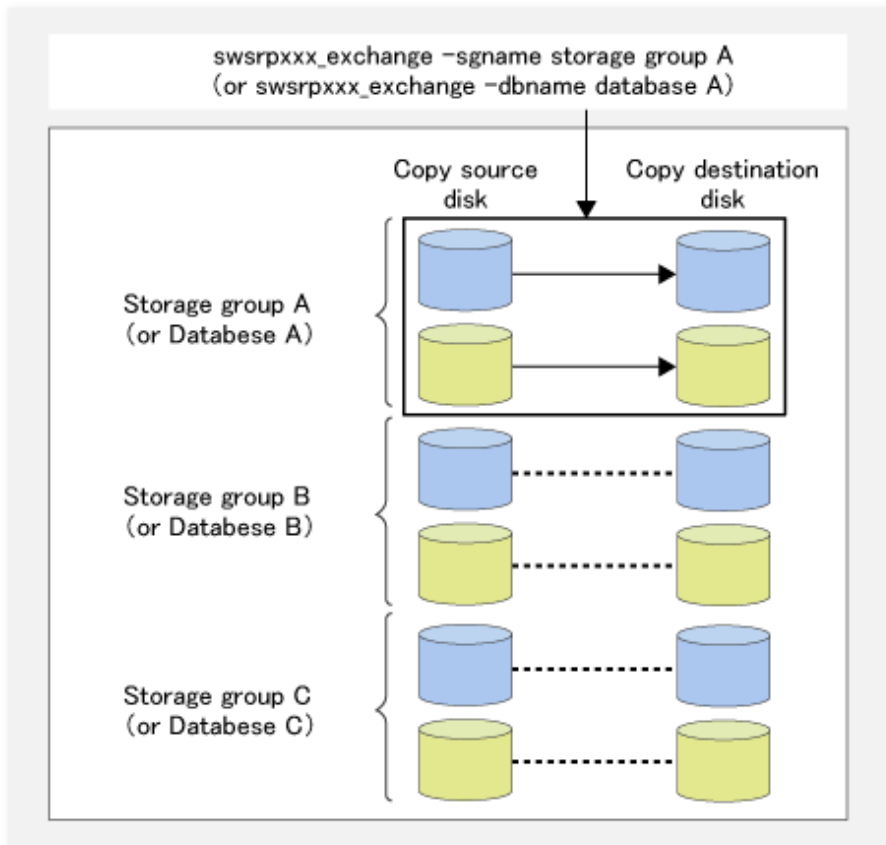
Copy sets with the same transaction disk but different backup disks cannot be registered at the same time.

Figure 8.11 When Registration to Copy Set Is Not Possible



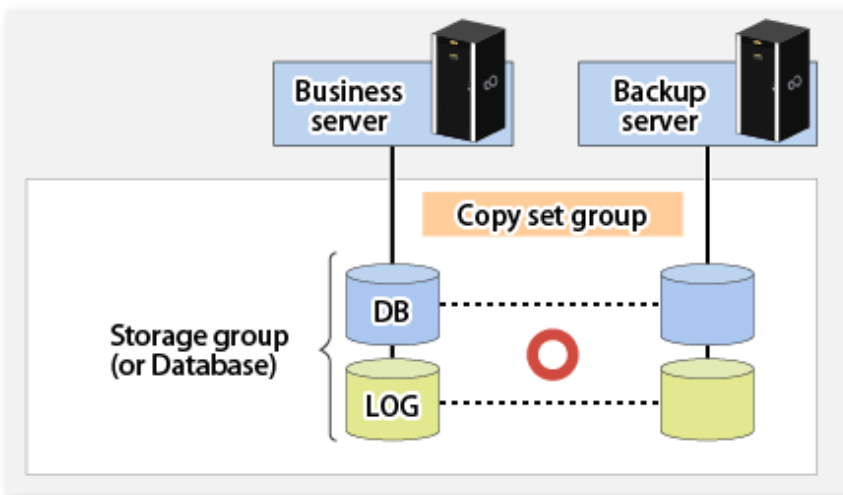
Exchange Server associated commands (swsrpXXX_exchange) perform processing on particular copy sets based on the database name.

Figure 8.12 When Multiple Storage Groups or Databases Are Registered



For one business server machine (one cluster environment), there must be one backup server machine and a non-cluster environment.

Figure 8.13 Business Server and Backup Server Example



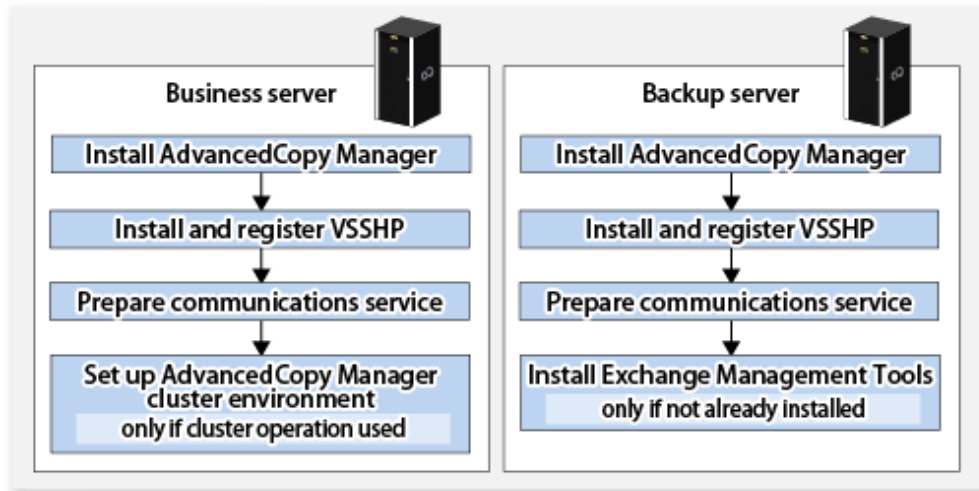
8.1.3 Preparation

8.1.3.1 Installation

This section describes the installation tasks.

The following figure shows the flow of tasks to install and business server and backup server.

Figure 8.14 Installation Task Flow



8.1.3.1.1 Installing AdvancedCopy Manager

Refer to the *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 Microsoft Windows Server 2012 or later 64bit environment at the business server and the backup server.

Installation must be to a LUN that is not subject to backup.

8.1.3.1.2 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 following directory of the DVD "ETERNUS SF SC/ACM/Express Mediapack (V16.9 or higher) Agent Program and Manual":

- <dvdDrive>:\Agent_windows\AdvancedCopy_Manager\VSSHP\DX_AF\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.

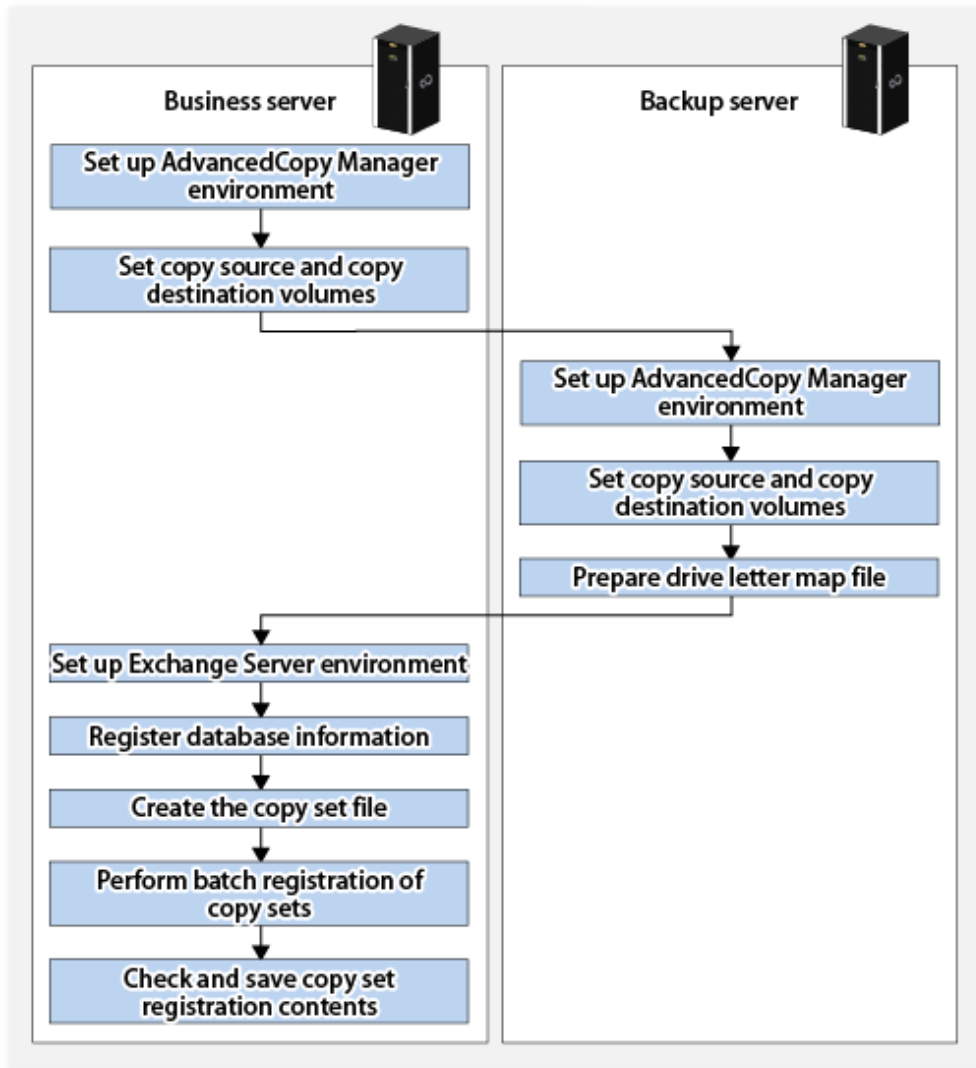
8.1.3.1.3 Installing Exchange Management Tools

Install the Exchange management tools.

8.1.3.2 Environment Setup

This section describes the environment settings to be performed before backup operations are started.

Figure 8.15 Environment Setup Flow



8.1.3.2.1 AdvancedCopy Manager Environment Setup

Perform the following tasks:

- [7.4.1 Starting Service](#)
- [7.4.2 Starting Web Console](#)
- [7.4.3 Registering Managed Server](#)
- [7.4.4 Fetching Device Information on Managed Server](#)

8.1.3.2.2 Setting Up Source and Replica Volumes

Use the `swsrpsetvol` command to register the replication source volume (transaction volume) and replication destination volume (backup volume) in the replication function.

The `swsrpvoinfo` 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 business 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.
- Specify a partition (gXdYpZ) for volume name. Do not specify a LUN (gXdY).

8.1.3.2.3 Preparing 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).

8.1.3.2.4 Configuring 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 "8.1.2.2 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.

8.1.3.2.5 Registering Database Information

Register Exchange Server database information in the management file using the [swsrpdbinfo_exchange](#) command. Before backing up or restoring the Exchange server databases, execute this command on the business server to perform an initialization. Additionally, execute this command after any change has been made to the Exchange Server configuration.

Example: This example registers the database MailBox1 (if the command is executed from the business server).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname MailBox1
swsrpdbinfo_exchange successfully completed
C:\>
```


8.1.3.2.6 Creating Copy Set File

Set the information about the disks included in the copy source and copy destination volumes set as described in "8.1.3.2.2 Setting Up Source and Replica Volumes", and enter this information in a copy set file to be used as VSSHP copy set information.

Use the `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#####XXXXXXXXX#####YYYYYYYYYYYYY##  
QOPC, ,6,0x00c1,00E8000M9#####XXXXXXXXX#####YYYYYYYYYYYYY##
```

8.1.3.2.7 Registering Copy Sets as Batch

Execute the `stxvcopysset` (Copy set file registration command) from the VSSHP group of commands at the business 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]

```
stxvcopysset [-c|-r] [-file copy_set_file]
```

* Option contents: "-c: Check only", "-r: Check then register", "-file: Copy set file specified using full path"



The copy set file registration command overwrites all the contents that have already been registered in the specified file.

8.1.3.2.8 Checking and Saving 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 business 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)]
```

8.1.4 Backup

8.1.4.1 Backing Up Databases

Back up the Exchange Server databases by executing the `swsrpvssbackup_exchange` command on the business server. This command backs up the databases in units of databases.

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 terminates abnormally.

Example:

```
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 (such as files with the *.edb, *.log, and *.chk extensions) are created in the backup volume that is specified in the copy set. After the shadow copies have been created, the backup volume becomes read-only.
 - Shadow copies are created by starting an OPC or QuickOPC.
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 the [swsrpvssbackup_exchange](#) 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	<i><Environment directory>\etc\repl\data\exchange\<managed business="" i="" name="" name>.wmd.xml<="" of="" server="" server>\metadoc\<database=""></managed></i>
Backup components document	<i><Environment directory>\etc\repl\data\exchange\<managed \<database="" business="" i="" name="" name>.bcd.xml<="" of="" server="" server>\metadoc=""></managed></i>

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 are 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 "[8.1.3.2.3 Preparing 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. The [swsrpvssbackup_exchange](#) 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 business 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 the [swsrpshadowadm_exchange](#) command on the business server.

Example:

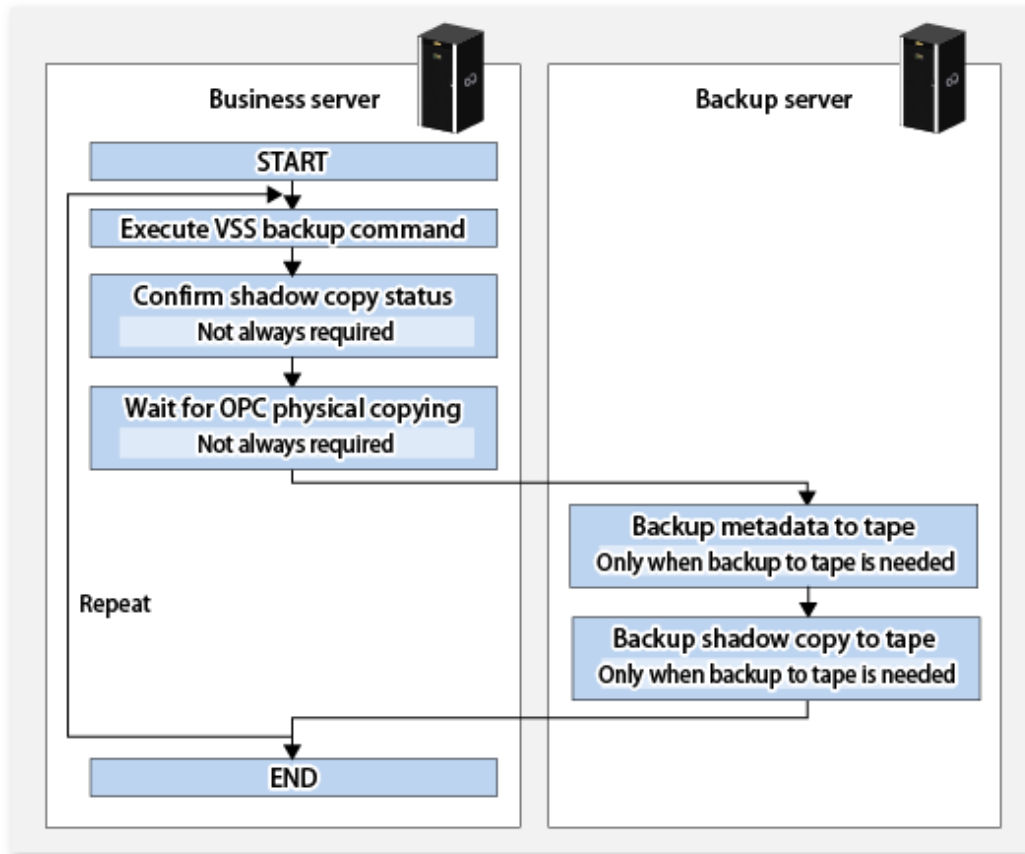
```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname Mailbox1
[Shadow Copy Status]
Original-Volume                Replica-Volume                Latest-Creation-Time Snapshot-
ID SnapshotSet-ID
g1d1p1@EXCHG-SVR(\\?\Volume{XXXX}\) g1d11p1@BKUP-SVR(\\?\Volume{XXXX}\) 2005/06/23 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:\>
```

8.1.4.2 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 8.16 For Snapshot Type Backups



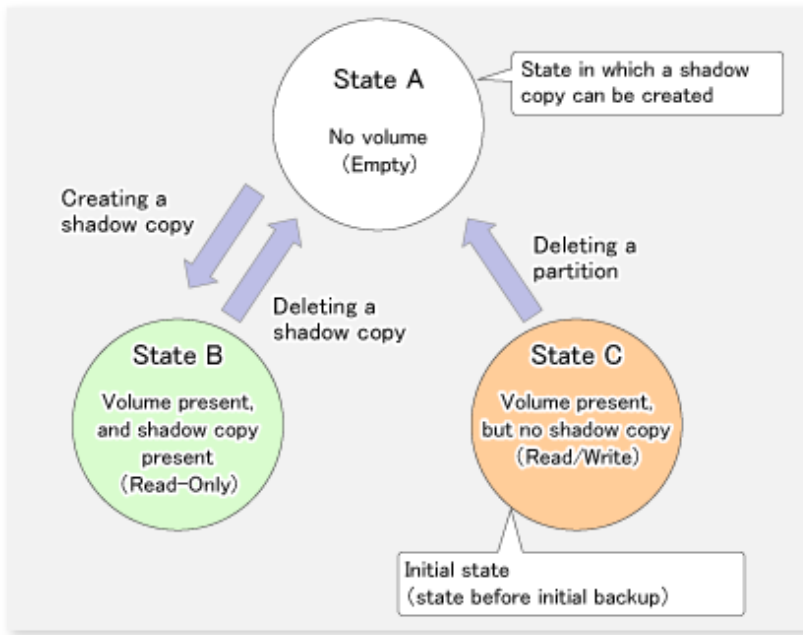
8.1.4.3 States of Backup Disk

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.

The number of backup disks associated with the transaction disk is restricted to one disk. This one backup disk is used repeatedly.

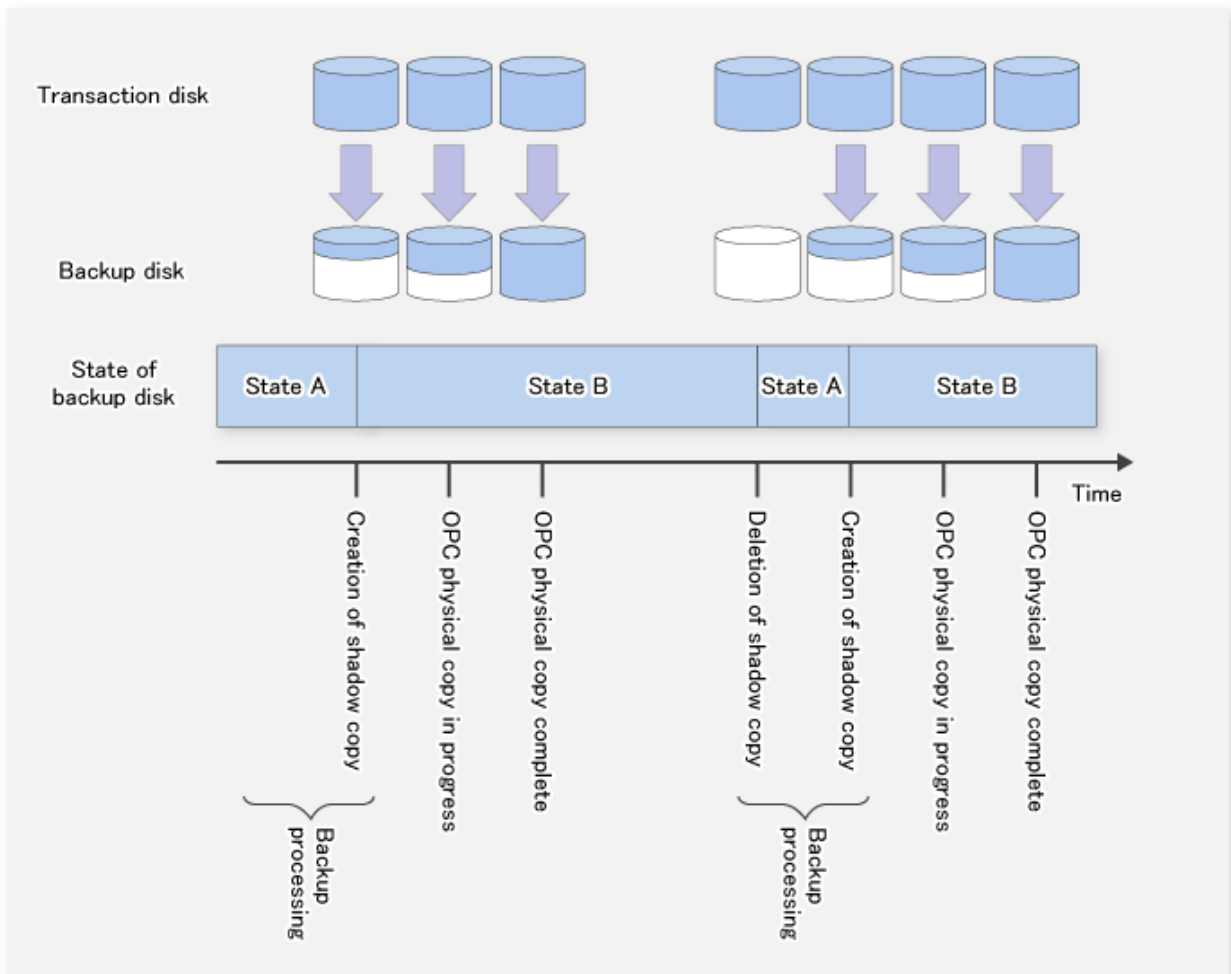
The state of the backup disk changes to one of the states in the following figure. The backup disk is in either the initial state or state A when the backup is executed. If it is in status A, the shadow copy is deleted and it is placed into state B before backup processing can begin.

Figure 8.17 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 8.18 For Snapshot Type Backups



Note

If the [swsrpshadowadm_exchange](#) or [swsrpshadowadm](#) 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 "[1.4 Notes about Online/Offline Status of Disks](#)" for information about the online and offline status of disks.

If you want to change the partition configuration of a disk after the [swsrpvssbackup_exchange](#) command has been executed for the disk, it must be returned to the initial status and then other tasks are required. Refer to "[8.1.6 Reconfiguration](#)" for the procedure.

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](#)
- [8.1.5.1.2 Permitting Overwrite of Database During Restoration](#)
- [8.1.5.1.3 Dismounting Database](#)
- [8.1.5.1.4 Stopping QuickOPC Session \(Only for Differential Snapshot Type Backups\)](#)
- [8.1.5.1.5 Stop Microsoft Exchange Search Host Controller Service \(for Exchange Server 2013 or later\)](#)

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

Use the Exchange Management Console and set the "Overwrite this database when restoring" option for database to be restored.

8.1.5.1.3 Dismounting Database

Use the Exchange Management Console and dismount database to be restored. After dismounting the stores, close the Exchange Management Console.

8.1.5.1.4 Stopping QuickOPC Session (Only for Differential Snapshot Type Backups)

For differential snapshot type backups, all of the QuickOPC sessions that have been set up on the transaction disk must be cancelled using the [swsrpshadowadm_exchange stopqopc](#) command before the restoration is executed. The [swsrpshadowadm_exchange status](#) command can be used to check the QuickOPC sessions that have been set up on the transaction disk.

Note

Restoration cannot be executed if there are any backup disks on the transaction disk that are undergoing QuickOPC. In order to cancel QuickOPC where physical copies are in progress, the shadow copies must be deleted first.

8.1.5.1.5 Stop Microsoft Exchange Search Host Controller Service (for Exchange Server 2013 or later)

For Exchange Server 2013 or later, 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.

8.1.5.2 Executing Restoration

Restoration is performed separately for each database, using the [swsrpvssrestore_exchange](#) command on the business 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)

Point

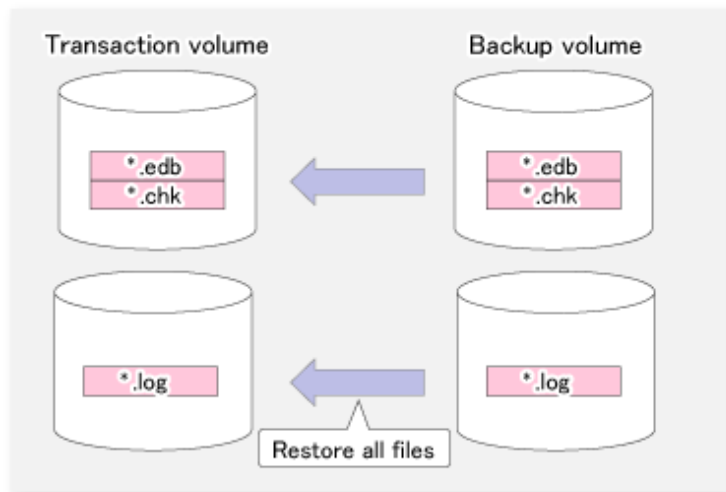
When performing restore, a restore destination volume must be made inaccessible from other processes. Lock it at pre- and post- processing.

(Do not specify "NoPrePost=on" in the copy destination volume locking specification file.)

8.1.5.2.1 Point-in-time Restoration (Restoring to Point When 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 the [swsrpvssrestore_exchange](#) command. If the `-point` option is specified, this command restores 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 8.19 Point-in-time Restoration



Example:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -point -dbname Mailbox1
swsrpvssrestore_exchange successfully completed
C:\>
```

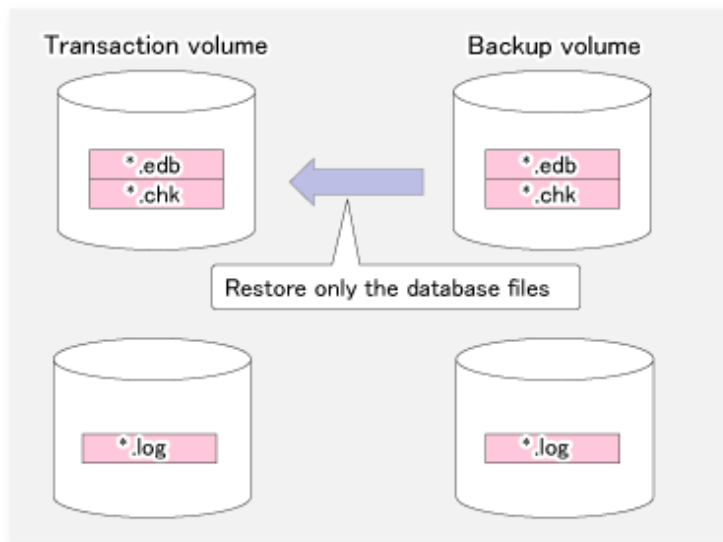
8.1.5.2.2 Roll Forward Restoration (Restoring to Latest Point)

Roll forward restorations restore databases to the latest point.

Roll forward restorations are executed by specifying the `-roll` with the `swsrpvssrestore_exchange` 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 8.20 Roll forward restoration



Example:

```
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.

8.1.5.3 Checking Restoration

The `swsrpstat_exchange` command can be used to check the restoration copy implementation status.

[Execution example (when OPC used to perform restoration)]

```
C:\> C:\Win32App\AdvancedCopyManager\bin\swsrpstat_exchange -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:\>
```

8.1.5.4 Post-restoration Operations

The following steps must be completed after performing a restoration:

- Start the Microsoft Exchange Search Host Controller service (for Exchange Server 2013 or later)
- Mounting the database

8.1.5.4.1 Start Microsoft Exchange Search Host Controller Service (for Exchange Server 2013 or later)

For Exchange Server 2013 or later, start the Microsoft Exchange Search Host Controller service on the restore destination server.

8.1.5.4.2 Mounting 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:

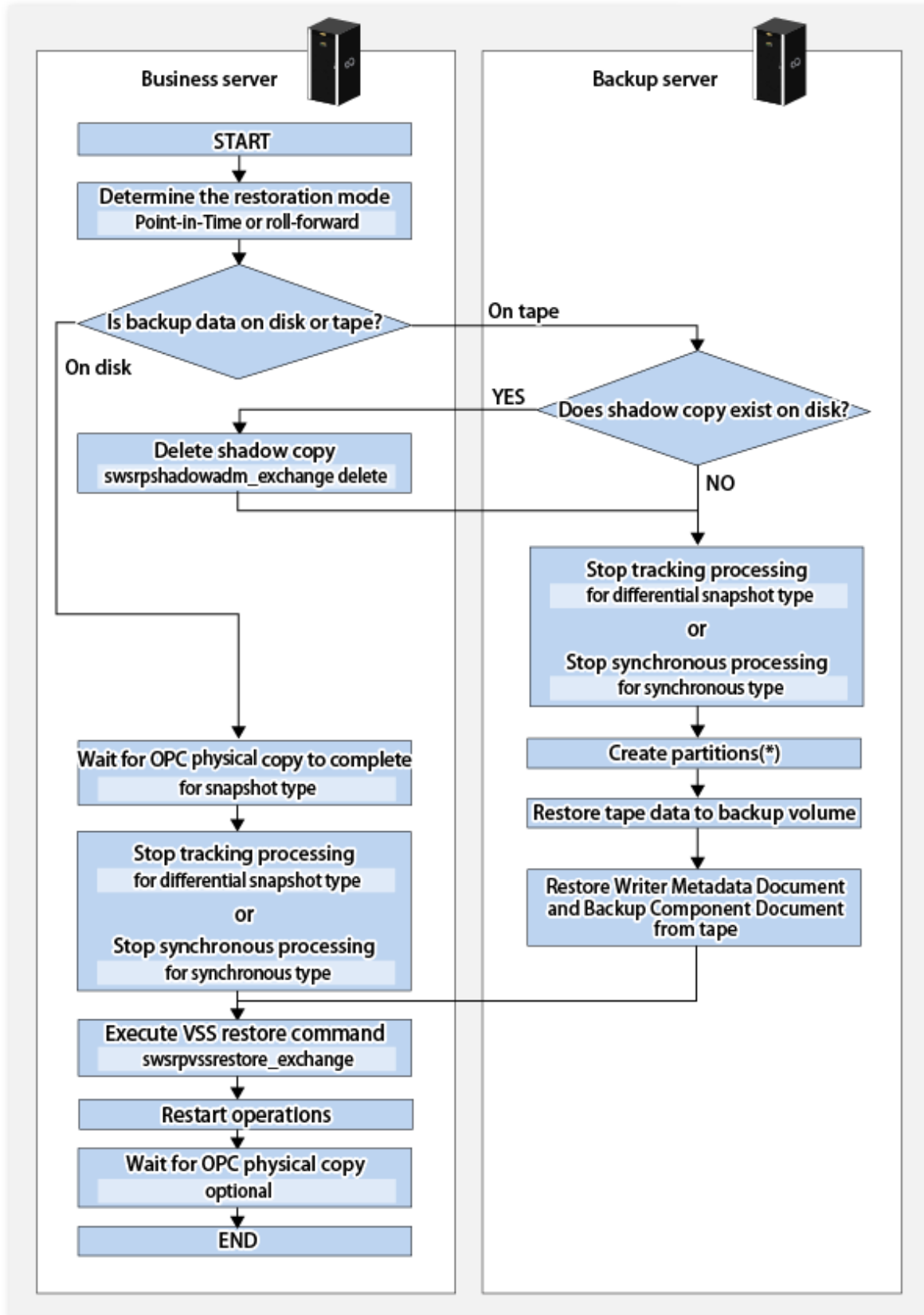
1. For roll forward restorations, either delete or rename the CHK file (EXX.chk). (For Point-in-Time restorations, do not perform this procedure.)
2. Use the Exchange Management Console to mount stores that have been dismounted.

8.1.5.5 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 8.21 Snapshot Restoration (Restoration Performed Using OPC)



*: If partitions cannot be created, the disk may be a read-only volume. In that case, start Diskpart by the command prompt to clear the read-only attribute on the disk.

8.1.6 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.

8.1.6.1 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 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 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 "[8.1.6.4 Initializing Disk](#)" for details.
3. Reconfigure the device.
4. Add the device information. Refer to "[7.4.4 Fetching Device Information on Managed Server](#)" for this operation.
5. Specify the source or replica volume.
6. Edit a drive letter map file.

8.1.6.2 Changing Copy Source and Destination Disks (When Changing 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 business server, check the copy status using the VSSH `stxvquery` (Status lookup command). If any copy is executing, or if QuickOPC is in the tracking state, use the VSSH `stxvcopy` (Backup control command) or the VSSH `stxvstopall` (Batch stop command) 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 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 "[8.1.6.4 Initializing Disk](#)" for details.
4. Reconfigure the device.
5. Add the device information. Refer to "[7.4.4 Fetching Device Information on Managed Server](#)" for information about this operation.
6. On the business server, execute "[8.1.3.2.6 Creating Copy Set File](#)" and "[8.1.3.2.7 Registering Copy Sets as Batch](#)" to change the copy set information.
7. On the business server, perform "[8.1.3.2.8 Checking and Saving Copy Set Registration Contents](#)".

- Specify the source or replica volume.
- Edit a drive letter map file.

8.1.6.3 Changing Storage Group Information or Database Information

If the storage group information or database information registered by the [swsrpdbname_exchange](#) command is changed, [swsrpdbname_exchange](#) 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.

8.1.6.4 Initializing 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 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 or later, 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 "[8.1.5.5 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.

8.1.6.5 Changing Managed Server Name

To change the Managed Server name, follow the procedure below:

- Delete the source or replica volume. Refer to "[7.6.2 Deleting Source Volume or Replica Volume](#)" for more information.
- Change the Managed Server name. For details, refer to "[13.5.4 Changing Server Name of Management Server or Managed Server](#)".
- Specify the source or replica volume.

8.1.6.6 Changing Copy Type

- On the business 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 business server, use "[8.1.3.2.6 Creating Copy Set File](#)" and "[8.1.3.2.7 Registering Copy Sets as Batch](#)" to change the copy type. Then perform the tasks described in "[8.1.3.2.8 Checking and Saving Copy Set Registration Contents](#)".

8.1.6.7 Changing IP Addresses of Business Server or Backup Server

Use the following procedures to change the IP addresses of the business server or the backup server:

1. Change the IP address of the Managed Server (business server or backup server). Refer to "[13.5.1 Changing IP Address of Management Server](#)" for details.
2. Change the settings of ETERNUS VSS Hardware Provider Communication Server service in the business server and the backup server. Refer to "When Changing the Communication Environment" in the *ETERNUS VSS Hardware Provider User's Guide* for details.

8.1.6.8 Other Environment Changes

Refer to "[13.5 Changing Operating Environment](#)" for information concerning other environment changes.

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 that is currently being executed

8.1.7.1 Deleting Shadow Copy

Delete the shadow copy by executing the `swsrpshadowadm_exchange` command on the business server.

Example:

```
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 "[1.4 Notes about Online/Offline Status of Disks](#)" for information about the online and offline status of disks.

8.1.7.2 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 the `swsrpshadowadm_exchange` command on the business server.

Example:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopgopc -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).

8.1.7.3 Stopping Restoration Copies

Stop the restoration copy process by executing the [swsrpcancel](#) command on the business server.

Example:

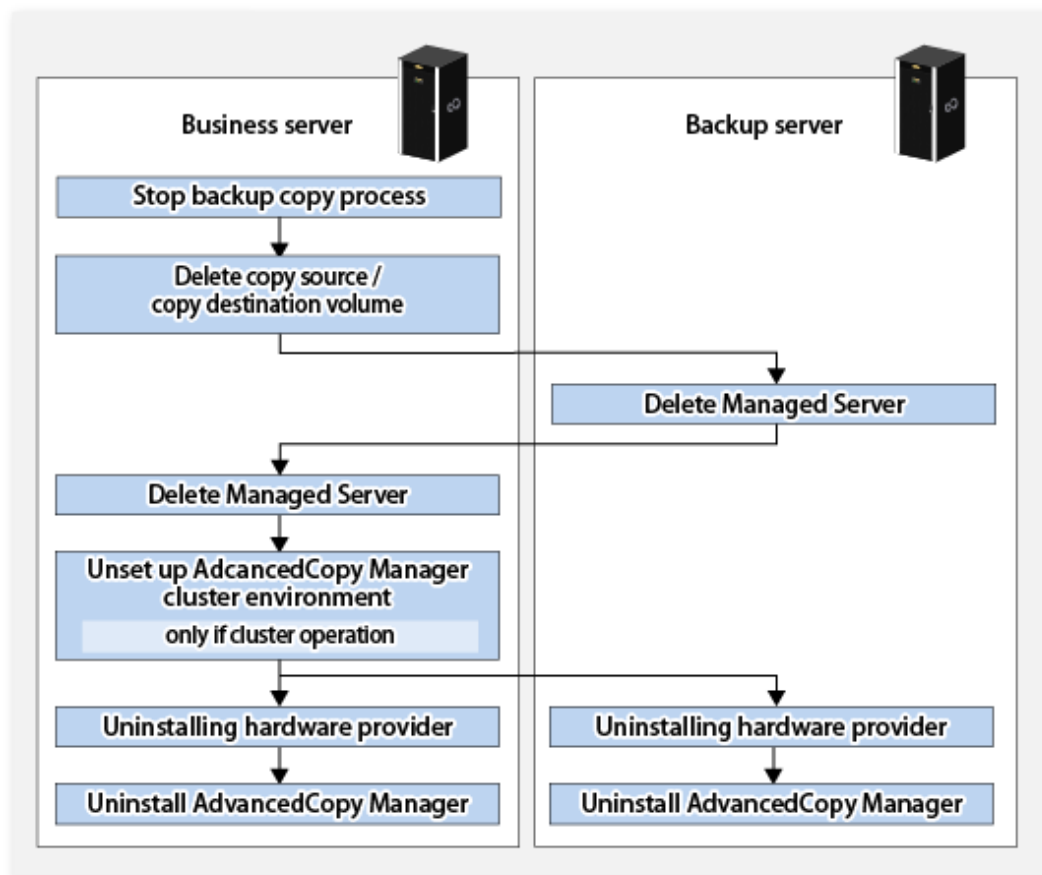
```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d11p1@BKUP-SVR g1d1p1@EXCHG-SVR
FROM=g1d3p1@BKUP-SVR, TO=g1d1p1@EXCHG-SVR swsrpcancel completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel g1d12p1@BKUP-SVR g1d2p1@EXCHG-SVR
FROM=g1d4p1@BKUP-SVR, TO=g1d2p1@EXCHG-SVR swsrpcancel completed
C:\>
```

When this command is executed, any restoration copy process in progress is 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

This section describes how to perform uninstallation. The following figure shows the flow of uninstallation tasks.

Figure 8.22 Uninstallation Task Flow



8.1.8.1 Stopping Backup Copy Process

On the business server, check the copy status using the VSSHP stxvquery (Backup status lookup command). If any copy process is still executing, stop it using the VSSHP stxvcopy (Backup control command) or the VSSHP stxvstopall (Batch stop command) command.

8.1.8.2 Delete Source and Replica Volumes

Execute the [swsrpdelvol](#) command to delete the source and replica volumes that have been set up. Alternatively, if the source or replica volume is no longer used, initialize the disk. Refer to "[8.1.6.4 Initializing Disk](#)" for the procedure.

8.1.8.3 Delete 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 the [stgxfwcmdelsrv](#) command.

If you have deleted the Managed server with the [stgxfwcmdelsrv](#) command, take the following actions to reflect to 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:
With Web Console, execute the **Reload Conf.** operation to update to the latest information.
- If only AdvancedCopy Manager's agent is used:
With Web Console, delete the Managed Server that you have deleted.

8.1.8.4 Uninstalling Hardware Provider

If VSSHP is no longer used, refer to "VSSHP Uninstallation" in the *ETERNUS VSS Hardware Provider User's Guide* and uninstall the VSSHP on both the business server and the backup server.

Note

Do not uninstall VSSHP if there are other storage groups on the backup server or business server where operations may use this hardware provider registration.

8.1.8.5 Deleting AdvancedCopy Manager

Refer to "Uninstalling ETERNUS SF Manager" and "Uninstalling AdvancedCopy Manager's Agent" in the *Installation and Setup Guide* to delete AdvancedCopy Manager.

8.2 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.

8.2.1 Overview

- Online backup
AdvancedCopy Manager performs online backup of Exchange Server database, working with VSS.
- Restore from online backup data
AdvancedCopy Manager performs restore from online backup data, working with VSS.

This section presents execution examples using Exchange Management Shell.
For more information about Exchange Management Shell, refer to "Help" in Exchange Server documents.

8.2.2 Configuration

This section focuses on the following configurations.

Figure 8.23 Server Configuration

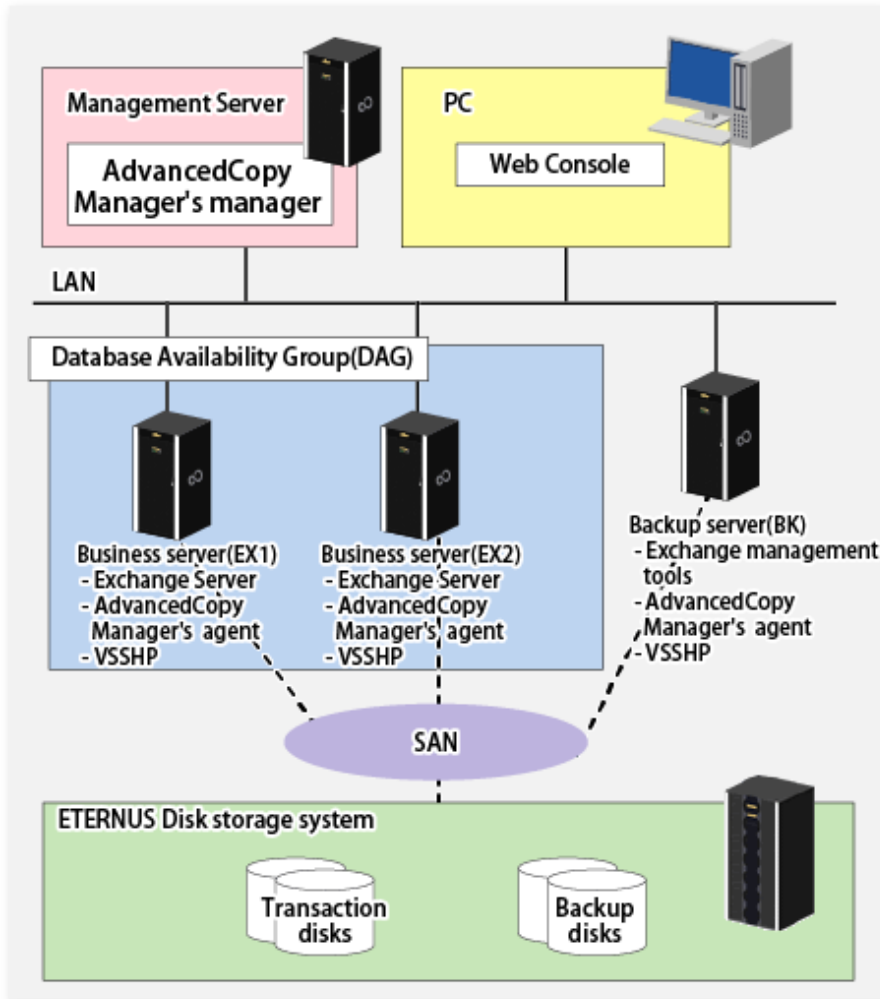
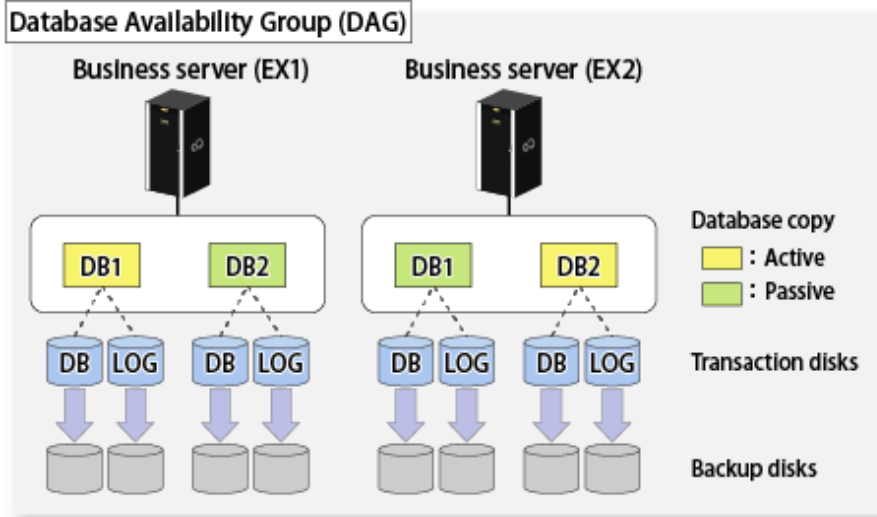


Figure 8.24 Database Configuration



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 "8.1.2.2 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.

8.2.3 Installation and Setup

For a Management Server and PC, refer to the *Installation and Setup Guide* to install and set up their respective components.

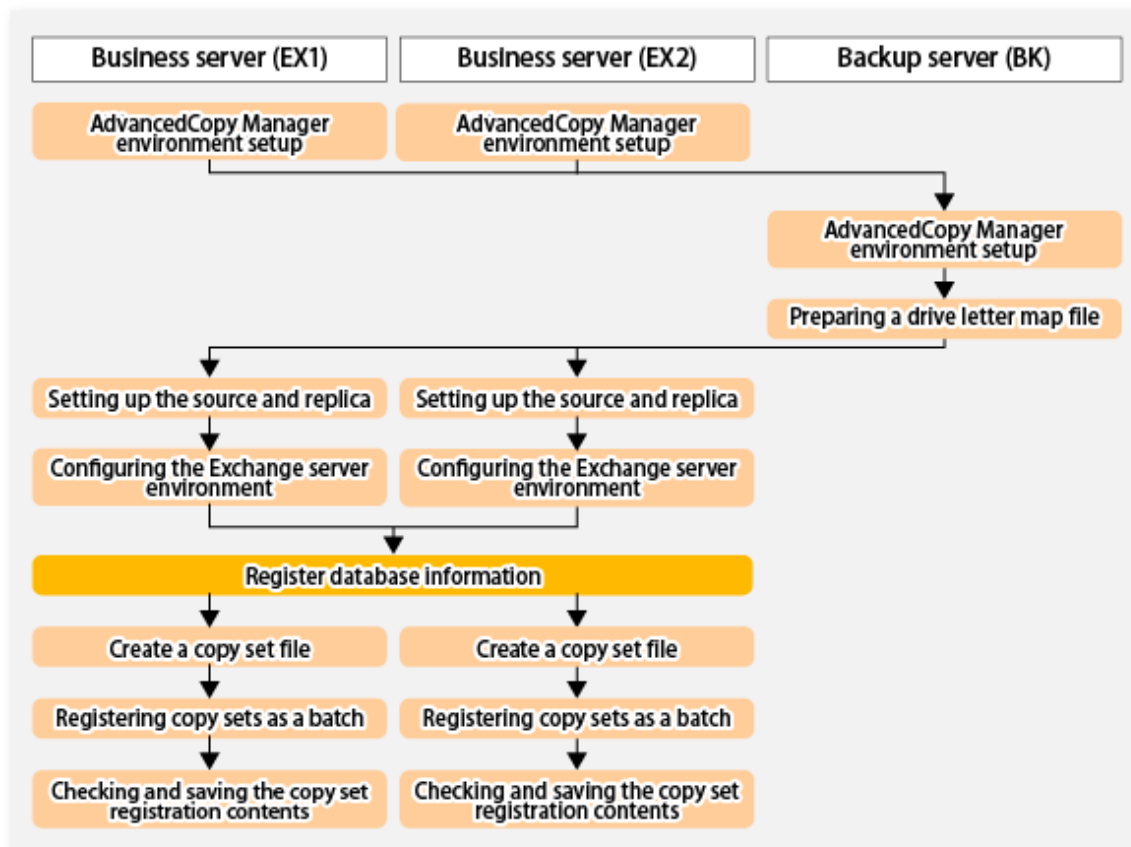
For the business server that performs backups and Backup server, install and set up AdvancedCopy Manager's agent.

For more information, refer to "8.1.2 Operation Design" and "8.1.3 Preparation".

8.2.3.1 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 "8.1.3.2.5 Registering Database Information".

1. Activate a target database copy.
2. Specify the database and execute the `swsrpdbinfo_exchange` command.



Note

- After performing this procedure, do not execute the `swsrpdbinfo_exchange` command with the `-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.

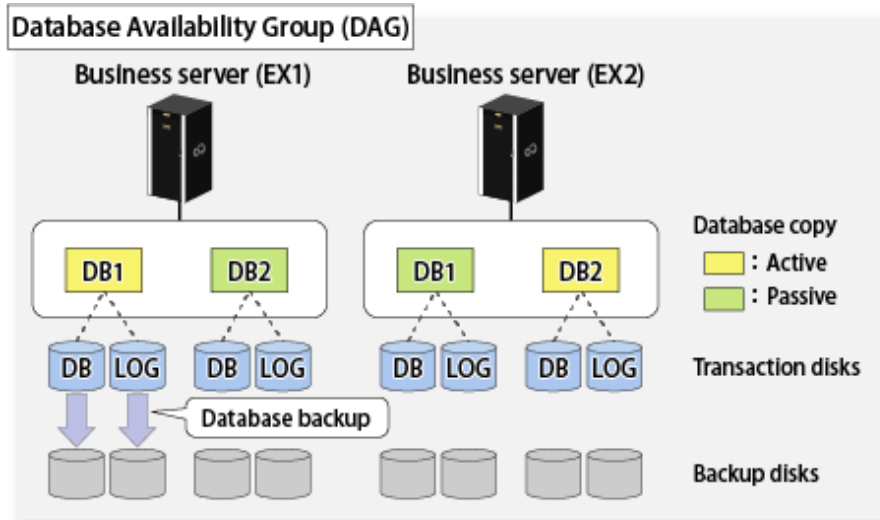
```
C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -dbname DB2
```

8.2.4 Backup

Perform online backup of Exchange Server database. For backup, use one of active database copy or passive database copy.

For details about database backup, refer to "8.1.4 Backup".

Figure 8.25 Backup of Exchange Server Database



Execution Example 1

Perform backup of DB1 (active) on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname DB1
```

Display the status of the shadow copy of DB1 on EX1 and confirm that the backup has been properly performed.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname DB1
```

Execution Example 2

Perform backup of DB2 (passive) on EX1.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpvssbackup_exchange -dbname DB2
```

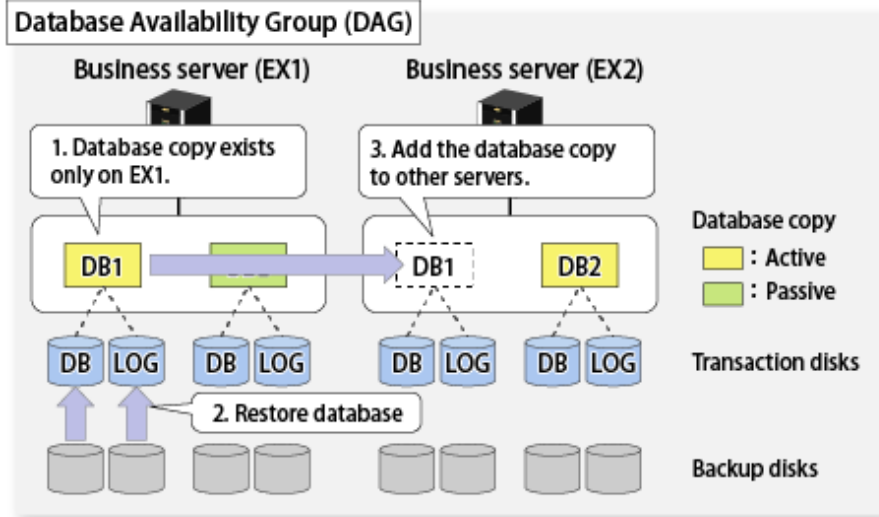
Display the status of the shadow copy of DB2 on EX1 and confirm that the backup has been properly performed.

```
C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname DB2
```

8.2.5 Restore

Perform restore from the backup data on the server on which backup was performed.

Figure 8.26 Restore of Exchange Server 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 "[8.1.5 Restoration](#)".
3. Add the database copy to other servers than the restore destination server.

For Exchange Server 2013 or Later

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 "[8.1.5 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 or later, 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 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 or later, 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 "[8.1.5.4.2 Mounting 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 or later, 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 or later, 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 "[8.1.5.4.2 Mounting 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.

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 or later, 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 or later, 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
```

8.3 Backup and Restore Using Wizard for Exchange Server

This section explains how to back up and restore Exchange Server databases using the wizard (Backup Wizard for Exchange Server and Restore Wizard for Exchange Server).



See

.....
Refer to "[8.1 Backup and Restore of Exchange Server Database](#)" for information on the procedure to back up Exchange Server databases without using the Wizard.

Refer to "[8.2 Backup and Restore of Database Availability Group](#)" for information on procedures for backup and restoration of a Database Availability Group (DAG) that does not use the wizard.
.....

8.3.1 Overview

8.3.1.1 Outline of Backup by Backup Wizard for Exchange Server

The Backup Wizard for Exchange Server simplifies the backup operation for Exchange Server databases.

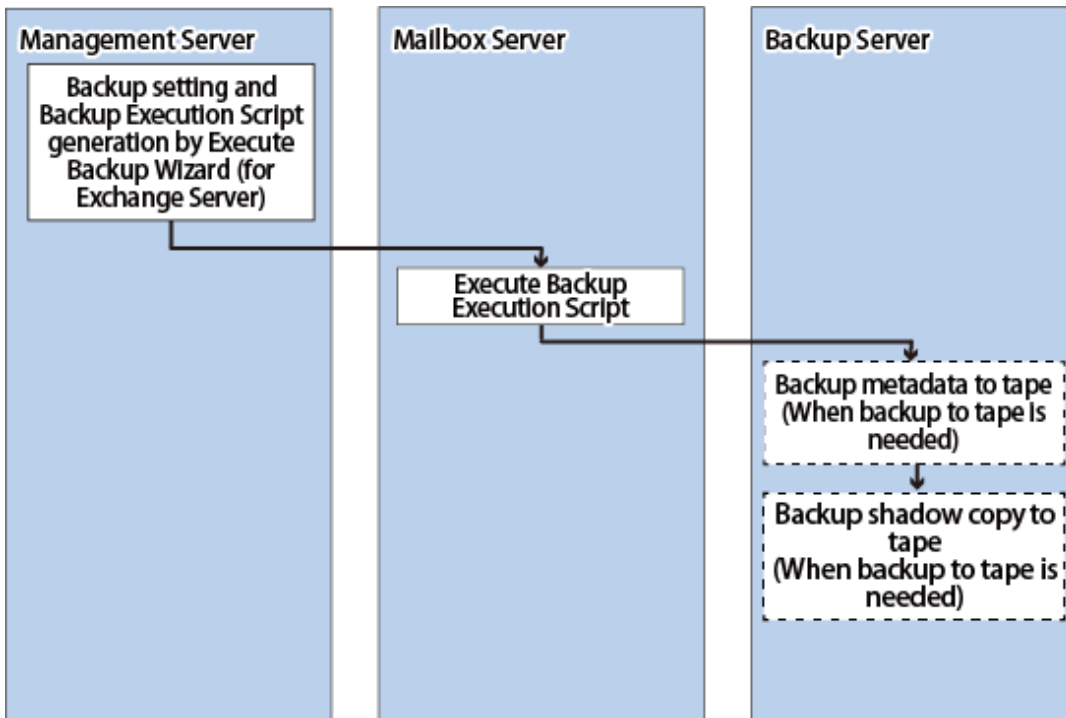
When the Backup Wizard for Exchange Server is used, the Exchange Server database backup settings and operations, both of which require complex procedures, can be simplified by users even without specialist knowledge.

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

The necessary procedures for backup with the Backup Wizard for Exchange Server are explained.

The flow of the backup task is as follows:



8.3.1.2 Outline of Restoring by Restore Wizard for Exchange Server

The Restore Wizard for Exchange Server makes restoration operation of the Exchange Server database easy.

When the Restore Wizard for Exchange Server is used, Exchange Server database restoration, which requires complex procedures, can be easily carried out by users even without specialized knowledge.

System Restoration through Restore Execution

The Mailbox Server database can be restored by launching the Restore Wizard, with no need for administrators to restore.

An example for a data center is shown below.

Figure 8.27 Restoration Using Restore Wizard for Exchange Server (Example of Application in Data Center)

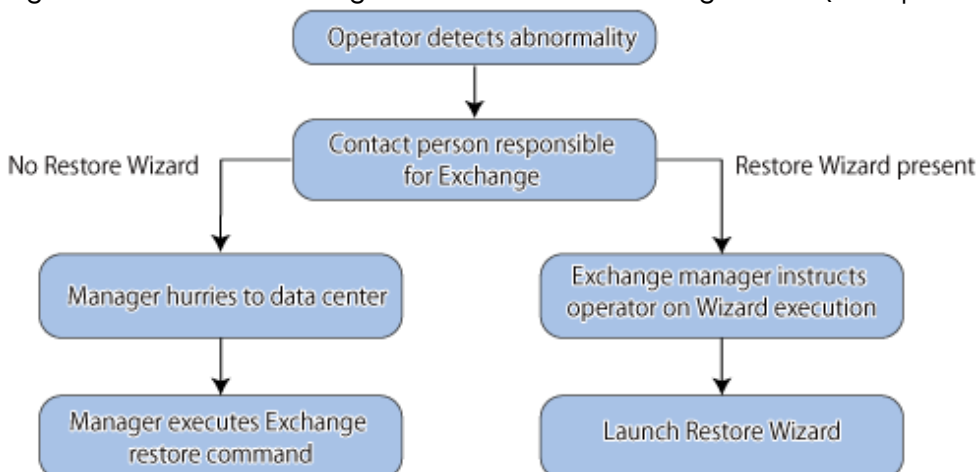
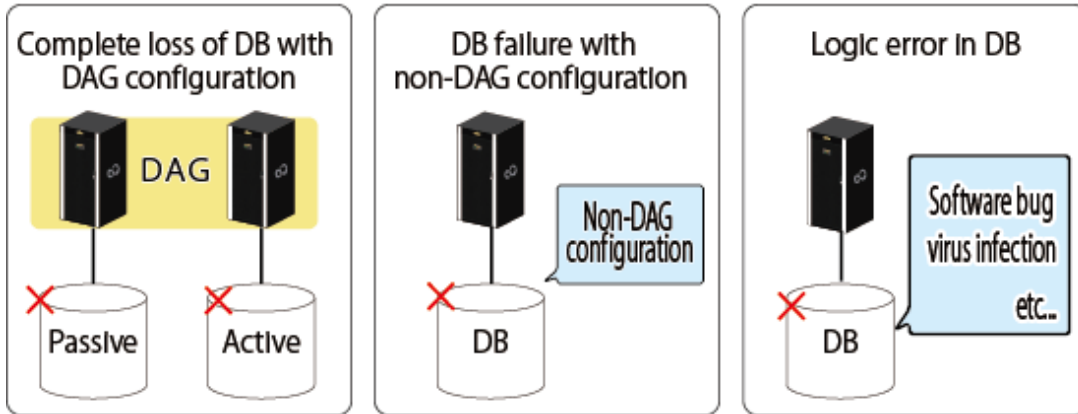


Figure 8.28 Use of Restore Wizard for Exchange Server

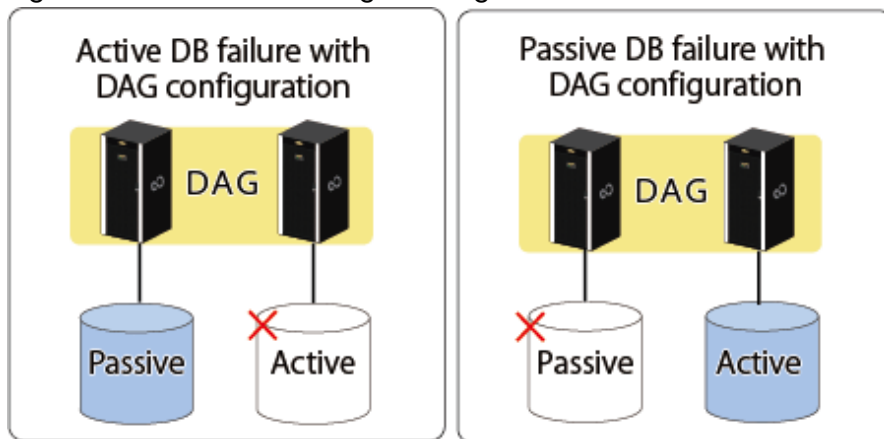


Restore Wizard for Exchange Server can handle the following 3 usage cases.

- Complete loss of DB in Database Availability Group (DAG) configuration
- DB failure in non-DAG configuration
- Logical failure in DB

 Information

Figure 8.29 Restoration Using Exchange Server Function



Use the Exchange Server function for restoration in the following cases.

- Active DB failure in DAG configuration
- Passive DB failure in DAG configuration

Support Range Provided by Restore Wizard for Exchange Server

The Restore Wizard for Exchange Server is capable of the following restoration.

- Restoration Targets
 - Mailbox database (Active, Passive)
 - Public folder database
- Restoration Point
 - Roll-forward
Restoring to the point immediately before fault

- Point-in-time

Restoring to the point when the (last) backup was taken

Restoration Process

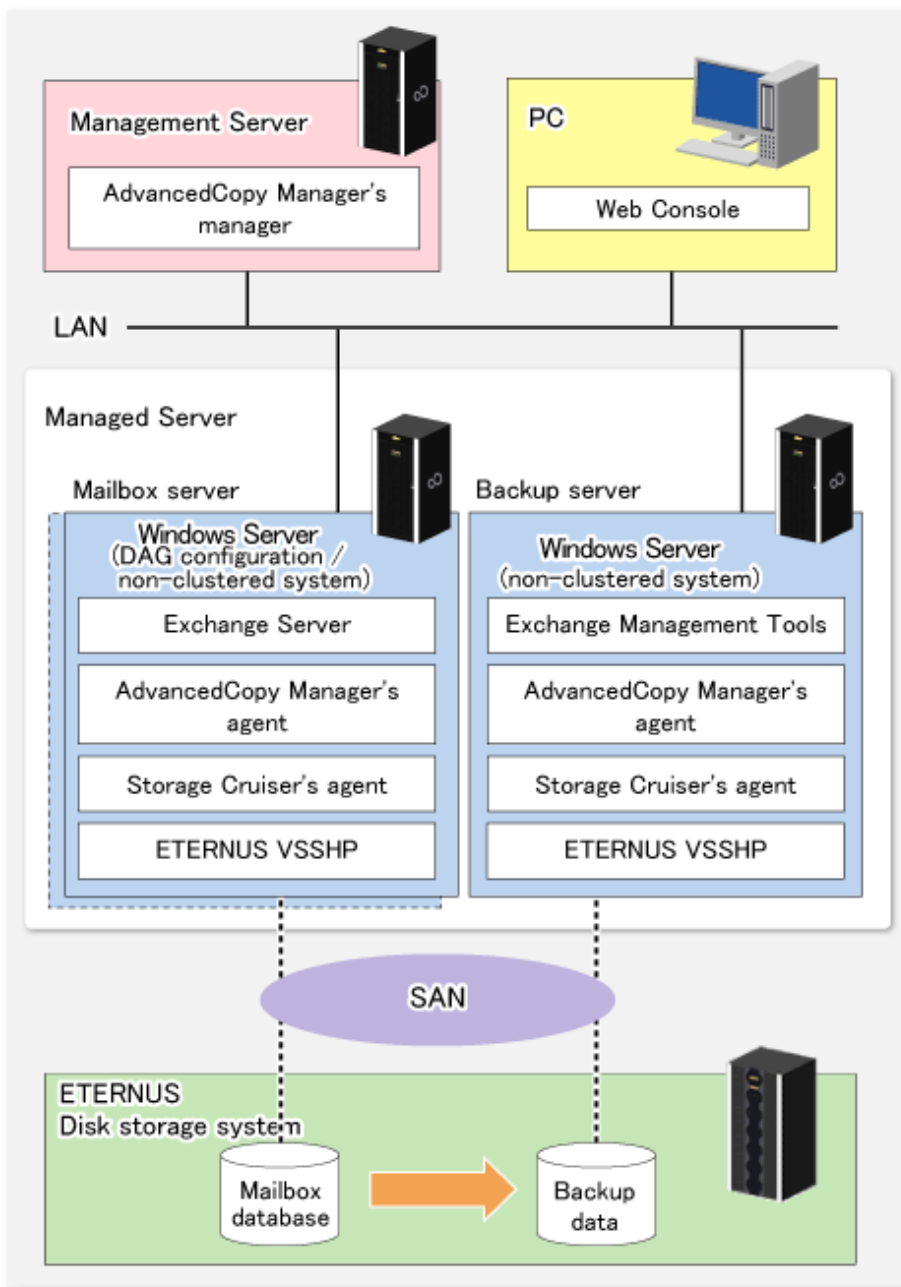
Executing the Restore Wizard for Exchange Server executes the following process in sequence.

1. Stop QuickOPC session
2. Activate database (only in case of DAG configuration)
3. Delete database copy (only in case of DAG configuration)
4. Permit database overwrite
5. High-speed restoration of data using the Advanced Copy function of ETERNUS Disk storage system
6. Mount database

8.3.1.3 System Configuration

The configuration of the Backup Wizard for Exchange Server and the Restore Wizard for Exchange Server is shown below.

Figure 8.30 System Configuration of Backup Wizard for Exchange Server and Restore 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.

8.3.1.4 Supported Configurations

Refer to "[8.1.2.1 Designing Server Configurations](#)" about supported server configurations.

The server configuration conditions different from "[8.1.2.1 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, it is possible to use the Mailbox Server as the operation server. In other words, the script generated by the Backup Wizard is executed where this is created (on the Mailbox Server).

Supported Configurations

This function supports the following configurations.

- [DAG Configuration \(Management Server: Cluster Configuration\)](#)
- [DAG Configuration \(Management Server: Non-cluster Configuration\)](#)
- [DAG Configuration \(Minimum Configuration\)](#)
- [Non-DAG Configuration](#)
- [Non-DAG \(Minimum Configuration\)](#)

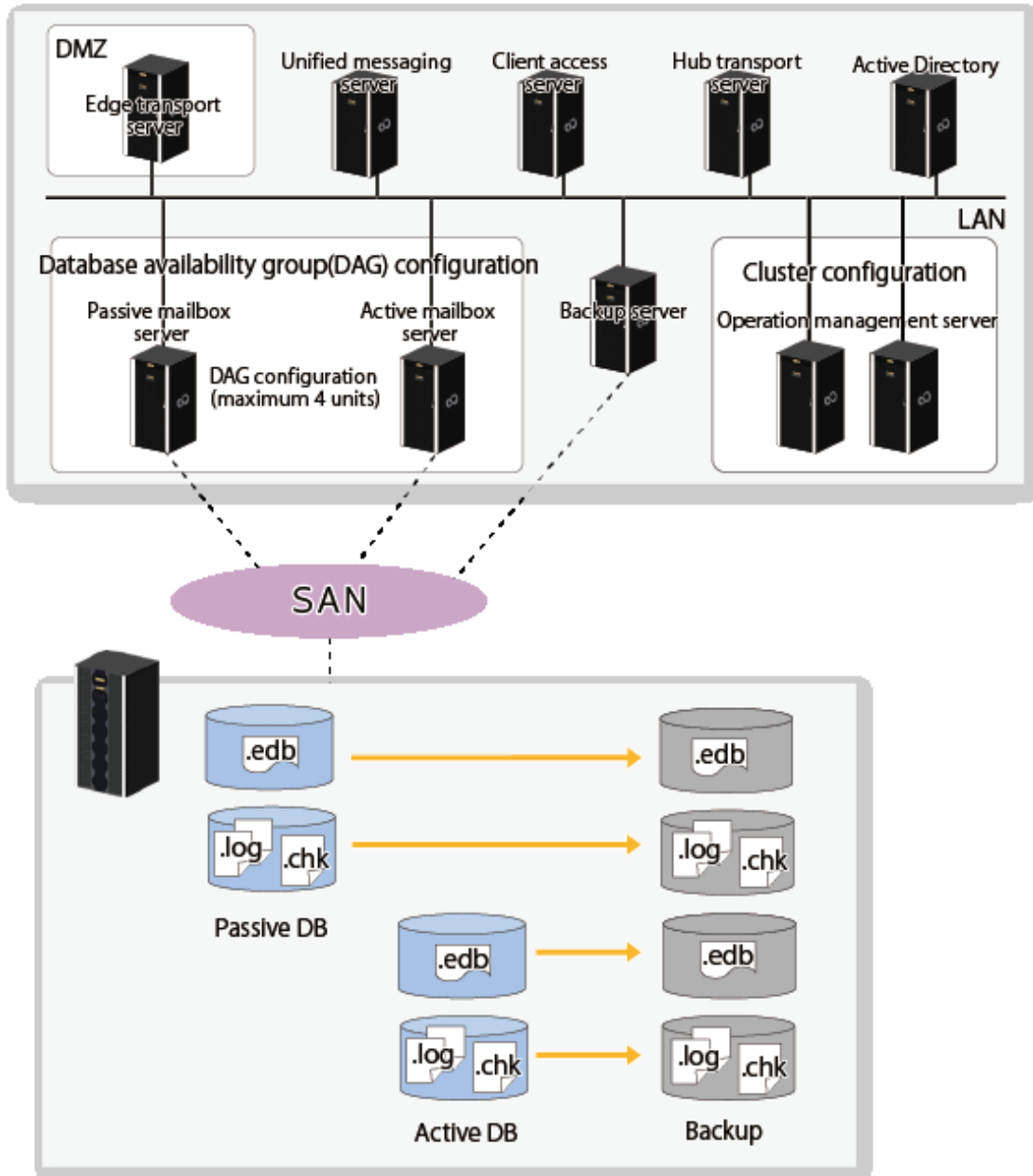
Note

- Do not operate the backup server in cluster operation mode.
- Do not use multiple backup servers for 1 Mailbox Server.
- Make sure that the Exchange Server version and service pack on the backup server and Mailbox Server are equivalent.
- The AdvancedCopy Manager's agent (Mailbox Server) platform must be Windows.
- Do not allow multiple versions of the Exchange Server to co-exist on 1 backup server or Mailbox Server.
- Restore it after it backs up again when the size and the composition of the device that executes the backup of the Exchange Server database are changed.

DAG Configuration (Management Server: Cluster Configuration)

Environment built with the Management Server in cluster configuration with DAG configuration.

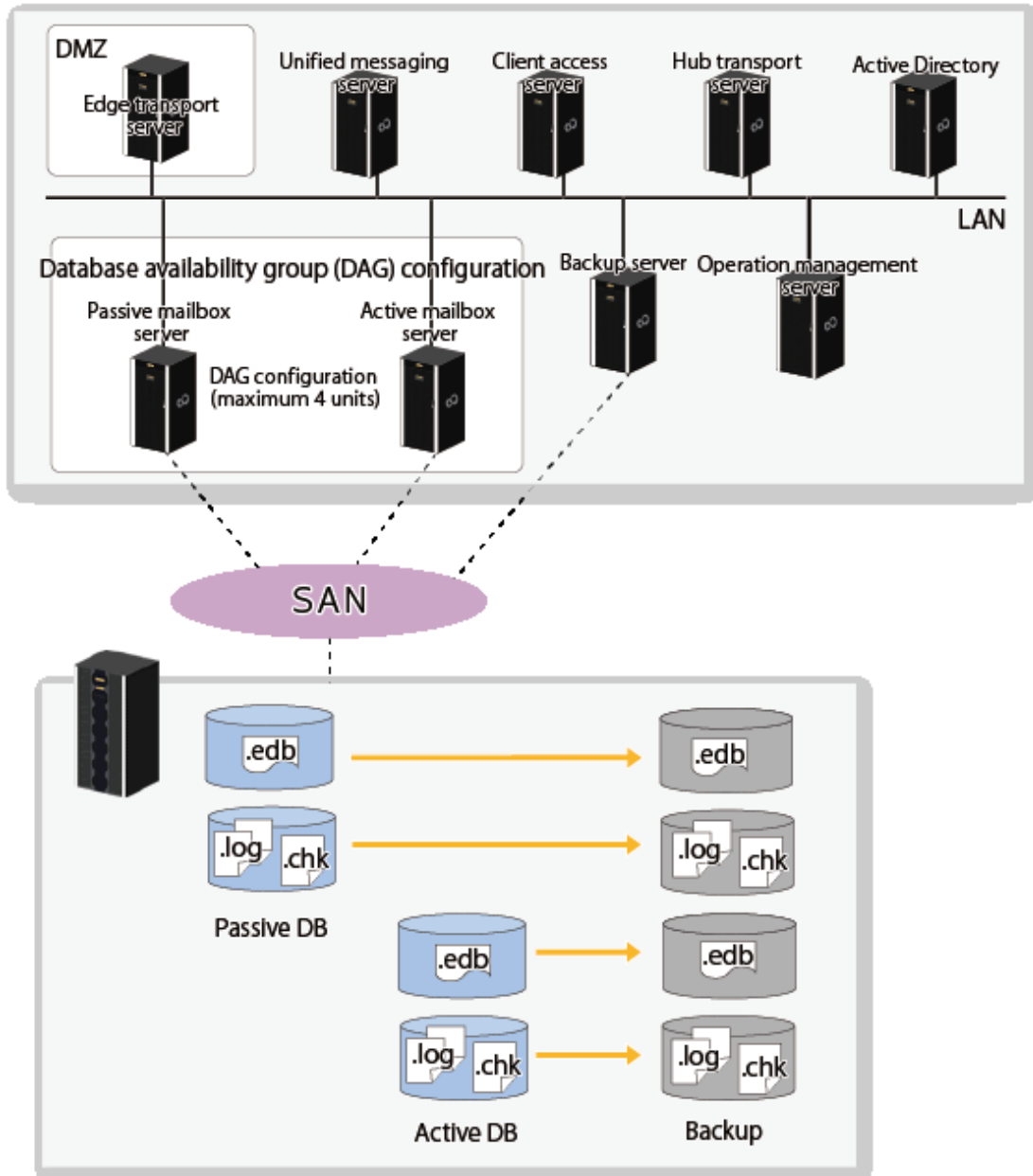
Figure 8.31 DAG Configuration (Management Server: Cluster Configuration)



DAG Configuration (Management Server: Non-cluster Configuration)

Environment built with the Management Server in non-cluster configuration with DAG configuration.

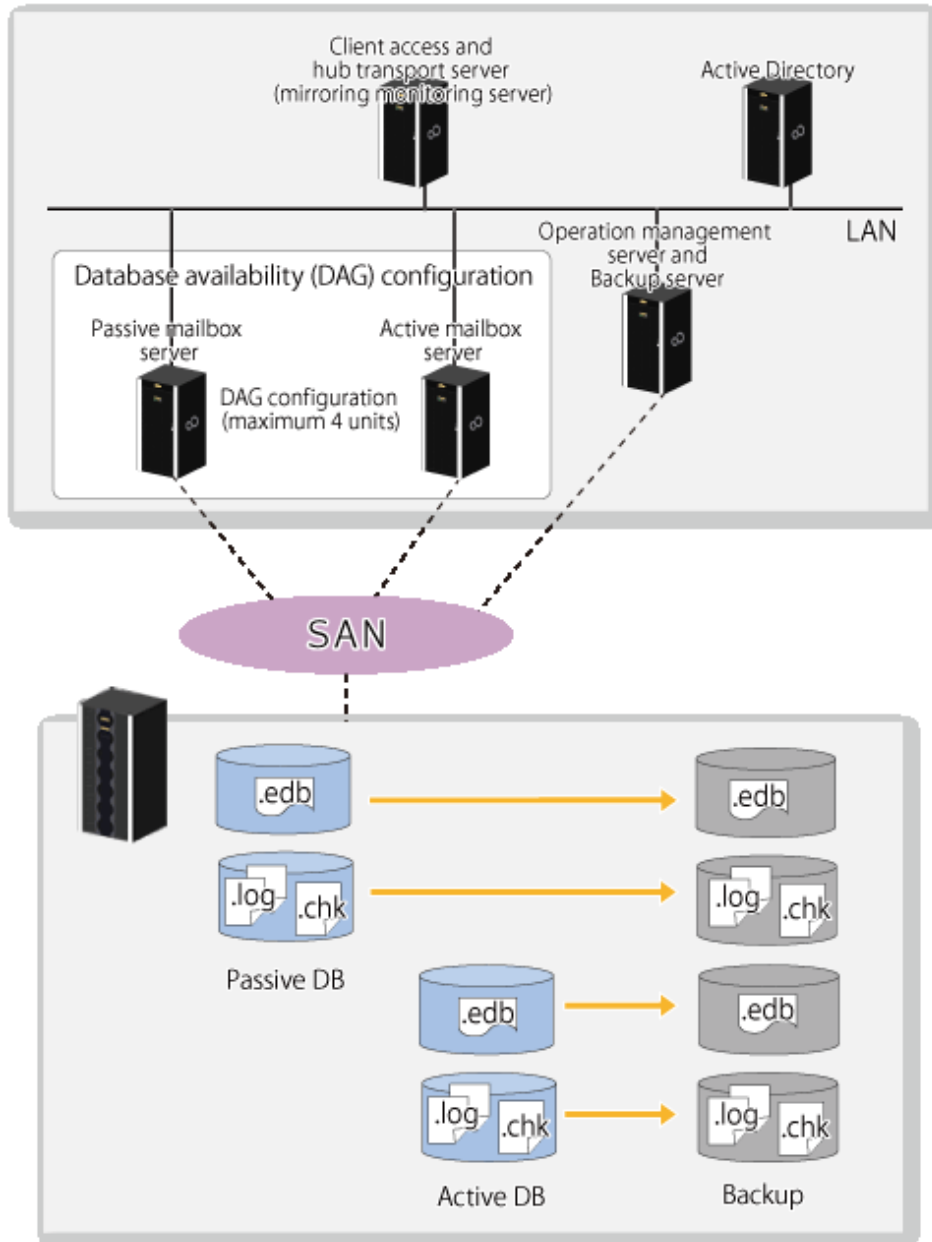
Figure 8.32 DAG Configuration (Management Server: Non-cluster Configuration)



DAG Configuration (Minimum Configuration)

Environment built with the client access server and hub transport server as the same server with DAG configuration.

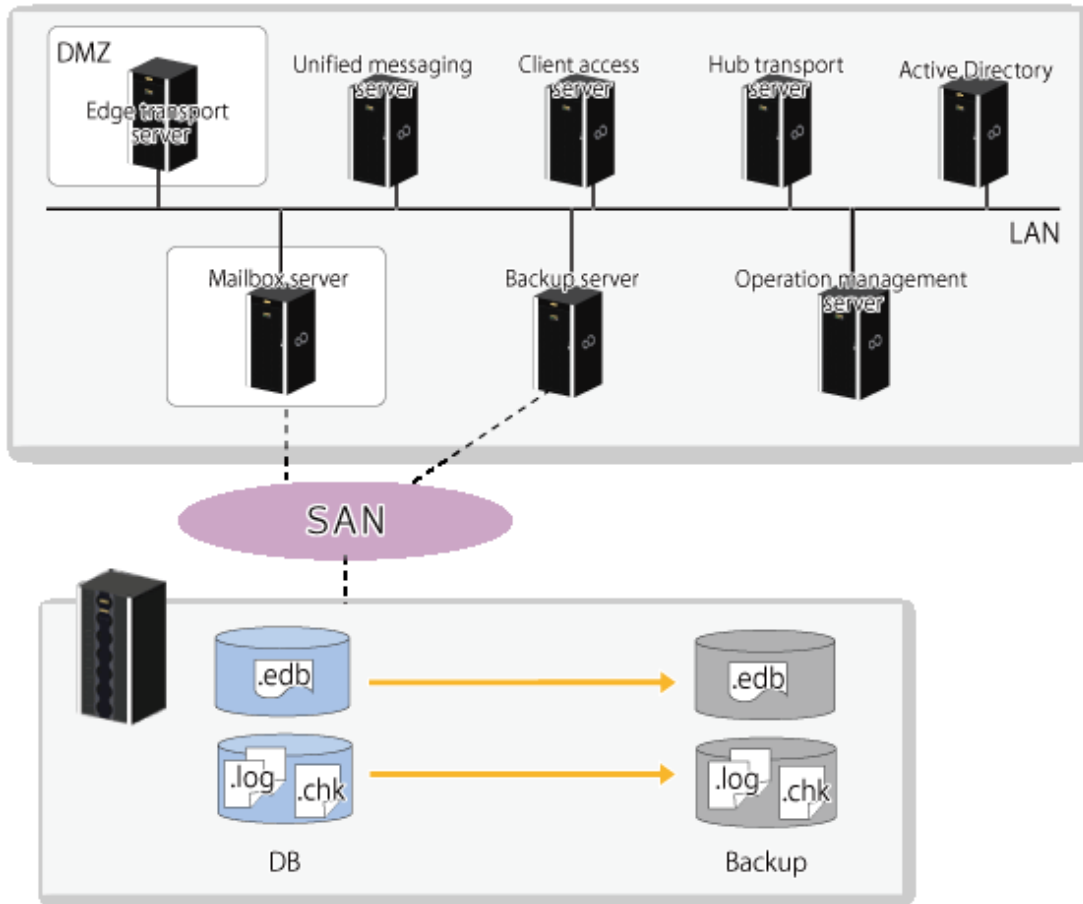
Figure 8.33 DAG Configuration (Minimum Configuration)



Non-DAG Configuration

Environment that does not have DAG configuration

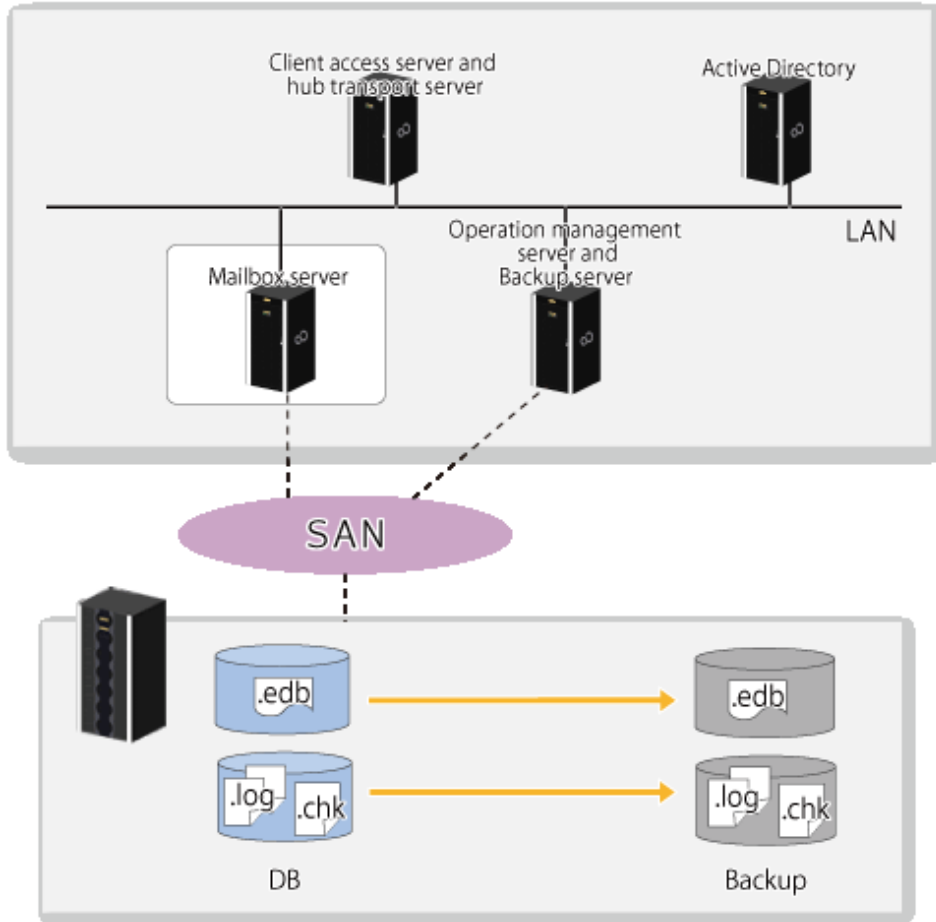
Figure 8.34 Non-DAG Configuration



Non-DAG (Minimum Configuration)

Environment built with the client access server and hub transport server as the same server in an environment that does not have DAG configuration.

Figure 8.35 Non-DAG Configuration (Minimum Configuration)



Overview of Server Roles and Functions

Refer to the following for an explanation of the server roles pertaining to Exchange Server backup restore operation.

Server Type	Server Roles	Required/Optional	Co-existence with Other Servers
Mailbox Server	This is the server that hosts the mailbox and public folder. This is the backup target server. AdvancedCopy Manager's agent, Storage Cruiser's agent, and ETERNUS VSS Hardware Provider must be installed.	Required (maintain the mailbox database and public folder database)	Co-existence with the following servers is possible: <ul style="list-style-type: none"> - Client access server - Hub transport server - Unified messaging server *: Cannot co-exist with the backup server and Management Server
Client access server	This server hosts client protocols such as POP3, IMAP4, HTTPS, Outlook Anywhere, free/busy status service, and automatic detection services, among others.	Required (in charge of handling connection requests from clients)	Co-existence with the following servers is possible: <ul style="list-style-type: none"> - Mailbox Server (not possible if co-existing with a Management Server) - Client access server - Hub transport server - Unified messaging server

Server Type	Server Roles	Required/Optional	Co-existence with Other Servers
			<ul style="list-style-type: none"> - Management Server (not possible if co-existing with a Mailbox Server)
Hub transport server	<p>This is a mail routing server that routes mail in the Exchange Server system.</p> <p>*: Automatically built as a monitoring server when DAG is created by default (mirroring monitoring server).</p>	Required (in charge of handling delivery of messages in the Exchange Server system)	<p>Co-existence with the following servers is possible:</p> <ul style="list-style-type: none"> - Mailbox Server (not possible if co-existing with a Management Server) - Unified messaging server - Management Server (not possible if co-existing with a Mailbox Server)
Edge transport server	This is the mail routing server that routes mail with the Exchange Server system and is set up on the perimeter network (DMZ).	Optional	<p>Not possible</p> <p>(must be operated with DMZ so cannot co-exist with other roles operating in the LAN)</p>
Unified messaging server	This server connects the private branch exchange (PBX) system to the Exchange Server.	Optional	<p>Co-existence with the following servers is possible:</p> <ul style="list-style-type: none"> - Mailbox Server (not possible if co-existing with a Management Server) - Client access server - Hub transport server - Unified messaging server - Management Server (not possible if co-existing with a Mailbox Server)
Backup server	<p>This is a dedicated backup server for online backup of the Exchange Server.</p> <p>A backup volume must be connected.</p> <p>AdvancedCopy Manager's agent(*1), Storage Cruiser's agent, ETERNUS VSS Hardware Provider, and Exchange Management Tools must be installed.</p>	Required (dedicated backup server for online backup of the Exchange Server)	<p>Co-existence with the following servers is possible:</p> <ul style="list-style-type: none"> - Management Server
Management Server	<p>This is a dedicated Management Server for online backup of the Exchange Server.</p> <p>It is necessary to Install ETERNUS SF Manager (AdvancedCopy Manager).</p>	Required (dedicated Management Server for online backup of the Exchange Server)	<p>Co-existence with the following servers is possible:</p> <ul style="list-style-type: none"> - Client access server - Hub transport server - Unified messaging server - Backup server <p>*: Cannot co-exist with Mailbox Server</p>

*1: If this server co-exists with the Management Server, you do not need to install the AdvancedCopy Manager's agent in this server.

 **Note**

Virtualization of all servers is supported, with the exception of Active Directory (see Note). The virtualization environment's support range is based on the support range of AdvancedCopy Manager, the support range of VSSHP, and the support range of Storage Cruiser. For details, refer to "Table 8.4 For Virtual Environment Table".

Note: Active Directory virtualization is not recommended and is therefore not supported by this function.

Table 8.4 For Virtual Environment Table

Platform		Agent	Manager
VMware	Host	X	X
	Guest (*1)	O	O
Hyper-V	Host	O	O
	Guest	X	O
KVM	Host	-	O
	Guest	-	O

O: Supported

X: Not supported

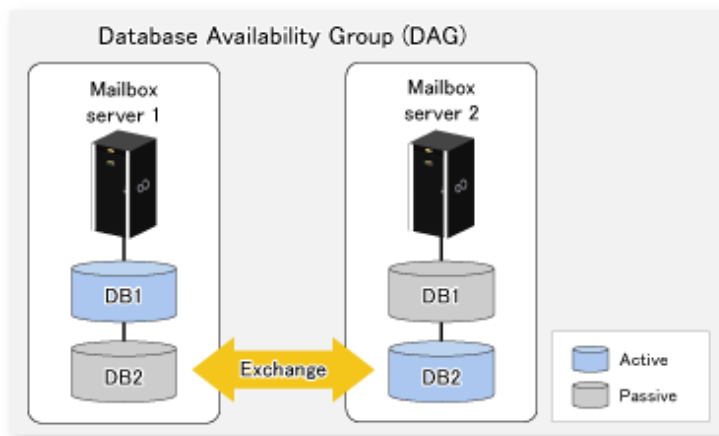
-: Not for Backup Wizard for Exchange Server and Restore Wizard for Exchange Server

*1: VMware Tools must be installed.

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 8.36 Mixed Active Mailbox Databases and Passive Mailbox Databases (DAG Configuration)



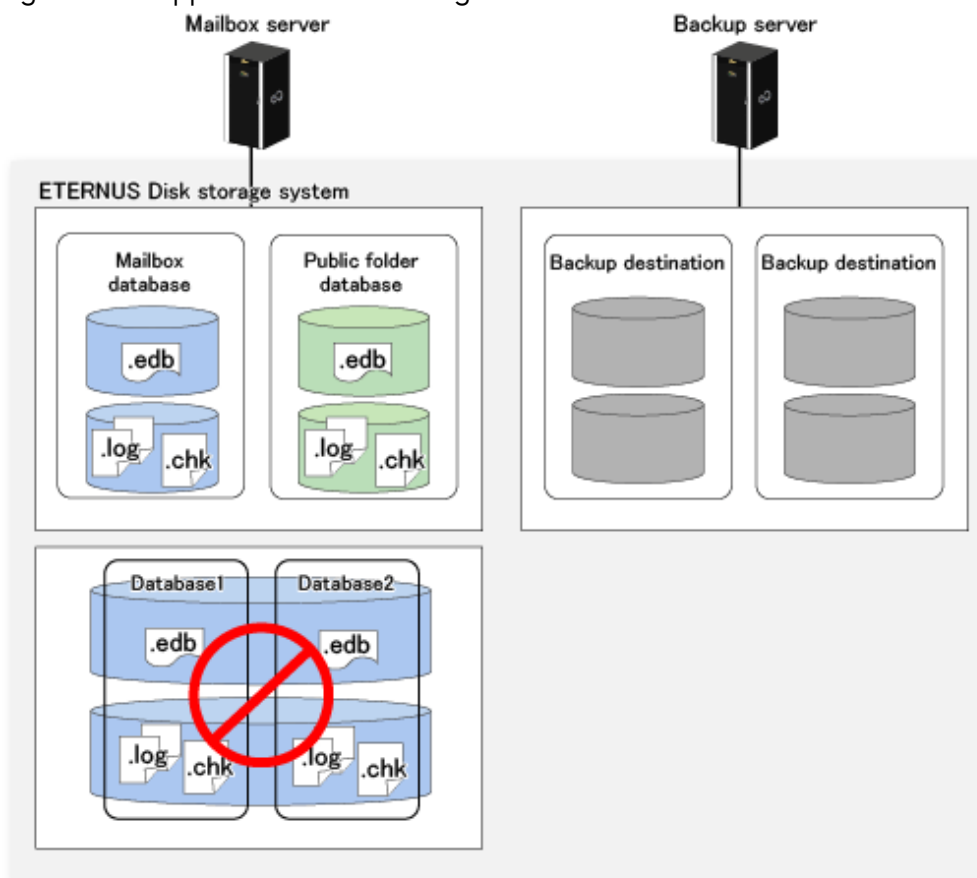
Supported Volume Configurations

Using the Backup Wizard for Exchange Server and the Restore 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.
- The format (NTFS) of the file system of the volumes on the backup source and the backup destination are matching.

Figure 8.37 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:
. % @ ` ~ ' ! () ^ - \$ [] { } + #



Point

The only type of snapshot replication supported by this feature is the QuickOPC Type Replication.

8.3.2 Operating Environments

This section explains the Backup Wizard for Exchange Server and the Restore Wizard for Exchange Server operating environments.

8.3.2.1 Required Hardware

Management Server

Refer to "Hardware Requirements" in "Operating Environment of ETERNUS SF Manager" in the *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 *Installation and Setup Guide*
- "Hardware Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- The operating systems shown in "[Backup Server](#)" are running.

Mailbox Server

The required Mailbox Server hardware must satisfy all of the following conditions:

- "Hardware Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "Hardware Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- The operating systems shown in "[Mailbox Server](#)" are running.



See

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 *Installation and Setup Guide*
- "Supported Environment" in the *ETERNUS VSS Hardware Provider User's Guide*

8.3.2.2 Required Software

Operating System

Management Server

Refer to "Supported Operating Systems" in "Operating Environment of ETERNUS SF Manager" in the *Installation and Setup Guide* for information on the required Management Server software.

Backup Server

The required backup server software must satisfy all of the following conditions:

- "Software Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "Software Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- The Exchange management tools are running.



Note

The Exchange management tools need to be installed in the Backup Server. Its version must be the same as Exchange Server that is installed in the Mailbox Server.

Mailbox Server

The required Mailbox Server software must satisfy all of the following conditions:

- "Software Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "Software Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- Exchange Server is running.



Note

Exchange Server 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\aplinkINST.bat
```

Restart the Storage Cruiser's agent after executing the above command. Refer to "Starting and Stopping Agent" in "Command References" in the *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 *Installation and Setup Guide*

Backup Server and Mailbox Server

- "For Windows Environments" in "Incompatible Software" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "For Windows Environments" in "Incompatible Software" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*

8.3.3 Prerequisites

Setting ETERNUS Disk Storage System

Perform an initialization it as follows:

- Setting for the RAID group
- Setting for volumes
- Setting for the Host Affinity

Checking Mailbox Server and Backup Server Environments

Check whether the conditions listed in "Supported volume configurations" of "[8.3.1.4 Supported Configurations](#)" are met.

Installation

This section explains the software installation that is required to use the Backup Wizard for Exchange Server and the Restore Wizard for Exchange Server.

The Mailbox Server and backup server installation flow is shown below.

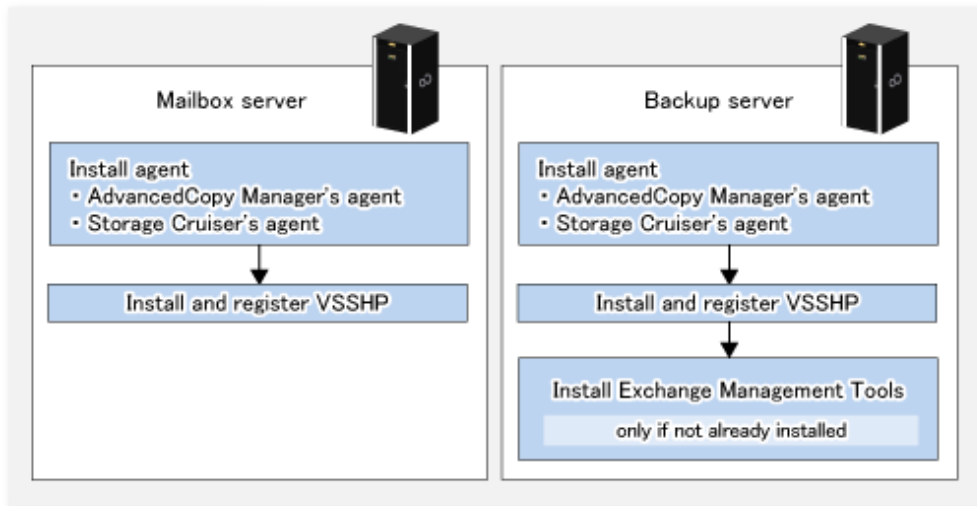


Note

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 8.38 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 *Installation and Setup Guide*

 Note

If the backup server and the Management Server are the same server, you do not need to install the AdvancedCopy Manager's agent in the backup server.

- Storage Cruiser's agent
"Installation of Storage Cruiser's Agent" in the *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 following directory of the DVD "ETERNUS SF SC/ACM/Express Mediapack (V16.9 or higher) Agent Program and Manual":

<dvdDrive>\Agent_windows\AdvancedCopy_Manager\VSSHP\DX_AF\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 **CANCEL**.

- Restart Storage Cruiser's agent after installing both AdvancedCopy Manager's agent and Storage Cruiser's agent. If the Management Server also serves as a Managed Server, restart Storage Cruiser's agent after installing both ETERNUS SF Manager and Storage Cruiser's agent. Refer to "Starting and Stopping Agent" in "Command References" in the *Storage Cruiser Operation Guide* for information on how to start the Storage Cruiser's agent.
-

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 *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 "[Chapter 2 Starting and Stopping Services](#)" for information on how to start the AdvancedCopy Manager's agent service.
Refer to "Starting and Stopping Agent" in "Command References" in the *Storage Cruiser Operation Guide* for information on how to start the Storage Cruiser's agent service.

Management Server

1. Set up the Management Server.
Refer to "Product Common Settings" and "Setup of AdvancedCopy Manager's Manager" in the *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 *Cluster Environment Setup Guide*, too.

Note

In "Setting up user account", create a user account for the Backup Wizard for Exchange Server and the Restore 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 Server" in the *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.
- Match the backup server name to be registered to the host name registered on VSSHP including upper and lower case letters. To check the host name of the backup server registered on VSSHP, execute the stxvchkcommu command of VSSHP on the Mailbox Server. Refer to "Communication Environment Check Command (stxvchkcommu)" in the *ETERNUS VSS Hardware Provider User's Guide* for information on the command.
- In server registration in a virtual environment, register the VMware host to Server on which Mailbox and backup servers are running. Refer to "Notes on utilizing the Wizard (for Exchange Server) on a 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.

- Register the Advanced Copy license or a license that includes the Advanced Copy license, and the license of the ETERNUS SF AdvancedCopy Manager license to the ETERNUS Disk storage system.
- Configure the copy table size on the ETERNUS Disk storage system.

Notes on Utilizing Wizard for Exchange Server on Virtual Environment

- 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 "VMware Server Node" in "Environment Configuration" in the *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 Web Console with respect to the registered guest OS:
 - Click [Yes] in **Use AdvancedCopy Manager**.
- When the IP address of the guest OS that is displayed on the server screen of Web Console is not an IP address for administration, refer to "Change Server Information" in the *Web Console Guide* and change the IP address of the guest OS to an IP address for administration.
- 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 AdvancedCopy Manager to back up the AdvancedCopy Manager definitions (backup operation, replication operation). Refer to "[13.1.1.1 Backing Up Backup Management List and Recovery Control File](#)" for how to back up resources for backup operation. Refer to "[13.1.1.2.1 Backing up 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 Managed Server](#)". To delete the definition of replication operation, perform "[7.6.2 Deleting 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 screen.
 6. Fetch the device information on a Managed Server. Refer to "[7.4.4 Fetching Device Information on 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 "[13.1.1.2 Restoring Backup Management List and Recovery Control File](#)" for how to restore resources for backup operation. Refer to "[13.1.1.2.2 Restoring Replication Management List](#)" for how to restore resources for replication operation.

License Registration

Restore Wizard for Exchange Server becomes available when the ETERNUS SF AdvancedCopy Manager for Exchange Server license is registered to the ETERNUS Disk storage system to be restored.

License registration is carried out through Web Console. Refer to "Register License" in the *Web Console Guide* for registration instructions.

8.3.4 Backup Using Backup Wizard for Exchange Server

This section explains the operations which use the Backup Wizard for Exchange Server.

8.3.4.1 Creating Backup Execution Script

The Backup Wizard for Exchange Server generates the following scripts:

- Backup Execution Script
- Configuration Removal Script



Refer to "Create Exchange Server Backup Script and Script Execution Environment Setting Using Wizard" in the *Web Console Guide* for information on how to operate these scripts.

The Backup Execution Script specification is shown below:

Table 8.5 Backup Execution Script Specification

Script storage destination server	Mailbox Server
File name	<Program directory when AdvancedCopy Managers agent is installed> \\Wizard\bat\execute_backup_dbName_date.bat
Encoding	ASCII
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=cmdPath
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 failed. & exit /b 1

echo execute_backup is successfully completed.
exit /b 0
```

dbName: Backup source mailbox database name or public folder database name.

cmdPath: Program Directory path that was specified when AdvancedCopy Manager's agent was installed.



When the Backup Execution Script of the same Mailbox Server is created again, if a Backup Execution Script was created previously this is not 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 Server 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.
-

8.3.4.2 Execution of Backup

The script that was generated in "[8.3.4.1 Creating Backup Execution Script](#)" can easily be registered in the ETERNUS SF Scheduler to back up the mailbox database.

Refer to "[Chapter 11 Scheduler](#)" for the method of registration in the scheduler.

As other methods, 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 Backup Automatically Using Task Scheduler

1. Copy the script file that was generated in "[8.3.4.1 Creating Backup Execution Script](#)" to any location.
2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.



Refer to "User Account of Windows" in the *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:
Start > Administrative Tools > Task Scheduler
4. In Task Scheduler, configure the following:
 - Task name
 - Date/time task starts
 - 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 Backup Manually

1. Copy the script file that was generated in "[8.3.4.1 Creating Backup Execution Script](#)" to any location.
2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.



Refer to "User Account of Windows" in the *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.

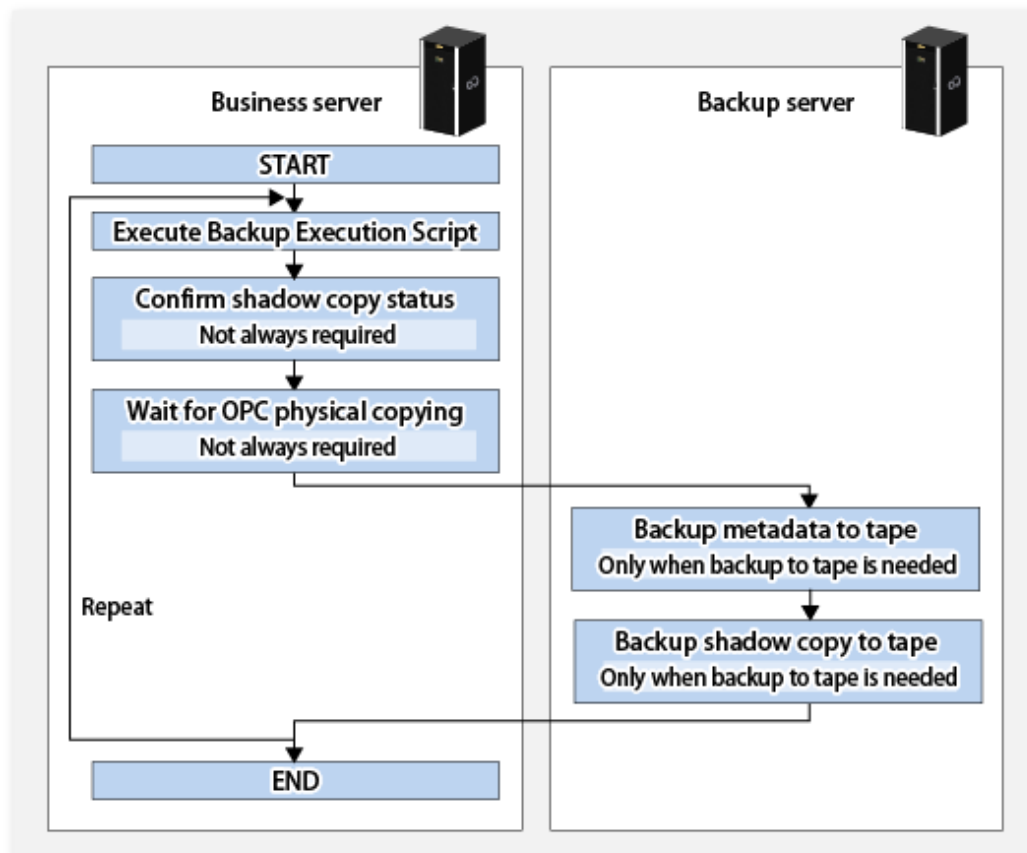
Example:

```
C:\EXCHANGE_SERVER\BACKUP\execute_backup_MailBoxDB01_20121201071234.bat
```

8.3.4.3 Backup to Tape

To perform the tape backup, take the following procedure:

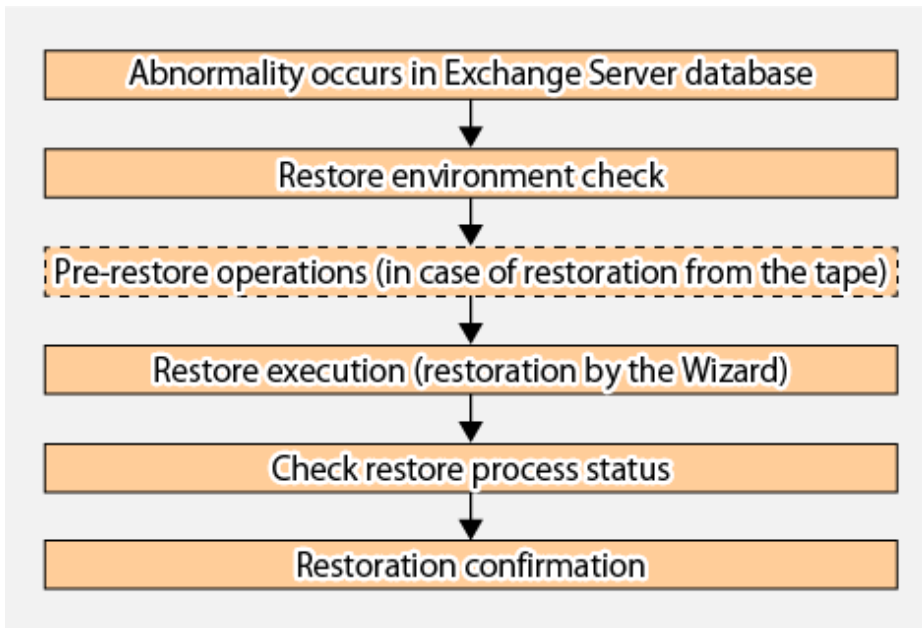
Figure 8.39 Procedures of Tape Backup



8.3.5 Restoration Using Restore Wizard for Exchange Server

This sub section explains the necessary operating procedures for restoration using the Restore Wizard for Exchange Server.

The flow of the restore operation is shown below.



8.3.5.1 Restore Environment Check

Check the following conditions.

- Check the backup
 - The Exchange Server database backup must be acquired using the Backup Execution Script created by the Backup Wizard. Or the backup of the Exchange Server database must be acquired according to the procedure described in the following sections:
 - "8.1 Backup and Restore of Exchange Server Database"
 - "8.2 Backup and Restore of Database Availability Group"
 - A new backup must be created immediately after the Exchange Server database path is changed.
 - A new backup must be created immediately after the ESEUTIL/p (restores faults or damaged Exchange Server databases) or ESEUTIL/d (defrags/compresses Exchange Server databases) commands are executed.
 - Do not let the size and the composition of the device that has executed the backup of the Exchange Server database be changed.
- Confirmation of restoring
 - For the point-in-time restoration
 - Exchange Server database must not be running.
(Dismount the Exchange Server database if running.)
 - For the roll-forward restoration
 - All of the transaction logs that have been created since the latest complete backup was taken must exist.
 - The generation numbers of existing transaction log files ("XXXXXXXX" part of E0nXXXXXXXXX.log) must be consecutive.
 - Exchange Server database must not be running.
(Dismount the Exchange Server database if running.)
- Check the server/storage
 - The environment described in "8.3.3 Prerequisites" of "Backup and Restore using the Wizard for Exchange Server" has been configured.

- The following has been configured to the backup server:
 - A Metadata document is present on the backup server (refer to [Table 8.6 Metadata Document](#)).
 - The Exchange Server database regions (active, passive) and the partitions of the log regions (active, passive) are of the same partition configuration as when the backup was performed, and these are formatted with NTFS.
 - The backup volume and backup destination volume must be set to be combined.

Table 8.6 Metadata Document

File	Save Destination
Writer Metadata Document	<ACM environment settings directory>\etc\repl\data\exchange \<active mailbox server host name>\metadoc\<Exchange Server database name>.wmd.xml
Backup Component Document	<ACM environment settings directory>\etc\repl\data\exchange \<active mailbox server host name>\metadoc\<Exchange Server database name>.bcd.xml

Note: "ACM" refers to AdvancedCopy Manager.

- No fault in the volumes used for restore is found.
Use the ETERNUS Web GUI to check the status of the restore source and destination volumes.
If any fault is found in the volumes, refer to "[8.3.7.1 Corrective Action for Hardware Fault](#)" to take corrective action.

Note

For Exchange Server 2013 or later, Microsoft Exchange Search Host Controller service is stopped and restarted by the Restore Wizard while the Restore Wizard is running. There is a possibility of influencing making and the retrieval of the index of Exchange Server if Microsoft Exchange Search Host Controller service stops. Consider the influence by the stop of Microsoft Exchange Search Host Controller service, that is, Exchange Server on the retrieval when you execute the Restore Wizard for Exchange Server.

8.3.5.2 Pre-restore Operations (When Restoring from Tape)

The following preparatory operations 1~6 are necessary when restoring from tape (secondary backup) due to a storage malfunction.

1. Delete the shadow copy

The shadow copy must be deleted when restoring from tape.

1. Login to the active Mailbox Server as an AdvancedCopy Manager user.
2. Bring up the command prompt.
3. Execute the following command.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange delete -dbname dbName
```

Information

When the command in step 3 is executed, the following processes takes place:

- The shadow copy existing on the backup server is deleted.
- The backup server writer metadata and backup component documents are deleted.

2. Stop QuickOPC session

Before executing a restore from tape, stop the QuickOPC session for the Exchange Server database for which restore is to be performed.

1. Login to the active Mailbox Server as an AdvancedCopy Manager user.
2. Bring up the command prompt.
3. Execute the following command:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange stopqopc -dbname dbName
```

Note

When there is no QuickOPC session, the command is abnormally terminated. Advance to the following procedure to continue processing, and confirm the stop of the session.

3. Confirmation of QuickOPC session stop

Execute the following command to confirm that the QuickOPC session has stopped.

When the QuickOPC session has stopped, "----" is displayed in the **Trk** column.

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpshadowadm_exchange status -dbname dbName
```

4. Initializing a disk

Note

- Make it online before initializing the disk when the disk is offline.
- All data on the initialized disk is deleted. Be careful to correctly identify the target.

1. Login to the backup server as an AdvancedCopy Manager user.
2. Bring up the command prompt.
3. Execute the following command:

```
C:\>diskpart
DISKPART> select disk diskNumber
DISKPART> clean
```

5. Creating a partition

Create a partition with the same configuration as that before initialization, and assign a drive letter.

1. Login to the backup server as an AdvancedCopy Manager user.
2. Bring up the server manager screen.
3. Select "Disk Management".
4. Right click on the target volume and select "New simple volume". Using the wizard, create a partition having the same configuration as that before initialization.

Note

If partitions cannot be created, the disk may be a read-only volume. In that case, start Diskpart by the command prompt to clear the read-only attribute on the disk.

6. Restoring data from tape

Restore the database domain and transaction log domain backup data to its initial location (the backup destination volume where a backup was acquired).

1. Login to the backup server as an AdvancedCopy Manager user.
2. Restore the saved files to their original location (the backup destination volume where a backup was acquired).

7. Restoring metadata documents from tape

Restore metadata documents to their initial location (the location where a backup was acquired). Refer to [Table 8.6 Metadata Document](#) for information on metadata document save destinations.

1. Login to the backup server as an AdvancedCopy Manager user.
2. Restore the saved files to their original location (the location where a backup was acquired).

8.3.5.3 Restore Execution (Restoring Using Wizard)

Refer to "Restore Exchange Server Database Using Wizard" in the *Web Console Guide* for the operating procedure.

8.3.5.4 Checking Status of Restore Process

Restore process status can be checked in the Job Status pane of Web Console. Refer to "Job Status Pane" in the *Web Console Guide* for information on the Job Status pane display.

When a restore is executed using the Restore Wizard for Exchange Server, the following information is displayed in the Job Status pane.

Table 8.7 Contents Displayed During Restore Process Execution

Item	Display Contents
Action	Restore Wizard for Exchange Server
Status	Executing
Results	-

Table 8.8 Contents Displayed When Restore Process Is Complete

Item	Display Contents	
Action	Restore Wizard for Exchange Server	
Status	Completed	
Results	Normal case	Success
	Abnormal case	Failed

8.3.5.5 Restoration Confirmation

After completing a restore using the Restore Wizard for Exchange Server, confirm that the Exchange Server database has been correctly restored.

In the case of DAG configuration, create a passive database copy after completing OPC physical copy.

Point

Because the passive database copy creation process is performed through the network, it can be expected to increase network and server loads for an extended period of time. It is therefore recommended that this action be performed during a time when it has minimum effect on operations, such as during a holiday or at night.

8.3.6 Changing 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 "[8.3.4.1 Creating Backup Execution Script](#)", remove the current configuration.
Refer to "[Removing 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, change within the range of the composition described in "Supported volume configurations" in "[8.3.1.4 Supported Configurations](#)"

After changing database configuration, perform the procedure described in "Reload Server Configuration Information" in the *Web Console Guide*.



See

Refer to "Create Exchange Server Backup Script and Script Execution Environment Setting Using Wizard" in the *Web Console Guide* for information on how to perform the generation of the backup script.

The configuration removal script specification is shown below:

Table 8.9 Configuration Removal Script Specification

Script storage destination server	Mailbox Server
File name	<Program directory when AdvancedCopy Manager's agent is installed> \Wizard\bat\delete_backup_dbName_date.bat
Encoding	ASCII
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=dbSrcVolume
set DBREP=dbDstVolume
set LOGORG=logSrcVolume
set LOGREP=logDstVolume

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^>^&l`) do (if "%i"==%CHECK% (set RET=OK) else
(call :CHECK %ERRCODE_OK% %i))
if not "%RET%"=="OK" echo delete_backup 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 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 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 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.
dbSrcVolume : Copy source Exchange Server database volume name.
dbDstVolume : Copy destination Exchange Server database volume name.
logSrcVolume : Copy source log volume name
logDstVolume : Copy destination volume name.

Note

- When the same Mailbox Server script is created again, if a configuration removal script was created previously this is not removed or overwritten.
- In an error occurs in the execution of the configuration removal script, refer to the *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 Configuration

The configuration removal script that was generated in "[8.3.4.1 Creating 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 "[8.3.4.1 Creating Backup Execution Script](#)" to any location.
2. Log into the backup source Mailbox Server as the AdvancedCopy Manager command execution user.



Refer to "User Account of Windows" in the *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
```



In the configuration removal script, execute the following commands:

- `swsrpshadowadm_exchange stopqopc` (stop QuickOPC)
- `swsrpdbinfo_exchange delete` (delete Exchange Server 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 Server 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>
```

8.3.7 Troubleshooting

The following is a description of the corrective action in case an error occurs while the Backup Wizard for Exchange Server or the Restore Wizard for Exchange Server is running.

8.3.7.1 Corrective Action for Hardware Fault

Use the ETERNUS Web GUI to see that there is no fault found in the restore source and destination volumes.

If any fault is found, collect the information required for troubleshooting and contact Fujitsu Technical Support. For the method to collect the information, refer to "[13.2.1 Collecting Troubleshooting Information](#)".

8.3.7.2 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 Volumes Used by 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 databaseName

The following is the example of command execution:

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

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 Mailbox Database Information](#)"
- If the information is not displayed: "[Obtain Volume Pair Definition \(Pattern 1\)](#)"

Delete 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 databaseName
```

The following is the example of command execution:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdbinfo_exchange -delete -dbname MB1_ENG
swsrpdbinfo_exchange successfully completed

C:\>
```

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\swsrpvoinfo
```

The following is the example of command execution:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpvoinfo
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:\>
```

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 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\swsrpvoinfo
```

The following is the example of command execution:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpvoinfo
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:\>
```

Of the pairs displayed above, determine the pair in which the volumes displayed in the step "[Check Volumes Used by 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  
backupSrcVol backupDstVol
```

For *backupSrcVol* and *backupDstVolume*, 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:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdelvol g1d61p1@VM-23 g1d86p1@VM-32  
swsrpdelvol completed  
  
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdelvol g1d62p1@VM-23 g1d97p1@VM-32  
swsrpdelvol completed  
  
C:\>
```

Chapter 9 Backup and Restore of Hyper-V

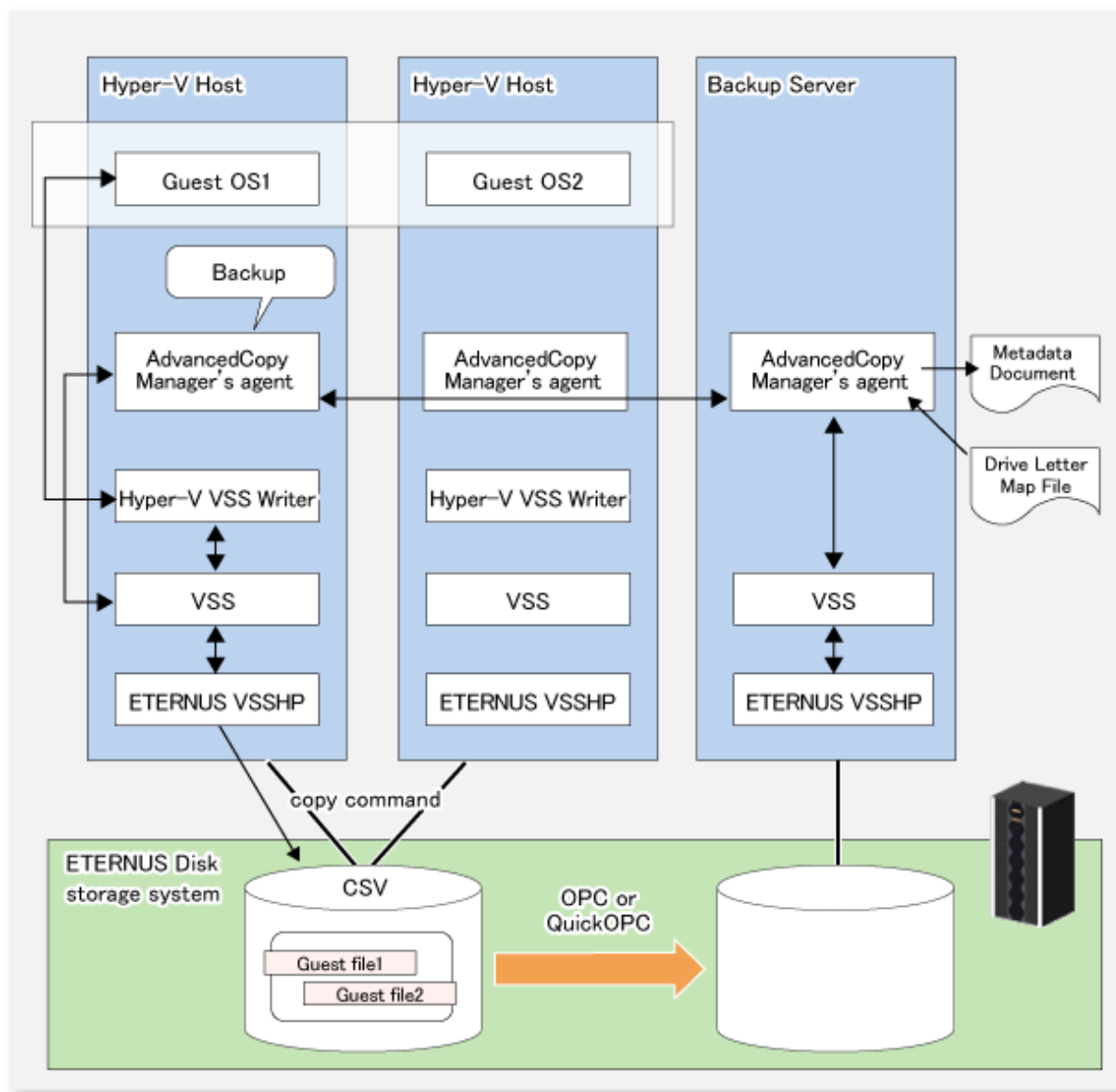
This chapter explains the procedures for backing up and restoring Hyper-V Guest OSs.

9.1 Overview

9.1.1 Backing Up Hyper-V

The Advanced Copy function of the ETERNUS Disk storage system can associate with VSS and the Hyper-V VSS writer to implement backup of Hyper-V Guest OSs.

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 OSs that are configured within Cluster Shared Volumes (CSVs).

Backup and restoration of Guest OSs that are configured on volumes other than CSV are not supported.

Be careful of the following during construction.

- "Initial Store" of Hyper-V cannot be backed up with this function. For backing up and restoring Initial Store, use Windows Server backup.
- When the Hyper-V host is Microsoft Windows Server 2012 R2 or later, construct the guest OS of the Hyper-V as "Generation 1".

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:
 - Microsoft Windows Server 2022 (when the Hyper-V Host OS is Microsoft Windows Server 2022)
 - Microsoft Windows Server 2019 (when the Hyper-V Host OS is Microsoft Windows Server 2019 or later)
 - Microsoft Windows Server 2016 (when the Hyper-V Host OS is Microsoft Windows Server 2016 or later)
 - Microsoft Windows Server 2012 R2 (when the Hyper-V Host OS is Microsoft Windows Server 2012 R2 or later)
 - Microsoft Windows Server 2012 (when the Hyper-V Host OS is Microsoft Windows Server 2012 or later)
 - Windows 10 (when the Hyper-V Host OS is Microsoft Windows Server 2016 or later)
- "Integration Services" must be installed in the Guest OS. (excluding Microsoft Windows Server 2012 or later)
- Within the "Integration Services", "Backup (Volume Snapshot)" must be enabled.
- The Guest OS must be configured in the CSV that is formatted with NTFS.
- All disks used by the Guest OS must be basic disks formatted with NTFS.

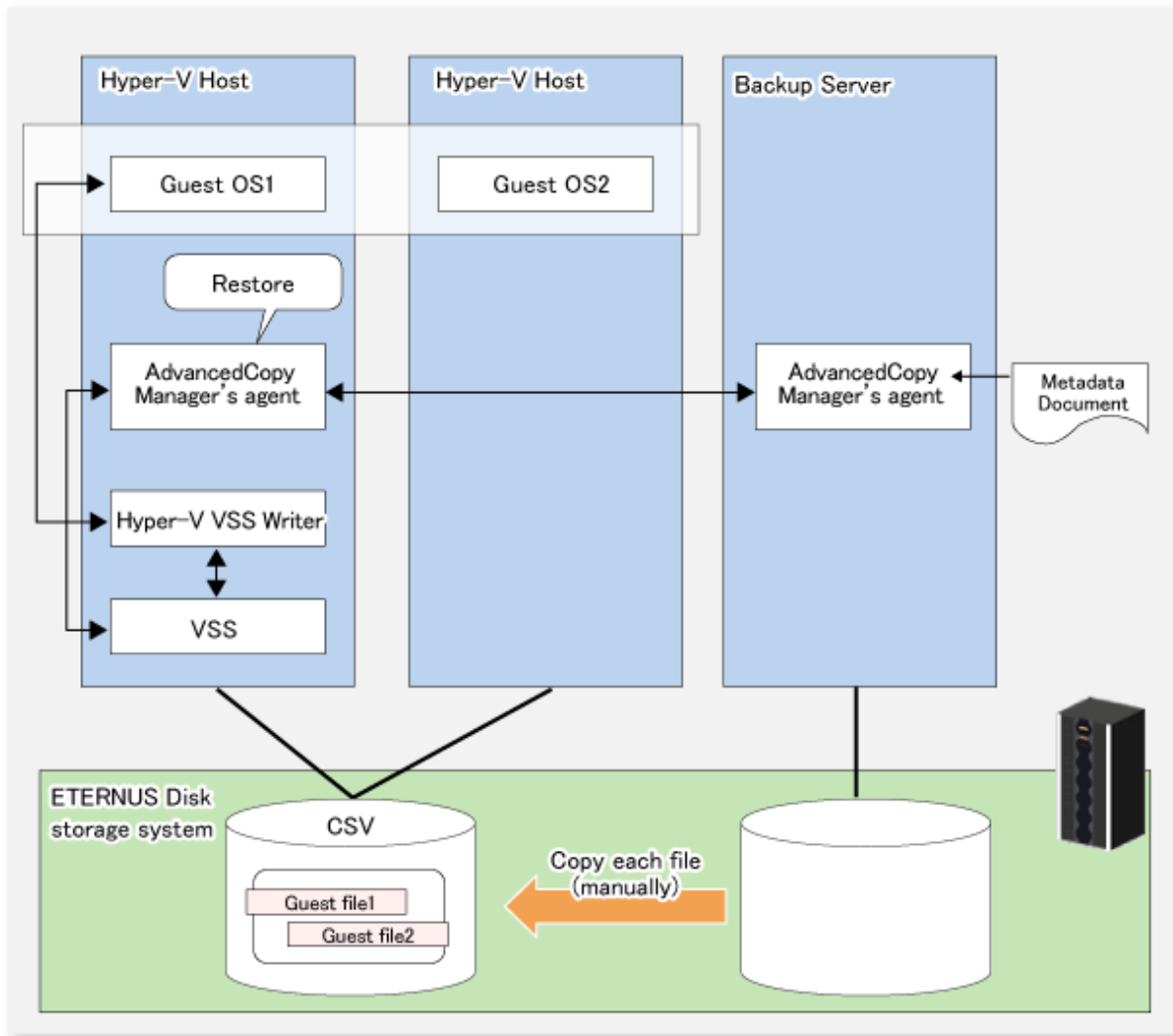
If any of the above conditions is not met, the Guest OS is backed up offline.

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 associate with VSS and the Hyper-V VSS writer to implement restoration of backed up Hyper-V Guest OSs.

Figure 9.2 Restoration Processing Image



- If the Guest OS to be restored is currently operating, it is stopped and deleted.
- When restoration is completed, the Guest OS is 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 OSs.

9.2.1 Designing Server Configurations

Management Server

The Management Server centrally manages and operates multiple Managed Servers.

Install the manager program on this server. A Managed Server (Hyper-V host) that performs backup of Hyper-V Guest OSs cannot serve as the Management Server. However, a backup server can serve as the Management Server.

Managed Server (Hyper-V Host)

The Managed Server is used for Hyper-V operation.

Install the AdvancedCopy Manager's agent. Select the 64bit version agent program when you install the AdvancedCopy Manager's agent.

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.

Managed Server (Backup Server)

This server operates as the backup server.

Install the AdvancedCopy Manager's agent. Select the 64bit version agent program when you install the AdvancedCopy Manager's agent.

The disk (backup volume) to which the Guest OS is backed up must be connected to the backup server.

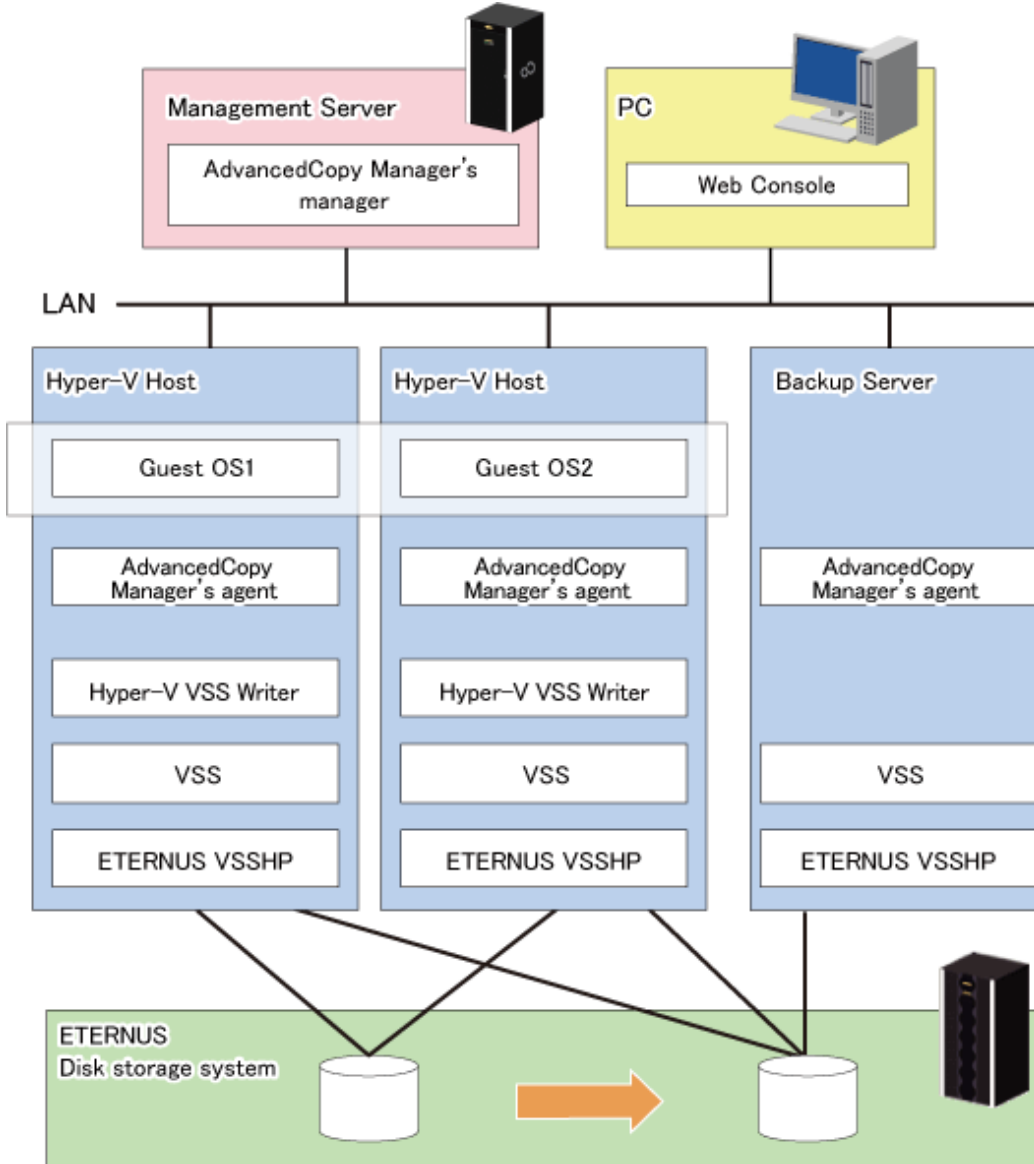


Note

- 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.

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.

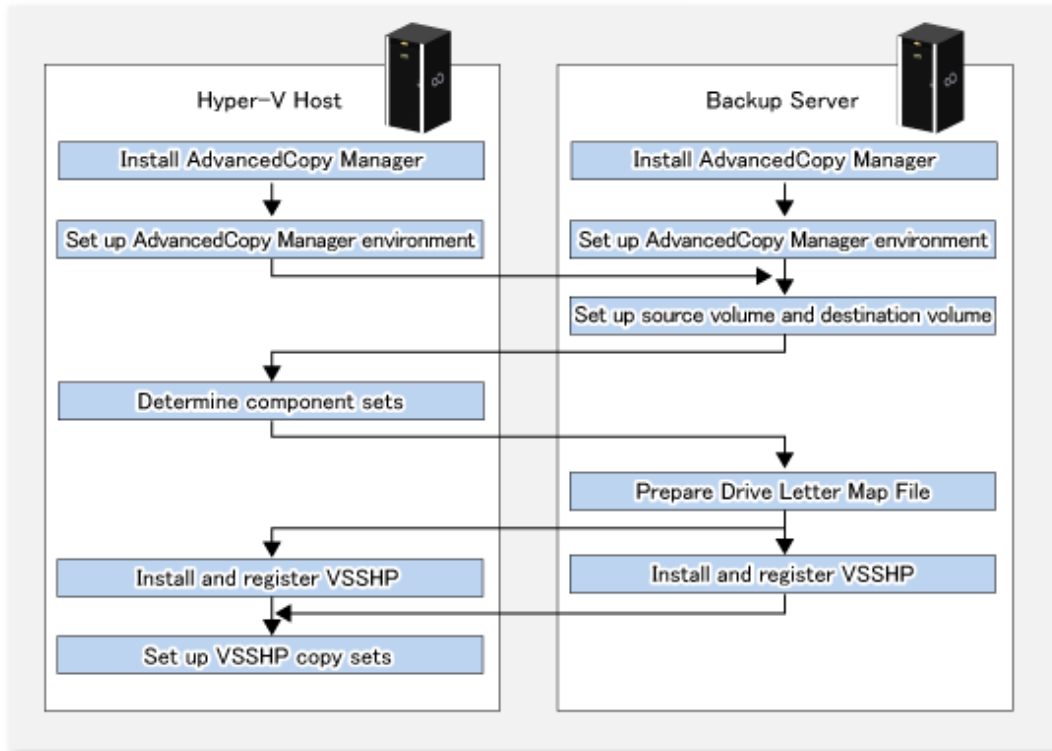
Point

Multiple partitions can be created on a single disk.

Backup, however, is performed disk by disk, so all partitions on a disk are backed up simultaneously.

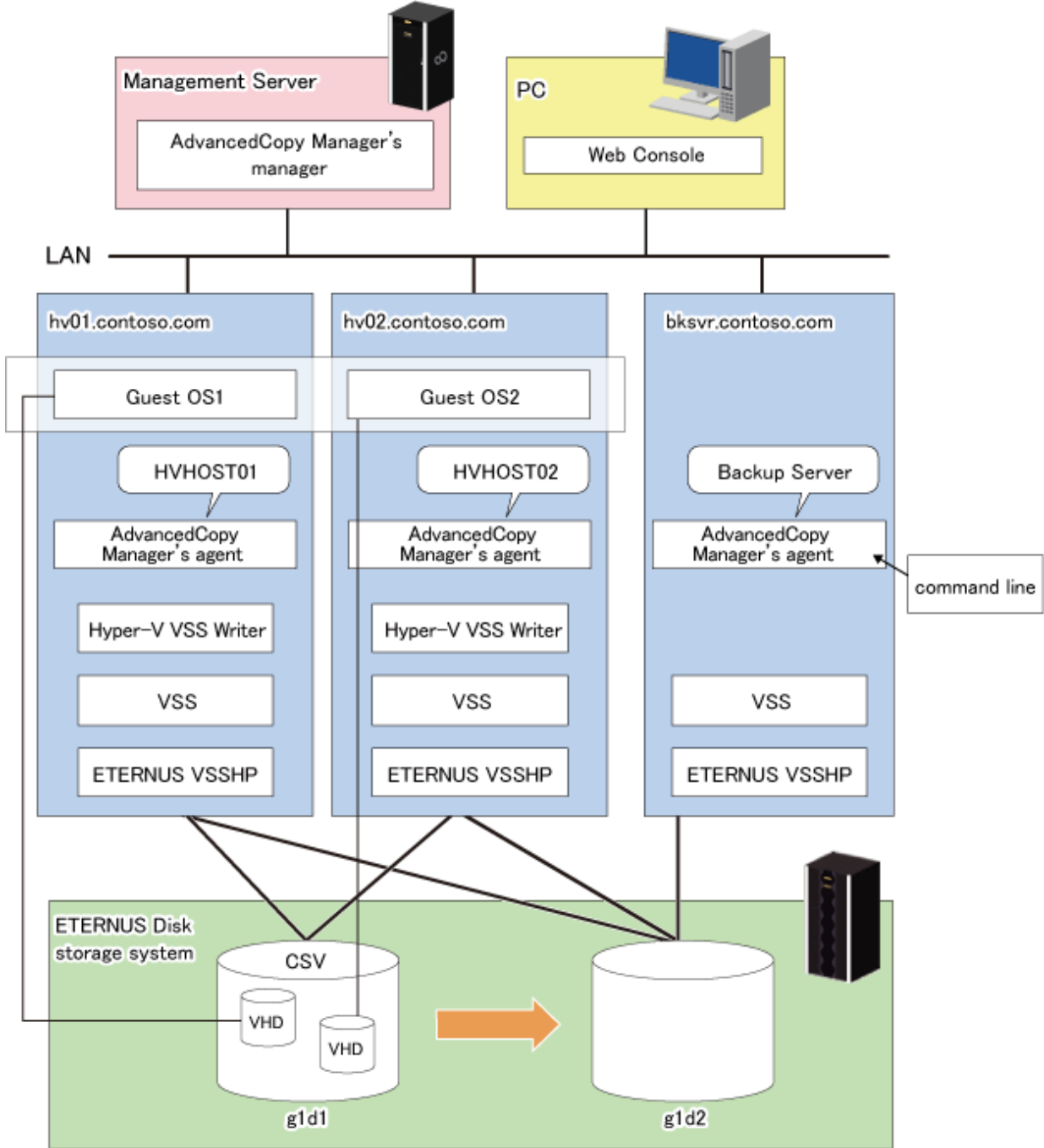
9.3 Preparation

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 *Installation and Setup Guide*.

Install the 64bit version agent program when you install the AdvancedCopy Manager's agent.

The operating systems of the Hyper-V host and the backup server must be either of the following:

- All agents are for Microsoft Windows Server 2022.
- All agents are for Microsoft Windows Server 2019.
- All agents are for Microsoft Windows Server 2016.

- All agents are for Microsoft Windows Server 2012 R2.
- All agents are for Microsoft Windows Server 2012.

9.3.2 Registering Copy License

If the storage device to be used is an ETERNUS DX series, an ETERNUS AF All-Flash Arrays, or an ETERNUS DX200F, register a local copy license in the ETERNUS Disk storage system.

For details, refer to "Registration of License" in the *Installation and Setup Guide*.

For backing up Hyper-V Guest OSs, you can use OPC or QuickOPC.

9.3.3 Installing and Registering VSSHP

Install and register VSSHP.

For details, refer to "[8.1.3.1.2 Installing and Registering VSSHP](#)".

9.3.4 Hyper-V Environment Settings for VSSHP

Perform the following work after installation of VSSHP.

1. Execute the "stxvhyperv" command (Hyper-V environment setup command) to set up the Hyper-V environment for VSSHP.
For information on the command, refer to "Hyper-V Environment Setup Command (stxvhyperv)" in the *ETERNUS VSS Hardware Provider User's Guide* for the storage device to be used.
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 Service](#)"
- "[7.4.2 Starting Web Console](#)"
- "[7.4.3 Registering Managed Server](#)"
- "[7.4.4 Fetching Device Information on Managed Server](#)"

9.3.6 Setting Up Source and Replica Volumes

Execute the [swsrpsetvol](#) command to register the source volumes (transaction volumes) and replica volumes (backup volumes) in the replication volume information.



Note

- 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 the [swsrpsetvol](#) command).
 - Specify a disk (gXdY) for the volume name. Do not specify a partition (gXdYpZ).
-

The information about the registered source and replica volumes can be checked by the [swsrpvoinfo](#) command.

[Example]

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o BOTH g1d1@HVHOST01 g1d2@BKSVR
swsrpsetvol completed
```

```

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvlinf
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\swsrpvlinf
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 OSs and Initial Store are VSS components.

Backup and restoration of Hyper-V Guest OSs are performed component set-wise.

Follow below procedure to create the component set required for backing up and restoring Hyper-V Guest OSs.

1. Execute the `swsrpvrc componentset create` command to create a blank component set.

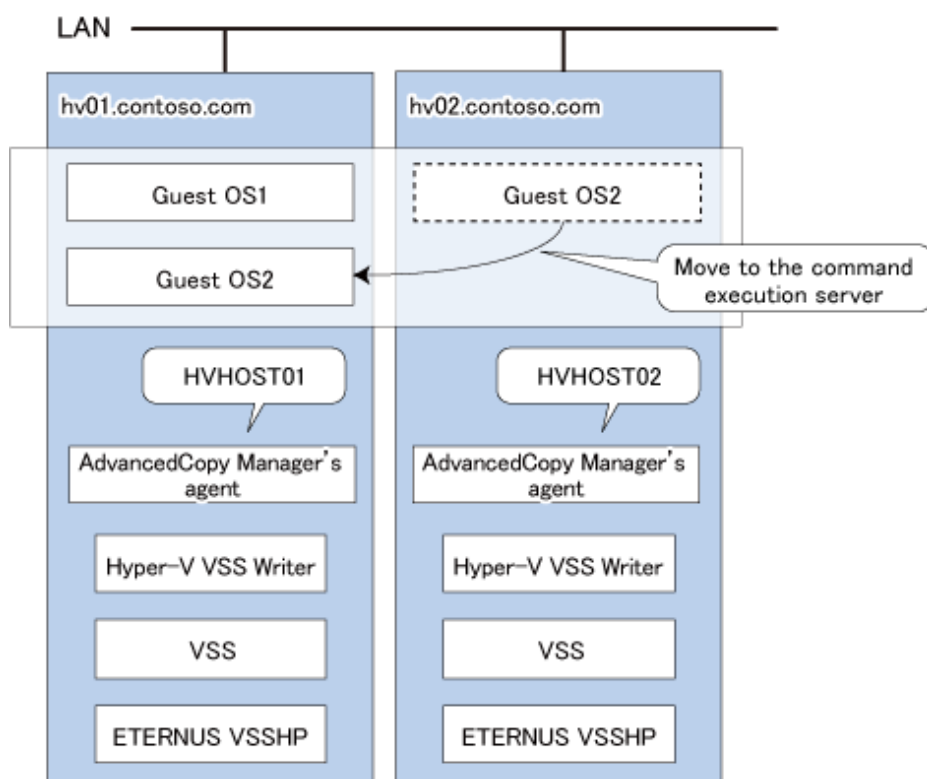
[Example (execution from backup server)]

```

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrc componentset create -h HVHOST -cs VMSet1
'swsrpvrq componentset create' completed

```

2. Execute the `swsrpvrc 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\swsrpvrc 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
```

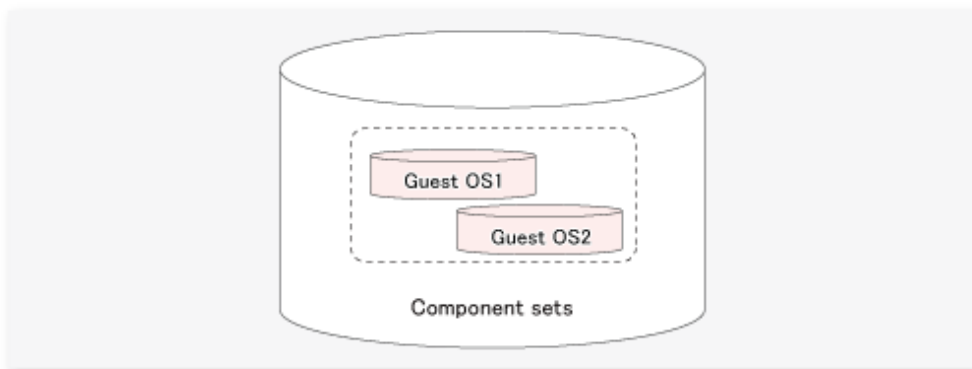
The contents of a component set can be checked by the `swsrpvrq componentset info` command.

[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 OSs that are on the same disk in the same component set. Any unregistered components are not 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 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 is assigned 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 already in use, or an invalid directory is specified for a mount point).

9.3.9 Registering Copy Sets

9.3.9.1 Creating 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 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 the `stxvgetolu` command (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).

For details, 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#####XXXXXXXXX#####YYYYYYYYYYYYY##  
QOPC, , 6, 0x00c1, 00E8000M9#####XXXXXXXXX#####YYYYYYYYYYYYY##
```

9.3.9.2 Registering Copy Sets In Batch

Refer to "8.1.3.2.7 Registering Copy Sets as 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 "8.1.3.2.8 Checking and Saving 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 the `swsrpvrq shadow backup-hyperv` 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 OSs included in the backup target and excluded from the backup target are displayed as like the message `swsrp5209` and `swsrp5210` of the above example.

- 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.
- 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.
- 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\ <i>Hyper-V host Managed Server name</i> \componentset\metadoc\ <i>Component set name</i> .wmd.xml
Backup Components Document	<Environment directory>\etc\repl\data\vrq\ <i>Hyper-V host Managed Server name</i> \componentset\metadoc\ <i>Component set name</i> .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 component sets exist, multiple sets of backup processing need to be executed sequentially, not in parallel. If multiple backup processes are executed in parallel, future processes are put on hold until the shadow copy creation for the prior processes has completed.

Information about the created shadow copies and the current progress of Advanced Copy can be checked by executing the [swsrpvrg shadow query](#) command.

[Example (execution on a backup server)]

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg 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 the [swsrpvrg advcopy query](#) command.

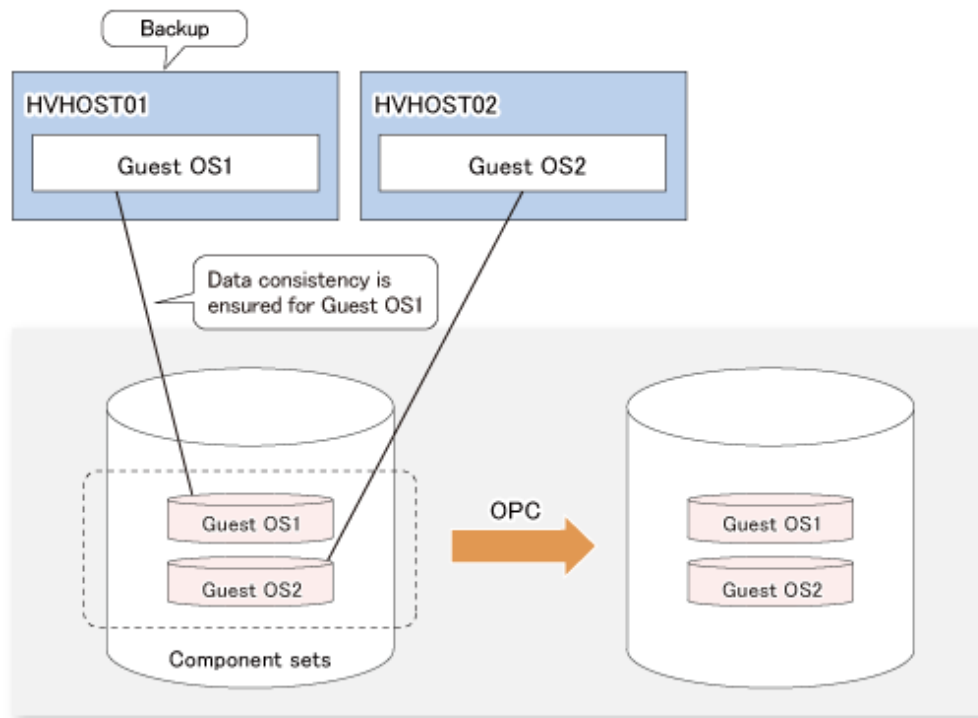
[Example (execution on a backup server)]

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg 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

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.



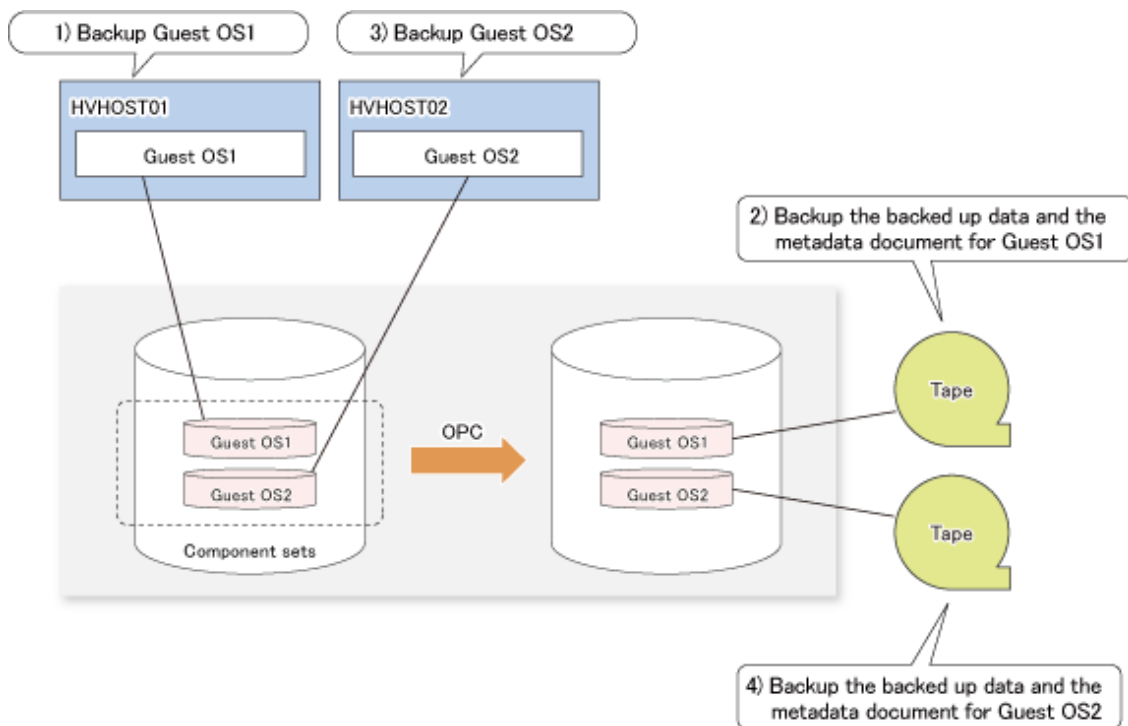
If multiple volumes in one CSV are operated on different Hyper-V hosts, perform backup for each Hyper-V host. It is not possible to perform backup simultaneously from multiple Hyper-V hosts for one CSV.

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

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 OSs ("Guest OS1" and "Guest OS2") are running on the command execution server.



1. Backup "Guest OS1" on "HVHOST01".
2. Backup the backed up data and the metadata document for "Guest OS1" to tape.
3. Backup "Guest OS2" on "HVHOST02".
4. Backup the backed up data and the metadata document for "Guest OS2" to tape.

9.4.1 Backing Up Specific Guest OSs

Of the guest OSs running on a Hyper-V host which backup command is executed, a specific Guest OS can be backed up by executing the `swsrpvrq shadow backup-hyperv` 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
```

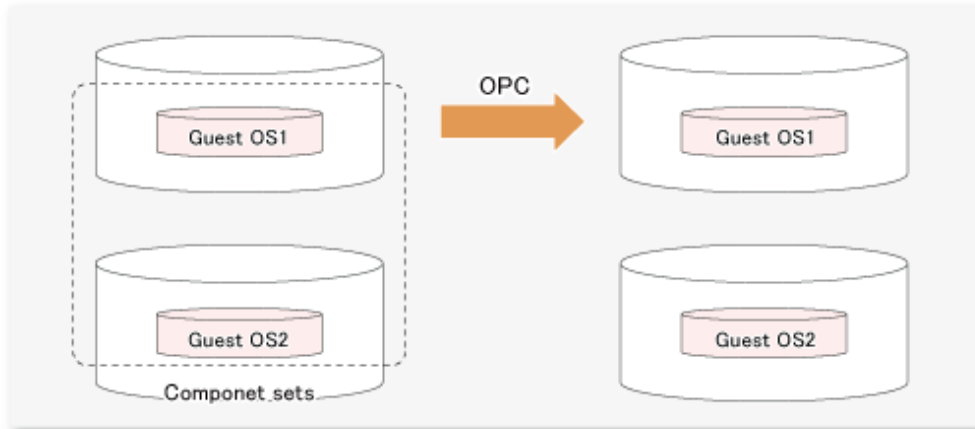
The `swsrpvrq shadow backup-hyperv` command with the `-hv-guests` option specified operates as follows:

1. Only the disk on which the Guest OS specified in the `-hv-guests` option is located is 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.

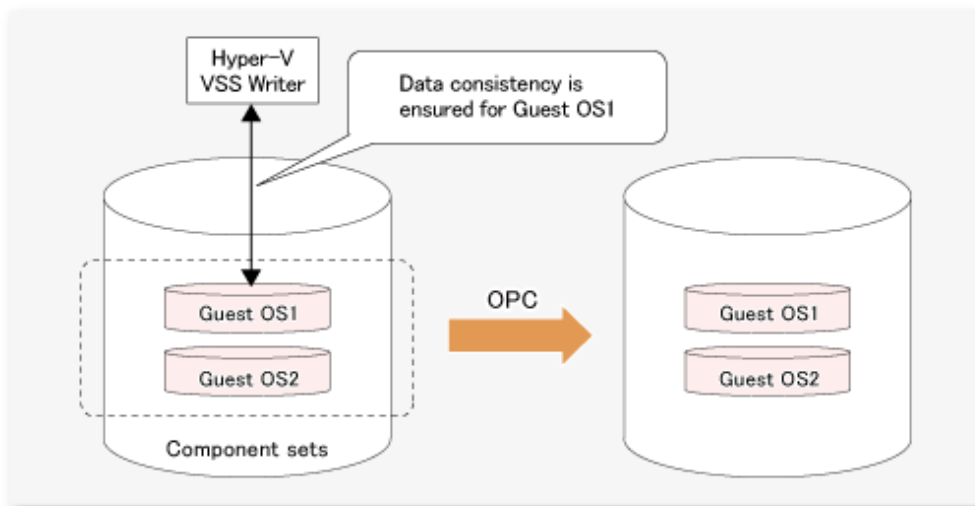
Example

Backup of Guest OS 1 Only

As in the example of below diagram, only the disk on which Guest OS1 is located is 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 OS1. In this case, data consistency is ensured for Guest OS1. 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 the `swsrprvq shadow restore-hyperv` command.

Follow below procedure for restoring Guest OSs.

1. Execute the `swsrprvq componentset info` 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\swsrprvq 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=gld1
Component:
  Writer=Microsoft Hyper-V VSS Writer
  Full-Path=\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4
```

```

    Friendly-Name=Guest2
    Volume: Name=C:\ClusterStorage\Volumel, Logical-Unit=gld1

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=gld2
    Volume: Name=C:\ClusterStorage3, Logical-Unit=gld3

```

- Execute the `swsrpvrg shadow restore-hyperv` command with the name of the component set to be restored specified in the `-cs` option.
All Guest OSs which has been backup target during backup are restored.

[Example (execution on a backup server)]

```

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg 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\Volumel\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-
CB02-454F-8369-2E5C0CA783B3.xml
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3\*
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Guest1-Disk.vhd
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Guest1.vhd
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-
CB02-454F-8369-2E5C0CA783B4.xml
C:\ClusterStorage\Volumel\Hyper-V\Guest2\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B4\*
C:\ClusterStorage\Volumel\Hyper-V\Guest2\Guest2-Disk.vhd
C:\ClusterStorage\Volumel\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

```

- When restoration is completed, press the 'Y' key.
The post-processing for restoration is executed.

Point

- 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:

- Assign the backup volume in which a shadow copy exists as a network drive (Z:).

```
net use Z: \\bksvr.contoso.com\<shared name>
```

- Copy the files by the XCOPY command. The file ownership and ACL information are also copied by /O switch.

```
xcopy Z:\<file path> C:\ClusterStorage\Volumel\<file path> /e /s /y /F /O /X /R /H
```

- Disconnect a network drive after the restoration procedure is completed.

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

9.5.1 Restoring Specific Guest OSs

You can restore only a specific Guest OS in a component set by executing the [swsrpvrg shadow restore-hyperv](#) 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\swsrpvrg 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\Volumel\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3.xml
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Virtual Machines\2ACF3DF4-CB02-454F-8369-2E5C0CA783B3\*
C:\ClusterStorage\Volumel\Hyper-V\Guest1\Guest1-Disk.vhd
C:\ClusterStorage\Volumel\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 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. After that, perform setup processing for the copy source or copy destination 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 copy source or copy destination volume may not be possible after the device configuration is changed.

1. In the Hyper-V guest OS, check the copy status using the `stxvquery` command (VSSHP status lookup command). If copy is in the copy processing state or the tracking state, execute the `stxvcopy` command (VSSHP backup control command) or the `stxvstopall` command (VSSHP batch stop command) 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 copy source or copy destination volume on the device to be reconfigured. Refer to "[9.8.2 Deleting the Copy Source / Destination Volumes](#)" for more information.

3. If there are changes in the configuration of source or replica disk partitions, initialize the disk. Refer to ["8.1.6.4 Initializing Disk"](#) for details.
4. Reconfigure the device.
5. Add the device information. Refer to ["7.4.4 Fetching Device Information on Managed Server"](#) for information about this operation.
6. Perform ["8.1.3.2.6 Creating Copy Set File"](#) and ["8.1.3.2.7 Registering Copy Sets as Batch"](#) to change the copy set information.
7. On the Hyper-V host, perform ["8.1.3.2.8 Checking and Saving Copy Set Registration Contents"](#).
8. Set up the copy source and copy destination volumes.
9. Edit a drive letter map file.

9.6.2 Changing Component Set Information

If any information on a component registered in the component set has changed, execute the `swsrpvrc component add` and `swsrpvrc component remove` commands to reflect the changes in AdvancedCopy Manager.

9.6.3 Changing Managed Server Name

The procedure to change the Managed Server name is as follows:

1. Delete the copy source and copy destination volumes.
Refer to ["9.8.2 Deleting the Copy Source / Destination Volumes"](#) for more information.
2. Change the server name of the Managed Server.
For details, refer to ["13.5.4 Changing Server Name of Management Server or Managed Server"](#).
3. Set up the copy source and copy destination volumes.

9.6.4 Changing IP Address of Managed Server

The procedure to change the IP address of the Managed Server is as follows:

1. Change the IP address of the Managed Server (Hyper-V host or backup server).
Refer to ["13.5.2 Changing IP Address of Managed Server"](#) for details on the procedure.
2. Change the settings for ETERNUS VSS Hardware Provider Communication Server services on the Hyper-V host and the backup server.
For details, refer to ["When Changing the Communication Environment"](#) in the *ETERNUS VSS Hardware Provider User's Guide* for the storage device to be used.

9.6.5 Changing Copy Type

The procedure to change the copy type is as follows:

1. On the Hyper-V host, execute the `stxvquery` command (VSSH backup status lookup command) to check the copy status. If any copying is in progress, execute the `stxvcopy` command (VSSH backup control command) to stop copying.
2. On the Hyper-V host, perform the procedure described in ["8.1.3.2.6 Creating Copy Set File"](#) and ["8.1.3.2.7 Registering Copy Sets as Batch"](#) to change the copy type. After that, perform the procedure described in ["8.1.3.2.8 Checking and Saving 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 Shadow Copy

Delete the shadow copy by executing the [swsrpvrq shadow 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. Refer to "[9.7.2 Stopping the Ongoing Copy Process](#)" for information on how to stop the physical copying process and the tracking process.
- 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 "[1.4 Notes about Online/Offline Status of Disks](#)" for information about the online and offline status of disks.

9.7.2 Stopping the Ongoing Copy Process

To stop physical copying process and the tracking process, execute the [swsrpvrq advcopy stop](#) command.

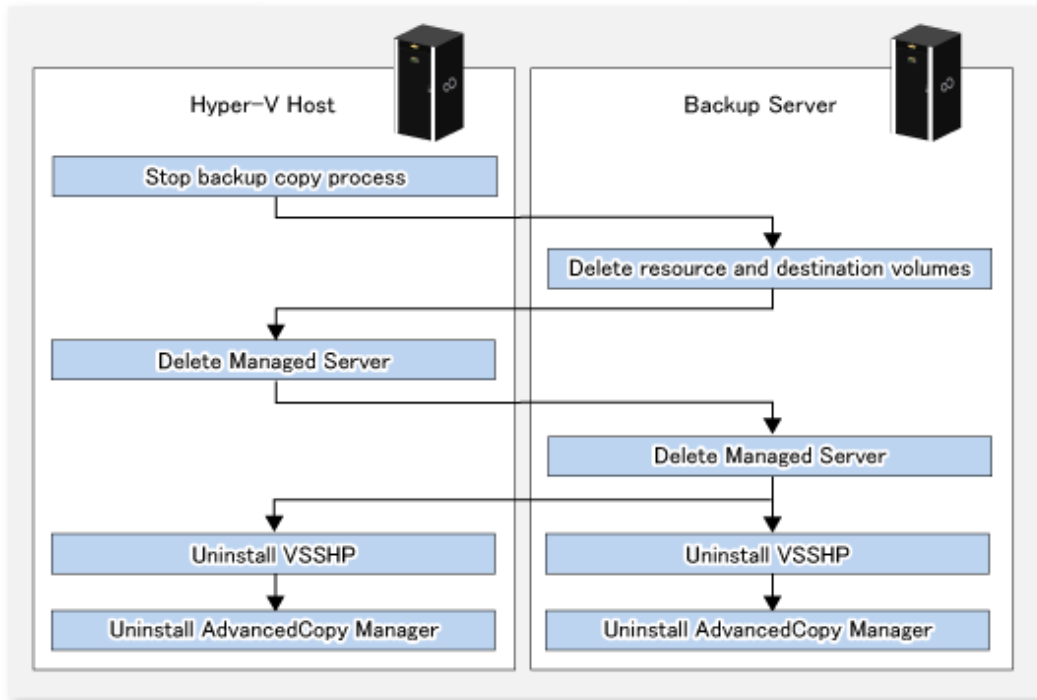
[Example (execution on a backup server)]

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy stop -h HVHOST -cs VMSet1
'swsrpvrq advcopy stop' completed
```

9.8 Uninstallation

Below figure shows the flow of uninstallation tasks.

Figure 9.5 Uninstallation Task Flow



9.8.1 Stopping Backup Copy Process

On the Hyper-V host, execute the `stxvquery` command (VSSHP backup status lookup command) to check the copy status. If copy is in the copy processing state or the tracking state, execute the `stxvcopy` command (VSSHP backup control command) or the `stxvstopall` command (VSSHP batch stop command) to stop copying or the tracking process.

9.8.2 Deleting the Copy Source / Destination Volumes

Execute the `swsrpdelvol` command to delete the copy source and copy destination volumes.

If the copy source or copy destination volume is no longer used, initialize the disk. Refer to "8.1.6.4 Initializing Disk" for details on the procedure.

9.8.3 Deleting Managed Server

Delete the Managed Server to be uninstalled from the control of AdvancedCopy Manager.

You can delete a Managed Server either from Web Console or by executing the `stgxfwcmdelsrv` command.

If you have deleted the Managed server with the `stgxfwcmdelsrv` command, take the following actions to reflect to 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:
With Web Console, perform the **Reload Conf.** operation to update to the latest information.
- If only AdvancedCopy Manager's agent is used:
With Web Console, delete the Managed Server that you have deleted.

9.8.4 Uninstalling VSSHP

If VSSHP is no longer 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 *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.

10.1 Overview

AdvancedCopy Manager performs high-speed backup and restore of SQL Server databases constructed on the ETERNUS Disk storage system by cooperating with SQL Server.

Backup and restore of SQL Server databases can be operated using a command or Web Console (wizard).

When Using a Command

Refer to the following sites:

- [10.1.1 Backup Function](#)
- [10.1.2 Restore Function](#)
- [10.2 Operational Overview](#)
- [10.3 Operation by Backup Management Function](#)
- [10.4 Operation Using Replication Management Function](#)

For the versions of SQL Server supported by commands, refer to "[Table 1.1 Software Requirements of AdvancedCopy Manager's Manager](#)".

When Using Web Console (Wizard)

Backup and restore of SQL Server databases can be performed simply by using the wizard via Web Console. Refer to "[10.5 Backup and Restore Using Wizard for SQL Server](#)" for more details.

In order to perform restoration by using the wizard, for every ETERNUS Disk storage system subject to restoration, the license is required for the ETERNUS SF AdvancedCopy Manager for Microsoft SQL Server.

Registration of the licenses are performed with Web Console. Refer to "Register License" in the *Web Console Guide* for how to register the licenses.

Information

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 10.1 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):

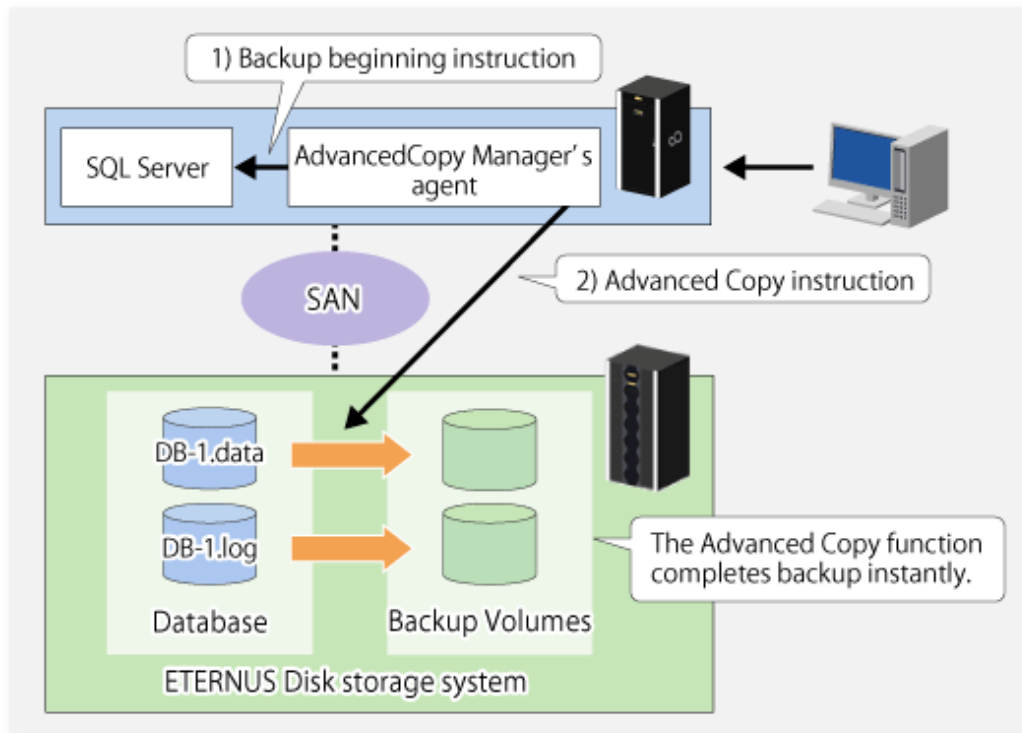
- Primary data file (one file is required per database)
- Secondary data files (there may be none, one or more than one)
- Transaction log files (at least one file is required per database)

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

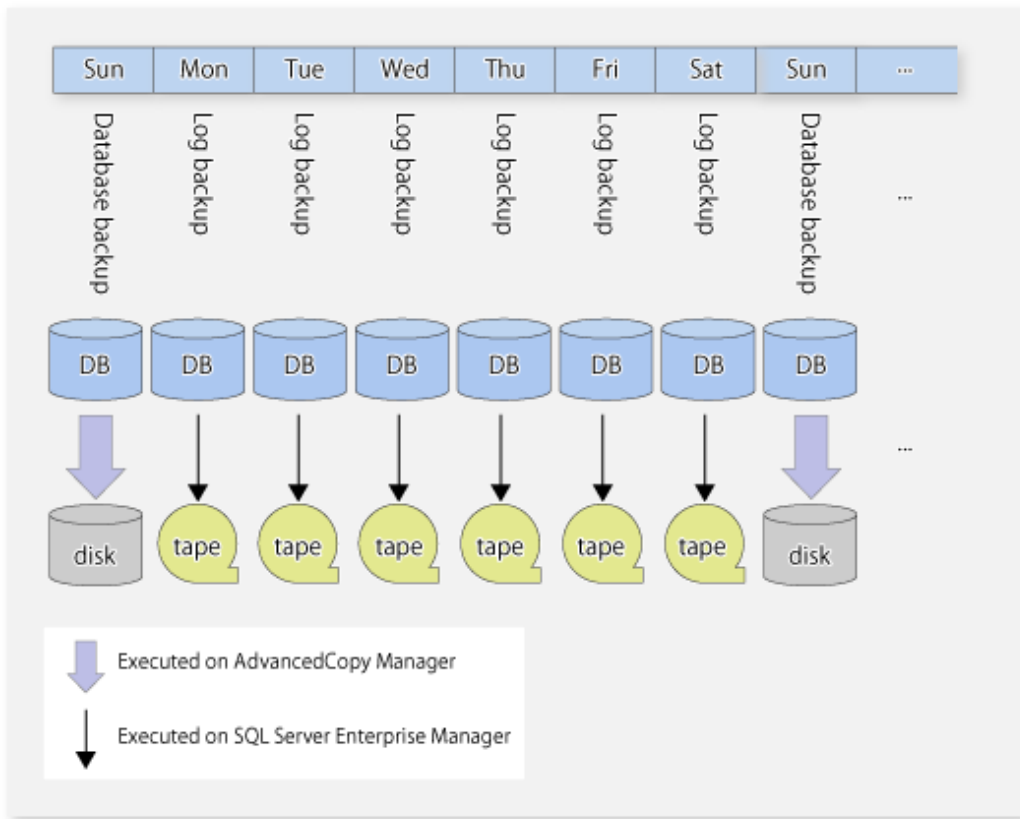
Figure 10.1 Backup Function Overview



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 Management Studio and Transact-SQL, etc.

The databases which can be backed up with AdvancedCopy Manager are only user databases, and so system databases cannot be backed up with AdvancedCopy Manager. Backup of the system databases should be performed with SQL Server.

Table 10.2 SQL Server and AdvancedCopy Manager Backup

Database Type		Backup Method	
		SQL Server	AdvancedCopy Manager
System Databases		Provided	Not provided
User Databases	Database backup	Provided	Provided
	Log backup	Provided	Not provided

Information

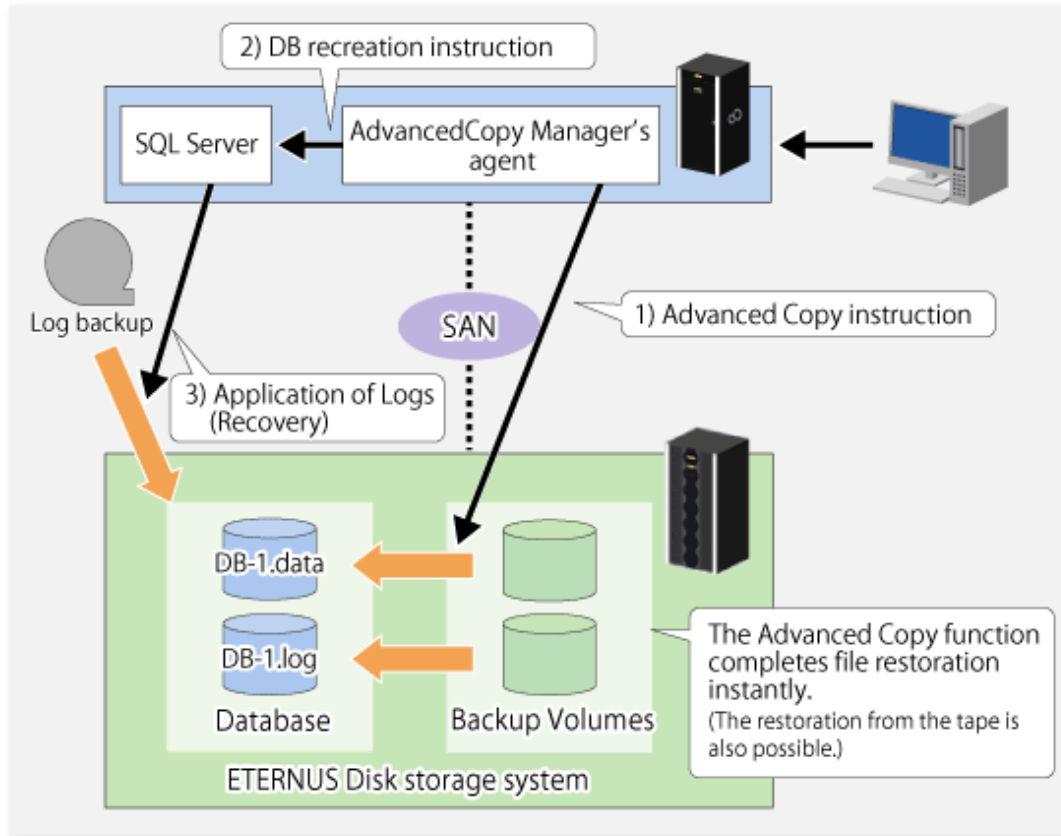
In this chapter, the term "database restore" refers to reloading a database image and status at the time of a specified database backup. In contrast, the term "database recovery" refers to applying logs to a database on which the database restore has been performed, in order to restore the database to 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:

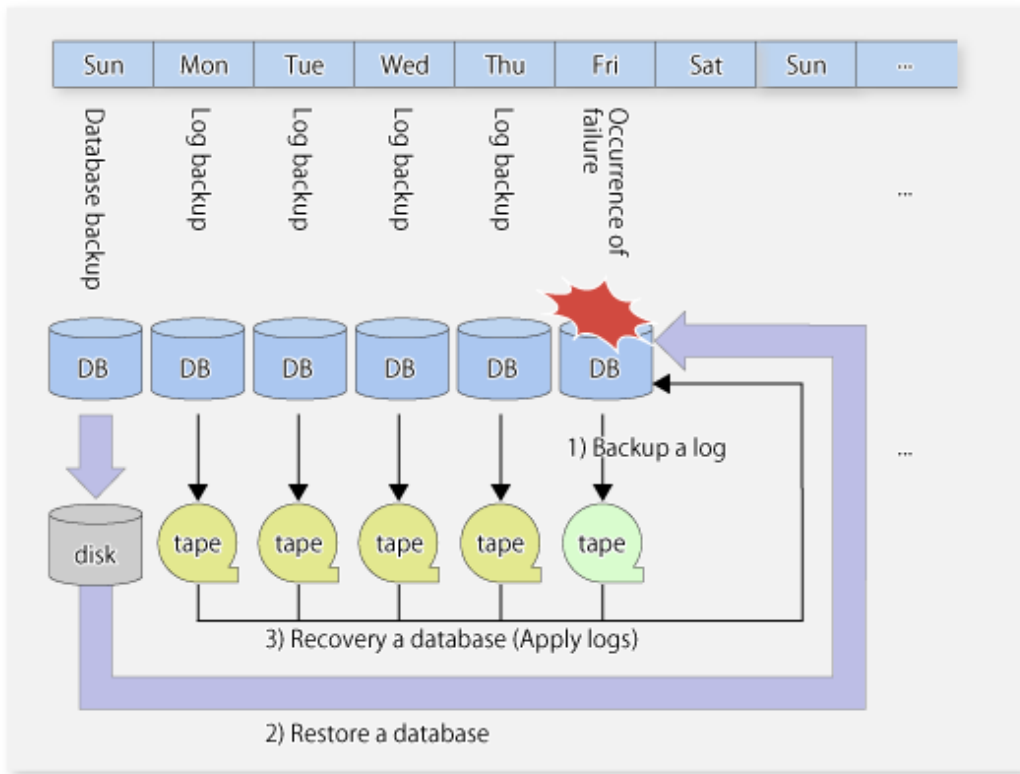
1. restoring database files
2. recreating a database
3. applying transaction logs

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 SQL Server Database

To configure the backup of a database, refer to "Recovery Models and Transaction Log Management" 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.
- Locate the following of the database to be backed up so that the file path length may become 254 bytes or less.
 - Primary data file

- Secondary data file
- Transaction log file

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

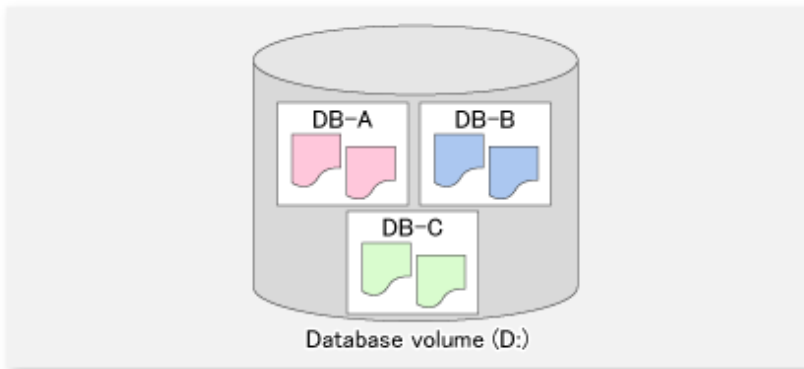
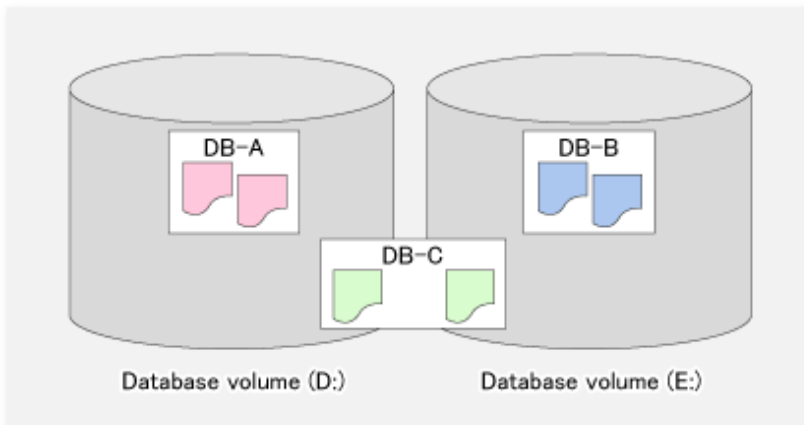


Figure 10.6 N Databases on M Volumes



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:

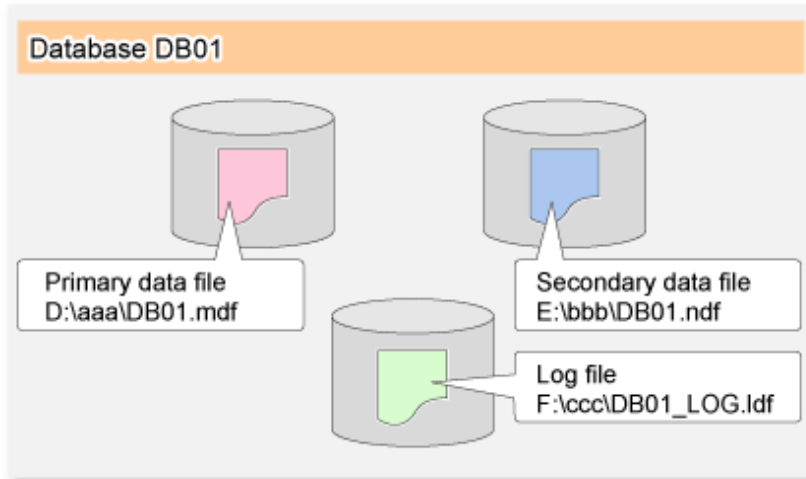
- When two or more databases are backed up at the same time, all the specified databases are frozen by SQL Server until processing is completed. If the database is frozen for an extended period, there is a possibility that the backup cannot be completed correctly. Design the databases so that the number 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

If a full text catalogue is used, 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 is not backed up and needs to be reconstructed after restore is executed.

10.2.1.3 Determining 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 (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 (Backup server: Only If 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 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 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.



See

.....
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 function 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 in the equivalency maintenance state.



Point

.....
When the backup management function is used, a backup is created by stopping or suspending EC under the equivalency maintenance status. When the `swstbackup_sqlsvr` 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 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
- Starting Services
- Starting Web Console
- Registering Managed Server
- Fetching device information on a Managed Server
- Configuring Environment for Backup Operation Server
- Setting Operation Type for Device

- Setting Backup Policy
- Customizing Pre-processing and Post-processing
- 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

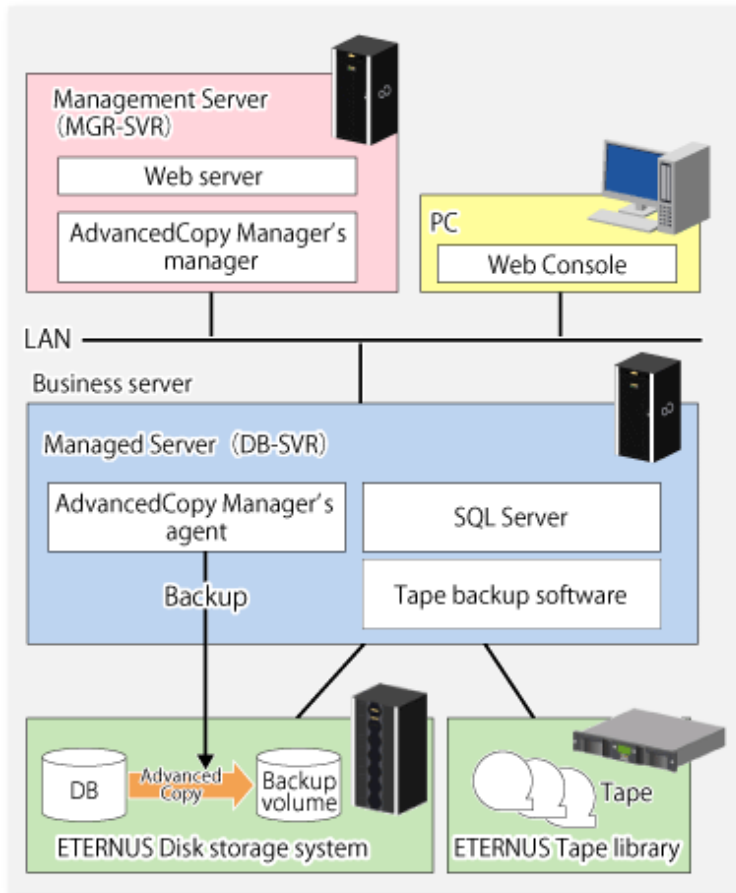


Table 10.3 Server Configuration

Server Type	Server Name	comment
Management Server	MGR-SVR	-
Managed Server	DB-SVR	- Business server - Cluster operation (AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)

Table 10.4 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

Database Name	Database File Name	Database File Type
	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 10.5 Database Volume Configuration

Drive Letter	AdvancedCopy Manager Device Name
D:	g1d1p1
E:	g1d2p1
F:	g1d3p1

10.3.1.1 Configuring 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 on this, refer to "Recovery Models and Transaction Log Management" in the "SQL Server Books Online".

10.3.1.2 Starting Services

Refer to "[3.4.1 Starting Services](#)".

10.3.1.3 Starting Web Console

Refer to "[3.4.2 Starting Web Console](#)".

10.3.1.4 Registering Managed Server

Refer to "[3.4.3 Registering Managed Server](#)".

10.3.1.5 Fetching Device Information on Managed Server

Refer to "[3.4.4 Fetching Device Information on Managed Server](#)".

10.3.1.6 Configuring Environment for Backup Operation Server

Refer to "[3.4.5 Configuring Environment for Backup Operation Server](#)".

10.3.1.7 Setting Operation Type for Device

Refer to "[3.4.6 Setting Operation Type for Device](#)".

Point

.....
When you register transaction volumes, register all the volumes on which database files are placed.
.....

10.3.1.8 Setting Backup Policy

Refer to "[3.4.7 Setting Backup Policy](#)".

Point

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.

10.3.1.9 Customizing Pre-processing and Post-processing

Refer to "3.4.8 Customizing Pre-processing and Post-processing".

10.3.1.10 Prepare Device Map File (Only If 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 Device Map File".

Point

Where the database consists of multiple volumes, it is necessary to state all the definitions pertaining to the database volumes in one device map file.

10.3.1.11 Record Output Path of 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 the `swstrestore_sqlsvr` command, it is necessary to record the absolute path of a metadata file in advance.

The metadata file is saved with the name ""DB name".swst-dmp" in the folder where the database file with file identification number (FILE_ID) 1 exists. For example, if the absolute path of the database file with file identification number 1 of a database DB01 is "D:\SQLSVR\DB01_data.mdf", the absolute path of a metadata file becomes "D:\SQLSVR\DB01.swst-dmp".

Even though the database file with file identification number 1 is a primary data file, it is a good idea to check using the following procedure to make sure it is correct:

1. Perform the Transact-SQL command "USE database name EXEC SP_HELPFILE".
2. Look for the record with which the column "file id" is 1 as a result of this execution. The content of the column "filename" of the record is the absolute path of the database file with file identification number 1.

Point

Although it is necessary to ensure that there is enough capacity for storing a metadata file in a transaction volume, the size of a metadata file is very small, so there is really no necessity for taking this into consideration. The size of a metadata file depends on the number of files of a database. For example, it is about 20 KB in a database containing 10 files.

10.3.1.12 Prepare 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) should be started beforehand. Synchronous processing starts by executing the [swststartsync](#) 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:\>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 Database

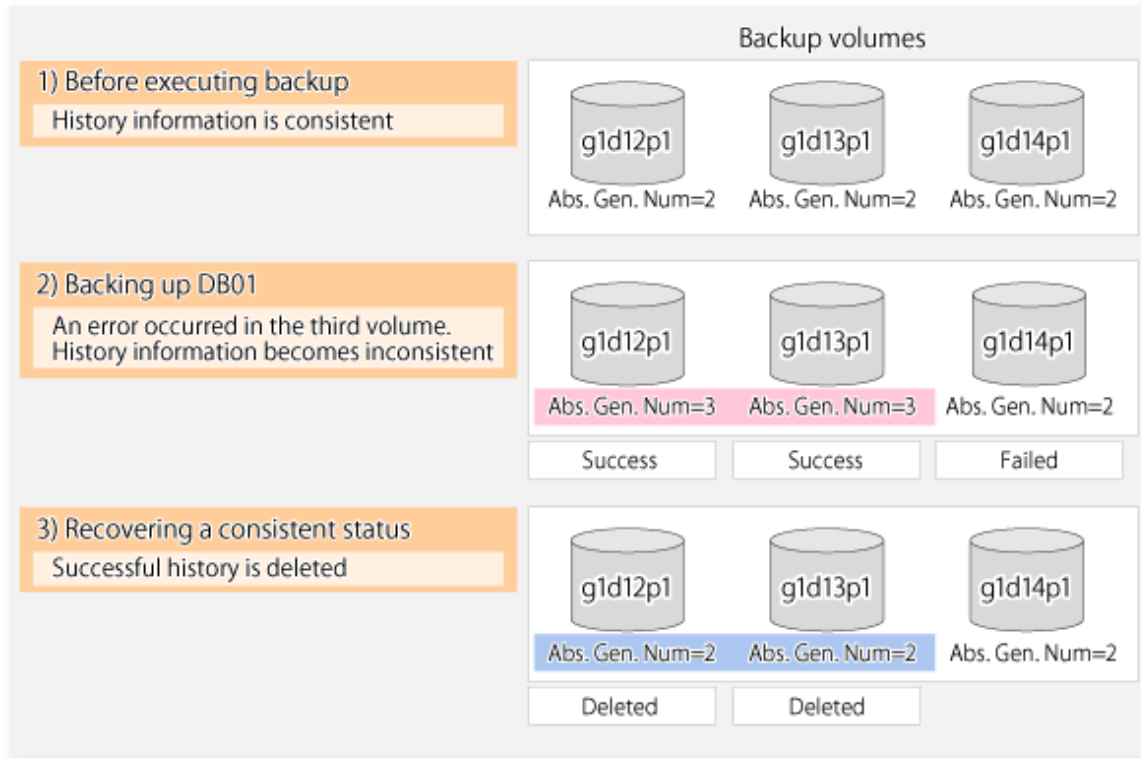
Backup of an SQL Server database is performed by the [swstbackup_sqlsvr](#) command.



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 the [swsthistdel](#) 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 the [swststartsync](#) command.

Figure 10.9 Recovery from Backup History Information Inconsistency



[Example]

Perform backup of databases DB01, DB02 and DB03. If you use a synchronous type backup, then by executing the [swstsyncstat](#) 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:\>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 Transaction Log

Back up the transaction log with Management Studio 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 Transaction Log (Perform This If Restore to Latest Point Is Required)

Back up the transaction log if the restoration to the latest point needs 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 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 Management Studio, 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.

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 10.6 Steps to Restore All Database Files

Step	Step Name	Description
1	Deleting a database	<p>Delete a database using Management Studio. When you apply logs, perform not to check the "Delete backup and restore history information for databases". If you do it, you are no longer able to apply logs from Management Studio. In this case, apply logs by Transact-SQL.</p> <p>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.</p>

Step	Step Name	Description
2	Executing the restore execution command	Execute the swstrestore command for the transaction volumes on which all the database files are placed.

Point

- A metadata file as well as the database files is 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 media, you can also directly restore files from the tape media 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:\>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 Database

Recreate a database using the [swstrestore_sqlsvr](#) 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 statement: ALTER AUTHORIZATION.

[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 is 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:\>
```



Once the SQL server restore execution command completes normally, the metadata file is deleted automatically.

Recovering Database (Perform This If Restore to Latest Point or Specific Point Is Required)

To restore a database to the latest point or a specific point, apply logs using Management Studio. For information on the operation method, refer to "How to: Restore a Transaction Log Backup (SQL Server Management Studio)" or "How to: Restore to a Point in Time (SQL Server Management Studio)" in the "SQL Server Books Online".

If you cannot apply logs using Management Studio 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 the `swstsyncstat`, `swstbackstat`, and `swstreststat` commands. 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 Management Studio.

10.3.2.4 Stopping Operations

To stop the currently running copy processing, use the `swstcancelsync`, `swsthistdel`, and `swstcancelrest` commands.

[Example]

Stop backup synchronous processing under execution.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync g1d1p1
g1d1p1 swstcancelsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync g1d2p1
g1d2p1 swstcancelsync completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swstcancelsync g1d3p1
g1d3p1 swstcancelsync completed
C:\>
```

10.3.2.5 Operation by Cluster

AdvancedCopy Manager supports WSFC. For more information on this, refer to "15.1.6 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
- Starting Services
- Starting Web Console
- Registering Managed Server
- Fetching device information on a Managed Server
- Creating Replication Group
- Preparing Device Map File (When Not Creating a Replication Group)
- Performing Database List 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

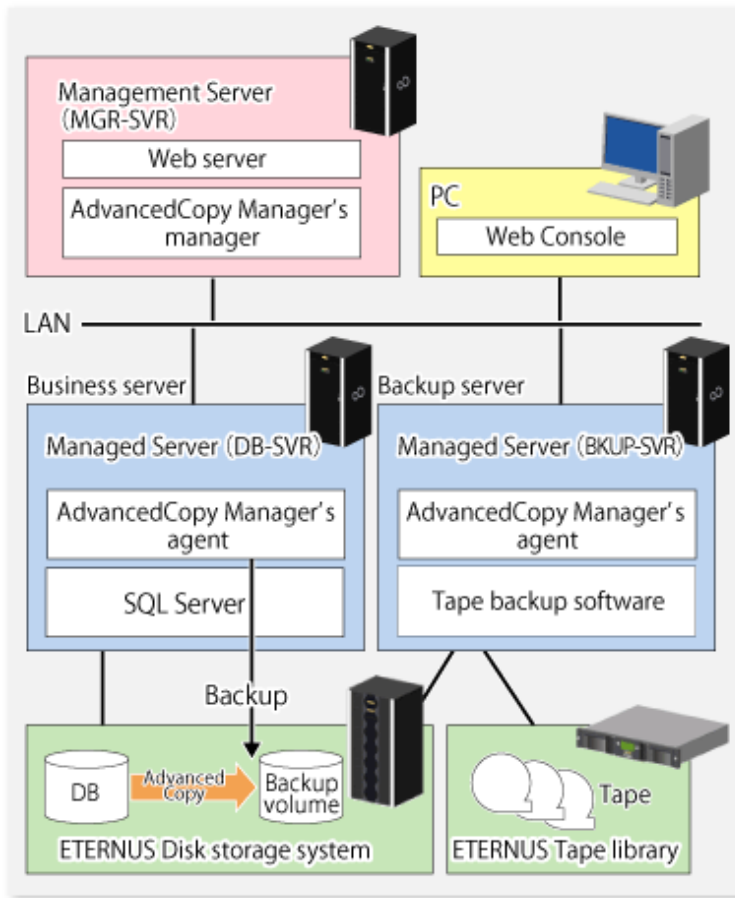


Table 10.7 Server Configuration

Server Type	Server Name	Comment
Management Server	MGR-SVR	-
Managed Server	DB-SVR	- Business server - Cluster operation (AdvancedCopy Manager's logical node name=nodeAGT, SQL Server virtual server name=VSERVER)
Managed Server	BKUP-SVR	Backup server

Table 10.8 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

Database Name	Database File Name	Database File Type
	E:\SQLSVR\DB03.ndf	Secondary data file
	F:\SQLSVR\DB03.ldf	Transaction log file

Table 10.9 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 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 "Recovery Models and Transaction Log Management" in the "SQL Server Books Online".

10.4.1.2 Starting Services

Refer to "[7.4.1 Starting Service](#)".

10.4.1.3 Starting Web Console

Refer to "[7.4.2 Starting Web Console](#)".

10.4.1.4 Registering Managed Server

Refer to "[7.4.3 Registering Managed Server](#)".

10.4.1.5 Fetching Device Information on Managed Server

Refer to "[7.4.4 Fetching Device Information on Managed Server](#)".

10.4.1.6 Creating Replication Group

Set a pair of a transaction volume to which SQL Server database 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").

Perform this task while being careful of the following.

- Register all database volumes and copy destination backup volumes.
- Specify a partition (gXdYpZ) for volume name. Do not specify a LUN (gXdY).
- Set the database volume as the replication source volume and then set the backup volume as the replication destination volume (do not set the replication destination volume first and then set the replication source volume).
- When performing backup server operation, set the server on which to operate the database (the replication source server) as the control server (specify "ORG" for the parameter of the o option with the replication volume information configuration command).
- Specify the u option when not using AdvancedCopy for file recovery processing. It is possible to limit the direction of the copying that can be implemented to only be from the replication source volume (database volume) to the replication destination volume (backup volume).
- Apart from this, refer to "[7.4.7.1 Conditions for Replication Volumes That Make Up Group](#)" for conditions of replication volumes that configure replication groups.

Create a replication group by the [swsrpsetvol](#) command.

The information for the created group can be referred to by the [swsrpvolinfo](#) command.

In backup to the 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 the business server can be an operated server.

[Example]

Configure replication volume information and a replication group in relation to all targeted database volumes. Execute the command from the business server (DB-SVR).

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp1 g1d1p1 g1d11p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp1 g1d2p1 g1d12p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp1 g1d3p1 g1d13p1@BKUP-SVR
swsrpsetvol completed
C:\>
```

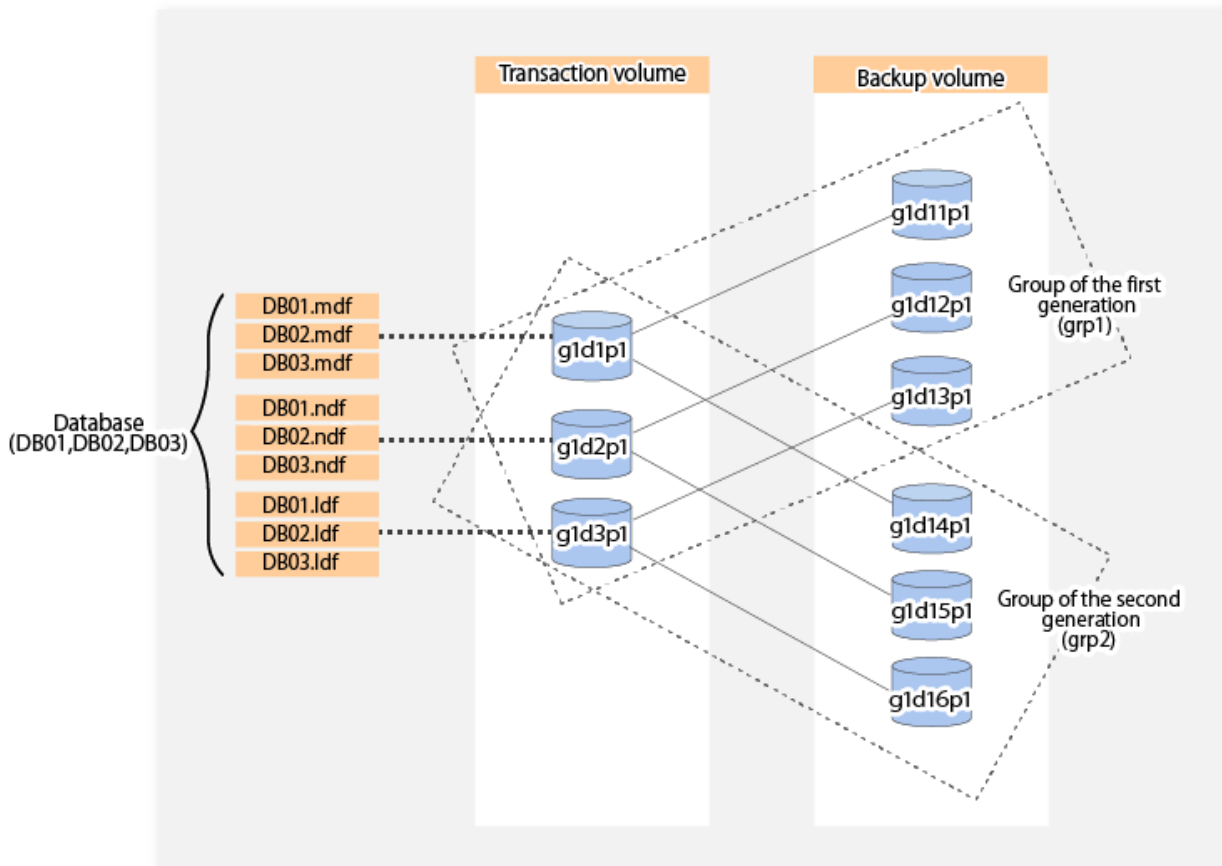
Multiple-generation Backup Operation

When performing backups of databases in multiple generations, create a replication group for each generation.



Example

To create a replication group that performs backup of the transaction volume (g1d1p1, g1d2p1, g1d3p1) that configures the database (DB01, DB02, DB03) to a backup volume of 2 generations (1st generation <g1d11p1, g1d12p1, g1d13p1>, 2nd generation <g1d14p1, g1d15p1, g1d16p1>) when setting up the backup.



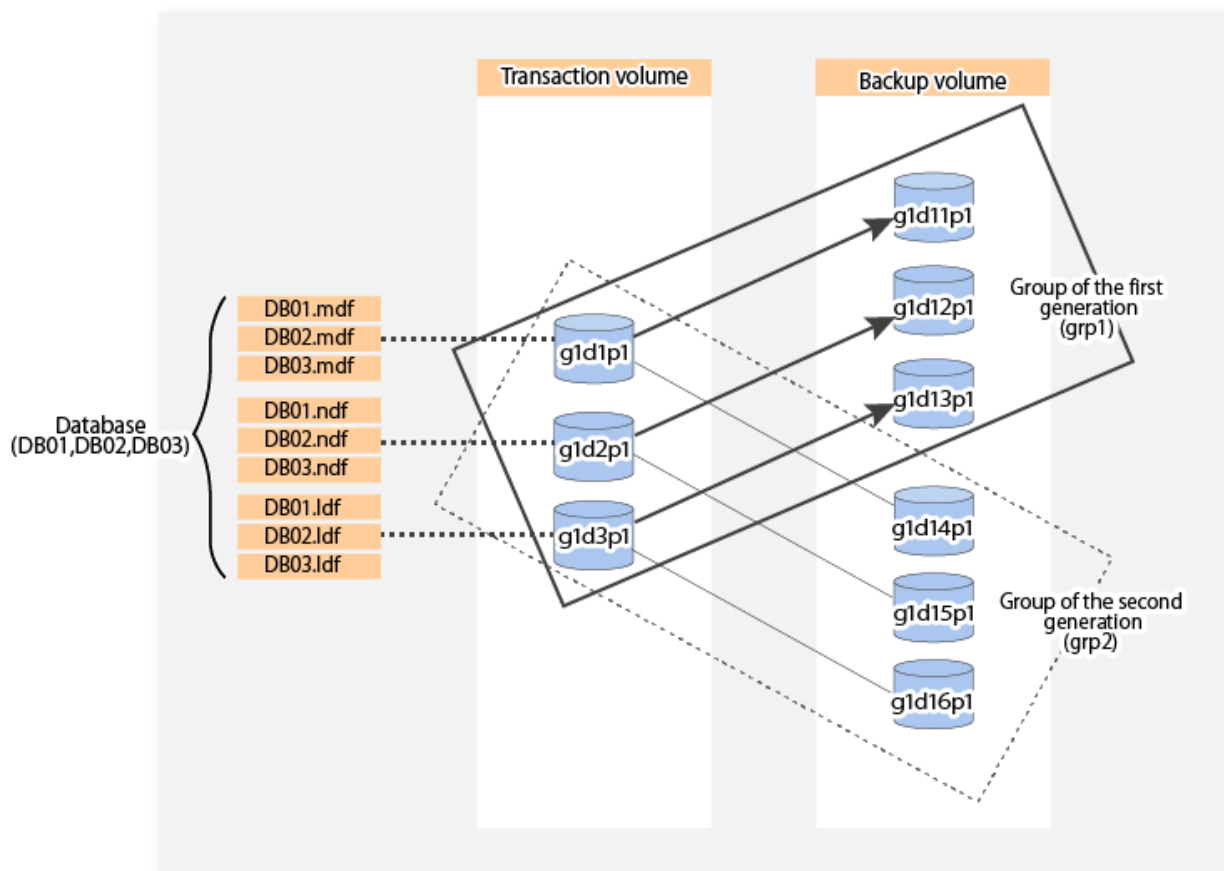
```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp2 g1d1p1 g1d14p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp2 g1d2p1 g1d15p1@BKUP-SVR
```

```

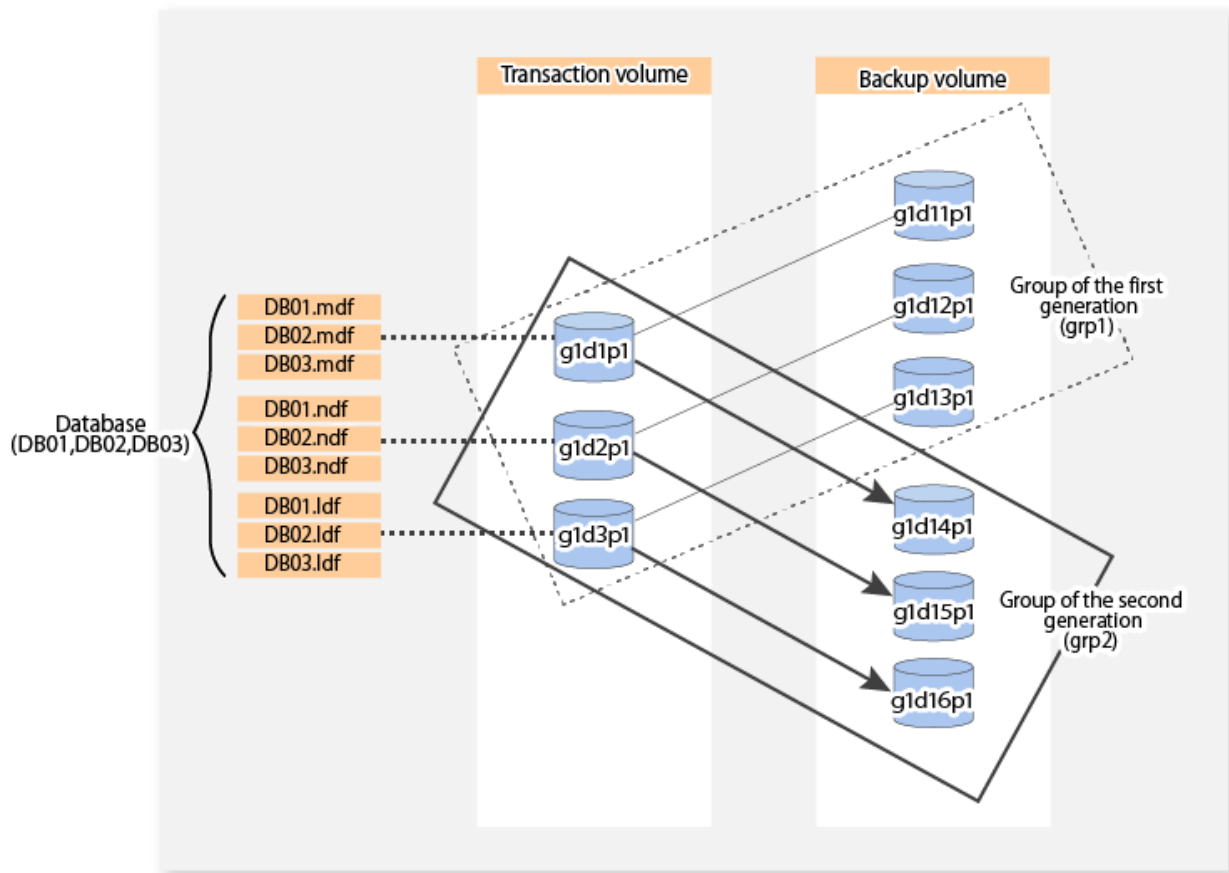
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpsetvol -o ORG -Xgroup grp2 g1d3p1 g1d16p1@BKUP-SVR
swsrpsetvol completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvoinfo -L
Server Original-Volume Size Replica-Volume Size Copy Op-Server Group
DB-SVR g1d1p1@DB-SVR 7.5 Gbyte g1d11p1@BKUP-SVR 7.5 Gbyte bi-direction original grp1
DB-SVR g1d2p1@DB-SVR 7.5 Gbyte g1d12p1@BKUP-SVR 7.5 Gbyte bi-direction original grp1
DB-SVR g1d3p1@DB-SVR 7.5 Gbyte g1d13p1@BKUP-SVR 7.5 Gbyte bi-direction original grp1
DB-SVR g1d1p1@DB-SVR 7.5 Gbyte g1d14p1@BKUP-SVR 7.5 Gbyte bi-direction original grp2
DB-SVR g1d2p1@DB-SVR 7.5 Gbyte g1d15p1@BKUP-SVR 7.5 Gbyte bi-direction original grp2
DB-SVR g1d3p1@DB-SVR 7.5 Gbyte g1d16p1@BKUP-SVR 7.5 Gbyte bi-direction original grp2

```

To perform a backup of the database (DB01, DB02, DB03) of the first generation, specify the database (DB01, DB02, DB03) and the replication group (grp1) when executing the backup.



To perform a backup of the database (DB01, DB02, DB03) of the second generation, specify the database (DB01, DB02, DB03) and the replication group (grp2) when executing the backup.



10.4.1.7 Prepare Device Map File (When Not Creating a Replication Group)

When performing a backup while specifying a replication group, it is not necessary to perform this task.

Point

Use of the device map file in cases where the device map file specified backup operation continuing from the previous version is carried out.

For other cases, carry out replication group specified backup operation. Furthermore, the backup history information can be confirmed with the `swsrphistory_sql` command at the replication group specified backup operation.

Generate a device map file by referring to "3.4.9 Preparing Device Map File" and the items to take note of below.

Note

- 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.
- Specify a partition (gXdYpZ) for volume name. Do not specify a LUN (gXdY).
- Where the database consists of multiple volumes, it is necessary to state all the definitions pertaining to the database volumes in one device map file.

10.4.1.8 Performing Database List File

The database list file indicated by the `swsrpbackup_sql` command is generated.

Without using the database list file, where backup of the database indicated at the operand of `swsrpbackup_sql` command is carried out, this procedure is not necessary.

The format of the database list file is as follows:

- List the database name in each row of the text file.
- List only one database name in each row.
- List the database name from the beginning of the rows.
- Blank lines are ignored.
- It is possible to specify a maximum of 128 databases.
- The names shall be listed using CR+LF for line breaks.

[Example]

```
DB01
DB02
DB03
```

10.4.1.9 Record Output Path of 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 "`dbName.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 is "`D:\SQLSVR\DB01.swsrp-dmp`". Even though the database file with file identification number 1 is a primary data file, you should confirm it with the following procedure:

1. Perform the Transact-SQL command "USE database name EXEC SP_HELPFILE".
2. Look for the record with which the column "file id" is 1 as a result of this execution. The content of the column "filename" of the record is the absolute path of the database file with file identification number 1.

Point

Although you need to ensure that there is enough space to store a metadata file in the transaction volume, the size of a metadata file is very small, so there is really no need to check this. The size of a metadata file depends on the number of files of a database. For example, it is about 20 KB in a database with 10 files.

10.4.1.10 Prepare 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 the [swsrpstartsync](#) 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). (When specifying a replication group name)

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstartsync -Xgroup grp1
GROUP=grp1 swsrpstartsync completed
C:\>
```

Backing Up Database

Backup of an SQL Server database is performed by the [swsrpbackup_sql](#) command.



Note

- The transaction log is not truncated by performing a snapshot backup. Therefore, execute the log backup for the truncation of the transaction log regularly even when the backup only consists of the database backup. For details, refer to the section "Truncating the Transaction Log" in "SQL Server Books Online".
- If an error occurs while the SQL Server backup execution command (swsrpbackup_sql) is processing a database that consists of two or more volumes with the replication creation command (swsrpmake), processing is interrupted at that time. In the case of volumes for which the replication processing has already been completed, after you fix cause of the error, restart synchronous processing by using the [swsrpstartsync](#) command.

[Example]

Perform backup of databases DB01, DB02 and DB03. If you use the synchronous type backup, execute the [swsrpstat](#) 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 replication group name is grp1.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_sql -Xserver VSERVER -Xgroup grp1 DB01 DB02 DB03
DB01 DB02 DB03 swsrpbackup_sql completed
C:\>
```

Confirm the backup history information with the [swsrphistory_sql](#) command.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_sql disp -Xserver VSERVER -Xgroup grp1
Instance-Name Server-Name Group-Name DB-Name Meta-Data-File DB-File Original-Volume
Replica-Volume Backup-Date
MSSQLSERVER VSERVER grp1 DB01 D:\SQLSVR\DB01.swsrp-dmp D:\SQLSVR\DB01.mdf g1d1p1@DB-
SVR g1d11p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB01 D:\SQLSVR\DB01.swsrp-dmp E:\SQLSVR\DB01.ndf g1d2p1@DB-
SVR g1d12p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB01 D:\SQLSVR\DB01.swsrp-dmp F:\SQLSVR\DB01.ldf g1d3p1@DB-
SVR g1d13p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB02 D:\SQLSVR\DB02.swsrp-dmp D:\SQLSVR\DB02.mdf g1d1p1@DB-
```

```

SVR g1d11p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB02 D:\SQLSVR\DB02.swsrp-dmp E:\SQLSVR\DB02.ndf g1d2p1@DB-
SVR g1d12p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB02 D:\SQLSVR\DB02.swsrp-dmp F:\SQLSVR\DB02.ldf g1d3p1@DB-
SVR g1d13p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB03 D:\SQLSVR\DB03.swsrp-dmp D:\SQLSVR\DB03.mdf g1d1p1@DB-
SVR g1d11p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB03 D:\SQLSVR\DB03.swsrp-dmp E:\SQLSVR\DB03.ndf g1d2p1@DB-
SVR g1d12p1@BKUP-SVR 2013/09/04 13:51
MSSQLSERVER VSERVER grp1 DB03 D:\SQLSVR\DB03.swsrp-dmp F:\SQLSVR\DB03.ldf g1d3p1@DB-
SVR g1d13p1@BKUP-SVR 2013/09/04 13:51
C:\>

```

Backing Up Transaction Log

Back up the transaction log with Management Studio 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 Transaction Log (Perform This If Restore to 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 Database

Restore a database by performing the following two procedures:

- Restoring files
- Recreating a database

Note

If a user's default database (the one used after logging on) is set as the target database of restoration, then it must be changed to be the master database before the above operation is performed. In such cases, the steps for restoration are as follows:

1. The default database is changed into the master from the database for restoration.
2. "Restoring file" processing is performed.
3. "Recreating a database" processing is performed.
4. The default database is changed to the database for restoration from the master.

The default database can be changed by Management Studio, 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.

- 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.

Restoring Files

Restore all the database files (ie, data and log files).

Note

- You cannot restore log files alone.
- Restore all the database files as follows:

Table 10.10 Steps to Restore All Database Files

Step	Step Name	Description
1	Deleting a database	<p>Delete the database using Management Studio. When you apply logs, perform not to check the "Delete backup and restore history information for databases". If you do it, you are no longer able to apply logs from Management Studio. In this case, apply logs by using Transact-SQL.</p> <p>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.</p>
2	Executing the replication creation command	<ul style="list-style-type: none"> - For backup within a box <p>Executing the swsrpmake command, copy all the database files from the backup volumes to the database volumes.</p> <ul style="list-style-type: none"> - For backup between boxes <p>Use the swsrpstartsinc and swsrpmake commands to copy all the database files from the backup volumes to the database volumes.</p>

Point

- A metadata file as well as database files is 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 media, you can then directly restore files from the tape media to the database volumes without using the replication creation command.

[Example (for Backup within Box)]

Restore files by using the snapshot type replication (OPC) after deleting the databases.

Execute the following commands from the business server (DB-SVR):

When specifying a replication group name, specify the -Xgroup option and the -Xreverse option.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake -Xgroup grp1 -Xreverse
GROUP=grp1 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).

When specifying a replication group name, specify the -Xgroup option and the -Xreverse option.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpstartsync -Xgroup grp1 -Xreverse
GROUP=grp1 swsrpstartsync completed

(Wait until equivalency status is reached)

C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpmake -Xgroup grp1 -Xreverse
GROUP=grp1 swsrpmake completed
C:\>
```

Recreating Database

Recreate a database using the [swsrprestore_sql](#) 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 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 statement: ALTER AUTHORIZATION.

[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 is restored to the latest point or to a specific point in time, as a result of the application of transaction logs.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta D:\SQLSVR
\DB01.swsrp-dmp DB01
DB01 swsrprestore_sql completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta D:\SQLSVR
\DB02.swsrp-dmp DB02
DB02 swsrprestore_sql completed
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_sql -Xserver VSERVER -Xmeta D:\SQLSVR
\DB03.swsrp-dmp DB03
DB03 swsrprestore_sql completed
C:\>
```



Point

Once the SQL server restore execution command completes normally, the metadata file is deleted automatically.

Recovering Database (Perform This If Restore to Latest Point or Specific Point Is Required)

To restore a database to the latest point or to a specific point, apply logs using Management Studio. For more information, refer to "How to: Restore a Transaction Log Backup (SQL Server Management Studio)" in the "SQL Server Books Online" or "How to: Restore to a Point in Time (SQL Server Management Studio)".

If you cannot apply logs using Management Studio 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 the [swsrpstat](#) 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 Management Studio.

10.4.2.4 Stopping Operations

When the copy processing under execution is stopped, use the [swsrpcancel](#) command.

[Example]

Stop backup synchronous processing under execution.
Execute the command from the business server (DB-SVR).
When using a replication group, specify the -Xgroup option.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpcancel -Xgroup grp1
GROUP=grp1 swsrpcancel completed
C:\>
```

10.4.2.5 Operation by Cluster

AdvancedCopy Manager supports WSFC. For more information, refer to "[15.1.6 Notes on Cluster Operation](#)".

10.5 Backup and Restore Using Wizard for SQL Server

This section explains how to back up and restore SQL Server databases using the wizard (Backup Wizard for SQL Server and Restore Wizard for SQL Server).

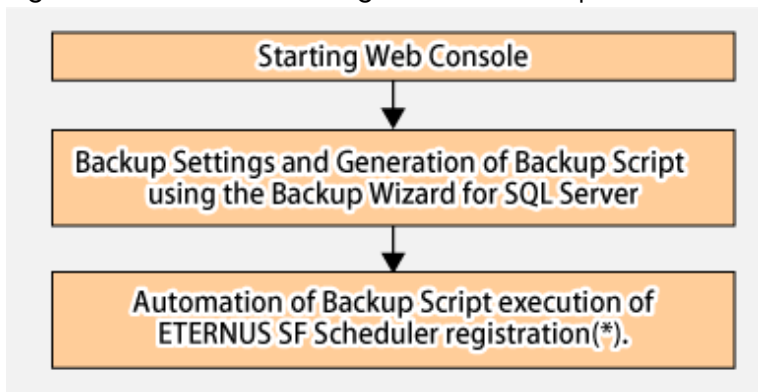
10.5.1 Overview

Backup and restoration of SQL Server databases are configured / operated with Web Console.

- Configurations for Backup and Restoration of SQL Server Databases
 - When the Backup Wizard for SQL Server is used, the SQL Server database backup settings and creation backup execution scripts, both of which require complex procedures, can be simplified.
- Operation of Backup and Restoration of SQL Server Databases
 - Registering the backup scripts created by the Backup Wizard for SQL Server to the Scheduler can automatically perform backup operation of SQL Server databases.
 - When the Restore Wizard for SQL Server is used, SQL Server database restoration, which requires complex procedures, can be easily carried out.

From configuration of backups to the execution flow is shown below.

Figure 10.11 Flow from Configuration of Backups to Execution



Note: Refer to "[Chapter 11 Scheduler](#)" for how to register this to the scheduler of ETERNUS SF.

Refer to "[10.5.5 Restoration Using Restore Wizard for SQL Server](#)" for the flow of the restoration task.

10.5.1.1 Outline of Backup by Backup Wizard for SQL Server

The Backup Wizard for SQL Server simplifies the backup operation for SQL Server databases.

When the Backup Wizard for SQL Server is used, the SQL Server 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 SQL Server, the following functions are provided:

- Backup settings
Configure backup of its source and destination.
- Creating Backup Execution Script
 - Full Backup Execution Script
The script that executes a full backup of the user database.
 - Log backup execution script
The script that performs a backup of the transaction log of the user database.
 - Configuration Removal Script
Script that clears the backup configured by the wizard.

Refer to "[10.5.4.1 Creating Backup Execution Script](#)" for details of each script.

10.5.1.2 Outline of Restoring by Restore Wizard for SQL Server

When the Restore Wizard for SQL Server is used, SQL Server database restoration, which requires complex procedures, can be easily carried out by users even without specialized knowledge.

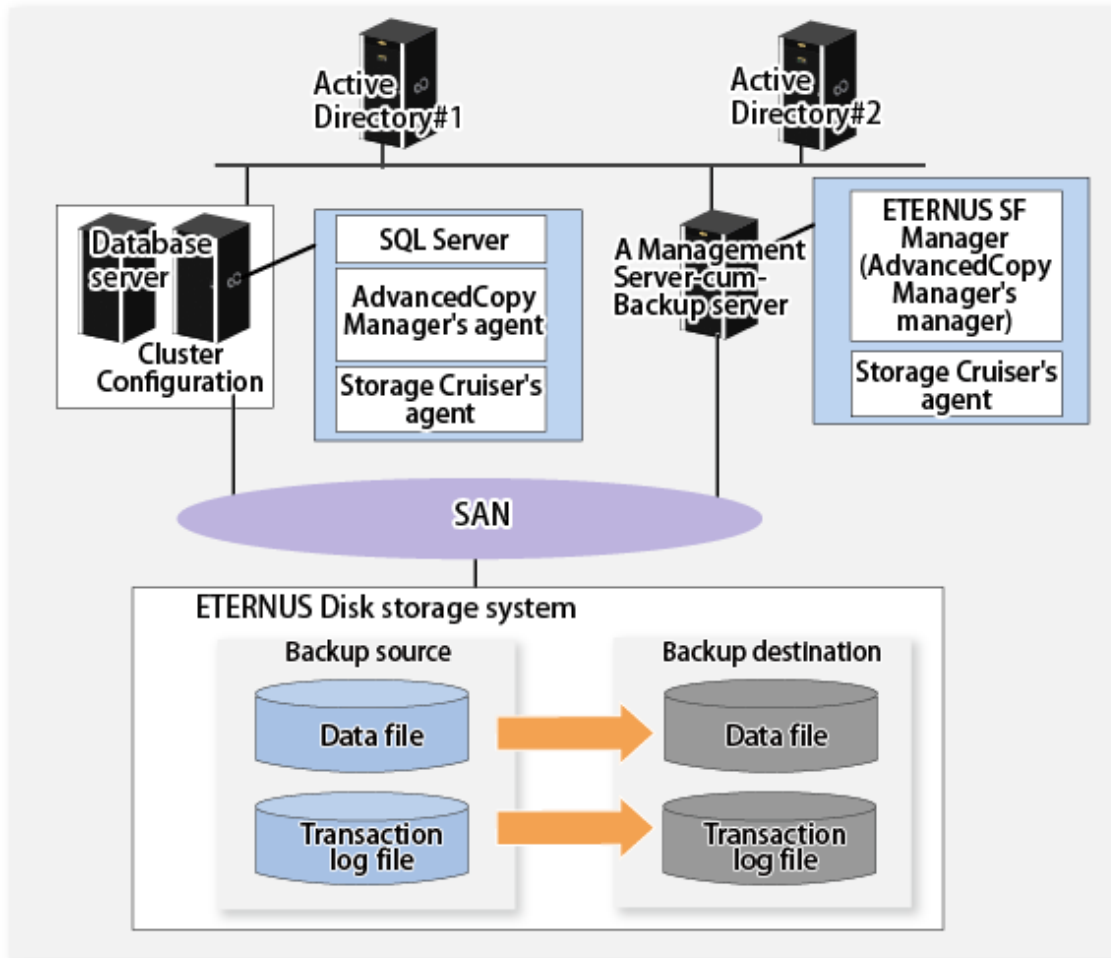
The Restore Wizard for SQL Server supports the restoration of databases backed up with the complete backup execution script or log backup execution script created with the Backup Wizard for SQL Server.

10.5.1.3 System Configuration

The system configuration recommended by this feature is indicated below:

- Recommended Configuration 1
 - Database Servers(cluster configurations)
 - A Management Server-cum-Backup server(Non-cluster Configuration)
- Recommended Configuration 2
 - Database Servers(cluster configurations)
 - A Management Server-cum-Backup server (Cluster Configuration)

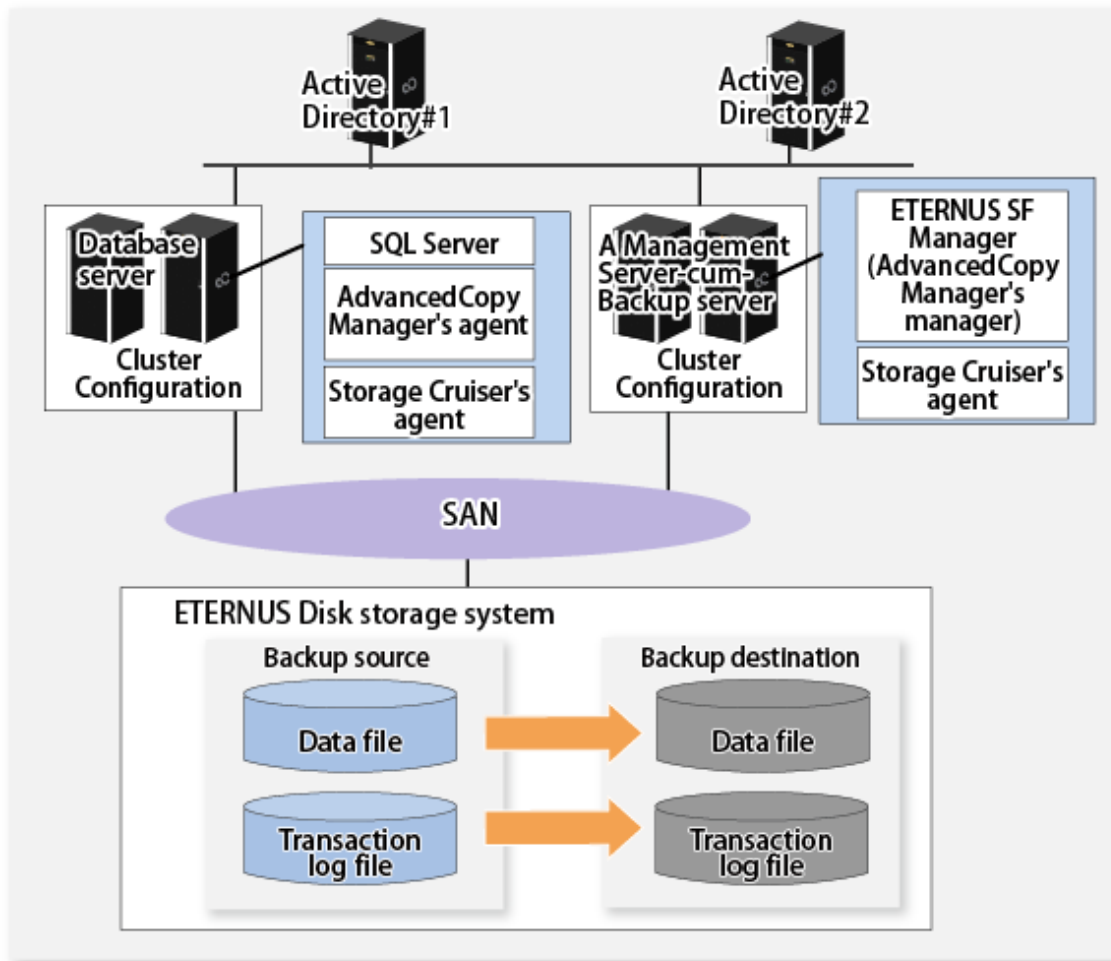
Figure 10.12 Recommended Configuration 1 (Example)



P Point

Though Storage Cruiser's agent does not support a cluster operation, install Storage Cruiser's agent in each physical node.

Figure 10.13 Recommended Configuration 2(Example)



Point

Though Storage Cruiser's agent does not support a cluster operation, install Storage Cruiser's agent in each physical node.

The servers that configure the SQL Server backup / restoration operation are explained below.

Table 10.11 Servers that Configure SQL Server Backup / Restoration Operation

Server Type	Server Roles	Required/Optional	ETERNUS SF and Installed Products of SQL Server
Active Directory Server	Active Directory is used for user authorization. In order to prevent a single failure of a domain controller from affecting the operation of the domain, a redundant setup with a plurality of units is recommended.	Optional (*1) This is necessary when using Active Directory for user authorization.	-
Database Server	The server on which the database of the SQL Server to be backed up operates. In addition, the server to which the ETERNUS Disk storage system storing the database of SQL Server is connected.	Required	- AdvancedCopy Manager's agent (*2) - Storage Cruiser's agent - SQL Server

Server Type	Server Roles	Required/Optional	ETERNUS SF and Installed Products of SQL Server
Backup Server	The server which serves as the destination for the backup of the database of SQL Server. A backup volume must be connected.	Required	- AdvancedCopy Manager's agent (*2) - Storage Cruiser's agent
Management Server	The Management Server for performing an online backup of the database of SQL Server. The Management Server manages the Managed Server (Database server and Backup server). Only 1 unit is installed within the system.	Required	ETERNUS SF Manager (AdvancedCopy Manager's manager)

*1: In the case that the Management Server or the Managed Server is of a cluster configuration, an Active Directory server is required.

*2: In the case that this server already exists together with the Management Server, it is not necessary to install the AdvancedCopy Manager's agent.

Table 10.12 Whether the Servers configuring SQL Server backup / restoration operation can exist together

Server Type	Active Directory Server	Database Server	Backup Server	Management Server
Active Directory server (*1)	-	N/A	N/A	A
Database Server	N/A	-	A	A
Backup Server	N/A	A	-	A
Management Server	A	A	A	-

(A=Available; N/A=Not Available)

*1: The AdvancedCopy Manager's agent cannot be installed on a Windows server that serves the role of the Active Directory domain service.

Note

- It is necessary for the ETERNUS SF Manager (AdvancedCopy Manager's manager), the AdvancedCopy Manager's agent, and the Storage Cruiser's agent to be of version 16.1 or later.
- In the case that Active Directory is used for user authorization, it is necessary to configure each server to an Active Directory environment.

Virtual Environment

The range of support of virtualized software (host / guest) is indicated below in the following table.

Table 10.13 For Virtual Environment Table

Platform		Managed Server	Management Server
VMware	Host	N/A	N/A
	Guest (*1)	A	A
Hyper-V	Host	A	A
	Guest	N/A	A
KVM	Host	-	A
	Guest	-	A

(A=Available, N/A=Not Available)

-: Not for Backup Wizard for SQL Server and Restore Wizard for SQL Server

*1: VMware Tools must be installed.

Note

- Virtualization of all servers is supported, with the exception of Active Directory.
The range of support of the virtualized environment is in accordance with the range of support of the AdvancedCopy Manager and the range of support of the Storage Cruiser.
- In the case that the Management Server exists together with the database server or the backup server, it is necessary for the OS of the Management Server to be Windows.
- The cluster configuration supported by the database server and the backup server is indicated below. Refer to "[10.4.2.5 Operation by Cluster](#)" for details.
 - 1: 1 Standby Operation
 - N: 1 Standby Operation
 - Mutual Standby Operation
 - Cascade Operation
- For details of the cluster operation, refer to "[15.1.6 Notes on Cluster Operation](#)" and "[15.1.7 Notes on Backup in Clustered System](#)".

10.5.1.4 Supported Configurations

Backup Function

The database type supported with the Backup Wizard for SQL Server is as follows:

Table 10.14 Supported Database Type

Database Type	Backup Type	
	Full Backup	Log Backup
System database (master, msdb, tempdb, model, distribution)	N/A	N/A
User database	A	A

(A=Available, N/A=Not Available (This is not supported with the wizard. Backups are performed by directly operating the SQL Server.))

- Full Backup

Backups are made for data files and transaction logs necessary for recovery in units of databases. With this, it is possible to perform recovery to the point when full backup has been completed.

- Log Backup

The transaction log is backed up. By performing log backup, it is possible to perform recovery to a point in time immediately prior to the failure. In addition, when log backup is performed, the transaction logs of completed transactions are deleted (disposal of logs). This prevents the log file from becoming excessively large. The backup destination is the file system region (NTFS or ReFS (see Note)) on the Managed Server (Database server).

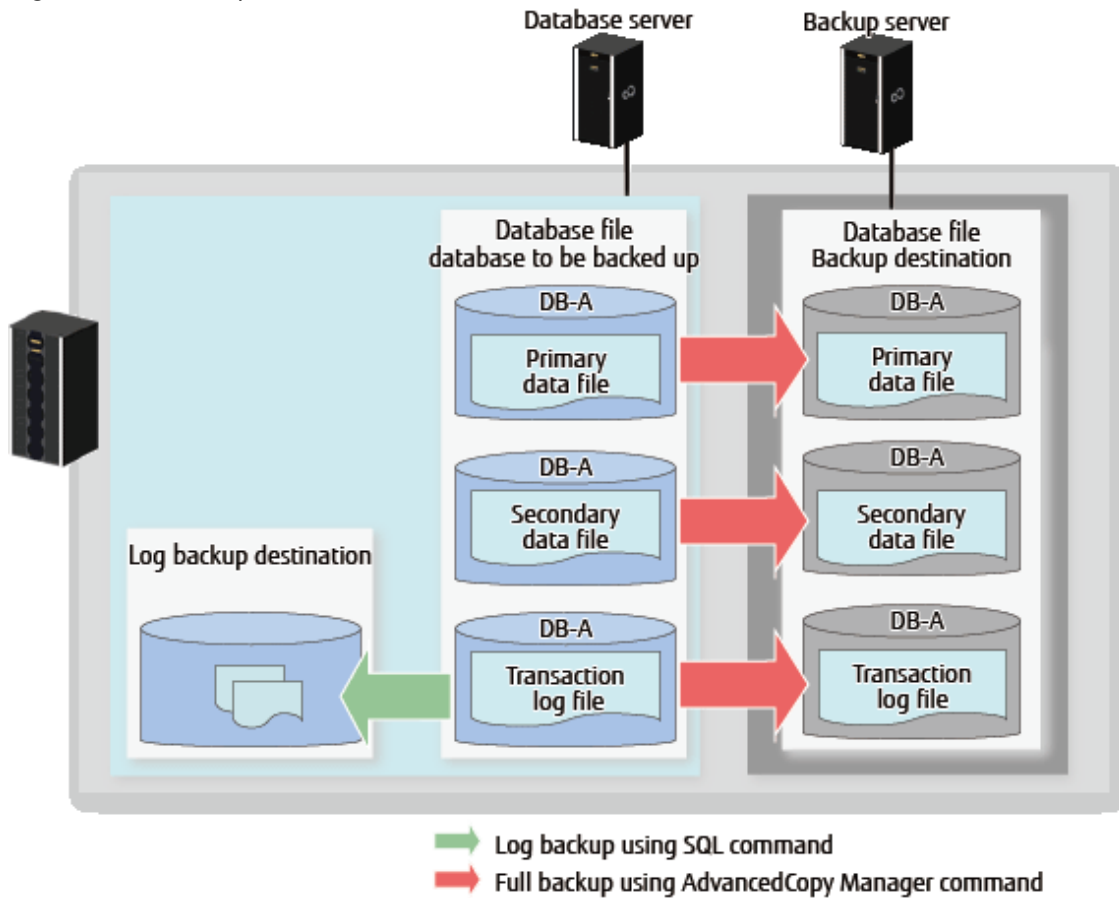
Note: The ReFS (Resilient File System) is a file system of Microsoft Windows Server 2012 or later.

Point

The only type of snapshot replication supported by this feature is the QuickOPC Type Replication.

A backup image is shown in the following chart:

Figure 10.14 Backup Destination



The recovery models of the SQL Server supported with this feature are as follows. For details of recovery models, refer to the SQL Server document.

Table 10.15 Recovery Models

Recovery Models	Backup Type	
	Full Backup	Log Backup
Full	A	A
Bulk-Logged	A	A
Simple	A	N/A

(A=Available, N/A=Not Available)

Restore Functions

The recovery models of the SQL Server supported with this feature are as follows. For details of recovery models, refer to the SQL Server document.

Table 10.16 Recovery Models

Recovery Models	Restore Type	
	Latest Point	Backup Point
Full	A	A
Bulk-Logged	A (*1)	A
Simple	N/A	A

(A=Available, N/A=Not Available)

*1: In the case that bulk operations (bulk import and creating of indexes) are performed after the latest full backup, it might not be possible to perform restoration to the latest point (recovery to immediately prior to the occurrence of the failure).

Refer to "Backup with the Bulk Log Recovery Model" in the "SQL Server Books Online" for more details.

A diagram illustrating restoration to the latest point and restoration to a backup point is shown below:

Figure 10.15 Restoring to Latest Point

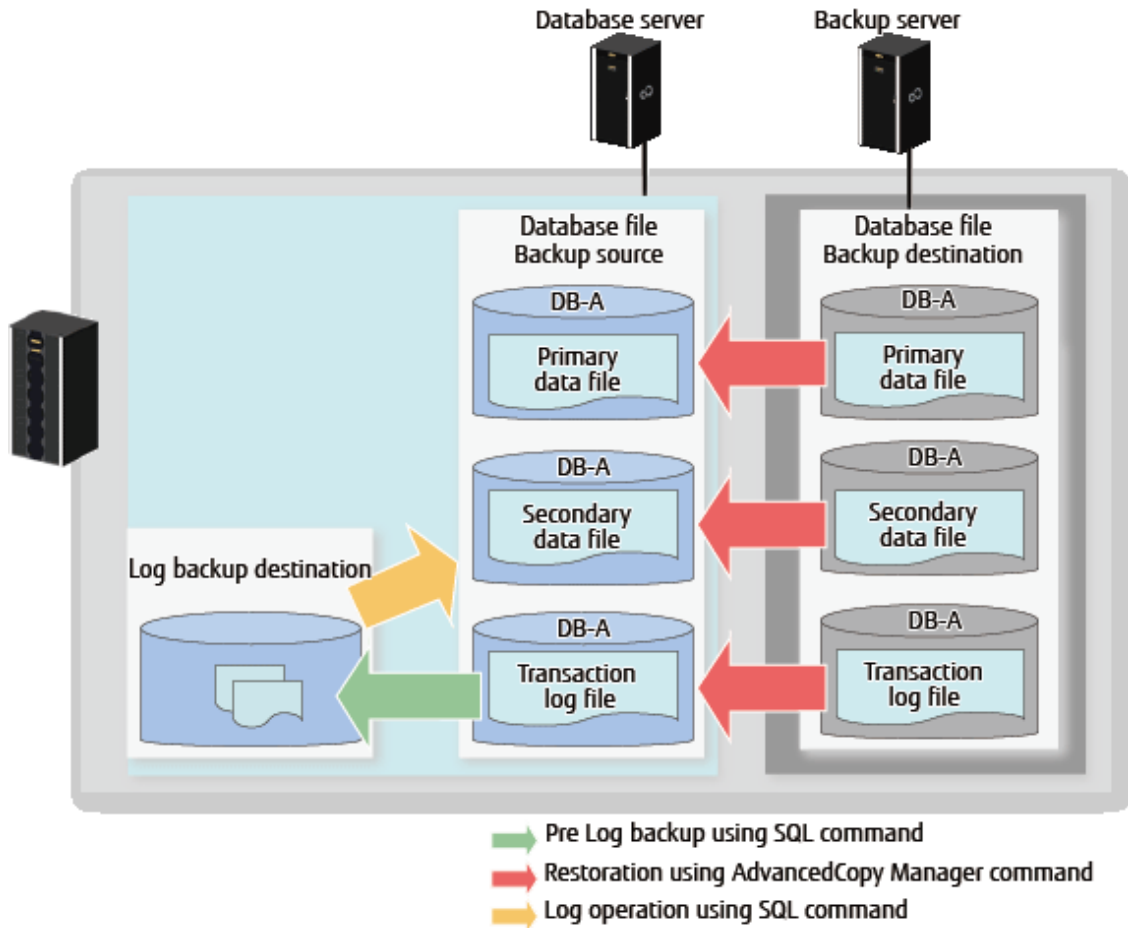
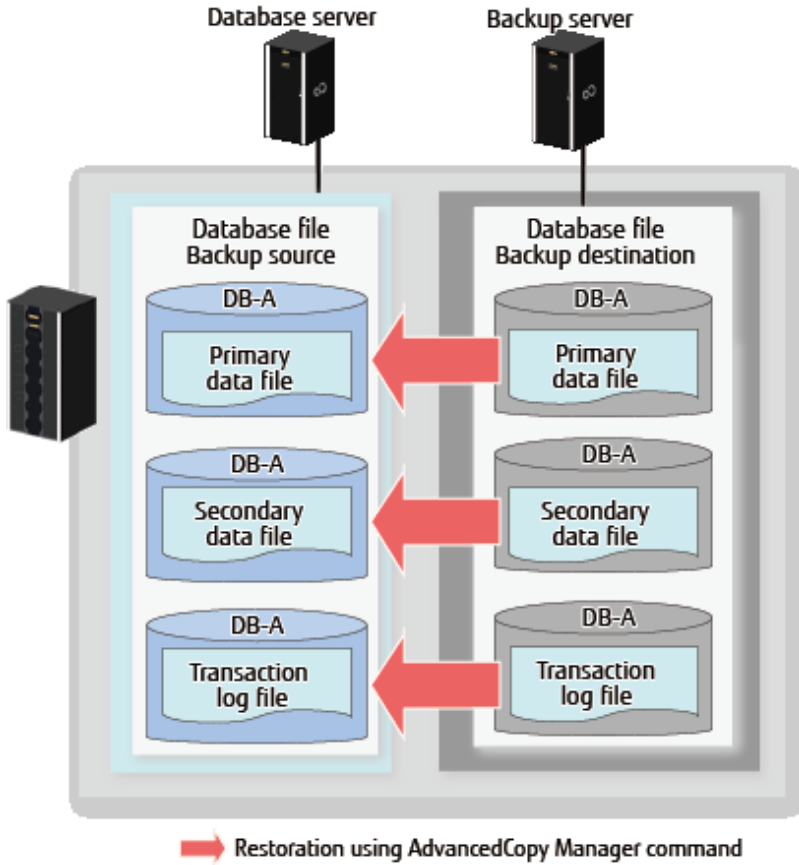


Figure 10.16 Restoring to Point When Backup Was Taken



P Point

Backup / restoration can be performed only in cases when the AlwaysOn availability group of the instance of the SQL Server database is not effective.

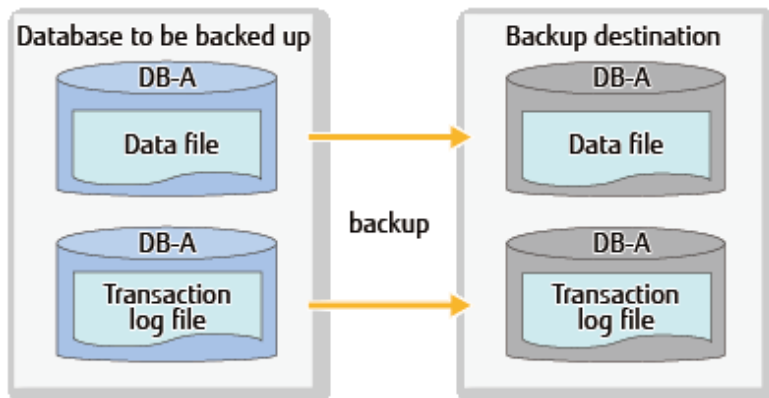
The only type of snapshot replication supported by this feature is the QuickOPC Type Replication.

Volume Configurations

The configurations of supported volumes are as follows:

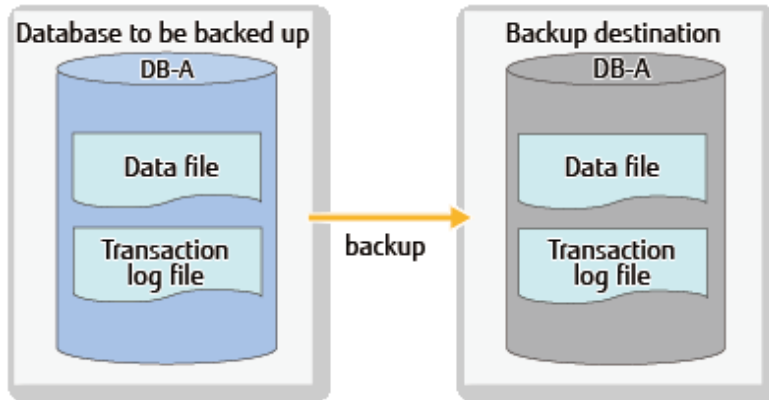
- Placement of the Data Files and the Transaction Log Files on Separate Volumes (recommended configuration)

Figure 10.17 Placement of the Data Files and the Transaction Log Files on Separate Volumes (recommended configuration)



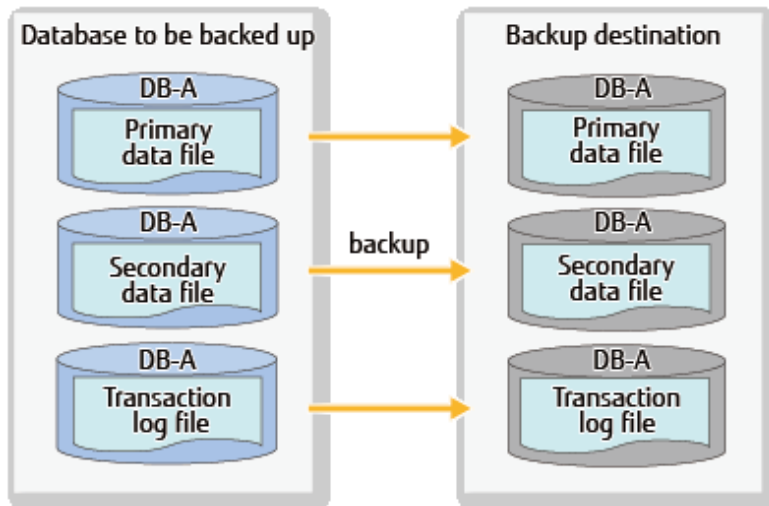
- 1 database placed on 1 volume

Figure 10.18 1 database placed on 1 volume



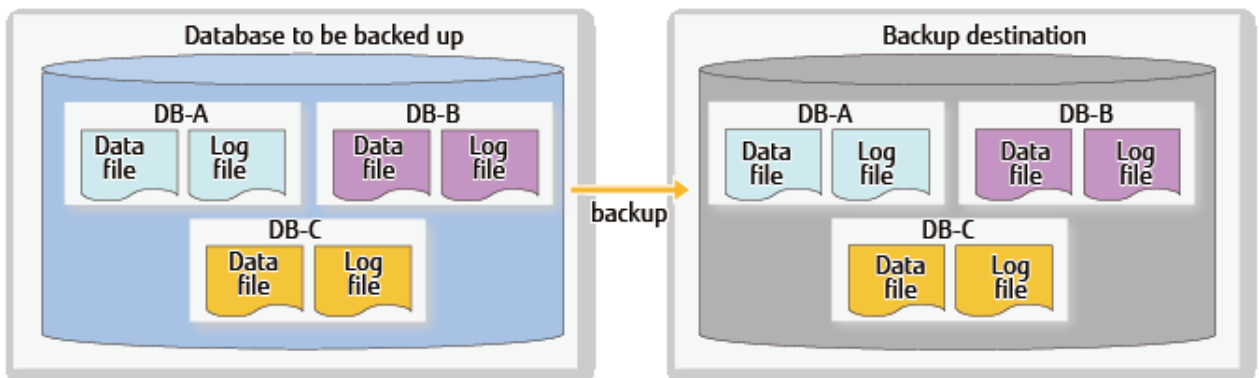
- 1 database placed on a plurality of volumes

Figure 10.19 1 database dispersed and placed on a plurality of volumes



- A plurality of databases placed on 1 volume

Figure 10.20 A plurality of databases placed on 1 volume



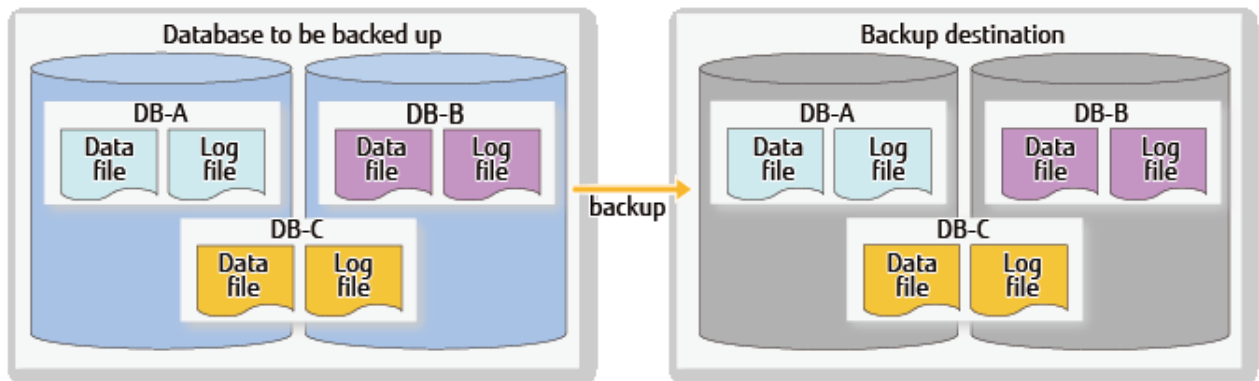
 Note

- It is required that all databases are databases under the same instance. In addition, the system database cannot be included in any of the databases (the tempdb is allowed).

- When performing restore in this configuration, it is required to select all the databases in the volume.

- An N number of databases placed on an M number of volumes

Figure 10.21 An N number of databases dispersed and placed on an M number of volumes



Note

- It is required that all databases are databases under the same instance. In addition, the system database cannot be included in any of the databases (the tempdb is allowed).
- When performing restore in this configuration, it is required to select all the databases in the volume.

Note

- Do not store any files other than target database files in the volumes on which the database files are placed.
- Locate the following of the database to be backed up so that the file path length may become 254 bytes or less.
 - Primary data file
 - Secondary data file
 - Transaction log file
- Place the database files and the transaction log files on separate volumes (recommended).
- If a full text catalogue is used, it is necessary to create on any of the database volumes. If the full text catalogue is created on a non-database volume, the full text catalogue is not backed up and needs to be reconstructed after restore is executed.
- It is required that the volume to be backed up and the backup destination volume is configured of the same size on the same ETERNUS Disk storage system (it is necessary for these sizes to be identical to the number of bytes). Furthermore, the volumes that may be selected as the backup destination are Standard, TPV (Thin Provisioning Volume), FTV (Flexible Tier Volume), and WSV (Wide Striping Volume).
- Confirm that the backup destination volume is not being used for other purposes.
- The format of the disk partitions shall be MBR or GPT and it is necessary for the partitions formats of the volume to be backed up and the backup destination volume to be the same.
- It is required that the partition on which the database of the SQL Server is placed is formatted in advance with the NTFS or ReFS format and that a drive letter or a mounting point folder path is assigned.
- It is required to assign a drive letter or mounting point folder path to the partition of the backup destination volume. The size of the partition must be the same number of bytes as that of a partition on which SQL Server database as backup source is located.

- It is required that a drive letter or a folder is assigned to the mounting point of the LUN. The supported assignment of drives and folder paths are listed below in the following table.

Usefulness	Assignment Destination	Supported Y/N
System Drive	drive letter	N/A
	Folder Path	A
Other than System Drive	drive letter	A
	Folder Path	A

(A=Available, N/A=Not Available)

- A database constructed on a raw partition is not supported. It is required that the database is constructed on the file system.
- Only one partition / LUN is supported.
- Spaces and the characters ! " % ' () - ^ \ @ [] : ; , . = ~ | ` { } * + < > ? / & are not supported for instance names.
- The characters " \ : | * < > ? / ' are not supported for database name.
- The characters " \ : | * < > ? / are not supported for file names of the database.

10.5.2 Operating Environments

This section explains the Backup Wizard for SQL Server and the Restore Wizard for SQL Server operating environments.

10.5.2.1 Required Hardware

The hardware requirements for utilization of the Backup Wizard for SQL Server and the Restore Wizard for SQL Server are explained below.

Management Server

Refer to "Hardware Requirements" in "Operating Environment of ETERNUS SF Manager" in the *Installation and Setup Guide* for information on the required Management Server hardware.

Managed Server (Database Server)

The required Managed Server (Database server) hardware must satisfy all of the following conditions:

- "Hardware Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- "Hardware Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- The following memory requirements of the SQL Server must be satisfied.
1 GB or more (4 GB or more recommended)
In addition, refer to the "system requirements" of the documentation of the SQL Server.

Managed Server (Backup Server)

The required Managed Server (Backup Server) hardware must satisfy all of the following conditions:

- "Hardware Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- "Hardware Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*



See

For details on the supported devices, refer to "Supported Devices" in "Operating Environment" in the *Installation and Setup Guide*.

10.5.2.2 Required Software

The software requirements for utilization of the Backup Wizard for SQL Server and the Restore Wizard for SQL Server are explained below.

Operating System

Management Server

Refer to "Supported Operating Systems" in "Operating Environment of ETERNUS SF Manager" in the *Installation and Setup Guide* for information on the required Management Server software.

Managed Server (Database Server and Backup Server)

The required Managed Server (Database Server and Backup Server) software must satisfy all of the following conditions:

- "Software Requirements" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*
- "Software Requirements" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- SQL Server is running.



Point

When the database of the SAP environment (note) is SQL Server 2012, it is possible to perform backup / restoration of the SQL Server database by using the Backup Wizard for SQL Server or the Restore Wizard for SQL Server.

Note: The supported object is SAP NetWeaver 7.4 (technical platform of the SAP Business Suite).

Incompatible Software

Refer to the following for information on incompatible software:

Management Server

"Incompatible Software" in "Operating Environment of ETERNUS SF Manager" in the *Installation and Setup Guide*

Database Server and Backup Server

- "For Windows Environments" in "Incompatible Software" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "For Windows Environments" in "Incompatible Software" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*

10.5.3 Prerequisites

Setting ETERNUS Disk Storage System

Perform an initialization it as follows:

- Setting for the RAID group
- Setting for volumes
- Setting for the Host Affinity

Database Server

- Prepare an environment on which the SQL Server can operate properly.
 - Create a user database to be backed up.
 - Set the user database to be backed up so that it is online.
- Check whether the conditions listed in "Supported volume configurations" of "10.5.1.4 Supported Configurations" are met.

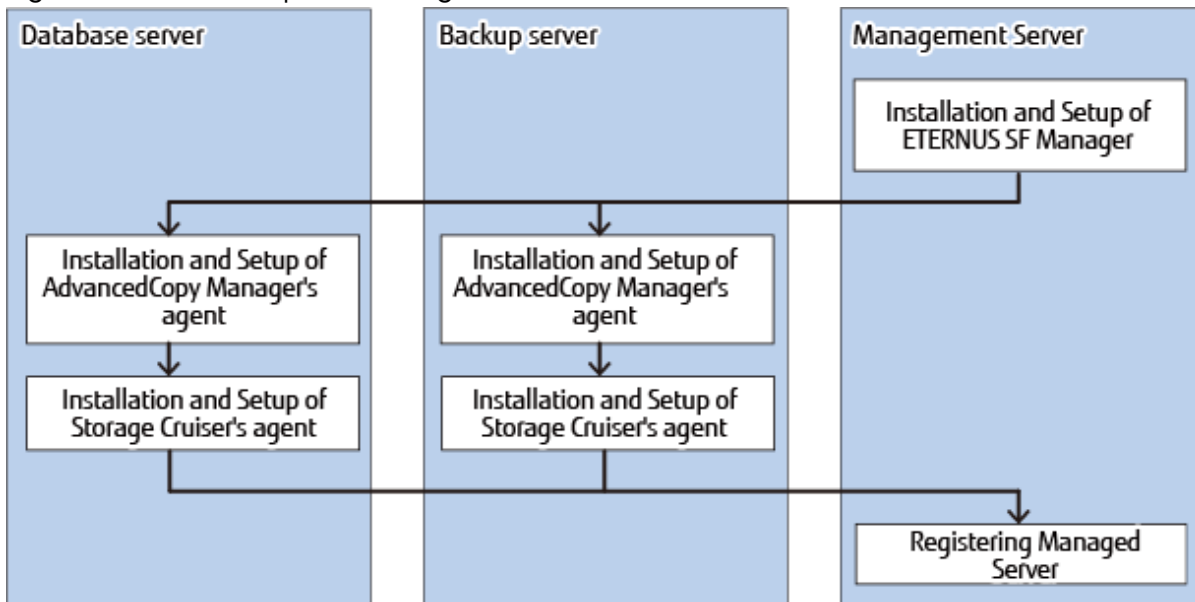
Backup Server

- Check whether the conditions listed in "Supported volume configurations" of "10.5.1.4 Supported Configurations" are met.

Installation

Complete the installation and setup shown in the following diagram.

Figure 10.22 Flow of Upfront Configurations



- Installation and Setup of ETERNUS SF Manager

Install the ETERNUS SF Manager on the Management Server. Refer to "Installation of ETERNUS SF Manager" and "Setup of ETERNUS SF Manager" in the *Installation and Setup Guide*. If the Management Server is cluster construction, refer to "Customization for Management Server Transaction" in the *Cluster Environment Setup Guide*, too.

Note

In the "user account configurations" done by "Setup of ETERNUS SF Manager", create a user account for the Backup Wizard for SQL Server and the Restore Wizard for SQL Server.

Make sure that the user that has been created belongs to the ESFAdmin of the ETERNUS SF role group.

- Installation and Setup of the AdvancedCopy Manager's agent

Install the AdvancedCopy Manager's agent on the Managed Server. Refer to "Installation of AdvancedCopy Manager's agent" in "Installation of ETERNUS SF Agent" and "Setup of AdvancedCopy Manager's agent" in "Setup of ETERNUS SF Agent" in the *Installation and Setup Guide*.

Note

- In cases when the database server and the Management Server are the same, it is not necessary to install the AdvancedCopy Manager's agent.
 - In cases when the backup server and the Management Server are the same, it is not necessary to install the AdvancedCopy Manager's agent.
-
- Installation and Setup of Storage Cruiser's agent
 - Install the Storage Cruiser's agent on the Managed Server. Refer to "Installation of Storage Cruiser's agent" in "Installation of ETERNUS SF Agent" and "Setup of Storage Cruiser's agent" in Setup of ETERNUS SF Agent" in the *Installation and Setup Guide*.
 - Restart Storage Cruiser's agent with both AdvancedCopy Manager's agent and Storage Cruiser's agent installed. If a server works as Managed Server and Management Server, restart Storage Cruiser's agent with both ETERNUS SF Manager and Storage Cruiser's agent installed.
For details on how to start the Storage Cruiser's agent, refer to "Starting and Stopping Agent" in "Command References" in the *Storage Cruiser Operation Guide*.

Point

Even if Managed Servers are in a clustered environment, enter the IP address of a physical server with the Storage Cruiser's agent installed for the start IP address used for agent service on the Agent Service Registration screen.

Registering Managed Server

With the Management Server, register the Managed Server (Database server and Backup server) subject to management and load the information of devices placed under the Managed Server.

Refer to "[7.4.3 Registering Managed Server](#)" and "[7.4.4 Fetching Device Information on Managed Server](#)" for details.

Point

- Check that the backup server and database server are running, before registering the Managed servers.
- In the Managed server registration, register them as Servers that use AdvancedCopy Manager's agent functions.
 - When Managed Servers are in a clustered environment:
Whether or not Storage Cruiser's agent is installed, be sure to select Manual for "Register Mode" on the Select Registration Option screen.
On the Enter Server Details screen, select Auto for "Name Setting Mode" to register the following servers:
 - Logical node of AdvancedCopy Manager installed database server (when database servers are in a clustered configuration)
 - Logical node of AdvancedCopy Manager installed backup server (when backup servers are in a clustered configuration)
Note: "For Advanced Copy Communication Port", specify a port number of logical node of AdvancedCopy Manager (communication service for cluster operation).
 - When Managed Servers are in a non-clustered environment:
For a virtual environment:
Register the VMware host to Server on which database servers and backup servers are running. Refer to "Notes on utilizing the Wizard (for SQL Server) on a 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 database servers and backup servers.
For a physical environment:
On the Enter Server Details screen, select Auto for "Name Setting Mode" to register the following servers:

- Database Server
- Backup Server
- Register a ETERNUS SF AdvancedCopy Manager for Microsoft SQL Server license in the ETERNUS Disk storage system.
Refer to "Register License" in the *Web Console Guide* for registration instructions.

Notes on Utilizing Wizard for SQL Server on Virtual Environment

- 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 "VMware Server Node" in the chapter "Environment Configuration" in the *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 Web Console with respect to the registered guest OS:
 - Click [Yes] in **Use AdvancedCopy Manager**.
- When the IP address of the guest OS that is displayed on the server screen of Web Console is not an IP address for administration, refer to "Change Server Information" in the *Web Console Guide* and change the IP address of the guest OS to an IP address for administration.
- In cases when using the backup wizard after the start of operation of the AdvancedCopy Manager in an environment where the ETERNUS SF Storage Cruiser Standard Edition license has not been registered, it is required that the server registration environment is transferred. For the steps for transferring the server registration environment, refer to "Notes on utilizing the Wizard (for Exchange Server) on a virtual environment" for more information.

10.5.4 Backup Using Backup Wizard for SQL Server

This section explains the operations which use the Backup Wizard for SQL Server.

10.5.4.1 Creating Backup Execution Script

The Backup Wizard for SQL Server generates the following scripts:

- [Full Backup Execution Script](#)
- [Log Backup Execution Script](#)
- [Configuration Removal Script](#)



See

Refer to "Create SQL Server Backup Script and Script Execution Environment Setting Using Wizard" in the *Web Console Guide* for information on how to operate these scripts.

Full Backup Execution Script

The full backup execution script specification is shown below:

Table 10.17 Full Backup Execution Script Specification

Script Storage Destination Server	The Database Server on which the Database to be backed up is operating
-----------------------------------	--

Storage Directory Path Name	Non-cluster operation: <Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat Cluster operation: <Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat
File Name	execute_backup_groupName.bat groupName: Replication group name set by backup wizard. Default: ApplinkForSQLGroup_yyyymmddhhmmss yyyymmddhhmmss is the time and date when creating the script using the wizard.
Execute Form	Non-cluster operation: <Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat \execute_backup_groupName.bat Cluster operation: <Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat \execute_backup_groupName.bat
Encoding	MS932
Exit status	0: Exits normally Value except 0: Exits with an error

Note

Execute a script to execute a full backup with database online.

As of when a complete backup is obtained, the log backup files from before this point are not necessary for restoration. For this reason, when the complete backup execution script is executed, the log backup files of the log backup destination corresponding to the database to be backed up that satisfy two following conditions are all deleted.

- The log is stored in a folder specified upon execution of the backup wizard
- The replication group name is included in the transaction log backup file name

The output messages of the complete backup execution script are listed below:

Output Message	Description
==== Backup Start. <i>executionCommandName</i> ====	The command to be executed within the script is displayed in <i>executionCommandName</i> .
<i>commandResult</i>	The results of execution of the swsrpbackup_sql command executed within this script is displayed.
<i>dbName</i>	The name of the database backed up is displayed in <i>dbName</i> .
Database list file already exists.	This is displayed when a file with the same name as the temporary file used within the script already exists.
execute_backup is successfully completed.	This is displayed when the script ends with no errors.
execute_backup failed.	This is displayed when the script ends in an error.

An example of the complete backup execution script is listed below.

```

@echo off

setlocal

setlocal disabledelayedexpansion

set WORKSPACE_PATH=C:\Win32app\AdvancedCopyManager\var\
set GROUP_NAME=XXXXX
set NOWTIME=%time: =0%
set NOWTIME=%NOWTIME:~0,2%%NOWTIME:~3,2%%NOWTIME:~6,2%%NOWTIME:~9,2%
set DATABASE_LIST_FILE=%WORKSPACE_PATH%%NOWTIME%_DBlist.lst
set INSTANCE_NAME=instance1
set INSTANCE_OPTION=-Xinstance %INSTANCE_NAME%
set SWSTGNODE=
set CLUSTER_OPTION=
set DATABASE_NAME_001=UserDatabase
set LOGBACKUP_PATH_001=C:\LOGBACKUP

set CHECK="swsrpbackup_sql completed"
set CMD=C:\Win32app\AdvancedCopyManager\bin\swsrpbackup_sql %CLUSTER_OPTION% -Xgroup "%GROUP_NAME%"
%INSTANCE_OPTION% -T -Xdblist "%DATABASE_LIST_FILE%"
if exist "%DATABASE_LIST_FILE%" (echo Database list file already exists. & exit /b 1)

echo %DATABASE_NAME_001%>>%DATABASE_LIST_FILE%

echo ===== Backup Start. %CMD% =====
%CMD%
if not %ERRORLEVEL% == 0 (echo execute_backup failed. & del %DATABASE_LIST_FILE% >NUL 2>&1 & exit /b 1)

del "%DATABASE_LIST_FILE%" >NUL 2>&1

del "%LOGBACKUP_PATH_001%\%GROUP_NAME%*.bk" >NUL 2>&1
echo execute_backup is successfully completed.
exit /b 0

```

Information

With the full backup execution script, the `swsrpbackup_sql` command is executed.

In an error occurs in the execution of the full backup execution script, the error message of the command is output. Refer to the *Messages* to take the appropriate action.

Log Backup Execution Script

The log backup execution script specification is shown below:

Table 10.18 Log Backup Execution Script Specification

Script Storage Destination Server	The Database Server on which the Database to be backed up is operating
Storage Directory Path Name	Non-cluster operation: <i><Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat</i> Cluster operation: <i><Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat</i>
File Name	execute_logbackup_groupName.bat <i>groupName:</i> Replication group name set by backup wizard.

	<p>Default:</p> <p>ApplinkForSQLGroup_yyyymmddhhmmss</p> <p>yyyymmddhhmmss is the time and date when creating the script using the wizard.</p>
Execute Form	<p>Non-cluster operation:</p> <p><Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat\execute_logbackup_groupName.bat [-restoreall]</p> <p>Cluster operation:</p> <p><Shared disk for shared data for AdvancedCopy Manager>:\var\lopt\swstorage\Wizard\bat\execute_logbackup_groupName.bat [-restoreall]</p> <p>Parameter</p> <p>Omitted:</p> <p>The backup of the transaction log during normal operation is executed (disposal of the transaction logs is performed). The backup of the logs of all databases within the script is executed.</p> <p>-restoreall:</p> <p>The backup of the latest transaction log prior to execution of "restoration to the latest point" is executed (disposal of the transaction logs is not performed). The backup of the logs of all databases within the script is executed.</p>
Encoding	MS932
Exit status	0: Exits normally Value except 0: Exits with an error

Note

Execute a script to execute a log backup with database online.

In the case that the backup wizard is executed in relation to a database of which the recovery model is "simple", a log backup script is not generated.

The output messages of the log backup execution script are listed below:

Output Message	Description
==== Log Backup Start. Database:dbName =====	The name of the database for the backup log is displayed in <i>dbName</i> .
<i>commandResult</i>	The results of executing the sqlcmd command executed within this script is displayed.
Log backup file already exists.	This is displayed when a file of the same name as the transaction log file to be output already exists.
execute_logbackup is successfully completed.	This is displayed when the script ends with no errors.
execute_logbackup failed.	This is displayed when the script ends in an error.
Invalid Argument.	This is displayed in cases when there is a mistake in how the parameters are specified.

An example of the log backup execution script is listed below.

```
@echo off
setlocal
```

```

setlocal disabledelayedexpansion

SET GROUP_NAME=XXXXX
SET NOWDATE=%date:/%=%
SET NOWTIME=%time: =0%
SET NOWTIME=%NOWTIME:~0,2%%NOWTIME:~3,2%%NOWTIME:~6,2%%NOWTIME:~9,2%

SET DATABASE_NAME_001=UserDatabase
SET DISP_DATABASE_NAME_001=UserDatabase
SET BACKUP_LOG_PATH_001=C:\LOGBACKUP\%GROUP_NAME%\%DISP_DATABASE_NAME_001%\%NOWDATE%\%NOWTIME%.bk
SET SERVER_NAME=.
SET NO_TRUNCATE=
SET RETURN_CODE=0

if not "%1" == "-restoreall" if not "%1" == "" (echo Invalid Argument. 1>&2 & exit /b 3)
if "%1" == "-restoreall" if not "%2" == "" (echo Invalid Argument. 1>&2 & exit /b 3)
if "%1" == "" goto restoreall
if "%1" == "-restoreall" (SET NO_TRUNCATE=WITH NO_TRUNCATE & goto restoreall)
echo Invalid Argument. 1>&2 & exit /b 3

:restoreall
SET DATABASE_NAME=%DATABASE_NAME_001%
echo ===== Log Backup Start. Database:%DISP_DATABASE_NAME_001% =====
if exist "%BACKUP_LOG_PATH_001%" (
echo Log backup file already exists.
SET RETURN_CODE=1
) else (
sqlcmd -b -S %SERVER_NAME%\instance1 -Q "BACKUP LOG [%DATABASE_NAME%] TO DISK =
'%BACKUP_LOG_PATH_001%' %NO_TRUNCATE%"
)
if not %ERRORLEVEL% == 0 ( SET RETURN_CODE=1 )

if %RETURN_CODE% == 0 (
echo execute_log_backup is successfully completed.
) else (
echo execute_log_backup failed.
)
exit /b %RETURN_CODE%

```

Information

In the log backup execution script, execute sqlcmd command.

If an error occurs in the execution of the log backup execution 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 log backup execution script to obtain the exit status when the log backup execution script is executed.

```
echo %ERRORLEVEL%
```

According to the exit status obtained, take the following actions:

- Error in log backup execution script: (Exit status: 1)
As the error message of the SQL Server is being output, correspond accordingly by referring to the "SQL Server Manual".
- Error in log backup execution script: (Exit status: 3)
Confirm be errorless to the parameters in the script.

Configuration Removal Script

Configuration removal script specification is shown below:

Table 10.19 Configuration Removal Script Specification

Script Storage Destination Server	The Database Server on which the Database to be backed up is operating
Storage Directory Path Name	Non-cluster operation: <i><Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat</i> Cluster operation: <i><Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat</i>
File Name	delete_backup_groupName.bat <i>groupName:</i> Replication group name set by backup wizard. Default: ApplinkForSQLGroup_yyyymmddhhmmss yyyymmddhhmmss is the time and date when creating the script using the wizard.
Execute Form	Non-cluster operation: <i><Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat \delete_backup_groupName.bat</i> Cluster operation: <i><Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat \delete_backup_groupName.bat</i>
Encoding	MS932
Exit status	0: Exits normally Value except 0: Exits with an error

The output messages of the configuration removal script are listed below:

Output Message	Description
==== Cancel Backup Start : <i>executionCommandName</i> ====	The command that executes the cancellation of backup configurations within the script is displayed in the <i>executionCommandName</i> .
==== Delete Backup Start : <i>executionCommandName</i> ====	The command that executes the deletion of backup configurations within the script is displayed in the <i>executionCommandName</i> .
delete_backup is successfully completed.	This is displayed when the script ends with no errors.
delete_backup failed.	This is displayed when the script ends in an error.

An example of the configuration removal script is listed below:

```
@echo off
setlocal
setlocal enabledelayedexpansion
set CMDPATH=C:\Win32app\AdvancedCopyManager\bin\
set GROUP_NAME=XXXXXX
```

```

set SWSTGNODE=
set ORGVOL_001=g1d321p1@E01DBS01WR2DE64
set DSTVOL_001=g1d324p1@E01BKS01WR2DE64
set ORGVOL_002=g1d322p1@E01DBS01WR2DE64
set DSTVOL_002=g1d434p1@E01BKS01WR2DE64
set CHECK_CANCEL="GROUP=%GROUP_NAME% swsrpcancel completed"
set CHECK_DELVOL="swsrpdelvol completed"
set ERRORMSG2605=swsrp2605
set ERRORMSG2637=swsrp2637
set CMD_CANCEL="%CMDPATH%swsrpcancel -Xgroup %GROUP_NAME% 2>&1"
set CMD_DELVOL_001="%CMDPATH%swsrpdelvol %ORGVOL_001% %DSTVOL_001% 2>&1"
set CMD_DELVOL_002="%CMDPATH%swsrpdelvol %ORGVOL_002% %DSTVOL_002% 2>&1"
echo ===== Cancel Backup Start. %CMD_CANCEL% =====
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD_CANCEL%`) do (if "%%i"==%CHECK_CANCEL% (set RET=OK) else
(call :CHECK %ERRORMSG2605% "%%i"))
if not "%RET%"=="OK" echo delete_backup failed. & exit /b 1

echo ===== Delete Backup Start. %CMD_DELVOL_001% =====
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD_DELVOL_001%`) do (if "%%i"==%CHECK_DELVOL% (set RET=OK) else
(call :CHECK %ERRORMSG2637% "%%i"))
if not "%RET%"=="OK" echo delete_backup failed. & exit /b 2

echo ===== Delete Backup Start. %CMD_DELVOL_002% =====
set RET=
for /f "usebackq tokens=*" %%i in (`%CMD_DELVOL_002%`) do (if "%%i"==%CHECK_DELVOL% (set RET=OK) else
(call :CHECK %ERRORMSG2637% "%%i"))
if not "%RET%"=="OK" echo delete_backup failed. & exit /b 2

echo delete_backup is successfully completed.
exit /b 0

:CHECK
set CHECK_STR=%2
for /f "tokens=1" %%i in (%CHECK_STR%) do (if %%i==%1 (set RET=OK) else (echo %CHECK_STR:=%))
exit /b

```

Information

The following commands are executed with the configuration removal script:

- [swsrpcancel](#) command
- [swsrpdelvol](#) command

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 configuration removal script : (Exit status: 1):
As the [swsrpcancel](#) command is output, correspond accordingly by referring to the execution command line that is output on the screen and the *Messages*.

- Error in configuration removal script : (Exit status: 2):
As the `swsrpdelvol` command is output, correspond accordingly by referring to the execution command line that is output on the screen and the *Messages*.

10.5.4.2 Execution of Backup

Using the script created in "[10.5.4.1 Creating Backup Execution Script](#)" can back up SQL Server databases.

- Full Backup Execution Script
The script that executes a full backup of the user database.
- Log Backup Execution Script
The script that performs a backup of the transaction log of the user database.



In the case that the Recovery Models is "Full" or "Bulk-Logged", regularly perform a log backup. The disposal of the transaction logs of the SQL Server database is performed by performing a backup of the logs. With the disposal of the transaction log, it is possible to prevent the region of the log file from being insufficient (refer to documentation of the SQL Server for details on the disposal of the transaction log).

Registering the script to the Scheduler of this product makes it easy to back up SQL Server databases.

For the method to register to Scheduler, refer to "[Chapter 11 Scheduler](#)".

Not only registering the script to the Scheduler of this product but also registering it to the Task Scheduler of the operating system or manually executing the script can back up SQL Server databases.

The procedures for automatically executing backup by registering this with the task scheduler of the OS and the procedures for when executing backup manually are explained below.

Executing Backup Automatically Using Task Scheduler

1. Copy the script file that was generated in "[10.5.4.1 Creating Backup Execution Script](#)" to any location.
2. Log into the backup source database server as the AdvancedCopy Manager command execution user.



Refer to "User Account of Windows" in the *Installation and Setup Guide* for information on the user which executes the command.

3. Start Task Scheduler.
Start > Administrative Tools > Task Scheduler
4. In Task Scheduler, configure the following:
 - Task name
 - Date/time task starts
 - Configure the script file which was copied in step 1 in the program which is to be executed

Executing Backup Manually

1. Copy the script file that was generated in "[10.5.4.1 Creating Backup Execution Script](#)" to any location.
2. Log into the backup source database server as the AdvancedCopy Manager command execution user.



.....
Refer to "User Account of Windows" in the *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. Refer to "[10.5.4.1 Creating Backup Execution Script](#)" for details.

10.5.4.3 Backup to Tape (When Performing Backup to Tape)

When backing up the backup destination volume to a tape media, perform a backup of all files within the data file region and the transaction log region.

Either selection of backup in units of files and RAW backup are possible for the backup method.

10.5.4.4 Backup of the System Database

When the following configurations that apply changes to the system database have been performed, perform a backup of the system database:

- When applying a service pack or correction module
- Immediately after creating an instance
- Making changes to the settings of the server configuration
- When creating / changing / deleting objects of the server level
- When creating / changing / deleting databases
- When adding / deleting a file group or data file
- When creating or deleting a backup device
- When adding / changing / deleting a login
- Dispersed queries of such as link servers or remote login and configurations for remote procedure calls
- When adding / changing / deleting jobs
- When adding / changing / deleting warnings
- When adding / changing / deleting operators
- Operations for saving the SQL Server Integration Services package created with the DB import / export wizard to the SQL Server
- When adding / changing / deleting replication configurations
- When creating or deleting user templates

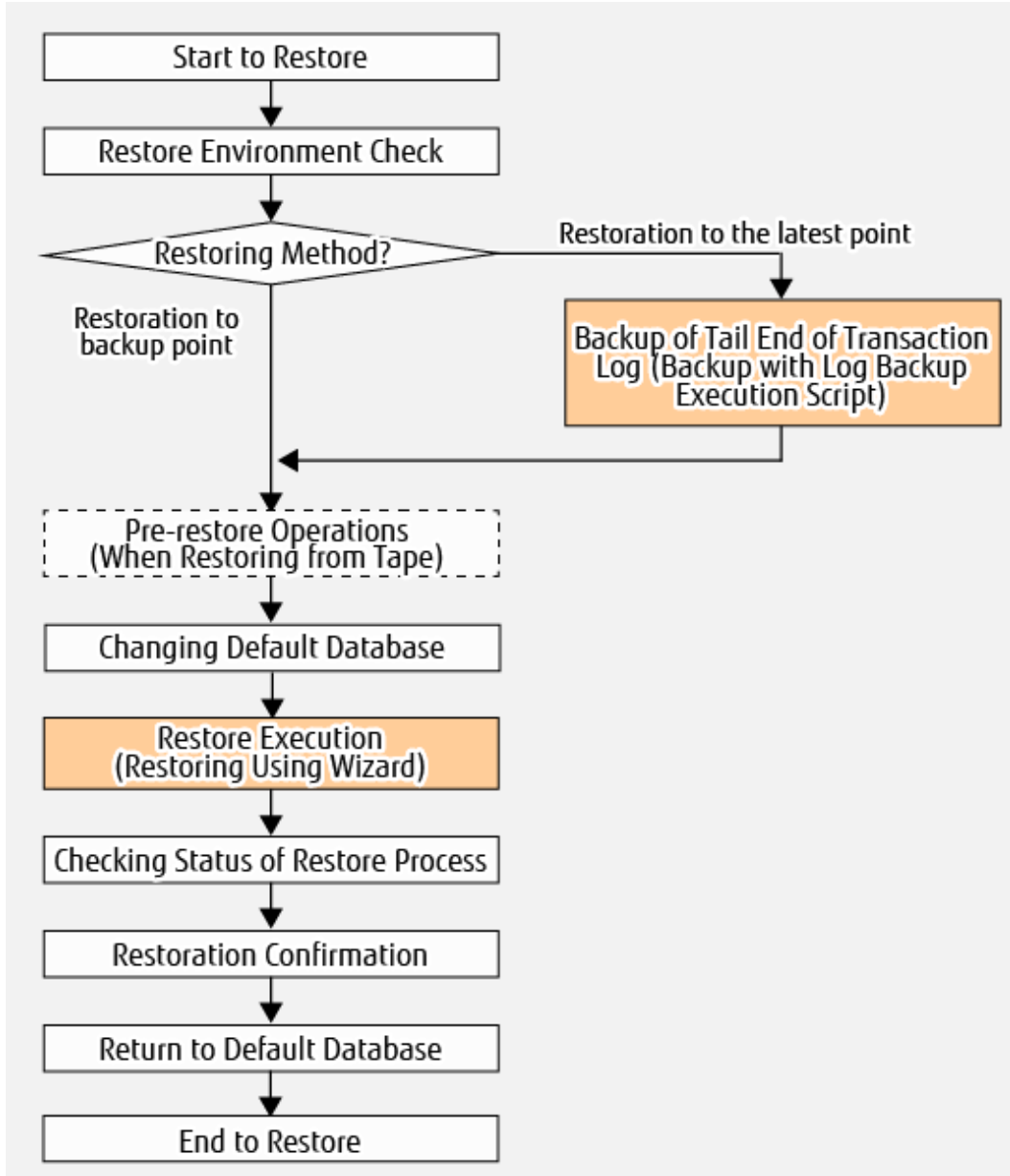
Refer to the documentation of the SQL Server for details on the backup method.

10.5.5 Restoration Using Restore Wizard for SQL Server

This sub section explains the necessary operating procedures for restoration using the Restore Wizard for SQL Server.

The flow of the restore operation is shown below.

Figure 10.23 Flow of Restoration Operation



10.5.5.1 Restore Environment Check

Check the following conditions.

1. ETERNUS Disk storage system
 - The ETERNUS SF AdvancedCopy Manager for Microsoft SQL Server license is registered.
2. Check the backup
 - The backup is located on the head region of the ETERNUS Disk storage system.

Point

.....
In the case of D2D2T (Disk to Disk to Tape) operation, and in the case that a failure has occurred in the backup destination region and a backup does not exist on the disk, the backup data is restored from the tape media to the backup destination region.
.....

- The database backup of the SQL Server has been obtained with the complete backup execution script generated with the backup wizard.
- In the case that the configuration of the database of the SQL Server has been changed, a new backup has been created after the change has been made.

Refer to "[10.5.7 Changing Configuration](#)" for details on the tasks required in order to make changes to the configuration of the database.

Point

Execute the configuration removal script and release the backup settings registered with the configuration prior to the changes. After the configuration of the database has been changed, it is necessary to generate a complete backup execution script with the Backup Wizard for SQL Server and execute this script that has been generated.

3. Checking Volume

- There exists no processes that are accessing the backup source / backup destination volumes of the database subject to restoration.
- Whether explorer or the command prompt is accessing the targeted volume.
- Whether an application accessing the targeted database is in operation.

Note

There may be cases when the restoration ends in a failure due to other processes using the backup source / backup destination volumes of the database subject to restoration. When re-executing the restoration wizard after removing the cause of the failure, the only restoration that may be selected is "Backup Point". In order to restore to the latest point, refer to "[10.4.2.2 Performing Restore](#)".

4. Checking SQL Server

- It is possible to use the SQL Server.

In cases when the system database (master) cannot be used, the SQL Server is unavailable. When the system database has been damaged, it is necessary to restore the system database prior to executing the Restore Wizard for SQL Server. Refer to the documentation of the SQL Server for details on the restoration of the system database.

- The sysadmin server role has been added to the Local System (NT AUTHORITY\SYSTEM) account.

Confirm this with the following steps from the Management Studio of the SQL Server.

1. Develop the SQL Server instance that can be used with the [Object Explorer] and double click on LOCAL SYSTEM (or NT AUTHORITY\SYSTEM) from [Login] under [Security].
2. From the [Login Properties] window, select the [Server Role] option.
3. Confirm that [sysadmin] has been selected in the [Server Role] list.
Note: If [sysadmin] had not been selected, select [sysadmin] and click **OK**.

- The default database of the user executing the restoration (the authentication user input in the "authentication information input screen" listed under "Restoration of the SQL Server Database with the Wizard" in the *Web Console Guide*) is "master".

- In cluster operation, tempdb is not included in the same volume as a database to be restored.

If included in the same volume as a database to be restored, move tempdb to other volume.

For the method to move tempdb, refer to "Move Database File" in the SQL Server Books Online.

5. Confirmation when performing restoration to the latest point

- The recovery model is "Full" or "Bulk-Logged".

Information

When the recovery model is "Simple", it is only possible to perform restoration with "restoration to backup point" and it is not possible to perform "restoration to latest point".

- When the recovery model is "Bulk-Logged", bulk operations have not been executed in relation to the SQL Server database after the full backup.

Information

In the case that bulk operations have been executed in relation to the SQL Server database after the full backup, it is possible to perform restoration only with "restoration to backup point".

- The log backups taken after the latest full backup are all in order.
- A backup of the latest transaction log has been obtained right before the execution of the restoration wizard.

Information

When the log backup execution script is executed with the -restoreall option, it is possible to obtain a backup of the latest transaction log, and it is possible to perform restoration with "restoration to most recent point".

Note

In cases when a backup of the transaction log has not been obtained after the most recent complete backup, the only method that can be selected for the restoration method is "Backup Point".

6. Check the server/storage

- The environment listed in "10.5.3 Prerequisites" has been configured
- The replication volume information of the AdvancedCopy Manager is configured as a combination of the volume to be backed up and the backup destination volume of the SQL Server database to be restored.

The procedures for confirming whether the replication volume information of the AdvancedCopy Manager is configured are listed below.

1. Log into the backup source Management Server as the AdvancedCopy Manager command execution user.
2. Bring up the command prompt.
3. Execute "*<Program directory when AdvancedCopy Manager's manager is installed>*\ACM\bin\swsrpvolinfo -h *serverName*" from the command prompt. For *serverName*, specify the database server name.
4. The row for Original-Volume in the command execution result indicates the device name corresponding to the replication source volume while the row for Replica-Volume indicates the device name corresponding to the replication destination volume. Confirm that the device name corresponding to the volume to be backed up and the device name corresponding to the backup destination volume of the SQL Server database being restored is displayed as a pair in the row for Original-Volume and the row for Replica-Volume.



See

For information `swsrpvoinfo` command, refer to "14.3.1.2 `swsrpvoinfo` (Replication Volume Information Display Command)".

- No fault in the volumes used for restore is found.

Use the ETERNUS Web GUI to check the status of the restore source and destination volumes.

If any fault is found in the volumes, refer to "10.5.8.1 Corrective Action for Hardware Fault" to take corrective action.

10.5.5.2 Backup of Tail End of Transaction Log (Backup with Log Backup Execution Script)

When performing restoration to the latest point, obtain a backup of the end of transaction log with the following procedures. When restoring to a backup point, this step is not needed.

1. Login to the database server.

The required login privileges are as follows:

- Windows Roles

- When domain authentication is used: (It is necessary to assign all of the following roles to the account.) Administrators, Domain Admins, Domain Users, Enterprise Admins, Group Policy Creator Owners, Schema Admins

- When local accounts authentication is used: Administrators

- SQL Server Roles

sa(SystemAdmin privileges)

2. Backup of the end of transaction log.

The log backup execution script is executed with the `-restoreall` option.

For information of the log backup execution script, refer to "Log Backup Execution Script".



Point

- The transaction logs of all databases within the backup execution script are backed up.

- When performing a backup of only part of the database, backup the tail end of the transaction log by using such as SQL Server Management Studio or Transact-SQL.

Backup by referring to either "Backup of Tail End of Log (SQL Server)" or "How to Backup the Tail End of a Transaction Log (SQL Server Management Studio)" in the "SQL Server Books Online".



Note

When the recovery model is "Simple", it is only possible to execute "restoration to a backup point". (It is not possible to execute a backup of the transaction log.)

10.5.5.3 Pre-restore Operations (When Restoring from Tape)

In the case that a failure has occurred in the backup destination region and a backup does not exist on the disk, restore the data of the data file region and the transaction log region, backed up onto a tape, to the backup destination volume.

10.5.5.4 Changing Default Database

Change to a default database.

Connect to the instance in which the database subject to restoration is included and change the default database of the user executing the restoration (authorized user input in the "Input of Authentication page" explained in "Restore SQL Server Database Using Wizard" in the *Web Console Guide*) to "master" by following the steps listed below. However, if this has already been set to "master", it is not necessary to make changes.

1. Log on to the database server with the operation account.
2. Start the SQL Server Management Studio.
3. From the object explorer, go through **Security** > **Login** and right-click on **User**, and then click on **Property**.
4. Click on **Selection of Page** > **General** and change **Default Database** to "master".
5. End the SQL Server Management Studio.

10.5.5.5 Restore Execution (Restoring Using Wizard)

Execute restore using the Restore Wizard for SQL Server provided on Web Console. Refer to "Restore SQL Server Database Using Wizard" in the *Web Console Guide* for the operating procedure.

10.5.5.6 Checking Status of Restore Process

Restore process status can be checked in the Job Status pane of Web Console. Refer to "Job Status Pane" in the *Web Console Guide* for information on the Job Status pane display.

When a restore is executed using the Restore Wizard for SQL Server, the following information is displayed in the Job Status pane.

Table 10.20 Contents Displayed During Restore Process Execution

Item	Display Contents
Action	Restore Wizard for SQL Server
Status	Executing
Results	-

Table 10.21 Contents Displayed When Restore Process Is Complete

Item	Display Contents	
Action	Restore Wizard for SQL Server	
Status	Completed	
Results	Normal case	Success
	Abnormal case	Failed

10.5.5.7 Restoration Confirmation

After completing a restore using the Restore Wizard for SQL Server, confirm that the SQL Server database has been correctly restored using the transaction application or SQL Server Management Studio.

10.5.5.8 Return to Default Database

When the default database has been changed to "master" with "[10.5.5.4 Changing Default Database](#)", return this to the default database prior to making the change.

10.5.6 Backup of Multiple Generations

For backup of multiple generations, execute the Backup Wizard for SQL Server for the number of generations to create backup scripts.

Point

- Provide a backup destination volume on a per generation basis.
- Backup scripts are created on a per executed Backup Wizard for SQL Server basis. Execute scripts on a per generation basis.

10.5.7 Changing Configuration

After backup configurations have been performed with the Backup Wizard for SQL Server, when changing the database or volume configuration, be sure to do it in the following steps:

1. Remove the current configuration.
Delete the current configuration using the configuration removal script generated with the "[10.5.4.1 Creating Backup Execution Script](#)".
2. Change the database or volume configuration.
3. Generate backup configurations and the complete backup execution script by using the Backup Wizard for SQL Server.
4. Execute the backup.
For more information about backup, refer to "[10.5.4.2 Execution of Backup](#)".

Note

If the configuration is changed in the procedure other than this procedure and backup operation is continued, a proper backup is not made and restore may fail.

Information

The operations subject to a change of configurations are as follows:

- Reconfigure the SQL Server database
 - Adding / deleting databases
- Adding databases to volumes already configured for backups
 - Reconfigure the database
- Adding / changing / deleting data files or transaction log files
- Changing where the database file is stored
 - Changing the recovery model of the database
 - Changing instance name
 - Changing database name
- Changing the configuration of the volume to be backed up of the SQL Server database
 - Changing the configuration of the volume to be backed up
- Changing / deleting volumes
- Adding / deleting partitions
 - Changing the drive / folder mount of the volume subject to backup
 - Changing file system

10.5.8 Troubleshooting

The following is a description of the corrective action in case an error occurs while the Backup Wizard for SQL Server or the Restore Wizard for SQL Server is running.

10.5.8.1 Corrective Action for Hardware Fault

Use the ETERNUS Web GUI to see that there is no fault found in the restore source and destination volumes.

If any fault is found, collect the information required for troubleshooting and contact Fujitsu Technical Support. For the method to collect the information, refer to "[13.2.1 Collecting Troubleshooting Information](#)".

10.5.8.2 Recovery Procedure for Failure in Rollback of Backup Wizard for SQL Server

If running the Backup Wizard for SQL 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 SQL 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, Database Server and Backup server, if any server is not started, start it.
2. Confirm whether the complete backup execution script, the log backup script, and the configuration removal script of the database subject to operation this time has been created in the following folder of the database server. If these have been created, delete these scripts.
 - Non-cluster operation:
<Program directory when AdvancedCopy Managers agent is installed>\Wizard\bat
 - Cluster operation:
<Shared disk for shared data for AdvancedCopy Manager>:\var\opt\swstorage\Wizard\bat



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. Confirm that the file that is about to be deleted contains the replication group name of when the script was created.

For example, if you change the replication group name to default, to execute the Backup Wizard at 20:49 on 7/29/2014, resulting in failure in the Rollback of Backup Wizard, delete the following files. Do not delete other files than those listed below:

```
execute_backup_ApplinkForSQLGroup_20140729204931.bat
execute_logbackup_ApplinkForSQLGroup_20140729204931.bat
delete_backup_ApplinkForSQLGroup_20140729204931.bat
```

3. As for the database selected by the Backup Wizard, delete the backup definition of AdvancedCopy Manager.

Obtain a definition of volume pair and delete the volume pair definition based on the obtained information.

a. Obtain Volume Pair Definition

When the database server is of a cluster environment, it is necessary to implement the following procedures and configure the environmental variable SWSTGNODE prior to executing the [swsrpvoinfo](#) command.

1. Execute the following command and display the logical node name of the AdvancedCopy Manager.

```
<AdvancedCopy Manager program directory>\bin\stgenvdisp
```

2. Execute the following command and configure the logical node name to the environmental variable SWSTGNODE.

The logical node name to be configured is one of the logical node names displayed in step a and is the name of the logical node on which the database selected in the wizard is active.

```
SET SWSTGNODE=<logicalNodename of the AdvancedCopy Manager>
```

Execute the following command with the database server and obtain volume pair definitions.

```
<AdvancedCopy Manager program directory>\bin\swsrpvoinfo -L
```

The following is the example of command execution:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpvoinfo -L
Server          Original-Volume      Size      Replica-Volume      Size
Copy           Op-Server Group
E14EMB01WR2DE64 g1d102p1@E14EMB01WR2DE64 1021.0 Mbyte g1d217p1@E14BKS01WR2DE64 1021.0 Mbyte
bi-direction original  ApplinkForSQLGroup_20130927153045
E14EMB01WR2DE64 g1d199p1@E14EMB01WR2DE64 1021.0 Mbyte g1d218p1@E14BKS01WR2DE64 1021.0 Mbyte
bi-direction original  ----
C:\>
```

Of the pairs displayed in the above, extract the volume pair in which the group name matches the replication group name specified upon execution of the backup wizard and perform Delete Volume Pair Definition.

In the above command execution example, g1d102p1@E14EMB01WR2DE64 is backup source volumes and g1d217p1@E14BKS01WR2DE64 is backup destination volumes.

- b. Delete Volume Pair Definition

Execute the following command on the database server:

```
<AdvancedCopy Manager program directory>\bin\swsrpdelvool backupSrcVol backupDstVol
```

For *backupSrcVol* and *backupDstVolume*, specify the volume pair obtained in the step Obtain Volume Pair Definition. The following is the example of command execution:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdelvool g1d102p1@E14EMB01WR2DE64
g1d217p1@E14BKS01WR2DE64
swsrpdelvool completed
C:\>
```

Chapter 11 Scheduler

This chapter describes using Scheduler.

11.1 Overview

The Scheduler provides the functions to manage Scheduler Tasks (create, display, delete) to backup operations.

Registering the following backup scripts to Scheduler Tasks makes it possible to automatically execute them on the date and time and execution interval specified at the time of registration.

- Backup script created by Backup Wizard for Exchange Server
- Backup script created by Backup Wizard for SQL Server

11.2 Operating Environment

The operating environment for Scheduler is described.

11.2.1 Required Hardware

Hardware requirements to use Scheduler are described.

Hardware depends on the environment in which scripts are executed.

- In the case that scripts created by Backup Wizard for Exchange Server are executed on a schedule:
Refer to the "[8.3.2.1 Required Hardware](#)".
- In the case that scripts created by Backup Wizard for SQL Server are executed on a schedule:
Refer to the "[10.5.2.1 Required Hardware](#)".

11.2.2 Required Software

Software requirements to use Scheduler are described.

Software depends on the environment in which scripts are executed.

Operating System

The following are the operating systems whose operations Scheduler guarantees:

Managed Server

- In the case that scripts created by Backup Wizard for Exchange Server are executed on a schedule:
It is in accordance with the "Operating System" in the "[8.3.2.2 Required Software](#)".
- In the case that scripts created by Backup Wizard for SQL Server are executed on a schedule:
It is in accordance with the "Operating System" in the "[10.5.2.2 Required Software](#)".

Management Server

- In the case that Management Server does not reside with Managed Server:
Refer to "Supported Operating Systems" in "Operating Environment of ETERNUS SF Manager" in the *Installation and Setup Guide*.
- In the case that Management Server resides with Managed Server:
It follows the support policy of the above-mentioned "Managed Server".

Installation Software

In the case that Backup Wizard for Exchange Server is used:

The following is the software configuration when Backup Wizard for Exchange Server is used:

Table 11.1 Software configuration when Backup Wizard for Exchange Server is used

Configuration Pattern	Managed Server	Management Server
Management Server does not reside with Managed Server	Storage Cruiser's agent and AdvancedCopy Manager's agent	ETERNUS SF Manager
Management Server resides with Managed Server	ETERNUS SF Manager and Storage Cruiser's agent	

In the case that Backup Wizard for SQL Server is used:

The following is the software configuration when Backup Wizard for SQL Server is used:

Table 11.2 Software configuration when Backup Wizard for SQL Server is used

Configuration Pattern	Managed Server	Management Server
Management Server does not reside with Managed Server	Storage Cruiser's agent and AdvancedCopy Manager's agent	ETERNUS SF Manager
Management Server resides with Managed Server	ETERNUS SF Manager and 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 *Installation and Setup Guide*

Managed Server

- "Incompatible Software" in "Operating Environment of AdvancedCopy Manager's Agent" in the *Installation and Setup Guide*
- "Incompatible Software" in "Operating Environment of Storage Cruiser's Agent" in the *Installation and Setup Guide*

11.2.3 Operation by Cluster

Support of cluster operation is as follows:

Management Server

Refer to the cluster configuration in the "Operating Environment of ETERNUS SF Manager" and "Supported Types of Operation" in the *Cluster Environment Setup Guide*.

Managed Server

Refer to the manual that includes the function to execute scripts on a schedule to see if the cluster configuration is supported.

11.2.4 Virtual Environment

Refer to the manual that includes the function to execute scripts on a schedule to see if virtual environments are supported.

11.3 Scheduler Function

Scheduler provides the following functions:

- [11.3.1 Create Scheduler Task](#)
- [11.3.2 Display Scheduler Task](#)
- [11.3.3 Delete Scheduler Task](#)
- [11.3.4 Immediately Execute Scheduler Task](#)
- [11.3.5 Disable Scheduler Task](#)
- [11.3.6 Enable Scheduler Task](#)

11.3.1 Create Scheduler Task

Use the wizard to create Scheduler Tasks, and a new Scheduler Task can be registered to ETERNUS SF Manager. Schedule date and time can be specified per hour, per day, or per day of the week on a weekly basis, or on a month-end specified monthly basis.

To create a Scheduler Task, refer to "Create New Scheduler Task" in the *Web Console Guide*.



Note

- The format of scripts to be registered must be filled in with the following requirements:
 - File name: ASCII
 - Encoding: ASCII, MS932 or Shift-JIS
 - Line breaks: CR+LF
 - When the return value of a script is 0 (zero), the script terminates normally, and when other than 0 (zero), it terminates abnormally.
 - Do not use the number 99999 and -2 as a return value of scripts.
 - If multiple Scheduler Tasks are created on the same host, they cannot be executed at the same time. Wait until the script of one Scheduler Task has been executed and execute the next one.
 - The number of Scheduler Tasks concurrently executable in the system is up to 10.
 - There is not a limit to the number of creatable Scheduler Tasks.
 - If the execution time of Scheduler Tasks is overlapped, the priority of execution is as follows:
 1. Give priority to the Scheduler Task executed immediately.
 2. Execute in order of Next start time.
 3. Execute in order of creating of Scheduler Tasks.
 - There is not a limit to the number of scripts that can be registered to one Scheduler Task.
 - If multiple scripts are registered to one Scheduler Task, a script that terminates abnormally and later scripts are not executed and the Scheduler Task terminates abnormally. Regardless of the execution result of the last script, to execute additional scripts, another Scheduler Task must be created.
 - If the total execution time of a script file with a Scheduler Task exceeds a time length of 10 minutes and 30 seconds, timeout occurs. If timeout occurs, the previous execution result of Scheduler Task become "Warning", and the result cannot be viewed on the Overview screen for Scheduler Tasks. The result can be viewed by the script execution log of agent. To view the script execution log, refer to "[11.3.1.1 How to View Results in Log](#)".
-

11.3.1.1 How to View Results in Log

The script execution log is output at the following location:

```
<AdvancedCopy Manager work directory>\var\trc\ESFScheduler_script.log.<n> (*)
```

*: n is a serial number.

If it is seen in the script execution log that the executed script terminates normally, the value of return code becomes 0 (zero), and the executed script terminates abnormally, the values of return code becomes other than 0 (zero). If the script was not executed due to an authentication error, Return Code is not displayed and the error content is displayed in Detail.

The following is an example of script execution log (script terminates normally):

```
yyyy/MM/dd HH:mm:ss,SSS INFO - [START]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
UserName : administrator
DomainName : sampleDomain

yyyy/MM/dd HH:mm:ss,SSS INFO - [END]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
ReturnCode: 0
Statndard Out:
[0] execute_backup is successfully completed.
Statndard Error:
```

The example of the output of a script execution log for authentication error is shown below:

```
yyyy/MM/dd HH:mm:ss,SSS INFO - [START]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
UserName : administrator
DomainName : sampleDomain
yyyy/MM/dd HH:mm:ss,SSS ERROR - [END]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
Detail: Failed to authentication.
```

The example of the output of a script execution log in which Return Code is 1 is shown below:

```
yyyy/MM/dd HH:mm:ss,SSS INFO - [START]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
UserName : administrator
DomainName : sampleDomain
yyyy/MM/dd HH:mm:ss,SSS ERROR - [END]
TaskName : sampleTask
ScriptFile : C:\Win32app\AdvancedCopyManager\Wizard\bat\SampleDB_20140210130055.bat
ReturnCode: 1
Statndard Out:
Statndard Error:
[0] execute_backup failed.
```

11.3.2 Display Scheduler Task

A list of Scheduler Tasks registered to ETERNUS SF Manager is displayed on the Overview screen for Scheduler Tasks. Filter settings display a list of specified Scheduler Tasks alone.

Click **Task Name** on the Browse screen for Scheduler Tasks, and details of the Scheduler Tasks can be checked.

Refer to "Display Scheduler Task" in the *Web Console Guide* for the method for displaying a list and details of Scheduler Tasks.

11.3.3 Delete Scheduler Task

Scheduler Tasks can be deleted on the screen to delete Scheduler Tasks (multiple Scheduler Tasks selectable).

To delete Scheduler Tasks, refer to "Delete Scheduler Task" in the *Web Console Guide*.

Information

Even if a Scheduler Task is deleted, registered scripts are not deleted.

11.3.4 Immediately Execute Scheduler Task

Scheduler Tasks can be immediately executed on the Immediate Execution screen for Scheduler Tasks (multiple Scheduler Tasks not selectable).

The number of Scheduler Tasks concurrently and immediately executable for the same host is one.

For the method for executing Scheduler Tasks immediately, refer to "Immediately Execute Scheduler Task" in the *Web Console Guide*.

11.3.5 Disable Scheduler Task

Scheduler Tasks can be disabled on the screen to disable Scheduler Tasks (multiple Scheduler Tasks selectable).

Disabling a Scheduler Task can prevent the Scheduler Task from being executed on the specified date and time.

For the method for disabling Scheduler Tasks, refer to "Enable/Disable Scheduler Task" in the *Web Console Guide*.

11.3.6 Enable Scheduler Task

Disabled Scheduler Tasks can be enabled on the screen to enable Scheduler Tasks (multiple Scheduler Tasks selectable).

Enabling a Scheduler Task can restart the operation of the Scheduler Task.

For the method for enabling Scheduler Tasks, refer to "Enable/Disable Scheduler Task" in the *Web Console Guide*.

11.4 Operations

The following is a description of how to use Scheduler.

11.4.1 How to Use Scheduler Task

The following is the procedure to execute scripts on a schedule:

1. On the wizard to create Scheduler Tasks, set the date and time of executing scripts and create a Scheduler Task.
To create a Scheduler Task, refer to "[11.3.1 Create Scheduler Task](#)".
2. If after the Scheduler Task was created, its operation has never been checked, on the Immediate Execution screen for Scheduler Tasks, immediately execute the Scheduler Task created at step 1 to see whether it works normally.
To execute the Scheduler Task immediately, refer to "[11.3.4 Immediately Execute Scheduler Task](#)".
3. Check if the Scheduler Task was executed by its status displayed on the Main pane on the Overview screen for Scheduler Tasks.
For the displayed status of Scheduler Task, refer to "[11.3.2 Display Scheduler Task](#)".
4. If it becomes unnecessary to execute scripts on a registered date and time, delete the Scheduler Task created at step 1 on the screen to delete Scheduler Tasks.
To delete the Scheduler Task, refer to "[11.3.3 Delete Scheduler Task](#)".

Note

- If a Scheduler Task terminates abnormally, the status of the Scheduler Task becomes "Disable". Remove the cause of abnormal termination to enable the Scheduler Task.
- A Scheduler Task that is running scripts cannot be stopped.

11.4.2 How to Change Scheduler Task Usage

When changing the execution date and time of a Scheduler Task or the settings of execution script, delete the Scheduler Task and recreate it.

Take the following steps:

1. On the screen to delete Scheduler Tasks, delete the Scheduler Task whose usage is to be changed.
To delete the Scheduler Task, refer to "[11.3.3 Delete Scheduler Task](#)".
2. On the wizard to create Scheduler Tasks, configure a new Scheduler Task.
To create the Scheduler Task, refer to "[11.3.1 Create Scheduler Task](#)".

11.4.3 How to Suspend Scheduler Task Usage

For example, in the case that a Scheduler Task must be suspended for such as system maintenance, temporarily disable the Scheduler Task execution on the specified date and time.

Take the following steps:

1. On the screen to disable Scheduler Tasks, disable all the Scheduler Tasks.
To disable the Scheduler Tasks, refer to "[11.3.5 Disable Scheduler Task](#)".
2. Perform required operations, such as system maintenance.
3. On the screen to enable Scheduler Tasks, enable the disabled Scheduler Tasks.
To enable Scheduler Tasks, refer to "[11.3.6 Enable Scheduler Task](#)".

Chapter 12 Storage Cluster Continuous Copy Function

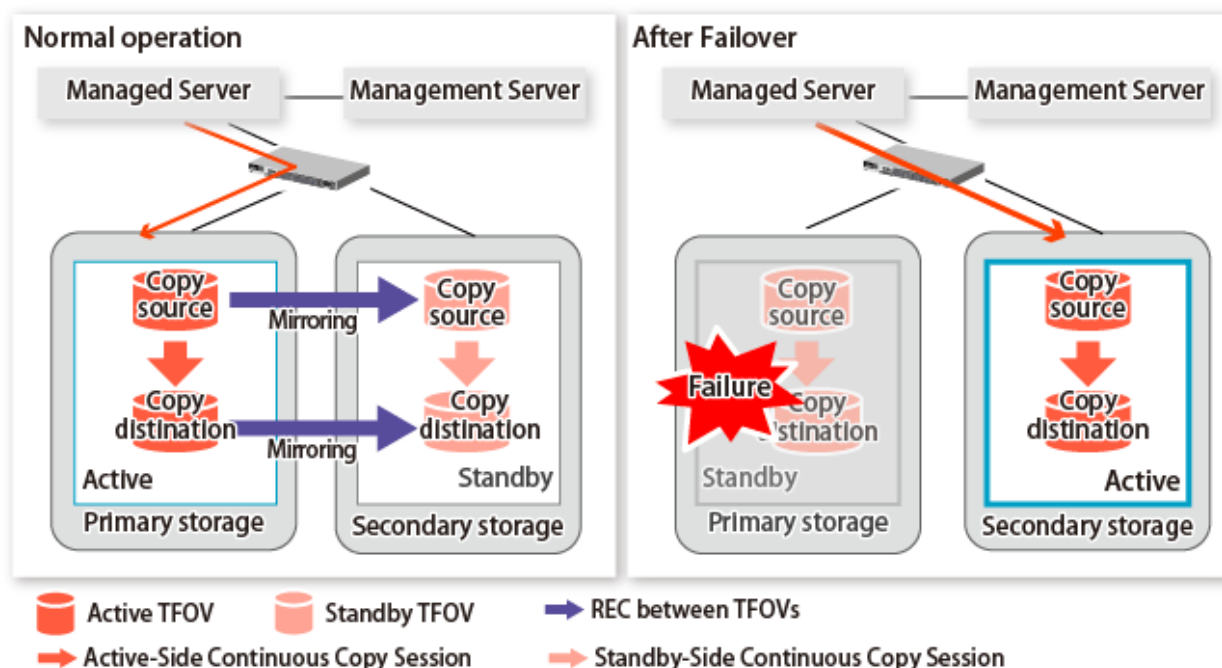
This chapter provides details of the replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function.

12.1 Overview

The Storage Cluster Continuous Copy function is an ETERNUS Disk storage function that maintains consistency on both storage devices by copying in the Primary Storage and Secondary Storage simultaneously. In a Storage Cluster environment, if a failover occurs in the Primary Storage while executing Advanced Copy, this is a function that can continue the copy operation with the Secondary Storage by automatically taking over the Advanced Copy process. For this reason, even if the power is interrupted due to a power cut, or a box failure occurs, the Advanced Copy operation can be continued without stopping the copy session.

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for details about the Storage Cluster function.

Figure 12.1 Storage Cluster Continuous Copy Function



The replication operation procedure that uses the Storage Cluster Continuous Copy function is the same as the replication operation for volumes (hereinafter referred to as "non-TFOV") that are not the target for Storage Cluster. When executing Advanced Copy from a TFOV to a TFOV, operation of the Storage Cluster Continuous Copy function starts the copy sessions on both the Primary Storage and Secondary Storage. For this reason, Advanced Copy can be executed without considering the storage device status.

On the AdvancedCopy Manager, sessions on the storage device where the TFO status is "Active" are referred to as "Active-Side Continuous Copy Session" and sessions on the storage device where the TFO status is "Standby" are referred to as "Standby-Side Continuous Copy Session".

Point

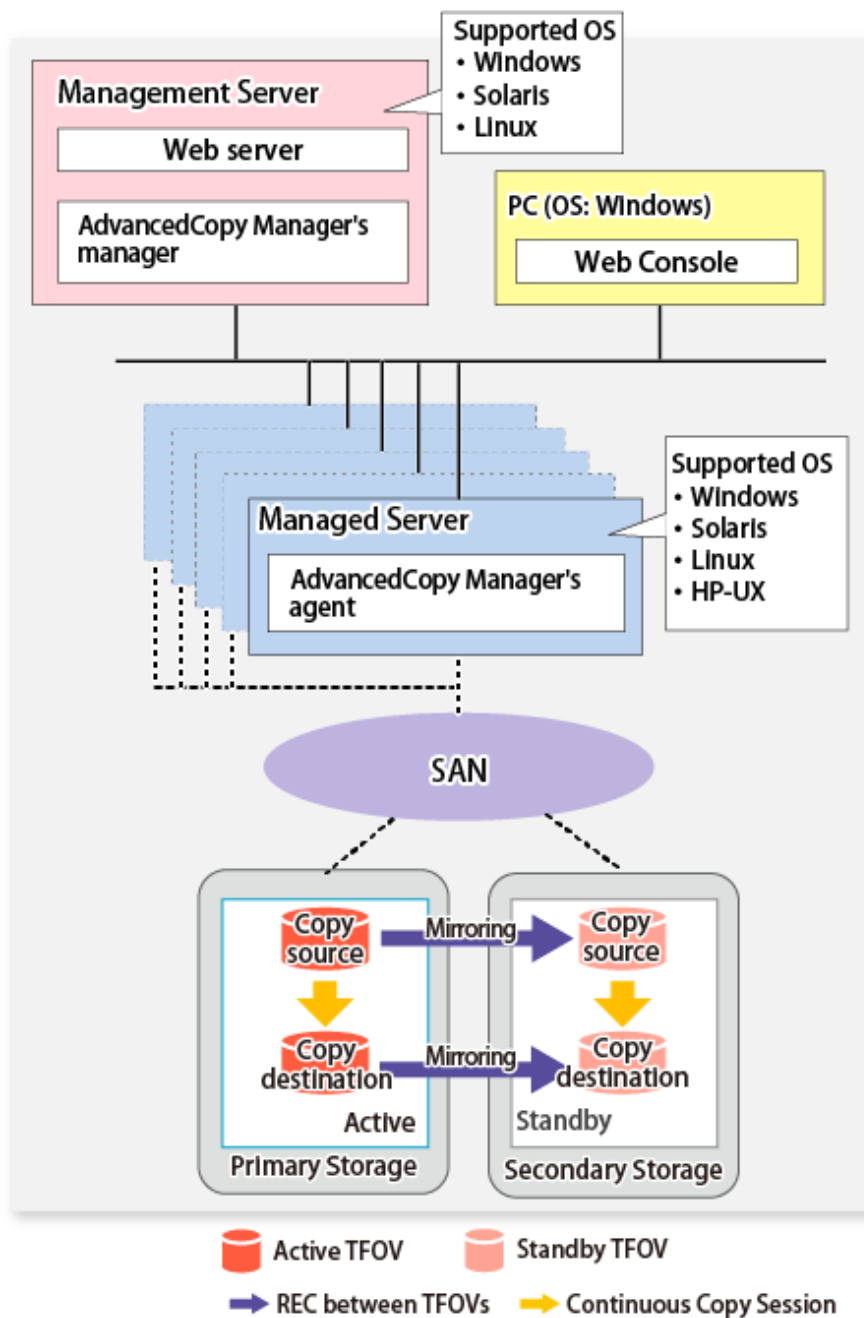
- Advanced Copy can be executed even if either the Primary Storage or the Secondary Storage is stopped.
- The Storage Cluster Continuous Copy function cannot be used when copying between non-TFOVs. Use the conventional Advanced Copy.

- The Storage Cluster Continuous Copy function cannot be used when copying between a TFOV and non-TFOV. When performing an Advanced Copy between a TFOV and non-TFOV, use the AdvancedCopy Manager Copy Control Module. Refer to "Operations of Advanced Copy Using TFOV" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for details.
- Remote Advanced Copy is not supported between TFOVs. When performing a Remote Advanced Copy between a TFOV and non-TFOV, use the AdvancedCopy Manager Copy Control Module. Refer to "Operations of Advanced Copy Using TFOV" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for details.

12.1.1 System Configuration

A system configuration using the Storage Cluster Continuous Copy function is shown below.

Figure 12.2 System Configuration Using Storage Cluster Continuous Copy Function



12.1.2 Operating Requirements

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide*.

12.1.3 Support Function

The support range of a Storage Cluster Continuous Copy function is shown below.

Advanced Copy Function		Support Range
Snapshot type high-speed copies	OPC	A
	QuickOPC	A
	SnapOPC	N/A
	SnapOPC+	N/A
Synchronous high-speed copies	EC	A
	REC	N/A

(A=Available, N/A=Not Available)

The range of functions supported by the Storage Cluster Continuous Copy function of AdvancedCopy Manager is shown below.

Function		Support Range
Backup operation		N/A
Backup operation using Suspend/Resume function		N/A
Backup operation using QuickOPC function		N/A
Replication operation		A
Backup operations (Symfoware)	Backup operations for Symfoware	N/A
	Symfoware Backup Server operation	A
Backup and restore of Exchange Server databases		A
Backup and restore of Hyper-V		A
Backup and restore of SQL Server databases		A
Operation on KVM guests		A(*1)

(A=Available, N/A=Not Available)

*1: Only the replication operation is supported.

12.2 Operation Design

This section provides details of the replication operation design using the Storage Cluster Continuous Copy function. Replication operation design is the same as a non-TFOV. Refer to "[7.2 Configuration](#)" for details.



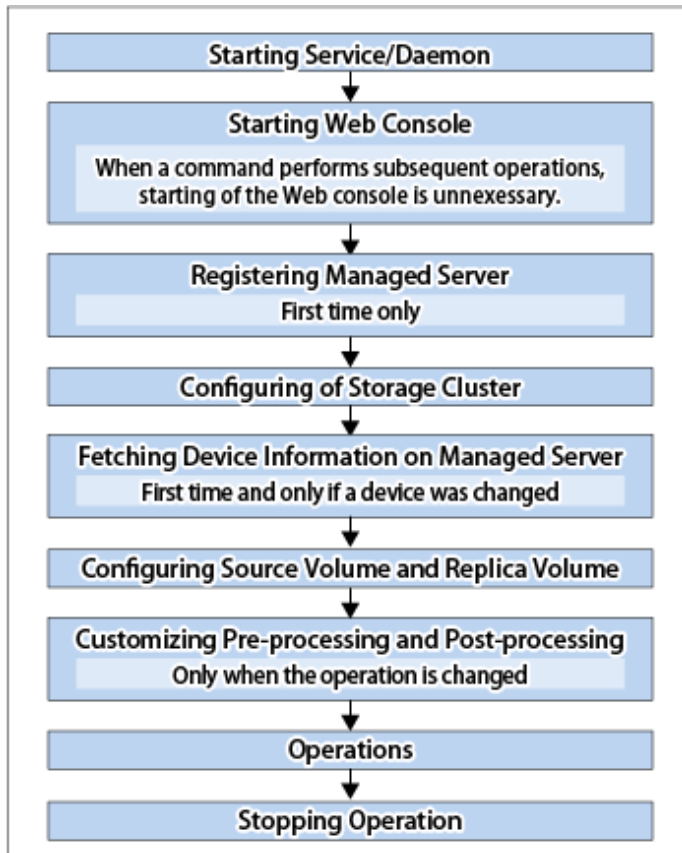
Note

- SnapOPC and SnapOPC+ are not supported.
- Make sure that the version of AdvancedCopy Manager's agent on the target server is Version 16.2 or later.

12.3 Flow of Operation

The flow of the replication operation when using the Storage Cluster Continuous Copy function is as described below.

Figure 12.3 Flow of Replication Operation When Using Storage Cluster Continuous Copy Function



12.4 Preparations

This section describes the preparations for using the Storage Cluster Continuous Copy function with replication operations.

Set up using the following procedure:

1. Starting Service
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](#)".
2. Starting Web Console
Start Web Console. For details, refer to "How to Start Web Console" in the *Web Console Guide*.
3. Registering Managed Server
The Management Server registers the Managed Server to be managed.
Refer to "[7.4.3 Registering Managed Server](#)" for details.
4. Configuration of Storage Cluster
Set up the Storage Cluster environment.
Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for Storage Cluster function setup.
5. Fetching Device Information on Managed Server
Fetch the device information on a Managed Server.
Refer to "[7.4.4 Fetching Device Information on Managed Server](#)" for details.

6. Configuring Source Volume and Replica Volume

Set the source volume and replica volume that are used in the replication.
Refer to ["7.4.5 Configuring Source Volume and Replica Volume"](#) for details.
When creating groups, refer to ["7.4.7 Creating Groups"](#).

Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for information on how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.
- All of the replication volumes registered in the group must belong to the same TFO group.
- Non-TFOVs cannot be registered as source and replica volumes.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered.
- When creating groups, do not perform a failover or a failback.

7. Customizing Pre-processing and Post-processing

Pre- and post-processing scripts are customized according to the operation.
Refer to ["7.4.6 Customizing Pre-processing and Post-processing"](#) for details.

12.5 Operations

The replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function is the same as a non-TFOV. Refer to ["7.5 Operations"](#) for details.

Refer to ["Chapter 14 Command References"](#) for the specifications and case examples for each command.

Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to ["12.12 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- If the volume that is the target of Storage Cluster or the TFO group of the volume is changed, refer to ["12.13.2 When Changing Storage Cluster Target Volume"](#) and register the replication volume again.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - `swsrpstartsync`
 - `swsrpmake`
 - `swsrprevsync`

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed as well:

- `swsrpstat`

- [swsrpcancel](#)

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console

Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.

- For using AdvancedCopy Manager Copy Control Module commands

- accopy query
- accopy fcancel

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.6 Backup Operations for Symfoware

The following method is supported for the Symfoware backup operation using the Storage Cluster Continuous Copy function.

- [4.2 Symfoware Backup Server Operation](#)

The following method is not supported.

- [4.1 Backup Operations for Symfoware](#)

Regarding the Symfoware backup server operation, this section describes the procedure for a backup/restore of the Symfoware Server database using the Storage Cluster Continuous Copy function.

The backup/restore procedure that uses the Storage Cluster Continuous Copy function is the same as for non-TFOVs. Refer to "[4.2 Symfoware Backup Server Operation](#)" for details.



Note

For backup operation for Symfoware, the Storage Cluster Continuous Copy function is not available.

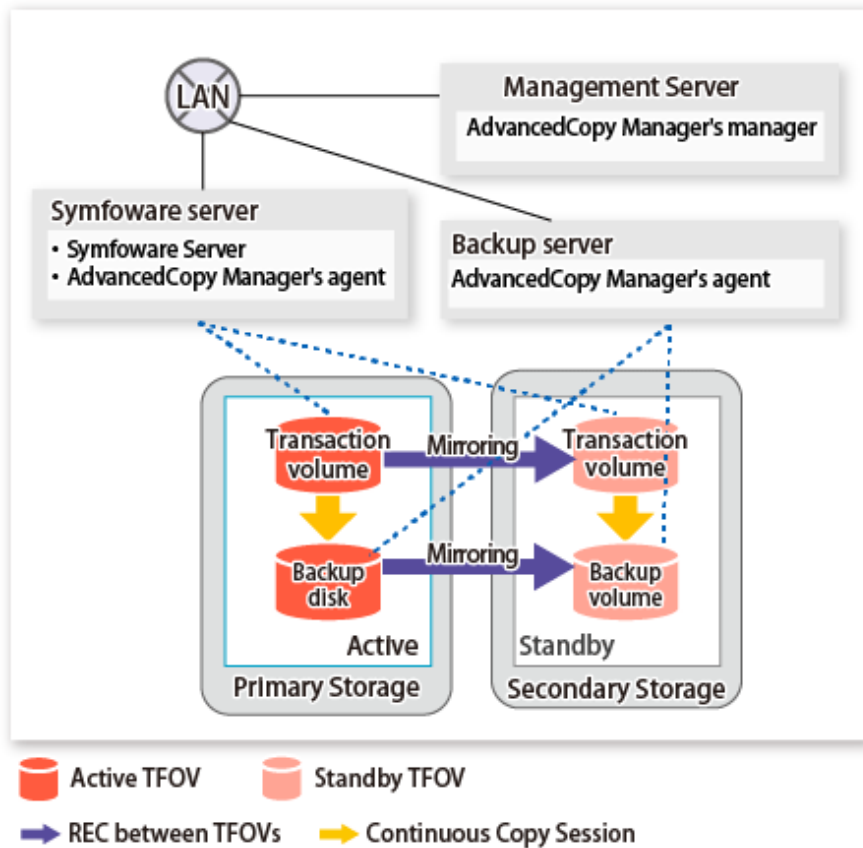
12.6.1 Operation Design

The configuration example when the Storage Cluster Continuous Copy function is used is shown in "[Figure 12.4 Configuration Example When Using Storage Cluster Continuous Copy Function](#)".

Perform an operational design by referring to 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. [4.2.2.4 Determining Backup Target](#)
5. [4.2.2.5 Preparing Backup Volumes](#)

Figure 12.4 Configuration Example When Using Storage Cluster Continuous Copy Function



Point

- Locate the transaction volumes and the backup volumes in the same TFO group.
- Even when backing up log groups to multiple generations, locate all of the volumes in the same TFO group.

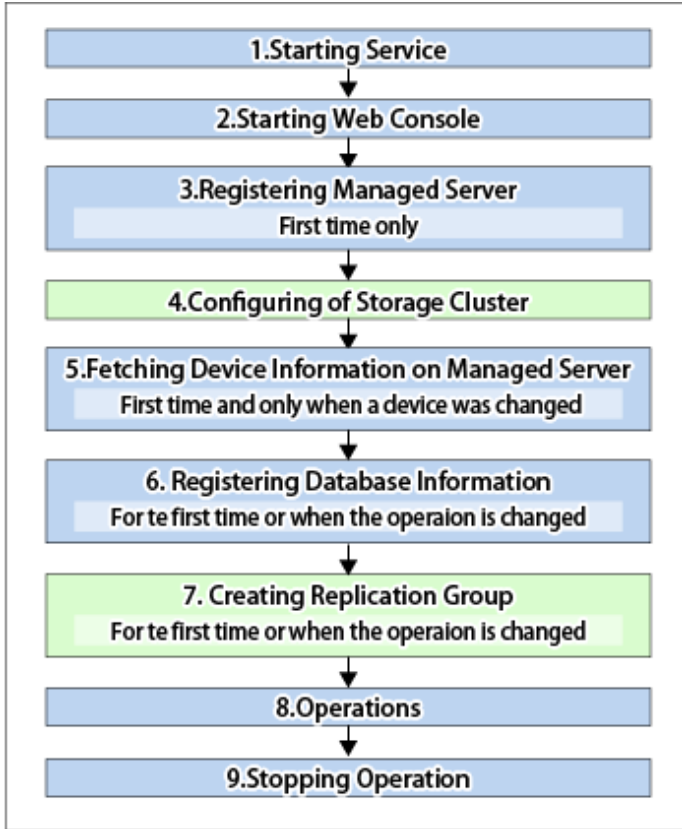
12.6.2 Preparing to Start Backup

Below figure shows the flow of preparation tasks.

This section describes steps 4 and 7.

The steps other than 4 and 7 are the same as for non-TFOVs. Refer to the relevant sections of "4.2.4 Pre-preparation" for details.

Figure 12.5 Flow of Preparation Tasks



12.6.2.1 Configuring of Storage Cluster

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for information on how to set up the Storage Cluster environment.

12.6.2.2 Creating Replication Group

For details on how to create the replication group, refer to "[4.2.4.6 Creating Replication Group](#)".

When using the Storage Cluster Continuous Copy function, note the following points:

Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.
- All of the replication volumes registered in the replication group must belong to the same TFO group.
- Non-TFOVs cannot be registered to the replication group.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered to the replication group.
- When setting up Storage Cluster, do not perform a failover or a failback.

12.6.3 Backup and Recovery

Refer to "[4.2.5.1 Performing Backup](#)" for information on how to backup.

Refer to ["4.2.5.2 Performing Recovery"](#) for information on how to recover data that was saved as a backup.

Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to ["12.12 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - [swsrpbackup_symfoware](#) command
 - [swsrprestore_symfoware](#) command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed, either:

- [swsrphistory_symfoware](#) command

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console

Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.

- For using AdvancedCopy Manager Copy Control Module commands

- `acopy query` command
- `acopy fcancel` command

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.6.4 Reconfiguration

Refer to ["4.2.6 Changing Operation"](#) for information on how to change the configuration.

Point

If the volume that is the target of Storage Cluster or the volume TFO group is changed, refer to ["12.13.2 When Changing Storage Cluster Target Volume"](#) and register the replication volume again.

12.6.5 Stopping Operation

Refer to ["4.2.7 Stopping Operation"](#) for information on how to stop the operation.

12.7 Backup and Restore of Exchange Server Databases

This section describes the procedure for backing up or restoring the Exchange Server database using the Storage Cluster Continuous Copy function. In addition, the description here is based on ["8.1 Backup and Restore of Exchange"](#)

Server Database". For a backup/restore of Database Availability Group(DAG), refer to this section and "8.2 Backup and Restore of Database Availability Group".

The backup/restore procedure that uses the Storage Cluster Continuous Copy function is the same as for non-TFOVs. Refer to "Chapter 8 Backup and Restore of Exchange Server Databases" for details.

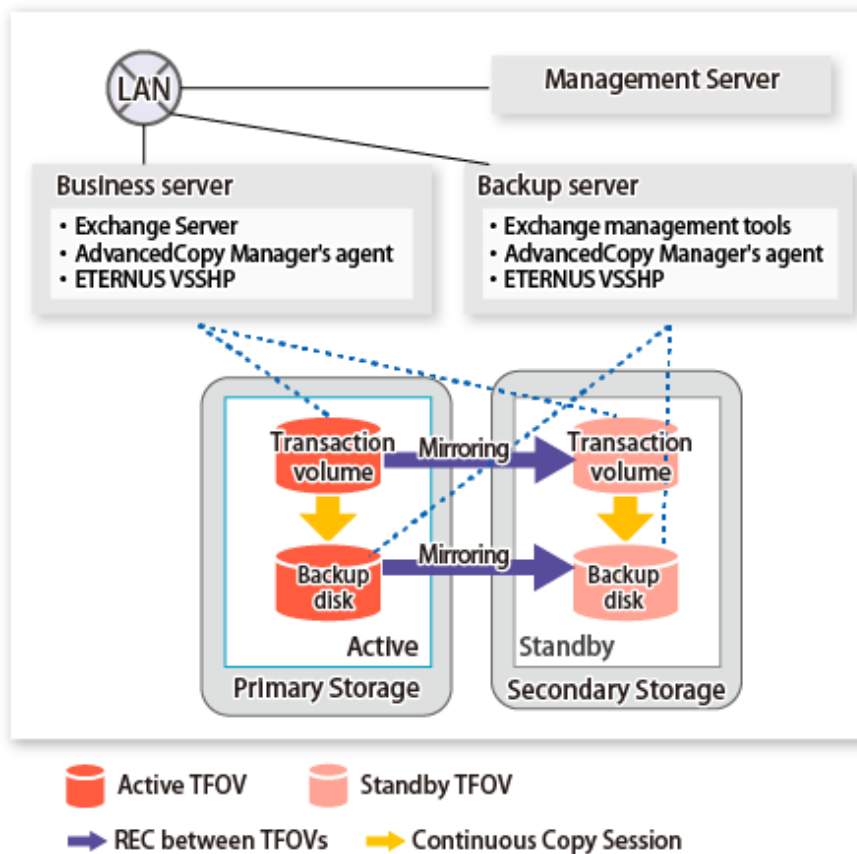
12.7.1 Operation Design

The configuration example when the Storage Cluster Continuous Copy function is used is shown in "Figure 12.6 Configuration Example When Using Storage Cluster Continuous Copy Function".

Perform an operational design by referring to the following procedure.

1. 8.1.2.1 Designing Server Configurations
2. 8.1.2.2 Designing Storage Groups or Databases
3. 8.1.2.3 Designing Circular Logs
4. 8.1.2.4 Preparing Backup Disks (LUs) and Backup Volumes (Partitions)
5. 8.1.2.5 Designing Copy Sets

Figure 12.6 Configuration Example When Using Storage Cluster Continuous Copy Function



Point

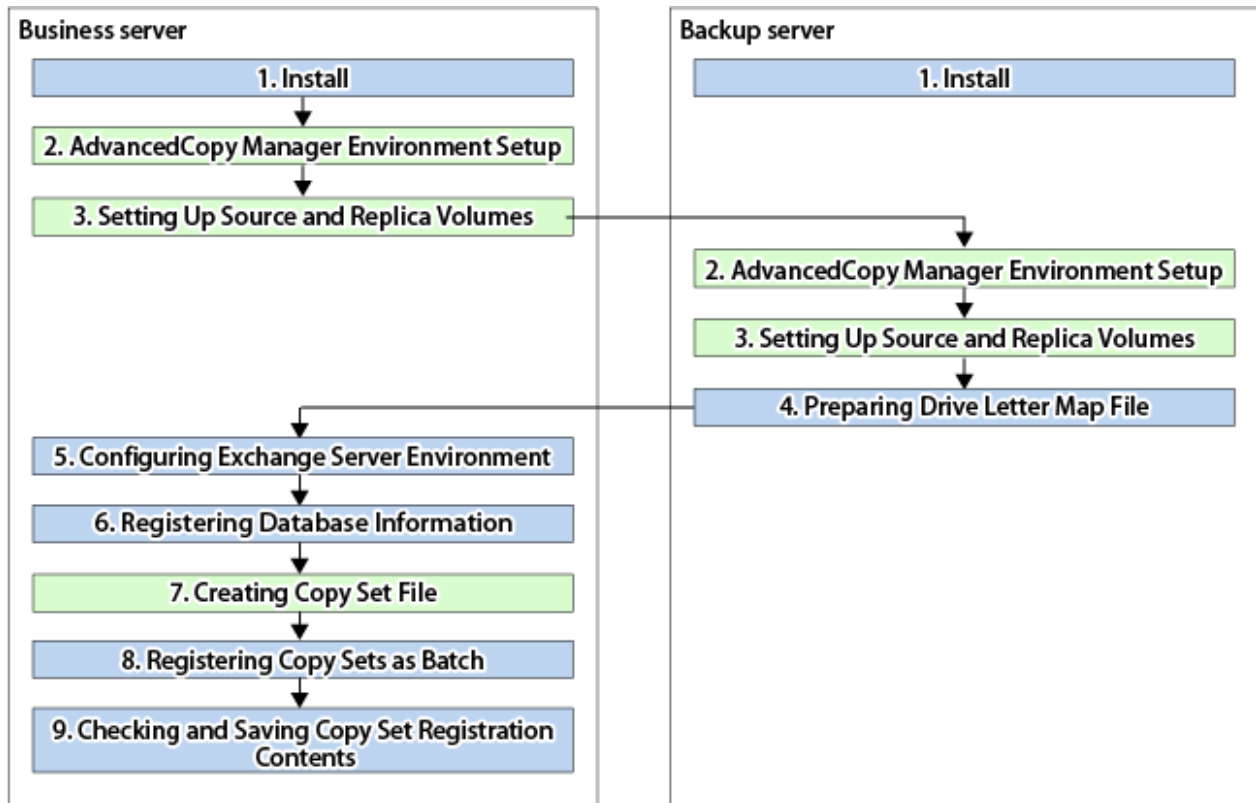
Locate the transaction disks and backup disks in the same TFO group.

12.7.2 Preparations

Below figure shows the flow of preparation tasks.

This section describes steps 2, 3 and 7.

The steps other than 2, 3 and 7 are the same as for non-TFOVs. Refer to the relevant sections of "[8.1 Backup and Restore of Exchange Server Database](#)" for details.



12.7.2.1 AdvancedCopy Manager Environment Setup

Using the following procedure, configure the AdvancedCopy Manager environment:

1. [7.4.1 Starting Service](#)
2. [7.4.2 Starting Web Console](#)
3. [7.4.3 Registering Managed Server](#)
4. Configuring of Storage Cluster
Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for information on how to set up the Storage Cluster environment.
5. [7.4.4 Fetching Device Information on Managed Server](#)

12.7.2.2 Setting Up Source and Replica Volume

Refer to "[8.1.3.2.2 Setting Up Source and Replica Volumes](#)" for information on how to set the source and replica volumes.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.

- All of the replication volumes registered in the group must belong to the same TFO group.
- Non-TFOVs cannot be registered as source and replica volumes.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered.
- When setting up, do not perform a failover or a failback.

12.7.2.3 Creating Copy Set File

Refer to "[8.1.3.2.6 Creating Copy Set File](#)" for information on how to register the copy set.

When using the Storage Cluster Continuous Copy function, note the following points:



Note

Specify the Primary Storage copy destination OLU and copy destination Box ID in the copy destination OLU and copy destination Box ID.

12.7.3 Backup and Restore

Refer to "[8.1.4 Backup](#)" for the backup method and "[8.1.5 Restoration](#)" for the restoration method.



Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - `swsrpvssbackup_exchange` command
 - `swsrpvssrestore_exchange` command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed as well:

- `swsrpshadowadm_exchange` command
- `swsrpstat_exchange` command
- `swsrpshadowadm` command

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console

Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.

- For using AdvancedCopy Manager Copy Control Module commands
 - `accopy query` command

- accopy fcancel command

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.7.4 Reconfiguration

Measures are required when changing the Primary Storage OLU number. Refer to "[8.1.6.2 Changing Copy Source and Destination Disks \(When Changing LUN_V Configuration\)](#)" for details.

Measures are not required when changing the Secondary Storage OLU number.



If the volume that is the target of Storage Cluster or the volume TFO group is changed, refer to "[12.13.2 When Changing Storage Cluster Target Volume](#)" and register the replication volume again.

12.7.4.1 Changing Copy Type

Refer to "[8.1.6.6 Changing Copy Type](#)" for information on how to change the copy type.

When using the Storage Cluster Continuous Copy function, note the following points:



The copy type cannot be changed while one side is operating.

12.7.5 Stopping Operation

Refer to "[8.1.7 Stopping Operation](#)" for information on how to stop operation.

12.7.6 Uninstallation

Refer to "[8.1.8 Uninstallation](#)" for information on how to uninstall.

12.8 Backup and Restore of Hyper-V

This section describes the procedure for backing up/restoring the Hyper-V Guest OS by using the Storage Cluster Continuous Copy function.

The backup/restore procedure that uses the Storage Cluster Continuous Copy function is the same as for non-TFOVs. Refer to "[Chapter 9 Backup and Restore of Hyper-V](#)" for details.

12.8.1 Operation Design

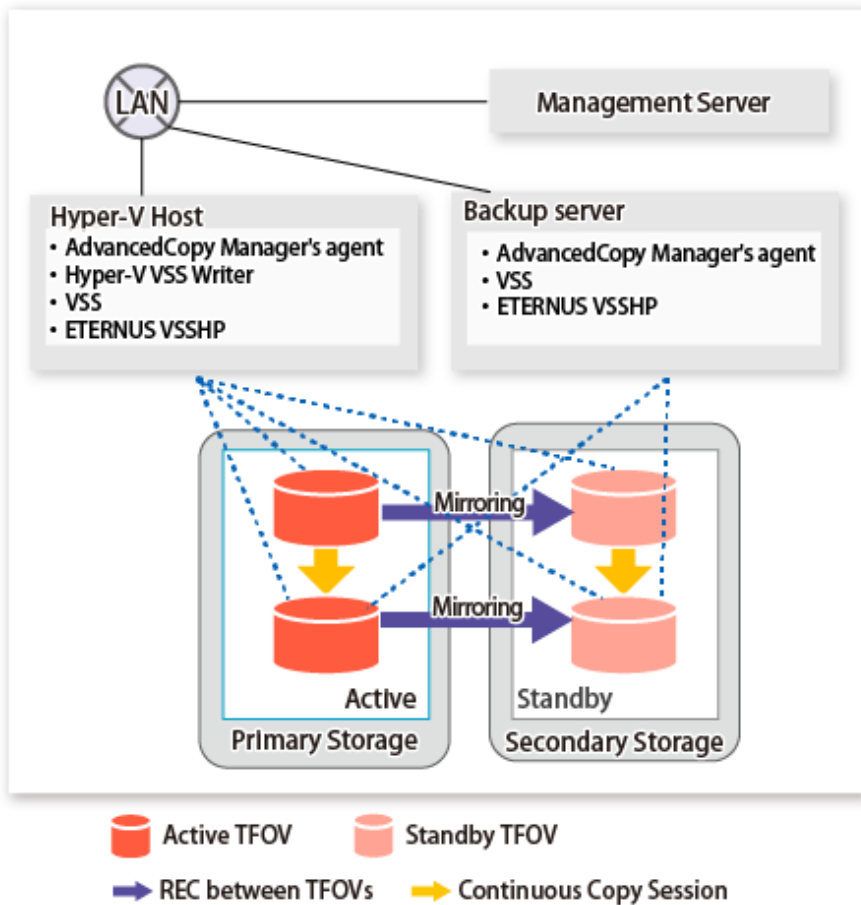
Perform the operation design for backup and restoration of Hyper-V Guest OSs.

12.8.1.1 Designing Server Configuration

Refer to "[9.2.1 Designing Server Configurations](#)" for information on designing server configuration.

The following figure shows a server configuration example.

Figure 12.7 Server Configuration



12.8.1.2 Designing Disk Configurations

Refer to "9.2.2 Designing Disk Configurations" for information on how to design the disk configuration.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

Locate the transaction volumes and the backup volumes of disks in the same TFO group.

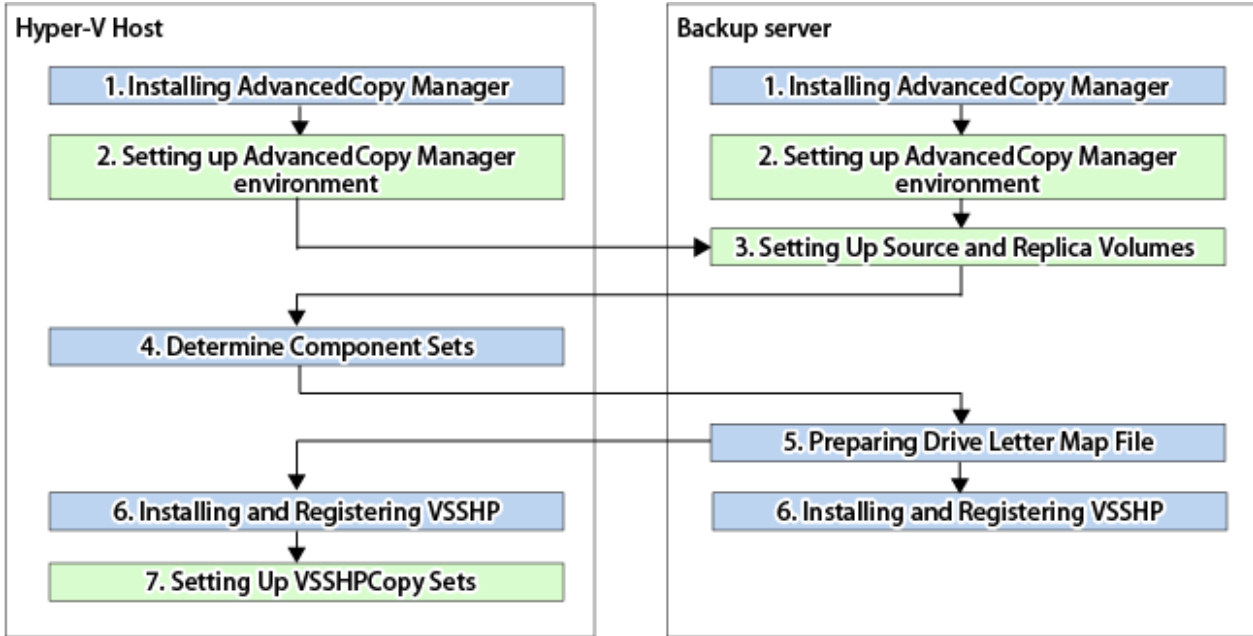
12.8.2 Preparation

Below figure shows the flow of preparation tasks.

This section describes steps 2, 3 and 7.

The steps other than 2, 3 and 7 are the same as for non-TFOVs. Refer to the relevant sections of "Chapter 9 Backup and Restore of Hyper-V" for details.

Figure 12.8 Flow of Preparation Tasks



12.8.2.1 Setting Up AdvancedCopy Manager Environment

Configure the AdvancedCopy Manager environment in the Hyper-V Host and backup server. The steps for configuration are as follows:

1. [7.4.1 Starting Service](#)
2. [7.4.2 Starting Web Console](#)
3. [7.4.3 Registering Managed Server](#)
4. Configuring of Storage Cluster
Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for information on how to set up the Storage Cluster environment.
5. [7.4.4 Fetching Device Information on Managed Server](#)

12.8.2.2 Setting Up Source and Replica Volumes

Refer to "[9.3.6 Setting Up Source and Replica Volumes](#)" for information on how to set the source and replica volumes.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.
- All of the replication volumes registered in the group must belong to the same TFO group.
- Non-TFOVs cannot be registered as source and replica volumes.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered.
- When setting up, do not perform a failover or a failback.

12.8.2.3 Registering Copy Sets

Refer to ["9.3.9 Registering Copy Sets"](#) for information on how to register the copy set.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

Specify the Primary Storage copy destination OLU and copy destination Box ID in the copy destination OLU and copy destination Box ID described for the copy set file in the ["9.3.9.1 Creating Copy Set File"](#).

12.8.3 Backup and Restore

Refer to ["9.4 Backup"](#) for the backup method and ["9.5 Restoration"](#) for the restoration method.

Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to ["12.12 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - `swsrpvrc shadow backup-hyperv` command
 - `swsrpvrc shadow restore-hyperv` command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed as well:

- `swsrpvrc shadow query` command
- `swsrpvrc shadow delete` command
- `swsrpvrc advcopy query` command
- `swsrpvrc advcopy stop` command

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.
- For using AdvancedCopy Manager Copy Control Module commands
 - `accopy query` command
 - `accopy fcancel` command

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.8.4 Reconfiguration

Measures are required when changing the Primary Storage OLU number. Refer to "[9.6.1 Changing Copy Source and Copy Destination Disks \(When Changing LUN_V Configuration\)](#)".

Measures are not required when changing the Secondary Storage OLU number.

Point

If the volume that is the target of Storage Cluster or the volume TFO group is changed, refer to "[12.13.2 When Changing Storage Cluster Target Volume](#)" and register the replication volume again.

12.8.4.1 Changing Copy Type

Refer to "[9.6.5 Changing Copy Type](#)" for information on how to change the copy type.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

The copy type cannot be changed while one side is operating.

12.8.5 Stopping Operation

Refer to "[9.7 Stopping Operation](#)" for information on how to stop the operation.

12.8.6 Uninstallation

Refer to "[9.8 Uninstallation](#)" for information on how to uninstall.

12.9 Backup and Restore of SQL Server Database

This section describes the procedure for backing up/restoring the SQL Server database using the Storage Cluster Continuous Copy function.

The backup/restore procedure that uses the Storage Cluster Continuous Copy function is the same as for non-TFOVs. Refer to "[Chapter 10 Backup and Restore of SQL Server Database](#)".

Note

The Storage Cluster Continuous Copy function cannot be used with the backup management function. When backing up/restoring the SQL Server database by using the Storage Cluster Continuous Copy function, use the replication management function.

12.9.1 Operation Design

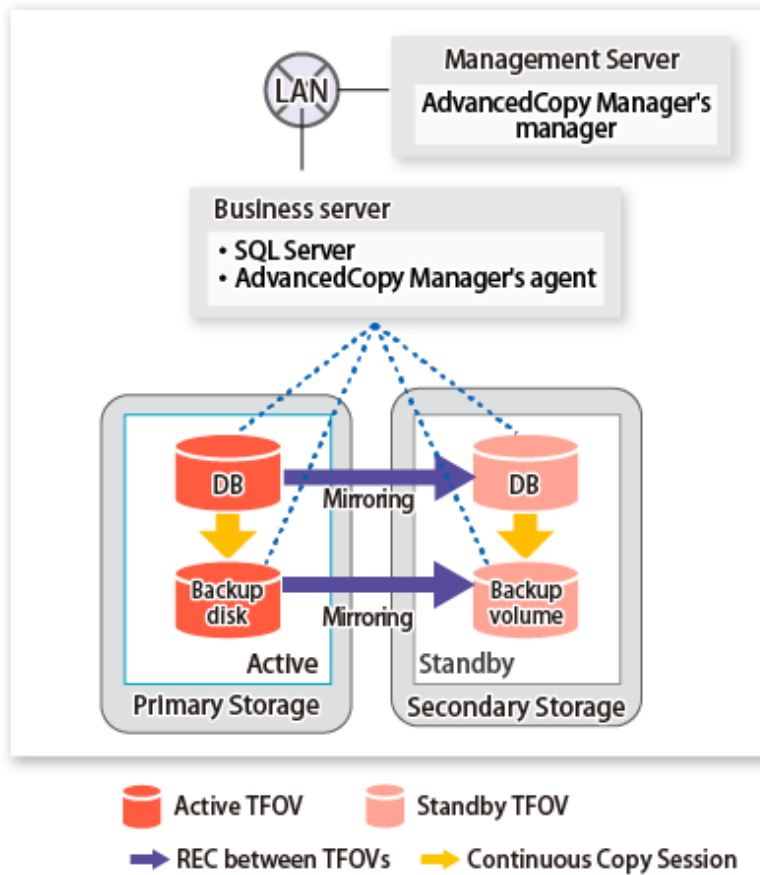
The configuration example when the Storage Cluster Continuous Copy function is used is shown in "[Figure 12.9 Configuration Example When Using Storage Cluster Continuous Copy Function](#)".

Perform an operational design by referring to the following procedure.

1. [10.2.1.1 Database in Raw Partitions](#)
2. [10.2.1.2 Placement of Files](#)
3. [10.2.1.3 Determining Servers to Perform Backup](#)
4. [10.2.1.4 Determining Backup Target](#)

5. [10.2.1.5 Determining Backup Method](#)
6. [10.2.1.6 Preparing Backup Volume](#)

Figure 12.9 Configuration Example When Using Storage Cluster Continuous Copy Function



Point

- Locate the databases and backup disks in the same TFO group.
- Even when backing up log groups to multiple generations, locate all of the volumes in the same TFO group.

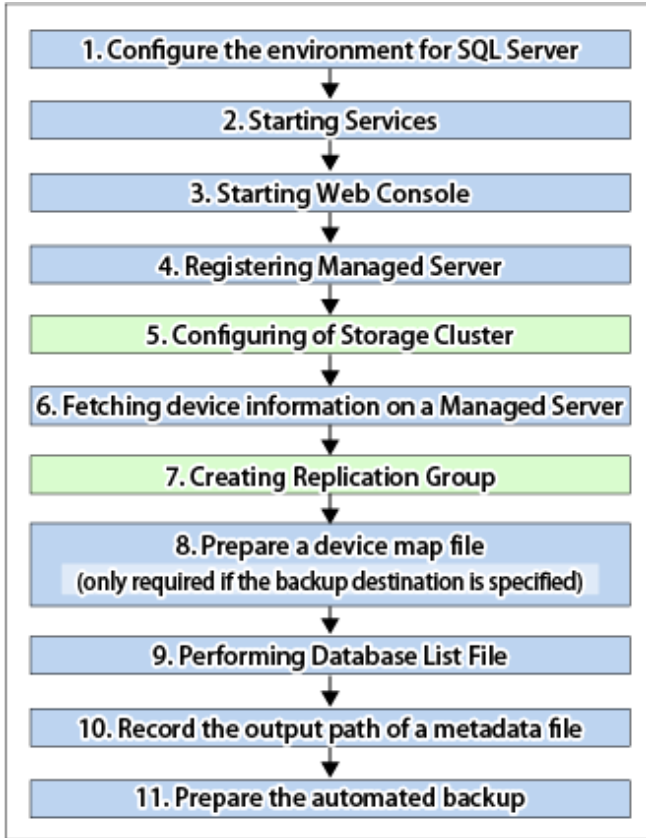
12.9.2 Preparations

Below figure shows the flow of preparation tasks.

This section describes steps 5 and 7.

The steps other than 5 and 7 are the same as for non-TFOVs. Refer to the relevant sections of "[10.4.1 Preparations](#)" for details.

Figure 12.10 Flow of Preparation Tasks



12.9.2.1 Configuring of Storage Cluster

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for information on how to set up the Storage Cluster environment.

12.9.2.2 Creating Replication Group

Refer to "[10.4.1.6 Creating Replication Group](#)" for information on how to create the replication group.

When using the Storage Cluster Continuous Copy function, note the following points:



Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.
- All of the replication volumes registered in the replication group must belong to the same TFO group.
- Non-TFOVs cannot be registered to the replication group.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered to the replication group.
- When setting up, do not perform a failover or a failback.

12.9.3 Performing Backup and Restore

Refer to "[10.4.2 Performing Backup and Restore](#)" for information on how to backup and restore of SQL Server databases.

Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- If the volume that is the target of Storage Cluster or the TFO group of the volume is changed, refer to "[12.13.2 When Changing Storage Cluster Target Volume](#)" and register the replication volume again.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - `swsrpbackup_sql` command
 - `swsrprestore_sql` command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed as well:

- `swsrphistory_sql` command

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console

Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.

- For using AdvancedCopy Manager Copy Control Module commands
 - `accopy query` command
 - `accopy fcancel` command

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.10 Operation on KVM Guests

This section describes the operating procedure in KVM guests using the Storage Cluster Continuous Copy function.

The operating procedure in the KVM guests using the Storage Cluster Continuous Copy function is the same as with non-TFOVs. Refer to "[Appendix F Operation on KVM Guests](#)" for details.

Note

The Storage Cluster Continuous Copy function cannot be used with the backup management function. When backing up/restoring the KVM guest volume by using the Storage Cluster Continuous Copy function, use the replication management function.

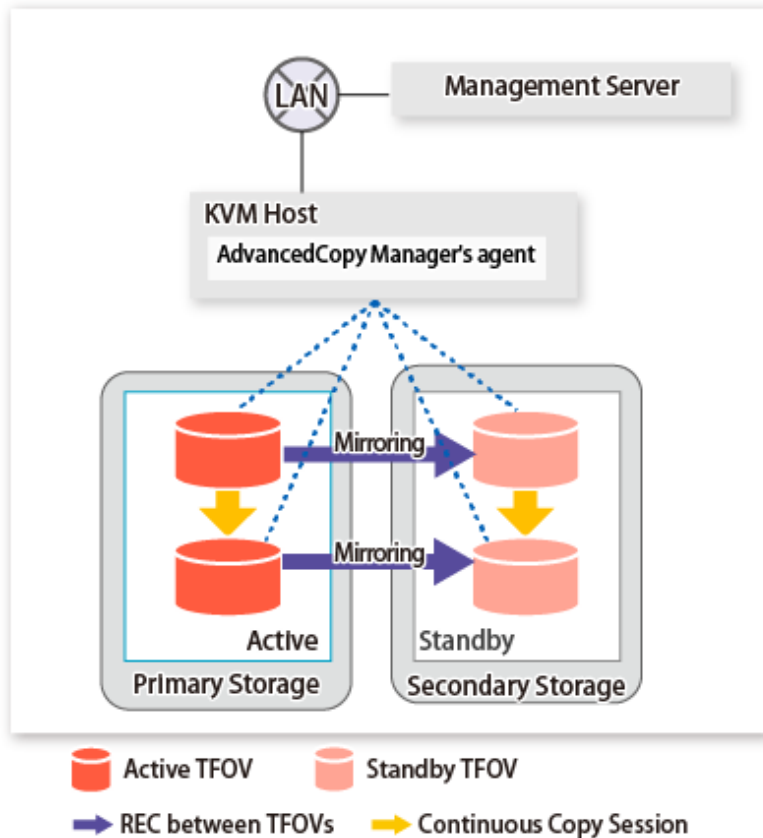
12.10.1 Operation Design

The configuration example when the Storage Cluster Continuous Copy function is used is shown in "Figure 12.11 Configuration Example When Using Storage Cluster Continuous Copy Function".

Perform an operational design by referring to the following procedure.

- F.2 Configuration
- F.3 Software Requirements

Figure 12.11 Configuration Example When Using Storage Cluster Continuous Copy Function



Point

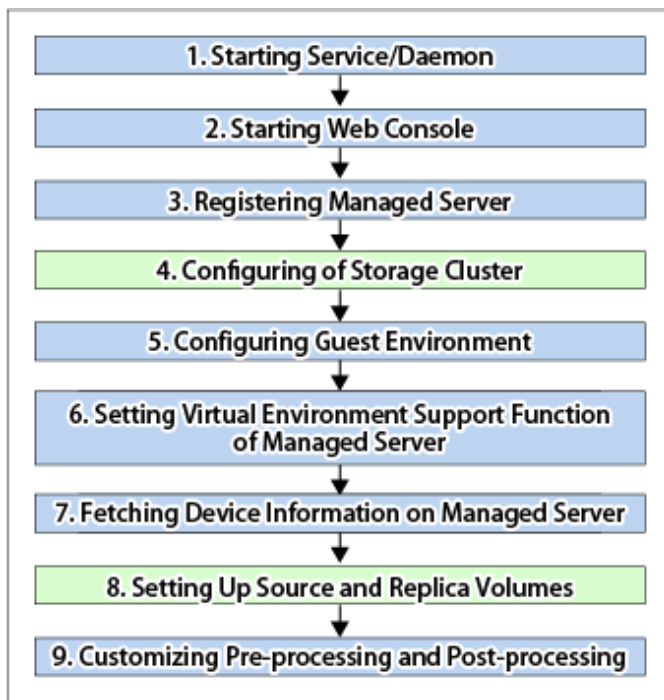
- REC, SnapOPC, and SnapOPC+ are not supported.
- Locate all of the devices that are used in the KVM guest operation in the same TFO group.

12.10.2 Preparations

Below figure shows the flow of preparation tasks.

This section describes steps 4 and 8.

The steps other than 4 and 8 are the same as for non-TFOVs. Refer to the relevant sections of "F.7 Preparations" for details.



12.10.2.1 Configuring of Storage Cluster

Refer to "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for information on how to set up the Storage Cluster environment.

12.10.2.2 Setting Up Source and Replica Volumes

Refer to "[7.4.5 Configuring Source Volume and Replica Volume](#)" for information on how to set the source and replica volumes for replication.

When using the Storage Cluster Continuous Copy function, note the following points:

Note

- Register the Advanced Copy license for the respective ETERNUS Disk storage systems on the Primary Storage and Secondary Storage. Refer to "Registration of License" in the *Installation and Setup Guide* for how to register the Advanced Copy license.
- The source volume and replica volume must belong to the same TFO group.
- All of the replication volumes registered in the group must belong to the same TFO group.
- Non-TFOV cannot be registered as source and replica volumes.
- Replication volumes that are not synchronized between the Primary Storage and Secondary Storage cannot be registered.
- When setting up, do not perform a failover or a failback.

12.10.3 Operations

Refer to "[7.5 Operations](#)". However, advanced preparations are not required in the referenced section.

Point

- When the status of the TFO group is "Normal" and Advanced Copy cannot operate on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
- When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command executes Advanced Copy on the storage device that has an "Active" TFO status and terminates normally. However, Advanced Copy could not be executed on the storage device that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.
- Advanced Copy cannot be operated during a failover or a failback.
- For TFOVs that are not synchronized between the Primary Storage and Secondary Storage, the following commands cannot be executed:
 - [swsrpstartsync](#) command
 - [swsrpmake](#) command
 - [swsrprevsync](#) command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed as well:

- [swsrpstat](#) command
- [swsrpcancel](#) command

To check the status of Advanced Copy and stop the session, use Web Console or AdvancedCopy Manager Copy Control Module commands.

- For using Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*.
- For using AdvancedCopy Manager Copy Control Module commands
 - [accopy query](#) command
 - [accopy fcancel](#) command

Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

12.10.4 Reconfiguration

Refer to "[F.9 Changing Operating Environment](#)" for information on how to change the operational environment.

Point

If the volume that is the target of Storage Cluster or the volume TFO group is changed, refer to "[12.13.2 When Changing Storage Cluster Target Volume](#)" and register the replication volume again.

12.10.5 Available Commands

If you use the Storage Cluster Continuous Copy function, the following are the commands that are available with the KVM guest.

- [14.2 Configuration Management Commands](#)
- [14.3 Replication Management Commands](#)
- "[14.5.2 Replication Management Commands](#)" in "[14.5 SQL Server Associated Commands](#)"

12.10.6 Setting File Specifications

Refer to "F.11 Setting File Specifications" for details.

12.11 Operating During Maintenance

When using the Storage Cluster Continuous Copy function, even if either the Primary Storage or Secondary Storage is stopped, Advanced Copy operation on the other storage can be continued. Further, when starting an ETERNUS Disk storage system that has been stopped, Primary Storage and Secondary Storage Advanced Copy automatically synchronizes.

A description of how the Storage Cluster Continuous Copy function operates in a maintenance state is as follows.

Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for the Storage Cluster environment of maintenance procedure.

Figure 12.12 When Primary Storage Is Stopped

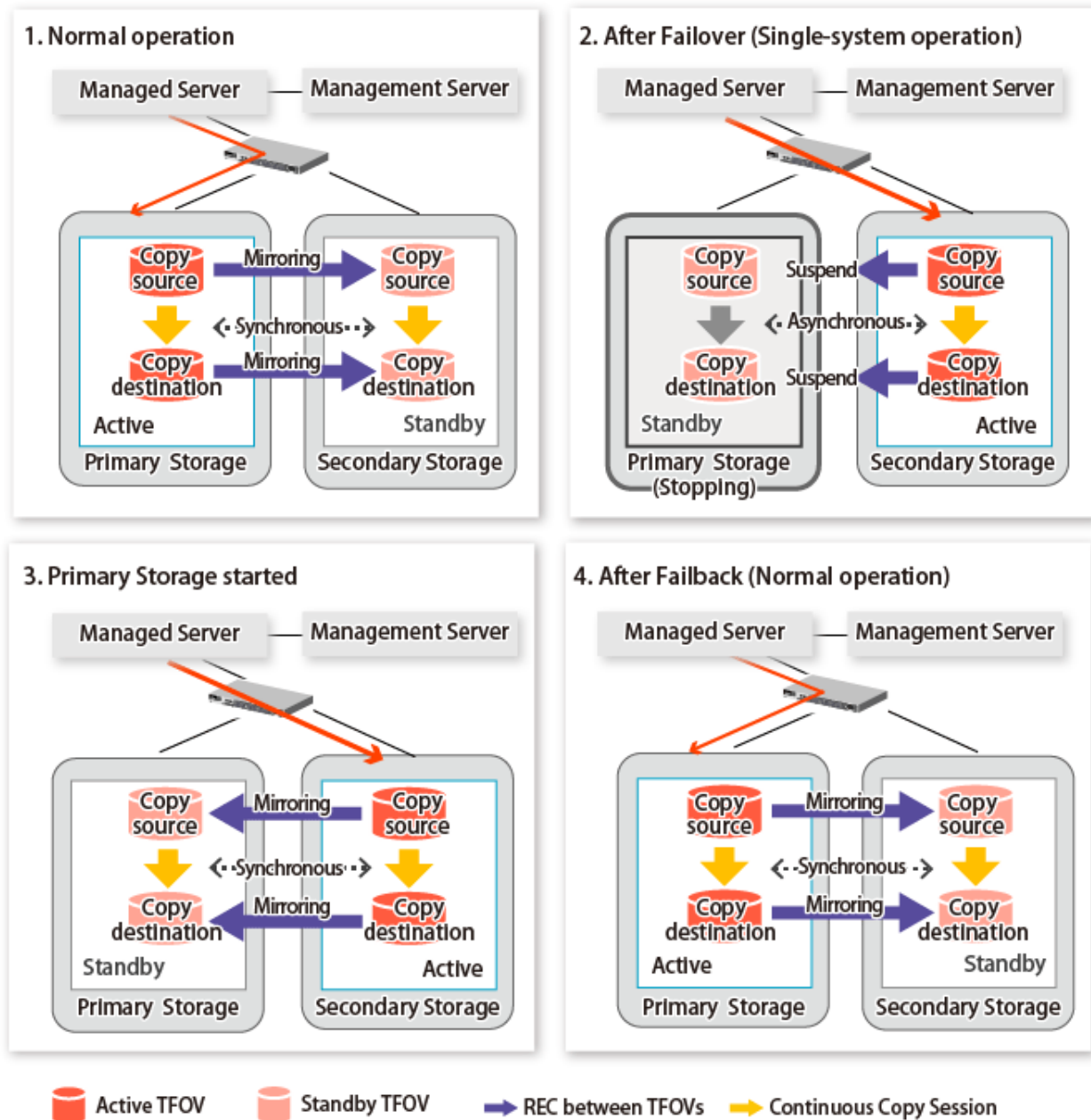
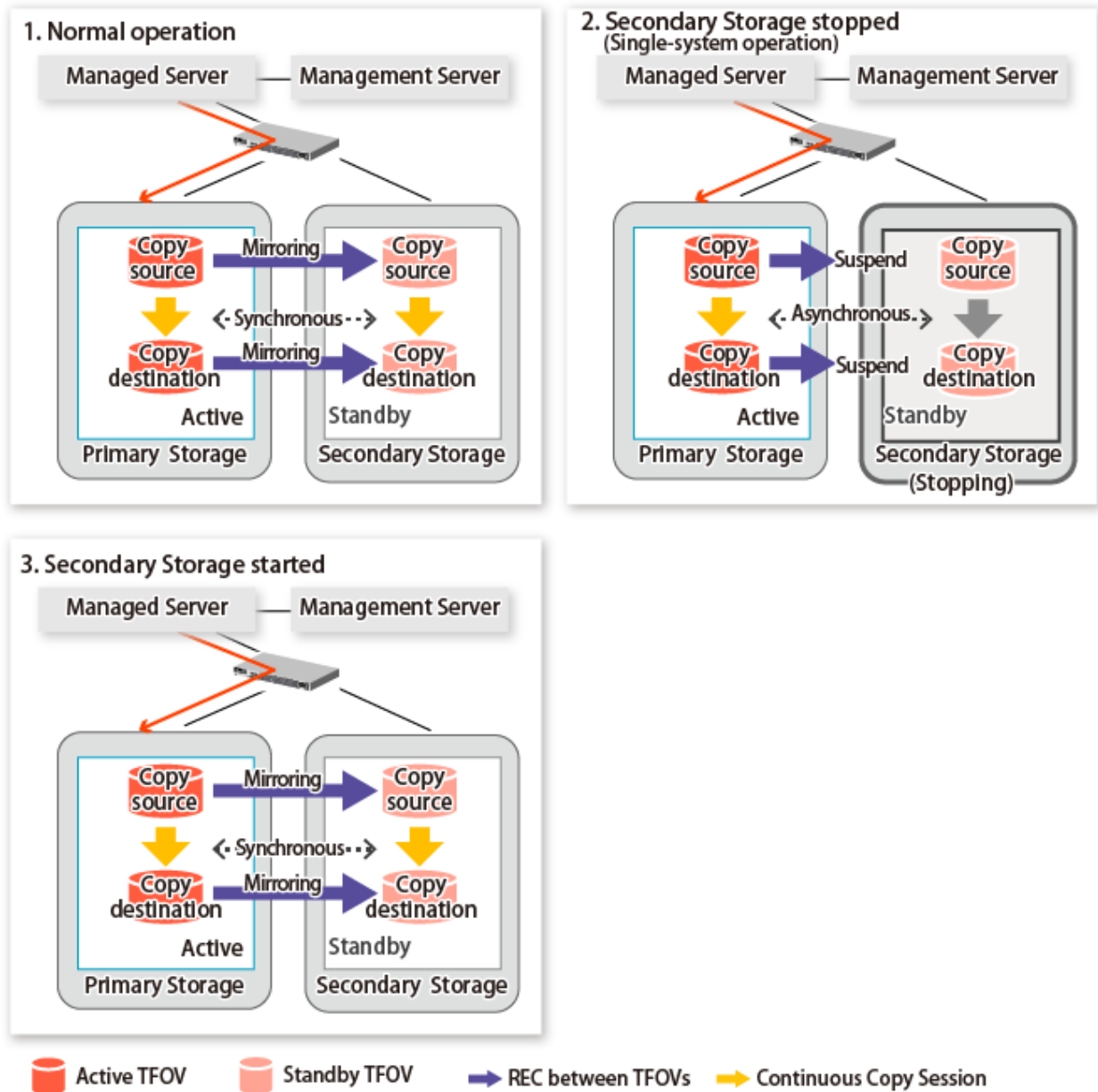


Figure 12.13 When Secondary Storage Is Stopped

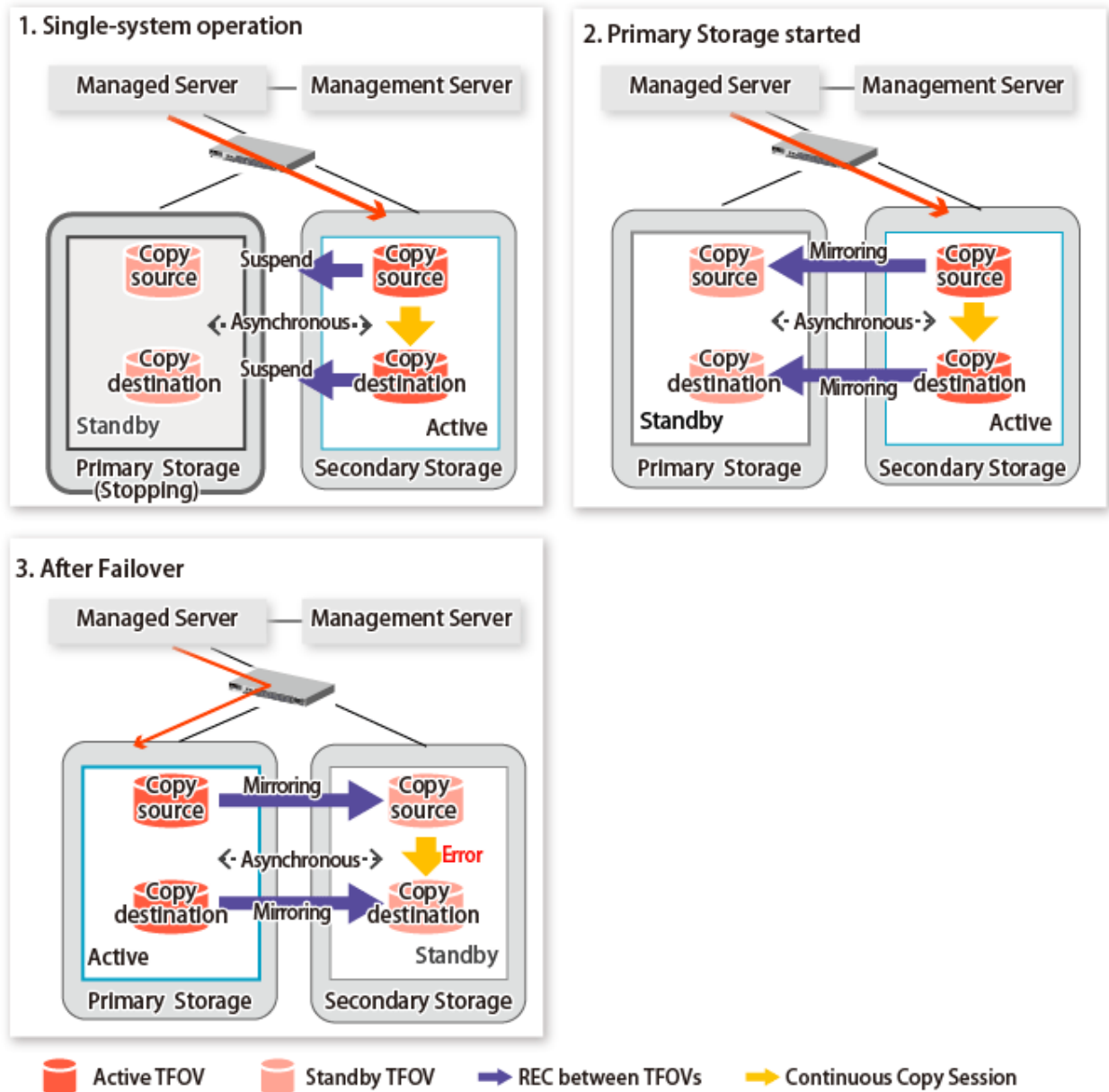


Point

- This command starts or stops copying while one side is operating and terminates normally, but there may be times when the swsrp2882 message is output. No measures need to be taken in regard to the swsrp2882 message.
- Even after the stopped ETERNUS Disk storage system is started, it may not be possible to synchronize the Primary Storage and Secondary Storage sessions. In addition, if a failover or a failback is performed in a state where a session is only on either the Primary Storage or the Secondary Storage, the session transitions to an Error Suspend state. For

this reason, refer to "12.12 When Recovering Storage Cluster Continuous Copy Function" and check that the status of the Primary Storage and the Secondary Storage are the same.

Figure 12.14 When Failback Is Carried Out in State Where There Are Only Sessions on Storage Where TFO Status Is "Active"



12.11.1 Recovery from Hardware Failure

This shows the state transition, with the Storage Cluster Continuous Copy function, where either of the Primary Storage or Secondary Storage volumes have a hardware failure.

Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* for details about the recovery procedure.

When using the Storage Cluster Continuous Copy function, Advanced Copy operation can continue with only a single storage device in the following cases. Stop only the Error Suspend state session that exists within the storage device where failure occurred.

- Hardware failure occurred on the Primary Storage and Automatic Failover was performed
- Hardware failure occurred on the storage device where the TFO status is "Standby"

For cases other than those above, since Advanced Copy cannot continue on a storage device where the TFO status is "Standby" only, the Primary Storage and Secondary Storage session states transitions to Error Suspend. When sessions for both the Primary Storage and Secondary Storage have transitioned to Error Suspend, stop both sessions.

Note

- If a TFO pairing is canceled while recovering from a hardware failure such as a RAID failure and RAID close, since the TFOV between the Primary Storage and Secondary Storage is not synchronized, the following commands cannot be executed until the TFO pairing is restored:
 - `swsrpstartsync` command
 - `swsrpmake` command
 - `swsrprevsync` command

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed, either:

- `swsrpstat` command
- `swsrpcancel` command

Back up the copy source volume before cancelling the TFO pairing as required.

- In a storage device where the TFO status is "Active", if there are bad sectors in the copy source logical volume, and if **Status** of the **Volume** tab on the **TFO Group Detail** screen in Web Console is other than "Active", recovering the data according to the usage state of the copy source logical volume is required. Perform recovery by following the steps outlined below.
 1. Use ETERNUS Web GUI to check the Advanced Copy status and the copy process error codes.
 - a. On the **Display status** menu, click **Advanced Copy status display** in the status display.
 - b. At "Session status", click the "Number of active sessions" link for the relevant copy type.
 - c. Refer to the value in the "**Error code**" column of the relevant copy process.
 2. Refer to "Maintenance" in "Storage Cluster Function" in the *Storage Cruiser Operation Guide* and recover the Storage Cluster environment. After that, recover the bad sector.
 3. Recover data according to the error code checked in step 1.
 - For "0xBA":
Recover data from the copy destination logical volume.
 - Other than "0xBA":
Contact Fujitsu Technical Support.
-

Figure 12.15 When Automatic Failover Is Performed Due to Hardware Failure Occurring on Primary Storage Where TFO Status Is "Active"

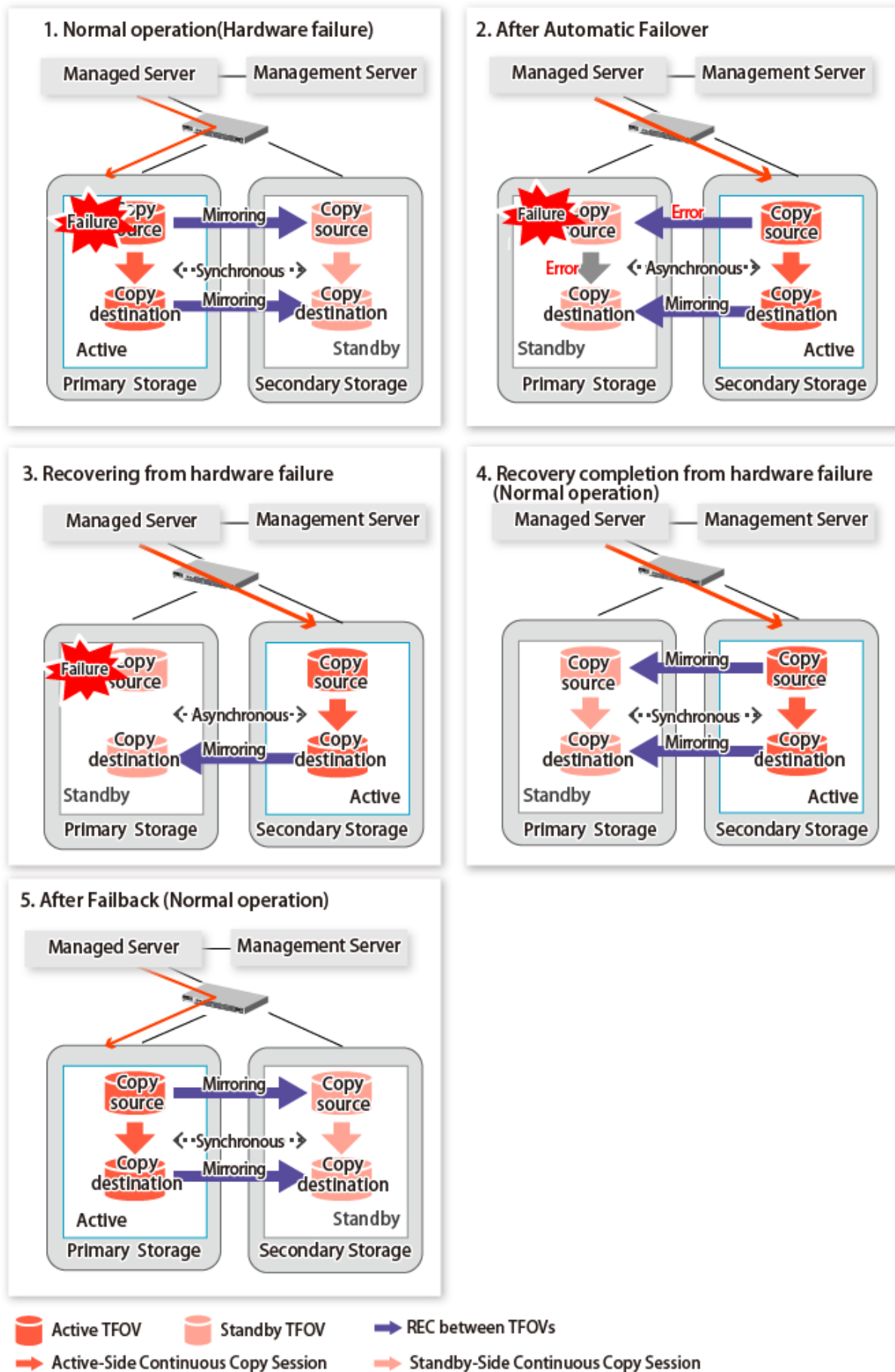


Figure 12.16 When Manual Failover Is Performed Due to Hardware Failure Occuring on Storage Device Where TFO Status Is "Active"

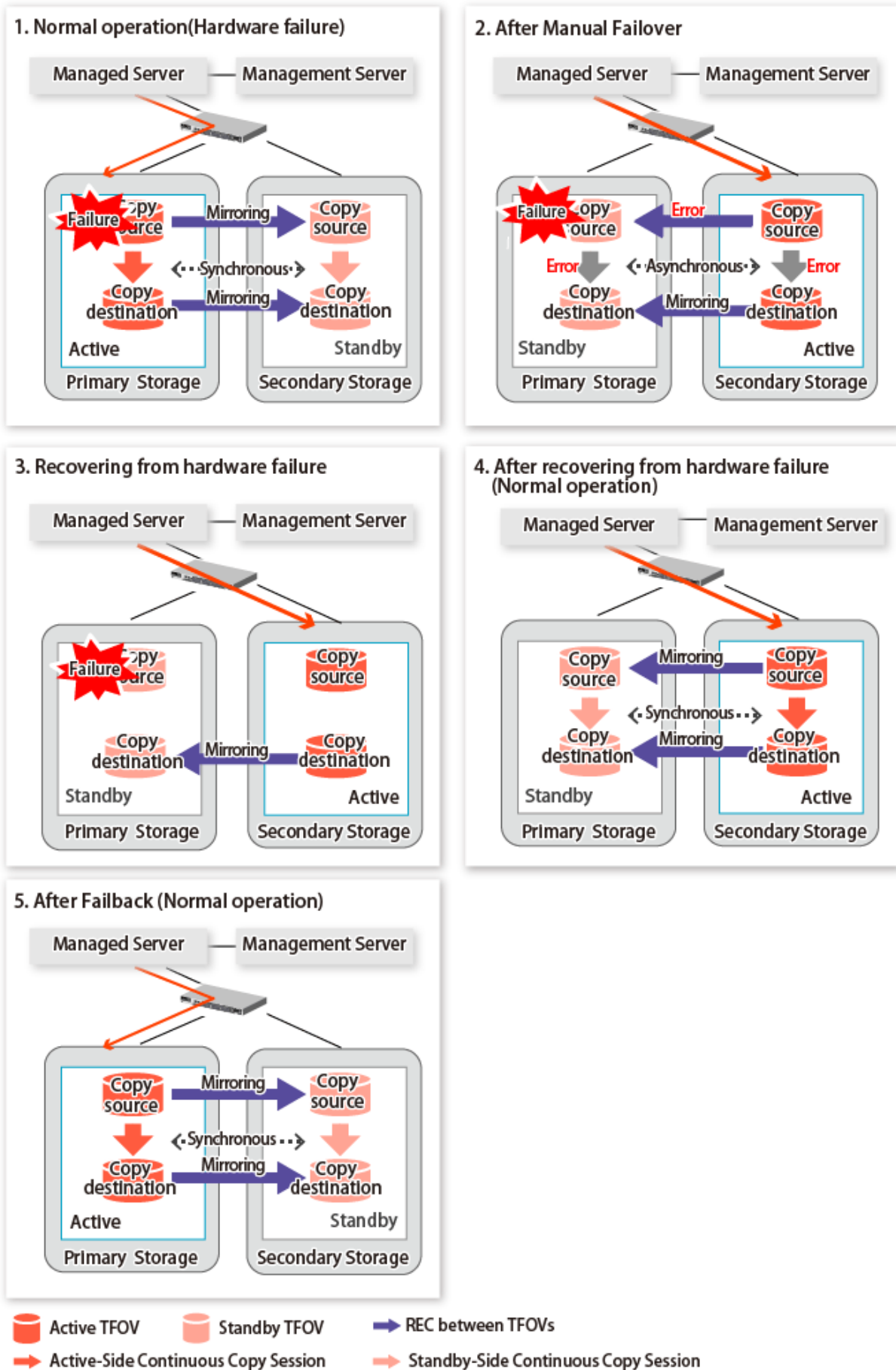
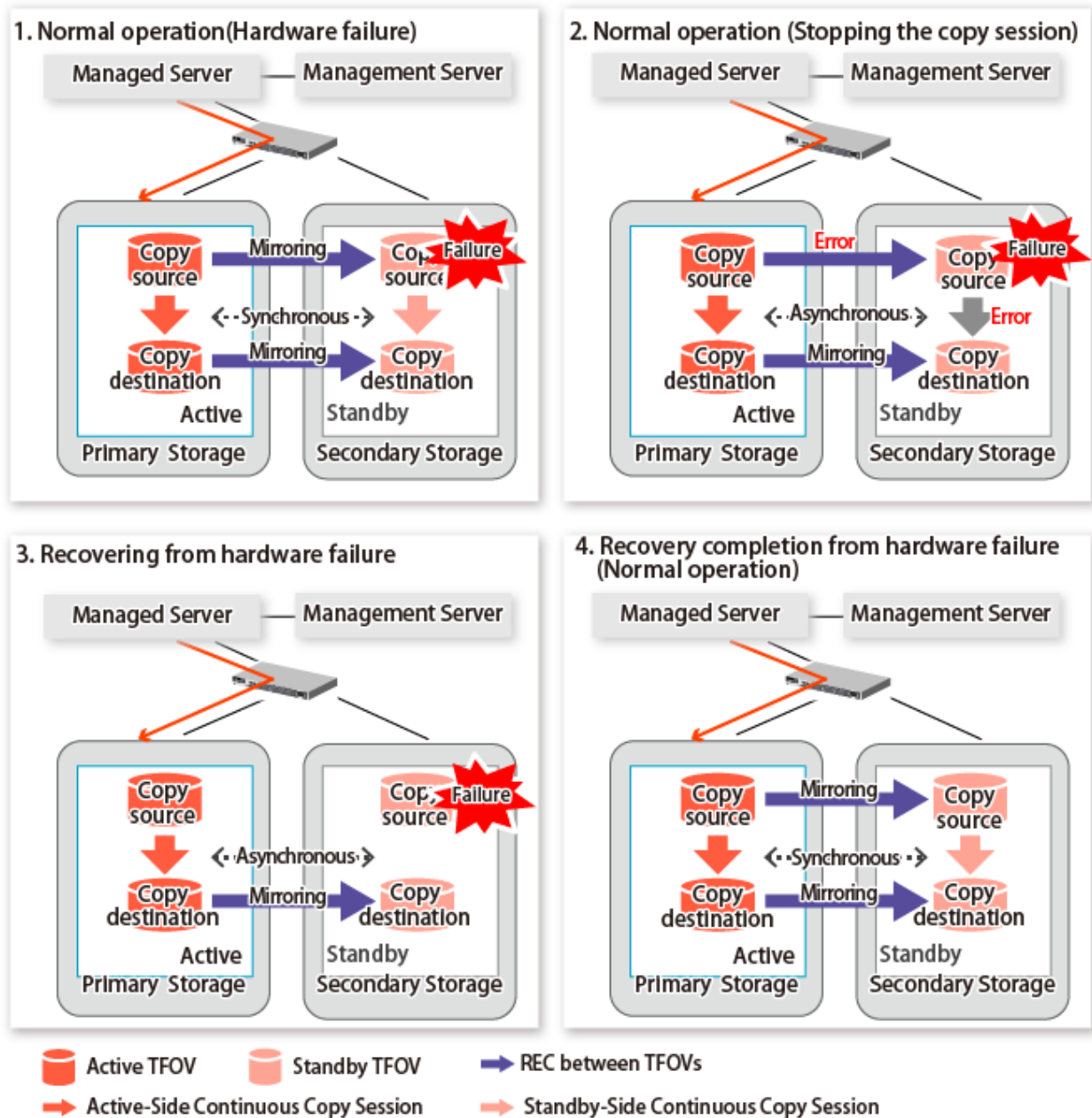


Figure 12.17 Hardware Failure Occurred on Storage Device Where TFO Status Is "Standby"



12.12 When Recovering Storage Cluster Continuous Copy Function

In a state where either the Primary Storage or Secondary Storage is stopped, if the copy is started or stopped, there may be times when the Primary Storage or Secondary Storage sessions are not synchronized.

Take measures after confirming the Advanced Copy status and the Storage Cluster Continuous Copy Session status. The methods for confirming and dealing with the Advanced Copy status and the Storage Cluster Continuous Copy Session status are shown below.

Point

- In the case of the replication management function commands, this operation cannot be executed in relation to storage where the TFO status is "Standby". For this reason, when performing operations on the storage where the TFO status is "Standby", use the commands of the AdvancedCopy Manager Copy Control Module function.

- If the command is executed in a state where the session of the Primary Storage and the Secondary Storage are not synchronized, the swsrp0740 message (error code: 103) may be output. If this message is output, after forcibly stopping the copy with one of the following methods, then take action with "Table 12.1 Corrective Action":
 - For using command
Specify the storage device where the TFO status is "Standby" with the -a option and forcible cancel the copy by the accopy fcancel command. Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the command.
 - For using Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*, and forcible cancel the copy.



Advanced Copy status and Standby-Side Continuous Copy Session status

1. Confirm the status of the Standby-Side Continuous Copy Session.
 - When checking by command
Check using the [swsrpstat](#) command.
The Standby-Side Continuous Copy Session status can be confirmed from the **Standby-Session** column.
 - When confirming from Web Console
Refer to "Create/Display/Change/Delete Replication Group" in the *Web Console Guide*, and display the replication group. The Standby-Side Continuous Copy Session status can be confirmed from the **Storage Cluster Standby Copy Session** column.
2. Confirm the status of the Active-Side Continuous Copy Session from the storage device where the TFO status is "Standby".
 - When checking by command
Check using the accopy query command. Refer to "Command References" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the command.
Specify the storage device where the TFO status is "Standby" with the -a option and execute the command. The Active-Side Continuous Copy Session status can be confirmed from the **TFO Info** column displayed when specifying the -tfoinfo option.
Refer to "When Recovering Storage Cluster Continuous Copy Function" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* for details.
 - When confirming from Web Console
Refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" in the *Web Console Guide*, and display the Copy Session. Active-Side Continuous Copy Session status can be confirmed from the **Storage Cluster/Session Status** column.

Countermeasures

Countermeasures are shown below.

Table 12.1 Corrective Action

AdvancedCopy Status of Storage Where TFO Status Is "Active"	Continuous Copy Session Status	Action
- readying - snap	When the Standby-Session column for the swsrpstat command, or the Storage Cluster Standby copy session column for Web Console is "not-exist".	Execute the swsrpmake command. When taking measures on Web Console, refer to "Start OPC/QuickOPC/SnapOPC/SnapOPC+" in the <i>Web Console Guide</i> , and start the copy.
- sync - equivalent	When the Standby-Session column for the swsrpstat command, or the	1. Execute the swsrpmake command to temporarily suspend EC (Suspend).

AdvancedCopy Status of Storage Where TFO Status Is "Active"	Continuous Copy Session Status	Action
	Storage Cluster Standby copy session column for Web Console is "not-exist".	2. Execute the swsrpstartsync command to resume EC. When taking measures on Web Console, refer to "Suspend EC" and "Start/Resume EC" in the <i>Web Console Guide</i> , and to temporarily suspend/resume copying.
replicated	When the Standby-Session column for the swsrpstat command, or Storage Cluster Standby copy session column for Web Console is "not-exist".	1. Execute the swsrpstartsync command to resume EC. 2. Execute the swsrpmake command to temporarily suspend EC (Suspend). When taking measures on Web Console, refer to "Start/Resume EC" and "Suspend EC" in the <i>Web Console Guide</i> , and to temporarily resume /suspend copying.
failed	When the Standby-Session column for the swsrpstat command, or Storage Cluster Standby copy session column for Web Console is "not-exist".	1. Execute the swsrpcancel command, and stop the copy. 2. Execute the swsrpmake command or the swsrpstartsync command, and start the copy. When taking measures on Web Console, refer to "Stop OPC/QuickOPC/SnapOPC/SnapOPC+" and "Start OPC/QuickOPC/SnapOPC/SnapOPC+", or "Stop EC" and "Start/Resume EC" in the <i>Web Console Guide</i> , and to temporarily stop/resume copying.
----	When the TFO Info column for the accopy query command, or the Storage Cluster/Session Status column for Web Console is "unpaired".	1. Specify the storage device where the TFO status is "Standby" with the -a option and forcibly cancel the copy sessions with the accopy fcancel command. Refer to "Command References" in the <i>AdvancedCopy Manager Operation Guide for Copy Control Module</i> for information on the command. 2. Execute the swsrpmake command or the swsrpstartsync command, start the copy. When taking measures on Web Console, refer to "Display/Forcible Suspend/Forcible Cancel Copy Session" and "Start OPC/QuickOPC/SnapOPC/SnapOPC+", or "Start/Resume EC" in the <i>Web Console Guide</i> , and to temporarily forcible cancel/resume copying.

12.13 When Changing Configurations/Settings

This section describes the procedure for changing the configuration of the replication operation and the setting of the replication volume information using the Storage Cluster Continuous Copy function.

The procedure for configuration and setting is the same as a non-TFOV. Refer to "[7.6 Changing Configuration Information](#)".

12.13.1 Deleting Storage Cluster Environment

When deleting the Storage Cluster environment, delete the replication volume settings for the replication operation.

Refer to "7.6.2 Deleting Source Volume or Replica Volume" for the deletion procedure of the replication volume information.

12.13.2 When Changing Storage Cluster Target Volume

When changing the logical volume number for the replication source/destination volume of the Primary Storage replication source/destination volume, configure the replication source/destination volume after deleting the reproduction information.

The procedure for changing the source/destination volume settings is as follows:

1. Deleting the source volume or replica volume
Delete the replication volume information by the `swsrpdelvol` command.
2. Fetching Device Information on Managed Server
Refer to "Fetching Device Information on Managed Server" in "12.4 Preparations", and update the device information.
3. Setting up the source volumes and replica volumes
Refer to "Configuring Source Volume and Replica Volume" in "12.4 Preparations", and reset the source volume and replica volumes.

12.14 Cascade Copies

This section describes cascade copy when using the Storage Cluster Continuous Copy function.

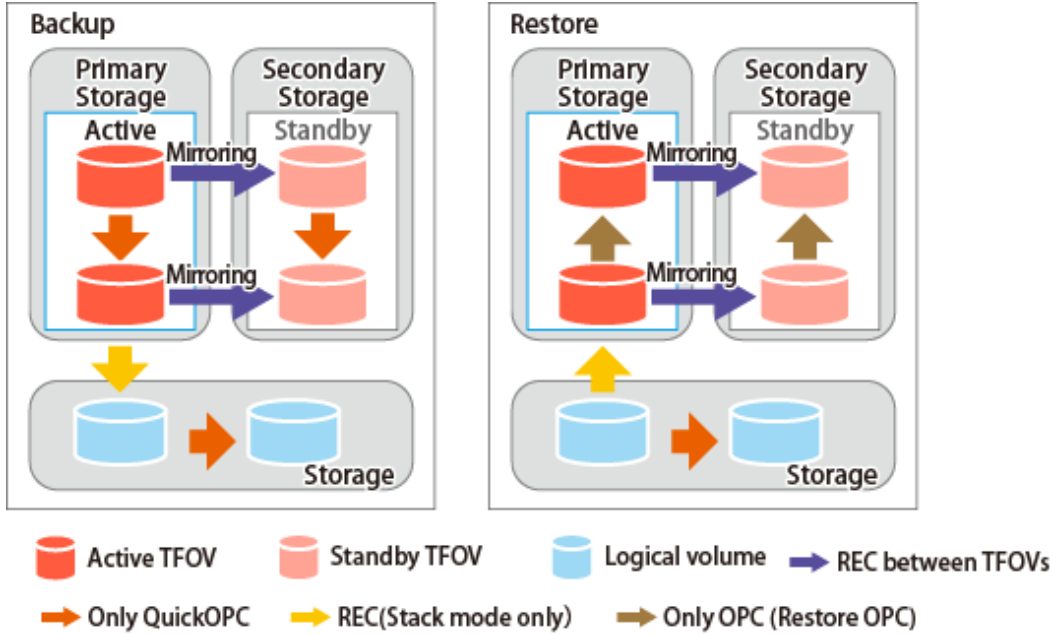
A cascade copy links the copy destination to the processing of another copy as a copy source. Refer to the ETERNUS Disk storage system manuals for details about the cascade copies.

Using cascade copy, it is possible to broaden application scenarios, such as backups that combine duplication to remote areas and sub-center side backups. When using the Storage Cluster Continuous Copy function, configuring cascade copies to different boxes as the backup target are supported. In this way, it can be operated as a secondary backup.

Point

- Use QuickOPC for intra-box copy.
- Use AdvancedCopy Manager Copy Control Module for REC. Refer to the *AdvancedCopy Manager Operation Guide for Copy Control Module* for details. Use Stack mode for the data transfer mode in REC.
- Cascade copy (QuickOPC) can be performed with the REC target as the copy source.

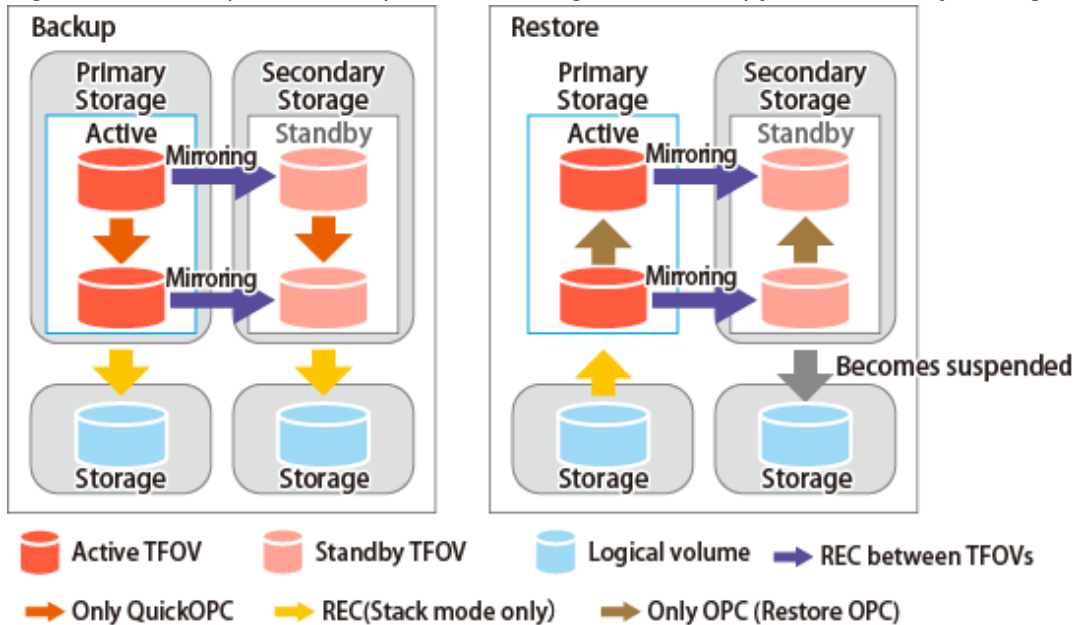
Figure 12.18 Example of Backup/Restore Using Cascade Copy on Primary Storage



Point

- Cascade copy can be performed from the Secondary Storage via REC. When restoring, put the REC for the storage device where the TFO status is "Standby" into suspend state, and then perform REC.

Figure 12.19 Example of Backup/Restore Using Cascade Copy on Secondary Storage



Chapter 13 Operation Maintenance

This chapter provides information on how to maintain a database, perform troubleshooting, and change the operation information.

13.1 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 13.1 Databases on Management Server

Type	When Backup to Be Created	Backup Method (References)	Size
Database	The configuration information has changed as a result of adding a Managed Server or loading of new device information, or changing the Management Server information (server name, IP address, or port number). In addition, information on the backup management operation or the replication management operation has changed.	"13.1.1.4.1 Backing up Database"	Refer to "13.1.1.4.1 Backing up Database".
Registry	The installation of the manager program has been performed on a Management Server (a Management Server transaction has been created in a clustered system), or Management Server information (server name, IP address, or port number) has changed.	"13.1.1.5.1 Backing Up Registry" or "13.1.2 Making Package Backup of Databases"	Refer to "13.1.1.5.1 Backing Up Registry".

Table 13.2 Databases on Managed Server

Type	When 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.	"13.1.1.5.1 Backing Up Registry" or "13.1.2 Making Package Backup of Databases"	Refer to "13.1.1.5.1 Backing Up Registry".
Backup management list	A backup transaction has been completed or information on the backup management operation has changed.	"13.1.1.1.1 Backing Up Backup Management List and Recovery Control File" or "13.1.2 Making Package Backup of Databases"	Refer to "13.1.1.1.1 Backing Up Backup Management List and Recovery Control File".

Type	When Backup to Be Created	Backup Method (References)	Size
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 "13.1.2 Making Package Backup of Databases"	Check the size of the pre-processing and post-processing script file for backup management.
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 "13.1.2 Making 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 "13.1.2 Making 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 "13.1.2 Making Package Backup of Databases"	Check the size of the file to be backed up.
Replication management list	Information on the replication management operation has changed.	"13.1.1.2.1 Backing up Replication Management List" or "13.1.2 Making Package Backup of Databases"	Refer to "13.1.1.2.1 Backing up 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 "13.1.2 Making 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 "13.1.2 Making 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 "13.1.2 Making 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 "13.1.2 Making 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.	"13.1.1.6.1 Backing Up Symfoware Database Information File"	Check the size of the file to be backed up.

Type	When Backup to Be Created	Backup Method (References)	Size
Target directory for output of the recovery control file	The backup has been performed for Symfoware backup server operation.	"13.1.1.7.1 Backing Up Target Directory for Output of Recovery Control File"	Check the size of the file to be backed up.

Point

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.

Note

- 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.

13.1.1 Making Individual Backups of Databases

13.1.1.1 Maintaining 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.

13.1.1.1.1 Backing Up Backup Management List and Recovery Control File

Execute the `swstresback` command to back up a backup management list and a recovery control file created at the time of backing up the Symfoware database spaces.

Backup Data Size of Backup Management List

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 size of files under the directory for output of the recovery control file.

Point

When you execute the `swstresback` 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 the `swstresback` command executes backup in the state holding the data saved before.

13.1.1.1.2 Restoring Backup Management List and Recovery Control File

Execute the `swstresrst` command to restore a backup management list and a recovery control file created at the time of backing up the Symfoware database spaces.

13.1.1.2 Maintaining Replication Management List

This section describes the maintenance of a replication management list.

13.1.1.2.1 Backing up 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 "[13.1.1.4.1 Backing up Database](#)" of the Management Server.



- 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 the `swsrpsetvol` or `swsrpdelvol` command.

13.1.1.2.2 Restoring 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 "[13.1.1.4.2 Restoring Database](#)" of the Management Server.
2. On the Managed Server, execute the `swsrprecoverres` command with the `-r` option.



- 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.

13.1.1.3 Maintaining 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.

13.1.1.3.1 Backing Up 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
```

13.1.1.3.2 Restoring VSS Backup Management List

For restoring the VSS backup management list, copy the files that you copied according to "[13.1.1.3.1 Backing Up VSS Backup Management List](#)" back to below directory.

```
<Environment directory>\etc\repl\data\vrq
```

13.1.1.4 Maintaining Database

This section describes the maintenance of a database used by a Management Server.

13.1.1.4.1 Backing up Database

Backup Data Size of Database

Calculate the size using the following formula:

```
60 + <Number of devices to be managed> * 0.001 megabytes
```

Note

- Do not use Telnet server service, as it does not work properly.
- When the Management Server is in cluster operation, you should prepare directories into which data is saved on shared disks.

Refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

13.1.1.4.2 Restoring Database

Note

- Do not use Telnet server service, as it does not work properly.
- When the Management Server is in cluster operation, note the following points:
When carrying out this process, first make sure that it is possible to use the shared disk for the AdvancedCopy Manager repository and the shared disk for AdvancedCopy Manager shared data.

Refer to "[13.7.2.2 Restore of Common Control and AdvancedCopy Manager Repository](#)" to restore the ETERNUS SF Manager database.

13.1.1.5 Maintaining Registry

This section describes the maintenance of a registry. Perform this procedure on a Management Server or a Managed Server.

13.1.1.5.1 Backing Up Registry

In a command prompt window, back up the following files using the copy command, etc.

File Names

- For non-clustered systems

```
<Environment directory>\etc\swnode.ini  
<Environment directory>\etc\device.ini
```

- For clustered systems

```
<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\  

```

Backup Data Size of Registry

Check the size of the file to be backed up.

13.1.1.5.2 Restoring Registry

In a command prompt window, use the copy command or another method to restore the following files.

File Names

- For non-clustered systems

```
<Environment directory>\etc\swnode.ini  
<Environment directory>\etc\device.ini  

```

- For clustered systems

```
<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\  

```

13.1.1.6 Maintaining Symfoware Database Information File

This section describes the maintenance of Symfoware database information file.

13.1.1.6.1 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  

```

13.1.1.6.2 Restoring Symfoware Database Information File

Restore Symfoware database information file used for Symfoware backup server operation.

Copy the file backed up in "[13.1.1.6.1 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  

```

13.1.1.7 Maintaining Target Directory for Output of Recovery Control File

This section describes the maintenance of a target directory for output of the recovery control file.

13.1.1.7.1 Backing Up Target Directory for Output of 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
```

13.1.1.7.2 Restoring Target Directory for Output of 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 "[13.1.1.7.1 Backing Up Target Directory for Output of 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
```

13.1.2 Making Package Backup of Databases

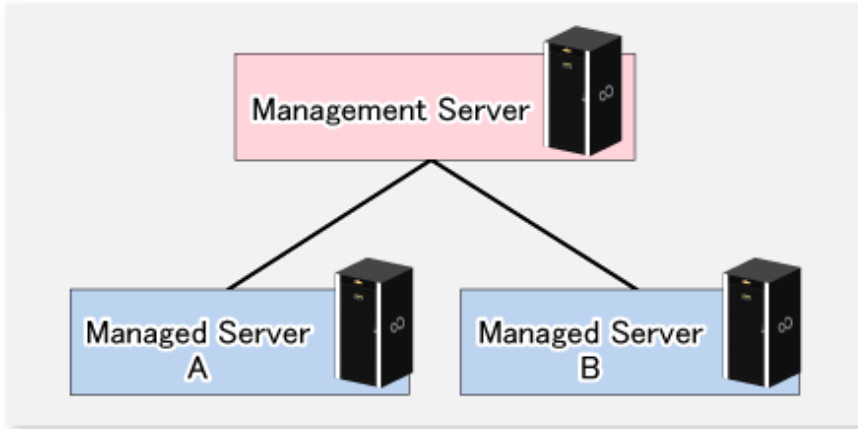
This section describes the function of making a backup of management information (e.g., databases) from just one Managed Server or Management Server.

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) 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".

 Example

Figure 13.1 Management Server and Managed Server



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 13.3 Types of Management Information Backed Up by Package Backup of Management Information

Function	Type of Data
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

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".

13.1.2.1 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 stores 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 Database" in the *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 Database" in the *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 Database" in the *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 Database" in the *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 Database" in the *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 `stgmgrinfo` 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 13.4 Management Information Package Backup Execution Server and Policy File Paths

Management Information Package Backup Execution Server		Policy File Path
OS Type	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/logicalNodeName/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 13.5 Policy File Format

Section Name	Key Name	Description(*)
Server name	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.
	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.

Specifiable only when the applicable function is operating on the server (Management Server or Managed Server).

*: 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 backup management.
- The Managed Server named ACMAGT1 creates backups for backup management.
- The Managed Server named ACMAGT2 creates backups for replication management.

```
[ACMMGR]
BkupData=Yes
[ACMAGT1]
BkupData=Yes
[ACMAGT2]
ReplData=Yes
```


Note

- Create a policy file only if it is used.
- The policy file cannot include any settings for backups of registries and of the policy file for management information package backup.

13.1.2.2 Backup Operations

Executing the `stmgrinfobkup` command on the management information package backup execution server stores the backup data in the directory under the following structure.

After the `stmgrinfobkup` command is executed, refer to "13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository" to back up the ETERNUS SF Manager database.

Table 13.6 Directory Structure for Execution of Management Information Package Backup and Data Types

Directory		Data Type		
*1	Server name	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 the `stmgrinfoaset` 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 the `stmgrinfobkup` command on the management information package backup execution server to make backups of the registries on all of the Managed Server.
2. Execute the `stmgrinfobkup` command on the management information package backup execution server to make a backup of the policy file.

3. Refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

Normal-use Operations

Execute the [stgmgrinfobkup](#) command on the management information package backup execution server when you need to make backups of the target data.

Afterwards, refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

For the timing of the backups, refer to "Maintaining Database" in the *AdvancedCopy Manager Operation Guide* for the applicable operating system.

Operations When 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 the [stgmgrinfobkup](#) command on the management information package backup execution server to make a backup of the registry of the added Managed Server.
3. Execute the [stgmgrinfobkup](#) command on the management information package backup execution server to make a backup of the policy file.
4. Refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

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 the [stgmgrinfobkup](#) command on the management information package backup execution server to make a backup of the policy file.
4. Refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

Operations When 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 the [stgmgrinfobkup](#) command on the management information package backup execution server to make a backup of the registry of the renamed Managed Server.
5. Execute the [stgmgrinfobkup](#) command on the management information package backup execution server to make a backup of the policy file.
6. Refer to "[13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository](#)" to back up the ETERNUS SF Manager database.

13.1.2.3 Restoration Operations

This section describes how to use the backup data created by the `stgmgrinfobkup` command and "13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository" to execute restoration.

Perform the operations below as a root user or with an account that belongs to the Administrators group.

Restoring Registry

1. Execute the `stgmgrinfo` 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:

- For Windows environments

```
<Directory-determined-in-step1>\<server-whose-registry-to-be-restored>\RegiData
```

- For Solaris, Linux, HP-UX or AIX environments

```
<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 Registry" in the *AdvancedCopy Manager Operation Guide* for the operating system running on the target server.

Restoring Database

Refer to "13.7.2.2 Restore of Common Control and AdvancedCopy Manager Repository" to restore the ETERNUS SF Manager database on the Management Server.

Restoring Replication Management List

1. Perform the procedure of "Restoring Database" to restore a database.

If you have performed it, this step is not needed.

2. On the target server, execute the `swsrprecoverres` command with the `-r` option.

For details on the command, refer to "swsrprecoverres (Resource Adjustment Command)" in the *AdvancedCopy Manager Operation Guide* for the operating system running on the target server.

Restoring Backup Management List, or Backup Management List and Recovery Control File

1. Execute the `stgmgrinfo` 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:

- For Windows environments

```
<Directory-determined-in-step1>\<server-whose-list/file-to-be-restored>\BkupData\FJSVswsts
```

- For Solaris, Linux, HP-UX or AIX environments

```
<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 *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 Backup Management List and Recovery Control File" in the *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 Backup Management Pre-processing/Post-processing Scripts

1. Execute the [stgmgrinfo](#) 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:
 - For Windows environments

`<Directory-determined-in-step1>\<server-whose-scripts-to-be-restored>\BkupData\Scripts`
 - For Solaris, Linux, HP-UX or AIX environments

`<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 are 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 of Backup and Restoration" in the *AdvancedCopy Manager Operation Guide* for the operating system running on the target server.
5. On a Solaris/Linux/HP-UX/AIX-version server, change the access permission assigned to the pre-processing and post-processing scripts for backup management copied in step 4 on the target server by using the chmod command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring Locking Specification Files for Backup Management

1. Execute the [stgmgrinfo](#) 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:
 - For Windows environments

`<Directory-determined-in-step1>\<server-whose-files-to-be-restored>\BkupData\data`
 - For Solaris, Linux, HP-UX or AIX environments

`<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 *AdvancedCopy Manager Operation Guide (for Windows)*.

Restoring Pre-processing and Post-processing Scripts for Replication Management

1. Execute the `stgmgrinfo` 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:

- For Windows environments

```
<Directory-determined-in-step1>\<server-whose-scripts-to-be-restored>\ReplData\Scripts
```

- For Solaris, Linux, HP-UX or AIX environments

```
<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 are 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 *AdvancedCopy Manager Operation Guide* for the operating system running on the target server.
5. On a Solaris/Linux/HP-UX/AIX server, change the access permission assigned to the pre-processing and post-processing scripts copied in step 4 on the target server by using the `chmod` command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring Locking Specification Files for Replication Management

1. Execute the `stgmgrinfo` 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:

- For Windows environments

```
<Directory-determined-in-step1>\<server-whose-files-to-be-restored>\ReplData\data
```

- For Solaris, Linux, HP-UX or AIX environments

```
<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 *AdvancedCopy Manager Operation Guide (for Windows)*.

Restoring Policy File for Management Information Package Backup

1. Execute the `stgmgrinfo` 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:

- For Windows environments

```
<Directory-determined-in-step1>\<server-whose-file-to-be-restored>\MgrInfoData
```

- For Solaris, Linux, HP-UX or AIX environments

```
<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 "13.1.2.1 Preliminaries".

13.2 Troubleshooting

13.2.1 Collecting Troubleshooting Information

13.2.1.1 Collecting Error Survey Information

Collecting Error Survey Information on 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 the [esfsnap](#) command.

When using Web Console, refer to "Collecting Troubleshooting Information" in the *Web Console Guide*.

Send the collected error survey information to Fujitsu Technical Support.

Collecting Error Survey Information on Managed Server

Login to the Managed Server and execute the [acmcapture](#) command on each server.

Send the collected error survey information to Fujitsu Technical Support.



.....
If VSSHP (ETERNUS VSS Hardware Provider) is used for backing up the Exchange Server database, refer to "How to Obtain Error Information" in the *ETERNUS VSS Hardware Provider User's Guide*.
.....



- 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 the AdvancedCopy Manager's agent, the [acmcapture](#) 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 **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 any following Wizard, collect troubleshooting data for the Storage Cruiser's agent, too. Refer to "Collecting Information on Managed Server Node (Windows)" in "Information for Further Investigation" in the *Storage Cruiser Operation Guide* for how to collect troubleshooting data.
 - Backup Wizard for Exchange Server or Restore Wizard for Exchange Server
 - Backup Wizard for SQL Server or Restore Wizard for SQL Server
 - In a clustered system, execute the command to collect troubleshooting information on all the nodes making up the clustered system.
-

13.3 Troubleshooting: Hardware Error During Backup

This section describes the actions to perform if a hardware error, etc. occurs during a backup using AdvancedCopy Manager.

13.3.1 Overview

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

- The [swstbackstat](#) command displays "failed" or "?????" in the **Status** column.
- The [swstsyncstat](#) command displays "failed" or "?????" in the **Status** column.
- The [swstreststat](#) command displays "failed" or "?????" in the **Status** column.
- The [swsthistdisp](#) command displays "failed" or "?????" in the **Status** column.
- The [swstexecstat](#) command displays "sync(failed)", "snapshot(failed)", "restore(failed)", or "?????" in the **Status** column.
- The [swstrkstat](#) 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.

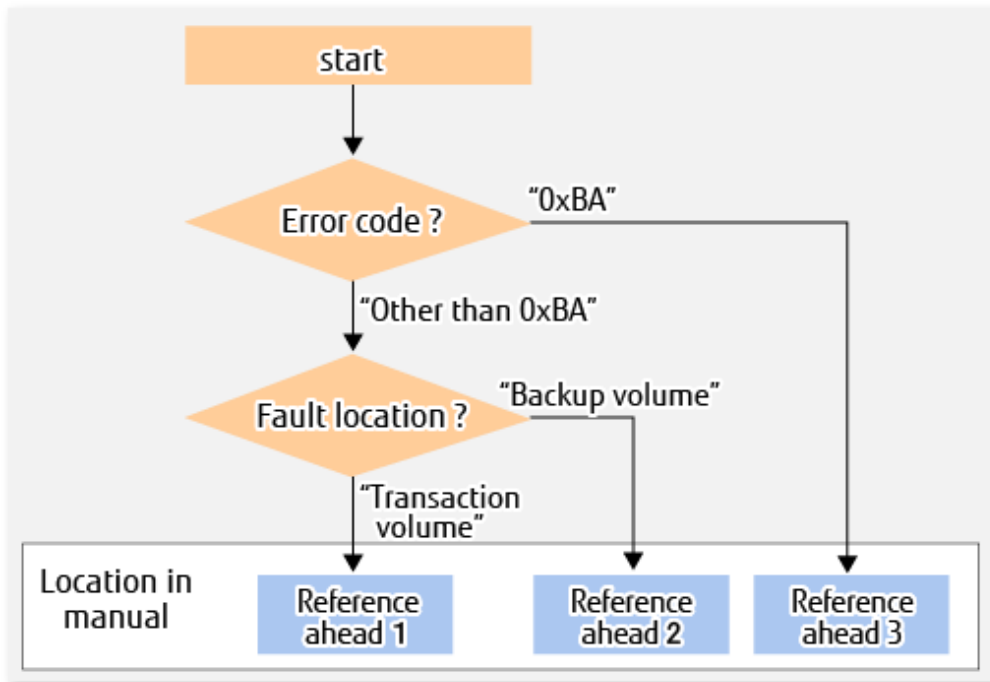
If the message swst0603, swst0634, swst0719, or swst0740 is displayed during command execution and the same error occurs even if the command is re-executed, a hardware error, etc. has occurred, causing Advanced Copy to fail.

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.

13.3.2 Troubleshooting

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

Figure 13.2 Troubleshooting Flow (for Faults During Backup)



Reference ahead 1: [13.3.2.1 Hardware Error on Transaction Volume](#)

Reference ahead 2: [13.3.2.2 Hardware Error on Backup Volume](#)

Reference ahead 3: [13.3.2.3 Troubleshooting If Bad Sector Occurred in Transaction Volume](#)

Note

- Refer to "[13.3.1 Overview](#)" for details about the **Status** column and "Fault location".

If the **Status** column is "?????", check if the copy processing is in the error suspend state ("failed") or the hardware suspend state ("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 "[15.1.6 Notes on Cluster Operation](#)".
- If there is anything unusual with Managed Server, switches, etc.:
Contact Fujitsu Technical Support.
- 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 13.7 Meanings of Error Codes

Error Code	Meaning
0xBA	<p>If a) or b) below applies, a bad sector was created in the transaction volume.</p> <p>a. QuickOPC has not yet performed physical copying and tracking is in progress</p> <p>b. EC is in the suspend status (replication established status)</p> <p>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 resume and prevents the backup volume from being overwritten with invalid transaction volume data.</p>
Other than 0xBA	An error other than the above occurred.

13.3.2.1 Hardware Error on 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](#)
 - If an error occurred during synchronous processing (EC): [swstcancelsync](#)
 - If an error occurred during restore (OPC) physical copy: [swstcancelrest](#)
 - If an error occurred during tracking processing (QuickOPC): [swstcanceltrk](#)
 2. Execute the execution status display commands ([swstbackstat](#), [swstsyncstat](#), [swstreststat](#), [swstrkstat](#) and [swsthistdisp](#)) to verify that no other errors have occurred.
 3. Fix the hardware error in the transaction volume.
 4. Execute the [swstrestore](#) command to restore the transaction volume.

13.3.2.2 Hardware Error on 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](#)
 - If an error occurred during synchronous processing (EC): [swstcancelsync](#)
 - If an error occurred during restoration (OPC) physical copy: [swstcancelrest](#)
 - If an error occurred during tracking processing (QuickOPC): [swstcanceltrk](#)

If the processing cannot be cancelled using one of the above commands, use ETERNUS Web GUI to cancel it.
2. Execute the [swstsrsemitch](#) command.
3. Cancel the processing in which the error occurred. At this point, the execution status display commands ([swstbackstat](#), [swstreststat](#) and [swsthistdisp](#)) 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](#)
 - If an error occurred during restoration (OPC) physical copy: [swstcancelrest](#)
4. Execute the execution status display commands ([swstbackstat](#), [swstsyncstat](#), [swstreststat](#), [swsttrkstat](#) and [swsthistdisp](#)) to verify that no other errors have occurred.
 5. Execute the [swstdevinforeset](#) command to delete the backup volume in which the error occurred.
 6. Execute the [swstdevinforeset](#) command to register a new backup volume. If the backup volume on which the error occurred is to be repaired and be reused, execute the [swstdevinforeset](#) command after executing the [stgxfwcmsetdev](#) command on the Management Server.
 7. Re-execute the processing in which the error occurred.

13.3.2.3 Troubleshooting If Bad Sector Occurred in 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](#)
 - If the bad sector occurred during QuickOPC tracking: [swstcanceltrk](#)
2. Execute the [swstbackstat](#), [swstsyncstat](#), [swstreststat](#), [swsttrkstat](#) and [swsthistdisp](#) commands 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:
Execute the [swstrestore](#) 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.)



The transaction volume cannot be restored by this method, if there is no backup history information.

13.4 Troubleshooting: 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.

13.4.1 Overview

If a hardware error, etc. occurs during the replication, the following symptoms are displayed:

- The [swsrpstat](#) 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:

- The [swsrpstat](#) command displays "halt" in the **Status** column.
- The message swsrp2648 is displayed during command execution.

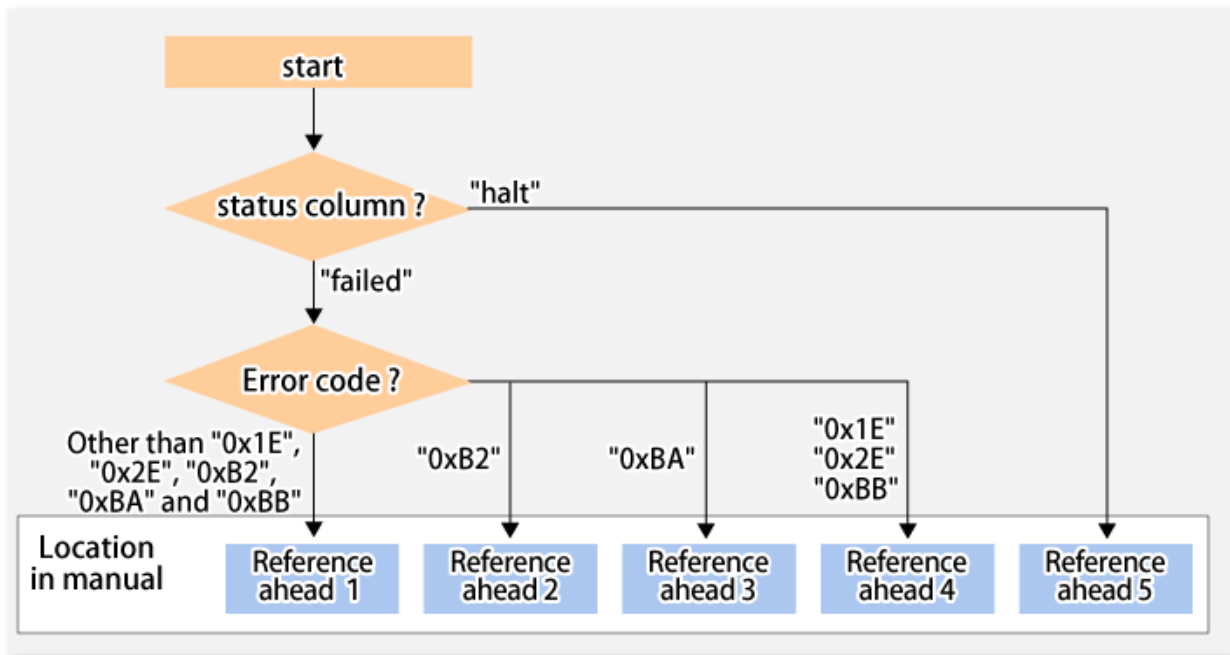
If the operation status display command displays "halt" in the **Status** column, and the message swsrp2648 is displayed during command execution, a hardware error has occurred during physical copying, and the remote copy processing may have failed.

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.

13.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure 13.3 Troubleshooting Flow (When Fault Occurs During Replication)



Reference ahead 1: [13.4.2.1 Hardware Error on Replication Volume](#)

Reference ahead 2: [12.12 When Recovering Storage Cluster Continuous Copy Function](#)

Reference ahead 3: [13.4.2.2 Troubleshooting If Bad Sector Occurred in Copy Source Volume](#)

Reference ahead 4: [13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)

Reference ahead 5: [13.4.2.4 Error \(halt\) on Remote Copy Processing](#)

Note

- Refer to "[13.4.1 Overview](#)" for details about the **Status** column and "Fault location".

If the **Status** column is "?????", check if the copy processing is in the error suspend state ("failed") or the hardware suspend state ("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 "[15.1.6 Notes on Cluster Operation](#)".
- If there is anything unusual with Managed Server, switches, etc.:
Contact Fujitsu Technical Support.
- Use ETERNUS Web GUI to check the error codes. Use the following two methods to check.
 - Checking with the `swsrpstat` 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 13.8 Meanings of Error Codes

Error Code	Meaning
0xB2	The Storage Cluster Continuous Copy Sessions of the Primary Storage and the Secondary Storage were not able to synchronize, and Advanced Copy was not able to continue.
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. <ol style="list-style-type: none"> a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) <p>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.</p>
0x1E, 0x2E, 0xBB	A lack of free space has occurred in the copy destination volume.
Other than above	An error other than the above occurred.

13.4.2.1 Hardware Error on Replication Volume

When a hardware error occurs in a duplicate volume, perform the repair work on the error according to the following procedures.

If the Storage Cluster Continuous Copy function is used, refer to "[12.11.1 Recovery from Hardware Failure](#)".

1. Execute the [swsrpcancel](#) 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.
If the processing cannot be cancelled by using the command, use ETERNUS Web GUI to cancel it.
2. Execute the [swsrprecoverres](#) command.
3. Execute the [swsrpstat](#) command to verify that no other errors have occurred.
4. Execute the [swsrpdelvol](#) command to delete the replication volume in which the error occurred.
5. Execute the [swsrpsetvol](#) command to register a new replication volume. If the replication volume on which the error occurred is to be repaired, execute the [swsrpsetvol](#) command after executing the [stgxfwcmsetdev](#) command on the Management Server.
6. Re-execute the processing in which the error occurred.

13.4.2.2 Troubleshooting If Bad Sector Occurred in Copy Source Volume

If a bad sector occurred in the copy source volume, use the following procedure to restore the copy source volume:

If the Storage Cluster Continuous Copy function is used, refer to "[12.11.1 Recovery from Hardware Failure](#)".

1. Execute the [swsrpcancel](#) 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 the [swsrpstat](#) 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:
Execute the [swsrpmake](#) 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.)

13.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume

Use the following procedure to recover the copy destination volume:

1. Execute the [swsrpcancel](#) command to cancel the copy session in which the error occurred.
If the cancellation is not possible from the operation server when an inter-server replication is being performed, cancel it from a non-operation server.
If the copy session cannot be cancelled using command, use ETERNUS Web GUI to cancel it.

2. Check the status of the copy destination volume and initialize it.

- If the copy destination volume is TPV

Use Storage Cruiser or ETERNUS Web GUI to check the status of the copy destination volume and initialize it. For the operation procedure when using Storage Cruiser, refer to "Display Volume" and "Delete Reserved Volume or Forcible Delete/Format Volume" in the *Web Console Guide*.

- If the copy destination volume is FTV

Use Storage Cruiser or ETERNUS Web GUI to check the status of the copy destination volume and initialize it. For the operation procedure when using Storage Cruiser, refer to "Display FTV" and "Format FTV" in the *Web Console Guide*.

- If the copy destination volume is SDV

Use Storage Cruiser, the [swstsdv](#) command, or ETERNUS Web GUI to check the status of the copy destination volume and initialize it.

For the operation procedure when using Storage Cruiser, refer to "Display Volume" and "Delete Reserved Volume or Forcible Delete/Format Volume" in the *Web Console Guide*.

The operation procedure when using the [swstsdv](#) command is as follows:

1. Execute the command with the "stat" subcommand and check the status of the SDV.
2. Execute the command with the "init" subcommand and initialize the SDV.

3. Recreate partitions (slices) in the copy destination volume.

The following factors may have caused a capacity shortage of the physical space in the copy destination volume:

- a. The estimate of the required physical space for the copy destination volume is not adequate.
- b. Although the estimate of the required physical space for the copy destination volume is adequate, because large amounts of updates have been performed in the copy destination volume in which the copy session does not exist, the physical space of the copy destination volume is being wasted.

When corresponding to the above "a", re-estimate the physical space required for the copy destination volume and consider the disk expansion.

- If the copy destination volume is TPV

Use Storage Cruiser or ETERNUS Web GUI to check the status of the Thin Provisioning pool and expand the capacity of the Thin Provisioning pool.

For the operation procedure when using Storage Cruiser, refer to "Display Thin Provisioning Pool" and "Expand Capacity of/Format/Change Threshold Value of/Delete Thin Provisioning Pool" in the *Web Console Guide*.

- If the copy destination volume is FTV

Use Storage Cruiser or ETERNUS Web GUI to check the status of the Tier pool and expand the sub-pool capacity of the Tier pool.

For the operation procedure when using Storage Cruiser, refer to "Display Tier Pool" and "Expand Capacity of Sub-Pool in Tier Pool" in the *Web Console Guide*.

- If the copy destination volume is SDV

Use the [swstsdv](#) command or ETERNUS Web GUI to check the status of the SDP and expand the SDP capacity.

Creating an exclusive volume named Snap Data Pool Volume (SDPV) enables the SDP and the created SDPV is automatically incorporated in the SDP. Creating an SDPV of the physical capacity that is assigned to a copy destination volume expands the SDP capacity.

The operation procedure when using the [swstsdv](#) command is as follows:

1. Execute the command with the "poolstat" subcommand and check the status of the SDP.
2. Create the SDPV with ETERNUS Web GUI.

13.4.2.4 Error (halt) on Remote Copy Processing

The REC restart (Resume) method varies, depending on the halt status.

Execute the [swsrpstat](#) 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 Automatic Recovery Mode

1. Remove the cause that made all paths close (halt).
2. ETERNUS Disk storage system automatically restarts (Resume) REC.

For Manual Recovery Mode

1. Remove the cause that made all paths close (halt).
2. Execute the [swsrpmake](#) 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. Execute the [swsrpstartsync](#) 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>
```

13.5 Changing 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.

Note

- If the [stgxfwcmmodsrv](#) command is used to change IP addresses, or similar.

Do not execute backup management commands or replication management commands at the Management Server that executes the [stgxfwcmmodsrv](#) command, nor at any of the Managed Servers managed by Management Server transactions, either before or during execution of [stgxfwcmmodsrv](#) command.

- If the [stgxfwcmmodsrv](#) 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 the [stgxfwcmmodsrv](#) 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.

13.5.1 Changing IP Address of Management Server

Change (including addition and deletion) the IP address of a Management Server as follows:

If only a physical IP address needs to be changed and the Management Server uses a logical IP address, then perform only steps 3 and 4. Otherwise, perform all steps.

1. On the Management Server, change the system IP address, and restart the Management Server
2. On the Management Server, create a server information change instruction file, and then execute the [stgxfwcmmodsrv](#) command with the -f option specified to change the IP address. When using the replication management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.
3. If the Storage Cruiser's agent has been installed on the Management Server implement the following procedures:
 1. Stop the Storage Cruiser's agent service.
 2. Change the starting IP address of the Storage Cruiser's agent.
 3. Start the Storage Cruiser's agent service.

Refer to "Starting and Stopping Agent" in the *Storage Cruiser Operation Guide* for information on how to start and stop the Storage Cruiser's agent. Refer to "setagtip (Agent Information Change Command)" in the *Storage Cruiser Operation Guide* for information on how to change the activation IP address of the Storage Cruiser's agent.

4. Refer to "Change Server Information" in the *Web Console Guide* and change the IP address information.
5. When the Storage Cruiser fault monitoring function is in use, change the SNMP Trap sending destination IP address of each device being monitored. Refer to "sanadmsh chtraprcvip (SNMP Trap Transmission Place IP Address Change Command)" in the *Storage Cruiser Operation Guide* for details.



See

For information about making the above change in a cluster operation, refer to "[13.5.6.1 Changing IP Address of Management Server Transaction](#)".



Note

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.

13.5.2 Changing IP Address of Managed Server

Change the IP address of a Managed Server as follows:

- When the Storage Cruiser's agent has been installed on a Managed Server
 1. On the target Managed Server, stop the services of AdvancedCopy Manager. For information on stopping services, refer to "[Chapter 2 Starting and Stopping Services](#)".
 2. On the target Managed Server, stop the Storage Cruiser's agent service. Refer to "Starting and Stopping Agent" in the *Storage Cruiser Operation Guide* for information on how to stop it.
 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](#)".
 5. Refer to "setagtip (Agent Information Change Command)" in the *Storage Cruiser Operation Guide* to change the Storage Cruiser agent's starting IP address.
 6. On the target Managed Server, start the Storage Cruiser's agent services. Refer to "Starting and Stopping Agent" in the *Storage Cruiser Operation Guide* for information on how to start it.
 7. Refer to "Change Server Information" in the *Web Console Guide* and change the IP address information.
- When the Storage Cruiser's agent has not been installed on the Managed Server
 1. On the target Managed Server, stop the services of AdvancedCopy Manager. For information on stopping services, refer to "[Chapter 2 Starting and Stopping Services](#)".
 2. On the target Managed Server, change the system IP address.
 3. On the target Managed Server, start the services of AdvancedCopy Manager. For information on stopping services, refer to "[Chapter 2 Starting and Stopping Services](#)".
 4. When AdvancedCopy Manager is being operated using Web Console, refer to "Change Server Information" in the *Web Console Guide* and change the IP address information. When AdvancedCopy Manager is being operated using only Command Line Interface, after creating a server information change instruction file with the Management Server, execute the `stgxfwcmmodsrv` command with the `-f` option and change the IP address. When using the replication management function, execute the `swsrprecoverres` command with the `-r` option and the `-h` option on the Management Server. Specify the server name of the Managed Server running the replication operation with the `-h` option.



See

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For information about performing the above change in cluster operation, refer to "[13.5.6.2 Changing IP Address of Managed Server Transaction](#)".
.....

13.5.3 Changing Port Number of Management Server or Managed Server

Change the port number of a Management Server or Managed Server as follows:

When changing port numbers for AdvancedCopy Manager communication services:

1. 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.
2. 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](#)".
3. On the Management Server, create a server information change instruction file, and then execute the `stgxfwcmmodsrv` command with the `-f` option specified to change the port number. When using the replication

management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.

4. Refer to "Reload Server Configuration Information" in the *Web Console Guide*, and reload the configuration information of the Management Server or Managed Server.

When changing port numbers for other than AdvancedCopy Manager communication services:

Refer to "Changing Port Numbers (Windows)" in the *Express Operation Guide*. Replace "Express" with "AdvancedCopy Manager" to read the manual.



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For information about performing the above change in cluster operation, refer to "[13.5.6.3 Changing Port Number of Management Server Transaction or Managed Server Transaction](#)".
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13.5.4 Changing Server Name of Management Server or Managed Server

Change the server name of a Management Server or Managed Server as follows:

1. 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.
2. On the Management Server, create a server information change instruction file, and then execute the [stgxfwcmmodsrv](#) command with the -f option specified to change the server name. When using the replication management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.
3. Refer to "Reload Server Configuration Information" in the *Web Console Guide* and reload the configuration information of the Management Server or Managed Server.



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For information about performing the above change in a cluster operation, refer to "[13.5.6.4 Changing Server Name of Management Server Transaction or Managed Server Transaction](#)".
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13.5.5 Changing Device Configuration

Changing the device configuration refers to any of the following:

- Changing the drive name and the mount point name
- Deleting a logical drive in the primary or extended partition
- Adding a primary partition, an extended partition, or a logical drive
- Changing the partition type (i.e., a primary partition or an extended partition)
- Changing the capacity of a logical drive in the primary partition or the extended partition
- Changing the start position of partitions of the logical drive in the primary partition or the extended partition
- Changing the box identifier (Box ID)
- Recreating LUs

Note

- 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 "[15.1.1.1 Size of Partition](#)" in "[15.1.1 General Notes](#)".

13.5.5.1 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 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 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 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 Operation Type for Device](#)", for details on adding the transaction volume or backup volume.

Point

If the device configuration is changed (in step 3 above) before the transaction and backup volumes are deleted (in steps 1 and 2), history information cannot be deleted, and synchronized backup processing cannot be cancelled. This could possibly prevent the deletion of the transaction and backup volumes.

In this case, set the emergency operation mode, and delete the history information or cancel synchronized backup processing.

For details about the emergency operation mode, refer to "[swsthistdel](#)" and "[swstcancelsync](#)".

13.5.5.2 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 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 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 Source Volume and Replica Volume](#)", for details about adding the replica volume.
5. Edit a drive letter map file.



.....

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 operation mode, and cancel replication processing. For details on the emergency operation mode, refer to "[swsrpcancel](#)".

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13.5.6 Changing Configuration in Cluster Operation

This section describes how to make a change to the operational configuration in cluster operation.

13.5.6.1 Changing IP Address of Management Server Transaction

Refer to "Changing IP Address for Management Server Transaction" in "Changing Operation Environment (for Windows)" in the *Cluster Environment Setup Guide*.

13.5.6.2 Changing IP Address of Managed Server Transaction

Change the IP address of a Managed Server transaction by performing the following steps:

1. Stop the Managed Server transaction.
For details on how to stop it, refer to the relevant cluster software manual.
2. Change the IP address resource.
For details on how to change an IP address resource, refer to the relevant cluster software manual.
3. Start the Managed Server transaction.
For details on how to start it up, refer to the relevant cluster software manual.
4. When AdvancedCopy Manager is being operated using Web Console, refer to "Change Server Information" in the *Web Console Guide* and change the IP address information. When AdvancedCopy Manager is being operated using only Command Line Interface, after creating a server information change instruction file with the Management Server, execute the [stgxfwcmmodsrv](#) command with the -f option and change the IP address. When using the replication management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.

13.5.6.3 Changing Port Number of Management Server Transaction or Managed Server Transaction

For changing the port number of Management Server transaction, refer to "Changing Port Number of Management Server Transactions" in "Changing Operation Environment (for Windows)" in the *Cluster Environment Setup Guide*.

Change the port number of a Managed Server transaction by performing the following steps:

1. Stop the Management Server transaction or Managed Server transaction.
For details on how to stop it, refer to the relevant cluster software manual.
2. On the primary node and secondary node of the target Managed Server transaction, change the port number of the AdvancedCopy Manager communication service ([stgxfws_logicalNodeName](#)) specified in the %SystemRoot%\system32\drivers\etc\services.
3. Start the targeted Managed Server transaction.
For details on how to start it up, refer to the relevant cluster software manual.
4. Create a server information change instruction file at the Management Server that manages the Managed Server. Then, execute the [stgxfwcmmodsrv](#) command with the -f option specified to change the port number. When using the replication management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.

5. Refer to "Reload Server Configuration Information" in the *Web Console Guide* and reload the configuration information of the Management Server or Managed Server.

13.5.6.4 Changing Server Name of Management Server Transaction or Managed Server Transaction

For changing the server name of Management Server transaction, refer to "Changing Server Name of Management Server Transaction" in "Changing Operation Environment (for Windows)" in the *Cluster Environment Setup Guide*.

Change the server name of a Managed Server transaction by performing the steps below.

1. Create a server information change instruction file at the Management Server that manages the Managed Server. Then, execute the [stgxfwcmmodsrv](#) command with the -f option specified to change the port number. When using the replication management function, execute the [swsrprecoverres](#) command with the -r option and the -h option on the Management Server. Specify the server name of the Managed Server running the replication operation with the -h option.
2. Refer to "Reload Server Configuration Information" in the *Web Console Guide* and reload the configuration information of the Management Server or Managed Server.

13.5.6.5 Changing Logical Node Name

For changing the logical node name of Management Server transaction, refer to "Changing Logical Node Name" in "Changing Operation Environment (for Windows)" in the *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 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 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 "[13.1.2.1 Preliminaries](#)".
4. Delete the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file 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 *Cluster Environment Setup Guide*.

Note

Do not perform the following step in the *Cluster Environment Setup Guide*.

- Step 1 described in "Deletion of Cluster Environment for Windows Clustered System"

6. Create the cluster environment of the target transaction.

For details on how to create, refer to "Customization of Managed Server Transactions" in the *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 *Cluster Environment Setup Guide*.
 - Step 31 in "Customization Procedure" on "Customization for Windows Clustered System"

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 3, 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 "[13.1.2.1 Preliminaries](#)".

9. Change the server name.

Perform the procedure described in "[13.5.6.4 Changing 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 Environment for Backup Operation Server](#)" task and subsequent tasks. For replication management, perform the "[7.4.5 Configuring Source Volume and Replica Volume](#)" task and subsequent tasks.)

11. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute the `stgmgrinfo` command to register as its server.

13.5.6.6 Changing 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 the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file.

- Backup management list

Make a backup of the backup management list.

For details about how to do this, refer to "[13.1.1.1 Backing Up 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 "[13.1.2.1 Preliminaries](#)".

3. Delete the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file 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 *Cluster Environment Setup Guide*.

 Note

Do not perform the following step of "Deletion of Cluster Environment for Managed Server Transactions" in the *Cluster Environment Setup Guide*.

- Step 1 described in "Deletion of Cluster Environment for Windows Clustered System"

5. On the clustered system, change the cluster group name (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 Transactions" in the *Cluster Environment Setup Guide*.

 Note

- Do not perform the following step in the *Cluster Environment Setup Guide*.

- Step 31 in "Customization Procedure" on " Customization for Windows Clustered System "

- 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 the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file.

- Backup management list

Restore the backup management list.

For details about how to do this, refer to "[13.1.1.2 Restoring 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 the [swsrprecoverres](#) 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 "[13.1.2.1 Preliminaries](#)".

9. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute the [stgmgrinfo](#) command to register as its server.

13.5.6.7 Changing 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 the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file.

- Backup management list

Make a backup of the backup management list.

For details about how to do this, refer to "[13.1.1.1 Backing Up 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 "[13.1.2.1 Preliminaries](#)".

3. Delete the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file 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 *Cluster Environment Setup Guide*.

Note

Do not perform the following step of "Deletion of Cluster Environment for Managed Server Transactions" in the *Cluster Environment Setup Guide*.

- Step 1 described in "Deletion of Cluster Environment for Windows Clustered System"

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 *Cluster Environment Setup Guide*.

Note

- Change the configuration of a shared disk in the clustered system.
- Do not perform the following step in the *Cluster Environment Setup Guide*.
 - Step 31 in "Customization Procedure" on " Customization for Windows Clustered System "

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 the "<shared disk>:\etc\opt\swstorage\etc\swnode.ini" file.
- Backup management list
Restore the backup management list.
For details about how to do this, refer to "[13.1.1.2 Restoring 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 the [swsrprecoverres](#) 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 "[13.1.2.1 Preliminaries](#)".

8. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute the [stgmgrinfo](#) command to register as its server.

13.5.7 Operation on Model Upgrade for ETERNUS Disk Storage System

Perform the procedure of "Operation on Model Upgrade for ETERNUS Disk Storage System" in the *Web Console Guide*.

13.5.8 Changing the SSL Version Settings for Communicating with Supported Devices

If you change the SSL version setting for communicating with the following devices that are registered for this product, restart the ETERNUS SF Manager if the protocol Maintenance-Secure TLSv1.2 is disabled, or TLSv1.2 and TLSv1.1 are disabled:

- ETERNUS DX S5/S4/S3 series
- ETERNUS AF All-Flash Arrays
- ETERNUS DX200F

13.6 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 is not used for operations.
- The Managed Server has been physically removed without performing the Managed Server deletion procedure ("[3.6.4 Deleting 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 Managed Server](#)" to delete the Managed Server.



Note

- When the procedure of this section is performed, the specified Managed Server is forcibly deleted regardless of the backup or replication status. Therefore, the procedure of this section should be used only for Managed Server that are not planned to be used afterwards.
- Do not execute a backup or replication while the procedure of this section 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 is not used afterwards or that it is 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 about the normal deletion procedure, refer to "3.6.4 Deleting Managed Server".

How to Check Status of Managed Server

On the Management Server, execute the `stgxfwcmsetdev` 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 "13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository".

However, for the "pg_dump" command, read the commands below.

```
> $INS_DIR\Common\sys\postgres\bin\pg_dump -U esfpostgres -a --attribute-inserts -p portNumber -t escss.\"BASE_\"* -t escss.\"REP_REPVOL\" -t escss.\"BR_\"* -f $BAK_DIR\Common\fileName esfdb
```

4. Delete the Managed Server information forcibly.

Execute the `stgforcedelsrv` command. For the `-b` option, specify the full path of the file name that is specified for the `-f` option when the "pg_dump" command is executed in step 3.

If the `stgforcedelsrv` command is completed successfully, the database without the Managed Server is stored in the directory of `afterDir` specified with the `-a` option. This database is used in step 5.

Note

If the `stgforcedelsrv` command terminated abnormally, 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.

- a. Prepare for the restoration.

For non-clustered systems, open the Service Control Manager and stop the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

1. Stop all cluster transactions which the Manager belongs to.
Refer to "Cluster Transaction and Local Transaction" in the *Cluster Environment Setup Guide* for details about cluster transaction.
2. Mount the shared disks on the primary node.
3. Open the Service Control Manager and start the ETERNUS SF Manager Postgres Service.

- b. 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 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 *portNumber*.

For *Database_without_ManagedServer*, specify the full path of the database without the Managed Server created in step 4.

```
> $INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p portNumber -f
Database_without_ManagedServer esfdb
```

2. The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

- c. Start the Manager.

For non-clustered systems, open the Service Control Manager and start the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

1. Open the Service Control Manager and stop the ETERNUS SF Manager Postgres Service.
2. Unmount the shared disk mounted in step a.
3. Start all cluster transactions which the Manager belongs to.

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 the [swsrprecoverres](#) 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 were 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 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:

With Web Console, execute the **Reload Conf.** operation to update to the latest information.

- If only AdvancedCopy Manager's agent is used:

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

13.7 Maintaining Database of ETERNUS SF Manager

This section explains the maintenance for database of ETERNUS SF Manager.

13.7.1 Saving Storage Cruiser's Manager Environment

To save a Storage Cruiser's manager environment, refer to "Backup of Manager" in the *Storage Cruiser Operation Guide*.

13.7.2 Maintaining Common Control and AdvancedCopy Manager Repository

This section explains the maintenance of common control and AdvancedCopy Manager repository.

13.7.2.1 Backup of Common Control and AdvancedCopy Manager Repository

Backup the common control and AdvancedCopy Manager repository.



Information

Notation in Procedure

Directory Name	Explanation
\$BAK_DIR	Backup destination directory.
\$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

1. Prepare for the backup.

For non-clustered systems, open the Service Control Manager and stop the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

- a. Stop all cluster transactions which the Manager belongs to.
Refer to "Cluster Transaction and Local Transaction" in the *Cluster Environment Setup Guide* for details about cluster transaction.
- b. Mount the shared disks on the primary node.
- c. Open the Service Control Manager and start the ETERNUS SF Manager Postgres 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 *portNumber*. If you did change the port number, specify the changed port number for *portNumber*.

The file name of the created backup data is *fileName*.

```
> $INS_DIR\Common\sys\postgres\bin\pg_dump -U esfpostgres -C --attribute-inserts -p  
portNumber -f $BAK_DIR\Common\fileName esfdb
```

3. The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

3. Start the Manager.

For non-clustered systems, open the Service Control Manager and start the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

- a. Open the Service Control Manager and stop the ETERNUS SF Manager Postgres Service.
- b. Unmount the shared disk mounted in step 1.
- c. Start all cluster transactions which the Manager belongs to.

13.7.2.2 Restore of Common Control and AdvancedCopy Manager Repository

Restore the common control and AdvancedCopy Manager repository.



Notation in Procedure

Directory Name	Explanation
\$BAK_DIR	Backup destination directory.
\$INS_DIR	"Program Directory" specified at the ETERNUS SF Manager installation.

1. Prepare for the restoration.

For non-clustered systems, open the Service Control Manager and stop the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

- Stop all cluster transactions which the Manager belongs to.
Refer to "Cluster Transaction and Local Transaction" in the *Cluster Environment Setup Guide* for details about cluster transaction.
- Mount the shared disks on the primary node.
- Open the Service Control Manager and start the ETERNUS SF Manager Postgres 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 *portNumber*. If you did change the port number, specify the changed port number for *portNumber*.

```
> $INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p portNumber 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 *portNumber*.

The *fileName* is the file name specified when the backup data was created.

```
> $INS_DIR\Common\sys\postgres\bin\psql -U esfpostgres -p portNumber -f $BAK_DIR\Common  
\fileName postgres
```

4. The prompt is displayed, and waiting for input. Input the following strings.

```
master01!
```

3. Start the Manager.

For non-clustered systems, open the Service Control Manager and start the ETERNUS SF Manager Tomcat Service.

For clustered systems, perform the following procedure:

- Open the Service Control Manager and stop the ETERNUS SF Manager Postgres Service.

- b. Unmount the shared disk mounted in step 1.
- c. Start all cluster transactions which the Manager belongs to.

 **Note**

After restoring the shared control repository, it takes approximately 2 minutes before Web Console becomes available.

13.7.3 Maintaining License Management Database

This section explains the maintenance of license management database.

13.7.3.1 Backup of License Management Database

Save the license management database.

 **Information**

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 *fileName*.

```
$INS_DIR\LM\bin\esflm backup $BAK_DIR\LM\fileName
```

13.7.3.2 Restore of License Management Database

Restore the license management database.

 **Information**

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 *fileName* is the file name specified when the backup data was created.

```
$INS_DIR\LM\bin\esflm restore $BAK_DIR\LM\fileName
```

13.7.4 Saving AdvancedCopy Manager CCM Environment Settings Files

If AdvancedCopy Manager CCM is used by the server where ETERNUS SF Manager is installed, refer to "How to Back Up Environment Settings Files" in the *AdvancedCopy Manager Operation Guide for Copy Control Module* to save an AdvancedCopy Manager CCM environment settings files.

If AdvancedCopy Manager CCM environment settings files are already saved, it is unnecessary to perform this task.

Chapter 14 Command References

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.

14.1 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." is generated and then the command aborts.
- Backup operations in Logical Units (disk units) are not supported. An error occurs if the [swstdevinfo](#) command is used to specify a Logical Unit (disk).
- The backup operations of AdvancedCopy Manager using the Storage Cluster Continuous Copy function are not supported.

Note

Operating Environment for Command Execution

The table below lists the operating environment requirements for different commands.

Table 14.1 Operating Environment for Executing Backup Management Commands

Command	Operating environment of AdvancedCopy Manager
swstbackstat	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: <ul style="list-style-type: none">- -h option specified- No -h option and device name are specified
swstbackup	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows and is in EC operation, the daemons or services of the Managed Server must be operating.
swstbkpdel	To execute this command on a Managed Server, the daemons or services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstbkpdisp	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: <ul style="list-style-type: none">- -h option specified- No -h option and device name are specified
swstbkpolset	To execute this command on a Managed Server, the daemons or services of the Management Server must be operating.

Command	Operating environment of AdvancedCopy Manager
	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstcancelrest	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstcancelsync	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows and is in EC operation, the daemons or services of the Managed Server must be operating.
swstcanceltrk	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstdevdisp	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified To execute this command with the -o option specified, the daemons or services of the Management Server must be operating.
swstdevinfoset	To execute this command on a Managed Server, the daemons or services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstexecstat	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified
swsthistdel	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swsthistdisp	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified
swstresback	-
swstresrst	The daemons or services of the Management Server must be operating. When the Managed Server runs on Windows, the daemons or services of the Managed Server must be always operating.
swstrestore	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstreststat	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified

Command	Operating environment of AdvancedCopy Manager
swtsrsemth	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. To execute this command on a Managed Server, the daemons or services of the Management Server must be operating. When the Managed Server runs on Windows, the daemons or services of the Managed Server must be always operating.
swststartsync	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows, the daemons or services of the Managed Server must be operating.
swstsvrdisp	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstsvrset	To execute this command on a Managed Server, the daemons or services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swstsyncstat	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified
swsttrkstat	The daemons or services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified
swstvolunlock	The daemons or services of the Management Server must be operating.
swstvollockstat	The daemons or services of the Management Server must be operating.

Note

- In Cluster Operation, there is the following note.

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=logicalNodeName
```

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 14.2 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swstsvrset	Required	Transaction operation node	-

Command	Environment Variable	Command Execution Node	Remarks
swstsvrdisp	Required	Transaction operation node	-
swstdevinfo	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	-
swstsrsemch	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 depend on the existence of the -h option and device name. For details, refer to the following table.

Table 14.3 Display Contents of 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 is terminated.
	Yes	Displays only the specified Management Server device information.

-h Option	Device Name Specified	Display Contents
Exists	No	Displays all Managed Server information specified using the -h option.
	Yes	Displays only the specified device information for the Managed Server specified using the -h option.

14.1.1 Environment Definition Commands

This section describes the environment definition commands for backup management.

14.1.1.1 swstsvrset (Managed Server Configuration Information Setting Command)

NAME

swstsvrset - sets configuration information of a Managed Server

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstsvrset [-c recCtrlFileDirectory] [-w workDirectory]
```

To Execute on Management Server

```
<program-directory>\bin\swstsvrset [-h serverName] [-c recCtrlFileDirectory] [-w workDirectory]
```

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 is not changed. In that case, the recovery control file is kept in the directory where it was before the modification.

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-c recCtrlFileDirectory

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 directory is used.

Non-cluster operation: <Environment directory>\etc\backup\SymfoWARE\Recovery

Cluster operation: <Environment directory for logical node>\etc\backup\SymfoWARE\Recovery

If this option is omitted during an update, the previously set values are carried over.
Do not use this option when Symfoware is not installed.

-w workDirectory

Specifies the name of the working directory.

If this option is omitted at the time of first registration, the following directory is used.

Non-cluster operation: <Environment directory>\var\backup\SymfoWARE

Cluster operation: <Environment directory for logical node>\var\backup\SymfoWARE

If this option is omitted during an update, the previously set values are 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\backup
\SymfoWARE\Recovery -w C:\Win32app\AdvancedCopyManager\var\backup\SymfoWARE
swstsvrset completed
C:\>
```

- Set the configuration information of a Managed Server "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](#)
 - [swstbkpolset](#)
 - [swstbkpoldel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)

- [swststartsync](#)
- [swstcancelsync](#)
- [swstdevinfofet](#)
- [swsthistdel](#)
- [swstcanceltrk](#)
- [swstresback](#)
- [swstresrst](#)
- [swstsrsemtdch](#)
- [swstbackup_sqlsvr](#)

14.1.1.2 swstsvrdisp (Managed Server Configuration Information Display Command)

NAME

swstsvrdisp - displays configuration information of a Managed Server

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstsvrdisp
```

To Execute on Management Server

```
<program-directory>\bin\swstsvrdisp [-h serverName]
```

DESCRIPTION

This command displays configuration information of a Managed Server that has been set using the [swstsvrset](#) command.

The following information is 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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display configuration information of the Managed Server "Work1":

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrdisp
Storage-Server = Work1
C:\>
```

- Display the configuration information for the Managed Server "Work2" on which Symfoware is installed:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsvrdisp
Storage-Server = Work2
RecCtrlFile-Dir = C:\Win32app\AdvancedCopyManager\etc\backup\SymfoWARE\Recovery
Work-Dir = C:\Win32app\AdvancedCopyManager\var\backup\SymfoWARE
C:\>
```

NOTES

- The directory name for outputting recovery control file and the working directory name are displayed only when Symfoware is already installed.

14.1.1.3 swstdevinfofet (Device Information Setting Command)

NAME

swstdevinfofet - sets the device information

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstdevinfofet -t | -b | -o deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstdevinfofet [-h serverName] -t | -b | -o deviceName
```

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 a new device or delete a device on a Managed Server on Windows, refer to "Add/Reload Device" in the *Web Console Guide* to reload the configuration and update the corresponding table for 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 Backup Source](#)" for information on a transaction volume, and "[3.2.4 Preparing 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 Backup Source](#)" for information on a transaction volume, and "[4.1.2.5 Preparing Backup Volume](#)" for information on a backup volume.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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\swstdevinfoaset -t g1d1p2
swstdevinfoaset completed
C:\>
```

- Register a device as a backup volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevinfoaset -b g1d2p1
swstdevinfoaset completed
C:\>
```

- Deregister a device that has been registered as a transaction volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstdevinfoaset -o g1d1p2
swstdevinfoaset 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.
- The device is a TFOV.
- 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 file system is FAT or FAT 32.
 - The device is a TFOV.
- 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`
 - `swstdevinfoset`
 - `swstbkpolset`
 - `swstbkpoldel`

- [swstbackup](#)
- [swstrestore](#)
- [swstcancelrest](#)
- [swststartsync](#)
- [swstcancelsync](#)
- [swsthistdel](#)
- [swstcanceltrk](#)
- [swstsrsemtrk](#)
- [swstresback](#)
- [swstresrst](#)
- [swstbackup_sqlsvr](#)

14.1.1.4 swstdevdisp (Device Usage Status Display Command)

NAME

swstdevdisp - displays the device information

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstdevdisp [-t] [-b [-u]] [-o] [device-Name]
```

To Execute on Management Server

```
<program-directory>\bin\swstdevdisp [-h serverName] [-t] [-b [-u]] [-o] [deviceName]
```

DESCRIPTION

This command displays information about a transaction or backup volume or any other definable device, which has been set using the [swstdevinfoset](#) command.

The following information is 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	<p>Displays a character string by which a device can be identified:</p> <p>"Transaction": Represents a transaction volume.</p> <p>"Backup": Represents a backup volume.</p> <p>"Other": Represents a device that can be registered as a working or backup volume.</p> <p>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 the -suspend or the -T option specified, the backup volume remains in use after history information is deleted.</p> <p>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.</p>
Mount-Point (Method)	Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.

Title	Description
	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 a hyphen (-).
- (5) Displays that the volume is a Symfoware volume.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server. When executing on the target Managed server, it is not necessary to specify this option. For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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 is displayed if all of the -t, -b and -o options are omitted.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name. Refer to "[1.2 Managing 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:\>
```

14.1.1.5 swstbkpolset (Backup Policy Setting Command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

Setting Backup Policy by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstbkpolset [-i intervalDays] [-s saveNumber] [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpolset [-h serverName] [-i intervalDays] [-s saveNumber]
[deviceName]
```

Setting Backup Policy by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstbkpolset -n [-i intervalDays] [-s saveNumber] logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpolset -n [-h serverName][[-i intervalDays][[-s saveNumber]
logGroupName[/rdbName]
```

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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-i intervalDays

Specifies the number of interval days. You can specify a value between 1 and 366. If this option is omitted during initial registration, 30 is set as the default. If this option is omitted during update, the existing value is inherited.

-s saveNumber

Specifies the number of preservation generations. You can specify a value between 1 and 31. If this option is omitted during initial registration, 2 is set as the default. If this option is omitted during update, the existing value is 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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

If the device name is omitted, the backup policy is set for all the transaction volumes.

logGroupName

Specify the name of the log group.

rdbName

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 "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 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:
 - [swtsvrset](#)
 - [swstdevinfo](#)
 - [swtsrsem](#)
 - [swstresback](#)
 - [swstresrst](#)

14.1.1.6 swstbkpoldisp (Backup Policy Display Command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

Displaying Backup Policy by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstbkpoldisp [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpoldisp [-h serverName] [deviceName]
```

Displaying Backup Policy by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstbkpoldisp -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpoldisp -n [-h serverName] logGroupName[/rdbName]
```

DESCRIPTION

This command displays a backup policy that has been set for a transaction volume. The following information is 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.

Title	Description
	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. (*1)

*1: 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 a hyphen (-).
- (5) Displays that the volume is a Symfoware volume.

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.
 When executing on the target Managed server, it is not necessary to specify this option.
 For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.
 Refer to "[1.2 Managing 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 is displayed.

logGroupName

Specify the name of the log group.

rdbName

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\swstbcpoldisp 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\swstbcpoldisp -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:\>

```

14.1.1.7 swstbkpodel (Backup Policy Deletion Command)

NAME

swstbkpodel - deletes the backup policy

SYNOPSIS

Deleting Backup Policy by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstbkpodel deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpodel [-h serverName] deviceName
```

Deleting Backup Policy by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstbkpodel -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbkpodel -n [-h serverName] logGroupName[/rdbName]
```

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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdspsrv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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:
 - [swtsvrset](#)
 - [swstdevinforeset](#)
 - [swtsrsemetch](#)
 - [swstresback](#)
 - [swstresrst](#)

14.1.2 Operation Commands

This section describes operation commands for backup management.

14.1.2.1 swstbackup (Backup Execution Command)

NAME

swstbackup - backup

SYNOPSIS

Executing Backup by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstbackup [-suspend|-T] [-k] deviceName [-Xdevmap deviceMapFile] [-Xflush]
```

To Execute on Management Server

```
<program-directory>\bin\swstbackup [-h serverName] [-suspend|-T] [-k] deviceName [-Xdevmap deviceMapFile] [-Xflush]
```

Executing Backup by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstbackup -n [-suspend|-T] [-k] logGroupName[/rdbName] [-Xdevmap deviceMapFile]
```

To Execute on Management Server

```
<program-directory>\bin\swstbackup -n [-h serverName] [-k] [-suspend|-T] logGroupName[/rdbName] [-Xdevmap deviceMapFile]
```

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 the [swstbkpolset](#) command.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-k

Specifies implementation of backup with reference dump.

If you omit this option, backup is implemented with normal dump.

When you back up with reference dump, you have to execute Symfoware's "rdbtr" 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 *deviceMapFile*

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 is 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

deviceName

Specify an AdvancedCopy Manager device name.
Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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:\advancedcopymanager\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 causes 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.
- 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.
- When either the transaction volume or the backup volume is changed to TFOV.
- 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 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 the `swstbkpolset` 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`
 - `swstdevinfo`
 - `swstsrsem`
 - `swstresback`
 - `swstresrst`
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.1.2.2 swstbackstat (Backup Execution Status Display Command)

NAME

`swstbackstat` - displays the completion status of a backup

SYNOPSIS

Displaying Backup Execution Status by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstbackstat [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbackstat [-h serverName] [deviceName]
```

Displaying Backup Execution Status by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstbackstat -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstbackstat -n [-h serverName] logGroupName[/rdbName]
```

DESCRIPTION

This command displays the completion status of a backup that is being performed using the [swstbackup](#) command. The following information is 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, "----" is 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 serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specifies the [AdvancedCopy Manager device name](#) corresponding to a transaction volume.

If this operand is omitted, the backup execution statuses of all the transaction volumes are displayed.

logGroupName

Specify the name of the log group.

rdbName

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, this command displays "succeeded" in the **Status** column 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 "[13.3 Troubleshooting: Hardware Error During Backup](#)" for information about this.

14.1.2.3 swstrestore (Restore Execution Command)

NAME

swstrestore - restore

SYNOPSIS

For Restore of Regular Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstrestore [-g generationNo | -v versionNo] [-r restoreDeviceName]
deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstrestore [-h serverName] [-g generationNo | -v versionNo] [-r
restoreDeviceName] deviceName
```

For Recover of Symfoware Database Space by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstrestore [-g generationNo | -v versionNo] [-l
archiveLogFileListFileName] [-w workDirectory] [-nolog workRecCtrlFileDirectory] deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstrestore [-h serverName] [-g generationNo | -v versionNo] [-l
archiveLogFileListFileName] [-w workDirectory] [-nolog workRecCtrlFileDirectory] deviceName
```

For Bundle Recovery by Specifying Multiple Transaction Volumes

To Execute on Managed Server

```
<program-directory>\bin\swstrestore -bundle [-g generationNo | -v versionNo] [-a | -e EndPoint]
[-l archiveLogFileListFileName] [-w workDirectory] [-nolog workRecCtrlFileDirectory]
DeviceListFile
```

To Execute on Management Server

```
<program-directory>\bin\swstrestore -bundle [-h serverName] [-g generationNo | -v versionNo] [-a
| -e EndPoint] [-l archiveLogFileListFileName] [-w workDirectory] [-nolog
workRecCtrlFileDirectory] DeviceListFile
```


For Recovery of Symfoware Database Space by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstrestore -n [-g generationNo | -v versionNo] [-a | -e EndPoint] [-l archiveLogFileListFileName] [-w workDirectory] [-nolog workRecCtrlFileDirectory] logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstrestore -n [-h serverName] [-g generationNo | -v versionNo] [-a | -e EndPoint] [-l archiveLogFileListFileName] [-w workDirectory] [-nolog workRecCtrlFileDirectory] logGroupName[/rdbName]
```

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 Command Reference*.

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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdisprv](#) command.

-g generationNo

Specifies the relative generation number of data to be restored.

Check the relative generation number using the [swsthistdisp](#) command.

-v versionNo

Specifies the absolute generation number of data to be restored.

Check the absolute generation number using the [swsthistdisp](#) command.

-r restoreDeviceName

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.

If both this option and the -e option are not specified, a recovery to the latest state is performed.

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.
If both this option and the -a option are not specified, a recovery to the latest state is performed.
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 *archiveLogFileListFileName*

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 *workDirectory*

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 the [swstsvrset](#) command is 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 *workRecCtrlFileDirectory*

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 is not 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 is restored.

OPERANDS

deviceName

Specifies the [AdvancedCopy Manager device name](#) corresponding to a transaction volume.

logGroupName

Specify the name of the log group.

rdbName

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 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 the [swsthistdisp](#) command:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstrestore -g 2 gldlp2
gldlp2 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 the [swstsyncstat](#) command. Execute the [swstcancelsync](#) command to cancel the synchronous processing:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 gld2p6 suspend ----
Work2 gldlp6 gld3p6 executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync -all gldlp6
gldlp6 swstcancelsync completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 ---- ---- ----
C:\>C:\Win32app\AdvancedCopyManager\bin\swstrestore gldlp6
gldlp6 swstrestore completed
C:\>
```

NOTES

- Restoration of an individual file cannot be performed because copying between devices is 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 the [swstdrvset](#) command. Check the backup volume using the backup history list view or [swsthistdisp](#) 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 the [swstdrvunset](#) 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 is 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 the -a, -e, -l, -w, -bundle, or -nolog option was specified for setting transaction volumes other than Symfaware.
 - 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 Symfaware.
 - 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 media).
 - When either of the transaction volume or the backup volume is changed to TFOV.
- 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 the [swstcancelsync](#) 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)"

- 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 media). 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 is also 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:
 - `swtsvrset`
 - `swstdevinfo`
 - `swstsrsem`
 - `swstresback`
 - `swstresrst`
- For recovering the database space, simultaneously issuing this command two or more times results 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) terminates abnormally is not predictable. For instance, the command executed first might terminate abnormally.
 - When multiple commands specify a transaction volume:

Command(s) terminates 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) terminates 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) terminates 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.
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.1.2.4 swstcancelrest (Restore Cancellation Command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

Canceling Restore by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstcancelrest [-g generationNo | -v versionNo] [-r restoreDeviceName]
[-emergency] deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstcancelrest [-h serverName][ -g generationNo | -v versionNo][ -r
restoreDeviceName] [-emergency] deviceName
```

Canceling Restore by Specifying Log Group (Symfoware)

To Execute on Managed Server

```
<program-directory>\bin\swstcancelrest -n [-g generationNo | -v versionNo ] [-emergency]
logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstcancelrest -n [-h serverName] [-g generationNo | -v versionNo ] [-
emergency] logGroupName[/rdbName]
```

DESCRIPTION

This command cancels OPC-based restoration.

A hardware error is displayed when the [swstrestore](#) command is executed while data is being copied using OPC. Fix the cause of the hardware error and repeat restoration using the [swstrestore](#) command.

Check whether a fault occurred using the [swstreststat](#) command.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-g *generationNo*

Specifies the relative generation number of data being restored.

This option cannot be specified at the same time as the -v option.

Check the relative generation number using the [swstreststat](#) command.

-v *versionNo*

Specifies the absolute generation number of data being restored.
This option cannot be specified at the same time as the **-g** option.
Check the absolute generation number using the [swstreststat](#) command.

-r *restoreDeviceName*

Specifies the device name if data is restored to any other device than a transaction volume.
Check the device name using the [swstreststat](#) 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 is cancelled if neither the **-g** or **-v** option is specified.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.
Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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:\>
```

- Cancelling a restore of the latest history information on the transaction volume in emergency operation mode:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelrest -emergency g1d1p2
g1d1p2 swstcancelrest completed
C:\>
```

- Cancelling a restore 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 is 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 the [swstrestore](#) 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](#)
 - [swstdevinfo](#)
 - [swstsrsem](#)
 - [swstresback](#)
 - [swstresrst](#)

14.1.2.5 swstreststat (Restore Execution Status Display Command)

NAME

swstreststat - displays the execution status of restoration

SYNOPSIS

Displaying Restore Execution Status by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstreststat [-g generationNo | -v versionNo] [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstreststat [-h serverName] [-g generationNo | -v versionNo]  
[deviceName]
```

Displaying Restore Execution Status by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstreststat -n [-g generationNo | -v versionNo] logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstreststat -n [-h serverName] [-g generationNo | -v versionNo]  
logGroupName[/rdbName]
```

DESCRIPTION

This command displays the execution status of restoration.
The following information is 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. "----" is 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. "----" is 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. "----" is 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. "----" is 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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-g *generationNo*

Specifies the relative generation number of data whose restore execution status is to be displayed.

Check the relative generation number using the [swsthistdisp](#) command.

-v *versionNo*

Specifies the absolute generation number of data whose restore execution status is to be displayed.

Check the absolute generation number using the [swsthistdisp](#) command.

-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.

The restore execution statuses of all the histories are displayed if both the -g and -v options are omitted.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

If this operand is omitted, the restore execution statuses of all the transaction volumes are displayed.

logGroupName

Specify the name of the log group.

rdbName

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 "[13.3 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 are displayed. If, at this time, restoration is not in progress from any of the histories, "----" is displayed in all the information columns other than "Server" and "Transaction-Disk".

14.1.2.6 swsthistdisp (History Information Display Command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

Displaying Backup History Information by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swsthistdisp [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swsthistdisp [-h serverName] [deviceName]
```

Displaying Backup History Information by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swsthistdisp -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swsthistdisp -n [-h serverName] logGroupName[/rdbName]
```

DESCRIPTION

This command displays history information in relation to data that has been backed up.

The following information is 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 is not displayed if no backup history information exists.
Version	Displays an absolute generation number. This item is not displayed if no backup history information exists.
Backup-Date	Displays a TimeStamp reflecting when backup has been completed. This item is not 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 is not 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 is not 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 is not 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". Information other than for Symfoware transaction volumes is not displayed. This item is not displayed if no backup history information exists.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

If this operand is omitted, the backup history information of all the transaction volumes is displayed.

logGroupName

Specify the name of the log group.

rdbName

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=gldlp2 Mount-Point=D: (NTFS)
Generation Version Backup-Date      Backup-Disk  Status      Execute
1           10      1999/11/12 22:00 gld2p1      succeeded   ----
2           9       1999/11/11 22:00 gld2p2      succeeded   ----
Server=Work1 Device=gldlp3 Mount-Point= E: (NTFS)
Generation Version Backup-Date      Backup-Disk  Status      Execute
1           13      1999/11/12 23:00 gld3p1      succeeded   ----
2           12      1999/11/11 23:00 gld3p2      succeeded   ----

Server=StrgSV01 Device=/dev/dsk/clt0d5s6 Mount-Point=DB1.DSB01/LOG01/RDB01 (SymfoWARE)
Generation Version Backup-Date      Backup-Disk  Status      Execute ArcSerial
1           13      2000/11/12 23:00 gld4p1      succeeded   ----   reference
2           12      2000/11/11 23:00 gld4p2      succeeded   ----     8
:
C:\>
```

NOTES

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "[13.3 Troubleshooting: Hardware Error During Backup](#)" for information about this.

14.1.2.7 swsthistdel (History Information Deletion Command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

Deleting Backup History Information by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swsthistdel -g generationNo | -v versionNo | -z [-emergency] deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swsthistdel [-h serverName] -g generationNo | -v versionNo | -z [-emergency] deviceName
```

Deleting Backup History Information by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swsthistdel -n -g generationNo | -v versionNo | -z [-emergency]  
logGroupName[/rdbNAME]
```

To Execute on Management Server

```
<program-directory>\bin\swsthistdel -n [-h serverName] -g generationNo | -v versionNo | -z [-  
emergency] logGroupName[/rdbNAME]
```

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 are also deleted.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-g *generationNo*

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 the [swsthistdisp](#) command.

-v *versionNo*

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 the [swsthistdisp](#) 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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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 gldlp2
gldlp2 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 gldlp2
gldlp2 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
gldlp2 swsthistdel completed
gldlp1 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](#)
- [swstdevinforeset](#)
- [swstsrsemetch](#)
- [swstresback](#)
- [swstresrst](#)

14.1.2.8 swststartsync (Backup Synchronous Processing Start Command)

NAME

swststartsync - starts backup synchronous processing

SYNOPSIS

Starting Backup Synchronous Processing by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swststartsync deviceName [-Xdevmap deviceMapFile]
```

To Execute on Management Server

```
<program-directory>\bin\swststartsync [-h serverName] deviceName [-Xdevmap deviceMapFile]
```

Starting Backup Synchronous Processing by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swststartsync -n logGroupName[/rdbNAME] [-Xdevmap deviceMapFile]
```

To Execute on Management Server

```
<program-directory>\bin\swststartsync -n [-h serverName] logGroupName[/rdbNAME] [-Xdevmap deviceMapFile]
```

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 as 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 is 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 is cancelled. However, if the status was "suspend" before command execution, even after terminating with an error, synchronous processing is not cancelled.

You can run this command specifying individual transaction volumes that are included in a log group.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-Xdevmap *deviceMapFile*

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 is 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

deviceName

Specify an AdvancedCopy Manager device name.
Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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 Corrective Action] 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.
- When either of the transaction volume or the backup volume is changed to TFOV.
- 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`
 - `swstdevinfo`
 - `swstsrsem`
 - `swstresback`
 - `swstresrst`

14.1.2.9 swstcancelsync (Backup Synchronous Processing Cancel Command)

NAME

swstcancelsync - cancels the backup synchronous processing

SYNOPSIS

Canceling Backup Synchronous Processing by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstcancelsync [-emergency] [-bd backupDeviceName | -all] deviceName
```

To Execute on Management Server

```
<program-directory>\bin\swstcancelsync [-h serverName] [-emergency] [-bd backupDeviceName | -all] deviceName
```

Canceling Backup Synchronous Processing by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstcancelsync [-emergency] -n logGroupName[/rdbNAME] [-all]
```

To Execute on Management Server

```
<program-directory>\bin\swstcancelsync [-h serverName] [-emergency] -n logGroupName[/rdbNAME] [-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 the [swstsyncstat](#) command to check for the error.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-emergency

Emergency operation mode is available for operations.

In such cases, EC sessions are neither confirmed nor cancelled.

-bd *backupDeviceName*

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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

logGroupName

Specify the name of the log group.

rdbName

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 gld0p0
gld0p0 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 gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 gldlp1 suspend ----
Work2 gldlp6 gldlp2 executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync gldlp6 -bd gldlp2
gldlp6 swstcancelsync completed.
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 gldlp1 suspend ----
C:\>
```

- Cancelling all of the backup synchronous processing of the transaction volume:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 gldlp1 suspend ----
Work2 gldlp6 gldlp2 executing 75%
C:\>C:\Win32app\AdvancedCopyManager\bin\swstcancelsync gldlp6 -all
gldlp6 swstcancelsync completed.
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsyncstat gldlp6
Server Transaction-Disk Backup-Disk Status Execute
Work2 gldlp6 ---- ---- ----
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:
 - [swtsvrset](#)
 - [swstdevinfoset](#)
 - [swstsrsemitch](#)
 - [swstresback](#)
 - [swstresrst](#)

14.1.2.10 swstsyncstat (Backup Synchronous Processing Progress Display Command)

NAME

swstsyncstat - displays the execution status of the backup synchronous processing

SYNOPSIS

Displaying Execution Status of Backup Synchronous Processing by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstsyncstat [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstsyncstat [-h serverName] [deviceName]
```

Displaying Execution Status of Backup Synchronous Processing by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstsyncstat -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swstsyncstat -n [-h serverName] logGroupName[/rdbName]
```

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 serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdisprv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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.

logGroupName

Specify the name of the log group.

rdbName

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 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 "[13.3 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 the [swstrsemitch](#) command to remove the inconsistency from the resource information.

14.1.2.11 swstexecstat (Execution Status Display Command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

Displaying Execution Status by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swstexecstat [-j] [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swstexecstat [-j] [-h serverName] [deviceName]
```

Displaying Execution Status by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swstexecstat -n [-j] logGroupName[/rdbNAME]
```

To Execute on Management Server

```
<program-directory>\bin\swstexecstat -n [-h serverName] [-j] logGroupName[/rdbNAME]
```

DESCRIPTION

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC or EC is displayed if OPC/EC is being executed.

The following information is 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 is displayed as "DELAY=number-of-days-passing". "OK" is 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" is displayed. Otherwise, "IDLE" is displayed. <ul style="list-style-type: none"> - swstbkpolset - swstbkpoldel - swstbackup - swstrestore - swsthistdel - swststartsync - swstcancelsync - swstcancelrest

Title	Description
	- swstcanceltrk
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, OPC, nor 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. "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 is 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" is displayed. Otherwise, "IDLE" is displayed. - swstbkpolset - swstbkpoldel

Title	Description
	<ul style="list-style-type: none"> - swstbackup - swstrestore - swsthistdel - swststartsync - swstcancelsync - swstcancelrest - swstcanceltrk
Mount-Point (Method)	<p>Displays the drive letter of a device. The file system type of the device is displayed inside the parentheses.</p> <p>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.</p>
Execute	<p>Displays the name of the command being executed or the progress of copying.</p> <p>"----": Neither a command, OPC, nor EC is being executed.</p> <p>"swststartsync": The backup synchronous processing start command is being processed.</p> <p>"swstcancelsync": The backup synchronous processing cancel command is being processed.</p> <p>"swstbackup": The backup execution command is being processed.</p> <p>"swstrestore": The restore execution command is being processed.</p> <p>"swstcancelrest": The restore cancellation command is being processed.</p> <p>"swstbkpolset": The backup policy setting command is being processed.</p> <p>"swstbkpoldel": The backup policy deletion command is being processed.</p> <p>"swsthistdel": The history information deletion command is being processed.</p> <p>"swstcanceltrk": The tracking cancel command is being processed.</p> <p>"sync(xxx%)": EC progress rate.</p> <p>"sync(failed)": EC ended abnormally.</p> <p>"snapshot(xxx%)": The progress of OPC backup.</p> <p>"snapshot(failed)": OPC backup ended abnormally.</p> <p>"restore(xxx%)": The progress of restoration.</p> <p>"restore(failed)": OPC restoration ended abnormally.</p> <p>"restore(halt)": OPC restoration is halt status.</p> <p>"?????": Failed to get copy status.</p> <p>During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.</p>

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specifies the [AdvancedCopy Manager device name](#) corresponding to a transaction volume.
If this operand is omitted, the execution statuses of all the transaction volumes are displayed.

logGroupName

Specify the name of the log group.

rdbName

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%)
:
```

- 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
:
```

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 "[13.3 Troubleshooting: Hardware Error During Backup](#)" for more information about this.

14.1.2.12 swstdrvset (Drive Letter Allocation Command)

NAME

swstdrvset - allocates a drive letter

SYNOPSIS

To Allocate Driver Letter

```
<program-directory>\bin\swstdrvset deviceName [driveLetter]
```

To Allocate Mount Point

```
<program-directory>\bin\swstdrvset deviceName mountPoint
```

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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

driveLetter

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 is automatically selected. Unused drive letters are searched starting from "Z:".

mountPoint

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 unused 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 is displayed).
 - This command is executed with no drive letter specified, and one or more drive letters have already been allocated (the warning message swst1011 is 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.

14.1.2.13 swstdrvunset (Drive Letter Deallocation Command)

NAME

swstdrvunset - cancels a drive letter

SYNOPSIS

To Deallocate Drive Letter

```
<program-directory>\bin\swstdrvunset {deviceName | driveLetter}
```

To Deallocate Mount Point

```
<program-directory>\bin\swstdrvunset mountPoint
```

DESCRIPTION

The drive letter or mount point currently assigned to the device is cancelled.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

driveLetter

Specifies a drive letter. Valid drive letters include "C:" to "Z:". The letters are not case sensitive.

mountPoint

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.

14.1.2.14 swstdismount (Dismount Command)

NAME

swstdismount - dismounts the specified volume

SYNOPSIS

```
<program-directory>\bin\swstdismount deviceName
```

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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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.

14.1.2.15 swstvolunlock (Volume Unlock Command)

NAME

swstvolunlock - unlocks a volume

SYNOPSIS

```
<program-directory>\bin\swstvolunlock [-n] deviceName
```

DESCRIPTION

This command unlocks a volume.

OPTIONS

-n

Specifies that a device is not to be dismounted before it is unlocked.

OPERANDS

deviceName

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.

14.1.2.16 swstvollockstat (Locked-volume Information Display Command)

NAME

swstvollockstat - displays information about a volume that has been locked

SYNOPSIS

```
<program-directory>\bin\swstvollockstat [deviceName]
```

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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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.

14.1.2.17 swstcanceltrk (Tracking Cancel Command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstcanceltrk [-copy | -emergency] deviceName (-bd backupDeviceName | -all)
```

To Execute on Management Server

```
<program-directory>\bin\swstcanceltrk [-h serverName] [-copy | -emergency] deviceName (-bd backupDeviceName | -all)
```

DESCRIPTION

This command stops tracking processing.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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 the [swsthistdel](#) 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 *backupDeviceName*

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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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\swstrkstat 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 Corrective Action" 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](#)
 - [swstdevinfo](#)
 - [swstsrsem](#)
 - [swstresback](#)
 - [swstresrst](#)

14.1.2.18 swsttrkstat (Tracking Status Display Command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

Displaying Execution Status of Tracking by Specifying Transaction Volume

To Execute on Managed Server

```
<program-directory>\bin\swsttrkstat [deviceName]
```

To Execute on Management Server

```
<program-directory>\bin\swsttrkstat [-h serverName] [deviceName]
```

Displaying Execution Status of Tracking by Specifying Log Group

To Execute on Managed Server

```
<program-directory>\bin\swsttrkstat -n logGroupName[/rdbName]
```

To Execute on Management Server

```
<program-directory>\bin\swsttrkstat -n [-h serverName] logGroupName[/rdbName]
```

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

Title	Description
	"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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.2 Managing 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.

logGroupName

Specify the name of the log group.

rdbName

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 "[13.3 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 the `swstsrsemctch` command to remove any inconsistencies from the resource information.

14.1.3 Maintenance Commands

This section describes the backup management maintenance commands.

14.1.3.1 swstsrsemctch (Resource Match Command)

NAME

swstsrsemctch - recovers resource information

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swstsrsemctch [-x]
```

To Execute on Management Server

```
<program-directory>\bin\swstsrsemctch [-x] [-h serverName]
```

DESCRIPTION

This command recovers resource information if a system failure, etc. has made the resource information inconsistent.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the `stgxfwcmdispsrv` command.

-x

If a recovery operation of the resource information in the Management Server cannot be performed for some reason, specify this option.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Recover resource information:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstsrsemtdch
swstsrsemtdch completed
C:\>
```

NOTES

- This command can only be executed if none of the following commands are running:
 - [swstsvrset](#)
 - [swstbkpolset](#)
 - [swstbkpoldel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swstdevinfofet](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstresback](#)
 - [swstresrst](#)
 - [swstsrsemtdch](#)
 - [swstbackup_sqlsvr](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.1.3.2 swstresback (Resource Backup Command)

NAME

swstresback - backup of backup management list and recovery control file

SYNOPSIS

```
<program-directory>\bin\swstresback backupDir
```

DESCRIPTION

A backup management list and a recovery control file are backed up to the specified directory.

- Backup management list (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 the [swstresrst](#) command.

OPERANDS

backupDir

Specifies the name of a directory to which the backup management list and the recovery control file are saved.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Backing up of the backup management list 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](#)
 - [swstbkpolset](#)
 - [swstbkpodel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swstdevinfo](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstresback](#)
 - [swstresrst](#)
 - [swstsrsemitch](#)
 - [swstbackup_sqlsvr](#)

14.1.3.3 swstresrst (Resource Restore Command)

NAME

swstresrst - restore of backup management list and recovery control file

SYNOPSIS

```
<program-directory>\bin\swstresrst backupDir
```

DESCRIPTION

A backup management list 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

backupDir

The backup location directory name directed by the [swstresback](#) command is specified.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Restoring the backup management list and the recovery control file:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swstresrst C:\backup
swstresrst completed
C:\>
```

NOTES

- Before the backup management list and the recovery control file is restored by this command, the [swstsvrset](#) 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 the [swstsvrset](#) 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 list 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](#)
 - [swstbkpolset](#)
 - [swstbkpodel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swstdevinfofet](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstresback](#)
 - [swstresrst](#)
 - [swstsrsemetch](#)
 - [swstbackup_sqlsvr](#)

14.2 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

- The operating environment required for command execution is shown in the table below.

Table 14.4 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.
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) and target Managed Server (Managed 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.
stgmgrinfofet	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.
stgmgrinfofdisp	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.
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, there is the following note.

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=logicalNodeName
```

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 14.5 Commands When Cluster Operation Is Used

Command Name	Environment Variable	Command Execution Node	Remarks
stgcmmodnode	Required	Transaction operating node	-
stgxfwcmaddsrv	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmmodsrv	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmdelsrv	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmsetdev	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmdeldev	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmdispsrv	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmdispdev	Not required	Transaction operating node	Executable only for Management Server transaction
stgxfwcmdisppat	Not required	Transaction operating node	Executable only for 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	-
stgrepocnv	Not required	Transaction operating node	Executable only for Management Server transaction
stgforcedelsrv	Not required	Transaction operating node	Executable only for Management Server transaction

14.2.1 stgcmmodnode (Management Server Information Change Command)

NAME

stgcmmodnode - changes or displays Management Server information

SYNOPSIS

```
<program-directory>\bin\stgcmmodnode [-i ipAddress] [-p portNumber] [-n serverName]
```

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:

- "[13.5.1 Changing IP Address of Management Server](#)"
- "[13.5.3 Changing Port Number of Management Server or Managed Server](#)"
- "[13.5.4 Changing Server Name of Management Server or Managed Server](#)"

OPTIONS

None

Displays the server information currently being managed.

-i ipAddress

Specifies the IP address of a Management Server, to change the IP address of the Management Server.

-p portNumber

Specifies the port number of a Management Server, to change the port number of the Management Server.

-n serverName

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 = 192.0.2.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
C:\>
```


- Change the IP address of a Management Server to 192.0.2.11:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgcmmodnode -i 192.0.2.11
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 occurs 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 the [stgxfwcmmodsrv](#) command.

14.2.2 stgxfwcmaddsrv (Server Information Addition Command)

NAME

stgxfwcmaddsrv - adds Managed Server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmaddsrv [-n serverName] -i ipAddress -p portNumber
```

DESCRIPTION

This command adds Managed Server information to be managed by AdvancedCopy Manager. This command can only be executed on the Management Server.

OPTIONS

-n serverName

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, hyphens (-), 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 ipAddress

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 *portNumber*

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 192.0.2.10 -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: 192.0.2.20; port number allocated to *stgxfws_logicalNodeName*: 1227)

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmaddsrv -n Server1 -i 192.0.2.20 -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.
- 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](#)
 - [stgxfwcmmodsrv](#)
 - [stgxfwcmdelsrv](#)
 - [stgxfwcmsetdev](#)
 - [stgxfwcmdeldev](#)
- This command cannot be executed while the following operations are being performed in the initial window by using Web Console:
 - Register Server
 - Change Server Details
 - Delete Server
 - Add/Reload Device

- Delete Device

14.2.3 stgxfwcmmodsrv (Server Information Change Command)

NAME

stgxfwcmmodsrv - changes the following server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmmodsrv -n serverName [-s newServerName] [-i newIpAddress] [-p newPortNumber] | [-f serverInformationChangeInstructionFilename [-y]]
```

DESCRIPTION

This command changes the following server information managed by AdvancedCopy Manager.

- 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

It is necessary to execute this command on the Management Server.

OPTIONS

-n serverName

Specify a server name that is currently being managed.

Specify a server name displayed by the [stgxfwcmmdispsrv](#) command exactly as displayed, including the case.

-s newServerName

Specify a new server name in less than 255 bytes. The usable characters are: 1-byte alphanumeric characters, hyphens (-), 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 newIpAddress

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 *newPortNumber*

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 *serverInformationChangeInstructionFilename*

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 specifying 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:

```
Mgr-svr      I  192.0.2.10, 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.

```
Mgr-svr      I  192.0.2.10
Server1      I  192.0.2.20
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 192.0.2.40:

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmmodsrv -n Server1 -i 192.0.2.40
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 the [stgcmmodnode](#) 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 "[13.5 Changing 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.
- 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 the [stgcmmodnode](#) command to change the IP address and port number, then restart the various AdvancedCopy Manager services.
 - After Management Server information is changed, execute the [stgcmmodnode](#) 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 the [stgxfwcmdispsrv](#) 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 is 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](#)
 - [stgxfwcmmodsrv](#)
 - [stgxfwcmdelsrv](#)
 - [stgxfwcmsetdev](#)
 - [stgxfwcmdeldev](#)
- This command cannot be executed while the following operations are being performed in the initial window by using Web Console:
 - Register Server
 - Change Server Details
 - Delete Server
 - Add/Reload Device
 - Delete Device

14.2.4 [stgxfwcmdelsrv](#) (Server Information Deletion Command)

NAME

[stgxfwcmdelsrv](#) - deletes the Managed Server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdelsrv -n serverName
```

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 *serverName*

Specify the Managed Server name to be deleted.

Specify a server name displayed by the [stgxfwcmdispsrv](#) 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.
- 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](#)
 - [stgxfwcmmodsrv](#)
 - [stgxfwcmdelsrv](#)
 - [stgxfwcmsetdev](#)
 - [stgxfwcmdeldev](#)
- This command cannot be executed when the following operations are being performed in the initial window by using Web Console:
 - Register Server
 - Change Server Details
 - Delete Server
 - Add/Reload Device
 - Delete Device

14.2.5 stgxfwcmsetdev (Device Information Collection/Reflection Command)

NAME

stgxfwcmsetdev - collects and reflects the device information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmsetdev -n serverName [-d deviceName] [-f fileName | -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.

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

It is necessary to execute this command on the Management Server.

OPTIONS

-n serverName

Specify the server name whose device information is to be collected or reflected.

Specify a server name displayed by the `stgxfwcmdispsrv` command exactly as displayed, including the case.

-d deviceName

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 fileName

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.

- 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 is 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](#)
 - [stgxfwcmmodsrv](#)
 - [stgxfwcmdelsrv](#)
 - [stgxfwcmsetdev](#)
 - [stgxfwcmdeldev](#)
- This command cannot be executed by using Web Console when the following operations are being performed:
 - Register Server
 - Change Server Details
 - Delete Server
 - Add/Reload Device
 - Delete Device

14.2.6 [stgxfwcmdeldev](#) (Device Information Deletion Command)

NAME

`stgxfwcmdeldev` - deletes the device information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdeldev -n serverName -d deviceName
```

DESCRIPTION

This command deletes the device information currently being managed by AdvancedCopy Manager. It is necessary to execute this command in the Management Server.

The [stgxfwcmsetdev](#) 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 serverName`

Specify the name of the server that is managing the device to be deleted.

Specify a server name displayed by the [stgxfwcmdispsrv](#) command exactly as displayed, including the case.

`-d deviceName`

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 gld18p1
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.
- 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](#)
 - [stgxfwcmmodsrv](#)
 - [stgxfwcmdelsrv](#)
 - [stgxfwcmsetdev](#)
 - [stgxfwcmdeldev](#)
- This command cannot be executed by using Web Console if the following operations are being performed:
 - Register Server
 - Change Server Details
 - Delete Server
 - Add/Reload Device
 - Delete Device

14.2.7 stgxfwcmdispsrv (Server Information Display Command)

NAME

stgxfwcmdispsrv - displays the server information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdispsrv [-n serverName]
```

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.

Title	Description
OS-Version	An operating system version is displayed.
Version	The version of this product is displayed.
IP-Address	The IP address for communication with the server is displayed. <ul style="list-style-type: none"> - For Management Server <ul style="list-style-type: none"> - 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 serverName`

Specify the server name whose information is to be displayed.

Specify a server the same name entered at the [stgxfwcmaddsrv](#) or [stgxfwcmmodsrv](#) 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 2016 --- V16.9 192.0.2.10 1226
Server1 Server --- Windows Server 2016 --- V16.9 192.0.2.20 1226
Server2 Server --- Windows Server 2016 --- V16.9 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 2016 --- V16.9 192.0.2.20 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 2016 --- V16.9
192.0.2.10,2001: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 displayed OS version retains 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.
- When processing takes a long time, a period (.) is displayed until it is complete.

14.2.8 stgxfwcmdispdev (Device Information Display Command)

NAME

stgxfwcmdispdev - displays the Device information

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdispdev -n serverName [-d deviceName [-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 PRIMECLUSTER GD terms.

Title	Description
S	<p>The status of each device is indicated. The following is displayed according to the device status:</p> <p>*: Device not set up (The AdvancedCopy license setting may be undefined, copy table size may be unspecified, or the copy table may be too small in the box containing this device.) D: Device deletion error U: Device update error</p>
Device	<p>For Solaris environments</p> <p>A RAW device name is displayed.</p> <p>For Windows environments</p> <p>A device name managed internally by AdvancedCopy Manager is displayed. The name is displayed in the g?d? and g?d?p? format.</p> <p>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)</p> <p>(*1)This is a number given uniquely within the ETERNUS Disk storage system. This number differs from the disk number in Disk Management.</p> <p>(*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.</p> <ul style="list-style-type: none"> - 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.

Title	Description
	<p>For HP-UX environments</p> <p>A RAW device name or a volume group name under LVM is displayed.</p> <p>For Linux environments</p> <p>When a RAW device has been created, its name is displayed; otherwise, a block device name is displayed.</p> <p>For AIX environments</p> <p>A RAW device name or a volume group name under LVM is displayed.</p>
Block-Device	<p>For Solaris environments</p> <p>A block device name is displayed.</p> <p>For Windows environments</p> <p>The name is displayed in the disk?p? format.</p> <p>disk?: Disk number displayed by disk administrator p?: Logical disk number (*2)</p> <p>For HP-UX environments</p> <p>A block device name or a volume group name under LVM is displayed.</p> <p>For Linux environments</p> <p>A block device name is displayed.</p> <p>For AIX environments</p> <p>A block device name or a volume group name under LVM is displayed.</p>
Mount-Point	<p>For Solaris, HP-UX, AIX, or Linux environments</p> <p>A mount point name is displayed.</p> <p>For Windows environments</p> <p>A drive character is displayed.</p>
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	<p>For Windows or Linux environments</p> <p>The Symfoware RDB system name is displayed.</p> <p>For Solaris, HP-UX, or AIX environments</p> <p>"---" is always displayed.</p>
Log-Group-Name	<p>For Windows or Linux environments</p> <p>The Symfoware log group name is displayed.</p> <p>For Solaris, HP-UX, or AIX environments</p> <p>"---" is always displayed.</p>
DB-Space-Name	<p>For Windows or Linux environments</p> <p>The Symfoware database space name is displayed.</p> <p>For Solaris, HP-UX, or AIX environments</p> <p>"---" is always displayed.</p>

OPTIONS

-n serverName

Specify the server name that manages the device whose information is to be displayed.

-d deviceName

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

- Displaying the information for a device of a server "Server1":

```
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:\>
```

- Displaying the information for each device of a server "Server1":

```
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:\>
```

- Displaying information of devices which use the same copy area as the device of a server "Server1":

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdispdev -n Server1 -d /dev/vx/rdisk/dg1/vol1 -sm
Device          Mount-Point
/dev/vx/rdisk/dg1/vol1 /storagedata
/dev/vx/rdisk/dg1/vol2 ---
/dev/vx/rdisk/dg1/vol3 /zzz
C:\>
```

- Displaying information of devices which exist in the same logical group as the device of a server "Server1":

```
C:\>C:\ETERNUS_SF\ACM\bin\stgxfwcmdispdev -n Server1 -d /dev/vx/rdisk/dg1/vol1 -grp
Device          Mount-Point
/dev/vx/rdmp/clt0d0s2 ---
/dev/vx/rdmp/clt0d1s2 ---
/dev/vx/rdisk/dg1/vol1 /storagedata
/dev/vx/rdisk/dg1/vol2 ---
/dev/vx/rdisk/dg1/vol3 /zzz
```

```
/dev/vx/rdisk/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, 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.
- The **RDB-Name** column, **Log-Group-Name** column, and **DB-Space-Name** column are displayed under the following conditions:
 - The Managed Server's OS is Linux or Windows.
 - 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.
- When processing takes a long time, a period (.) is displayed until it is complete.

14.2.9 stgxfwcmdisppat (Partition Information Display Command)

NAME

stgxfwcmdisppat - displays the information for the partitions

SYNOPSIS

```
<program-directory>\bin\stgxfwcmdisppat -n serverName -d deviceName
```

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 PRIMECLUSTER GD terms.

Title	Description
Partition	<p>Solaris server:</p> <p>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.</p> <p>Windows server:</p> <p>When the device is installed in the ETERNUS Disk storage system, the same contents as the stgxfwcmdispdev command are displayed. When the device is not installed in the ETERNUS Disk storage system, the name is displayed in the following formats.</p> <p>MBR Disks:</p> <p>S?p?</p> <p>S?: Signature (8-digit hexadecimal number) p?: Logical disk number (*1)</p> <p>GPT Disks:</p> <p>G?: DiskId of disk (32-bit hexadecimal character string) p?: Logical disk number (*1)</p>

Title	Description
	<p>(*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.</p> <ul style="list-style-type: none"> - 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 <p>HP-UX server:</p> <p>A RAW device name or a volume group name under LVM is displayed.</p> <p>Linux server:</p> <p>When a RAW device has been created, its name is displayed. Otherwise, a block device name is displayed.</p> <p>In the case of an SDX object in units of slices, it displays in the form of RAW device name:sd?.</p> <ul style="list-style-type: none"> - RAW device name: The udev device name indicated by the sdxinfo DEVNAME value - RAW device name: The sdxinfo DEVNAME value <p>AIX server:</p> <p>A RAW device name or a volume group name under LVM is displayed.</p>
Identifier	<p>Solaris server:</p> <p>A block device name is displayed.</p> <p>In the case of an SDX object, the name is displayed in the block device name c?t?d? format.</p> <p>Windows server:</p> <p>A device name managed internally by AdvancedCopy Manager is displayed.</p> <p>The same contents as Device of the stgxfwcmdispdev command are displayed.</p> <p>HP-UX server:</p> <p>A block device name or a volume group name under LVM is displayed.</p> <p>Linux server:</p> <p>A block device name is displayed.</p> <p>In the case of an SDX object in units of slices, it displays in the form of a block device name:sd?.</p> <ul style="list-style-type: none"> - RAW device name: The udev device name indicated by the sdxinfo DEVNAME value - RAW device name: The sdxinfo DEVNAME value <p>AIX server:</p> <p>A block device name or a volume group name under LVM is displayed.</p>
Physical-Disk	<p>Solaris, HP-UX, Linux, or AIX server:</p> <p>"---" is always displayed.</p> <p>Windows server:</p> <p>A physical device name is displayed.</p> <p>The same contents as 'Block-Device' of the stgxfwcmdispdev command are displayed.</p>
Disk-Type	<p>When the device is installed in the ETERNUS Disk storage system, "GR" is displayed.</p> <p>When the device is not installed in the ETERNUS Disk storage system, "---" is displayed.</p> <p>Solaris or Linux server:</p> <p>When the device is an SDX object in units of logical volumes, "---" is displayed.</p>
LU-Number	<p>When the device is installed in the ETERNUS Disk storage system, a logical unit number is displayed.</p> <p>When the device is not installed in the ETERNUS Disk storage system, "---" is displayed.</p>

Title	Description
	Solaris or Linux server: When the device is an SDX object in units of logical volumes, "---" is displayed.

OPTIONS

`-n serverName`

Specify the server name that manages a device whose information is to be displayed.

Specify a server name displayed by the `stgxfwcmdispsrv` command exactly as displayed, including the case.

`-d deviceName`

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.
- When processing takes a long time, a period (.) is displayed until it is complete.

14.2.10 stgenvdisp (Environment Information Display Command)

NAME

`stgenvdisp` - displays the values of the environment settings

SYNOPSIS

```
<program-directory>\bin\stgenvdisp [-n serverName]
```

DESCRIPTION

This command displays the environmental information set in AdvancedCopy Manager in the server where the command is executed. 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: "MSCS": Clustered system on Windows environment "GENERAL": Clustered system on Solaris, Linux, or HP-UX environment
Node type	The node type is displayed as follows:

Title	Description
	"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 " 13.5.6.1 Changing IP Address of Management Server Transaction " or " 13.5.6.2 Changing 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 " 13.5.6.1 Changing IP Address of Management Server Transaction " or " 13.5.6.2 Changing 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. <ul style="list-style-type: none"> - For "Management server" <p>The IP address of the Management Server is displayed. If both IPv4 address and IPv6 address are set, they are displayed in two lines. If the Management Server is a cluster configuration, the physical IP address is displayed.</p> - For "Managed server" <p>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.</p> IPv6 address is expressed in abbreviated notation.
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_logicalNodeName) is displayed.
Program install directory	Displays the "Program directory" specified during installation.
Fixed configuration directory	Displays the "Environment directory" specified during installation.

Title	Description
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

OPTIONS

-n serverName

Specifies the logical node name (logical node name specified in the cluster setup command) of the transaction.

In Cluster Environment

If this option is specified, information on only the specified transactions is output. Otherwise, information on all transactions is output.

In 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    : 192.0.2.10
Communication         : 1226
-----
Version              : V16.9
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    : 192.0.2.10
Manager IP address    : 2001:db8::1234:0:0:1
Communication         : 1226
-----
Version              : V16.9
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    : 192.0.2.10
Communication         : 1226
-----
Version               : V16.9
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               : V16.9
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   : 192.0.2.10
Manager IP address    : 192.0.2.10
Communication         : 11000
-----
Server type           : Server
Node name             : Local-Service
Manager IP address    : 192.0.2.10
Communication         : 1226
-----
Version               : V16.9
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 : 1192.0.2.10
IPv6 by cluster setup : 2001:db8::1234:0:0:1
Manager IP address  : 192.0.2.10
Manager IP address  : 2001:db8::1234:0:0:1
Communication       : 11000
```

```
Server type         : Server
Node name           : Local-Service
Manager IP address  : 192.0.2.10
Communication       : 1226
```

```
Version             : V16.9
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
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 : 192.0.2.11
Manager IP address  : 192.0.2.10
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 : 192.0.2.12
Manager IP address  : 192.0.2.10
Communication       : 12000
```

```
Server type         : Server
Node name           : Local-Service
Manager IP address  : 192.0.2.10
Communication       : 1226
```

```
Version             : V16.9
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
Network name         : ACMNet1
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              : V16.9
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.

14.2.11 stgmgrinfo set (Management Information Package Backup Server Registration/Deletion Command)

NAME

stgmgrinfoaset - registers, deletes or displays the management information

SYNOPSIS

```
<program-directory>\bin\stgmgrinfoaset [-del | -d directoryName -c managementServerEncoding]
```

DESCRIPTION

This command can be used to register, delete or display information about the management information package backup execution server(the server on which the [stgmgrinfobkup](#) 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 *directoryName*

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 *managementServerEncoding*

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\stgmgrinfoaset -d 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\stgmgrinfoaset -del
swstf3001 The server which performs package backup of the management information on AdvancedCopy
Manager was deleted. Delete a directory. Directory=D:\stgbkupdata
C:\>
```

- Display information about the management information package backup execution server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfoaset
Directory      : D:\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.

14.2.12 stgmgrinfobkup (Management Information Package Backup Command)

NAME

`stgmgrinfobkup` - backup the management information

SYNOPSIS

```
<program-directory>\bin\stgmgrinfobkup [-n serverName] [-t backupType]
```

DESCRIPTION

This command backup the management information stored on the Managed Server and the Management Server.

OPTIONS

`-n serverName`

Creates backups of the management information stored on the specified server.

If this option is omitted, the management information on all Managed Server (including the Management Server) is backed up.

`-t backupType`

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:

RegiData : Registry

MgrInfoData : Policy file for management information package backup

BkupData : Backup management

ReplData : Replication management

If this option is omitted, backups are created as defined in the policy file. For details on the policy file, refer to the section "[13.1.2.1 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 the 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.
- 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 is not made if the -t option is omitted.

- 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 omitted. Additionally, specify the name of the management information package backup execution server in the -n option.
- 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.
- If the version of Management Server is lower than that of Managed Server, back up the management information on Management Server.

14.2.13 stmgrinfodisp (Management Information Package Backup Status Display Command)

NAME

stmgrinfodisp - displays the status of execution of the stmgrinfobkup

SYNOPSIS

```
<program-directory>\bin\stmgrinfodisp [-n serverName]
```

DESCRIPTION

This command displays the status of execution of the [stmgrinfobkup](#) command.

The types of information listed below are output.

If there are no backups created by executing the [stmgrinfobkup](#) command or if the [stmgrinfobkup](#) command ends in error, then no data is output.

Item	Description
Server	Server name
RegiData	Date and time at which the stmgrinfobkup command created a backup of a registry (ie, the date and time that the stmgrinfobkup command was executed) In yy/mm/dd hh:mm:ss format
BkupData	Date and time at which the stmgrinfobkup command created a backup of the backup management (ie, the date and time that the stmgrinfobkup command was executed) yy/mm/dd hh:mm:ss
ReplData	Date and time at which the stmgrinfobkup command created a backup of replication management (ie, the date and time that the stmgrinfobkup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	Date and time at which the stmgrinfobkup command created a backup of the policy file for management information package backup (ie, the date and time that the stmgrinfobkup command was executed) yy/mm/dd hh:mm:ss

OPTIONS

-n *serverName*

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 [stmgrinfobkup](#) command was executed is displayed.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Output the information about all the Managed Server:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\stgmgrinfodisp
Server:      acm01
  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
  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.

14.2.14 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 the environment variable SWSTGNODE is set: value of the environment variable SWSTGNODE
- If the 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 : Checks the current setup status of Virtual Environment Support Function.

Information Output When "disp" Is Specified is as follows:

Output Strings	Explanation
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:\>
```

14.2.15 stgarcext (Backup Data Expansion Command)

NAME

stgarcext - expands the backup data

SYNOPSIS

```
<program-directory>\bin\stgarcext fileName directoryName
```

DESCRIPTION

This command expands the following types of backup data collected by the [stgmgrinfobkup](#) command from the Management Server and Managed Server running the Windows version of AdvancedCopy Manager.

- Backup management list

OPERANDS

fileName

Specify the absolute path to the backup file to be expanded.

directoryName

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.

14.2.16 stgrepcnv (Repository Data Migration Command)

NAME

stgrepcnv - migrates the repository data

SYNOPSIS

```
<program-directory>\bin\stgrepcnv -d directoryName | fileName
```

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 *directoryName* | *fileName*

When upgrading from Version 16.0 or earlier, specify the absolute path name of the directory where the migration target repository data is stored.

When upgrading from Version 16.1 or later, specify the absolute path name for the migration repository data backup file.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

```
C:\>C:\ETERNUS_SF\ACM\bin\stgrepcnv -d C:\backdir
.....
stgrepcnv 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.
- Do not use Telnet server service, as it does not work properly.
- For Management Server transactions, execute this command at a currently operating server. The environment variable SWSTGNODE need not be set.

14.2.17 stgforcedelsrv (Managed Server Forcibly Deletion Command)

NAME

stgforcedelsrv - deletes the information of Managed Server forcibly

SYNOPSIS

```
<program-directory>\bin\stgforcedelsrv -n managedServer -b beforeFile -a afterDir
```

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 "[13.6 Action When Managed Server Information Cannot Be Deleted](#)".

OPTIONS

-n *managedServer*

Specify the server name of Managed Server to be deleted forcibly.

-b *beforeFile*

Specify the full path name of the file containing the database backup.

The command deletes the Managed Server information forcibly from the database in the file specified with the -b option and stores the database after deletion in the directory specified with -a option.

-a *afterDir*

Specify the full path name of the directory that stores the database after the Managed Server information has been deleted. 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 does 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\db_file.txt -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.
- 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.

- If the OS of the Management Server is Windows, launch the command prompt with "Run as Administrator" and then execute this command.

14.3 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 terminates abnormally.

Note

- The operating environment required for command execution is shown in the table below.

Table 14.6 Operating Environment When Executing Replication Management Commands

Command Name	Operating Environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Management Server with the -h option specified, the daemons or services of 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 the equivalency maintain state, 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, the daemons or services of the Management Server and target Managed Server must be operating.
swsrpdelvol	To execute this command on a Managed Server, the daemons or services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. For inter-server replication, the daemons or services of the Managed Server in communication must be operating. (except when the -d option is specified).
swsrprebuffstat	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swsrprebuffset	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.
swsrpmake	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows and is engaged in replication on single server and EC operation, Windows services required by the Managed Server must be running. For inter-server replication, the daemons or services of the Managed Server in communication must be operating. (except when the -d option is specified).

Command Name	Operating Environment of AdvancedCopy Manager
swsrprecoverres	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. 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, the daemons or services of the Management Server and target Managed Server must be operating.
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, the daemons or services of the Management Server and target Managed Server must be operating. For inter-server replication, the daemons or services of the Managed Server in communication must be operating.
swsrpstartsync	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating. 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, the daemons or services of the Management Server and target Managed Server must be operating.
swsrpvolinfo	To execute this command on a Management Server with the -h option specified, the daemons or services of the Management Server and target Managed Server must be operating.

Note

- In Cluster Operation, there is the following note.

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=logicalNodeName
```

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 14.7 Commands When Cluster Operation Is Used

Command Name	Environment Variable	Command Execution Node	Remarks
swsrpsetvol	Required	Transaction operation node	-
swsrpvolinfo	Required	Transaction operation node	-

Command Name	Environment Variable	Command Execution Node	Remarks
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	-

14.3.1 Environment Definition Commands

This section describes environment definition commands for replication management.

14.3.1.1 swsrpsetvol (Replication Volume Information Setting Command)

NAME

swsrpsetvol - sets the replication source volumes and replication destination volumes

SYNOPSIS

To Execute on Managed Server

For Replication on Single Server

```
<program-directory>\bin\swsrpsetvol [-n] [-u] [-Xvtoc] [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

For Server-to-server Replication

```
<program-directory>\bin\swsrpsetvol [-n] [-u] [-Xvtoc] -o {ORG|REP|BOTH} [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

To Execute on Management Server

For Replication on Single Server

```
<program-directory>\bin\swsrpsetvol [-h serverName] [-n] [-u] [-Xvtoc] [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

For Server-to-server Replication

```
<program-directory>\bin\swsrpsetvol [-h Server-Name] [-n] [-u] -o {ORG|REP|BOTH} [-Xvtoc] [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

DESCRIPTION

This command sets the replication source volumes and replication destination volumes that are used in a replication operation. Execute this command to declare that the replication operation is performed using the specified replication volumes.

When using the Storage Cluster Continuous Copy Function, configure the replication source and replication destination volume information that are commonly used by the Primary Storage and Secondary Storage.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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}

When performing the server-to-server replication, specify the operation server(s) authorized to manage replication. 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.

When BOTH has been specified, all commands can be executed from either the replication source server or the replication destination server.

When ORG or REP was specified, the non-operation server cannot issue the following commands:

- [swsrpdelvol](#)
- [swsrpstartsync](#)
- [swsrpmake](#)
- [swsrpcancel](#)
- [swsrpchsync](#)
- [swsrprevsync](#)

However, in the following cases, the non-operation server can issue the above commands.

- When specifying the -d option with the [swsrpdelvol](#) command.
- When specifying the -c option with the [swsrpcancel](#) command.
- When specifying the -b option with the [swsrpcancel](#) command.

-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 *groupName*

Specifies that the copy source and copy destination volumes are 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 hyphens (-),

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 omitted, 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

originalVolumeName

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*.

replicaVolumeName

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 server-to-server replication.
- 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 the specified replication source and replication destination volumes are neither of the following combinations:
 - Both the replication source volume and the replication destination volume are TFOV.
 - Both the replication source volume and the replication destination volume are non-TFOV.
- The specified replication source and destination volumes belong to different TFO groups.
- The specified replication source and destination volumes are in the failover or in the failback state.
- 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 the [swsrpdelvol](#) command.
 2. Refer to "Add/Reload Device" in the *Web Console Guide* to reload the configuration. Otherwise the [stgxfwcmsetdev](#) command is executed in a Management Server.
 3. Reset the replication volume information with the [swsrpsetvol](#) command.

If you add a new device or delete a device (including general devices other than ETERNUS Disk storage system) on a Managed Server, refer to "Add/Reload Device" in the *Web Console Guide* to reload the configuration and update the corresponding 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 group configuration conditions are not met.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)

- swsrpdelvol
- swsrprecbuffset
- swsrpstartsync
- swsrpmake
- swsrpcancel
- swsrpchsyc
- swsrprevsync
- swsrprecoverres
- swsrpbackup_sql
- swsrpdbinfo_exchange
- swsrpvssbackup_exchange
- swsrpvssrestore_exchange
- swsrpshadowadm_exchange
- swsrpshadowadm

14.3.1.2 swsrpvoinfo (Replication Volume Information Display Command)

NAME

swsrpvoinfo - displays the replication volume information

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrpvoinfo [-L] [originalVolumeName]
```

To Execute on Management Server

```
<program-directory>\bin\swsrpvoinfo [-h serverName] [-L] [originalVolumeName]
```

DESCRIPTION

This command displays the replication volume information registered by the [swsrpsetvol](#) command. The following information is 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.

Title	Description
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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-L

Specifies that information is 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

originalVolumeName

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](#)

14.3.1.3 swsrpdelvol (Replication Volume Information Deletion Command)

NAME

swsrpdelv - deletes the replication volume

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrpdelv [-e] [-d] originalVolumeName replicaVolumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrpdelv [-h serverName] [-e] [-d] originalVolumeName replicaVolumeName
```

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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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 server-to-server replication. 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 server-to-server replication.

The option can be used on the server not specified as the operation server.

OPERANDS

originalVolumeName

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*.

replicaVolumeName

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 gld1p1 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](#)
 - [swsrpdelvol](#)
 - [swsrprebuffset](#)
 - [swsrpstartsync](#)
 - [swsrpmake](#)
 - [swsrpcancel](#)
 - [swsrpchsync](#)
 - [swsrprevsync](#)
 - [swsrprecoverres](#)
 - [swstbackup_sqlsvr](#)
 - [swsrpdbinfo_exchange](#)
 - [swsrpvssbackup_exchange](#)
 - [swsrpvssrestore_exchange](#)
 - [swsrpshadowadm_exchange](#)
 - [swsrpshadowadm](#)

14.3.1.4 swsrprebuffstat (REC Buffer Information Display Command)

NAME

swsrprebuffstat - displays information for the REC buffer

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrprecbuffstat [-L] volumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrprecbuffstat [-h serverName] [-L] volumeName
```

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 is 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 "Use" is SEND, the usage rate of the REC buffer is displayed as a percentage. The usage rate may not be 0 %, even if REC is not being performed in Consistency mode. If "Use" is RECV, "0%" is always displayed. "----" is 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: <ul style="list-style-type: none"> - "----": 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: <ul style="list-style-type: none"> - 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 *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the `stgxfwcmdispsrv` command.

-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

volumeName

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 -L gld10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                               DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active  50%
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat -L gld20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                               DiskBuff DiskRate
1  RECV 0%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA ---    ---
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 -L gld10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                               DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active  0%
2  RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB ---    ---
C:\>
```

[Command executed on Managed Server "Server2"]

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat -L gld30p1@Server2
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                               DiskBuff DiskRate
1  RECV 0%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA ---    ---
2  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA 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 -L gld10pl@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD invalid --- ---
6 RECV 0% EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE --- ---
7 SEND 12% FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF inactive(code=05) --- ---
8 SEND 12% GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG 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 takes a short time for changes to REC buffer settings to take effect, during which time the buffer may become unusable (the Rate column is 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](#)
- The REC buffer information cannot be displayed by using TFOV.

14.3.1.5 swsrprecbuffset (REC Buffer Settings Change Command)

NAME

swsrprecbuffset - changes the settings of the REC buffer

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} volumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrprecbuffset [-h serverName] -Xbuffid buffer-id -Xbuffuse {SEND|RECV} volumeName
```

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 serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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

volumeName

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 gld10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse RECV gld10p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat gld10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat gld20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND gld20p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat gld20p1@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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 gld10p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND gld20p1@Server1
swsrprecbuffset completed
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffset -Xbuffid 2 -Xbuffuse RECV gld20p1@Server1
swsrprecbuffset completed
```

```

C:\>C:\Win32app\AdvancedCopyManager\bin\swsrprecbuffstat g1d20p1@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
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 takes a short time for changes to buffer settings to take effect, during which time the REC buffer becomes unusable. Do not perform REC operations during this time.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrpstartsync](#)
 - [swsrpmake](#)
 - [swsrpstat](#)
 - [swsrpcancel](#)
 - [swsrpchsync](#)
 - [swsrprevsync](#)
 - [swsrprecoverres](#)
 - [swstbackup_sqlsvr](#)
 - [swsrpdbinfo_exchange](#)
 - [swsrpvssbackup_exchange](#)
 - [swsrpvssrestore_exchange](#)
 - [swsrpshadowadm_exchange](#)
 - [swsrpshadowadm](#)
- The REC buffer settings cannot be changed by using TFOV.

14.3.2 Operation Commands

This section describes operation commands for replication management.

14.3.2.1 swsrpstartsync (Synchronous Processing Start Command)

NAME

swsrpstartsync - starts synchronous processing

SYNOPSIS

To Executed on Managed Server

```

<program-directory>\bin\swsrpstartsync [-y [-a | -v] | -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] fromVolumeName toVolumeName

```

To Execute on Management Server

```
<program-directory>\bin\swsrpstartsync [-h serverName] [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
<program-directory>\bin\swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
<program-directory>\bin\swsrpstartsync [-h serverName] [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] [-Xreverse] -Xgroup groupName
```

DESCRIPTION

Start the synchronous replication processing (copying disks by EC or REC).

It copies 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 just copies 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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

If the Storage Cluster Continuous Copy function is used, the synchronous replication process is started on both the Primary Storage and Secondary Storage.

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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.

If both the -a and -v options are omitted, the mode starts in Automatic Split mode.

If the -y, -k, and -i options are omitted, the transfer mode for inter-box synchronization is set to 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.

If the -y, -k, and -i options are omitted, the transfer mode for inter-box synchronization is set to 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.

If the -y, -k, and -i options are omitted, the transfer mode for inter-box synchronization is set to 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 the [swsrpmake](#) command.

-Xgroup *groupName*

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).

This option is valid only when the -Xgroup option is specified.

-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 media 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

fromVolumeName

Specifies a replication source volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

toVolumeName

Specifies a replication destination volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Starting 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:\>
```

- Starting 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:\>
```

- Starting 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 is terminated immediately if an error occurs.
- When the replication to be performed satisfies either of the following two conditions, 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.

- 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 14.8 Differences in Processing Corresponding to Synchronization Status

Status of Synchronization Processing	Processing
Dismount status	Start of total copy
Total or incremental copy status	Information message (swsrp2401) is output and the command ends normally
Equivalency maintain status	Information message (swsrp2401) is output and the command ends normally
Replication established status (i.e., halt status)	Start of incremental copy

- Before starting the replication, this command executes 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 "[15.1.1 General Notes](#)" for notes about starting replication.

- An error occurs if the synchronous process is restarted with -Xda option. When changing the access permission for replication destination volume, first cancel the current replication processing with the [swsrpcancel](#) command and then re-execute this command.
- This command terminates 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](#)
 - [swsrpdelvol](#)
 - [swsrprecbuffset](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.
- When the Storage Cluster Continuous Copy function is used:
 - When the status of the TFO group is "Normal", and synchronous processing cannot start on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command starts synchronous processing on the storage that has an "Active" TFO status and terminates normally. However, synchronous processing could not be started on the storage that has a "Standby" TFO status. In this case, swsrp2882 message may be output. If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

14.3.2.2 swsrpmake (Replication Creation Command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To Execute on Managed Server

Synchronized Replication

```
<program-directory>\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur | -C | -P])
fromVolumeName toVolumeName
```

Snapshot Replication

```
<program-directory>\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) fromVolumeName
toVolumeName
```

To Execute on Management Server

Synchronized Replication

```
<program-directory>\bin\swsrpmake [-h serverName] [-m] [-f | -Xflush] [-t] ([-j | -T | -Xconcur
| -C | -P])fromVolumeName toVolumeName
```

Snapshot Replication

```
<program-directory>\bin\swsrpmake [-h serverName] [-m] [-f | -Xflush] [-t] ([-T | -C | -P])
fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

Synchronized Replication

```
<program-directory>\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -Xgroup groupName
```

Snapshot Replication

```
<program-directory>\bin\swsrpmake [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

Synchronized Replication

```
<program-directory>\bin\swsrpmake [-h serverName] [-m] [-f | -Xflush] [-t] ([-j|-T|-Xconcur|-C | -P]) [-Xreverse] -Xgroup groupName
```

Snapshot Replication

```
<program-directory>\bin\swsrpmake [-h serverName] [-m] [-f | -Xflush] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-Xreverse] -Xgroup groupName
```

DESCRIPTION

When synchronization processing (EC) is not performed, this command starts 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 about these processes, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)".

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

If the Storage Cluster Continuous Copy function is used, replication volumes are created on both the Primary Storage and Secondary Storage.

OPTIONS

-h serverName

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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 the [swsrpstartsync](#) 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 is 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 occurs.

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 the [swsrpstartsync](#) command with the -t option specified.

-T

Specifies that differential snapshot processing is 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 *groupName*

Specifies that a replication is created for each group.

-Xreverse

Specifies that a replication is created for each group in the reverse direction (i.e., from replica volumes to original volumes).

This option is valid only when the -Xgroup option is specified.

-Xconcur

Specifies that a replication is created using the Concurrent Suspend function.

This option is not supported when PRIMECLUSTER GD Snapshot linkage is being used.

-Xconcur-opc

Specifies that a replication is created using the Concurrent OPC function.

This option is not supported when linking with PRIMECLUSTER GD Snapshot.

-C

Specifies to start SnapOPC.

This option is only valid for intra-box replications and for ETERNUS Disk storage system that supports the SnapOPC function.

-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.

An error occurs in the following cases:

- The same SnapOPC+ session exists at the copy source volume and the copy destination volume.

OPERANDS

fromVolumeName

Specifies a replication source volume.

Specifies the replication source volume or the replication destination volume that was set with the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

toVolumeName

Specifies a replication destination volume.

Specifies the replication source volume or the replication destination volume that was set with the [swsrpsetvol](#) 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.
- 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 S2 (for earlier than V10L30 firmware)
 - ETERNUS DX90 S2 (for earlier than V10L30 firmware)
 - ETERNUS DX400 S2 series (for earlier than V10L30 firmware)
 - ETERNUS DX8000 S2 series (for earlier than V10L30 firmware)
- If the -Xgroup option is specified, processing is 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 is 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 is terminated without creating a copy.

Refer to the following table for details about the preliminary checks.

Type	Details of Preliminary Checks
Common	Check if a pair of synchronized replications is not exist in the group.
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 about copy operation.

OPC/SnapOPC/SnapOPC+

Operation Status (Display by swsrpstat -L Command)	Copy Operation
When the operation status of the replication volume in the group is in one of the following: <ul style="list-style-type: none"> - 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".) 	<ol style="list-style-type: none"> 1. Copying that is in progress is terminated. 2. Define the Concurrent OPC. Snapshot processing is newly started with the Concurrent OPC specified.

Operation Status (Display by swsrpstat -L Command)	Copy Operation
<ul style="list-style-type: none"> - 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".) 	

QuickOPC

Operation Status (Display by swsrpstat -L Command)	Copy Operation
<p>When the operation status of the replication volume in the group is in one of the following:</p> <ul style="list-style-type: none"> - 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)".) - Error suspend status (Status is "failed".) 	<ol style="list-style-type: none"> 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.
<p>When the operation status of the replication volume in the group is in one of the following:</p> <ul style="list-style-type: none"> - 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".) 	<p>Differential snapshot processing is restarted with the Concurrent OPC specified.</p>

- When the replication to be performed satisfies either of the following conditions, 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.

- 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.

- If this command is executed while a snapshot process is running, the copy in progress is stopped and a new snapshot process is started. However, if the target copy session is SnapOPC+ and the snap generation is not the oldest, this command terminates with an error before the copy is stopped.
- 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.
- 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/SnapOPC+ can be executed.
- When restoring data from the copy destination volume of SnapOPC/SnapOPC+, note that there must be a copy session between the copy source volume and the copy destination volume. However, for SnapOPC+ sessions whose snap generations are currently being deleted, the data cannot be restored.
- If this command is executed during snapshot processing, snapshot processing is restarted. Refer to the following table for details about copy operation:

Table 14.9 Copy Operation When Command Is Executed During Snapshot Processing

Operation Status (Display by swsrpstat -L Command)	-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.

Operation Status (Display by swsrpstat -L Command)	-T Option Specification	Copy Operation
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 "[15.1.1 General Notes](#)" for notes on creating replication.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrprecbuffset](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.
- When the Storage Cluster Continuous Copy function is used:
 - If the status of the TFO group is "Normal", and replication volume cannot create on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command starts synchronous processing on the storage that has an "Active" TFO status and terminates normally. However, synchronous processing could not be started on the storage that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and the phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

14.3.2.3 swsrpstat (Operation Status Display Command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrpstat [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E] [-H] [-O]
[originalVolumeName]
```

To Execute on Management Server

```
<program-directory>\bin\swsrpstat [-h serverName] [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ]
[-E] [-H] [-O] [originalVolumeName]
```

To Execute on Managed Server: Group Specification

```
<program-directory>\bin\swsrpstat [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E] [-H] [-O] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
<program-directory>\bin\swsrpstat [-h serverName] [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E] [-H] [-O] -Xgroup groupName
```

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 is 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	<p>Displays the copy direction if a copy session exists.</p> <ul style="list-style-type: none"> - "regular": Copying from the replication source to the replication destination is being performed. - "reverse": Copying from the replication destination to the replication source is being performed. - "----": Copying is not being performed.
Status	<p>Displays the execution status.</p> <p>If the Storage Cluster Continuous Copy function is used, the execution status of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - "----": 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). - "deleting": SnapOPC+ processing is being stopped (snap generation is being deleted) - "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).

Title	Description
	<ul style="list-style-type: none"> - "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. <p>*1: "halt(use-buffer)" and "halt(use-disk-buffer)" are output when the following two conditions are fulfilled:</p> <ul style="list-style-type: none"> - The -H option was specified, and - In inter-server replication, this command was executed on the replication source server of REC.
Execute	<p>Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed.</p> <p>If the Storage Cluster Continuous Copy function is used, the replication progress rate of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p>
Trk	<p>Displays whether tracking processing is in progress.</p> <p>If the Storage Cluster Continuous Copy function is used, the presence of the tracking process of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - "on": Tracking processing is in progress. - "off": Tracking processing is not in progress. - "----": Snapshot processing is not being performed.
Update	<p>Displays the percentage of data that has been updated since the last copy was created, in the cases shown below.</p> <p>If the Storage Cluster Continuous Copy function is used, the size of the data that has been updated of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <p>For SnapOPC+, this displays the percentage of data that has been updated since the previous snap generation.</p> <ul style="list-style-type: none"> - When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not 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) - When the Status column is "deleting" (SnapOPC+ processing is being stopped (snap generation is being deleted)) <p>Displays "----" during physical copying or when tracking is not in progress.</p>
Rcv	<p>Indicates the Recovery mode for Inter-ETERNUS synchronization.</p> <ul style="list-style-type: none"> - "auto": Automatic Recovery mode - "manual": Manual Recovery mode - "----": Inter-ETERNUS synchronous replication (REC) is not performed.

Title	Description
Split	<p>Indicates the Split mode for Inter-ETERNUS synchronization.</p> <ul style="list-style-type: none"> - "auto": Automatic Split mode - "manual": Manual Split mode - "----": Inter-ETERNUS synchronous replication (REC) is not performed using the Synchronous mode.
Xfer	<p>Indicates the Transfer for Inter-ETERNUS synchronization.</p> <ul style="list-style-type: none"> - "sync": Synchronous mode - "async": Through mode - "stack": Stack mode - "consist": Consistency mode - "----": Inter-ETERNUS synchronous replication (REC) is not performed.
Snap-Gen	<p>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.</p>
Copy-DA (Copy Destination Access)	<p>Displays the access permission for the replication destination volume. If the Storage Cluster Continuous Copy function is used, the access permission of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <ul style="list-style-type: none"> - "on": Access is not being permitted. - "off": Access is being permitted. <p>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.</p>
Date	<p>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.</p> <p>If the Storage Cluster Continuous Copy function is used, the timestamp of the ETERNUS Disk storage system where the TFO status is "Active" is displayed.</p> <p>The timestamp is relative to the time zone settings of the specified storage system.</p> <p>[For the OPC or QuickOPC]</p> <ul style="list-style-type: none"> - Starting the logical copy (Execution the "swsrpmake" or "swsrpmake -T") - Changing to error suspend status (The Status is "failed") <p>[For the SnapOPC or SnapOPC+]</p> <ul style="list-style-type: none"> - Starting the logical copy (Execution the "swsrpmake -C" or "swsrpmake -P") - Changing to error suspend status (The Status is "failed") <p>[For the EC]</p> <ul style="list-style-type: none"> - Suspend (Execution the "swsrpmake") - Concurrent Suspend (Execution the "swsrpmake -Xconcur") - Changing to error suspend status (The Status is "failed") <p>[For the REC]</p> <ul style="list-style-type: none"> - Starting the REC by initial copy skip function (Execution the "swsrpstartsync -Xskip") - Suspend (Execution the "swsrpmake") (*1)

Title	Description
	<ul style="list-style-type: none"> - Concurrent Suspend (Execution the "swsrpmake -Xconcur") - Changing to error suspend status (The Status is "failed") - Changing to hard suspend status (The Status is "halt") <p>*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.</p> <p>"----/--/-- --:--:--" is displayed in the following situations:</p> <ul style="list-style-type: none"> - 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 (swsrpstartsnc) 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
Standby-Session	<p>If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.</p> <ul style="list-style-type: none"> - "exist": A Standby-Side Continuous Copy Session exists. - "not-exist": A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session exists) - "----": A Standby-Side Continuous Copy Session does not exist. (An Active-Side Continuous Copy Session also does not exist) - "?????": The Standby-Side Continuous Copy Session status is unknown.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-L

Specifies to display in extension format.

For the items displayed by this option, refer to the table in the description above.

-E

An option which when set displays the operational status in the opposite direction only (from the copy destination to the copy source).

If this option is omitted, the operation status is always 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 is not displayed. Only the operational status in the opposite direction is 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 *groupName*

Specifies that the operation statuses are displayed by the group.

If this option is set, all the operational statuses relating to the specified group are 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)" is displayed when hard-suspend status occurs during a total copy or a differential copy. "halt (equivalent)" is 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)" is 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)" is 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 is 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.

-Xstandby-s

If the Storage Cluster Continuous Copy function is used, the Standby-Side Continuous Copy Session status is displayed.

-Xall

Displays all the 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

originalVolumeName

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 Standby-Session
SRC-SV g1d1p1@SRC-SV g2d1p1@TARG-SV regular replicated ---- ---- auto ---- async
---- on 2010/10/20 22:00:45 exist
SRC-SV g1d2p1@SRC-SV g1d4p1@TARG-SV ---- ---- on 6% ----
---- off 2010/10/20 22:10:39 not-exist
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
#

```

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -Xstandby-s option specified):

```

C:\>C:\ETERNUS_SF\ACM\bin\swsrpstat -h SRC-SV -Xstandby-s
Server Original-Volume Replica-Volume Direction Status Execute Standby-Session
SRC-SV g1d1p3@SRC-SV g2d1p1@TARG-SV regular replicated 45% exist
SRC-SV g1d2p1@SRC-SV g2d2p1@TARG-SV regular replicated 10% not-exist
SRC-SV g1d3p1@SRC-SV g2d3p1@TARG-SV reverse equivalent 100% ?????
C:\>

```


NOTES

- When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to ["13.4 Troubleshooting: 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:
 - [swsrprebuffset](#)
 - [swsrprecoverres](#)
- If the Storage Cluster Continuous Copy function is used, some corrective action may be required according to what is displayed in the **Standby-Session** column.
 - For "not-exist":
Refer to ["12.12 When Recovering Storage Cluster Continuous Copy Function"](#).
 - Other than those above:
No action is required.

14.3.2.4 swsrpcancel (Replication Cancellation Command)

NAME

swsrpcancel - stops snapshot processing and synchronization processing

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrpcancel [-c] {[[-f] [-t] [-m] [-b]]|[-T]} [-Xflush] [-Xforce]  
fromVolumeName toVolumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrpcancel [-h serverName] [-c] {[[-f] [-t] [-m] [-b]]|[-T]} [-Xflush] [-  
Xforce] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
<program-directory>\bin\swsrpcancel [-c] {[[-f] [-t] [-m] [-b]]|[-T]} [-Xreverse] [-Xflush] [-  
Xforce] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
<program-directory>\bin\swsrpcancel [-h serverName] [-c] {[[-f] [-t] [-m] [-b]]|[-T]} [-Xreverse]  
[-Xflush] [-Xforce] -Xgroup groupName
```

DESCRIPTION

This command stops snapshot processing (OPC, QuickOPC, SnapOPC, or 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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to ["15.1.8.1 When Using WSFC for Cluster Operation"](#).

If the Storage Cluster Continuous Copy function is used, the replication process is stopped on both the Primary Storage and Secondary Storage.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-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 the [swstvollockstat](#) command and, if it is locked, unlock the volume using the [swstvolunlock](#) 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 is not 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 single server, the copying is cancelled for both boxes.

For server-to-server replication, 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 is 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 *groupName*

Specifies that copy processing is stopped for each group.

-Xreverse

Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) is stopped

This option is valid only when the -Xgroup option is specified.

-Xforce

Specification of this option forcibly stops a SnapOPC+ session.

Forcibly stopping SnapOPC+ deletes 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 deleted.

OPERANDS

fromVolumeName

Specifies a copy source volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

toVolumeName

Specifies a copy destination volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) 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 is 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 single 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 is performed for each active replication volume, but processing is 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 is terminated immediately if an error occurs.

- SnapOPC+ snap generations are deleted differently depending on whether the target storage device supports deletion of specific snap generation.

- When deletion is supported

Specific snap generation can be deleted while past snap generations are retained.

When a snap generation other than the oldest (snap generation number is "2" or later) is deleted, the snap generation may remain for some time after the command is executed with the status of "deleting".

Before reusing the replication destination volume that is being used for the deletion target snap generation as the replication destination volume, confirm that the generation deletion process is completed.

- When deletion is not supported

The oldest snap generation (snap generation number is "1") must be deleted first.

To forcibly delete a snap generation other than the oldest, specify the -Xforce option. In this case, the specified snap generation and all snap generations prior to that generation are deleted.

If the -Xforce option and the -Xgroup option are specified at the same time, the SnapOPC+ sessions in the group are stopped and the snap generation and all earlier generations in the group are deleted.

- When SnapOPC+ snap generations are deleted, the remaining snap generation numbers are moved up. When snap generations other than the oldest (snap generation number is "2" or later) are deleted, the snap generation numbers are moved up when the deletion process of the snap generation is completed.
- 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 14.10 Processing Differences in Accordance with Operating Status

Operation Status	Processing
Reverse copy direction	Suspends the processing.

Operation Status	Processing
Not operating yet	Suspends the processing.
Total or incremental copy is performed	Suspends synchronization processing. The replication destination volume cannot be used as a replica.
Equivalency maintain status	Suspends synchronization processing. The replication destination volume can be used as a replica
Replication established status	Suspends synchronization processing. The replication destination volume can be used as a replica
Snapshot processing is being performed	Stops the snapshot processing. The replication destination volume cannot be used as a replica or for any other purposes. To reuse the replication destination volume, the volume must be initialized so that the OS recognizes the volume correctly.

- 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 the -T option is omitted
command processing varies depending on the operation status of the source and destination volumes.

Table 14.11 Processing When -T Option Is omitted

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 as a replica.
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 as a replica. 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 14.12 Processing When -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](#)
 - [swsrpdelvol](#)
 - [swsrprecbuffset](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.
- When the Storage Cluster Continuous Copy function is used:
 - When the status of the TFO group is "Normal", and replication processing cannot stop on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of TFO group is "Normal" and its phase is "Maintenance", or when the status of the TFO group is "Halt", the command starts synchronous processing on the storage that has an "Active" TFO status and terminates normally. However, synchronous processing could not be started on the storage that has a "Standby" TFO status. In this case, swsrp2882 message may be output.
If a swsrp2882 message is output, after the status of TFO group has become "Normal" and its phase is not "Maintenance", refer to "[12.12 When Recovering Storage Cluster Continuous Copy Function](#)" to take action.

14.3.2.5 swsrpchsync (Synchronization Mode Change Command)

NAME

swsrpchsync - changes the operation mode

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrpchsnc [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] fromVolumeName toVolumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrpchsnc [-h serverName] [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
<program-directory>\bin\swsrpchsnc [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
<program-directory>\bin\swsrpchsnc [-h serverName] [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] [-Xreverse] -Xgroup groupName
```

DESCRIPTION

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

OPTIONS

-h *serve-Name*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-F {Sync|Async|Stack|Consist}

Changes the transfer mode for inter-box synchronization.

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 *groupName*

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) is changed.

This option is valid only when the -Xgroup option is specified.

OPERANDS

fromVolumeName

Specifies a copy source volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

toVolumeName

Specifies a copy destination volume name.

Specifies the replication source volume or the replication destination volume set with the [swsrpsetvol](#) 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\swsrpchsnc -h SRC-SV -F Async
g1d2p1@SRC-SV g2d2p1@TARG-SV
FROM=g1d2p1@SRC-SV, TO=g2d2p1@TARG-SV swsrpchsnc 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\swsrpchsnc -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsnc 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** column by the [swsrpstat](#) command or hard-suspended status (with "halt" indicated as the **Status** column by the [swsrpstat](#) 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 is terminated immediately if an error occurs.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrprebuffset](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)

14.3.2.6 swsrprevsync (Synchronization Reverse Command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrprevsync fromVolumeName toVolumeName
```

To Execute on Management Server

```
<program-directory>\bin\swsrprevsync [-h serverName] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
<program-directory>\bin\swsrprevsync [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
<program-directory>\bin\swsrprevsync [-h serverName] [-Xreverse] -Xgroup groupName
```

DESCRIPTION

This command reverses the copying direction of synchronization when in suspended status.

If the Storage Cluster Continuous Copy function is used, the replication process is reversed on both the Primary Storage and Secondary Storage.

OPTIONS

-h *serverName*

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

When performing the server-to-server replication, specify the name of the operation server configured with the [swsrpsetvol](#) command.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

-Xgroup *groupName*

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) is inverted.

This option is valid only when the -Xgroup option is specified.

OPERANDS

fromVolumeName

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 the [swsrpsetvol](#) command.

Specifies the [AdvancedCopy Manager device name](#) for the volume name.

toVolumeName

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 the [swsrpsetvol](#) 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 is 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`
 - `swsrpdelvol`
 - `swsrprecbuffset`
 - `swsrprecoverres`
 - `swsrpdbinfo_exchange`
- When the Storage Cluster Continuous Copy function is used:
 - When the status of the TFO group is "Normal", and synchronous processing cannot reverse on either the Primary Storage or Secondary Storage, the command may terminate abnormally. Check the cause of the error on both the Primary Storage and Secondary Storage to address the error message in the storage device where the error is occurring.
 - When the status of the TFO group is "Normal" and its phase is "Maintenance", or when the status of TFO group is "Halt", the command reverses the synchronous processing on the storage that has an "Active" TFO status and terminates normally.

14.3.3 Maintenance Commands

This section describes the maintenance commands for replication management.

14.3.3.1 swsrprecoverres (Resource Adjustment Command)

NAME

`swsrprecoverres` - executes recovery to make replication management information

SYNOPSIS

To Execute on Managed Server

```
<program-directory>\bin\swsrprecoverres [-r] [-p]
```

To Execute on Management Server

```
<program-directory>\bin\swsrprecoverres [-h serverName] [-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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

`-h serverName`

When executing on the Management Server, specify the name of the target Managed Server.

When executing on the target Managed server, it is not necessary to specify this option.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the [stgxfwcmdispsrv](#) command.

`-r`

Specify this option when an incorrect status exists in the replication management lists. E.g., when the [swsrpsetvol](#) or [swsrpdelvol](#) command that update the replication management lists terminate suddenly because of a forced stop, a system failure or the replication management lists have been deleted by mistake.

When this option is specified, the following processing is performed to recreate the replication management lists. 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 the [swsrpmake](#) 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 the [swsrpsetvol](#) and [swsrpdelvol](#) commands 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 server-to-server replication, 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 the [swsrpmake](#) 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`
 - `swsrpvoinfo`
 - `swsrpdelvol`
 - `swsrprecbuffset`
 - `swsrpstartsync`
 - `swsrpmake`
 - `swsrpstat`
 - `swsrpcancel`
 - `swsrpchsync`
 - `swsrprevsync`
 - `swsrprecoverres`
 - `swsrpbackup_sql`
 - `swsrpdbinfo_exchange`
 - `swsrpvssbackup_exchange`
 - `swsrpvssrestore_exchange`
 - `swsrpshadowadm_exchange`
 - `swsrpshadowadm`
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.4 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

The operating environment required for command execution is shown in the table below.

Table 14.13 Operating Environment Required for Executing Exchange Server Associated Commands

Command Name	Operating Environment of AdvancedCopy Manager
<code>swsrpdbinfo_exchange</code>	-
<code>swsrpdevdisp_exchange</code>	-
<code>swsrpvssbackup_exchange</code>	The service of the backup server in communication must be running.
<code>swsrpvssrestore_exchange</code>	The service of the backup server in communication must be running.
<code>swsrpshadowadm_exchange</code>	The service of the backup server in communication must be running (except in the situation when the <code>-copy</code> option is specified).
<code>swsrpstat_exchange</code>	-
<code>swsrpcancel_exchange</code>	-
<code>swsrpshadowadm</code>	-

Note

- In Cluster Operation, there is the following note.

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=logicalNodeName
```

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 14.14 Commands When Cluster Operation Is Used

Command Name	Environment Variable	Command Execution Node	Remarks
swsrpdbinfo_exchange	Required	Transaction operation node	It executes on the business server.
swsrpdevdisp_exchange	Required	Transaction operation node	It executes on the business server.
swsrpvssbackup_exchange	Required	Transaction operation node	It executes on the business server.
swsrpvssrestore_exchange	Required	Transaction operation node	It executes on the business server.
swsrpshadowadm_exchange	Required	Transaction operation node	It executes on the business server.
swsrpstat_exchange	Required	Transaction operation node	It executes on the business server.
swsrpshadowadm	Not required	-	It executes on the backup server.

Information

For the Exchange Server associated commands, backup operation by OPC or QuickOPC is available.

14.4.1 swsrpdbinfo_exchange (Exchange Server Database Information Registration Command)

NAME

swsrpdbinfo_exchange - registers or deletes information about a storage group or database.

SYNOPSIS

To Register Exchange Server Database Information

```
<program-directory>\bin\swsrpdbinfo_exchange [-dbname databaseName]
```

To Delete Information of Exchange Server Database That Is Not Mounted or Does Not Exist

```
<program-directory>\bin\swsrpdbinfo_exchange -clean
```

To Delete Information of Exchange Server Database Regardless of Database Status

```
<program-directory>\bin\swsrpdbinfo_exchange -delete [-dbname databaseName]
```

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

-dbname *databaseName*

Specifies the database name.

If this option is omitted when registering the Exchange Server database information, information on all databases are registered.

If this option is omitted when deleting the Exchange Server database information with **-delete** option, information on all databases are deleted.

If the database name contains a space, enclose it with double quotes.

-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 or later, execute this command after deleting the Exchange Server database information.

-delete

Specifies when deleting information of the registered storage groups or database whether or not they are mounted.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Register storage group FirstStorageGroup:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -sgname FirstStorageGroup
swsrpdbinfo_exchange successfully completed
C:\>
```

- Delete unnecessary storage group information:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpdbinfo_exchange -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.
- Mount databases before execute this command.
- This command cannot be executed while one of the following commands is in execution:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrpstartsync](#)
 - [swsrpmake](#)
 - [swsrpcancel](#)
 - [swsrpchsync](#)
 - [swsrprevsync](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)
 - [swsrpvssbackup_exchange](#)
 - [swsrpvssrestore_exchange](#)
 - [swsrpshadowadm_exchange](#)
 - [swsrpshadowadm](#)

14.4.2 [swsrpdevdisp_exchange](#) (Exchange Device Display Command)

NAME

[swsrpdevdisp_exchange](#) - displays the Exchange device information

SYNOPSIS

To Display Information on Specific Storage Group

```
<program-directory>\bin\swsrpdevdisp_exchange -dbname databaseName
```

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](#) Command

```
<program-directory>\bin\swsrpdevdisp_exchange -reg
```

DESCRIPTION

This command displays the information registered with the [swsrpdbinfo_exchange](#) command. The command displays the files constituting a storage group or database and the AdvancedCopy Manager device name.

OPTIONS

`-dbname databaseName`

Specifies the database name.

If this option is omitted, information on all databases are registered.

If the database name contains a space, enclose it with double quotes.

`-reg`

Displays all the database information registered by the [swsrpdbinfo_exchange](#) command.

Even if some database existing in Exchange are not registered, only the registered database is displayed.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display device information on database Mailbox1:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\swsrpdevdisp_exchange -dbname Mailbox1
Store: Mailbox1
  EDB=e:\Exchsrvr\pdbname\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 the [swsrpdbinfo_exchange](#) 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 the [swsrpdbinfo_exchange](#) 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 the [swsrpdbinfo_exchange](#) command using the `-reg` option.
- This command cannot be executed while the following command is being executed:
 - [swsrprecoverres](#)

14.4.3 swsrpvssbackup_exchange (Exchange VSS Backup Execution Command)

NAME

swsrpvssbackup_exchange - backup of a Storage group or a database

SYNOPSIS

```
<program-directory>\bin\swsrpvssbackup_exchange [-skipchk] -dbname databaseName
```

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.
 - Shadow copies are created by starting OPC or QuickOPC.
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	<Environment directory>\etc\repl\data\exchange\ <i>Managed Server name of business server</i> \metadoc\ <i>storage group name or database name</i> .wmd.xml
Backup component Document	<Environment directory>\etc\repl\data\exchange\ <i>Managed Server name of business server</i> \metadoc\ <i>storage group name or database name</i> .bcd.xml

OPTIONS

-dbname *databaseName*

A database name is specified.

If the database name contains a space, enclose it with double quotes.

-skipchk

This specifies that data consistency verification should not be performed by ESEUTIL.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- 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 the [swsrpdbinfo_exchange](#) 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 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.
- If this command is executed by specifying the `-skipchk` option, it is strongly recommended that the data consistency is verified 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:

```
http://msdn.microsoft.com/en-us/library/bb891802.aspx
```

- 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 is output, and backup cannot be performed.

```
srsrp4648 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:
 - [srsrpsetvol](#)
 - [srsrpdelvol](#)
 - [srsrprecoverres](#)
 - [srsrpdbinfo_exchange](#)
- 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 is interrupted.

14.4.4 `srsrpvssrestore_exchange` (Exchange VSS Restore Execution Command)

NAME

`srsrpvssrestore_exchange` - restore of a Storage group or a database

SYNOPSIS

```
<program-directory>\bin\swsrpvssrestore_exchange (-point|-roll) -dbname databaseName
```

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 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 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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

-dbname *databaseName*

A database name is specified.

If the database name contains a space, enclose it with double quotes.

-point

A Point-in-Time system is restored.

-roll

A roll forward system is restored.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- For the database Mailbox1, roll-forward restoration is performed:

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvssrestore_exchange -roll -dbname Mailbox1
swsrpvssrestore_exchange successfully completed
C:\>
```

NOTES

- When the following conditions occur, this command terminates abnormally:
 - When the database information on the specified Storage group or database is not registered by the [swsrpdbinfo_exchange](#) 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 a business 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 -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.
- This command cannot be executed during execution of the following commands:
 - `swsrpsetvol`
 - `swsrpdelvol`
 - `swsrprecoverres`
 - `swsrpdbinfo_exchange`
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.4.5 swsrpshadowadm_exchange (Exchange VSS Shadow Copy Management Command)

NAME

`swsrpshadowadm_exchange` - shadow copy management of a Storage group or a database

SYNOPSIS

When State Display of Shadow Copy Is Performed

```
<program-directory>\bin\swsrpshadowadm_exchange status [-copy | -shadow] -dbname databaseName
```

When Shadow Copy Is Deleted

```
<program-directory>\bin\swsrpshadowadm_exchange delete -dbname databaseName
```

When QuickOPC Is Stopped

```
<program-directory>\bin\swsrpshadowadm_exchange stopqopc -dbname databaseName
```

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. "OPC": OPC "QOPC": QuickOPC
Group	"----" is always 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. "failed": It is in an error state. "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 "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.

OPC/QuickOPC is not stopped.

QuickOPC Stop Function

This function stops QuickOPC processing (both the physical copy and tracking processing). It can only be used when the copy type is QOPC.

- QuickOPCs, where the physical copy is in progress, cannot be stopped if a shadow copy exists. To stop a QuickOPC where the physical copy is in progress, the shadow copy must first be deleted. QuickOPCs, where tracking is in progress, can be stopped regardless of whether any shadow copies exist.

OPTIONS

-dbname *databaseName*

A database name is specified.

If the database name contains a space, enclose it with double quotes.

Specific Options of State Display (i.e., Status) of 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

- 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](#)
 - [swsrpdelvol](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)

14.4.6 swsrpstat_exchange (Exchange Operation Status Display Command)

NAME

swsrpstat_exchange - displays restoration status of a Storage group or a database.

SYNOPSIS

```
<program-directory>\bin\swsrpstat_exchange [-Xdevmap deviceMapFile] -dbname databaseName
```

DESCRIPTION

This command displays restoration status of the specified storage group or database.

Refer to the [swsrpstat](#) command for display information and notes.

OPTIONS

-dbname *databaseName*

Specifies the database name.

If the database name contains a space, enclose it with double quotes.

-Xdevmap *deviceMapFile*

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 the swsrpcancel 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](#)

14.4.7 swsrpshadowadm (Shadow Copy Management Command)

NAME

swsrpshadowadm - displays or deletes a shadow copy

SYNOPSIS

When State Display of Shadow Copy Is Performed

```
<program-directory>\bin\swsrpshadowadm status
```

When Shadow Copy Is Deleted

```
<program-directory>\bin\swsrpshadowadm delete (-id snapshotID | -all)
```

DESCRIPTION

This command allows a shadow copy to be managed.

Execute this command on a backup server. Use this command 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 business 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.
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. OPC or QuickOPC is not stopped.

OPTIONS

`-id snapshotID`

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](#)
 - [swsrpdelvol](#)
 - [swsrprecoverres](#)
 - [swsrpdbinfo_exchange](#)

14.5 SQL Server Associated Commands

The commands described in this section must be executed by users who have the following privileges.

- Windows Roles
 - When domain authentication is used: (It is necessary to assign all of the following roles to the account.)
Administrators, Domain Admins, Domain Users, Enterprise Admins, Group Policy Creator Owners, Schema Admins
 - When local accounts authentication is used:
Administrators

- SQL Server Roles
sa(SystemAdmin privileges)

The commands used by the backup management function and the replication management function are different. Refer to "14.5.1 Backup Management Commands" when you use the backup management function. Refer to "14.5.2 Replication Management Commands" when you use the replication management function.

Note

The operating environment required for command execution is shown in the table below.

Table 14.15 Operating Environment Required for Executing SQL Server Associated Commands

Command Name	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 replication on single server 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, there is the following note.

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=logicalNodeName
```

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 14.16 Commands When Cluster Operation Is Used

Command Name	Environment Variable	Command Execution Node	Remarks
swstbackup_sqlsvr	Required	Transaction operation node	-
swstrestore_sqlsvr	Required	Transaction operation node	-
swsrpbackup_sql	Required	Transaction operation node	-
swsrprestore_sql	Required	Transaction operation node	-

- SQL Server associated commands do not support the SnapOPC function.

14.5.1 Backup Management Commands

Swstbackup_sqlsvr and swstrestore_sqlsvr are used in the backup operation of an SQL Server by the backup management function.

14.5.1.1 swstbackup_sqlsvr (SQL Server Backup Execution Command)

NAME

swstbackup_sqlsvr - backup of SQL Server databases

SYNOPSIS

```
<program-directory>\bin\swstbackup_sqlsvr [-Xserver serverName] [-Xinstance instanceName] [-Xdevmap  
deviceMapFile] [-suspend|-T] dbName-1 dbName-2,,,dbName-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 the [14.1.2.1 swstbackup \(Backup Execution Command\)](#) command.

When the [swststartsync](#) 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` option specified and suspend the backup synchronous processing.

The database backup history information is stored in msdb of SQL Server. The database volume backup history information is stored in the backup management lists of AdvancedCopy Manager.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

`-Xserver serverName`

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 instanceName`

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection is made to the default instance.

`-Xdevmap deviceMapFile`

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 is automatically selected. Specify a device map file name by using an absolute pathname.

`-suspend`

Specifies performing the 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

dbName,,,dbName-i(i=1,2,,,64)

Specifies database names. If the database name contains a space, enclose it with double quotes.

When specifying two or more database names, separate the names with a space or tab as a delimiter. 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):

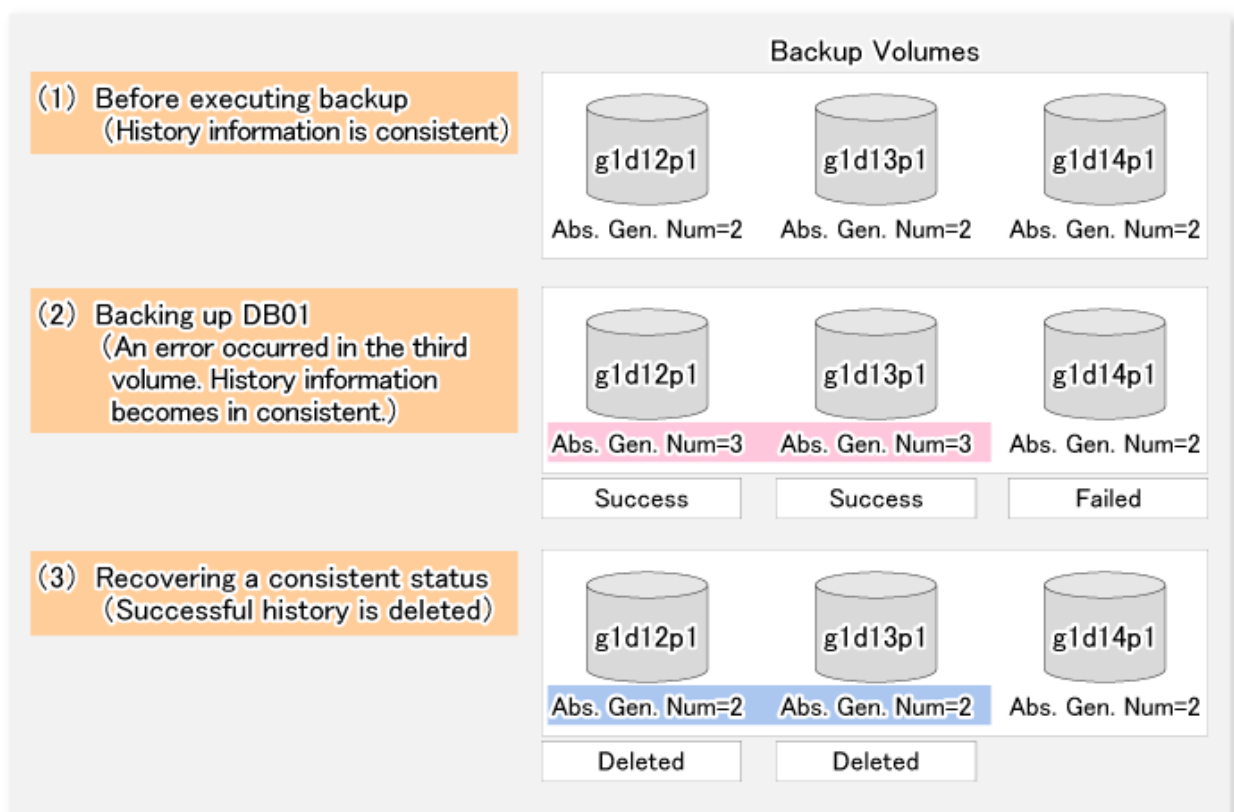
```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swstbackup_sqlsvr -Xserver VSERVER -Xdevmap G:\STGADM
\DEV.map DB01 DB02 DB03
DB01 DB02 DB03 swstbackup_sqlsvr completed
C:\>
```

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 causes 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.
 - 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.
- 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 the `swststartsync` command.
- If an error occurs while `swstbackup_sqlsvr` (SQL Server backup execution command) is processing the database consisting of two or more volumes with the `swstbackup` 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 the `swsthistdel` command.

Figure 14.1 Recovery from History Information Inconsistency



- Normally, if the existing backup history reaches the maximum number of saved generations specified by the [swstbkpolset](#) 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](#)
 - [swstdevinfo](#)
 - [swstsrsemtch](#)
 - [swstresback](#)
 - [swstresrst](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.5.1.2 swstrestore_sqlsvr (SQL Server Restore Execution Command)

NAME

swstrestore_sqlsvr - restores of SQL Server database.

SYNOPSIS

```
<program-directory>\bin\swstrestore_sqlsvr [-Xserver serverName] [-Xinstance instanceName] [-Xnolog]
-Xmeta metaFileName dbName
```

DESCRIPTION

This command restores a SQL Server database. Execute this command after restoring database files using the [swstrestore](#) command. This command recreates a database from restored database files. To perform recovery after this command has been executed, apply logs using Management Studio or Transact-SQL.

OPTIONS

`-Xserver serverName`

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 instanceName`

Specifies a connection instance. Specify an instance name in the operand. If this option is omitted, connection is made to the default instance.

-Xnolog

Specifies restoring a DB to a backup point, without applying logs. If this option is omitted, the DB is restored to a backup point but cannot be used until logs are applied to it. Apply logs using Management Studio or Transact-SQL.

-Xmeta *metaFileName*

Specifies a metadata file name, using an absolute pathname. A metadata file is 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

dbName

Specifies a database name. If the database name contains a space, enclose it with double quotes.

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)

14.5.2 Replication Management Commands

Swsrpbackup_sql and swsrprestore_sql are used in the backup operation of SQL Server by the replication management function.

14.5.2.1 swsrpbackup_sql (SQL Server Backup Execution Command)

NAME

swsrpbackup_sql - backup of SQL Server databases

SYNOPSIS

```
<program-directory>\bin\swsrpbackup_sql [-Xserver serverName] [-Xinstance instanceName] (-Xgroup
groupName | -Xdevmap deviceMapFile) [-m] [-t] [-T] (-Xdblist dbListFile | dbName-1 dbName-2,,,dbName-
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 the [swsrpmake](#) command. The database backup history information is stored in msdb of SQL Server.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

OPTIONS

-Xserver *serverName*

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 *instanceName*

Specifies a connection instance. Specify an instance name in the operand. If this option is not specified, connection is made to the default instance.

-Xgroup *groupName*

Specify replication management function group name.

In cases when backup has been performed while specifying this option, it is possible to confirm the backup history information with the [swsrphistory_sql](#) command.

-Xdevmap *deviceMapFile*

Specify a device map file name that describes combinations of database volumes and destination backup volumes. For details on the device map file, refer to "[10.4.1.7 Prepare Device Map File \(When Not Creating a Replication Group\)](#)". 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 is 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.

-Xdblast *dbListFile*

Specify the file that lists all databases subject to backup (the database list file).

Specify the database list file as an absolute path or as a relative path from the current task folder.

In the case that this option has been specified, it is not possible to specify a database name as the operand.

For details on the database list file, refer to "[10.4.1.8 Performing Database List File](#)".

OPERANDS

dbName-1 dbName-2,,dbName-i

Specifies database names. If the database name contains a space, enclose it with double quotes.

When specifying two or more database names, separate the names with/using a space or tab as a delimiter. No more than 128 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 in group grp1:

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_sql -Xserver VSERVER -Xgroup grp1 DB01 DB02
DB03
DB01 DB02 DB03 swsrpbackup_sql completed
C:\>
```

- Specify the database list file with the -Xdblast option and perform a backup of the databases DB01, DB02, and DB03 under the virtual server VSERVER within the group grp1 (in the case that the command is executed while specifying the -Xdblast option, the command completion message is listed on a different row for each database name).

```
C:\>set SWSTGNODE=nodeAGT
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpbackup_sql -Xserver VSERVER -Xgroup grp1 -Xdblast G:
\STGADM\dblist.dat
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 "[10.4.1.7 Prepare Device Map File \(When Not Creating a Replication Group\)](#)")
 - 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.
 - 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., 129 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.
- 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 the [swsrpstartsync](#) 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](#)
 - [swsrpdelvol](#)
 - [swstsrsemctch](#)
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.5.2.2 swsrphistory_sql(SQL Server Backup History Information Display/Delete Command)

NAME

swsrphistory_sql - SQL Server backup history information display/delete

SYNOPSIS

To Display SQL Server Backup History Information

```
<program-directory>\bin\swsrphistory_sql disp [-Xserver serverName | -Xallserver] [-Xinstance instanceName | -Xallinstance] [-Xgroup groupName] [-Xreg] [-Xdblist dbListFile | dbName-1,, ,dbName-i]
```

To Delete SQL Server Backup History Information

```
<program-directory>\bin\swsrphistory_sql delete [-Xserver serverName] [-Xinstance instanceName] (-Xgroup groupName | -z) (-Xdblist dbListFile | dbName-1,, ,dbName-i)
```

DESCRIPTION

This command Display/Deletes SQL Server backup history information.

The following information is displayed.

Title	Explanation
Instance-Name	Instance name is displayed.
Server-Name	In a case of cluster operation, virtual server name is displayed. In case of operation without cluster, computer name is displayed.
Group-Name	Replication group name is displayed.
DB-Name	Database name is displayed.
Meta-Data-File	Display the meta data file path as an absolute path.
DB-File	Display the file paths of the database files (primary data file (.mdf), secondary data file (.ndf), log files (.ldf)) as absolute paths.
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.

Execute this command with the server on which the SQL Server is installed.

OPTIONS

-Xserver serverName

Specify the computer name or the virtual server name of the SQL Server of the SQL Server backup history information to be displayed / deleted.

If both this option and the -Xallserver option are omitted, the computer name is specified.

-Xallserver

The SQL Server backup history information of all the computers or virtual servers of SQL Server is displayed.

If both this option and the -Xserver option are omitted, the computer name is specified.

-Xgroup groupName

Specify replication management function group name.

-Xinstance instanceName

Specify the instance of the SQL Server backup history information to be displayed / deleted. Specify an instance name in the operand.

If both this option and the -Xallinstance option are omitted, the default instance is specified.

-Xallinstance

The SQL Server backup history information of all instances of SQL Server is displayed.

If both this option and the -Xinstance option are omitted, the default instance is specified.

-Xreg

The SQL Server backup history information of the group registered on the replication management log is displayed. In the case that this option has been omitted, all the SQL Server backup history information is displayed.

-Xdblist *dbListFile*

Specify the file that lists all databases subject to backup (the database list file).

Specify the database list file as an absolute path or as a relative path from the current task folder.

In the case that this option has been specified, it is not possible to specify a database name as the operand.

For details on the database list file, refer to "10.4.1.8 Performing Database List File".

-z

Delete all the SQL Server backup history information.

OPERANDS

dbName-1,,,dbName-i

Specifies a database name. If the database name contains a space, enclose it with double quotes.

When specifying two or more database names, separate the names with/using a space or tab as a delimiter. No more than 128 database names can be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Displays SQL Server backup history information.

```
C:\Win32app\AdvancedCopyManager\bin>swsrphistory_sql disp -Xgroup grp1 -Xdblist C:\tmp\dblist.txt
Instance-Name Server-Name      Group-Name DB-Name Meta-Data-File          DB-File          Original-
Volume          Replica-Volume          Backup-Date
MSSQLSERVER    WIN-FJPDG31D87G grp1      db0      E:\sql_db\db0.swsrp-dmp E:\sql_db\db0.mdf
g3d7p1@WIN2012R2-X64_JP g1d36p1@WS2012X64MK23CT 2013/09/04 13:51
MSSQLSERVER    WIN-FJPDG31D87G grp1      db0      E:\sql_db\db0.swsrp-dmp F:\sql_log\db0.ldf
g3d7p2@WIN2012R2-X64_JP g1d36p2@WS2012X64MK23CT 2013/09/04 13:51
MSSQLSERVER    WIN-FJPDG31D87G grp1      db1      E:\sql_db\db1.swsrp-dmp E:\sql_db\db1.mdf
g3d7p1@WIN2012R2-X64_JP g1d36p1@WS2012X64MK23CT 2013/09/04 13:51
MSSQLSERVER    WIN-FJPDG31D87G grp1      db1      E:\sql_db\db1.swsrp-dmp F:\sql_log\db1.ldf
g3d7p2@WIN2012R2-X64_JP g1d36p2@WS2012X64MK23CT 2013/09/04 13:51
C:\>
```

- Deletes SQL Server backup history information.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrphistory_sql delete -Xgroup grp1 db0 db1
db0 db1 swsrphistory_sql completed
C:\>
```

NOTES

- The database from which backup history information is deleted cannot be restored by the Restore Wizard for SQL Server.

14.5.2.3 swsrprestore_sql (SQL Server Restore Execution Command)

NAME

swsrprestore_sql - restores an SQL Server database

SYNOPSIS

```
<program-directory>\bin\swsrprestore_sql [-Xserver serverName] [-Xinstance instanceName] [-Xnolog] -Xmeta metaFileName dbName
```

DESCRIPTION

This command restores an SQL Server database. Execute this command after restoring database files using the [swsrpmake](#) command. This command recreates a database from restored database files. To perform recovery after this command is executed, apply logs using Management Studio or Transact-SQL.

OPTIONS

-Xserver serverName

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 instanceName

Specifies a connection instance. Specify an instance name in the operand. If this option is omitted, connection is made to the default instance.

-Xnolog

Specifies the restoration of a DB to a backup point, without applying logs. If this option is omitted, the DB is restored to a backup point but cannot be used until logs are applied to it. Apply logs using Management Studio or Transact-SQL.

-Xmeta metaFileName

Specifies a metadata file name, using an absolute pathname. A metadata file is 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

dbName

Specifies a database name. If the database name contains a space, enclose it with double quotes.

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 is "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)

14.6 Symfoware Cooperation Command

This section describes the Symfoware cooperation command used for Symfoware backup server operation.

Note

- Symfoware associated commands 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.
- The operating environment required for command execution is shown in the table below:

Table 14.17 Operating Environment Required for Executing Symfoware Associated Commands

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 (except when the -m or -t option is specified).
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.

- In Cluster Operation, there is the following note.

Execute a command by taking the following steps:

1. As necessary, set the logical node name of a target service to the environment variable SWSTGNODE. The environment variable setting method is as follows:

```
set SWSTGNODE=logicalNodeName
```

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 14.18 Command When Cluster Is Operated

Command Name	Environment Variable	Command Executed Node	Remarks
swsrpdbinfo_symfoware	Necessary	Service running node	Executable on the Symfoware server
swsrpbackup_symfoware	Necessary	Service running node	Executable on the Symfoware server
swsrprestore_symfoware	Necessary	Service running node	Executable on the Symfoware server
swsrphistory_symfoware	Necessary	Service running node	Executable on the Symfoware server

14.6.1 swsrpdbinfo_symfoware (Symfoware Database Information Register/Delete/Display Command)

NAME

swsrpdbinfo_symfoware - register/delete/display Symfoware database information

SYNOPSIS

To Register Symfoware Database Information

```
<program-directory>\bin\swsrpdbinfo_symfoware set logGroupName[/rdbName]
```

To Delete Symfoware Database Information

```
<program-directory>\bin\swsrpdbinfo_symfoware delete logGroupName[/rdbName]
```

To Display Symfoware Database Information

```
<program-directory>\bin\swsrpdbinfo_symfoware disp [logGroupName[/rdbName]]
```

DESCRIPTION

This command includes the following 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, a hyphen (-) is displayed.
DB-Space-Name	Database space name is displayed.
Device	AdvancedCopy Manager device name is displayed.

Execute this command on the Symfoware server.

OPERANDS

logGroupName

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.

rdbName

Specify RDM system name after log group name with a 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:\>
```

14.6.2 swsrpbackup_symfoware (Symfoware Backup Command Execution Command)

NAME

swsrpbackup_symfoware - backup of Symfoware database space

SYNOPSIS

```
<program-directory>\bin\swsrpbackup_symfoware [-m] [-t] [-T] [-k] -Xgroup groupName [-Xdev
deviceName] logGroupName[/rdbName]
```

DESCRIPTION

This command performs online backup of database space cooperating with Symfoware.

Execute this command on the Symfoware server.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

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 reference dump.

If this option is omitted, backup is performed by normal dump.

In backup by reference dump, it is required to use the Symfoware "rdbtr" 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 *groupName*

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

logGroupName

Specify log group name

Specify "system" for the database space that is not defined in a log group.

rdbName

Specify RDB system name after log group name with a 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 the log group "LOG1/RDB1" by the 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 the database space "DB1.DBS1(g1d1p1)" contained in the log group "LOG1/RDB1" by the 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

- The [swsrpmake](#) command is executed in this command. Confirm notes of the [swsrpmake](#) command beforehand.
- In the following cases, the backup cannot be executed. Deal according to "System Administrator Corrective Action" 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.
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.6.3 swsrprestore_symfoware (Symfoware Recovery Execution Command)

NAME

swsrprestore_symfoware - recovery of Symfowaredatabase space

SYNOPSIS

```
<program-directory>\bin\swsrprestore_symfoware [-a | -e EndPoint] [-l archiveLogFileListFileName] [-w workDirectory] [-Xnolog workRecCtrlFileDirectory] -Xgroup groupName [-Xdev deviceName | -Xdevlist deviceListFile] logGroupName[/rdbName]
```

DESCRIPTION

This command performs database space recovery cooperating with Symfoware.

Execute this command 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 Command Reference*.

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.

When using WSFC for cluster operation in a Windows environment, this command performs automatic configuration of the maintenance mode of the physical disk resources to which the volume belongs with pre- and post-processing. For more information, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

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.

If both this option and the -e option are not specified, a recovery to the latest state is performed.

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.

If both this option and the -a option are not specified, a recovery to the latest state is performed.

For recovery end point, refer to the Symfoware Server manuals.

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 archiveLogFileListFileName

Specify with the absolute path a file in which archive log backup destination names required for Symfoware 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 recovery exists.

This option cannot be specified at the same time with the -Xnolog option.

-w workDirectory

Specify a temporary working directory with the absolute path.

The directory name should be on the Managed Server in which a transaction 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 *workRecCtrlFileDirectory*

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's `rdbmrrcv` command.

If this option is specified to do recovery, database cannot be used till the log is applied by the Symfoware's `rdbmrrcv` command.

-Xgroup *groupName*

Specify group name of replication management function.

-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

logGroupName

Specify log group name.

Specify "system" for the database space that is not defined in a log group.

rdbName

Specify RDB system name after log group name with a 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 the log group "LOG1/RDB1" by the group "grp1" of replication management function.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_symfoware -Xgroup grp1 LOG1/RDB1
LOG1/RDB1 swsrprestore_symfoware completed
C:\>
```

- Recover the database space "DB1.DBS1(g1d1p1)" contained in the log group "LOG1/RDB1" by the group "grp1" of replication management function.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrprestore_symfoware -Xgroup grp1 -Xdev g1d1p1 LOG1/RDB1
LOG1/RDB1 swsrprestore_symfoware completed
C:\>
```

- Recover multiple database space contained in the log group "LOG1/RDB1" by the group "grp1" of replication management function. 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

- The `swsrprestore` command is executed in this command. Confirm notes of the `swsrprestore` 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 media).
- 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 media). 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 is also 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 results 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) terminates abnormally is not predictable. For instance, the command executed first might terminate abnormally.
 - When multiple commands specify a transaction volume:

Command(s) terminates 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) terminates 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) terminates 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.
- This command terminates abnormally if it cannot turn the maintenance mode of the physical disk resource ON.

14.6.4 swsrphistory_symfoware (Symfoware Backup History Information Display/Delete Command)

NAME

swsrphistory_symfoware - display/delete Symfoware backup history Information

SYNOPSIS

To Display Symfoware Backup History Information

```
<program-directory>\bin\swsrphistory_symfoware disp [logGroupName[/rdbName]]
```

To Delete Symfoware Backup History Information

```
<program-directory>\bin\swsrphistory_symfoware delete (-Xgroup groupName [-Xdev deviceName] | -z)
logGroupName[/rdbName]
```

DESCRIPTION

This command includes the following two functions:

- Displays Symfoware backup history information.
 - Deletes Symfoware backup history 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, a hyphen (-) is displayed.
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.

Title	Explanation
ArcSerial	Archive log serial number is displayed. For history information for backup done by reference dump, "reference" is displayed.

Execute this command on the Symfoware server.

OPTIONS

-Xgroup *groupName*

Specify replication management function group name.

If the **-Xdev** option is omitted, delete all the backup history information backed up using *groupName*.

-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 information of the specified device name among backup history information backed up using *groupName*.

-z

Delete all the backup history information in a log group.

OPERANDS

logGroupName

Specify log group name.

Specify "system" for the database space that is not defined in a log group.

rdbName

Specify RDB system name after log group name with a slash (/) as a separator 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 history information in the 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 information 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 information 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 information of the 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 history information.

```
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:\>
```

14.7 Hyper-V Commands

This section explains commands for backing up and restoring Hyper-V Guest OSs.



- The operating environment required for command execution is shown in the table below.

Table 14.19 Operating Environment Required for Executing Hyper-V Associated Commands

Command Name	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.

Command Name	Operating Environment of AdvancedCopy Manager
swsrpvrg 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.
swsrpvrg 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.
swsrpvrg 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.
swsrpvrg 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, it is unnecessary to specify the environment variable SWSTGNODE. Perform the Hyper-V associated commands without specifying the environment variable SWSTGNODE.

14.7.1 swsrpvrg componentset create (Component Set Create Command)

NAME

swsrpvrg componentset create - creates a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrg componentset create [-h hypervHost] -cs componentSet
```

DESCRIPTION

This command creates an empty component set.

OPTIONS

-h hypervHost

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 componentSet

Specifies the name of the component set to be created.

Usable characters for the component name are single-byte alphanumeric characters, hyphens (-), 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

- Giving the command from a backup server to the Managed Server "HVHOST01" to create a component set.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg componentset create -h HVHOST01 -cs VMSet1
'swsrpvrq componentset create' completed
C:\>
```

14.7.2 swsrpvrq componentset info (Component Set Information Display Command)

NAME

swsrpvrq componentset info - displays component set information

SYNOPSIS

```
<program-directory>\bin\swsrpvrq componentset info [-h hypervHost] [-cs componentSet]
```

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 hypervHost

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 componentSet

Specifies the name of the component set to be displayed.
If this option is omitted, the information for all component sets is displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Give the command from a backup server to the 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:\>
```

14.7.3 swsrpvrq componentset remove (Component Set Remove Command)

NAME

swsrpvrq componentset remove - removes a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrq componentset remove [-h hypervHost] -cs componentSet
```

DESCRIPTION

This command removes a component set.

OPTIONS

-h *hypervHost*

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 *componentSet*

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 the 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:\>
```

14.7.4 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 hypervHost] -cs componentSet -hv-guest guestOS
```

DESCRIPTION

This command adds a Guest OS to a component set.

OPTIONS

-h hypervHost

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 componentSet

Specifies the name of the component set to which to add a Guest OS.

-hv-guest guestOS

Specifies the Guest OS to be added.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Give the command from a backup server to the Managed Server "HVHOST01" to add a component.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg component add -h HVHOST01 -cs VMSet1 -hv-guest
Guest1
'swsrpvrq component add' completed
C:\>
```

14.7.5 swsrpvrg component remove (Component Remove Command)

NAME

swsrpvrg component remove - removes a Guest OS from a component set

SYNOPSIS

```
<program-directory>\bin\swsrpvrg component remove [-h hypervHost] -cs componentSet -hv-guest guestOS
```

DESCRIPTION

This command removes a Guest OS from a component set.

OPTIONS

-h hypervHost

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 componentSet

Specifies the name of the component set from which to remove a Guest OS.

-hv-guest guestOS

Specifies the Guest OS to be removed.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Give the command from a backup server to the Managed Server "HVHOST01" to remove a component.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg component remove -h HVHOST01 -cs VMSet1 -hv-guest
Guest1
'swsrpvrq component remove' completed
C:\>
```

14.7.6 swsrpvrg shadow backup-hyperv (Hyper-V Backup Command)

NAME

swsrpvrg shadow backup-hyperv - backs up a Hyper-V Guest OS

SYNOPSIS

```
<program-directory>\bin\swsrpvrg shadow backup-hyperv [-h HyperV-Host] -cs Component-Set [-hv-guests
guestOsListFile]
```

DESCRIPTION

This command backs up Hyper-V Guest OSs per component set.

When execution of this command completes successfully, the metadocuments required for restoring are output to the following files on the backup server.

File	Output Place
Writer metadata Document	< <i>Environment directory</i> >\etc\repl\data\vrq\ <i><Hyper-V host name for Managed Server></i> \componentset\metadoc\ <i><Component set name></i> .wmd.xml
Backup component Document	< <i>Environment directory</i> >\etc\repl\data\vrq\ <i><Hyper-V host name for Managed Server></i> \componentset\metadoc\ <i><Component set name></i> .bcd.xml

OPTIONS

-h *hypervHost*

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 *componentSet*

Specifies the name of the component set which is to be backed up.

-hv-guests *guestOsListFile*

For backing up only specific Guest OSs in a component set, specify the files (Guest OS list files) in which the relevant Guest OSs 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 the Managed Server "HVHOST01" to back up a Hyper-V Guest OS.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrg shadow backup-hyperv -h HVHOST01 -cs VMSet1
'swsrpvrq shadow backup-hyperv' completed
C:\>
```

14.7.7 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 componentSet [-hv-guests guestOsListFile]
-manual-restore
```

DESCRIPTION

This command restores Hyper-V Guest OSs per component set.

OPTIONS

-cs *componentSet*

Specifies the name of the component set which is to be restored.

-hv-guests *guestOsListFile*

For restoring only specific Guest OSs in a component set, specify the files (Guest OS list files) in which the relevant Guest OSs 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

- Restoring a Hyper-V Guest OS on the Managed Server "HVHOST01".

```
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:\>
```

14.7.8 swsrpvrq shadow query (Shadow Copy Status Display Command)

NAME

swsrpvrq shadow query - displays the status of shadow copy

SYNOPSIS

To Display Information per Component

```
<program-directory>\bin\swsrpvrq shadow query [-h hypervHost] -cs componentSet
```

To Display 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 is 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 is 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 is displayed if there is no shadow copy on the backup volume.
Original-Volume	Displays the names of transaction volumes (\\?\Volume{GUID}\). Nothing is 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 is 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 is 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 is 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. <ul style="list-style-type: none">- If there is shadow copy on the backup volume- 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 OSs on the volume that have resources. In the case of multiple Guest OSs, the displayed values are delimited by commas. Nothing is displayed if the command is executed from a backup server.

OPTIONS

-h hypervHost

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 componentSet

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 the 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:\>
```

14.7.9 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 hypervHost] -cs componentSet
```

Deletion by Specifying Shadow Copy ID (Executed on Backup Server)

```
<program-directory>\bin\swsrpvrq shadow delete -snap-id snapshotID
```

Deletion by Specifying Shadow Copy Set ID (Executed on Backup Server)

```
<program-directory>\bin\swsrpvrq shadow delete -snap-set-id snapshotSetID
```

Deletion of All Shadow Copies (Executed on Backup Server)

```
<program-directory>\bin\swsrpvrq shadow delete -all
```

DESCRIPTION

This command deletes shadow copy.

OPTIONS

-h *hypervHost*

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 *componentSet*

Specifies the name of the component set from which to delete the shadow copy.

`-snap-id snapshotID`

Specifies the shadow copy ID that is to be deleted.
The shadow copy with the specified ID is deleted.

`-snap-set-id snapshotSetID`

Specifies the shadow copy set ID that is to be deleted.
The shadow copy set with the specified ID is 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 the 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:\>
```

14.7.10 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 hypervHost] -cs componentSet
```

Status Display for All Copy Sets

```
<program-directory>\bin\swsrpvrq advcopy query [-h hypervHost]
```

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

Title	Description
Status	Displays the running status of Advanced Copy from the replication source disk to the replication target disk. <ul style="list-style-type: none"> - "----": 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. <ul style="list-style-type: none"> - "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 hypervHost`

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 componentSet`

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 the 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:\>
```

14.7.11 swsrpvrq advcopy stop (Advanced Copy Stop Command)

NAME

`swsrpvrq advcopy stop` - stops Advanced Copy

SYNOPSIS

```
<program-directory>\bin\swsrpvrq advcopy stop [-h hypervHost] -cs componentSet
```

DESCRIPTION

This command stops Advanced Copy.

OPTIONS

`-h hypervHost`

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 componentSet`

Specifies the name of the component set on which to stop Advanced Copy.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Give the command from a backup server to the Managed Server "HVHOST01" to stop Advanced Copy.

```
C:\>C:\Win32App\AdvancedCopyManager\bin\swsrpvrq advcopy stop -h HVHOST01 -cs VMSet1
'swsrpvrq advcopy stop' completed
C:\>
```

14.8 SnapOPC/SnapOPC+ Support Commands

This section explains the commands can be used to execute SnapOPC or SnapOPC+.



Note

- The table below lists the requirements for the operating environment in which to execute the respective commands.

Table 14.20 Operating Environment When Executing SnapOPC/SnapOPC+ Support Commands

Command	Operating Environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-



Note

- In Cluster Operation, there is the following note.

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=logicalNodeName
```

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 14.21 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	-

14.8.1 swstestupdate (Update Volume Measurement Command)

NAME

swstestupdate - measures the physical capacity of a Snap Data Volume

SYNOPSIS

To Start Update Volume Measurements (Setting Up Monitor Session)

```
<program-directory>\bin\swstestupdate start volumeName
```

To Look Up Update Volume (Displaying Status of Monitor Session)

```
<program-directory>\bin\swstestupdate status volumeName
```

To Finish Update Volume Measurements (Cancelling Monitor Session)

```
<program-directory>\bin\swstestupdate stop volumeName
```

DESCRIPTION

This command measures the update amount in the volume.

To Start Update Volume Measurements (Setting Up Monitor Session)

Specify "start" as the subcommand to start measure of the physical capacity of a Snap Data Volume.

To Look Up Update Volume (Displaying Status of Monitor Session)

Specify "status" as the subcommand to display the physical capacity of a Snap Data Volume.
The following information is 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 monitor session. Displays "failed" if the monitor session is error-suspended.

To Finish Update Volume Measurements (Cancelling Monitor Session)

Specify "stop" as the subcommand to stop measure of the physical capacity of a Snap Data Volume.

OPERANDS

volumeName

- Specifies the name of the measurement target volume.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Measure the update volume:

```
(Start taking measurements by starting a monitor session)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate start gldlp1
gldlp1 swstestupdate completed

(First measurement)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate status gldlp1
Volume-Name Update
gldlp1          644333

(Second measurement)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate status gldlp1
Volume-Name Update
gldlp1          1045000

(Stop taking measurements by cancelling the monitor session)
C:\>C:\Win32App\AdvancedCopyManager\bin\swstestupdate stop gldlp1
gldlp1 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 specified volume is TFOV.
 - When the monitor session has already been set up (i.e., when the "start" option is specified).
 - When the monitor session does not exist (i.e., when the "stop" option is specified).

14.8.2 swstsdv (Snap Data Volume Operation/Reference Command)

NAME

swstsdv - Initialize or display the Snap Data Volume

SYNOPSIS

To Initialize Snap Data Volume

```
<program-directory>\swstsdv init volumeName
<program-directory>\swstsdv init -G accessVolumeName luNumber
```

To Display Snap Data Volume Status

```
<program-directory>\bin\swstsdv stat volumeName
<program-directory>\bin\swstsdv stat -G accessVolumeName luNumber
```

To Display Snap Data Pool Status

```
<program-directory>\swstsdv poolstat -G volumeName
```

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 and SnapOPC+ are 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 or SnapOPC+ is running.

Host usage: Update of Snap Data Volume while SnapOPC and SnapOPC+ are 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'.

Title	Description
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 or SnapOPC+ is running.

Host usage: Update of Snap Data Volume while SnapOPC and SnapOPC+ are not running.

OPTIONS

Options of "init" Subcommand

-G accessVolumeName

Specifies the Access volume.

For details on Access volume, refer to "[Creating Access Volume](#)".

Options of "stat" Subcommand

-G accessVolumeName

Specifies the Access volume.

For details on Access volume, refer to "[Creating Access Volume](#)".

Options of "poolstat" Subcommand

-G volumeName

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 Access Volume](#)".

OPERANDS

Operands of "init" Subcommand

volumeName

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.

luNumber

Specifies the logical unit number in the ETERNUS Disk storage system.

This value is specified as a decimal.

Operands of "stat" Subcommand

volumeName

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.

luNumber

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 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 logical unit 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 logical unit number.
For this reason, you must check the logical unit number in advance and record it.
- By specifying TFOV in the volume and access volume, Snap Data Volume cannot be initialized and Snap Data Volume's status or Snap Data Pool's status cannot be displayed.

14.9 Troubleshooting Data Collection Commands

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

14.9.1 esfsnap (AdvancedCopy Manager's Manager Troubleshooting Data Collection Command)

NAME

esfsnap - collects the troubleshooting information of the AdvancedCopy Manager's manager

SYNOPSIS

```
<program-directory>\Common\bin\esfsnap -dir dirname [-all]
```

DESCRIPTION

This command collects the AdvancedCopy Manager's manager troubleshooting data on the Management Server.

Only a user belonging to the Administrators group can execute this command.

Send the collected data to Fujitsu Technical Support.

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, check that *dirname* directory has the following free space.

Collected Information	Required Free Space
Initial investigation information	more than 40 MB
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 increases 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
```

NOTES

- Refer to [NOTES] of "esfsnap (CCM Server Troubleshooting Data Collection Command)" in the *AdvancedCopy Manager Operation Guide for Copy Control Module*.

14.9.2 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 the 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*_*tmmss*" 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 *tmmss*, *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 (500 MB or more) is recommended. Regard 500 MB as a rough guide, since the size of the troubleshooting data varies depending on the system environment and conditions. If there is not enough free space, then this command terminates abnormally without collecting troubleshooting data.

Specify an existing directory, otherwise this command terminates abnormally without collecting troubleshooting data.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Collecting the troubleshooting information on the "D:\temp" directory:

```
C:\>C:\Win32app\AdvancedCopyManager\bin\acmcapture.bat C:\temp
Executing.....
Completed.
OUTPUT=C:\temp\acmcapture_srv01_20090323_094614
```

NOTES

- 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.
- When the Managed Server is in a clustered system, execute this command on all nodes. Execute the command after mounting the shared disk on any node for collecting information of the shared disk.

Chapter 15 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

15.1 Notes on Backup and Replication Operation

15.1.1 General Notes

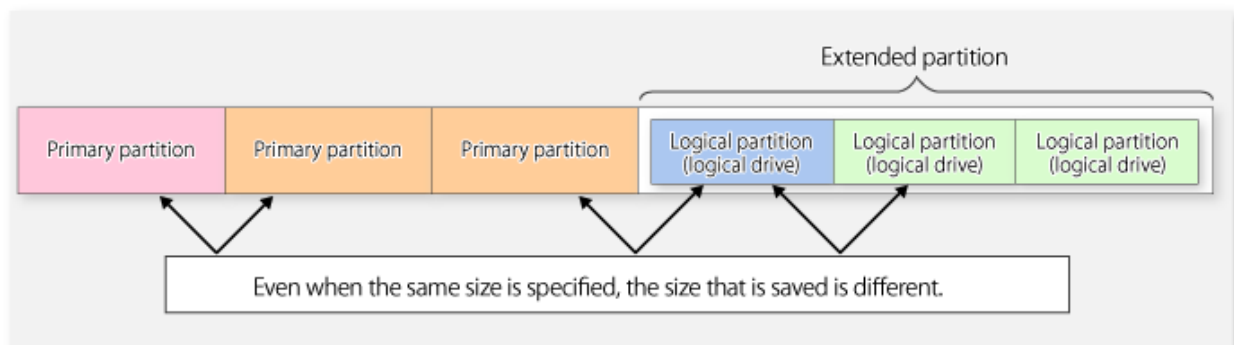
15.1.1.1 Size of Partition

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 may 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 15.1 Available Size of Partition



Create partitions for the transaction and backup volumes in the same size and combination as shown below.

Figure 15.2 Combination of Transaction and Backup Volume

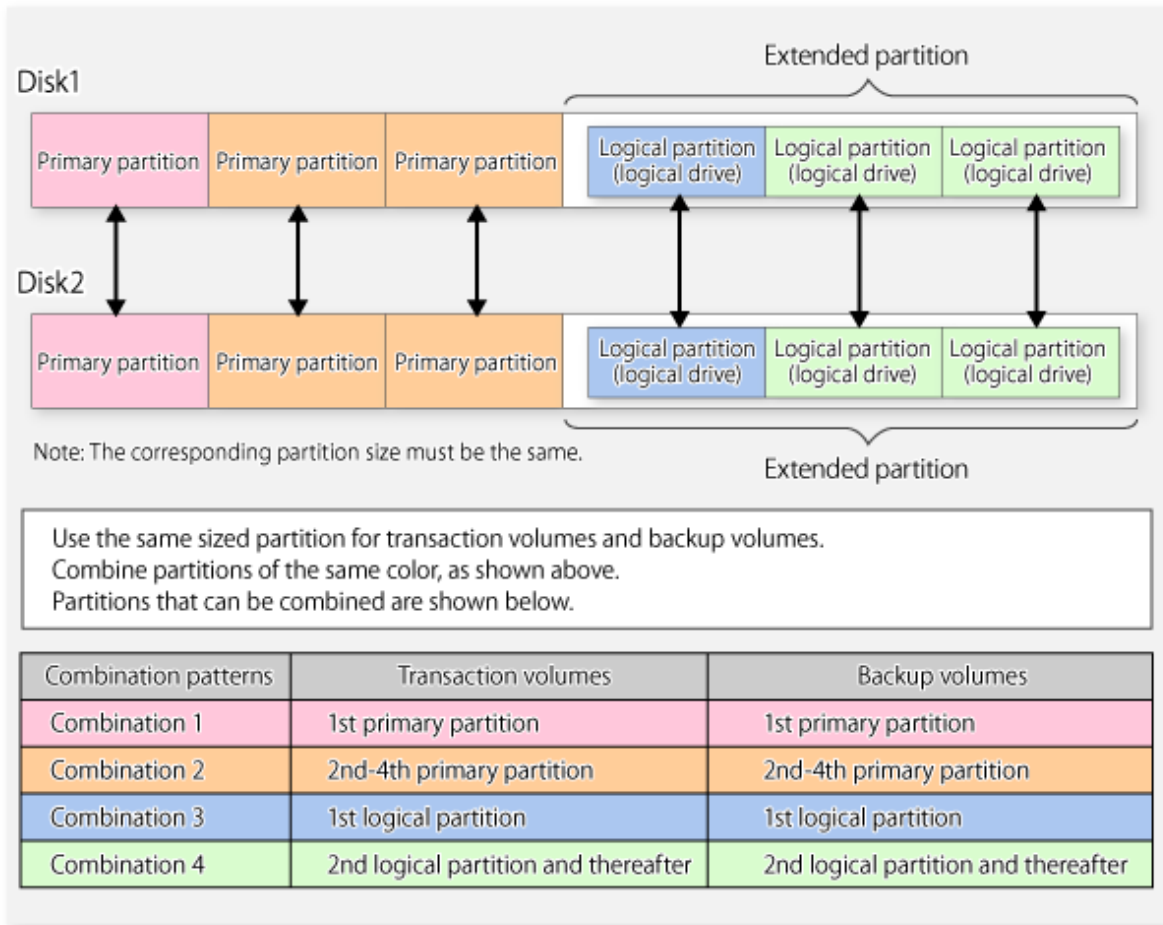
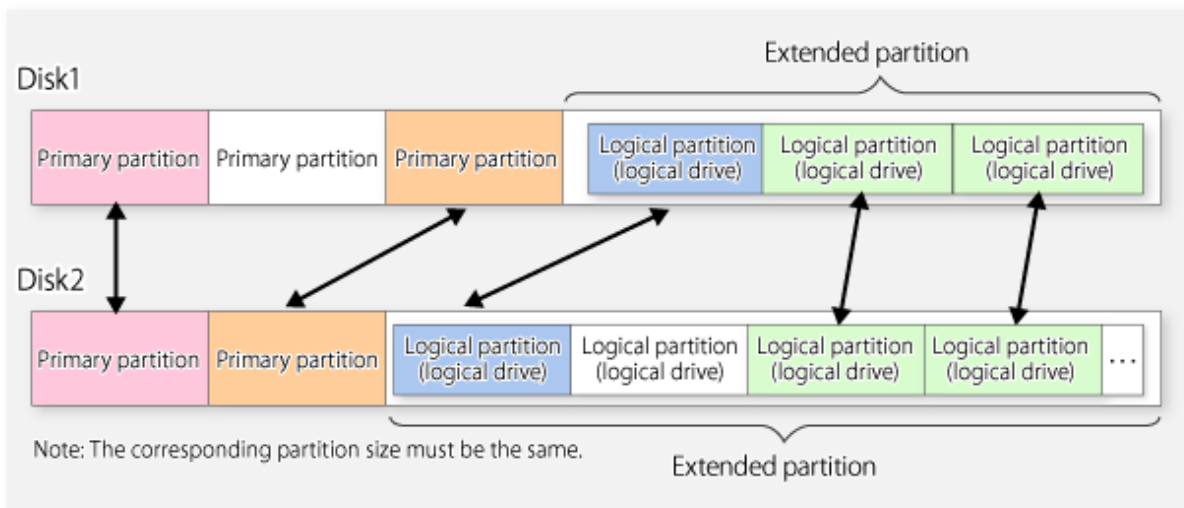


Figure 15.3 Example of Disk with Partitions of Different Sizes



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 the server-to-server replication that use different Windows operating systems, 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, define it as a replication target that allows for expansion.

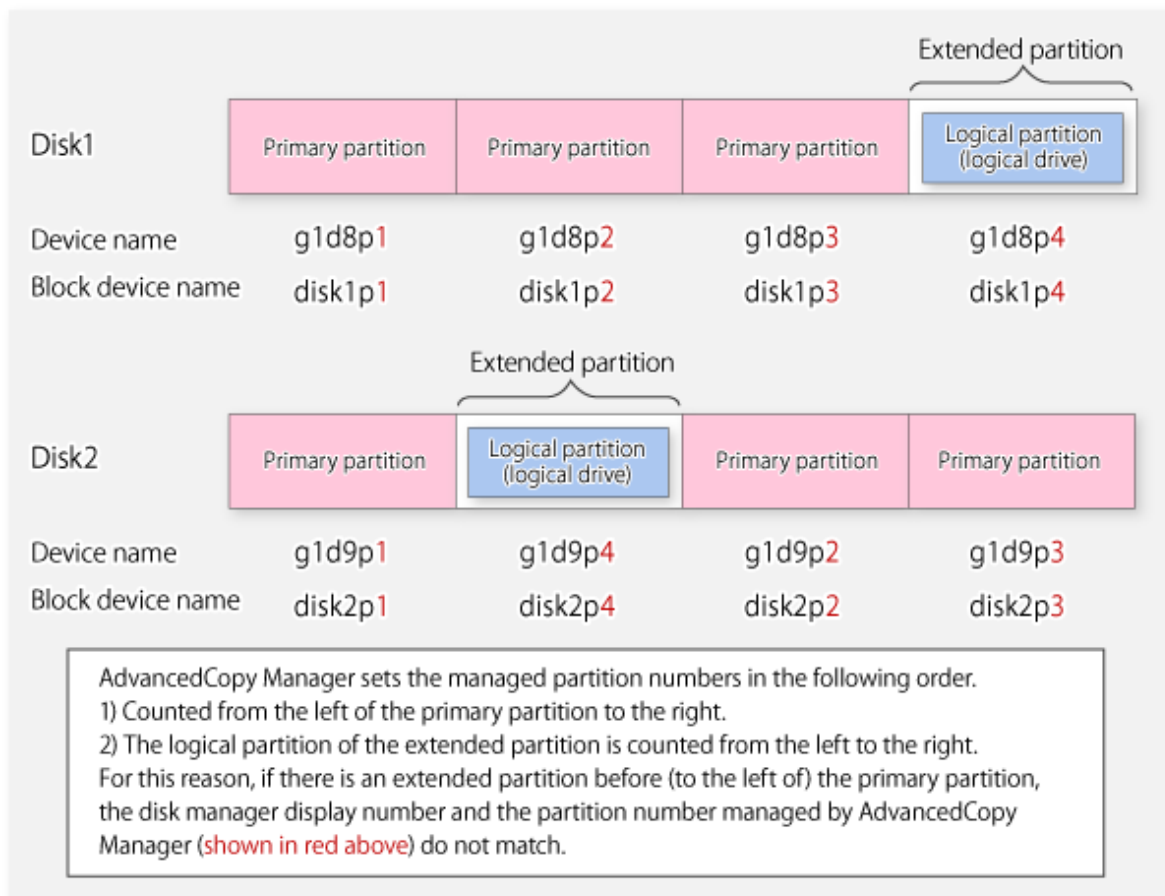
15.1.1.2 Layout of Partition

If basic and extended logical disks are mixed in one Logical Unit (disk), be sure to create an extended logical disk after a basic logical disk (i.e., on the right side on Disk Management). Do not create a basic logical disk after an extended logical disk.

Note

If you do, a mismatch may 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 15.4 Assigned Number for Partition



15.1.1.3 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

15.1.1.4 Consistency of Data on Volumes

Table 15.1 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 about sample scripts, refer to " Appendix B Sample Script for Backup Operations ".
Exchange Server 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 ".

15.1.1.5 Fetching Device Information

Before starting either the backup or replication operation, fetch information of devices that are managed by all Managed Servers using Web Console. Refer to "[3.4.4 Fetching Device Information on Managed Server](#)" for the fetching procedure. 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.

15.1.1.6 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 "[13.5.5 Changing Device Configuration](#)".

15.1.1.7 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 Disk (e.g., Antivirus Software, System Surveillance Software, etc.)

When performing backup/restore operation and replication operation, to prevent software from accessing a device targeted for service, suspend the software or specify the device for services other than check or monitoring by the software. For the setting method, refer to the manuals for respective software.

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, or replication, 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, or replication, 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, or replication, temporarily terminate the distributed link tracking client service (service display name: Distributed Link Tracking Client).

Distributed Transaction Coordinator Service

If you perform backup, restoration, or replication, temporarily terminate the distributed transaction coordinator service (service display name: Distributed Transaction Coordinator).

Kernel Transaction Manager

If you perform backup, restoration, or replication, temporarily terminate the Kernel Transaction Manager using the following command.

```
fsutil resource stop <driveLetter>:
```

When monitoring the processes of the above-mentioned services (or software) with such as a system monitoring software, by suspending the services, this may be notified as a system error.

Correspond to this in advance by such as removing the subject service from being a subject of the monitoring.

15.1.1.8 Maximum Number of Simultaneously Executing Operations

There is an upper limit (maximum value) to the number of Advanced Copy sessions that can be simultaneously executed. For this reason, make an operational design so that Advanced Copies exceeding the maximum number of copy sessions cannot simultaneously be executed.

Also, when creating partitions in one Logical Unit (LU) and running Advanced Copy at the same time, be sure not to exceed the maximum number of copy sessions simultaneously executable per LU.

For the upper limit to the number of copy sessions simultaneously executable, refer to the ETERNUS Disk storage system manuals.

15.1.1.9 Dynamic Volume

Dynamic volumes cannot be used as transaction volumes, backup volumes, original volumes, or replica volumes.

15.1.1.10 When Mounting Volume to 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.

15.1.1.11 Failure and 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 Transaction Volume with Mount Point:

Set to continue the process even if the mount point cannot be acquired. Create the following file:

- For non-clustered systems

```
<Environment directory>\etc\backup\data\DEFAULT\check.ini
```

- For clustered systems

```
<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 Transaction Volume without Mount Point

Set to execute the process without acquiring the mount point. Create the following file:

- For non-clustered systems

```
<Environment directory>\etc\backup\data\DEFAULT\check.ini
```

- For clustered systems

```
<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.

15.1.1.12 Error Messages Displayed 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. 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), ignore, as it is not a problem you need to be concerned about.

15.1.1.13 Configuration of 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 Microsoft Windows Server, it is necessary to set up the appropriate hardware, such as the ETERNUS Disk storage system and a fiber channel switch.

15.1.1.14 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 terminates 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.

15.1.1.15 Notes on Using 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 is then 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 cause errors after the operating system restarts.

15.1.1.16 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.

15.1.1.17 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:

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:

- The copy destination disk is 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 is 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, correct the drive character assignment after restore.
- In the target WSFC shared disk, if the Maintenance mode is "ON", WSFC is no longer able to recognize the disk after a restore.
- If the target is a system disk, the following message dialog is 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 take effect. Do you want to restart your computer now? "

In order to avoid the above occurrences, it is recommended to avoid operations that 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.

15.1.1.18 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 15.2 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)

15.1.1.19 Notes on Executing Copy from Logical Unit (Disk) to Partition Using Replication Function

When a copy is performed, the Logical Unit (disk) data is written in the replication destination volume (partition). If a copy is performed with a file system existing on the replication destination volume (partition), because a data overwrite can occur to the file system depending on the copy, not only will the data in the file system become inaccessible but the copied data will become inaccessible through the file system as well.

15.1.1.20 Notes When Using -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](#) command

- [swsrpmake](#) command
- [swsrpcancel](#) 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.

15.1.1.21 Notes When Using -t Option

When you execute the [swsrpstartsync](#) command with the -t option, volume lock fails with the [swsrpmake](#) command and the swsrp3607 message may be output.

If you execute the [swsrpstartsync](#) 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 the [swsrpstartsync](#) command with the -t option, execute the [swsrpmake](#) command with the -t option.

15.1.1.22 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.

15.1.1.23 Restarting 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 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 system 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 Backup Volume](#)".

15.1.1.24 Moving of VM Guest of VMware

Refer to the manual of the VMware vCenter Server for information on how to move the VM guest by using the functions of the VMware vCenter Server.

Do not move the VM guest that changes the disk type by utilizing the functions of the VMware vCenter Server. When the disk type has been changed, the following situations may occur.

- A "?????" is displayed in the status of the configuration information of the AdvancedCopy Manager. The status can be confirmed from the following information displayed with operations of the Command Line Interface or Web Console.

Confirmation Means	Command Name or Screen Name	Displayed Field
Command Line Interface	swstbackstat command	Status
	swstsyncstat command	Status
	swstreststat command	Status
	swsthistdisp command	Status
	swstexecstat command	Execute
	swstrkstat command	Status
	swsrpstat command	Status
Web Console	Backup Operation screen	Status
	Replication Operation screen	Status

- The following error is displayed and the operation of the Command Line Interface or Web Console ends.

Executed Operation	Errors that Occurs
Backup management	swst0603, swst0634, swst0719, swst0740
Replication management	swsrp0603, swsrp0634, swsrp0719, swsrp0740, swsrp2606, swsrp2648

When the above-mentioned situation has occurred, confirm the device configuration of the virtual machine and confirm if whether the type of disk has been changed.

When the type of disk has been changed, reconfigure the configuration information of the AdvancedCopy Manager.

When the type of disk has not been changed, there is the possibility that a hardware failure has occurred.

Confirm the status of the hardware, and when a hardware failure has occurred, re-execute the operations after removing the cause of the error. Refer to the following sections for details.

- ["13.3 Troubleshooting: Hardware Error During Backup"](#)
- ["13.4 Troubleshooting: Hardware or Other Error During Replication"](#)

15.1.1.25 Data Deduplication Function of Windows Operating System

Any NTFS that is set with the data deduplication function implemented in Microsoft Windows Server 2012 or later operating systems cannot be used.

15.1.1.26 Executing the Command That Displays the Advanced Copy Status

If multiple commands that display the Advanced Copy status, such as the copy status display command and operation status display command, are executed simultaneously, the response speed from the storage device is reduced and may affect command executions and transactions.

For this reason, design the operation so that multiple commands cannot be executed at the same time.

15.1.2 Notes on Snapshot High-speed Backup

15.1.2.1 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.

15.1.2.2 Simultaneous Backups

Performing snapshot high-speed backup simultaneously with the same transaction volume specified performs two backups in parallel.

However, performing snapshot high-speed backup simultaneously more often than the number of preservation generations cancels the backup operations starting from the oldest one. In other words, you cannot perform more simultaneous backups than the specified number of generations.

15.1.3 Notes on Synchronous High-speed Backup

15.1.3.1 Processing of Backup

The `swstbackup` command cannot be executed until the transaction and backup volumes are in the equivalency maintain state.

15.1.3.2 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.

15.1.3.3 Error: Loss of Delay Write-in Data

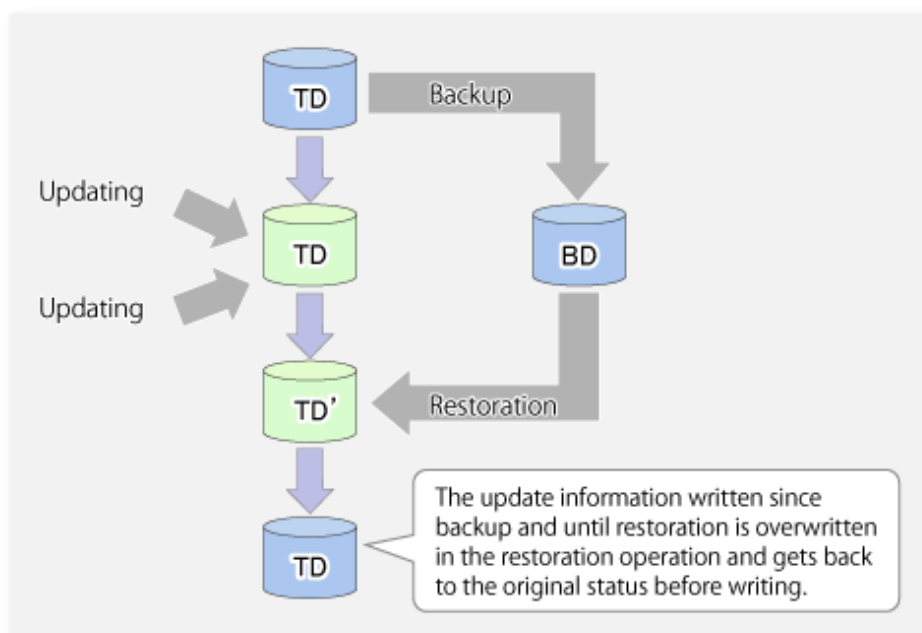
When backup synchronous processing starts, the error "loss of delay write-in data" may occur. If the volume which has generated the error is performing backup synchronous processing, you can ignore the error, since the problem is not in the adjustment of backup data.

15.1.4 Notes on Restoration

15.1.4.1 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 is overwritten.

Figure 15.5 Notes on Restoration of AdvancedCopy Manager



TD: Transaction volume
 BD: Backup volume

15.1.5 Notes on Snapshot Replication

15.1.5.1 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 the [swsrpmake](#) command, it may not be possible to preserve the sequence of data updates across multiple volumes. In this case, an error message is 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 is not preserved across multiple volumes.

Create check.ini in the following path of the server on which to execute the [swsrpmake](#) command:

- For non-clustered systems

```
<Environment directory>\etc\repl\data\DEFAULT
```

- For clustered systems

```
<Environment directory for logical node>\etc\repl\data\DEFAULT
```

Table 15.3 File Format of 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 is disabled. By setting any value other than "No", preservation of the sequence is 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 is not preserved across multiple volumes.

- ETERNUS DX80 S2 (for earlier than V10L30 firmware)
- ETERNUS DX90 S2 (for earlier than V10L30 firmware)
- ETERNUS DX400 S2 series (for earlier than V10L30 firmware)
- ETERNUS DX8000 S2 series (for earlier than V10L30 firmware)

15.1.5.2 Stopping SnapOPC+

If the SnapOPC+ replication process is stopped, the deletable snap generations and the results of the [swsrpcancel](#) command vary depending on factors such as the firmware version of the storage device and the volume type of the copy destination volume. Refer to "[7.1.1.3 Deletable SnapOPC+ Snap Generations](#)" for details.

To prevent necessary sessions from being stopped, confirm that the target storage device, its firmware version, the volume type of the copy destination volume, and the snap generation are all correct before stopping SnapOPC+.

15.1.6 Notes on Cluster Operation

15.1.6.1 When Using 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 on single 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 failover cluster manager according to the following procedure:



Note

Do not change any information other than the dependency.

1. Select the cluster group you want to handle in the "Failover cluster manager" window.
2. In "Services and Applications", select the group to be used in AdvancedCopy Manager.
3. Select **Services: [AdvancedCopy COM Service_logicalNodeName]**, 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 **OK** to close the properties window.
6. Close the "Failover cluster manager" window.

15.1.7 Notes on Backup in Clustered System

15.1.7.1 When Using WSFC for Cluster Operation

Note the following:

- 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.

- 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 WSFC failover.

- Perform snapshot high-speed backup operations.
When using EC or REC, perform replication operation. For notices for replication operation in a cluster configuration, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

Maintenance Mode

If volumes are inaccessible, set the maintenance mode of the physical disk resources to ON because a failover may occur due to a resource check in the cluster. In addition, if a resource is using the targeted physical disk resource, take actions such as taking the resource offline in advance.

In the following cases, volumes become inaccessible at backup/restore:

- Volume is locked at pre-processing of backup/restore.

In either of the following cases, AdvancedCopy Manager sets maintenance mode automatically at pre- and post-processing of backup/restore:

- One partition exists on one disk and maintenance mode is OFF before backup/restore is performed.

For details about pre- and post-processing of backup/restore, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".

When setting maintenance mode of physical disk resources manually, use the following procedure to perform backup/restore:

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
```



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".

15.1.7.2 Notes on 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 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 the `swsrpbackup_sql` command, specify the name of the logical node for AdvancedCopy Manager in the environment variable `SWSTGNODE` beforehand.
- To execute the `swstbackup_sqlsvr` or `swstrestore_sqlsvr` 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.

15.1.7.3 Backup and Restoration During Stoppage of Cluster

When Using 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 COM Service_ *logicalNodeName*
- IP address resource (When created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_ *logicalNodeName*" 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 WSFC manual.
2. Start (i.e., set online) the resources required for operation.
Start the following resources:
 - AdvancedCopy COM Service_ *logicalNodeName*
 - IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_ *logicalNodeName*" 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. For details on how to start a resource, refer to the WSFC manual.
- Since the dependency between AdvancedCopy COM Service_ *logicalNodeName* and the transaction disk has been set, starting AdvancedCopy COM Service_ *logicalNodeName* starts all dependent disk resources.

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=logicalNodeName
```

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 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 WSFC manual.

15.1.8 Notes on Replication in Clustered System

15.1.8.1 When Using WSFC for Cluster Operation

Note the following:

- If failover occurs while running a replication command, you must ensure consistency by using the [swsrprecoverres](#) 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.
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.
If REC is used, also connect the copy destination to a non-cluster Managed Server to perform inter-server replication. For reverse replication, use synchronous replication using REC.
- 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, do not do the copy that the administrative information of the disk overlaps. If 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 "[15.1.1.17 Notes on Executing Logical Unit \(Disk\) Unit Copy](#)".

Maintenance Mode

If volumes are inaccessible, set the maintenance mode of the physical disk resources to ON because a failover may occur due to a resource check in the cluster. In addition, if a resource is using the targeted physical disk resource, take actions such as taking the resource offline in advance.

In the following cases, volumes become inaccessible at replication:

- Volume is locked at pre-processing of replication
- Volume is a destination volume of synchronous replication.

In either of the following cases, AdvancedCopy Manager sets maintenance mode automatically at pre- and post-processing of replication:

- One partition exists on one disk and maintenance mode is OFF before replication is performed.
- Copy on a per LUN basis and maintenance mode is OFF before replication is performed.

For details about pre- and post-processing of replication, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)".

When setting maintenance mode of physical disk resources manually, use the following procedure to perform backup/restore.

Replication using OPC

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
```

Replication using EC or REC

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
```

Reverse replication using REC

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.

 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".

15.1.8.2 Notes on 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 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 the `swsrpbackup_sql` command, specify the name of the logical node for AdvancedCopy Manager in the environment variable SWSTGNODE beforehand.
- To execute the `swstbackup_sqlsvr` or `swstrestore_sqlsvr` 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)

15.1.8.3 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, do the following.

- Use the AdvancedCopy Manager's agent installed to each physical server. As such, 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.
Place the files either on a shared disk or on the local disks of both nodes.

15.1.8.4 Replication During Stoppage of Cluster

When Using 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 COM Service_ *logicalNodeName*
- IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_ *logicalNodeName*" 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 COM Service_ *logicalNodeName*
- IP address resource (when created by the cluster setup command of AdvancedCopy Manager, the resource is named in "AdvancedCopy IP Address_ *logicalNodeName*" 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. For details on how to start a resource, refer to the WSFC manual.
- Since the dependency between AdvancedCopy COM Service_ *logicalNodeName* and transaction disk has been set, starting AdvancedCopy COM Service_ *logicalNodeName* starts all dependent disk resources.

- 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=logicalNodeName
```

- Perform replication operation.
You can perform replication operation in the same way as for regular cluster operations.
- Stop (i.e., set to offline) the resources you started in step 2.
For details on how to stop a resource, refer to the WSFC manual.
- 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 WSFC manual.

15.1.9 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 Microsoft Windows Server 2012 or later 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.

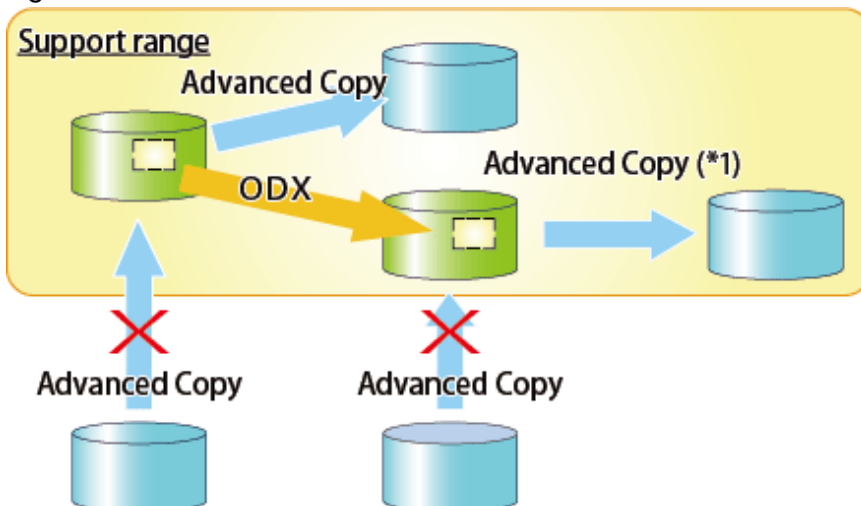
If the command terminates abnormally, check on Web Console that no ODX session exists on the copy destination volume and then re-execute the command.

If 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 Microsoft Windows Server 2012 or later 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 15.6 Use in Combination with ODX



*1: In the following ETERNUS Disk storage systems whose firmware version number is earlier than V10L50, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which ODX session is running.

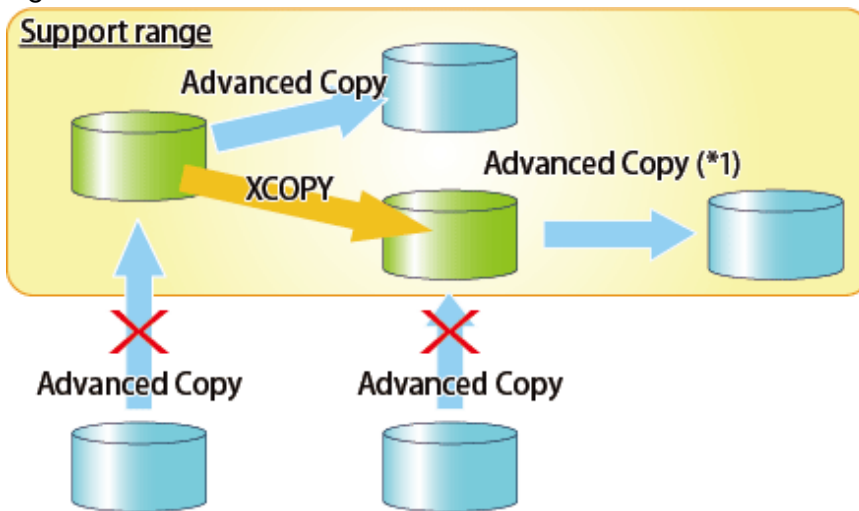
- ETERNUS DX80 S2
- ETERNUS DX90 S2
- ETERNUS DX400 S2 series
- ETERNUS DX8000 S2 series

15.1.10 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 Web Console that no XCOPY session exists on the copy destination volume and then re-execute the command.

Figure 15.7 Use in Combination with XCOPY



*1: In the following ETERNUS Disk storage systems whose firmware version number is earlier than V10L50, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which XCOPY session is running.

- ETERNUS DX80 S2
- ETERNUS DX90 S2
- ETERNUS DX400 S2 series
- ETERNUS 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.

A.2 Pre-processing and Post-processing of Backup

By specifying the -Xflush option in the [swstbackup](#) 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.

In the case of WSFC operation, automatic configuration of the maintenance mode of the physical disk resources is performed with pre- and post-processing. For details on maintenance mode, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

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. In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the backup volume belongs ON (only when this is of a configuration where there is 1 partition on 1 disk and the maintenance mode is off prior to execution of the backup). 2. In the following cases, the backup volume is locked. - Snapshot backup - In the case of Synchronous Backup of WSFC Operation 3. The file system buffer of the transaction volume is flushed. - When the -Xflush option is not specified and BufferFlushOnly is set to off: 1. In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the backup volume and transaction volume belong ON (only when this is of a configuration where there is

Type	Detail of Operations
	<p>1 partition on 1 disk and the maintenance mode is off prior to execution of the backup).</p> <p>2. In the following cases, the backup volume is locked.</p> <ul style="list-style-type: none"> - Snapshot backup - In the case of Synchronous Backup of WSFC Operation <p>3. The transaction volume is locked.</p>
Backup post-processing (implemented with the backup execution command)	<ul style="list-style-type: none"> - Default operations: <ol style="list-style-type: none"> 1. The backup volume is dismounted. 2. The backup volume is unlocked. 3. In the case that the maintenance mode is turned ON with the pre-processing, turn the maintenance mode of the physical disk resource to which the backup volume belongs OFF. - When the -Xflush option is not specified and BufferFlushOnly is set to off: <ol style="list-style-type: none"> 1. The transaction volume is unlocked. 2. The backup volume is dismounted. 3. The backup volume is unlocked. 4. In the case that the maintenance mode is turned ON with the pre-processing, turn the maintenance mode of the physical disk resource to which the backup volume and the transaction volume belong OFF.

Table A.2 Pre-processing and Post-processing for Symfoware Backup Operations

Type	Detail of Operations
Pre-processing for synchronous processing	<ol style="list-style-type: none"> 1. In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the backup volume belong ON (only when this is of a configuration where there is 1 partition on 1 disk and the maintenance mode is off prior to execution of the backup). 2. The backup volume is locked.
Post-processing for synchronous processing	<ul style="list-style-type: none"> - In the case of WSFC operation: <ol style="list-style-type: none"> 1. The backup volume is dismounted. 2. The backup volume is unlocked. - Not in the case of WSFC operation: <p>Take no action.</p>
Backup pre-processing	<ul style="list-style-type: none"> - For a snapshot backup: <ol style="list-style-type: none"> 1. In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the backup volume belong ON (only when this is of a configuration where there is 1 partition on 1 disk and the maintenance mode is off prior to execution of the backup). 2. The backup volume is locked. 3. The file system buffer of the transaction volume is flushed. - For a synchronous backup: <ul style="list-style-type: none"> - In the case of WSFC operation: <ol style="list-style-type: none"> 1. The backup volume is locked.

Type	Detail of Operations
	<p>2. The file system buffer of the transaction volume is flushed.</p> <p>- Not in the case of WSFC operation:</p> <p>The file system buffer of the transaction volume is flushed.</p> <p>The file system buffer of the transaction volume is flushed regardless of the -Xflush option specification or the value of BufferFlushOnly.</p>
Backup post-processing	<ol style="list-style-type: none"> 1. The backup volume is dismounted. 2. The backup volume is unlocked. 3. In the case that the maintenance mode is turned ON with the pre-processing, turn the maintenance mode of the physical disk resource to which the backup volume belongs OFF.

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 the [swstrsemrch](#) 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 Synchronous-type Backup Operation (Flushing File System Buffer of Transaction Volume)

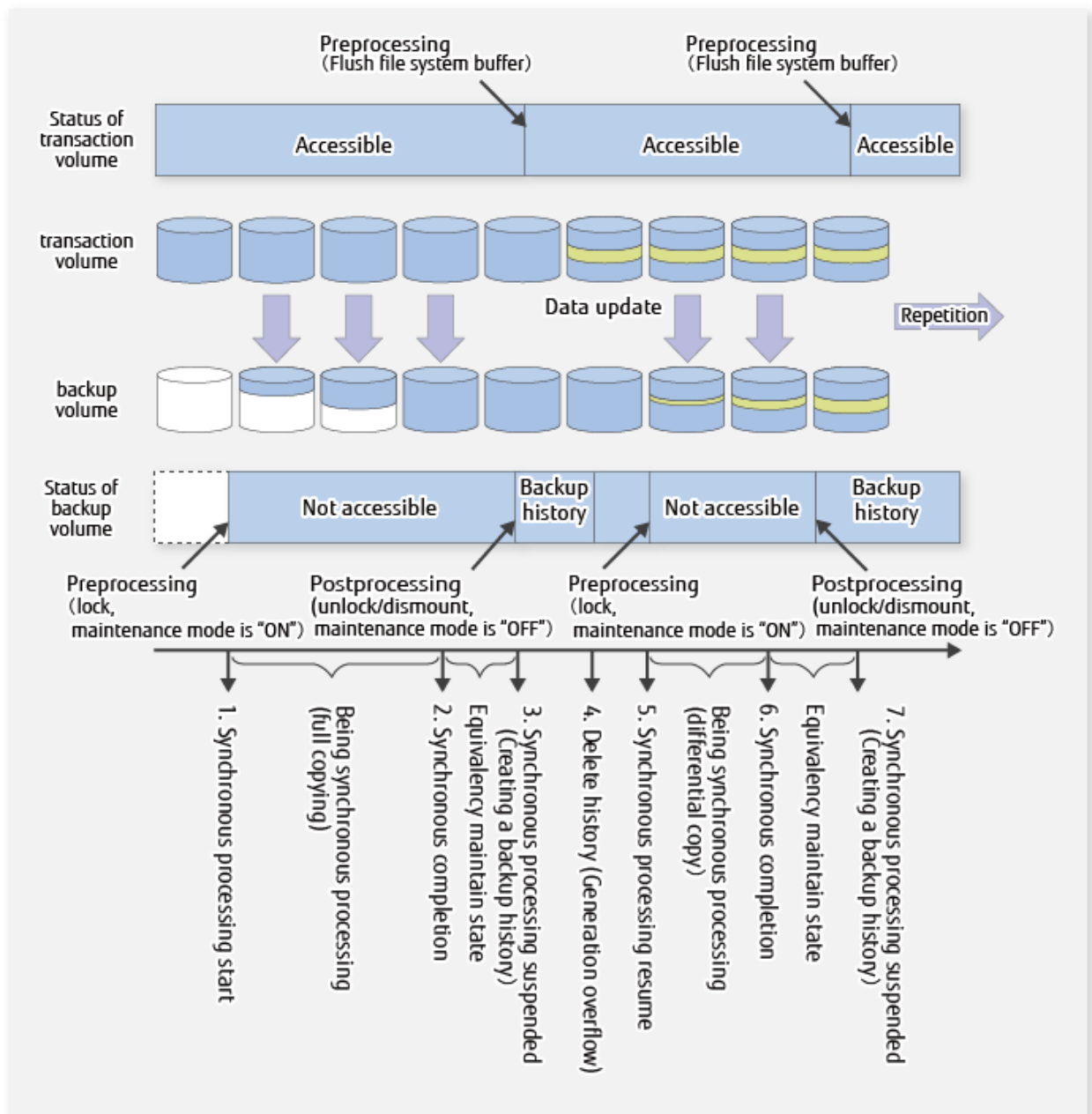
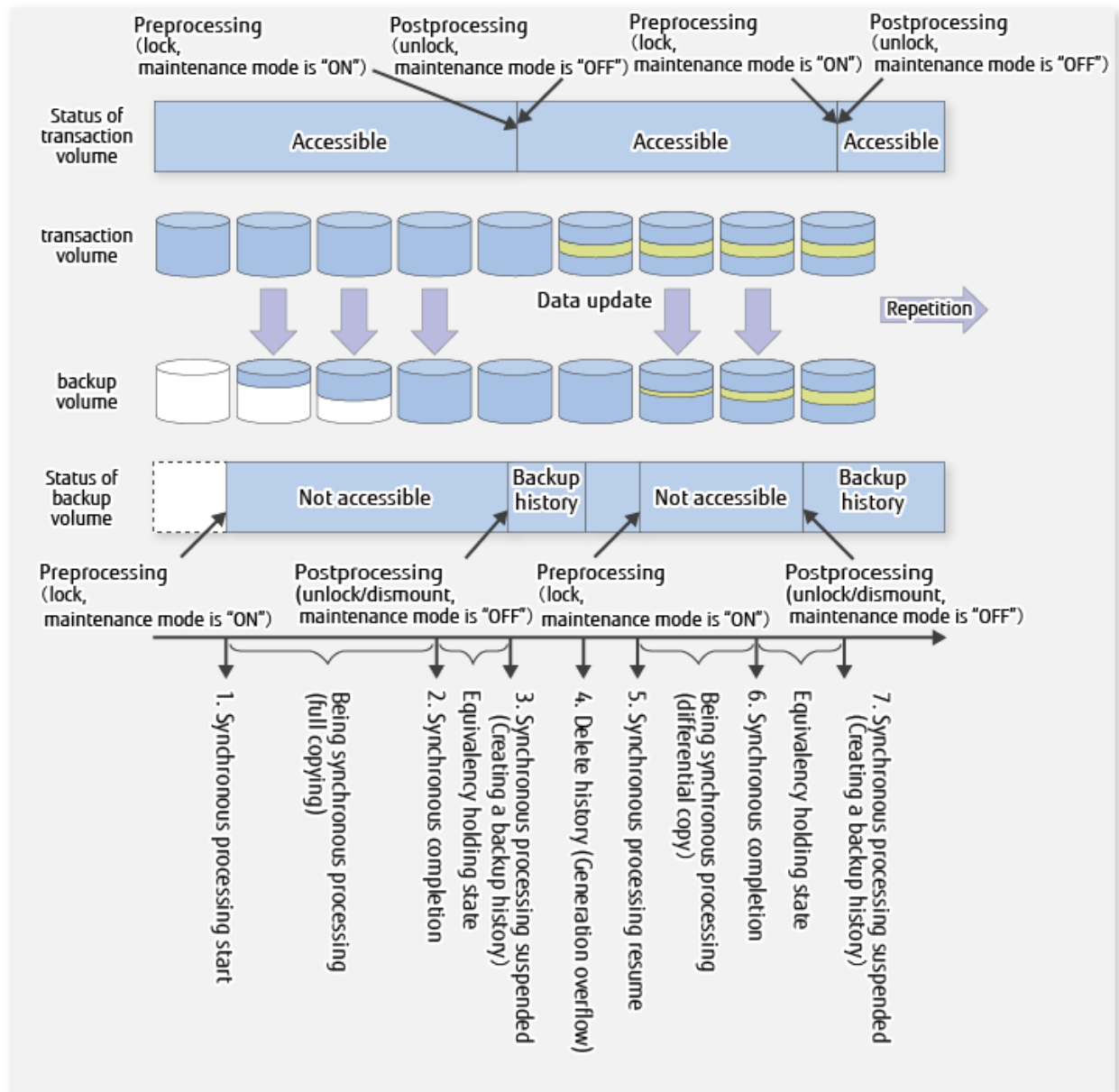


Figure A.2 Processing in Synchronous-type Backup Operation (Locking Transaction Volume)



A.2.1 Pre-processing of Backup

The name of a script file for pre-processing of a backup is as follows.

- For non-clustered systems

```
<Environment directory>\etc\backup\scripts\OpcBackupPre.js
```

- For clustered systems

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcBackupPre.js
```

Pre-processing Script for Backup (OpcBackup.pre)

```
1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
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.

- For non-clustered systems

```
<Environment directory>\etc\backup\scripts\OpcBackupPost.js
```

- For clustered systems

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcBackupPost.js
```

Post-processing Script for Backup (OpcBackup.post)

```
1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
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
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)

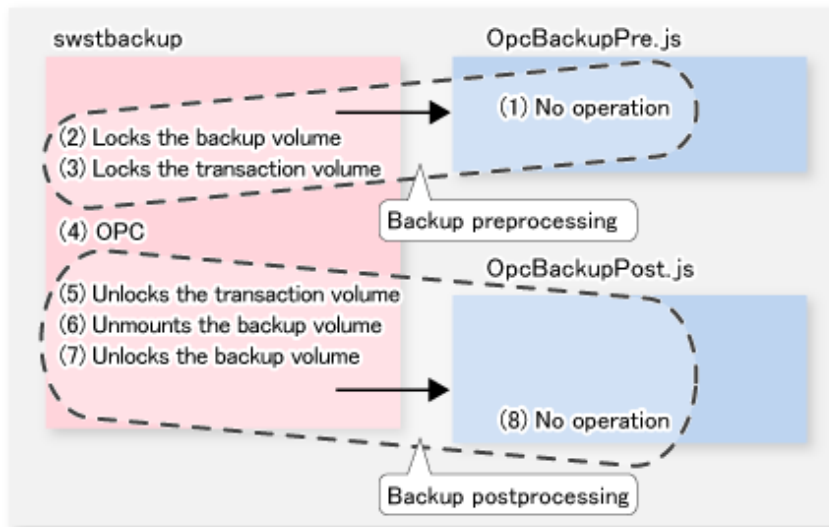


Figure A.4 Synchronous-type Backup (EC) in Non-clustered System

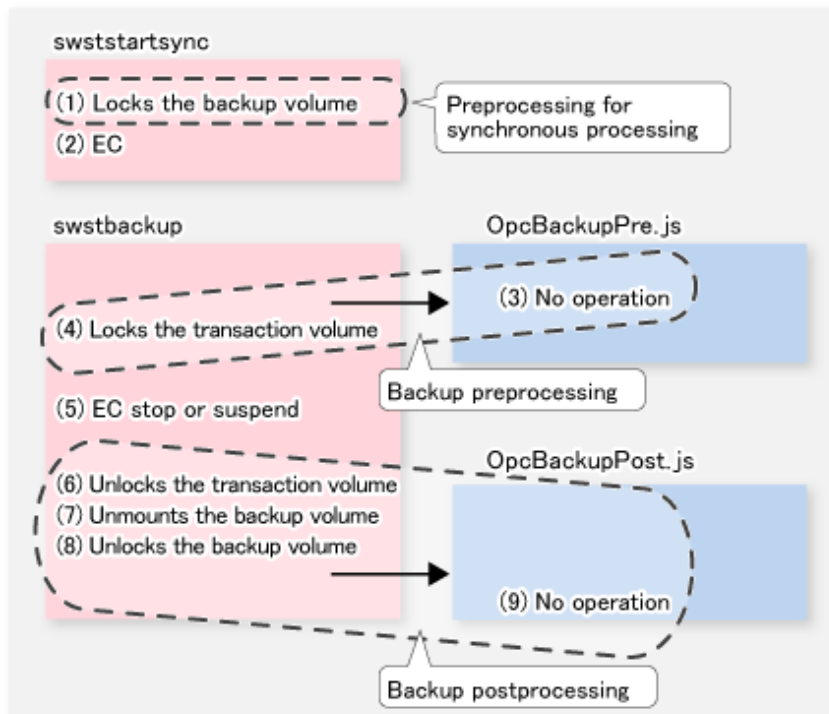
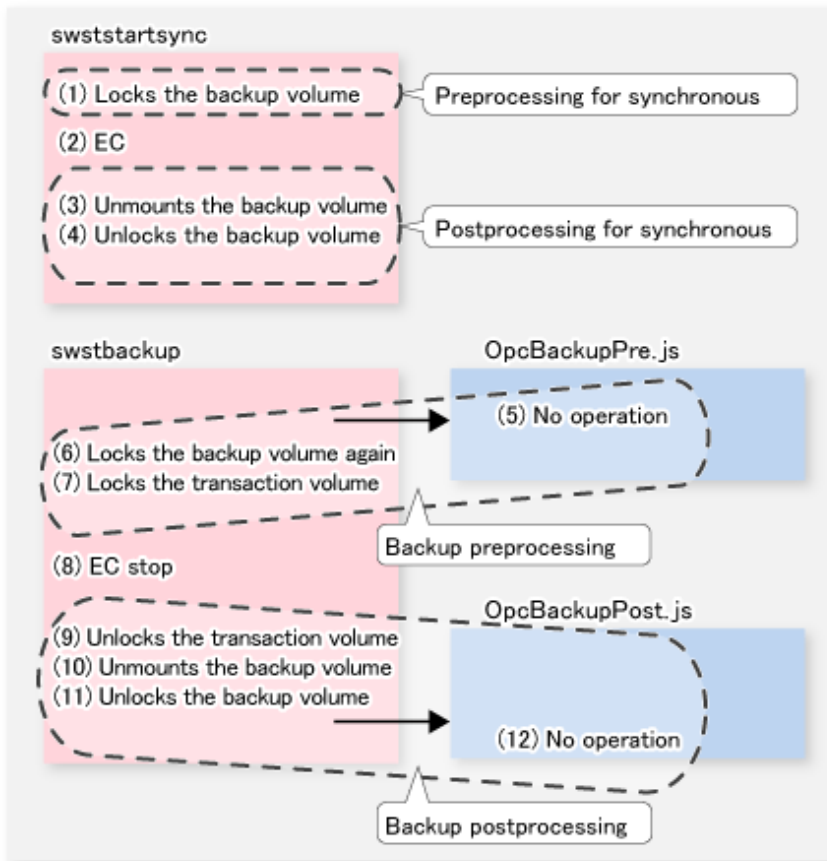


Figure A.5 Synchronous-type Backup (EC) in Clustered System



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 "[15.1.12 Error Messages Displayed Event Viewer](#)" in "[15.1 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

The `swstresback` 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.

- For non-clustered systems

```
<Environment directory>\etc\backup\data\BTRANLOCK.INI
```

- For clustered systems

```
<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
ClusterResourceMaint=off
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
ClusterResourceMaint=on
```

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	<p>Specifies flushing the file system buffer of the transaction volume instead of locking the transaction volume:</p> <p>on (default value) = the buffer is flushed (no locking) off = the buffer is not flushed (locking)</p> <p>If the -Xflush option is specified in swstbackup and BufferFlushOnly=off, then the -Xflush option has priority.</p> <p>If BufferFlushOnly is not set to off, all other parameters (LockForceMode, LockRetryNumber, and LockRetryInterval) become invalid.</p> <p>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.</p> <p>If on is specified for NoPrePost, then this parameter becomes invalid.</p>
LockForceMode	<p>This parameter specifies that the volume be dismounted before locking is retried.</p> <p>off (default value) = no dismounting before locking is retried on = dismounting before locking is retried</p> <p>When the volume is dismounted, all handles opened for the volume become invalid.</p> <p>* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.</p> <p>If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.</p>
LockRetryNumber	<p>This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified.</p> <p>The default value is 20 (retries).</p> <p>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.</p> <p>If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.</p>
LockRetryInterval	<p>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).</p> <p>If on is specified for BufferFlushOnly or NoPrePost, then this parameter becomes invalid.</p>
NoPrePost	<p>Specifies that the backup pre-processing and post-processing are not to be performed.</p> <p>off (default value) = The backup pre-processing and post-processing are performed. on = The backup pre-processing and post-processing are not performed.</p> <p>Setting NoPrePost to on disables all the other parameters (BufferFlushOnly, LockForceMode, LockRetryNumber, and LockRetryInterval).</p>
ClusterResourceMaint	<p>In the case of WSFC operation, specify whether to configure the maintenance mode of the physical disk resource to which the volume belongs.</p> <p>on(default value) = The maintenance mode is set. off = The maintenance mode is not set.</p>

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

The `swstresback` 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.

- For non-clustered systems

`<Environment directory>\etc\backup\data\BBACKLOCK.INI`

- For clustered systems

`<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
ClusterResourceMaint=off
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
ClusterResourceMaint=on
```

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.

Key	Explanation
	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).
ClusterResourceMaint	In the case of WSFC operation, specify whether to configure the maintenance mode of the physical disk resource to which the volume belongs. on(default value) = The maintenance mode is set. off = The maintenance mode is not set.

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 the case of WSFC operation, automatic configuration of the maintenance mode of the physical disk resources is performed with pre- and post-processing. For details on maintenance mode, refer to "[15.1.7.1 When Using WSFC for Cluster Operation](#)".

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

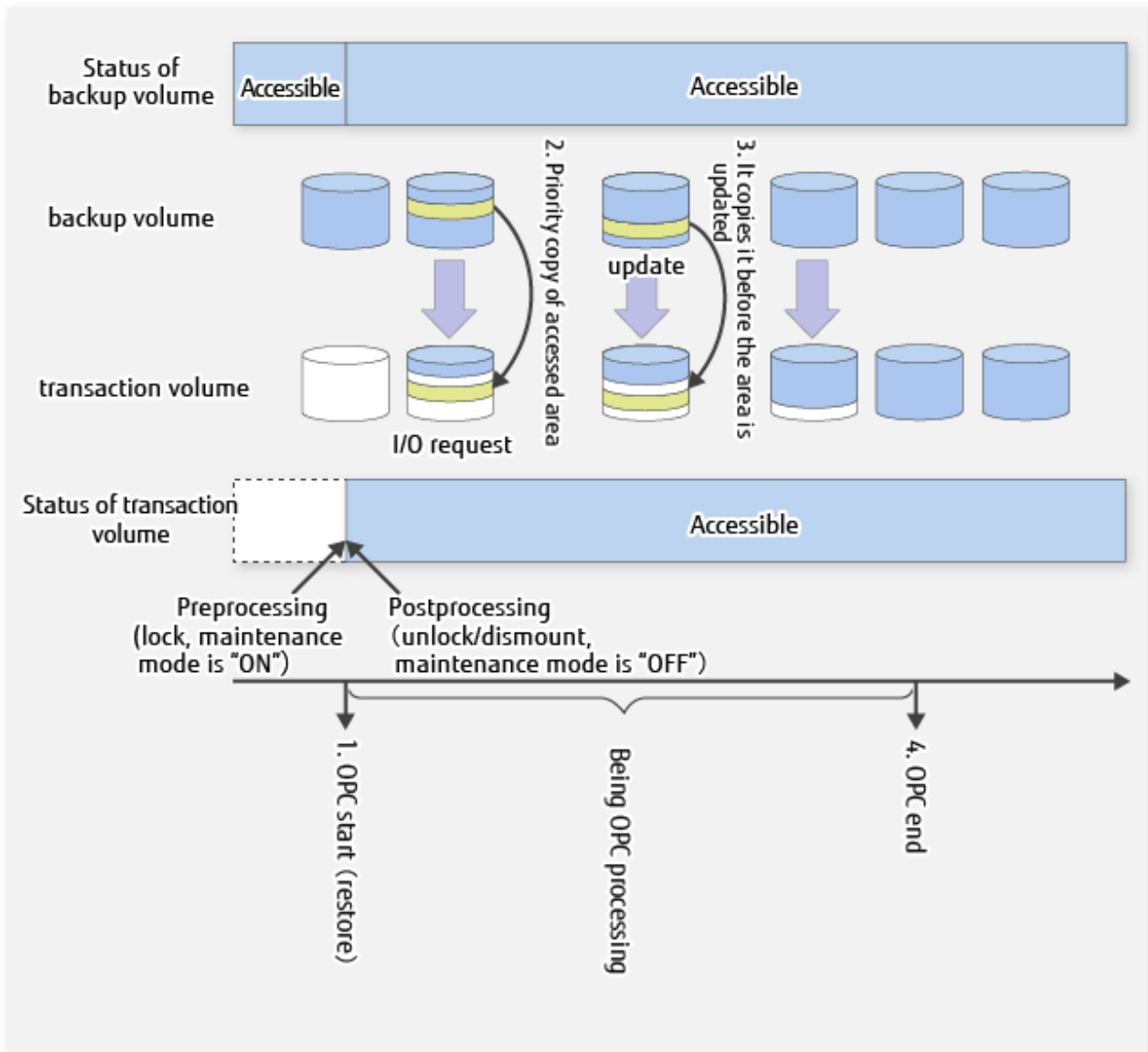


Note

If the post-processing fails, the resource information may have inconsistencies. Execute the `swstsrsemitch` 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.

- For non-clustered systems

```
<Environment directory>\etc\backup\scripts\OpcRestorePre.js
```

- For clustered systems

```
<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcRestorePre.js
```

Pre-processing Script for Restoration (OpcRestore.pre)

```
1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2005
3: //
4: // OpcRestorePre.js: Pre-Processing Script for swstore
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.

- For non-clustered systems

<Environment directory>\etc\backup\scripts\OpcRestorePost.js

- For clustered systems

<Shared disk>:\etc\opt\swstorage\etc\backup\scripts\OpcRestorePost.js

Post-processing Script for Restoration (OpcRestore.post)

```
1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
3: //
4: // OpcRestorePost.js: Post-Processing Script for swstrestore
5: //
6: // [Parameters]
7: // 1st argument: device name of transaction volume
8: //
9: // [Return Values]
10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (3,5): not used, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");           // create Shell object
18:     var WshEnv = WshShell.Environment("PROCESS");                   // create Environment object
19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstRestorePostProc object
22:     var proc = new SwstRestorePostProc();
23:
24:     // do nothing if postprocessing file exists
25:     if (fsObj.FileExists(proc.postFileName) == false) {
26:     proc.doNothing();
27:     }
28:     // get postprocessing type
29:     else {
30:     var postProcType = proc.getPostProcType();
31:     switch(postProcType) {
32:     case "none":
33:         proc.doNothing();
34:         break;
35:     }
36:     }
37:
38:     // clear temporary file
39:     proc.deletePostFile();
40:     SwstQuit(0);
41: } catch (e) {
42:     SwstQuit(6);
43: }
44:
45: function SwstRestorePostProc()
46: {
47:     // member variables
48:     this.tvName = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of transaction volume
49:     this.postFileName = getDataPathName() + "\\\" + getPutFileName(this.tvName) + ".pre"; // name
of postprocessing file
50:
51:     // member functions
52:     this.getPostProcType= getPostProcType;           // self-explanatory
53:     this.doNothing      = doNothing;                 // self-explanatory
54:     this.deletePostFile = deletePostFile;           // self-explanatory
```

```

55: }
56:
57: function getPostProcType()
58: {
59:     var iomode = 1;    // means read-only mode
60:     var create = false; // means not to create a file
61:     var postFileStream = fsObj.OpenTextFile(this.postFileName, iomode, create);
62:     var postProc = postFileStream.ReadAll();
63:     postFileStream.Close();
64:     return postProc;
65: }
66:
67: function doNothing()
68: {
69:     // do nothing
70: }
71:
72: function deletePostFile()
73: {
74:     if (fsObj.FileExists(this.postFileName) == true) {
75:         fsObj.DeleteFile(this.postFileName);
76:     }
77: }
78:
79: function SwstQuit(exitStatus)
80: {
81:     switch(exitStatus) {
82:         case 0:
83:             WScript.Quit(0);
84:         case 1:
85:             WScript.Echo("[Restore Postprocessing] The number of the arguments is incorrect.");
86:             WScript.Quit(2);
87:         default:
88:             WScript.Echo("[Restore Postprocessing] The script exited abnormally.");
89:             WScript.Quit(4);
90:     }
91: }
92:
93: function getDataPathName()
94: {
95:     return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\backup\\data\\DEFAULT";
96: }
97:
98: function getBinPathName()
99: {
100:     return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
101: }
102:
103: function getSetupInfoKey()
104: {
105:     var nodeName = WshEnv.Item("SWSTGNODE");
106:     if( nodeName != "" ){
107:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
108:     }
109:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
110: }
111:
112: function getPutFileName(deviceName){
113:     var fileName;
114:     if( isSafeDISKName(deviceName) ){
115:         var re = /(\\S+)\\(\\S+):(\\S+)/;
116:         fileName = deviceName.replace(re, "$1_$2_$3");

```

```

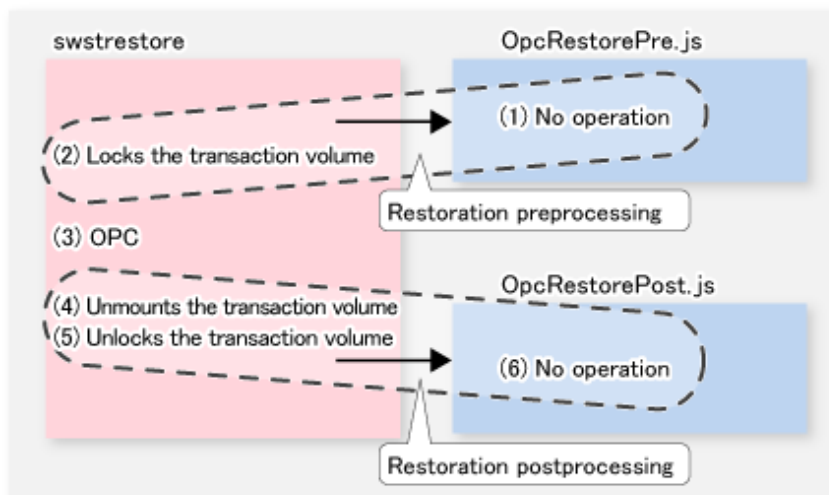
117:     }else{
118: fileName = deviceName;
119:     }
120:     return(fileName);
121: }
122:
123: function getGXDXPX(deviceName){
124:     var gXdXpX;
125:     if( isSafeDISKName(deviceName) ){
126: var re = /(\\S+)\\(\\S+):(\\S+)/;
127: gXdXpX = deviceName.replace(re, "$3");
128:     }else{
129: gXdXpX = deviceName;
130:     }
131:     return(gXdXpX);
132: }
133:
134: function isSafeDISKName(deviceName){
135:     var key = ":g";
136:     var s = deviceName.indexOf(key);
137:     if ( s < 0 ) {
138: return (false);
139:     } else {
140: return (true);
141:     }
142: }

```

Point

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



Note

In the restoration pre-processing, to avoid a temporary access conflict with other applications, locking is retried if it cannot complete its operation. If the number of times the command is executed reaches the specified retry count limit, locking ends abnormally. If an abnormal end occurs, a process that is using the backup-restored volume remains active. Stop all applications and services involved or take other appropriate measures so that the volume cannot be used by another process.

Although the retry count limit can be changed by creating a volume locking specification file and resetting the count limit (for details on the file, refer to "A.3.3 Backup-restored volume locking specification file"), the files do not need to be created if appropriate measures have been taken to prevent other processes from using the target volume during restoration processing execution.

A.3.3 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)



Note

The `swstresback` command cannot back up this file. In operations that use this file, the "copy" command, etc., must be executed to back up the backup-restored volume locking specification file for backups.

File Name and Directory

Use a name such as the one below to create a backup-restored volume locking specification file for backups.

- For non-clustered systems

`<Environment directory>\etc\backup\data\RDSTLOCK.INI`

- For clustered systems

`<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
ClusterResourceMaint=off
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
ClusterResourceMaint=on
```

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	<p>This parameter specifies that the volume be dismounted before locking is retried.</p> <p>off (default value) = no dismount before locking is retried on = dismount before locking is retried</p> <p>When the volume is dismounted, all handles opened for the volume become invalid.</p> <p>* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.</p>
LockRetryNumber	<p>This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified.</p> <p>The default value is 20 (retries).</p> <p>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.</p>
LockRetryInterval	<p>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).</p>
ClusterResourceMaint	<p>In the case of WSFC operation, specify whether to configure the maintenance mode of the physical disk resource to which the volume belongs.</p> <p>on(default value) = The maintenance mode is set. off = The maintenance mode is not set.</p>

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. The manager of the backup operation should customize the sample scripts according to their specific requirements and apply them to the backup.

Point

This section explains how the sample script is created for the backup management function and the replication management function.

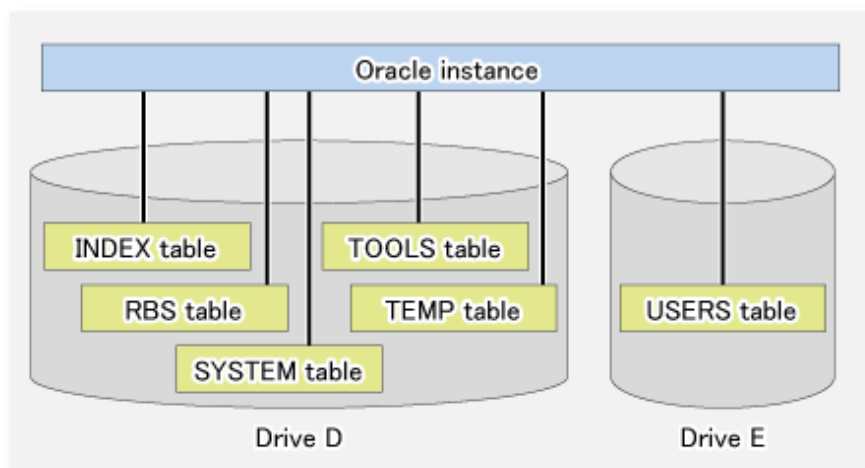
This document and the sample script show how to back up both of the drives on which all the physical data files in the table space in an instance to be backed up.

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 Oracle Instance and Data Files in Drive Table Spaces (For 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 need to customize the sample scripts as required.

- Oracle Database 12c Release 12.2.x.x.x

B.1 Backup and Restoration of Transaction Volume

This section describes how to perform backup and restoration of an Oracle database using AdvancedCopy Manager.

B.1.1 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 (copy) a disk partition

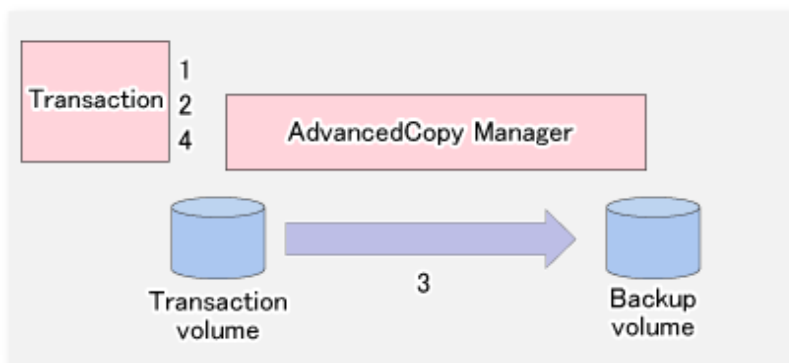
Back up (copy) a disk partition that stores the transaction data using the backup management function or the replication management function of AdvancedCopy Manager.

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.2.1.2 Backup".

Figure B.2 Backup



B.1.2 Restoration Procedure

The following provides an overview of how to perform restoration from a backup volume.

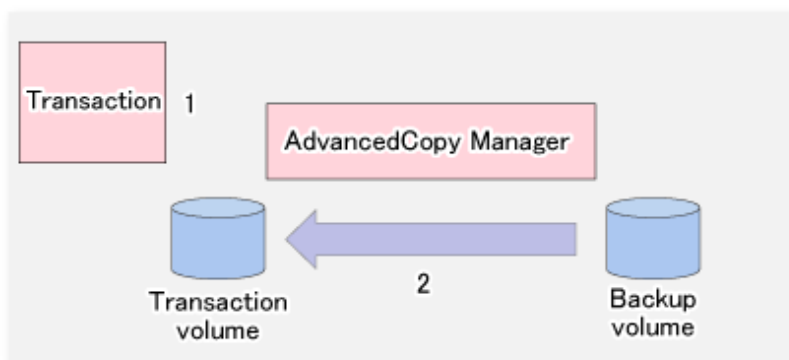
1. Checking the processing stop status

Check that processing has stopped. If processing is in operation, stop the processing completely.

2. Performing restoration from a backup volume

Restore data from a backup volume to the transaction volume using the restoration function or the replication management function of AdvancedCopy Manager.

Figure B.3 Performing Restoration from Backup Volume



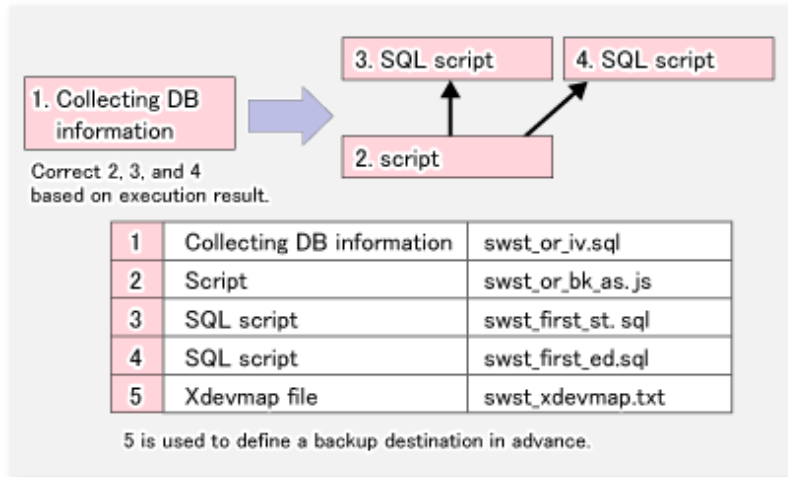
B.2 Sample Scripts for Oracle

This chapter describes sample scripts that are provided for AdvancedCopy Manager.

B.2.1 Overview of Sample Scripts

The sample scripts that are provided for AdvancedCopy Manager are stored as follows. For the backup management function, the sample script is stored under the "C:\Win32app\AdvancedCopyManager\etc\backup\sample" directory. For the replication management function, the sample script is stored under the "C:\Win32app\AdvancedCopyManager\etc\repl\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.2.1.1 Collecting DB Information

The sample script for the backup management function (swst_or_iv.sql) or for the replication management function (swsrp_or_iv.sql) outputs the Oracle database information. 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.

Sample Script for the Backup Management Function

- 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 12.2.0.1.0 Production on Wed Jul 4 14:06:48 2018
Copyright (c) 1982, 2016, Oracle. All rights reserved.

Last Successful login time: Wed Jul 04 2018 14:01:00 +09:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
```

TABLESPACE-NAME	DEVICE-NAME
SYSAUX	D:\ORACLE\ORADATA\ORCL\SYSAUX01.DBF
SYSTEM	D:\ORACLE\ORADATA\ORCL\SYSTEM01.DBF
UNDOTBS1	D:\ORACLE\ORADATA\ORCL\UNDOTBS01.DBF
USERS	D:\ORACLE\ORADATA\ORCL\USERS01.DBF
NAME	TYPE
VALUE	
log_archive_dest	string
log_archive_dest_1	string
log_archive_dest_10	string
log_archive_dest_11	string
log_archive_dest_12	string
log_archive_dest_13	string
log_archive_dest_14	string
log_archive_dest_15	string
log_archive_dest_16	string
log_archive_dest_17	string
log_archive_dest_18	string
log_archive_dest_19	string
log_archive_dest_2	string
log_archive_dest_20	string
log_archive_dest_21	string
log_archive_dest_22	string
log_archive_dest_23	string
log_archive_dest_24	string
log_archive_dest_25	string
log_archive_dest_26	string
log_archive_dest_27	string
log_archive_dest_28	string
log_archive_dest_29	string
log_archive_dest_3	string
log_archive_dest_30	string
log_archive_dest_31	string

log_archive_dest_4	string
log_archive_dest_5	string
log_archive_dest_6	string
log_archive_dest_7	string
log_archive_dest_8	string
log_archive_dest_9	string
log_archive_dest_state_1	string
enable	
log_archive_dest_state_10	string
enable	
log_archive_dest_state_11	string
enable	
log_archive_dest_state_12	string
enable	
log_archive_dest_state_13	string
enable	
log_archive_dest_state_14	string
enable	
log_archive_dest_state_15	string
enable	
log_archive_dest_state_16	string
enable	
log_archive_dest_state_17	string
enable	
log_archive_dest_state_18	string
enable	
log_archive_dest_state_19	string
enable	
log_archive_dest_state_2	string
enable	
log_archive_dest_state_20	string
enable	
log_archive_dest_state_21	string
enable	
log_archive_dest_state_22	string
enable	
log_archive_dest_state_23	string
enable	
log_archive_dest_state_24	string
enable	
log_archive_dest_state_25	string
enable	
log_archive_dest_state_26	string
enable	
log_archive_dest_state_27	string
enable	
log_archive_dest_state_28	string
enable	
log_archive_dest_state_29	string
enable	
log_archive_dest_state_3	string
enable	
log_archive_dest_state_30	string
enable	
log_archive_dest_state_31	string
enable	
log_archive_dest_state_4	string

```

enable
log_archive_dest_state_5          string
enable
log_archive_dest_state_6          string
enable
log_archive_dest_state_7          string
enable
log_archive_dest_state_8          string
enable
log_archive_dest_state_9          string
enable
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

```

Sample Script for the Replication Management Function

- Start Method

```
sqlplus user-name/password@connection-string-for-DB-to-be-backed-up @swwsrp_or_iv
```

- Usage Example

```
C:\>sqlplus system/manager@orcl @swwsrp_or_iv
```

- Result Example

```

SQL*Plus: Release 12.2.0.1.0 Production on Wed Jul 4 14:09:35 2018

Copyright (c) 1982, 2016, Oracle. All rights reserved.

Last Successful login time: Wed Jul 04 2018 14:09:24 +09:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

  TABLESPACE-NAME                DEVICE-NAME
-----
SYSAUX                           D:\ORACLE\ORADATA\ORCL\SYSAUX01.DBF
SYSTEM                            D:\ORACLE\ORADATA\ORCL\SYSTEM01.DBF
UNDOTBS1                          D:\ORACLE\ORADATA\ORCL\UNDOTBS01.DBF
USERS                             D:\ORACLE\ORADATA\ORCL\USERS01.DBF

NAME                               TYPE
-----
VALUE
-----
log_archive_dest                   string
log_archive_dest_1                 string
log_archive_dest_10                string
log_archive_dest_11                string
log_archive_dest_12                string
log_archive_dest_13                string
log_archive_dest_14                string
log_archive_dest_15                string
log_archive_dest_16                string

```

log_archive_dest_17	string
log_archive_dest_18	string
log_archive_dest_19	string
log_archive_dest_2	string
log_archive_dest_20	string
log_archive_dest_21	string
log_archive_dest_22	string
log_archive_dest_23	string
log_archive_dest_24	string
log_archive_dest_25	string
log_archive_dest_26	string
log_archive_dest_27	string
log_archive_dest_28	string
log_archive_dest_29	string
log_archive_dest_3	string
log_archive_dest_30	string
log_archive_dest_31	string
log_archive_dest_4	string
log_archive_dest_5	string
log_archive_dest_6	string
log_archive_dest_7	string
log_archive_dest_8	string
log_archive_dest_9	string
log_archive_dest_state_1	string
enable	
log_archive_dest_state_10	string
enable	
log_archive_dest_state_11	string
enable	
log_archive_dest_state_12	string
enable	
log_archive_dest_state_13	string
enable	
log_archive_dest_state_14	string
enable	
log_archive_dest_state_15	string
enable	
log_archive_dest_state_16	string
enable	
log_archive_dest_state_17	string


```

enable
log_archive_dest_state_18          string
enable
log_archive_dest_state_19          string
enable
log_archive_dest_state_2           string
enable
log_archive_dest_state_20          string
enable
log_archive_dest_state_21          string
enable
log_archive_dest_state_22          string
enable
log_archive_dest_state_23          string
enable
log_archive_dest_state_24          string
enable
log_archive_dest_state_25          string
enable
log_archive_dest_state_26          string
enable
log_archive_dest_state_27          string
enable
log_archive_dest_state_28          string
enable
log_archive_dest_state_29          string
enable
log_archive_dest_state_3           string
enable
log_archive_dest_state_30          string
enable
log_archive_dest_state_31          string
enable
log_archive_dest_state_4           string
enable
log_archive_dest_state_5           string
enable
log_archive_dest_state_6           string
enable
log_archive_dest_state_7           string
enable
log_archive_dest_state_8           string
enable
log_archive_dest_state_9           string
enable
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

```

B.2.1.2 Backup

The sample script for the backup management function (swst_or_bk_as.js) or for the replication management function (swsrp_or_bk_as.js) backs up processing data stored in an Oracle database on a file system, using AdvancedCopy Manager.

Processing data is copied to a backup volume of AdvancedCopy Manager.

This script corresponds to steps 2 through 5 described in "[B.1.1 Backup Procedure](#)".

Sample Script for the Backup Management Function

- Start Method

```
CSCRIPT.EXE swst_or_bk_as.js
```

- Usage Example

```
C:\>CSRIPT.EXE swst_or_bk_as.js
```

- Result Example

No result is output if the processing ends normally.

- Processing Overview

```
Main processing
try {
    // create global objects
    var oracle_sid = "ORCL"; // [[[ **1** TARGET INSTANCE NAME ]]]
    var ScriptPathName = "C:\\SCRIPT"; // [[[ **2** SCRIPT PATH ]]]
    var BinPathName = "C:\\WIN32APP\\AdvancedCopyManager\\bin" // [[[ **3** SCRIPT PATH ]]]
    var OraclePathName = "D:\\app\\administrator\\product\\12.2.0\\dbhome_1\\bin"; // [[[ **4**
ORACLE PATH ]]]
    var OracleSM = OraclePathName + "\\\" + "sqlplus /nolog";
    var FirstBusinessVolumeName = "g3d0p2"; // [[[ **5** 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); // [[[ **6** File Name ]]]
    if (CheckErrorLog() != 0) {
        ExecSql("swst_first_ed.sql", false); // [[[ **7** File Name ]]]
        SwstQuit (1);
    }
    var returnCode = WshShell.Run(BinPathName + "\\swstbackup g3d0p2 -Xdevmap " +
ScriptPathName + "\\swst_xdevmap.txt", 0, true); // [[[ **8** Device Name
File Name ]]]
    ExecSql("swst_first_ed.sql", false); // [[[ **9** File Name ]]]
    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); // [[[ **10** File Name ]]]
    if (CheckErrorLog() != 0) {
        ExecSql("swst_second_ed.sql", false); // [[[ **11** File Name ]]]
        SwstQuit (1);
    }
    var returnCode = WshShell.Run(BinPathName + "\\swstbackup g3d0p3 -Xdevmap " +
ScriptPathName + "\\swst_xdevmap.txt", 0, true); // [[[ **12** Device Name
File Name ]]]
    ExecSql("swst_second_ed.sql", false); // [[[ **13** File Name ]]]
    if (returnCode != 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

```

Sample Script for the Replication Management Function

- Start Method

```
CSCRIPT.EXE swsrp_or_bk_as.js
```

- Usage Example

```
C:\>CSCRIPT.EXE swsrp_or_bk_as.js
```

- Result Example

No result is output if the processing ends normally.

- Processing Overview

```

Main processing
try {
    // create global objects
    var oracle_sid = "ORCL";                // [[[ **1** TARGET INSTANCE NAME ]]]
    var ScriptPathName = "C:\\SCRIPT";      // [[[ **2** SCRIPT PATH ]]]
    var BinPathName = "C:\\WIN32APP\\AdvancedCopyManager\\bin" // [[[ **3** SCRIPT PATH ]]]
    var OraclePathName = "D:\\app\\administrator\\product\\12.2.0\\dbhome_1\\bin"; // [[[ **4**
ORACLE PATH ]]]
    var OracleSM = OraclePathName + "\\ " + "sqlplus /nolog";
    var FirstBusinessVolumeName = "g3d0p2"; // [[[ **5** 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("swsrp_first_st.sql", true);    // [[[ **6** File Name ]]]
    if (CheckErrorLog() != 0) {
        ExecSql("swsrp_first_ed.sql", false); // [[[ **7** File Name ]]]
        SwsrpQuit(1);
    }
}

```

```

    }
    var returnCode = WshShell.Run(BinPathName + "\\swsrpmake g3d0p2 g3d1p2@TARG-SV", 0,
true); // [[[ ***8*** fromVolumeName toVolumeName@targetServerName ]]]
    ExecSql("swsrp_first_ed.sql", false); // [[[ ***9*** FileName ]]]
    if (returnCode != 0) {
        SwsrpQuit(2);
    } else if (CheckErrorLog() != 0) {
        SwsrpQuit(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("swsrp_second_st.sql", false); // [[[ ***10*** FileName ]]]
    if (CheckErrorLog() != 0) {
        ExecSql("swsrp_second_ed.sql", false); // [[[ ***11*** FileName ]]]
        SwsrpQuit(1);
    }
    var returnCode = WshShell.Run(BinPathName + "\\swsrpmake g3d0p3 g3d1p3@TARG-SV", 0,
true); // [[[ ***12*** fromVolumeName toVolumeName@targetServerName ]]]
    ExecSql("swsrp_second_ed.sql", false); // [[[ ***13*** FileName ]]]
    if (returnCode != 0) {
        SwsrpQuit(2);
    } else if (CheckErrorLog() != 0) {
        SwsrpQuit(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);

SwsrpQuit(0); //Normal END
} catch (e) { //In an error, it ends, without deleting an error log file.
    SwsrpQuit(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 SwsrpQuit(exitStatus) //Error processing

```

B.2.2 Applying Sample Script

B.2.2.1 Updating Sample Script

Customize a sample script so that it is appropriate for the actual operation being performed.

Sample Script for the Backup Management Function

- 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.2.1.1 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.2.1.1 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 [swstexecstat](#) command.

[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. This rewrites it in the business volume name of the first drive for the backup.
6. Rewrite this item with an existing file name corresponding to "swst_first_st.sql".
7. Rewrite this item with an existing file name corresponding to "swst_first_ed.sql".

8. 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 6 and 7 above) and a file name corresponding to "swst_xdevmap.txt".
9. The same as step 7 above.
10. Rewrite this item with an arbitrary file name provided for a different drive in "swst_first_st.sql".
11. Rewrite this item with an arbitrary file name provided for a different drive in "swst_first_ed.sql".
12. Rewrite this item with the name of a different transaction volume to be backed up than specified in step 8 (a drive with a table space specified in steps 10 and 11 above) and a file name corresponding to "swst_xdevmap.txt".
13. The same as step 11 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.2.1.1 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 - ]]]
        XXXXXXXX
        XXXXXXXX
//[[[ Second Drive - END - ]]]
```

- 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 the [swstbackup](#) command with the -Xflush option.

This script operates only on a Managed Server of AdvancedCopy Manager.

Sample Script for the Replication Management Function

- swsrp_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.2.1.1 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.

- swsrp_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.2.1.1 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.

- swsrp_or_bk_as.js

This sample script (swsrp_or_bk_as.js) shows an example where the backup destination volume is stored in a server different from the one with the backup source volume.

Customize this sample script (swsrp_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. This rewrites it in the business volume name of the first drive for the backup.
6. Rewrite this item with an existing file name corresponding to "swsrp_first_st.sql".
7. Rewrite this item with an existing file name corresponding to "swsrp_first_ed.sql".
8. Rewrite this item with the transaction volume name of the drive to be backed up (such as the drive with a table space specified in steps 6 and 7 above) and with a file name that corresponds to "*backup destination volume name@backup destination server name*".
9. The same as step 7 above.
10. Rewrite this item with an arbitrary file name provided for a different drive in "swsrp_first_st.sql".
11. Rewrite this item with an arbitrary file name provided for a different drive in "swsrp_first_ed.sql".
12. Rewrite this item with the name of a backup target transaction volume that is different from the one specified in step 8 (a drive with a table space specified above in steps 10 and 11 above) and with a file name that corresponds to "*backup destination volume name@backup destination server name*".
13. The same as step 11 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.2.1.1 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 - ]]]
      XXXXXXXX
      XXXXXXXX
//[[[ Second Drive - END - ]]]
```

- When BufferFlushOnly in the transaction volume locking specification file for replications 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 the [swsrpmake](#) command with the -Xflush option.

This script operates only on a Managed Server of AdvancedCopy Manager.

B.2.3 Restoration Methods

Use the restoration function of AdvancedCopy Manager to perform restoration.

Restoration Method for the Backup Management Function

To restore only some of the files on a transaction volume, use the `swstrestore` 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.

Restoration Method for the Replication Management Function

To restore only some of the files on a transaction volume, use the `swsrpsetvol` command to specify the backup destination volume and set the backup data as the transaction volume, and then use the `swsrpmake` command to restore the backup volume to the transaction 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.2.4 Notes on Using Sample Scripts

B.2.4.1 Location of Oracle Resources

Store data files and other Oracle files on different disks or in different partitions.

B.2.4.2 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 then means 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.2.4.3 Recovery of Oracle Databases

To recover an Oracle database to the latest state, 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, refer to the *Oracle Database 12c Backup and Recovery Guide* (if the database is Oracle Database 12c).

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.

The necessary processes that are performed by AdvancedCopy Manager for the replication source volume and the replication destination volume are described in the shell scripts.

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 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.

In the case of WSFC operation, automatic configuration of the maintenance mode of the physical disk resources is performed with pre- and post-processing. For details on maintenance mode, refer to "[15.1.8.1 When Using WSFC for Cluster Operation](#)".

Table C.1 When Replication Source/Destination Volumes Are Partitions

Target	Type	Details
Replication source volume	Pre-processing	<ul style="list-style-type: none">- 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: In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the replication source volume belongs ON (only when this is of a configuration where there is 1 partition on 1 disk and the maintenance mode is off prior to execution of the replication). The replication source volume is locked.

Target	Type	Details
		<ul style="list-style-type: none"> - When the -f option is specified: No processing is performed (i.e., the source pre-processing script is not executed).
	Post-processing	<ul style="list-style-type: none"> - Default operation: No processing is performed. - When the -Xflush option is not specified: The replication source volume is unlocked. In the case that the maintenance mode is turned ON with the preprocessing, turn the maintenance mode of the physical disk resource to which the replication source volume belongs OFF. - 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	<ul style="list-style-type: none"> - Default operation: In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the replication destination volume belongs ON (only when this is of a configuration where there is 1 partition on 1 disk and the maintenance mode is off prior to execution of the replication). 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	<ul style="list-style-type: none"> - Default operation: The replication destination volume is unlocked. In the case that the maintenance mode is turned ON with the preprocessing, turn the maintenance mode of the physical disk resource to which the replication destination volume belongs OFF. - 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 Replication Source/Destination Volumes Are Logical Units (disks)

Target	Type	Details
Replication source volume	Pre-processing	<ul style="list-style-type: none"> - 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: In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the replication source volume belongs ON (only when the maintenance mode is off prior to execution of the replication). The partition included in the Logical Unit (disk) is locked. - When the -f option is specified:

Target	Type	Details
		No processing is performed (i.e., the source pre-processing script is not executed).
	Post-processing	<ul style="list-style-type: none"> - Default operation: No processing is performed. - When the -Xflush option is not specified: The partition included in the Logical Unit (disk) is unlocked. In the case that the maintenance mode is turned ON with the preprocessing, turn the maintenance mode of the physical disk resource to which the replication destination volume belongs OFF. - 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	<ul style="list-style-type: none"> - Default operation: In the case of WSFC operation, turn the maintenance mode of the physical disk resource to which the replication source volume belongs ON (only when the maintenance mode is off prior to execution of the replication). <ul style="list-style-type: none"> 1. The partition included in the Logical Unit (disk) is locked. 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	<ul style="list-style-type: none"> - Default operation: The operating system is notified that Logical Unit (disk) management information (partition table, etc.) has been updated. If "C.2.6 Drive Character Mapping File" contains settings for the copy destination disk, the following processing is executed: <ul style="list-style-type: none"> 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. In the case that the maintenance mode is turned ON with the preprocessing, turn the maintenance mode of the physical disk resource to which the replication destination volume belongs OFF. - 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 File System

Command	Copy Status	Source/Destination	Pre-processing	Post-processing
swsrpstartsync	Copy not started, or replication establishment	Source	X	X
		Destination	O--*1	H--*2
swsrpmake	Equivalency maintenance	Source	O	O
		Destination	H--*1	O--*2
swsrpcancel	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	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 server-to-server replication, 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 File System Buffer of Replication Source Volume)

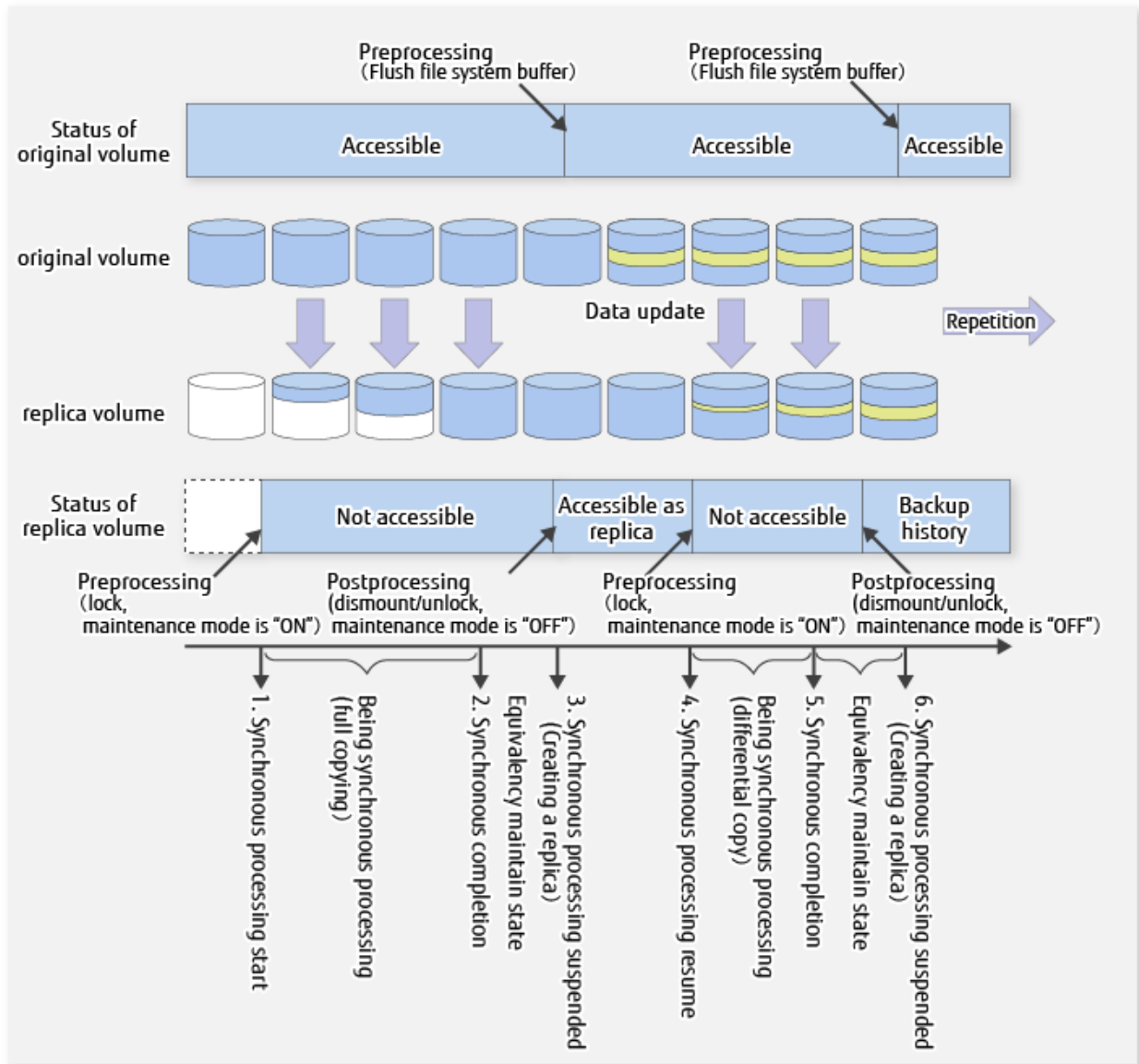
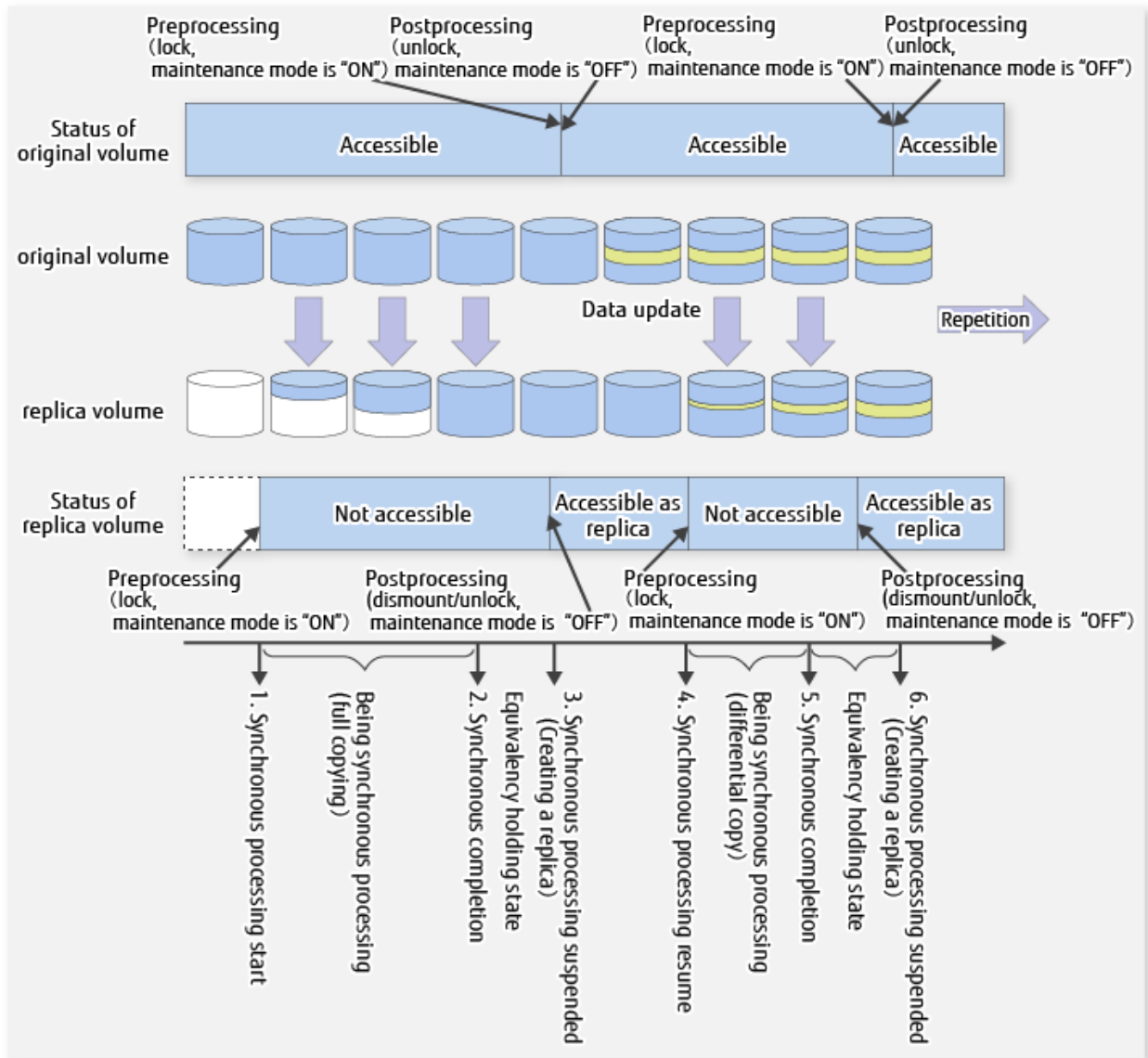


Figure C.2 Synchronized Replication Processing (Locking Replication Source Volume)



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 Server, 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. Customize these scripts according to the processing requirements.

- For non-clustered systems

```
<Environment directory>\etc\repl\scripts
```

- For clustered systems

```
<Shared disk>:\etc\opt\swstorage\etc\repl\scripts
```

Replication Source Volume Pre-processing Sample Script (RepSrcPre.js)

```
1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
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: }

```

Replication Destination Volume Pre-processing Sample Script (RepDstPre.js)

```

1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
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.

- For non-clustered systems

<Environment directory>\etc\repl\scripts

- For clustered systems

<Shared disk>:\etc\opt\swstorage\etc\repl\scripts

Replication Source Volume Post-processing Sample Script (RepSrcPost.js)

```

1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
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
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: }

```

Replication Destination Volume Post-processing Sample Script (RepDstPost.js)

```

1: // AdvancedCopy Manager for Windows
2: // All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2006
3: //
4: // RepDstPost.js: Post-Processing Script for Replication(Destination)
5: //
6: // [Parameters]
7: // 1st argument: device name of destination volume
8: //
9: // [Return Values]

```

```

10: // 0: The script ended normally.
11: // 2: The number of the arguments is incorrect.
12: // (1,3,5-7): unused, but must not be used because older versions use these values.
13: // 4: An error other than the above occurred.
14:
15: try {
16:     // create global objects
17:     var WshShell = WScript.CreateObject("WScript.Shell");           // create Shell object
18:     var WshEnv   = WshShell.Environment("PROCESS");                 // create Environment
object
19:     var fsObj    = WScript.CreateObject("Scripting.FileSystemObject"); // create FileSystemObject
object
20:
21:     // create SwstReplicationPostProc object
22:     var proc = new SwstReplicationPostProc();
23:
24:     // do nothing if postprocessing file exists
25:     if (fsObj.FileExists(proc.postFileName) == false) {
26:         SwstQuit(0);
27:     }
28:
29:     // get postprocessing type
30:     var postProcType = proc.getPostProcData(proc.postFileName);
31:     switch(postProcType) {
32:     case "none":
33:         proc.doNothing();
34:         break;
35:     }
36:
37:     // clear temporary files
38:     proc.deletePostFile(proc.postFileName);
39:     SwstQuit(0);
40: } catch (e) {
41:     SwstQuit(9);
42: }
43:
44: function SwstReplicationPostProc()
45: {
46:     // member variables
47:     this.dvName = WScript.Arguments.length!=1?SwstQuit(1):WScript.Arguments.Item(0); // device
name of destination volume
48:     this.postFileName = getDataPathName() + "\\\" + getPutFileName(this.dvName) + ".dpre"; //
name of postprocessing file
49:
50:     // member functions
51:     this.getPostProcData = getPostProcData; // self-explanatory
52:     this.doNothing = doNothing; // self-explanatory
53:     this.deletePostFile = deletePostFile; // self-explanatory
54: }
55:
56: function getPostProcData(postfile)
57: {
58:     var iomode = 1; // means read-only mode
59:     var create = false; // means not to create a file
60:     var postFileStream = fsObj.OpenTextFile(postfile, iomode, create);
61:     var postData = postFileStream.ReadLine();
62:     postFileStream.Close();
63:     return postData;
64: }
65:
66: function doNothing()
67: {
68:     // do nothing

```

```

69: }
70:
71: function deletePostFile(postfile)
72: {
73:     if (fsObj.FileExists(postfile) == true) {
74:         fsObj.DeleteFile(postfile);
75:     }
76: }
77:
78: function SwstQuit(exitStatus)
79: {
80:     switch(exitStatus) {
81:     case 0:
82:         WScript.Quit(0);
83:     case 1:
84:         WScript.Echo("[Replication Postprocessing] The number of the arguments is incorrect.");
85:         WScript.Quit(2);
86:     default:
87:         WScript.Echo("[Replication Postprocessing] The script exited abnormally.");
88:         WScript.Quit(4);
89:     }
90: }
91:
92: function getDataPathName()
93: {
94:     return WshShell.RegRead(getSetupInfoKey() + "\\etcPathName") + "\\etc\\repl\\data\\DEFAULT";
95: }
96:
97: function getBinPathName()
98: {
99:     return WshShell.RegRead(getSetupInfoKey() + "\\PathName") + "\\bin";
100: }
101:
102: function getSetupInfoKey()
103: {
104:     var nodeName = WshEnv.Item("SWSTGNODE");
105:     if( nodeName != "" ){
106:         return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion\\" +
nodeName;
107:     }
108:     return "HKEY_LOCAL_MACHINE\\SOFTWARE\\Fujitsu\\AdvancedCopy Manager\\CurrentVersion";
109: }
110:
111: function getPutFileName(deviceName){
112:     var fileName;
113:     if( isSafeDISKName(deviceName) ){
114:         var re = /(\\S+)\\(\\S+):(\\S+)/;
115:         fileName = deviceName.replace(re, "$1_$2_$3");
116:     }else{
117:         fileName = deviceName;
118:     }
119:     return(fileName);
120: }
121:
122: function getGXDXPX(deviceName){
123:     var gXdXpX;
124:     if( isSafeDISKName(deviceName) ){
125:         var re = /(\\S+)\\(\\S+):(\\S+)/;
126:         gXdXpX = deviceName.replace(re, "$3");
127:     }else{
128:         gXdXpX = deviceName;
129:     }
130:     return(gXdXpX);

```



```

131: }
132:
133: function isSafeDISKName(deviceName){
134:     var key = ":g";
135:     var s = deviceName.indexOf(key);
136:     if ( s < 0 ) {
137:         return (false);
138:     } else {
139:         return (true);
140:     }
141: }

```

Point

The volume is locked/unlocked, and the buffer is flushed by the command, not by the script. Therefore, the source pre-processing and post-processing scripts are executed immediately before and after (respectively) the source/destination volumes are locked/unlocked and the buffer is flushed. The source/destination pre-processing and post-processing scripts do not perform any processing.

Figure C.3 Snapshot-type Replication (OPC)

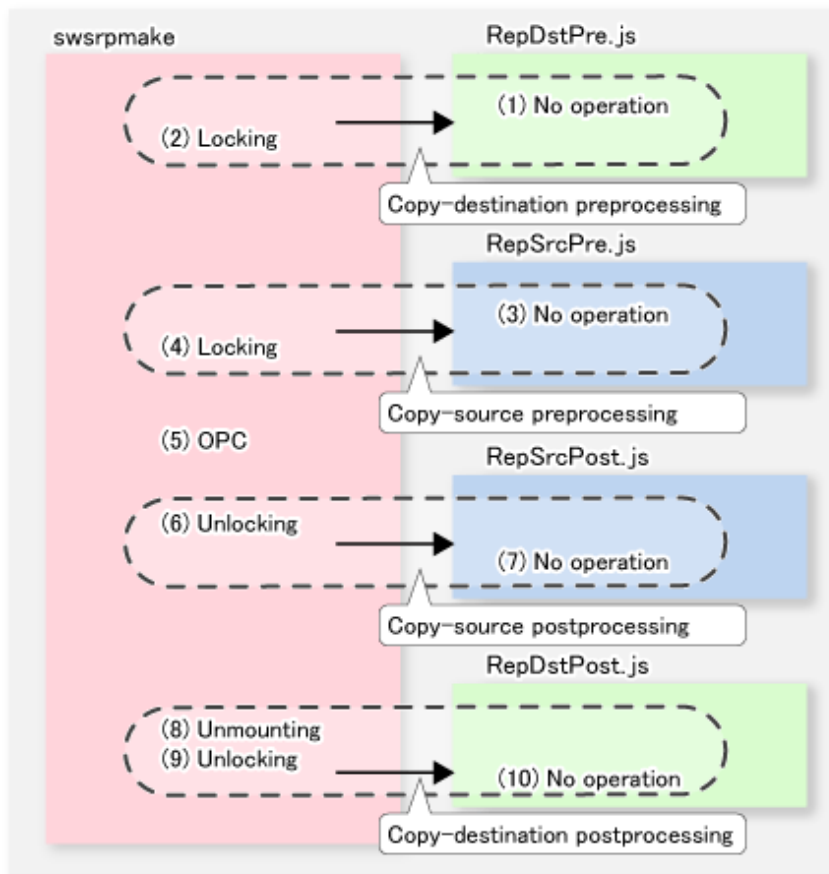


Figure C.4 Synchronous-type Replication (EC) (1): When Destination Volume Is Not Shared Volume in Clustered System

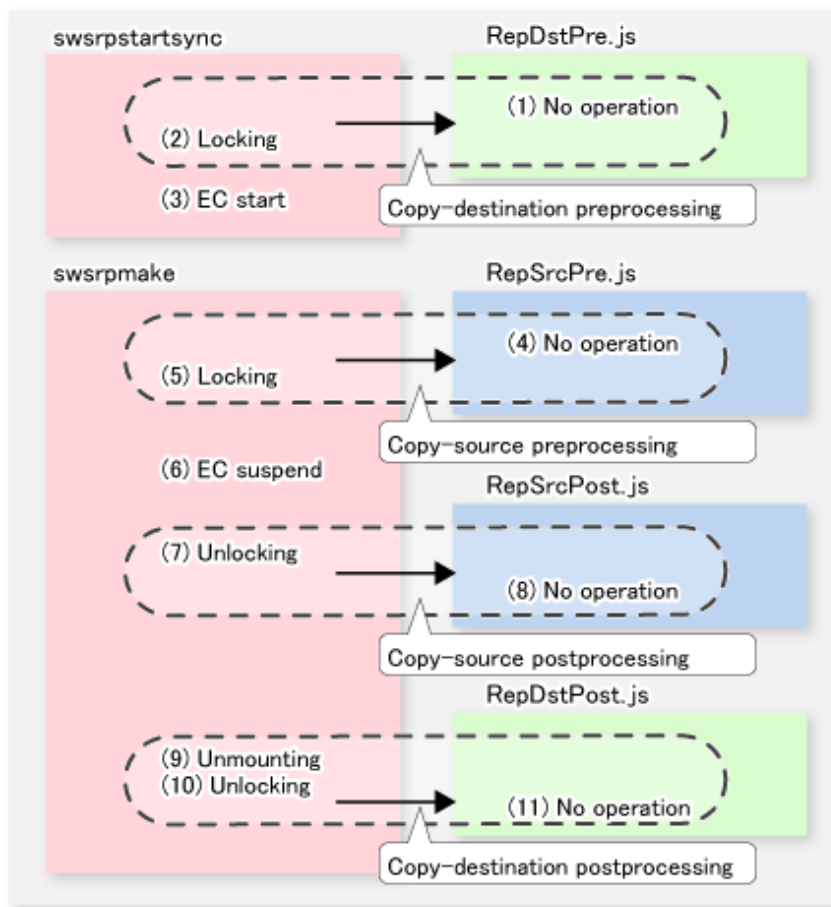
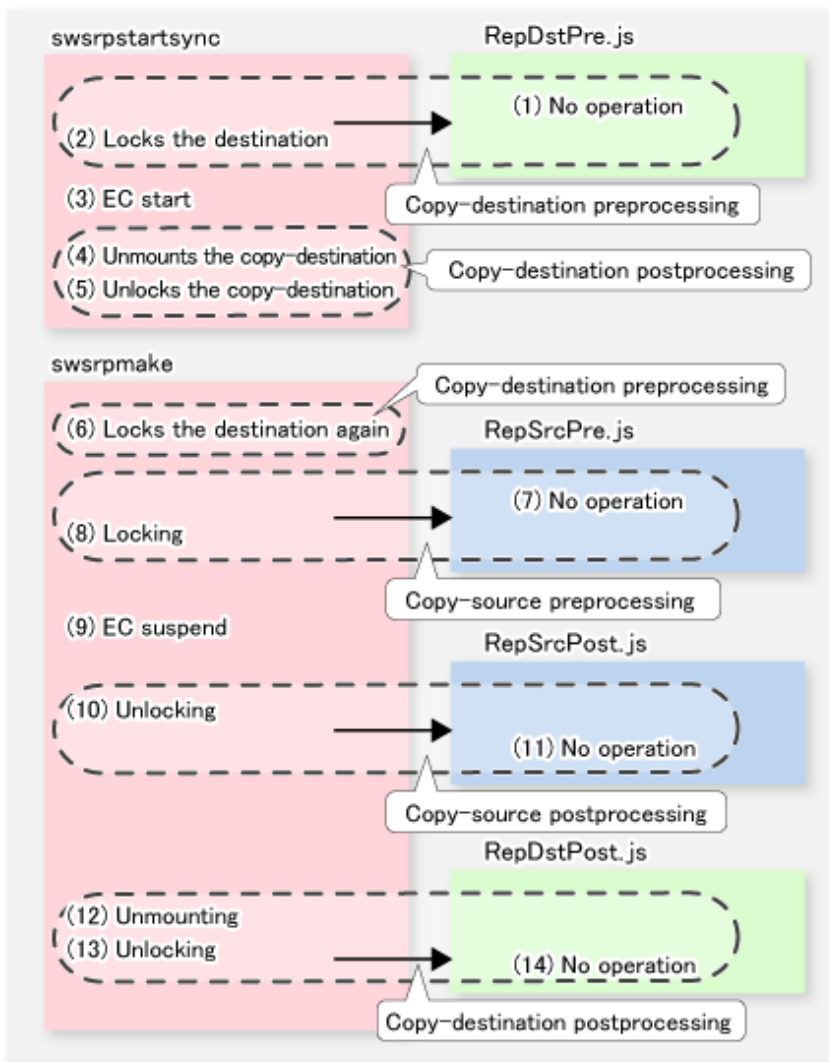


Figure C.5 Synchronous-type Replication (EC) (2): When Destination Volume Is Shared Volume in Clustered System



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 the **swsrpstartsync** and **swsrpmake** commands 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 "[15.1.12 Error Messages Displayed 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)

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:

- For non-clustered systems

```
<Environment directory>\etc\repl\data\SRLOCK.INI
```

- For clustered systems

```
<Shared disk>:\etc\opt\swstorage\etc\repl\data\SRLOCK.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
ClusterResourceMaint=off
[g1d1p2]
BufferFlushOnly=on
[ANY]
BufferFlushOnly=off
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
ClusterResourceMaint=on
```

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	<p>Specifies flushing the file system buffer of the copy source volume instead of locking the copy source volume:</p> <p>on (default value) = the buffer is flushed (no locking) off = the buffer is not flushed (locking)</p> <p>If the -Xflush option is specified in the "swsrpmake" command and BufferFlushOnly=off, then the -Xflush option has priority.</p> <p>If BufferFlushOnly is not set to "off", all other parameters (LockForceMode, LockRetryNumber and LockRetryInterval) become invalid.</p> <p>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.</p> <p>This parameter becomes invalid if "on" is specified for NoPrePost.</p> <p>If "on" is not specified for NoPrePost and "off" is not specified for BufferFlushOnly, other parameters (LockForceMode, LockRetryNumber and LockRetryInterval) become invalid.</p>
LockForceMode	<p>This parameter specifies that the volume be dismounted before locking is retried.</p> <p>off (default value) = no dismounting before locking is retried on = dismounting before locking is retried</p> <p>When the volume is dismounted, all handles opened for the volume become invalid.</p> <p>* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.</p> <p>If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.</p>
LockRetryNumber	<p>This parameter specifies the retry count limit. A numeric value ranging from 1 to 10,000 can be specified.</p> <p>The default value is 20 (attempts).</p> <p>If the copy source volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally.</p> <p>If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.</p>
LockRetryInterval	<p>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).</p> <p>If "on" is specified for BufferFlushOnly or for NoPrePost, then this parameter becomes invalid.</p>
NoPrePost	<p>Specifies that replication pre-processing and post-processing are not executed.</p> <p>off (default value) = The replication pre-processing and post-processing are performed. on = The replication pre-processing and post-processing are not performed.</p> <p>If "on" is specified for NoPrePost, all other parameters (BufferFlushOnly, LockForceMode, LockRetryNumber, LockRetryInterval) are ignored.</p>
ClusterResourceMaint	<p>In the case of WSFC operation, specify whether to configure the maintenance mode of the physical disk resource to which the volume belongs.</p> <p>on(default value) = The maintenance mode is set. off = The maintenance mode is not set.</p>

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)

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:

- For non-clustered systems

```
<Environment directory>\etc\repl\data\DSTLOCK.INI
```

- For clustered systems

```
<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
ClusterResourceMaint=off
[ANY]
LockForceMode=off
LockRetryNumber=20
LockRetryInterval=2000
ClusterResourceMaint=on
```

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	<p>This parameter specifies that the volume be dismounted before locking is retried.</p> <p>off (default value) = no dismounting before locking is retried on = dismounting before locking is retried</p> <p>When the volume is dismounted, all handles opened for the volume become invalid.</p> <p>* If the volume is set in the used state immediately after it is dismounted, then locking may be impossible.</p>

Key Name	Explanation
	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 copy destination volume cannot be locked after locking is retried for the specified retry count limit, then the processing is suspended and the command ends abnormally. If "on" is specified for NoPrePost, this parameter becomes invalid.
LockRetryInterval	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.
ClusterResourceMaint	In the case of WSFC operation, specify whether to configure the maintenance mode of the physical disk resource to which the volume belongs. on(default value) = The maintenance mode is set. off = The maintenance mode is not set.

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:

- For non-clustered systems

<Environment directory>\etc\repl\data\DRVMAP.INI

- For clustered systems

<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).

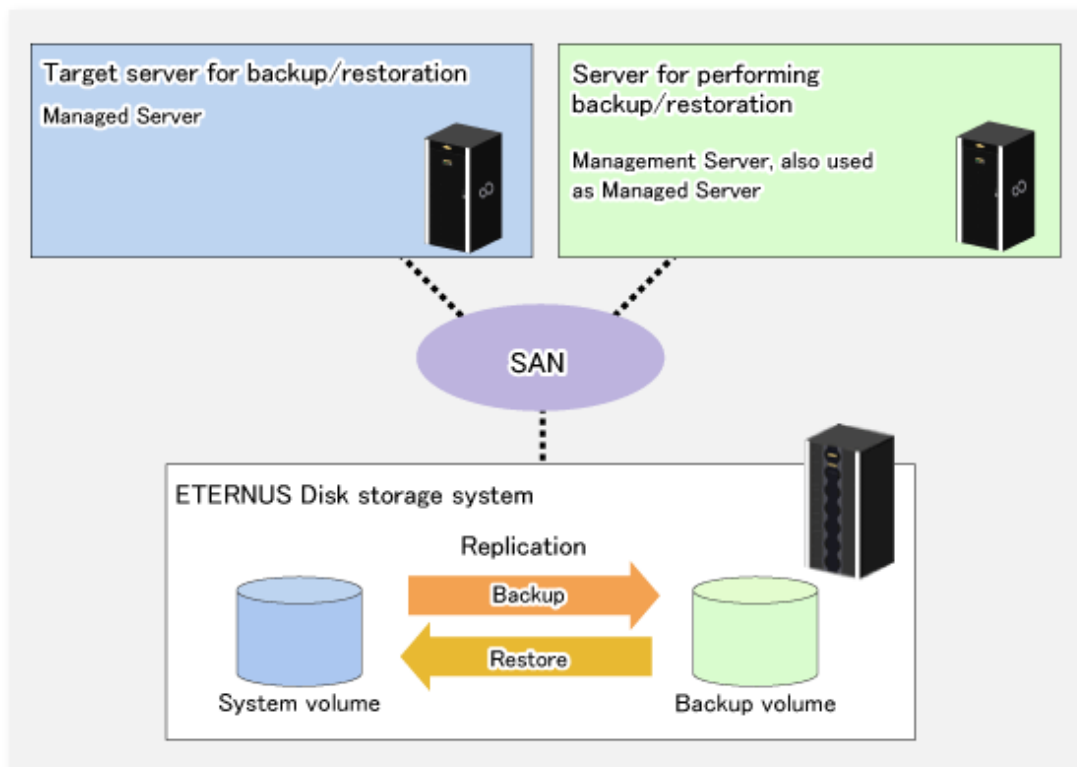
Appendix D System Volume Backup Operation

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 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.

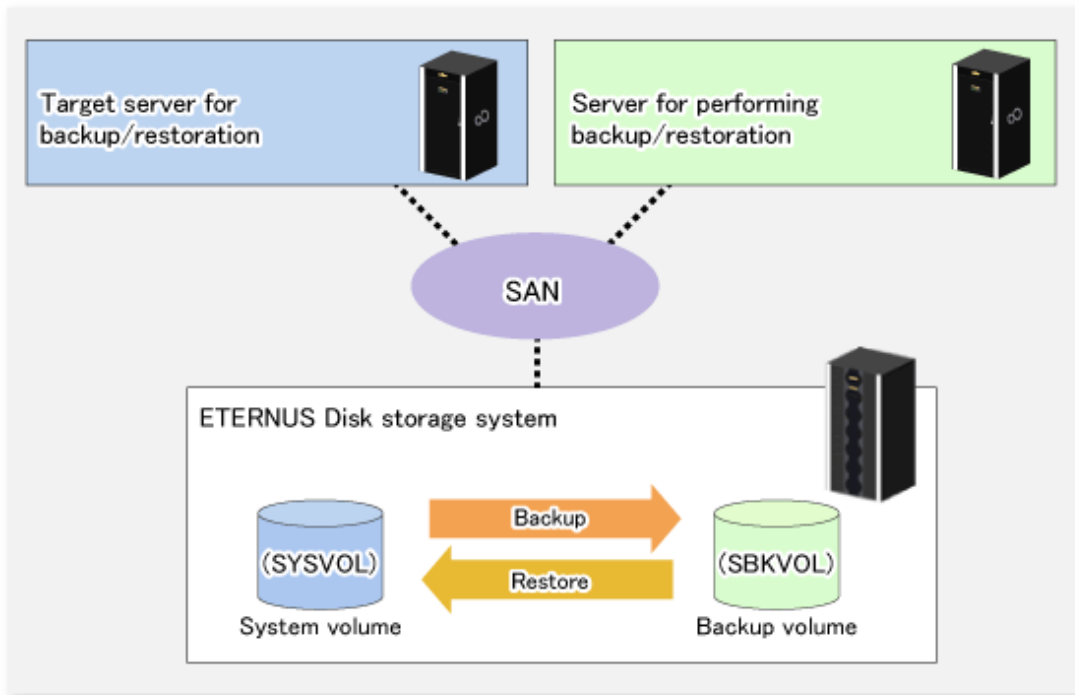
D.2 Preparation

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 system configuration example for backup and restoration of a system volume is shown below.

Figure D.2 System Configuration Example for Backup and Restoration of System Volume



P Point

If the backup source server and the server used for backup operations have different operating systems, refer to "[15.1.1.18 Notes on Executing Copy Between Different Operating Systems](#)".

D.2.1 Registration Managed Server

The server being backed up and the server used for backup operations must be registered as Managed Servers. If their servers are not registered, register them as the Managed Server.

Refer to "[7.4.3 Registering Managed Server](#)" for information how to register a server as the Managed Server.

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. If the device information is not registered, register it.

Refer to "[7.4.4 Fetching Device Information on Managed Server](#)" for information on how 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. If the replication volume information is not set, set it.

Refer to "[7.4.5 Configuring Source Volume and Replica Volume](#)" for information how to set the replication volume information.

P Point

Register the backup volume as a volume without a mount point.

Specify the server used for backup operations as the replication destination.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpsetvol -o REP SYSVOL@TRG-SV SBKVOL@SBK-SV
```

D.3 Backing up System Volume

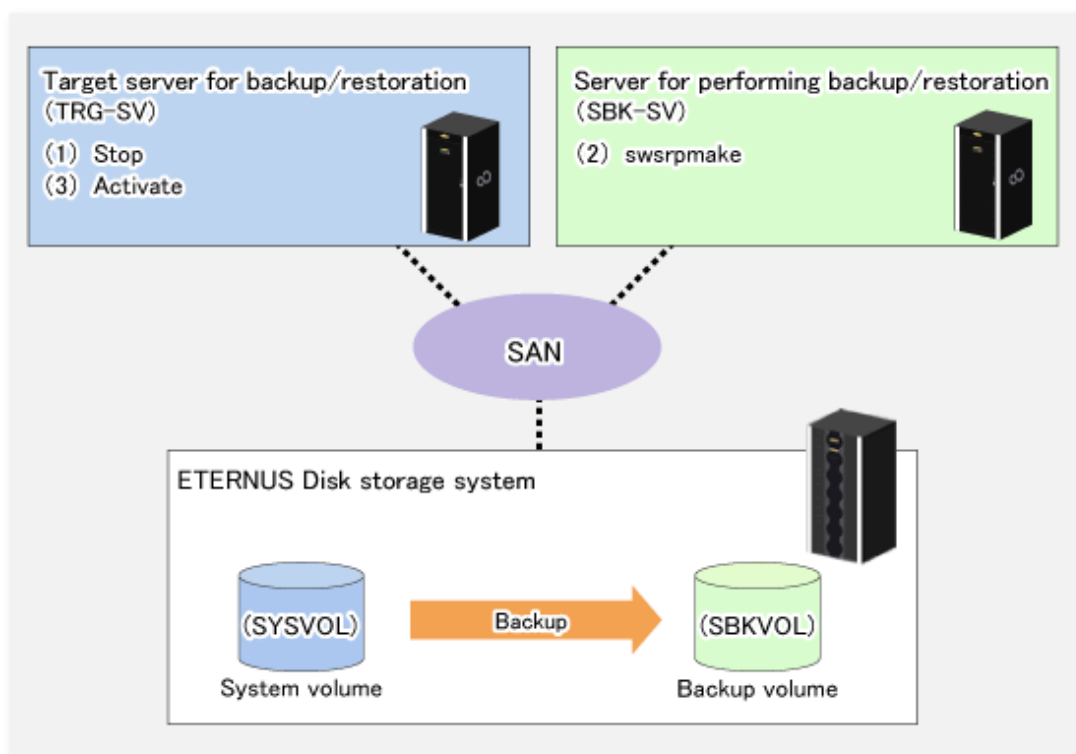
The replication function is used to back up the system volume.

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 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 the `swsrpmake` command on the server used for backup.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpmake -m SYSVOL@TRG-SV SBKVOL@SBK-SV
```

The `swsrpmake` 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

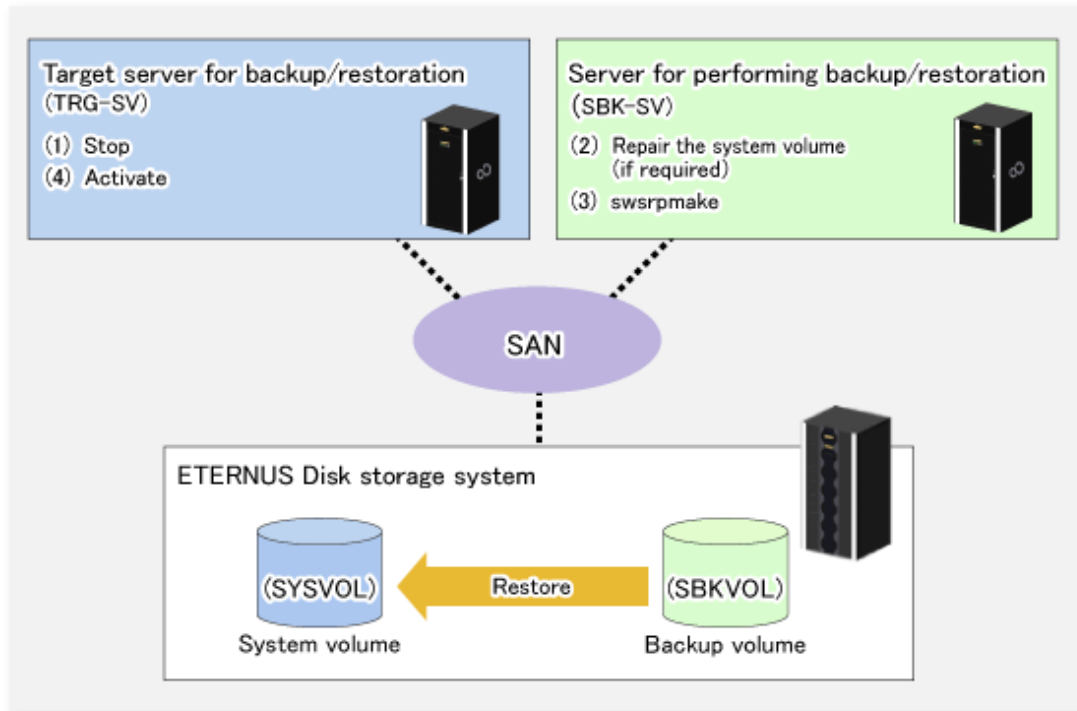
- name of backup volume: SBKVOL

3. Activate the backup target server.

D.4 Restoring System Volume

The replication function is used to restore a system volume.

Figure D.4 Restoring 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 the [swsrpmake](#) command with replication in the reverse direction.

```
> C:\Win32app\AdvancedCopyManager\bin\swsrpmake -m SBKVOL@SBK-SV SYSVOL@TRG-SV
```

The [swsrpmake](#) 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

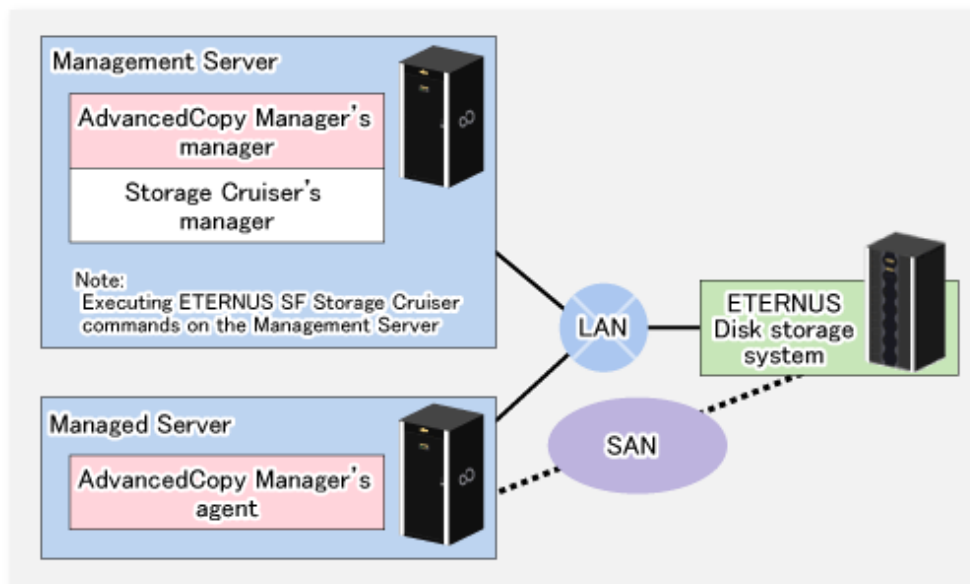
Enabling Eco Mode on the ETERNUS Disk storage system can control ON/OFF of disk drive power (or spindle rotation) using the Storage Cruiser functions. For example, the Storage Cruiser commands can power ON a disk drive as backup destination at backup and power it OFF on completion of backup.

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) with a long suspend time.
- Replication management
 - Snapshot type high-speed replication (OPC) with no access to the replication destination volume for a long period of time.
 - Suspend/Resume functionality of synchronous type high-speed replication (EC, REC) with a long suspend time.

An overview of the system structure is as follows.

Figure E.1 Overview of System Structure



E.1 Environment Settings

This section describes how to configure the environment.

1. [E.1.1 Settings for ETERNUS Disk Storage System](#)
2. [E.1.2 Settings for AdvancedCopy Manager](#)
3. [E.1.3 Settings for Storage Cruiser](#)

E.1.1 Settings for ETERNUS Disk Storage System

Settings in Eco-mode

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 more details about the settings, refer to the *Storage Cruiser Operation Guide*.

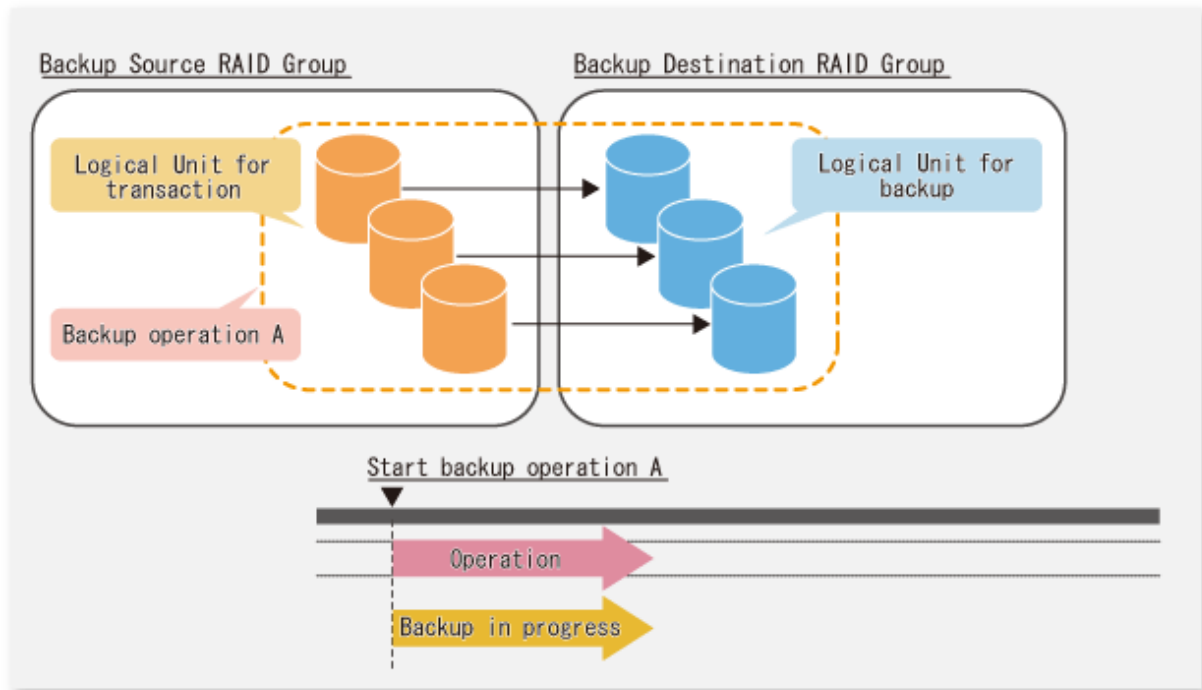
For details on how to configure an ETERNUS Disk storage system, refer to the ETERNUS Web GUI manual.

Creating RAID Group and Logical Unit

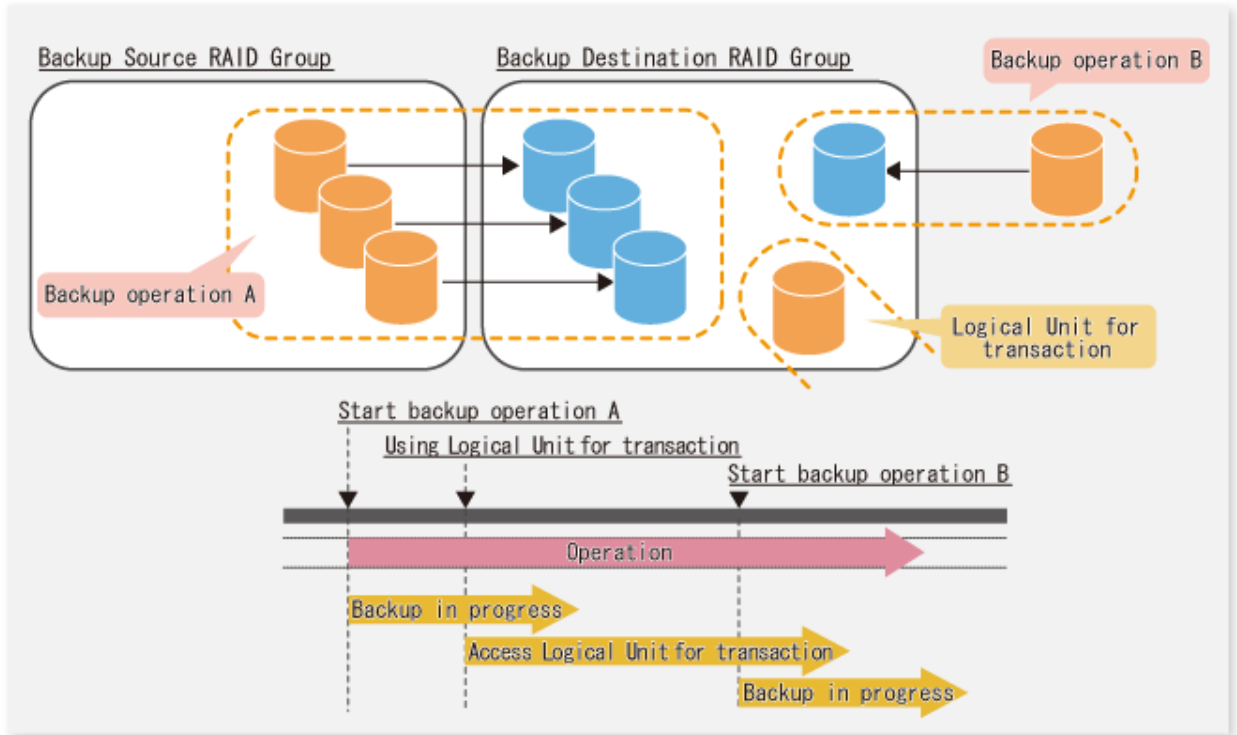
The Eco-mode is applied and the RAID group is created.

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.

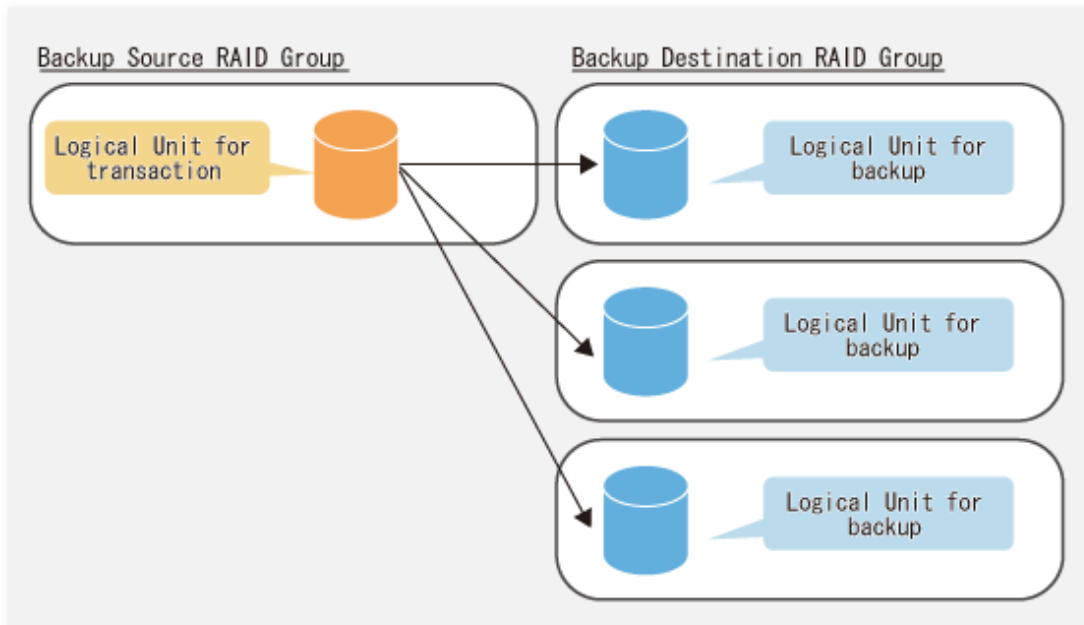


The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, although backup operation A has ended, the Logical Units for backup operation B and for business applications are required to be running.



Point

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.





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.

E.1.2 Settings for AdvancedCopy Manager

AdvancedCopy Manager needs to be configured so that the RAID group for the Eco-mode is used.

Using 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 Replication Operation

For the destination volumes, use a logical unit or partition (slice) that belongs to a RAID group.

E.1.3 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.2 Operation

This section describes the procedure for establishing power-saving operations. Perform all procedures described in this section on the Management Server.

1. [E.2.1 Start Disk Drive](#)
2. [E.2.2 Operate AdvancedCopy Manager](#)
3. [E.2.3 Stop Disk Drive](#)

E.2.1 Start Disk Drive

A RAID group disk drive is started using the `storageadm spindle` command of Storage Cruiser. It is possible to wait for the start time of the disk drive by specifying the `-sync` option.

Refer to "Command References" in the *Storage Cruiser Operation Guide* for information on the command.

E.2.2 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.2.3 Stop 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.

Refer to "Command References" in the *Storage Cruiser Operation Guide* for information on the command.



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. Refer to "storageadm spindle (Disk Control Command)" in the *Storage Cruiser Operation Guide* for information on the command.



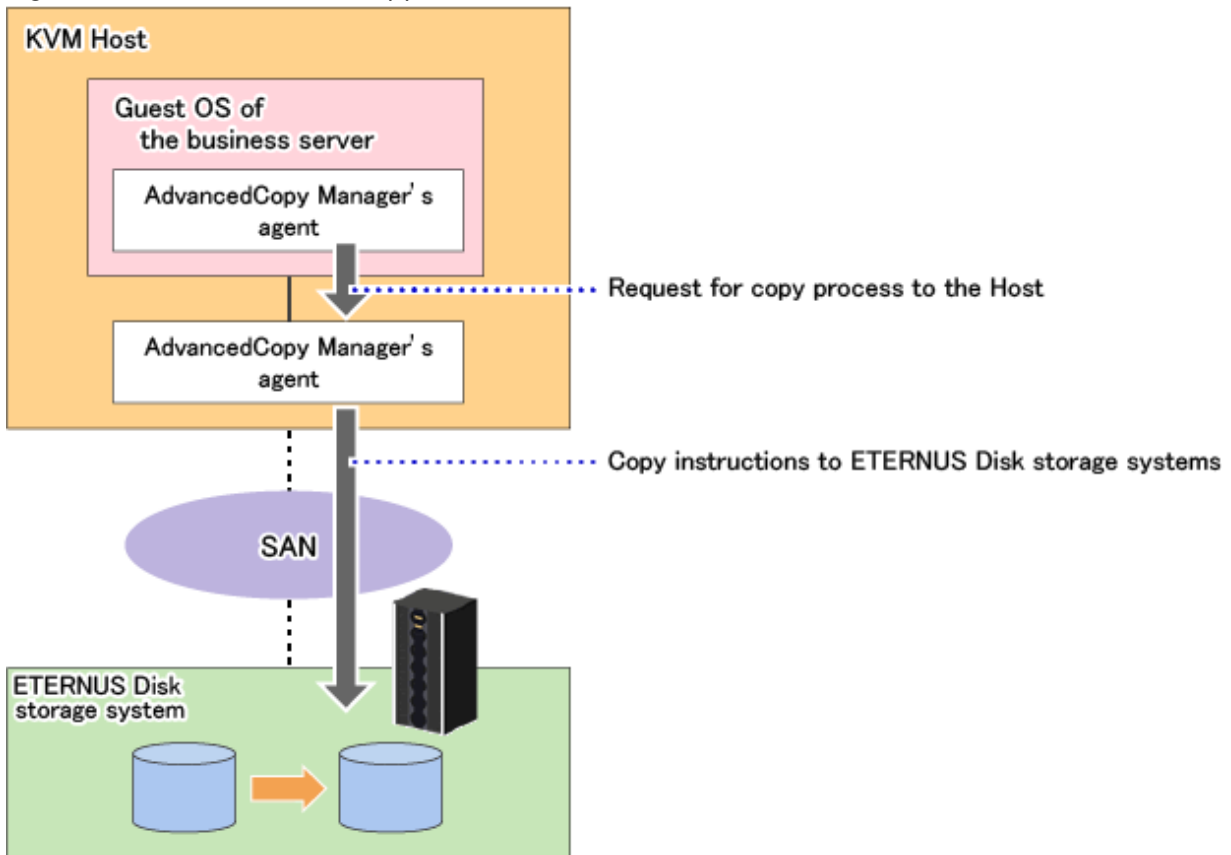
Appendix F Operation on KVM Guests

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.

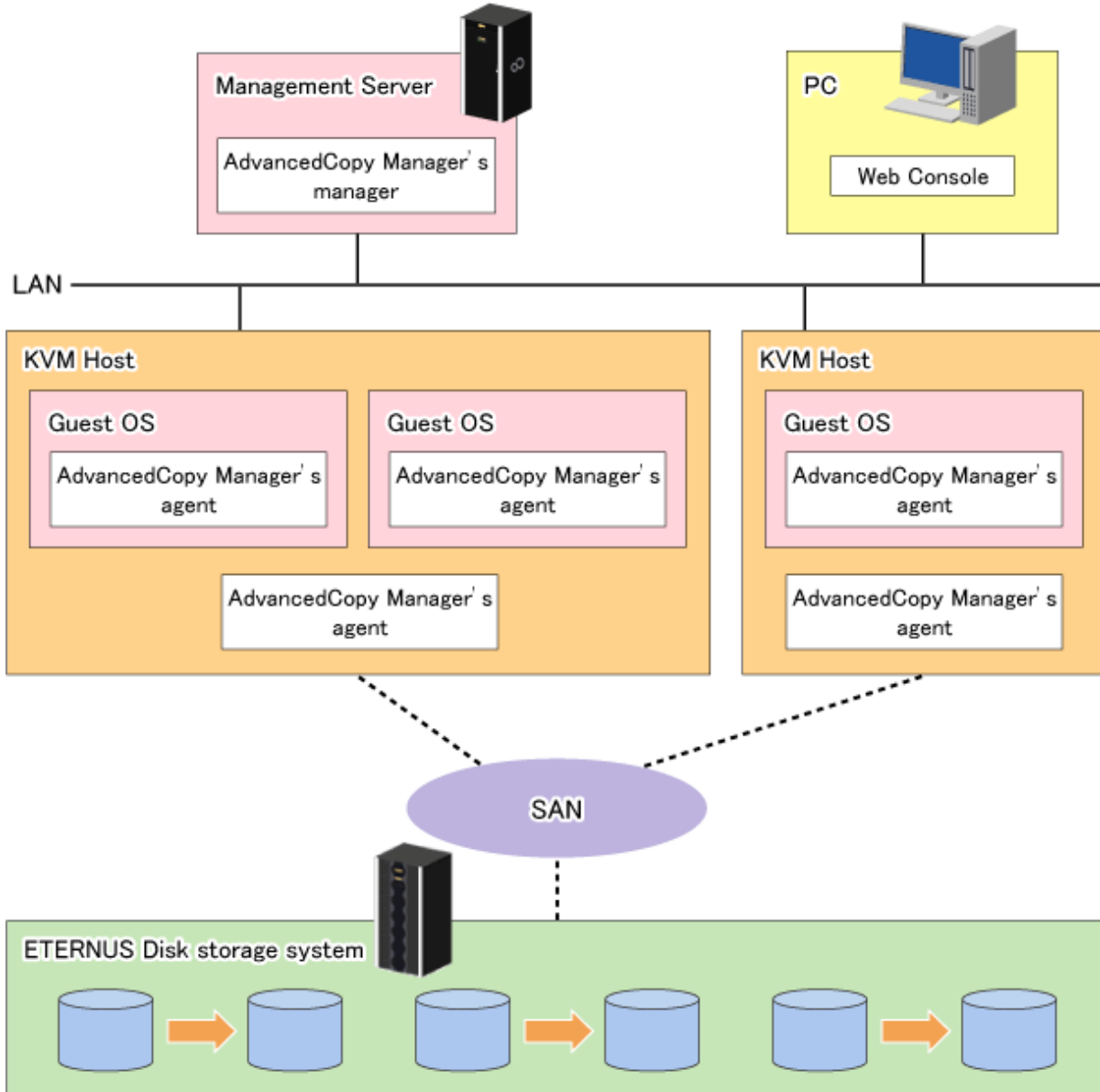
Figure F.1 Overview of KVM Support Function



F.2 Configuration

The diagram below shows the configuration for using the KVM Support Function.

Figure F.2 Configuration for Using KVM Support Function



- When creating a guest OS, specify the following according to the creation method.

Creating Method	Specification
Command	Specify "PC" as the machine type.
GUI	Specify "i440FX" as the chipset.

After creating a guest OS, make sure the chipset is set to "i440FX" in GUI.
 For details on how to create a guest OS, refer to the relevant Linux manual.

- 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



The version of ETERNUS SF Manager or AdvancedCopy Manger's agent to be installed in the KVM host must be equal to or later than that of the KVM guest.

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	Remarks
Management Server	No requirements.	-
Managed Server (guest)	Microsoft Windows Server 2022 Standard Microsoft Windows Server 2022 Datacenter Microsoft Windows Server 2019 Standard Microsoft Windows Server 2019 Datacenter Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	Available OSs are limited to OSs supported by the OS of the Managed Server (host). For details, check the KVM support status of the OS on the Managed Server (host).
Managed Server (host)	Red Hat Enterprise Linux 9 (for Intel64) Red Hat Enterprise Linux 8 (for Intel64) Red Hat Enterprise Linux 7 (for Intel64) Red Hat Enterprise Linux 6.2 (for Intel64) or later	-
Server where ServerView Resource Orchestrator's manager exists (*1)	Red Hat Enterprise Linux 6 (for Intel64)	-

*1: This is required for setting the host information setting file and the 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 the host information setting file and the 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

The following AdvancedCopy Manager functions can be used:

- Advanced Copy function
- Backup management function
- Replication management function

The following Advanced Copy types can be used:

- OPC
- QuickOPC
- EC
- REC
- SnapOPC
- SnapOPC+



For details of the AdvancedCopy Manager functions, refer to "Function Overview of AdvancedCopy Manager" and "Overview of Advanced Copy Function" in the *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

The cluster operation is not supported on KVM guest OSs.

F.5 Supported Devices

This section explains devices that can use 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 the relevant Linux manual.

- If the KVM guest OS is Windows, a configuration using a PCI bridge is not supported for the guest. Note that a PCI bridge may be used automatically if 32 or more virtual disks are installed. For details about PCI bridges in a KVM, refer to the 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/xxxxxxx (for a disk)
Example: /dev/disk/by-id/xxxxxxx-part1 (for a partition)

- Allocate a disk or partition of the host to the guest.

Figure F.3 Allocating Disk of Host to Guest

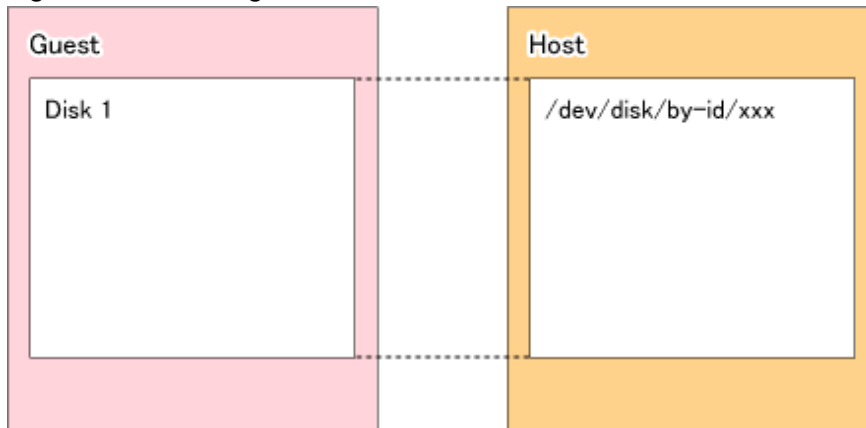
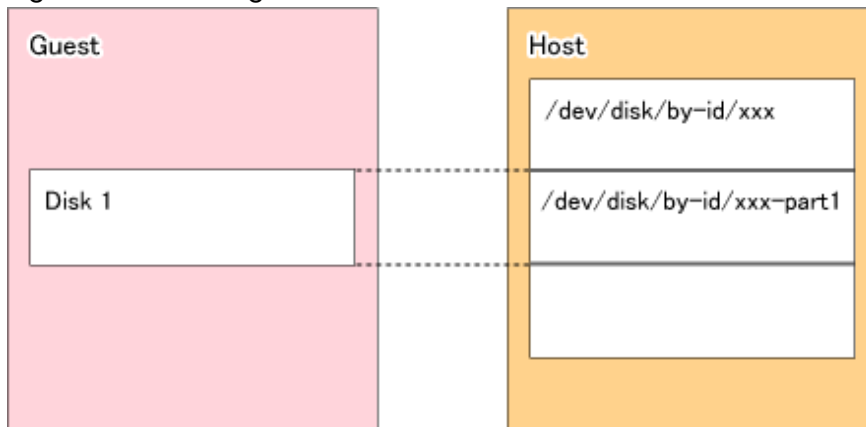


Figure F.4 Allocating Partition of Host to Guest



- 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 Same Disk to Different Guests (OK)

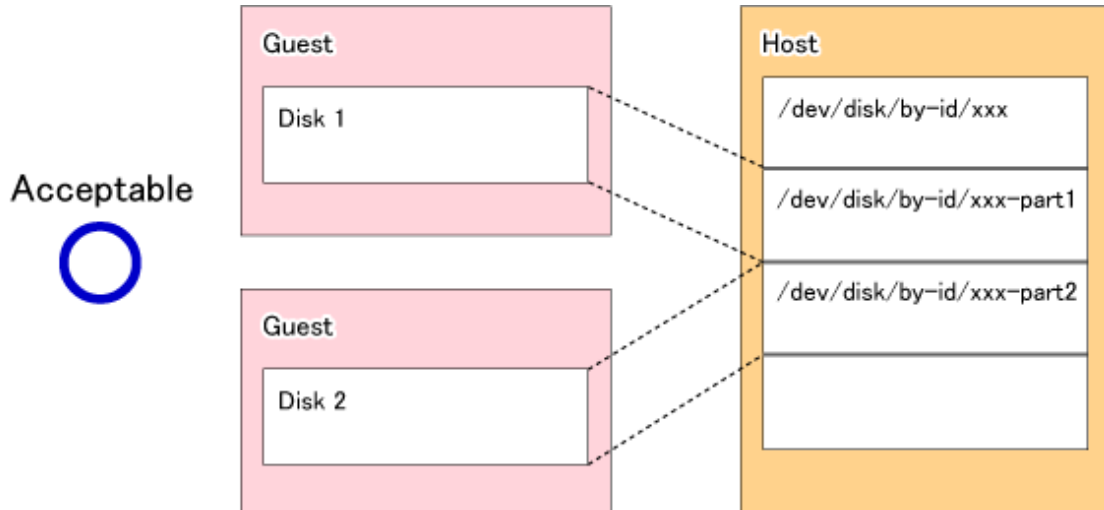
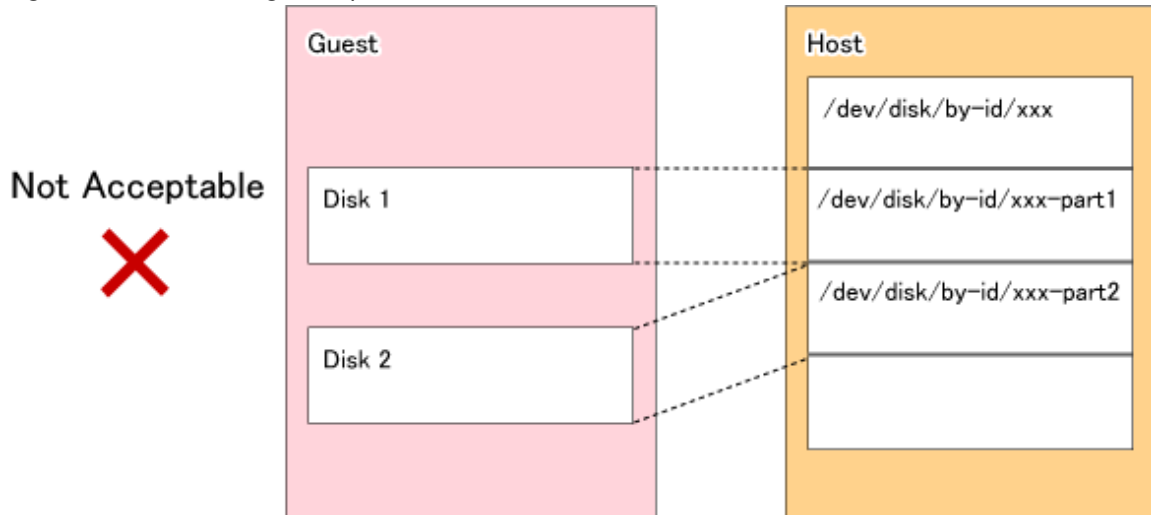


Figure F.6 Connecting Multiple Partitions on Same Disk to Same Guest (Bad)



F.5.2 Devices That Can Be Specified in AdvancedCopy Manager

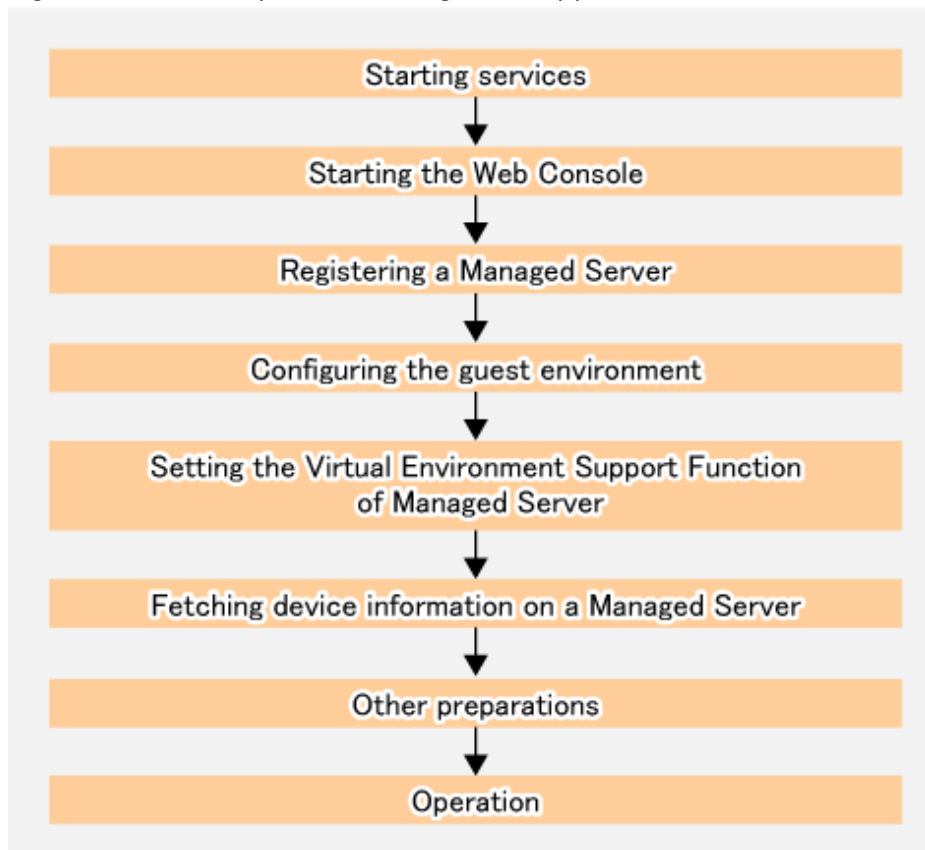
Device names that can be specified by AdvancedCopy Manager on KVM guests are either `g?d?` or `g?d?p?` (AdvancedCopy Manager device names).

For details on AdvancedCopy Manager device names, refer to "[1.2 Managing Device on AdvancedCopy Manager](#)".

F.6 Flow of Operation

This section explains the flow of operations using the KVM Support Function.

Figure F.7 Flow of Operations Using 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 Web Console"	PC	PC
3	"F.7.3 Registering Managed Server"	- Web Console (when using the GUI) - Management Server (when using the CLI)	All guests and hosts
4	"F.7.4 Configuring Guest Environment"	All guests	All guests
5	"F.7.5 Setting Virtual Environment Support Function of Managed Server"	All guests	All guests
6	"F.7.6 Fetching Device Information on Managed Server"	- Web Console (when using the GUI) - Management Server (when using the CLI)	All guests
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 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 Web Console

Start Web Console. For details about this, refer to "How to Start Web Console" in the *Web Console Guide*.

F.7.3 Registering Managed Server

With Web Console, register all guests and hosts used for KVM Support Function as the Managed Server.



Note

Perform this task after confirming that it is possible to communicate from the Managed Server to the IP address of the Management Server. Check the Management Server IP address with the `stgxfwcmdispsrv` command.

F.7.4 Configuring Guest Environment

Create the following two 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\stxapi_hostacm.ini
Guest information setting file	This file sets the domain names of virtual machines on which local guests are started.	<Environment directory>\etc\stxapi_domname.ini

[Example of the host information setting file]

```
ipaddr=10.10.10.22
port=1226
```

[Example of the guest information setting file]

```
domname=domain_1
```

For details about the setting files, refer to "F.11 Setting File Specifications".



Point

- 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 *AdvancedCopy Manager Operation Guide (for Linux)*.

F.7.5 Setting Virtual Environment Support Function of Managed Server

Execute the [stgxfwcmsetmode](#) 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 Managed Server

Fetch the device information that is stored on the Managed Servers (guests).
It is not required to perform this operation for the Managed Servers (hosts).

For the control procedure, refer to "7.4.4 Fetching Device Information on 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 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, it is not required to perform 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 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 "[13.5 Changing Operating Environment](#)".

- "[F.9.1 Changing IP Address of Managed Server](#)"
- "[F.9.2 Changing Port Number of Managed Server](#)"
- "[F.9.3 Implementing Live Migration](#)"

F.9.1 Changing IP Address of Managed Server

For details on changing the IP address of a Managed Server (host), refer to "Changing IP Address of Managed Server" in "Operation on KVM Guests" in the *AdvancedCopy Manager Operation Guide (for Linux)*.

F.9.2 Changing Port Number of Managed Server

For details on changing the port number of a Managed Server (host), refer to "Changing Port Number of Managed Server" in "Operation on KVM Guests" in the *AdvancedCopy Manager Operation Guide (for Linux)*.

F.9.3 Implementing Live Migration

If you perform the live migration while AdvancedCopy Manager is operating, afterwards, you have to update all host information setting files.

Point

If you know the target hosts before live migration, you can update the host information setting files without editing them during implementation of live migration by preparing templates for the 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)".

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 *AdvancedCopy Manager Operation Guide (for Linux)*.



F.10 Available Commands

The following commands are available with the KVM Support Function.

- "14.1 Backup Management Commands"
- "14.2 Configuration Management Commands"
- "14.3 Replication Management Commands"
- "14.5 SQL Server Associated Commands"
- "14.8 SnapOPC/SnapOPC+ Support Commands"
- "14.9 Troubleshooting Data Collection Commands"

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 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=xxxxxx
```

Parameter	Value to be Set
- IPv4 format ipaddr=xxx.xxx.xxx.xxx	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.
- IPv6 format ipaddr=n:n:n:n:n:n:n (*1)	
port=xxxxxx	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 "1.8.4 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).