

FUJITSU Storage ETERNUS SF AdvancedCopy Manager V16.5

Operation Guide

HP-UX

B1FW-6013-06ENZO(00)
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Preface

Purpose

This manual describes the functionality of FUJITSU Storage 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.

Organization

This manual is composed as follows:

[Chapter 1 Overview of AdvancedCopy Manager](#)

This chapter provides an overview of AdvancedCopy Manager.

[Chapter 2 Starting and Stopping Daemons](#)

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

[Chapter 3 Backup Operation](#)

This chapter describes how to backup data.

[Chapter 4 Backup Operation Using Suspend/Resume Function](#)

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

[Chapter 5 Backup Operation Using QuickOPC Function](#)

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

[Chapter 6 Replication](#)

This chapter describes the replication operation.

[Chapter 7 Storage Cluster Continuous Copy Function](#)

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

[Chapter 8 Operation Maintenance](#)

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

[Chapter 9 Command References](#)

This chapter describes commands.

[Chapter 10 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 Backup Operations Using Power-Saving](#)

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

Notation

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

Operating Systems

Formal Name	Abbreviation	
Microsoft(R) Windows Server(R) 2008 Standard (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM) (32-bit)(64-bit)	Windows Server 2008	Windows
Microsoft(R) Windows Server(R) 2008 R2 Foundation Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	Windows Server 2008 R2	
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter	Windows Server 2012	
Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	Windows Server 2012 R2	
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	Windows Server 2016	
Windows(R) 7 Home Basic Windows(R) 7 Home Premium Windows(R) 7 Professional Windows(R) 7 Enterprise Windows(R) 7 Ultimate	Windows 7	
Windows(R) 8 Windows(R) 8 Pro	Windows 8	
Windows(R) 8.1 Windows(R) 8.1 Pro	Windows 8.1	
Windows(R) 10 Home Windows(R) 10 Pro Windows(R) 10 Mobile	Windows 10	
Solaris(TM) 9 Operating System	Solaris 9	Solaris or Solaris OS
Oracle Solaris 10	Solaris 10	
Oracle Solaris 11	Solaris 11	
Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	RHEL5	Linux
Red Hat(R) Enterprise Linux(R) 6 (for x86) Red Hat(R) Enterprise Linux(R) 6 (for Intel64)	RHEL6	
Red Hat(R) Enterprise Linux(R) 7 (for Intel64)	RHEL7	
SUSE(R) Linux Enterprise Server 12 for AMD64 & Intel64	SUSE Linux Enterprise Server 12	
HP-UX 11i v3	HP-UX	

Formal Name	Abbreviation	
AIX(R) V6.1 AIX(R) V7.1	AIX	
VMware(R) vSphere 5	VMware vSphere 5	VMware
VMware(R) vSphere 6	VMware vSphere 6	

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

FUJITSU Storage ETERNUS

Formal Name	Abbreviation		
FUJITSU Storage ETERNUS DX60	-	-	ETERNUS DX series or ETERNUS Disk storage system
FUJITSU Storage ETERNUS DX410 FUJITSU Storage ETERNUS DX440	ETERNUS DX400 series		
FUJITSU Storage ETERNUS DX8100 FUJITSU Storage ETERNUS DX8400 FUJITSU Storage ETERNUS DX8700	ETERNUS DX8000 series		
FUJITSU Storage ETERNUS DX60 S2 FUJITSU Storage ETERNUS DX80 S2 FUJITSU Storage ETERNUS DX90 S2	-	ETERNUS DX S2 series	ETERNUS All-Flash Arrays
FUJITSU Storage ETERNUS DX410 S2 FUJITSU Storage ETERNUS DX440 S2	ETERNUS DX400 S2 series		
FUJITSU Storage ETERNUS DX8100 S2 FUJITSU Storage ETERNUS DX8700 S2	ETERNUS DX8000 S2 series		
FUJITSU Storage ETERNUS DX60 S3 FUJITSU Storage ETERNUS DX100 S3 FUJITSU Storage ETERNUS DX200 S3	-	ETERNUS DX S3 series	
FUJITSU Storage ETERNUS DX500 S3 FUJITSU Storage ETERNUS DX600 S3	-		
FUJITSU Storage ETERNUS DX8700 S3 FUJITSU Storage ETERNUS DX8900 S3	ETERNUS DX8000 S3 series		
FUJITSU Storage ETERNUS DX60 S4 FUJITSU Storage ETERNUS DX100 S4 FUJITSU Storage ETERNUS DX200 S4	-	ETERNUS DX S4 series	
FUJITSU Storage ETERNUS AF250 FUJITSU Storage ETERNUS AF650	ETERNUS AF series		
FUJITSU Storage ETERNUS DX200F	-		
FUJITSU Storage ETERNUS LT20/LT20 S2 FUJITSU Storage ETERNUS LT40/LT40 S2 FUJITSU Storage ETERNUS LT60 S2 FUJITSU Storage ETERNUS LT220 FUJITSU Storage ETERNUS LT230 FUJITSU Storage ETERNUS LT250 FUJITSU Storage ETERNUS LT270	ETERNUS Tape library		
FUJITSU Storage ETERNUS Multipath Driver	ETERNUS Multipath Driver		

Each individual device name in this document is listed with "FUJITSU Storage" omitted from it.

Software Products

Formal Name	Abbreviation
Windows(R) Internet Explorer(R)	Internet Explorer
Mozilla(R) Firefox(R)	Firefox
Google Chrome(TM)	Chrome
Microsoft(R) Windows Server(R) Failover Clustering	WSFC
Microsoft(R) Exchange Server	Exchange Server
Microsoft(R) SQL Server(R)	SQL Server
VMware(R) ESX(R)	VMware ESX
VMware(R) ESXi(TM)	VMware ESXi
VMware(R) vCenter(TM) Server	VMware vCenter Server or vCenter Server
FUJITSU Storage ETERNUS SF Express	Express
FUJITSU Storage ETERNUS SF Storage Cruiser	Storage Cruiser
FUJITSU Software PRIMECLUSTER Global Disk Services	GDS
FUJITSU Software PRIMECLUSTER Global File Services	GFS

Manuals

Formal Name	Abbreviation
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Quick Reference	ETERNUS SF Quick Reference
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Release Notes	ETERNUS SF Release Notes
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Installation and Setup Guide	ETERNUS SF Installation and Setup Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Migration Guide	ETERNUS SF Migration Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Web Console Guide	ETERNUS SF Web Console Guide
FUJITSU Storage ETERNUS SF Storage Cruiser / AdvancedCopy Manager Cluster Environment Setup Guide	ETERNUS SF Cluster Environment Setup Guide
FUJITSU Storage ETERNUS SF Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes	ETERNUS SF Operation Guide for VMware vSphere Virtual Volumes
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Messages	ETERNUS SF Messages
FUJITSU Storage ETERNUS SF Express / Storage Cruiser Event Guide	ETERNUS SF Event Guide
FUJITSU Storage ETERNUS SF Express / Storage Cruiser / AdvancedCopy Manager Glossary	ETERNUS SF Glossary

Besides the above-mentioned, each individual manual name in this document is listed with "FUJITSU Storage" omitted from it.

Others

- In this manual, the following products are collectively described as "Windows Server 2012 or later".
 - Windows Server 2012
 - Windows Server 2012 R2
 - Windows Server 2016

- In this manual, the following products are collectively described as "Windows Server 2012 R2 or later".
 - Windows Server 2012 R2
 - Windows Server 2016
 - In this manual, unless there is a special disclaimer, ETERNUS Disk storage system includes the ETERNUS All-Flash Arrays. However, the following functions are not supported in the ETERNUS All-Flash Arrays:
 - Energy saving operation for storage device
 - NAS operation for storage device
- The following function is not supported in the ETERNUS DX200F All-Flash Arrays:
- Automated Storage Tiering operation at multiple tiers (two or more)

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Notes

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- This manual is subject to change without advance notice.

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Update History

Content of Update	Updated Section	Revision
The information related to ETERNUS DX200F is described	"Others" in Preface	1.1
The explanations for the Oracle Database systems are added.	1.2.1, 1.2.2, 1.3.1	2
The section regarding the transfer mode of the inter-box synchronous replication is modified.	6.5.2.2	
Notes regarding the number of simultaneous executions of Concurrent OPC and Concurrent Suspend processes are modified.	6.5.1.1, 6.5.2.3	
The steps for backing up the data base are added.	7.1.2.2	
The explanations to restore the data base are modified.	7.1.2.3	
The explanations in regard to how to correspond to certain situations are modified.	7.2.2.2, 7.2.3.1, 8.3.1.1	
The operating environments of AdvancedCopy Manager for the swstresrst command and the swstsrsemtch command are modified.	8.1	
Precautions for when operating on a clustered environment are added.	9.1.6	
Explanations in regard to energy-saving operation (eco-mode) are altered.	Appendix D	
Information related to the ETERNUS DX200F is modified.	"Others" in Preface	
The explanations of preparations are modified.	4.4, 5.4	
The explanations of the replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function are added.	1.2.1, 1.2.2, Chapter3, Chapter4, Chapter5, Chapter7, 9.1, 9.1.1.3, 9.1.2.1, 9.1.2.3, 9.1.2.8, 9.3.1.1, 9.3.1.4, 9.3.1.5, 9.3.2.1, 9.3.2.2, 9.3.2.3, 9.3.2.4, 9.3.2.6, 9.5.1, 9.5.2	
The corrective procedure when hardware failure occurs in volumes is modified.	8.2.2.2, 8.3.2.1	
The term "VMware Virtual Volumes" is 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 is added.	"Notation" in Preface	
The command name of Figure 6.31 is corrected.	6.5.2.2	

Content of Update	Updated Section	Revision
The Copyright is 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 ETERNUS DX8700 S3/DX8900 S3 is added.	"Notation" in Preface	3.2
Information related to Windows Server 2003 is deleted.	"Notation" in Preface	4
Information related to Windows 10 is added.	"Notation" in Preface	
A note is modified.	3.4.3, 4.4.3, 5.4.3, 6.4.3	
Information related to troubleshooting is added.	8.2	
The explanation related to the stgxfwcmmodsrv command execution is modified.	8.5.2 - 8.5.4, 8.5.6.1 - 8.5.6.3	
The explanation related to the operating environment during a command execution is modified.	9.1, 9.3	
Information related to HP-UX 11i v1/v2 is deleted.	"Notation" in Preface, 1.4.1 - 1.4.3, 3.9.1, 6.9.1, 9.2.14	5
Information related to VMware vSphere 4 is deleted.	"Notation" in Preface	
Information related to the ETERNUS DX80/DX90 is deleted.	"Notation" in Preface, 9.3.2.2, 10.1.2, 10.1.9, 10.1.10	
Information related to the ETERNUS AF250/AF650 is added.	"Notation" and "Others" in Preface	
Information related to the ETERNUS LT60 is deleted.	"Notation" in Preface	
The description of referring to the <i>ETERNUS SF Web Console Guide</i> is added.	3.4.4, 4.4.4, 5.4.4, 6.4.4	
The explanation related to SnapOPC/SnapOPC+ is modified.	6.1.1.1, 6.1.1.2, 6.2.3.1 - 6.2.3.5, 6.5.1, 8.4.2, 8.4.2.3, 9.3.2.2, 9.5.1	
The operations to change the device configuration are added.	8.5.5	
The explanation is modified.	10.1.1.10	
Information related to Windows Server 2016 is added.	"Notation" and "Others" in Preface	
Information related to Windows Vista is deleted.	"Notation" in Preface	
Information related to SUSE Linux Enterprise Server 11 is deleted and information related to SUSE Linux Enterprise Server 12 for AMD64 & Intel64 is added.	"Notation" in Preface	
Information related to the ETERNUS DX60 S4/DX100 S4/DX200 S4 is added.	"Notation" in Preface	
The reference destination related to the combination of the manager program and the agent program is changed.	1.1.2	
In [Note], information is added.	6.1.2	
A new condition is added.	6.4.7.1	
A new section is added.	8.5.8	
In DESCRIPTION, information is modified.	9.2.10	
In NOTES, the factors that cannot set the replication volume information are added.	9.3.1.1	

Manual Organization and Reading Suggestions

Manual Organization

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

When to Read	Related Manuals (Abbreviated)	Related Products (*1)			Explanation
		EXP	SC	ACM	
Before installation	Quick Reference	Yes	Yes	Yes	This manual is common for all products.
	Release Notes	Yes	Yes	Yes	This manual is common for all products.
	Overview	-	-	Yes	This manual is unique for the product.
During installation	Installation and Setup Guide	Yes	Yes	Yes	This manual is common for all products.
	Cluster Environment Setup Guide	-	Yes	Yes	This manual is common for Storage Cruiser and AdvancedCopy Manager.
	Migration Guide	Yes	Yes	Yes	This manual is common for all products.
During operation	Operation Guide	Yes	Yes	Yes	This manual is unique for each product. The following manuals are available: <ul style="list-style-type: none"> - Express Operation Guide - Storage Cruiser Operation Guide - Storage Cruiser Operation Guide for Optimization Function - AdvancedCopy Manager Operation Guide (for Windows) - AdvancedCopy Manager Operation Guide (for Solaris) - AdvancedCopy Manager Operation Guide (for Linux) - AdvancedCopy Manager Operation Guide (for HP-UX) - AdvancedCopy Manager Operation Guide (for AIX) - AdvancedCopy Manager Operation Guide for Copy Control Module - Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes
	Web Console Guide	Yes	Yes	Yes	This manual is common for all products.
Anytime	Event Guide	Yes	Yes	-	This manual is common for Express and Storage Cruiser.
	Messages	Yes	Yes	Yes	This manual is common for all products.
	Glossary	Yes	Yes	Yes	This manual is common for all products.

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

How to Read Manuals

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

Purpose	Manual	Main Contents	How to Read
Acquiring a product	Quick Reference	<ul style="list-style-type: none"> - Product overview - Installation decision 	Read if you want to acquire a fundamental knowledge of

Purpose	Manual	Main Contents	How to Read
overview and basic operation knowledge		<ul style="list-style-type: none"> - Overview of the necessary tasks from installation to first use 	the product and its operation in order to decide to install it or not.
	AdvancedCopy Manager Overview	<ul style="list-style-type: none"> - Main functions - Linkable applications - Procedure overview for Advanced Copy of ETERNUS Disk storage system 	
Confirming the updated contents	Release Notes	<ul style="list-style-type: none"> - New function overview - Incompatibilities with previous version - Fixed bugs 	Read if you want to know the updated contents from a previous version and if you perform the upgrade.
Deciding if an upgrade is required	Migration Guide	<ul style="list-style-type: none"> - Notes and cautions about the upgrade - Upgrade procedure 	Read if you want to upgrade from a previous version.
Installing and correctly operating the product Setting up operating environment depending on purpose	Installation and Setup Guide	<ul style="list-style-type: none"> - Operating environment - Installation procedure - Setup procedure - Uninstallation procedure 	Read if you want to install and setup the product.
	Cluster Environment Setup Guide	<ul style="list-style-type: none"> - Supported cluster software - Installation procedure for a clustered system - Setup procedure for a clustered system - Uninstallation procedure for a clustered system 	Read if you want to install and setup the product on a clustered system.
Administration and operation of the installed system	Express Operation Guide	<ul style="list-style-type: none"> - Starting and stopping the software - Device monitoring - Data copy inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance 	Read if you want to start or shutdown the system, monitor the operation status, do backup/restore operations, etc.
	Storage Cruiser Operation Guide	<ul style="list-style-type: none"> - Starting and stopping the software - Device monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	

Purpose	Manual	Main Contents	How to Read
	Storage Cruiser Operation Guide for Optimization Function	<ul style="list-style-type: none"> - Operating environment construction - Operating status monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	
	AdvancedCopy Manager Operation Guide (for Windows)	<ul style="list-style-type: none"> - Starting and stopping the software 	
	AdvancedCopy Manager Operation Guide (for Solaris)	<ul style="list-style-type: none"> - Data backup/restore inside the storage system 	
	AdvancedCopy Manager Operation Guide (for Linux)	<ul style="list-style-type: none"> - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference 	
	AdvancedCopy Manager Operation Guide (for HP-UX)	<ul style="list-style-type: none"> - Command reference 	
	AdvancedCopy Manager Operation Guide (for AIX)		
	AdvancedCopy Manager Operation Guide for Copy Control Module		
	Storage Cruiser / AdvancedCopy Manager Operation Guide for VMware vSphere Virtual Volumes	<ul style="list-style-type: none"> - Operating environment construction - Virtual machine operation using a virtual volume - Backup/restore of the virtual machine - Necessary tasks after an architectural modification of the system as well as product maintenance 	
	Web Console Guide	<ul style="list-style-type: none"> - Operating environment - Screen layout description 	Read if you want to understand the ETERNUS SF Web Console.
Dealing with messages issued by the software	Messages	<ul style="list-style-type: none"> - Messages and their explanations - Parameter (variable information) description - System action - Countermeasures 	Read if you want a practical way of investigating and dealing with messages issued by the software.
Dealing with events issued by the software	Event Guide	<ul style="list-style-type: none"> - Phenomenon of event - Countermeasures 	Read if you need to find a practical way of investigating and dealing with events.
Researching the meaning of specific terms	Glossary	<ul style="list-style-type: none"> - Product specific terminology explanation 	Read if you want to learn the meaning of important terms, product specific terms or

Purpose	Manual	Main Contents	How to Read
related to the products and other important terms		<ul style="list-style-type: none"> - Explanation of important terminology appearing in the manual - Synonyms and related terms - Proper form of abbreviated terms 	abbreviations used in the manuals.

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Chapter 1 Overview of AdvancedCopy Manager

1.1 Product Configuration of AdvancedCopy Manager

1.1.1 Functions

AdvancedCopy Manager consists of the following functions.

Table 1.1 Functions

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

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

Managed Server

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

Management Server

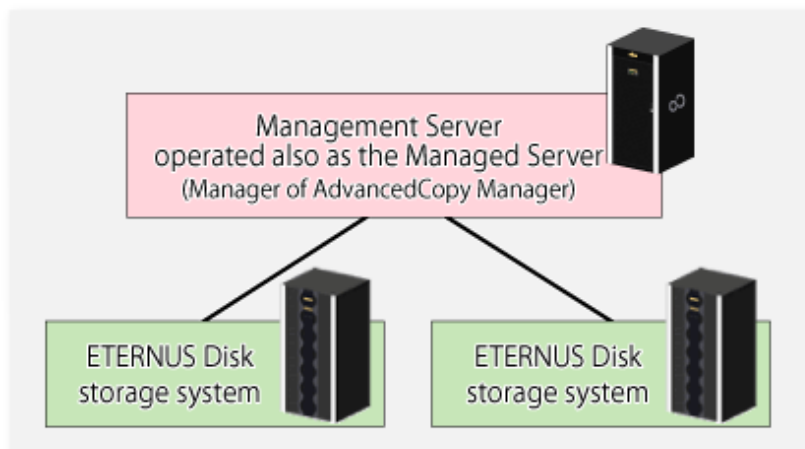
The Management Server manages the Managed Servers and only one Management Server can be set in the system. The Management module of AdvancedCopy Manager is installed on the Management Server.

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

- When only one Managed Server is installed

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

Figure 1.1 When Only One Managed Server Is Installed



- When two or more Managed Servers are installed

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

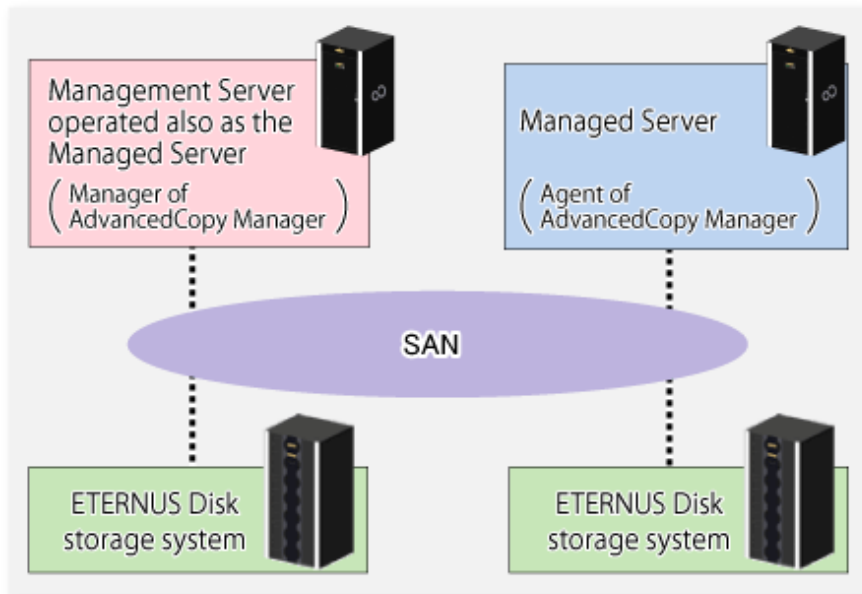
- When a Managed Server is operated as a Management Server

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

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

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

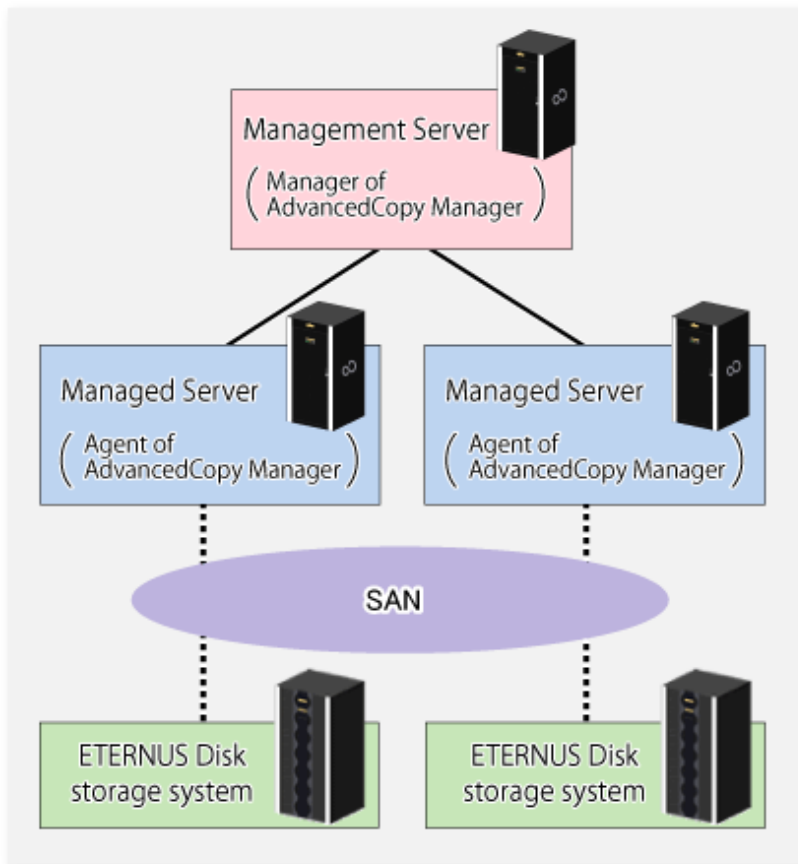
Figure 1.2 When Managed Server Is Also Operated as Management Server



- When setting up a dedicated Management Server

This setup comprises two or more Managed Servers with a dedicated Management Server.

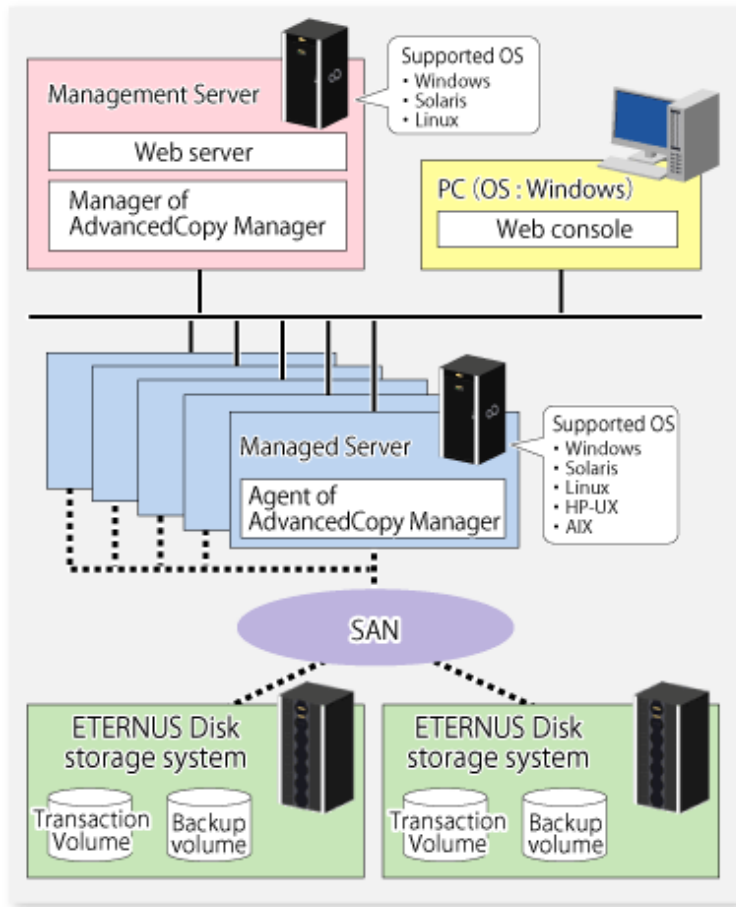
Figure 1.3 When Dedicated Management Server Manages Managed Servers



1.1.2 System Configuration

The system configuration of AdvancedCopy Manager is shown below.

Figure 1.4 System Configuration of Management Server and Multiple Managed Servers



See

Refer to "Notes on Combining Different Versions" in the *ETERNUS SF Release Guide* for the supported combinations of the manager and the agent.

1.2 Function Overview of AdvancedCopy Manager

1.2.1 What Is Backup Function?

The backup function of AdvancedCopy Manager provides operation management for high-speed backup by using the Advanced Copy function of ETERNUS Disk storage system.

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

High-speed Backup Operation

The Advanced Copy function of ETERNUS Disk storage system is used to perform high-speed backup between volumes regardless of volume capacities. This function greatly reduces the impact of a backup operation.

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

Backup Operation in Conjunction with Oracle (Sample Shell Scripts)

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

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

Policy Management Function

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

Storage Configuration Management Function

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

On AdvancedCopy Manager, a volume to be backed up is called a transaction volume; a volume to which a backup should be saved is called a backup volume.

Backup and Restore Functions

The backup and restore functions backup and restore a specified volume.

History Information Management Function

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



Note

In a backup operation, the Advanced Copy function for Storage Cluster-enabled volumes (hereinafter referred to as "TFOV") is not available. When using a TFOV with the Advanced Copy function, use the Replication function of AdvancedCopy Manager or AdvancedCopy Manager Copy Control Module.

Refer to "[1.2.2 What Is Replication Function?](#)" or "Supported Functions" in "Overview of AdvancedCopy Manager CCM" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details.

1.2.2 What Is Replication Function?

The replication function of AdvancedCopy Manager provides operation management of replications by using the Advanced Copy function of ETERNUS Disk storage system.

As a result, the following replication operations become possible.

High-speed Replication Operation

The Advanced Copy function of ETERNUS Disk storage system is used to perform high-speed replication between volumes regardless of volume capacities. This function greatly reduces the impact of a replication operation.

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

Replication Operation in Conjunction with Oracle (Sample Shell Scripts)

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

Main Differences with Backup Function

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

Storage Cluster Continuous Copy Function

In a Storage Cluster environment, if a failover occurs in the Primary Storage while executing Advanced Copy, this function can continue the copy operation with the Secondary Storage by automatically taking over the Advanced Copy process.

Refer to "[Chapter 7 Storage Cluster Continuous Copy Function](#)" for details.

1.2.3 Web Console

ETERNUS SF Web Console (hereafter referred to as "Web Console") can be used to perform environmental setup and employment functions for AdvancedCopy Manager. The main functions are as follows.

- Security management
Operational restrictions of users of AdvancedCopy Manager can be performed using the GUI interface.
- Backup management
AdvancedCopy Manager Backup management tasks (such as definition of a server or a device, backup, restoration, etc.) can be performed using the GUI interface.
- Replication management
AdvancedCopy Manager replication management tasks (such as defining volumes and executing replications) can be performed using the GUI interface.

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

1.2.4 Copy Control Module

When the AdvancedCopy Manager Copy Control Module is used, it is possible to perform back ups from the server where the Copy Control Module is installed, using the Advanced Copy function of ETERNUS Disk storage system.

As a result, the AdvancedCopy Manager's agent need not be installed.

For details, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module*.

1.3 Operating Environment of AdvancedCopy Manager

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

For the hardware requirements, refer to "Operating Environment" in the *ETERNUS SF Installation and Setup Guide*.

For browsers on which Web Console can run, refer to "Supported Web Browsers" in the *ETERNUS SF Web Console Guide*.

Point

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

1.3.1 Software Requirement of AdvancedCopy Manager's Agent

The following table lists the software requirements of AdvancedCopy Manager's agent.

For about the supported operating systems, refer to "Operating Environment of AdvancedCopy Manager's Agent" in the *ETERNUS SF Installation and Setup Guide*.

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

Table 1.2 Software Requirements of AdvancedCopy Manager's Agent

Product Name	Remarks
VERITAS Volume Manager 3.5 VERITAS Volume Manager 4.1 VERITAS Volume Manager 5.0	When a logical volume of VERITAS Volume Manager is the target of the operation performed.
Oracle 8i later	It is necessary to link to Oracle.

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

1.4 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 "[6.2.2 Determining Replication Target](#)" for devices that can be used for the replication operation.

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

1.4.1 Normal Devices

The following devices are supported for backup and replication management:

- sd driver resources

However, the following device is not supported for management:

- GPT disk



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

Devices with New Format

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

Devices with Legacy Format

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

- AdvancedCopy Manager gives priority to using new format devices. If devices with legacy formats are used with AdvancedCopy Manager, the information collection mode must be changed before device information is collected or reflected to avoid the use of a new format device. Refer to "[9.2.14 stgxfwcmsetmode \(Information Collection Mode Configuration Command\)](#)" for details.
- Devices with the same format as the AdvancedCopy Manager information collection mode must be set for the physical disks comprising ordinary devices and LVMs, and the physical disks comprising VxVM. For example, if the AdvancedCopy Manager information collection mode is "Legacy format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be legacy format devices.
- Disks that are 2 terabytes and over cannot be used with AdvancedCopy Manager. Therefore, operate AdvancedCopy Manager with disks that are less than 2 terabytes.

1.4.2 Volumes under Control of Logical Volume Manager (LVM)

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

- Volume group
- Physical disk that constitutes a volume group

For information on the backup and replication of LVM volumes, refer to "LVM Volume Operation" in "[3.8 LVM Volume Operation](#)" and "[6.8 LVM Volume Operation](#)".



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

- AdvancedCopy Manager supports device names in both the legacy format and the new format. Refer to "1.4.1 Normal Devices" for details. The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise LVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.

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

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

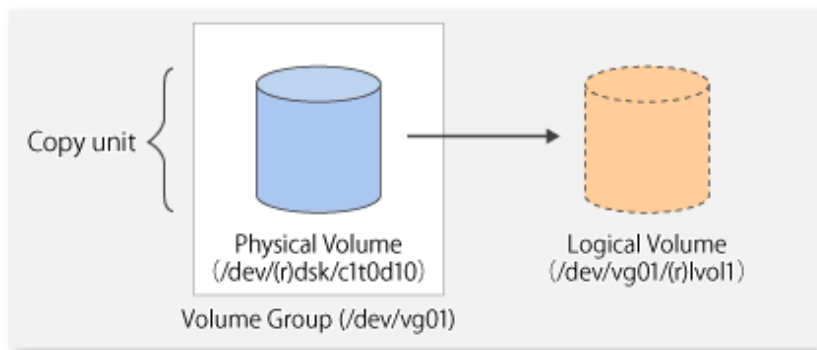
1.4.2.1 Backup/Replication in Units of Volume Groups

LVM volumes are volumes which are managed in units of volume groups containing logical volumes. AdvancedCopy Manager copies each physical disk that constitutes a volume group.

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

- One volume group contains only one physical disk, and logical volumes are configured so that one physical disk includes <n> logical volumes.

Figure 1.5 Support Configuration



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

A configuration in which one volume group contains multiple logical volumes is also supported.

For operation, note the following:

- A logical volume for which a file system was constructed must be unmounted before backup or replication can be performed and remounted after the backup or replication has completed.

Note

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

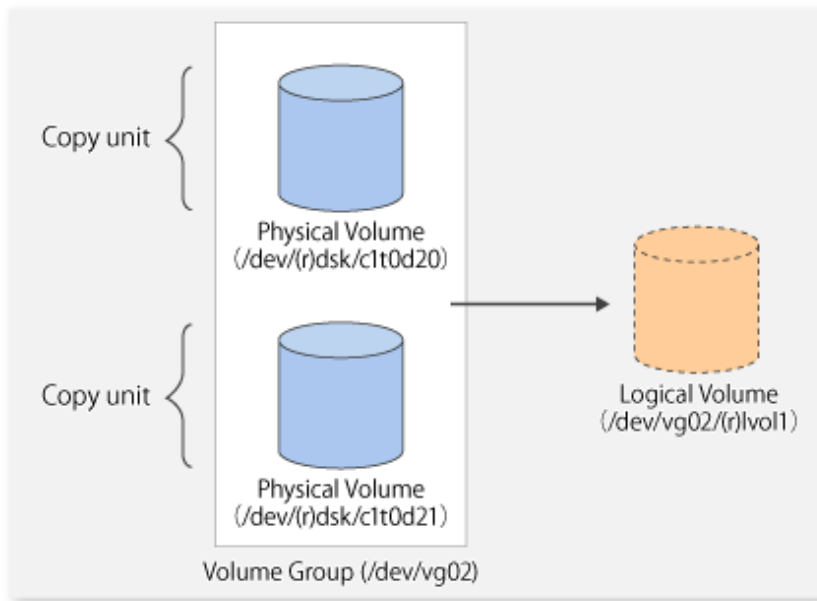
1.4.2.2 Physical Disks That Constitute Volume Group

In this case, the individual physical disks that constitute a volume group in which a logical volume exists are used as management units. Use this type of operation when a volume group has a configuration that is not supported for operations in units of volume groups.

Note

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

Figure 1.6 Configuration That Is Not Supported for Operation in Units of Volume Groups



Copying during backup or replication must be performed while maintaining the integrity of an entire volume group.

1.4.3 Volumes under Control of VERITAS Volume Manager (VxVM)

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

- Physical disk that constitutes a volume group

For details on backup of a subordinate volume of VxVM, refer to the section titled "[3.9 VxVM Volume Operation](#)". For details on replication of a subordinate volume of VxVM, refer to the section titled "[6.9 VxVM Volume Operation](#)".

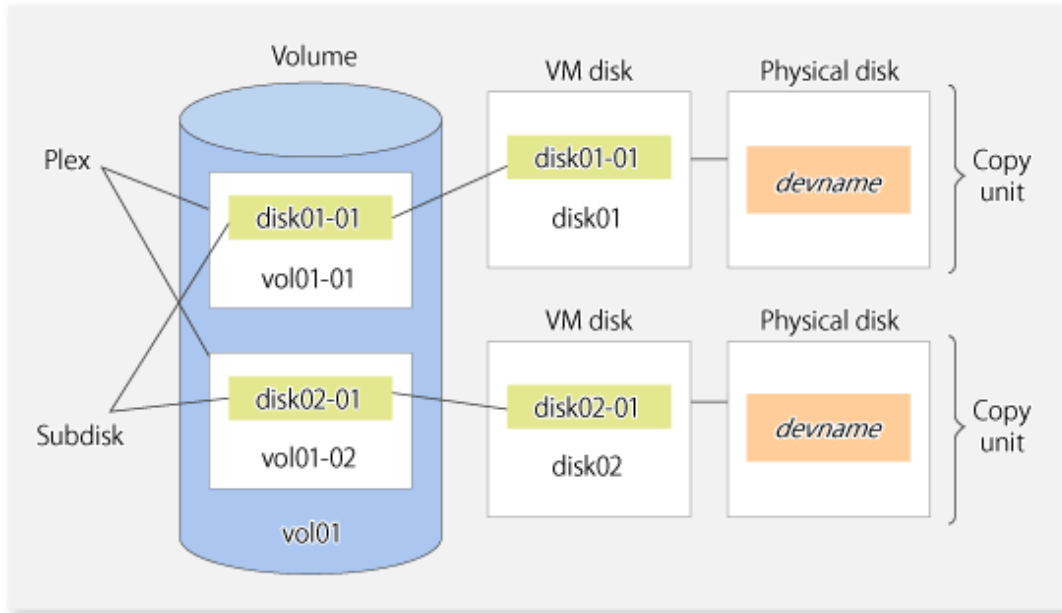
Note

- AdvancedCopy Manager supports device names in both the legacy format and the new format. Refer to [1.4.1 Normal Devices](#) for details. Physical disks that comprise VxVM can use only legacy format devices (`/dev/(r)disk/c#t#d#`) and they cannot use new format devices (`/dev/(r)disk/disk#`). Therefore, if VxVM is used, the AdvancedCopy Manager information collection mode must be set to legacy format devices. Refer to [9.2.14 stgxfwcmsetmode \(Information Collection Mode Configuration Command\)](#) for details of information collection modes.
- The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.
For example, if the AdvancedCopy Manager information collection mode is "Legacy format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be legacy format devices.
- Disks that are 2 TB and over cannot be used with AdvancedCopy Manager. Therefore, operate AdvancedCopy Manager with disks that are less than 2 TB.

1.4.3.1 Physical Disks That Constitute Disk Group

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

Figure 1.7 Example of VxVM Configuration



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

Specify a device name as follows:

- /dev/vx/dmp/c#t#d#

Note

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

Note

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

1.5 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.

Chapter 2 Starting and Stopping Daemons

This chapter explains how to activate and stop daemons provided by AdvancedCopy Manager. For more information on how to activate and stop the daemons described in this chapter, refer to "9.4 Start/Stop Daemon Commands".

2.1 Daemons of AdvancedCopy Manager

The Agent is configured with the following daemon.

Table 2.1 Daemons of Agent

Daemon Type	Description
Communication daemon	Communicates with the Management Server and other Managed Servers

When the Managed Server is in a clustered system, the following daemon composes Managed Server transactions.

Table 2.2 Daemons Used for Managed Server Transactions

Daemon Type	Description
Transaction-intended communication daemon	Communicates with the Management Server and other Managed Servers



Note

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

- Communication daemon (local daemon)

2.2 Starting Daemons

Daemons must be running on the Managed Servers.

If for whatever reason daemons stop, the daemons must be restarted on each server.

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



Note

- Before executing the startacm command, confirm that the SWSTGNODE environment variable is not defined.
- If starting daemon fails, confirm that IP address and name of the local server in /etc/hosts file are valid.

When the Managed Server is in a clustered system, start up the daemon(s) from the clustered system. For the start procedure, refer to the relevant cluster software manual.

To Start Daemon Separately

To start the daemon separately on AdvancedCopy Manager transactions in a clustered system, follow the steps described below:

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

1. Execute the following command.

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

Confirm that the command execution does not display the following strings. If the strings are displayed, the daemon(s) has already started.

```
/opt/FJSVswstf/bin/stgxfws logicalNodeName
```

2. For the environment variable SWSTGNODE, specify the name of the logical node that the transaction is to be performed on.
3. Start the communication daemon.

For the startup command, refer to "[9.4.1 Starting and Stopping Communication Daemon](#)".

2.3 Stopping Daemons

Stop daemons from the Managed Server. Normally, they are automatically stopped on system shutdown.

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

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



Note

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

When the Managed Server is in cluster operation, stop the daemon(s) from the clustered system. For the stop procedure, refer to the relevant cluster software manual.

To Stop Daemon Separately

To stop the daemon separately on AdvancedCopy Manager transactions in a clustered system, follow the steps described below:

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

1. Execute the following command.

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

Confirm that command execution displays the following strings. If the strings are not displayed, the daemon(s) has already stopped.

```
/opt/FJSVswstf/bin/stgxfws logicalNodeName
```

2. For the environment variable SWSTGNODE, specify the name of the logical node that the transaction is to be performed on.
3. Stop the communication daemon.

For the stop command, refer to "[9.4.1 Starting and Stopping Communication Daemon](#)".

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.

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

For information on the relationships between the configurations of supported devices and the copy operation, refer to "[1.4 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 the OPC function is called "snapshot fast backup", while backup that uses the EC function is called "synchronized high-speed backup".

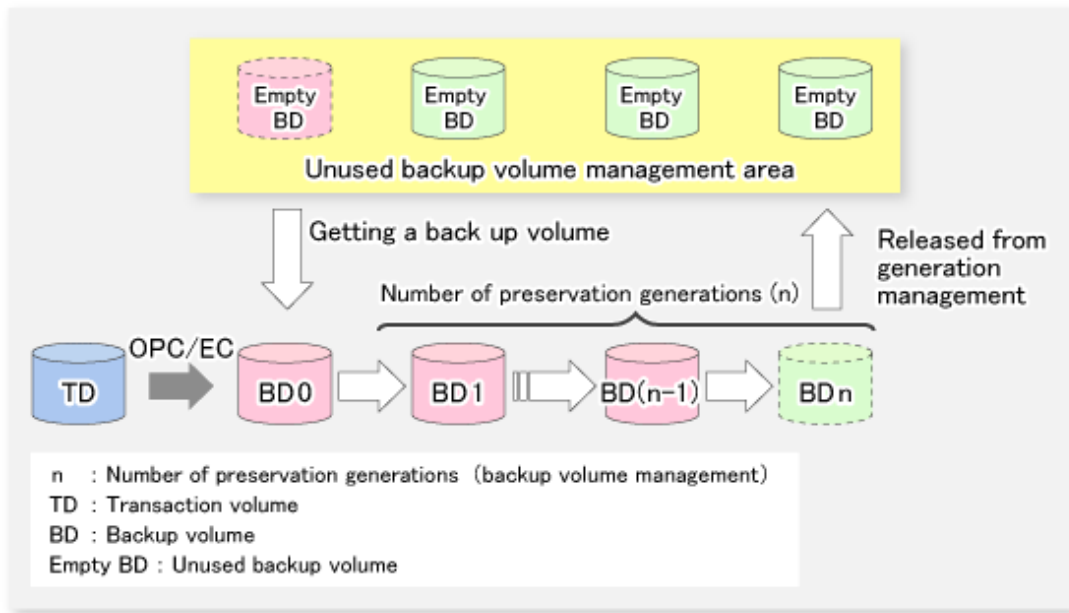
Automatic snapshot backup can be scheduled without first estimating the time required, because it does not use synchronous backup processing. However, when the save number is 1, a state may occur in which there is no backup data because a snapshot backup deletes the history prior to copy processing.

As synchronized high-speed backup deletes the history after backup processing is complete, there is no status where backup data does not exist, even though the generation number is 1, but synchronized high-speed backup does 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



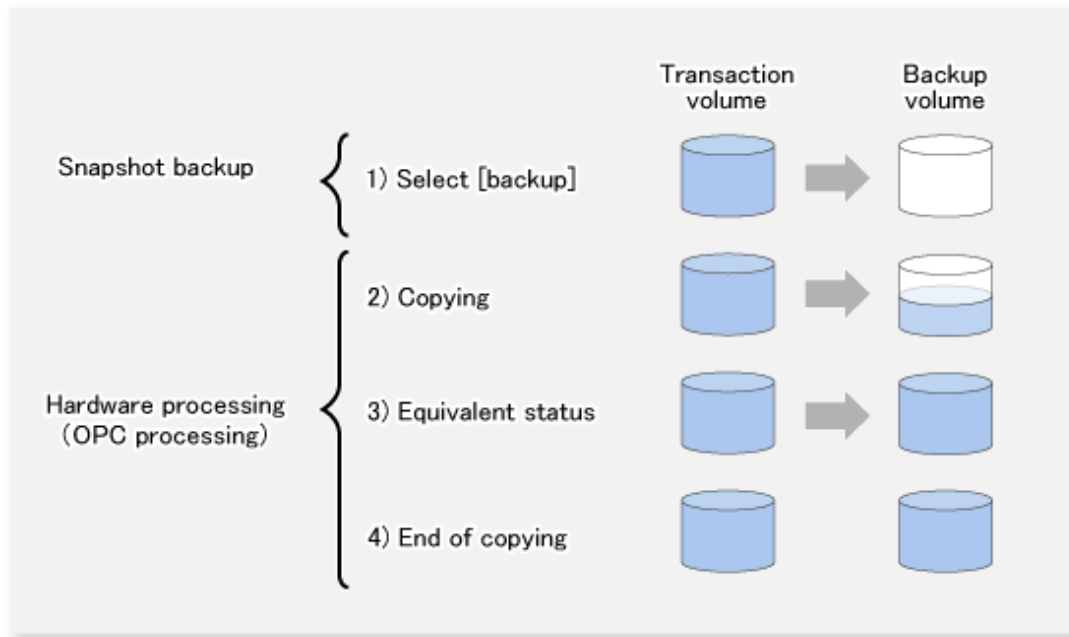
3.1.1 Snapshot Backup Processing

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 5 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.

3.1.1.1 Snapshot Backup Processing of Volume Group

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

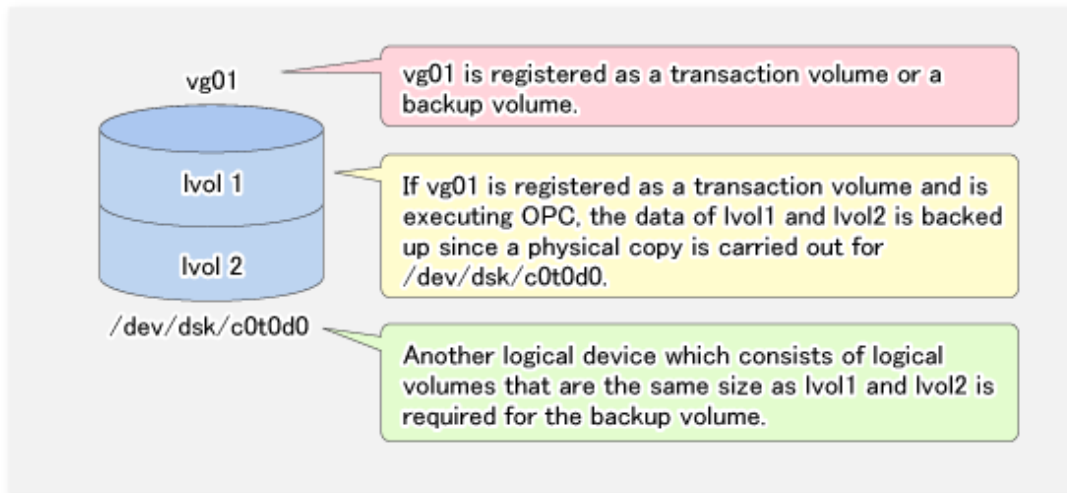
Note

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

- When the transaction source volume is a volume group, construct a logical disk whose size matches that of the transaction volume, in a volume group different from the transaction group, and register this volume group whose physical disk size is the same as the transaction volume as the backup volume.
- A "[Describing Device Map File](#)" is created to describe the pairing of matching transaction and backup volumes. For details, refer to "[3.4.9 Preparing Device Map File](#)". A "Device map" is mandatory if you are backing up using a volume group unit.
- In backup processing, since the LVM configuration information on the backup volume is rewritten for the LVM information on the transaction volume, LVM configuration information is restored in the processing after backup. For more information, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".
- When backing up a volume group using an account with Administrator authority for backup, modify the scripts used for backup pre-processing and post-processing to unmount/mount all logical volumes in the volume group. For more information, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".

- When two or more physical disks exist in the volume group which is registered with a transaction volume, the backup operation results in an error.

Figure 3.3 Transaction Volume and Backup Volume for Two or More Logical Disks



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:

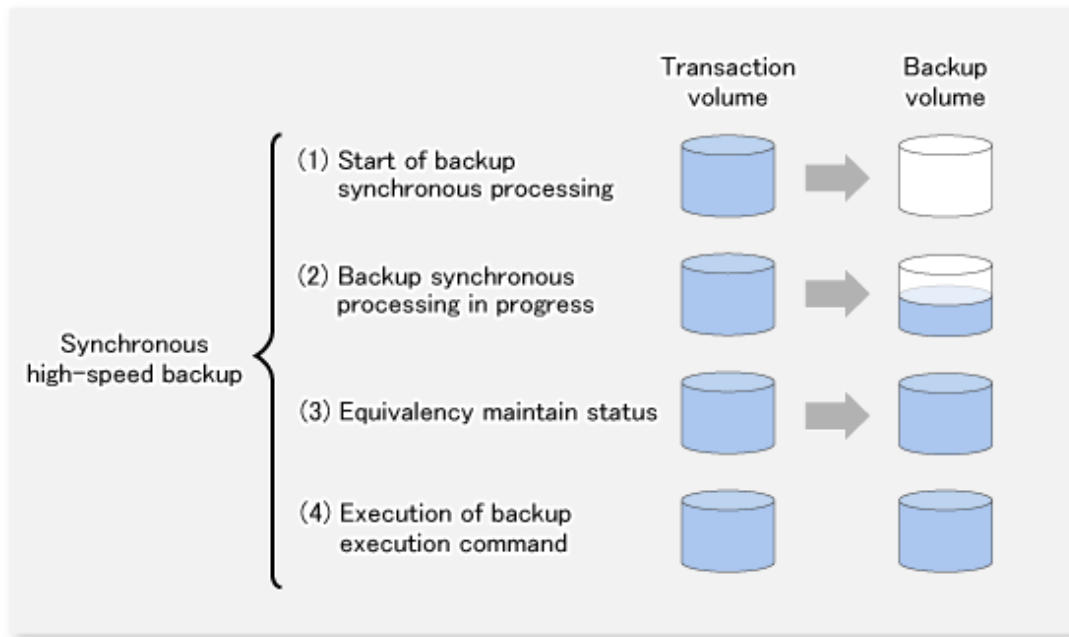
1. When the `swststartsync` command is executed ((1) in the following figure), an unused backup volume with the same size as the relevant transaction volume is selected from the unused backup volume management area and backup synchronous processing begins.
2. After the synchronous copy completes, the 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 3.4 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 4 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.

3.1.2.1 Synchronized High-speed Backup Processing of Volume Group

When the transaction volume is a volume group, copy processing by the EC function of ETERNUS Disk storage system is performed to the entire physical disk comprising the volume group. Therefore, when two or more logical volumes exist in a volume group, the data contained in all logical volumes is backed up.

 Note

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

- When the transaction source volume is a volume group, construct a logical disk whose size matches that of the transaction volume, in a volume group different from the transaction group, and register this volume group whose physical disk size is the same as the transaction volume as the backup volume.
- A "[Describing Device Map File](#)" is created to describe the pairing of matching transaction and backup volumes. For details, refer to "[3.4.9 Preparing Device Map File](#)". A "Device map" is mandatory if you are backing up using a volume group unit.
- In backup processing, since the LVM configuration information on the backup volume is rewritten for the LVM information on the transaction volume, LVM configuration information is restored in the processing after backup. For more information, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".
- When backing up a volume group using an account with Administrator authority for backup, modify the scripts used for backup pre-processing and post-processing to unmount/mount all logical volumes in the volume group. For more information, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".

- When two or more physical disks exist in the volume group which is registered with a transaction volume, the backup operation results in an error.
- In the case where the backup volume is a volume group, do not execute the `vgchange (1M)` command while executing synchronous processing. If the backup volume becomes deactivated during the execution of synchronous processing, it is not possible to reactivate it. In addition, it is not possible to stop synchronous processing, the backup execution command, the backup synchronous processing cancel command, etc. If accidentally deactivated, use ETERNUS Web GUI or similar, to forcibly stop synchronous processing, and then activate the backup volume.

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.

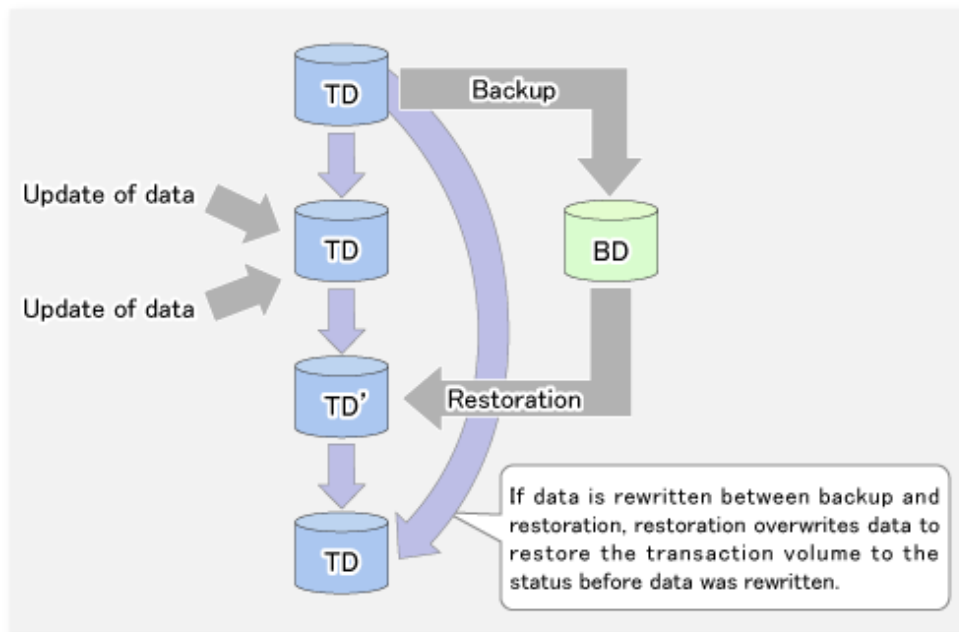
If the data on a backup volume under carrier management is restored to a transaction volume, the carrier management information does not change.

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 3.5 Notes on Restore Operations in AdvancedCopy Manager



TD: Transaction volume
BD: Backup volume

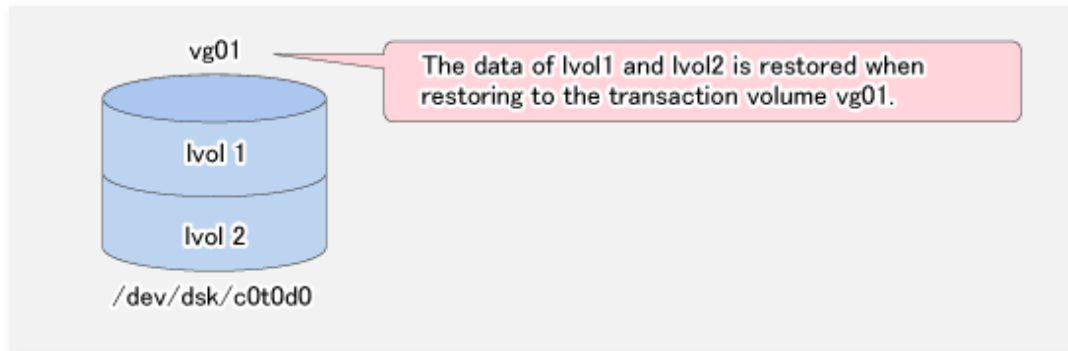
3.1.3.1 Restoration Processing of Volume Group

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

Note

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

Figure 3.6 Restoration for Two or More Logical Disks



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.

A Management Server can also serve as a Managed Server.

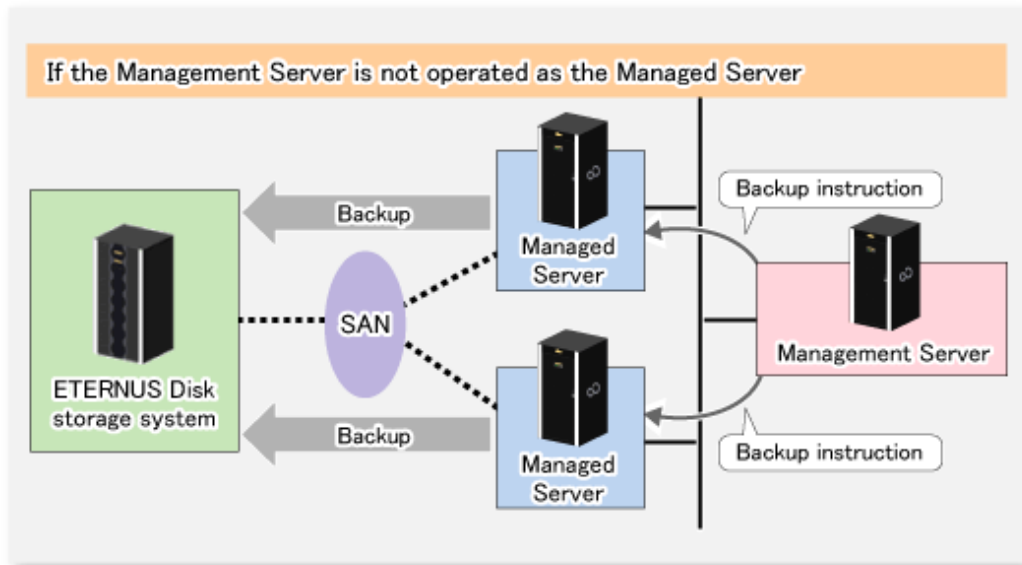
Note that AdvancedCopy Manager running on a Management Server must run in either Windows, Solaris or Linux OS environment.

Managed Server

AdvancedCopy Manager operations can be performed on the Managed Server.

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

Figure 3.7 Configuration of Servers on Which Backup Operation Should Be Performed



3.2.2 Selecting Backup Source

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

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

For the supported units, refer to "1.4 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.
- The following should be noted when using a volume group as operating volume:
 - Do not register two or more physical disks into one volume group.
- Refer to "10.1.1 General Notes" for points to consider when deciding on a candidate volume for backup. Some points to consider include but may not be limited to:
 - [10.1.1.1 Backup and Replication Exclusions](#)

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 disk. 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.

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 backup a system disk or a disk where AdvancedCopy Manager is installed.
- The following should be noted when using a volume group as a backup volume:
 - Do not register two or more physical disks into one volume group.
 - Create a logical volume so that it does not span two or more physical disks.
 - The backup volume must be the same physical size as transaction volume.

In addition, if the backup and transaction volumes are volume groups, they must be in different volume groups. However, these volume groups must have the same configuration.

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

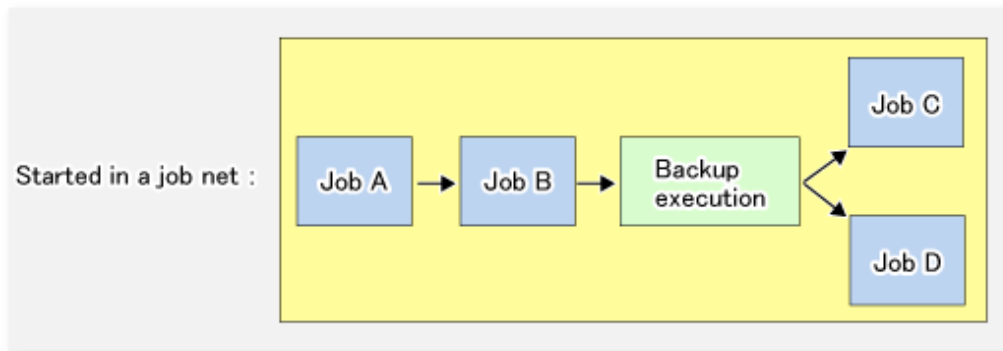
The backup operation of AdvancedCopy Manager can be automated by using Systemwalker Operation Manager.

Automatic Snapshot Fast Backup

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

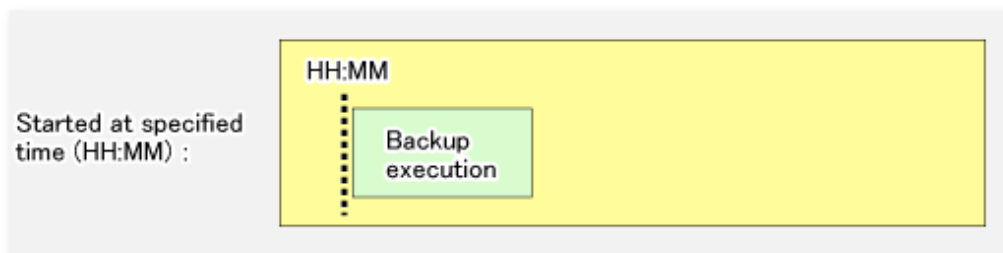
- Start the backup command as part of a batch job.

Figure 3.8 Start in Job Net



- Start the backup command at the specified time.

Figure 3.9 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.

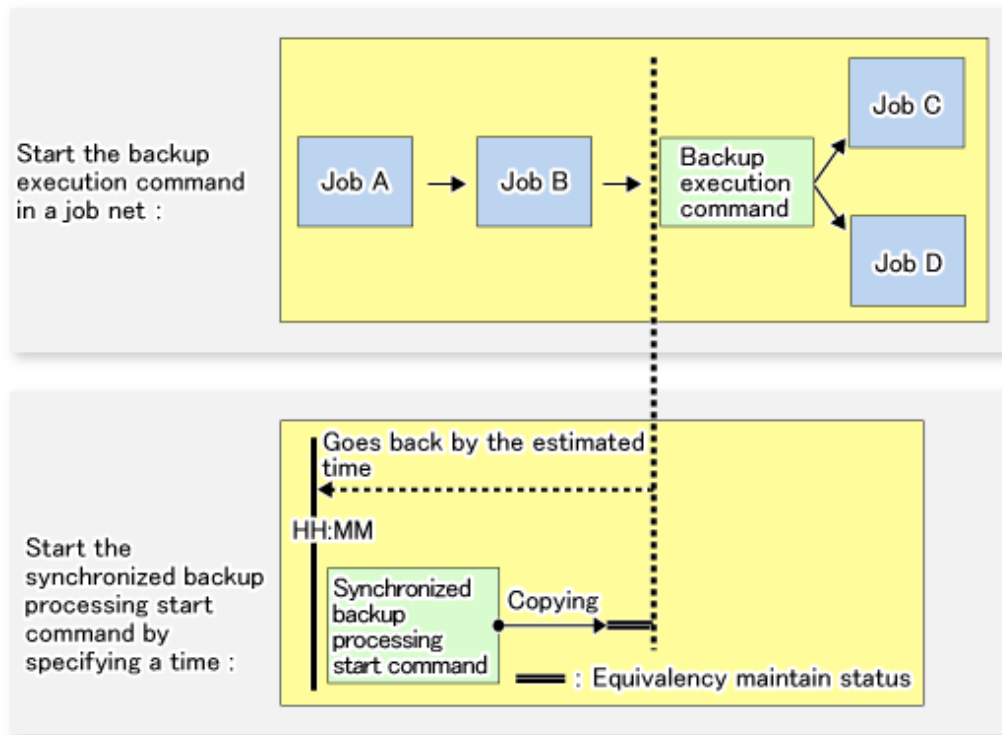
The time between the start of synchronized backup processing and the transition to maintenance equivalency status depends on the capacity of the volume to be copied.

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 3.10 Start in Job Net

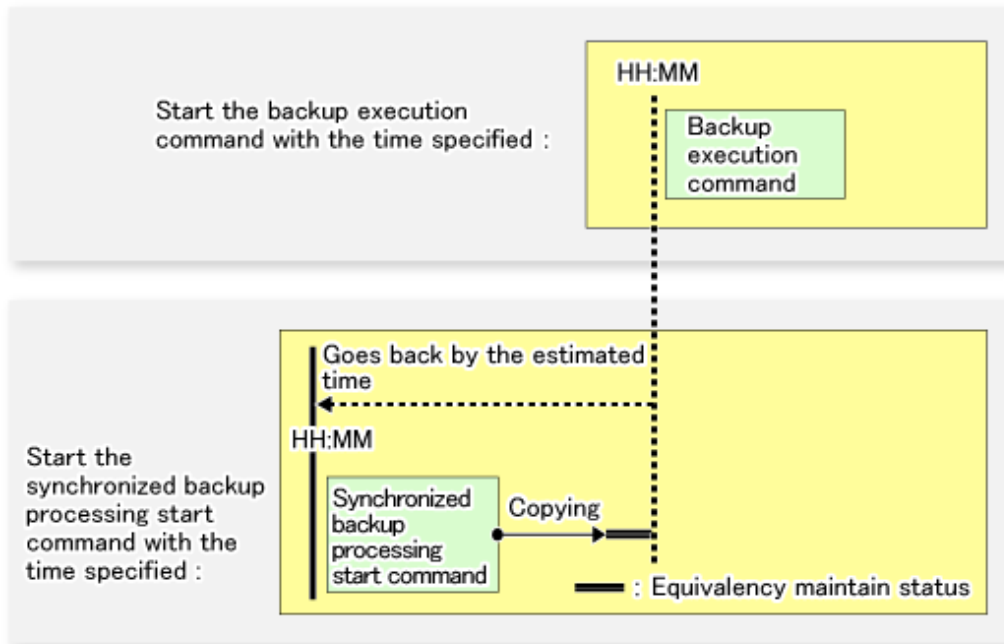


Note

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.

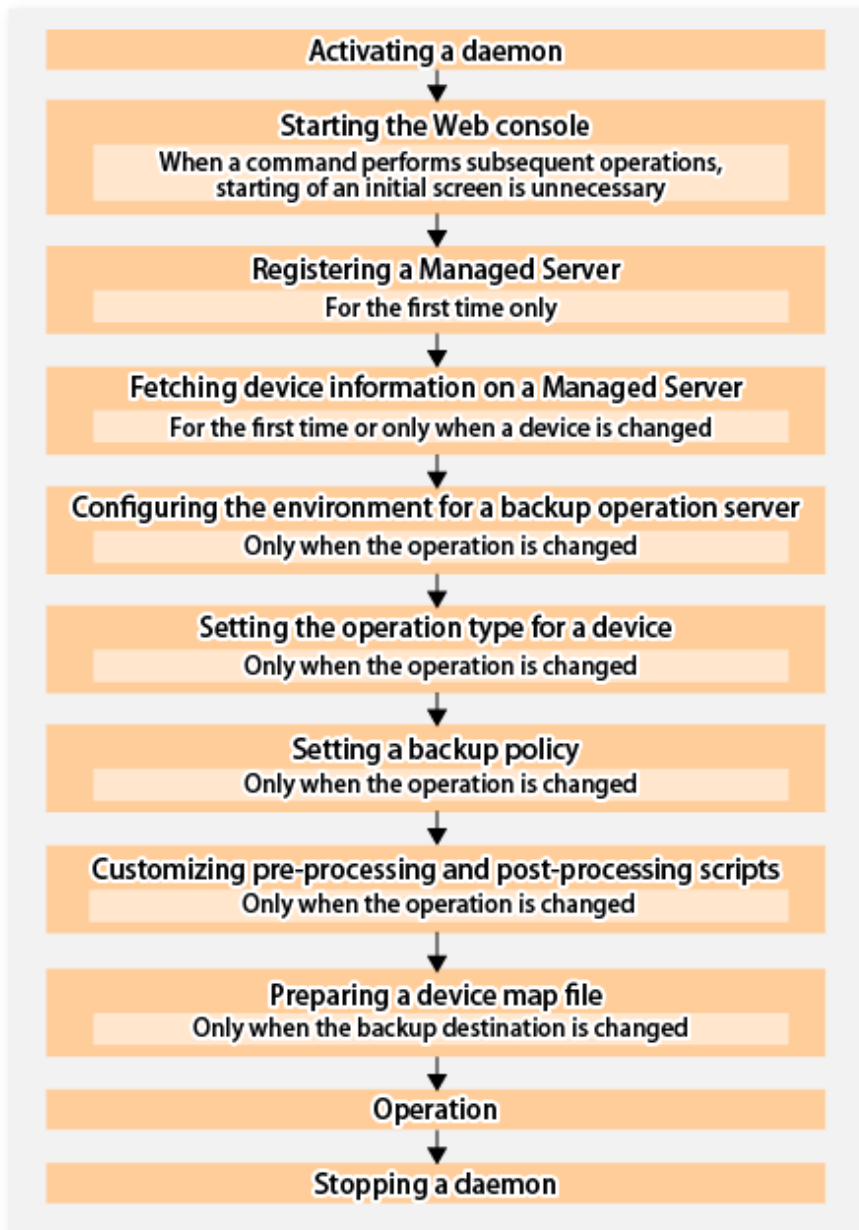
Figure 3.11 Start at Specified Time



3.3 Flow of Operation

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

Figure 3.12 Flow of Backup Operation on Transaction Volume



3.4 Preparing to Start Backup

3.4.1 Activating Daemons

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

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

3.4.2 Starting Web Console

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

3.4.3 Registering Managed Server

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



Note

- Specify the length of Server name of the management target Server (HP-UX) within 8 bytes.
- 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 *ETERNUS SF 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.

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

- A logical volume of LVM cannot be registered as transaction volume or backup volume. Register it in a volume group.
- In order to use a volume group as a transaction volume, it is necessary to create a logical disk as follows:
 - Do not register two or more physical disks into one volume group.

- Create a logical disk so that one logical disk does not span two or more physical disks.
- 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 `swstdevinfo` 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 mounted device cannot be set to backup volume. However, it is possible to set it to the transaction volume.
- When the registered contents are checked by Web Console or by the command, the value displayed on the "Size" column is the physical disk size. When a volume group is registered, this column also displays the physical disk size of the volume group.

 **Point**

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

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

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

- For operational reasons, to avoid unmount and mount processing of transaction volumes that comprise a file system
- The backup target is a volume group
- To add special pre-processing and post-processing to the corresponding scripts.

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



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.



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 be 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
/dev/dsk/c1t1d1      /dev/dsk/c1t1d21
/dev/dsk/c1t1d2      /dev/dsk/c1t1d22
/dev/dsk/c1t1d3      /dev/dsk/c1t1d23

# Volume Group
/dev/vg01            /dev/vg02 # A comment can be described here also.
/dev/vg03            /dev/vg04
:

```

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

- Describe a transaction volume name and a corresponding target backup volume name in one line. Separate the transaction volume name and backup volume name with one or more space or tab characters. One or more space or tab characters may be used as delimiters between the beginning of a line and a transaction volume name or between the end of a target backup volume name and the end of a line (new line character).
- A blank line (Space or tab characters) may be included in a file.
- Anything after the symbol '#' is a comment. If the comment uses more than a single line, then each line must be preceded by a '#' character.
- You cannot specify more than one backup volume for the same transaction volume in one device map file. If you do, only the first occurrence is valid. While the device map file 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. For details on commands, refer to the following:

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

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 4 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.
- Notes about the restoration of a volume group are available in this chapter at "Restoration processing of Volume Group".

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. Mount the backup volume. Check the backup volume using Web Console or the [swsthistdisp](#) command.
2. Copy files to restore using the cp command.
3. Unmount 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 in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the OS of the Management Server 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.



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

Refer to "Required Resources for Operation" in "Operating Environment of AdvancedCopy Manager's Agent" in the *ETERNUS SF Installation and Setup Guide* for details.

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.



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 [swstdevinfo](#) 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 *ETERNUS SF 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 [swstbkpodel](#) 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 a backup operation, stop the daemons running on the Managed Server. Normally, they are automatically stopped when the system stops.

You can stop a specific daemon if you need to do so for some reason. For more information, refer to "[Chapter 2 Starting and Stopping Daemons](#)".

Note

- When all daemons on the Managed Server have stopped, all functions of AdvancedCopy Manager running on the Managed Server stop.
- Stop daemons on a Management Server only after ensuring that all the Managed Servers that it manages have also been stopped.

3.8 LVM Volume Operation

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

- Backup operation units of volume groups
- Backup operation in units of physical disks (LU: Logical Unit)

Note

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

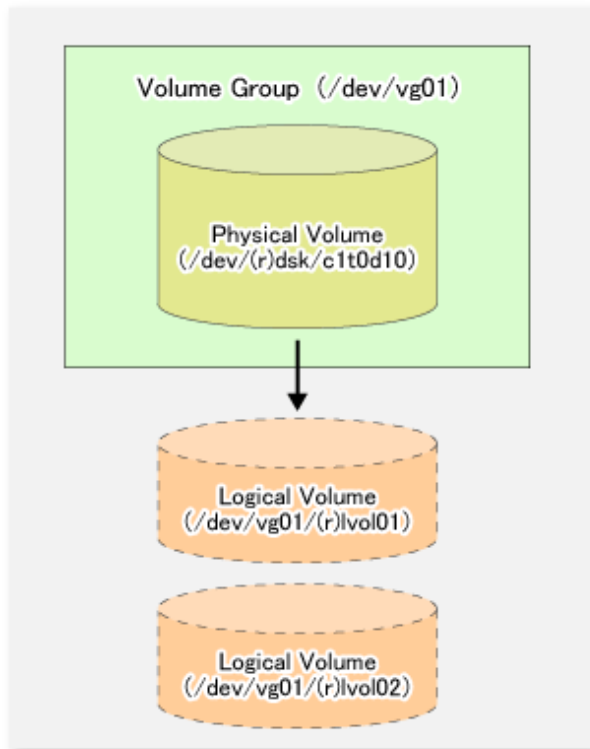
3.8.1 Backup Operation in Volume Group Units

Provided that all volume group configurations satisfy the following conditions, backup operation can be performed in units of volume groups:

- One volume group has only one physical disk, and logical volumes are configured so that one physical disk includes n logical volumes.

If the above conditions are not satisfied, backup operation must be performed in units of physical disks.

Figure 3.13 Example of Configuration in Which Backup Operation Can Be Performed in Volume Group Units

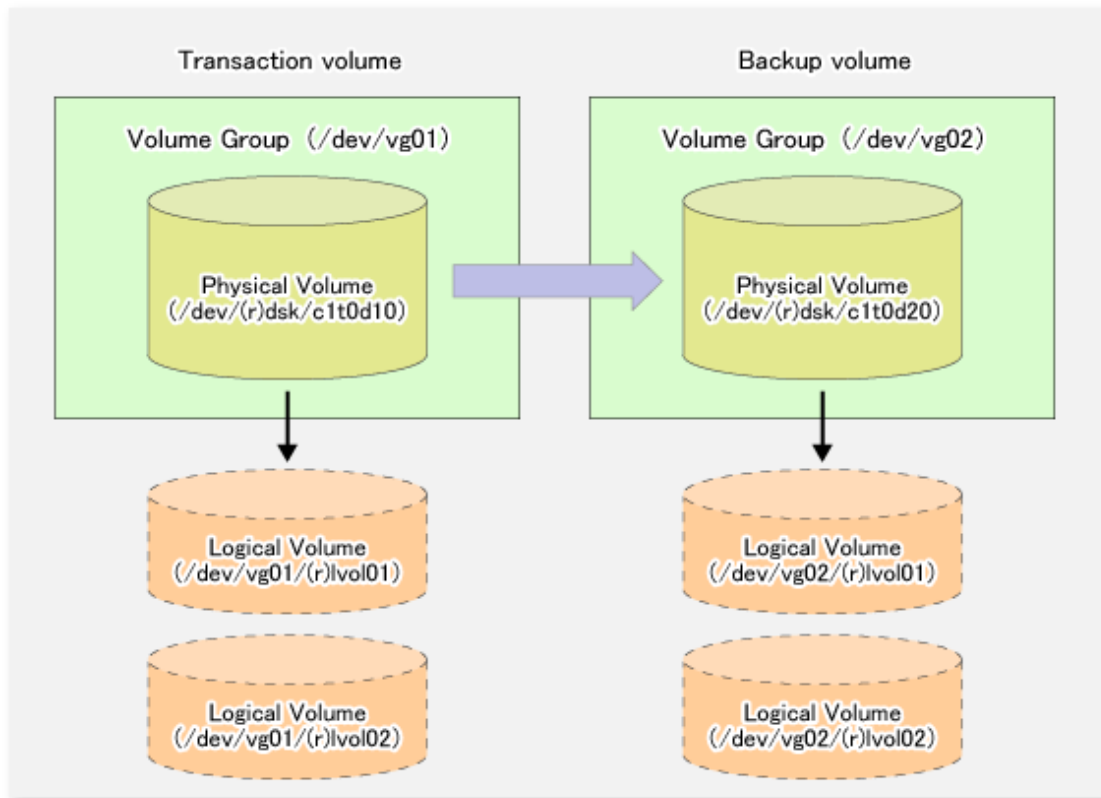


3.8.1.1 Operation Design

Take note of the following conditions regarding volume groups when configuring volume groups for use as transaction volumes or backup volumes:

- All physical disks must be the same size.
- The configurations of all logical volumes must be the same.

Figure 3.14 Transaction Volume and Backup Volume



3.8.1.2 Preparations

3.8.1.2.1 Saving Volume Group Configuration Information File

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

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

Note

Backup cannot be performed if a volume group configuration information file has not been saved. In this case, post-processing results in an error if backup is executed.

Customize the post-processing script if volume group configuration information has been saved to another file.

3.8.1.2.2 Configuring Transaction Volume and Backup Volume

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

Example:

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

3.8.1.2.3 Customizing Pre-processing and Post-processing Scripts

If a volume group is to be backed up, the pre-processing and post-processing scripts must be customized accordingly.

Refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)" for information on the customization procedure.



.....
If backup is attempted without customization of the scripts, pre-processing results in an error and backup cannot be performed.
.....

3.8.1.3 Backup in Units of Volume Groups

When a transaction volume is part of a volume group, copy processing covers the entire physical disk corresponding to the volume group. Therefore, if the volume group contains multiple logical volumes, data on all the logical volumes is backed up.

Example of Snapshot Backup

```
# /opt/FJSVswsts/bin/swstbackup /dev/vg01
/dev/vg01 swstbackup completed
#
```

Example of Synchronous Backup

```
# /opt/FJSVswsts/bin/swststartsync /dev/vg01
/dev/vg01 swststartsync completed
:
(After state of equivalency upkeep)
:
# /opt/FJSVswsts/bin/swstbackup /dev/vg01
/dev/vg01 swstbackup completed
#
```



.....
When using a volume group for backup operation, you should take note of the following:

- Configure the same logical disk as the transaction volume in a volume group separate from the transaction volume, and configure a volume group with the same physical disk size as the backup volume.
To perform the backup by associating transaction volumes with backup volumes, create an association file called "[Device Map File](#)" that defines the relationship between the transaction volume and the backup volume. For details, refer to "[3.4.9 Preparing Device Map File](#)". The device map specification is required when performing backup in units of volume groups.
- During backup processing, the LVM configuration information for the backup volume is overwritten by the LVM information from the transaction volume. Therefore, it is critical that the original LVM configuration information for the backup volume must be restored by backup post-processing. For details, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".
- A file system may be configured on a logical volume. In this case, modify both the backup pre-processing and post-processing scripts, and execute the backup using an account with Administrator authority, so that all the logical volumes in the volume group are unmounted or mounted respectively. For details, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".
- When the backup volume is a volume group, do not deactivate the backup volume with the "vgchange" (1M) command during synchronous processing (that is, while running the EC functions).

If the backup volume is deactivated during synchronous processing, not only can the backup volume not be activated again, but the functions for stopping synchronous processing (eg, the backup command and the synchronous processing cancel command) are also disabled. If the backup volume is deactivated in error, forcibly stop synchronous processing by using functions like ETERNUS Web GUI, and then reactivate the backup volume.
.....

3.8.1.4 Restoration in Units of Volume Groups

When a transaction volume is part of a volume group, copy processing covers the entire physical disk corresponding to the volume group. Therefore, if the volume group contains multiple logical volumes, data on all the logical volumes is restored.

Example of Restoration

```
# /opt/FJSVswsts/bin/swstrestore /dev/vg01  
/dev/vg01 swstrestore completed  
#
```

Note

When using a volume group for restoration, note the following:

- A file system may be configured on a logical volume. In this case, modify the backup pre-processing and post-processing scripts, and execute the backup using an account with Administrator authority, so that all logical volumes are unmounted and mounted, respectively.
- For details, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".

3.8.2 Backup Operation in Units of Physical Disks

When the volume group configuration does not satisfy the conditions of operation in units of volume groups, backup can be performed by operation in units of physical disks.

When backup is performed in units of physical disks, volume group integrity must be maintained. Therefore, all the physical disks in the volume group must be operated synchronously.

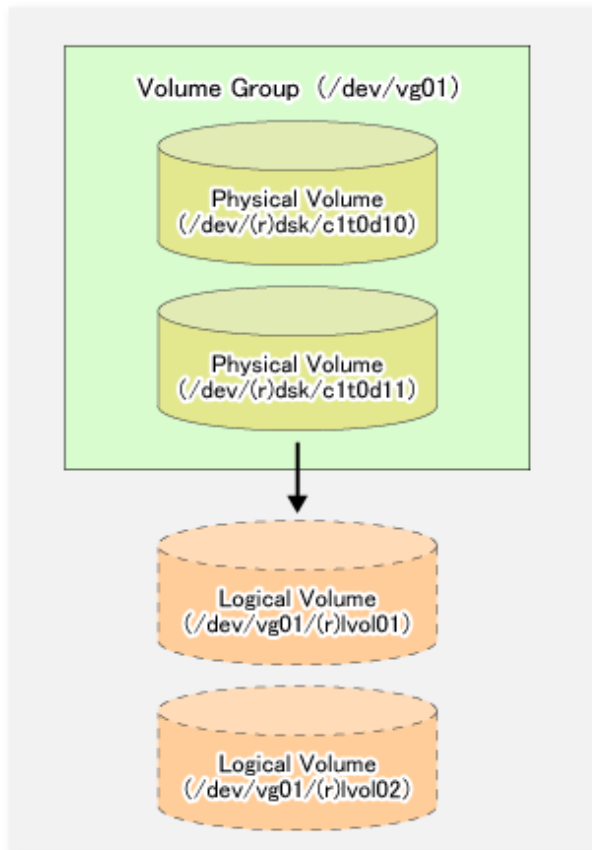
Point

Physical volumes that should be operated synchronously can be checked by using Web Console or the [stgxfwcmdispdev](#) command.

Note

For operation in a cluster configuration, the device name (`/dev/(r)dsk/c#t#d#`) of the physical disks that comprise the volume group must be the same at all servers that comprise the cluster, and the ETERNUS Disk storage system's disk indicated by the device name must also be the same.

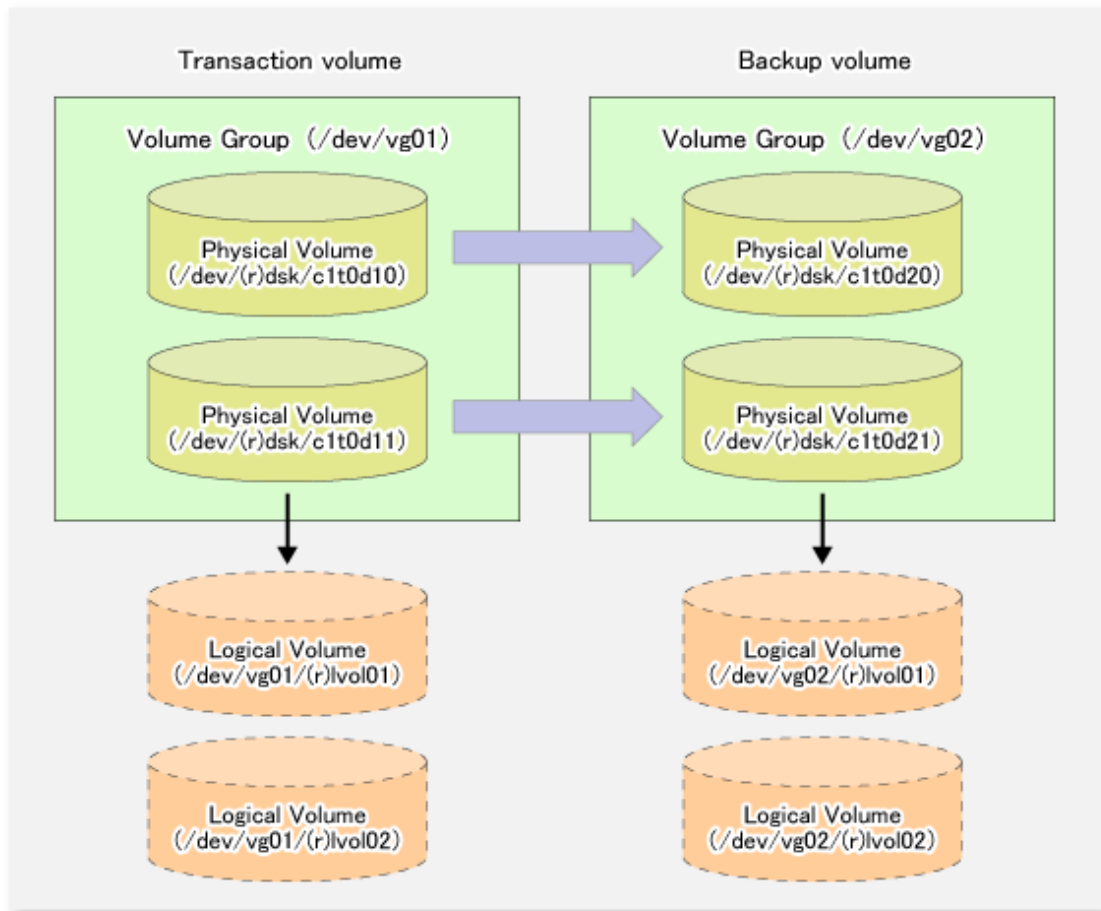
Figure 3.15 Sample Configuration for Operation in Units of Physical Disks



3.8.2.1 Operational Configuration

In order to use a replica volume after replication if the original volume is a volume group, the replica volume must have the same logical volume configuration as the original volume, and must be a volume group of the same physical size.

Figure 3.16 Transaction Volume and Backup Volume



3.8.2.2 Preparations

3.8.2.2.1 Saving Volume Group Configuration Information File

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

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

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

3.8.2.2.2 Configuring Transaction Volume and Backup Volume

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

Example:

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

3.8.2.2.3 Example Device Map File

In the case of a backup of an LVM volume, a device map file must be created. This is because a backup volume with the same volume structure as the transaction volume must be specified.

Example of Device Map File

```
# Transaction volume          Backup volume
/dev/dsk/clt0d10             /dev/dsk/clt0d20
/dev/dsk/clt0d11             /dev/dsk/clt0d21
```

For details on the device map file, refer to "3.4.9 Preparing Device Map File".

3.8.2.3 Backup in Units of Physical Disks

Perform the operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing or post-processing work for each volume group before and after (respectively) the backup. Disable pre-processing and post-processing when operating individual physical disks.

Example of Snapshot Backup

```
(Perform pre-processing for the transaction and backup volumes.)

# /opt/FJSVswsts/bin/swstbackup /dev/dsk/clt0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/clt0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/clt0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/clt0d11 swstbackup completed
#

(Perform post-processing for the transaction and backup volumes.)
```

Example of Synchronous Backup

```
(Perform pre-processing for the backup volume.)

# /opt/FJSVswsts/bin/swststartsync /dev/dsk/clt0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/clt0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/clt0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/clt0d11 swststartsync completed
#

(After state of equivalency upkeep)
(Perform pre-processing for the transaction volume.)

# /opt/FJSVswsts/bin/swstbackup /dev/dsk/clt0d10
/dev/dsk/clt0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/clt0d11
/dev/dsk/clt0d11 swstbackup completed
#

(Perform post-processing for the transaction and backup volumes.)
```

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

Table 3.4 Backup Pre-processing and Post-processing

	Pre-processing	Post-processing
Transaction volume	<ol style="list-style-type: none"> 1. Ensure data integrity by preventing access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 	If file systems are included, remount the volumes that were unmounted by pre-processing.
Backup volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the volume group. 	<ol style="list-style-type: none"> 1. Reconfigure the volume group.

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

Reconfiguring Volume Group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

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

2. Restore volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdisk/clt0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdisk/clt0d21
#
```

3. Reactivate the volume group.

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

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

Reconfigure shared mode volume groups using the following procedure:

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

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

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

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdisk/clt0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdisk/clt0d21
#
```

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

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

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

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

3.8.2.4 Restoration in Units of Physical Disks

Perform this operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing or post-processing work for each volume group before and after the restoration respectively. Disable pre-processing and post-processing when using individual physical disks.

Example of Restoration

(Perform pre-processing for the transaction and backup volumes.)

```
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/clt0d10
/dev/dsk/clt0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/clt0d11
/dev/dsk/clt0d11 swstrestore completed
#
```

(Perform post-processing for the transaction and backup volumes.)

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

Table 3.5 Restoration Processing

	Pre-processing	Post-processing
Backup volume	Ensure data integrity by preventing access to all logical volumes in the volume group.	Post-processing is not required.
Restoration destination volume	<ol style="list-style-type: none">1. Prevent access to all logical volumes in the volume group.2. If file systems are included, unmount all file systems in the volume group.	<ol style="list-style-type: none">1. Reconfigure the volume group.2. If file systems are included, remount the volumes that were unmounted during pre-processing.

Reconfiguring Volume Group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

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

2. Restore the volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdisk/clt0d10
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdisk/clt0d11
#
```

3. Reactivate the volume group.

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

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

Reconfigure shared mode volume groups using the following procedure:

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

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

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

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

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

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

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

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

3.9 VxVM Volume Operation

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

3.9.1 Backup Operation in Units of Physical Disks

If a VxVM volume is the backup target, execute backup in the physical disk units that comprise the VxVM volume.

When backup operation is performed in units of physical disks, disk group integrity must be maintained and, therefore, all the physical disks in the disk group must be processed synchronously.

Point

For the physical volume which should be synchronized, confirm it by using either Web Console or the [stgxfwcmdispdev](#) command.

Note

- Before starting this operation, be sure to understand the basic operation of ordinary volumes.
- Snapshot backup is recommended for backing up in units of physical disks. In the case of synchronized backup, commands that access the destination volume, such as VxVM commands cannot be used during full copy or differential copy.
- For operation in a cluster configuration, the device name (`/dev/(r)disk/c#t#d#`) of the physical disks that comprise the disk group must be the same at all servers that comprise the cluster, and the ETERNUS Disk storage system's disk indicated by the device name must be the same.
- AdvancedCopy Manager supports device names in both the legacy format and the new format. For details, refer to "[1.4 Managing Device on AdvancedCopy Manager](#)". A physical disk made up of VxVM can only use legacy devices (`/dev/(r)disk/c#t#d#`) and cannot use new devices (`/dev/(r)disk/disk#`). As a result, when VxVM is used, the AdvancedCopy Manager information collection mode must be set to legacy devices. For details on the information collection mode, refer to the reference of the [stgxfwcmsetmode](#) command.
- Normal devices, physical disks made up of LVM and physical disks made up of VxVM must be set to the same device format as the AdvancedCopy Manager information collection mode.

[Example]

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

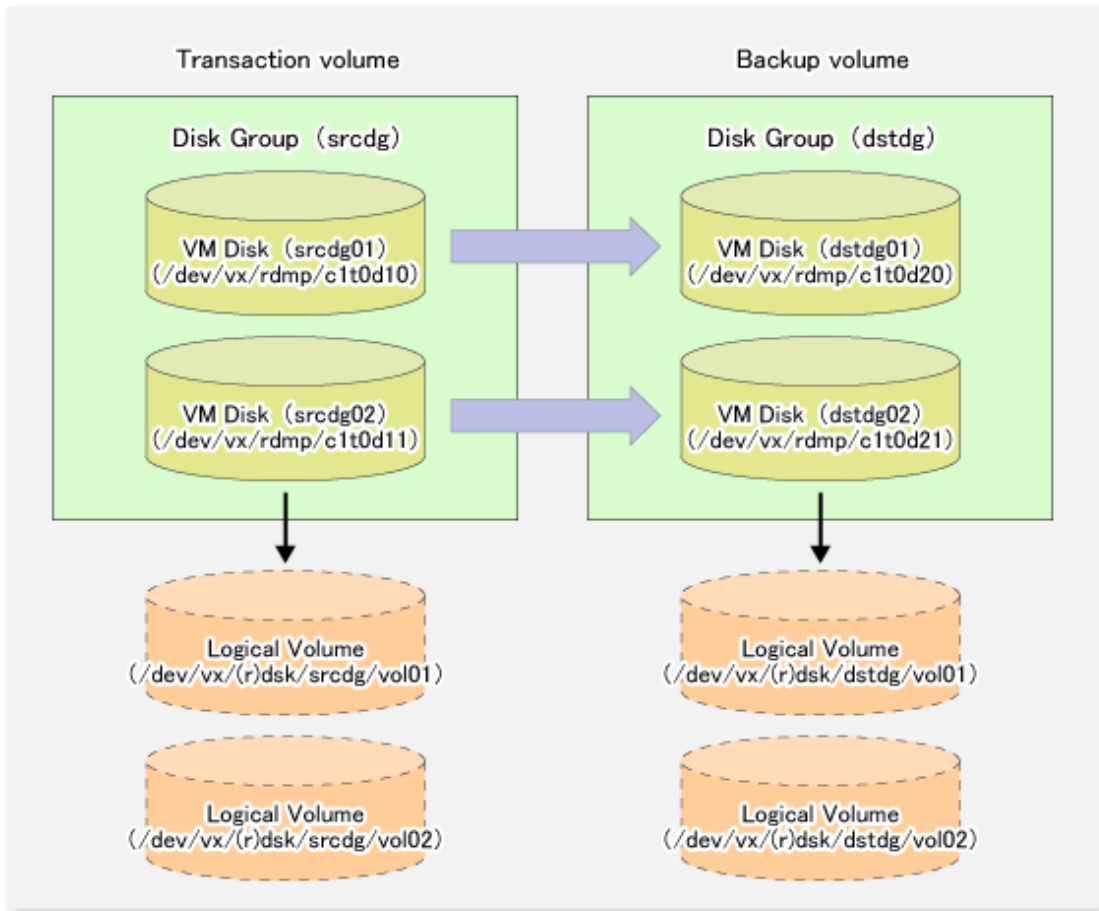
3.9.1.1 Operational Configuration

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

Observe the following conditions when configuring the disk groups:

- The number, sizes, and types of VM disks must be the same.
- The configurations of logical volumes must be the same.

Figure 3.17 Transaction Volume and Backup Volume



3.9.1.2 Preparations

3.9.1.2.1 Confirming Disk Group Configuration Information File

The disk group must be reconfigured in backup post-processing. Confirm that a volume group configuration information file has been saved in the following format.

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

3.9.1.2.2 Setting Transaction Volume and Backup Volume

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

Example:

```
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/vx/dmp/clt0d10
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -t /dev/vx/dmp/clt0d11
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/vx/dmp/clt0d20
swstdevinfofet completed
# /opt/FJSVswsts/bin/swstdevinfofet -b /dev/vx/dmp/clt0d21
swstdevinfofet completed
#
```


3.9.1.2.3 Preparing Device Map File

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

Example of Device Map File

```
# Transaction volume          Backup volume
/dev/vx/dmp/clt0d10          /dev/vx/dmp/clt0d20
/dev/vx/dmp/clt0d11          /dev/vx/dmp/clt0d21
```

For details on the device map file, refer to "3.4.9 Preparing Device Map File".

3.9.1.3 Backup

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

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

Example of Snapshot Backup

```
(Perform pre-processing for the transaction and backup volumes.)

# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/clt0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/clt0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/clt0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/clt0d11 swstbackup completed
#

(Perform post-processing for the transaction and backup volumes.)
```

Example of Synchronous Backup

```
(Perform pre-processing for the backup volume.)

# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/clt0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/clt0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/clt0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/clt0d11 swststartsync completed
#

(After state of equivalency upkeep)
(Perform pre-processing for the transaction volume.)

# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/clt0d10
/dev/vx/dmp/clt0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/clt0d11
/dev/vx/dmp/clt0d11 swstbackup completed
#

(Perform post-processing for the transaction and backup volumes.)
```

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

Table 3.6 Pre-processing and Post-processing for Backup

Volume Type	Pre-processing	Post-processing
Transaction volume	<ol style="list-style-type: none"> 1. Secure data integrity by stopping access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Import the disk group, when the disk group is not imported. 	If file systems are included, mount the volumes that were unmounted during preprocessing.

Volume Type	Pre-processing	Post-processing
Backup volume	<ol style="list-style-type: none"> 1. Stop access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Deport the disk group. 4. Set the physical disks in the disk groups to offline. 	<ol style="list-style-type: none"> 1. Online the physical disks that were set to offline during preprocessing. 2. Reconfigure the disk group. 3. If file systems are included, remount the volumes that were unmounted during preprocessing.

Reconfiguring Disk Group

Reconfigure the disk group as follows:

1. Pre-commit analysis for restoration

```
# /etc/vx/bin/vxconfigrestore -p dstdg
Diskgroup dstdg configuration restoration started .....

Installing volume manager disk header for clt0d20 ...
Installing volume manager disk header for clt0d21 ...
-
dstdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.

Run:
vxconfigrestore -c dstdg ==> to commit the restoration.
vxconfigrestore -d dstdg ==> to abort the restoration.
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c dstdg
Committing configuration restoration for diskgroup dstdg ....

dstdg's diskgroup configuration restoration is committed.
#
```



Note

- In the case of a clustered system, when a disk group or a mount resource has been defined, instead of using the import/deport command for the disk group use the online/offline process. If a mount point is defined as a cluster resource, instead of using the file system mount/unmount commands use the mount resource online/offline processing.
- When performing a system disk exchange, there are cases when conflicting backup configuration information may exist. In such cases, the disk group ID needs to be reset after executing the above command.
- After this operation, where the volumes within a disk group are required to be run in synchronous mode in background, synchronous processing may take some time depending on the volume configuration. It is also possible to use the volumes during this time.

3.9.1.4 Restoration

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

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

Example of Restoration

```
(Perform pre-processing for the transaction and backup volumes.)

# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/clt0d10
/dev/vx/dmp/clt0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/clt0d10
/dev/vx/dmp/clt0d10 swstrestore completed
#

(Perform post-processing for the transaction and backup volumes.)
```

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

Table 3.7 Pre-processing and Post-processing for Restoration

Volume Type	Pre-processing	Post-processing
Backup volume	<ol style="list-style-type: none"> 1. Secure data integrity by stopping access to all logical volumes in the disk group. 2. Import the disk group, when the disk group is not imported. 	Post-processing is not required.
Restoration destination volume	<ol style="list-style-type: none"> 1. Stop access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Deport the disk group. 4. Set the physical disks in the disk groups to offline. 	<ol style="list-style-type: none"> 1. Online the physical disks that were set to offline during preprocessing.. 2. Reconfigure the disk group. 3. If file systems are included, remount the volumes that were unmounted by preprocessing.

Reconfiguring Disk Group

Reconfigure the disk group as follows:

1. Restoration pre-commit analysis

```
# /etc/vx/bin/vxconfigrestore -p srcdg
Diskgroup srcdg configuration restoration started .....

Installing volume manager disk header for clt0d10 ...
Installing volume manager disk header for clt0d11 ...
-
srcdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.

Run:
  vxconfigrestore -c srcdg ==> to commit the restoration.
  vxconfigrestore -d srcdg ==> to abort the restoration.
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c srcdg
Committing configuration restoration for diskgroup srcdg ...
```

```
srcdg's diskgroup configuration restoration is committed.  
#
```

Note

- In case of a clustered system, when a disk group or a mount resource has been defined, instead of using the import/deport command for the disk group use the online/offline process.
If a mount point has been defined as a clustered system resource, instead of using the file system mount/unmount commands use the mount resource online/offline processing.
- When performing a system disk exchange, there are cases when conflicting backup configuration information may exist.
In such cases, the disk group ID needs to be reset after executing the above command.
- After this operation, where the volumes within a disk group are required to be run in synchronous mode in background, synchronous processing it may take some time depending on the volume configuration.
It is also possible to use the volumes during this time.

Chapter 4 Backup Operation Using Suspend/Resume Function

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



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

4.1 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.

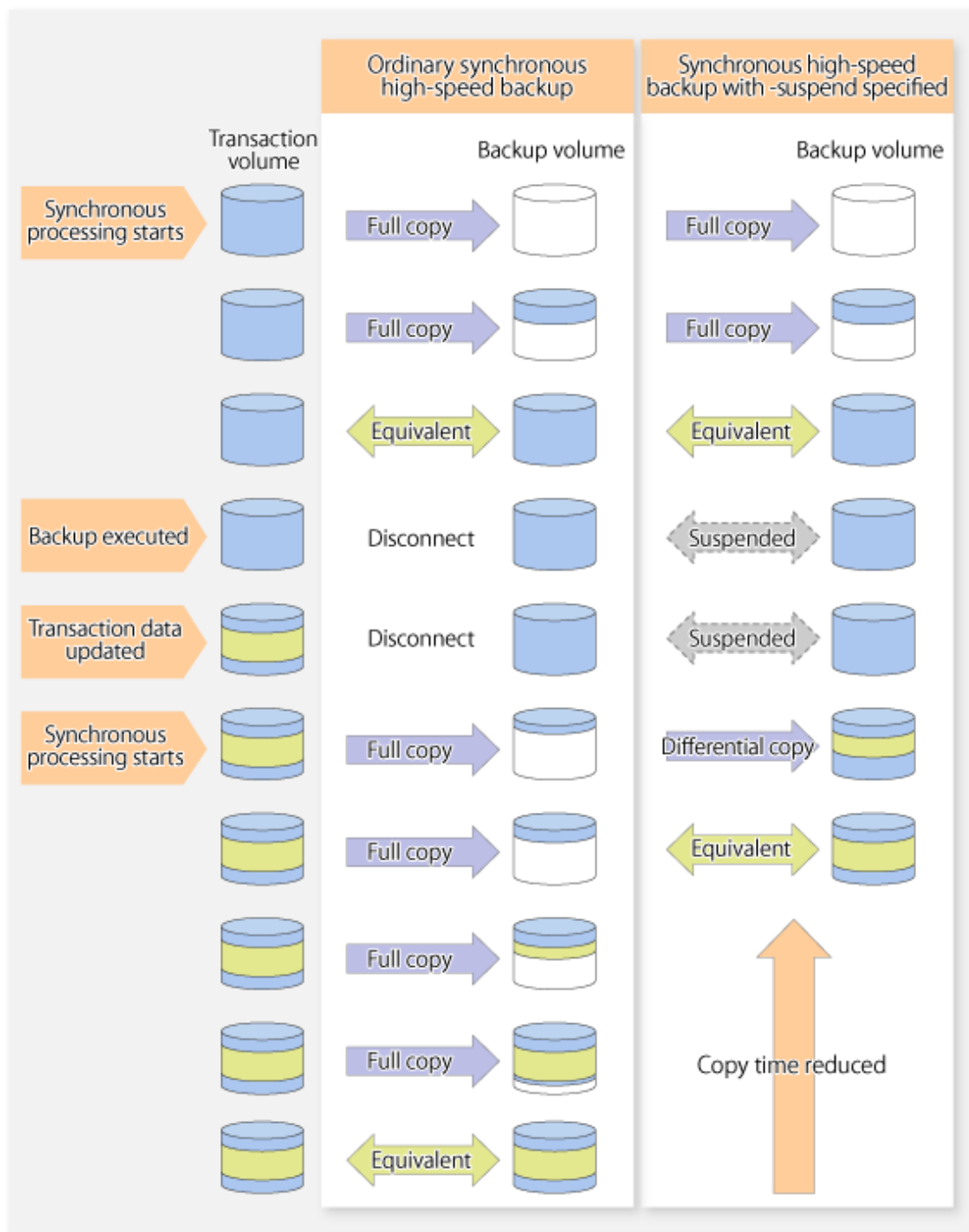
AdvancedCopy Manager provides two backup functions: snapshot high-speed backup and synchronous high-speed backup. In snapshot high-speed backup, OPC is used to create a backup. In synchronous high-speed backup, EC is used to create a backup. The Suspend/Resume function can be thought of as a kind of 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 4.1 Comparison Between Ordinary Synchronous High-speed Backup and Synchronous High-speed Backup Using Suspend/Resume Function



4.2 Backup Operation Design

Notes about synchronous high-speed backup using the Suspend/Resume function and backup operation design are provided below, as well as information related to backup management operation design (refer to "3.2 Operation Design").

Transaction Volume

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

Backup Volume

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

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

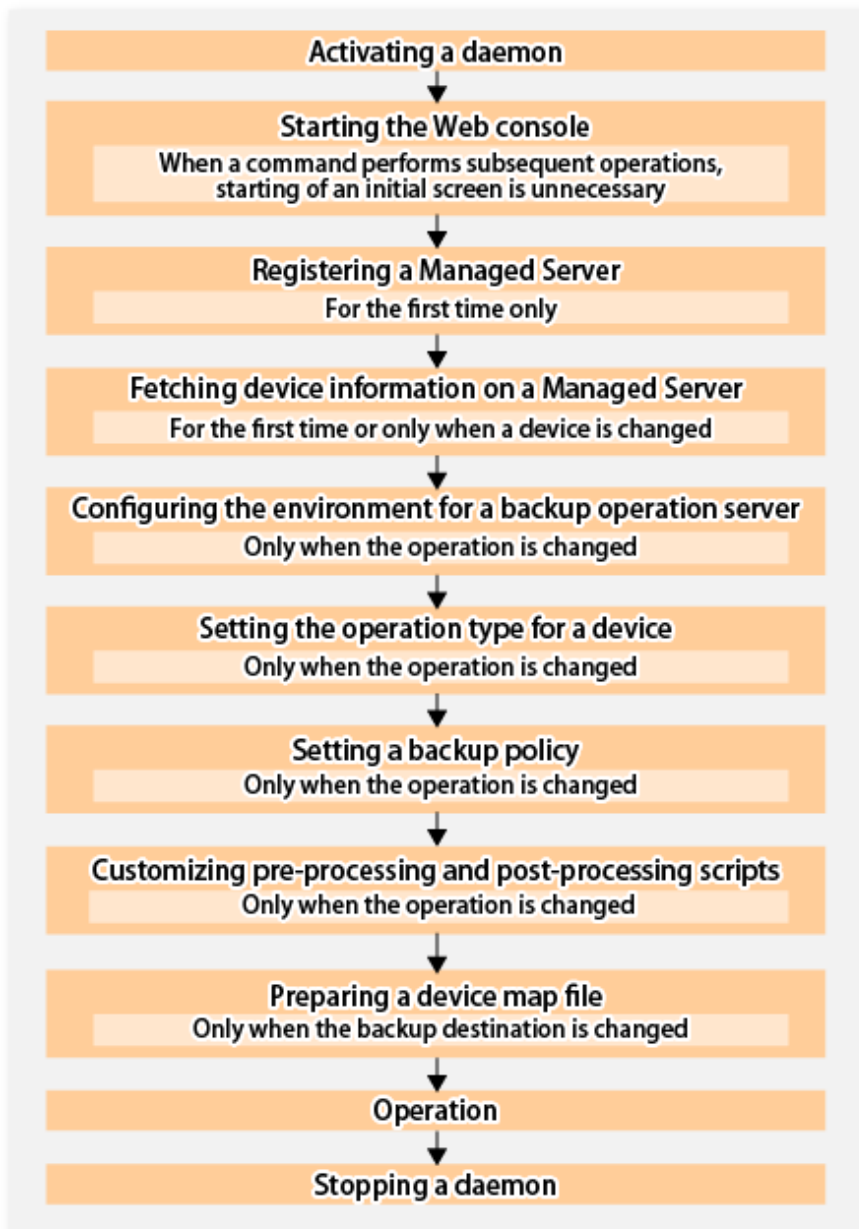
Point

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

4.3 Flow of Operations

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

Figure 4.2 Flow of Backup Operations Using Suspend/Resume Function



4.4 Preparations

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

4.4.1 Activating Daemons

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

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

4.4.2 Starting Web Console

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

4.4.3 Registering Managed Server

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



- Specify the length of Server name of the management target Server (HP-UX) within 8 bytes.
 - 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.
-

4.4.4 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 *ETERNUS SF 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.
-

4.4.5 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.

4.4.6 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.

4.4.7 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](#)

4.4.8 Customizing Pre-processing and Post-processing

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

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

- For operational reasons, to avoid unmount and mount processing of transaction volumes that comprise a file system
- The backup target is a volume group
- To add special pre-processing and post-processing to the corresponding scripts.

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

Point

When AdvancedCopy Manager Is Upgraded

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

4.4.9 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.

4.5 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.

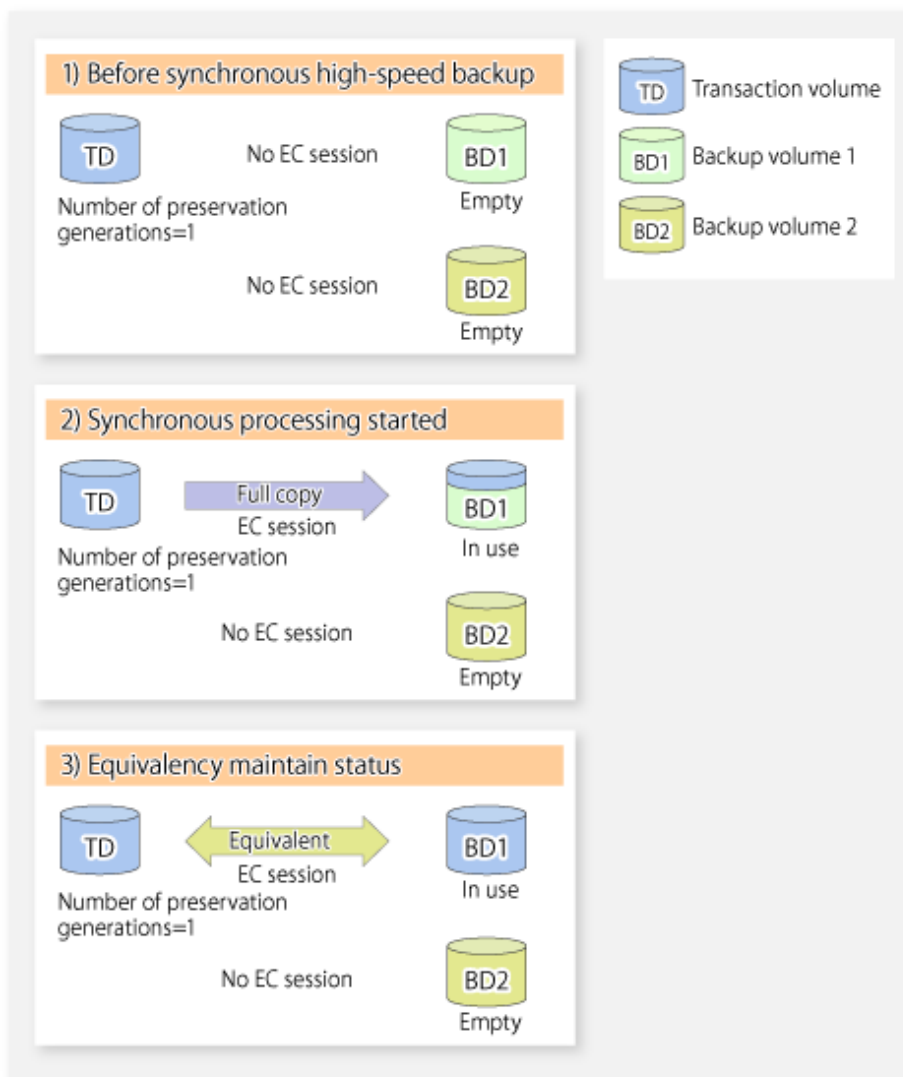
When history information is deleted because the number of generations has been exceeded or when the `swsthistdel` command is executed, the backup volume becomes the Suspend state without any history information.

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.

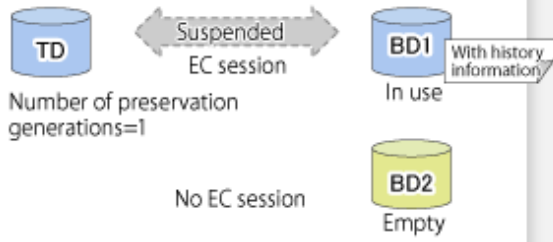
Note that synchronous high-speed backup using the Suspend/Resume function can also be operated from Web Console.

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

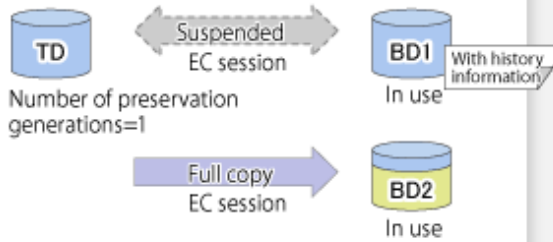
Figure 4.3 Synchronous High-speed Backup Operations Using Suspend/Resume Function



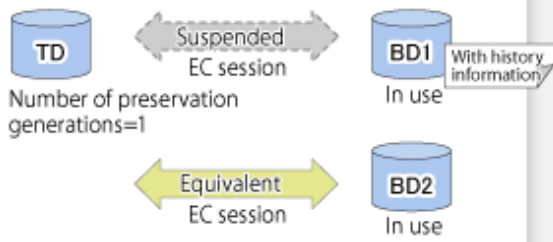
4) Execution of the backup command with -suspend specified



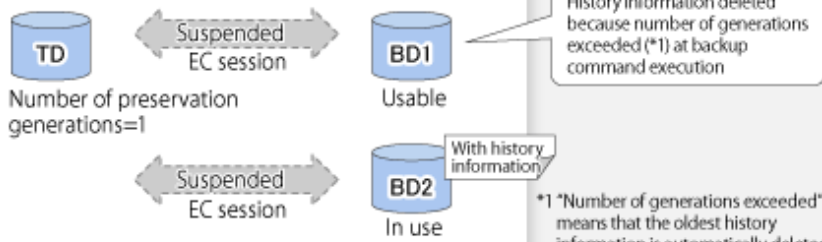
5) Synchronous processing started



6) Equivalency maintain status

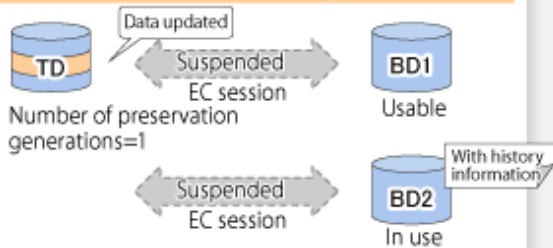


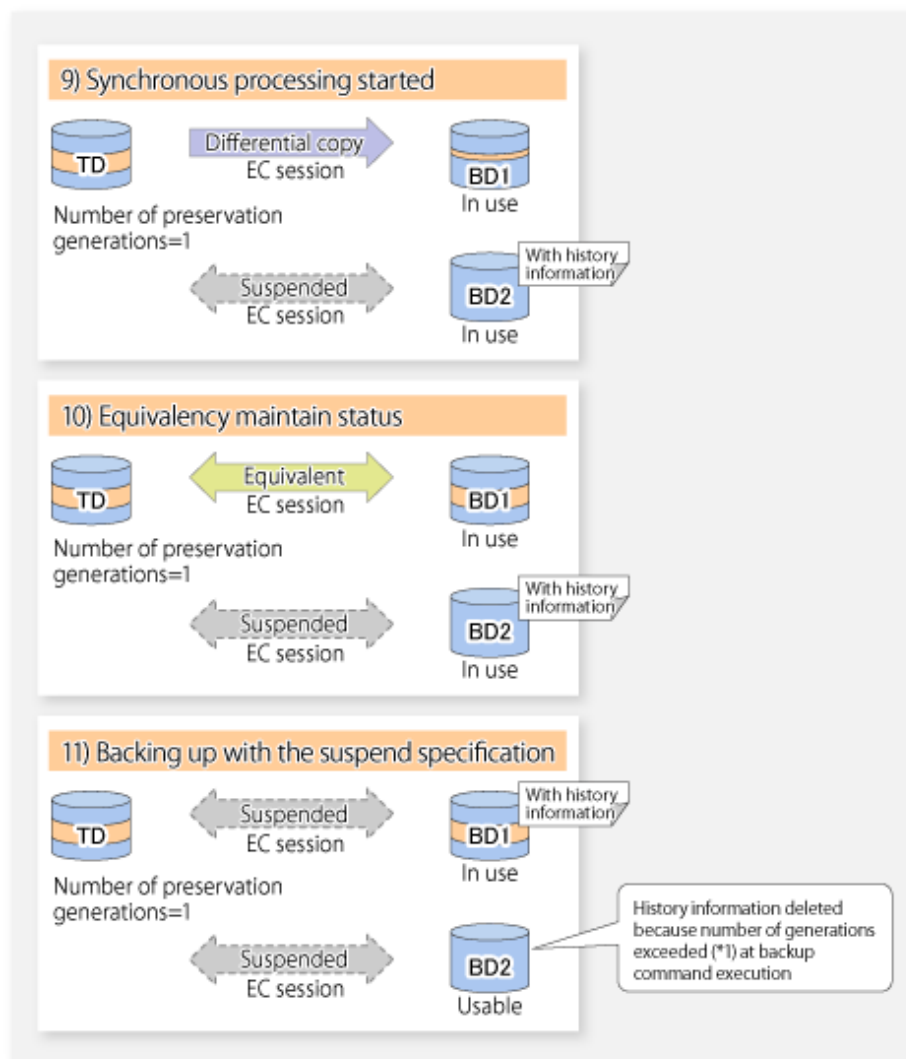
7) Backing up with the suspend specification



*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





4.5.1 Starting Synchronous Processing

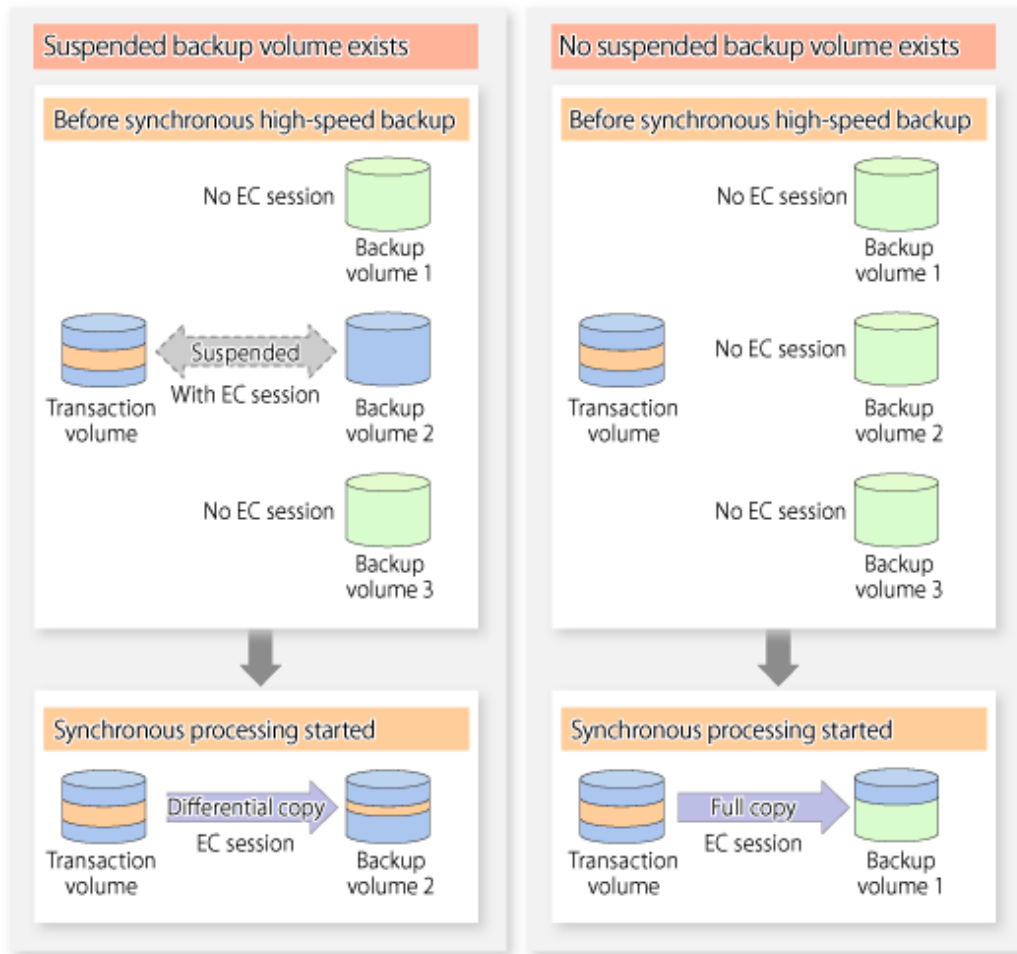
For synchronous high-speed backup, execute the `swststartsync` command to start the synchronous processing. If there is a suspended backup volume at the start of the synchronous processing, then the following devices are selected first, and EC resumes (i.e., the Resume function causes differential copying 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 4.4 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.

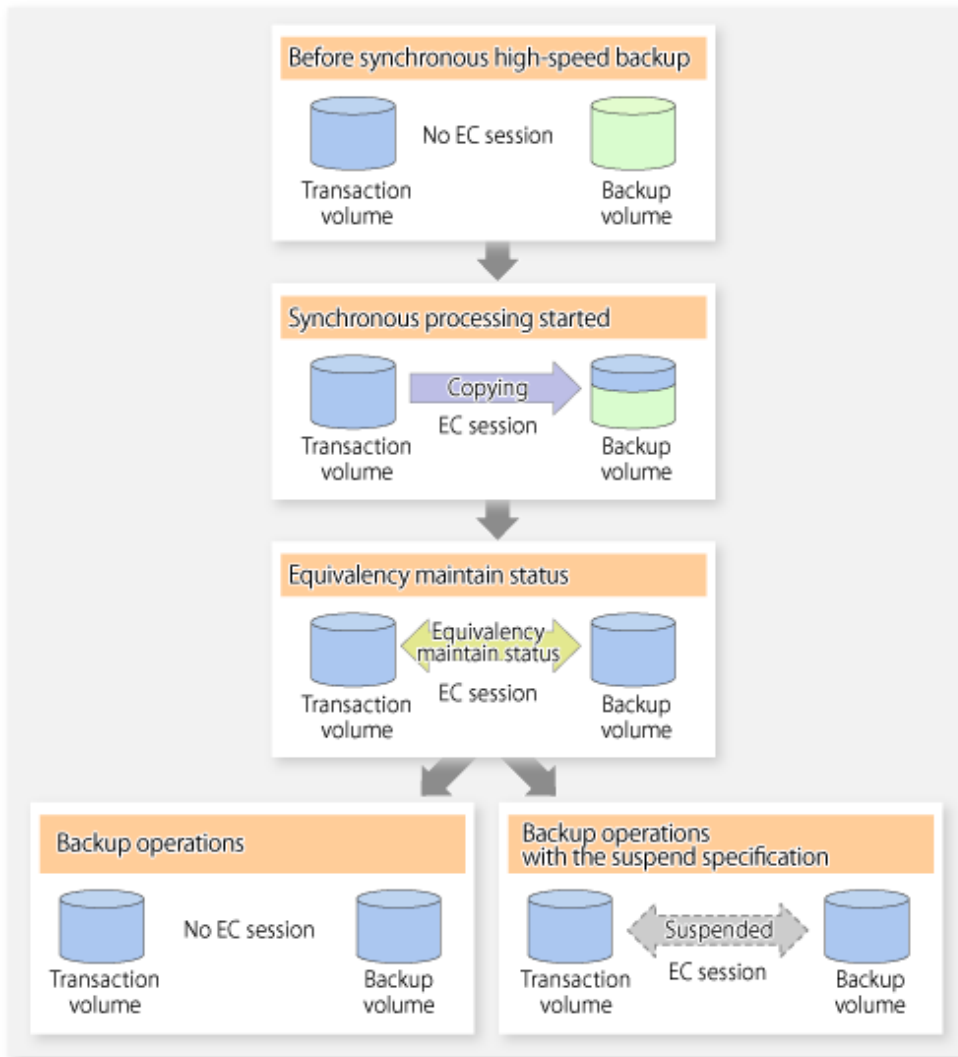
4.5.2 Backing Up

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 4.5 Ordinary Backup Operations and Backup Operations with Suspend Specification



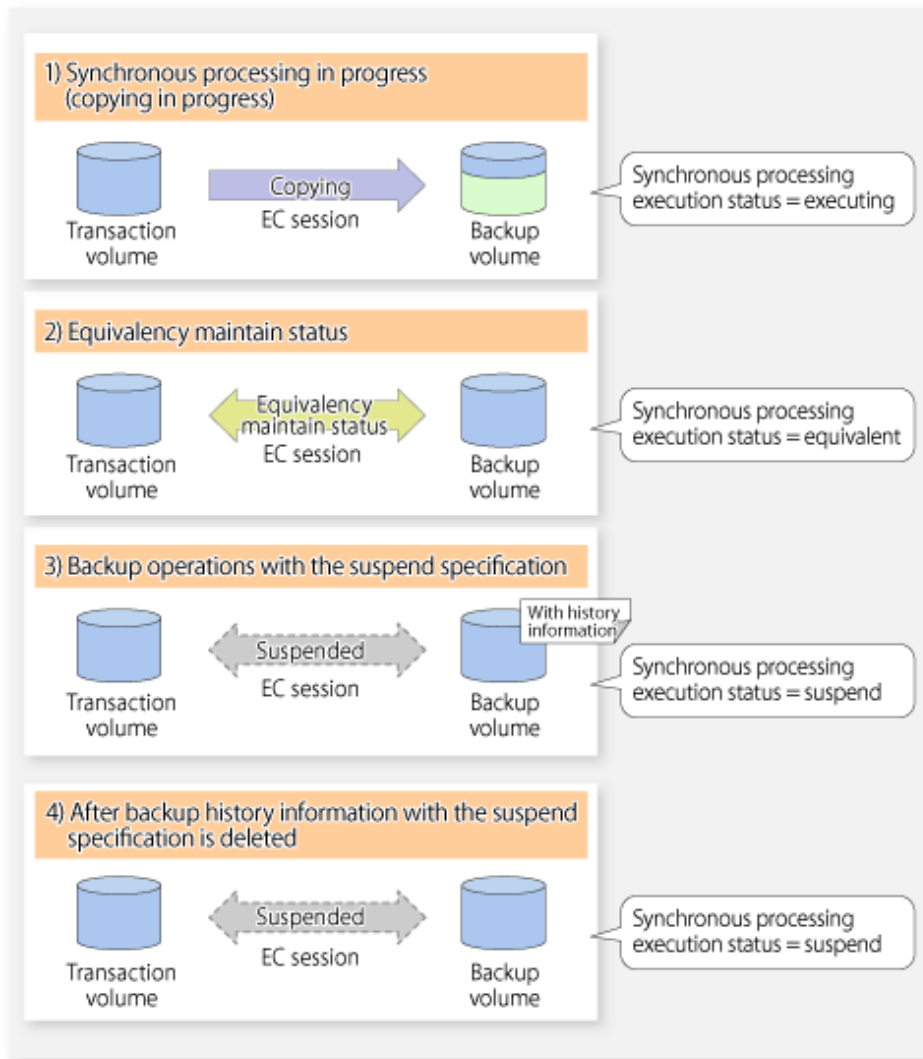
4.5.3 Displaying Synchronous Processing Execution Status

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 4.6 Ordinary Backup Operations and Backup Operations with Suspend Specification



4.5.4 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.

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 4.7 Operational States in Synchronous Processing Caused by Cancellation



4.5.5 History Management

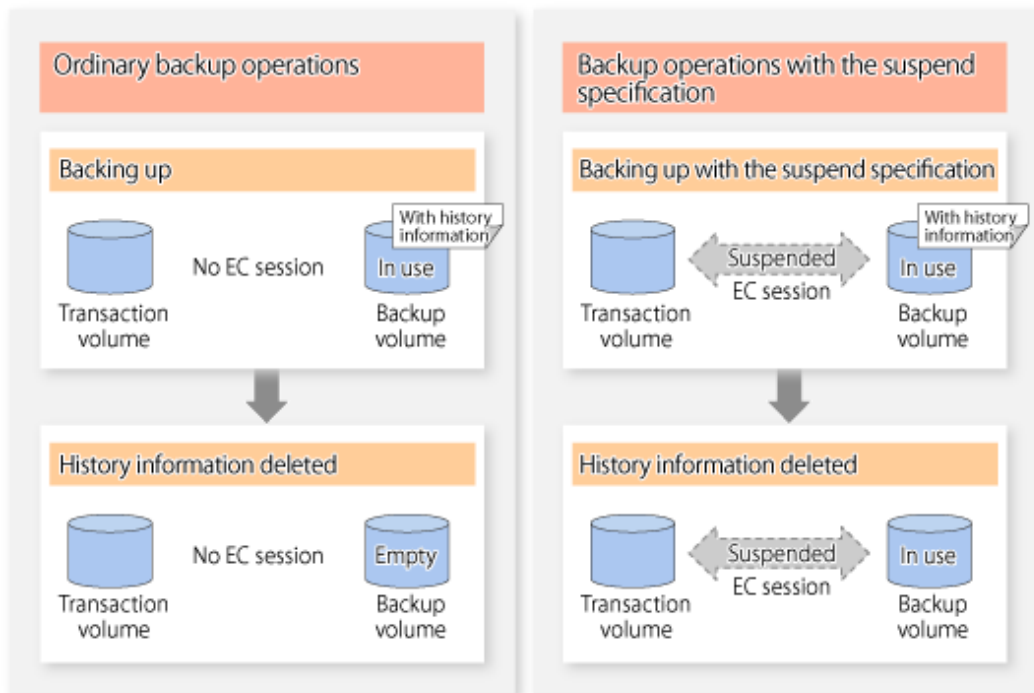
Backup history information can be referenced using the `swsthistdisp` command.
Backup history information can be deleted using the `swsthistdel` command.

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 4.8 Deleting Ordinary Backup History Information and Backup History Information with Suspend Specification



4.5.6 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 5 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.

5.1 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.

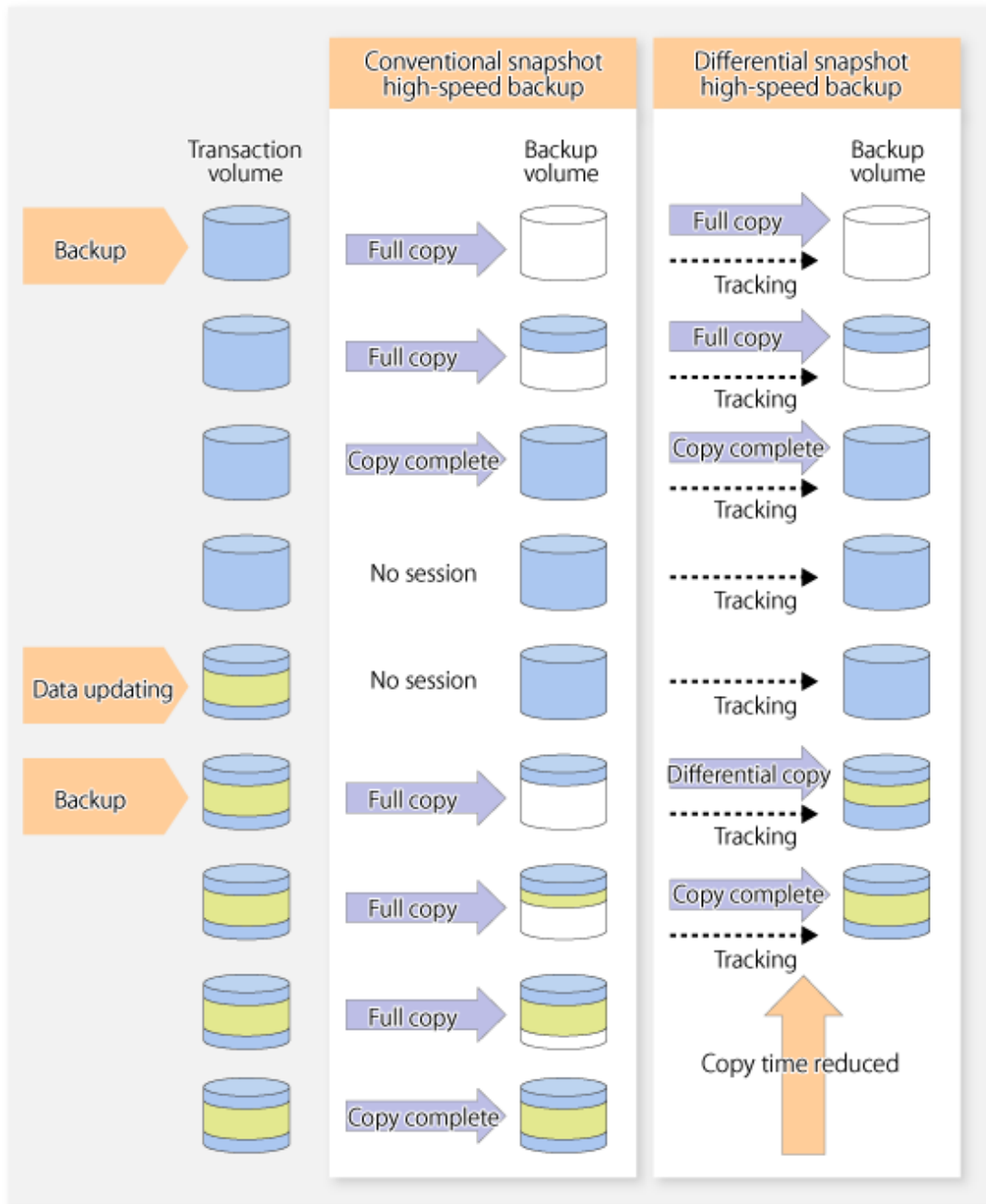
The snapshot high-speed backup using the QuickOPC function is referred to as the differential snapshot high-speed backup.

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 5.1 Comparison Between Conventional Snapshot High-speed Backup and Differential Snapshot High-speed Backup



5.2 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:

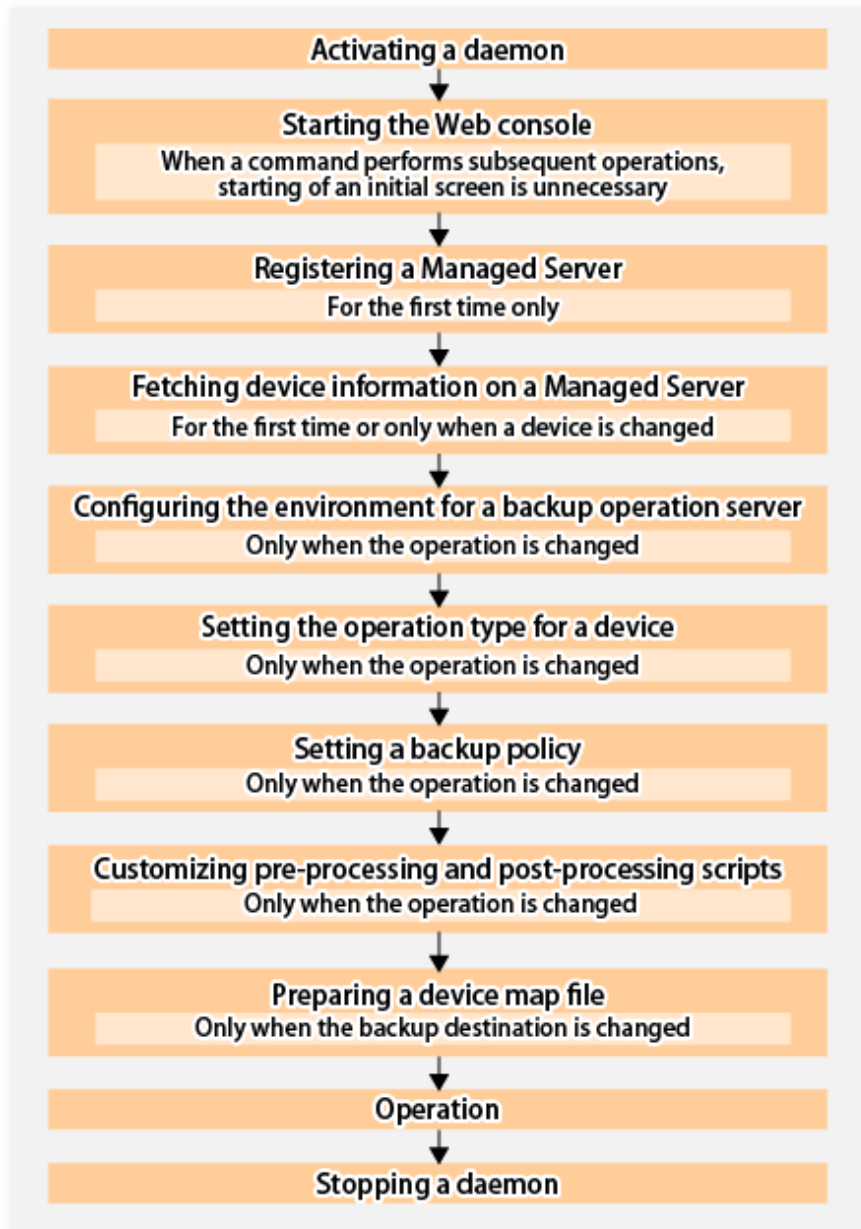
- In a backup operation using the QuickOPC function, an OPC session remains active even after the physical copy has been completed. Operators should specify the number of preservation generations so that the maximum number of OPC sessions that can be defined for the same logical unit cannot be exceeded.

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

5.3 Operation Flow

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

Figure 5.2 Flow of Backup Operations Using QuickOPC Function



5.4 Preparation

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

5.4.1 Activating Daemons

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

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

5.4.2 Starting Web Console

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

5.4.3 Registering Managed Server

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



- Specify the length of Server name of the management target Server (HP-UX) within 8 bytes.
 - 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.
-

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 *ETERNUS SF 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.
-

5.4.5 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.

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 [swstdevinfofet](#) 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.



- 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.

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

5.4.8 Customizing Pre-processing and Post-processing

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

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

- For operational reasons, to avoid unmount and mount processing of transaction volumes that comprise a file system
- The backup target is a volume group
- To add special pre-processing and post-processing to the corresponding scripts.

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

 **Point**

When AdvancedCopy Manager Is Upgraded

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

5.4.9 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.

5.5 Operation

5.5.1 Invoking Backup

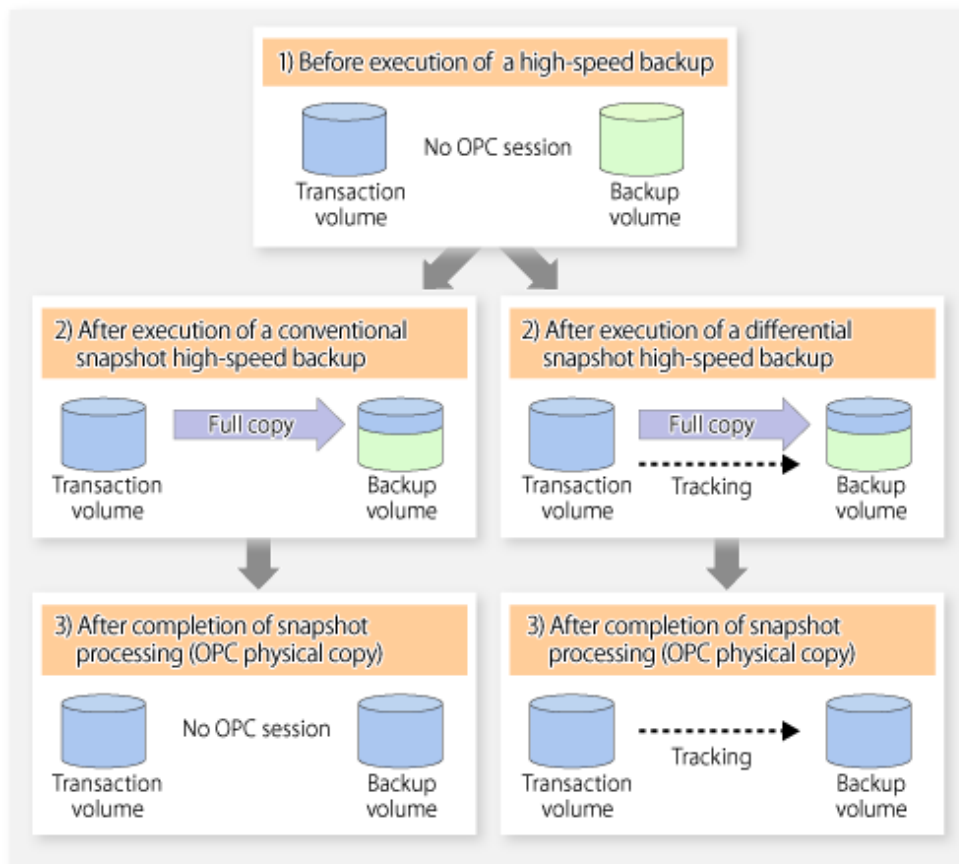
Invoke the differential snapshot high-speed backup by specifying the -T option in the `swstbackup` command.

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.

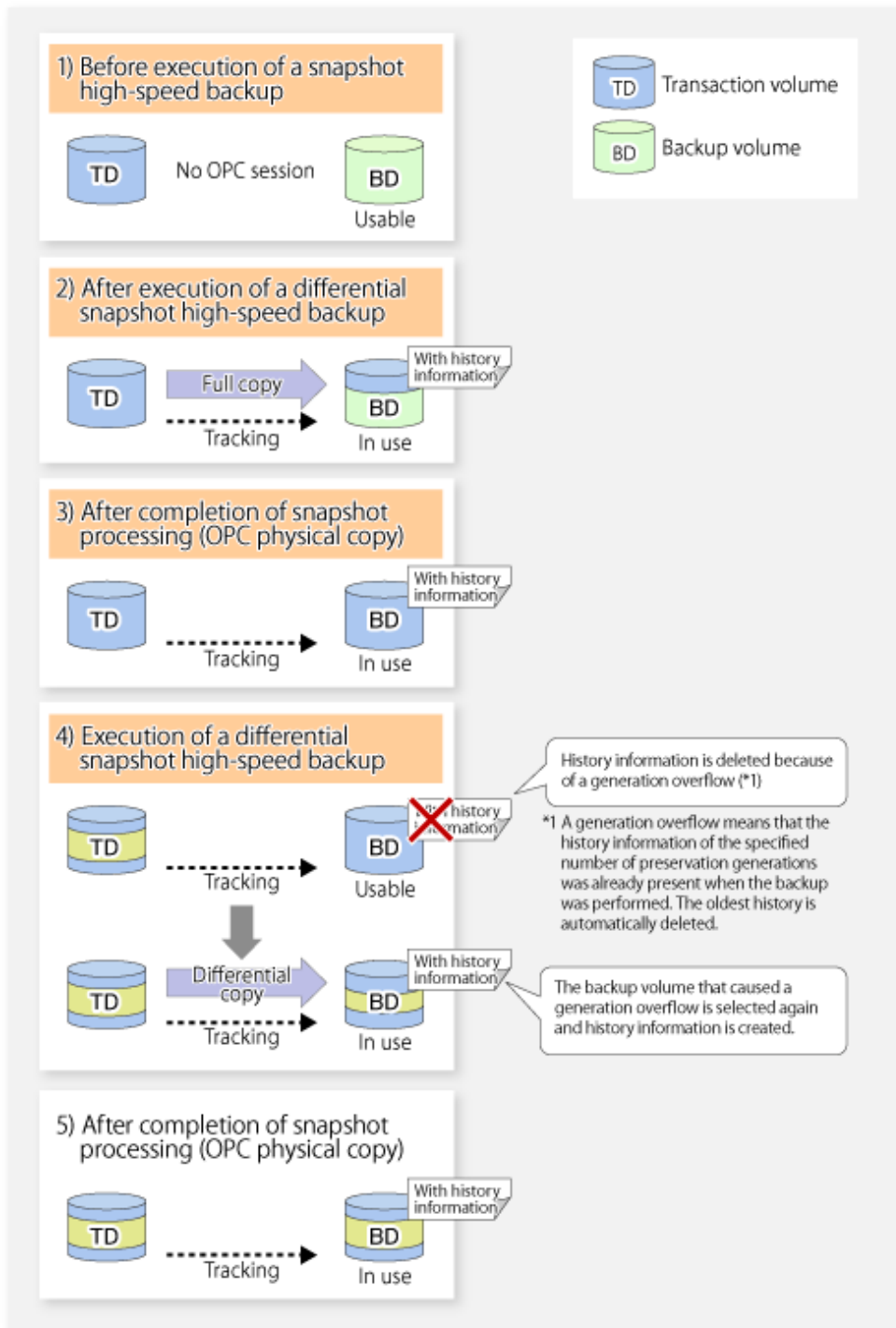
Figure 5.3 Conventional Snapshot High-speed Backup and Differential Snapshot High-speed Backup



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 5.4 Flow of Differential Snapshot High-speed Backup Operation



5.5.2 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).

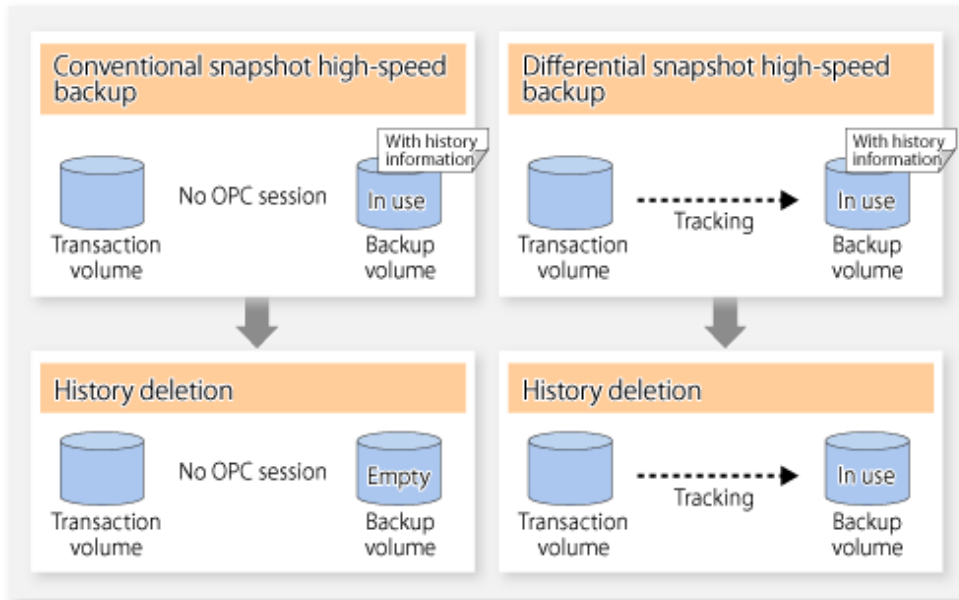
In the conventional snapshot high-speed backup, after the history information is deleted, the backup volume is released and "Backup (free)" is displayed in the **Device-Mode** column by the [swstdevdisp](#) command. In the differential snapshot high-speed backup,

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 5.5 Comparison of History Deletion Between Snapshot High-speed Backup and Differential Snapshot High-speed Backup

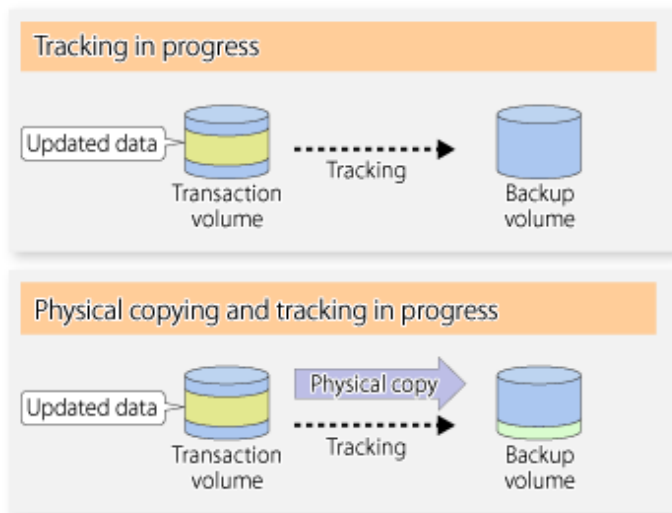


5.5.3 Restoration

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.

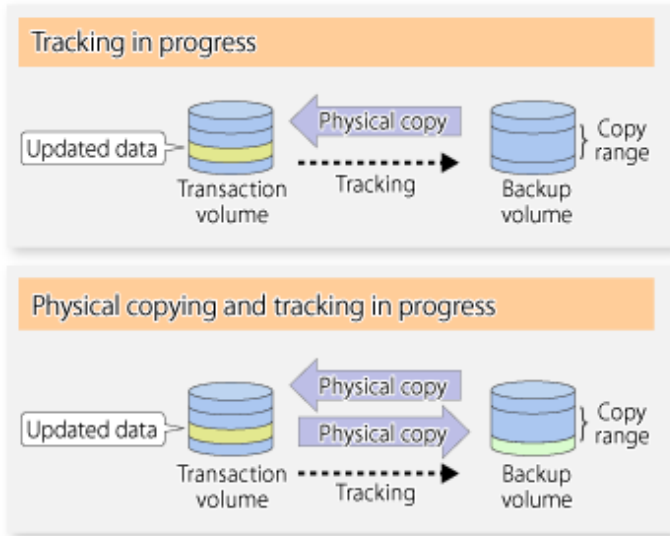
Figure 5.6 Tracking of Differential Snapshot High-speed Backup Operations



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.

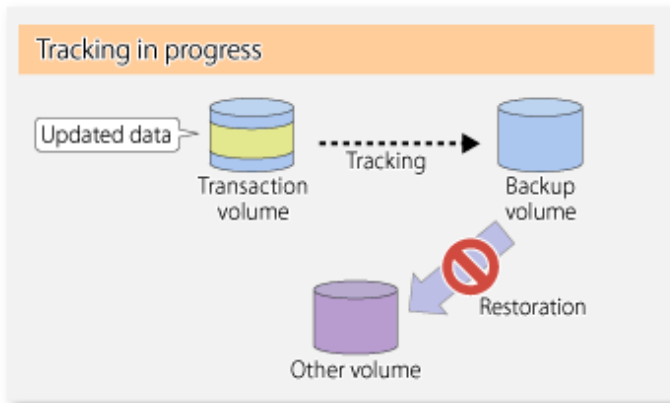
Figure 5.7 Restoration from Backup Volume to Transaction Volume



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 5.8 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.

5.5.4 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.
.....

5.5.5 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.

5.5.6 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 6 Replication

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

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

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

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

6.1.1 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:

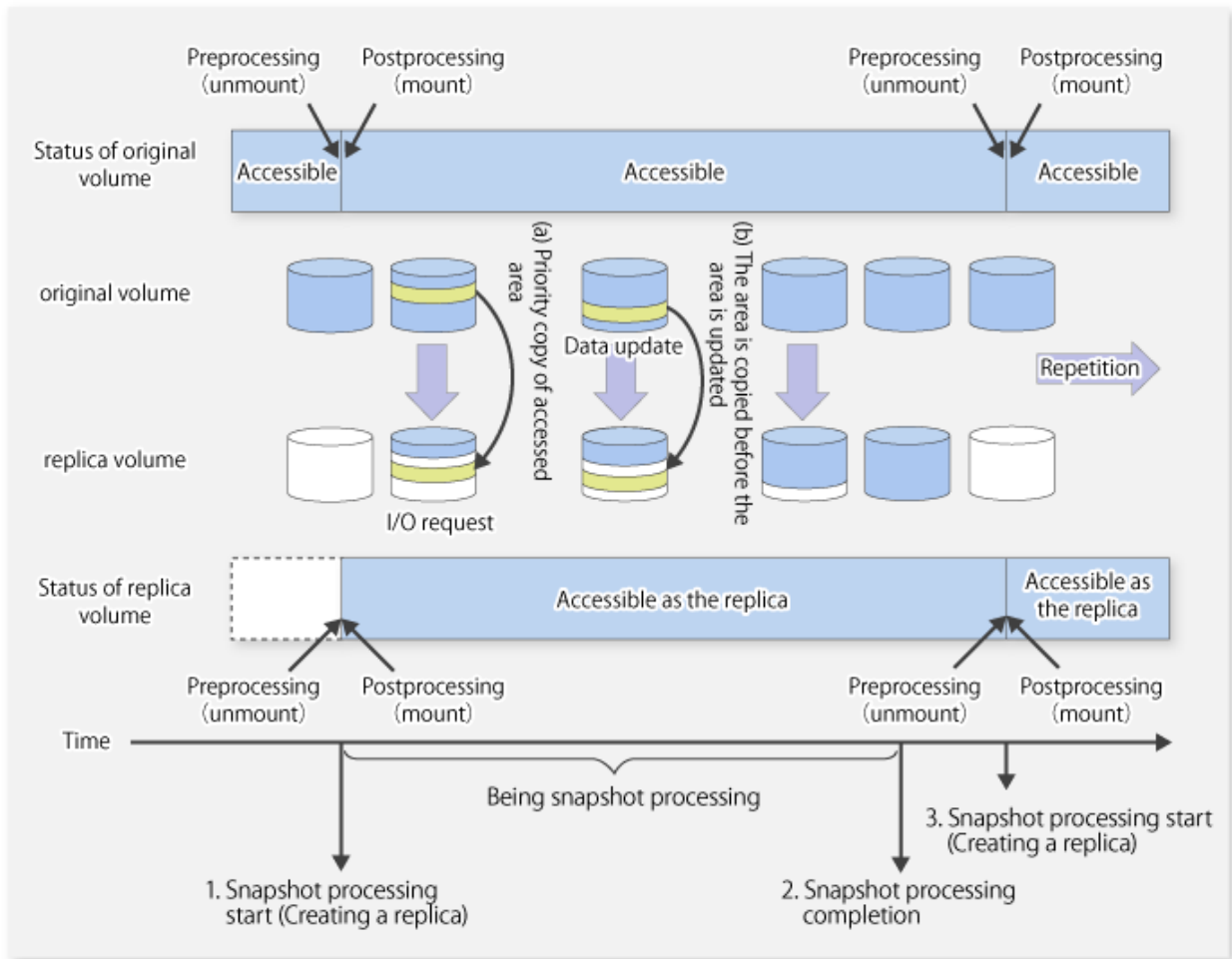
1. When a copy is created, the snapshot processing (OPC) from the source volume to the replica volume is executed with the [swsrpmake](#) command.

The [swsrpmake](#) command dismounts or mounts the original volume.

This process determines the scope of original data (for details, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)"). Refer to steps (1). 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 6.1 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.

6.1.1.1 Types of Snapshot Replication

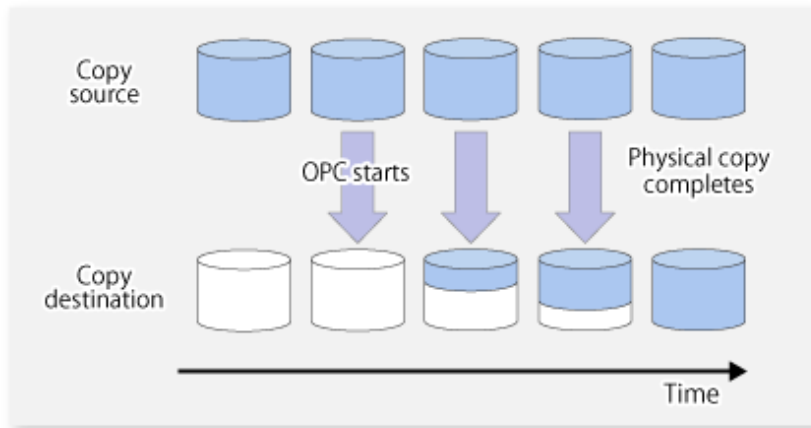
The following types of snapshot replication are available, depending on the used Advanced Copy functions:

- [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 6.2 Ordinary Snapshot Replication



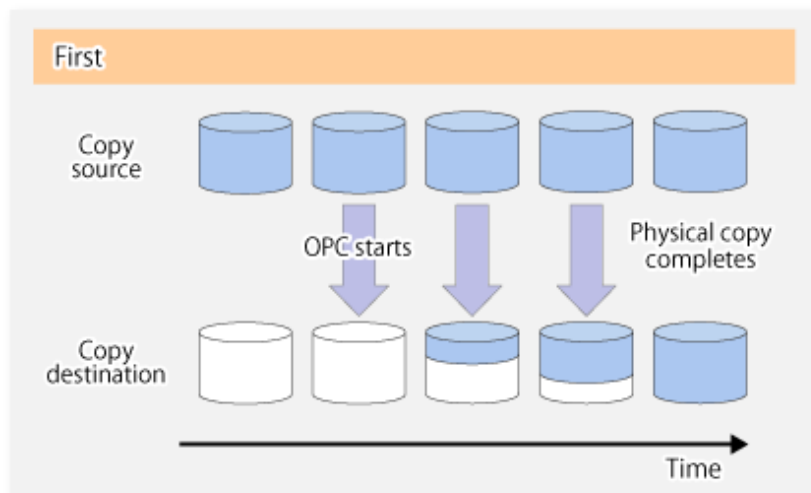
P Point

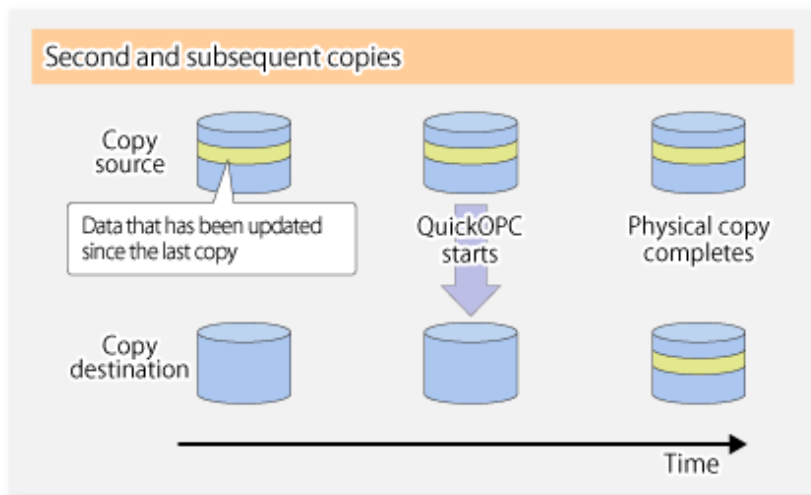
The copy destination disk must be the same size or larger than the copy source disk.
The copying time is the time taken to copy all the data.

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 6.3 QuickOPC Replication





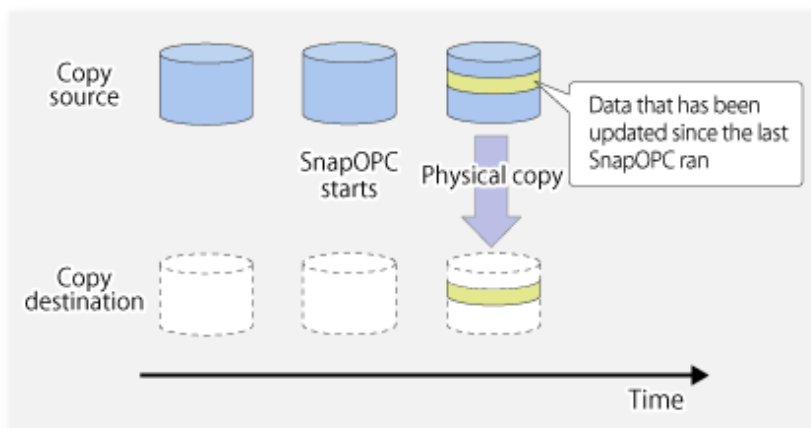
P Point

- 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.

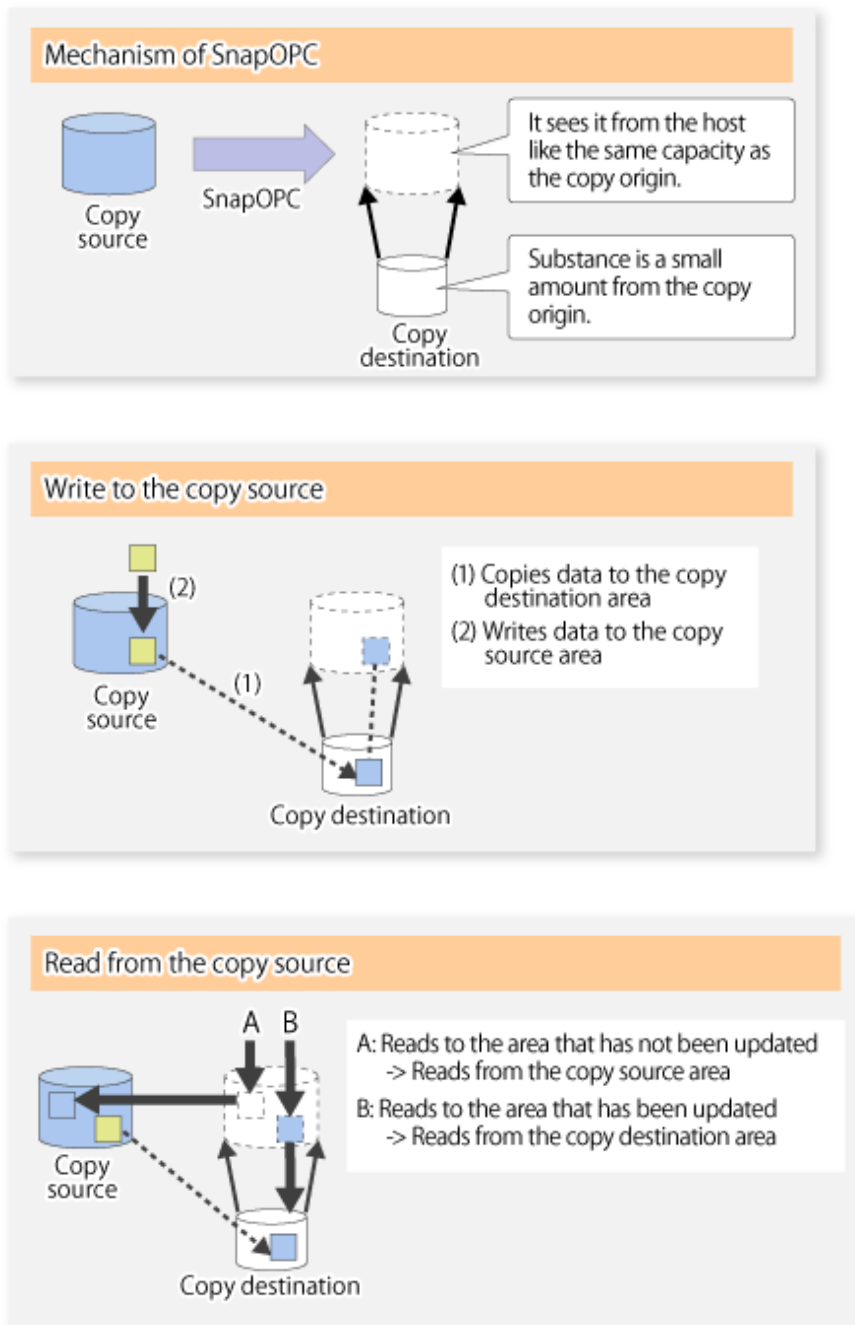
Figure 6.4 SnapOPC Replication



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 6.5 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.

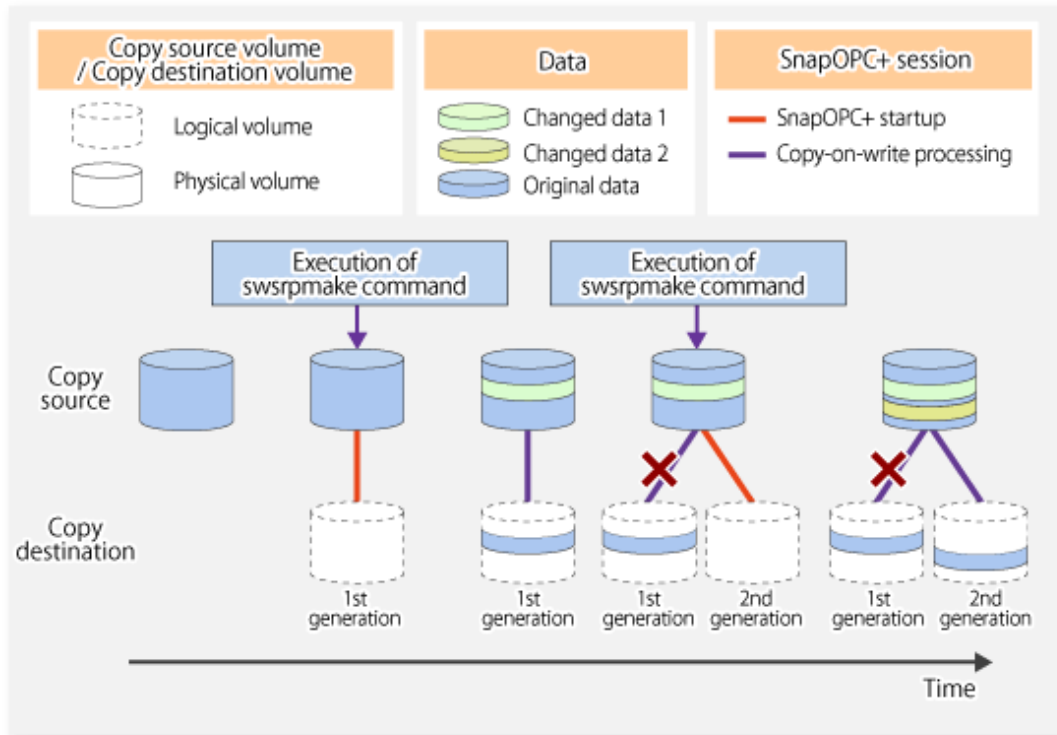
These points suggest that SnapOPC should be used in temporary areas for tape backups, for systems where access performance is not an important consideration.

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 6.6 SnapOPC+ Function Flow

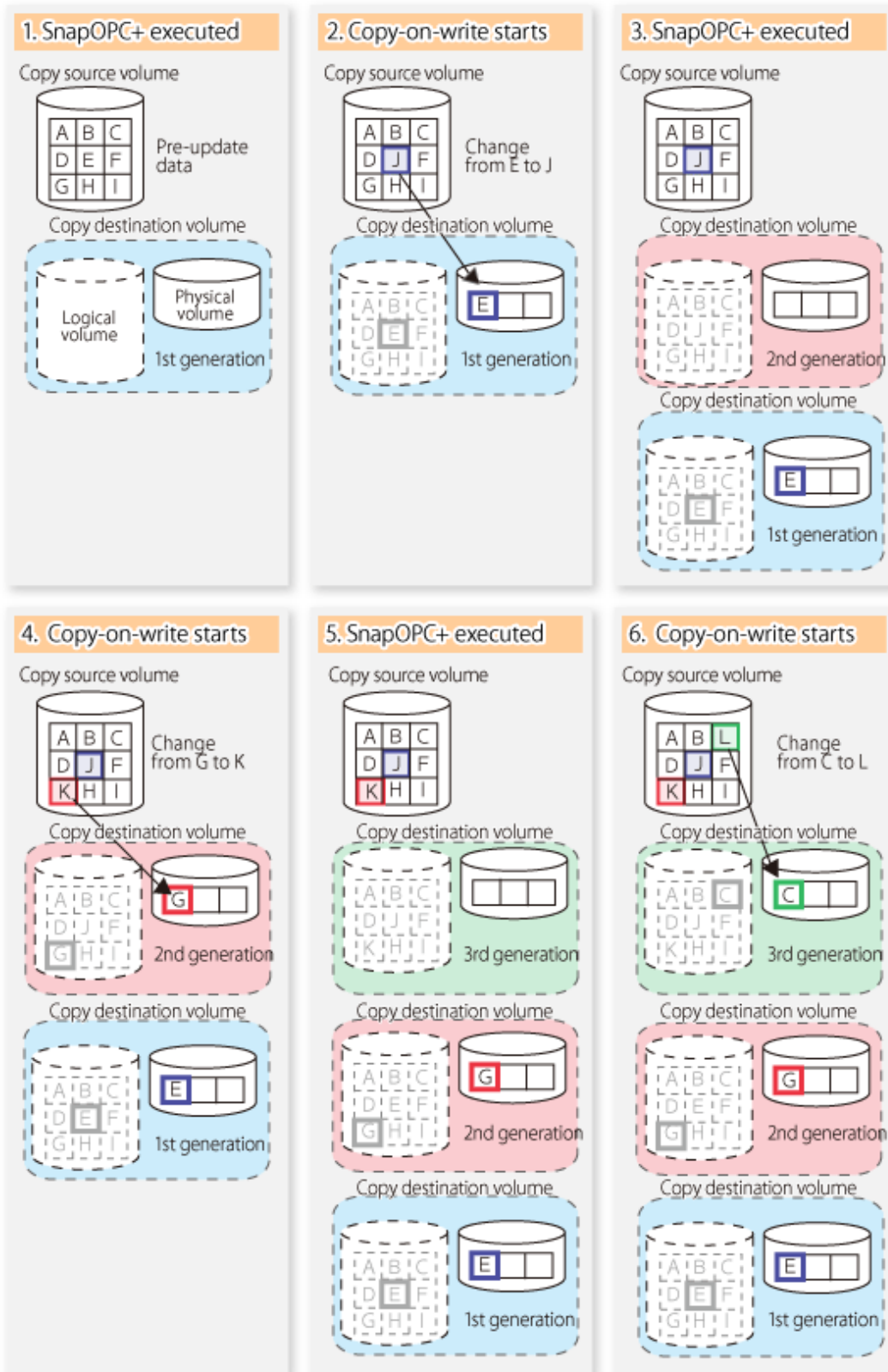


1. Logical copy is performed from the copy source to the copy destination.
2. After the logical copy, a SnapOPC+ session is set between the copy source and the copy destination.
3. After the SnapOPC+ session is set, only the original data of the changed data at the copy source is copied to the copy destination (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 6.7 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 6.1 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

However, for the following ETERNUS Disk storage systems, SDV is the only copy destination volume type that can be used:

- ETERNUS DX60
- ETERNUS DX400 series
- ETERNUS DX8000 series
- ETERNUS DX S2 series
- ETERNUS DX S3 series (for earlier than V10L60 firmware)

6.1.1.2 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 "[6.2.3.3 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 "[8.4.2.3 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 "[8.4.2.3 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 of SDV and SDP.

6.1.2 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.

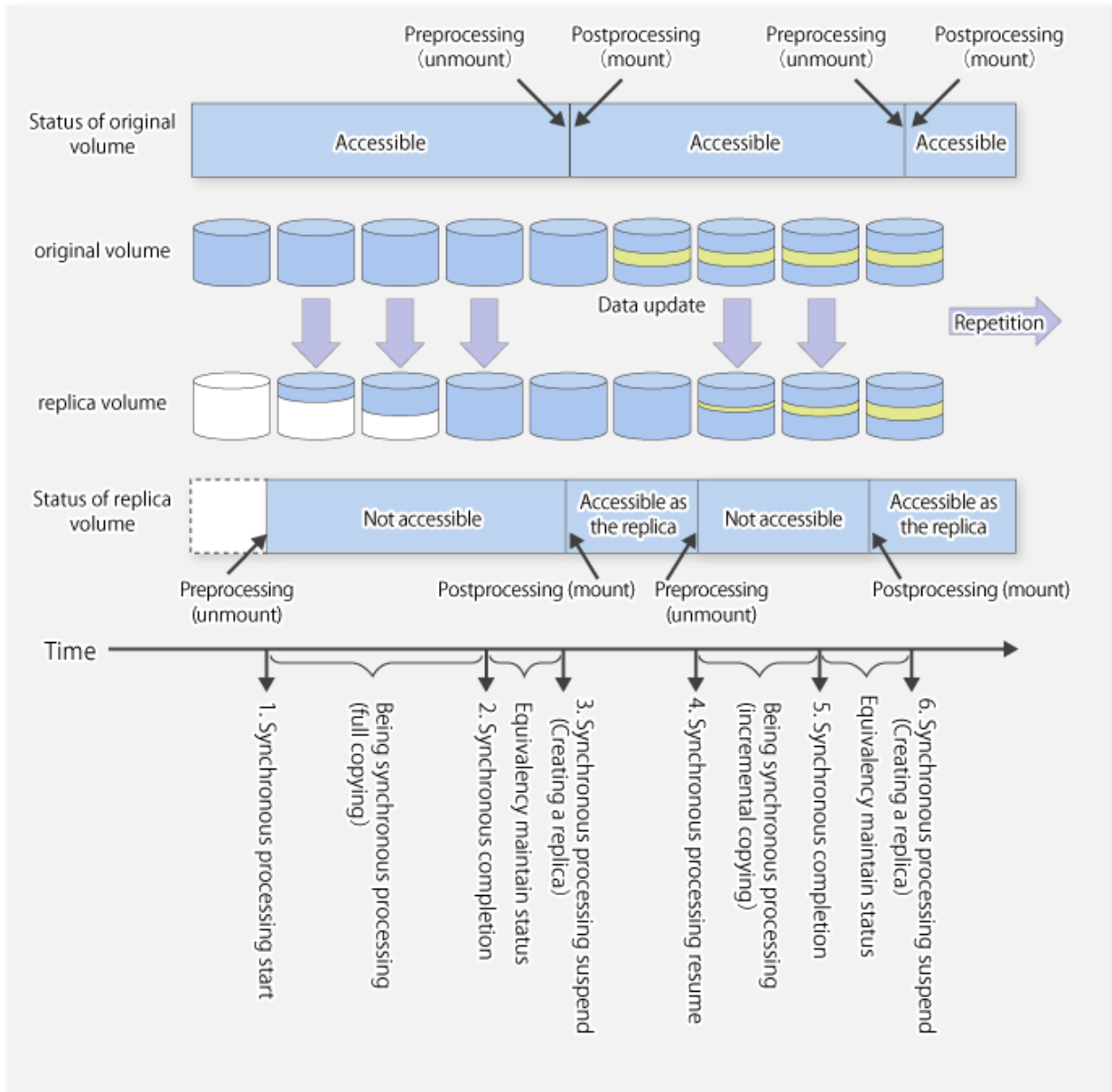
Synchronized replication uses two methods to create a copy: full copying and incremental copying. In the case of full copying, all of the source volume is completely copied. In the case of incremental copying, only the data that has been updated since the last replication is copied.

- 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 maintain 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 dismounts or mounts the original volume.
This processing determines the scope of original data (for details of this, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)". After execution of the replication creation command, the replica volume can be accessed (copy established status). Refer to the states in steps (3) and (4) in the figure below.
4. To create another copy, the synchronized processing that has been temporarily stopped is restarted with the [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 6.8 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 maintain state.
- If the replication destination volume is being synchronized or in the equivalency maintenance state, it is not accessible.
- If the backup volume is part of a volume group, do not execute the `vgchange (1M)` command under synchronous processing (EC/REC) execution. If the backup volume becomes deactivated during the execution of synchronous processing, it is not only impossible to make it active again but it is in a state such that operations including stopping synchronous processing, the backup execution command, and the backup synchronous processing cancel command, cannot be performed. When you have accidentally deactivated the backup volume, reactivate it after performing a forced stop of the synchronous processing using ETERNUS Web GUI etc.

6.2 Configuration

This section explains the operation of replication.

Configure replication using the following procedure:

1. [6.2.1 Determining Server That Performs Replication](#)
2. [6.2.2 Determining Replication Target](#)

Refer to "[6.2.3 Notes on Configuration of SnapOPC/SnapOPC+ Replication](#)", when SnapOPC/SnapOPC+ snapshot replication is used.

6.2.1 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.

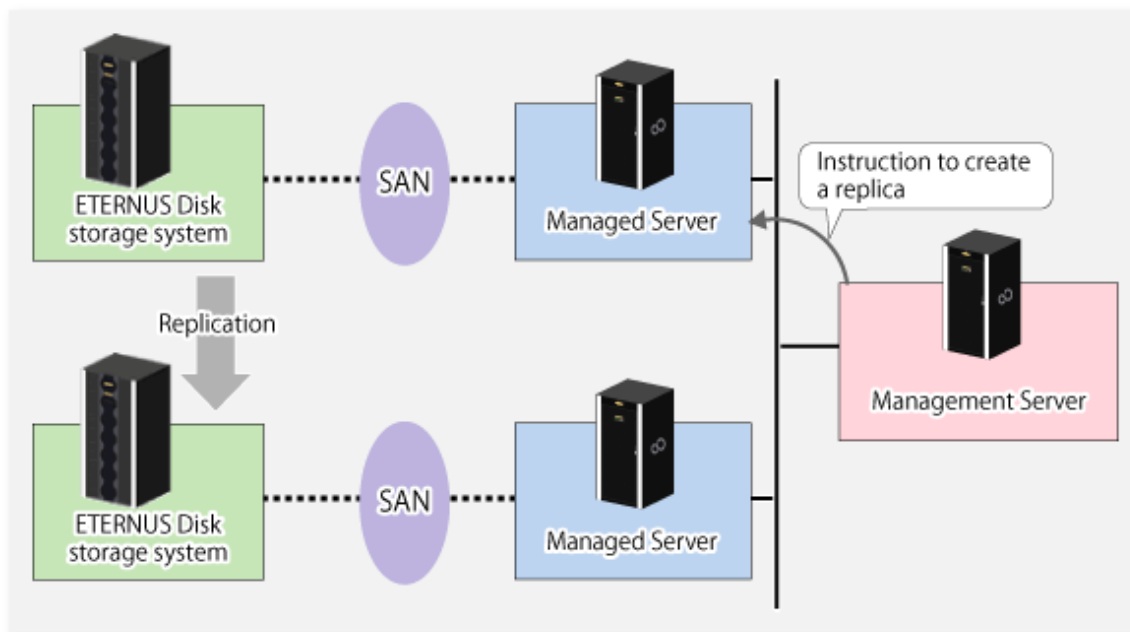
However, a Management Server requires AdvancedCopy Manager to run under the Windows, Solaris or Linux operating systems.

Managed Server

AdvancedCopy Manager operations are performed.

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

Figure 6.9 Configuration of Servers That Perform Replication



Note

- The following requirements apply when an inter-box replication is performed using the REC function of ETERNUS Disk storage system:
 - The REC function must be supported in both ETERNUS Disk storage systems.
 - Both ETERNUS Disk storage systems must already be connected to each other using an FC Remote Adapter (FCRA). This is a connection that uses an FCRA, in which data flows only from the Initiator side to the Target side. For bi-directional copying, at least two FCRA connections are required.

6.2.2 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.

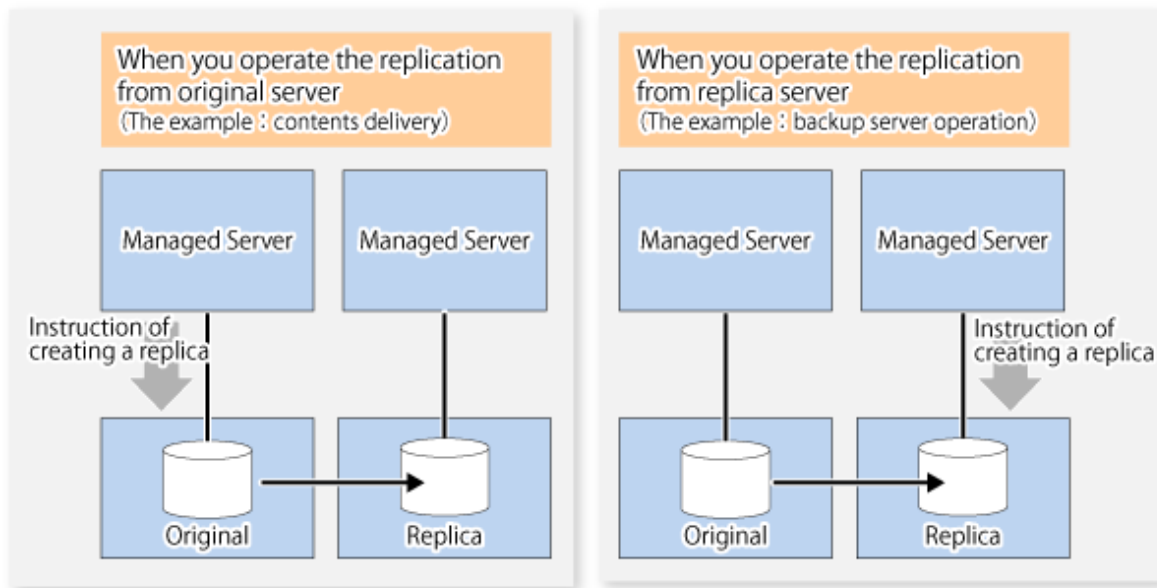
Both Servers

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 "[6.4.7 Creating Groups](#)".

Figure 6.10 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 "10.1.1 General Notes", for notes on determining a replication target.
 - [10.1.1.1 Backup and Replication Exclusions](#)

6.2.2.1 Notes on Replication Volume

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

Disk Size of Source Volume and Replica Volume

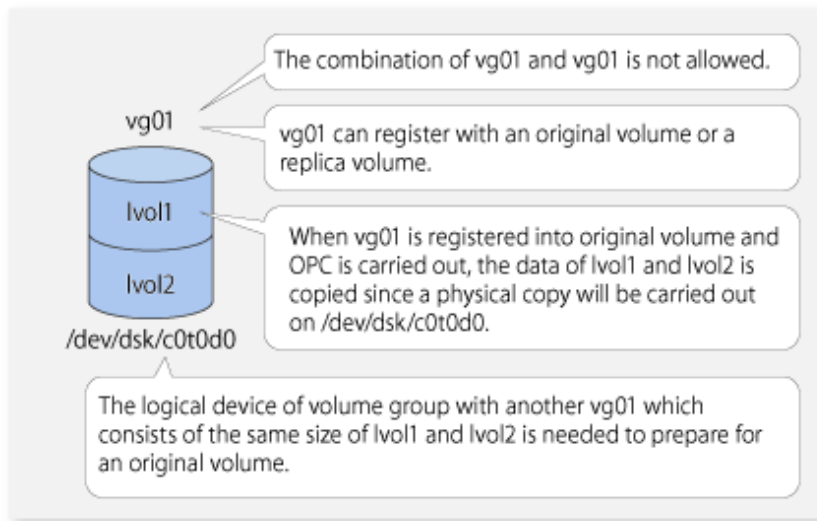
When the size of the physical disk (or one which constitutes a logical disk when this has been specified) of a source volume differs from that of a replica volume, ensure that the replica volume is at least as large as the source volume, otherwise some data is lost in the replication.

Using Volume Group for Source Volume or Replica Volume

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

In addition, when the configuration of the volume group cannot be supported by AdvancedCopy Manager, it cannot be registered with a replication management function. For details about logical disk configurations which cannot be supported, refer to "1.4 Managing Device on AdvancedCopy Manager".

Figure 6.11 Source Volume and Replica Volume for Multiple Logical Disks

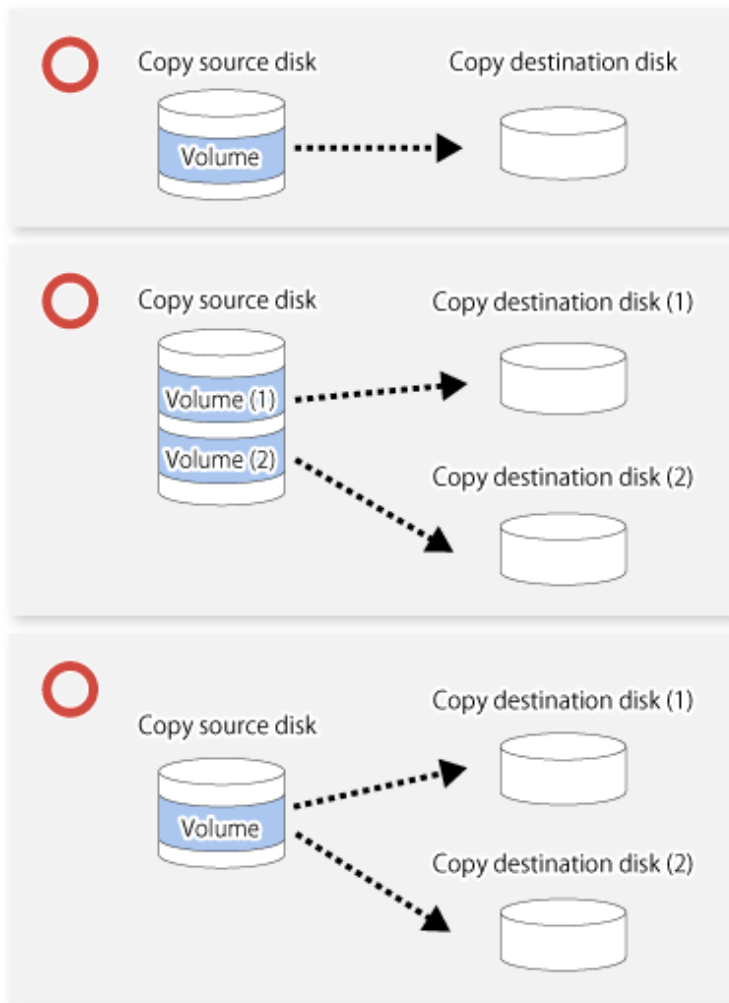


6.2.3 Notes on Configuration of SnapOPC/SnapOPC+ Replication

6.2.3.1 Notes on Session Configurations

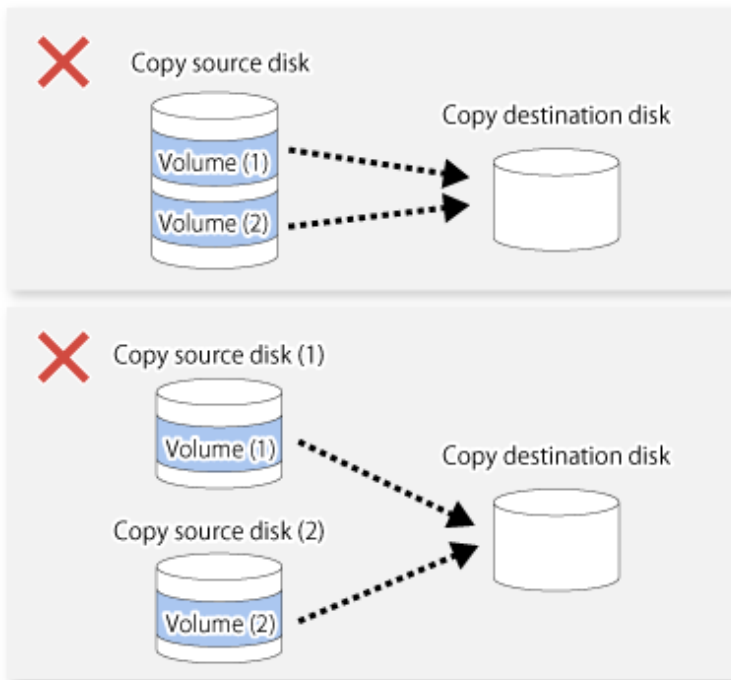
Only a single session can be set for the copy destination disk of SnapOPC/SnapOPC+.

Figure 6.12 When a Single Session Is Set for Copy Destination Disk



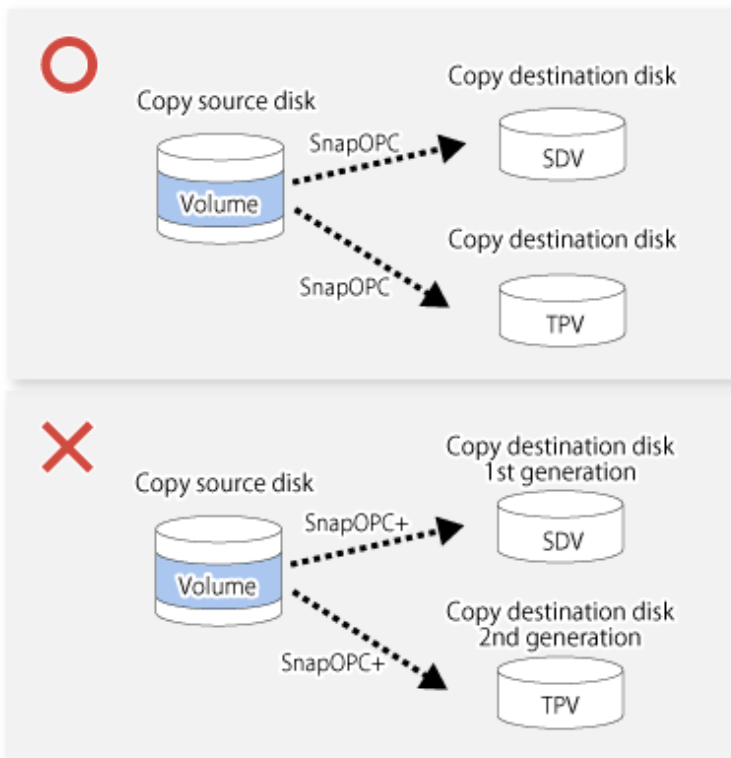
Multiple sessions cannot be set for a single copy destination disk, as shown in the following figure.

Figure 6.13 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 6.14 When Multiple Sessions Mixed with SDV and TPV Are Set for Copy Destination Disk



6.2.3.2 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.

```
# /opt/FJSSVswsts/bin/swstestupdate start /dev/dsk/c1t1d1
/dev/dsk/c1t1d1 swstestupdate completed
#
```

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.

```
# /opt/FJSSVswsts/bin/swstestupdate status /dev/dsk/c1t1d1
Volume-Name      Update
/dev/dsk/c1t1d1  644333
#
```

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

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

The formula for estimating the capacity is as follows.

$(\text{Updated volume of replication source volume}) * (\text{safety coefficient}) < (\text{Physical capacity of the copy destination volume})$
--



.....
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.
.....

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 *ETERNUS SF 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 *ETERNUS SF 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 file systems to the minimum requirement for the update after initializing the SDV.

See

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

6.2.3.3 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 *ETERNUS SF Storage Cruiser Operation Guide* for details of TPV monitoring.

Refer to "Automated Storage Tiering Management" in the *ETERNUS SF Storage Cruiser Operation Guide* for details of 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 "[8.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.

6.2.3.4 Notes When Using SDV as Copy Destination Volume

Creating Access Volume

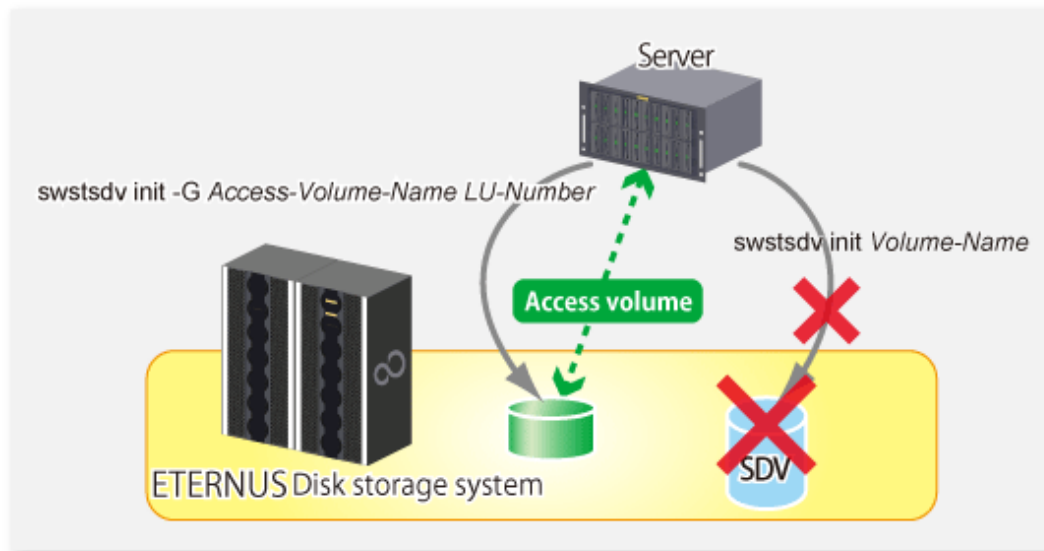
If the capacity of the SDV or the SDP is insufficient, you cannot access the copy destination volume. In the following cases, you cannot access the copy destination volume either:

- 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](#)



6.2.3.5 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.

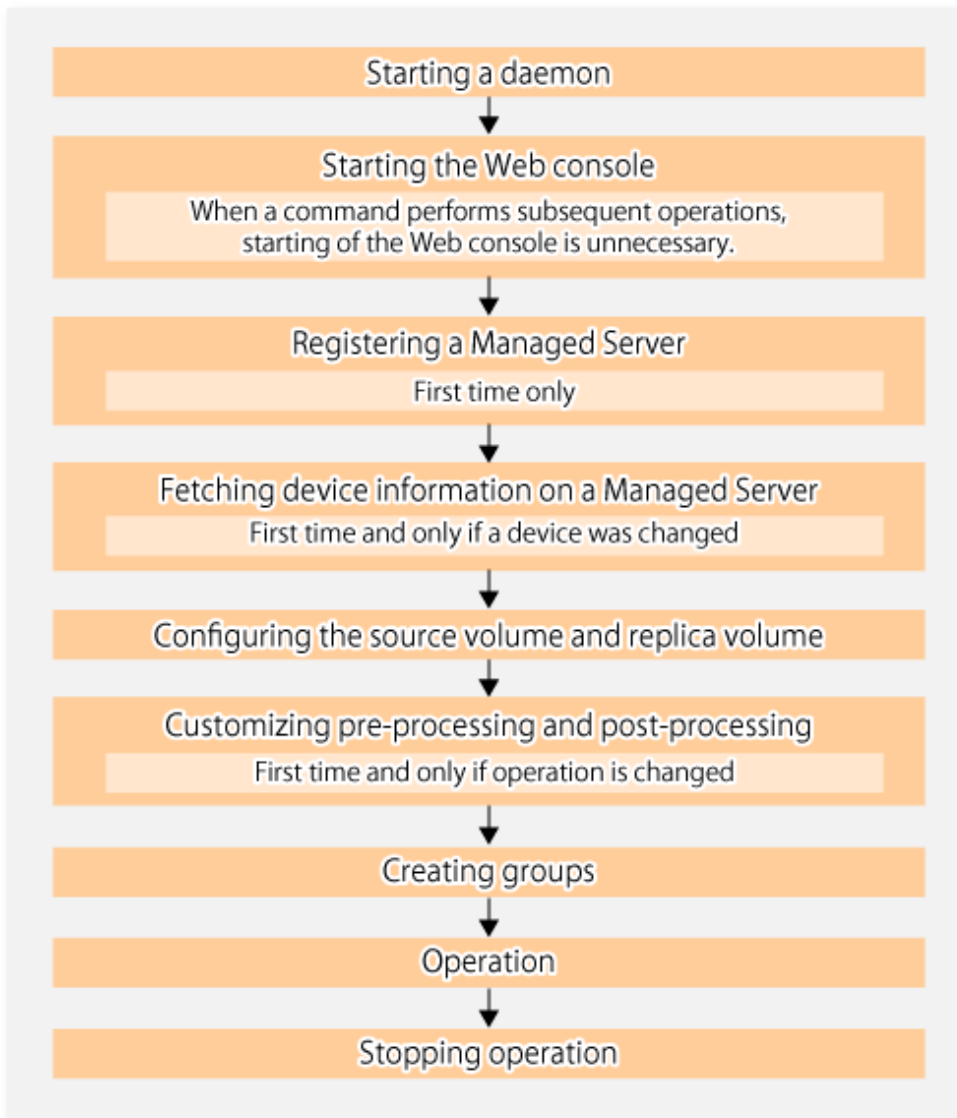
In cluster operations, use the following methods to prevent the copy destination volume of SnapOPC/SnapOPC+ from being used as a shared disk:

- Permit the copy destination volume of SnapOPC/SnapOPC+ to be referenced from all the nodes in the clustered system.
- Use inter-server replication between the clustered system and a non-clustered system.

6.3 Flow of Operations

The following figure shows the flow of the replication.

Figure 6.15 Flow of Replication Operations



6.4 Preparations

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

6.4.1 Starting Daemon

Before replication is started, the AdvancedCopy Manager daemon must be started on the Management Server and Managed Server. Normally, the daemon is configured to be automatically invoked at system startup.

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

6.4.2 Starting Web Console

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

6.4.3 Registering Managed Server

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

Note

- Specify the length of Server name of the management target Server (HP-UX) within 8 bytes.
- 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.

6.4.4 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 *ETERNUS SF 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.
- In relation to a device that is part of an LVM, a volume group and a logical device are fetched, but the physical device which constitutes a logical device is not.

6.4.5 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*".

6.4.6 Customizing Pre-processing and Post-processing

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

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

For details of the pre-processing and post-processing, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)".

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

For example:

- When replication target is a volume group.
- For specific operational requirements, you want to avoid the unmount/mount processing of the volume where a file system is constructed.
- If you want to add special pre-processing or post-processing.

Refer to "[Appendix C Pre-processing and Post-processing of Replication](#)" for information on the customization.



Note

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

It is also necessary to deactivate a volume group (LVM) before it is used as a replication destination. It is then necessary to reconfigure the volume group after the copy is created.

Refer to "The reconfiguration of the volume group" in ["6.8.2 Replication in Units of Physical Disks"](#) for information on the reconfiguration of a volume group.

It is also necessary to configure a disk group before a VxVM volume is used as a replication destination. It is necessary to reconfigure the disk group after the copy is created.

Refer to ["6.8.2 Replication in Units of Physical Disks"](#) or ["Reconfiguring Disk Group \(for Server-to-server Replication\)"](#) of ["6.9 VxVM Volume Operation"](#) for information on the usage and the reconfiguration of a disk group.



Point

When AdvancedCopy Manager Is Upgraded

The script may need to be updated after an upgrade of AdvancedCopy Manager.

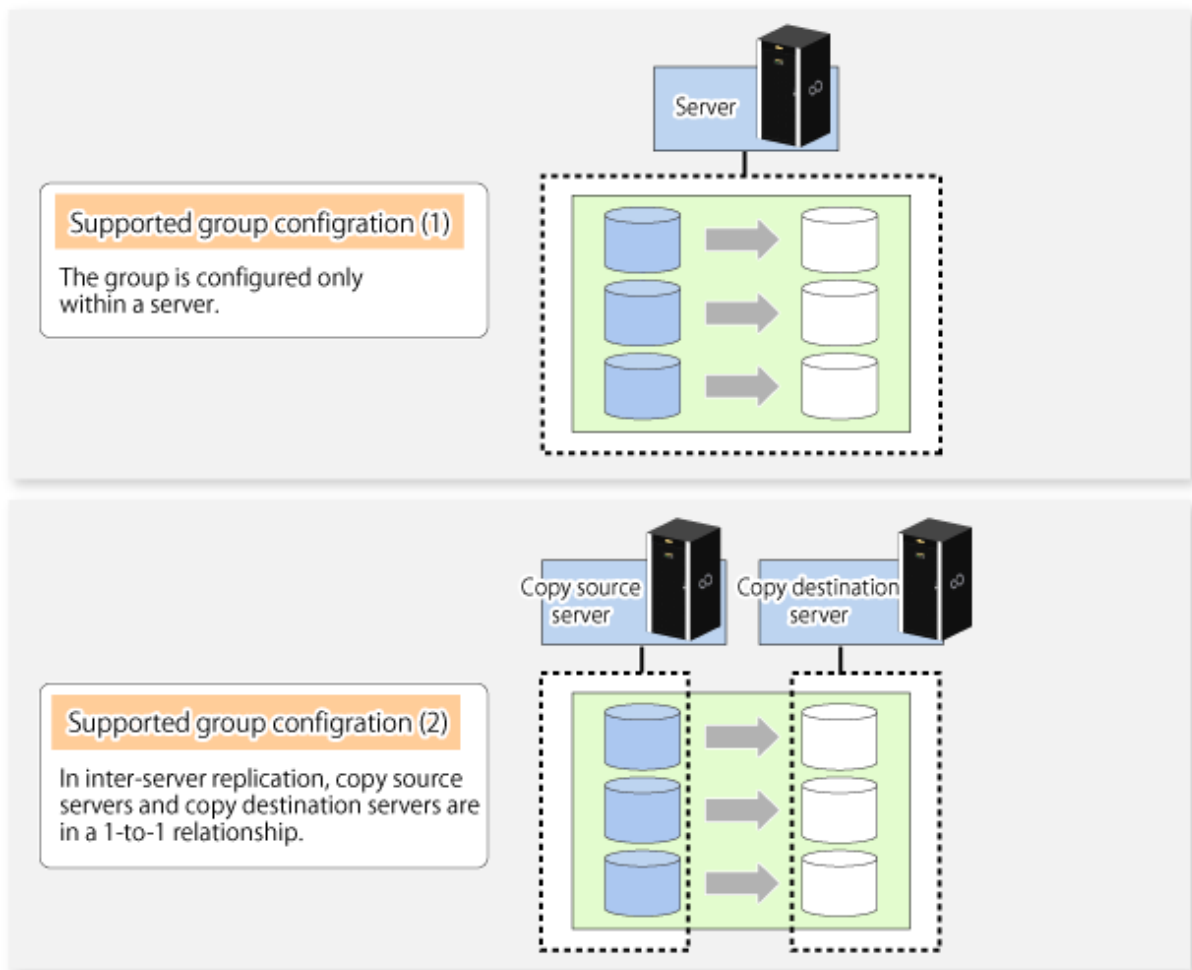
Therefore, you should check the script after any upgrade to ensure it is compatible with newer versions.

6.4.7 Creating Groups

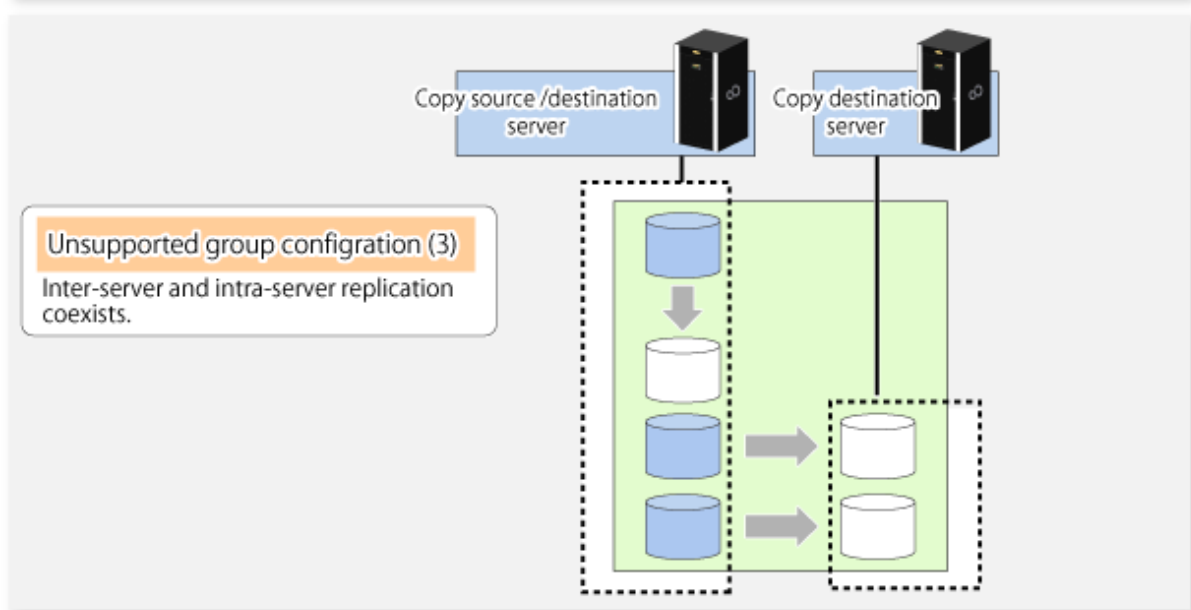
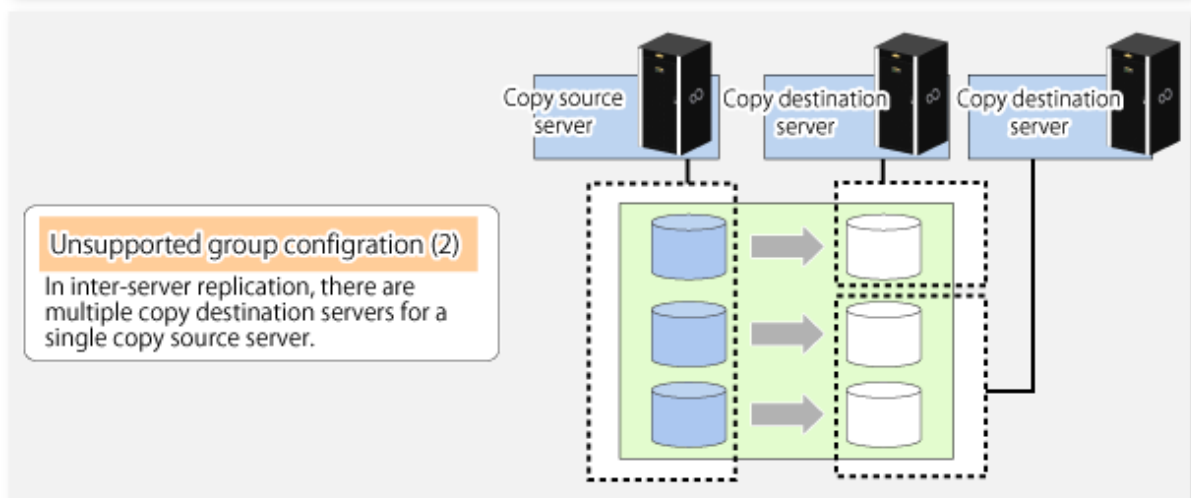
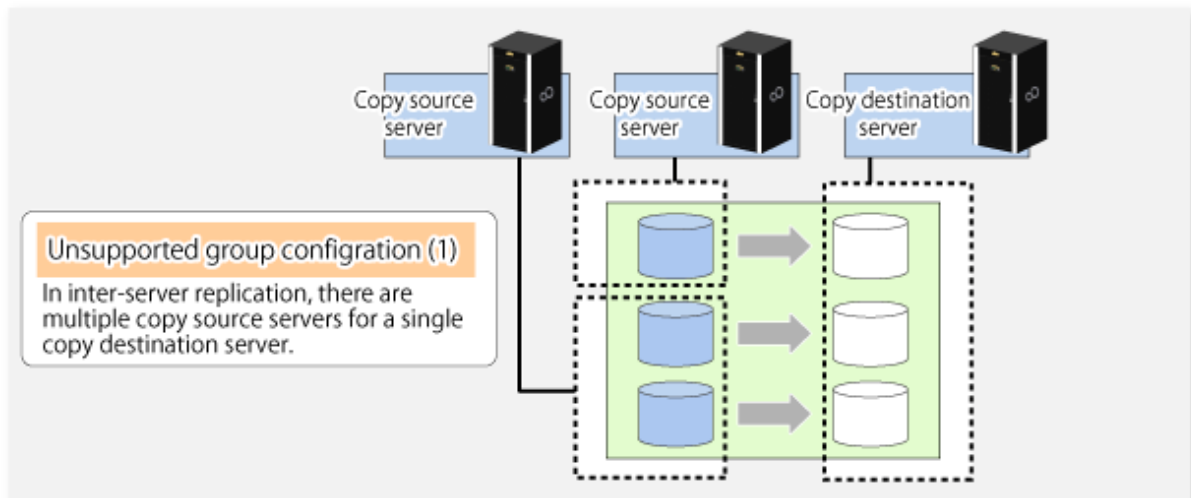
6.4.7.1 Conditions for Replication Volumes That Make Up Group

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

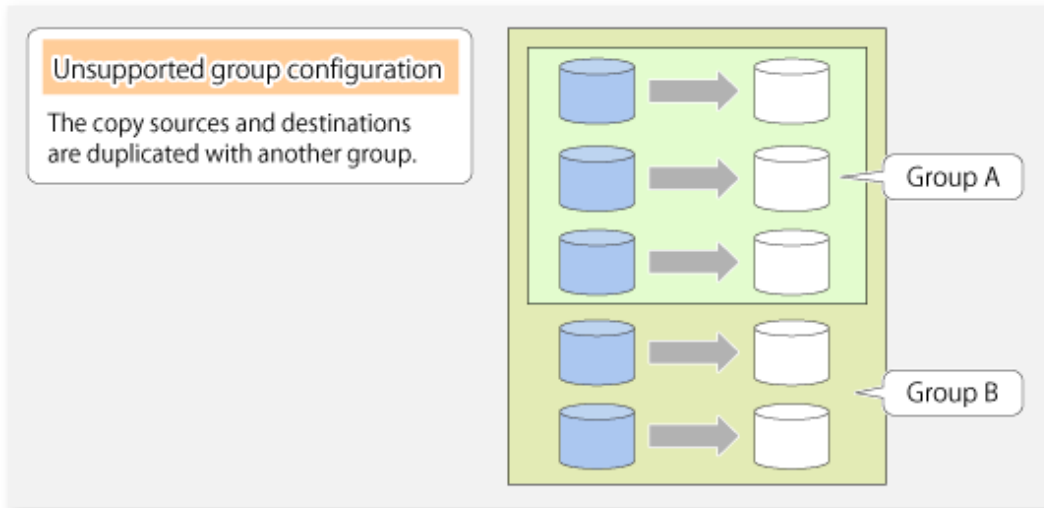
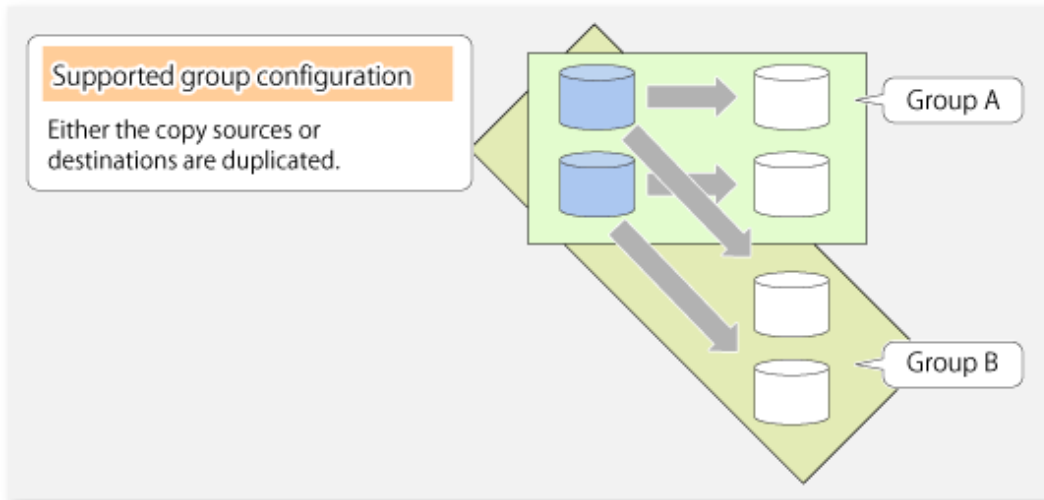
- The copy source servers and destination servers must have matching attributes such as size and device configuration.



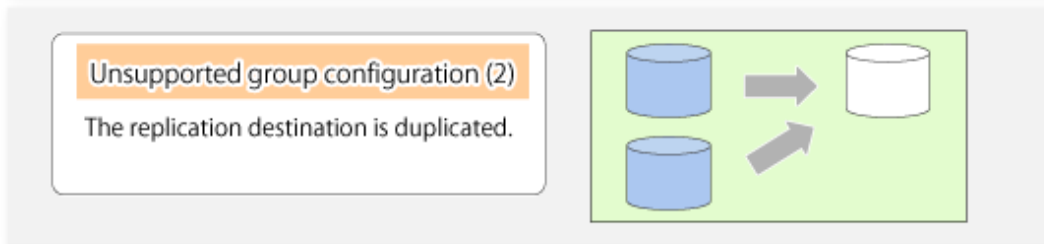
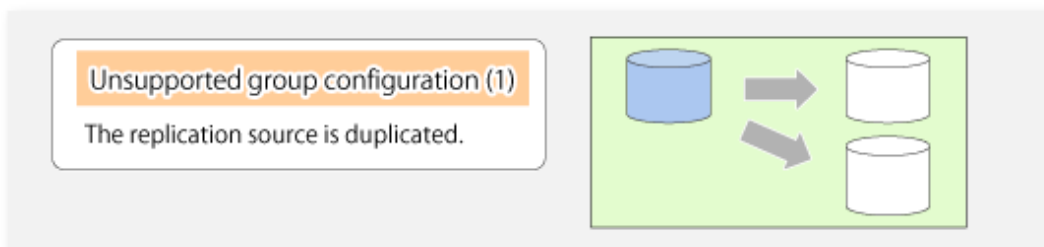
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the **Op-Server** and **Copy** columns displayed by executing the `swsrpvolinfo` command.



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

6.4.7.2 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.

```
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/dsk/clt2d10@SRC /dev/dsk/
clt2d20@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/dsk/clt2d11@SRC /dev/dsk/
clt2d21@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpvoinfo -L
Server Original-Volume      Size      Replica-Volume      Size      Copy
Op-Server Group
SRC      /dev/dsk/clt2d10@SRC 4.0 Gbyte /dev/dsk/clt2d20@TARG-1 4.0 Gbyte bi-
direction both          GRP1
SRC      /dev/dsk/clt2d11@SRC 4.0 Gbyte /dev/dsk/clt2d21@TARG-1 4.0 Gbyte bi-
direction both          GRP1
#
```

6.5 Operations

Before performing replication, refer to "6.4 Preparations" to set up the environment required for replication.

This section describes the operation by command.

6.5.1 Executing Snapshot Replication

Use the `swsrpmake` command to perform snapshot replication.

Refer to "6.1.1 Snapshot Replication Processing" for an explanation of snapshot replication.

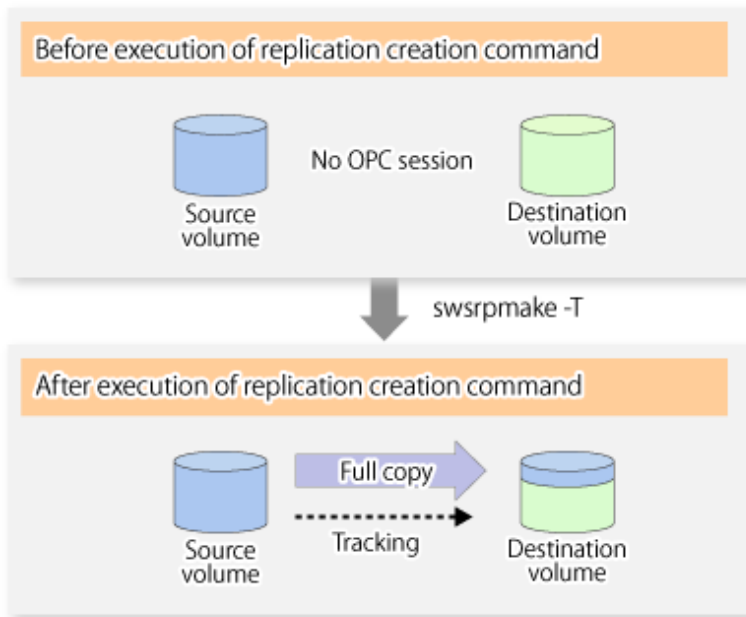
The operation status of a physical copy can be checked by executing the `swsrpstat` command.

QuickOPC Type Replication

Execute QuickOPC replication by specifying the `-T` option in the `swsrpmake` command.

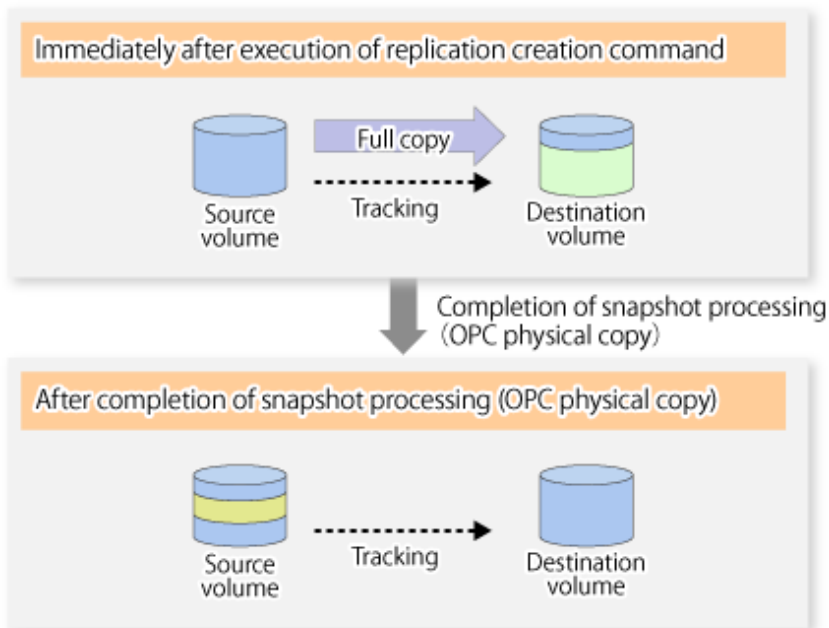
If no OPC session exists when the `swsrpmake` command is executed, the command starts snapshot processing (OPC physical copying), and tracks processing from the source volume to the destination volume.

Figure 6.16 When Replication Creation Command Is Executed (1st Time)



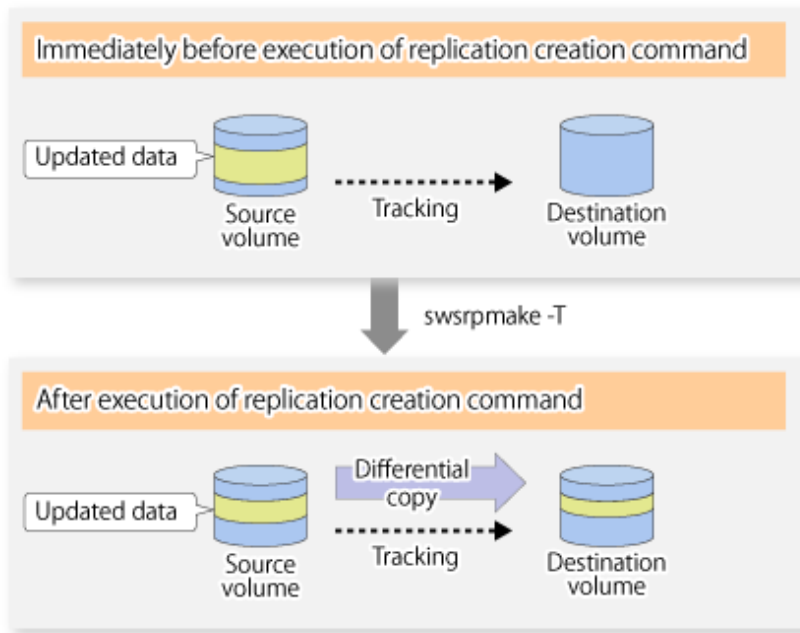
To check the execution status of physical copying, use the `swsrpstat` command in the same way as for an ordinary snapshot replication. After snapshot processing (OPC physical copy) is complete, only tracking processing is active. To check the tracking status, execute the `swsrpstat` command with the `-L` option.

Figure 6.17 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 6.18 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

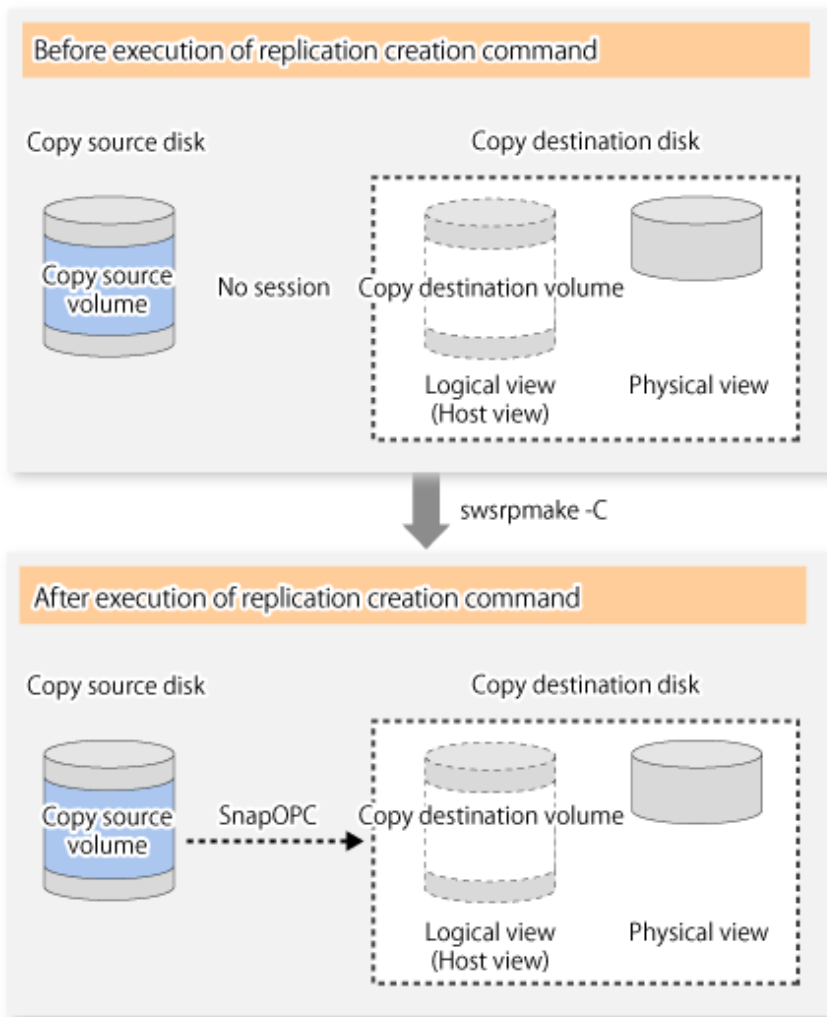
Execute SnapOPC type replications with the -C option specified in the [swsrpmake](#) command.

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

Example

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


Figure 6.19 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 6.20 When Copy Source Volume Is Updated

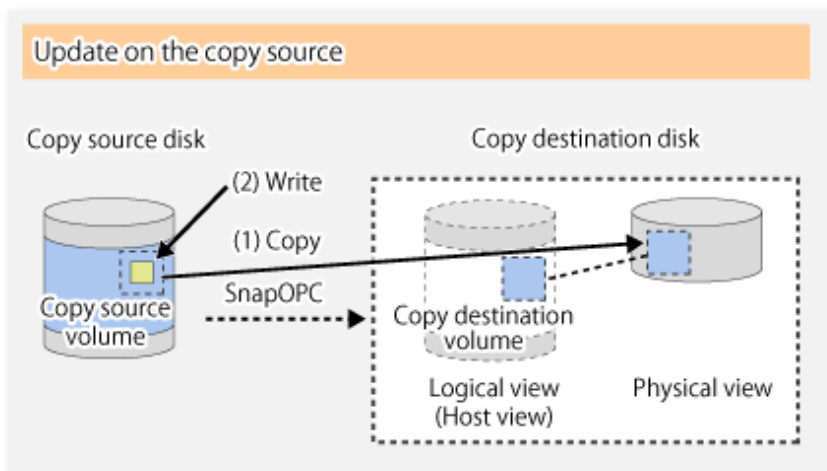
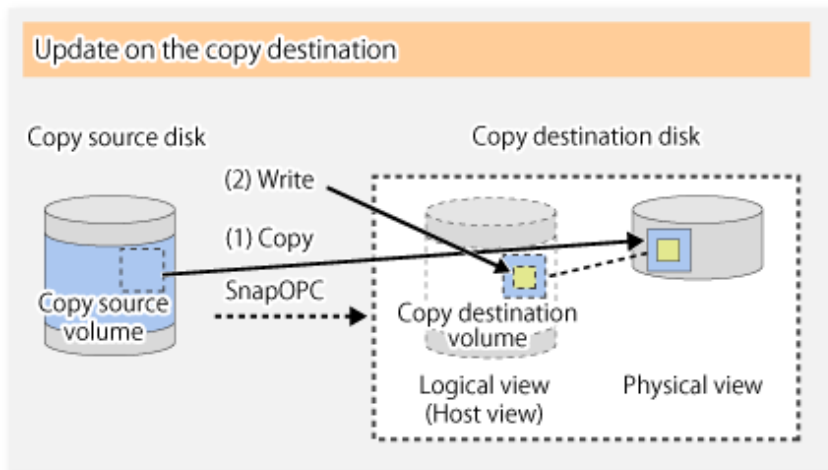


Figure 6.21 When Copy Destination Volume Is Updated



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 `swwsrpstat` command.

The following example shows the execution of the `swwsrpstat` command immediately after a SnapOPC snapshot has started. While SnapOPC is being performed, "copy-on-write" is displayed in the **Status** column, and the amount of data updated since the last copy was created is displayed in the **Update** column as a percentage.

Example

```
# /opt/FJSSVswsrp/bin/swwsrpstat -L /dev/dsk/c1t1d1
Server Original-Volume      Replica-Volume      Direction Status      Execute Trk  Update Rcv  Split
Xfer Snap-Gen
SV1 /dev/dsk/c1t1d1@SV1 /dev/dsk/c1t1d2@SV1 regular copy-on-write ---- off 0% ----
----
#
```

If the `swwsrpmake` 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 `swwsrpstat` command output result Status column.

Example

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

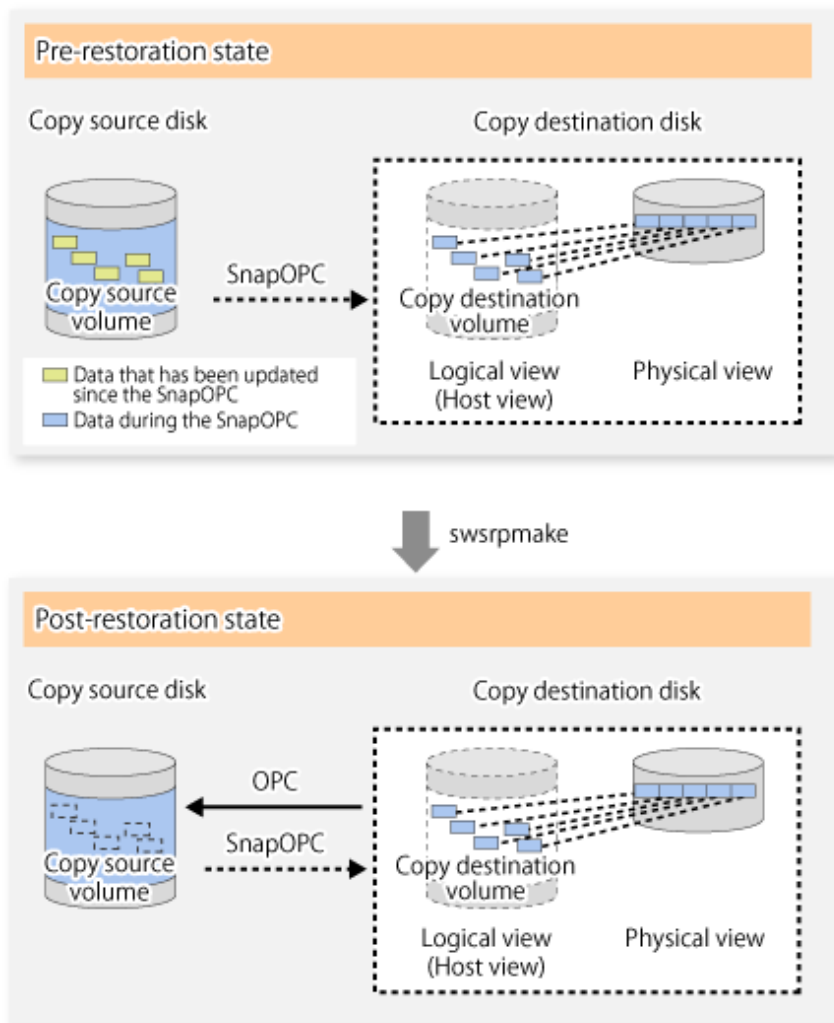
When the SnapOPC execution status is error suspend status ("failed"), refer to "8.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume" and take appropriate action.

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

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

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

Figure 6.22 When Restoration Is Executed



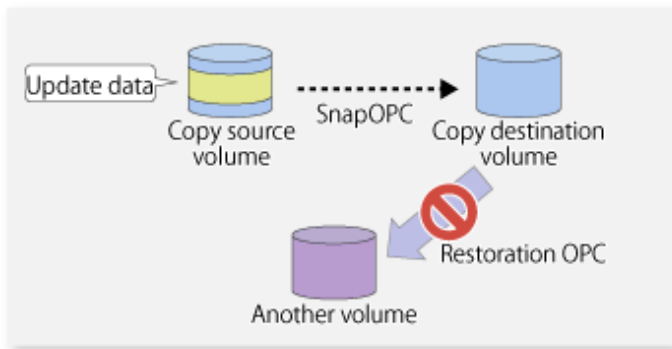
The execution status of restorations can be checked by specifying the -E option with the `swwsrpstat` command.

```
# /opt/FJSSwwsrp/bin/swwsrpstat -E /dev/dsk/clt1d1
Server Original-Volume      Replica-Volume      Direction Status Execute
SV1    /dev/dsk/clt1d1@SV1 /dev/dsk/clt1d2@SV1 reverse  snap  80%
#
```

 Note

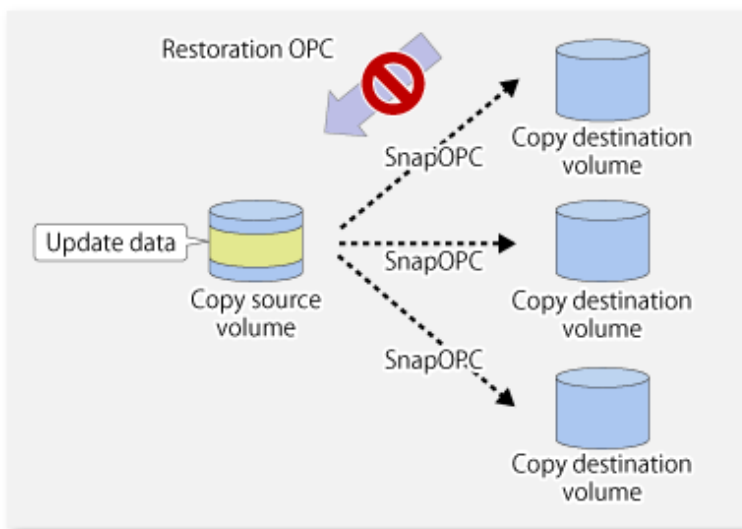
If a SnapOPC is being performed between the source volume and the destination volume, restorations to volumes other than the source volume cannot be executed. To restore to a volume other than the source volume, operating system copy functions (such as the `cp` command or the `copy` command) must be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

Figure 6.23 When Restoring to Volume Other Than Copy Source Volume



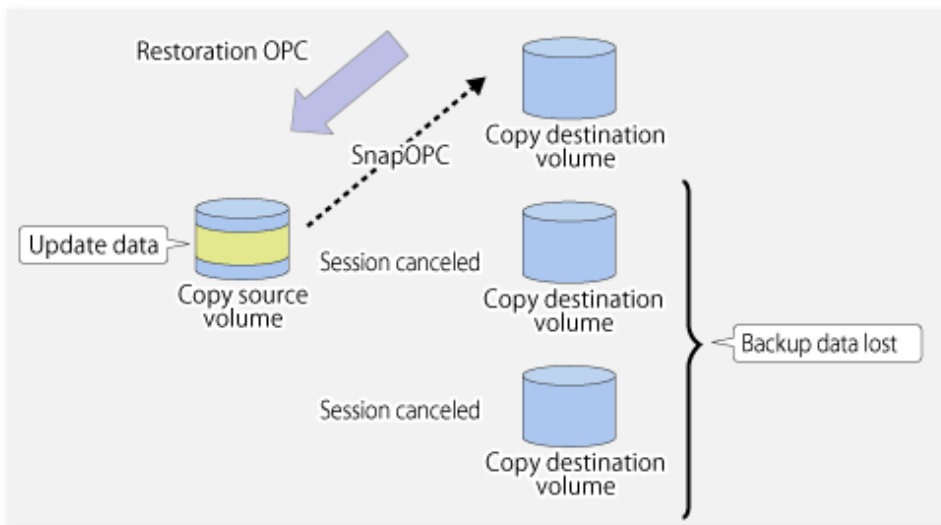
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure 6.24 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.

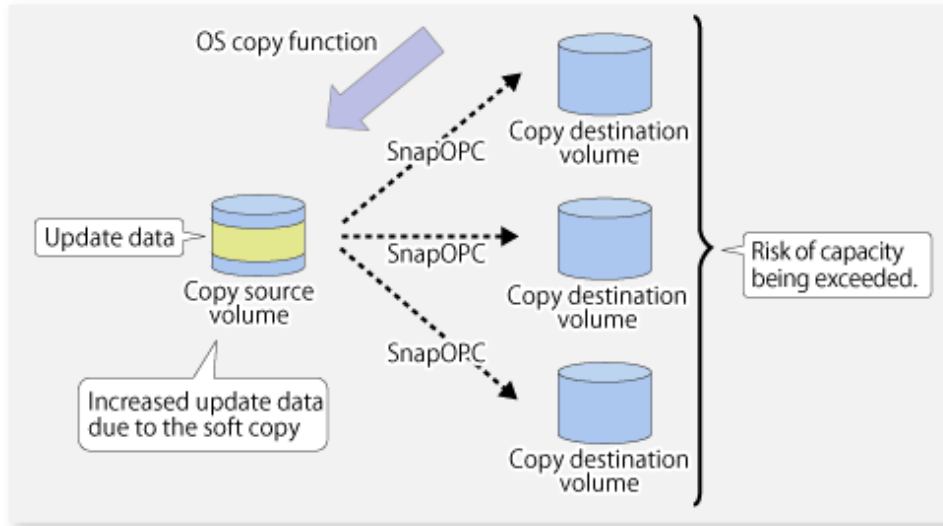
Figure 6.25 When SnapOPC Session Cancelled to Perform Restoration



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 6.26 When Performing Restoration without Cancelling SnapOPC Session



SnapOPC+ Type Replication

Execute the `swwsrpmake` 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 `swwsrpmake` command with the `-P` option is shown below.

Execution Example

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

At this time, the (logically copied) copy destination volume is saved as a snap generation number.

The next time this command is executed with a different copy destination volume for the same copy source volume, the copy-on-write processing being executed between the copy source volume and the previous generation of the copy destination volume is stopped. Then, a SnapOPC+ session is set between the copy source volume and the newly specified copy destination volume, and copy-on-write is performed.

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

Execution Example

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

This time, the (logically copied) copy destination volume is saved as snap generation number 2.

Similarly, each time there is a new copy destination volume, a snap generation number is assigned.

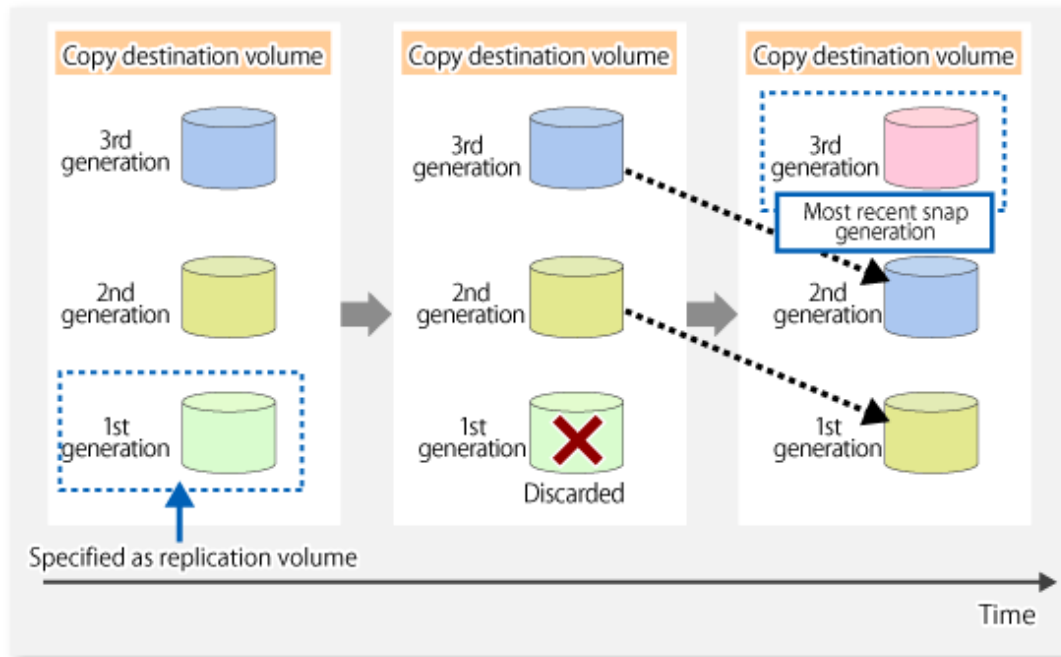


Note

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when the `swwsrpmake` 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 6.27 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

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

Note

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

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

When the SnapOPC+ execution status is error suspend status ("failed"), refer to "[8.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)" and take appropriate action.

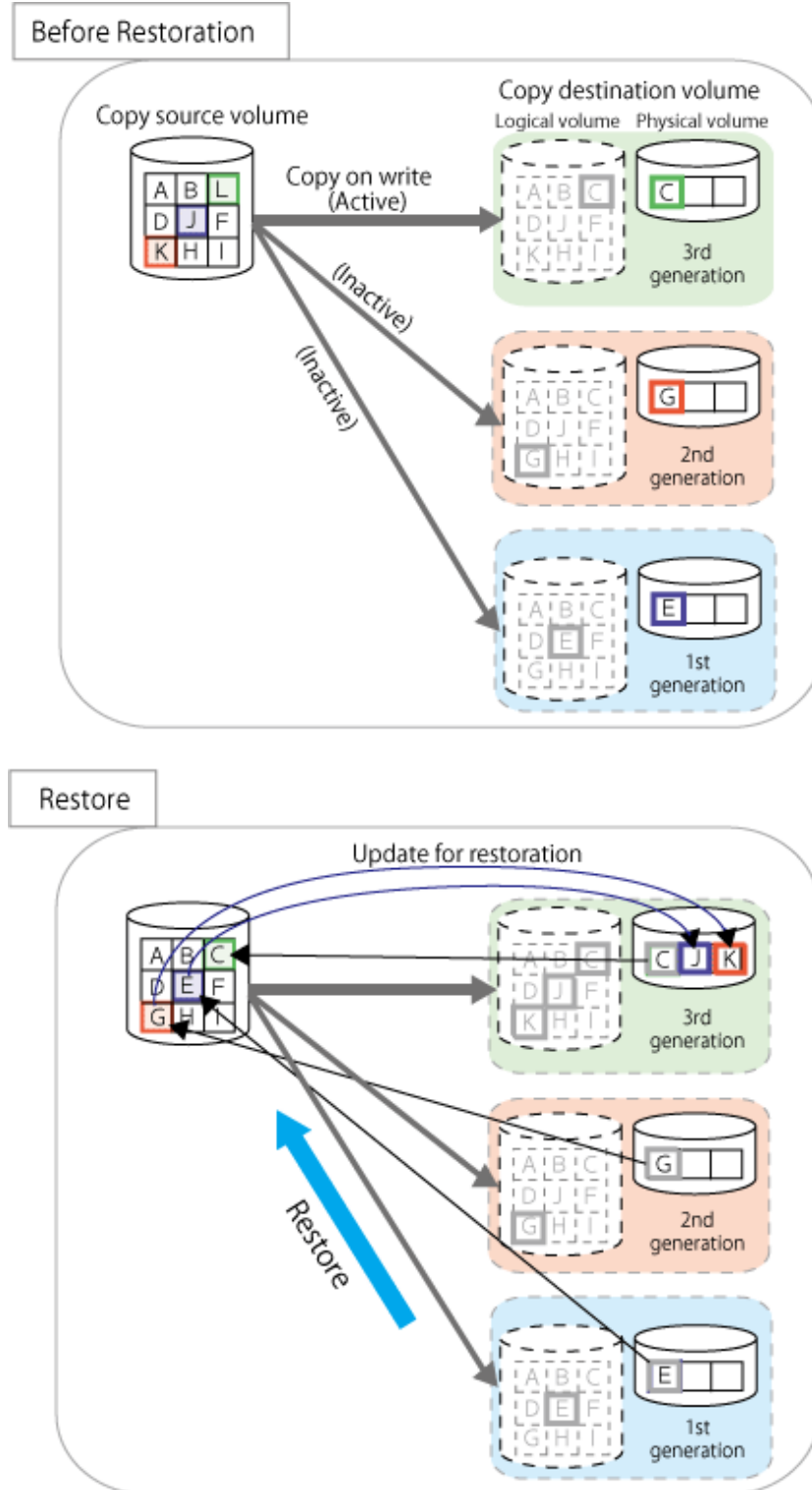
To restore from the copy destination volume, execute the `swsrpmake` command to start OPC.

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t1d2@SV1 /dev/dsk/c1t1d0@SV1
FROM=/dev/dsk/c1t1d2@SV1,T0=/dev/dsk/c1t1d0@SV1 swsrpmake completed
#
```

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

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

Figure 6.28 Restoration with SnapOPC+ Session Maintained



To check the restoration execution status, execute the `swsrpstat` command with the `-E` option.

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/clt1d0
Server Original-Volume      Replica-Volume      Direction Status Execute
SV1    /dev/dsk/clt1d0@SV1    /dev/dsk/clt1d1@SV1 ----    ----    ----
SV1    /dev/dsk/clt1d0@SV1    /dev/dsk/clt1d2@SV1 reverse  snap    80%
#
```


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).

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

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

2. 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 *ETERNUS SF 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 *ETERNUS SF Web Console Guide* for information on how to check the used capacity.

- If the copy destination volume is SDV

Execute the `swstdv` 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.

[/dev/dsk/c1t1d2 disk usage]

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

[/dev/dsk/c1t1d3 disk usage]

```
# /opt/FJVSWSRST/bin/swstdsv stat /dev/dsk/c1t1d3
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 111 (0x6F)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
```

4%	8388608	1048576	46928	16	46912	0
#						

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

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 *ETERNUS SF 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 *ETERNUS SF Web Console Guide* for information how to check the capacity.

- If the copy destination volume is SDV

Execute the `swstdsv` 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".

```
# /opt/FJSVswsts/bin/swstdsv poolstat -G /dev/dsk/clt1d0
BoxID = 00E4000M3#####E450S20A#####KD4030639004##
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
Normal    10%  20971520      2097152      0          2097152      18874368
Encrypted 0%   20971520         0           0           0           20971520
#
```

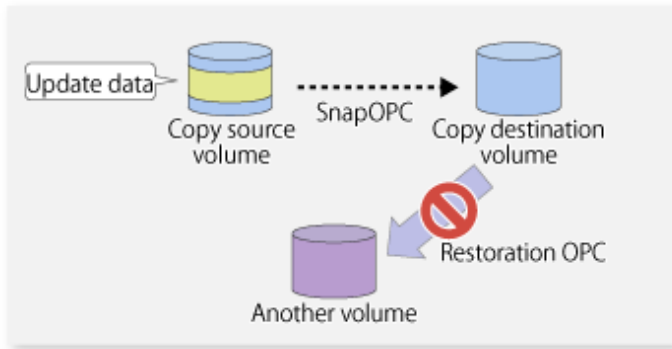
The disk usage in this example is 15% $\approx (2097152 + 1049040) / 20971520 \times 100$

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 "6.2.3.3 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.

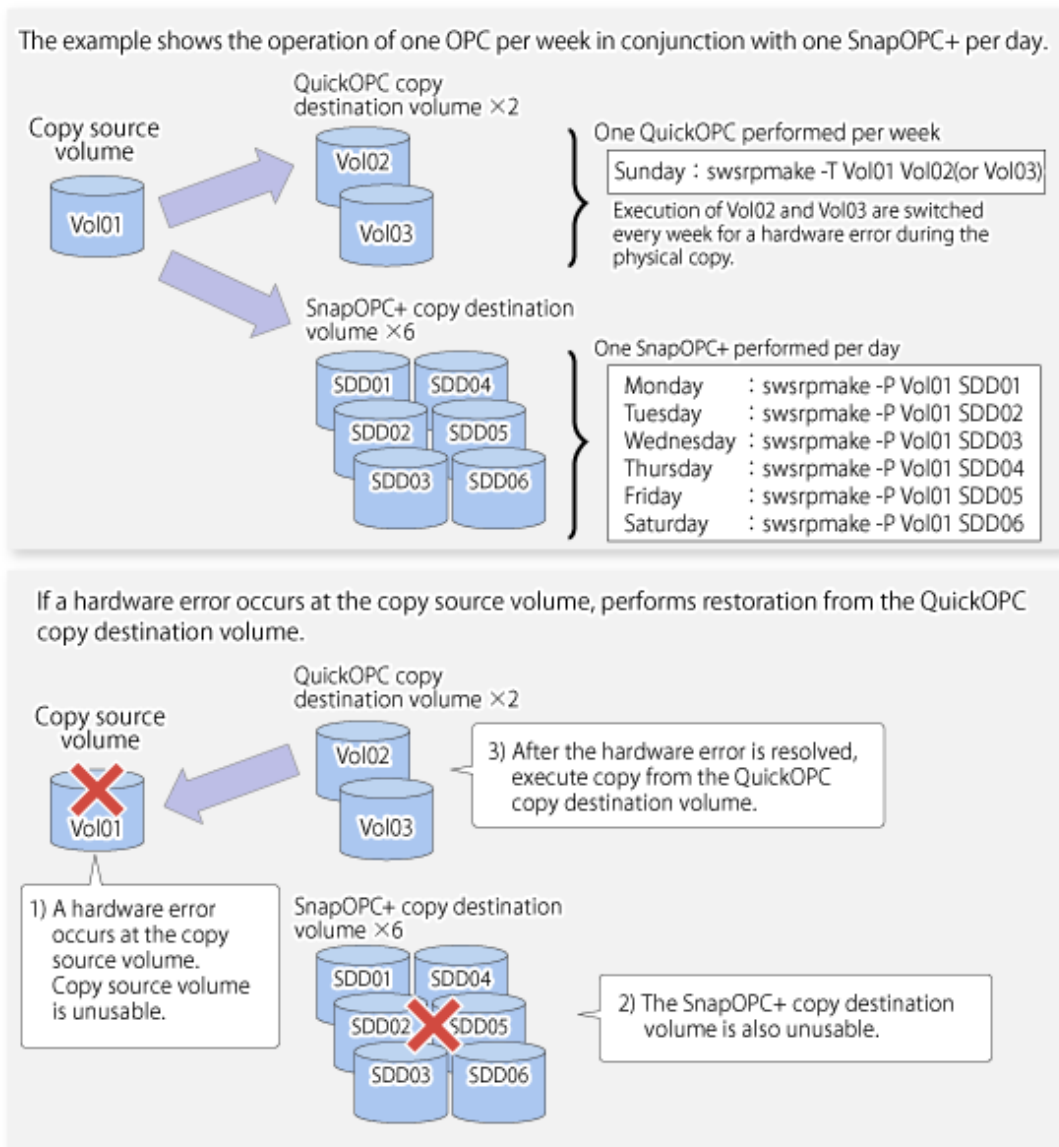


P Point

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 6.29 Example of Operation Using SnapOPC+ and QuickOPC

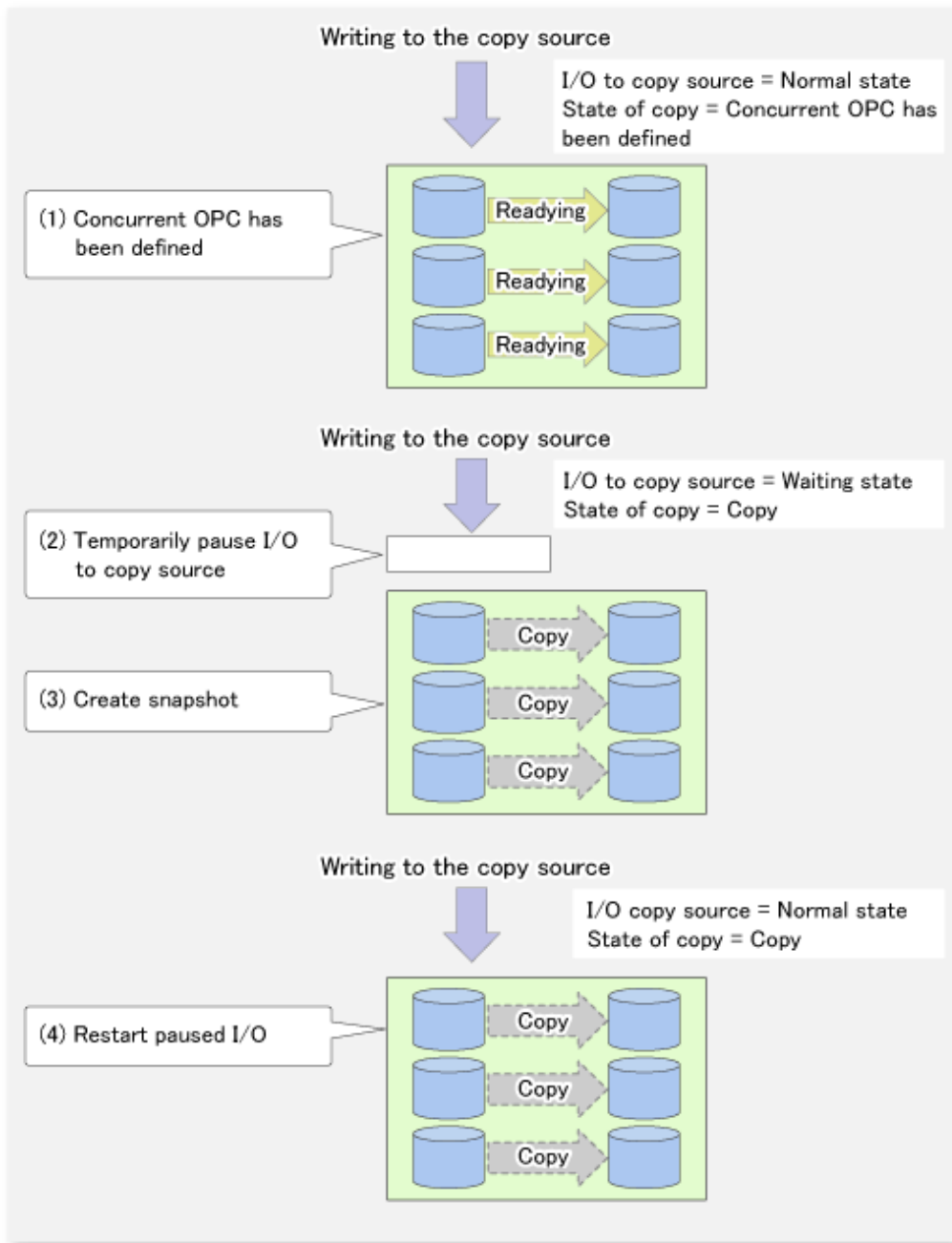


6.5.1.1 Concurrent OPC Functions

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 6.30 Operations in ETERNUS Disk Storage System



 Note

- If you force-quit the `swsrpcancel` 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.

6.5.2 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.

6.5.2.1 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.

6.5.2.2 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.

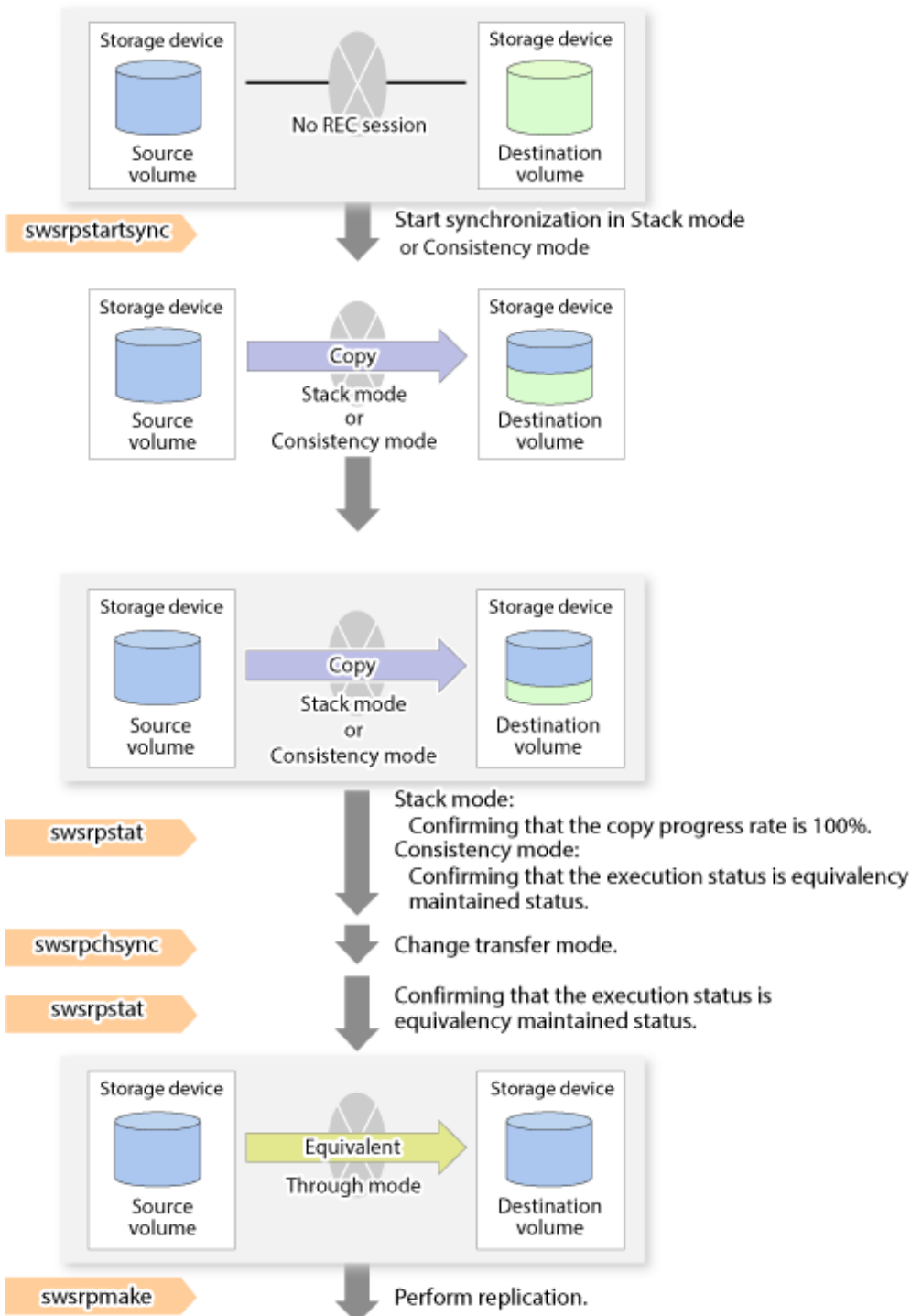
Table 6.2 Transfer Mode Types

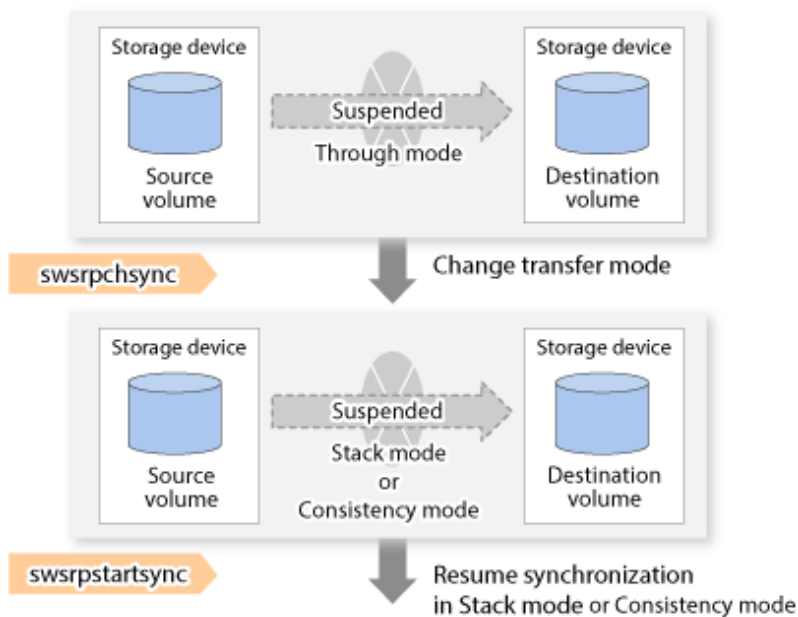
Transfer Method	Transfer Mode	Explanation
Synchronous transfer method	Synchronous	<p>In this mode, responses to write requests from the server do not return as "complete" until data has been written to the copy source volume and copied to the destination volume.</p> <p>Synchronizing data copies with 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 methods	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 transmission transfer buffer and then using a reception transfer buffer to "expand" the data that has been transferred.</p>

Transfer Method	Transfer Mode	Explanation
	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 [swsrpchsinc](#) 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 6.31 Flow of Synchronous Replication (for Stack Mode / Consistency Mode)





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 maintained status. There may be cases when the execution state does not enter the equivalency maintained status immediately after changing the mode. When the transfer mode has been changed, create a replication after confirming that the execution status is equivalency maintained status.
- 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 6.3 Recovery Mode Types

Mode	Description
Automatic Recovery	In this mode, the REC session automatically switches from halt status to regular status, and copy processing resumes when the inter-box FCRA path is recovered.
Manual Recovery	In this mode, the REC session remains in halt status and copy processing does not resume even if the inter-box FCRA path is recovered. Manually resume copying. This mode is used, for example, when operating a standby database.

Split Mode

Split mode includes two modes for performing a write operation to the source volume when REC is used for synchronous transfer mode, and for recovery from an inter-box path error (halt status).

Table 6.4 Split Mode Types

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

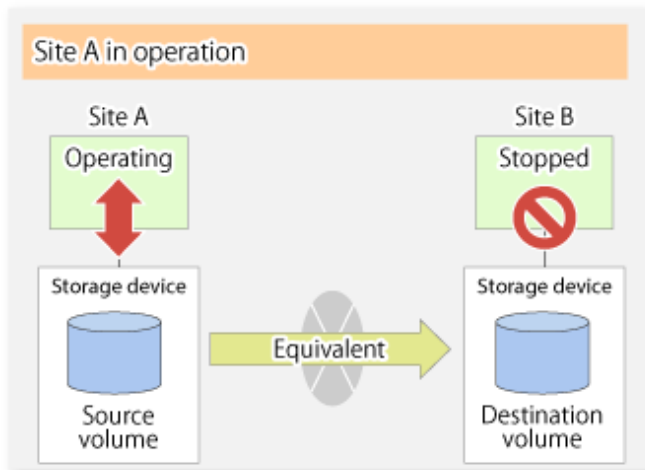
Copy Direction Reverser

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

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

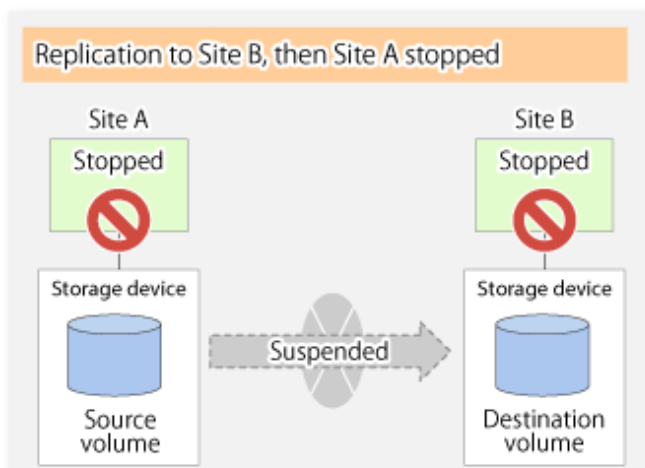
1. Assume that Site A is operating and REC is operating from Site A to Site B.

Figure 6.32 When REC Performed from Site A to Site B



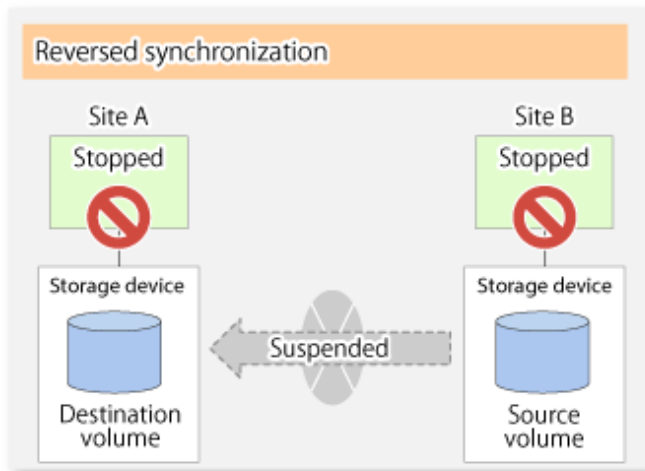
2. To switch the sites, execute the `swsrpmake` command to make a replication to Site B. Then, stop operating Site A.

Figure 6.33 When Replication Creation Command Used to Create Replica at Site B



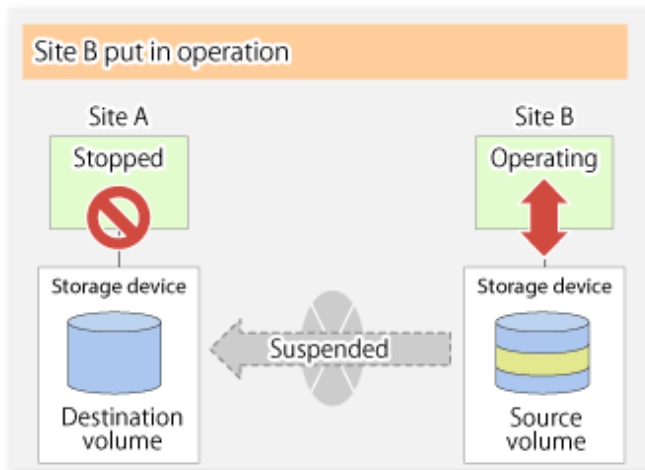
- Execute the `swsrprevsync` command to reverse the copy direction.

Figure 6.34 When Synchronization Reverse Command Is Executed



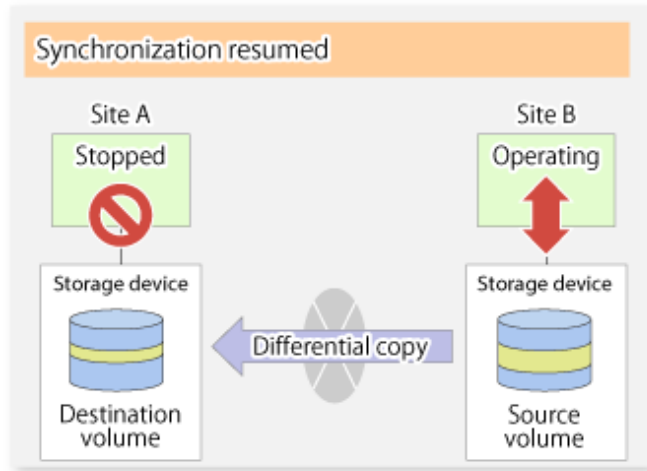
- Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure 6.35 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 6.36 When Operation Is Started at Site B (Synchronization Resumed)

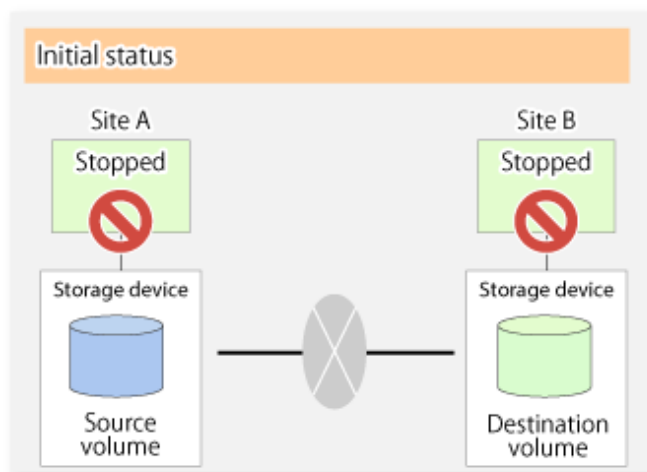


6.5.2.2.1 Initial Copy Skip Function

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.

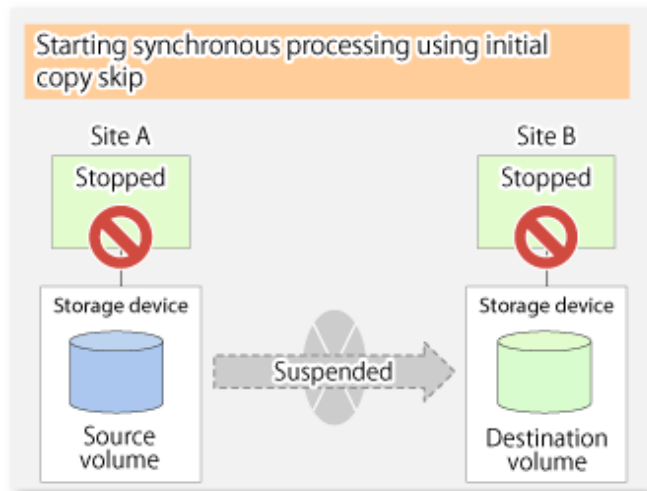
- Suppose that operations at Site A have stopped.

Figure 6.37 If Operations at Site A Have Stopped



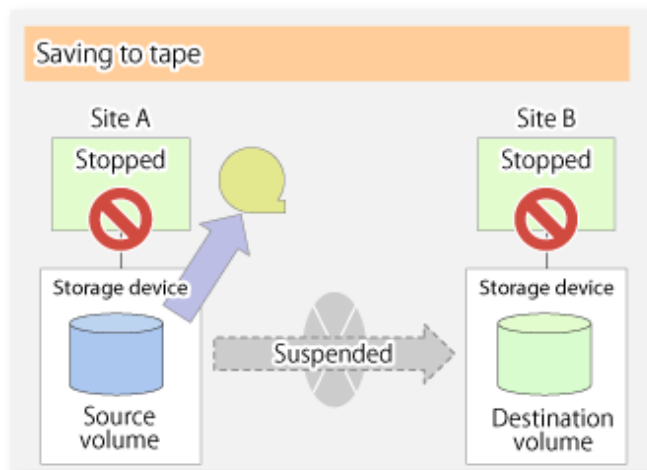
2. Next, synchronous processing begins, using the initial copy skip function. At this point, a REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

Figure 6.38 When Synchronization Is Started by Initial Copy Skip Function



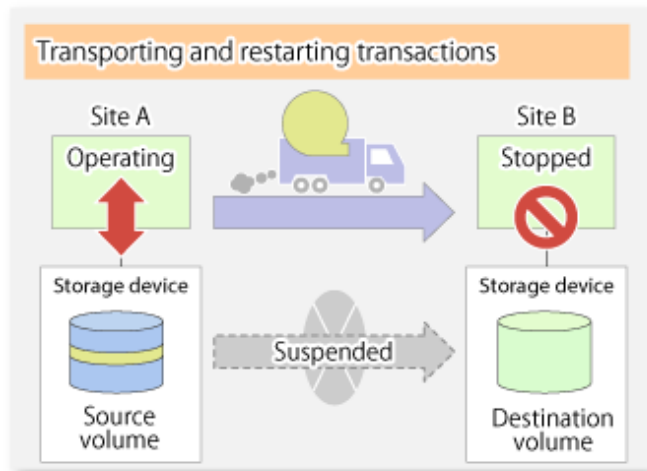
3. Next, the data on the copy source volume is backed up to tape.

Figure 6.39 When Copy Source Data Is Backed Up to Tape



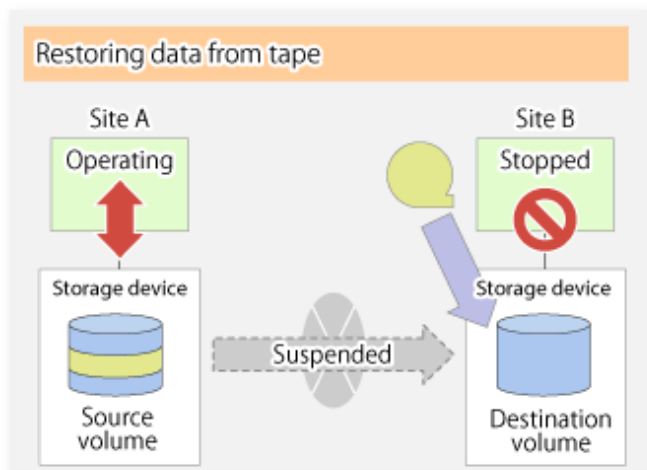
- The tape media is sent to Site B and jobs at Site A restart.

Figure 6.40 When Site A Operations Restart



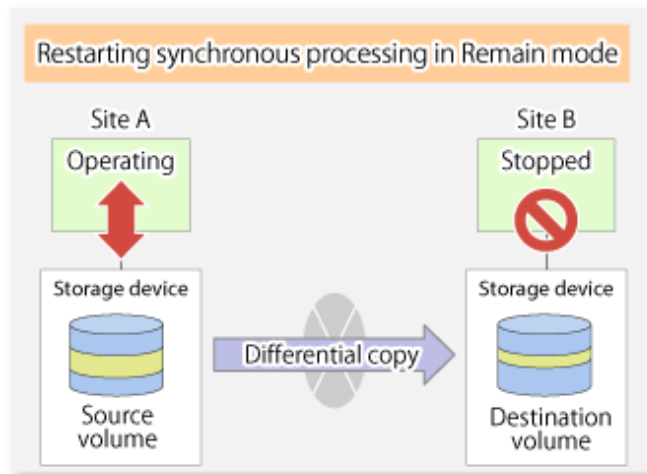
- The data on the tape media is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure 6.41 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.

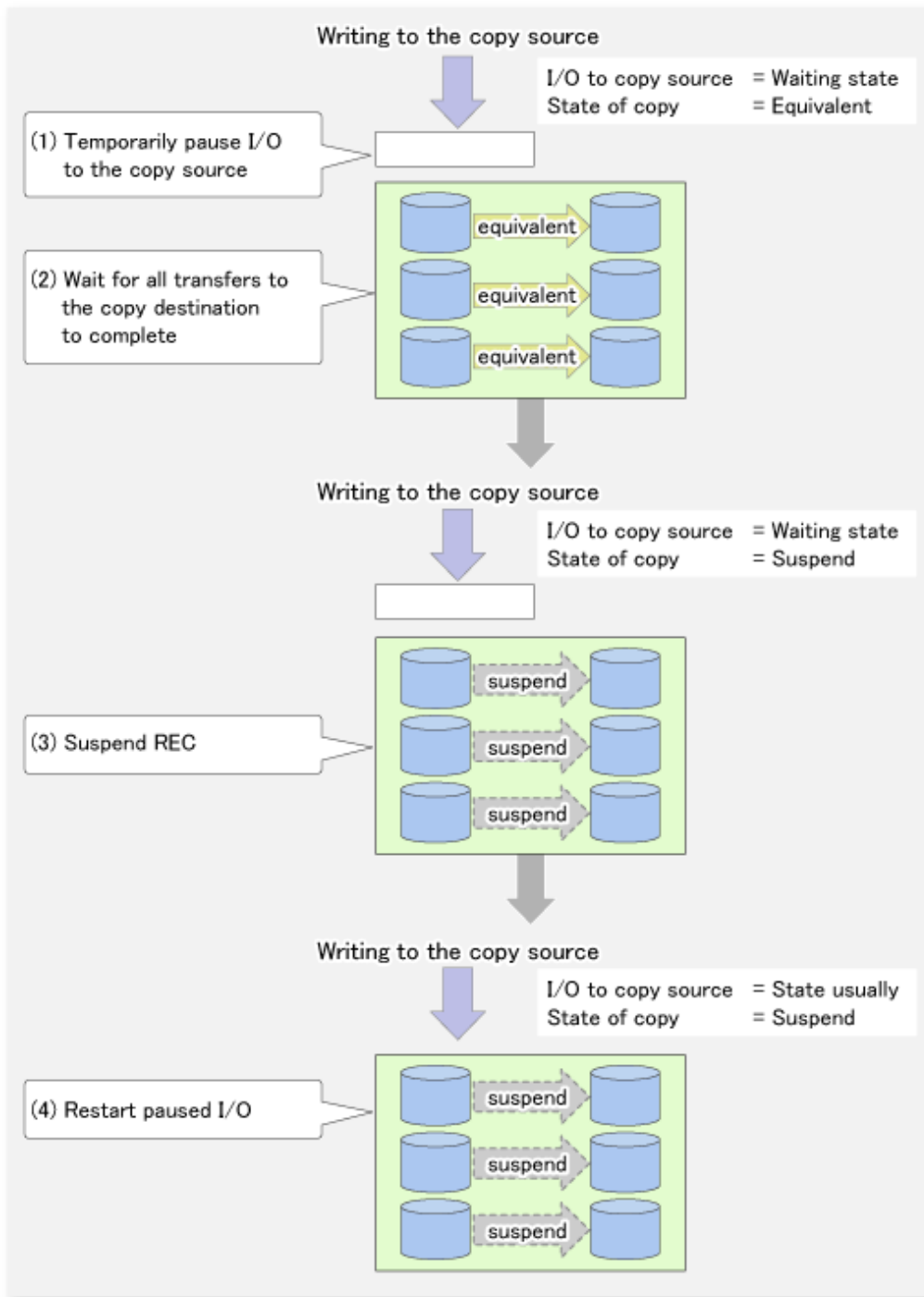
Figure 6.42 When Synchronization Is Restarted in Remain Mode



6.5.2.3 Concurrent Suspend Function

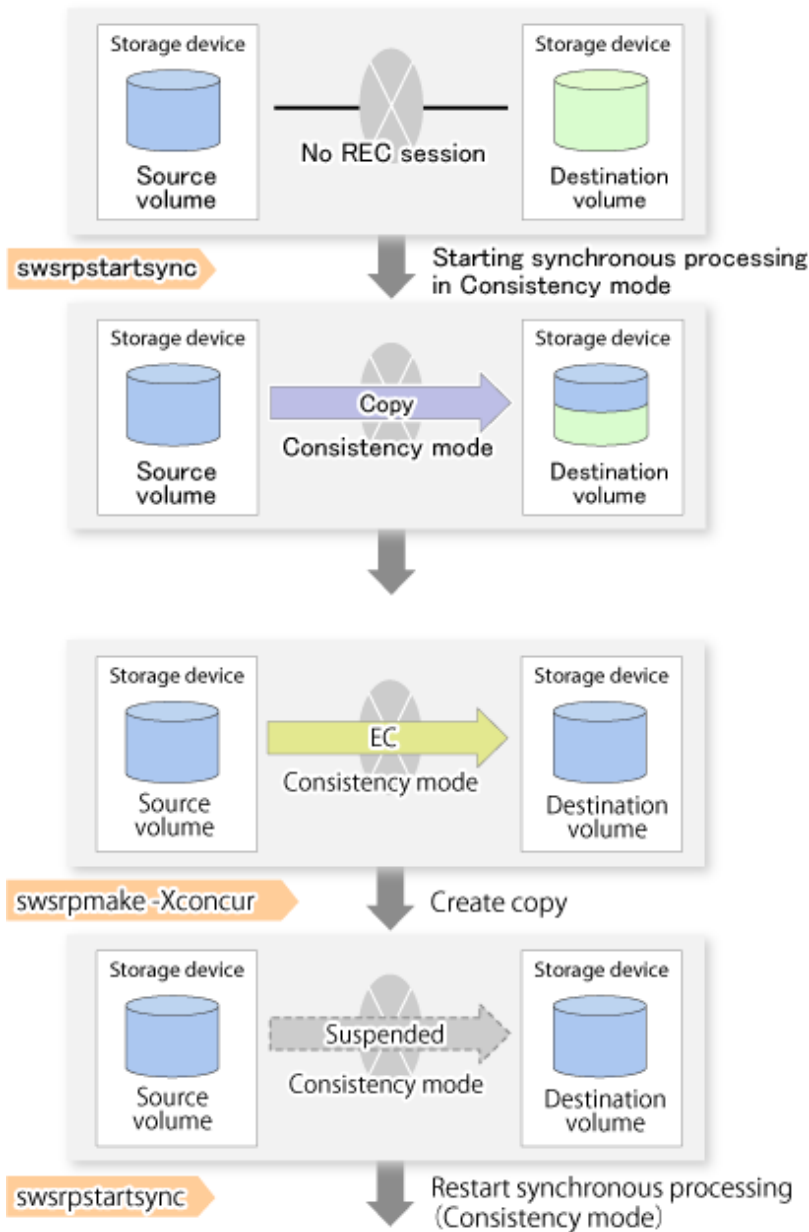
The Concurrent Suspend function simultaneously suspends multiple EC/REC sessions for ETERNUS Disk storage system. By using this function, a copy with consistency can be easily taken. For example, this is useful for a database composed of multiple volumes. The behavior that takes place within the ETERNUS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

Figure 6.43 Internal Operation of ETERNUS Disk Storage System



Replication using the Concurrent Suspend function is performed by specifying the `-Xconcur` option for the `swwrmake` 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 6.44 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.

6.5.2.3.1 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 "[6.5.2.3.2 Concurrent Suspend When REC Disk buffer Is Used](#)".

The following message is shown if it times out.

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


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

In Case of Normal Operation (Non-clustered Environment)

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

In Case of Operation in Clustered Environment

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

Table 6.5 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.

6.5.2.3.2 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 `swsrprebuffstat` command with specifying -L option.

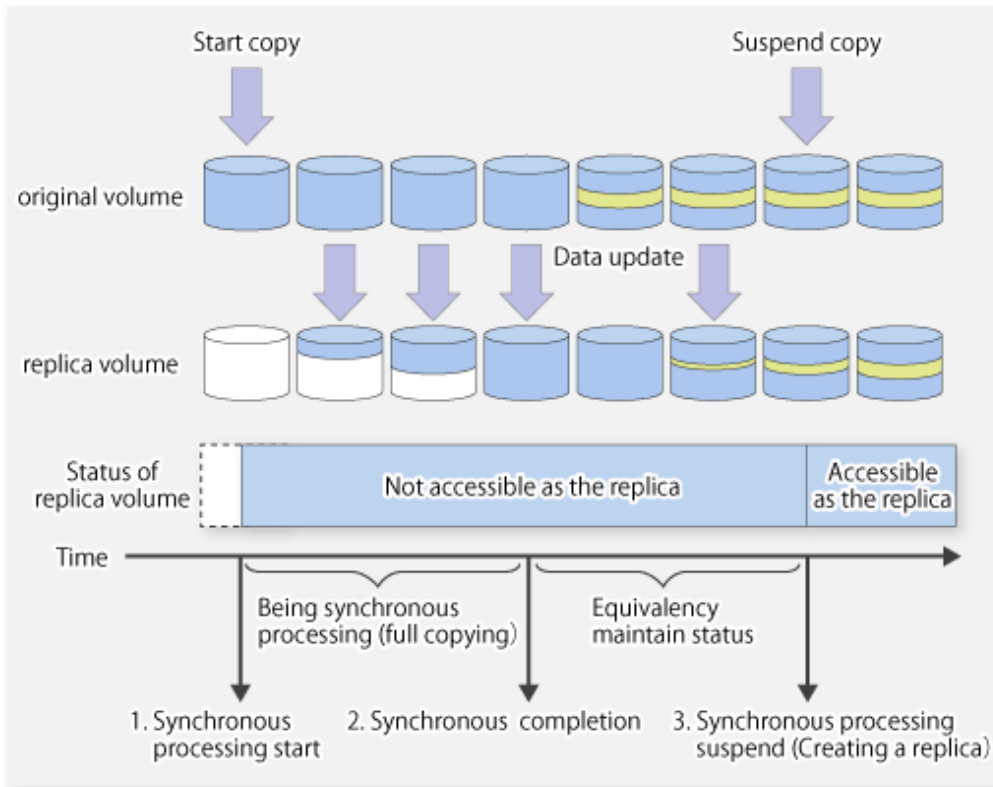
6.5.2.4 Destination Access Permission Function

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

It starts synchronization (EC/REC) from the replication source volume to the replication target volume, and when full or differential copying is complete, they are maintained in a state of equivalency.

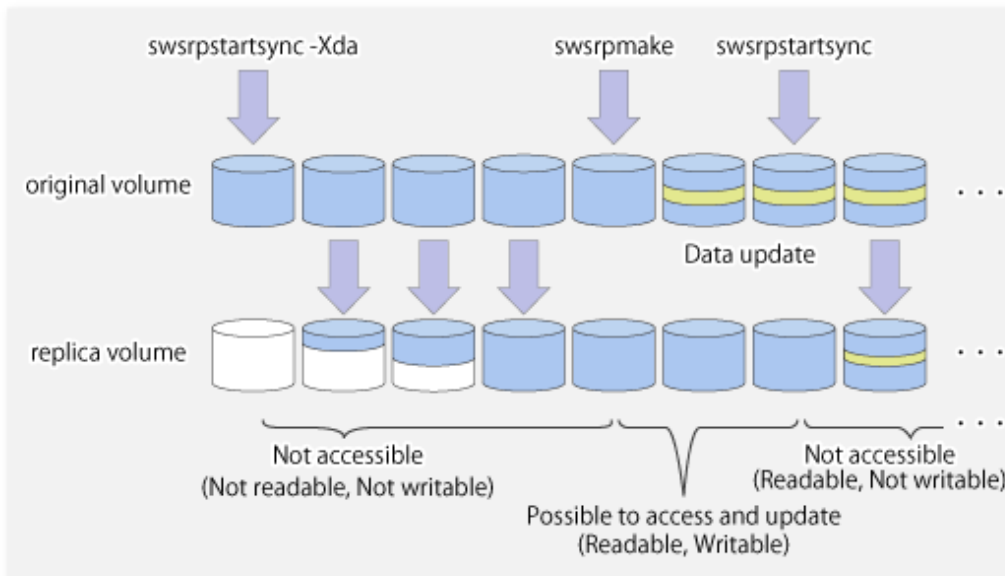
In the state of maintained equivalency, any upgrades on the replication source volume are successively reflected on the replication target volume, so that any access to the replication target volume would possibly be inappropriate.

The Destination Access Permission function can be used to inhibit access from users to the replication target in such unsuitable moments.



To set the Destination Access Permission function, execute 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.



6.5.3 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.

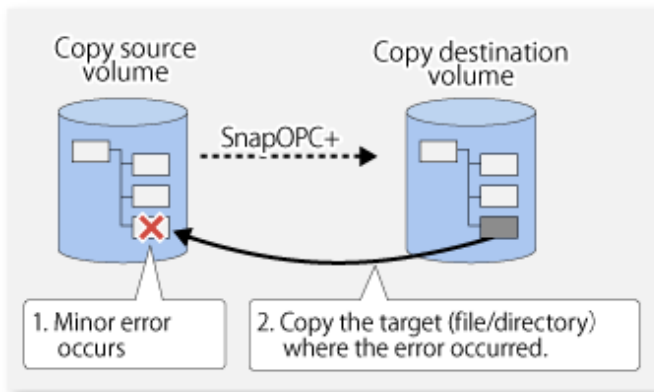
Restoration can be executed according to the following procedures:

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 6.45 Manual Restoration with SnapOPC+

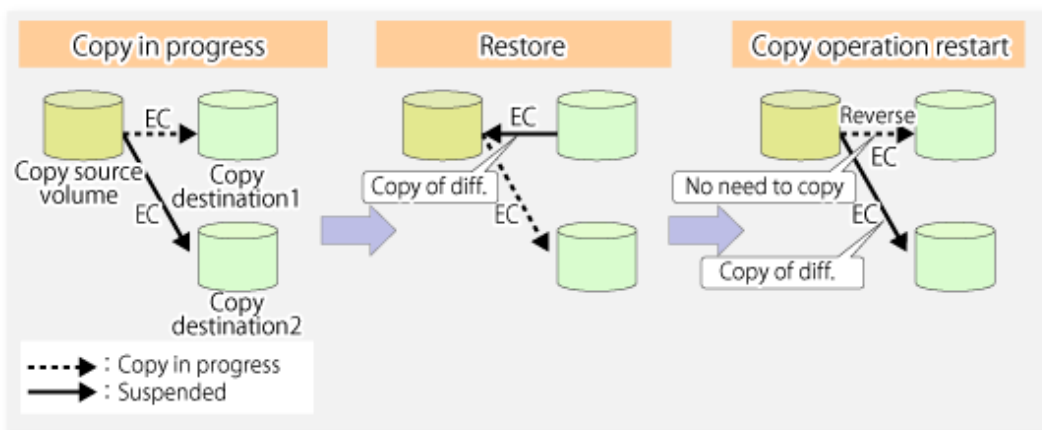


6.5.4 Execution of Synchronization Reversal

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 6.46 Example of EC Reversal Operation



6.6 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.

6.6.1 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.

6.6.2 Deleting Source Volume or Replica Volume

To delete the source volume or the replica volume that have been configured, use the `swsrpdelvol` command.

6.6.3 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 of this, refer to "[6.6.2 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 "[6.4.4 Fetching Device Information on Managed Server](#)".
4. Configure the source/replica volume with the new information.

6.7 Stopping Operation

To stop replication processing that is in progress, or to change synchronized replication into snapshot replication, use the `swsrancel` command.



To stop replication processing by SnapOPC+, start with the oldest snap generation.

To forcibly stop the second or subsequent snap generations, use the `-Xforce` option with the `swsrancel` command. This stops the specified snap generation and all earlier snap generations.

If the `-Xforce` and `-Xgroup` options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

To stop replication operation, stop the daemon on the Managed Server. In general, the daemon stops when the system stops.

The daemon can be stopped independently if it needs to be stopped for some reason. For more information, refer to "[Chapter 2 Starting and Stopping Daemons](#)".



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.

6.8 LVM Volume Operation

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

- Replication in units of volume groups
- Replication in units of physical disks (LU: Logical Unit)

Note

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

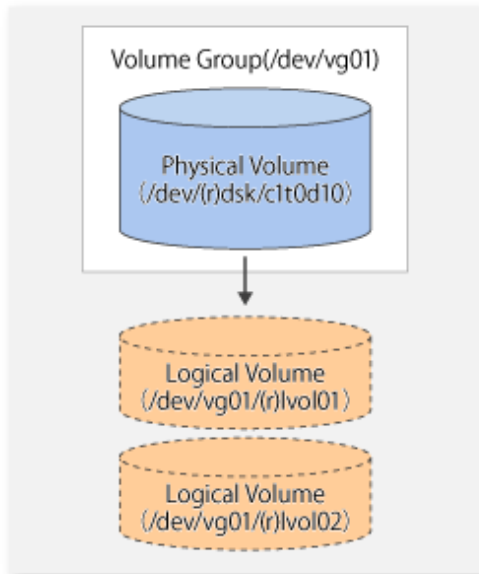
6.8.1 Replication in Units of Volume Groups

Provided that all volume group configurations satisfy the following conditions, the replication can be performed in units of volume groups.

- One volume group has only one physical disk, and logical volumes are configured so that one physical disk includes n logical volumes.

If the above conditions are not satisfied, replication must be performed in units of physical disks.

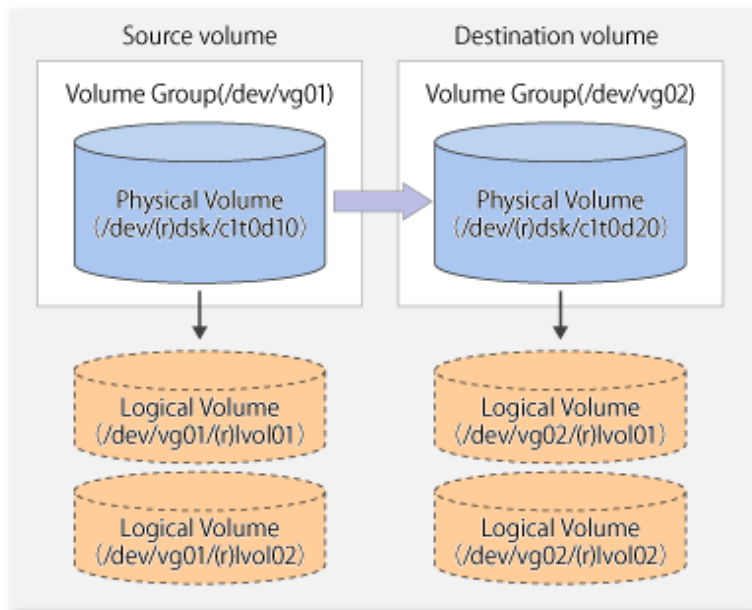
Figure 6.47 Example of Configuration in Which Replication Can Be Performed in Units of Volume Groups



6.8.1.1 Operation Design

Ensure that the following conditions are met when designing volume groups for use as source or replica volume groups:

- All physical disks must have the same size.
- The configurations of all logical volumes must be the same.



6.8.1.2 Preparations

6.8.1.2.1 Saving Volume Group Configuration Information File

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

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

Note

Replication cannot be performed if a volume group configuration information file has not been saved. In this case, target volume post-processing results in an error during replication.

Customize the post-processing script for the target volume if volume group configuration information has been saved to another file.

6.8.1.2.2 Configuring Source Volume and Replica Volume

When configuring the source volume and the replica volume, specify their volume groups.

Example

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vg01 /dev/vg02
swsrpsetvol completed
#
```

6.8.1.2.3 Customizing Pre-processing and Post-processing Scripts

If a volume group is to be replicated, the pre-processing and post-processing scripts must be customized.

Refer to "[Appendix C Pre-processing and Post-processing of Replication](#)" for information on the customization procedure.

Note

If replication is attempted without customization of the scripts, pre-processing for the source volume causes an error, so that replication cannot be achieved.

6.8.1.3 Replication in Units of Volume Groups

Execute replication with a volume group specified.

Example of Snapshot Replication

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpmake completed
#
```

Example of Synchronous Replication

```
# /opt/FJSVswsrp/bin/swsrpstartsync /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpstartsync completed
:
(After state of equivalency upkeep)
:
# /opt/FJSVswsrp/bin/swsrpmake /dev/vg01 /dev/vg02
FROM=/dev/vg01@SV1, TO=/dev/vg02@SV1 swsrpmake completed
#
```

6.8.2 Replication in Units of Physical Disks

When the volume group configuration does not satisfy the conditions for operation in units of volume groups, replication can be performed by operation in units of physical disks.

When backup is performed in units of physical disks, volume group integrity must be maintained and, therefore, all physical disks in the volume group must be operated synchronously.

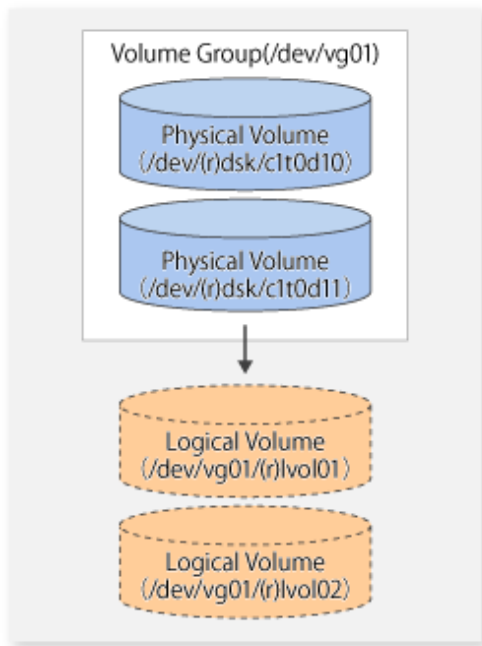
Point

Physical volumes that should be operated synchronously can be checked by using Web Console or the [stgxfwcmdispdev](#) command.

Note

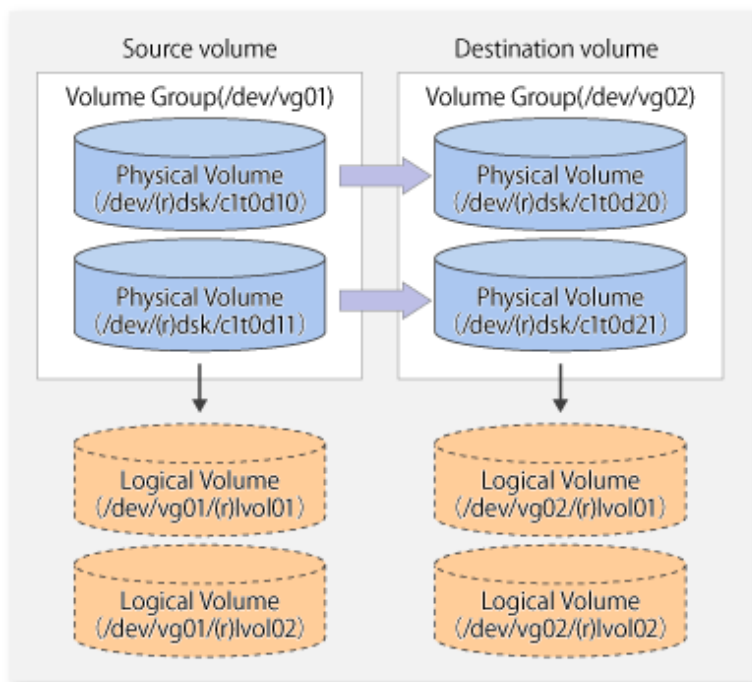
For operation in a cluster configuration, the device name (`/dev/(r)dsk/c#t#d#`) of the physical disks that comprise the volume group must be the same at all servers that comprise the cluster, and the ETERNUS Disk storage system's disk indicated by the device name must be the same.

Figure 6.48 Sample Configuration for Operation in Units of Physical Disks



6.8.2.1 Operation Design

To use the replica volume after replication in the situation when a source volume is a volume group, the replica volume must have the same logical volume configuration as the source volume and must be a volume group of the same physical size.



6.8.2.2 Preparations

6.8.2.2.1 Saving Volume Group Configuration Information File

The volume group configuration information file must be restored during replication post-processing. Confirm that the volume group configuration file has been saved. It is usually saved to the following location:


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

6.8.2.2 Configuring Source and Replica Volumes

When configuring the source and replica volumes, specify all of the physical disks in the volume group.

Example

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/dsk/clt0d10 /dev/dsk/clt0d20
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/dsk/clt0d11 /dev/dsk/clt0d21
swsrpsetvol completed
#
```

6.8.2.3 Replication in Units of Physical Disks

Perform the operation by synchronizing all physical disks in the volume group.

Perform the required pre-processing and post-processing work for each volume group before and after (respectively) the replication.

Disable pre-processing and post-processing when operating individual physical disks.

Example of Snapshot Replication

```
(Perform pre-processing for the source and target volumes.)

# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/clt0d10 /dev/dsk/clt0d20
FROM=/dev/dsk/clt0d10@SV1, TO=/dev/dsk/clt0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/clt0d11 /dev/dsk/clt0d21
FROM=/dev/dsk/clt0d11@SV1, TO=/dev/dsk/clt0d21@SV1 swsrpmake completed
#

(Perform post-processing for the source and target volumes.)
```

Example of Synchronous Replication

```
(Perform pre-processing for the target volume.)

# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/dsk/clt0d10 /dev/dsk/clt0d20
FROM=/dev/dsk/clt0d10@SV1, TO=/dev/dsk/clt0d20@SV1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/dsk/clt0d11 /dev/dsk/clt0d21
FROM=/dev/dsk/clt0d11@SV1, TO=/dev/dsk/clt0d21@SV1 swsrpstartsync completed
#

(After state of equivalency upkeep)
(Perform pre-processing for the source volume.)

# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/clt0d10 /dev/dsk/clt0d20
FROM=/dev/dsk/clt0d10@SV1, TO=/dev/dsk/clt0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/clt0d11 /dev/dsk/clt0d21
FROM=/dev/dsk/clt0d11@SV1, TO=/dev/dsk/clt0d21@SV1 swsrpmake completed
#

(Perform post-processing for the source and target volumes.)
```

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

Table 6.6 Pre- and Post-processing of Replication

	Pre-processing	Post-processing
Source volume	<ol style="list-style-type: none">1. Ensure data integrity by preventing access to all logical volumes in the volume group.2. If file systems are included, unmount all file systems in the volume group.	If file systems are included, remount the volumes that were unmounted by pre-processing.

	Pre-processing	Post-processing
Target volume	<ol style="list-style-type: none"> 1. Prevent access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 	<ol style="list-style-type: none"> 1. Reconfigure the volume group. 2. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring Volume Group

Reconfigure the volume group as follows:

1. Deactivate the volume group.

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

2. Restore volume group configuration information.

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/clt0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/clt0d21
#
```

3. Reactivate the volume group.

- When cluster operation is enabled:

```
# /usr/sbin/vgchange -c y /dev/vg02
# /usr/sbin/vgchange -a e /dev/vg02
```

- When cluster operation is disabled:

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

Reconfigure shared mode volume groups using the following procedure:

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

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

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

```
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/clt0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/clt0d21
#
```

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

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

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

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



Note

After performing replication, you have to reconfigure the volume group; otherwise, there may be output of a PV-LINK message to the system log.

[Example of output]

```
Feb 28 11:58:06 lavender vmunix: LVM: VG 64 0x220000: PVLink 31 0x140100 Wrong Disk!: PVID or VGID on the disk does not match with that in the kernel.
```

Likewise, if you have set PV-LINK messages to be monitored by Storage Cruiser's failure monitoring, you are notified of an "Error" level event.

If you want to suppress such event notifications, referring to the customization procedure, edit the "SNMP Trap XML configuration file" of Storage Cruiser's agent.

Also note that PV-LINK messages may also be output for operations other than of AdvancedCopy Manager.

[Customization procedure]

1. Edit the "SNMP Trap XML configuration file" for Storage Cruiser's agent.

[File to be edited]

```
/etc/opt/FJSSVssage/snmpth/1_3_6_1_4_1_211_4_1_3_21_2_4.xml
```

[Contents to be edited]

Commentate the following portions according to the XML rules:

```
<TrapType type="ST1" flag="001111" cf="1000" level="E" msg="%s">
  <ARG index="0" VBIndex="2"/>
  <MSG key=".*LVM: .*PVLink.*!.*" />
</TrapType>
```

[Example of editing]

Below example shows how to commentate by inserting the red text portions.

In the example, PV-Link messages that match the regular expression ".*LVM: .*PVLink.*!.*" are exempt from failure monitoring in Storage Cruiser.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE SNMPTrapControl[
<!ATTLIST TrapType type ID #REQUIRED>
]>
<SNMPTrapControl name="LVM" ver="1.0">
  <TrapType type="ST1" flag="001111" cf="1000" level="E" msg="%s">
    <ARG index="0" VBIndex="2"/>
    <MSG key=".*LVM: Path.*" />
  </TrapType>
  <!-- COMMENT Start =====
  <TrapType type="ST1" flag="001111" cf="1000" level="E" msg="%s">
    <ARG index="0" VBIndex="2"/>
    <MSG key=".*LVM: .*PVLink.*!.*" />
  </TrapType>
  ===== COMMENT End -->
</SNMPTrapControl>
```

2. Restart Storage Cruiser's agent.

For information on restarting methods, refer to the *ETERNUS SF Storage Cruiser Operation Guide*.

6.9 VxVM Volume Operation

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

6.9.1 Replication Operation in Units of Physical Disks

If a VxVM volume is the replication target, execute replication in the physical disk units that comprise the VxVM volume.

When replication operation is performed in units of physical disks, disk group integrity must be maintained and, therefore, all the physical disks in the disk group must be replicated synchronously.

Point

For the physical volume which should be synchronized, confirm it by using either Web Console or the `stgxfwcmdispdev` command.

Note

- Before starting this operation, be sure to understand the basic operation of ordinary volumes.
- Snapshot backup is recommended for backing up in units of physical disks. In the case of synchronized backup, commands that access destination volumes, such as VxVM commands, cannot be executed during full copy or differential copy.
- For operation in a cluster configuration, the device name (`/dev/(r)dsk/c#t#d#`) of the physical disks that comprise the disk group must be the same at all servers that comprise the cluster, and the ETERNUS Disk storage system's disk indicated by the device name must be the same.
- AdvancedCopy Manager supports device names in both the legacy format and the new format. Refer to "1.4.1 Normal Devices" for details. Physical disks that comprise VxVM can use only legacy format devices (`/dev/(r)dsk/c#t#d#`) and they cannot use new format devices (`/dev/(r)dsk/disk#`). Therefore, if VxVM is used, the AdvancedCopy Manager information collection mode must be set in legacy format devices. Refer to "9.2.14 `stgxfwcmsetmode` (Information Collection Mode Configuration Command)" for details of information collection modes.
- The physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must be set as devices with the same format as the AdvancedCopy Manager information collection mode.

Example

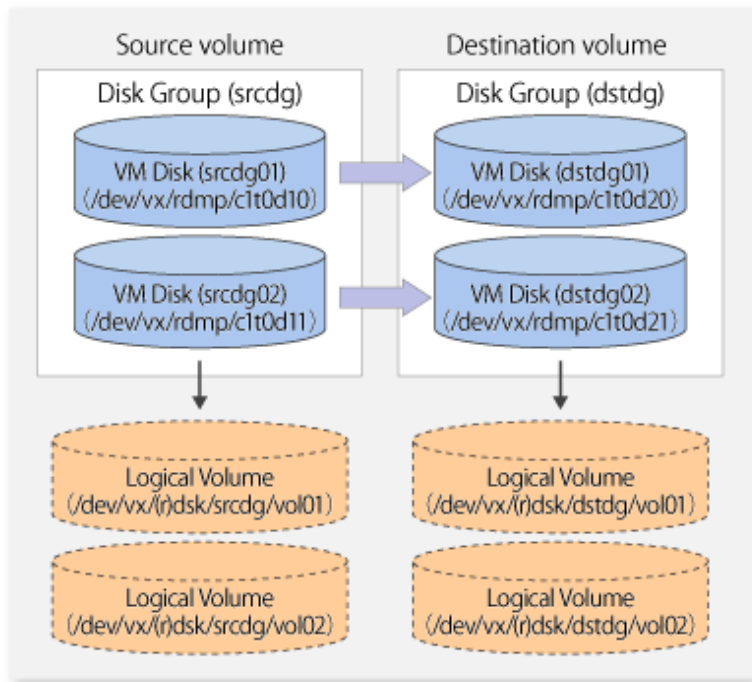
If the AdvancedCopy Manager information collection mode is "Legacy format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be legacy format devices.

6.9.1.1 Configuration

When configuring the disk groups of the original and replica volumes, you should note the following:

- The number, sizes, and types of VM disks must be the same.
- The configurations of logical volumes must be the same.

Figure 6.49 Copy Source Volume and Copy Destination Volume



6.9.1.2 Preparations

6.9.1.2.1 Confirming Disk Group Configuration Information File

The disk group must be reconfigured in replication post-processing. Confirm that a volume group configuration information file has been saved.

```
# /usr/sbin/vxprint -hvmps -g srcdrg > /tmp/aaa
```

6.9.1.2.2 Configuring Original and Replica Volumes

When setting the original and replica volumes, specify all disks in the volume group.

Example of Setting Original and Replica Volumes

```
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/clt0d10@SV1 /dev/vx/dmp/clt0d20@SV2
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/clt0d11@SV1 /dev/vx/dmp/clt0d21@SV2
swsrpsetvol completed
#
```

6.9.1.3 Replication

Perform Replication by synchronizing all physical disks in the disk group.

Perform the required pre-processing or post-processing work for each volume group respectively before and after the replication operation. Disable pre-processing and post-processing when replicating individual physical disks.

Example of Snapshot Backup

```
(Perform pre-processing for the source and target volumes.)

# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/clt0d10@SV1 /dev/vx/dmp/clt0d20@SV2
FROM=/dev/vx/dmp/clt0d10@SV1, TO=/dev/vx/dmp/clt0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/clt0d11@SV1 /dev/vx/dmp/clt0d21@SV2
FROM=/dev/vx/dmp/clt0d11@SV1, TO=/dev/vx/dmp/clt0d21@SV2 swsrpmake completed
#
```

(Perform post-processing for the source and target volumes.)

Example of Synchronous Replication

(Perform pre-processing for the target volume.)

```
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/vx/dmp/clt0d10@SV1 /dev/vx/dmp/clt0d20@SV2
FROM=/dev/vx/dmp/clt0d10@SV1, TO=/dev/vx/dmp/clt0d20@SV2 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/vx/dmp/clt0d11@SV1 /dev/vx/dmp/clt0d21@SV2
FROM=/dev/vx/dmp/clt0d11@SV1, TO=/dev/vx/dmp/clt0d21@SV2 swsrpstartsync completed
#
```

(After state of equivalency upkeep)

(Perform pre-processing for the source volume.)

```
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/clt0d10@SV1 /dev/vx/dmp/clt0d20@SV2
FROM=/dev/vx/dmp/clt0d10@SV1, TO=/dev/vx/dmp/clt0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/clt0d11@SV1 /dev/vx/dmp/clt0d21@SV2
FROM=/dev/vx/dmp/clt0d11@SV1, TO=/dev/vx/dmp/clt0d21@SV2 swsrpmake completed
#
```

(Perform post-processing for the source and target volumes.)

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

Table 6.7 Replication Pre-processing and Post-processing

Type	Pre-processing	Post-processing
Source volume	<ol style="list-style-type: none"> 1. Secure data integrity by stopping access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 	If file systems are included, remount the volumes that were unmounted by pre-processing.
Target volume	<ol style="list-style-type: none"> 1. Stop access to all logical volumes in the volume group. 2. If file systems are included, unmount all file systems in the volume group. 3. Deport the disk group. 4. Set the disk groups subordinate physical disks to offline. 	<ol style="list-style-type: none"> 1. Online the physical disks that were set to offline during preprocessing. 2. Reconfigure the volume group. 3. If file systems are included, remount the volumes that were unmounted by pre-processing.

Reconfiguring Disk Group (for Replication on single Server)

Reconfigure the disk group as follows:

1. Pre-commit analysis for restoration

```
# /etc/vx/bin/vxconfigrestore -p dstdg
Diskgroup dstdg configuration restoration started .....

Installing volume manager disk header for clt0d20 ...
Installing volume manager disk header for clt0d21 ...
-
dstdg's diskgroup configuration is restored (in precommit state).
Diskgroup can be accessed in read only and can be examined using
vxprint in this state.
```

Run:

```
vxconfigrestore -c dstdg ==> to commit the restoration.
```

```
vxconfigrestore -d dstdg ==> to abort the restoration.  
#
```

2. Commit the change required for restoring the configuration of the copy destination disk group.

```
# /etc/vx/bin/vxconfigrestore -c dstdg  
Committing configuration restoration for diskgroup dstdg ....  
  
dstdg's diskgroup configuration restoration is committed.  
#
```

Reconfiguring Disk Group (for Server-to-server Replication)

1. Import the disk group "srcdg" on the master server as disk group "dstdg" on the target server.

```
# /usr/sbin/vxdg -C -n dstdg import srcdg  
#
```

Note

When the disk group name is the same in the server of the source and destination, the -n option is not specified.

2. Execute recovery processing for the volume in the disk group "dstdg" on the target server.

```
# vxrecover -g dstdg -sb  
#
```

3. Because udid of the copy destination disk is not an adjustment, this is restored.

```
# vxdisk updateudid c1t0d20 c1t0d21  
#
```

Note

- When performing a system disk exchange, there are cases when multiple conflicting configuration information backups may exist for one disk group.
In such cases, the disk group ID displayed after executing the above command needs to be set and executed instead of the disk group.
- When the volumes within a disk group are required to be run in synchronous mode in the background and depending on the volume configuration it may take some time for synchronous processing to complete after this operation.
It is also possible to use the volumes during this time.

Chapter 7 Storage Cluster Continuous Copy Function

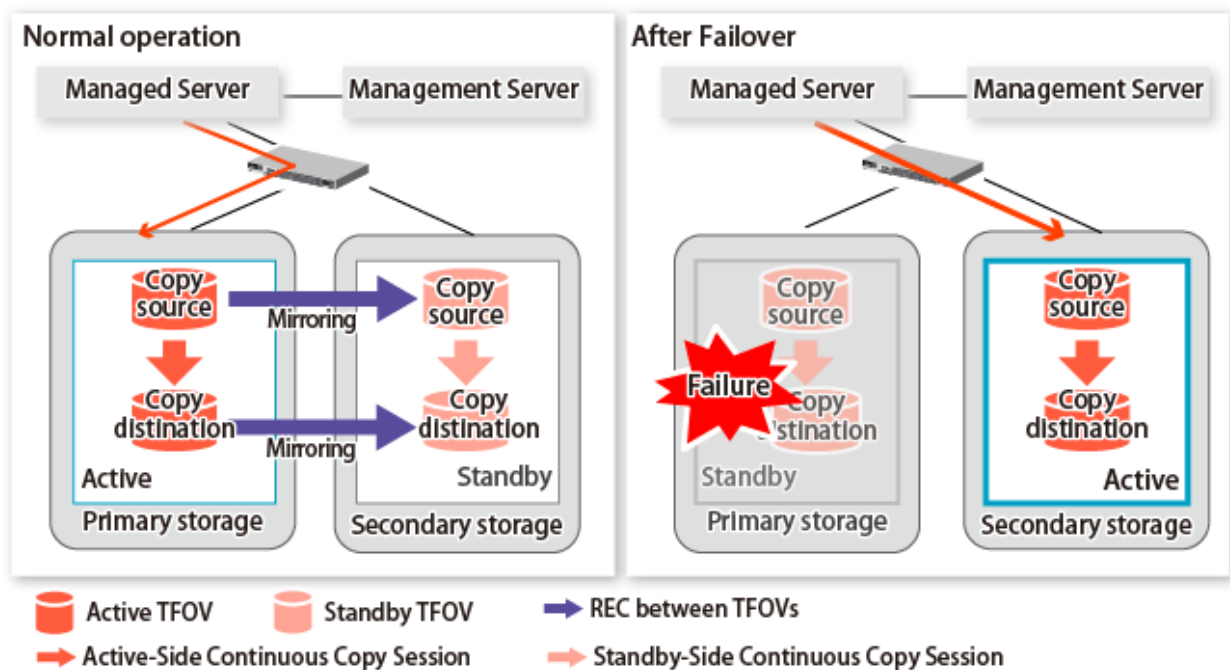
This chapter provides details of the replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function.

7.1 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 *ETERNUS SF Storage Cruiser Operation Guide* for Storage Cluster function.

Figure 7.1 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

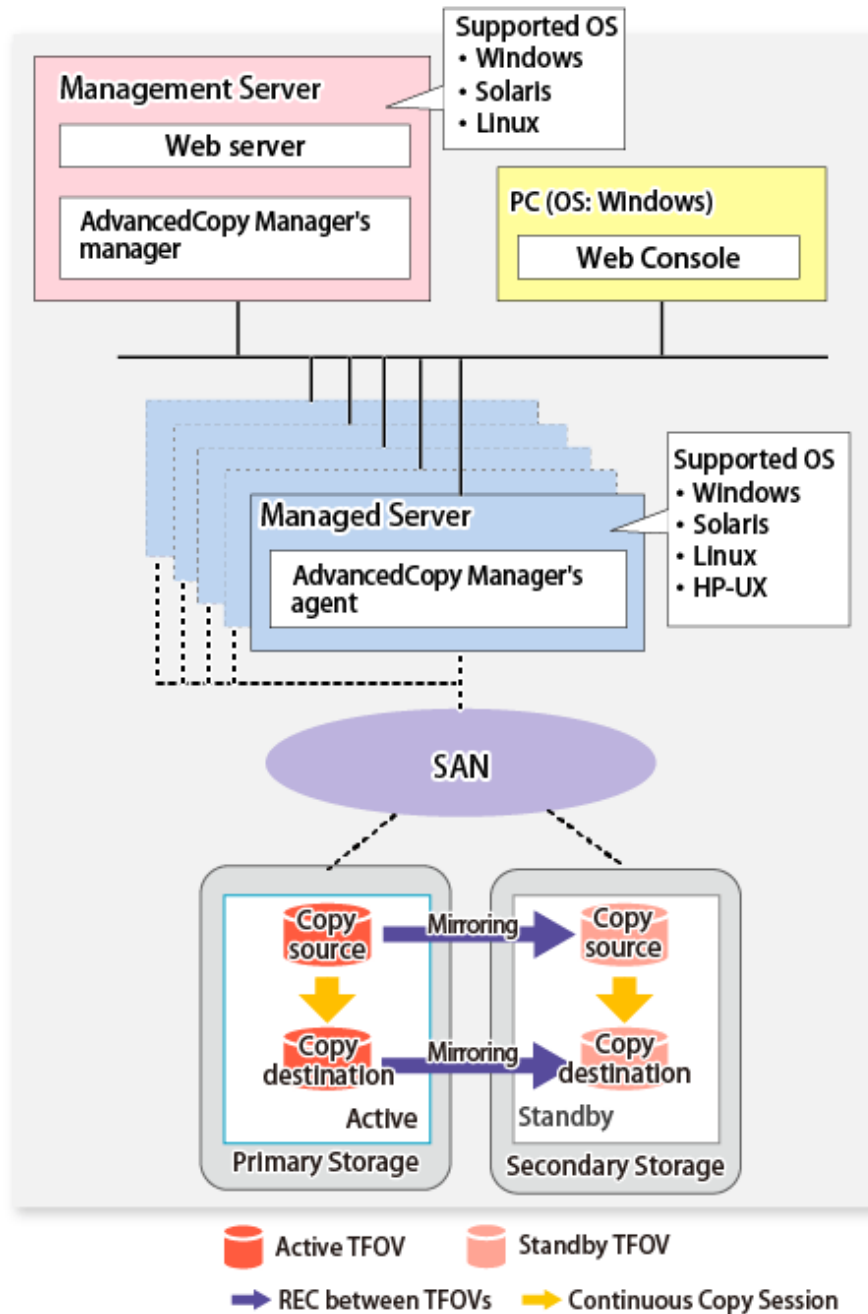
- Advanced Copy can be executed even if either the Primary Storage or the Secondary Storage is stopped.
- The Storage Cluster Continuous Copy function cannot be used when copying between non-TFOVs. Use the conventional Advanced Copy.
- The Storage Cluster Continuous Copy function cannot be used when 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 *ETERNUS SF 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 *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for details.

7.1.1 System Configuration

A system configuration using the Storage Cluster Continuous Copy function is shown below.

Figure 7.2 System Configuration Using Storage Cluster Continuous Copy Function



7.1.2 Operating Requirements

Refer to "Storage Cluster Function" in the *ETERNUS SF Storage Cruiser Operation Guide*.

7.1.3 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

A=Available, N/A=Not Available

7.2 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 "[6.2 Configuration](#)" for details.

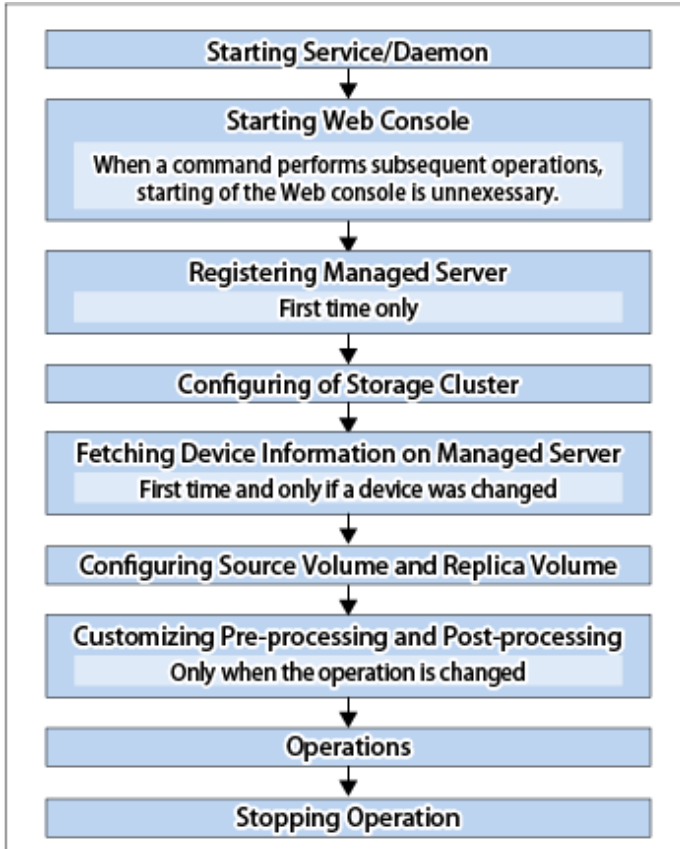
Note

- 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.

7.3 Flow of Operation

The flow of the replication operation when using the Storage Cluster Continuous Copy function is as described below.

Figure 7.3 Flow of Replication Operation When Using Storage Cluster Continuous Copy Function



7.4 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 Daemon
Normally, the daemon is configured to be automatically invoked at system startup.
However, if a daemon fails to start for some reason or has stopped, both servers must restart their respective daemons. For information about starting daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
2. Starting Web Console
Start Web Console. For details, refer to "How to Start Web Console" in the *ETERNUS SF Web Console Guide*.
3. Registering Managed Server
The Management Server registers the Managed Server to be managed.
Refer to "[6.4.3 Registering Managed Server](#)" for details.
4. Configuration of Storage Cluster
Set up the Storage Cluster environment.
Refer to "Storage Cluster Function" in the *ETERNUS SF 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 "[6.4.4 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 "[6.4.5 Configuring Source Volume and Replica Volume](#)" for details.
When creating groups, refer to "[6.4.7 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 *ETERNUS SF 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 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 "[6.4.6 Customizing Pre-processing and Post-processing](#)" for details.

7.5 Operations

The replication operation of AdvancedCopy Manager using the Storage Cluster Continuous Copy function is the same as a non-TFOV. Refer to "[6.5 Operations](#)" for details.

Refer to "[Chapter 9 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 "[7.7 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 "[7.8.2 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 *ETERNUS SF Web Console Guide*.

- For using AdvancedCopy Manager Copy Control Module commands
 - accopy query
 - accopy fcancel

Refer to "Command References" in the *ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module* for information on the commands.

.....

7.6 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 *ETERNUS SF Storage Cruiser Operation Guide* for the Storage Cluster environment of maintenance procedure.

Figure 7.4 When Primary Storage Is Stopped

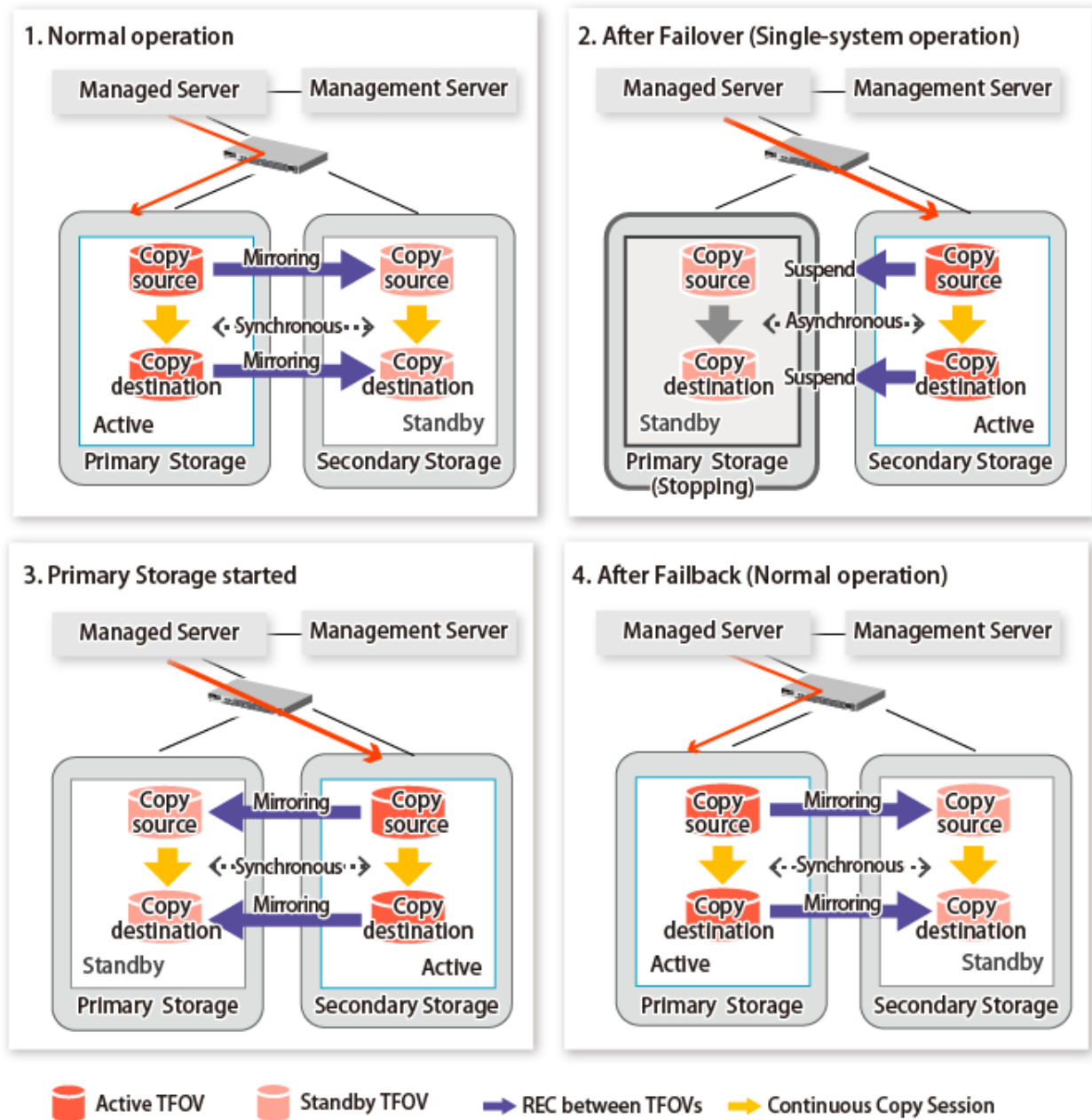
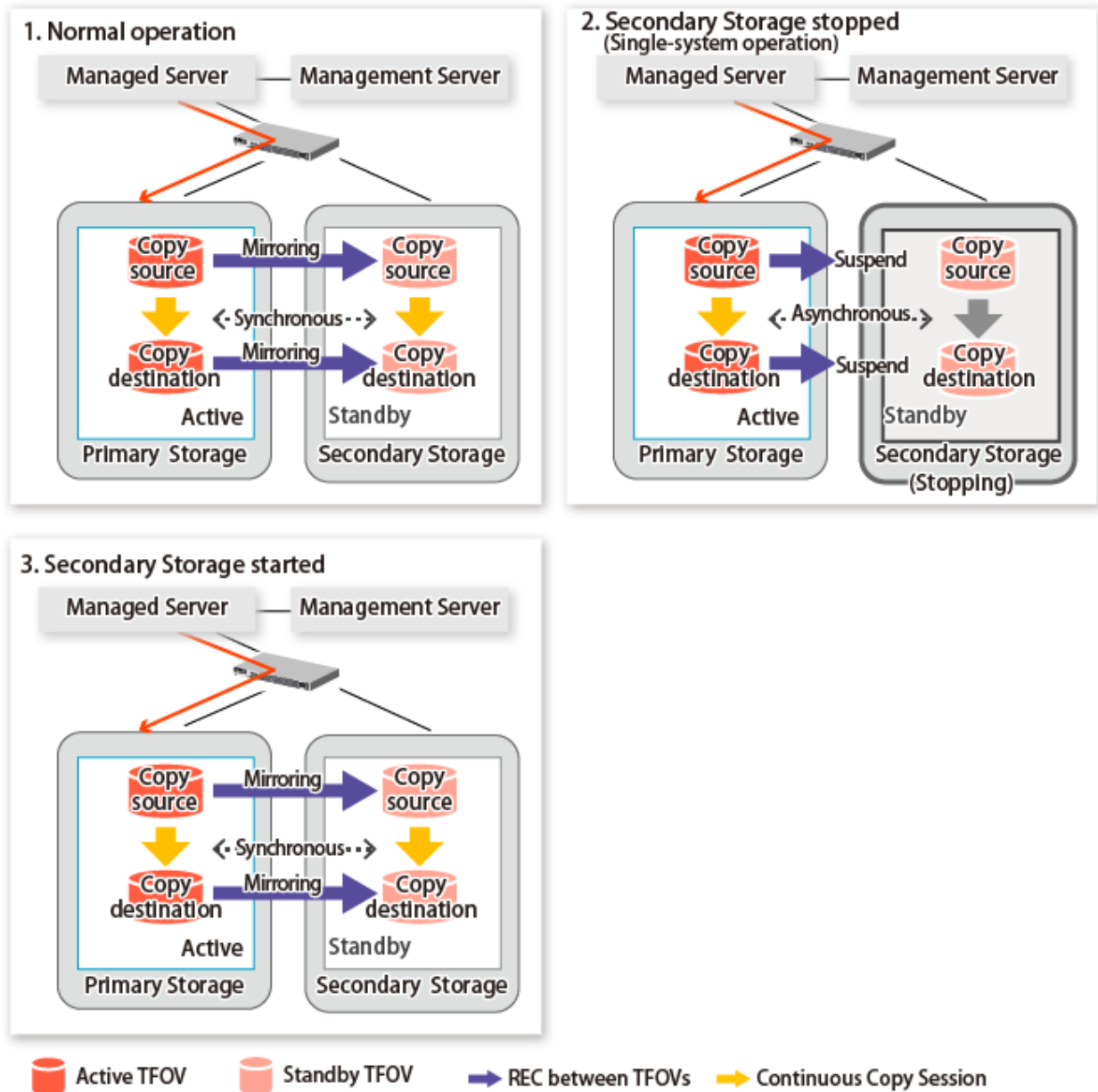


Figure 7.5 When Secondary Storage Is Stopped

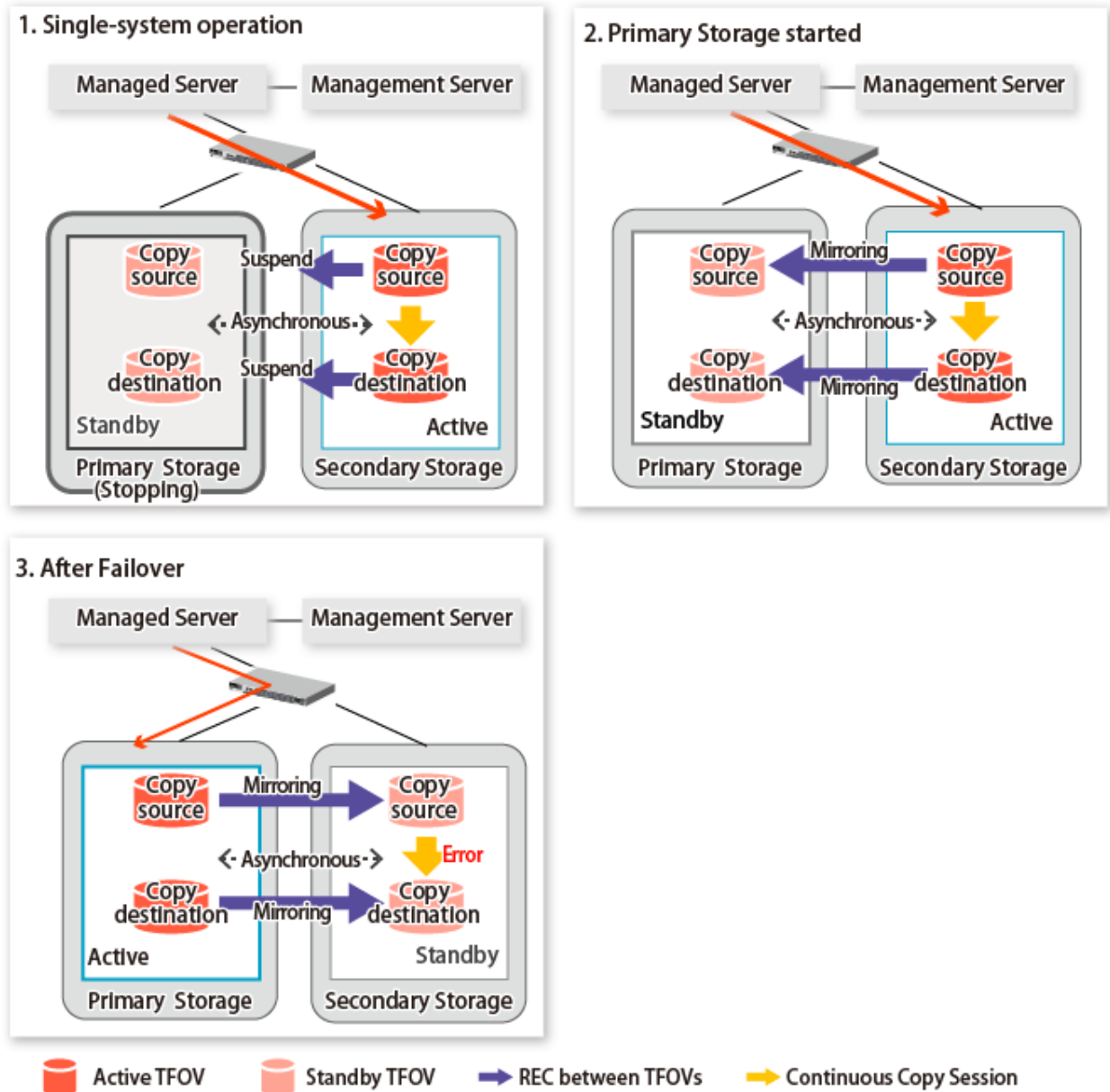


Point

- 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 "7.7 When

Recovering Storage Cluster Continuous Copy Function" and check that the status of the Primary Storage and the Secondary Storage are the same.

Figure 7.6 When Failback Is Carried Out in State Where There Are Only Sessions on Storage Where TFO Status Is "Active"



7.6.1 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 *ETERNUS SF Storage Cruiser Operation Guide* for the details of 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`
 - `swsrpmake`
 - `swsrprevsync`

When the TFO status on the Secondary Storage is "Active", the following commands cannot be executed, either:

- `swsrpstat`
- `swsrpcancel`

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 *ETERNUS SF Storage Cruiser Operation Guide* to recover the Storage Cluster environment, and 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 7.7 When Automatic Failover Is Performed Due to Hardware Failure Occurring on Primary Storage Where TFO Status Is "Active"

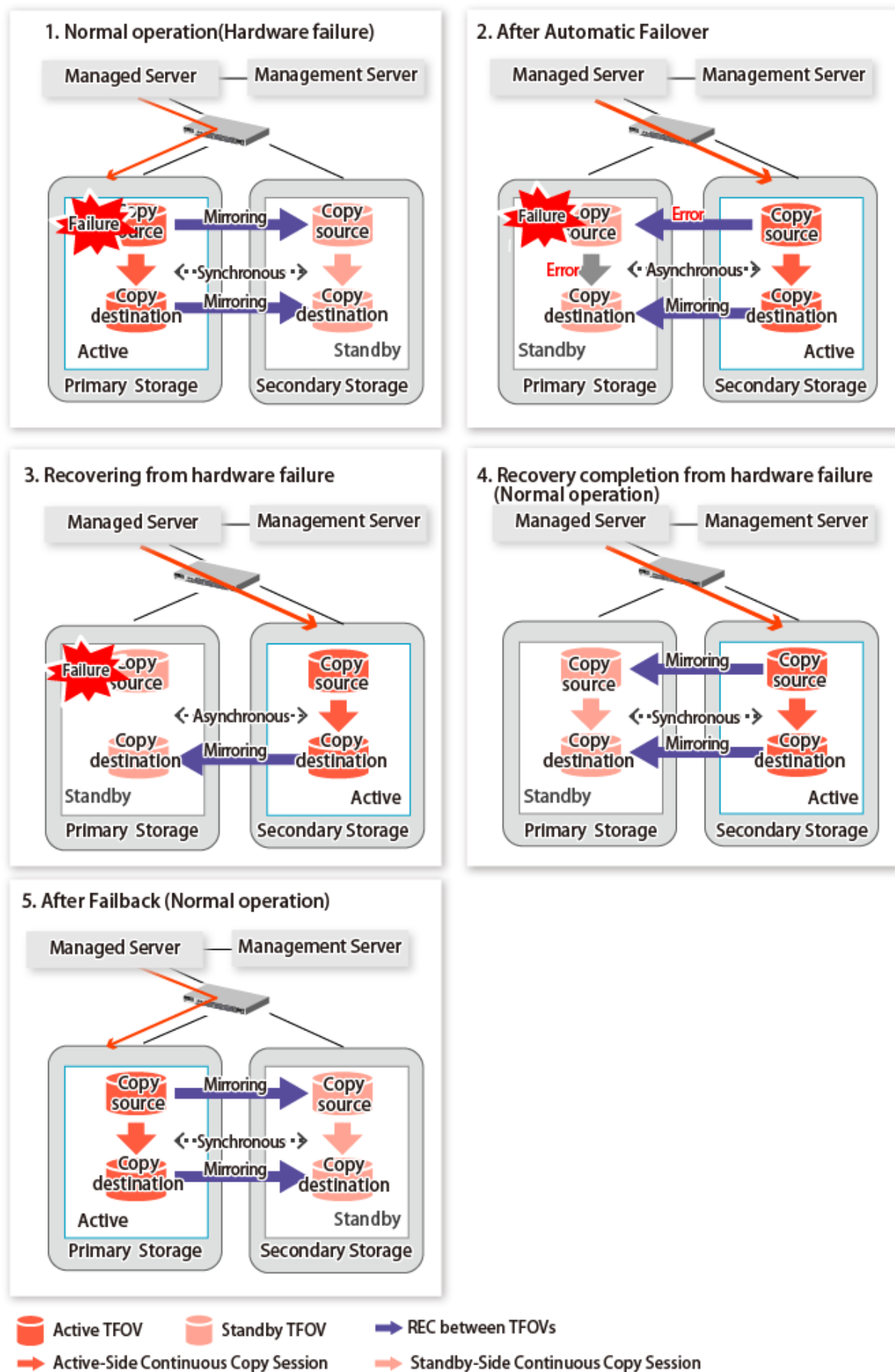


Figure 7.8 When Manual Failover Is Performed Due to Hardware Failure Occuring on Storage Device Where TFO Status Is "Active"

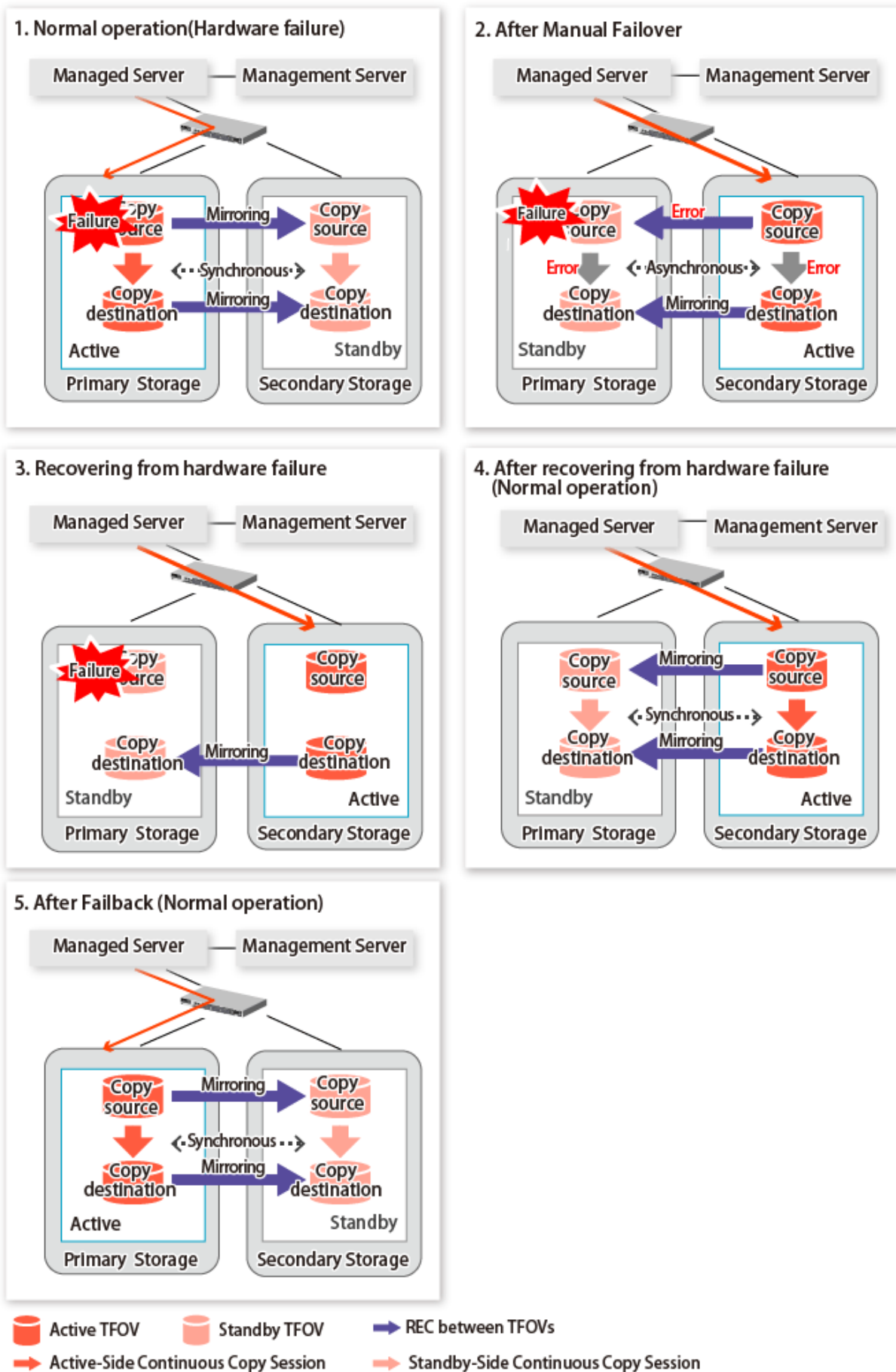
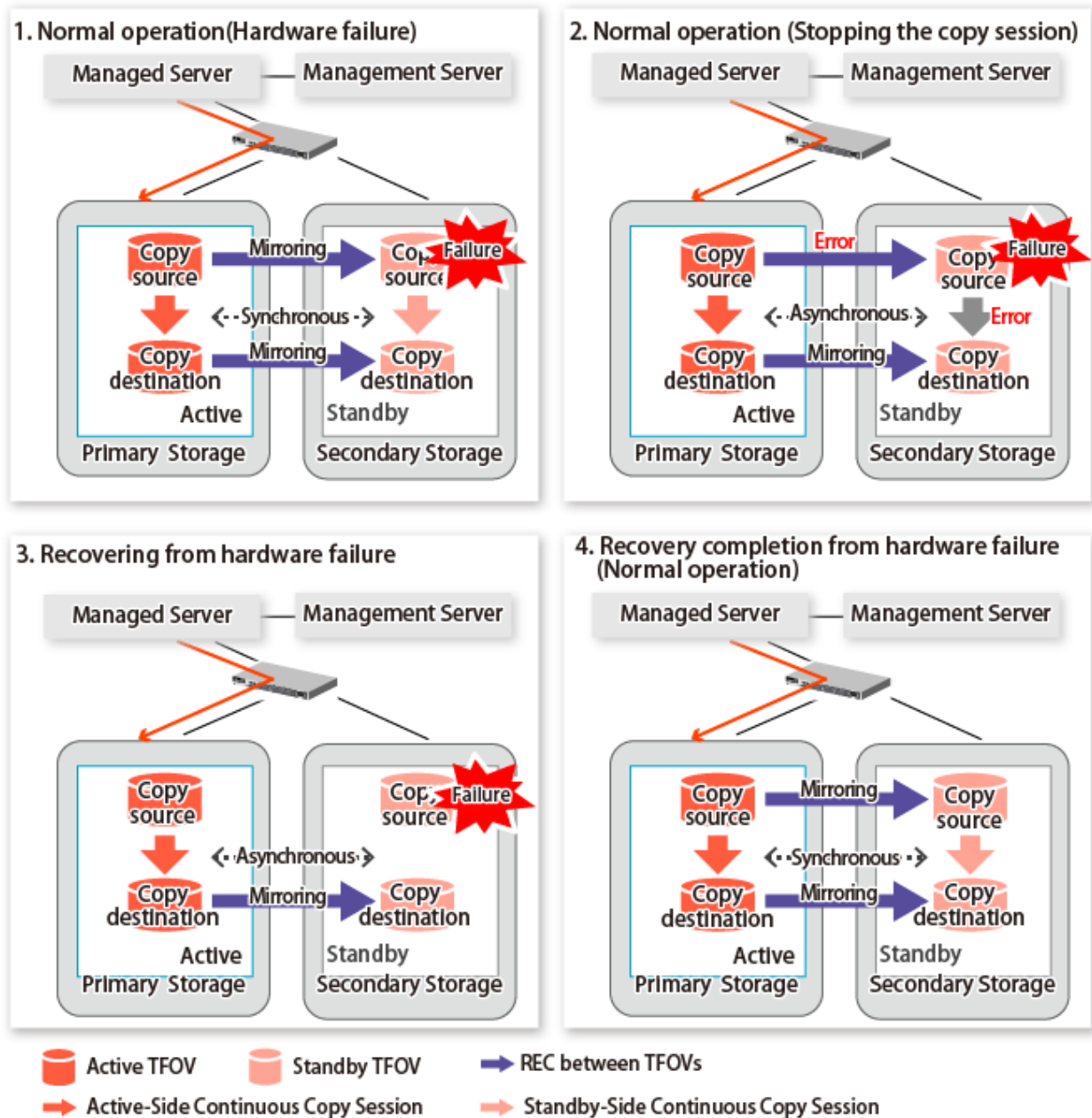


Figure 7.9 Hardware Failure Occurred on Storage Device Where TFO Status Is "Standby"



7.7 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 7.1 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 7.1 Corrective Action

Advanced Copy Status of Storage Where TFO Status Is "Active"	Continuous Copy Session Status	Action
<ul style="list-style-type: none"> - readying - snap 	When the Standby-Session column for the <code>swsrpstat</code> command, or the Storage Cluster Standby copy session column for Web Console is "not-exist".	<p>Execute the <code>swsrpmake</code> command.</p> <p>When taking measures on Web Console, refer to "Start OPC/QuickOPC/SnapOPC/SnapOPC+" in the <i>ETERNUS SF Web Console Guide</i>, and start the copy.</p>
<ul style="list-style-type: none"> - sync - equivalent 	When the Standby-Session column for the <code>swsrpstat</code> command, or the Storage Cluster Standby copy session column for Web Console is "not-exist".	<ol style="list-style-type: none"> 1. Execute the <code>swsrpmake</code> command to temporarily suspend EC (Suspend). 2. Execute the <code>swsrpstartsync</code> command to resume EC. <p>When taking measures on Web Console, refer to "Suspend EC" and "Start/Resume EC" in the <i>ETERNUS</i></p>

Advanced Copy Status of Storage Where TFO Status Is "Active"	Continuous Copy Session Status	Action
		<i>SF 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".	<ol style="list-style-type: none"> Execute the swsrpstartsync command to resume EC. Execute the swsrpmake command to temporarily suspend EC (Suspend). <p>When taking measures on Web Console, refer to "Start/Resume EC" and "Suspend EC" in the <i>ETERNUS SF Web Console Guide</i>, and to temporarily resume / suspend copying.</p>
failed	When the Standby-Session column for the swsrpstat command, or Storage Cluster Standby copy session column for Web Console is "not-exist".	<ol style="list-style-type: none"> Execute the swsrpcancel command, and stop the copy. Execute the swsrpmake command or the swsrpstartsync command, and start the copy. <p>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>ETERNUS SF Web Console Guide</i>, and to temporarily stop/resume copying.</p>
----	When the TFO Info column for the accopy query command, or the Storage Cluster/Session Status column for Web Console is "unpaired".	<ol style="list-style-type: none"> 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>ETERNUS SF AdvancedCopy Manager Operation Guide for Copy Control Module</i> for information on the command. Execute the swsrpmake command or the swsrpstartsync command, start the copy. <p>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>ETERNUS SF Web Console Guide</i>, and to temporarily forcible cancel/ resume copying.</p>

7.8 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 ["6.6 Changing Configuration Information"](#).

7.8.1 Deleting Storage Cluster Environment

When deleting the Storage Cluster environment, delete the replication volume settings for the replication operation.

Refer to ["6.6.2 Deleting Source Volume or Replica Volume"](#) for the deletion procedure of the replication volume information.

7.8.2 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 "7.4 Preparations", and update the device information.
3. Setting up the source volumes and replica volumes
Refer to "Configuring Source Volume and Replica Volume" in "7.4 Preparations", and reset the source volume and replica volumes.

7.9 Cascade Copies

This section describes cascade copy when using the Storage Cluster Continuous Copy function.

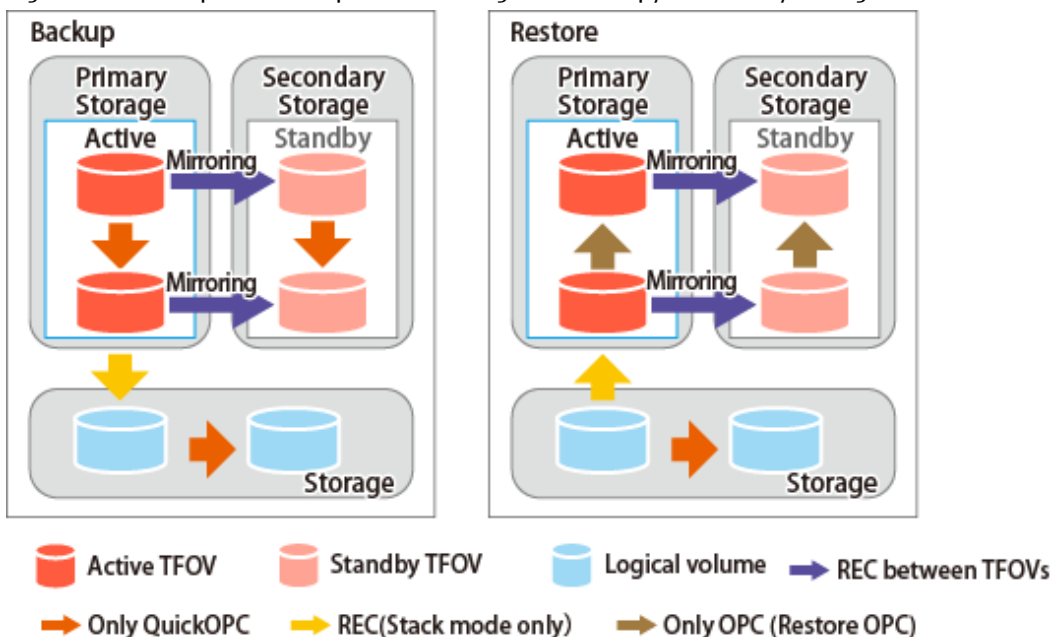
A cascade copy links the copy destination to the processing of another copy as a copy source. Refer to the ETERNUS Disk storage system manuals for details of the cascade copies.

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 *ETERNUS SF 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.

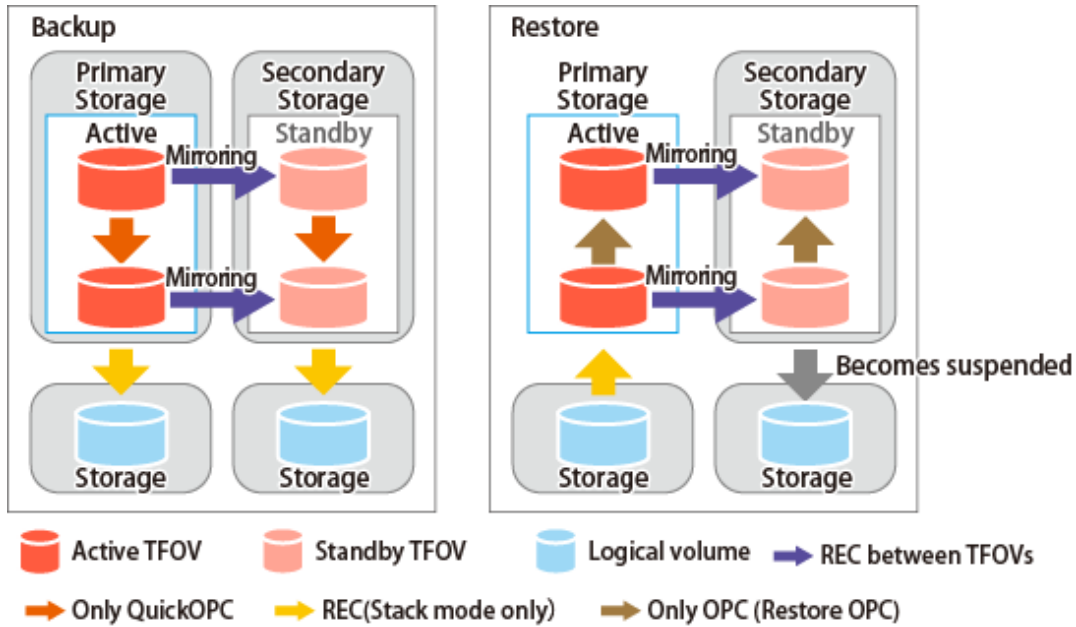
Figure 7.10 Example of Backup/Restore Using Cascade Copy on Primary Storage



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 7.11 Example of Backup/Restore Using Cascade Copy on Secondary Storage



Chapter 8 Operation Maintenance

This chapter provides information on how to maintain a database, perform troubleshooting, and change the operation information.

8.1 Maintenance of Database

AdvancedCopy Manager holds various repositories of management information on the usage of its functions. They are named generically and are referred to as a database in this chapter.

The databases are important information and it is recommended that they be backed up periodically. Note that the databases referred to here differ from databases used for transactions, such as ORACLE databases.

The following table lists instances when backup of the database is needed.

Table 8.1 Databases on 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.	"8.1.1.4.1 Backing Up Registry" or "8.1.2 Making Package Backup of Databases"	Refer to "8.1.1.4.1 Backing Up Registry".
Backup management list	A backup transaction has been completed.	"8.1.1.1.1 Backing up Backup Management List" or "8.1.2 Making Package Backup of Databases"	Refer to "8.1.1.1.1 Backing up Backup Management List".
Volume configuration information (Backup management)	When the configuration of the volume group has changed.	"8.1.1.1.3 Preserving Volume Configuration Information"	Refer to "8.1.1.1.3 Preserving Volume Configuration Information".
Pre-processing and post-processing scripts for backup management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or "8.1.2 Making Package Backup of Databases"	Check the size of the pre-processing and post-processing script files for backup management.
Replication management list	A replication transaction has been completed.	"8.1.1.2.1 Backing up Replication Management List" or "8.1.2 Making Package Backup of Databases"	Refer to "8.1.1.2.1 Backing up Replication Management List".
Volume configuration information (Replication management)	When the configuration of the volume group is changed.	"8.1.1.2.3 Preserving Volume Configuration Information"	Refer to "8.1.1.2.3 Preserving Volume Configuration Information".
Pre-processing and post-processing scripts for replication management	A pre-processing or post-processing script has changed.	Saving a database by using the copy command or "8.1.2 Making Package Backup of Databases"	Check the size of the pre-processing and post-processing script file for replication management.
Policy file for management	The policy file has changed.	Saving a database by using the copy command or	Check the size of the policy file for management information package backup.

Type	When Backup to Be Created	Backup Method (References)	Size
information package backup		"8.1.2 Making Package Backup of Databases"	

 **Point**

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You can create backups of databases either individually or as a whole. If a Managed Server also operates as a Management Server, the Managed Server contains a database for the Management Server as well as for the Managed Server.

.....

8.1.1 Making Individual Backups of Databases

8.1.1.1 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.

8.1.1.1.1 Backing up Backup Management List

Execute the `swstresback` command to back up a backup management list.

Backup Data Size of Backup Management List

Check the size of the file that the subdirectory of the following directory contains.

```
/etc/opt/FJSVswsts/data
```

In the cluster environment, check the size of the file that the subdirectory of the following directory contains.

```
/etc/opt/FJSVswsts/logicalNodeName/data
```

 **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.

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8.1.1.1.2 Restoring Backup Management List

Execute the `swstresrst` command to restore a backup management list.

8.1.1.1.3 Preserving Volume Configuration Information

When the transaction volume or backup volume is a volume group, the volume configuration information file `"/etc/lvmconf/volumeGroupName.conf"` is required to restore the volume configuration information in the processing after backup and restoration. In order to prepare for a system crash, ensure that you maintain the above mentioned file on another storage medium at the time of creating the volume group.

 **Point**

.....

Usually, a volume configuration information file `"/etc/lvmconf/volumeGroupName.conf"` is automatically created at the time of `vgcreate (1M)` execution. If `vgcfgbackup (1M)` is used, a backup of the volume configuration information can be created by assigning arbitrary file names. For details of this, refer to the online manual or the `man` command.

.....

8.1.1.2 Maintaining Replication Management List

This section describes the maintenance of a replication management list.

8.1.1.2.1 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 "Backing up Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

Point

- Operational information for replication management is saved in a repository.
- It is recommended that a replication management list be backed up when operation information for replication management is changed with the `swsrpsetvol` or `swsrpdelvol` command.

8.1.1.2.2 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 "Restoring Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.
2. On the Managed Server, execute the `swsrprecoverres` command with the `-r` option.

Point

- 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.

8.1.1.2.3 Preserving Volume Configuration Information

When the source volume or replica volume is a volume group, the volume configuration information file `/etc/lvmconf/volumeGroupName.conf` is needed to restore the volume configuration information in the post-processing script.

In order to prepare for a system crash, ensure that you maintain the abovementioned file on another storage medium at the time of creating the volume group.

Point

Usually, a volume configuration information file `/etc/lvmconf/volumeGroupName.conf` is automatically created at the time of `vgcreate (1M)` execution. If `vgcfgbackup (1M)` is used, a backup of volume configuration information can be created with arbitrary file names. For details of this, refer to the online manual or the `man` command.

8.1.1.3 Maintaining Database

For information about maintaining a database used by a Management Server, refer to "Maintaining Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server:

8.1.1.4 Maintaining Registry

This section describes the maintenance of a registry. Perform this procedure on a Management Server or a Managed Server.

8.1.1.4.1 Backing Up Registry

In a command prompt window, back up the following files using the copy command, etc.

File Names

For Non-clustered Systems

```
/etc/opt/swstorage/swnode.ini
```

For Clustered Systems

```
/etc/opt/swstorage/logicalNodeName/swnode.ini
```

Example

Save it in the /backup directory.

```
# cp /etc/opt/swstorage/swnode.ini /backup
```

Backup Data Size of Registry

Check the size of the file to be backed up.

8.1.1.4.2 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

```
/etc/opt/swstorage/swnode.ini
```

For Clustered Systems

```
/etc/opt/swstorage/logicalNodeName/swnode.ini
```

Example

Restore the following file saved in the /backup directory:

```
# cp /backup/swnode.ini /etc/opt/swstorage
```

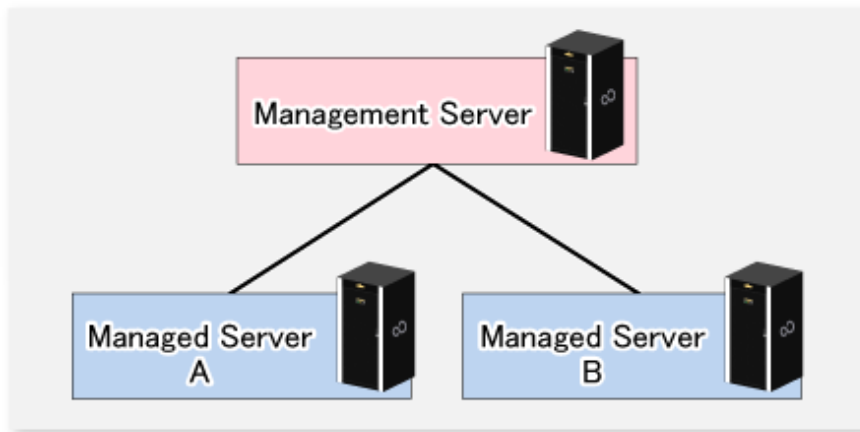
8.1.2 Making Package Backup of Databases

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".

Figure 8.1 Management Server and Managed Server



Example

Assume that the package backup of management information function has been used to back up the management information on a Management Server, Managed Server A, and Managed Server B onto Managed Server B in the diagram above. In this case, Managed Server B is the backup execution server. The Management Server, Managed Server A, and Managed Server B are the backup target servers. That is, Managed Server B operates as both the backup execution server and backup target server.

The following table shows the types of management information that is handled in a package backup of management information.

Table 8.2 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

8.1.2.1 Preliminaries

Before creating a package backup of management information, you must perform the following:

1. Determine the management information package backup target servers and the types of management information to be backed up.
2. Determine the management information package backup execution server.
3. Create a directory where the management information package backup execution server 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 *ETERNUS SF Advanced Copy 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 *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the management information package backup target server.
 - The required size for backup management is the total of the sizes below for each management information package backup target server:
For the size of each component of backup data, refer to "Maintaining Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the management information package backup target server.
 - Size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 1.2
 - Size of the pre-processing and post-processing scripts for backup management
 - Size of the transaction volume locking specification file for backups for backup management
 - Size of the backup volume locking specification file for backups for backup management
 - Size of the backup-restored volume locking specification file for backup management
 - The required size for replication management is the total of the following sizes for each management information package backup target server:
 - Size of the pre-processing and post-processing scripts for replication management
 - Size of the copy-source volume locking specification file for replication management
 - Size of the copy-destination volume locking specification file for replication management
4. Check the size of the working directory for the management information package backup target servers (or the shared disk for shared data for AdvancedCopy Manager in a clustered system). The sizes described below are needed only when a package backup of management information is being created. Use the largest value of the sizes of the databases to be backed up from the management information package backup target servers. The required sizes are as follows:
- The required size for the databases is the size of the database backup data multiplied by 2.2.
For the backup data size, refer to "Maintaining Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the Management Server.
 - The required size for backup management is the size of the backup data for the backup management lists (size of the backup data for the backup management lists plus the size of the backup data for the recovery control files) multiplied by 2.2.
For the backup data size, refer to "Maintaining Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the management information package backup target server.
 - The working directory does not require any space for registry, replication management, and policy file backups.
5. Execute the `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 8.3 Management Information Package Backup Execution Server and Policy File Paths

Management Information Package Backup Execution Server		Policy File Path
OS	Operation Type	
Windows	Non-cluster	<Environment directory>\etc\stgmgrinfo_policy.ini
	Cluster	<AdvancedCopy-Manager-shared-data>:\etc\opt\swstorage\etc\stgmgrinfo_policy.ini
Solaris, Linux, HP-UX, AIX	Non-cluster	/etc/opt/FJJSVswstf/stgmgrinfo_policy.ini
	Cluster	/etc/opt/FJJSVswstf/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 8.4 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.

8.1.2.2 Backup Operations

Executing the `stgmgrinfobkup` command on the management information package backup execution server stores the backup data in the directory under the following structure.

Table 8.5 Directory Structure for Execution of Management Information Package Backup and Data Types

Directory		Data Type		
*1	Server name	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 [stgmgrinfo](#) command.

Example

When *1 is /ACMBkupData and the server name is ACMAGT1, the pre-processing and post-processing scripts for backup management are put in the following directory:

```
/ACMBkupData/ACMAGT1/BkupData/Scripts
```

Initial Operations

The 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 [stgmgrinfo](#) command on the management information package backup execution server to make backups of the registries on all of the Managed Server.
2. Execute the [stgmgrinfo](#) command on the management information package backup execution server to make a backup of the policy file.
3. Refer to "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* to back up the ETERNUS SF Manager database.

Normal-use Operations

Execute the [stgmgrinfo](#) command on the management information package backup execution server when you need to make backups of the target data.

Afterwards, refer to "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* to back up the ETERNUS SF Manager database.

For the timing of the backups, refer to "Maintaining Database" in the *ETERNUS SF 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 "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* 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 "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* 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 "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* to back up the ETERNUS SF Manager database.

8.1.2.3 Restoration Operations

This section describes how to use the backup data created by the `stgmgrinfobkup` command and "Backup of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* 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 `stgmgrinfoset` 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:

```
<Directory-determined-in-step1>\<server-whose-registry-to-be-restored>\RegiData
```

For Solaris, Linux, HP-UX or AIX:

```
<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 *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server.

Restoring Database

Refer to "Restore of Common Control and AdvancedCopy Manager Repository" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* 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 *ETERNUS SF 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:

```
<Directory-determined-in-step1>\<server-whose-list/file-to-be-restored>\BkupData\FJSVswsts
```

For Solaris, Linux, HP-UX or AIX:

```
<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 `stgarxct` (Backup Data Expansion Command) in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.
 - On a Solaris/Linux/HP-UX/AIX version server:

Expand the backup of the backup management list or the backups of the backup management list and recovery control file by using the `tar` command supported by the operating system.
5. Restore the backup management list, or the backup management list and recovery control file on the target server. For details on restoring, refer to "Restoring Backup Management List and Recovery Control File" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server. The Backup-Directory specified in the resource restoration command is the directory expanded in step 4.

Restoring 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:

```
<Directory-determined-in-step1>\<server-whose-scripts-to-be-restored>\BkupData\Scripts
```

For Solaris, Linux, HP-UX or AIX:

```
<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 *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server.
5. On a Solaris/Linux/UP-UX/AIX-version server, change the access permission assigned to the pre-processing and post-processing scripts for backup management copied in step 4 on the target server by using the `chmod` command supported by the operating system. Set execution permission for the root user, which is the owner.

Restoring Locking Specification Files for Backup Management

1. Execute 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:

```
<Directory-determined-in-step1>\<server-whose-files-to-be-restored>\BkupData\data
```

For Solaris, Linux, HP-UX or AIX:

```
<Directory-determined-in-step1>/<server-whose-files-to-be-restored>/BkupData/data
```

3. Transfer the backups of the locking specification files for backup management copied in step 2 to the target server in binary mode.
4. Copy the backups of the locking specification files for backup management transferred in step 3 to the target server. For the directory in which the locking specification files for backup management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Backup and Restoration" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.

Restoring Pre-processing and Post-processing Scripts for Replication Management

1. Execute 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:

```
<Directory-determined-in-step1>\<server-whose-scripts-to-be-restored>\ReplData\Scripts
```

For Solaris, Linux, HP-UX or AIX:

```
<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 *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server.
5. On a Solaris/Linux/UP-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:

```
<Directory-determined-in-step1>\<server-whose-files-to-be-restored>\ReplData\data
```

For Solaris, Linux, HP-UX or AIX:

```
<Directory-determined-in-step1>/<server-whose-files-to-be-restored>/ReplData/data
```

3. Transfer the backups of the locking specification files for replication management copied in step 2 to the target server in binary mode.
4. Copy the backups of the locking specification files for replication management transferred in step 3 to the target server. For the directory in which the locking specification files for replication management are used (that is, the directory to which the files are to be copied), refer to "Pre-processing and Post-processing of Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.

Restoring 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:

```
<Directory-determined-in-step1>\<server-whose-file-to-be-restored>\MgrInfoData
```

For Solaris, Linux, HP-UX or AIX:

```
<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 "[8.1.2.1 Preliminaries](#)".

8.2 Troubleshooting

8.2.1 Collecting Troubleshooting Information

To collect error survey information on the 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.



Note

If the Managed Server is a clustered system, execute the `acmcapture` command to collect troubleshooting information on all the nodes making up the clustered system.

For collecting error survey information on the Management Server, refer to "Collecting Error Survey Information" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the Management Server.

8.3 Troubleshooting: Hardware Error During Backup

This section describes the actions to perform if a hardware error, etc. occurs during a backup using AdvancedCopy Manager.

8.3.1 Overview

If a hardware error, 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.

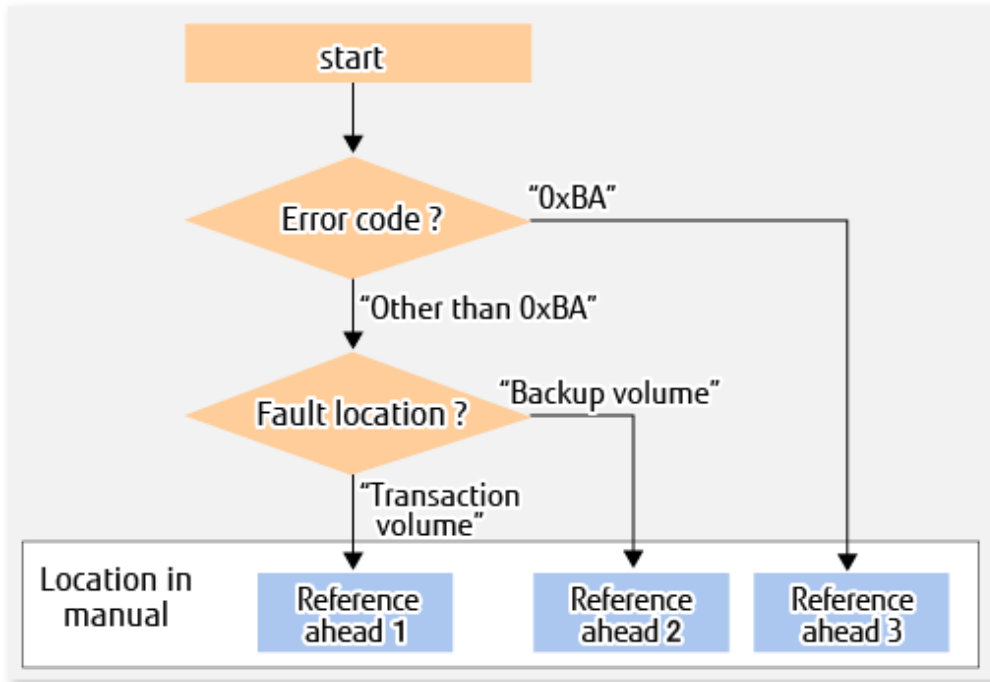
If the message `swst0603`, `swst0634`, `swst0719`, or `swst0740` is displayed during command execution and the same error occurs even if the command is re-executed, a hardware error, etc. has occurred, causing Advanced Copy to fail.

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.

8.3.2 Troubleshooting

The following figure shows the flow of troubleshooting tasks if a hardware or similar fault occurs.

Figure 8.2 Troubleshooting Flow (for Faults During Backup)



Reference ahead 1: [8.3.2.1 Hardware Error on Transaction Volume](#)

Reference ahead 2: [8.3.2.2 Hardware Error on Backup Volume](#)

Reference ahead 3: [8.3.2.3 Troubleshooting If Bad Sector Occurred in Transaction Volume](#)

Note

- Refer to ["8.3.1 Overview"](#) for details of the **Status** column and "Fault location".

If the **Status** column is "?????", check if the copy processing is in the error suspend 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 a device is not accessible:
 - Check if the device exists.
- 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 8.6 Meanings of Error Codes

Error Code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. <ul style="list-style-type: none"> a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC is in the suspend status (replication established status)

Error Code	Meaning
	<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.

8.3.2.1 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](#), [swsttrkstat](#) 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.

8.3.2.2 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 [swstsrsemth](#) 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.

8.3.2.3 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.)



Note
 The transaction volume cannot be restored by this method, if there is no backup history information.

8.4 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.

8.4.1 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:

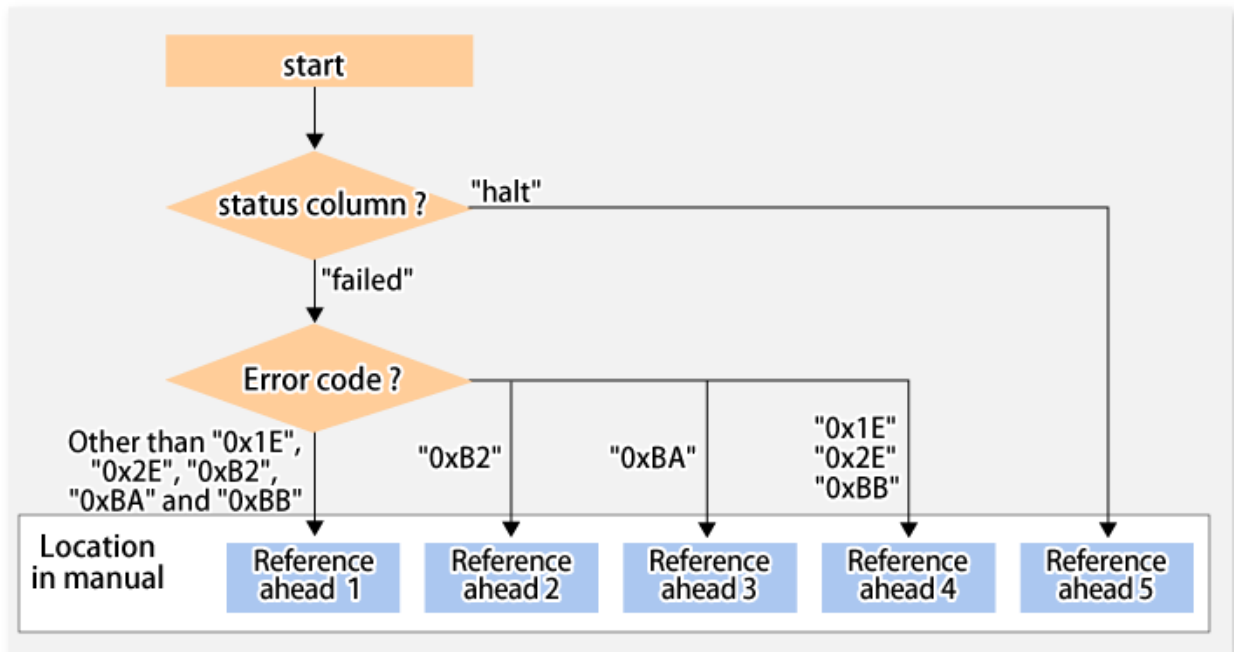
- The `swsrpstat` command displays "halt" in the **Status** column.
- The message `swsrp2648` is displayed during command execution.

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.

8.4.2 Troubleshooting

The following figure shows the troubleshooting flow when a hardware or similar fault occurs.

Figure 8.3 Troubleshooting Flow (When Fault Occurs During Replication)



Reference ahead 1: [8.4.2.1 Hardware Error on Replication Volume](#)

Reference ahead 2: [7.7 When Recovering Storage Cluster Continuous Copy Function](#)

Reference ahead 3: [8.4.2.2 Troubleshooting If Bad Sector Occurred in Copy Source Volume](#)

Reference ahead 4: [8.4.2.3 Troubleshooting When Lack of Free Physical Space Has Occurred in Copy Destination Volume](#)

Reference ahead 5: [8.4.2.4 Error \(halt\) on Remote Copy Processing](#)

Note

- Refer to ["8.4.1 Overview"](#) for details of the **Status** column and "Fault location".

If the **Status** column is "?????", check if the copy processing is in the error suspend 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 a device is not accessible:
 - Check if the device exists.
- 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 8.7 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	<p>If a) or b) below applies, a bad sector was created in the transaction volume.</p> <ul 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.

8.4.2.1 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 "7.6.1 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.

8.4.2.2 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 "7.6.1 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.)

8.4.2.3 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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 *ETERNUS SF 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.

8.4.2.4 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>
```

8.5 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.



- 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.

8.5.1 Changing IP Address of Management Server

For information about changing the IP address of a Management Server, refer to "Changing IP Address of Management Server" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

8.5.2 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 AdvancedCopy Manager daemons. For more information on stopping daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
 2. On the target Managed Server, stop the Storage Cruiser's agent daemon. Refer to "Starting and Stopping Agent" in the *ETERNUS SF 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, restart the AdvancedCopy Manager daemons. For more information on starting daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
 5. Refer to "setagtip (Agent Information Change Command)" in the *ETERNUS SF 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 daemon. Refer to "Starting and Stopping Agent" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on how to start it.
 7. Refer to "Change Server Information" in the *ETERNUS SF 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 AdvancedCopy Manager daemons. For more information on stopping daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
 2. On the target Managed Server, change the system IP address.
 3. On the target Managed Server, start the AdvancedCopy Manager daemons. For more information on stopping daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
 4. When AdvancedCopy Manager is being operated using Web Console, refer to "Change Server Information" in the *ETERNUS SF 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 [swsprcoverres](#) 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

For information about performing the above change in cluster operation, refer to "[8.5.6.1 Changing IP Address of Managed Server Transaction](#)".

8.5.3 Changing Port Number of Management Server or Managed Server

For information about changing the port number of a Management Server, refer to "Changing Port Number of Management Server or Managed Server" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

Change the port number of a Managed Server as follows:

1. On the target Managed Server, change the port number of the AdvancedCopy Manager communication daemon (stgxfws) specified in /etc/services.
2. On the target Managed Server, restart the AdvancedCopy Manager daemons. For information on restarting daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".
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 [swsprcoverres](#) 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 *ETERNUS SF Web Console Guide*, and reload the configuration information of the Management Server or Managed Server.



See

For information about performing the above change in cluster operation, refer to "[8.5.6.2 Changing Port Number of Managed Server Transaction](#)".

8.5.4 Changing Server Name of Management Server or Managed Server

For information about changing the server name of a Management Server, refer to "Changing Server Name of Management Server or Managed Server" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

Change the server name of a 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

[swsrecoverres](#) 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 *ETERNUS SF Web Console Guide* and reload the configuration information of the Management Server or Managed Server.



For information about performing the above change in a cluster operation, refer to ["8.5.6.3 Changing Server Name of Managed Server Transaction"](#).

8.5.5 Changing Device Configuration

Changing the device configuration refers to any of the following:

- Changing the mount name
- Adding and deleting partitions
- Change from File System operation to Raw Device operation
- Capacity change of partitions
- Start position for change of partitions
- Changing the box identifier (Box ID)
- Recreating LUNs

8.5.5.1 Backup Management

Change the device configuration by using the following procedure. This processing is executed for all volumes on the disk containing the volume whose device configuration is to be changed.

1. Check whether there is a transaction volume on the target disk that needs to be backed up. If there is, delete the transaction volume. For information on this, refer to ["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. Change the device configuration.
4. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing. Refer to ["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.



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 of the emergency operation mode, refer to ["swsthistdel"](#) and ["swstcancelsync"](#).

8.5.5.2 Replication Management

Change the device configuration as shown below. This processing applies to all the volumes on a disk whose device configuration is to be changed.

1. Check whether there are any replication volumes on the target disk. If there are, delete them. For information about this, refer to "[6.6.2 Deleting Source Volume or Replica Volume](#)".
2. Change the device configuration.
3. Because the post-change device configuration needs to be reflected in the AdvancedCopy Manager data set, execute device information change processing for AdvancedCopy Manager. Refer to "[6.4.4 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 "[6.4.5 Configuring Source Volume and Replica Volume](#)", for details about adding the replica volume.

Point

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If the device configuration is changed (in step 2 above) before the replication volumes are deleted (in step 2), replication processing cannot be cancelled. This could possibly prevent the deletion of the replication volumes. In this case, set the emergency operation mode, and cancel replication processing. For details on the emergency operation mode, refer to "[swsrpcancel](#)".

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8.5.6 Changing Configuration in Cluster Operation

This section describes how to make a change to the operational configuration in cluster operation.

8.5.6.1 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 *ETERNUS SF 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.

8.5.6.2 Changing Port Number of Managed Server Transaction

Change the port number of a Managed Server transaction by performing the following steps:

1. Stop the target 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, change the port number of the transaction-intended communication daemon ([stgxfws_logicalNodeName](#)) specified in */etc/services*.
3. Start the target Managed Server transaction.
For details on how to start it, refer to the relevant cluster software manual.
4. On the Management Server that manages the target Managed Server transactions, 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.
5. Refer to "Reload Server Configuration Information" in the *ETERNUS SF Web Console Guide* and reload the configuration information of the Managed Server.

8.5.6.3 Changing Server Name of Managed Server Transaction

Change the server name of a Managed Server transaction by performing the steps below.

1. On the Management Server that manages the Managed Server transactions, 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.
2. Refer to "Reload Server Configuration Information" in the *ETERNUS SF Web Console Guide* and reload the configuration information of the Managed Server

8.5.6.4 Changing Logical Node Name

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 "[6.6.2 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.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 "[8.1.2.1 Preliminaries](#)".
4. Delete `/etc/opt/swstorage/logicalNodeName/swnode.ini` on the node operating the transaction.
5. Delete the cluster environment of the target transaction.
For details about how to delete, refer to "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

Do not perform the following step in "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

- Step 1 described in "Deletion Procedure"

6. Create the cluster environment of the target transaction.

For details on how to create, refer to "Customization for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

When you perform the cluster set up, specify the name of the new logical node.

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.

For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information
For details about the policy file path, refer to "8.1.2.1 Preliminaries".

9. Change the server name.

Perform the procedure described in "8.5.6.3 Changing Server Name of 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 "6.4.5 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.

8.5.6.5 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 `/etc/opt/swstorage/logical/NodeName/swnode.ini`.
- Backup management list
Make a backup of the backup management list.
For details about how to do this, refer to "8.1.1.1 Backing up Backup Management List".
- Pre-processing/post-processing scripts
Save the pre-processing and post-processing scripts for backup management and replication management.

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 "8.1.2.1 Preliminaries".

3. Delete `/etc/opt/swstorage/logical/NodeName/swnode.ini` on the node operating the transaction.

4. Delete the cluster environment of the target transaction.

For details on how to do this, refer to "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.



Note

Do not perform the following step of "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

- Step 1 described in "Deletion Procedure"

5. On the clustered system, change the name of cluster transaction.

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 for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

 Note

When you perform the cluster set up, do not change any information other than the transaction name.

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 `/etc/opt/swstorage/logical/NodeName/swnode.ini`.

- Backup management list

Restore the backup management list.

For details about how to do this, refer to "[8.1.1.1.2 Restoring Backup Management List](#)".

- 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 `swsrecoverres` command with the `-r` option.

For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information

For details about the policy file path, refer to "[8.1.2.1 Preliminaries](#)".

9. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute the `stgmgrinfo` command to register as its server.

8.5.6.6 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 `/etc/opt/swstorage/logical/NodeName/swnode.ini`.

- Backup management list

Make a backup of the backup management list.

For details about how to do this, refer to "[8.1.1.1.1 Backing up Backup Management List](#)".

- Pre-processing/post-processing scripts

Save the pre-processing and post-processing scripts for backup management and replication management.

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 "[8.1.2.1 Preliminaries](#)".

3. Delete `/etc/opt/swstorage/logical/NodeName/swnode.ini` on the node operating the transaction.

4. Delete the cluster environment of the target transaction.

For details about how to do this, refer to "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

Do not perform the following step of "Deletion for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

- Step 1 described in "Deletion Procedure"

5. Create the cluster environment of the target transaction.

For details about how to do this, refer to "Customization for Solaris/Linux/HP-UX version Clustered Systems" in the *ETERNUS SF Cluster Environment Setup Guide*.

Note

- To change the name of a mount point, specify the new mount point name when you perform the cluster set up.
- To change a physical disk, specify the new physical disk when you mount it.
- Change the configuration of a shared disk in the 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 `/etc/opt/swstorage/logicalNodeName/swnode.ini`.

- Backup management list

Restore the backup management list.

For details about how to restore do this, refer to "[8.1.1.1.2 Restoring Backup Management List](#)".

- 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 `swsrecoverres` command with the `-r` option.

For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, restore the following data:

- Policy file for package backup of the management information

For details about the policy file path, refer to "[8.1.2.1 Preliminaries](#)".

8. For a "package-backup-of-the-management-information execution server" of AdvancedCopy Manager, execute the `stgmgrinfo` command to register as its server.

8.5.7 Operation on Model Upgrade for ETERNUS Disk Storage System

Perform the procedure of "Operation on Model Upgrade for ETERNUS Disk Storage System" in the *ETERNUS SF Web Console Guide*.

8.5.8 Changing the SSL Version Settings for Communicating with Supported Devices

Refer to "Changing the SSL Version Settings for Communicating with Supported Devices" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

Chapter 9 Command References

Note

Set the following paths in the environment variable PATH to execute the commands.

- /usr/sbin
- /usr/bin

9.1 Backup Management Commands

This section describes operations using Backup Management Commands.

Note

- The backup operations of AdvancedCopy Manager using the Storage Cluster Continuous Copy function are not supported.
- Only a root user can execute all the commands of backup management. When command execution is carried out by other users, a message "swst0601 This Command cannot be run. This is because the user is not a root user." is displayed, and then an error terminated.

Note

Operating Environment for Command Execution

The table below lists the operating environment requirements for different commands.

Table 9.1 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

Command	Operating Environment of AdvancedCopy Manager
swstbkpolset	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.
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: <ul style="list-style-type: none"> - -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.
swstdevinforeset	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: <ul style="list-style-type: none"> - -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: <ul style="list-style-type: none"> - -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:

Command	Operating Environment of AdvancedCopy Manager
	<ul style="list-style-type: none"> - -h option specified - No -h option and device name are specified
swtstrsemth	<p>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.</p> <p>To execute this command on a Managed Server, the daemons or services of the Management Server must be operating.</p> <p>When the Managed Server runs on Windows, the daemons or services of the Managed Server must be always operating.</p>
swststartsync	<p>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.</p> <p>When the Managed Server runs on Windows, the daemons or services of the Managed Server must be operating.</p>
swstsvrdisp	<p>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.</p>
swstsvrset	<p>To execute this command on a Managed Server, the daemons or services of the Management Server must be operating.</p> <p>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.</p>
swstsyncstat	<p>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:</p> <ul style="list-style-type: none"> - -h option specified - No -h option and device name are specified
swsttrkstat	<p>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:</p> <ul style="list-style-type: none"> - -h option specified - No -h option and device name are specified

Note

In Cluster Operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

2. Execute the command.

The table below lists the commands available in cluster operation, notes whether environment variables must be configured, and specifies the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 9.2 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swstsvrset	Required	Transaction operating node	-
swstsvrdisp	Required	Transaction operating node	-
swstdevinfo	Required	Transaction operating node	-
swstdevdisp	Required	Transaction operating node	-
swstbkpolset	Required	Transaction operating node	-
swstbkpoldisp	Required	Transaction operating node	-
swstbkpoldel	Required	Transaction operating node	-
swstbackup	Required	Transaction operating node	-
swstbackstat	Required	Transaction operating node	-
swstrestore	Required	Transaction operating node	-
swstcancelrest	Required	Transaction operating node	-
swstreststat	Required	Transaction operating node	-
swsthistdisp	Required	Transaction operating node	-
swsthistdel	Required	Transaction operating node	-
swststartsync	Required	Transaction operating node	-
swstcancelsync	Required	Transaction operating node	-
swstsyncstat	Required	Transaction operating node	-
swstexecstat	Required	Transaction operating node	-
swstcanceltrk	Required	Transaction operating node	-
swstrkstat	Required	Transaction operating node	-
swstsrsemtrk	Required	Transaction operating node	-
swstresback	Required	Transaction operating node	-
swstresrst	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 9.3 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.
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.

9.1.1 Environment Definition Commands

This section describes the environment definition commands for backup management.

9.1.1.1 swstsvrset (Managed Server Configuration Information Setting Command)

NAME

swstsvrset - sets configuration information of a Managed Server

SYNOPSIS

To Execute on Managed Server

```
/opt/FJJSVswsts/bin/swstsvrset
```

To Execute on Management Server

```
/opt/FJJSVswsts/bin/swstsvrset [-h serverName]
```

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.

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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Set the configuration information of a Managed Server:

```
# /opt/FJJSVswsts/bin/swstsvrset
swstsvrset completed
#
```

- Set the configuration information of a Managed Server named job1 from a Management Server:

```
# /opt/FJJSVswsts/bin/swstsvrset -h job1
swstsvrset completed
#
```

NOTES

- This command can only be executed if none of the following commands are running:
 - [swstsvrset](#)
 - [swstbkpolset](#)
 - [swstbkpoldel](#)
 - [swstbackup](#)
 - [swstrestore](#)

- [swstcancelrest](#)
- [swststartsync](#)
- [swstcancelsync](#)
- [swstdevinforeset](#)
- [swsthistdel](#)
- [swstcanceltrk](#)
- [swstresback](#)
- [swstresrst](#)
- [swstsrsemitch](#)

9.1.1.2 swstsvrdisp (Managed Server Configuration Information Display Command)

NAME

swstsvrdisp - displays configuration information of a Managed Server

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstsvrdisp
```

To Execute on Management Server

```
/opt/FJSVswsts/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.

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 a Managed Server named Work1:

```
# /opt/FJSVswsts/bin/swstsvrdisp
Storage-Server = Work1
#
```

9.1.1.3 swstdevinfoaset (Device Information Setting Command)

NAME

swstdevinfoaset - sets the device information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJJSVswsts/bin/swstdevinfoaset -t | -b | -o deviceName
```

To Execute on Management Server

```
/opt/FJJSVswsts/bin/swstdevinfoaset [-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.

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.

-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 "[1.4 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:

```
# /opt/FJJSVswsts/bin/swstdevinfoaset -t /dev/dsk/clt0d0
swstdevinfoaset completed
#
```

- Register a device as a backup volume:

```
# /opt/FJSVswsts/bin/swstdevinfoaset -b /dev/dsk/c1t0d2
swstdevinfoaset completed
#
```

- Deregister a device that has been registered as a transaction volume:

```
# /opt/FJSVswsts/bin/swstdevinfoaset -o /dev/dsk/c1t0d0
swstdevinfoaset completed
#
```

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 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 already mounted. However, when configuring a volume group as backup volume, the check of whether the logical volume in a volume group is mounted is not carried out. If you set a volume group as a backup volume, unmount the logical volume beforehand.
 - The device to be set up is registered as a replication destination volume in replication management.
 - The device to be set up is registered as a replication source volume of the duplicate volume information in which bidirectional copy is possible in replication management.
 - 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
- If using a volume group as a transaction volume:
 - Do not register two or more physical disks into one volume group.
 - Create a logical disk so that it does not consist of two or more physical disks.
 - Note: that a volume group that is not active cannot be set as a transaction volume.
- If using a volume group as a backup volume:
 - Do not register two or more physical disks into one volume group.
 - Create a logical disk so that it does not consist of two or more physical disks.

- The backup volume must be the same physical size as the transaction volume. In addition, the backup volume's logical disk must be in a different volume group to the transaction volume but it must have the same configuration as the transaction volume.
- Note: a volume group that is not active cannot be set as a backup volume.
- In order to make a configuration change to a transaction volume or a backup volume, delete the Configuration, and re-register.
- The following changes are not possible unless the related synchronous processing (in an EC session) is cancelled:
 - Changing a setting in a suspended transaction volume
 - Changing a setting in a suspended backup volume
- The related tracking processing (in an OPC session) must be 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](#)
 - [swstdevinfo](#)
 - [swstbkpolset](#)
 - [swstbkpoldel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstsrsemtrk](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.1.4 swstdevdisp (Device Usage Status Display Command)

NAME

swstdevdisp - displays the device information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstdevdisp [-t] [-b [-u]] [-o] [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/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 [swstdevinfo](#) 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. In the case of a volume group, the display also shows the size of the physical disk on which the logical disk is defined.
Device-Mode	Displays a character string by which a device can be identified: "Transaction" : Represents a transaction volume. "Backup" : Represents a backup volume. "Other" : Represents a device that can be registered as a working or backup volume. A backup volume is indicated as "Backup (used)" if it is being used or "Backup (free)" if it is not used. During the backup process with -suspend or -T option specified, the backup volume remains in use after history information is deleted. When the -u option is specified, "Backup (used-S)" is displayed for a backup volume in the suspend status for which history information was deleted, or "Backup (used-T)" is displayed for a backup volume in the tracking status for which history information was deleted.
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Backup-Engine	Displays the operation type: "AdvancedCopy" : Backup operation using AdvancedCopy Manager

OPTIONS

-h 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.

-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 "[1.4 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:

```
# /opt/FJSVswsts/bin/swstdevdisp -t -b
Server Device                Size      Device-Mode  Mount-Point (Method) Backup-Engine
job2  /dev/dsk/c1t0d0            1.0 Gbyte Transaction /mnt/tran1 (vxfs)   AdvancedCopy
job2  /dev/vg01                  2.0 Gbyte Transaction ----- (----)      AdvancedCopy
job2  /dev/dsk/c1t0d2            1.0 Gbyte Backup (used) ----- (----)      AdvancedCopy
job2  /dev/dsk/c1t0d3            1.0 Gbyte Backup (free) ----- (----)      AdvancedCopy
job2  /dev/vg02                  2.0 Gbyte Backup (free) ----- (----)      AdvancedCopy
job2  /dev/dsk/c1t0d7            1.0 Gbyte Backup (free) ----- (----)      AdvancedCopy
:
#
```

9.1.1.5 swstbkpolset (Backup Policy Setting Command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstbkpolset [-i intervalDays] [-s saveNumber] [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbkpolset [-h serverName] [-i intervalDays] [-s saveNumber] [deviceName]
```

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 [stgxfwcmdisprv](#) 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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- To set 3 as the save number of a transaction volume as a backup policy:

```
# /opt/FJJSVswsts/bin/swstbkpolset -s 3 /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstbkpolset completed
#
```

NOTES

- Even if the number of interval days is specified, AdvancedCopy Manager does not automatically create a backup.
- When you specify a backup policy, there must be as many backup volumes in operation according to the specified backup policy. To view information on the number of backup volumes required to perform the backup operation of a regular transaction volume, refer to "[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.
 - The replication management function is executing a process for the target transaction volume.
 - The specified device is an LU (disk unit).
- This command can only be executed while none of the following commands are running:
 - [swstsvrset](#)
 - [swstdevinfo](#)
 - [swstsrsem](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.1.6 swstbkpoldisp (Backup Policy Display Command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

To Execute on Managed Server

```
/opt/FJJSVswsts/bin/swstbkpoldisp [deviceName]
```


To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbkpoldisp [-h serverName] [deviceName]
```

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 mount point of a device. The file system type of the mount point is displayed inside the parentheses.

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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display a backup policy of a transaction volume:

```
# /opt/FJSVswsts/bin/swstbkpoldisp /dev/dsk/c1t0d0
Server Device          Interval-Days Save-Number Mount-Point (Method)
job2 /dev/dsk/c1t0d0 30              3          /mnt/tran1 (vxfs)
#
```

9.1.1.7 swstbkpoldel (Backup Policy Deletion Command)

NAME

swstbkpoldel - deletes the backup policy

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstbkpoldel deviceName
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbkpoldel [-h serverName] deviceName
```

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 [stgxfwcmdisprv](#) command.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- To delete the backup policies of a transaction volume:

```
# /opt/FJSVswsts/bin/swstbkpoldel /dev/dsk/c1t0d0  
/dev/dsk/c1t0d0 swstbkpoldel completed  
#
```

NOTES

- A backup policy cannot be deleted if:
 - The transaction volume to be deleted has backup history information.
 - A transaction volume whose backup policies are to be deleted has already started backup synchronous processing.
 - The replication management function is executing a process for the target transaction volume.
- This command can only be executed while none of the following commands are running:
 - [swstsvrset](#)
 - [swstdevinfo](#)
 - [swstsrsem](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.2 Operation Commands

This section describes operation commands for backup management.

9.1.2.1 swstbackup (Backup Execution Command)

NAME

swstbackup - backup

SYNOPSIS

To Execute on Managed Server

```
/opt/FJJSVswsts/bin/swstbackup [-suspend|-T] deviceName [-Xdevmap deviceMapFile]
```

To Execute on Management Server

```
/opt/FJJSVswsts/bin/swstbackup [-h serverName] [-suspend|-T] deviceName [-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 4 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](#)".

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.

-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.

-suspend

This results in synchronous high-speed backup using the "[Chapter 4 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 "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Back up a transaction volume:

```
# /opt/FJSSVswsts/bin/swstbackup /dev/dsk/c1t0d0  
/dev/dsk/c1t0d0 swstbackup completed  
#
```

NOTES

- To preserve data integrity, this command performs the backup only after inhibiting access to both transaction and backup volumes from all other processes. Thus, drive letters, logical volume names or device labels of devices are unassigned. This command terminates with an error if a drive letter, logical volume name or device label of a transaction volume is assigned or if:
 - The mount point has directories to which other volumes are also mounted.
 - The volume has a file in use.
- To mount a transaction volume from a server other than the server on which this command is entered, unmount the transaction volume, using the authority of the backup administrator. If the transaction volume must not be unmounted, create backup copies with the following procedure:
 1. Execute the sync command to synchronize the transaction volume and file system.
 2. Execute this command.
 3. Execute the fsck command for the backup volume, and check the file system.
- When setting a volume group as a transaction volume, and backing up or restoring it, modify the pre-processing and post-processing script for backup (using an Administrator account) so that unmount/mount of all logical devices is carried out.
- Backup cannot be executed in the following situations:
 - No backup policy has been specified for the specified transaction volume.
 - The backup that was executed one generation earlier was unsuccessful.
 - Restore is being performed to the transaction volume that is to be backed up.
 - Synchronous backup processing is performed in a transaction volume to be processed, but the state of equivalence is not reached;
 - Restoration is being executed using backup history information that 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 mount point of a transaction volume set at registration has been changed.

- A backup volume defined as the copy destination is mounted.
- Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
- A volume group is inactive in the volume group specification.
- 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](#)
 - [swstdevinforeset](#)
 - [swstsrsematch](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.2.2 swstbackstat (Backup Execution Status Display Command)

NAME

swstbackstat - displays the completion status of a backup

SYNOPSIS

To be executed on Managed Server

```
/opt/FJSVswsts/bin/swstbackstat [deviceName]
```

To be executed on Management Server

```
/opt/FJSVswsts/bin/swstbackstat [-h serverName] [deviceName]
```

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.

Title	Description
	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 [stgxfwcmdisprv](#) command.

OPERANDS

`deviceName`

Specifies the "1.4 Managing Device on AdvancedCopy Manager" corresponding to a transaction volume.

If this operand is omitted, the backup execution statuses of all the transaction volumes are displayed.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display the actual copying execution status:

```
# /opt/FJSVswsts/bin/swstbackstat
Server Transaction-Disk Backup-Disk Status Execute
job1 /dev/dsk/clt0d0 /dev/dsk/clt0d3 succeeded ----
job1 /dev/vg01 ---- ----
:
```

NOTES

- Do not use the OPC stop function of ETERNUS Web GUI while the snapshot fast backup is in progress. If you do use the OPC stop function of ETERNUS Web GUI, it displays "succeeded" whether or not the backup has actually been successful.
- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "8.3 Troubleshooting: Hardware Error During Backup" for information about this.
- Backup execution status display cannot be executed in the following circumstances:
 - Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.

9.1.2.3 swstrestore (Restore Execution Command)

NAME

swstrestore - restore

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstrestore [-g generationNo | -v versionNo] [-r restoreDeviceName] deviceName
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstrestore [-h serverName] [-g generationNo | -v versionNo][-r  
restoreDeviceName] deviceName
```

DESCRIPTION

The data that exists in backup history information is restored using OPC.

When this command is executed, AdvancedCopy Manager performs the restoration pre-processing and post-processing scripts before and after copying data using OPC. For more information on customizing these scripts, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)".

You can restore data to a device that is not a transaction volume. When you do so, the device must not be registered as a transaction volume and the device must have the same amount of space available as the specified transaction volume.

OPTIONS

-h *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 [swsthistsdisp](#) command.

-v *versionNo*

Specifies the absolute generation number of data to be restored.

Check the absolute generation number using the [swsthistsdisp](#) command.

-r *restoreDeviceName*

Specifies a restore destination device name to restore data to any device other than a transaction volume.

Note: If neither the -g or -v option is specified, the latest information from the information history management is restored.

OPERANDS

deviceName

Specifies the AdvancedCopy Manager device name corresponding to a transaction volume.

Refer to "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

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:

```
# /opt/FJSVswsts/bin/swstrestore -g 2 /dev/dsk/clt0d0
/dev/dsk/clt0d0 swstrestore completed
#
```

- If the "[Chapter 4 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:

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0s6
Server Transaction-Disk Backup-Disk      Status      Execute
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d3 suspend      ----
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync -all /dev/dsk/clt0d0
/dev/dsk/clt0d0 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk Status Execute
job2  /dev/dsk/clt0d0  ----      ----      ----
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/clt0d0
/dev/dsk/clt0d0 swstrestore completed
#
```

NOTES

- On a transaction volume on which a file system has been constructed, restore a specific file as follows:
 1. Mount a backup volume. Check the backup volume by executing the Backup History List view/[swsthistdisp](#) command.
 2. Copy the file to be restored by executing, for example, the cp command.
 3. Unmount the backup volume.
- If a transaction volume is mounted from a server other than the server on which this command is entered, execute this command after unmounting the transaction volume, using the authority of the backup administrator.
- Restoration or recovery cannot be executed in the following situations:
 - When both relative and absolute generation numbers have been specified.
 - When a device registered as a transaction volume has been specified in a parameter with the -r option.
 - When a device registered as a backup volume has been specified in a parameter with the -r option, the device has been registered in the backup registration information of a certain transaction volume. If you restore data to a backup volume without registered backup data, and the backup volume is used to back up a certain transaction volume, then data 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.
 - A transaction volume currently in use with synchronous backup processing is specified.
 - 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.
 - The mount point set at registration of a transaction volume has been changed.

- Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - 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)"
- This command can only be executed while none of the following commands are running:
 - [swstsvrset](#)
 - [swstdevinforeset](#)
 - [swstsrsemetch](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.2.4 swstcancelrest (Restore Cancellation Command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstcancelrest [-g generationNo | -v versionNo] [-r restoreDeviceName] [-  
emergency] deviceName
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstcancelrest [-h serverName][-g generationNo | -v versionNo][-r  
restoreDeviceName] [-emergency] deviceName
```

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.

-emergency

Emergency operation mode is available for operations.
In such cases, OPC sessions are neither confirmed nor cancelled.

Note: The restoration of the latest history information is cancelled if neither the **-g** or **-v** option is specified.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.
Refer to "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Cancel restoration of the transaction volume:

```
# /opt/FJSVswsts/bin/swstcancelrest -g 1 /dev/dsk/clt0d0  
/dev/dsk/clt0d0 swstcancelrest completed.  
#
```

- Restoration of the latest history information on the transaction volume is cancelled in emergency operation mode:

```
# /opt/FJSVswsts/bin/swstcancelrest -emergency /dev/dsk/clt0d0  
/dev/dsk/clt0d0 swstcancelrest completed.  
#
```

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 [swstorestore](#) command.
- You cannot cancel restoration if:
 - The history specified in the **-g** or **-v** option does not exist.
 - Restoration is not performed on the device specified in the **-r** option.
 - Restoration is not performed from the specified history. In this case, processing is terminated with an information message "swst0303 Restoration for specified restoration device is not performed". The end status after this message is a normal end.
 - Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.

- 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`
 - `swstdevinforeset`
 - `swstsrsemitch`
 - `swstresback`
 - `swstresrst`

9.1.2.5 swstreststat (Restore Execution Status Display Command)

NAME

swstreststat - displays the execution status of restoration

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstreststat [-g generationNo | -v versionNo] [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstreststat [-h serverName] [-g generationNo | -v versionNo] [deviceName]
```

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.

Title	Description
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 [stgxfwcmdisprv](#) command.

-g *generationNo*

Specifies the relative generation number of data whose restore execution status is to be displayed.

-v *versionNo*

Specifies the absolute generation number of data whose restore execution status is to be displayed.

Note: 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 "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display the restore execution statuses of transaction volumes:

```
# /opt/FJSVswsts/bin/swstreststat
Server Transaction-Disk Generation Version Backup-Disk Restore-Device Status Execute
job2 /dev/dsk/c1t0d0 1 10 /dev/dsk/c1t0d8 /dev/dsk/c1t0d11 executing 75%
job2 /dev/dsk/c1t0d2 ---- ---- ---- ---- ----
job2 /dev/dsk/c1t0d5 2 12 /dev/dsk/c1t0d9 ---- succeeded ---
job2 /dev/dsk/c1t0d6 3 13 /dev/dsk/c1t0d10 /dev/dsk/c1t0d12 executing 75%
:
#
```

NOTES

- Do not use the OPC stop function of ETERNUS Web GUI while the snapshot fast backup is in progress. If you use the OPC stop function of ETERNUS Web GUI, this command displays "succeeded" whether or not the restoration has actually been successful.
- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "[8.3 Troubleshooting: Hardware Error During Backup](#)" for information about this.
- If no generation number has been specified in the -v or -g option, the restore execution statuses of all the histories 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".
- In the following cases, restore execution status display processing cannot be executed:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

- A volume group is in an inactive state in volume group specification.

9.1.2.6 swsthistdisp (History Information Display Command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swsthistdisp [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swsthistdisp [-h serverName] [deviceName]
```

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 mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Generation	Displays a relative generation number. This item 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.

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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display the backup history information of all the transaction volumes:

```
# /opt/FJSVswsts/bin/swsthistdisp
Server=StrgSV01 Device=/dev/dsk/clt0d0 Mount-Point=/mnt/tran1 (vxfs)
Generation Version Backup-Date Backup-Disk Status Execute
1 10 2000/11/12 22:00 /dev/dsk/clt0d2 succeeded ----
2 9 2000/11/11 22:00 /dev/dsk/clt0d4 succeeded ----
:
#
```

NOTES

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "[8.3 Troubleshooting: Hardware Error During Backup](#)" for information about this.
- In the following cases, history information display processing cannot be executed:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is in an inactive state in volume group specification.

9.1.2.7 swsthistdel (History Information Deletion Command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swsthistdel -g generationNo | -v versionNo | -z [-emergency] deviceName
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swsthistdel [-h serverName] -g generationNo | -v versionNo | -z [-emergency] deviceName
```

DESCRIPTION

This command deletes backup history information.

The backup volume of the deleted history is released and becomes an empty 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 [stgxfwcmdisprv](#) 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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Delete a history with absolute generation number 10 of a transaction volume:

```
# /opt/FJSVswsts/bin/swsthistdel -v 10 /dev/dsk/c1t0d0  
/dev/dsk/c1t0d0 swsthistdel completed  
#
```

- The history information of relative generation number 1 of the transaction volume is deleted in the emergency operation mode:

```
# /opt/FJSVswsts/bin/swsthistdel -g 1 -emergency /dev/dsk/c1t0d0  
/dev/dsk/c1t0d0 swsthistdel completed  
#
```

NOTES

- You cannot delete backup history information if:
 - The backup history information specified in the `-g` or `-v` option does not exist.
 - The specified backup history information is currently being used in a restoration.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is in an inactive state in volume group specification.

- 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`
 - `swstsrsematch`
 - `swstresback`
 - `swstresrst`

9.1.2.8 swststartsync (Backup Synchronous Processing Start Command)

NAME

`swststartsync` - starts backup synchronous processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swststartsync deviceName [-Xdevmap deviceMapFile]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swststartsync [-h serverName] deviceName [-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.

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.

`-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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 Managing Device on AdvancedCopy Manager](#)" for the devices to be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- To start the backup synchronous processing for a transaction volume:

```
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d0  
/dev/dsk/c1t0d0 swststartsync completed.  
#
```

NOTES

- When you execute the backup synchronous processing start command for a transaction volume to which the backup synchronous processing is already being executed, the message "swst0301 Backup synchronous processing is already in progress." is output.
- 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - The replication 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 the backup volume is a volume group, do not execute the `vgchange (1M)` command to deactivate the volume group under synchronous processing (EC) execution. If this occurs and the backup volume is inactive then it cannot be reactivated. Additionally, it is not possible to perform commands including those to stop synchronous processing, such as the [swstbackup](#) and [swstcancelsync](#) commands. If it has been inactivated accidentally, make the backup volume active after stopping the synchronous processing using ETERNU Web GUI etc.
- If a suspended backup volume is the transaction volume at the start of the synchronous processing, then the suspended backup volume is selected as the backup destination with the highest priority, and the synchronous processing restarts (ie, differential copy) starts. Otherwise, the synchronous processing (ie, full copy) starts.
- This command cannot be executed when any of the following commands are running:
 - [swstsvrset](#)

- [swstdevinfo](#)
- [swstsrsem](#)
- [swstresback](#)
- [swstresrst](#)

9.1.2.9 swstcancelsync (Backup Synchronous Processing Cancel Command)

NAME

swstcancelsync - cancels the backup synchronous processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstcancelsync [-emergency] [-bd Backup-Device-Name | -all] Device-Name
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstcancelsync [-h serverName] [-emergency] [-bd backupDeviceName | -all] deviceName
```

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 [stgxfwcmdisprv](#) 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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "1.4 Managing Device on AdvancedCopy Manager" for the devices to be specified.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Cancelling backup synchronous processing to a transaction volume:

```
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/clt0d0
/dev/dsk/clt0d0 swstcancelsync completed.
#
```

- Cancelling backup synchronous processing of transaction volume in the emergency operation mode:

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/dsk/clt0d0
/dev/dsk/clt0d0 swstcancelsync completed.
#
```

- Cancelling backup synchronous processing of the backup volume from the transaction volume:

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk      Status      Execute
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d3  suspend     ----
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d2  executing   75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/clt0d0 -bd /dev/dsk/clt0d2
/dev/dsk/clt0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk      Status      Execute
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d3  suspend     ----
#
```

- Cancelling all of the backup synchronous processing of the transaction volume:

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk      Status      Execute
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d3  suspend     ----
job2  /dev/dsk/clt0d0  /dev/dsk/clt0d2  executing   75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/clt0d0 -all
/dev/dsk/clt0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk      Status      Execute
job2  /dev/dsk/clt0d0  ----          ----          ----
#
```

NOTES

- However, EC sessions are neither confirmed nor cancelled by execution in the emergency operation mode. If an EC session is in the error suspended state or the halt state, then unmanaged sessions remain. In this event, ETERNUS Web GUI must be used to cancel these sessions.
- You cannot cancel synchronous backup processing in the following case:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - When a volume group is inactive in the volume group specification.
 - The replication management function is executing a process for the target transaction volume.

- This command cannot be executed when any of the following commands are running:
 - `swstsvrset`
 - `swstdevinforeset`
 - `swstsrsemetch`
 - `swstresback`
 - `swstresrst`

9.1.2.10 swstsyncstat (Backup Synchronous Processing Progress Display Command)

NAME

swstsyncstat - displays the execution status of the backup synchronous processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstsyncstat [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstsyncstat [-h serverName] [deviceName]
```

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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- To display the status of backup synchronous processing to a transaction volume:

```
# /opt/FJJSVswsts/bin/swstsyncstat /dev/dsk/clt0d0
Server Transaction-Disk Backup-Disk      Status      Execute
job1   /dev/dsk/clt0d0   /dev/dsk/clt0d3  suspend     ----
job1   /dev/dsk/clt0d0   /dev/dsk/clt0d2  executing   75%
#
```

- To display the status of backup synchronous processing for all of the transaction volumes:

```
# /opt/FJJSVswsts/bin/swstsyncstat
Server Transaction-Disk Backup-Disk      Status      Execute
job1   /dev/dsk/clt0d0   /dev/dsk/clt0d1  suspend     ----
job1   /dev/dsk/clt0d0   /dev/dsk/clt0d2  executing   75%
job1   /dev/dsk/clt0d0   /dev/dsk/clt0d4  suspend     ----
job1   /dev/dsk/clt0d1   /dev/dsk/clt0d3  equivalent  100%
job1   /dev/dsk/clt0d5   /dev/dsk/clt0d7  failed      ----
job1   /dev/dsk/clt0d6   ----            ----       ----
#
```

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 "[8.3 Troubleshooting: Hardware Error During Backup](#)" for more information about this.
- If "nosession" is indicated as the status of the backup synchronous processing (in the Status column), resource information having inconsistency is a possible cause. Use the [swstsrsemtd](#) command to remove the inconsistency from the resource information.
- In the following cases, backup synchronous processing progress display command cannot be executed:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is in an inactive state in volume group specification.

9.1.2.11 swstexecstat (Execution Status Display Command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

To Execute on Managed Server

```
/opt/FJJSVswsts/bin/swstexecstat [-j] [deviceName]
```

To Execute on Management Server

```
/opt/FJSSVswsts/bin/swstexecstat [-j] [-h serverName] [deviceName]
```

DESCRIPTION

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC/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	<p>Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" is displayed. Otherwise, "IDLE" is displayed.</p> <ul style="list-style-type: none"> - swstbkpolset - swstbkpoldel - swstbackup - swstrestore - swsthistdel - swststartsync - swstcancelsync - swstcancelrest - swstcanceltrk
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Execute	<p>Displays the name of the command being executed or the progress of copying.</p> <p>"----" : Neither a command nor OPC/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>"sync(halt)" : EC is halt status.</p> <p>"snapshot(xxx%)" : The progress of OPC backup.</p> <p>"snapshot(failed)" : OPC backup ended abnormally.</p> <p>"snapshot(halt)" : OPC backup is halt status.</p> <p>"restore(xxx%)" : The progress of restoration.</p> <p>"restore(failed)" : OPC restoration ended abnormally.</p>

Title	Description
	<p>"restore(halt)" : OPC restoration is halt status. "?????" : Failed to get copy status.</p> <p>During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.</p>

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	<p>Displays whether any of the following commands are being executed on a transaction volume. If so, "EXEC" is displayed. Otherwise, "IDLE" is displayed.</p> <ul style="list-style-type: none"> - swstbkpolset - swstbkpoldel - swstbackup - swstrestore - swsthistdel - swststartsync - swstcancelsync - swstcancelrest - swstcanceltrk
Mount-Point (Method)	Displays the mount point of a device. The file system type of the mount point is displayed inside the parentheses.
Execute	<p>Displays the name of the command being executed or the progress of copying.</p> <p>"----" : Neither a command nor OPC/EC is being executed. "swststartsync" : The backup synchronous processing start command is being processed. "swstcancelsync" : The backup synchronous processing cancel command is being processed. "swstbackup" : The backup execution command is being processed. "swstrestore" : The restore execution command is being processed. "swstcancelrest" : The restore cancellation command is being processed. "swstbkpolset" : The backup policy setting command is being processed. "swstbkpoldel" : The backup policy deletion command is being processed. "swsthistdel" : The history information deletion command is being processed. "swstcanceltrk" : The tracking cancel command is being processed. "sync(xxx%)" : EC progress rate. "sync(failed)" : EC ended abnormally. "snapshot(xxx%)" : The progress of OPC backup. "snapshot(failed)" : OPC backup ended abnormally.</p>

Title	Description
	<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.

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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Display the execution statuses of transaction volumes:

```
# /opt/FJSVswsts/bin/swstexecstat
Server Device          Last-Backup-Date Interval Status Mount-Point (Method) Execute
job1 /dev/dsk/clt0d0 2000/12/11 12:20 OK IDLE /mnt/trans1 (vxfs) ----
job1 /dev/dsk/clt0d5 2000/12/10 12:20 DELAY=1 IDLE /mnt/usr1 (hfs) sync(22%)
job1 /dev/dsk/clt0d6 2000/12/09 12:20 DELAY=2 IDLE /mnt/usr2 (ufs) snapshot(45%)
:
#
```

- An example of using the -j option is as follows:

```
# /opt/FJSVswsts/bin/swstexecstat -j
Server Device          Execute-Date      Status Mount-Point (Method) Execute
job1 /dev/dsk/clt0d0 2000/12/11 12:20 IDLE /usr1 (ufs) ----
job1 /dev/dsk/clt0d2 2000/12/10 12:20 IDLE /usr2 (ufs) sync(22%)
job1 /dev/dsk/clt0d5 2000/12/09 12:20 IDLE /usr3 (ufs) snapshot(45%)
:
#
```

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 ["8.3 Troubleshooting: Hardware Error During Backup"](#) for more information about this.
- In the following cases, execution status display command cannot be executed:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.

- A volume group is in an inactive state in volume group specification.

9.1.2.12 swstcanceltrk (Tracking Cancel Command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstcanceltrk [-copy | -emergency] deviceName (-bd backupDeviceName | -all)
```

To Execute on Management Server

```
/opt/FJSVswsts/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 [stgxfwcmdisprv](#) 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 "[1.4 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:

```
# /opt/FJSVswsts/bin/swstcanceltrk /dev/c1t0d3 -bd /dev/c1t0d8
/dev/c1t0d3 swstcanceltrk completed.
#
```

- The following example stops tracking processing and physical copying that were specified for the transaction volume:

```
# /opt/FJSVswsts/bin/swsttrkstat /dev/c1t0d3
Server Transaction-Disk Backup-Disk Status Execute Update
job2 /dev/c1t0d3 /dev/c1t0d3 executing 33% -----
# /opt/FJSVswsts/bin/swstcanceltrk -copy /dev/c1t0d3 -bd /dev/c1t0d8
/dev/c1t0d3 swstcanceltrk completed.
#
```

NOTES

- If the command is executed in emergency operation mode, no OPC session is 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](#)
 - [swstdevinforeset](#)
 - [swstsrsematch](#)
 - [swstresback](#)
 - [swstresrst](#)

9.1.2.13 swsttrkstat (Tracking Status Display Command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swsttrkstat [deviceName]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swsttrkstat [-h serverName] [deviceName]
```

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.

Title	Description
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----" : Not in the process of tracking "executing" : In the process of physical copying and tracking "tracking" : In the process of tracking "failed" : Physical copying or tracking terminated abnormally "nosession" : No session exists. (eg, resource information is inconsistent.) "?????" : Failed to get copy status.
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.

OPTIONS

-h *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.

OPERANDS

deviceName

Specify an AdvancedCopy Manager device name.

Refer to "[1.4 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.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- The following example displays the status of tracking processing of a transaction volume:

```
# /opt/FJSVswsts/bin/swstrkstat /dev/c1t0d3
Server Transaction-Disk Backup-Disk Status Execute Update
job1 /dev/c1t0d3 /dev/c1t0d8 tracking ---- 12%
#
```

- The following example displays the status of tracking processing of all transaction volumes:

```
# /opt/FJSVswsts/bin/swstrkstat
Server Transaction-Disk Backup-Disk Status Execute Update
job1 /dev/c1t0d3 /dev/c1t0d9 nosession ---- ----
job1 /dev/c1t0d4 /dev/c1t0d10 executing 75% ----
job1 /dev/c1t0d5 /dev/c1t0d11 failed ---- ----
job1 /dev/c1t0d6 /dev/c1t0d12 ?????? ---- ----
job1 /dev/c1t0d7 /dev/c1t0d13 tracking ---- 12%
job1 /dev/c1t0d8 ---- ---- ---- ----
:
#
```

NOTES

- When the execution status (ie, the value displayed in the "Status" column) is "failed" or "?????", a hardware problem, etc. has occurred. Refer to ["8.3 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 [swstsrsemth](#) command to remove any inconsistencies from the resource information.
- The execution status of the tracking process cannot be displayed under the following conditions:
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is in an inactive state in volume group specification.

9.1.3 Maintenance Commands

This section describes the backup management maintenance commands.

9.1.3.1 swstsrsemth (Resource Match Command)

NAME

swstsrsemth - recovers resource information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstsrsemth [-x]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstsrsemth [-x] [-h serverName]
```

DESCRIPTION

This command recovers resource information if a system failure, etc. has made the resource information inconsistent.

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.

-x

Achieves consistency with a repository. Specify this option if a backup management files and a repository become inconsistent.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Recover resource information:

```
# /opt/FJSVswsts/bin/swstsrsemth
swstsrsemth completed
#
```

NOTES

- This command can only be executed if none of the following commands are running:
 - `swstsvrset`
 - `swstbkpolset`
 - `swstbkpodel`
 - `swstbackup`
 - `swstrestore`
 - `swstcancelrest`
 - `swststartsync`
 - `swstcancelsync`
 - `swstdevinforeset`
 - `swsthistdel`
 - `swstcanceltrk`
 - `swstresback`
 - `swstresrst`
 - `swstsrsemitch`

9.1.3.2 `swstresback` (Resource Backup Command)

NAME

`swstresback` - backup of backup management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresback backupDirectory
```

DESCRIPTION

A backup management file is backed up to the specified directory.

- Backup management file
Management information, such as Managed Server configuration information

The information backed up by this command can be restored by the `swstresrst` command.

OPERANDS

backupDirectory

Specifies the name of a directory to which the backup management file is saved.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Backup of the backup management file:

```
# /opt/FJSVswsts/bin/swstresback /home/backup  
swstresback completed  
#
```

NOTES

- You cannot perform backup if:
 - The specified directory does not exist.
 - Copying of data to the specified directory failed because of insufficient free space, etc.
- This command can be executed only while none of the following commands are running:
 - [swstsvrset](#)
 - [swstbkpolset](#)
 - [swstbkpoldel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swstdevinfo](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstresback](#)
 - [swstresrst](#)
 - [swstsrsemrch](#)

9.1.3.3 swstresrst (Resource Restore Command)

NAME

swstresrst - restore of backup management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresrst backupDirectory
```

DESCRIPTION

A backup management file is restored from the specified directory.

- Managed resources information
Management information, such as Managed Server configuration information.

OPERANDS

backupDirectory

The backup location directory name directed by the [swstresback](#) command is specified.

EXIT STATUS

- =0: Completed successfully
- >0: Terminated abnormally

EXAMPLES

- Restore the backup management file:

```
# /opt/FJSVswsts/bin/swstresrst /home/backup
swstresrst completed
#
```

NOTES

- Before the backup management file is restored by this command, the [swstsvrset](#) command must be executed.
- You cannot perform restoration if:
 - The specified directory does not exist.
 - No backup management files exist in the specified directory.
 - Copying of data from the specified directory for restoration failed because of insufficient free space, or for some other reason.
- This command can be executed only while none of the following commands are running:
 - [swstsvrset](#)
 - [swstbkpolset](#)
 - [swstbkpodel](#)
 - [swstbackup](#)
 - [swstrestore](#)
 - [swstcancelrest](#)
 - [swststartsync](#)
 - [swstcancelsync](#)
 - [swstdevinforeset](#)
 - [swsthistdel](#)
 - [swstcanceltrk](#)
 - [swstresback](#)
 - [swstresrst](#)
 - [swstsrsemitch](#)

9.2 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.



Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 9.4 Operating Environment for Executing Configuration Management Commands

Command	Operating Environment of AdvancedCopy Manager
stgcmodnode	To execute this command on a Management Server (Management Server transaction), the Management Server (Management Server transaction) must be operating.
stgenvdisp	This command is executable when both Management Server (Management Server transaction) and Managed Server (Managed Server transaction) are not operating.

Command	Operating Environment of AdvancedCopy Manager
	Note that when the cluster service (which is named differently in respective clustered systems) is not in cluster operation, this command cannot display certain information.
stgmgrinfofet	The package-backup-of-the-management-information execution server must be operating.
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 operating.
stgmgrinfodisp	The package-backup-of-the-management-information execution server must be operating.
stgxfwcmsetmode	The Managed Server transaction must be operating.



Note

In Cluster Operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

2. Execute the command.

The table below lists the commands available in cluster operation, indicates whether environment variables need to be configured, and shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 9.5 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
stgcmmmodnode	Required	Transaction operating node	-
stgenvdisp	Not required	Transaction operating node	-
stgmgrinfobkup	Required	Transaction operating node	-
stgmgrinfodisp	Required	Transaction operating node	-
stgmgrinfofet	Required	Transaction operating node	-
stgxfwcmsetmode	Required	Transaction operating node	-

9.2.1 stgcmmmodnode (Management Server Information Change Command)

NAME

stgcmmmodnode - changes or displays Management Server information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgcmmmodnode [-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 daemon that runs on a Management Server
- Server name of a Management Server

Refer to the following for the change procedure which uses this command:

- ["8.5.1 Changing IP Address of Management Server"](#)
- ["8.5.3 Changing Port Number of Management Server or Managed Server"](#)
- ["8.5.4 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:

```
# /opt/FJSVswstf/bin/stgcmmodnode
swstf2413 IP Address = 192.0.2.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
#
```

- Change the IP address of a Management Server to 192.0.2.11:

```
# /opt/FJSVswstf/bin/stgcmmodnode -i 192.0.2.11
swstf2401 Storage Management Server registry updated.
#
```

NOTES

- This command can be executed only by root users.
- 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.

- To execute this command, the AdvancedCopy Manager daemons must be stopped.
After successful execution, you must restart the AdvancedCopy Manager daemons.

9.2.2 stgxfwcmaddsrv (Server Information Addition Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.3 stgxfwcmmodsrv (Server Information Change Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.4 stgxfwcmdelsrv (Server Information Deletion Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.5 stgxfwcmsetdev (Device Information Collection/Reflection Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.6 stgxfwcmdeldev (Device Information Deletion Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.7 stgxfwcmdispsrv (Server Information Display Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.8 stgxfwcmdispdev (Device Information Display Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.9 stgxfwcmdisppat (Partition Information Display Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.2.10 stgenvdisp (Environment Information Display Command)

NAME

stgenvdisp - displays the values of the environment settings

SYNOPSIS

```
/opt/FJSVswstf/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: 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 logical IP address specified in the cluster setting command is displayed. However, note that the displayed IP address is not the active logical IP address if the IP address of either the Management Server transaction or Managed Server transaction is changed during operation.
Manager IP address	The IP address of the Management Server is displayed. However, if no server is added, then "???" is displayed.
Communication	The communication service port number (the service name in the services file: stgxfws) is displayed. In a cluster environment, the transaction communication service port number (the service name in the services file: stgxfws_logicalNodeName) is displayed.
Program install directory	Displays the "Program directory" specified during installation.
Fixed configuration directory	Displays the "Environment directory" specified during installation.
Modifying configuration directory	Displays the "Work directory" specified during installation.
Version	Displays the version and level of AdvancedCopy Manager.
Language	Displays the AdvancedCopy Manager language type. JAPANESE : Japanese version ENGLISH : English version

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:

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type           : Server
Manager IP address   : 192.0.2.10
Communication        : 1226
-----
Version              : V16.5
Language             : ENGLISH
Program install directory : /opt
Fixed configuration directory : /etc/opt
Modifying configuration directory : /var/opt
#
```

- Information on all transactions in a clustered system is displayed:

```
# /opt/FJSVswstf/bin/stgenvdisp
Server type           : Server
Cluster system       : GENERAL
Node type            : Primary
Node name            : nodeagt1
Service name         : agent_service1
Mount point          : /acmagt1disk
Manager IP address   : 192.0.2.10
Communication        : 11000
-----
Server type           : Server
Cluster system       : GENERAL
Node type            : Secondary
Node name            : nodeagt2
Service name         : agent_service2
Mount point          : /acmagt2disk
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              : V16.5
Language             : ENGLISH
```

```
Program install directory      : /opt
Fixed configuration directory  : /etc/opt
Modifying configuration directory : /var/opt
#
```

NOTES

- To output cluster operation information, execute the command from an active node. Executing the command from a standby node displays only partial information. To output cluster operation information while a transaction is stopped, either set the shared disk containing the AdvancedCopy Manager shared data of the transaction to the online state, or mount the shared disk and then execute the command.
- When this command is executed in a clustered system, the environment variable SWSTGNODE need not be set.
- This command can be executed only by root users.
- "???" is displayed for any information that cannot be displayed because of an error.
- Some items may not be output, depending on the server type (whether Management Server or Managed Server) or cluster type.

9.2.11 stgmgrinfoset (Management Information Package Backup Server Registration/Deletion Command)

NAME

stgmgrinfoset - registers, deletes or displays the management information

SYNOPSIS

```
/opt/FJISVswstf/bin/stgmgrinfoset [-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 /stgbkupdata, and the encoding used on the Management Server is ASCII):

```
# /opt/FJSVswstf/bin/stgmgrinfo set -d /stgbkupdata -c ASCII
swstf3000 The server which performs package backup of the management information on AdvancedCopy
Manager was registered.
#
```

- Delete the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfo set -del
swstf3001 The server which performs package backup of the management information on AdvancedCopy
Manager was deleted. Delete a directory. Directory=/stgbkupdata
#
```

- Display information about the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfo set
Directory      : /stgbkupdata
Manager code   : ASCII
#
```

NOTES

- This command can be executed only by root users.
- To change the backup data storage directory, first use the -del option to delete the current directory, then register a new backup data storage directory.
- Register only one Managed 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.

9.2.12 stgmgrinfo bkup (Management Information Package Backup Command)

NAME

stgmgrinfo bkup - backup the management information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfo bkup [-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 not specified, 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 not specified, backups are created as defined in the policy file. For details on the policy file, refer to the section ["8.1.2.1 Preliminaries"](#).

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Back up the management information on all the Managed Server as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00, Server
name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:02:00, Server
name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00, Server
name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:05:00, Server
name=acm02
swstf3021 The normal end of the backup of management information was carried out by all servers.
#
```

- Back up the management information on Managed Server as defined in the policy file:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00, Server
name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:02:00, Server
name=acm01
swstf3021 The normal end of the backup of management information was carried out by all servers.
#
```

- Back up the registries on all of the Managed Server:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -t RegiData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00, Server
name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:02:00, Server
name=acm01
swstf3014 Backup of management information is started. Start time=04/07/02 11:02:00, Server
name=acm02
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:05:00, Server
name=acm02
swstf3021 The normal end of the backup of management information was carried out by all servers.
#
```

- Back up the backup management located on Managed Server:

```
# /opt/FJSVswstf/bin/stgmgrinfobkup -n acm01 -t BkupData
swstf3014 Backup of management information is started. Start time=04/07/02 11:00:00, Server
name=acm01
swstf3020 Backup of management information was ended normally. End time=04/07/02 11:02:00, Server
name=acm01
swstf3021 The normal end of the backup of management information was carried out by all servers.
#
```

NOTES

- This command can be executed only by root users.
- Be sure to check the information (ie, a message indicating completion or an error) that is output by this command.
- This command can be executed only on the management information package backup execution server.
- Set the name of the logical node in the 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.
- If this command was executed under one of the following circumstances from a Managed Server on which AdvancedCopy Manager Version 14.2 or earlier is installed, backup of authentication data is not implemented.
 - When AuthData was specified in the -t option
 - When the value "YES" was specified for the AuthData key in the Management Server section of the policy file for batch backup of management data
- To save backup data to a tape or similar external medium, save all files and directories under the backup data storage directory.
- Registry backups are made only when RegiData is specified in the -t option. A registry backup is not made if the -t option is not specified.
- A backup of the policy file for management information package backup is made only when MgrInfoData is specified in the -t option. No backup is made when the -t option is not specified. Additionally, specify the name of the management information package backup execution server in the -n option.
- If the version of Management Server is lower than that of Managed Server, back up the management information on Management Server.

9.2.13 stmgrinfodisp (Management Information Package Backup Status Display Command)

NAME

stmgrinfodisp - displays the status of execution of the stmgrinfobkup

SYNOPSIS

```
/opt/FJsvswstf/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 no backups are created when the management information package backup command is executed or if the management information package backup command ends in error, then no data is output.

Item	Description
Server	Server name
RegiData	Date and time at which the management information package backup command created a backup of a registry (ie, the date and time that the management information package backup command was executed) In yy/mm/dd hh:mm:ss format
BkupData	Date and time at which the management information package backup command created a backup of the backup management (ie, the date and time that the management information package backup command was executed)

Item	Description
	yy/mm/dd hh:mm:ss
ReplData	Date and time at which the management information package backup command created a backup of replication management (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss
MgrInfoData	Date and time at which the management information package backup command created a backup of the policy file for management information package backup (ie, the date and time that the management information package backup command was executed) yy/mm/dd hh:mm:ss

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 management information package backup command was executed is displayed.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Output the information about all the Managed Server:

```
# /opt/FJSVswstf/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
#
```

- Output the information about Managed Server named acm01:

```
# /opt/FJSVswstf/bin/stgmgrinfodisp -n acm01
Server:      acm01
  RegiData:  04/08/01 09:00:00
  ReplData:  04/08/02 16:32:22
#
```

NOTES

- This command can be executed only by root users.
- This command can be executed only on the management information package backup execution server.
- When the management information package backup execution server is in a clustered system, set the name of the logical node in the environment variable SWSTGNODE.

9.2.14 stgxfwcmsetmode (Information Collection Mode Configuration Command)

NAME

stgxfwcmsetmode - sets the collection mode for information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgxfwcmsetmode -leg {on | off | disp}
```

DESCRIPTION

This command sets the collection mode for information collected by the server. It also displays the collection mode that is currently set.

This command must be executed from the Managed Server.

OPTIONS

-leg {on | off | disp}

This option sets whether information is collected with the devices (/dev/(r)disk/disk#) of the new format or the devices (/dev/(r)dsk/c#t#d#) of the legacy format. For information on each device, refer to "1.4 Managing Device on AdvancedCopy Manager". The values that can be specified are as follows:

on : Use a legacy format device.

off : Use a new format device.

disp : Check the current setup status.

Information Output When "disp" Is Specified

leg : on Use a legacy format device

leg : off Use a new format device.

EXIT STATUS

=0: Completed successfully

>0: Terminated abnormally

EXAMPLES

- Set configuration so that a legacy format device is used:

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -leg on
stgxfwcmsetmode completed (SWSTGNODE=nodemgr)
#
```

- Check the current setup status:

```
# /opt/FJSVswstf/bin/stgxfwcmsetmode -leg disp
leg: on (SWSTGNODE=null)
#
```

NOTES

- If this command is used to change the set value at a time when information concerning managed devices exists, a message indicating that device information has been changed may be posted the next time device information is collected or displayed. Therefore, the backup management and replication management definition information must be deleted before the setting is changed.
- If no legacy format devices exist, it is not possible to set the configuration so that legacy format devices are used.

9.2.15 stgrepcnv (Repository Data Migration Command)

This command is executed by the Management Server.

For more information, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

9.3 Replication Management Commands

This section describes operations using Replication Management Commands.

 Note

Only a root user can execute all the commands of replication management. When command execution is carried out by other users, a message "swsrp0601 This Command cannot be run. This is because the user is not a root user." is displayed, and the command aborts.

 Note

Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 9.6 Operating Environment When Executing Replication Management Commands

Command	Operating Environment of AdvancedCopy Manager
swsrpcancel	To execute this command on a Management Server with the -h option specified, 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).
swsrpchsnc	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).
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.

Command	Operating Environment of AdvancedCopy Manager
	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.
swsrpvoinfo	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

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. Specify the environment variable as follows:

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

2. Execute the command.

The table below lists the commands available in cluster operation, indicates whether environment variables must be configured and shows the nodes on which commands are executable. For notes and cautions on command execution, refer to the Remarks column.

Table 9.7 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swsrpsetvol	Required	Transaction operation node	-
swsrpvoinfo	Required	Transaction operation node	-
swsrpdelvol	Required	Transaction operation node	-
swsrprebuffstat	Required	Transaction operation node	-
swsrprebuffset	Required	Transaction operation node	-
swsrpstartsync	Required	Transaction operation node	-
swsrpmake	Required	Transaction operation node	-
swsrpstat	Required	Transaction operation node	-
swsrpcancel	Required	Transaction operation node	-
swsrpchsync	Required	Transaction operation node	-
swsrprevsync	Required	Transaction operation node	-
swsrprecoverres	Required	Transaction operation node	-

9.3.1 Environment Definition Commands

This section describes environment definition commands for replication management.

9.3.1.1 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

```
/opt/FJSSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

For Server-to-server Replication

```
/opt/FJSSVswsrp/bin/swsrpsetvol [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup groupName]
originalVolumeName replicaVolumeName
```

To Execute on Management Server

For Replication on Single Server

```
/opt/FJSSVswsrp/bin/swsrpsetvol [-h serverName] [-n] [-u] [-Xgroup groupName] originalVolumeName
replicaVolumeName
```

For Server-to-server Replication

```
/opt/FJSSVswsrp/bin/swsrpsetvol [-h serverName] [-n] [-u] -o (ORG|REP|BOTH) [-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 minus sign (-), underscore (_), number sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.

OPERANDS

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/dev/dsk/c1t2d0 of Managed Server SRC-SV as the replication source volume, and volume /dev/dsk/c1t2d0 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 following example shows the command executed on SRC-SV:

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
swsrpsetvol completed
#
```

- When the same configuration is made from TARG-SV, the example is as follows (be careful with the volume name):

```
# /opt/FJSVswsrp/bin/swsrpsetvol -u -o ORG /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0
swsrpsetvol completed
#
```

NOTES

- Replication volume information cannot be set if:
 - Replication volume information has already been set.
 - The specified replication source volume and replication destination volume are already set as the replication destination volume and the replication source volume respectively.
 - The -n option is not specified when the sizes of the replication source volume and the replication destination volume are different.
 - Two volumes that have the same 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.
 - Changes have been made to the logical disk configuration that cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - The 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 using a volume group as a source volume or replica volume, the following applies:
 - Be sure to specify the pairs of a volume group as a source volume and replica volume. Note that this does not work between platforms
 - The same volume group cannot be registered as a source volume and replica volume.

- When registering a volume group as a source volume and replica volume, make the logical disk configuration the same.
- When you change physical information on volumes (ie, partition size, drive letter, and box information on ETERNUS Disk storage system device using such functions as an OS management tool (format command etc) or ETERNUS Web GUI provided by ETERNUS Disk storage system, you need to reset the registered replication volume information associated with the changed volumes, by following these steps:
 1. Delete the replication volume information using the [swsrpdelvol](#) command.
 2. Refer to "Add/Reload Device" in the *ETERNUS SF Web Console Guide* to reload the configuration. Otherwise the [stgxfwcmsetdev](#) command is executed in a Management Server.
 3. Reset the replication volume information using the [swsrpsetvol](#) command.
- 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](#)
 - [swsrpstartsync](#)
 - [swsrpmake](#)
 - [swsrpcancel](#)
 - [swsrpchsyc](#)
 - [swsrprevsync](#)
 - [swsrprecoverres](#)

9.3.1.2 swsrpvoinfo (Replication Volume Information Display Command)

NAME

swsrpvoinfo - displays the replication volume information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpvoinfo [-L] [originalVolumeName]
```

To Execute on Management Server

```
/opt/FJSVswsrp/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.

Title	Description
	Additionally, in the case of a volume group, displays the size of the physical disk on which the logical disk exists.
Replica-Volume	Displays a replication destination volume name.
Copy	Displays the copying direction. uni-direction : One-way copying from a replication source volume to a replication destination volume is allowed. bi-direction : Bidirectional copying is allowed.
Op-Server	Displays the operation server of a pair of replication volumes. original : The replication source server is the operation server. replica : The replication destination server is the operation server. both : Sets both the copy-source server and copy-destination server as operation servers.
Group (Only when 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 [stgxfwcmdispsv](#) 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:

```
# /opt/FJsvswsrp/bin/swsrpvoinfo -h SRC-SV
Server Original-Volume      Size      Replica-Volume      Size      Copy      Op-Server
SRC-SV /dev/dsk/c1t2d0@SRC-SV  4.0 Gbyte /dev/dsk/c1t2d0@TARG-SV  4.0 Gbyte uni-direction
original
SRC-SV /dev/dsk/c1t2d1@SRC-SV  4.0 Gbyte /dev/dsk/c1t2d1@TARG-SV  5.0 Gbyte bi-direction original
SRC-SV /dev/dsk/c1t2d2@SRC-SV  9.1 Gbyte /dev/dsk/c1t2d2@TARG-SV  9.1 Gbte bi-direction replica
SRC-SV /dev/dsk/c1t2d3@SRC-SV  7.5 Gbyte /dev/dsk/c1t2d3@TARG-SV  7.5 Gbte bi-direction both
#
```

NOTES

- Replication volume information cannot be displayed if:
 - The specified volume has not been set as a replication source volume
- This command cannot be executed while the following command is running:
 - [swsrprecoverres](#)

9.3.1.3 swsrpdelvol (Replication Volume Information Deletion Command)

NAME

swsrpdelvol - deletes the replication volume

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSSVswsrp/bin/swsrpdelvol [-e] [-d] originalVolumeName replicaVolumeName
```

To Execute on Management Server

```
/opt/FJSSVswsrp/bin/swsrpdelvol [-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 [stgxfwcmdispsv](#) 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:

```
# /opt/FJSVswsrp/bin/swsrpdelvol /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
swsrpdelvol completed
#
```

NOTES

- Replication volume information cannot be deleted if:
 - The specified replication source volume and the replication destination volume are not set as replication volumes.
 - The copy processing (synchronization processing and snapshot processing) is performed between replication volumes.
 - For server-to-server replication, the 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.
 - A volume group is inactive in the volume group specification.
- However, OPC sessions are neither confirmed nor cancelled by execution in emergency operation mode. If an OPC session is in the error suspended state, then unmanaged sessions remain. In this event, ETERNUS Web GUI must be used to cancel these sessions.
- If a logical volume is deleted, or if changes are made to its configuration that cannot be supported by AdvancedCopy Manager, replica volume information cannot be deleted. In this case, perform processing of a or b shown below.
 - a. Specify the `-e` option and execute the command, after checking that an Advanced Copy is not processing in the replica volume to be deleted (if an Advanced Copy is running, stop the Advanced Copy with ETERNUS Disk storage system, or perform b).
 - b. Execute the command after re-creating the logical volume with a configuration that AdvancedCopy Manager can support, or after returning the logical volume configuration to its original state.
- This command cannot be executed while any of the following commands are running:
 - `swsrpsetvol`
 - `swsrpdelvol`
 - `swsrpstartsync`
 - `swsrpmake`
 - `swsrpcancel`
 - `swsrpchsync`
 - `swsrprevsync`
 - `swsrprecoverres`

9.3.1.4 swsrprebuffstat (REC Buffer Information Display Command)

NAME

swsrprebuffstat - displays information for the REC buffer

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrprebuffstat [-L] volumeName
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrprebuffstat [-h server-Name] [-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 Displays the usage rate of the REC buffer as a percentage. This is never 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

Title	Description
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 [stgxfwcmdisprv](#) 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":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate  RemoteBoxID                               DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB B active  50%
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate  RemoteBoxID                               DiskBuff DiskRate
1  RECV 0%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA ---    ---
#
```

- 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"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate  RemoteBoxID                               DiskBuff DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active  0%
2  RECV 0%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB ---    ---
#
```

[Command executed on Managed Server "Server2"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d20@Server2 -L
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID DiskBuff DiskRate
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA --- ---
2 SEND 12% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA active 0%
#
```

- 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"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID DiskBuff DiskRate
1 SEND 25% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB warning(code=08) 0%
2 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB --- ---
3 SEND 12% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC active 50%
4 RECV 0% CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC --- ---
5 SEND 12% DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD invalid --- ---
6 RECV 0% EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE --- ---
7 SEND 12% FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF inactive(code=05) --- ---
8 SEND 12% GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG active 0%
#
```

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.

9.3.1.5 swsrprecbuffset (REC Buffer Settings Change Command)

NAME

swsrprecbuffset - changes the settings of the REC buffer

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid buffer-id -Xbuffuse {SEND|RECV} volumeName
```

To Execute on Management Server

```
/opt/FJSVswsrp/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 [stgxfwcmdisprv](#) 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":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 25% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse RECV /dev/dsk/clt2d10@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 RECV 0% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 RECV 0% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/clt2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use Rate RemoteBoxID
1 SEND 12% AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

- 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"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
```

```

1 SEND 25% BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2 RECV 0%  BBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/clt2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 2 -Xbuffuse RECV /dev/dsk/clt2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/clt2d11@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use Rate RemoteBoxID
1 SEND 12%  BBBB
2 RECV 0%  BBBB
#

```

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.
- 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](#)
- The REC buffer settings cannot be changed by using TFOV.

9.3.2 Operation Commands

This section describes operation commands for replication management.

9.3.2.1 swsrpstartsync (Synchronous Processing Start Command)

NAME

swsrpstartsync - starts synchronous processing

SYNOPSIS

To Execute on Managed Server

```

/opt/FJSVswsrp/bin/swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda]
fromVolumeName toVolumeName

```

To Execute on Management Server

```

/opt/FJSVswsrp/bin/swsrpstartsync [-h Server-Name] [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] fromVolumeName toVolumeName

```


To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstartsync [-y [-a | -v] | -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/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 between disks by EC and 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.

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 [stgxfwcmdisprv](#) 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.

Specifying the -y option without the -a or -v option starts the mode in Automatic Split mode.

Not specifying the -y, -k, and -i options sets Through mode.

Synchronization in intra-box replication is always handled in synchronous mode.

-a

Specifies the start of split mode for inter-box synchronization in Automatic Split mode. This option is valid only when total copy is started for inter-box replication.

Specify this option together with the -y option.

-v

Specifies the start of split mode for inter-box synchronization in Manual Split mode. This option is valid only when total copy is started for inter-box replication.

Specify this option together with the -y option.

You must specify this option when specifying synchronization mode (the -y option) on a box that does not support Automatic Split mode.

-k

Specifies the setting of transfer mode for inter-box synchronization in Stack mode. This option is valid only when total copy is started for inter-box replication.

Not specifying the -y, -k, or -i option sets Through mode.

-i

Specifies the setting of transfer mode for inter-box synchronization in Consistency mode. This option is valid only when total copy is started for inter-box replication.

Not specifying the -y, -k, or -i option sets Through mode.

-g

Specifies the setting of recovery mode for inter-box synchronization in Manual Recovery mode. This option is valid only when total copy is started for inter-box replication.

Not specifying this option sets Automatic Recovery mode.

-m

For server-to-server replication, this option specifies that communication processing with non-operational servers is not performed. When this option is specified, volume status check processing and the pre-processing for the replication destination volume of a non-operational server are not performed.

This option is valid only during server-to-server replication.

-t

Specifies that pre-processing for the replication destination volume is not performed.

Use this option if any of the following conditions apply:

- AdvancedCopy Manager does not perform pre-processing or post-processing for the replication destination volume, and independent pre-processes and post-processes are inserted before and after AdvancedCopy Manager commands. (*)
- Replication destination pre-processing and post-processing are judged to be unnecessary (for example, for databases constructed on RAW devices). (*)
- Synchronous processing (REC) between boxes is restarted after a forcible suspend.

*: If you specify this option to start or resume synchronous processing, specify the -t option also when executing 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

- Start replication from /dev/dsk/c1t2d0 of a Management Server to /dev/dsk/c1t2d0@TARG-SV of Managed Server SRC-SV:

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpstartsync completed
#
```

- Start replication from /dev/dsk/c1t2d0 of a Management Server to /dev/dsk/c1t2d0@TARG-SV of a Managed Server SRC-SV with replication destination volume access disabled.

```
# /opt/FJSVswsrp/bin/swsrpstartsync -h SRC-SV -Xda /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpstartsync completed
#
```

- Start replication for group "GRP1":

```
# /opt/FJSVswsrp/bin/swsrpstartsync -Xgroup GRP1
GROUP=GRP1 swsrpstartsync completed
#
```

NOTES

- Replication cannot be started if:
 - The specified source volume and destination volume have not been set as replication volumes.
 - A replication source volume is specified as the copy volume and a replication destination volume is specified as the copied material volume, and one-way copy is set as the copy attribute of the replication volume.
 - Volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed after operation starts. In this case, the operation cannot continue for the corresponding volume. Stop the replication operation for the corresponding volume, and then delete and reset the replication volume information.
 - For server-to-server replication, the 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.
 - The -g option is specified, except for a remote copy.
 - Changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - The backup management function 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
 - When the file systems 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 9.8 Differences in Processing Corresponding to Synchronization Status

Status of Synchronization Processing	Processing
Dismount status	Start of total copy
Total or incremental copy status	Informational message (swsrp2401) is output and the command ends normally
Equivalency maintain status	Informational message (swsrp2401) is output and the command ends normally
Replication established status (i.e., halt status)	Start of incremental copy

- Before starting the replication, run the replication pre-processing script for the replication destination volume. The contents of this script can be customized. For more information about this, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)". If you do not want to implement the pre-processing script, use the -t option.
If replication is started with the -Xgroup option specified, the replication pre-processing script is not executed for the copy destination volume. Therefore, pre-processing must be executed for all copy destination volumes in the group before this command is executed.
- To protect processing that accesses a replication destination volume, set the replication destination volume before starting replication so that other processes cannot access it. To do so, 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.
 - When configuring a volume group which consists of two or more logical disks as a source volume, and replicating it, make all logical devices unmount/mount using the Administrator's authority.
- If the replica volume is a volume group, do not execute the vgchange (1M) command to deactivate the replica volume under synchronous processing (EC/REC) execution. If the replica volume is inactive during synchronous processing execution then it cannot be reactivated. Additionally, it is not possible to perform commands including those to stop synchronous processing, [swsrpmake](#) and [swsrpcancel](#) commands. If it has been inactivated accidentally, make the replica volume active after stopping the synchronous processing using ETERNUS Web GUI etc.
- Refer to "[10.1.1 General Notes](#)" for notes about starting replication.
- 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 restart 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](#)
 - [swsrprecoverres](#)
- 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 ["7.7 When Recovering Storage Cluster Continuous Copy Function"](#) to take action.

9.3.2.2 swsrpmake (Replication Creation Command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To Execute on Managed Server

Synchronized Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j | -Xconcur]) fromVolumeName toVolumeName
```

Snapshot Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-T | -C | -P]) fromVolumeName toVolumeName
```

To Execute on Management Server

Synchronized Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-h serverName] [-m] [-f] [-t] ([-j | -Xconcur]) fromVolumeName toVolumeName
```

Snapshot Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-h serverName] [-m] [-f] [-t] ([-T | -C | -P]) fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

Synchronized Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j | -Xconcur]) [-Xreverse] -Xgroup groupName
```

Snapshot Replication

```
/opt/FJJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

Synchronized Replication

```
/opt/FJSSVswsrp/bin/swsrpmake [-h serverName] [-m] [-f] [-t] ([-j | -Xconcur]) [-Xreverse] -Xgroup groupName
```

Snapshot Replication

```
/opt/FJSSVswsrp/bin/swsrpmake [-h serverName] [-m] [-f] [-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 of these processes, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)".

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.

-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.

If this option is used, the size of the copy destination volume must be the same or larger than that of the copy source volume.

-Xconcur-opc

Specifies that a replication is created using the Concurrent OPC function.

-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

- The Management Server instructs Managed Server SRC-SV to create a copy of /dev/dsk/c1t2d0 in /dev/dsk/c1t2d0@TARG-SV:

```
# /opt/FJSVswsrp/bin/swsrpmake -h SRC-SV /dev/dsk/c1t0d2 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpmake completed
#
```

- Creates a copy for the group "GRP1":

```
# /opt/FJSVswsrp/bin/swsrpmake -Xgroup GRP1
GROUP=GRP1 swsrpmake completed
#
```

- Creates a copy for the group "GRP1" by using the Concurrent OPC:

```
# /opt/FJSVswsrp/bin/swsrpmake -Xgroup GRP1 -Xconcur-opc
GROUP=GRP1 swsrpmake completed
#
```

NOTES

- Replication cannot be created if:
 - The specified replication source and replication destination volumes are not set as replication volumes.
 - The synchronization processing from the specified replication source volume to the replication destination volume is not in the equivalency maintenance status.
 - After operation starts, physical volume information (box identifier, OLU, EXTENT start position, and EXTENT size) is changed. In this case, operation for the corresponding volume cannot continue. Stop the replication operation for the volume, and then delete and reset the replication volume information.
 - A destination volume has multiple mount points.
 - For server-to-server replication, the 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - The replication destination volume cannot be locked
 - The contents of the replication destination volume lock operation specification file are invalid
 - The backup management function 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/DX400 S2 series (for earlier than V10L30 firmware)
 - ETERNUS DX8000/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 of 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 of copy operation.

OPC/SnapOPC/SnapOPC+

Operation Status (Display by swsrpstat -L)	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".) - 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".) 	<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.t

QuickOPC

Operation Status (Display by swsrpstat -L)	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".) 	<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.

Operation Status (Display by swsrpstat -L)	Copy Operation
<ul style="list-style-type: none"> - 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".) 	
<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
 - When the file systems 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.

- In the operation mode involving activation of the replica volume group, the post-processing script for the replica volume may take longer for command processing because the LVM management information is rewritten (recreatevg).
- Before a replica is created, the pre-processing for the source volume and destination volume are executed (for synchronized replication, only pre-processing is executed). After the replica has been created, the post-processing for the source volume and destination volume is executed. The contents of the script can be customized. For more information about this refer to "[Appendix C Pre-processing and Post-processing of Replication](#)". If the -f or -t option is specified, the pre-processing and post-processing are not performed.

If a replica is created with the -Xgroup option specified, the replication, pre-processing and post-processing scripts are not executed for the copy source volume/copy destination volume. Therefore, execute pre-processing for all copy source volumes/copy destination volumes in the group before this command is executed.

(However, for synchronous replication, pre-processing for the copy destination volume is executed when replication starts, so it need not be executed.)

In addition, post-processing must be executed after this command is executed.

- If this command is executed during execution of snapshot processing, stop the copy processing in progress and restart the snapshot processing.
- To protect the data, this command sets the replication source volume before creating a replica so that other processes cannot access the volume. The replication source volume is unmounted in order to disable to access it. If you cannot unmount 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, unmounting, 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 unmount or use some other method, refer to ["Appendix C Pre-processing and Post-processing of Replication"](#) and note the following:

- When setting a volume group which consists of two or more disks as a source volume, and replicating it, make all logical devices unmount/mount using the Administrator's authority.
 - For replication pre-processing, execute the UNIX sync command to synchronize volumes and the file system.
 - In replication post-processing, execute the <fsck> command to check the file system at the copy destination.
 - When the replication source volume is being used by backup management, dismount may not be possible. In this case, "swsrp2613 An error occurred in the pre-processing script for creating a replica. Error Code = 2" is output.
 - 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 SnapOPC session between the copy source volume and the copy destination volume.
 - If this command is executed during snapshot processing, snapshot processing is restarted.
- Refer to the following table for details of copy operation:

Table 9.9 Copy Operation When Command Is Executed During Snapshot Processing

Operation Status (Display by swsrpstat -L)	-T Option Specification	Copy Operation
Copy is not executed. (Status is "----" and Trk also is "----".)	No	Ordinary snapshot processing is started.
Copy is not executed. (Status is "----" and Trk also is "----".)	Yes	Differential snapshot processing is started.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	No	Copying that is in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is not executed. (Status is "snap" and Trk is "off".)	Yes	Copying in progress is terminated and differential snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	No	Copying in progress is terminated and ordinary snapshot processing is restarted.
Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	Yes	Differential snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	No	Tracking processing is terminated and ordinary snapshot processing is restarted.
Tracking is in progress. (Status is "----" and Trk is "on".)	Yes	Differential snapshot processing is restarted.

- Refer to ["10.1.1 General Notes"](#) for notes on creating replication.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrprecoverres](#)
- When the Storage Cluster Continuous Copy function is used:
 - If the status of the TFO group is "Normal", and replication volume cannot be created 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 "7.7 When Recovering Storage Cluster Continuous Copy Function" to take action.

9.3.2.3 swsrpstat (Operation Status Display Command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpstat [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E] [-H] [-O]
[originalVolumeName]
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpstat [-h serverName] [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E]
[-H] [-O] [originalVolumeName]
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstat [ [-L] [-Xdate] [-Xda] [-Xstandby-s] | [-Xall] ] [-E] [-H] [-O] -
Xgroup groupName
```

o Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/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	Displays the copy direction if a copy session exists. regular : Copying from the replication source to the replication destination is being performed. reverse : Copying from the replication destination to the replication source is being performed. ---- : Copying is not being performed.
Status	Displays the execution status. 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. ---- : 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.

Title	Description
	<p>copy-on-write(active) : SnapOPC+ processing is being performed (most recent snap generation). copy-on-write(inactive) : SnapOPC+ processing is being performed (past snap generation). failed : Error suspend status. failed(badsector) : There is a bad sector in the copy source. failed(overflow) : There is insufficient Snap Data Volume or Snap Data Pool capacity. failed(other) : The error suspend status is neither failed(badsector) or failed(overflow). halt : Hard suspend status. halt(sync) : Hard suspend status (hard suspend status has been entered during a REC total copy or differential copy). halt(equivalent) : Hard suspend status (hard suspend status has been entered during an REC equivalency maintenance state). halt(use-buffer) : A line fault occurred and the REC buffer is in use. (*1) halt(use-disk-buffer) : A line fault occurred and the REC Disk buffer is in use. (*1) snap : OPC or QuickOPC processing is being performed. ????? : Failed to get copy status.</p> <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> <p>on : Tracking processing is in progress. off : Tracking processing is not in progress. ---- : Snapshot processing is not being performed.</p>
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) <p>Displays "----" during physical copying or when tracking is not in progress.</p>
Rcv	<p>Indicates the Recovery mode for Inter-ETERNUS synchronization.</p> <p>auto : Automatic Recovery mode manual : Manual Recovery mode ---- : Inter-ETERNUS synchronous replication (REC) is not performed.</p>

Title	Description
Split	<p>Indicates the Split mode for Inter-ETERNUS synchronization.</p> <p>auto : Automatic Split mode manual : Manual Split mode ---- : Inter-ETERNUS synchronous replication (REC) is not performed using the Synchronous mode.</p>
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.</p> <p>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> <p>on : Access is not being permitted. off : Access is being permitted.</p> <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 and 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 and 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) - Concurrent Suspend (Execution the "swsrpmake -Xconcur") - Changing to error suspend status (The Status is "failed")

Title	Description
	<ul style="list-style-type: none"> - 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 (swsrpstartsycnc) 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 [stgxfwcmdisprv](#) 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 not set, 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 the all information.
For the items displayed by this option, refer to the example following.
Note that the items displayed by this option may be subject to change in a future release.

OPERANDS

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:

```
# /opt/FJVSwsrpb/bin/swsrpstat -h SRC-SV
Server Original-Volume      Replica-Volume      Direction Status      Execute
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular replicated ----
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV regular ----
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@TARG-SV reverse snap 45%
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d1@TARG-SV regular copy-on-write(inactive) ----
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d2@TARG-SV regular copy-on-write(inactive) ----
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d3@TARG-SV regular copy-on-write(active) ----
#
```


- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -L option specified):

```
# /opt/FJVSwsrp/bin/swsrpstat -h SRC-SV -L
Server Original-Volume      Replica-Volume      Direction Status      Execute Trk
Update Rcv Split Xfer Snap-Gen
SRC-SV /dev/dsk/clt2d0@SRC-SV /dev/dsk/clt2d0@TARG-SV regular replicated ---- ----
---- auto ---- async ----
SRC-SV /dev/dsk/clt2d1@SRC-SV /dev/dsk/clt2d1@TARG-SV regular ---- ---- on
6% ---- ---- ---- ----
SRC-SV /dev/dsk/clt2d2@SRC-SV /dev/dsk/clt2d2@TARG-SV reverse snap 45% off
---- ---- ---- ---- ----
SRC-SV /dev/dsk/clt1d0@SRC-SV /dev/dsk/clt1d1@TARG-SV regular copy-on-write(inactive) ----
off 0% ---- ---- ---- 1
SRC-SV /dev/dsk/clt1d0@SRC-SV /dev/dsk/clt1d2@TARG-SV regular copy-on-write(inactive) ----
off 5% ---- ---- ---- 2
SRC-SV /dev/dsk/clt1d0@SRC-SV /dev/dsk/clt1d3@TARG-SV regular copy-on-write(active) ----
off 6% ---- ---- ---- 3
#
```

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server (with the -Xall option specified):

```
# /opt/FJVSwsrp/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 /dev/dsk/clt2d0@SRC-SV /dev/dsk/clt2d0@TARG-SV regular replicated ---- ---- ---- auto
---- async ---- on 2010/10/20 22:00:45 exist
SRC-SV /dev/dsk/clt2d1@SRC-SV /dev/dsk/clt2d1@TARG-SV ---- ---- ---- on 6% ----
---- ---- ---- off 2010/10/20 22:10:39 not-exist
SRC-SV /dev/dsk/clt2d2@SRC-SV /dev/dsk/clt2d2@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):

```
# /opt/FJVSwsrp/bin/swsrpstat -h SRC-SV -Xdate
Server Original-Volume      Replica-Volume      Direction Status      Execute Date
SRC-SV /dev/dsk/clt2d0@SRC-SV /dev/dsk/clt2d0@TARG-SV regular replicated ---- 2010/10/20
22:00:45
SRC-SV /dev/dsk/clt2d1@SRC-SV /dev/dsk/clt2d1@TARG-SV ---- ---- ---- 2010/10/20
22:10:39
SRC-SV /dev/dsk/clt2d2@SRC-SV /dev/dsk/clt2d2@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):

```
# /opt/FJVSwsrp/bin/swsrpstat -h SRC-SV -Xstandby-s
Server Original-Volume      Replica-Volume      Direction Status      Execute Standby-Session
SRC-SV /dev/dsk/clt2d0@SRC-SV /dev/dsk/clt2d0@TARG-SV regular replicated 45% exist
SRC-SV /dev/dsk/clt2d1@SRC-SV /dev/dsk/clt2d1@TARG-SV regular replicated 10% not-exist
SRC-SV /dev/dsk/clt2d2@SRC-SV /dev/dsk/clt2d2@TARG-SV reverse equivalent 100% ?????
#
```

NOTES

- When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to [8.4 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
- This command cannot be executed while the following command is running:
 - [swsrprecoverres](#)
- 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 ["7.7 When Recovering Storage Cluster Continuous Copy Function"](#).
 - Other than those above:
No action is required.

9.3.2.4 swsrpcancel (Replication Cancellation Command)

NAME

swsrpcancel - stops snapshot processing and synchronization processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpcancel [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} fromVolumeName toVolumeName
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpcancel [-h serverName] [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpcancel [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpcancel [-h serverName] [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} [-Xreverse] -Xgroup groupName
```

DESCRIPTION

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

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.

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).

-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+ stops the specified snap generation and all earlier snap generations.

This option can be specified even if there is only one snap generation.

This option is a SnapOPC+ fixed option.

If this option is specified at the same time as the -Xgroup option, the SnapOPC+ sessions in that group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

OPERANDS

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 /dev/dsk/c1t2d0 to /dev/dsk/c1t2d0@TARG-SV is stopped for Managed Server SRC-SV:

```
#/opt/FJSVswsrp/bin/swsrpcancel -h SRC-SV /dev/dsk/c1t2d0 /dev/dsk/c1t2d0@TARG-SV
FROM=/dev/dsk/c1t2d0@SRC-SV,TO=/dev/dsk/c1t2d0@TARG-SV swsrpcancel completed
#
```

- Stops copy processing for group "GRP1":

```
# /opt/FJSVswsrp/bin/swsrpcancel -Xgroup GRP1
GROUP=GRP1 swsrpcancel completed
#
```

NOTES

- Following execution with the -b option specified in replication on 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
 - The 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
 - When you execute -b option specifying a nonexistent copy in the "halt" state in the group.
 - When you execute -T option specifying a nonexistent copy in the tracking process of QuickOPC in the group.

Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing is terminated immediately if an error occurs.

- When stopping SnapOPC+ sessions, the oldest snap generation must be stopped first. Specify the -Xforce option to forcibly stop the second and subsequent snap generations. However, note that this option stops the specified snap generation and all earlier snap generations. If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.
- The volume information for the specified volume is not checked (check for matching of the volume information in the management list and the actual physical information). The operation is cancelled unconditionally using the volume information in the management list.
- The following processing is performed depending on the operation status of the specified replication source volume and replication destination volume.

Table 9.10 Processing Differences in Accordance with Operating Status

Operation Status	Processing
Reverse copy direction	Suspends the processing.
Not operating yet	Suspends the processing.
Total or incremental copy is performed	Suspends synchronization processing. The replication destination volume cannot be used.
Equivalency maintain status	Suspends synchronization processing. The replication destination volume can be used as a copy
Replication established status	Suspends synchronization processing. The replication destination volume can be used as a copy
Snapshot processing is being performed	Stops the snapshot processing. The replication destination volume cannot be used.

- Pre-processing and post-processing for a replication source and replication destination volumes are performed only when the status of synchronization processing is equivalency maintenance status.

If replication is cancelled before the equivalency maintenance status is achieved, the replica volume is placed in the incomplete state and, in the case of a file system, the replica volume cannot be mounted.

If the processing target is a volume group, the operation may be customized so that the pre-processing and post-processing scripts for the replica volume are used to mount and unmount the volume. If replication is cancelled before the equivalency maintenance state is achieved under these conditions, take action as follows:

- To start synchronous processing
Execute the [swsrpstartsync](#) command with the -t option specified.
 - To execute replication
Execute the [swsrpmake](#) command with the -t option specified. After replication is completed, mount the replica volume.
- When the -T option is not specified
command processing varies depending on the operation status of the source and destination volumes.

Table 9.11 Processing When -T Option Is Not Specified

Operation Status (Display by swsrpstat -L)	Processing
Reverse copy	Processing is interrupted.

Operation Status (Display by swsrpstat -L)	Processing
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Synchronous processing is terminated. The destination volume cannot be used.
Equivalency maintained status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.
Snapshot processing complete status and tracking processing in progress. (Status is "----" and Trk also is "on".)	Tracking processing is terminated. The destination volume can be used as a replica.

- When the -T option is specified command processing varies depending on the operation status of the source and destination volumes.

Table 9.12 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](#)
 - [swsrprecoverres](#)

- 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 "7.7 When Recovering Storage Cluster Continuous Copy Function" to take action.

9.3.2.5 swsrpchsnc (Synchronization Mode Change Command)

NAME

swsrpchsnc - changes the operation mode

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpchsnc [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] fromVolumeName toVolumeName
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpchsnc [-h serverName] [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpchsnc [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|Manual}] [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/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.

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 /dev/dsk/c1t2d3@SRC-SV and /dev/dsk/c1t2d3@TARG-SV from Consistency mode to Through mode:

```
#!/opt/FJSSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume      Replica-Volume      Direction Status Execute Trk  Rcv  Split Xfer
Snap-Gen
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV regular   sync   99%   ---- auto ----
consist ----
:
#!/opt/FJSSVswsrp/bin/swsrpchsnc -h SRC-SV -F Async /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV
FROM=/dev/dsk/c1t2d3@SRC-SV, TO=/dev/dsk/c1t2d3@TARG-SV swsrpchsnc completed
```



```

:
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV -L /dev/dsk/clt2d3@SRC-SV
Server Original-Volume      Replica-Volume      Direction Status      Execute Trk  Rcv  Split
Xfer Snap-Gen
SRC-SV /dev/dsk/clt2d3@SRC-SV /dev/dsk/clt2d3@TARG-SV regular  equivalent 100%  ---- auto ----
async ----
#

```

- Specify that the transfer mode of inter-box synchronous processing for group "GRP1" be changed from Consistency mode to Through mode:

```

# /opt/FJSVswsrp/bin/swsrpchsnc -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsnc completed
#

```

NOTES

- In any of the following cases, you cannot change the operation mode of inter-box synchronization:
 - The specified original/replica volume has not been configured as a replica volume.
 - None of the -F, -R and -S options are specified.
 - In inter-server replication, the Managed Server on which you execute the command is not the operation server for the replica volume.
 - Synchronization from the specified source volume to the destination volume is not secured.
 - Synchronization from the specified source volume to the destination volume is in error-suspended status (with "failed" indicated as the Status by the [swsrpstat](#) command or hard-suspended status (with "halt" indicated as the Status 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
- If the -Xgroup option is specified, the synchronous processing for all replication volumes being processed is changed to the same operation mode. However, the operation mode cannot be changed if there is at least one replication volume that meets the conditions above. Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing is terminated immediately if an error occurs.
- This command cannot be executed while any of the following commands are running:
 - [swsrpsetvol](#)
 - [swsrpdelvol](#)
 - [swsrprecoverres](#)

9.3.2.6 swsrprevsync (Synchronization Reverse Command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To Execute on Managed Server

```

/opt/FJSVswsrp/bin/swsrprevsync fromVolumeName toVolumeName

```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrprevsync [-h serverName] fromVolumeName toVolumeName
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup groupName
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/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 [stgxfwcmdisprv](#) 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 /dev/dsk/c1t2d3@SRC-SV and /dev/dsk/c1t2d3@TARG-SV:

```
#/opt/FJSVswsrp/bin/swsrpstat -h SRC-SV /dev/dsk/c1t2d3@SRC-SV
Server Original-Volume      Replica-Volume      Direction  Status    Execute
SRC-SV /dev/dsk/c1t2d3@SRC-SV /dev/dsk/c1t2d3@TARG-SV reverse    replicated ----
```

```

#/opt/FJSVswsrp/bin/swsrprevsync /dev/dsk/clt2d3@TARG-SV /dev/dsk/clt2d3@SRC-SV
FROM=/dev/dsk/clt2d3@SRC-SV,TO=/dev/dsk/clt2d3@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /dev/dsk/clt2d3@SRC-SV
Server Original-Volume      Replica-Volume      Direction  Status      Execute
SRC-SV /dev/dsk/clt2d3@SRC-SV /dev/dsk/clt2d3@TARG-SV regular    replicated  ---
#

```

- Change the direction of synchronous processing for group "GRP1":

```

# /opt/FJSVswsrp/bin/swsrprevsync -Xgroup GRP1
GROUP=GRP1 swsrprevsync completed
#

```

NOTES

- In any of the following cases, you cannot reverse the direction of synchronization:
 - The specified original/replica volume has not been configured as a replica volume.
 - Unidirectional copying has been specified in the copying attribute for the replica volume.
 - In inter-server replication, the 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.
 - Changes have been made to the logical disk configuration which cannot be supported by AdvancedCopy Manager.
 - A volume group is inactive in the volume group specification.
- If the -Xgroup option is specified, the direction of synchronous processing for all replication volumes being processed is changed. However, the direction of synchronous processing cannot be changed if there is at least one replication volume that meets the conditions above. Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing 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](#)
 - [swsrprecoverres](#)
- 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.

9.3.3 Maintenance Commands

This section describes the maintenance commands for replication management.

9.3.3.1 swsrprecoverres (Resource Adjustment Command)

NAME

swsrprecoverres - executes recovery to make replication management information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrprecoverres [-r] [-p]
```

To Execute on Management Server

```
/opt/FJSVswsrp/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.

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 files. E.g., when the [swsrpsetvol](#) or [swsrpdelvol](#) command that update the replication management files terminate suddenly because of a forced stop, a system failure or the replication management files have been deleted by mistake.

When this option is specified, the following processing is performed to recreate the replication management files.

Replication management information in the Management Server repository is downloaded to the Managed Server, and the replication volume information is restored.

The ETERNUS Disk storage system is queried, and the execution information for the synchronization processing is restored.

-p

Specifies to not perform any post-processing that has not already been performed. This option can be used when 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:

```
#!/opt/FJSVswsrp/bin/swsrprecoverres
swsrprecoverres completed
#
```

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 -r option is specified and the command terminates with an error when changes have been made to the logical disk configuration that cannot be supported AdvancedCopy Manager or a volume group is inactive in the volume group specification.

- The consistency of resource information is restored only for the 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`
 - `swsrpvolinfo`
 - `swsrpdelvol`
 - `swsrpstartsync`
 - `swsrpmake`
 - `swsrpstat`
 - `swsrpcancel`
 - `swsrpchsync`
 - `swsrprevsync`
 - `swsrprecoverres`

9.4 Start/Stop Daemon Commands

This section describes how to start and stop AdvancedCopy Manager daemons.



Note

Notes when using commands:

- Confirm that the environment variable `SWSTGNODE` is not defined.
- Execute this command using the same environment variable `LANG` that of the code system used by the system.
- Only a root user can execute this command.
- For cluster operation, refer to "[Starting and Stopping Daemons](#)".

9.4.1 Starting and Stopping Communication Daemon

Starting Communication Daemon

Enter the following command to stop the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom start
```

Stopping Communication Daemon

Enter the following command to stop the communication daemon:

```
# /opt/FJSVswstf/bin/stgfwcom stop
```



Point

In order to verify if the communication daemon has been launched normally, check if the message `stgxfws0060` has been generated in the `syslog`.

Use the following methods to check the syslog message output from the communication daemon when you have specified a logical node name.

- The message stgxfws0001 outputs for the logical node name and the process ID.
Use the process ID as a basis for checking the message output from the communication daemon.
- If there is no output of message stgxfws0060, the daemon launch has possibly failed.
Use the syslog message to determine the cause and take the necessary measures according to the *ETERNUS SF Messages*.

[Example]

The process ID for the communication daemon, which was launched specifying the logical node name nodeagt0, is 5893, but the message output to syslog after starting to launch is stgxfws0023.

```
Dec 10 12:19:34 hs stgxfws[5893]: UX:stgxfws : INFO : 0001 : stgxfws start. PID=5893, NodeName=nodeagt0
Dec 10 12:19:34 hs stgxfws[5893]: UX:stgxfws : ERROR : 0023 : stgxfws type get error. iReturn=174,
errno=2
```

9.4.2 Starting and Stopping AdvancedCopy Manager Daemons

The daemons listed below are started and stopped together:

Table 9.13 Daemons Started and Stopped as Package

Server Type	Daemon Name
Managed Server	Communication daemon

For details on how to start a service or daemon of a Management Server, refer to the *ETERNUS SF AdvancedCopy Manager Operation Guide* relevant to the OS of the Management Server.

Starting AdvancedCopy Manager Daemon

Enter the following command to start a AdvancedCopy Manager daemon:

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

Stopping AdvancedCopy Manager Daemon

Enter the following command to stop a AdvancedCopy Manager daemon:

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

9.5 SnapOPC/SnapOPC+ Support Commands

This section explains the commands can be used to execute SnapOPC/SnapOPC+.



Note

Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

Table 9.14 Operating Environment When Executing SnapOPC/SnapOPC+ Support Commands

Command	Operating Environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-



Note

In Cluster Operation

In cluster operation, execute a command by performing the following steps:

1. If necessary, specify the logical node name to the transaction in the environment variable SWSTGNODE. Specify the environment variable as follows:

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

2. Execute the command.

The table below lists the commands available in cluster operation, whether environment variables must be configured, and the nodes on which commands are executable.

Table 9.15 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swstestupdate	Not required	Transaction operation node	-
swstsdv	Not required	Transaction operating node	-

9.5.1 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)

```
/opt/FJJSVswsts/bin/swstestupdate start volumeName
```

To Look Up Update Volume (Displaying Status of Monitor Session)

```
/opt/FJJSVswsts/bin/swstestupdate status volumeName
```

To Finish Update Volume Measurements (Cancelling Monitor Session)

```
/opt/FJJSVswsts/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)
#/opt/FJFSVswsts/bin/swstestupdate start /dev/dsk/c1t2d10
/dev/dsk/c1t2d10 swstestupdate completed
```

```
(First measurement)
#/opt/FJFSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
Volume-Name      Update
/dev/dsk/c1t2d10 644333
```

```
(Second measurement)
#/opt/FJFSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
Volume-Name      Update
/dev/dsk/c1t2d10 1045000
```

```
(Stop taking measurements by cancelling the monitor session)
# /opt/FJFSVswsts/bin/swstestupdate stop /dev/dsk/c1t2d10
/dev/dsk/c1t2d10 swstestupdate completed
#
```

NOTES

- The amount of data updated cannot be measured in the following cases:
 - When the specified volume does not exist.
 - When the 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).

9.5.2 swstdv (Snap Data Volume Operation/Reference Command)

NAME

swstdv - Initialize or display the Snap Data Volume

SYNOPSIS

To Initialize Snap Data Volume

```
/opt/FJFSVswsts/bin/swstdv init volumeName
/opt/FJFSVswsts/bin/swstdv init -G accessVolumeName luNumber
```


To Display Snap Data Volume Status

```
/opt/FJSSVswsts/bin/swtsdv stat volumeName  
/opt/FJSSVswsts/bin/swtsdv stat -G accessVolumeName luNumber
```

To Display Snap Data Pool Status

```
/opt/FJSSVswsts/bin/swtsdv 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/SnapOPC+ is not running.

All the data in the Snap Data Volume is destroyed in the initialization of the Snap Data Volume. For this reason, the following procedure is recommended.

(Creation of the Access volume and collection of the LU-Number must be completed before logical volume manager operations.)

1. If there is necessary data in the Snap Data Volume, back it up in advance using the relevant OS command.
2. Initialize the disk management information.
Set the target Snap Data Volume (physical disk) outside logical volume manager management when there is a logical volume manager operation.
3. Initialize the Snap Data Volume using this command.
Initialize the information using the Access volume when there is a logical volume manager operation.

Snap Data Volume Status Display

Specify "stat" as the subcommand to display Snap Data Volume logical capacity, physical capacity, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number on the ETERNUS Disk storage system. The format used for the display is "<decimal>{<hexadecimal>".
Rate	Displays the Snap Data Volume usage as a percentage (%).
Logical	Displays the Snap Data Volume logical capacity. The unit used for display is 'sector'.
Physical	Displays the Snap Data Volume physical capacity. The unit used for display is 'sector'.
Used	Displays the amount of Snap Data Volume used space. The unit used for display is 'sector'. The capacity for both Copy usage (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Volume, Copy usage (*1) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Volume, Host usage (*1) is displayed. The unit used for display is 'sector'.
Pool	Displays the Snap Data Pool usage allocated to the Snap Data Volume. The unit used for display is 'sector'.

*1:

Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.

Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Snap Data Pool Status Display

Specify "poolstat" as the subcommand to display the Snap Data Pool total amount, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
Pool-Type	Displays the Snap Data Pool type. Normal Encrypted
Rate	Displays the Snap Data Pool usage rate (%).
Total	Displays the Snap Data Pool total amount. The unit used for display is 'sector'.
Used	Displays the Snap Data Pool used space capacity. The unit used for display is 'sector'. The capacity for both Copy usage (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Pool, Copy usage (*1) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Pool, Host usage (*1) is displayed. The unit used for display is 'sector'.
Free	Displays the Snap Data Pool unused space capacity. The unit used for display is 'sector'.

*1:

Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.

Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

OPTIONS

Specific Options of Snap Data Volume Initialization(init)

-G accessVolumeName

Specifies the Access volume.

For details on Access volume, refer to "[Creating Access Volume](#)".

Specific Options of Snap Data Volume Status Display(stat)

-G accessVolumeName

Specifies the Access volume.

For details on Access volume, refer to "[Creating Access Volume](#)".

Specific Options of Snap Data Pool Status Display(poolstat)

-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

Specific Operands of Snap Data Volume Initialization(init)

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.

Specific Operands of Snap Data Volume Status Display(stat)

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:

```
# /opt/FJSVswsts/bin/swstsdv init /dev/dsk/c39t0d5
swstsdv init completed
#
```

- The Snap Data Volume is initialized using the Access volume following insufficient capacity:

```
# /opt/FJSVswsts/bin/swstsdv init -G /dev/dsk/c39t0d1 110
swstsdv init completed
#
```

- The Snap Data Volume status is displayed:

```
# /opt/FJSVswsts/bin/swstsdv stat /dev/dsk/c39t0d5
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 142 (0x8E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
0% 8388608 1048576 0 0 0 0
#
```

- The LU-Number (110) status is displayed using the Access volume:

```
# /opt/FJSVswsts/bin/swstsdv stat -G /dev/dsk/c39t0d1 110
BoxID = 00E4000M3#####E450S20A####KD4030639004##
LUN = 110 (0x6E)
Rate Logical(sector) Physical(sector) Used(sector) Copy(sector) Host(sector) Pool(sector)
0% 8388608 1048576 0 0 0 0
#
```

- The Snap Data Pool status is displayed by specifying the Access volume:

```
# /opt/FJSVswsts/bin/swstsdv poolstat -G /dev/dsk/c39t0d1
BoxID = 00E4000M3#####E450S20A####KD4030639004##
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
Normal 10% 20971520 2097152 0 2097152 18874368
Encrypted 0% 20971520 0 0 0 20971520
#
```

NOTES

- When there is insufficient Snap Data Volume capacity, operations are possible using the Access volume and logical unit number (LU-Number) in the ETERNUS Disk storage system.
When there is insufficient Snap Data Volume capacity, however, and "stat" is specified in the subcommand and an attempt is made to check the LU-Number of the Snap Data Volume with insufficient Snap Data Volume capacity, an access error occurs when the attempt to access the Snap Data Volume with insufficient Snap Data Volume capacity is made. In this case, an error occurs in the

command and it is not possible to check the LU-Number.
For this reason, you must check the LU-Number in advance and record it.

- 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.

9.6 Troubleshooting Data Collection Command

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

9.6.1 acmcapture (AdvancedCopy Manager's Agent Troubleshooting Data Collection Command)

NAME

acmcapture - Collection of AdvancedCopy Manager's agent troubleshooting data

SYNOPSIS

```
/opt/FJSVswstf/bin/acmcapture dirname
```

DESCRIPTION

This command collects AdvancedCopy Manager's agent troubleshooting data. Data is collected for AdvancedCopy Manager's agent installed on the Managed Server where this command is executed.

Only the root user can execute this command.

Troubleshooting Data File Name

The collected data is stored in a file with the "acmcapture_HOSTNAME_YYYYMMDD_ttmss.tar.Z" format under the directory specified for "dirname".

The name of the host where the command is executed is used for HOSTNAME. If characters other than alphanumerics and hyphens are used in the host name, then "NOHOSTNAME" is used as the host name. Values are truncated to 15 characters.

- For YYYYMMDD, YYYY is the year, MM is the month, and DD is the day.
- For ttmss, 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

- Collect data to the /tmp directory:

```
# /opt/FJSVswstf/bin/acmcapture /tmp
Executing.....
Completed.
OUTPUT=/tmp/acmcapture_srv01_20090323_094614.tar.Z
```

NOTES

- In a clustered system, execute this command at all nodes. To gather information on the shared disk, mount the shared disk on a node and execute this command on that node.
- Execute this command when other AdvancedCopy Manager commands are in the stopped state. Data collection may not be performed correctly if other AdvancedCopy Manager commands are running.

Chapter 10 Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

10.1 Notes on Backup and Replication Operation

10.1.1 General Notes

10.1.1.1 Backup and Replication Exclusions

The following devices must not be backed up or replicated:

- The device on which the system is stored
- The device on which AdvancedCopy Manager has been installed
- The device on which the management list of AdvancedCopy Manager resides

10.1.1.2 Consistency of Data on Volumes

Table 10.1 Consistency of Data on Volumes

Data in Transaction Volume	Maintenance of Data Integrity	Operation
File system	An AdvancedCopy Manager command unmounts the file system to maintain the integrity.	Refer to " Appendix A Pre-processing and Post-processing of Backup and Restoration " and " Appendix C Pre-processing and Post-processing of Replication ".
Other than the above	The data integrity must be maintained in operations.	Take appropriate action, such as stopping transactions during execution of backup or replication.

10.1.1.3 Fetching Device Information

Before starting either the backup or replication operation, The "[3.4.4 Fetching Device Information on Managed Server](#)" that is managed by all Managed Servers using Web Console. The time taken to complete this operation is proportional to the total number of devices defined on the selected Managed Servers. If many devices are involved, perform this operation while the CPU or I/O load on the system is low.

As a guide, about 0.5 seconds are required per device (i.e., disk) when there is no load on the system.

10.1.1.4 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.

10.1.1.5 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.

10.1.1.6 Notes for Multipath Configurations

When the device has a multipath configuration, a path switch is not carried out automatically, even if one of the two paths is blocked.

When one of the two paths is blocked, perform the backup or replication again after taking the following steps:

1. Execute the following command on an available device to switch the path:

```
/usr/sbin/pvchange -s /dev/dsk/c*t*d*
```

Be careful, as the system stops if the commands are executed on a failed device

2. Execute the backup or replication command again.

10.1.1.7 Mounting of Disks from Other Servers

Before backup/restoration or replication of a volume that can be mounted from multiple servers, unmount and cancel any pending mount on the other servers.

For disks that need not be mounted from other servers, prevent multiple servers from detecting or accessing the same logical disk by setting up hardware, such as devices in the ETERNUS Disk storage system and Fibre Channel switches, accordingly.

10.1.1.8 Notes on Copy Operations Targeted at File Systems

For a copy operation targeted at a file system, unmount the relevant volume to prevent data access and maintain the data integrity. If backup/restoration and replication are performed without unmounting the volume, an error occurs since a volume in use cannot be unmounted.

Note the following about processing where unmounting is enabled:

- Another application is not using the volume. If another application is using it, suspend the application temporarily.
- Users are not using the volume. If users are using it, prohibit them from using it temporarily.
- Another volume is not mounted on the volume. If it is mounted, unmount it temporarily.
- The volume is not shared with NFS sharing. If it is shared, unshare it temporarily.

Unmounting is required only during command execution. Normal operations can be resumed after command execution.

10.1.1.9 Notes on Executing Copy Between Different Operating Systems

Copies can be made between different operating systems by using replication operations.

Use the following combinations to execute copy between different operating systems:

Table 10.2 Combinations for Executing Copy Between Different Operating Systems

Copy Source	Copy Destination	
	Slices	Logical Unit (Disk)
slices	A	N/A
Logical Unit (disk)	A	N/A

(A=Available, N/A=Not Available)

10.1.1.10 Notes on Executing Copy from Logical Unit (Disk) to Slice (Partition) Using Replication Function

When a copy is performed, the Logical Unit (disk) data is written in the replication destination volume (slice). If a copy is performed with a file system existing on the replication destination volume (slice), 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.

10.1.1.11 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](#)
- [swsrpmake](#)
- [swsrpcancel](#)

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.

10.1.1.12 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.

10.1.1.13 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.

10.1.1.14 Restart While Executing Synchronous Processing

When a copy destination is a volume group and a restart is performed while executing the synchronous processing (EC/REC), the volume becomes inactive. When the copy destination becomes inactive while the synchronous processing is being executed, it cannot be activated again. Moreover, the operation such as stopping the synchronous processing cannot be executed. If it is deactivated by mistake, the synchronous processing must be stopped forcibly using ETERNUS Web GUI and then the copy destination volume is activated.

10.1.2 Notes on Snapshot High-speed Backup

Number of Required Backup Volumes

Snapshot high-speed backup requires as many backup volumes as the number of specified backup generations. Accordingly, snapshot backup is disabled if:

- All the specified number of generations have been backed up, and
- There is no new volume that can be used as a backup volume.

Simultaneous Backups

Performing snapshot high-speed backup simultaneously with the same transaction volume specified 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.

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:

- In a non-cluster environment

```
/etc/opt/FJSVswsrp/data/DEFAULT
```

- In a cluster environment

```
/etc/opt/FJSVswsrp/logicalNodeName/data/DEFAULT
```

Table 10.3 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/DX400 S2 series (for earlier than V10L30 firmware)
- ETERNUS DX8000/DX8000 S2 series (for earlier than V10L30 firmware)

10.1.3 Notes on Synchronous High-speed Backup

Processing of Backup

The `swstbackup` command cannot be executed until the transaction and backup volumes are in the equivalency maintain state.

Backup Policy Settings

A backup policy can still be set up if the number of registered volumes is enough for snapshot type high-speed backup, even if the number is not enough for synchronous high-speed backup. In this case, synchronous high-speed backup cannot be performed.

Volume Group Operation under Synchronous Processing

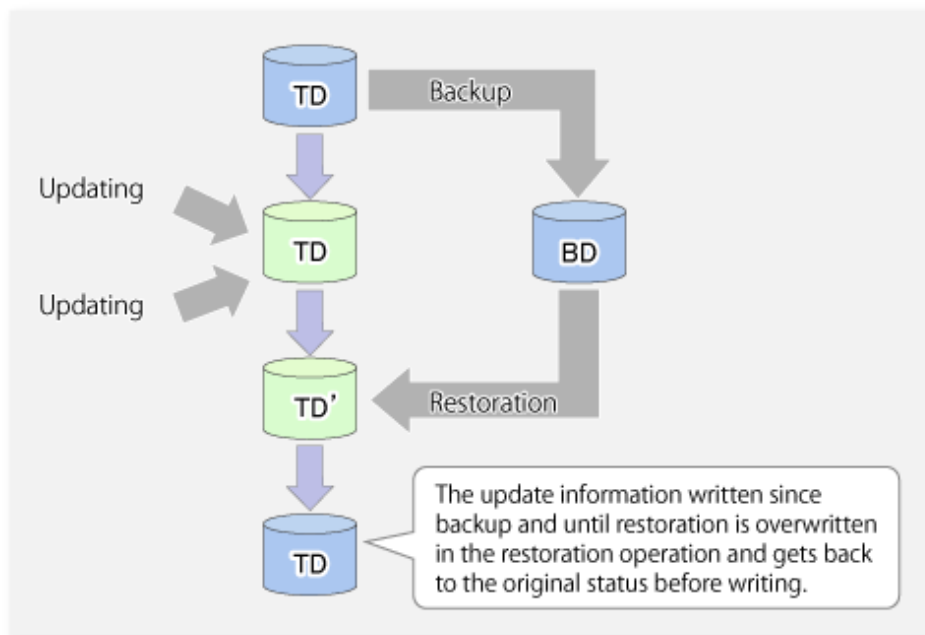
If the backup volume is a volume group, do not execute the `vgchange (1M)` command under synchronous processing (EC) execution. If this occurs and the backup volume is inactive then it cannot be re-activated. Additionally, it is not possible to perform commands including those to stop synchronous processing, execute backup and cancel backup synchronous processing. If accidentally inactivated, use ETERNUS Web GUI or similar to forcibly stop synchronous processing, and then activate the backup volume.

10.1.4 Notes on Restoration

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 10.1 Notes on Restoration of AdvancedCopy Manager



TD: Transaction volume
BD: Backup volume

10.1.5 Notes on Synchronous Replication

Volume Group Operation under Synchronous Processing

If the replica volume is a volume group, do not execute the `vgchange (1M)` command under synchronous processing (EC/REC) execution. If this occurs and the replica volume is inactive then it cannot be reactivated. Additionally, it is not possible to perform commands including those to stop synchronous processing, execute replication and cancel replication. If accidentally inactivated, use ETERNUS Web GUI or similar to forcibly stop synchronous processing, and then activate the copy destination volume.

10.1.6 Notes on Cluster Operation

Note the following general points on cluster operation:

- Do not set a SWSTGNODE registration that configures an environment variable to the entire system.
- AdvancedCopy Manager does not monitor daemons of an active server. If the daemon of a transaction stops for some reason, AdvancedCopy Manager does not automatically restart it, so you must restart it manually. Moreover, the stopping of an active server daemon of AdvancedCopy Manager does not cause the cluster to fail over. For details on the daemons of AdvancedCopy Manager active servers and how to start these daemons, refer to "[Chapter 2 Starting and Stopping Daemons](#)".

- For volumes for which to perform backup and replication, configure their device names, mount points and logical unit numbers on the ETERNUS Disk storage system so that they are the same on all the nodes making up a cluster.

10.1.7 Notes on Backup in Clustered System

MC/ServiceGuard

For backups in a clustered system, note the following points that do not apply to regular operation:

- If failover occurs while running a backup command, you must ensure consistency by using the `swstrsemitch` command as a recovery measure.
- You must define a volume group of backup volumes in "VOLUME GROUPS" on the transaction-oriented package control script.

Example:

```
VG[1]=vg02
```

- In cluster operation, you must perform backups on the active system of the package because AdvancedCopy Manager is placed in the package and operates as part of the package.
You cannot make a backup from a standby node or another package.

If the backup volume belongs to a volume group and failover occurs while synchronization (EC) is being handled, package startup is disabled because the backup volume cannot be activated on the standby node.

Therefore, you should perform OPC-based, snapshot type, high speed backups in a cluster environment.

If package startup is disabled during an EC-based, synchronous high speed backup, forcibly stop synchronization by using ETERNUS Web GUI or similar, and then start the package.

VERITAS Cluster Server

For backup operation in a clustered system, note the following points that do not apply to regular operation:

- If failover occurs while running a backup command, you must ensure consistency by using the `swstrsemitch` command as a recovery measure.
- To use synchronous high-speed backup, do not register a backup to any cluster transaction.
- You must perform backups on the active server of the service group because AdvancedCopy Manager is placed into the service group and operates as a part of it.
You cannot make a backup from a standby node or another service group.
- To perform backup/restoration using AdvancedCopy Manager, you usually must unmount transaction volumes beforehand and mount the volumes later.

If the mount point of transaction volumes have been registered to a cluster transaction, set the mount point resource online or offline from the cluster transaction instead of mounting or unmounting the volumes. Alternatively, modify the backup/restoration pre-processing and post-processing scripts so that the transaction volumes are set offline or online instead of being unmounted or mounted.

Moreover, the Volume is immediately placed offline/online for a mount point resource whereas there is a time delay when mount/unmount is used. Therefore, add into the pre-processing script, after the statement where the success or failure value of offline/online is returned, the `df` or `sleep` command to function until mount/unmount is actually complete.

For details and examples on the pre-processing and post-processing scripts, refer to "[Appendix A Pre-processing and Post-processing of Backup and Restoration](#)". For details on the commands used to set resources offline and online, refer to the relevant cluster software manual.

10.1.7.1 Backup and Restoration During Stoppage of Cluster

MC/ServiceGuard

When the package to which AdvancedCopy Manager belongs is operating, backup is enabled only on the active node. The standby node environment is not ready to provide the necessary resources, thus disabling backup operation. Likewise, if the package has been stopped, the environment is not ready and backup is disabled.

However, the backup operation is re-enabled only when the package has been stopped, by temporarily arranging the minimum resources.

Note

- If either of the following types of shared disks cannot be enabled (ie, be set online or mounted in a system), backup is disabled:
 - Shared disk for AdvancedCopy Manager shared data
 - Backup operation disk (transaction volume/backup volume to operate)
- The following operations are not allowed in a backup:
 - Backup/restore using Web Console
 - Manipulation of a backup operation from a Management Server (host specification with the -h option)
 - Addition or deletion of a transaction volume/backup volume, or a change in policy
- If display-related commands are executed by Management Server transactions or Managed Server transactions, options must be specified in the commands. Refer to "9.1 Backup Management Commands" for details of backup management display-related commands.

If the package has been stopped, perform a backup by taking the following steps:

1. Confirm that the package has been stopped on both nodes.
For details on how to stop the package, see the MC/ServiceGuard manual.
2. Log in to the node on which you want to make a backup, for example through telnet.
You cannot use the logical IP address. Directly use a node that is accessible via the physical IP address.
3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.
When the transaction volume is a file system, mount it.

Note

Be sure to enable the shared disk from only one of the nodes, not both.

4. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
Set the environment variable as shown below.

<Execution example>

```
# SWSTGNODE=logicalNodeName  
# export SWSTGNODE
```

5. Perform the backup.
You can perform the backup in the same way as for regular cluster operations.
6. Release all the shared disks you enabled in step 3.
Unmount the file systems you mounted.
Stop (set offline) the shared disk.
7. Start (set online) the package.
Start the package, if necessary.
For details on how to start the package, see the MC/ServiceGuard manual.

VERITAS Cluster Server

When a service group to which AdvancedCopy Manager belongs is operating, backup is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for backup operation, therefore backup is disabled. Likewise, if the

service group has been stopped, the environment is not ready and disables backup operation. However, backup is temporarily enabled when the service group is stopped.

Note

- If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), backup is disabled:
 - Shared disk for AdvancedCopy Manager shared data
 - Backup operation disk (transaction volume/backup volume to operate)
- The following operations are not allowed in backup:
 - Backup/restoration through Web Console
 - Manipulation for backup operation from a Management Server (host specification with the -h option)
 - Addition or deletion of a transaction volume/backup volume, or change in policy
- To execute a display command for backup management to a Management Server transaction that also functions as a Managed Server transaction, you must specify options for the command. For details on the display command for backup management, refer to "9.1 Backup Management Commands".

If the service group has been stopped, perform a backup by taking the following steps:

1. Confirm that the service group has been stopped on both nodes.
For details on how to stop a service group, refer to the VERITAS Cluster Server manual.
2. Log in (for example, using Telnet) to the node on which you want to make a backup.
You cannot use the logical IP address. Use a node that is operable via the physical IP address.
3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.
When the transaction volume is a file system, mount it.

Note

Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.

4. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
Set the environment variable as shown below.

<Execution example>

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

5. Perform the backup.
You can perform the backup in the same way as for regular operations in a cluster environment.
You can use the [swstrestore](#) command to perform restoration.
6. Release all the shared disks you enabled in step 3.
unmount the file systems you mounted.
Stop (set offline) the shared disk.
7. Start (set online) the service group.
Start the service group, if necessary.
For details on how to start a service group, refer to the VERITAS Cluster Server manual.

10.1.8 Notes on Replication in Clustered System

MC/ServiceGuard

For replication in a clustered system, note the following points that do not apply to regular operation:

- If failover occurs while running a replication command, you must ensure consistency by using the [swsrprecoverres](#) command as a recovery measure.
- You must define a volume group of backup volumes in "VOLUME GROUPS" on the transaction-oriented package control script.

Example:

```
VG[1]=vg02
```

- You must perform replication on the active system of the package because AdvancedCopy Manager is placed in the package and operates as part of the package.

You cannot perform replication from a standby node or another package.

In addition, if the destination volume belongs to a volume group and failover occurs while synchronization (EC/REC) is being handled, package startup is disabled because the destination volume cannot be activated on the standby node.

Therefore, in a cluster environment you should use OPC based, snapshot type replications.

If package startup is disabled during EC-based synchronous replication, forcibly stop the synchronization by using ETERNUS Web GUI or similar, and then start the package.

VERITAS Cluster Server

For replication in a clustered system, note the following points that do not apply to regular operation:

- If failover occurs while running a replication command, you must ensure consistency by using the [swsrprecoverres](#) command as a recovery measure.
- When you use synchronous replication, do not register any destination volumes to a cluster transaction.
- You must perform replication on the active system of the service groups because AdvancedCopy Manager is placed in the service groups and operates as a part of it.
You cannot perform replication from a standby node or another service group.

- To perform replication, you must unmount original/source volumes beforehand and mount the volumes later for some commands. If the mount points of original/source volumes have been registered to a cluster transaction, set the mount point resources online or offline from the cluster transaction instead of mounting or unmounting the volumes. Alternatively, modify the unmount and mount processes in the replication pre-processing and post-processing scripts to offline and online processes, respectively. Moreover, the Volume is immediately placed offline/online for a mount point resource whereas there is a time delay when mount/unmount is used. Therefore, add into the pre-processing script, after the statement where the success or failure value of offline/online is returned, the `df` or `sleep` command to function until mount/unmount is actually complete.

For details and examples on the types of commands that require the volumes to be unmounted and mounted, and the pre-processing and post-processing scripts, refer to "[Appendix C Pre-processing and Post-processing of Replication](#)". For details on the commands used to set resources online and offline, refer to the relevant clustered system manual.

10.1.8.1 Replication During Stoppage of Cluster

MC/ServiceGuard

When the package to which AdvancedCopy Manager belongs is operating, replication is enabled only on the active node. The standby node environment is not ready to provide the necessary resources, thus disabling replication. Likewise, if the package has been stopped, the environment is not ready and it disables replication.

However, replication is re-enabled only when the package has been stopped, by temporarily arranging the minimum essential resources.



Note

- If either of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), replication is disabled:
 - Shared disk for AdvancedCopy Manager shared data

- Replication disks (source volume/destination volume to operate)
- The following are not allowed in replication operations:
 - Manipulation for replication from a Management Server (host specification with the -h option)
 - Addition or deletion of an original/replica volume
 - Inter-server replication without the -m option specified
- To execute a display command for replication management to a Management Server transaction that also functions as a Managed Server transaction, you must specify options for the command. For details on the display command for replication management, refer to "9.3 Replication Management Commands".

Perform replication during stoppage of a package by taking the following steps:

1. Confirm that the package has been stopped on both nodes.
For details on how to stop the package, refer to the MC/ServiceGuard manual.
2. Log in to the node on which you want to perform replication, for example through telnet.
You cannot use the logical IP address. Directly use a node that is accessible via the physical IP address.
3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.
When the original volume and replica volume have been mounted as file systems for operation, mount the volumes.



Note

Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.

4. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
Set the environment variable as shown below.

<Execution example>

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

5. Perform the replication.
You can perform the replication in the same way as for regular cluster operations.
6. Release all the shared disks you enabled in step 3.
Unmount the file systems you mounted.
Stop (set offline) the shared disk.
7. Start (set online) the package.
Start the package, if necessary.
For details on how to start the package, refer to the MC/ServiceGuard manual.

VERITAS Cluster Server

When a service group to which AdvancedCopy Manager belongs is operating, replication is enabled only on the active node. The standby node environment is not ready (to provide necessary resources) for replication, and replication is, therefore, disabled. Likewise, if the service group has been stopped, the environment is not ready and disables replication. However, replication is temporarily enabled when the service group has been stopped.

Note

- If any of the following types of shared disks cannot be enabled (i.e., set online or mounted in a system), replication is disabled.
 - Shared disk for AdvancedCopy Manager shared data
 - Replication operation disks (source volume/destination volume to operate)
- The following operations are not allowed in replication:
 - Manipulation for replication from a Management Server (host specification with the -h option)
 - Addition or deletion of an original/replica volume
 - Inter-server replication without the -m option specified
- To execute a display command for replication management to a Management Server transaction that also functions as a Managed Server transaction, you must specify options for the command. For details on the display command for replication management, refer to "[9.3 Replication Management Commands](#)".

Perform replication during stoppage of the service group by taking the steps below.

1. Confirm that the service group has been stopped on both nodes.
For details on how to stop a service group, refer to the VERITAS Cluster Server manual.
2. Log in (for example, through Telnet) to the node on which you want to perform replication.
You cannot use the logical IP address. Use a node that is operable via the physical IP address.
3. Enable the shared disk.
Start (set online) the shared disk.
Mount the shared disk for AdvancedCopy Manager shared data.
When the original volume and replica volume have been mounted as file systems for operation, mount the volumes.

Note

Be sure to enable the shared disk from either node. Do not enable the shared disk from both nodes.

4. In the environment variable SWSTGNODE, set the logical node name for the relevant task.
Set the environment variable as shown below.

<Execution example>

```
# SWSTGNODE=logicalNodeName
# export SWSTGNODE
```

5. Perform replication.
You can perform replication in the same way as for regular operations in a cluster environment.
You can also perform restoration from the replica volume to the original volume.
6. Release all the shared disks you enabled in step 3.
Unmount the file systems you mounted.
Stop (set offline) the shared disk.
7. Start (set online) the service group.
Start the service group, if necessary.
For details on how to start a service group, refer to the VERITAS Cluster Server manual.

10.1.9 Use in Combination with ODX (Offloaded Data Transfer)

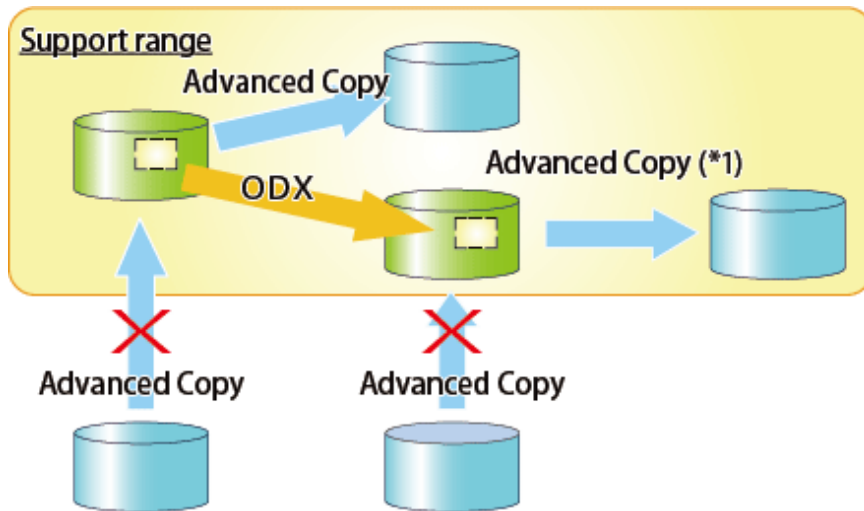
When using an ETERNUS Disk storage system that supports the Offloaded Data Transfer (hereinafter referred to as "ODX") function, ODX session starts within the ETERNUS Disk storage system by Windows Server 2012 or later Offloaded Data Transfer function when files are copied or transferred. However, Advanced 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 the error is not resolved, refer to "If Error Is Not Resolved" in "Use in Combination with ODX (Offloaded Data Transfer)" in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.

Figure 10.2 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.

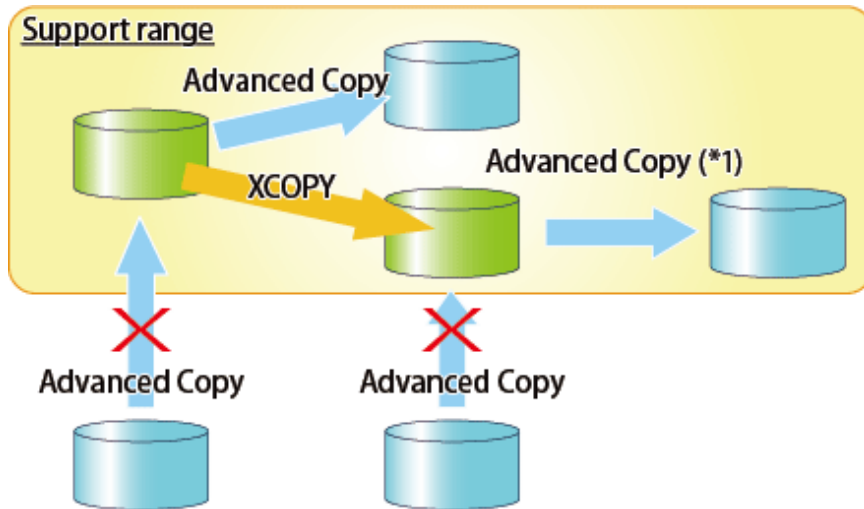
- ETERNUS DX80 S2
- ETERNUS DX90 S2
- ETERNUS DX400/DX400 S2 series
- ETERNUS DX8000/DX8000 S2 series

10.1.10 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 10.3 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/DX400 S2 series
- ETERNUS DX8000/DX8000 S2 series

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

This appendix provides information on pre-processing and post-processing of backup and restoration.

A.1 Overview

Pre-processing and post-processing of backup or restoration are started before and after backup or restoration when a backup or restore command is executed.

This processing is required by AdvancedCopy Manager to back up or restore a transaction volume.

A.2 Pre-processing and Post-processing of Backup

Backup using AdvancedCopy Manager must be performed basically while access to a transaction volume from other processes is inhibited.

Normally, the pre-processing acquires the mount status of a transaction volume using the transaction volume name and then performs the following processing:

Table A.1 Pre-processing for Transaction Volume

Transaction Volume Status	Pre-processing
Mounted	Unmount a transaction volume.(*1)
Unmounted	Take no action.

*1 If the transaction volume cannot be unmounted, however, customize the shell script for pre-processing is customized accordingly. For information on this customization, refer to the section on "[When You Do Not Want to Unmount Transaction Volume](#)".

Tasks performed in the post-processing are generally determined by what has been done in the pre-processing.

Table A.2 Backup Pre-processing and Post-processing

Pre-processing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If no transaction volume has been mounted since the start of system operation (e.g., a transaction volume used as a database), neither pre- nor post-processing is performed.

If special pre-processing or post-processing is required, you need to add the additional instructions to the shell script.

When customizing a script, strictly observe the following rules regarding error codes:

Table 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 `swtsrsemch (Resource match command)` because the consistency of resource information may be incomplete.

- For backing up the volume group that includes the logical volume in which the file system has been built, refer to "[Backup Volume Group](#)". The pre-processing and post-processing scripts have to be customized to execute unmount/mount processing for all logical volumes across which the file system exists.
-

A.2.1 Pre-processing of Backup

The name of a script file for pre-processing of a backup is as follows.

For Non-clustered System

```
/etc/opt/FJSVswsts/sh/OpcBackup.pre
```

For Clustered System

```
/etc/opt/FJSVswsts/logicalNodeName/sh/OpcBackup.pre
```

A.2.1.1 Pre-processing Script for Backup

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Pre-processing of backup processing
8: #
9: #   Argument: $1 Device or VG name of transaction disk
10: #               $2 Mount point of transaction disk
11: #               $3 Device or VG name of backup disk
12: #
13: #   Error number
14: #               2: Argument error
15: #               10: umount error
16: #               30: VG configuration file not found error
17: #               99: Script not customize
18:
19:
20: # Argument check
21: case $# in
22: 1)
23:   ;;
24: 2)
25:   ;;
26: 3)
27:   ;;
28: *)
29:   exit 2
30:   ;;
31: esac
32:
33: device=$1
34: mount_point=$2
35: bk_device=$3
36:
37: # Determination postprocessing file name
38: if [ "$SWSTGNODE" != "" ]
39: then
40:   swstg_node="/`echo $SWSTGNODE`"
41: else
42:   swstg_node=""
43: fi
44:
```

```

45: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
46:
47: # Device type check
48: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
49: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
50: vxpvtrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`
51: if [ "$trans" != "" ]
52: then
53:     dev_type="physical"
54:     dev=`echo $device | /usr/bin/sed -e "s/\dev\dsk\///" -e "s/\dev\disk\//_hppv/"`
55:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
56:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
57:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
58: elif [ "$vxpvtrans" != "" ]
59: then
60:     dev_type="vxvm_pv"
61:     # /dev/vx/dmp/XXXX -> XXXX
62:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`
63:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
64:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
65:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
66: elif [ "$lvmtrans" != "" ]
67: then
68:     dev_type="logical"
69:     # /dev/XXXX -> XXXX
70:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`
71:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
72:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
73:     bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
74: else
75:     exit 0
76: fi
77:
78: # Save VG name of backup disk
79: bk_trans=`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
80: bk_lvmtrans=`echo $bk_device | /usr/bin/grep "/dev/"`
81: bk_vxpvtrans=`echo $bk_device | /usr/bin/grep "/dev/vx/dmp/"`
82: if [ "$bk_trans" = "" -a "$bk_lvmtrans" != "" -a "$bk_vxpvtrans" = "" ]
83: then
84:     bk_vg_name=`echo $bk_device | /usr/bin/awk -F\ / '{ print $3 }'`
85:     cfg_file="/etc/lvmconf/"$bk_vg_name".conf"
86:     if [ ! -r $cfg_file ]
87:     then
88:         exit 30
89:     fi
90:     echo $bk_device > $bd_file
91: fi
92:
93: # When the transaction disk is a physical device #####
94: if [ "$dev_type" = "physical" ]
95: then
96:
97:     if [ "$mount_point" != "" ]
98:     then
99: # When device cannot be unmounted --- 1
100: #
101: #     if [ "$device" = "/dev/dsk/cXtXdX" ]
102: #     then
103: #         if [ "$bk_device" != "" ]
104: #         then
105: #             echo $bk_device > $bd_file
106: #         fi
107: #         df -ln $mount_point 2>/dev/null | awk -F: '{ print $2 }' | awk '{ print $1 }' >

```

```

$fstype_file
108: #         sync
109: #         sync
110: #         echo "fsck" > $post_file
111: #
112: # When device can be unmounted --- 2
113: #         else
114: #             /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }'
| /usr/bin/awk '{ print $1 }' > $fstype_file
115: #             /usr/sbin/umount $mount_point 2>/dev/null
116: #             if [ $? != 0 ]
117: #             then
118: #                 retry_count=3
119: #                 sleep_time=1
120: #                 result_flag=1
121: #
122: #                 while [ $retry_count -gt 0 ]
123: #                 do
124: #                     /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
125: #                     if [ $? != 0 ]
126: #                     then
127: #                         retry_count=`expr $retry_count - 1`
128: #                         /usr/bin/sleep $sleep_time
129: #                     else
130: #                         result_flag=0
131: #                         break
132: #                     fi
133: #                 done
134: #
135: #                 if [ $result_flag != 0 ]
136: #                 then
137: #                     /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
138: #                     /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
139: #
140: #                     exit 10
141: #                 else
142: #                     /usr/bin/rm -f $err_log_path/$dev.umount
143: #                 fi
144: #             fi
145: #             echo "mount" > $post_file
146: #         fi
147: # When device was not mounted --- 3
148: #
149: #         else
150: #             echo "none" > $post_file
151: #         fi
152: #
153: # When the transaction disk is a volume group #####
154: elif [ "$dev_type" = "logical" ]
155: then
156: #
157: # Devices is volume group and script not customize
158: exit 99
159: #
160: # When devices of volume group cannot be unmounted --- 4
161: #
162: # # Specify the name of volume group not to unmount
163: # if [ "$device" = "/dev/vgXX" ]
164: # then
165: #     if [ "$bk_device" != "" ]
166: #     then
167: #         echo $bk_device > $bd_file
168: #     fi

```

```

169: #     sync
170: #     sync
171: #     echo "fsck" > $post_file
172: # fi
173: #
174: # When devices of volume group can be unmounted --- 5
175: #
176: # # Specify the name of volume group to unmount
177: # if [ "$device" = "/dev/vgXX" ]
178: # then
179: #     # Unmount all logical volumes of the volume group
180: #     mount_point="/XX"
181: #     /usr/sbin/umount $mount_point 2>/dev/null
182: #     if [ $? != 0 ]
183: #     then
184: #         retry_count=3
185: #         sleep_time=1
186: #         result_flag=1
187: #
188: #         while [ $retry_count -gt 0 ]
189: #         do
190: #
191: #             # $dev is volume group name
192: #
193: #             /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
194: #             if [ $? != 0 ]
195: #             then
196: #                 retry_count=`expr $retry_count - 1`
197: #                 sleep $sleep_time
198: #             else
199: #                 rm -f $err_log_path/$dev.umount
200: #                 result_flag=0
201: #                 break
202: #             fi
203: #         done
204: #
205: #         if [ $result_flag != 0 ]
206: #         then
207: #             /usr/sbin/fuser -cu $mount_point > $err_log_path/$dev.fuser 2>&1
208: #             /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
209: #
210: #             exit 10
211: #         fi
212: #     fi
213: #     echo "mount" > $post_file
214: # fi
215: #
216: # When devices of volume group was not mounted --- 6
217: #
218: # # Specify the name of volume group to do nothing
219: # if [ "$device" = "/dev/vgXX" ]
220: # then
221: #     echo "none" > $post_file
222: # fi
223: #
224: # When the transaction disk is a VxVM physical volume --- 7 #####
225: elif [ "$dev_type" = "vxvm_pv" ]
226: then
227:     # Nothing is done to VxVM PV.
228:     echo "none" > $post_file
229: fi
230:
231: exit 0

```

A.2.2 Post-processing of Backup

The name of a script file for post-processing of a backup is as follows.

For Non-clustered System

```
/etc/opt/FJSVswsts/sh/OpcBackup.post
```

For Clustered System

```
/etc/opt/FJSVswsts/logicalNodeName/sh/OpcBackup.post
```

A.2.2.1 Post-processing Script for Backup

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: # Post-processing of backup processing
8: #
9: #     Argument: $1 Device or VG name of transaction disk
10: #             $2 Mount point of transaction disk
11: #
12: #Error number
13: #             2: Argument error
14: #             11: mount error
15: #             31: vgcfgrestore error
16: #             12: fsck error
17:
18: # Argument check
19: case $# in
20: 1)
21:     ;;
22: 2)
23:     ;;
24: *)
25:     exit 2
26:     ;;
27: esac
28:
29: device=$1
30: mount_point=$2
31:
32: # Determination of postprocessing file name
33:
34: if [ "$SWSTGNODE" != "" ]
35: then
36:     swstg_node="`echo $SWSTGNODE`"
37: else
38:     swstg_node=""
39: fi
40:
41: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
42:
43: # Device type check
44: trans="`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
45: lvmtrans="`echo $device | /usr/bin/grep "/dev/"`"
46: vxpvttrans="`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
47: if [ "$trans" != "" ]
48: then
49:     dev_type="physical"
50:     dev="`echo $device | /usr/bin/sed -e "s/\dev\dsk\///" -e "s/\dev\disk\//_hppv/"`"
```



```

51: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
52: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
53: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
54: elif [ "$vxpvtrans" != "" ]
55: then
56: dev_type="vxvm_pv"
57: # /dev/vx/dmp/XXXX -> XXXX
58: dev=`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`"
59: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
60: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
61: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
62: elif [ "$lvmtrans" != "" ]
63: then
64: dev_type="logical"
65: # /dev/vgXX -> vgXX
66: dev=`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`"
67: post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
68: fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
69: bd_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".bd"
70: else
71: exit 0
72: fi
73:
74: # Confirmation of postprocessing
75: if [ ! -r $post_file ]
76: then
77: exit 0
78: fi
79: post=`/usr/bin/cat $post_file`"
80:
81: # Confirmation of FStype
82: if [ ! -r $fstype_file ]
83: then
84: fs=""
85: else
86: fs=`/usr/bin/cat $fstype_file`"
87: fi
88:
89: # Restore VG Configuration
90: if [ -r $bd_file ]
91: then
92: bk_device=`/usr/bin/cat $bd_file`"
93: bk_trans=`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
94: bk_lvmtrans=`echo $bk_device | /usr/bin/grep "/dev/"`"
95: bk_vxpvtrans=`echo $bk_device | /usr/bin/grep "/dev/vx/dmp/"`"
96: if [ "$bk_trans" = "" -a "$bk_lvmtrans" != "" -a "$bk_vxpvtrans" = "" ]
97: then
98: bk_vg_name=`echo $bk_device | /usr/bin/awk -F\ / '{ print $3 }'`"
99: cfg_file="/etc/lvmconf/"$bk_vg_name".conf"
100: if [ ! -r $cfg_file ]
101: then
102: exit 31
103: fi
104: bk_pv_rname=`/usr/sbin/vgcfgrestore -n $bk_device -l 2> /dev/null | /usr/bin/awk '{print
$1}' | /usr/bin/grep -e "/dev/rdisk\" -e \" /dev/rdisk\"`"
105: if [ "$bk_pv_rname" = "" ]
106: then
107: echo "NULL: /usr/sbin/vgcfgrestore -n $bk_device -l 2> /dev/null | /usr/bin/awk '{print
$1}' | /usr/bin/grep -e \" /dev/rdisk\" -e \" /dev/rdisk\" > $err_log_path/$dev.vgcfgrestore
108: exit 31
109: fi
110: /usr/sbin/vgchange -a n $bk_device > /dev/null 2>&1
111: reststatus=0

```

```

112:     for bk_pv_rname1 in $bk_pv_rname
113:     do
114:         /usr/sbin/vgcfgrestore -n $bk_device $bk_pv_rname1 > /dev/null 2>&1
115:         if [ $? != 0 ]
116:         then
117:             /usr/sbin/vgcfgrestore -n $bk_device $bk_pv_rname1 >> $err_log_path/$dev.vgcfgrestore
118:             2>&1
119:         fi
120:         if [ $? = 0 ]
121:         then
122:             /usr/bin/rm -f $err_log_path/$dev.vgcfgrestore
123:             reststatus=1
124:             break
125:         fi
126:     done
127:     if [ "$SWSTGNODE" != "" ]
128:     then
129:         /usr/sbin/vgchange -c y $bk_device > /dev/null 2>&1
130:         /usr/sbin/vgchange -a e $bk_device > /dev/null 2>&1
131:     else
132:         /usr/sbin/vgchange -a y $bk_device > /dev/null 2>&1
133:     fi
134:     if [ $reststatus = 0 ]
135:     then
136:         exit 31
137:     fi
138: fi
139:
140: # No processing
141: # When device was not mounted --- 3
142: # When devices of volume group was not mounted --- 6
143: # When the transaction disk is a VxVM physical volume --- 7
144: if [ "$post" = "none" ]
145: then
146:     /usr/bin/rm -rf $post_file 2> /dev/null
147:     /usr/bin/rm -rf $fstype_file 2> /dev/null
148:     /usr/bin/rm -rf $bd_file 2> /dev/null
149:     exit 0
150: fi
151:
152: # mount processing
153: if [ "$post" = "mount" ]
154: then
155:
156:     # When device can be unmounted --- 2
157:     if [ "$dev_type" = "physical" ]
158:     then
159:         /usr/bin/df -l $device > /dev/null 2>&1
160:         if [ $? != 0 ]
161:         then
162:             if [ ! -r $fstype_file ]
163:             then
164:                 /usr/sbin/mount $device $mount_point 2> /dev/null
165:             else
166:                 if [ "$fs" = "" ]
167:                 then
168:                     /usr/sbin/mount $device $mount_point 2> /dev/null
169:                 else
170:                     /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
171:                 fi
172:             fi
173:         fi

```

```

174:         then
175:             retry_count=3
176:             sleep_time=1
177:             result_flag=1
178:
179:             while [ $retry_count -gt 0 ]
180:             do
181:                 if [ ! -r $fstype_file ]
182:                 then
183:                     /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
184:                 else
185:                     if [ "$fs" = "" ]
186:                     then
187:                         /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
188:                     else
189:                         /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount 2>&1
190:                     fi
191:                 fi
192:                 if [ $? != 0 ]
193:                 then
194:                     retry_count=`expr $retry_count - 1`
195:                     /usr/bin/sleep $sleep_time
196:                 else
197:                     /usr/bin/rm -f $err_log_path/$dev.mount
198:                     result_flag=0
199:                     break
200:                 fi
201:             done
202:
203:             if [ $result_flag != 0 ]
204:             then
205:                 exit 11
206:             fi
207:         fi
208:     fi
209: # elif [ "$dev_type" = "logical" ]
210: # then
211: #
212: # When devices of volume group can be unmounted --- 5
213: # # Specify the name of volume group to mount
214: #     if [ "$device" = "/dev/vgXX" ]
215: #     then
216: #         # Mount all logical volumes of the volume group
217: #         fs="hfs"
218: #         lvname="/dev/vgXX/XXXXX"
219: #         lv_mount_point="/XX"
220: #
221: #         /usr/bin/df -l $lvname > /dev/null 2>&1
222: #         if [ $? != 0 ]
223: #         then
224: #             /usr/sbin/mount -F $fs $lvname $lv_mount_point 2> /dev/null
225: #             if [ $? != 0 ]
226: #             then
227: #                 retry_count=3
228: #                 sleep_time=1
229: #                 result_flag=1
230: #
231: #                 while [ $retry_count -gt 0 ]
232: #                 do
233: #                     /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount 2>&1
234: #                     if [ $? != 0 ]
235: #                     then
236: #                         retry_count=`expr $retry_count - 1`

```

```

237: #                /usr/bin/sleep $sleep_time
238: #                else
239: #                rm -f $err_log_path/$dev.mount
240: #                result_flag=0
241: #                break
242: #                fi
243: #            done
244: #
245: #            if [ $result_flag != 0 ]
246: #            then
247: #                exit 11
248: #            fi
249: #        fi
250: #    fi
251: #    fi
252:
253: fi
254: /usr/bin/rm -rf $post_file 2> /dev/null
255: /usr/bin/rm -rf $fstype_file 2> /dev/null
256: /usr/bin/rm -rf $bd_file 2> /dev/null
257: exit 0
258: fi
259:
260: # fsck processing
261: # When device cannot be unmounted          --- 1
262: # When devices of volume group cannot be unmounted --- 4
263: if [ "$post" = "fsck" ]
264: then
265:     if [ -r $bd_file ]
266:     then
267:         bk_device="/usr/bin/cat $bd_file`"
268:         bk_trans="`echo $bk_device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
269:         if [ "$bk_trans" != "" ]
270:         then
271:             if [ ! -r $fstype_file ]
272:             then
273:                 /usr/sbin/fsck -y $bk_device > /dev/null 2>&1
274:             else
275:                 if [ "$fs" = "" ]
276:                 then
277:                     /usr/sbin/fsck -y $bk_device > /dev/null 2>&1
278:                 else
279:                     /usr/sbin/fsck -y -F $fs $bk_device > /dev/null 2>&1
280:                 fi
281:             fi
282:             if [ $? != 0 ]
283:             then
284:                 if [ "$fs" = "" ]
285:                 then
286:                     /usr/sbin/fsck -y $bk_device > $err_log_path/$dev.fsck 2>&1
287:                 else
288:                     /usr/sbin/fsck -y -F $fs $bk_device > $err_log_path/$dev.fsck 2>&1
289:                 fi
290:             if [ $? != 0 ]
291:             then
292:                 exit 12
293:             else
294:                 /usr/bin/rm -f $err_log_path/$dev.fsck
295:             fi
296:         fi
297:     else
298: # Specify the name of volume group to fsck
299: if [ "$bk_device" = "/dev/vgXX" ]

```

```

300: #         then
301: #             fs="hfs"
302: #             lvname="/dev/vgXX/rXXXXXX"
303: #
304: #             fsck -F $fs -y $lvname > /dev/null 2>&1
305: #             if [ $? != 0 ]
306: #                 then
307: #                     if [ "$fs" = "" ]
308: #                         then
309: #                             fsck -y $lvname > $err_log_path/$dev.fsck 2>&1
310: #                         else
311: #                             fsck -y -F $fs $lvname > $err_log_path/$dev.fsck 2>&1
312: #                         fi
313: #                     if [ $? != 0 ]
314: #                         then
315: #                             exit 12
316: #                         else
317: #                             rm -f $err_log_path/$dev.fsck
318: #                         fi
319: #                     fi
320: #                 fi
321: #             fi
322: #         fi
323: #         /usr/bin/rm -rf $post_file 2> /dev/null
324: #         /usr/bin/rm -rf $fstype_file 2> /dev/null
325: #         /usr/bin/rm -rf $bd_file 2> /dev/null
326: #         exit 0
327: #     fi
328: #
329: #     exit 0

```

A.2.3 Customizing Shell Script

The method of customizing the shell script for backup pre- and post-processing is explained below.

When You Do Not Want to Unmount Transaction Volume

If you do not want to unmount a mounted transaction volume, eliminate the comment characters ("#") in lines 101-110, 113 and 146 (in the case of a physical volume) or lines 163-172 (in the case of a volume group), and point to the target device in line 101 or line 163.

In addition, do not perform an update operation on a transaction volume file system after performing the sync command on line 108 or line 169 until backup post-processing. If a file system update is performed in the meantime, the backup is taken with a corrupted file system. In this case the fsck command executed by the post-processing may raise an error.

Backup Volume Group

When you are backing up the volume group containing the logical volume used to build the file system, insert a comment character ("#") into line 158 of the pre-processing script (OpcBackup.pre) to remove the exit statement.

- Remove the comment ("#") from lines 177-214 of the pre-processing script (OpcBackup.pre), as well as from lines 209, 210 and 214-251 of the post-processing script (OpcBackup.post). Correct the description in a comment so that unmount/mount processing is carried out on all the logical volumes across which the file system exists. Change the parts shown as "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 180-212 of the pre-processing script (OpcBackup.exe) and lines 218-250 of the post-processing script (OpcBackup.post) once for each additional logical volume.
- If the operating volume was not unmounted in the pre-processing script then the fsck command needs to be executed (on all the logical volumes contained in the backup volume) in post-processing. Remove the comment ("#") in lines 297-320 of the post-processing script (OpcBackup.post), and correct the description in a comment so that fsck processing is carried out on all the logical volumes across which the file system exists. Change the parts shown as "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 309-319 once for each additional logical volume.

Note

- Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.
- When the backup volume is a volume group, in order to enable use of the backup volume as LVM, volume group configuration information is restored using the `vgcfgrestore` command in the post-processing. The information is restored from the standard backup file `"/etc/lvmconf/volumeGroupName.conf"`. If volume group configuration information is backed up by another file, customize the script.

In a clustered system, the respective nodes comprising the cluster must have volume group configuration information.

- Correct the parameters and options, of the OS commands, such as the mount command and the fsck command, appropriately for their use.
- For shared-mode volume groups:

When reconfiguring shared-mode volume groups, comment out line numbers 90-138, 144, 145 and 150 in the post-processing script (`OpcBackup.post`) to prevent the volume group from being reconfigured by the script.

Reconfigure the volume group by manually performing the following steps after the backup has been executed.

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

```
# /usr/sbin/vgchange -a n volumeGroupName
#
```

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

```
# /usr/sbin/vgcfgrestore -n volumeGroupName pvPath
#
```

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

```
# /usr/sbin/vgchange -S y -c y volumeGroupName
#
```

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

```
# /usr/sbin/vgchange -a s volumeGroupName
#
```

File System Name

Change the file system names on lines 217 and 301 of the post-processing shell script (`OpcBackup.post`) that is executed when backup is performed as appropriate for the operation.

Cluster Operation by VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required when performing cluster operations using VERITAS Cluster Server, and when the mount point of the transaction volume is registered in the cluster transaction.

Change the unmount/mount processing in the pre-processing and post-processing scripts into offline/online processing of the mount point resource.

The mount point resource relating to the Volume is immediately offline/online whilst there is a time delay before access is actually prevented when mount/unmount is used.

Note that once the online/offline command is issued there is a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/ unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]

Changing Unmount Processing of Backup Pre-processing Script (OpcBackup.pre)

[lines 115, 124, 181 and 193]

(before change)	<code>/usr/sbin/umount \$mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName</code>

[Example]

Adding Unmount Wait Processing to Backup Pre-processing Script (OpcBackup.pre)

[lines 145 and 213]

(addition)	<code>while /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

[Example]

Changing Mount Processing of Backup Post-processing Script (OpcBackup.post)

[lines 164, 168, 170, 183, 187, 189, 224 and 233]

(before change)	<code>/usr/sbin/mount \$device \$mount_point</code> <code>/usr/sbin/mount -F \$fs \$device \$mount_point</code> <code>/usr/sbin/mount -F \$fs \$lvname \$lv_mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -online resourceName -sys systemName</code>

[Example]

Adding Mount Wait Processing to Backup Post-processing Script (OpcBackup.post)

[lines 209 and 252]

(addition)	<code>while ! /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

A.3 Pre-processing and Post-processing of Restoration

In AdvancedCopy Manager, restore processing must be performed while transaction volumes are unmounted.

Thus, in pre-processing, the mount state of the transaction volume is determined using its name and the following processing is then performed:

Table A.4 Pre-processing for Transaction Volume

Transaction Volume Status	Pre-processing
Mounted	Unmount the transaction volume.
Unmounted	Take no action.

Post-processing tasks are determined by what has occurred in pre-processing.

Table A.5 Pre-processing and Post-processing for Restoration

Pre-processing	Post-processing
A transaction volume was unmounted.	Remount the transaction volume.
Take no action.	Take no action.

If special pre-processing or post-processing is required, you need to add the instructions as appropriate to the shell script.

When customizing a script, strictly observe the following rules regarding error codes:

Table A.6 Error Code Rules

Error Code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

- If the post-processing fails, the resource information may have inconsistencies. Execute the `swstrsemitch` command.
- When restoring a file system in a volume group, refer to "Restore Volume Group", and customize the pre-processing and post-processing scripts so that the unmount/mount command is carried out for all logical volumes across which a file system exists.

A.3.1 Pre-processing of Restoration

The name of a script file for pre-processing of a restoration is as follows.

For Non-clustered System

```
/etc/opt/FJSVswsts/sh/OpcRestore.pre
```

For Clustered System

```
/etc/opt/FJSVswsts/logicalNodeName/sh/OpcRestore.pre
```

A.3.1.1 Pre-processing Script for Restoration

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Pre-processing of restoration processing
8: #
9: #       Argument: $1 Device or VG name of transaction disk
10: #           $2 Mount point of transaction disk
11: #
12: #   Error number
13: #           2: Argument error (system error)
14: #           10: umount error
15: #           30: VG configuration file not found error
16: #           99: Script not customize
17:
18:
19: # Argument check
20: case $# in
21: 1)
22:   ;;
23: 2)
24:   ;;
25: *)
26:   exit 2
27:   ;;
28: esac
29:
30: device=$1
31: mount_point=$2
32:
33: # Determination of postprocessing file name
34:
```



```

35: if [ "$SWSTGNODE" != "" ]
36: then
37:     swstg_node="/`echo $SWSTGNODE`"
38: else
39:     swstg_node=""
40: fi
41:
42: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
43:
44: # Device type check
45: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
46: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
47: vxpvttrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`
48: if [ "$trans" != "" ]
49: then
50:     dev_type="physical"
51:     dev=`echo $device | /usr/bin/sed -e "s/\dev\dsk\\/" -e "s/\dev\disk\\/_hppv_/"`
52:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
53:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
54: elif [ "$vxpvttrans" != "" ]
55: then
56:     dev_type="vxvm_pv"
57:     # /dev/vx/dmp/XXXX -> XXXX
58:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`
59:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
60:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
61: elif [ "$lvmtrans" != "" ]
62: then
63:     dev_type="logical"
64:     # /dev/vgXX -> vgXX
65:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`
66:     post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
67:     fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
68: else
69:     exit 0
70: fi
71:
72: # When the transaction disk is a physical device #####
73: if [ "$dev_type" = "physical" ]
74: then
75:
76: # When device was mounted --- 1
77:     if [ "$mount_point" != "" ]
78:     then
79:         /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/awk
' { print $1 }' > $fstype_file
80:         /usr/sbin/umount $mount_point 2> /dev/null
81:         if [ $? != 0 ]
82:         then
83:             retry_count=3
84:             sleep_time=1
85:             result_flag=1
86:
87:             while [ $retry_count -gt 0 ]
88:             do
89:                 /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
90:                 if [ $? != 0 ]
91:                 then
92:                     retry_count=`expr $retry_count - 1`
93:                     /usr/bin/sleep $sleep_time
94:                 else
95:                     /usr/bin/rm -f $err_log_path/$dev.umount
96:                     result_flag=0

```

```

97:             break
98:         fi
99:     done
100:
101:     if [ $result_flag != 0 ]
102:
103:     then
104:         /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
105:         /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
106:
107:         exit 10
108:     fi
109: fi
110: echo "mount" > $post_file
111:
112: # When device was not mounted --- 2
113:     else
114:         echo "none" > $post_file
115:     fi
116:
117: # When the transaction disk is a volume group #####
118: elif [ "$dev_type" = "logical" ]
119: then
120:
121:     # Check VG configuration file exists
122:     vg_name=`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`
123:     cfg_file="/etc/lvmconf/"$vg_name".conf"
124:     if [ ! -r $cfg_file ]
125:     then
126:         exit 30
127:     fi
128:
129: # Devices is volume group and script not customize
130:     exit 99
131:
132: # When devices of volume group was mounted --- 3
133: #     # Specify the name of volume group to unmount
134: #     if [ "$device" = "/dev/vgXX" ]
135: #     then
136: #
137: # # Unmount all logical volumes of the volume group
138: # mount_point="/XX"
139: # /usr/sbin/umount $mount_point 2>/dev/null
140: # if [ $? != 0 ]
141: # then
142: #     retry_count=3
143: #     sleep_time=1
144: #     result_flag=1
145: #
146: #     while [ $retry_count -gt 0 ]
147: #     do
148: #         /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
149: #         if [ $? != 0 ]
150: #         then
151: #             retry_count=`expr $retry_count - 1`
152: #             sleep $sleep_time
153: #         else
154: #             rm -f $err_log_path/$dev.umount
155: #             result_flag=0
156: #             break
157: #         fi
158: #     done
159: #

```

```

160: #     if [ $result_flag != 0 ]
161: #
162: #     then
163: #         /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
164: #         /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
165: #
166: #         exit 10
167: #     fi
168: # fi
169: # echo "mount" > $post_file
170: #     fi
171:
172: # When devices of volume group was not mounted --- 4
173: #     # Specify the name of volume group to do nothing
174: #     if [ "$device" = "/dev/vgXX" ]
175: #     then
176: #     echo "none" > $post_file
177: #     fi
178: #
179: # When the transaction disk is a VxVM physical volume --- 5 #####
180: elif [ "$dev_type" = "vxvm_pv" ]
181: then
182:     # Nothing is done to VxVM PV.
183:     #
184:     echo "none" > $post_file
185: fi
186: exit 0

```

Restore processing is not possible on a mounted transaction volume that cannot be unmounted. Specify a device at the restore destination.

A.3.2 Post-processing of Restoration

The name of a script file for post-processing of a restoration is as follows.

For Non-clustered System

```
/etc/opt/FJSVswsts/sh/OpcRestore.post
```

For Clustered System

```
/etc/opt/FJSVswsts/logicalNodeName/sh/OpcRestore.post
```

A.3.2.1 Post-processing Script for Restoration

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #     Post-processing of restoration processing
8: #
9: #     Argument: $1 Device or VG name of transaction disk
10: #             $2 Mount point of transaction disk
11: #
12: #     Error number
13: #             2: Argument error
14: #             11: mount error
15: #             31: vfcfgrestore error
16: #             12: fsck error
17:
18: # Argument check

```

```

19: case $# in
20: 1)
21:   ;;
22: 2)
23:   ;;
24: *)
25:   exit 2
26:   ;;
27: esac
28:
29: device=$1
30: mount_point=$2
31:
32: # Determination of postprocessing file name
33:
34: if [ "$SWSTGNODE" != "" ]
35: then
36:   swstg_node="\`echo $SWSTGNODE`"
37: else
38:   swstg_node=""
39: fi
40:
41: err_log_path="/var/opt/FJSVswsts"$swstg_node"/log"
42:
43: trans="\`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`"
44: lvmtrans="\`echo $device | /usr/bin/grep "/dev/"`"
45: vxpvtrans="\`echo $device | /usr/bin/grep "/dev/vx/dmp/"`"
46: if [ "$strans" != "" ]
47: then
48:   dev_type="physical"
49:   dev="\`echo $device | /usr/bin/sed -e "s/\dev\dk\//" -e "s/\dev\disk\//_hppv/"`"
50:   post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
51:   fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
52: elif [ "$vxpvtrans" != "" ]
53: then
54:   dev_type="vxvm_pv"
55:   # /dev/vx/dmp/XXXX -> XXXX
56:   dev="\`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`"
57:   post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
58:   fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
59: elif [ "$lvmtrans" != "" ]
60: then
61:   dev_type="logical"
62:   # /dev/vgXX -> vgXX
63:   dev="\`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`"
64:   post_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".pre"
65:   fstype_file="/etc/opt/FJSVswsts"$swstg_node"/data/DEFAULT/"$dev".fstype"
66: else
67:   exit 0
68: fi
69:
70: # Confirmation of postprocessing
71: if [ ! -r $post_file ]
72: then
73:   exit 0
74: fi
75: post="\`usr/bin/cat $post_file`"
76:
77: # Confirmation of FStype
78: if [ ! -r $fstype_file ]
79: then
80:   fs=""
81: else

```

```

82: fs="`/usr/bin/cat $fstype_file`"
83: fi
84:
85: # Restore VG Configuration
86: if [ "$dev_type" = "logical" ]
87: then
88:   vg_name="`echo $device | /usr/bin/awk -F/ '{ print $3 }`"
89:   cfg_file="/etc/lvmconf/"$vg_name".conf"
90:   if [ ! -r $cfg_file ]
91:   then
92:     exit 31
93:   fi
94:   pv_rname="`/usr/sbin/vgcfgrestore -n $device -l 2> /dev/null | /usr/bin/awk '{print $1}'
| /usr/bin/grep -e `"/dev/rdisk\" -e `"/dev/rdisk\"`"
95:   if [ "$pv_rname" = "" ]
96:   then
97:     echo "NULL: /usr/sbin/vgcfgrestore -n $device -l 2> /dev/null | /usr/bin/awk '{print $1}'
| /usr/bin/grep -e `"/dev/rdisk\" -e `"/dev/rdisk\"" > $err_log_path/$dev.vgcfgrestore 2>&1
98:     exit 31
99:   fi
100: /usr/sbin/vgchange -a n $device > /dev/null 2>&1
101: reststatus=0
102: for pv_rname1 in $pv_rname
103: do
104:   /usr/sbin/vgcfgrestore -n $device $pv_rname1 > /dev/null 2>&1
105:   if [ $? != 0 ]
106:   then
107:     /usr/sbin/vgcfgrestore -n $device $pv_rname1 >> $err_log_path/$dev.vgcfgrestore 2>&1
108:   fi
109:   if [ $? = 0 ]
110:   then
111:     /usr/bin/rm -f $err_log_path/$dev.vgcfgrestore
112:     reststatus=1
113:     break
114:   fi
115: done
116: if [ "$SWSTGNODE" != "" ]
117: then
118:   /usr/sbin/vgchange -c y $device > /dev/null 2>&1
119:   /usr/sbin/vgchange -a e $device > /dev/null 2>&1
120: else
121:   /usr/sbin/vgchange -a y $device > /dev/null 2>&1
122: fi
123: if [ $reststatus = 0 ]
124: then
125:   exit 31
126: fi
127: fi
128:
129: # No processing
130: # When device was not mounted --- 2
131: # When devices of volume group was not mounted --- 4
132: # When the transaction disk is a VxVM physical volume --- 5
133: if [ "$post" = "none" ]
134: then
135:   /usr/bin/rm -rf $post_file 2> /dev/null
136:   /usr/bin/rm -rf $fstype_file 2> /dev/null
137:   exit 0
138: fi
139:
140: # mount processing
141: if [ "$post" = "mount" ]
142: then

```

```

143:
144: # When device was mounted --- 1
145:   if [ "$dev_type" = "physical" ]
146:   then
147:     /usr/bin/df -l $device > /dev/null 2>&1
148:     if [ $? != 0 ]
149:     then
150:       if [ ! -r $fstype_file ]
151:       then
152:         /usr/sbin/mount $device $mount_point 2> /dev/null
153:       else
154:         if [ "$fs" = "" ]
155:         then
156:           /usr/sbin/mount $device $mount_point 2> /dev/null
157:         else
158:           /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
159:         fi
160:       fi
161:     if [ $? != 0 ]
162:     then
163:       retry_count=3
164:       sleep_time=1
165:       result_flag=1
166:
167:       while [ $retry_count -gt 0 ]
168:       do
169:         if [ ! -r $fstype_file ]
170:         then
171:           /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
172:         else
173:           if [ "$fs" = "" ]
174:           then
175:             /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
176:           else
177:             /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount 2>&1
178:           fi
179:         fi
180:         if [ $? != 0 ]
181:         then
182:           retry_count=`expr $retry_count - 1`
183:           /usr/bin/sleep $sleep_time
184:         else
185:           /usr/bin/rm -f $err_log_path/$dev.mount
186:           result_flag=0
187:           break
188:         fi
189:       done
190:
191:       if [ $result_flag != 0 ]
192:       then
193:         exit 11
194:       fi
195:     fi
196:   fi
197: # elif [ "$dev_type" = "logical" ]
198: # then
199: #
200: # When devices of volume group was mounted --- 3
201: #   # Specify the name of volume group to mount
202: #   if [ "$device" = "/dev/vgXX" ]
203: #   then
204: #     # Mount all logical volumes of the volume group
205: #     fs="hfs"

```

```

206: #         lvname="/dev/vgXX/XXXXX"
207: #         lv_mount_point="/XX"
208: #
209: #         fsck -F $fs -y $lvname > /dev/null 2>&1
210: #         if [ $? != 0 ]
211: #         then
212: #             fsck -F $fs -y $lvname > $err_log_path/$dev.fsck 2>&1
213: #             if [ $? != 0 ]
214: #             then
215: #                 exit 12
216: #             else
217: #                 rm -f $err_log_path/$dev.fsck
218: #             fi
219: #         fi
220: #         /usr/bin/df -l $lvname > /dev/null 2>&1
221: #         if [ $? != 0 ]
222: #         then
223: #             /usr/sbin/mount -F $fs $lvname $lv_mount_point 2> /dev/null
224: #             if [ $? != 0 ]
225: #             then
226: #                 retry_count=3
227: #                 sleep_time=1
228: #                 result_flag=1
229: #
230: #                 while [ $retry_count -gt 0 ]
231: #                 do
232: #                     /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount 2>&1
233: #                     if [ $? != 0 ]
234: #                     then
235: #                         retry_count=`expr $retry_count - 1`
236: #                         /usr/bin/sleep $sleep_time
237: #                     else
238: #                         rm -f $err_log_path/$dev.mount
239: #                         result_flag=0
240: #                         break
241: #                     fi
242: #                 done
243: #
244: #                 if [ $result_flag != 0 ]
245: #                 then
246: #                     exit 11
247: #                 fi
248: #             fi
249: #         fi
250: #     fi
251: fi
252: /usr/bin/rm -rf $post_file 2> /dev/null
253: /usr/bin/rm -rf $fstype_file 2> /dev/null
254: exit 0
255: fi
256:
257: exit 0

```

A.3.3 Customizing Shell Script

The method to customize the shell script for restore pre/post-processing is explained below.

Restore Volume Group

When restoring a file system that is part of a logical volume in a volume group, insert a comment character ("##") into line 130 of the pre-processing script (OpcRestore.pre) to remove the exit statement

- Eliminate the comment ("##") from lines 134-170 of the pre-processing script (OpcRestore.pre), and also from lines 197,198 and 202-250 of the post-processing script (OpcRestore.post), Correct the description in the comment so that unmount/mount processing is carried out on all the logical volumes used to build the file system. Modify the parts shown as "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 138-168 of the pre-processing script (OpcRestore.exe) and lines 206-249 of the post-processing script (OpcRestore.post) once for each additional logical volume.
- If the operating volume was not unmounted in the pre-processing script, and if fsck is not being carried out to the backup volume, then the fsck command needs to be executed (to all the logical volumes contained in the backup volume) in post-processing

Note

- Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.
- When the transaction volume is a volume group, in order to enable use of the backup volume as LVM, volume group configuration information is restored using the `vgcfgrestore` command in the restore post-processing. In the above-mentioned script, volume configuration information is restored from the standard backup file `/etc/lvmconf/volumeGroupName.conf`. If volume group configuration information is backed up by another file, customize the script.
In a clustered system, the respective nodes comprising the cluster must have volume group configuration information.
- Correct parameters, options, etc. of the OS command, such as the "mount" command and the "fsck" command, according to their employment.
- For shared-mode volume groups:

When reconfiguring shared-mode volume groups, comment out line numbers 96-127, 133, 134 and 138 in the post-processing script (OpcBackup.post) to prevent the volume group from being reconfigured by the post-processing script.

Reconfigure the volume group by manually performing the following steps after the Replication has been executed.

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

```
# /usr/sbin/vgchange -a n volumeGroupName
#
```

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

```
# /usr/sbin/vgcfgrestore -n volumeGroupName pvPath
#
```

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

```
# /usr/sbin/vgchange -S y -c y volumeGroupName
#
```

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

```
# /usr/sbin/vgchange -a s volumeGroupName
#
```

File System Name

Change the file system name on line 205 of the post-processing shell script (OpcRestore.post) that is executed when restore is performed as appropriate for the operation.

Cluster Operations on VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required, when performing cluster operations on VERITAS Cluster Server, and when the mount point of the transaction volume is registered in the cluster transaction.

Change the unmount/mount processing in the pre-processing and post-processing script into offline/online processing of the mount point resource.

The mount point resource relating to the Volume is immediately offline/online whilst there is a time delay before access is actually prevented when mount/unmount is used.

Note that once the online/offline command is issued there is a delay before the mount/unmount command can be executed. The "sleep" and "df" commands can be used to delay the mount/ unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]

Changing Unmount Processing of Restore Pre-processing Script (OpcRestore.pre)

[lines 80, 89, 139 and 148]

(before change)	<code>/usr/sbin/umount \$mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName</code>

[Example]

Adding Unmount Wait Processing to Restore Pre-processing Script (OpcRestore.pre)

[lines 110 and 169]

(addition)	<code>while /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

[Example]

Changing Mount Processing of Restore Post-processing Script (OpcRestore.post)

[lines 152, 156, 158, 171, 175, 177, 223 and 232]

(before change)	<code>/usr/sbin/mount \$device \$mount_point</code> <code>/usr/sbin/mount -F \$fs \$device \$mount_point</code> <code>/usr/sbin/mount -F \$fs \$lvname \$lv_mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -online resourceName -sys systemName</code>

[Example]

Adding Mount Wait Processing to Restore Post-processing Script (OpcRestore.post)

[lines 197 and 251]

(addition)	<code>while ! /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

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. By using it as a reference when creating similar scripts for the replication management function, you can copy Oracle databases.

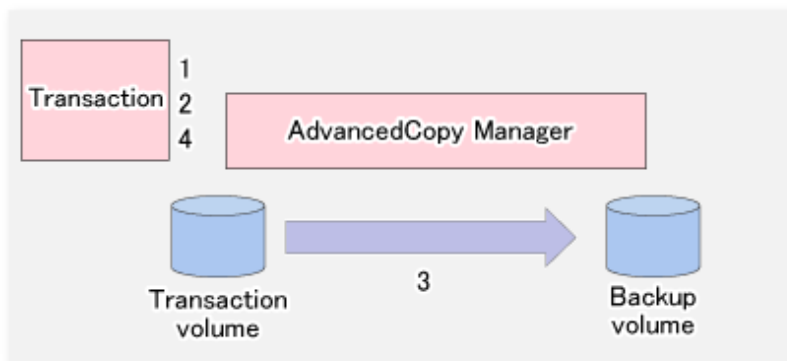
B.1 Backup and Restoration of Transaction Volume

B.1.1 Backup Procedure

The following is an overview of the backup procedure:

1. Check the work operation status
Check whether processing is in operation or not.
2. Declare the start of online backup
If processing was found to be in operation in step 1, declare the start of online backup for the database to stop updating the data files. This makes the slices that store transaction data ready for online backup.
3. Backup (copy) slices
Backup (copy) the slices that store transaction data using the AdvancedCopy Manager backup function.
4. Declare the end of online backup
If processing was found to be in operation in step 1, declare the end of online backup for the database to resume updating the data files.

Figure B.1 Backup

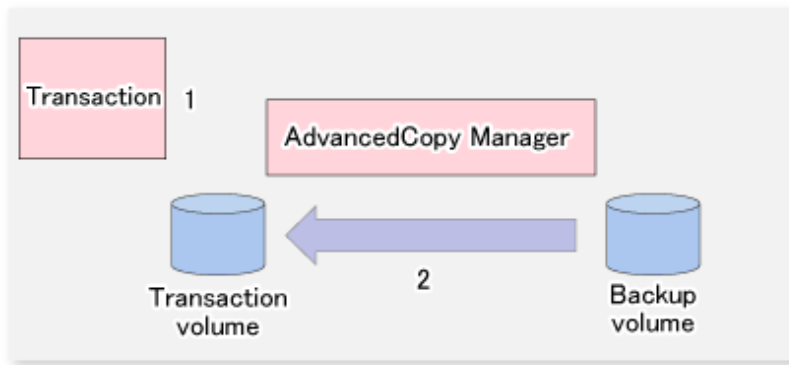


B.1.2 Restoration Procedure

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
Using the restoration function of AdvancedCopy Manager, restore data from a backup volume to the transaction volume.

Figure B.2 Performing Restoration from Backup Volume



B.2 Sample Scripts for Oracle

Sample scripts provided for AdvancedCopy Manager are created assuming that the following version of Oracle is used. If you use any other version, correct the sample scripts as required.

- Oracle 10g (V 10.1.0.2.0)

B.2.1 Overview of Sample Scripts

The sample shell scripts provided are summarized below. These scripts are stored in the /etc/opt/FJSVswts/samp directory.

Table B.1 Sample Shell Script for Oracle

No.	Type	Script Name	Associated Transaction	Associated Resource Type
1	Collection of DB information	swst_or_iv	Oracle transaction	-
2	Backup	swst_or_fs_bk	Oracle transaction, general file transaction	File system
3	Backup	swst_or_rd_bk	Oracle transaction	Raw device

B.2.1.1 Collecting DB Information

swst_or_iv outputs information about an Oracle database. The output file names and their contents are:

- spdata.lst : List of table space names and storage destinations
- spdata.bgn : Command in the following format:

```
Alter tablespace Table-space-name begin backup;
```

- spdata.end : Command in the following format:

```
Alter tablespace Table-space-name end backup;
```

- spcont.lst : Oracle database control file information
- splog.lst : Oracle database log file information
- spreadolog.lst : REDO Log file information of an Oracle database

Use the database information above as a reference for creating shell scripts for backup processing.

Format

```
swst_or_iv
```

Usage Example

```
# swst_or_iv
swst_or_iv completed.
```

Result Example

```
spdata.lst
  TABLESPACE-NAME                                DEVICE-NAME
-----
ACMTS1                /dev/vg170/rlv01170
SYSAUX                /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/sysaux01.dbf
SYSTEM                /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/system01.dbf
UNDOTBS1              /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/undotbs01.dbf
USERS                 /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/users01.dbf
spdata.bgn
alter tablespace ACMTS1 begin backup;
alter tablespace SYSAUX begin backup;
alter tablespace SYSTEM begin backup;
alter tablespace UNDOTBS1 begin backup;
alter tablespace USERS begin backup;
spdata.end
alter tablespace ACMTS1 end backup;
alter tablespace SYSAUX end backup;
alter tablespace SYSTEM end backup;
alter tablespace UNDOTBS1 end backup;
alter tablespace USERS end backup;
spcont.lst
NAME                                TYPE                                VALUE
-----
control_files                       string                               /var/adm/crash/u01/app/oracle/
OraHome_1/oradata/acmtest1/con
trol01.ctl, /var/adm/crash/u01
/app/oracle/OraHome_1/oradata/
acmtest1/control02.ctl, /var/a
dm/crash/u01/app/oracle/OraHom
e_1/oradata/acmtest1/control03
.ctl

splog.lst
NAME                                TYPE                                VALUE
-----
db_recovery_file_dest                string                               /var/adm/crash/u01/app/oracle/
OraHome_1/flash_recovery_area

db_recovery_file_dest_size           big integer                          2G
spredolog.lst
GROUP#      MEMBER
-----
3           /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo03.log
2           /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo02.log
1           /var/adm/crash/u01/app/oracle/OraHome_1/oradata/acmtest1/redo01.log
```

Processing Outline

```
#!/bin/sh
reterr() --- An error message is output before an error is returned.
sqldata()
{
  sqlplus /nolog <<!
  connect / as sysdba
  SELECT --- Acquire Oracle table space information.
}
sqllog()
{
```

```

sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle log information.
}
sqlcont()
{
sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle control information.
}
sqlredolog()
{
sqlplus /nolog <<!
connect / as sysdba
show --- Acquire Oracle REDO log information.
}

# main()

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJVSswsts/bin

# 1) Acquisition of Oracle table space information
sqldata() invocation --- Acquire Oracle table space information

# 2) Acquisition of Oracle log information
sqllog() invocation --- Acquire Oracle log information

# 3) Acquisition of Oracle control information
sqlcont() invocation --- Acquire Oracle control information

# 4) Acquisition of Oracle REDO log information
sqlredolog() invocation --- Acquire Oracle REDO log information

exit 0

```

B.2.1.2 File System Backup

swst_or_fs_bk, run using AdvancedCopy Manager, backs up processing data stored in an Oracle database on a file system. Processing data is copied to the backup volumes of AdvancedCopy Manager. These scripts correspond to steps 2 to 5 in "[B.2.2.1 DB Information Collection](#)".

Format

```
swst_or_fs_bk {-a | -i} mountPointName
```

Options

-a

Specify when an Oracle database is online. The start of backup processing is declared to the Oracle server.

-i

Specify when an Oracle database is stopped or the file is a general file. The start of backup processing is not declared to the Oracle server.

Operands

mountPointName

Specify the name of the mount point targeted for backup.

Example Using swst_or_fs_bk

While processing is active, back up /gyoumu_db in which an Oracle database is located.

```
# swst_or_fs_bk -a /gyoumu_db
swst_or_fs_bk completed. ( /gyoumu_db -> /dev/vg170 at 23:00 on 2005.10.01 )
```

Processing Outline of swst_or_fs_bk

```
#!/bin/sh
usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
chkmp() --- Check for a mount point
get_mp_blk() --- Conversion from a mount point to a device
getfs() --- Conversion from a mount point to a file system type
sqlbegin()

{
sqlplus /nolog <<!
connect / as sysdba
alter system switch logfile;
alter system flush shared_pool;
alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.
}
sqlend()

{
sqlplus /nolog <<!
connect / as sysdba
alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.
}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and mount point check

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJJSwsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $VG --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
BDBLK=`getbd $VG` --- Fetch a backup volume as a character device.
BDDATE=`getdate $VG` --- Fetch the backup date.
BDTIME=`gettime $VG` --- Fetch the backup time.
```

```
exit 0
```

B.2.1.3 Raw Device Backup

swst_or_rd_bk is run using AdvancedCopy Manager to back up live data using an Oracle database on a raw device. Live data is copied to work disks prepared by users. These scripts apply to steps 2 to 5 in "B.2.2.1 DB Information Collection".

Format

```
swst_or_rd_bk {-a | -i} deviceName
```

Options

-a

Specify when an Oracle database is online. The start of backup processing is declared to the Oracle server.

-i

Specify when an Oracle database is stopped or the file is a general file. The start of backup processing is not declared to the Oracle server.

Operands

deviceName

Specify the name of the raw device targeted for backup.

Example Using swst_or_rd_bk

While the database is online, back up /dev/vg170 in which an Oracle database is located.

```
# swst_or_rd_bk -a /dev/vg170
swst_or_rd_bk completed. (/dev/vg170 -> /dev/vg171 at 23:01 on 2005.10.01 )
```

Processing Outline of swst_or_rd_bk

```
#!/bin/sh

usage() --- Command syntax is output before an error is returned.
reterr() --- An error message is output before an error is returned.
get_chr_blk() --- Conversion from a character device to a block device
get_blk_chr() --- Conversion from a block device to a character device
sqlbegin()
{
sqlplus /nolog <<!
connect / as sysdba
alter system switch logfile;
alter system flush shared_pool;
alter tablespace CCC begin backup; --- Notify Oracle of the start of backup.
}
sqlend()
{
sqlplus /nolog <<!
connect / as sysdba
alter tablespace CCC end backup; --- Notify Oracle of the stopping of backup.
}
getbd() --- Fetch the name of the backup (copy) destination device of AdvancedCopy Manager.
getdate() --- Fetch the backup (copy) date of AdvancedCopy Manager.
gettime() --- Fetch the backup (copy) time of AdvancedCopy Manager.

# main()
Parameter analysis and raw device check
```

```

# 0) Environmental variable setting
PATH=$PATH:/usr/bin:/usr/sbin:/opt/FJSVswsts/bin

# 1) Notification issued to Oracle of the start of backup
if [ "-a" operand specification ]
then
sqlbegin() invocation --- Notify Oracle of the start of backup.
Error handling
fi

# 2) Disk backup (copy) by AdvancedCopy Manager command
swstbackup $SRC --- Copy the disk.
Error handling

# 3) Notification issued to Oracle of the stopping of backup
if [ "-a" operand specification ]
then
sqlend() invocation --- Notify Oracle of the stopping of backup.
Error handling
fi

# 4) Acquisition of the backup (copy) destination of AdvancedCopy Manager
DSTBLK=`getbd $SRC` --- Fetch a backup volume.
DST=`get_blk_chr $DSTBLK`
BKDATE=`getdate $SRC`
BKTIME=`gettime $SRC`

exit 0

```

B.2.2 Applying Sample Shell Scripts

B.2.2.1 DB Information Collection

Sample Shell Script Update

Update the procedures below of swst_or_iv according to actual operations. The following numbers correspond to those in the scripts:

- 0) Environmental variable setting
- 1) Acquisition of Oracle table space information
- 2) Acquisition of Oracle log information
- 3) Acquisition of Oracle control information

Procedures 1) to 3) change Oracle account information.

These scripts can operate only on business servers of AdvancedCopy Manager.

B.2.2.2 File System Backup

AdvancedCopy Manager Setup

Set up backup volumes so that the mount point targeted for backup is backed up correctly in AdvancedCopy Manager.

The generations of the backup volumes to be managed are arbitrary.

Sample Shell Script Update

Update the procedures below of swst_or_fs_bk to adjust them for actual operations. The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Notification issued to Oracle of the start of backup
- 3) Notification issued to Oracle of the stopping of backup

Procedures 1) and 3) refer to the spdata.bgn file and spdata.end file created by swst_or_iv. These scripts can operate only on business servers of AdvancedCopy Manager.

B.2.2.3 Raw Device Backup

AdvancedCopy Manager Setup

Set up backup volumes so that the raw device targeted for backup is backed up correctly in AdvancedCopy Manager. The generations of the backup volumes to be managed are arbitrary.

Sample shell script Update

Update the procedures below of swst_or_rd_bk to adjust them for actual operations. The following numbers correspond to those in the scripts.

- 0) Environmental variable setting
- 1) Notification issued to Oracle of the start of backup
- 3) Notification issued to Oracle of the stopping of backup

Procedures 1) and 3) refer to spdata.lst, spdata.bgn, spdata.end, splog.lst and spcont.lst, created by swst_or_iv. These scripts can operate only on business servers of AdvancedCopy Manager.

Recording and Managing Backup Volume Name and Processing Time

After executing a shell script, a backup volume name and the processing time are output in a message. This information is needed for restoration, so it must be recorded and managed.

B.2.3 Restore Method

B.2.3.1 File system

Use the restore function of AdvancedCopy Manager for restore processing.

B.2.3.2 Raw Device

Use the restore function of AdvancedCopy Manager for restore processing.

B.2.4 Notes on Using Sample Shell Scripts

Oracle Resource Location

Store Oracle data files and files other than data files on separate disks or in separate slices.

Backup of Oracle Resources

Note the following when performing this function:

- Initialization parameter file
 - Every time a change occurs, back up this file using the cp command of the OS is executed for backup.
- Control files
 - You are recommended to use mirroring using Oracle.
 - If a change is made in the DB environment, use the following command to create a trace file. If a control file is destroyed, execute the SQL statement in the trace file to recover the control file.

```
alter database backup control file to trace;
```

- Data files
 - The recommended location of data files is on a raw device.

- To store a data file on the file system, disable the automatic extended function of the data file (AUTOEXTEND OFF). Customization of the sample shell script is required to prevent unmounting during context processing.
- Create backup copies in AdvancedCopy Manager.
- The range of table spaces targeted for backup must be within the unit of synchronous backup processing (begin backup/end backup) in Oracle and the unit of backup in AdvancedCopy Manager. For example, if backup copies must be created in units of LUNs in AdvancedCopy Manager, place one table space in one LUN.
- Archive all of the latest logs by executing the following command after backing up all table spaces in the system:

```
alter system archive log current;
```

- REDO files
 - You are recommended to mirror the online REDO log files and archive log files using Oracle or the OS.
 - No online REDO log file needs to be backed up.

Note

For online backup operations, the target Oracle database must use an archive log.

Recovery of Oracle Databases

After an Oracle database has stopped, restore the database, and restart it. To recover the database to its latest state, use Oracle's recovery function.

Appendix C Pre-processing and Post-processing of Replication

The replication explains the replication pre-processing and post-processing that are performed in AdvancedCopy Manager.

C.1 Overview

The replication pre-processing and post-processing scripts are started before and after the replication (i.e., the copy) processing. AdvancedCopy Manager performs the processing required for a replication source volume and replication destination volume by executing these scripts.



Note

If replication is performed in group units, the replication pre-processing and post-processing scripts are not started. Therefore, replication pre-processing and post-processing must be performed manually when replication is performed in group units.

C.2 Pre-processing and Post-processing of Replication

The pre-processing and post-processing 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, source data is temporarily frozen, and after the replication is complete, the frozen data is released in post-processing.
- Pre-processing and post-processing for a replication destination volume
This is intended to prevent applications from accessing the copy destination volume during replication. In pre-processing, replication data for the destination is given an access-disabled status. This status is released in post-processing, after the replication is complete.

The specific tasks executed during the pre-processing and post-processing differ according to the data contents of the volume. The next sub section explains the pre-processing and post-processing of the file system.

C.2.1 Pre-processing and Post-processing for File System

The pre-processing and post-processing for a file system is typically the unmounting and remounting of the file system. (For Windows, the processing consists of allocating and cancelling a drive letter.) Pre-processing and post-processing of the replication source volume is performed in order to guarantee the replication source data by disabling access from other processes during execution of synchronous processing and snapshot copy.

If no volume is mounted, the pre-processing and post-processing are not performed.

The implementation status of the pre-processing and post-processing for a file system is shown below. This table shows whether pre-processing and post-processing are performed depending on the command type. It also shows the copy status at the time of the command execution.

Table C.1 Pre-processing and Post-processing for File System

Command	Copy Status	Source/Destination	Pre-processing	Post-processing
swsrpstartsync	Copy not started, or replication establishment	Source	X	X
		Destination	0--*1	X
swsrpmake	Equivalency maintenance	Source	0	0
		Destination	X	0--*2
swsrpcancel	Equivalency maintenance	Source	0	0

Command	Copy Status	Source/Destination	Pre-processing	Post-processing
		Destination	X	0--*2
		Source	X	X
	Replication establishment	Destination	X	X
	Copying	Source	X	X
		Destination	X	X
swsrpmake	Copy not started	Source	0	0
		Destination	0	0

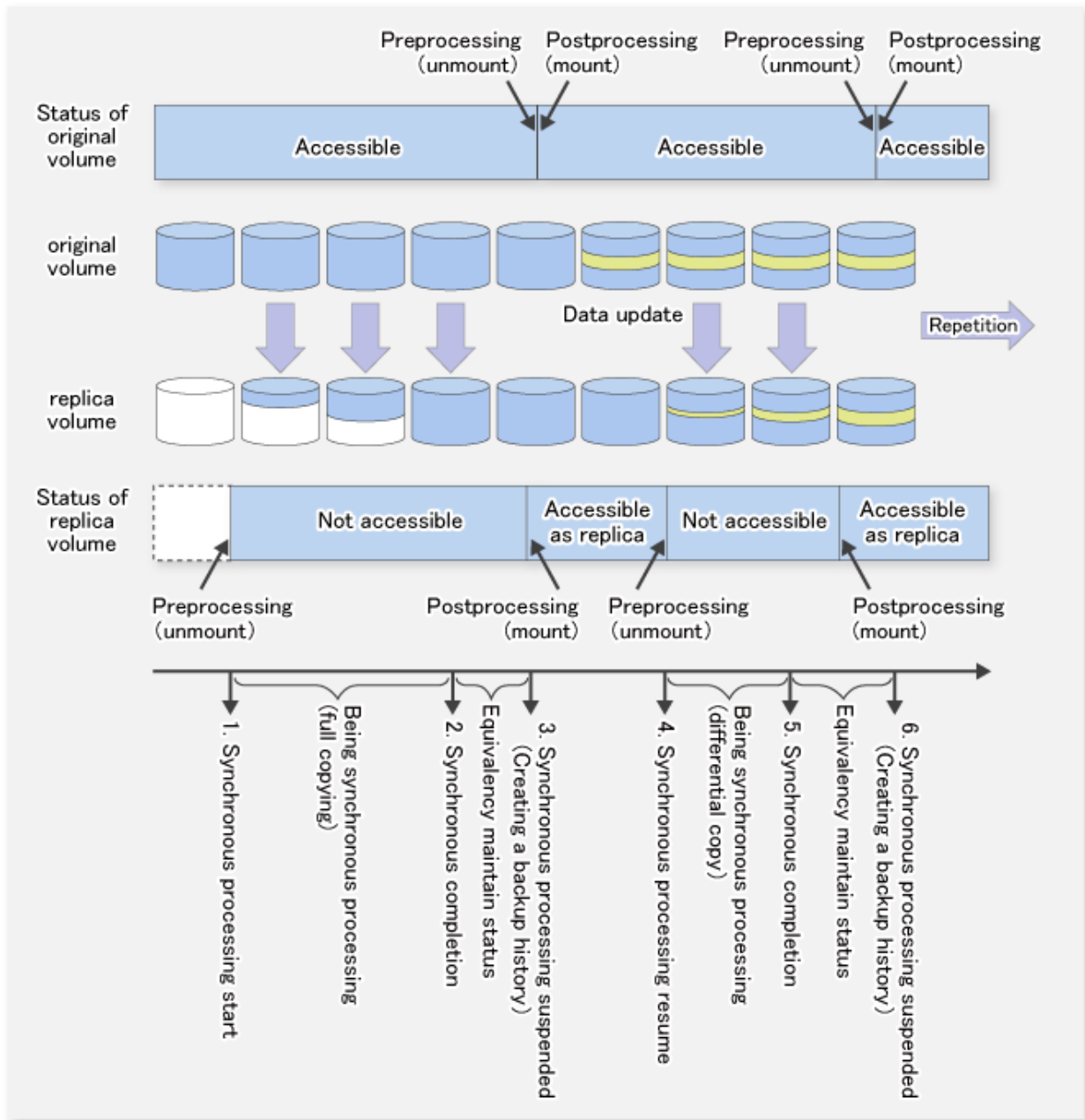
0 : Executed,
X : Not executed

The post-processing for the pre-processing executed in step (*1) is executed in step (*2). In the post-processing in (2), re-mount is performed for the mount point where unmount was performed in the pre-processing in (1).

The pre-processing and post-processing for a file system can be customized. The processing is started in accordance with the table above when a replication management command is executed. For 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



If processing other than the standard pre-processing and post-processing is required in the pre-processing and post-processing, customize the scripts.

When customizing a script, strictly observe the following rules regarding error codes:

Table C.2 Error Code Rules

Error Code	Usage
0-99	Unusable (reserved for AdvancedCopy Manager)
100-255	Usable



Note

- When the replication target is a volume group that includes a logical volume in which the file system has been built, refer to "[When Replication Target Is Volume Group](#)". The pre-processing and post-processing scripts have to be customized to execute unmount/mount processing for all logical volumes in which the file system has been built.
- If the replication target volume cannot be unmounted, refer to "[When You Do Not Want to Unmount Replication Target Volume](#)" and customize the script for pre-processing.
- AdvancedCopy Manager does not support pre-processing and post-processing of databases. Database pre-processing and post-processing must be executed uniquely before and after (respectively) the execution of the AdvancedCopy Manager command.

C.2.2 Pre-processing When Replication Is Executed

The replication source volume script (RepSrc.pre) and the replication destination volume script (RepDst.pre) 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 System

```
/etc/opt/FJVSwsrp/sh
```

For Clustered System

```
/etc/opt/FJVSwsrp/logicalNodeName/sh
```

C.2.2.1 Replication Source Volume Pre-processing Sample Script (RepSrc.pre)

```
1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Pre-processing of Replication(Source) processing
8: #
9: #   Argument: $1 Device name of Source disk
10: #           $2 Mount point of Source disk
11: #
12: #   Error number
13: #           2: Argument error
14: #           10: umount error
15: #           99: Script not customize
16:
17: # Argument check
18: case $# in
19: 2)
20:   ;;
21: *)
22:   exit 2
23:   ;;
24: esac
25:
26: device=$1
27: mount_point=$2
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
32: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
33: vxpvttrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`
34: if [ "$trans" != "" ]
35: then
```

```

36: dev_type="physical"
37: # /dev/dsk/c?t?d? -> c?t?d?
38: dev=`echo $device | /usr/bin/sed -e "s\/\dev\/dsk\/\/" -e "s\/\dev\/disk\/\/_hppv\/"``"
39: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
40: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43: dev_type="vxvm_pv"
44: # /dev/vx/dmp/XXXX -> XXXX
45: dev=`echo $device | /usr/bin/awk -F\/ '{ print $5 }'``"
46: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
47: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50: dev_type="logical"
51: # /dev/vgXX -> vgXX
52: dev=`echo $device | /usr/bin/awk -F\/ '{ print $3 }'``"
53: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
54: else
55: exit 0
56: fi
57:
58: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
59:
60: # When the disk is a physical device #####
61: if [ "$dev_type" = "physical" ]
62: then
63:
64: if [ "$mount_point" != "" ]
65: then
66: # When device cannot be unmounted --- 1
67: # # Specify the name of volume group not to unmount
68: # if [ "$device" = "/dev/dsk/cXtXdX" ]
69: # then
70: # sync
71: # sync
72: # echo "none" > $post_file
73: #
74: # When device can be unmounted --- 2
75: # else
76: /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }'
| /usr/bin/awk '{ print $1 }' > $fstype_file
77: /usr/sbin/umount $mount_point 2>/dev/null
78:
79: if [ $? != 0 ]
80: then
81: retry_count=3
82: sleep_time=1
83: result_flag=1
84:
85: while [ $retry_count -gt 0 ]
86: do
87: /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
88: if [ $? != 0 ]
89: then
90: retry_count=`expr $retry_count - 1`
91: /usr/bin/sleep $sleep_time
92: else
93: /usr/bin/rm -f $err_log_path/$dev.umount
94: result_flag=0
95: break
96: fi
97: done

```

```

98:
99:         if [ $result_flag != 0 ]
100:         then
101:             /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
102:             /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
103:             exit 10
104:         fi
105:     fi
106:     echo "mount,$mount_point" > $post_file
107: #     fi
108: # When device was not mounted --- 3
109:     else
110:         echo "none" > $post_file
111:     fi
112:
113: # When the disk is a volume group #####
114: elif [ "$dev_type" = "logical" ]
115: then
116:
117: # Devices is volume group and script not customize
118:     exit 99
119:
120: # When devices of volume group cannot be unmounted --- 4
121: #
122: # # Specify the name of volume group not to unmount
123: # if [ "$device" = "/dev/vgXX" ]
124: # then
125: #     sync
126: #     sync
127: #     echo "none" > $post_file
128: # fi
129: #
130: # When devices of volume group can be unmounted --- 5
131: #
132: # # Specify the name of volume group to unmount
133: # if [ "$device" = "/dev/vgXX" ]
134: # then
135: #     # Unmount all logical volumes of the volume group
136: #     mount_point="/XX"
137: #     /usr/sbin/umount $mount_point 2>/dev/null
138: #     if [ $? != 0 ]
139: #     then
140: #         retry_count=3
141: #         sleep_time=1
142: #         result_flag=1
143: #
144: #         while [ $retry_count -gt 0 ]
145: #         do
146: #             /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
147: #             if [ $? != 0 ]
148: #             then
149: #                 retry_count=`expr $retry_count - 1`
150: #                 sleep $sleep_time
151: #             else
152: #                 rm -f $err_log_path/$dev.umount
153: #                 result_flag=0
154: #                 break
155: #             fi
156: #         done
157: #
158: #     if [ $result_flag != 0 ]
159: #     then
160: #         /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1

```



```

161: #           /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
162: #           exit 10
163: #           fi
164: #           fi
165: #           echo "mount" > $post_file
166: #       fi
167: #
168: # When devices of volume group was not mounted --- 6
169: #
170: # # Specify the name of volume group to do nothing
171: # if [ "$device" = "/dev/vgXX" ]
172: # then
173: #     echo "none" > $post_file
174: # fi
175: #
176: # When Src devices is a VxVM physical device --- 7 #####
177: elif [ "$dev_type" = "vxvm_pv" ]
178: then
179:     # Nothing is done to VxVM PV.
180:     #
181:     echo "none" > $post_file
182:
183: fi
184:
185: exit 0

```

C.2.2.2 Replication Destination Volume Pre-processing Sample Script (RepDst.pre)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Pre-processing of Replication(Destination) processing
8: #
9: #       Argument: $1 Device name of Destination disk
10: #           $2 Mount point of Destination disk
11: #
12: #       Error number
13: #           2: Argument error
14: #           10: umount error
15: #           99: Script not customize
16:
17: # Argument check
18: case $# in
19: 2)
20:     ;;
21: *)
22:     exit 2
23:     ;;
24: esac
25:
26: device=$1
27: mount_point=$2
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
32: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
33: vxpvtrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`
34: if [ "$trans" != "" ]
35: then

```

```

36: dev_type="physical"
37: # /dev/dsk/c?t?d? -> c?t?d?
38: dev=`echo $device | /usr/bin/sed -e "s\/\dev\/dsk\/\/" -e "s\/\dev\/disk\/\/_hppv\/"``"
39: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
40: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43: dev_type="vxvm_pv"
44: # /dev/vx/dmp/XXXX -> XXXX
45: dev=`echo $device | /usr/bin/awk -F\/ '{ print $5 }'``"
46: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
47: fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50: dev_type="logical"
51: # /dev/vgXX -> vgXX
52: dev=`echo $device | /usr/bin/awk -F\/ '{ print $3 }'``"
53: post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
54: conf_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".conf"
55: else
56: exit 0
57: fi
58:
59:
60: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
61:
62:
63: # When the disk is a physical device #####
64: if [ "$dev_type" = "physical" ]
65: then
66:
67: if [ "$mount_point" != "" ]
68: then
69: # When device can be unmounted --- 2
70: /usr/bin/df -ln $mount_point 2>/dev/null | /usr/bin/awk -F: '{ print $2 }' | /usr/bin/awk
' { print $1 }' > $fstype_file
71: /usr/sbin/umount $mount_point 2>/dev/null
72:
73: if [ $? != 0 ]
74: then
75: retry_count=3
76: sleep_time=1
77: result_flag=1
78:
79: while [ $retry_count -gt 0 ]
80: do
81: /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
82: if [ $? != 0 ]
83: then
84: retry_count=`expr $retry_count - 1`
85: /usr/bin/sleep $sleep_time
86: else
87: /usr/bin/rm -f $err_log_path/$dev.umount
88: result_flag=0
89: break
90: fi
91: done
92:
93: if [ $result_flag != 0 ]
94: then
95: /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
96: /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
97: exit 10

```

```

98:         fi
99:     fi
100:     echo "mount,$mount_point" > $post_file
101: # fi
102: # When device was not mounted --- 3
103:     else
104:         echo "none" > $post_file
105:     fi
106:
107: # When the disk is a volume group #####
108: elif [ "$dev_type" = "logical" ]
109: then
110:
111: # Devices is volume group and script not customize
112:     exit 99
113:
114: # When devices of volume group can be unmounted --- 5
115: #
116: # # Specify the name of volume group to unmount
117: # if [ "$device" = "/dev/vgXX" ]
118: # then
119: #     # Unmount all logical volumes of the volume group
120: #     mount_point="/XX"
121: #     /usr/sbin/umount $mount_point 2> /dev/null
122: #     if [ $? != 0 ]
123: #     then
124: #         retry_count=3
125: #         sleep_time=1
126: #         result_flag=1
127: #
128: #         while [ $retry_count -gt 0 ]
129: #         do
130: #             /usr/sbin/umount $mount_point > $err_log_path/$dev.umount 2>&1
131: #             if [ $? != 0 ]
132: #             then
133: #                 retry_count=`expr $retry_count - 1`
134: #                 sleep $sleep_time
135: #             else
136: #                 rm -f $err_log_path/$dev.umount
137: #                 result_flag=0
138: #                 break
139: #             fi
140: #         done
141: #
142: #         if [ $result_flag != 0 ]
143: #         then
144: #             /usr/sbin/fuser -cu $mount_point> $err_log_path/$dev.fuser 2>&1
145: #             /usr/bin/ps -ef > $err_log_path/$dev.ps 2>&1
146: #             exit 10
147: #         fi
148: #     fi
149: #     echo "mount" > $post_file
150: # fi
151: #
152: # When devices of volume group was not mounted --- 6
153: #
154: # # Specify the name of volume group to do nothing
155: # if [ "$device" = "/dev/vgXX" ]
156: # then
157: #     echo "none" > $post_file
158: # fi
159: #
160: # When Src/Dst devices is a VxVM physical volume --- 7 #####

```

```

161: elif [ "$dev_type" = "vxvm_pv" ]
162: then
163:     # Nothing is done to VxVM PV.
164:     #
165:     echo "none" > $post_file
166:
167: fi
168:
169: exit 0

```

C.2.3 Post-processing When Replication Is Executed

The replication source volume script (RepSrc.post) and the replication destination volume script (RepDst.post) 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 System

```
/etc/opt/FJSVswsrp/sh
```

For Clustered System

```
/etc/opt/FJSVswsrp/logicalNodeName/sh
```

C.2.3.1 Replication Source Volume Post-processing Sample Script (RepSrc.post)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Post-processing of Replication(Source) processing
8: #
9: #           Argument: $1 Device name of Source disk
10: #
11: #           Error number
12: #           2: Argument error
13: #           11: mount error
14:
15: # Argument check
16: case $# in
17: 1)
18:   ;;
19: *)
20:   exit 2
21:   ;;
22: esac
23:
24: device=$1
25:
26: # Device type check
27: # Determination postprocessing file name
28: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
29: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
30: vxpvtrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`
31: if [ "$trans" != "" ]
32: then
33:   dev_type="physical"
34:   # /dev/dsk/c?t?d? -> c?t?d?
35:   dev=`echo $device | /usr/bin/sed -e "s/\dev\dsk\///" -e "s/\dev\disk\//_hppv_/"`
36:   post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
37:   fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
38: elif [ "$vxpvtrans" != "" ]

```

```

39: then
40:     dev_type="vxvm_pv"
41:     # /dev/vx/dmp/XXXX -> XXXX
42:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`
43:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
44:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
45: elif [ "$lvmtrans" != "" ]
46: then
47:     dev_type="logical"
48:     # /dev/vgXX -> vgXX
49:     dev=`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`
50:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".spre"
51:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".sfstype"
52: else
53:     exit 0
54: fi
55:
56: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
57:
58: # Confirmation of postprocessing
59: if [ ! -r $post_file ]
60: then
61:     exit 0
62: fi
63: post=`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`
64: mount_point=`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`
65:
66: # Confirmation of FStype
67: if [ ! -r $fstype_file ]
68: then
69:     fs=""
70: else
71:     fs=`/usr/bin/cat $fstype_file`
72: fi
73:
74: # No processing
75: # When Src device cannot be unmounted          --- 1
76: # When Src device was not mounted              --- 3
77: # When Src devices of volume group cannot be unmounted --- 4
78: # When Src devices of volume group was not mounted --- 6
79: # When Src devices is a VxVM physical device   --- 7
80: if [ "$post" = "none" ]
81: then
82:     /usr/bin/rm -rf $post_file 2> /dev/null
83:     /usr/bin/rm -rf $fstype_file 2> /dev/null
84:     exit 0
85: fi
86:
87: # mount processing
88: if [ "$post" = "mount" ]
89: then
90: # When Src device can be unmounted --- 2
91:     if [ "$dev_type" = "physical" ]
92:     then
93:         /usr/bin/df -l $device > /dev/null 2>&l
94:         if [ $? != 0 ]
95:         then
96:             if [ ! -r $fstype_file ]
97:             then
98:                 /usr/sbin/mount $device $mount_point 2> /dev/null
99:             else
100:                 if [ "$fs" = "" ]
101:                 then

```

```

102:         /usr/sbin/mount $device $mount_point 2> /dev/null
103:     else
104:         /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
105:     fi
106: fi
107: if [ $? != 0 ]
108: then
109:     retry_count=3
110:     sleep_time=1
111:     result_flag=1
112:
113:     while [ $retry_count -gt 0 ]
114:     do
115:         if [ ! -r $fstype_file ]
116:         then
117:             /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
118:         else
119:             if [ "$fs" = "" ]
120:             then
121:                 /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
122:             else
123:                 /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount 2>&1
124:             fi
125:         fi
126:         if [ $? != 0 ]
127:         then
128:             retry_count=`expr $retry_count - 1`
129:             /usr/bin/sleep $sleep_time
130:         else
131:             /usr/bin/rm -f $err_log_path/$dev.mount
132:             result_flag=0
133:             break
134:         fi
135:     done
136:
137:     if [ $result_flag != 0 ]
138:     then
139:         exit 11
140:     fi
141: fi
142: fi
143: # When devices of volume group can be unmounted --- 5
144: # elif [ "$dev_type" = "logical" ]
145: # then
146: #     #Specify the name of volume group to mount
147: #     if [ "$device" = "/dev/vgXX" ]
148: #     then
149: #         # Mount all logical volumes of the volume group
150: #         fs="hfs"
151: #         lvname="/dev/vgXX/XXXXX"
152: #         lv_mount_point="/XX"
153: #
154: #         /usr/bin/df -l $lvname > /dev/null 2>&1
155: #         if [ $? != 0 ]
156: #         then
157: #             /usr/sbin/mount -F $fs $lvname $lv_mount_point 2>/dev/null
158: #             if [ $? != 0 ]
159: #             then
160: #                 retry_count=3
161: #                 sleep_time=1
162: #                 result_flag=1
163: #
164: #                 while [ $retry_count -gt 0 ]

```

```

165: #          do
166: #          /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount 2>&1
167: #          if [ $? != 0 ]
168: #          then
169: #              retry_count=`expr $retry_count - 1`
170: #              /usr/bin/sleep $sleep_time
171: #          else
172: #              rm -f $err_log_path/$dev.mount
173: #              result_flag=0
174: #              break
175: #          fi
176: #          done
177: #
178: #          if [ $result_flag != 0 ]
179: #          then
180: #              exit 11
181: #          fi
182: #      fi
183: #  fi
184: #  fi
185: #  fi
186: #  /usr/bin/rm -rf $post_file 2> /dev/null
187: #  /usr/bin/rm -rf $fstype_file 2> /dev/null
188: #  exit 0
189: #  fi
190: #
191: #  exit 0

```

C.2.3.2 Replication Destination Volume Post-processing Sample Script (RepDst.post)

```

1: #!/bin/sh
2:
3: # AdvancedCopy Manager
4: # All Rights Reserved, Copyright FUJITSU LIMITED, 2002-2008
5:
6: #
7: #   Post-processing of Replication(Destination) processing
8: #
9: #           Argument: $1 Device name of Destination disk
10: #
11: #           Error number
12: #               2: Argument error
13: #               11: mount error
14: #               30: VG configuration file not found error
15: #               31: vgcfgrestore error
16: #               12: fsck error
17:
18: # Argument check
19: case $# in
20: 1)
21:     ;;
22: *)
23:     exit 2
24:     ;;
25: esac
26:
27: device=$1
28:
29: # Device type check
30: # Determination postprocessing file name
31: trans=`echo $device | /usr/bin/grep -e "/dev/dsk/" -e "/dev/disk/"`
32: lvmtrans=`echo $device | /usr/bin/grep "/dev/"`
33: vxpvtrans=`echo $device | /usr/bin/grep "/dev/vx/dmp/"`

```

```

34: if [ "$trans" != "" ]
35: then
36:     dev_type="physical"
37:     # /dev/dsk/c?t?d? -> c?t?d?
38:     dev="`echo $device | /usr/bin/sed -e "s/\dev\dsk\//" -e "s/\dev\disk\/_hppv_\`"
39:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
40:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
41: elif [ "$vxpvtrans" != "" ]
42: then
43:     dev_type="vxvm_pv"
44:     # /dev/vx/dmp/XXXX -> XXXX
45:     dev="`echo $device | /usr/bin/awk -F\ / '{ print $5 }'`"
46:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
47:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
48: elif [ "$lvmtrans" != "" ]
49: then
50:     dev_type="logical"
51:     # /dev/vgXX -> vgXX
52:     dev="`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`"
53:     post_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dpre"
54:     fstype_file="/etc/opt/FJSVswsrp/"$SWSTGNODE"/data/DEFAULT/"$dev".dfstype"
55: else
56:     exit 0
57: fi
58:
59: err_log_path="/var/opt/FJSVswsrp/"$SWSTGNODE"/log"
60:
61: # Confirmation of postprocessing
62: if [ ! -r $post_file ]
63: then
64:     exit 0
65: fi
66: post="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f1`"
67: mount_point="`/usr/bin/cat $post_file | /usr/bin/cut -d',' -f2`"
68:
69: # Confirmation of FStype
70: if [ ! -r $fstype_file ]
71: then
72:     fs=""
73: else
74:     fs="`/usr/bin/cat $fstype_file`"
75: fi
76:
77: # Restore VG Configuration
78: if [ "$dev_type" = "logical" ]
79: then
80:     vg_name="`echo $device | /usr/bin/awk -F\ / '{ print $3 }'`"
81:     cfg_file="/etc/lvmconf/"$vg_name".conf"
82:     if [ ! -r $cfg_file ]
83:     then
84:         exit 30
85:     fi
86:     pv_rname="`/usr/sbin/vgcfgrestore -n $vg_name -l 2> /dev/null | /usr/bin/awk '{print $1}' | /
usr/bin/grep -e \"/\dev/rdisk\" -e \"/\dev/rdisk\"`"
87:     if [ "$pv_rname" = "" ]
88:     then
89:         echo "/usr/sbin/vgcfgrestore -n $vg_name -l 2> /dev/null | /usr/bin/awk '{print $1}' | /usr/
bin/grep -e \"/\dev/rdisk\" -e \"/\dev/rdisk\"" > $err_log_path/$dev.vgcfgrestore 2>&1
90:         exit 31
91:     fi
92:     /usr/sbin/vgchange -a n $vg_name > /dev/null 2>&1
93:     reststatus=0
94:     for pv_rname1 in $pv_rname

```



```

95: do
96:     /usr/sbin/vgcfgrestore -n $vg_name $pv_rname1 > /dev/null 2>&1
97:     if [ $? = 0 ]
98:     then
99:         /usr/sbin/vgcfgrestore -n $vg_name $pv_rname1 > $err_log_path/$dev.vgcfgrestore 2>&1
100:        if [ $? = 0 ]
101:        then
102:            reststatus=1
103:            break
104:        fi
105:    fi
106: done
107: if [ "$SWSTGNODE" != "" ]
108: then
109:     /usr/sbin/vgchange -c y $vg_name > /dev/null 2>&1
110:     /usr/sbin/vgchange -a e $vg_name > /dev/null 2>&1
111: else
112:     /usr/sbin/vgchange -a y $vg_name > /dev/null 2>&1
113: fi
114: if [ $reststatus = 0 ]
115: then
116:     exit 31
117: fi
118: fi
119:
120: # No processing
121: if [ "$post" = "none" ]
122: then
123: # When Src device cannot be unmounted --- 1
124: # if [ "$device" = "/dev/dsk/cXtXdX" ]
125: # then
126: #     rdevice=`echo $device | sed "s/\dsk\///\rdsk\//"`
127: #     src_fs=hfs
128: #     fsck -F $src_fs -y $rdevice > /dev/null 2>&1
129: #     if [ $? != 0 ]
130: #     then
131: #         exit 12
132: #     fi
133: # fi
134: #
135: # When Src devices of volume group cannot be unmounted --- 4
136: # if [ "$device" = "/dev/vgXX" ]
137: # then
138: #     rdevice="/dev/vgXX/XXXXXX"
139: #     src_fs=hfs
140: #     fsck -F $src_fs -y $rdevice > /dev/null 2>&1
141: #     if [ $? != 0 ]
142: #     then
143: #         exit 12
144: #     fi
145: # fi
146: # When Src/Dst device was not mounted --- 3
147: # When Src/Dst devices of volume group was not mounted --- 6
148: # When Src/Dst devices is a VxVM physical volume --- 7
149: /usr/bin/rm -rf $post_file 2> /dev/null
150: /usr/bin/rm -rf $fstype_file 2> /dev/null
151: exit 0
152: fi
153:
154: # mount processing
155: if [ "$post" = "mount" ]
156: then
157:     if [ "$dev_type" = "physical" ]

```

```

158:     then
159: # When Dst device can be unmounted --- 2
160:     /usr/bin/df -l $device > /dev/null 2>&1
161:     if [ $? != 0 ]
162:     then
163:         if [ ! -r $fstype_file ]
164:         then
165:             /usr/sbin/mount $device $mount_point 2> /dev/null
166:         else
167:             if [ "$fs" = "" ]
168:             then
169:                 /usr/sbin/mount $device $mount_point 2> /dev/null
170:             else
171:                 /usr/sbin/mount -F $fs $device $mount_point 2> /dev/null
172:             fi
173:         fi
174:     if [ $? != 0 ]
175:     then
176:         retry_count=3
177:         sleep_time=1
178:         result_flag=1
179:
180:         while [ $retry_count -gt 0 ]
181:         do
182:             if [ ! -r $fstype_file ]
183:             then
184:                 /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
185:             else
186:                 if [ "$fs" = "" ]
187:                 then
188:                     /usr/sbin/mount $device $mount_point > $err_log_path/$dev.mount 2>&1
189:                 else
190:                     /usr/sbin/mount -F $fs $device $mount_point > $err_log_path/$dev.mount 2>&1
191:                 fi
192:             fi
193:             if [ $? != 0 ]
194:             then
195:                 retry_count=`expr $retry_count - 1`
196:                 /usr/bin/sleep $sleep_time
197:             else
198:                 /usr/bin/rm -f $err_log_path/$dev.mount
199:                 result_flag=0
200:                 break
201:             fi
202:         done
203:
204:         if [ $result_flag != 0 ]
205:         then
206:             exit 11
207:         fi
208:     fi
209: fi
210: # elif [ "$dev_type" = "logical" ]
211: # then
212: # When Dst devices of volume group can be unmounted --- 5
213: #     # Specify the name of volume group to mount
214: #     if [ "$device" = "/dev/vgXX" ]
215: #     then
216: #         # Mount all logical volumes of the volume group
217: #         fs="hfs"
218: #         lvname="/dev/vgXX/XXXXX"
219: #         lv_mount_point="/XX"
220: #

```

```

221: #      /usr/bin/df -l $lvname > /dev/null 2>&1
222: #      if [ $? != 0 ]
223: #      then
224: #          /usr/sbin/mount -F $fs $lvname $lv_mount_point 2>/dev/null
225: #          if [ $? != 0 ]
226: #          then
227: #              retry_count=3
228: #              sleep_time=1
229: #              result_flag=1
230: #
231: #              while [ $retry_count -gt 0 ]
232: #              do
233: #                  /usr/sbin/mount -F $fs $lvname $lv_mount_point > $err_log_path/$dev.mount 2>&1
234: #                  if [ $? != 0 ]
235: #                  then
236: #                      retry_count=`expr $retry_count - 1`
237: #                      /usr/bin/sleep $sleep_time
238: #                  else
239: #                      rm -f $err_log_path/$dev.mount
240: #                      result_flag=0
241: #                      break
242: #                  fi
243: #              done
244: #
245: #              if [ $result_flag != 0 ]
246: #              then
247: #                  exit 11
248: #              fi
249: #          fi
250: #      fi
251: #  fi
252: fi
253: /usr/bin/rm -rf $post_file 2> /dev/null
254: /usr/bin/rm -rf $fstype_file 2> /dev/null
255: exit 0
256: fi
257:
258: exit 0

```

C.2.4 Customizing Shell Script

The method to customize the shell script for replication pre/post-processing is explained below.

When You Do Not Want to Unmount Replication Target Volume

- If you do not want to unmount a mounted volume, remove the comment characters ("#") from lines 68-72, 75 and 107 (in the case of a physical volume) or lines 123-128 (in the case of a volume group) in the pre-processing script (RepSrc.pre), and point to the target device in line 70 or 125. In addition, do not perform an update operation on a replication source volume file system after performing the sync command on line 68 or 125 until post-processing for original volume. If a file system update is performed in the meantime, the replica is extracted with an imperfect file system. In this case the fsck command which is carried out by the post-processing script (RepDst.post) may serve as an error.
- The replication source volume must be unmounted.

When Replication Target Is Volume Group

When replicating a file system which is part of a logical volume in a volume group, the processing scripts need to be modified as follows:

- Remove the comment ("#") from lines 133-166 in the source volume pre-processing script (RepSrc.pre), and lines 144-184 in the source volume post-processing script (RepSrc.post). Correct the description in a comment so that the unmount/mount processing is carried out for all logical volumes in which a file system is constructed. Change the sections indicated with an upper case "X" to

match the actual environment. If more than one logical volume is being processed, repeat lines 136-164 of the pre-processing script and lines 151-183 of the post-processing script once for each logical volume.

- Remove the comment ("#") from lines 117-150 in the destination volume pre-processing script (RepDst.pre), and lines 210, 211 and 214-251 in the destination volume post-processing script (RepDst.post). Correct the description in a comment so that the unmount/mount processing is carried out for all logical volumes in which a file system is constructed. Change the sections indicated with an upper case "X" to match the actual environment. If more than one logical volume is being processed, repeat lines 120-149 of the pre-processing script and lines 218-250 of the post-processing script once for each logical volume.
- When not unmounting copied material volume, it is necessary to carry out fsck to all the logical volumes by which the file system in copy place volume was built with the post-processing script of copy place volume.

Insert a comment ("#") into line 118 of the source volume pre-processing script and line 112 of the destination pre-processing script.

Note

- Note that unmount/mount processing to a volume group is not carried out if the scripts have not been customized.
- When a destination volume is a volume group, in order to enable use of the volume for LVM, volume group configuration information is restored using the "vgcfgrestore" command in the restore post-processing. Volume configuration information is restored from the standard backup file "/etc/lvmconf/*volumeGroupName.conf*". If volume group configuration information is backed up by another file the script needs to be customized.
- Modify the parameters and options of the OS commands (such as the mount command and the fsck command), appropriately for their use.
- For shared-mode volume groups:

When reconfiguring shared-mode volume groups, comment out lines 78-118, 121, 122 and 152 in the post-processing script (OpcBackup.post) to prevent the volume group from being reconfigured by the post-processing script.

Reconfigure the volume group by manually performing the following steps after the Replication has been executed.

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

```
# /usr/sbin/vgchange -a n volumeGroupName
#
```

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

```
# /usr/sbin/vgcfgrestore -n volumeGroupName pvPath
#
```

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

```
# /usr/sbin/vgchange -S y -c y volumeGroupName
#
```

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

```
# /usr/sbin/vgchange -a s volumeGroupName
#
```

File System Name

Change the file system names on line 150 of the replication source volume post-processing shell script (RepSrc.post) and lines 127, 139, and 217 of the replication destination volume post-processing shell script (RepDst.post) as appropriate for the operation.

Cluster Operation Using VERITAS Cluster Server

Customization of the pre-processing and post-processing scripts is required when performing cluster operations using VERITAS Cluster Server, and when the mount point of the original/source volume is registered in the cluster transaction.

Change unmount/mount processing in the pre-processing and post-processing scripts into offline/online processing of the mount point resource.

The mount point resource relating to the Volume is immediately offline/online whilst there is a time delay before access is actually prevented when mount/unmount is used.

Note that once the offline/online command is issued there is a delay before the mount/unmount command can be executed. The "sleep" and "df" commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]

Changing Unmount Processing of Source Volume Pre-processing Script (RepSrc.pre)

[lines 77, 87, 137 and 146]

(before change)	<code>/usr/sbin/umount \$mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName</code>

[Example]

Adding Unmount Wait Processing to Source Volume Pre-processing Script (RepSrc.pre)

[lines 106 and 165]

(addition)	<code>while /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

[Example]

Changing Unmount Processing of Destination Volume Pre-processing Script (RepDst.pre)

[lines 71, 81, 121 and 130]

(before change)	<code>/usr/sbin/umount \$mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName</code>

[Example]

Adding Unmount Wait Processing to Destination Volume Pre-processing Script (RepDst.pre)

[lines 100 and 149]

(addition)	<code>while /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

[Example]

Changing Mount Processing of Source Volume Post-processing Script (RepSrc.post)

[lines 98, 102, 104, 117, 121, 123, 157 and 166]

(before change)	<code>/usr/sbin/mount \$device \$mount_point /usr/sbin/mount -F \$fs \$device \$mount_point /usr/sbin/mount -F \$fs \$lvname \$lv_mount_point</code>
(after change)	<code>/opt/VRTSvcs/bin/hares -online resourceName -sys systemName</code>

[Example]

Adding Mount Wait Processing to Source Volume Post-processing Script (RepSrc.post)

[lines 143 and 185]

(addition)	<code>while ! /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</code>
------------	---

[Example]

Changing Mount Processing of Destination Volume Post-processing Script (RepDst.post)

[lines 165, 169, 171, 188, 190, 224 and 233]

(before change)	<pre>/usr/sbin/mount \$device \$mount_point /usr/sbin/mount -F \$fs \$device \$mount_point /usr/sbin/mount -F \$fs \$lvname \$lv_mount_point</pre>
(after change)	<pre>/opt/VRTSvcs/bin/hares -online resourceName -sys systemName</pre>

[Example]

Adding Mount Wait Processing to Destination Volume Post-processing Script (RepDst.post)

[lines 210 and 252]

(addition)	<pre>while ! /usr/bin/df -l "\$device">/dev/null 2>&1; do ;; done</pre>
------------	---

Appendix D Backup Operations Using Power-Saving

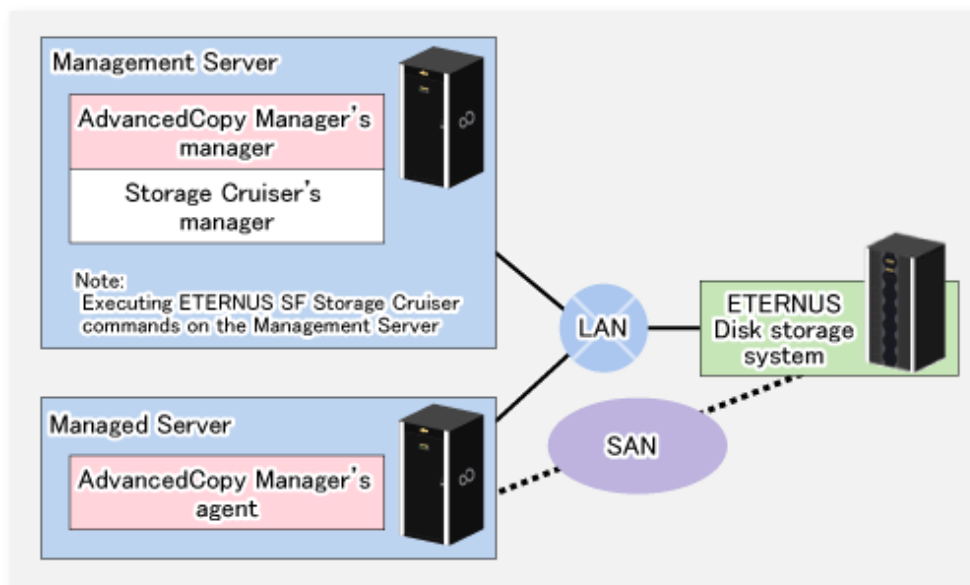
Enabling Eco Mode on the ETERNUS Disk storage system can control ON/OFF of disk drive power (or spindle rotation) using the Storage Cruiser functions. For example, the Storage Cruiser commands can power ON a disk drive as backup destination at backup and power it OFF on completion of backup.

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 D.1 Overview of System Structure



D.1 Environment Settings

This section describes how to configure the environment.

1. [D.1.1 Settings for ETERNUS Disk Storage System](#)
2. [D.1.2 Settings for AdvancedCopy Manager](#)
3. [D.1.3 Settings for Storage Cruiser](#)

D.1.1 Settings for ETERNUS Disk Storage System

Settings in Eco-mode

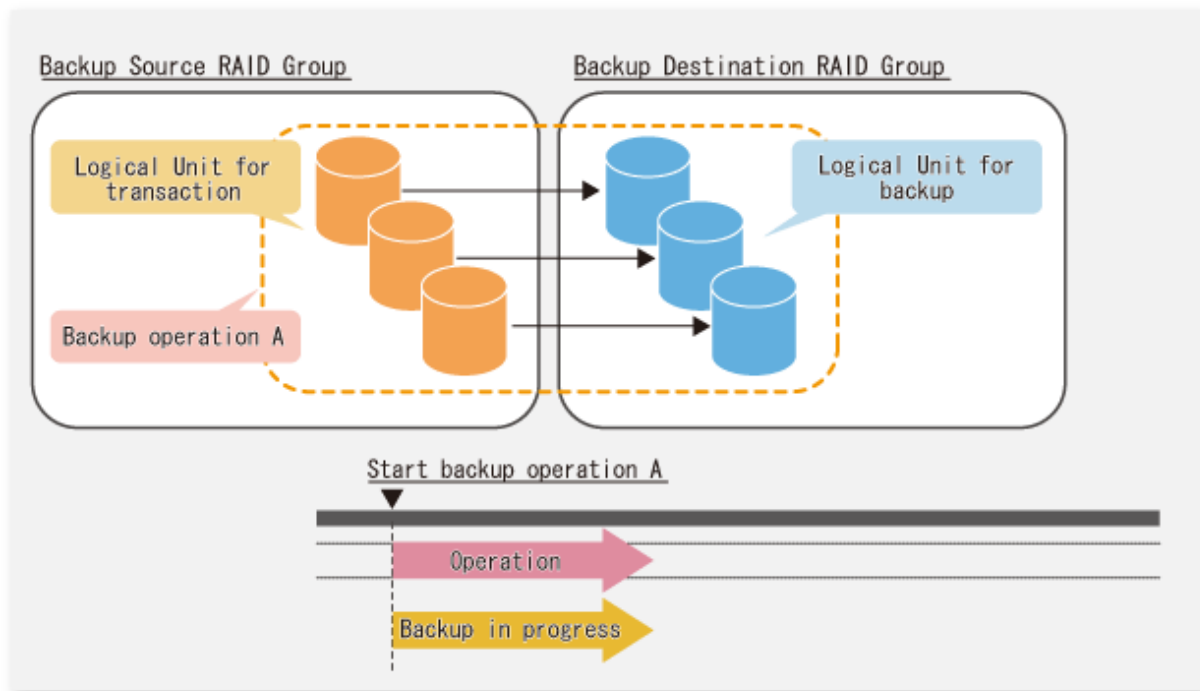
To use the Eco-mode, it is required to set the device Eco-mode, create the Eco-mode schedule, and then set the Eco-mode scheduling for the RAID group. For more details about the settings, refer to the *ETERNUS SF Storage Cruiser Operation Guide*. For details on how to configure an ETERNUS Disk storage system, refer to the ETERNUS Web GUI manual.

Creating RAID Group and Logical Unit

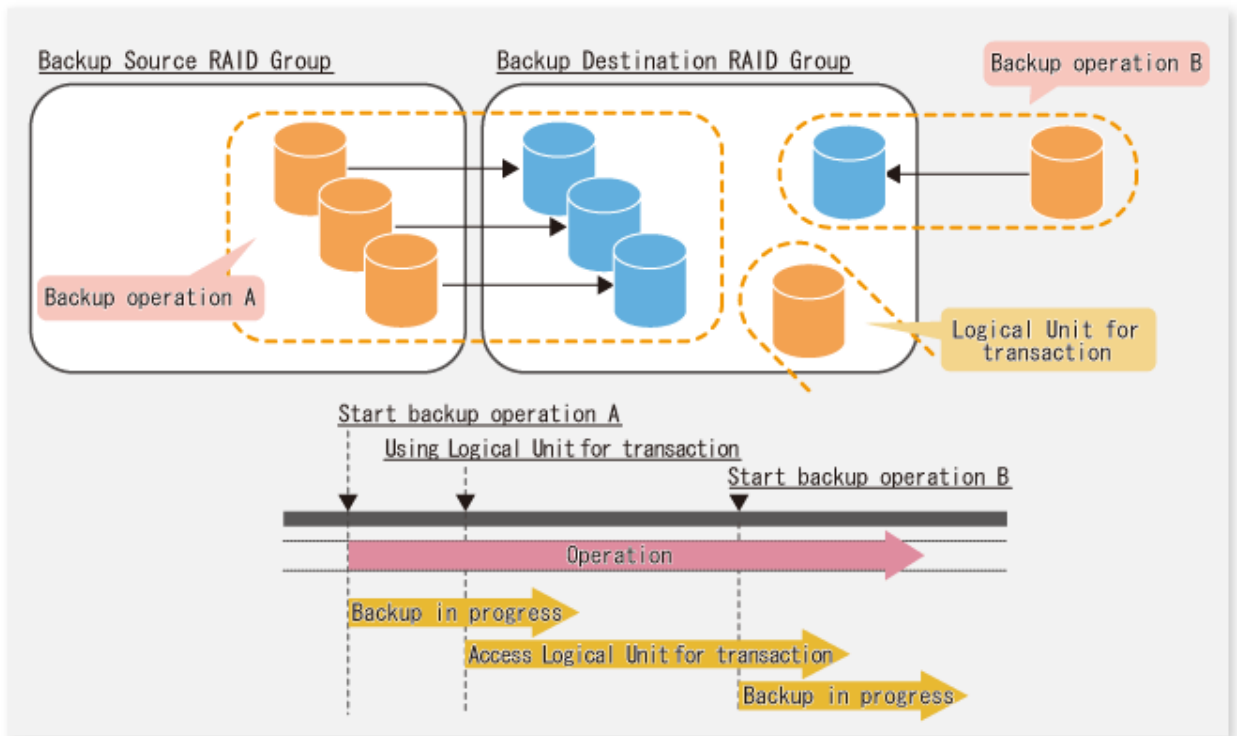
The Eco-mode is applied and the RAID group is created.

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.

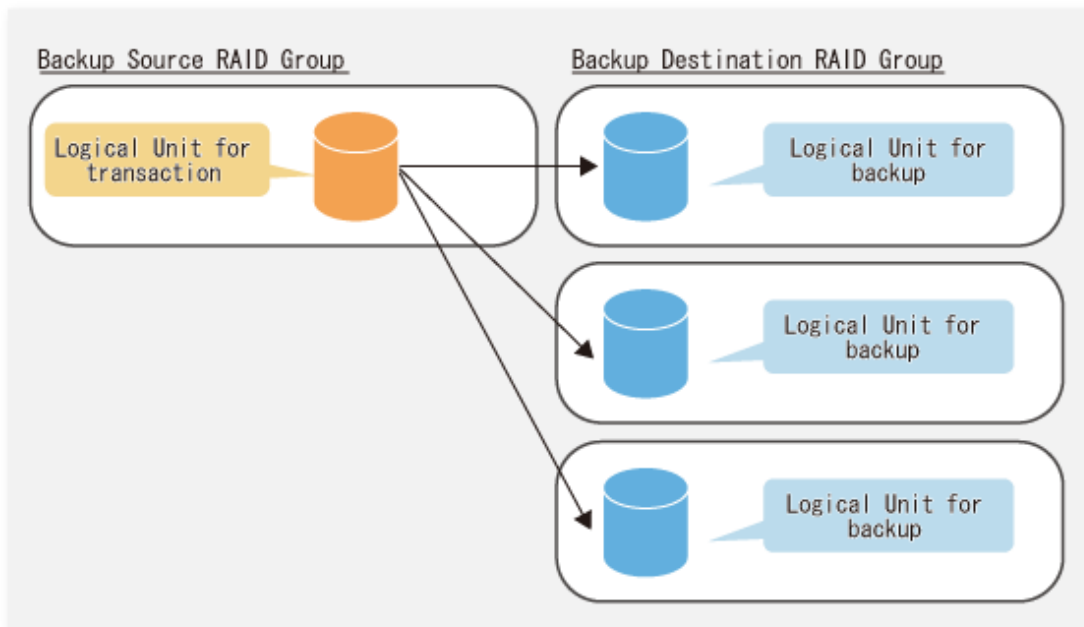


The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, although backup operation A has ended, the Logical Units for backup 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.



Note

A Snap Data Volume and a Snap Data Pool should not be included in a backup destination RAID group. The RAID group disk drive which includes a Snap Data Volume or a Snap Data Pool does not reach a stop status.

D.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.

D.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.

D.2 Operation

This section describes the procedure for establishing power-saving operations. Perform all procedures described in this section on the Management Server.

1. [D.2.1 Start Disk Drive](#)
2. [D.2.2 Operate AdvancedCopy Manager](#)
3. [D.2.3 Stop Disk Drive](#)

D.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 *ETERNUS SF Storage Cruiser Operation Guide* for information on the command.

D.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.

D.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 *ETERNUS SF Storage Cruiser Operation Guide* for information on the command.

Note

Depending on the status of the back up destination RAID group, a disk drive may not stop immediately.

- While OPC physical copying

If the OPC physical copy is in progress on the disk drive, the disk drive stops after a certain period once the physical copy is completed.

- While the disk is being accessed

If the RAID group for backup destination is being accessed, for example when backing up to a tape, the drive stops after a certain period once the access is stopped.

Other than the above, there are cases that the disk does not stop. Refer to "storageadm spindle (Disk Control Command)" in the *ETERNUS SF Storage Cruiser Operation Guide* for information on the command.