FUJITSU

**FUJITSU Storage
ETERNUS SF AdvancedCopy Manager V16.1**

Operation Guide

HP-UX

Preface

Purpose

This manual describes the functionality of FUJITSU Storage ETERNUS SF AdvancedCopy Manager of the following FUJITSU Storage ETERNUS SF products:

- FUJITSU Storage ETERNUS SF Express (hereafter referred to as "Express")

- FUJITSU Storage ETERNUS SF Storage Cruiser (hereafter referred to as "Storage Cruiser")

- FUJITSU Storage ETERNUS SF AdvancedCopy Manager (hereafter referred to as "AdvancedCopy Manager")

Intended Readers

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

Organization

This manual is composed as follows:

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) 2003, Standard Edition Microsoft(R) Windows Server(R) 2003, Standard x64 Edition Microsoft(R) Windows Server(R) 2003, Enterprise Edition Microsoft(R) Windows Server(R) 2003, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition	Windows Server 2003	Windows
Microsoft(R) Windows Server(R) 2008 Standard (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Standard without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Enterprise without Hyper-V(TM) (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter (32-bit)(64-bit) Microsoft(R) Windows Server(R) 2008 Datacenter without Hyper-V(TM) (32-bit)(64-bit)	Windows Server 2008	
Microsoft(R) Windows Server(R) 2008 R2 Foundation Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	Windows Server 2008 R2	
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter	Windows Server 2012	
Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	Windows Server 2012 R2	
Windows Vista(R) Home Basic Windows Vista(R) Home Premium Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate	Windows Vista	
Windows(R) 7 Home Basic Windows(R) 7 Home Premium Windows(R) 7 Professional Windows(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	
Solaris(TM) 9 Operating System	Solaris 9	Solaris or Solaris OS
Oracle Solaris 10	Solaris 10	
Oracle Solaris 11	Solaris 11	

Formal Name	Abbreviation	
Red Hat(R) Enterprise Linux(R) AS (v.4 for x86) Red Hat(R) Enterprise Linux(R) AS (v.4 for EM64T)	RHEL-AS4	Linux
Red Hat(R) Enterprise Linux(R) ES (v.4 for x86) Red Hat(R) Enterprise Linux(R) ES (v.4 for EM64T)	RHEL-ES4	
Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	RHEL5	
Red Hat(R) Enterprise Linux(R) 6 (for x86) Red Hat(R) Enterprise Linux(R) 6 (for Intel64)	RHEL6	
SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T	SUSE Linux Enterprise Server 11	
HP-UX 11i v1 HP-UX 11i v2 HP-UX 11i v3	HP-UX	
AIX(R) V6.1 AIX(R) V7.1	AIX	
VMware(R) vSphere 4 Essentials Kit VMware(R) vSphere 4 Essentials Plus Kit VMware(R) vSphere 4 Standard Edition(TM) VMware(R) vSphere 4 Standard Plus Data Recovery VMware(R) vSphere 4 Advanced Edition(TM) VMware(R) vSphere 4 Enterprise Edition(TM) VMware(R) vSphere 4 Enterprise Plus Edition(TM)	VMware vSphere 4	VMware
VMware(R) vSphere 5 Essentials Kit VMware(R) vSphere 5 Essentials Plus Kit VMware(R) vSphere 5 Standard Edition(TM) VMware(R) vSphere 5 Standard Plus Data Recovery VMware(R) vSphere 5 Enterprise Edition(TM) VMware(R) vSphere 5 Enterprise Plus Edition(TM)	VMware vSphere 5	

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

FUJITSU Storage ETERNUS

Formal Name	Abbreviation		
FUJITSU Storage ETERNUS DX60/DX60 S2 FUJITSU Storage ETERNUS DX80/DX80 S2 FUJITSU Storage ETERNUS DX90/DX90 S2	-		ETERNUS DX series or ETERNUS Disk storage system
FUJITSU Storage ETERNUS DX100 S3 FUJITSU Storage ETERNUS DX200 S3			
FUJITSU Storage ETERNUS DX410 FUJITSU Storage ETERNUS DX440	ETERNUS DX400 series	ETERNUS DX400/ DX400 S2 series	
FUJITSU Storage ETERNUS DX410 S2 FUJITSU Storage ETERNUS DX440 S2	ETERNUS DX400 S2 series		
FUJITSU Storage ETERNUS DX500 S3 FUJITSU Storage ETERNUS DX600 S3	-		
FUJITSU Storage ETERNUS DX8100 FUJITSU Storage ETERNUS DX8400 FUJITSU Storage ETERNUS DX8700	ETERNUS DX8000 series	ETERNUS DX8000/ DX8000 S2 series	

Formal Name	Abbreviation		
FUJITSU Storage ETERNUS DX8100 S2 FUJITSU Storage ETERNUS DX8700 S2	ETERNUS DX8000 S2 series		
FUJITSU Storage ETERNUS DX200F	-		
FUJITSU Storage ETERNUS LT20/LT20 S2 FUJITSU Storage ETERNUS LT40/LT40 S2 FUJITSU Storage ETERNUS LT60/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
Microsoft(R) Internet Explorer(R)	Internet Explorer
Mozilla(R) Firefox(R)	Firefox
Microsoft(R) Cluster Service	MSCS
Microsoft(R) Windows Server(R) Failover Clustering	WSFC
Microsoft(R) Exchange Server	Exchange Server
Microsoft(R) SQL Server(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 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 Express / Storage Cruiser / AdvancedCopy Manager Messages	ETERNUS SF Messages

Formal Name	Abbreviation
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

- In this document, unless there is a special explanatory note, ETERNUS DX200 S3 indicates ETERNUS DX200 S3 and ETERNUS DX200F. In addition, ETERNS Disk storage system includes ETERNUS DX200F All Flash Arrays.
  However, the following functions are not supported in ETERNUS DX200F:

    - Energy saving operation for storage device

    - NAS operation for storage device

    - Automated Storage Tiering operation at multiple tiers (two or more)

    - Storage Cluster function

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Notes

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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 swstsrsemtech 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	

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.

When to Read	Related Manuals (Abbreviated)	Related Products (*1)			Explanation
		EXP	SC	ACM	
	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: - 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
	Web Console Guide	Yes	Yes	Yes	This manual is common for all products.
Anytime	Event Guide	Yes	Yes	-	This manual is common for Express and Storage Cruiser.
	Messages	Yes	Yes	Yes	This manual is common for all products.
	Glossary	Yes	Yes	Yes	This manual is common for all products.

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

How to Read Manuals

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

Purpose	Manual	Main Contents	How to Read
Acquiring a product overview and basic operation knowledge	Quick Reference	- Product overview - Installation decision - Overview of the necessary tasks from installation to first use	Please read if you want to acquire a fundamental knowledge of the product and its operation in order to decide to install it or not.
	AdvancedCopy Manager Overview	- Main functions - Linkable applications	

Purpose	Manual	Main Contents	How to Read
		- Procedure overview for Advanced Copy of ETERNUS Disk storage system	
Confirming the updated contents	Release Notes	- New function overview - Incompatibilities with previous version - Fixed bugs	Please read if you want to know the updated contents from a previous version and if you perform the upgrade.
Deciding if a version upgrade is required	Migration Guide	- Notes and cautions about version upgrade - Version upgrade procedure	Please read if you want to upgrade from a previous version.
Installing and correctly operating the product Setting up operating environment depending on purpose	Installation and Setup Guide	- Operating environment - Installation procedure - Setup procedure - Uninstallation procedure	Please read if you want to install and setup the product.
	Cluster Environment Setup Guide	- Supported cluster software - Installation procedure for a clustered system - Setup procedure for a clustered system - Uninstallation procedure for a clustered system	Please read if you want to install and setup the product on a clustered system.
Administration and operation of the installed system	Express Operation Guide	- Starting and stopping the software - Device monitoring - Data copy inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance	Please read if you want to start or shutdown the system, monitor the operation status, do backup/restore operations, etc.
	Storage Cruiser Operation Guide	- Starting and stopping the software - Device monitoring - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
	Storage Cruiser Operation Guide for Optimization Function	- Operating environment construction - Operating status monitoring - Necessary tasks after an architectural modification of	

Purpose	Manual	Main Contents	How to Read
		the system as well as product maintenance - Command reference	
	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	- Starting and stopping the software - Data backup/restore inside the storage system - Necessary tasks after an architectural modification of the system as well as product maintenance - Command reference	
	Web Console Guide	- Operating environment - Screen layout description	Please read if you want to understand the ETERNUS SF Web Console.
Dealing with messages issued by the software	Messages	- Messages and their explanations - Parameter (variable information) description - System action - Countermeasures	Please read if you want a practical way of investigating and dealing with messages issued by the software.
Dealing with events issued by the software	Event Guide	- Phenomenon of event - Countermeasures	Please read if you need to find a practical way of investigating and dealing with events.
Researching the meaning of specific terms related to the products and other important terms	Glossary	- Product specific terminology explanation - Explanation of important terminology appearing in the manual - Synonyms and related terms - Proper form of abbreviated terms	Please read if you want to learn the meaning of important terms, product specific terms or abbreviations used in the manuals.

Contents

Chapter 1   Overview of AdvancedCopy Manager

This chapter describes the overview of AdvancedCopy Manager.

1.1 Product Configuration of AdvancedCopy Manager

1.1.1   Functions

AdvancedCopy Manager consists of the following three 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, will need to be installed. The Agent installation is included as part of the Manager installation.

Management Server

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

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

- When only one Managed Server is installed
  In this operating environment, only the Management module of AdvancedCopy Manager needs to be installed (Management module of AdvancedCopy Manager includes the Agent functions of AdvancedCopy Manager).

Figure 1.1 When Only One Managed Server Is Installed
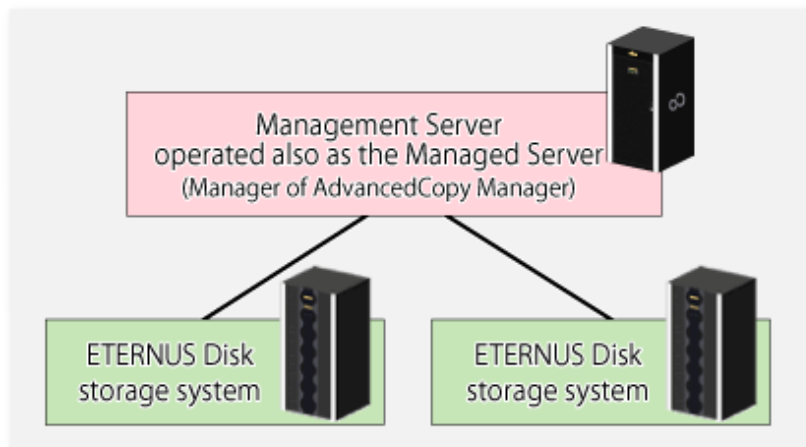
- When two or more Managed Servers are installed
  When two or more Managed Servers are available, set only one of them up as the Management Server or set up a new server with no ETERNUS Disk storage system connected as the Management Server. Each environment is explained below.

  a. When a Managed Server is operated as a Management Server:
      One of the servers functions as a Management Server. The Management Server has a repository where the information on operating and management of all Managed Servers is stored.
      When many Managed Servers exist, they all compete for access to the repository. To ensure overall performance and other applications running on the same server are not adversely affected, the Management Server functionality should be installed on a dedicated server, or on a server on which the load of other applications is relatively low.
      The following diagram illustrates the configuration of the Managed Server when it is also operating as the Management Server.

      Figure 1.2 When Managed Server Is Also Operated as Management Server
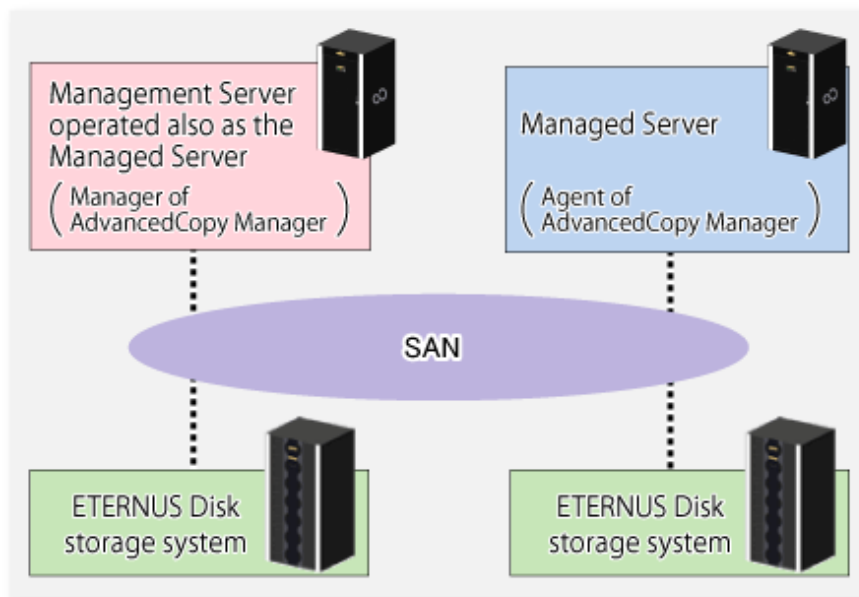
b. Setting up a dedicated Management Server:
   This setup comprises two or more Managed Servers with a dedicated Management Server.

Figure 1.3 When Dedicated Management Server Manages Managed Servers
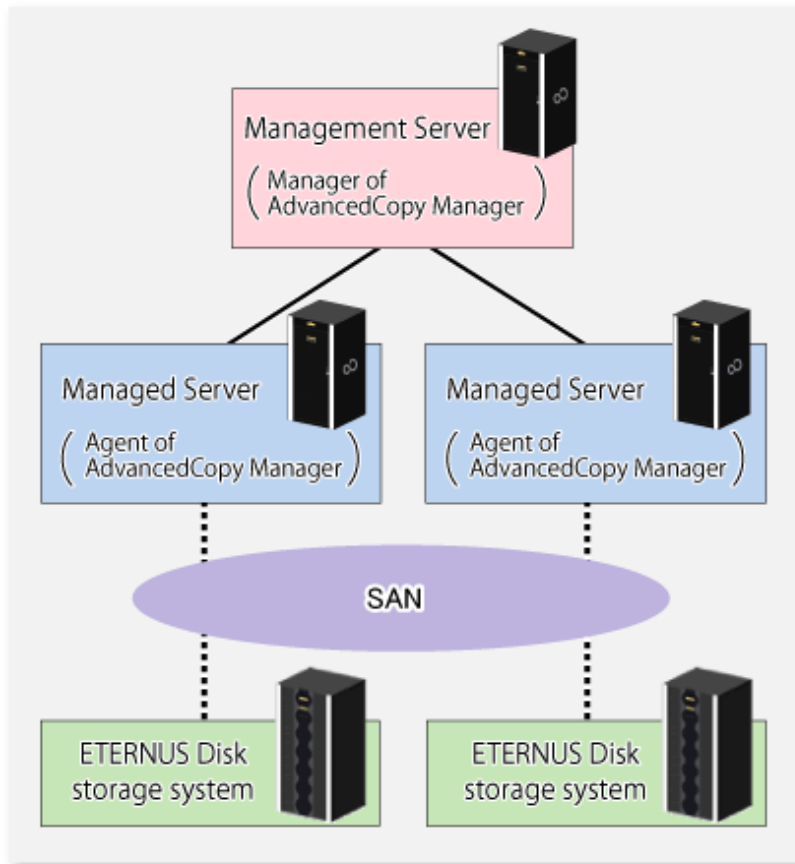
1.1.2 System Configuration

The system configuration of AdvancedCopy Manager is shown below.

Figure 1.4 System Configuration of Management Server and Multiple Managed Servers
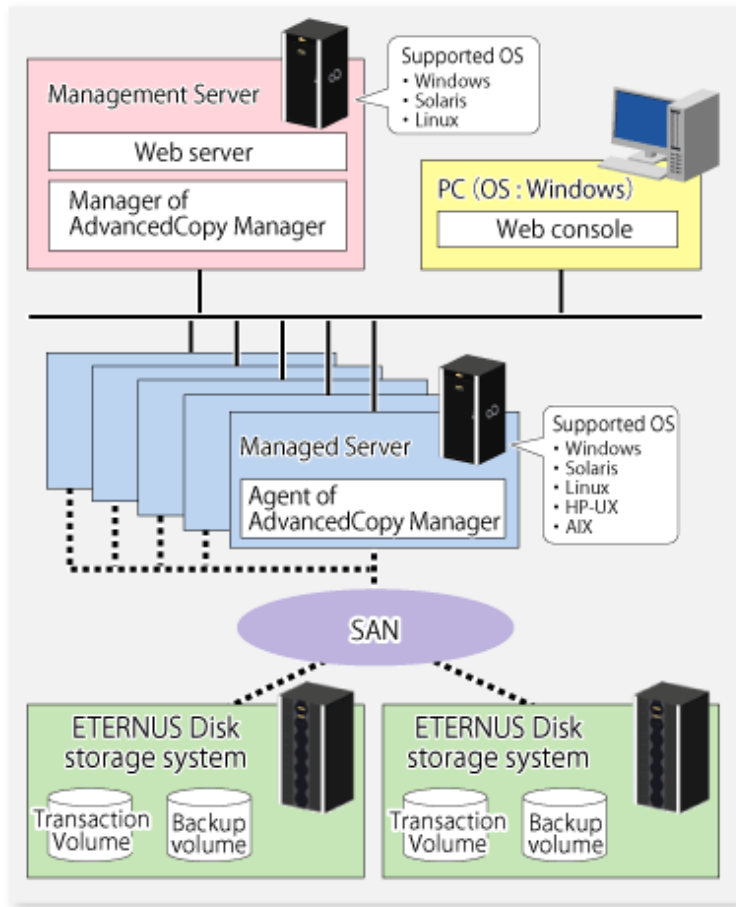
📘 See
. . . .
For the Combination that Manager and Agent can connect, refer to "Combining ETERNUS SF Agent and ETERNUS SF Manager" in the *ETERNUS SF Installation and Setup Guide.*
. . . .

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.

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.

Replicattion 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.

1.2.3 Web Console

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

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

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

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

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

1.2.4 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*.

P Point
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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

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

Note that the following device is not supported for management by HP-UX 11i v2.0 (Itanium) or later:

  - GPT disk

Note
. . . .
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 Conventional Format

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

- When HP-UX 11i v3 is used as a Managed Server, AdvancedCopy Manager gives priority to using new format devices. If devices with conventional formats are used with AdvancedCopy Manager, the information collection mode must be changed before device information is collect or reflected to avoid the use of a new format device. Refer to "8.2.14 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 "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional 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".

⬢ Note

. . . .

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

- New device names are supported from HP-UX 11i v3. 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 "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

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

. . . .

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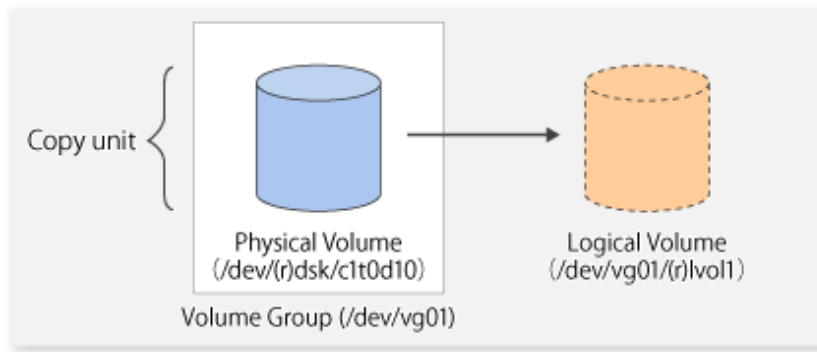
LVM allows multiple logical volumes to be defined on a single physical disk (a logical volume is referred to as LU: Logical Unit). The boundaries of logical volumes can be defined independently of the boundaries of the host physical disk.

A configuration in which one volume group contains multiple logical volumes is also supported.
For operation, please 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
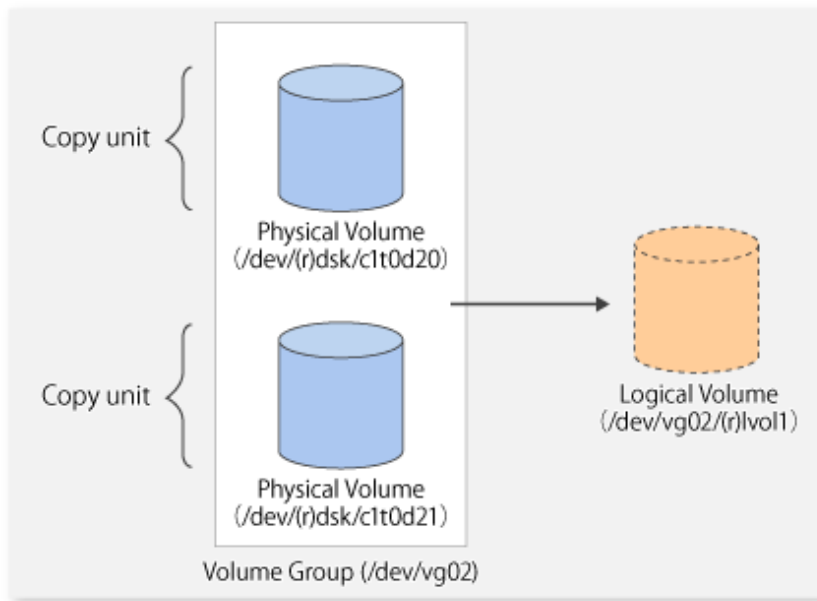
Copying during backup or replication must be performed while maintaining the integrity of an entire volume group.

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
....

- New device names are supported from HP-UX 11i v3. Refer to 1.4.1 Normal Devices" for details. Physical disks that comprise VxVM can use only conventional format devices (/dev/(r)dsk/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 conventional format devices. Refer to "8.2.14 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 "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional format devices.

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

....

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
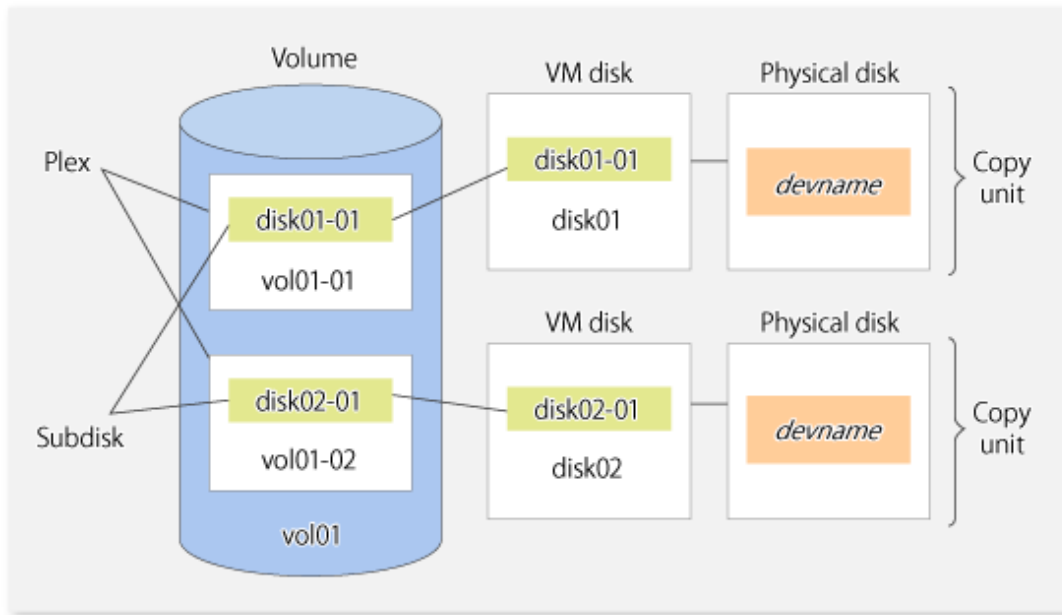
Since AdvancedCopy Manager copies an entire VM disk, not only the shared area that is a sub-disk but also the public region containing VxVM-internal configuration information is copied.

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 will fail.

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

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 "8.4 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 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 validate.

. . . .

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 environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.

3. Start the communication daemon.

   For the startup command, refer to "8.4.1 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 environment variable SWSTGNODE, specify the name of the logical node on which the transaction is to be performed.

3. Stop the communication daemon.

   For the stop command, refer to "8.4.1 Starting and Stopping Communication Daemon".

Chapter 3 Backup Operation

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

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".

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

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
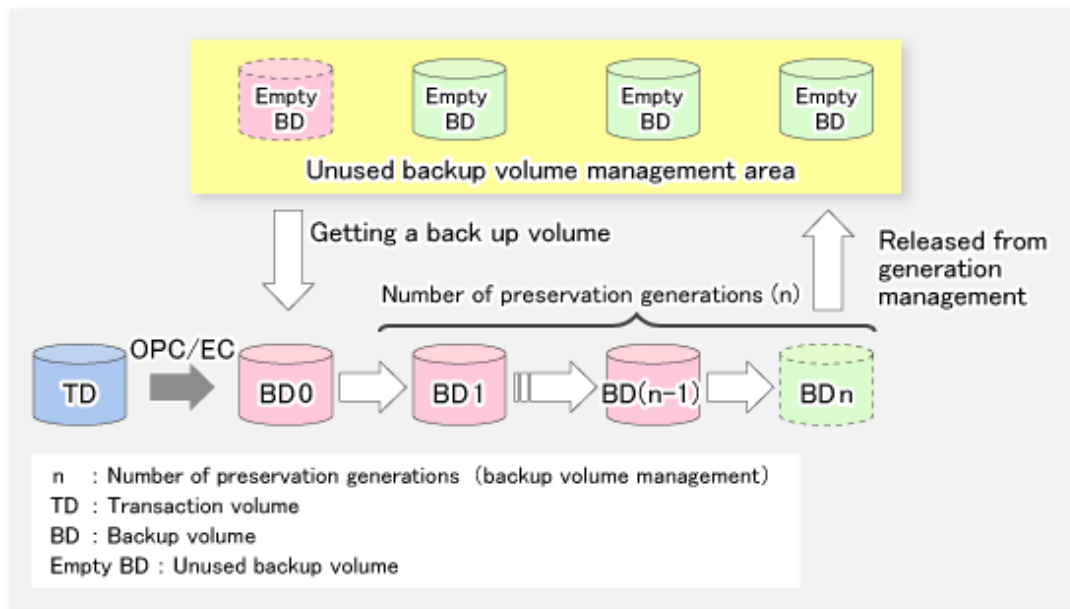
3.1.1　Snapshot Backup Processing

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

3. Backup carrier information will be set.

Figure 3.2 Snapshot Fast Backup Processing
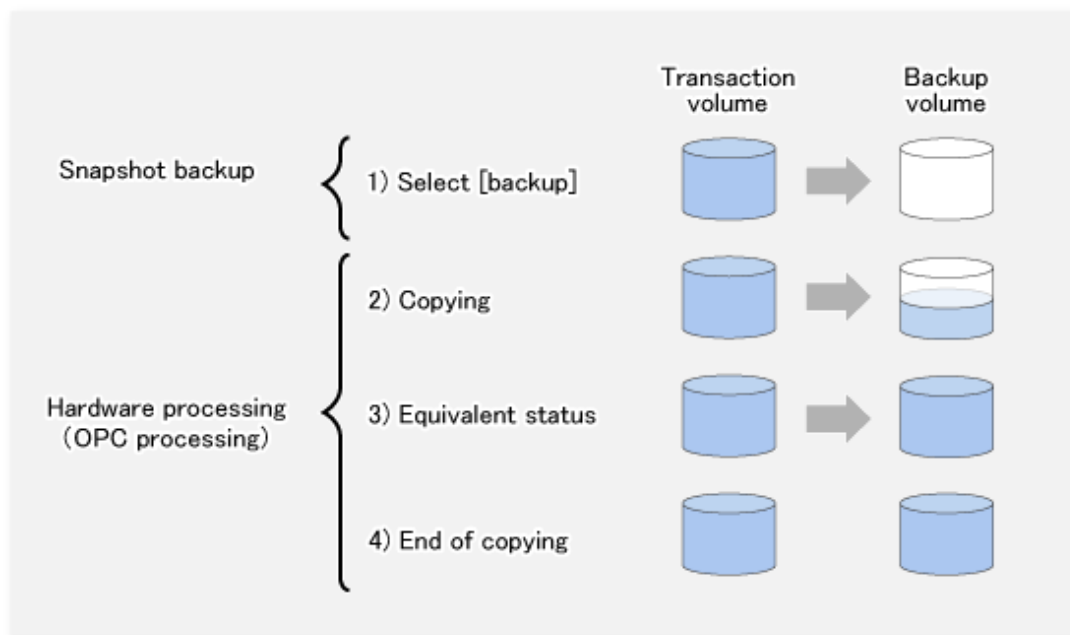
The snapshot fast backup is completed as soon as you confirm the execution of the backup. The actual data copying will be performed internally by the OPC function of ETERNUS Disk storage system.
The QuickOPC function of the snapshot high-speed backup creates a snapshot image by only copying the data updated since the start of previous backup. This reduces the time for physical copying significantly.

For information on the QuickOPC function, refer to "Chapter 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 will be 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 will results in an error.

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

. . . .
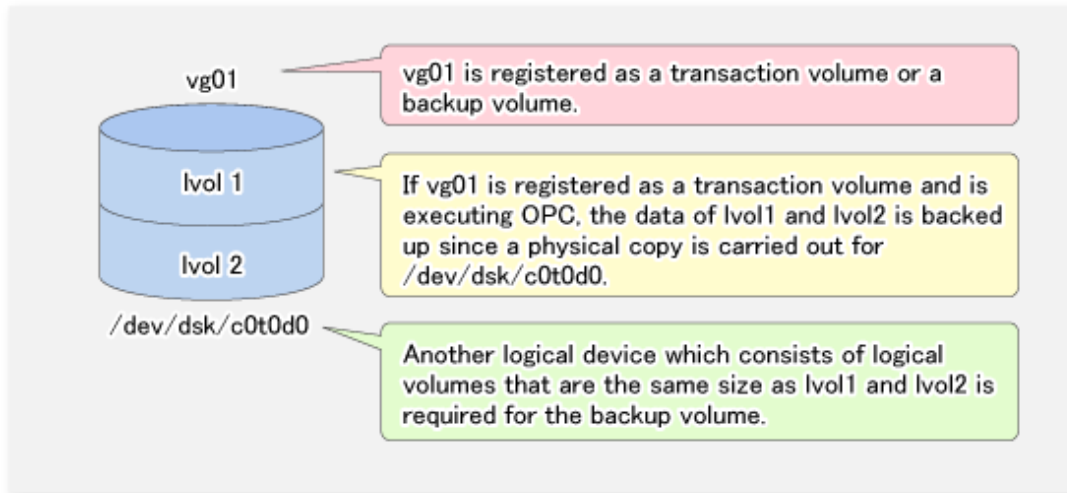
3.1.2   Synchronized High-speed Backup Processing

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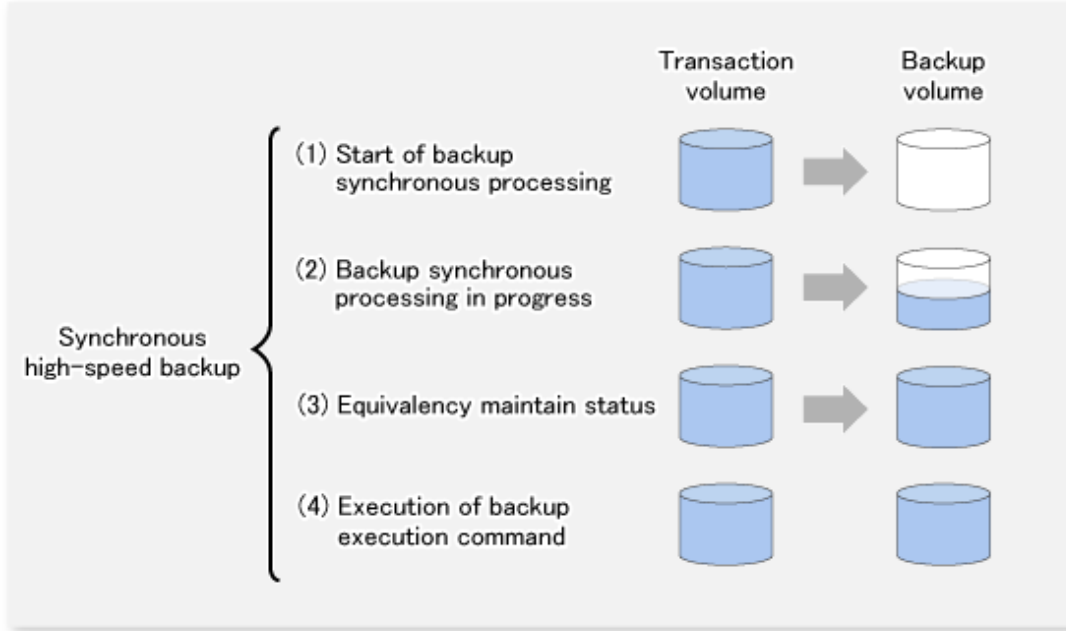
During synchronous high-speed backup using the Suspend/Resume function, the equivalency maintenance status of EC can be set to Suspend or Resume. The synchronous backup process is therefore faster because the function can create a differential copy from the Suspend state.

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 will be 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 will 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 will not be possible to reactivate it. In addition, it will not be 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 will not change.
Note that data will be restored to a transaction volume that was the backup source. However, you can change the restore destination.

Note

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

Figure 3.5 Notes on Restore Operations in AdvancedCopy Manager
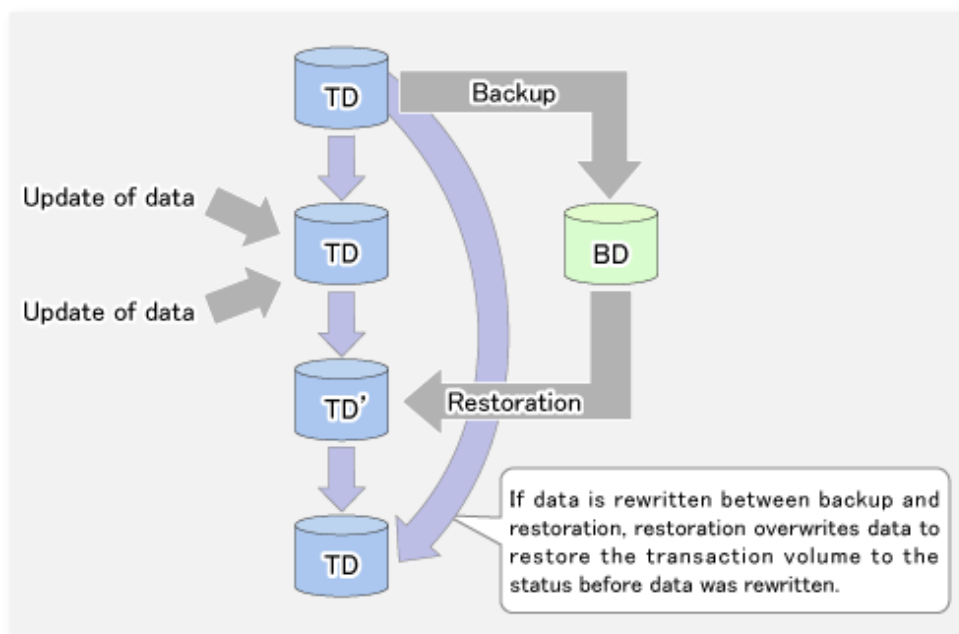
TD: Transaction volume
BD: Backup volume

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 icon] **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

....
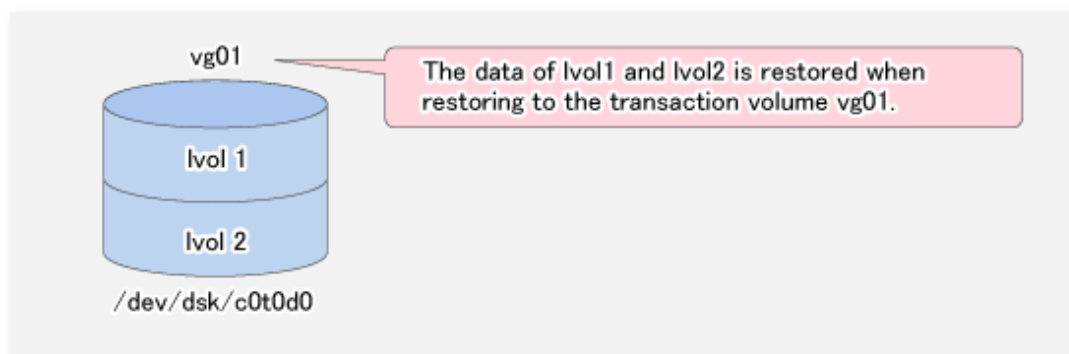
3.2 Operation Design

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

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

- 3.2.1 Selecting 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
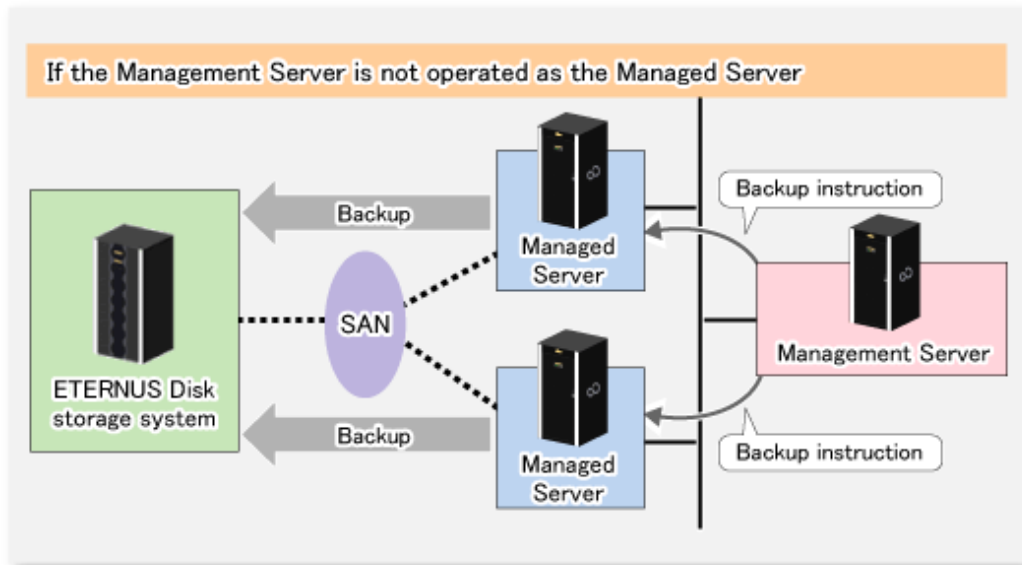
3.2.2 Selecting Backup Source

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 icon] **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 "9.1.1 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:

    - 9.1.1.1 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, Fujitsu recommends that you re-execute backup immediately to create the required number of generations of backup data.

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

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

Interval Days

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

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

For information on setting a backup policy, refer to "3.4.7 Setting 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.

・・・

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
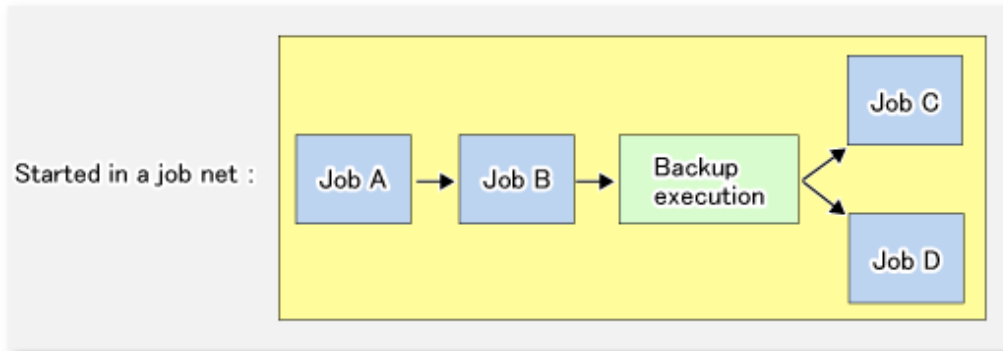
- Start the backup command at the specified time.

Figure 3.9 Start at Specified Time
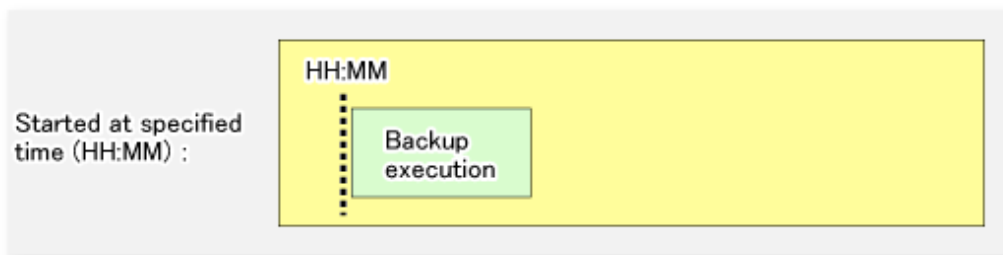
Automatic Synchronized High-speed Backup

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 will then have maintained equivalency status when backup is executed.

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

Starting 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
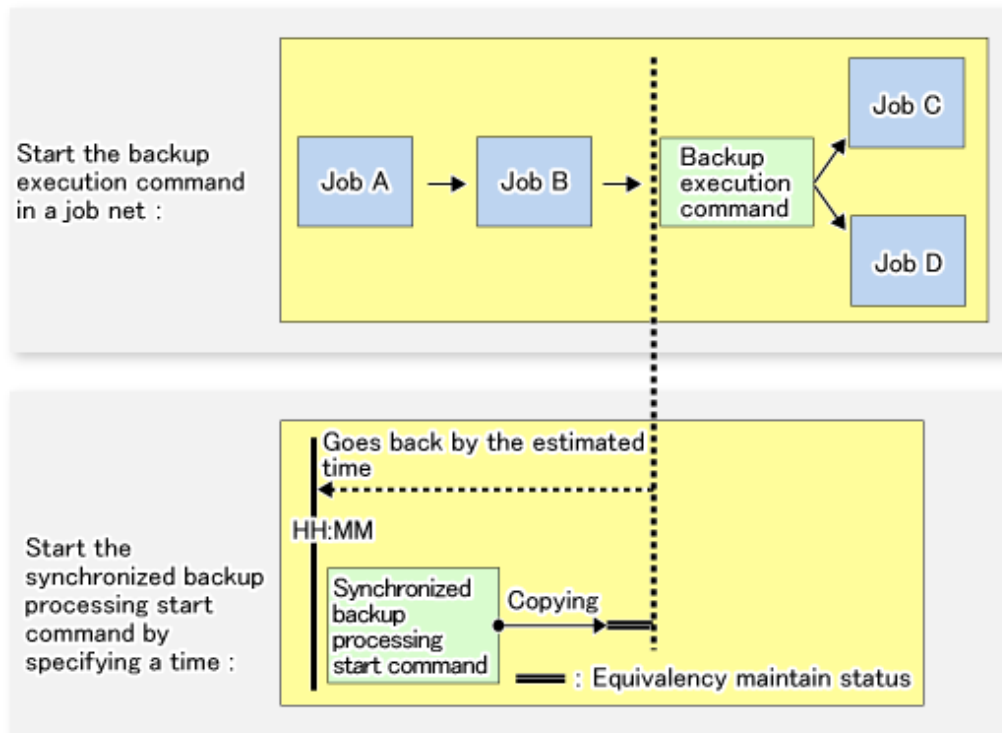
🔔 Note

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
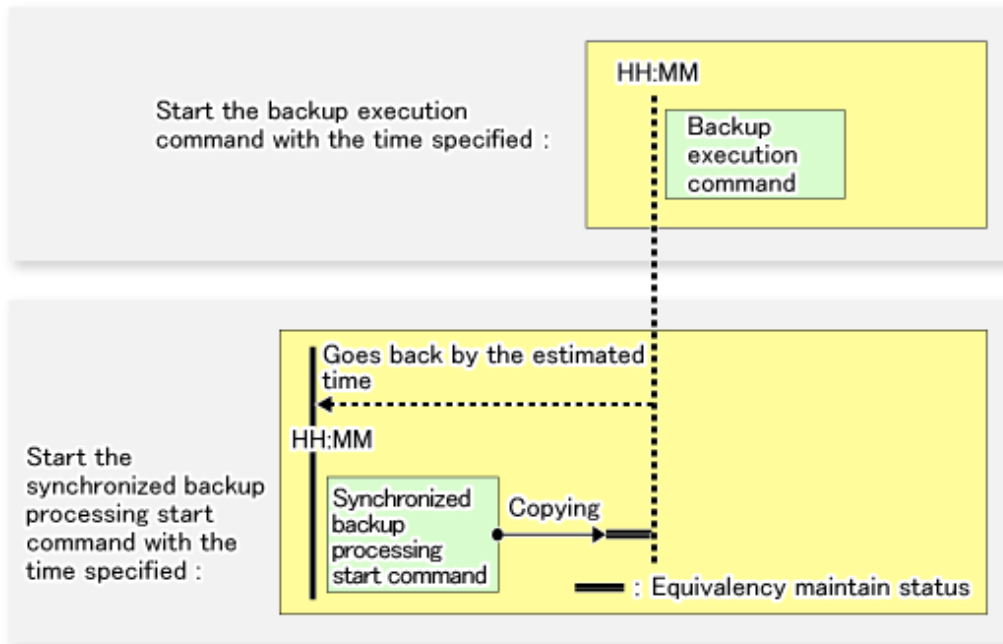
3.3 Flow of Operation

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

Figure 3.12 Flow of Backup Operation on Transaction Volume
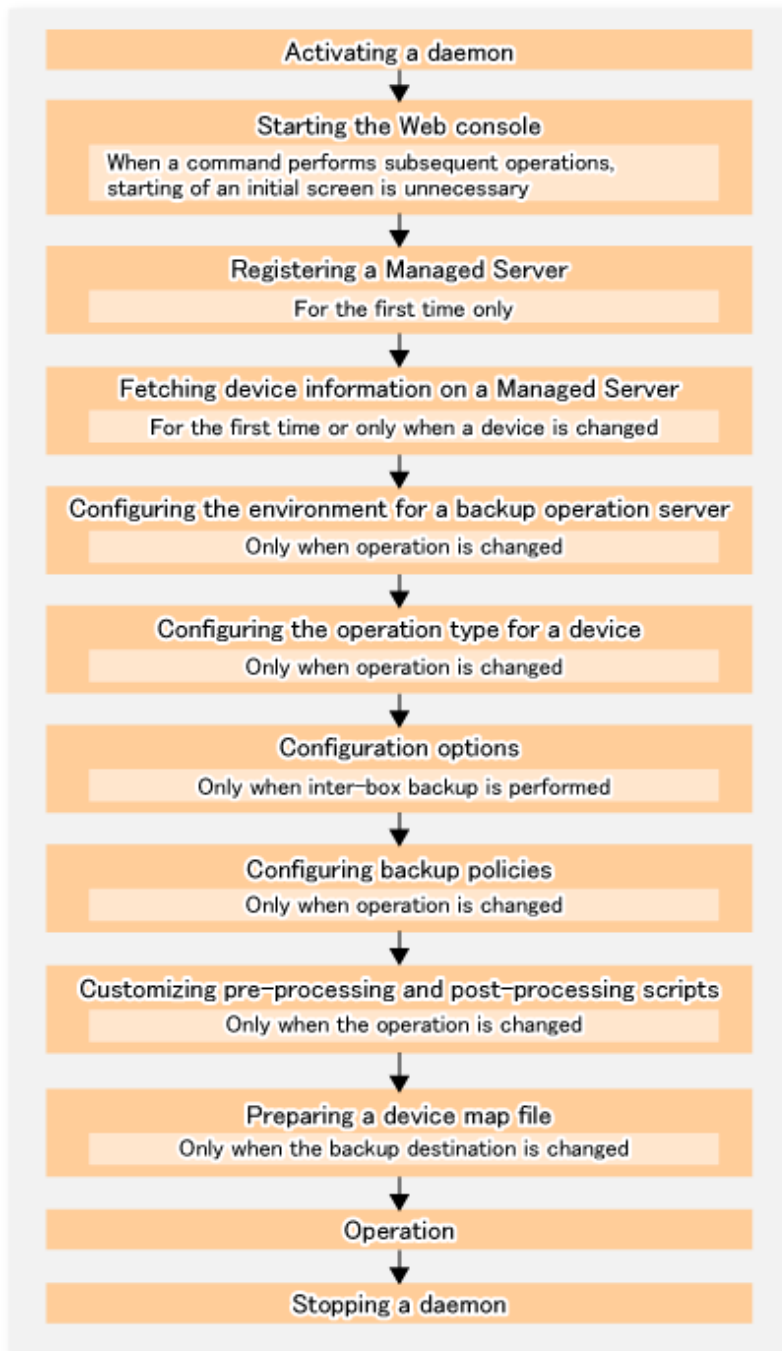
3.4 Preparing to Start Backup

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

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

3.4.3   Registering Managed Server

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

This process is carried out using Web Console.

3.4.4   Fetching device information on a Managed Server

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

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 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 swstdevinfoset 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 a Managed Server".

    3. Execute the swstdevinfoset 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 the 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 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 will be prompted to perform a backup in the Web Console.

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

 Point
. . . .
When AdvancedCopy Manager Is Upgraded

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

. . . .

3.4.9   Preparing Device Map File

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

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

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

 Point
. . . .
To manage multiple generations of backups using defined transaction volume to backup volume relationships, multiple device map files must be prepared.
The device map file used when backing up or starting synchronous processing should meet either of the following requirements:

- Either an unused backup volume must be specified

- A backup volume detailed in the history information that was deleted by this backup must be specified.

Care should taken to ensure that the device map file is configured and used correctly where the backup system uses two or more backup volumes.

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

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

3.4.9.1   Describing Device Map File

The following provides an example of a device map file:

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


# Normal Disks
/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 will still be read, subsequent occurrences will be ignored.

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

3.5 Operation

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

Before performing the backup operation, configure the environment settings that are required for the backup according to "3.4 Preparing to Start Backup".

There are two kinds of backup in AdvancedCopy Manager:

- Snapshot type high-speed backup

- Synchronous high-speed backup

3.5.1 Performing Snapshot High-speed Backup

Snapshot high-speed backup can be carried out using either Web Console or swstbackup 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 the 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 the Web Console or commands.
If operating with commands, perform the backup synchronous process, then carry out the backup for the transaction volume that you need to backup. For details on commands, refer to the following:

- Starting backup synchronous process: swststartsync

- 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 the Web Console. Enter the appropriate command for operation.

   - If one transaction volume has multiple synchronous processing (ie, EC sessions), specify the backup volume and cancel only the specified EC session (swstcancelsync 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 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 the Web Console.

   1. Mount the backup volume. Check the backup volume using the Web Console or 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 will automatically be deleted.

. . . .

3.5.4.1   Displaying Backup History

Backup history can be displayed using either Web Console or swsthistdisp command.

3.5.4.2 Deleting Backup History

Backup history can be deleted using either Web Console or swsthistdel command.

3.6 Changing Setting Information

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

3.6.1 Adding Device

After a device is added to any Managed Server, incorporate it into the backup as described below.
This process can be carried out using either the Web Console or commands.
For information on adding a device using commands, refer to the following steps:

1. 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 swstdevinfoset command to set up the operation type of the added device.

3. If the added device was defined as a transaction volume, execute the swstbkpolset command to set up the backup policy.

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

Refer to "Required Resources for Operation" in "Operating Environment of AdvancedCopy Manager's Agent" in the *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 the 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 swstdevinfoset command to delete the device information for the deleted transaction volume.

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

3.6.2.2 Deleting Backup Volume

This process can be carried out using either the Web Console or commands.
For information on the operation method using commands, refer to the following steps:

1. If deleting the backup volume, ensure that you first 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 swstdevinfoset 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 a 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 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 swstbkpoldel command.

3. Delete the volume type that was registered using "3.4.6 Setting Operation Type for Device" for the device connected to the Managed Server.

4. Delete the Managed Server.

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

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

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

   - If only AdvancedCopy Manager's agent is used:

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

3.7 Stopping 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 will 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
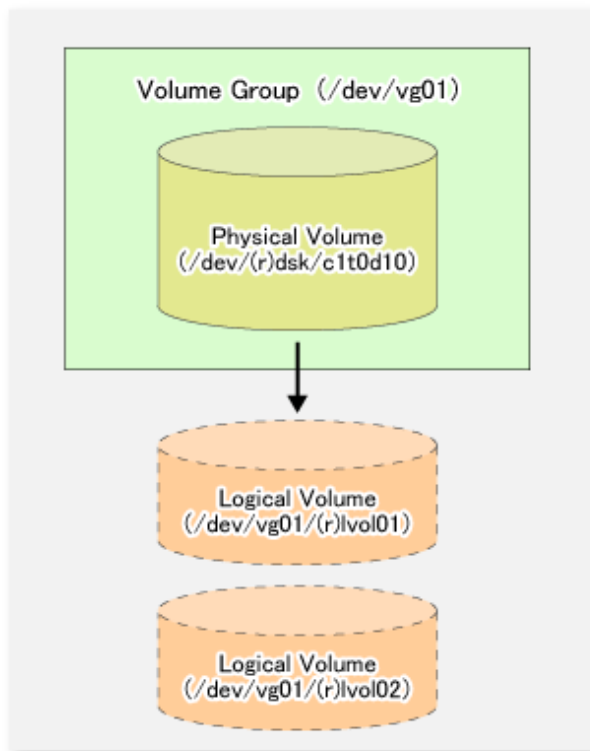
3.8.1.1 Operation Design

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
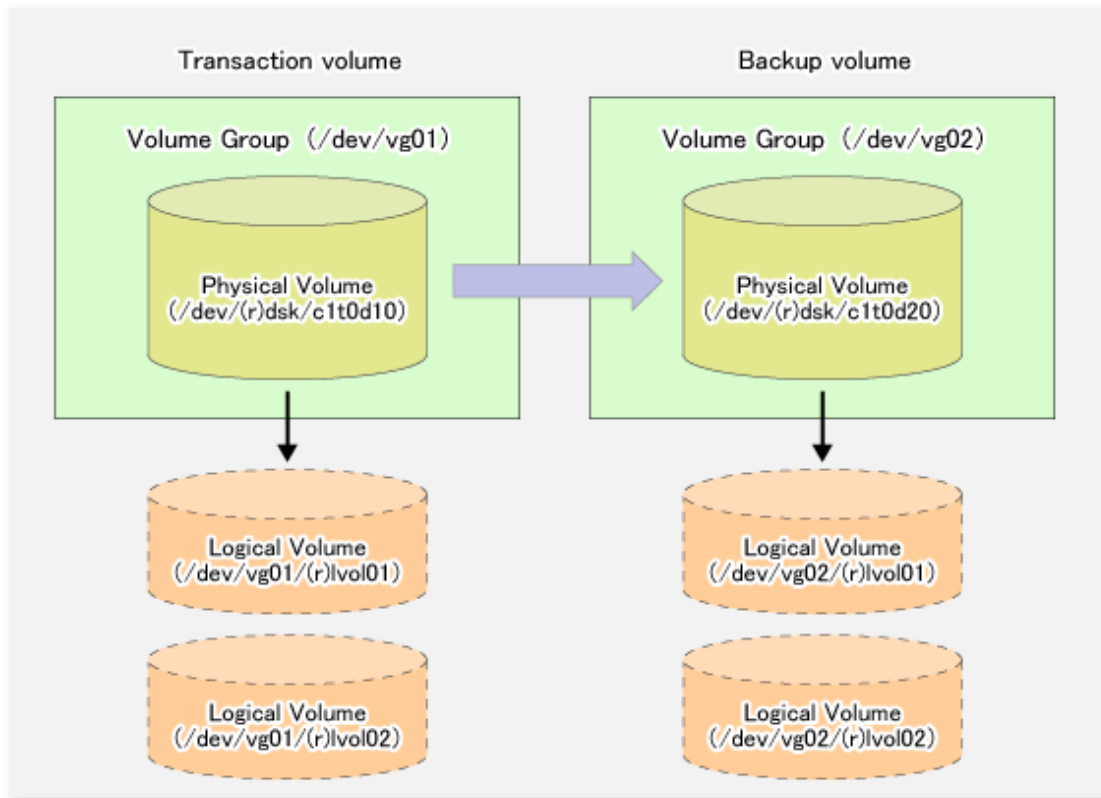
3.8.1.2   Preparations

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 will result 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/swstdevinfoset -t /dev/vg01
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vg02
swstdevinfoset 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.

📖 **Note**

. . . .

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
#
```

📖 **Note**

. . . .

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 the Web Console or 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
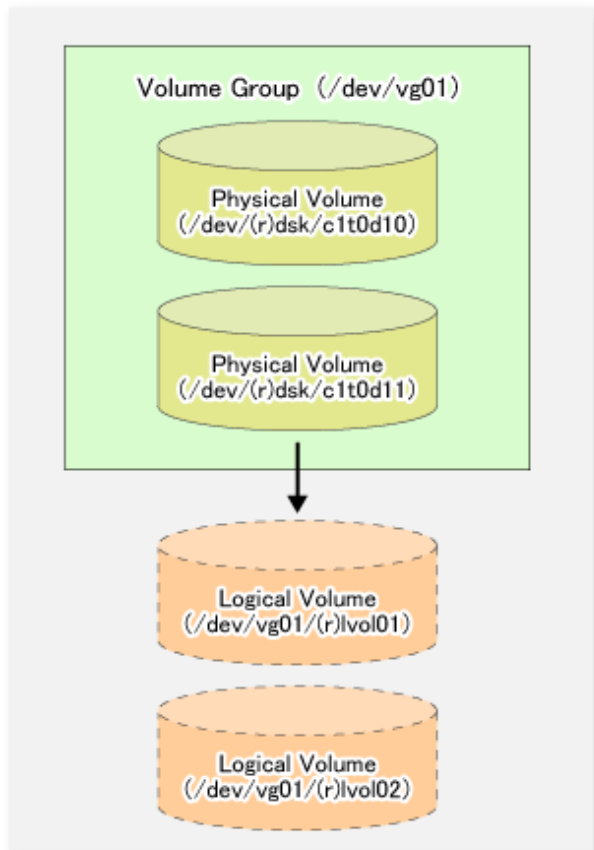
3.8.2.1 Operational Configuration

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
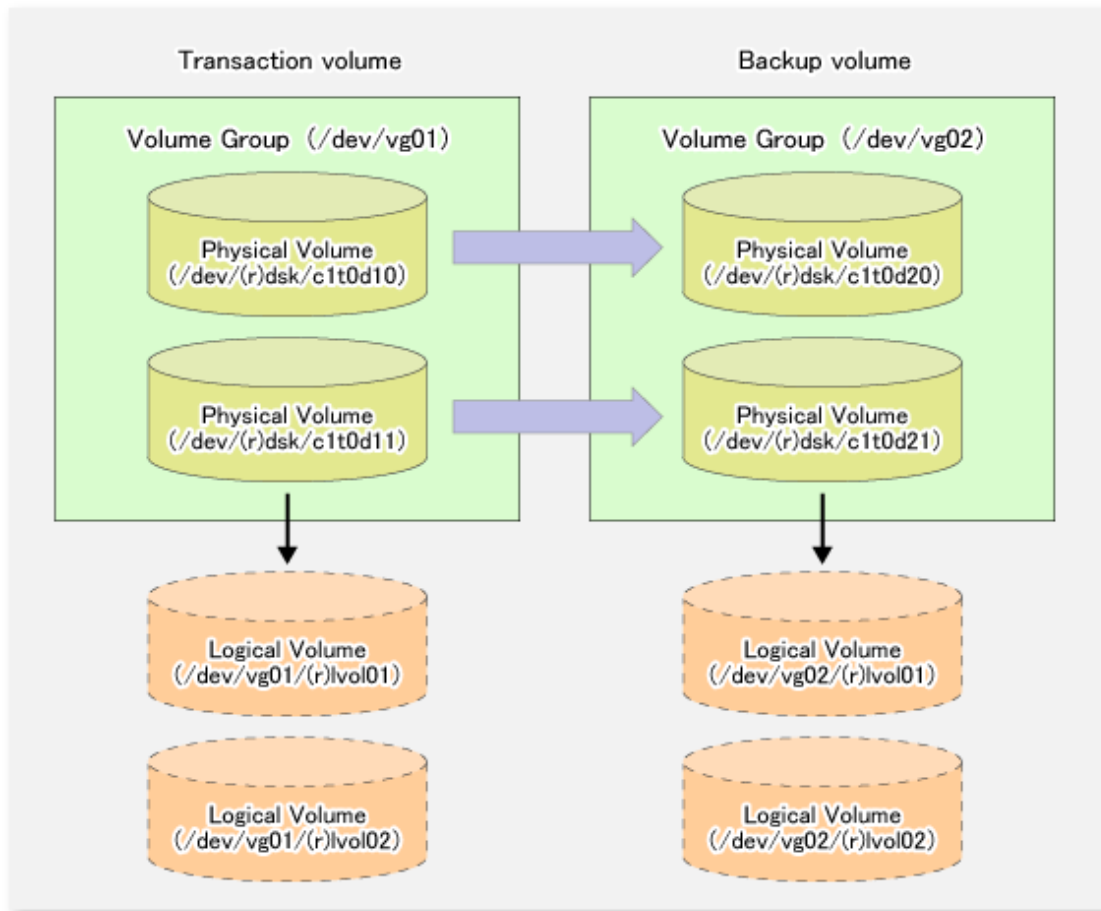
3.8.2.2   Preparations

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

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/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d11 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/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/dsk/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/dsk/c1t0d11 swststartsync completed
#

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

# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d10
/dev/dsk/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/dsk/c1t0d11
/dev/dsk/c1t0d11 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	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	1. Prevent access to all logical volumes in the volume group.	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/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

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/rdsk/c1t0d20
# /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
#
```

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/c1t0d10
/dev/dsk/c1t0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d11
/dev/dsk/c1t0d11 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	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.	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/rdsk/c1t0d10
   # /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/c1t0d11
   #
   ```

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/rdsk/c1t0d10
# /usr/sbin/vgcfgrestore -n /dev/vg01 /dev/rdsk/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.

P Point

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

- From HP-UX 11i v3, new device names are supported. 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)dsk/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
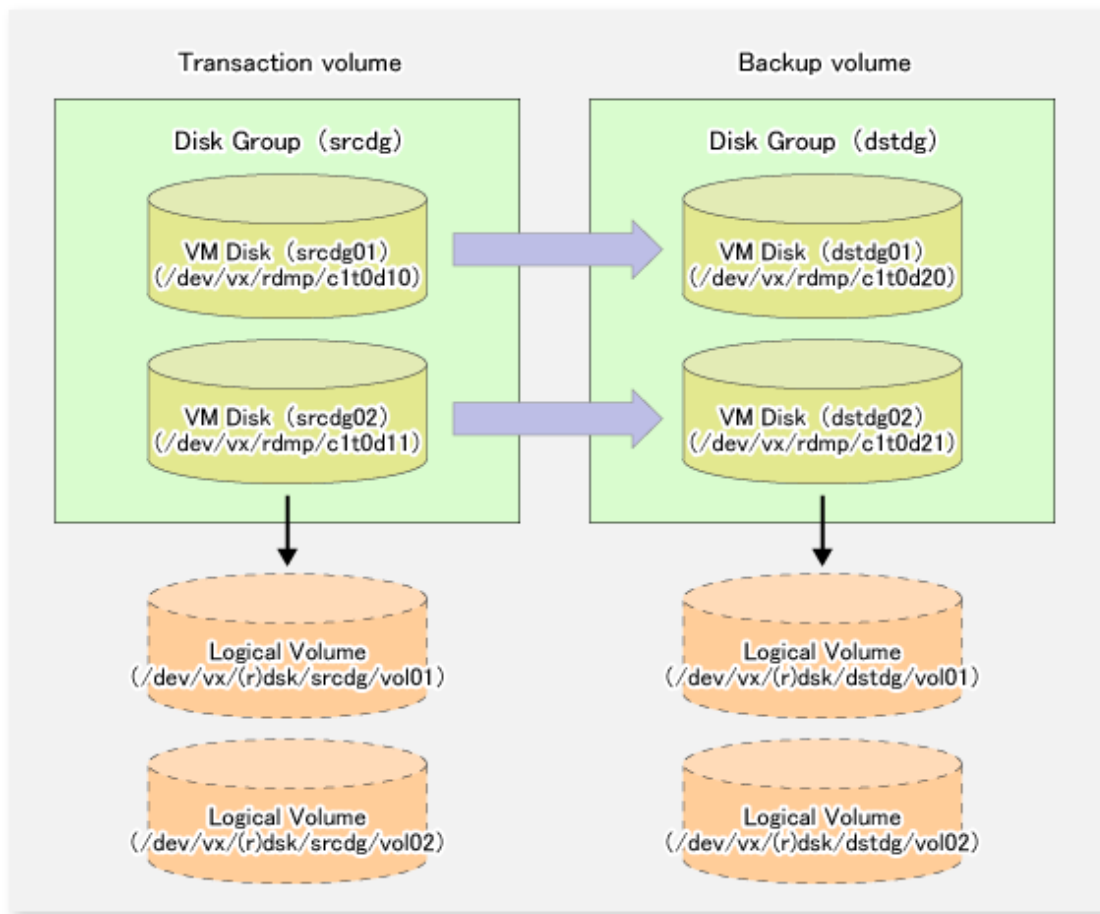
3.9.1.2   Preparations

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/swstdevinfoset -t /dev/vx/dmp/c1t0d10
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -t /dev/vx/dmp/c1t0d11
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d20
swstdevinfoset completed
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/vx/dmp/c1t0d21
swstdevinfoset 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/c1t0d10            /dev/vx/dmp/c1t0d20
/dev/vx/dmp/c1t0d11            /dev/vx/dmp/c1t0d21
```

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/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11 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/c1t0d10 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d10 swststartsync completed
# /opt/FJSVswsts/bin/swststartsync /dev/vx/dmp/c1t0d11 -Xdevmap /acm/devmap.txt
/dev/vx/dmp/c1t0d11 swststartsync completed
#

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

# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d10
/dev/vx/dmp/c1t0d10 swstbackup completed
# /opt/FJSVswsts/bin/swstbackup /dev/vx/dmp/c1t0d11
/dev/vx/dmp/c1t0d11 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	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	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.	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 c1t0d20 ...
Installing volume manager disk header for c1t0d21 ...
-
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.

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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/c1t0d10
/dev/vx/dmp/c1t0d10 swstrestore completed
# /opt/FJSVswsts/bin/swstrestore /dev/vx/dmp/c1t0d10
/dev/vx/dmp/c1t0d10 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	1. Secure data integrity by stopping access to all logical volumes in the disk group. 2. Import the disk group, when the disk group is not imported.	Post-processing is not required.
Restoration destination volume	1. Stop access to all logical volumes in the disk group. 2. If file systems are included, unmount all file systems in the disk group. 3. Deport the disk group. 4. Set the physical disks in the disk groups to offline.	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 c1t0d10 ...
   Installing volume manager disk header for c1t0d11 ...
   -
   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.

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Chapter 4   Backup Operation Using Suspend/Resume Function

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

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
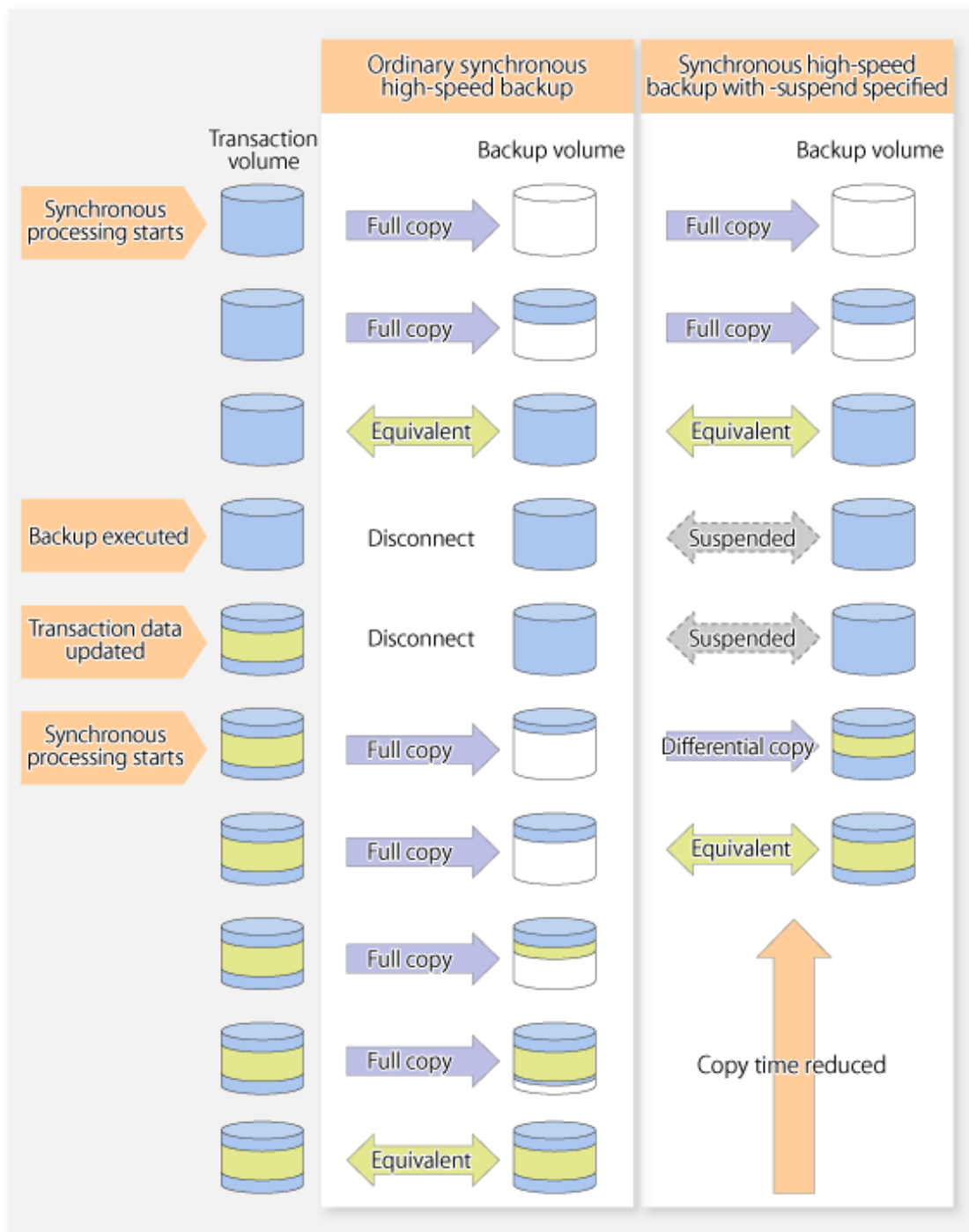
4.2 Backup Operation Design

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
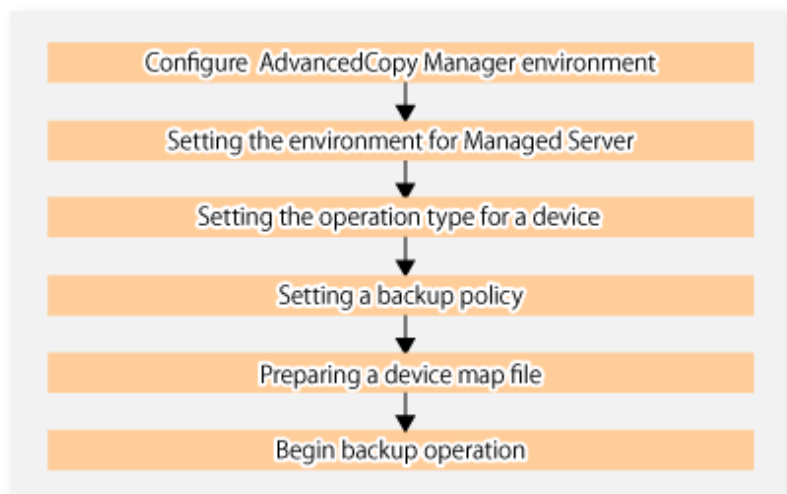
4.4 Preparations

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

4.4.1 Configuring AdvancedCopy Manager Environment

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

4.4.2 Setting Environment for Managed Server

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

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

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

4.4.3 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 the Web Console or swstdevinfoset command.

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

4.4.4   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 the Web Console or following commands.

- Backup Policy Setup: swstbkpolset

- Check Backup Policy that has been set up: swstbkpoldisp

- Backup Policy Deletion: swstbkpoldel

4.4.5   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.

Point

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

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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
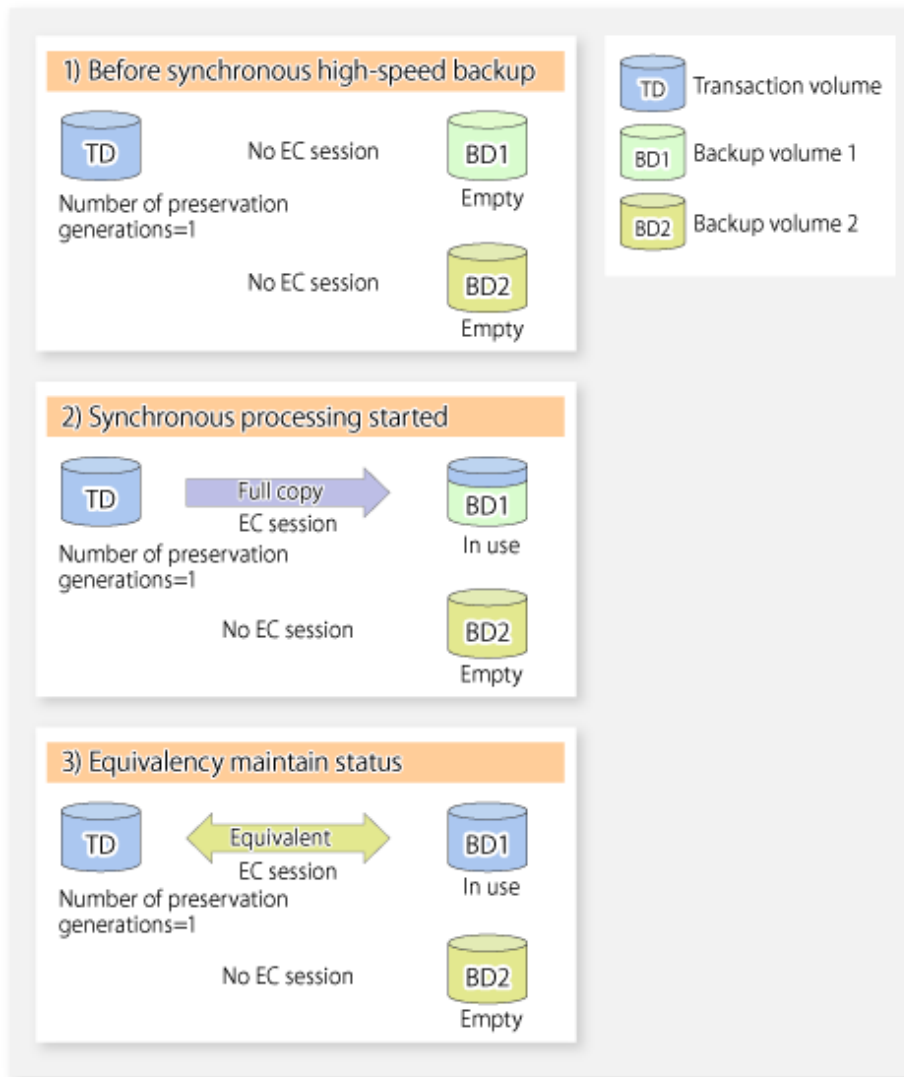
4) Execution of the backup command with -suspend specified

TD — Suspended EC session — BD1 (With history information) In use

Number of preservation generations=1

No EC session

BD2 Empty

5) Synchronous processing started

TD — Suspended EC session — BD1 (With history information) In use

Number of preservation generations=1

Full copy EC session → BD2 In use

6) Equivalency maintain status

TD — Suspended EC session — BD1 (With history information) In use

Number of preservation generations=1

Equivalent EC session — BD2 In use
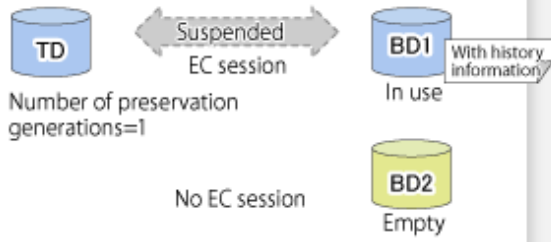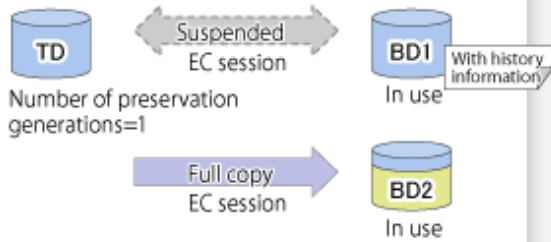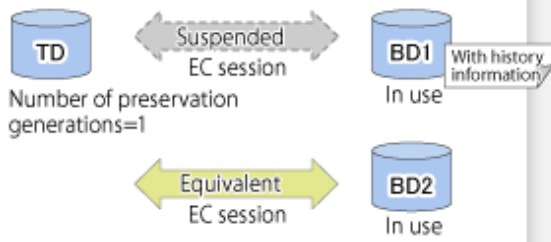
7) Backing up with the suspend specification

TD — Suspended EC session — BD1 Usable

Number of preservation generations=1

Suspended EC session — BD2 (With history information) In use
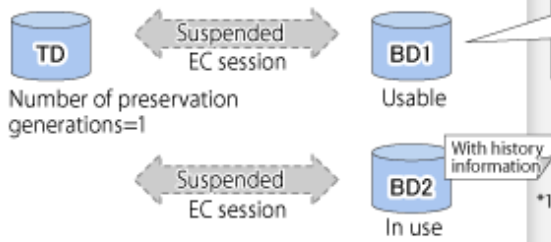
History information deleted because number of generations exceeded (*1) at backup command execution

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

8) Transaction volume data updated

TD (Data updated) — Suspended EC session — BD1 Usable

Number of preservation generations=1

Suspended EC session — BD2 (With history information) In use
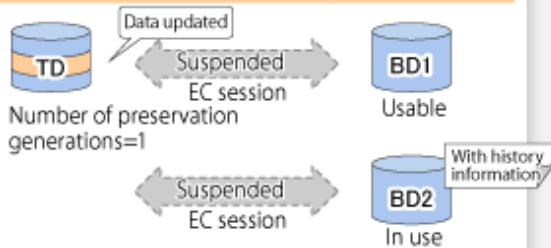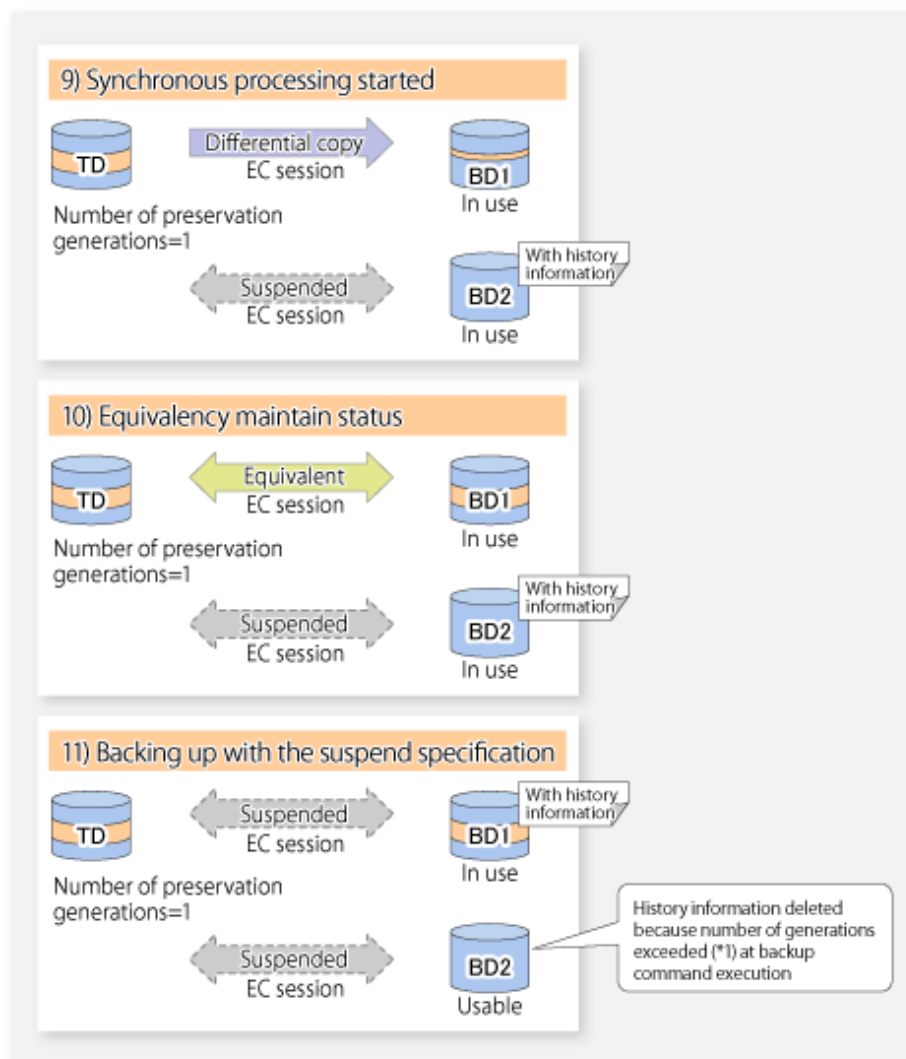
4.5.1 Starting Synchronous Processing

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
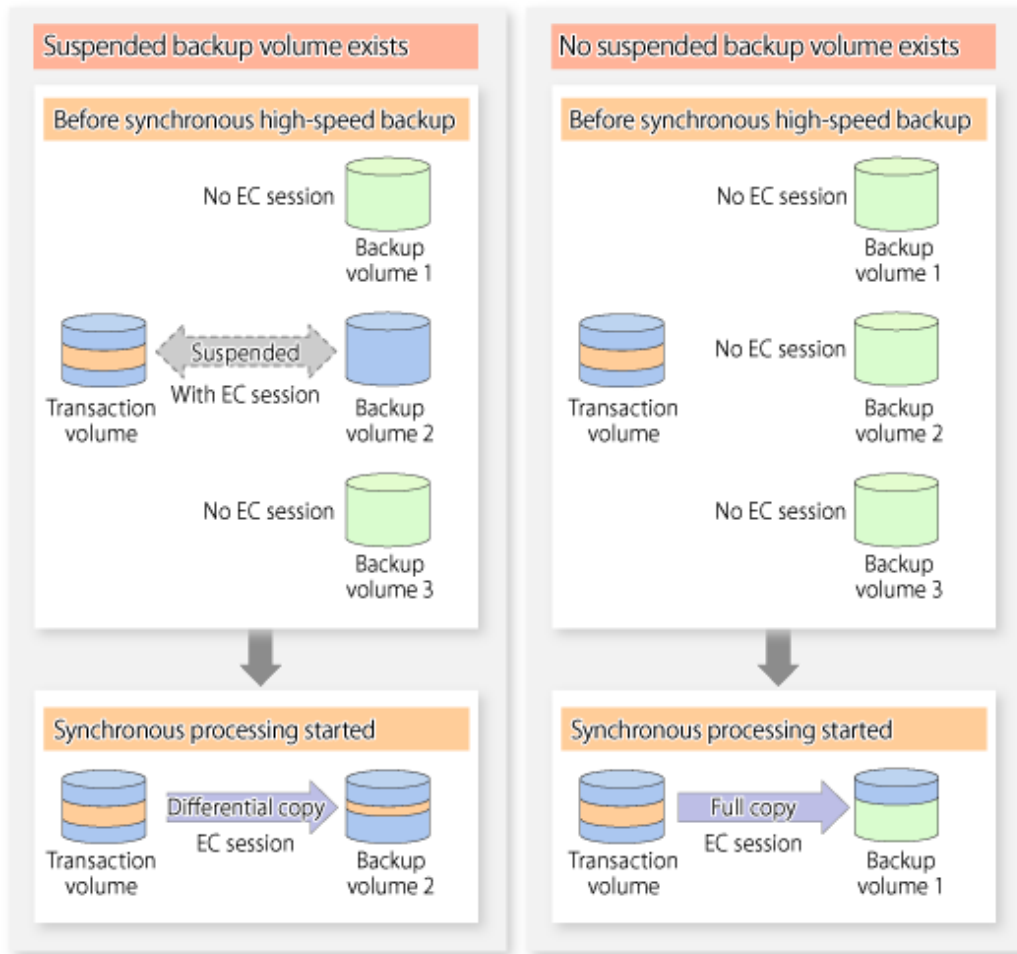
Note

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
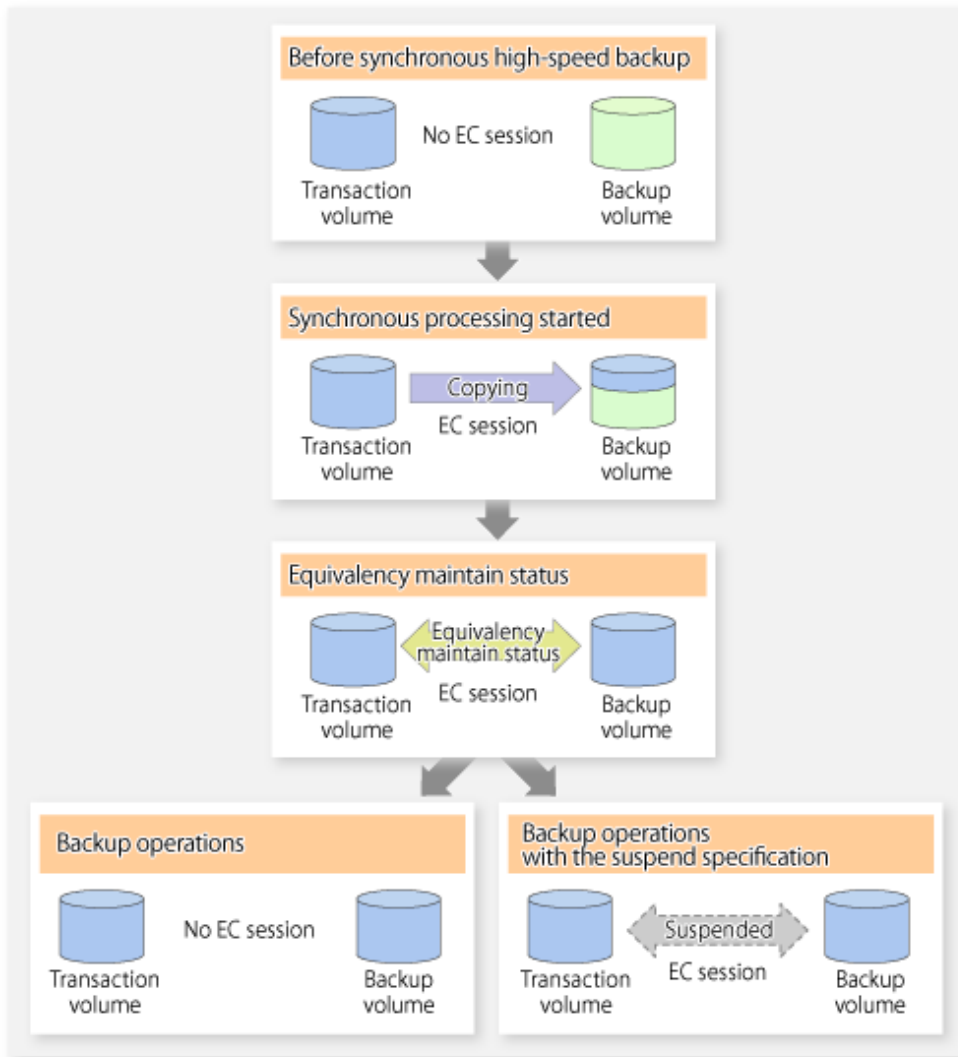
4.5.3 Displaying Synchronous Processing Execution Status

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
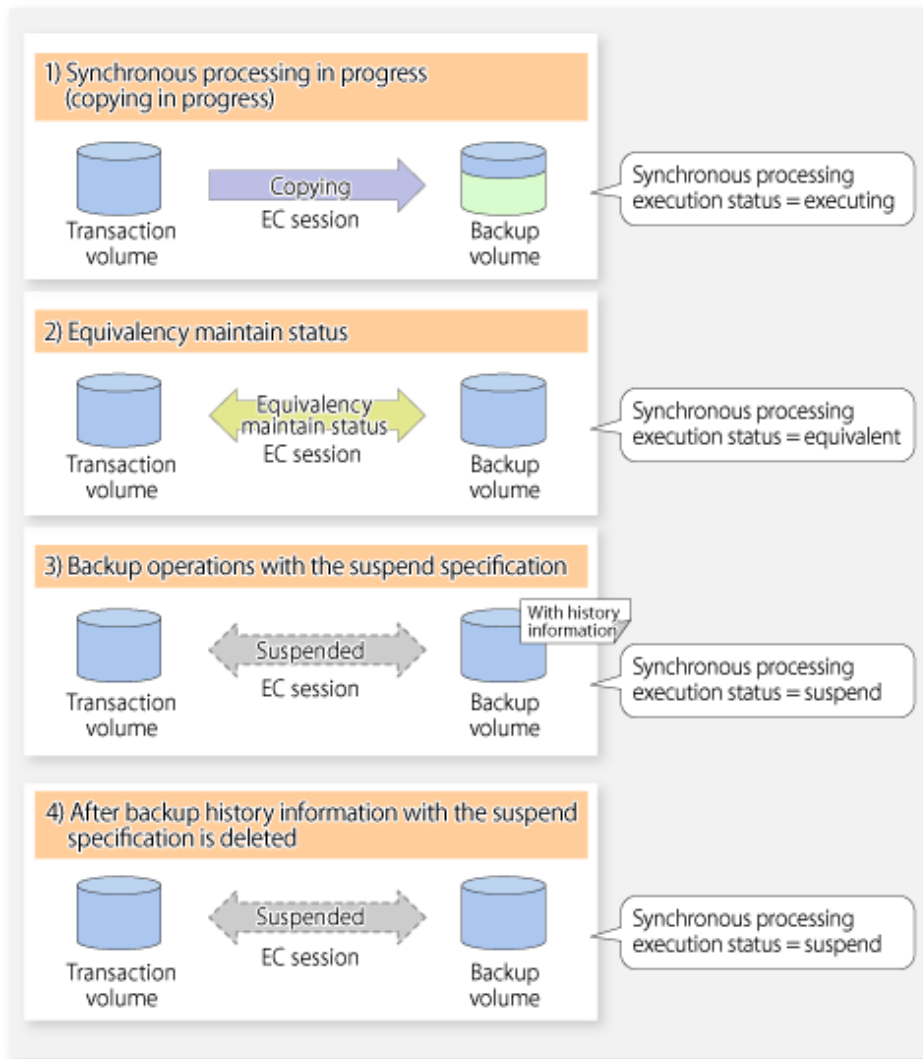
4.5.4 Cancelling Synchronous Processing

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.

P Point

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

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

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

....

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

Figure 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
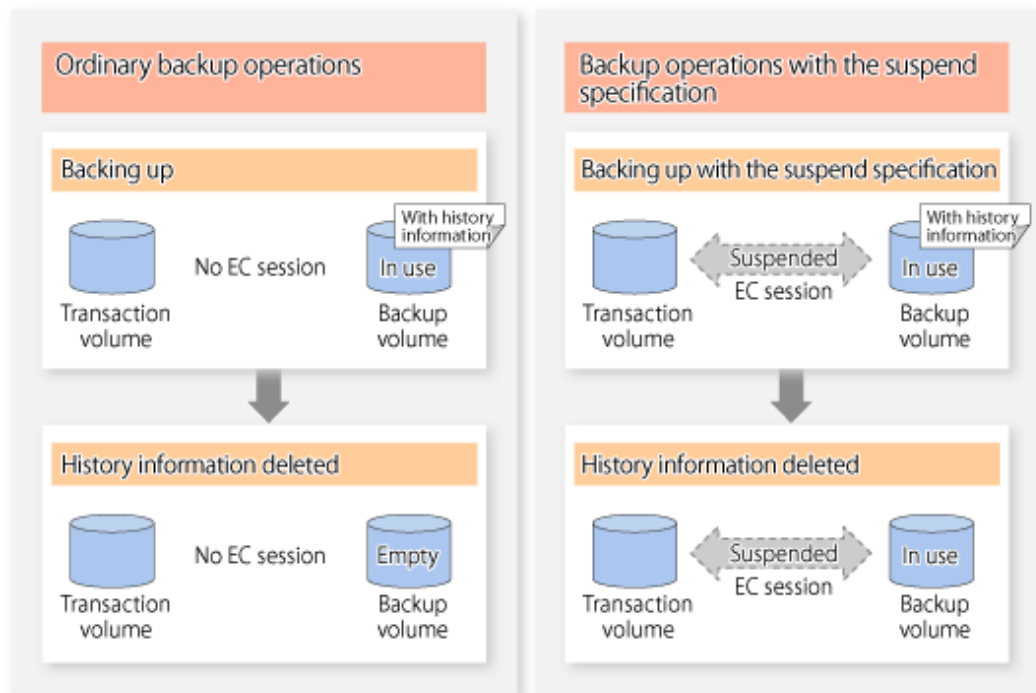
4.5.6 Restoring

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.

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
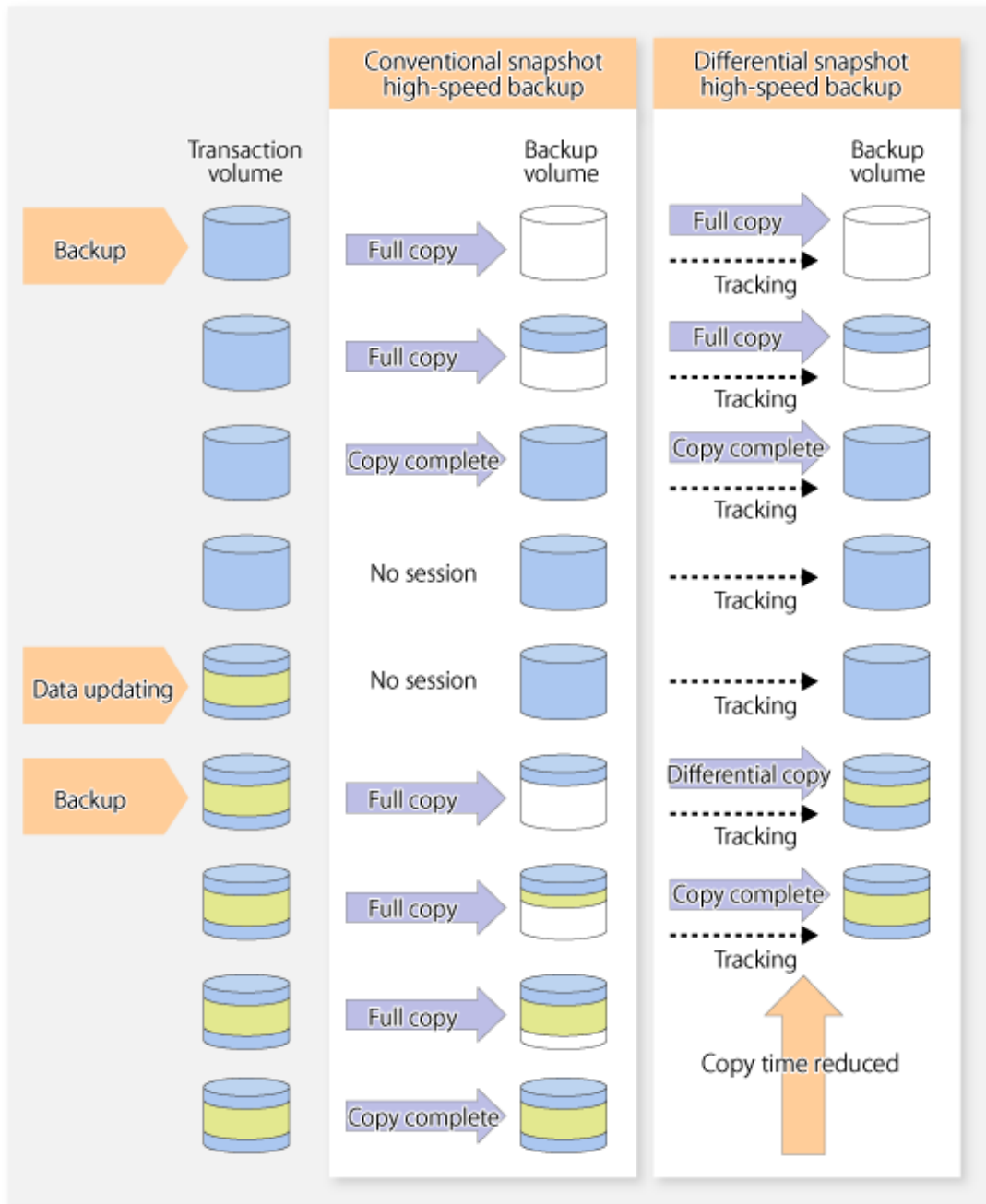
5.2 Configuring Backup Operation

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
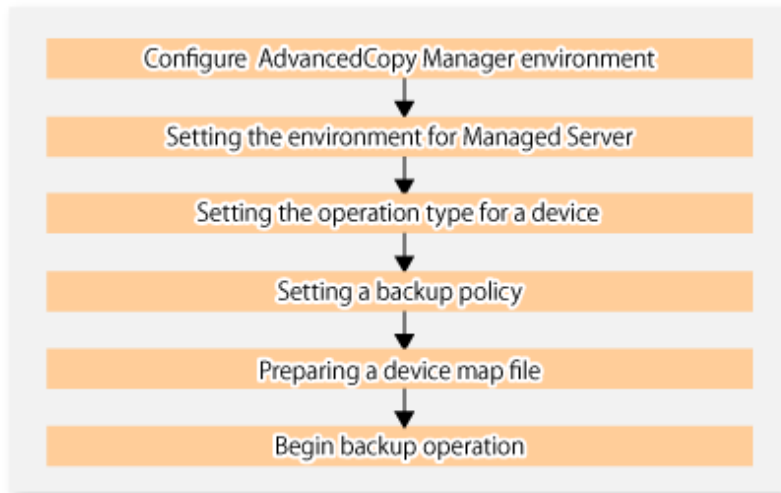
5.4 Preparation

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

5.4.1 Configuring AdvancedCopy Manager Environment

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

5.4.2 Setting Environment for Managed Server

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

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

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

5.4.3 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 the Web Console or swstdevinfoset 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 swsttrkstat command.

Note

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

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

5.4.4   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 the Web Console or following commands.

- Backup Policy Setup: swstbkpolset

- Check Backup Policy that has been set up: swstbkpoldisp

- Backup Policy Deletion: swstbkpoldel

5.4.5   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.

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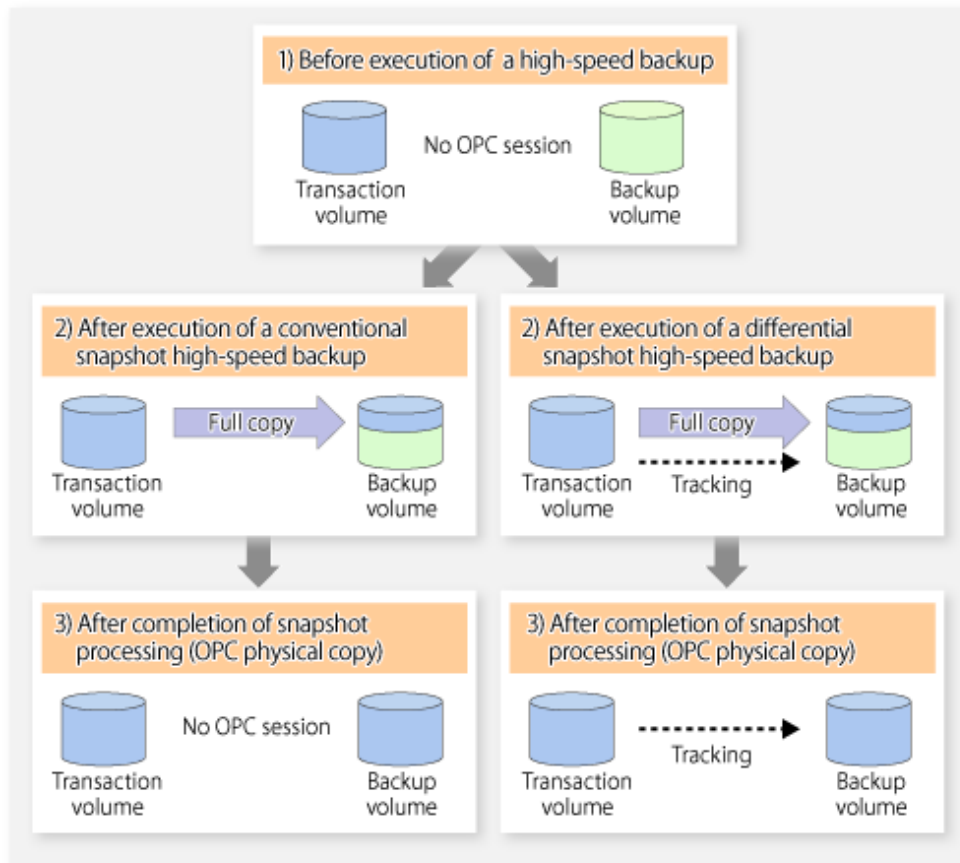
After history information is deleted in a differential snapshot high-speed backup, the backup volume is put into the tracking state without history information. If a new differential snapshot high-speed backup is started under that condition, the backup volume in the tracking state without history information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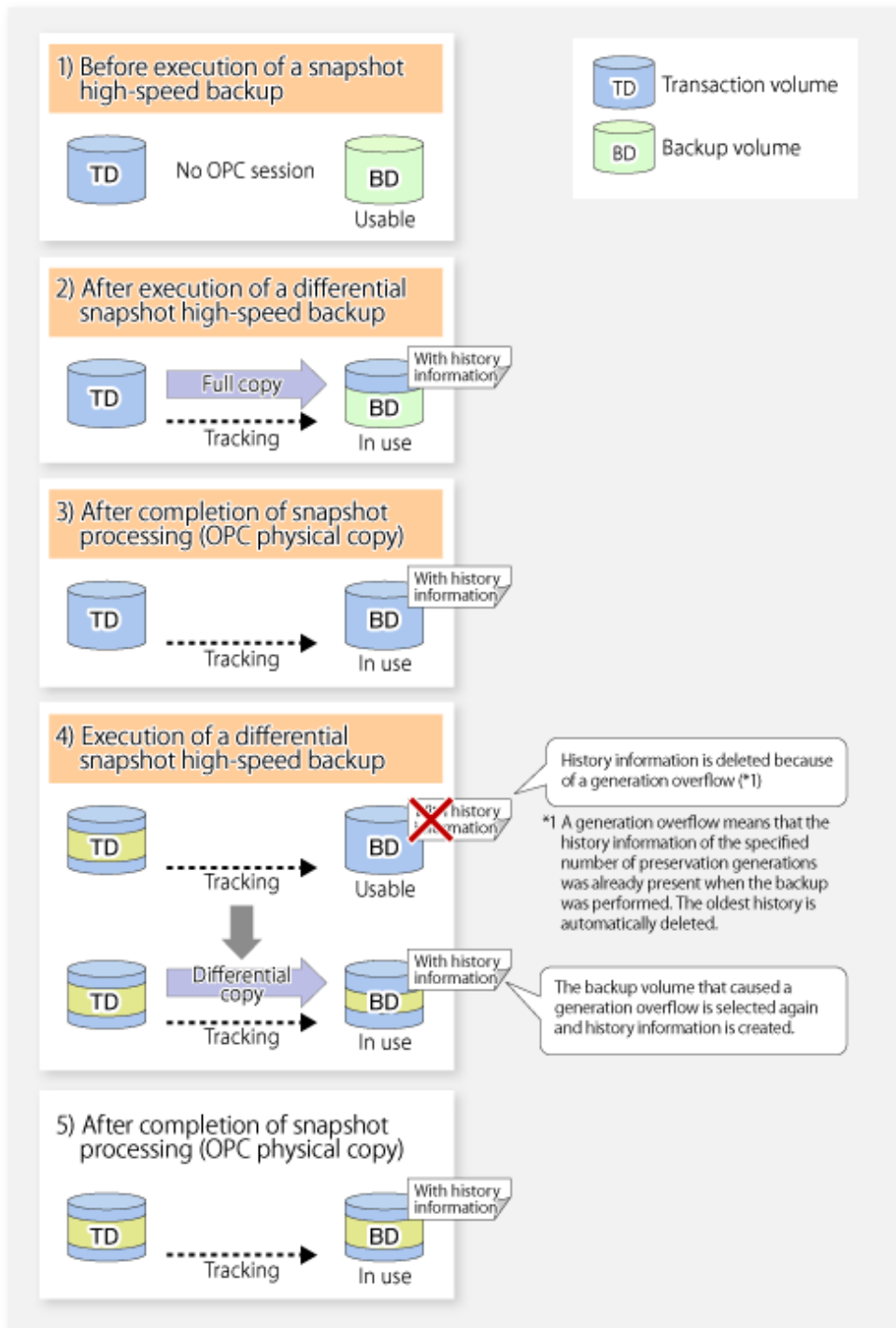
5.5.2   History Management

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
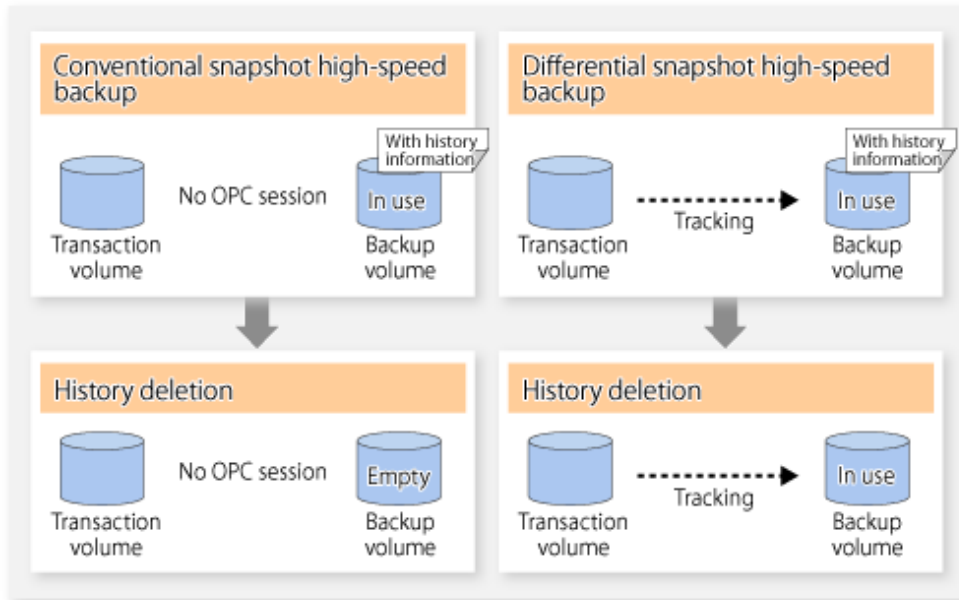
5.5.3 Restoration

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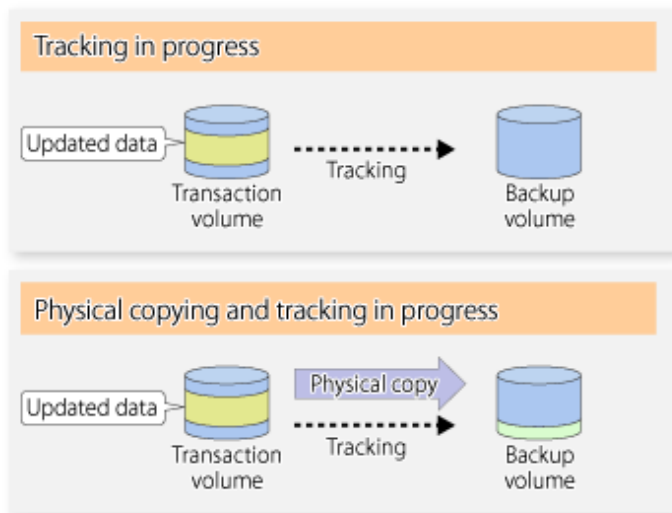
When restoration is executed, normal OPC from the backup volume to the transaction volume is started while the tracking state from the transaction volume to the backup volume is maintained.

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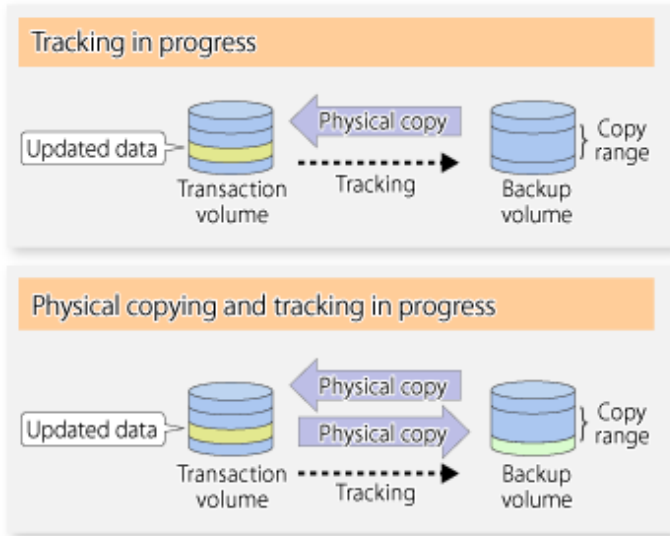
While tracking processing is performed between the transaction volume and backup volume, restoration to other volumes cannot be performed. If restoration to other volumes is required, the following operational steps must be performed in advance:

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
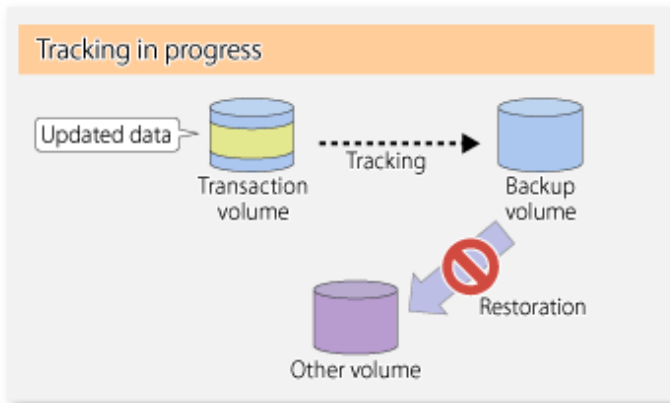
![Note icon] **Note**

. . . .

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.

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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 swsttrkstat 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.

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. . . .

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
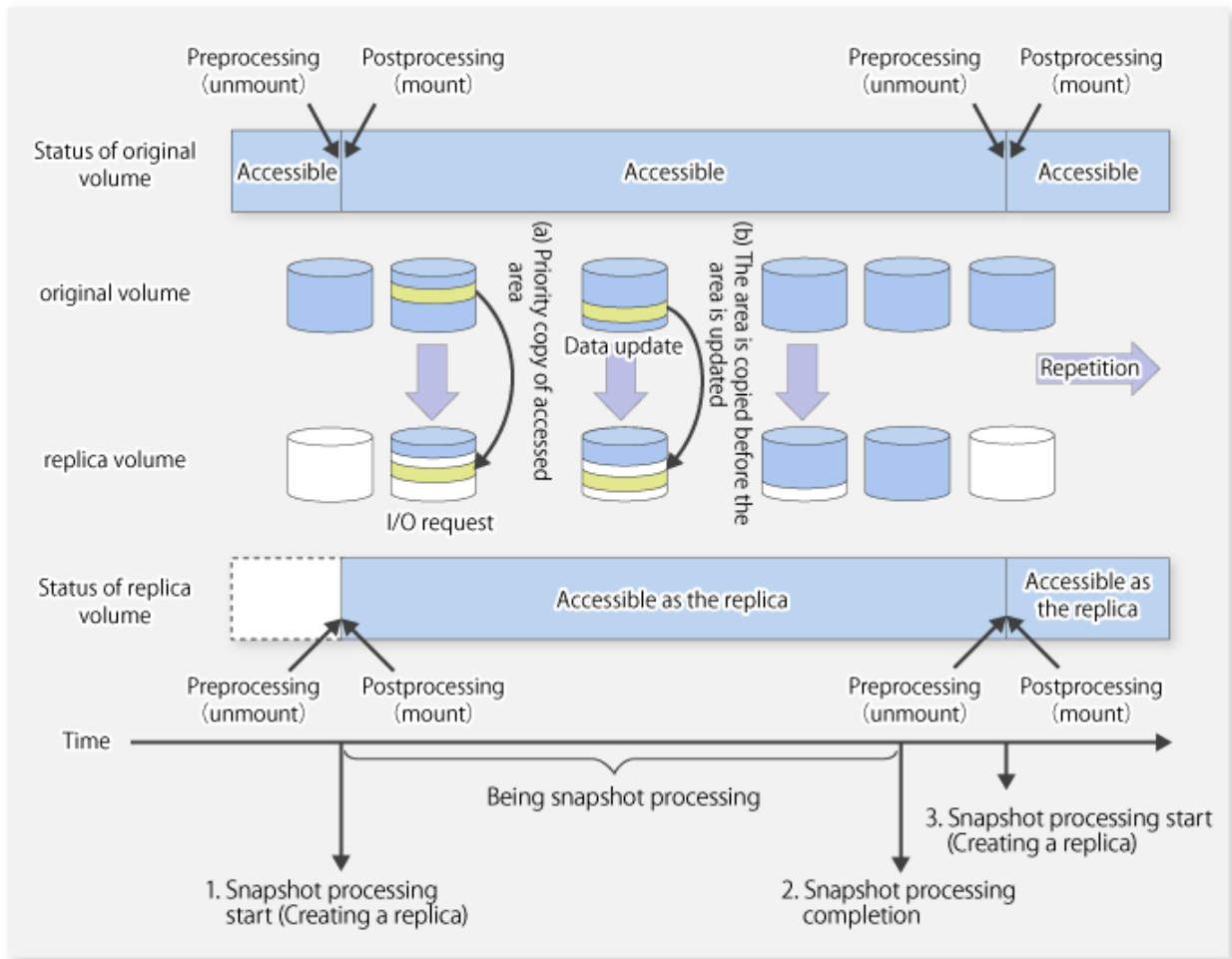
Snapshot replication is completed when the replication creation command is issued. During snapshot processing performed internally by the ETERNUS Disk storage system, if there is an attempt to access an area where copying is not yet complete at the replication destination, priority is given to copying 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
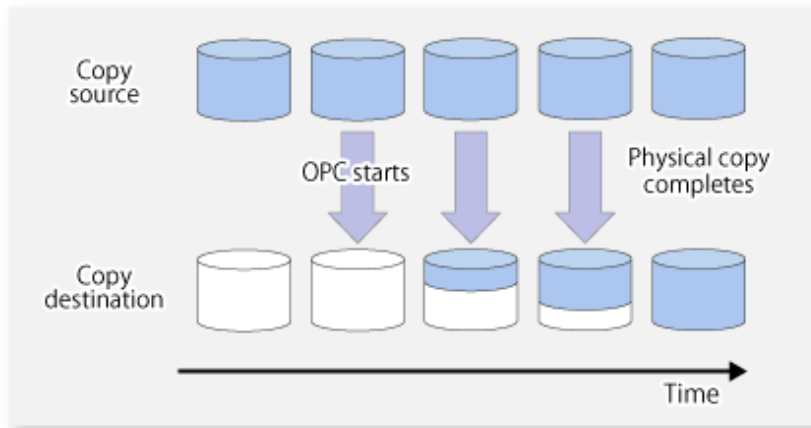
Point

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
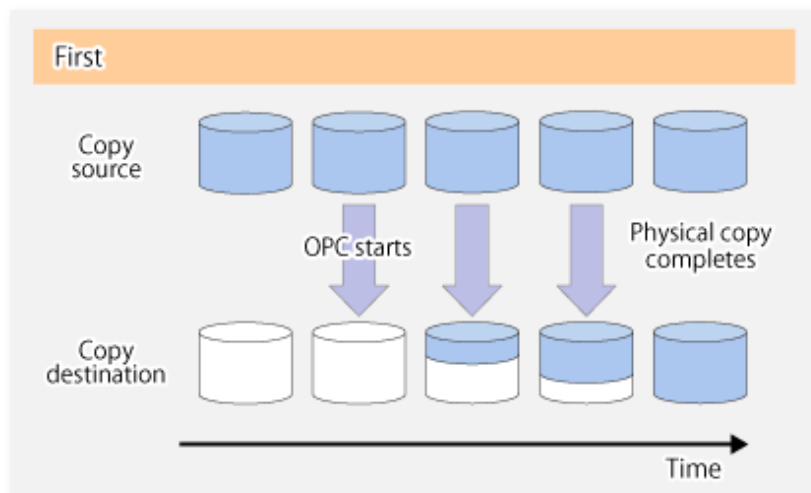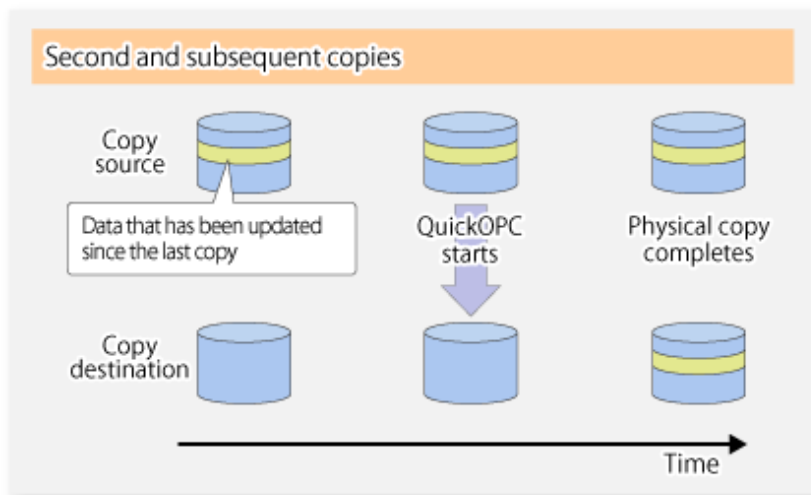
Point

- 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
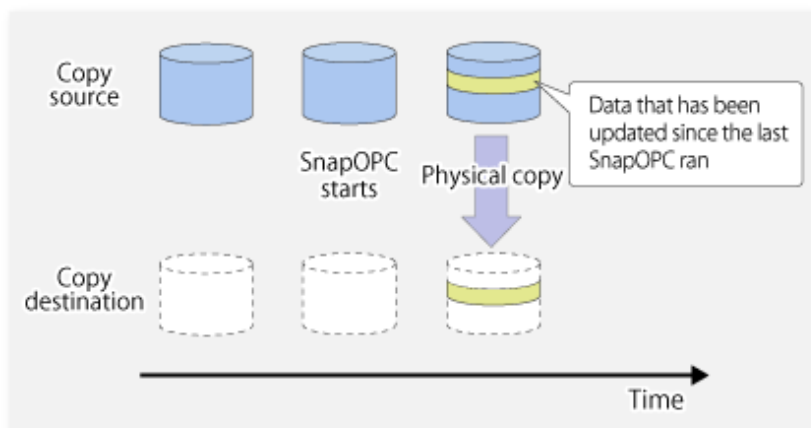
Point

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.

Information

The SnapOPC copy destination disk is called "Snap Data Volume".

Figure 6.5 SnapOPC Mechanism

Mechanism of SnapOPC

Copy source → SnapOPC → Copy destination

It sees it from the host like the same capacity as the copy origin.

Substance is a small amount from the copy origin.

Write to the copy source

Copy source (2)

Copy destination (1)

(1) Copies data to the copy destination area
(2) Writes data to the copy source area

Read from the copy source

A B

Copy source

Copy destination

A: Reads to the area that has not been updated
   -> Reads from the copy source area
B: Reads to the area that has been updated
   -> Reads from the copy destination area

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
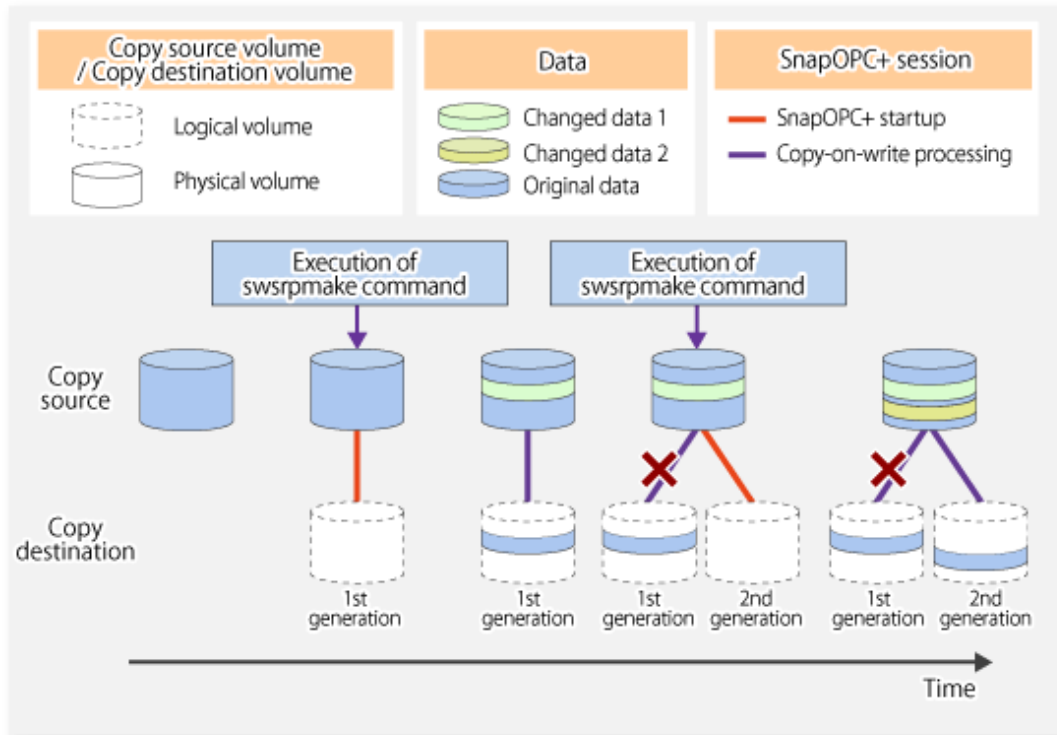
1. Logical copy is performed from the copy source to the copy destination.

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".

🅿 Point
・・
It is recommended to set the Snap Data Pool using the ETERNUS Web GUI when using SnapOPC+.
For details, refer to "6.1.1.2 Snap Data Volume and Snap Data Pool".
・・

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

Figure 6.7 1:3 Replication Operations Using SnapOPC+
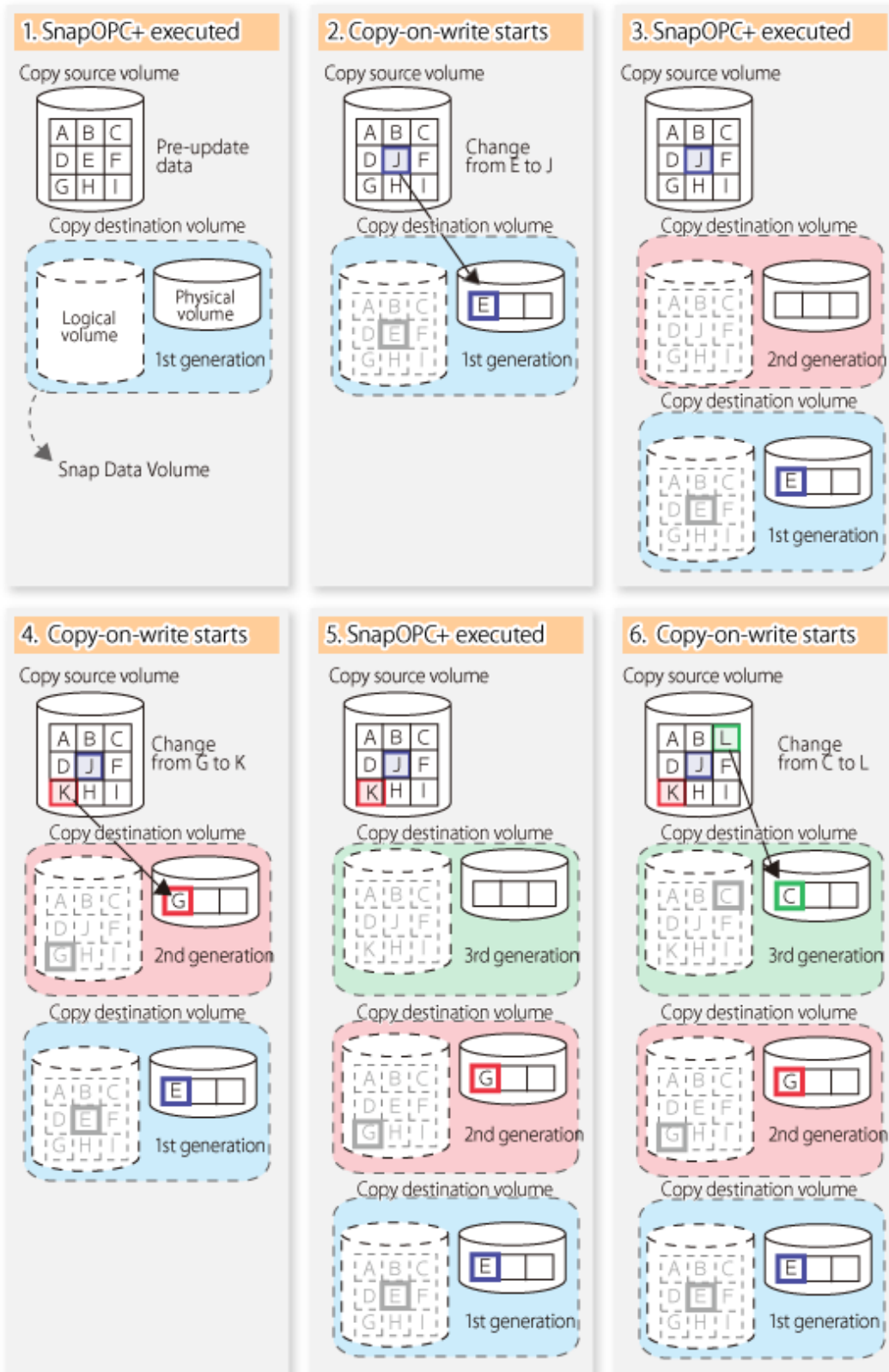
Due to the mechanism and features of SnapOPC+, it is assumed that it will be used as a backup to enable recovery from minor errors, such as operator mistakes and software errors. In order to be prepared for hardware errors, Fujitsu recommends that SnapOPC+ be used in conjunction with the copying of all data by means of OPC/QuickOPC/EC/REC.

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

Table 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	Snap Data Volume
1:N operation	Available	Available (recommended): Access performance to the copy source volume is better than with SnapOPC. Also, compared with SnapOPC, less physical space is required at the copy destination volume.
Snap generation numbers	No	Yes
Restoration using the replication function	Yes	Yes (*1)
Usefulness	- Tape backup temporary area - Backup of file servers or similar that have a small amount of updates	- Tape backup temporary area - Backup of file servers or similar that have a small amount of updates

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

6.1.1.2   Snap Data Volume and Snap Data Pool

Snap Data Volume

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

Note

When there is insufficient Snap Data Volume capacity, it is not possible to access source volume (Snap Data Volume).
When there is insufficient capacity, refer to "7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool".

Snap Data Pool

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

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

> 📝 **Note**
> ....
> When there is insufficient Snap Data Pool capacity, it is not possible to access the copy destination (Snap Data Volume).
> When there is insufficient capacity, refer to "7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool".
> ....

Figure 6.8 Image of Snap Data Volume Extension
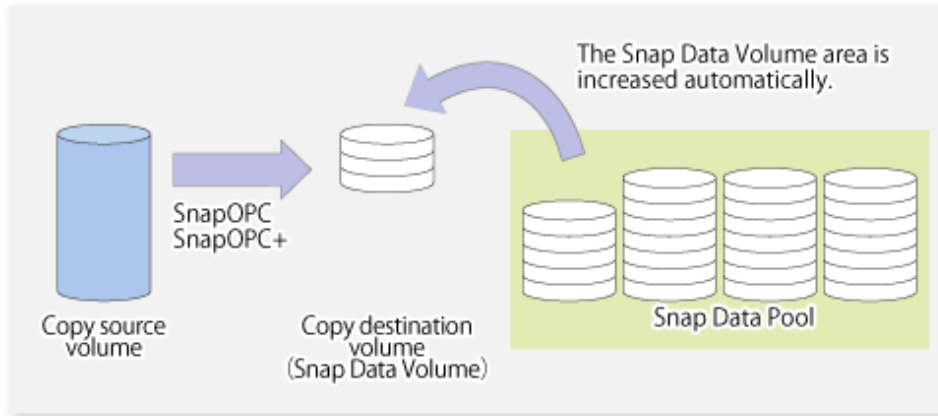
6.1.2 Synchronized Replication Processing

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 6.9 Synchronized Replication Processing
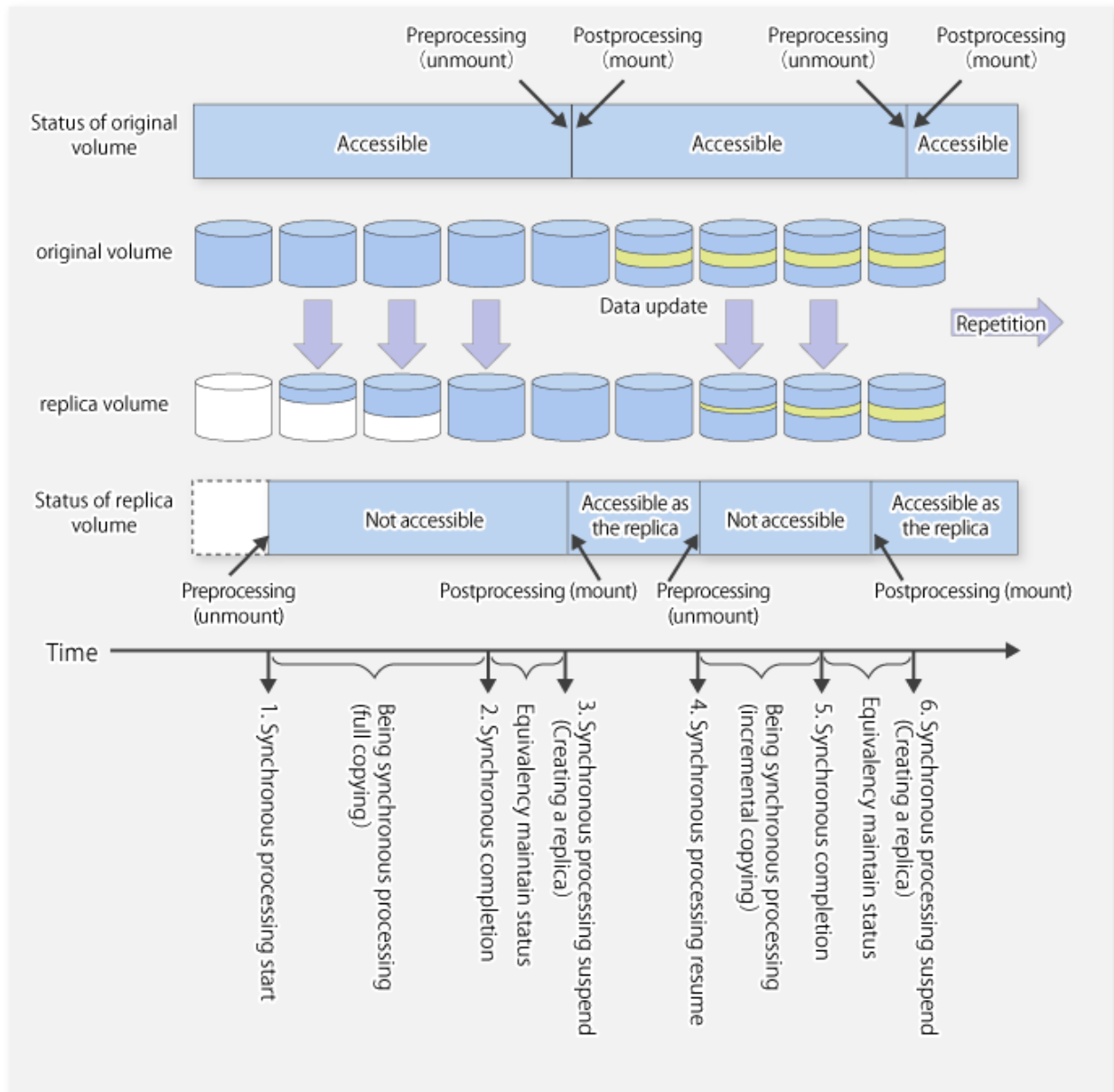
![Note]

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

- The swsrpmake command cannot be executed unless both the source volume and replica volume are in the equivalency maintain state.

Note

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 will be 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 6.10 Configuration of Servers That Perform Replication
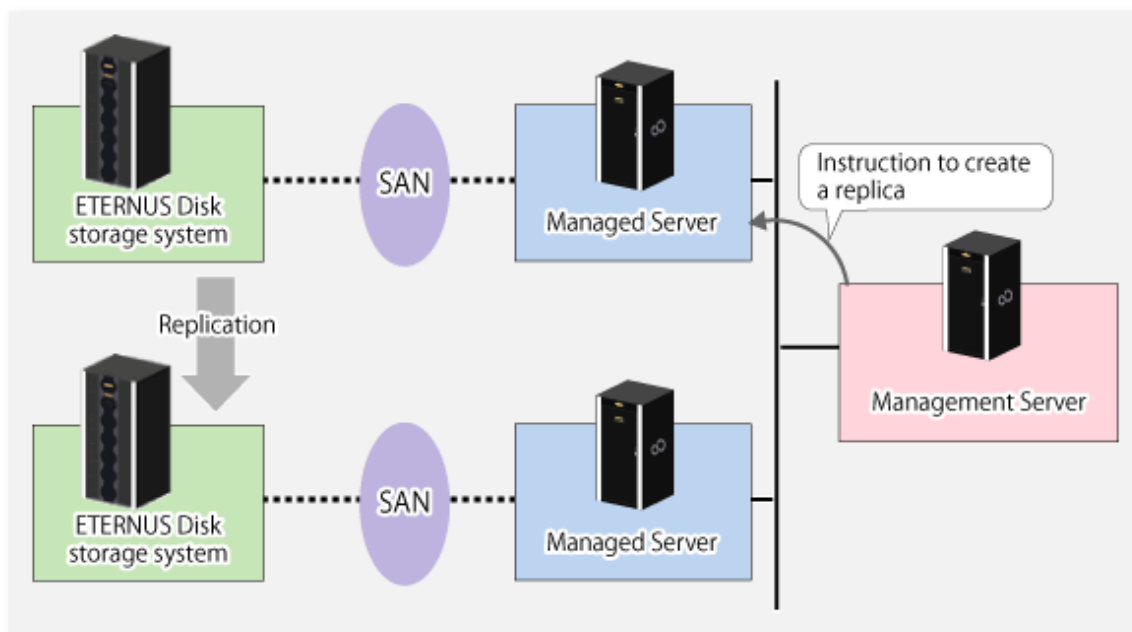
Note

. . . .

- 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.

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6.2.2 Determining Replication Target

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

Point

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

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

. . . .

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

- Copy direction

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

  Bi-directional

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

  Uni-directional

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

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

  In the case of replication between servers, you can specify whether to allow replication to be performed on either the source server or destination server, or on both servers.

  Original Server

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

  Replica Server

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

  Both Servers

    Sets both the source and destination servers as operational servers.

It is possible to create a group by arranging multiple source volumes and destination volumes.
In addition, the operation for multiple source volumes and destination volumes can be performed in a group. For details, refer to "6.4.7 Creating Groups".

Figure 6.11 Servers Used in Performing Replication
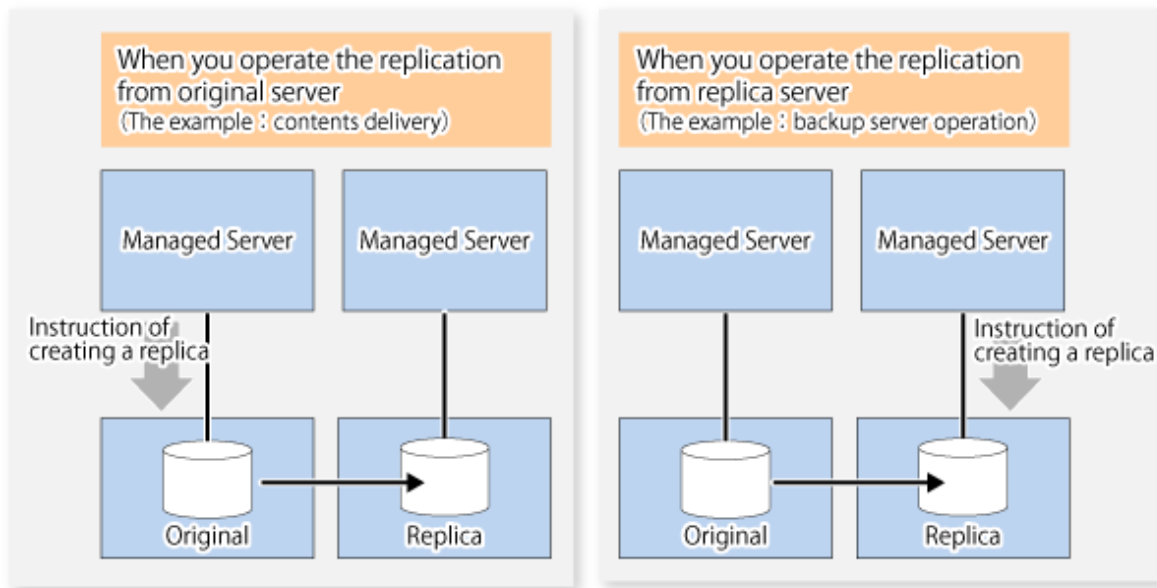
In this manual, a Managed Server used to perform replication is called the operational server. An original server or replica server is specified as the operational server.
An operational server can perform all of the replication functions. In contrast, any other type of server can use only the information display function and operational release function.

Note

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

- In order to set up a volume as a source volume, there are some points which should be taken into consideration. For details, please refer to "9.1.1 General Notes", for notes on determining a replication target.

  - 9.1.1.1 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 will be 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 6.12 Source Volume and Replica Volume for Multiple Logical Disks
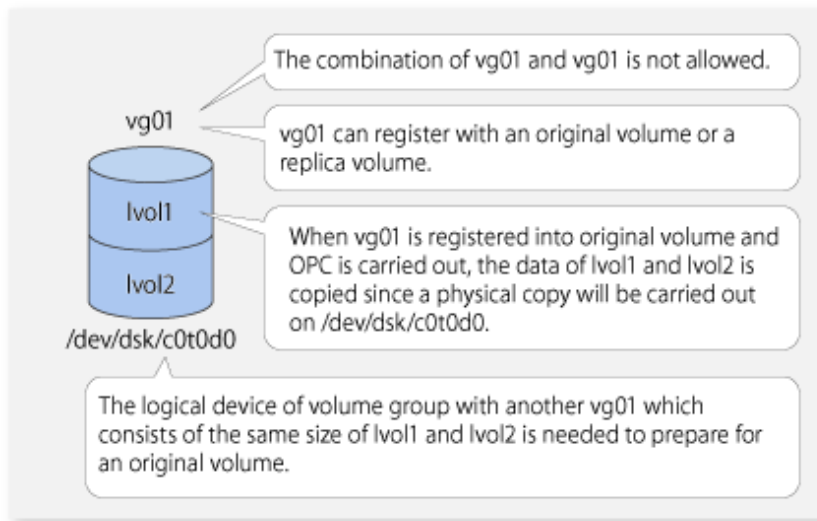
6.2.3 Notes on Configuration of SnapOPC/SnapOPC+ Replication

6.2.3.1 Notes on Session Configurations

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

Figure 6.13 If One Session Is Set for Snap Data Volume
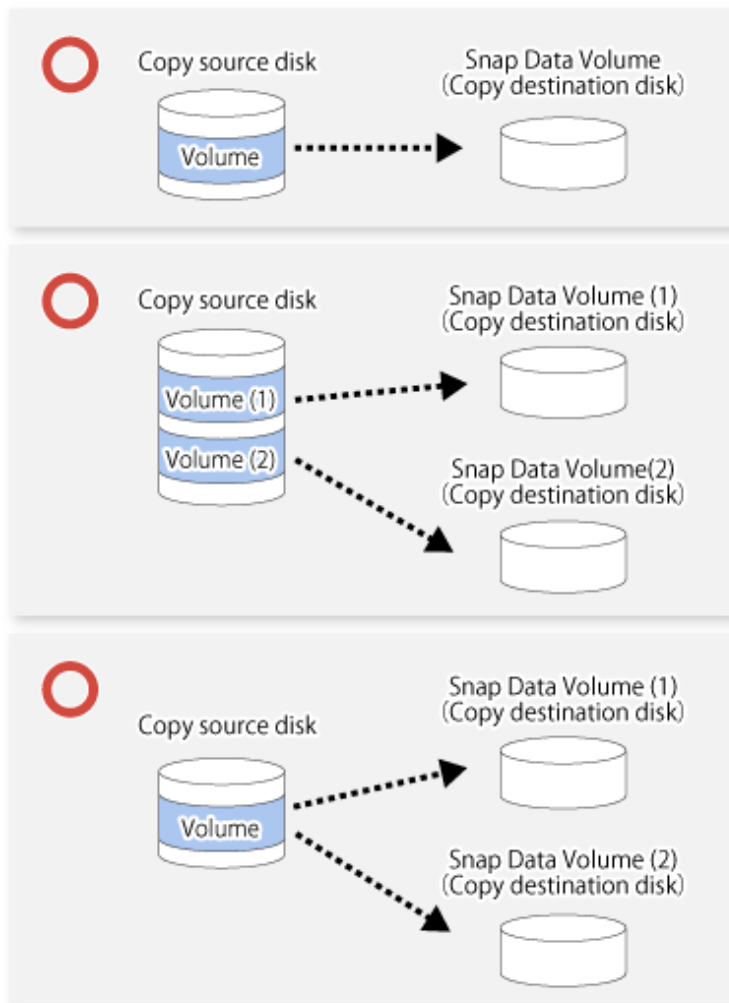
Accordingly, multiple sessions cannot be set up for a single Snap Data Volume, as shown in the following figure:

Figure 6.14 If Multiple Sessions Are Set for Snap Data Volume
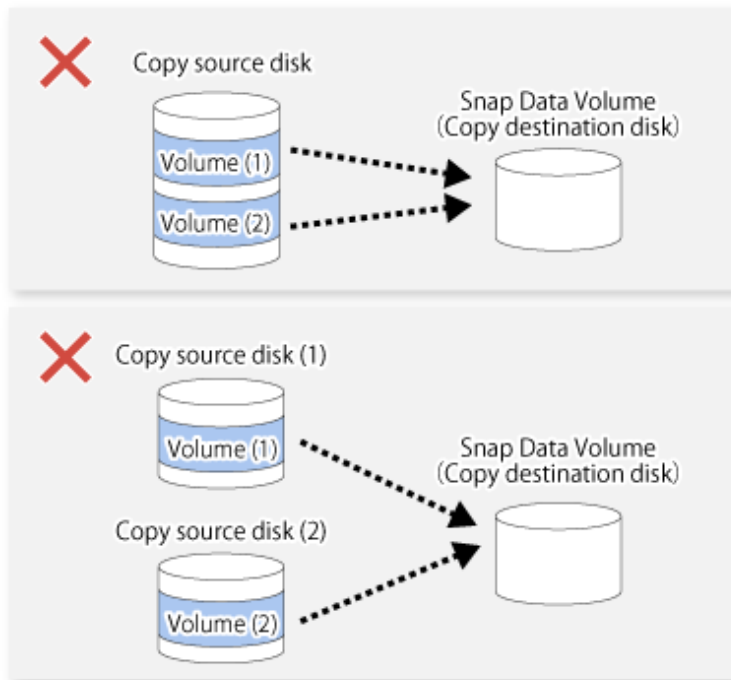
6.2.3.2   Creating Snap Data Volume and Snap Data Pool

Create a Snap Data Volume and a Snap Data Pool by performing the following steps:

1. Estimating the physical capacity for the Snap Data Volume and the capacity for the Snap Data Pool.

2. Creating and initializing the Snap Data Volume.

3. Creating the Snap Data Pool.

Estimating Physical Capacity for Snap Data Volume and Capacity for Snap Data Pool

In order to estimate the physical capacity of the Snap Data Volume and the capacity of the Snap Data Pool, measure the updated amount of the replication source volume.
How to measure the update amount of the replication source volume will differ depending on 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.

The amount of the updated on the copy source volume can be measured using the swstestupdate command.

Make this measurement using the following procedure:

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

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

2. Start transactions. Blocks that are updated by transactions will be recorded on the hardware.

3. After the measurement period has elapsed, check the number of blocks that have been updated.

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

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

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

The formula for estimating the capacity is as follows:

- When using only the Snap Data Volume (when the Snap Data Pool is not configured):

```
(Updated volume of replication source volume) * (safety coefficient) < (Physical capacity of the
Snap Data Volume)
```

- When using the Snap Data Pool (when the Snap Data Pool has been configured):

```
(Updated volume of replication source volume) * (safety coefficient) < (Physical capacity of the
Snap Data Volume + Capacity of the Snap Data Pool)
```

P Point
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If estimation in advance is difficult, it is advised that the sum of the capacity of the Snap Data Volume and the capacity of the Snap Data Pool is 30-50% of the total capacity of the copy source. As this is an advised value, it is necessary to change the capacity of the Snap Data Pool in accordance with the operation status.
....

Creating and Initializing Snap Data Volume

Create and initialize the Snap Data Volume using ETERNUS Web GUI.

P Point
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- Configure the logical capacity of the Snap Data Volume to be of the same capacity as the replication source disk.

- In order to avoid wasteful consumption of the Snap Data Volume physical capacity, keep updates after starting a SnapOPC+/ SnapOPC copy session to a minimum by performing operations such as file system creation before starting the copy session.
....

Creating Snap Data Pool

Create the Snap Data Pool using ETERNUS Web GUI.

P Point
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According to the estimation formula, specify the capacity of the Snap Data Pool.
....

6.2.3.3 Snap Data Volume/Snap Data Pool Monitoring

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

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

- When using only the Snap Data Volume (when the Snap Data Pool is not configured):
  Specify "stat" subcommand in the swstsdv command, and regularly monitor whether there is insufficient Snap Data Volume capacity.

- When using the Snap Data Pool (when the Snap Data Pool has been configured):
  Specify "poolstat" subcommand in the swstsdv command, and regularly monitor whether there is insufficient Snap Data Pool capacity.

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

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

When there is insufficient Snap Data Volume or Snap Data Pool capacity, refer to "7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool".

Creating Access Volume

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

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

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

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

The following operations can be executed using the Access volume:

- Snap Data Volume Initialization

- Snap Data Volume Status Display

- Snap Data Pool Status Display
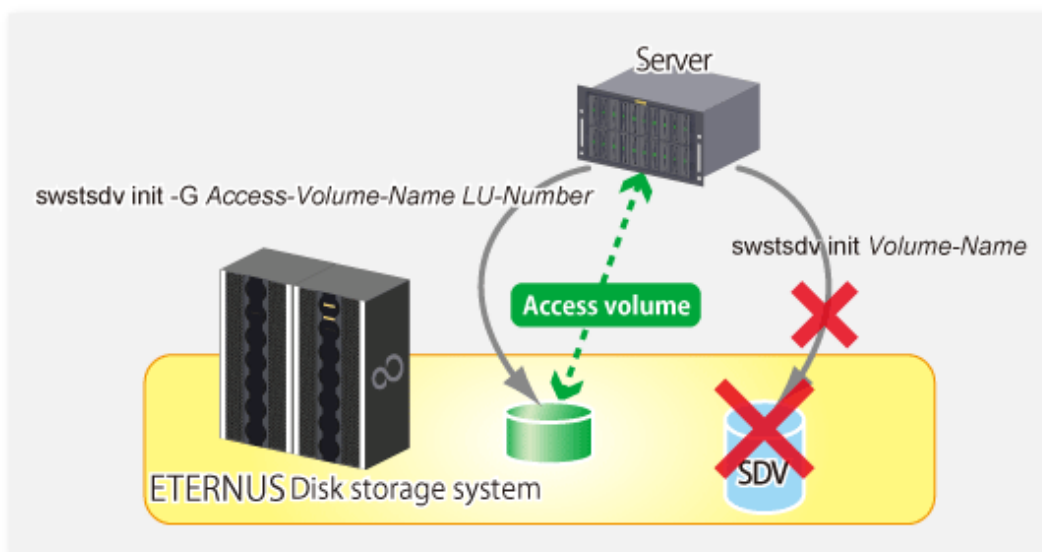
6.2.3.4 Cluster Operations

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

- Permit the Snap Data Volume 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
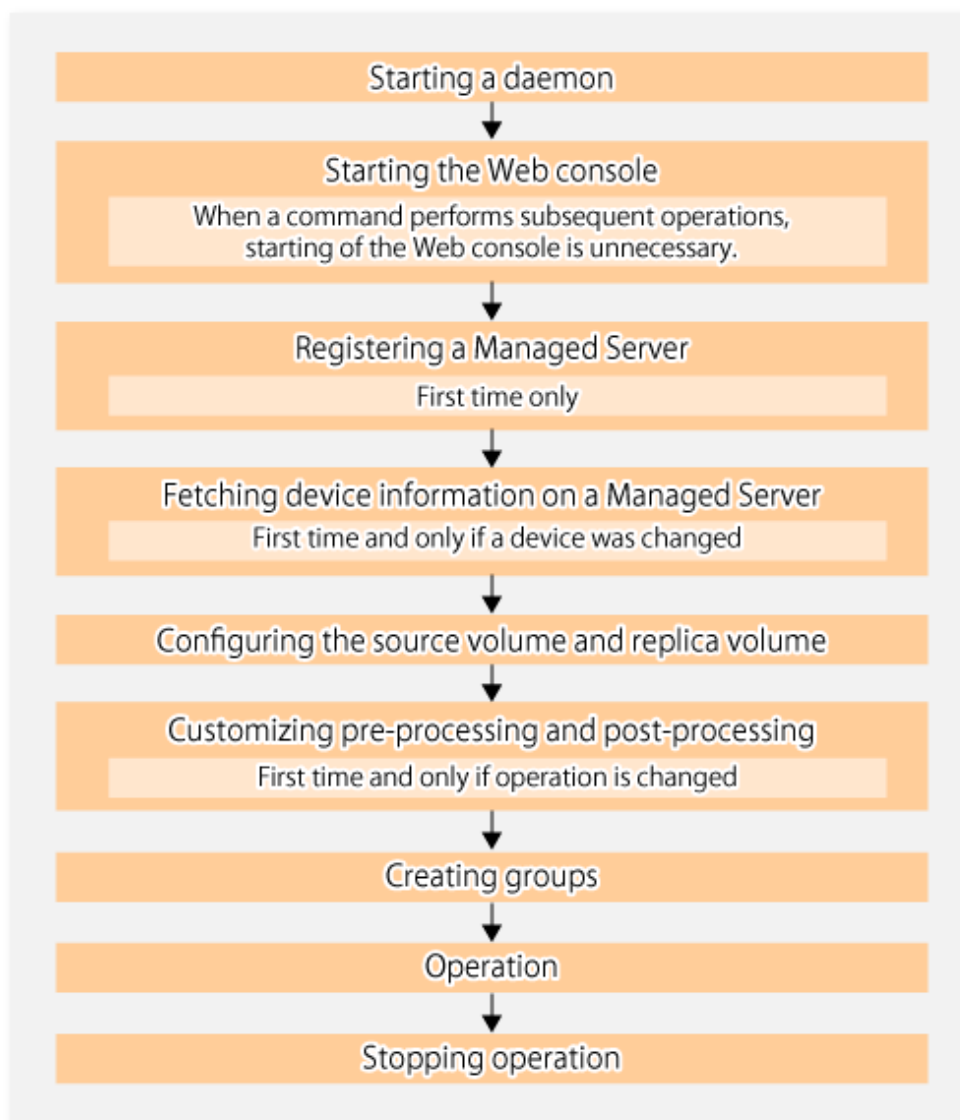
6.4 Preparations

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 the 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.

6.4.4 Fetching Device Information on Managed Server

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

📝 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 will be used in the replication. The information on the registered source volume and replica volume can be checked with the swsrpvolinfo 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.

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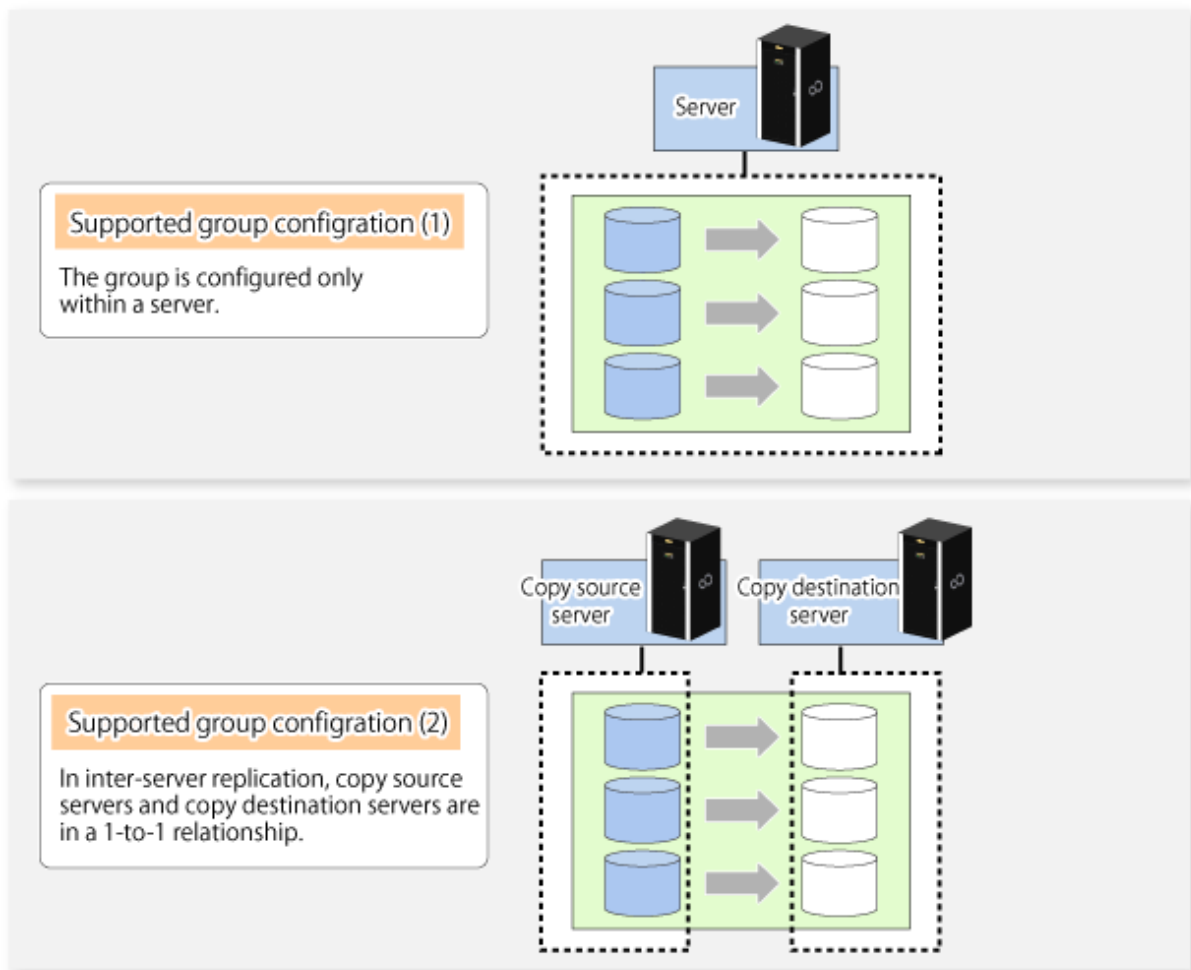
- The operational servers and the copy directions must all match. The values for the operational servers and the copy directions can be checked using the **Op-Server** and **Copy** columns displayed by executing the swsrpvolinfo command.

Unsupported group configuration (1)

In inter-server replication, there are multiple copy source servers for a single copy destination server.

Unsupported group configuration (2)

In inter-server replication, there are multiple copy destination servers for a single copy source server.

Unsupported group configuration (3)

Inter-server and intra-server replication coexists.
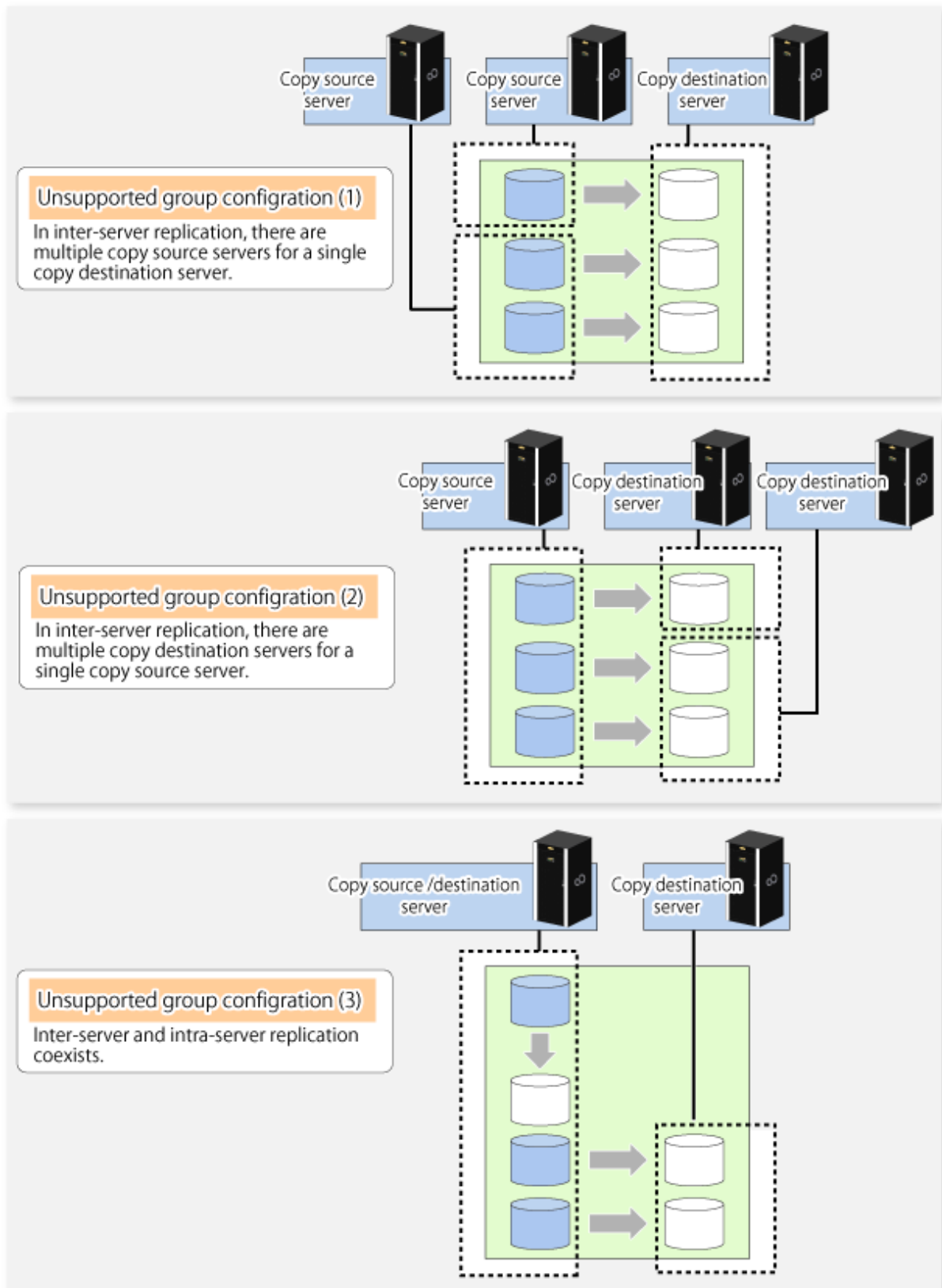
- The replication volume information being registered must not be registered in any other group.

Supported group configuration

Either the copy sources or destinations are duplicated.

Group A

Group B

Unsupported group configuration

The copy sources and destinations are duplicated with another group.
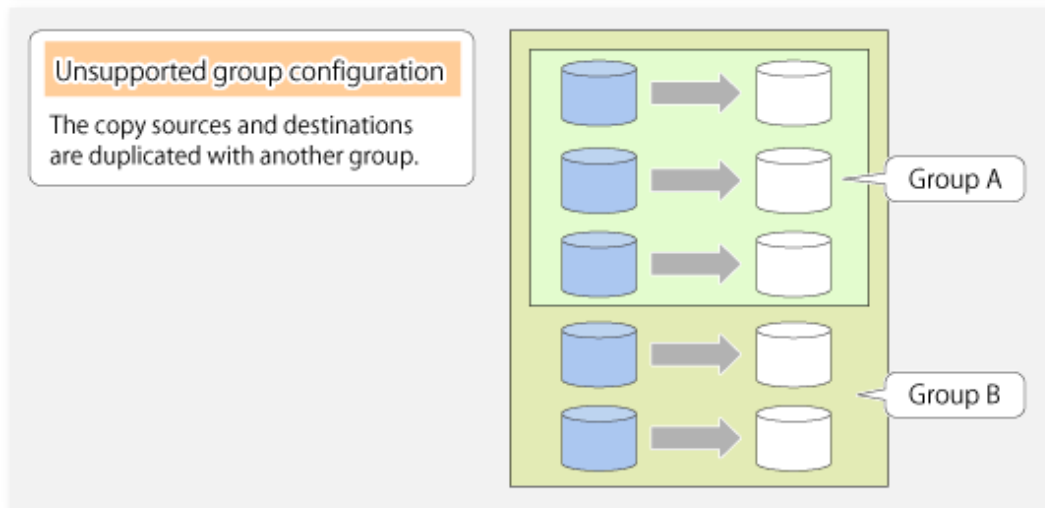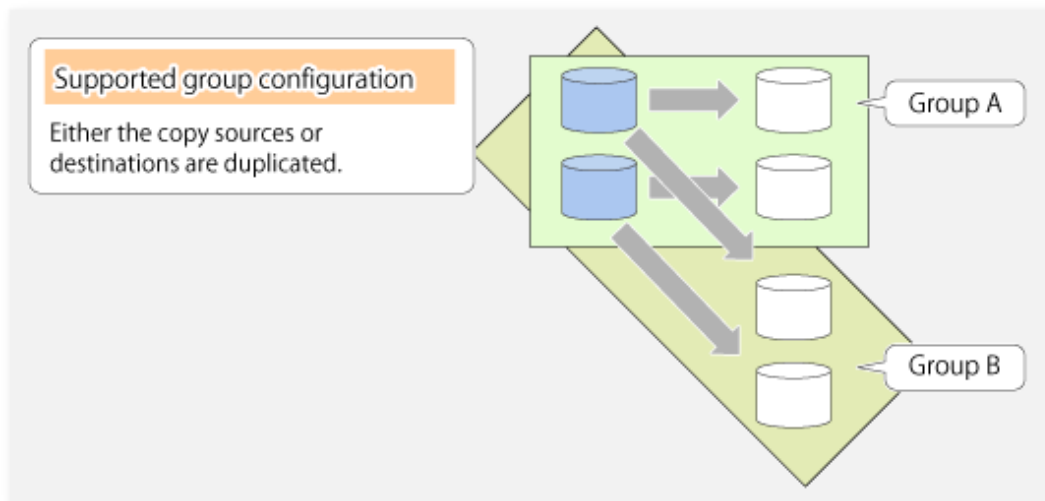
Group A

Group B

- Source volumes and destination volumes must not be duplicated within the group.

Unsupported group configuration (1)

The replication source is duplicated.

Unsupported group configuration (2)

The replication destination is duplicated.
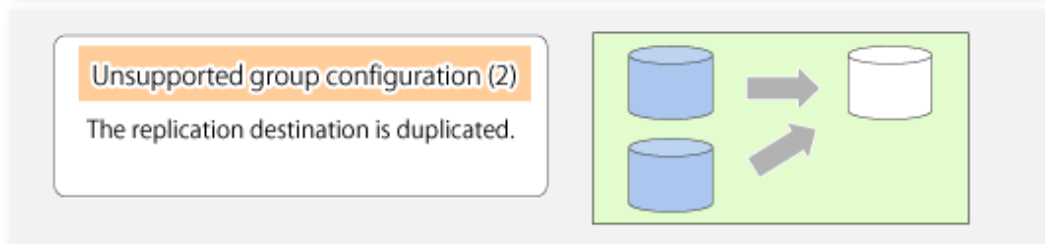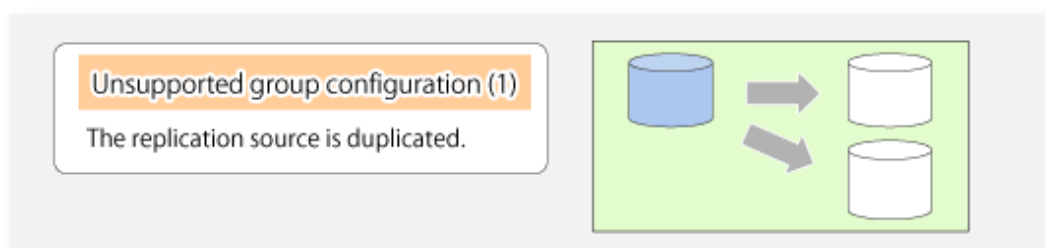
6.4.7.2 How to Create Groups

Groups are created using the swsrpsetvol command.
Information for created groups can be displayed using the swsrpvolinfo 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/c1t2d10@SRC /dev/dsk/
c1t2d20@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol -Xgroup GRP1 /dev/dsk/c1t2d11@SRC /dev/dsk/
c1t2d21@TARG-1
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpvolinfo -L
Server Original-Volume    Size     Replica-Volume        Size      Copy
Op-Server Group
SRC    /dev/dsk/c1t2d10@SRC 4.0 Gbyte /dev/dsk/c1t2d20@TARG-1 4.0 Gbyte bi-
direction both      GRP1
SRC    /dev/dsk/c1t2d11@SRC 4.0 Gbyte /dev/dsk/c1t2d21@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)
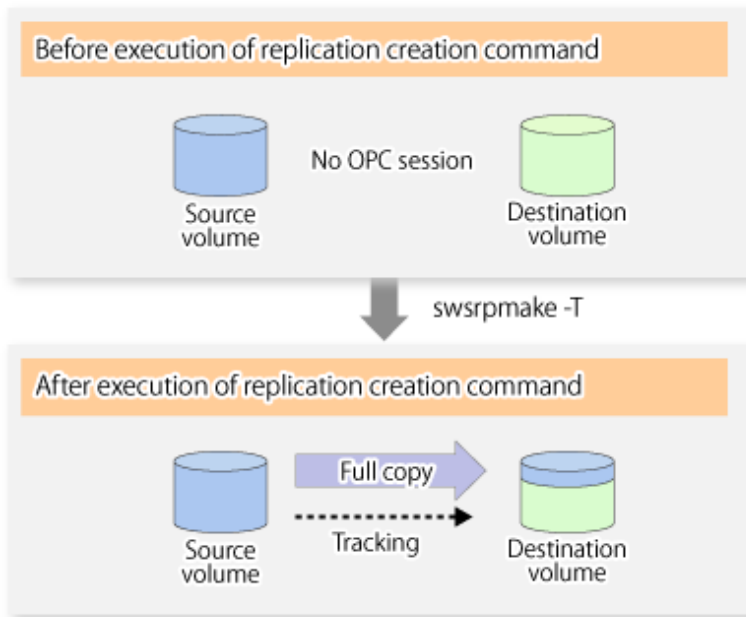
To check the execution status of physical copying, use the swsrpstat command in the same way as for an ordinary snapshot replication. After snapshot processing (OPC physical copy) is complete, only tracking processing is active.
To check the tracking status, execute the swsrpstat command with the -L option.

Figure 6.17 When Snapshot Processing Is Completed
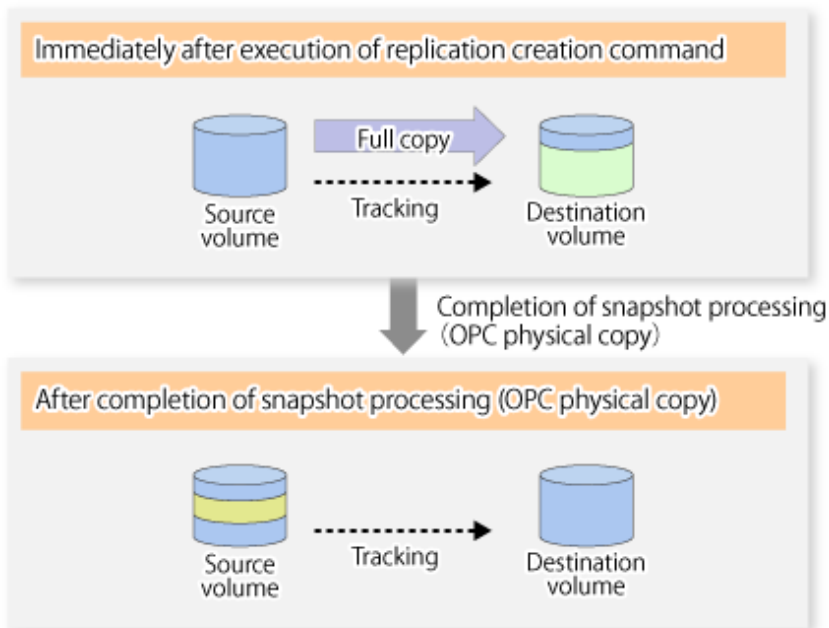
Entering the swsrpmake command with the -T option specified during tracking processing performs the physical copying of only the data that has been generated since the previous snapshot processing. This means that physical copying can be accomplished in a shorter period of time.

Figure 6.18 When Replication Creation Command Is Executed (2nd Time)
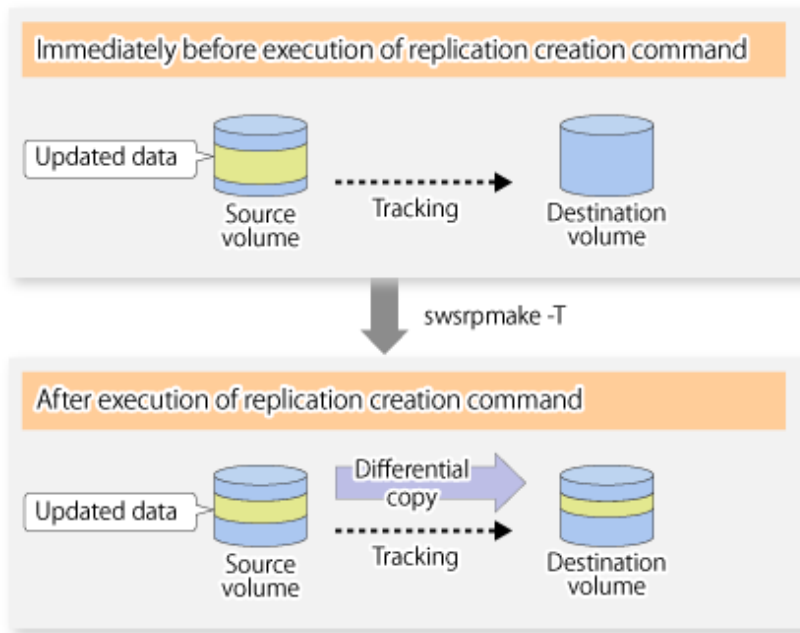
When you want to perform a restoration while tracking processing is being executed, you need to perform a restoration by OPC (to achieve this, you need to execute the swsrpmake command without the -T option). QuickOPC cannot be executed in the reverse direction while tracking processing is being executed. 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 will be set up between the copy source volume and the copy destination volume.

Example

```
# /opt/FJSVswsrp/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
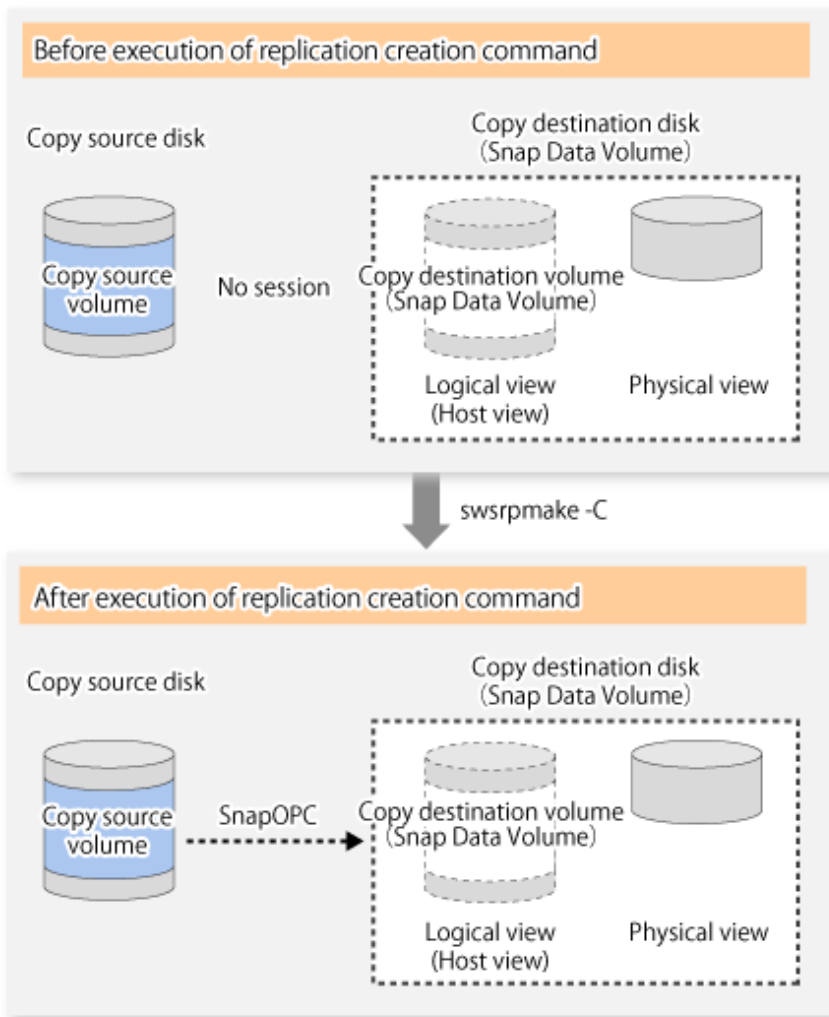
Unlike normal OPCs and QuickOPCs, SnapOPCs do not copy all of the data from the source volume, but instead copy only the data that has been updated on the source or destination since SnapOPC started. This kind of copy processing is referred to as "Copy-on-Write".

Figure 6.20 When Copy Source Volume Is Updated
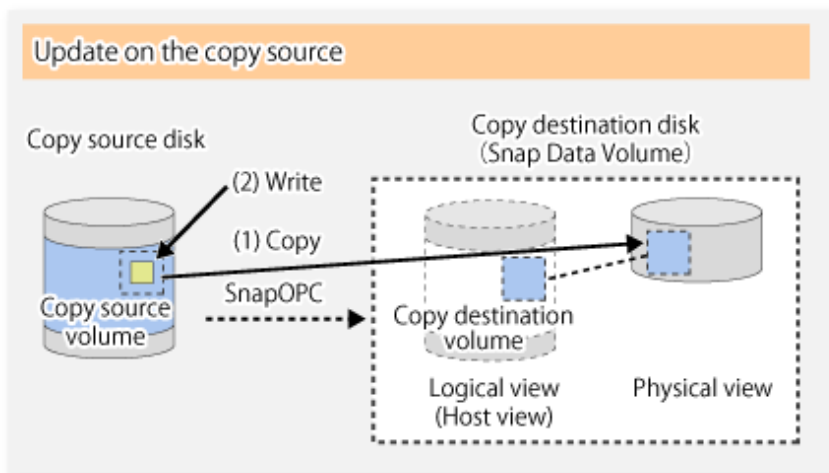
Figure 6.21 When Copy Destination Volume Is Updated
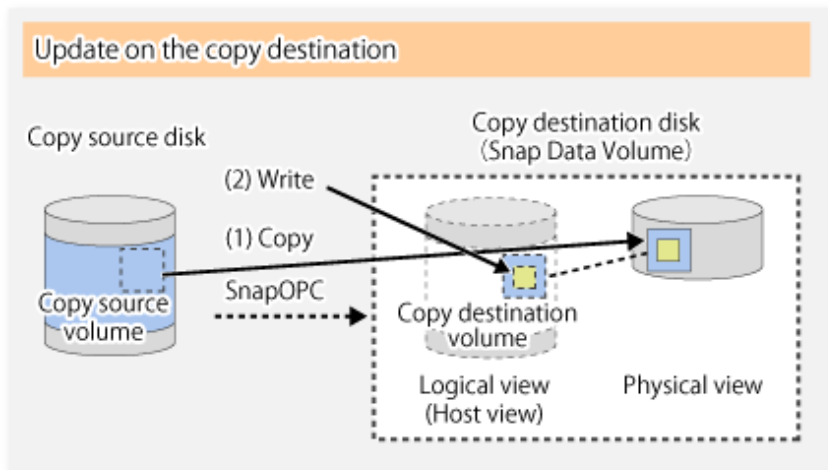
Note: The units for host I/O and storage device copies are different (512 bytes for host I/O and 8 kilobytes for storage device copies), and therefore data copies also occur when the copy destination is updated.

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

Example

```
# /opt/FJSVswsrp/bin/swsrpstat -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 swsrpmake command is executed again during SnapOPC processing, the SnapOPC session that has already been set up will be cancelled, and a new session will be set up.

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

Example

```
# /opt/FJSVswsrp/bin/swsrpstat -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 "7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool".
. . . .

Perform restorations from Snap Data Volume by running an OPC using the swsrpmake command.

```
# /opt/FJSVswsrp/bin/swsrpmake /dev/dsk/c1t1d2 /dev/dsk/c1t1d1
FROM=/dev/dsk/c1t1d2@SV1,TO=/dev/dsk/c1t1d1@SV1 swsrpmake 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
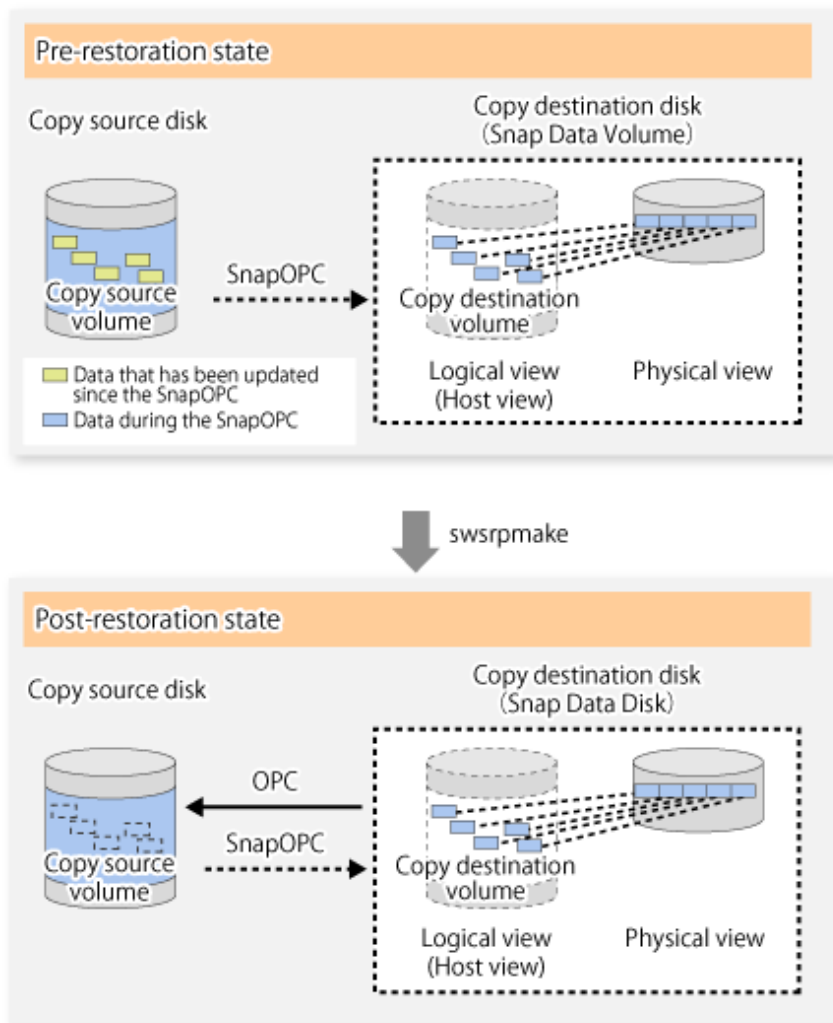
The execution status of restorations can be checked by specifying the -E option with the swsrpstat command.

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/c1t1d1
Server Original-Volume    Replica-Volume        Direction Status Execute
SV1    /dev/dsk/c1t1d1@SV1 /dev/dsk/c1t1d2@SV1 reverse   snap   80%
#
```

![Note icon] **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
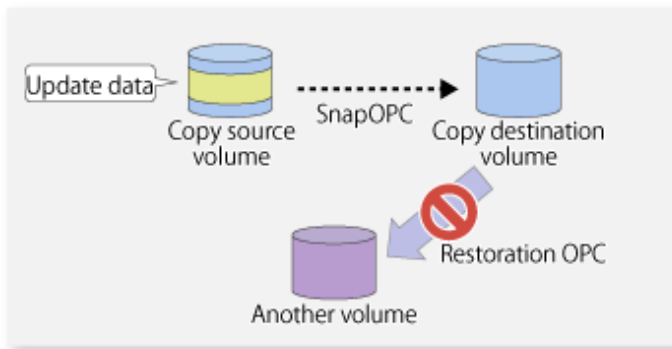
Additionally, if SnapOPCs are being performed to multiple copy destination volumes, restoration cannot be performed.

Figure 6.24 When SnapOPC Is Performed for Multiple Copy Destination Volumes
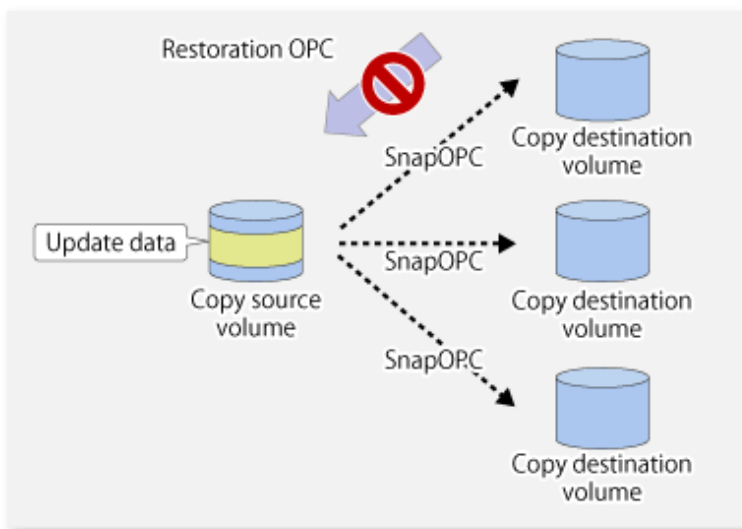
In this case, restoration using an OPC can be performed by cancelling the other SnapOPCs. However, the backup data on the copy destination volumes whose SnapOPC sessions were cancelled will be lost.

Figure 6.25 When SnapOPC Session Cancelled to Perform Restoration
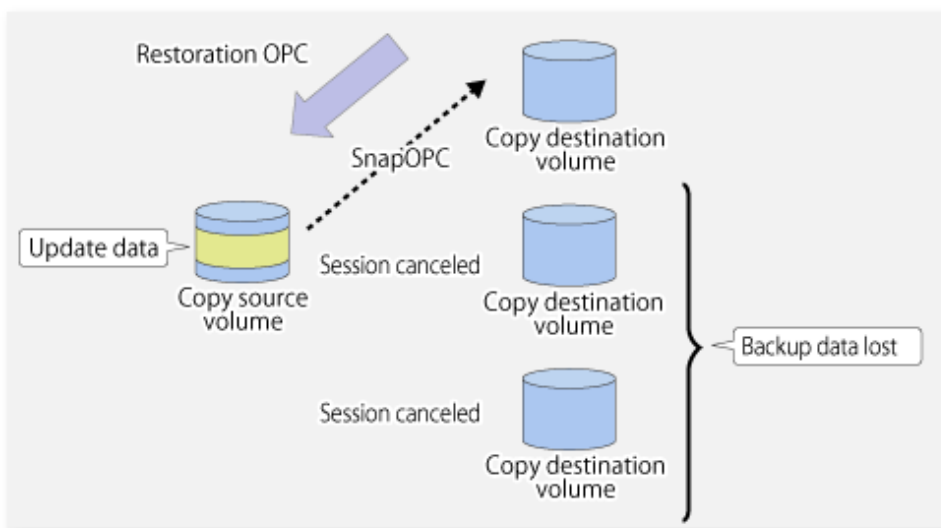
To perform a restoration while still maintaining all SnapOPC sessions, operating system copy functions (such as the cp command or the copy command) must be used for the restoration.

However, if restoration is performed using operating system functions, the amount of updated data on the source volume will increase, and there is a risk that the capacity of the SnapOPC volume will be insufficient.

Figure 6.26 When Performing Restoration without Cancelling SnapOPC Session
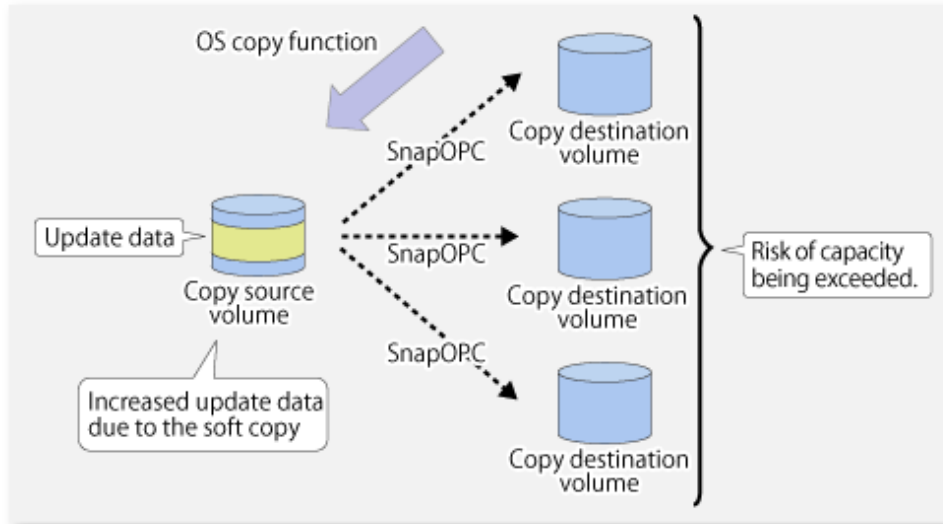
SnapOPC+ Type Replication

Execute the swsrpmake command using the -P option to perform SnapOPC+ replication. This sets a SnapOPC+ session between the copy source volume and the copy destination volume. After the session is set, copy-on-write is performed between the copy source volume and the copy destination volume.

An execution example of the swsrpmake command with the -P option is shown below.

Execution Example

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

At this time, the (logically copied) copy destination volume is saved as a snap generation number.
The next time this command is executed with a different copy destination volume for the same copy source volume, the copy-on-write processing being executed between the copy source volume and the previous generation of the copy destination volume is stopped. Then, a SnapOPC+ session is set between the copy source volume and the newly specified copy destination volume, and copy-on-write is performed.
An execution example of the swsrpmake command with the -P option for the newly specified copy destination volume is shown below.

Execution Example

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

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

🛈 Note

If an earlier snap generation (other than the oldest snap generation) is specified as the copy destination volume when the swsrpmake command is executed, the command terminates with an error. If the oldest snap generation is specified as the copy destination volume, that snap generation is automatically discarded and a replica is created as the newest snap generation. In this case,

subsequent snap generations (second, third) are assigned a snap generation number that is one generation prior (second generation => first generation, and third generation => second generation).

Figure 6.27 When Oldest Snap Generation Number Is Specified as Replication Volume

---
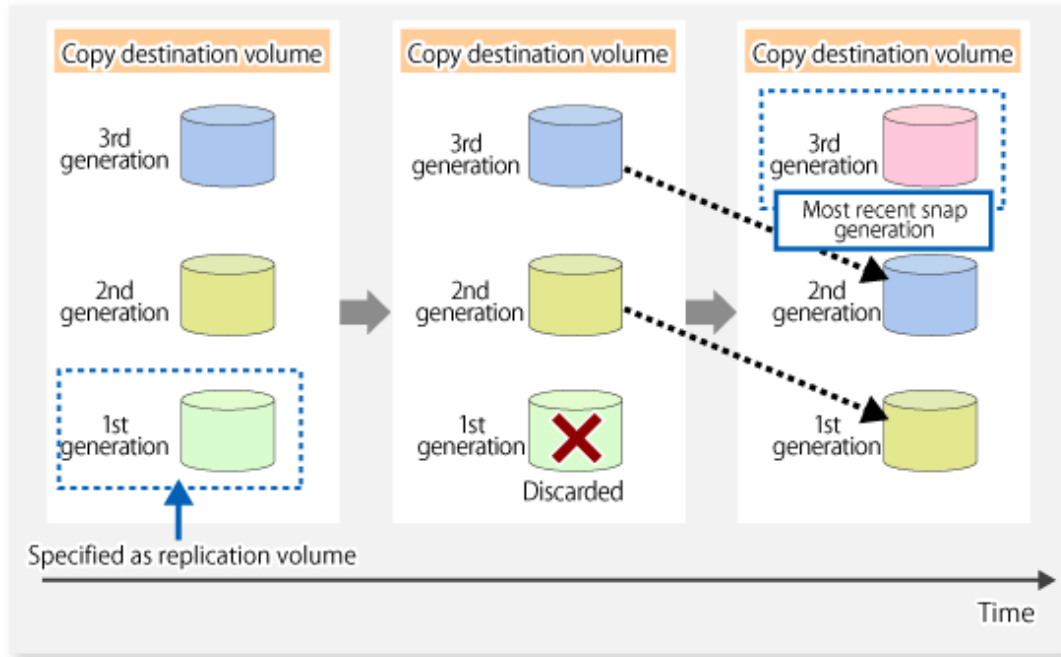
The operation status of SnapOPC+ replication can be checked by executing the swsrpstat command with the -L option.
For the most recent snap generation, "copy-on-write(active)" is displayed in the **Status** column. For past snap generations, "copy-on-write(inactive)" is displayed. In the **Update** column, 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/FJSVswsrp/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]
Note

When there is insufficient Snap Data Volume or Snap Data Pool capacity, the SnapOPC+ execution status changes to error suspend status ("failed"), and the execution status of SnapOPC+ that was executed before it will also change to error suspend status ("failed"). Replication volume of error suspend status ("failed") cannot be used.

The SnapOPC+ execution status can be checked in the swsrpstat command output result **Status** column.

Execution Example

```
# /opt/FJSVswsrp/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 "7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool".

. . . .

To restore from a Snap Data 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,TO=/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
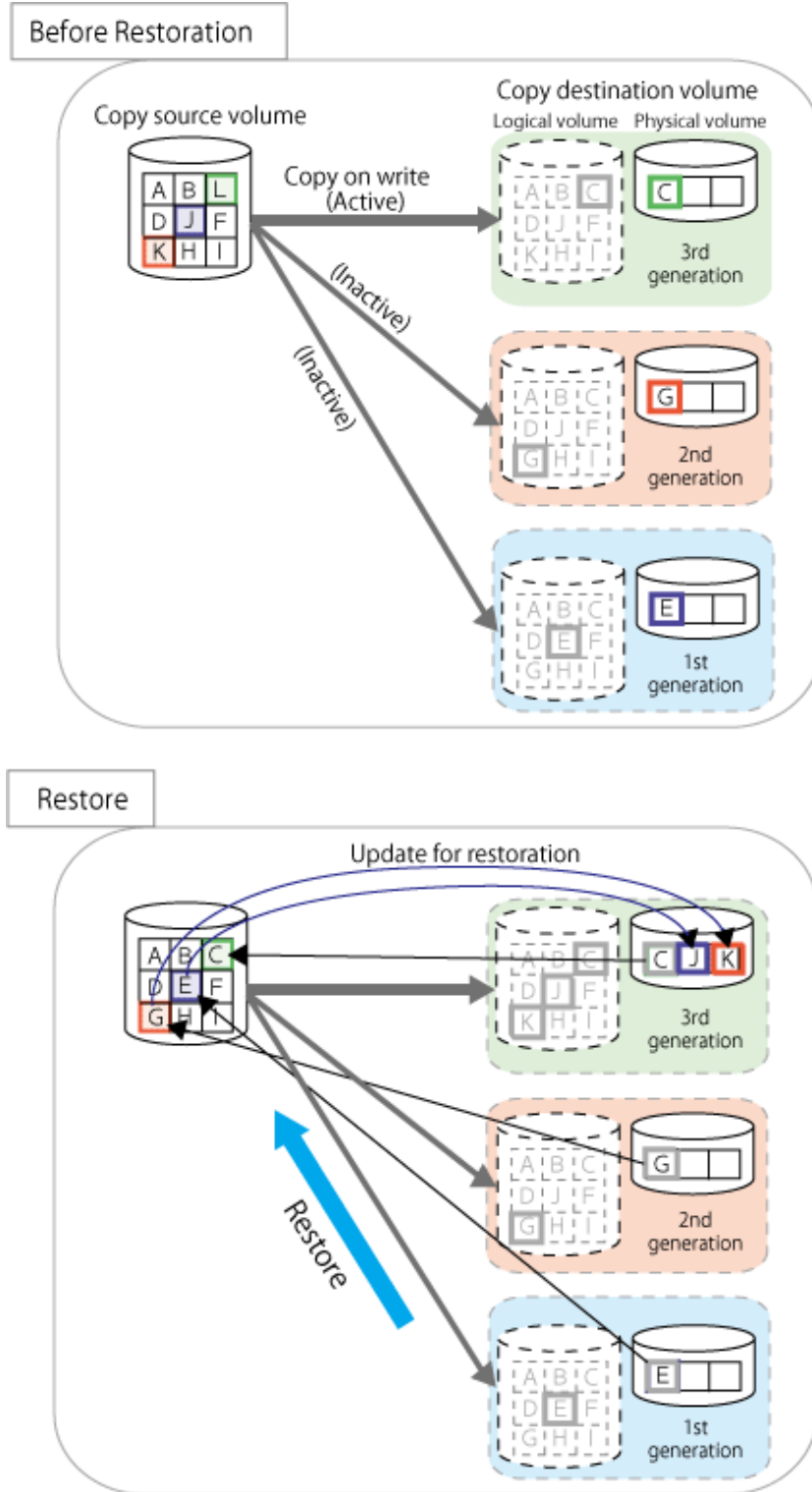
To check the restoration execution status, execute the swsrpstat command with the -E option.

```
# /opt/FJSVswsrp/bin/swsrpstat -E /dev/dsk/c1t1d0
Server Original-Volume     Replica-Volume       Direction Status Execute
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d1@SV1 ----       ----   ----
SV1    /dev/dsk/c1t1d0@SV1 /dev/dsk/c1t1d2@SV1 reverse    snap   80%
#
```

 Note

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

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

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

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

1. 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/FJSVswsrp/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. Execute the swstsdv command with the "stat" subcommand to find the total copy usage amount for the device in the previous step.

If a Snap Data Pool is used, also add the Snap Data Pool usage capacity.

[/dev/dsk/c1t1d2 disk usage]

```
# /opt/FJSVswsts/bin/swstsdv 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/FJSVswsts/bin/swstsdv 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.

To check the Snap Data Pool total capacity and the usage area capacity, execute the swstsdv command with the "poolstat" subcommand.

If the Snap Data Volume is not encrypted, then check the capacity of the usage area and the total capacity where Pool-Type is Normal. Otherwise, check the capacity of the usage area and the total capacity where Pool-Type is encrypted.

```
# /opt/FJSVswsts/bin/swstsdv poolstat -G /dev/dsk/c1t1d0
BoxID = 00E4000M3#####E450S20A####KD4030639004##
```

```
Pool-Type Rate Total(sector) Used(sector) Copy(sector) Host(sector) Free(sector)
Normal   10%  20971520      2097152      0            2097152      18874368
Encrypted 0%  20971520      0            0            0            20971520
#
```

The disk usage in this example is 15% =~ (2097152 + 1049040) / 20971520 x 100

If the value obtained by adding the size of the Snap Data Pool usage area to the restoration update amount is less than the total capacity, then restoration is possible. However, in order to safely perform restoration, it is recommended to extend the Snap Data Pool if the disk usage after restoration is predicted to exceed 70%.

In addition, if the disk usage is expected to exceed 50%, then consider extending the Snap Data Pool after restoration and increasing the monitoring frequency of the Snap Data Pool.

For details on Snap Data Pool monitoring, refer to "6.2.3.3 Snap Data Volume/Snap Data Pool Monitoring".

Note

If SnapOPC+ is being performed between the replication source volume and the replication destination volume, restoration cannot be performed to a volume other than the replication source volume.
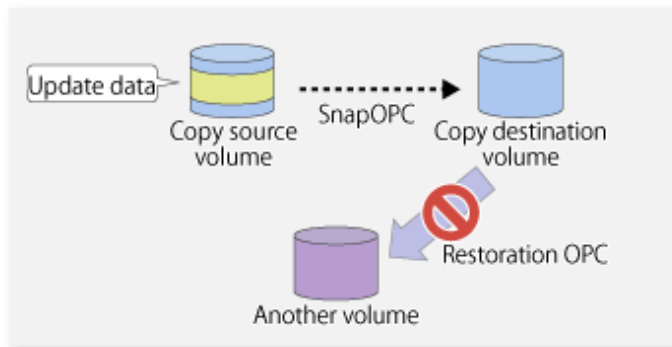
Point

As a precaution against hardware malfunctions with SnapOPC+, it is recommended to operate it in conjunction with making full copies using OPC/QuickOPC/EC(REC).
An example of performing QuickOPC on Sundays and SnapOPC+ on Mondays to Saturdays is displayed below.

Figure 6.29 Example of Operation Using SnapOPC+ and QuickOPC

....
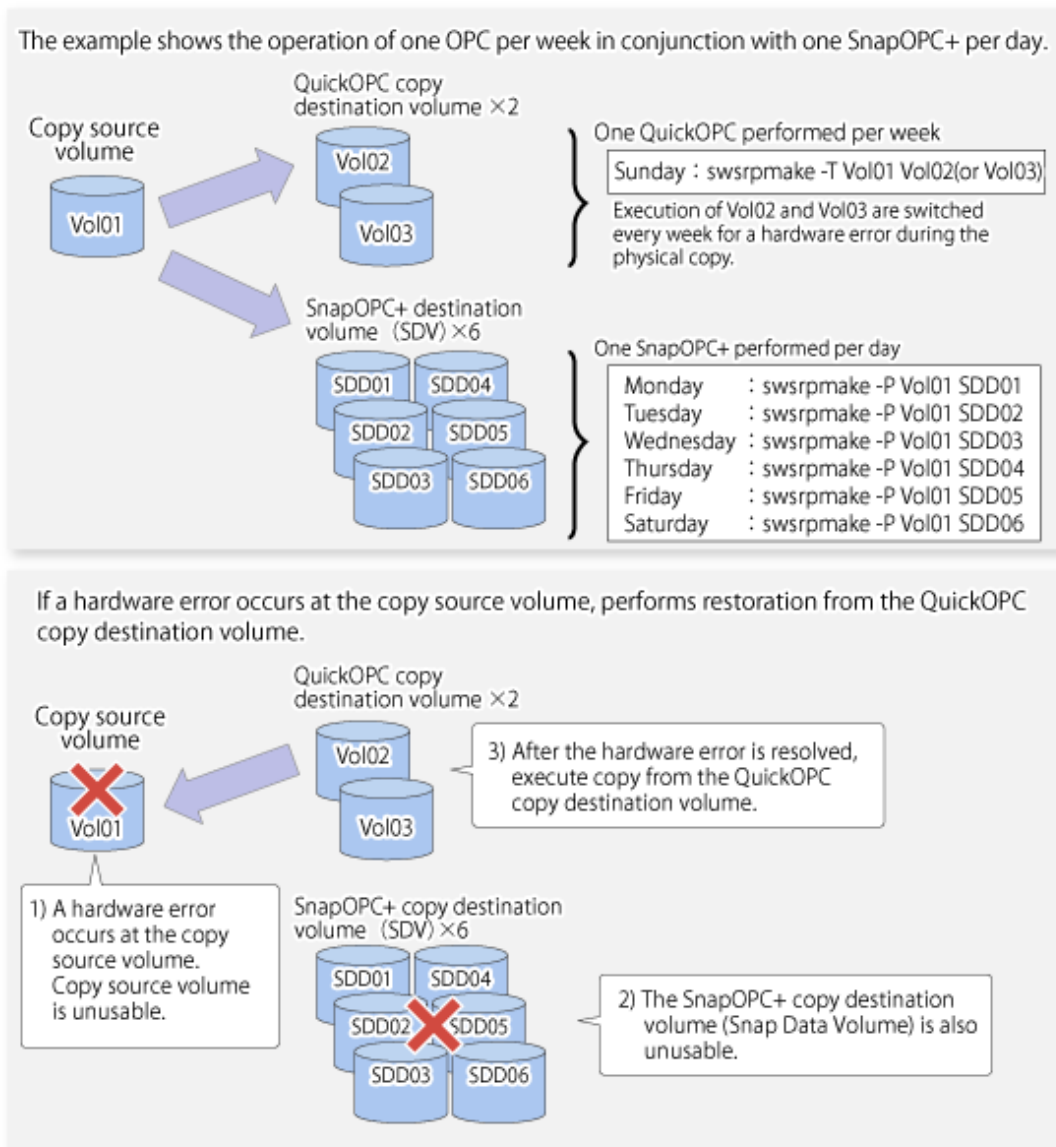
6.5.1.1 Concurrent OPC Functions

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
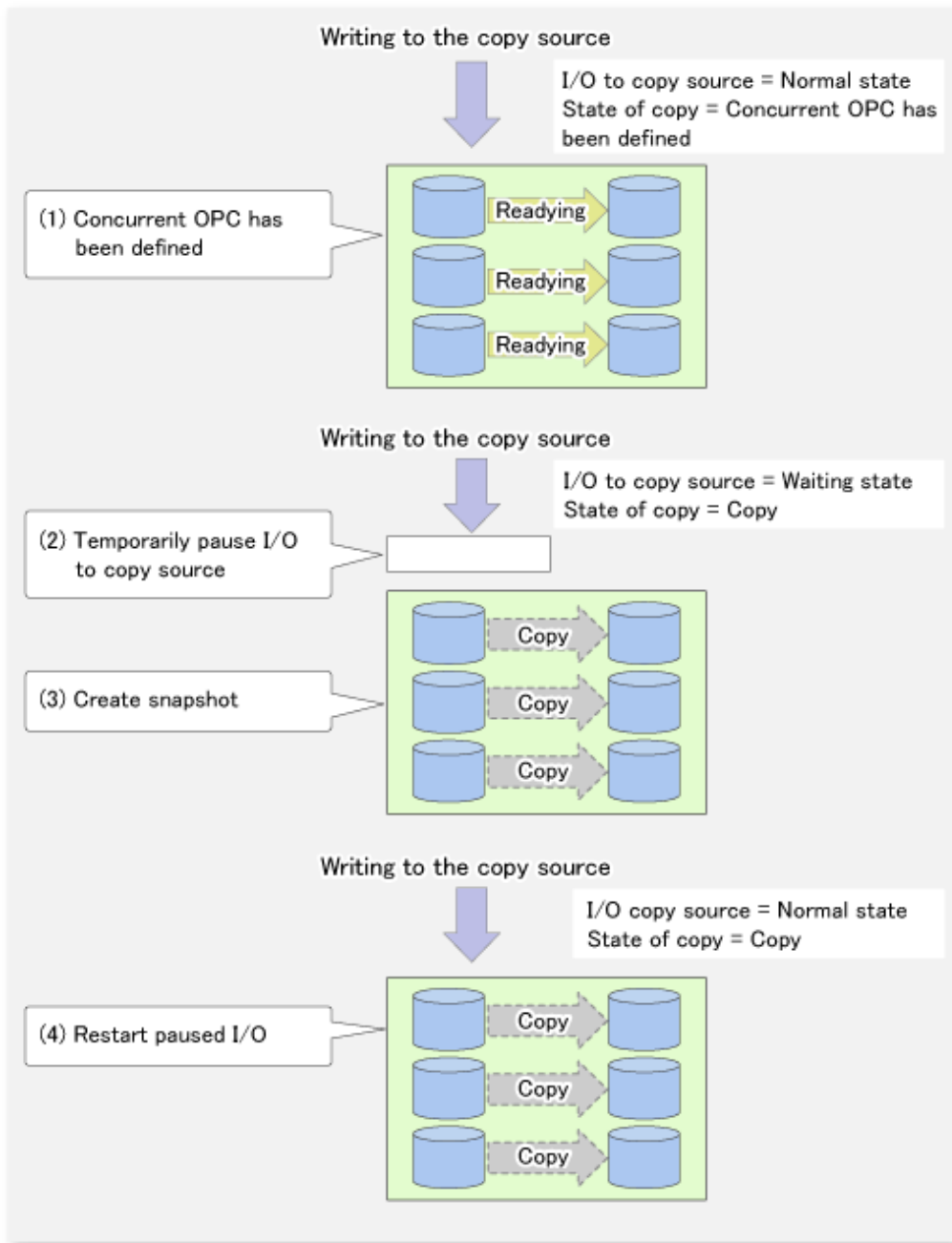
> **Note**
> ....
> - If you force-quit the swsrpcancel command with task manager or Ctrl-C, the session may remain defined concurrent OPC. In this case, execute the command again, or stop the session with the swsrpcancel command.
>
> - The maximum number of pairs that can simultaneously implement concurrent 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 transmission modes described below.

Table 6.2 Transfer Mode Types

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

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 swsrpchsync 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)
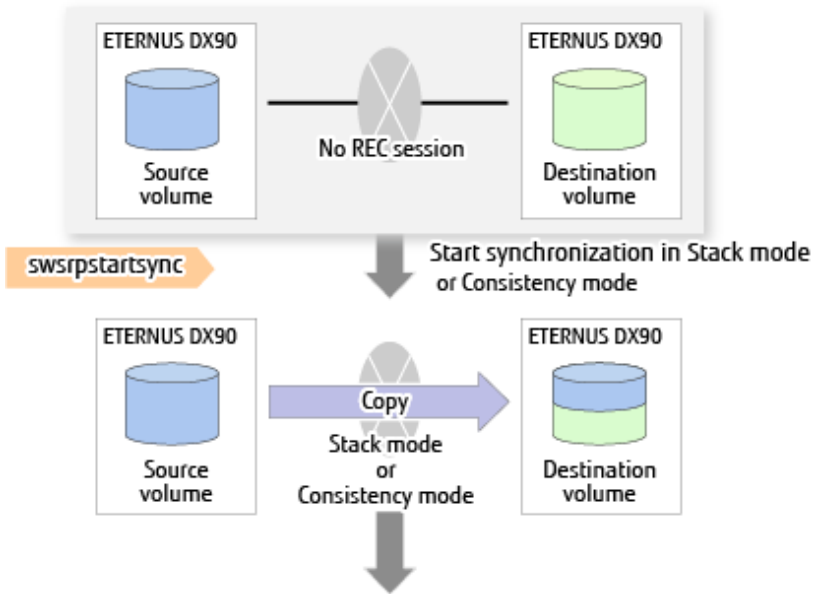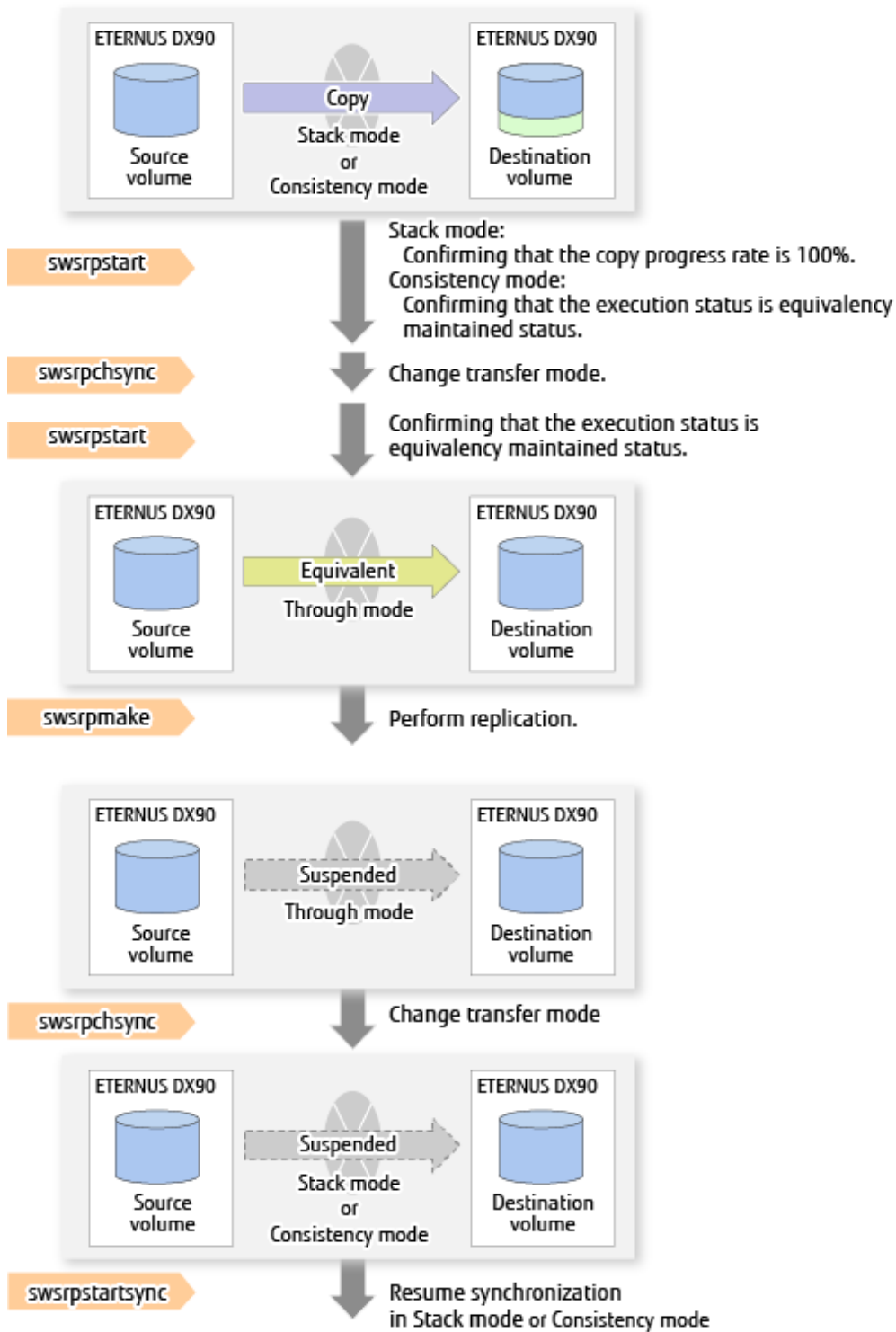
Point

- 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 will be longer as the data that has not yet been transferred will be 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
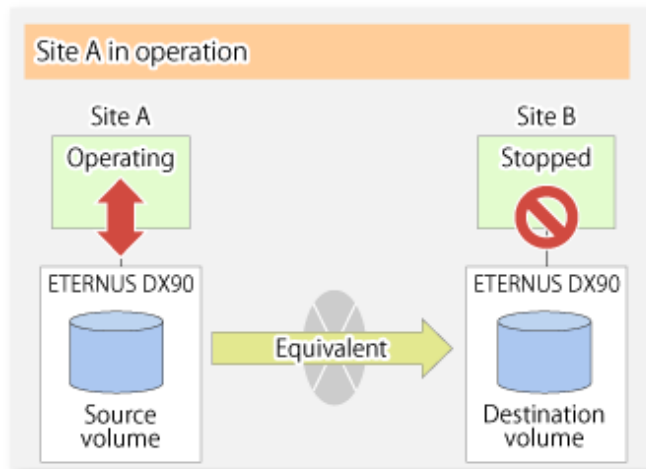
2. To switch the sites, execute the swsrpmake command to make a replication to Site B. Then, stop operating Site A.

   Figure 6.33 When Replication Creation Command Used to Create Replica at Site B
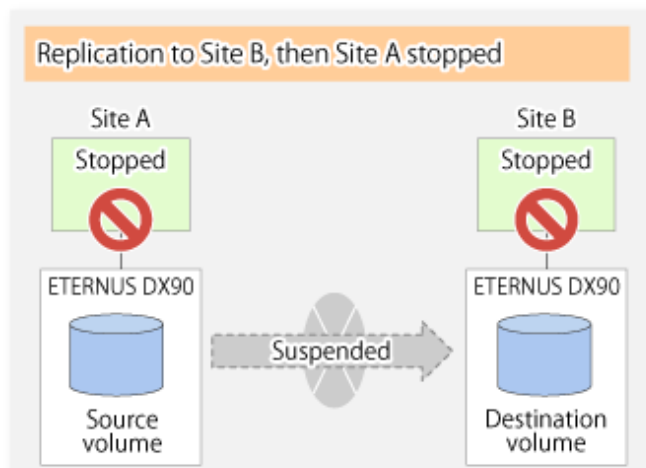
3. Execute the swsrprevsync command to reverse the copy direction.

   Figure 6.34 When Synchronization Reverse Command Is Executed
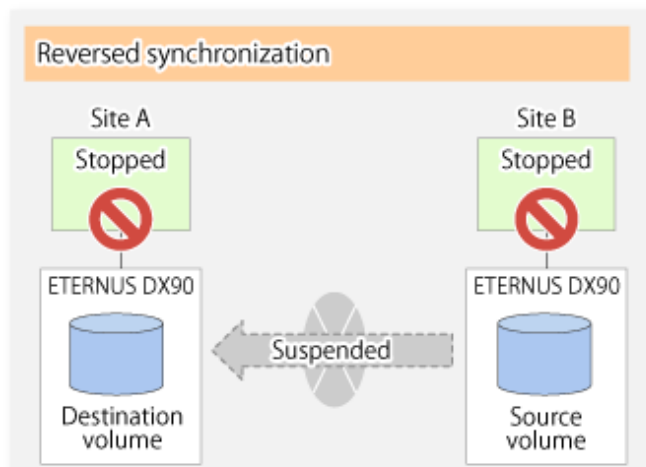
4. Bring Site B into operation. At this stage, synchronization is still suspended, thus any update to the volume at Site B is not reflected at Site A.

Figure 6.35 When Operation Is Started at Site B (Synchronization Suspend State)
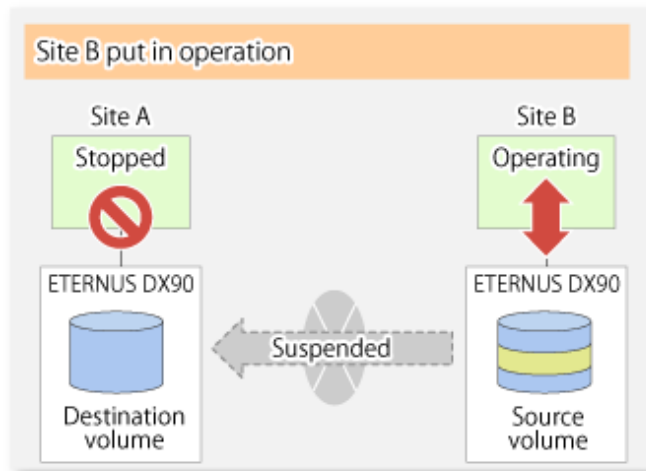
5. Start (resume) synchronization from Site B to Site A. Updates made to the volume in Site B while synchronization is suspended are reflected in Site A with differential copies.

Figure 6.36 When Operation Is Started at Site B (Synchronization Resumed)
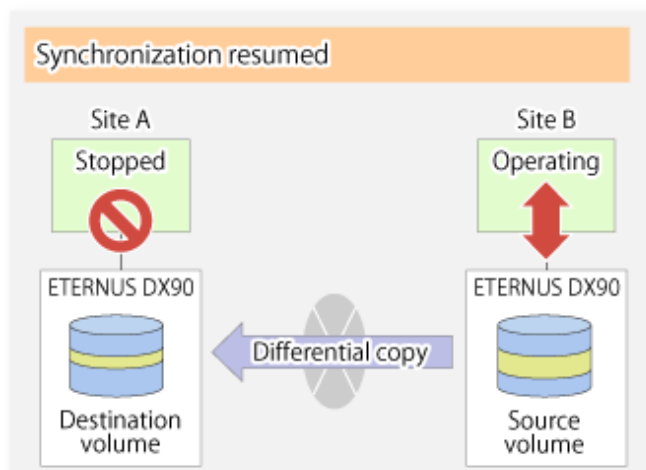
6.5.2.2.1 Initial Copy Skip Function

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.

1. Suppose that operations at Site A have stopped.

   Figure 6.37 If Operations at Site A Have Stopped
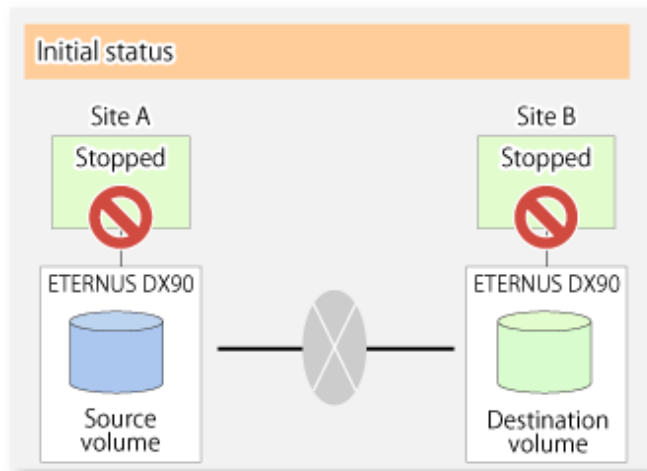
2. Next, synchronous processing begins, using the initial copy skip function. At this point, a REC session is set up, and the status is Replication Established. Data is not copied to the copy destination volume.

   Figure 6.38 When Synchronization Is Started by Initial Copy Skip Function
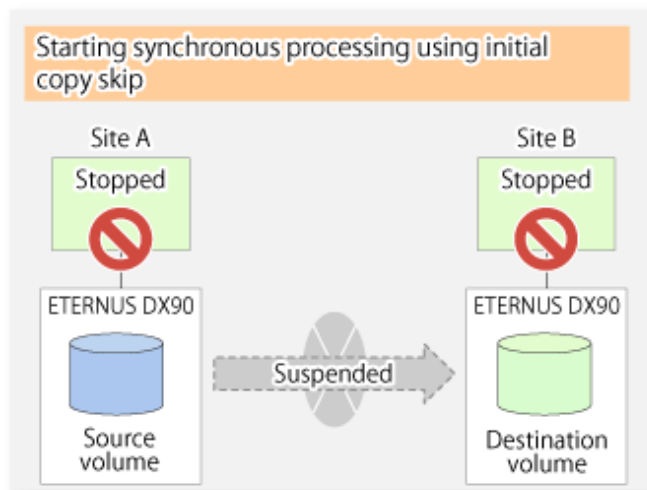
3. Next, the data on the copy source volume is backed up to tape.

Figure 6.39 When Copy Source Data Is Backed Up to Tape
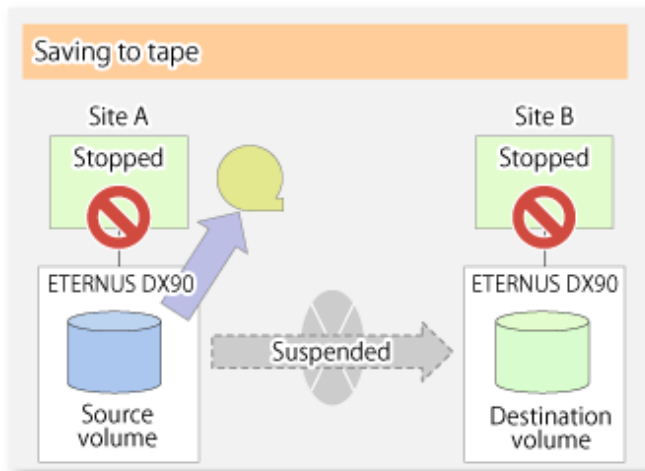
4. The tape medium is sent to Site B and jobs at Site A restart.

Figure 6.40 When Site A Operations Restart
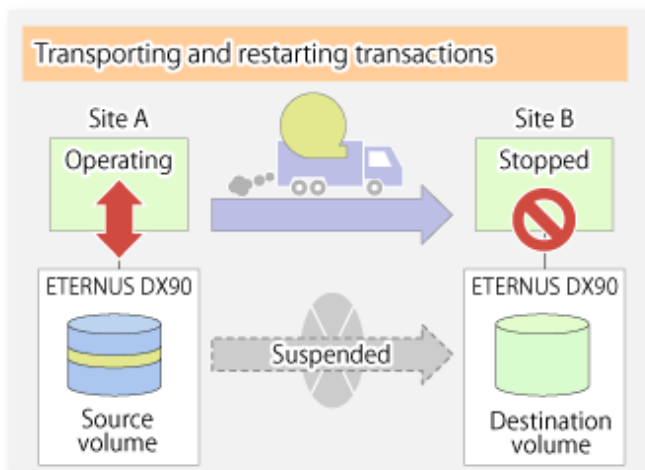
5. The data on the tape medium is restored to the copy destination volume. At this point, the data on the copy destination volume is the same as the data on the copy source volume that existed before operations restarted.

Figure 6.41 When Data Is Restored from Tape to Copy Destination
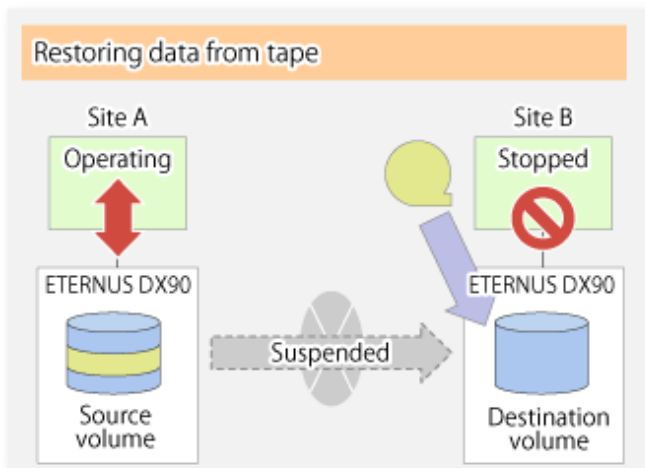
6. Synchronous processing restarts in Remain mode. Restarting synchronous processing in Remain mode means that only data that has been updated on the copy source volume is reflected on the copy destination volume. If Remain mode is not used, all data on the copy source volume is copied.

Figure 6.42 When Synchronization Is Restarted in Remain Mode
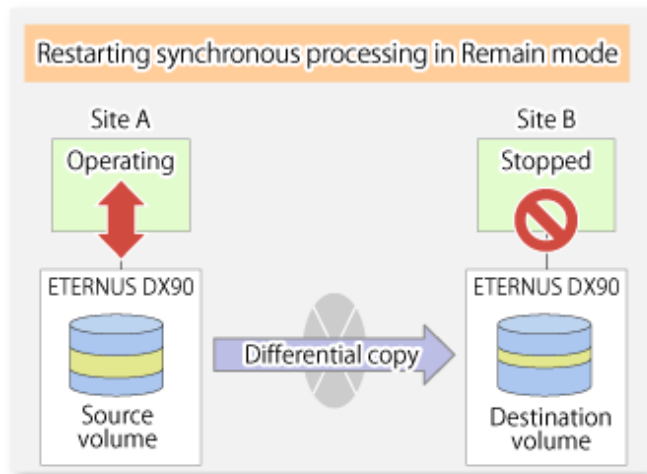
6.5.2.3 Concurrent Suspend Function

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 places within the ETERNUS Disk storage system is shown below.

Figure 6.43 Internal Operation of ETERNUS Disk Storage System
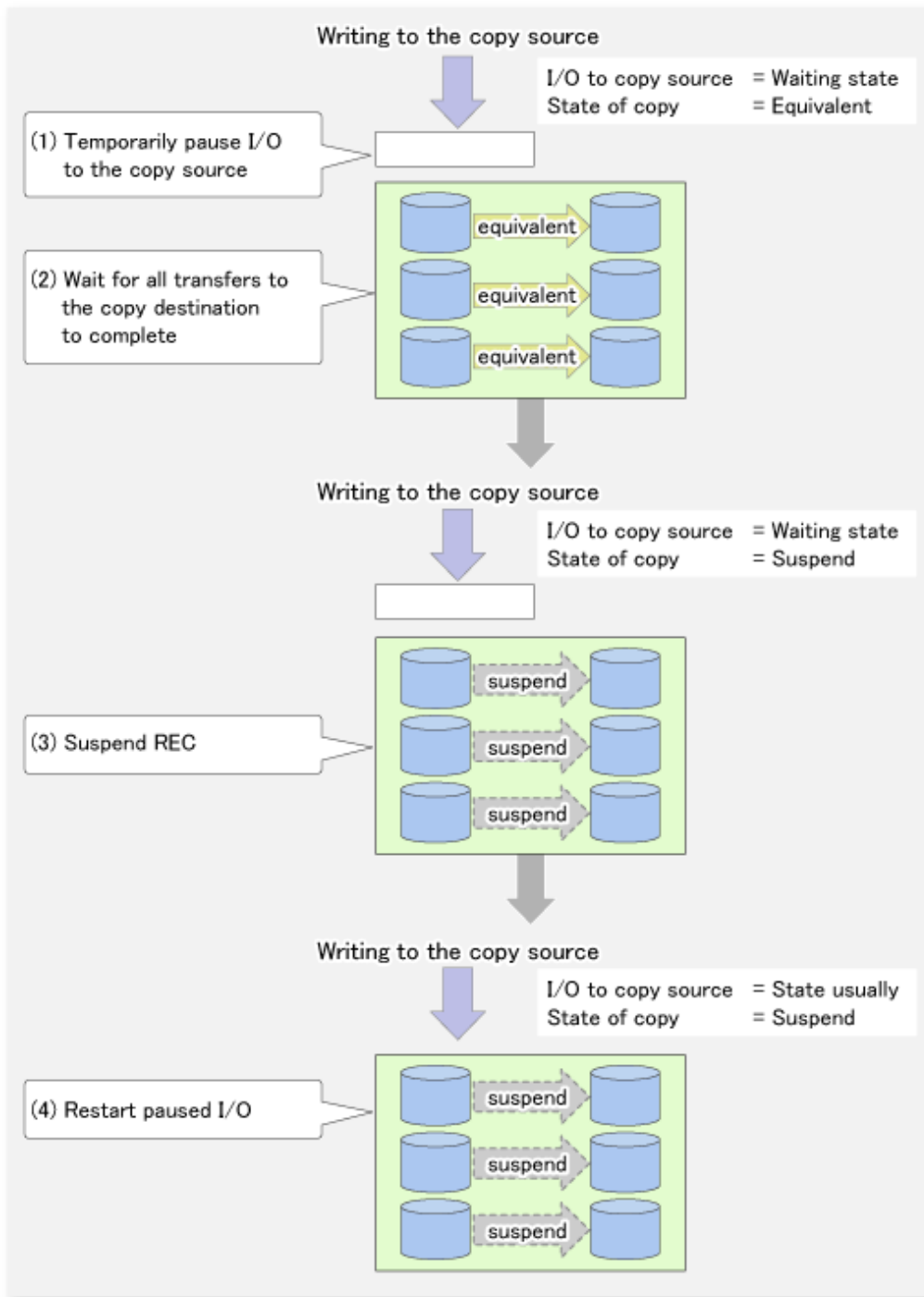
Replication using the concurrent suspend function is performed by specifying the -Xconcur option for the swsrpmake command. Additionally, if concurrent suspend is performed using the Consistency transfer mode, it is no longer necessary to make temporary mode changes during multiple creation processes. (Refer to the figure below). Accordingly, the operating procedure used when concurrent suspend is executed in Consistency mode is the same as the procedure for Through mode and Synchronous mode.

Figure 6.44 When Consistency Mode Used
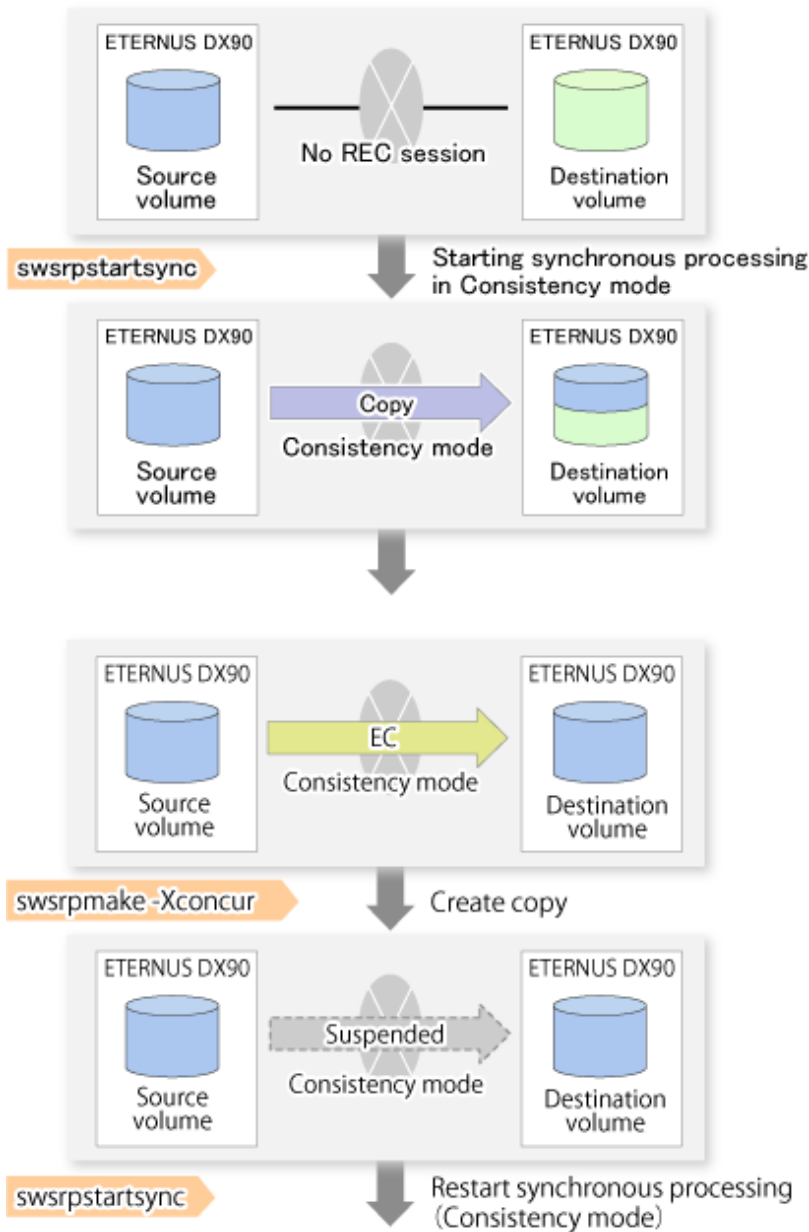
> 📌 **Note**
>
> The maximum number of pairs that can simultaneously implement concurrent suspend depends on the specifications of the ETERNUS Disk storage system.

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 timeout.

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

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

In Case of Normal Operation (Non-clustered Environment)

```
/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 2147483647 sec.
		If you set a value beyond this range, the default value 60 sec will be applied.

Example

Setting the timeout value for the concurrent suspend function to 120 seconds.

```
[check]
ConcurCheckTimeout=120
```

If the setting file for the concurrent suspend function is not created, the default value (60 seconds) will be applied.

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 swsrprecbuffstat 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.
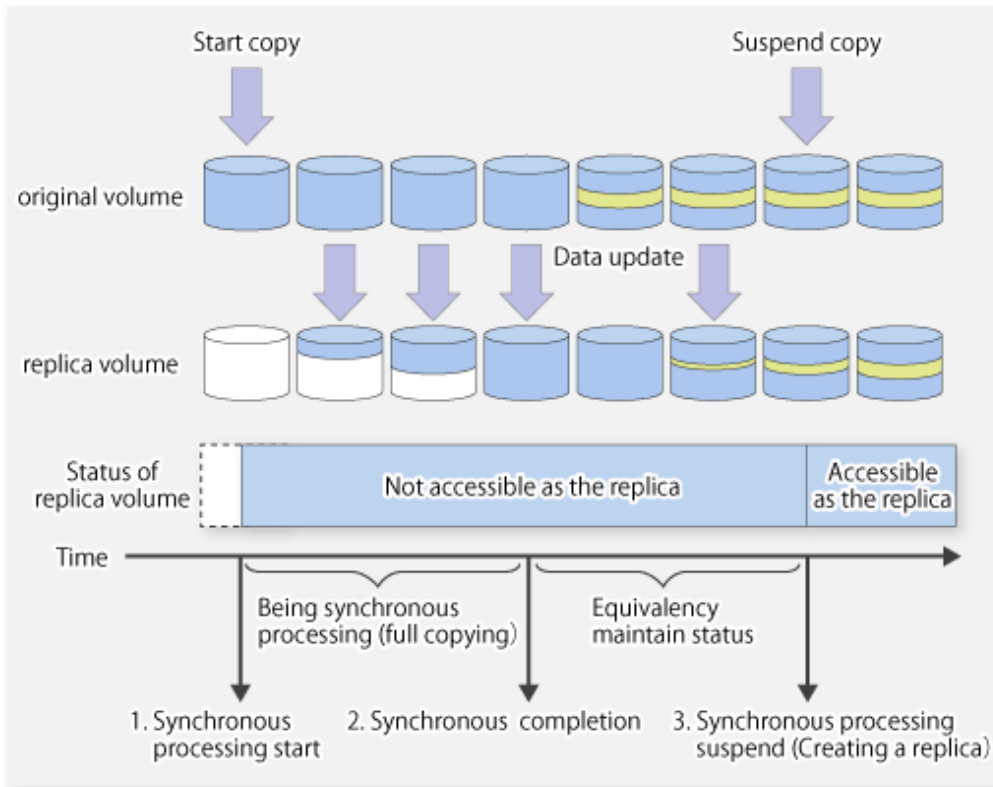
To set the Destination Access Permission function, execute the swsrpstartsync command with the -Xda option. Until replication processing is stopped by the swsrpcancel command neither WRITE nor READ access to the replication target volume can be performed. For changing this setting, once the replication 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.
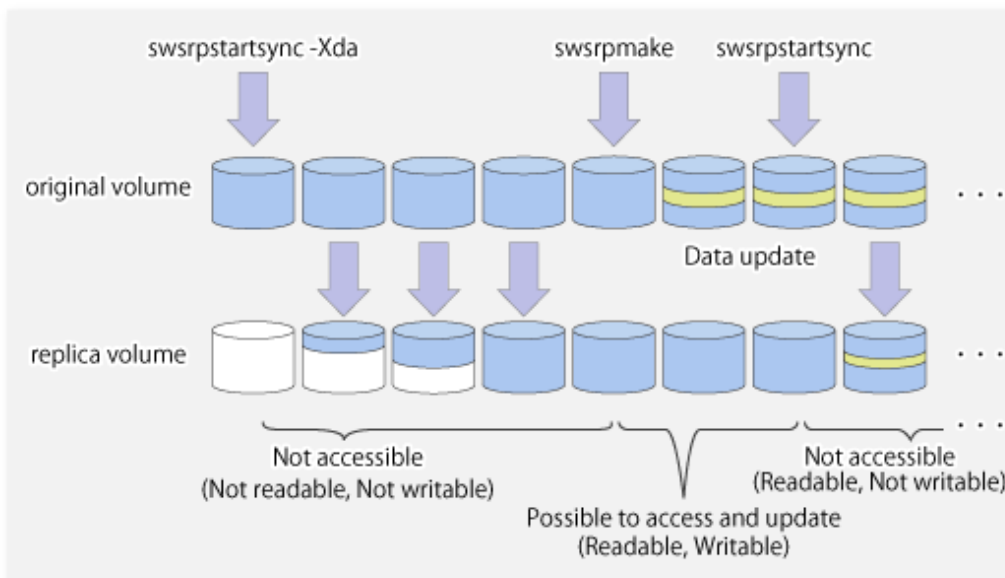
6.5.3   Backup and Restoration Using Replication Function

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 icon] **Note**

. . . .

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

Figure 6.45 Manual Restoration with SnapOPC+

. . . .
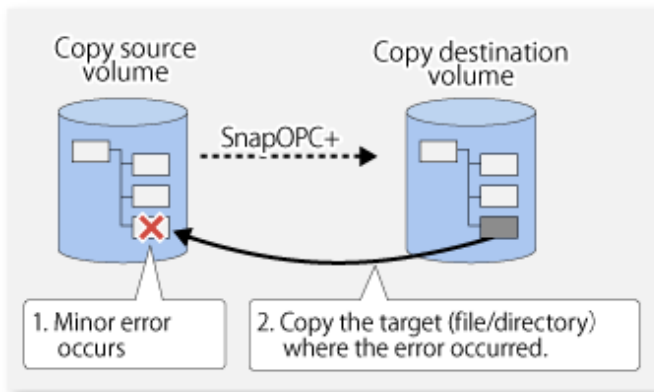
6.5.4   Execution of Synchronization Reversal

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
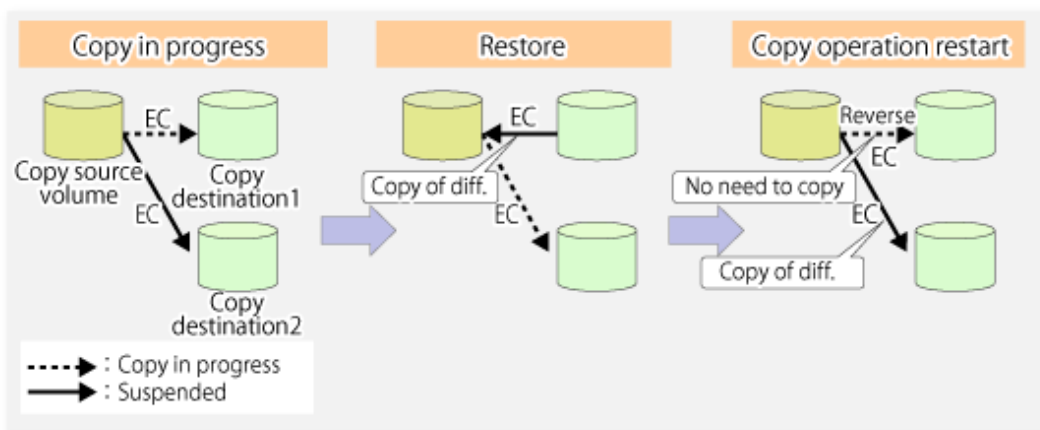
6.6   Changing Configuration Information

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 swsrpcancel command.

📝 Note

To stop replication processing by SnapOPC+, start with the oldest snap generation.
To forcibly stop the second or subsequent snap generations, use the -Xforce option with the swsrpcancel command. This will stop the specified snap generation and all earlier snap generations.

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

To stop 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".

📝 Note

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

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)

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
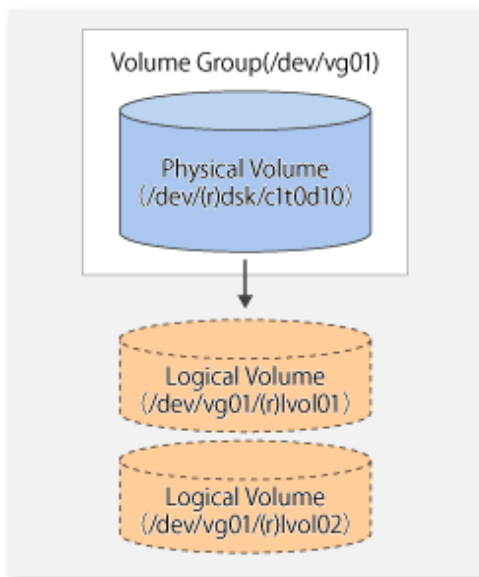
6.8.1.1 Operation Design

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.

Source volume — Destination volume

Volume Group(/dev/vg01) — Volume Group(/dev/vg02)

Physical Volume
(/dev/(r)dsk/c1t0d10) → Physical Volume
(/dev/(r)dsk/c1t0d20)

Logical Volume
(/dev/vg01/(r)lvol01)

Logical Volume
(/dev/vg02/(r)lvol01)

Logical Volume
(/dev/vg01/(r)lvol02)

Logical Volume
(/dev/vg02/(r)lvol02)
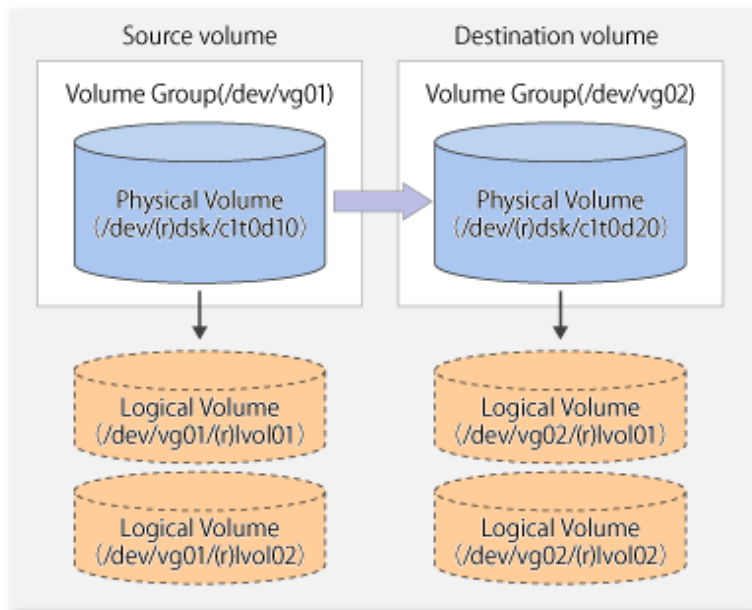
6.8.1.2 Preparations

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 will result 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.

P Point
....
Physical volumes that should be operated synchronously can be checked by using the Web Console or 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
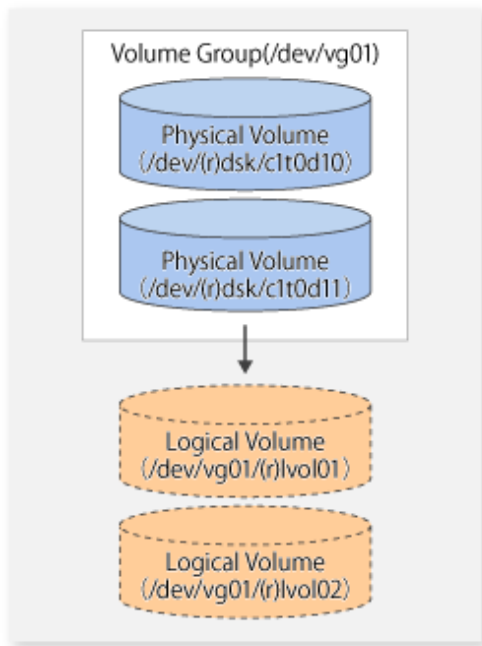
6.8.2.1 Operation Design

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.
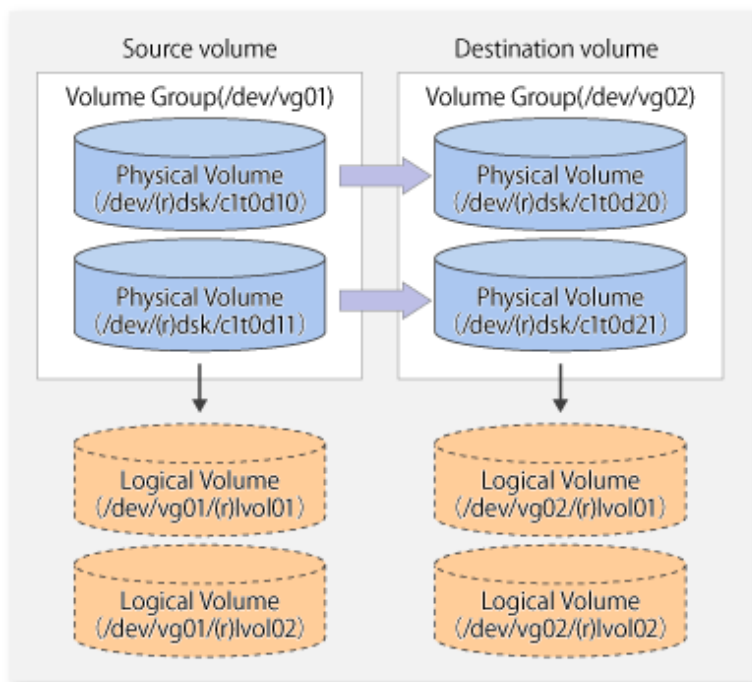
6.8.2.2 Preparations

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
```

6.8.2.2.2 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/c1t0d10 /dev/dsk/c1t0d20
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
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/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@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/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@SV1 swsrpstartsync completed
#

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

# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d10 /dev/dsk/c1t0d20
FROM=/dev/dsk/c1t0d10@SV1, TO=/dev/dsk/c1t0d20@SV1 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/dsk/c1t0d11 /dev/dsk/c1t0d21
FROM=/dev/dsk/c1t0d11@SV1, TO=/dev/dsk/c1t0d21@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	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	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.	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/c1t0d20
   # /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
   #
   ```

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/c1t0d20
   # /usr/sbin/vgcfgrestore -n /dev/vg02 /dev/rdsk/c1t0d21
   #
   ```

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 will be 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/FJSVssage/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.*!.*" will be 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 the Web Console or 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.

- New device names are supported from HP-UX 11i v3. Refer to "1.4.1 Normal Devices" for details. Physical disks that comprise VxVM can use only conventional format devices (/dev/(r)dsk/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 in conventional format devices. Refer to "8.2.14 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 "Conventional format device", the physical disks that comprise ordinary devices and LVMs and the physical disks that comprise VxVM must all be conventional 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
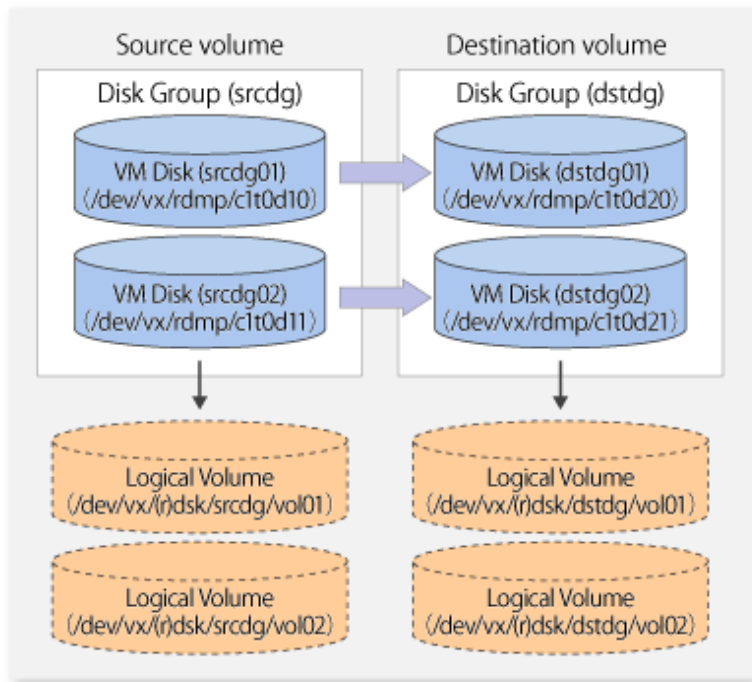
6.9.1.2   Preparations

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 srcdg > /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/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
swsrpsetvol completed
# /opt/FJSVswsrp/bin/swsrpsetvol /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@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/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@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/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpstartsync completed
# /opt/FJSVswsrp/bin/swsrpstartsync -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@SV2 swsrpstartsync completed
#

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

# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d10@SV1 /dev/vx/dmp/c1t0d20@SV2
FROM=/dev/vx/dmp/c1t0d10@SV1, TO=/dev/vx/dmp/c1t0d20@SV2 swsrpmake completed
# /opt/FJSVswsrp/bin/swsrpmake -f -t /dev/vx/dmp/c1t0d11@SV1 /dev/vx/dmp/c1t0d21@SV2
FROM=/dev/vx/dmp/c1t0d11@SV1, TO=/dev/vx/dmp/c1t0d21@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	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	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.	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 within 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 c1t0d20 ...
Installing volume manager disk header for c1t0d21 ...
-
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 Replication Between Servers)

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

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

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

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

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

3. Because udid of the copy destination disk is not an adjustment, 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   Operation Maintenance

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

7.1 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 7.1 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.	"7.1.1.4.1 Backing Up Registry" or "7.1.2 Making Package Backup of Databases"	Refer to "7.1.1.4.1 Backing Up Registry".
Backup management list	A backup transaction has been completed.	"7.1.1.1.1 Backing up Backup Management List" or "7.1.2 Making Package Backup of Databases"	Refer to "7.1.1.1.1 Backing up Backup Management List".
Volume configuration information (Backup management)	When the configuration of the volume group has changed.	"7.1.1.1.3 Preserving Volume Configuration Information"	Refer to "7.1.1.1.3 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 "7.1.2 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.	"7.1.1.2.1 Backing up Replication Management List" or "7.1.2 Making Package Backup of Databases"	Refer to "7.1.1.2.1 Backing up Replication Management List".
Volume configuration information (Replication management)	When the configuration of the volume group is changed.	"7.1.1.2.3 Preserving Volume Configuration Information"	Refer to "7.1.1.2.3 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 "7.1.2 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		"7.1.2 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.

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7.1.1 Making Individual Backups of Databases

7.1.1.1 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.

7.1.1.1.1 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
```

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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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7.1.1.1.2 Restoring Backup Management List

Execute the swstresrst command to restore a backup management list.

7.1.1.1.3 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.

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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.

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7.1.1.2 Maintaining Replication Management List

This section describes the maintenance of a replication management list.

7.1.1.2.1 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.

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- Operational information for replication management is saved in a repository.

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

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7.1.1.2.2 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.

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- When above 2 steps are performed, operational information for replication management of a repository is copied to a Managed Server, where it is then available for use.

- When this information for replication management in the repository does not need to be changed, and only the operation information for replication management on the Managed Server is incorrect (for some reason), perform only step 2.

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7.1.1.2.3 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.

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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.

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7.1.1.3 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:

7.1.1.4 Maintaining Registry

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

7.1.1.4.1 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.

7.1.1.4.2 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
```

7.1.2 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 7.1 Management Server and Managed Server
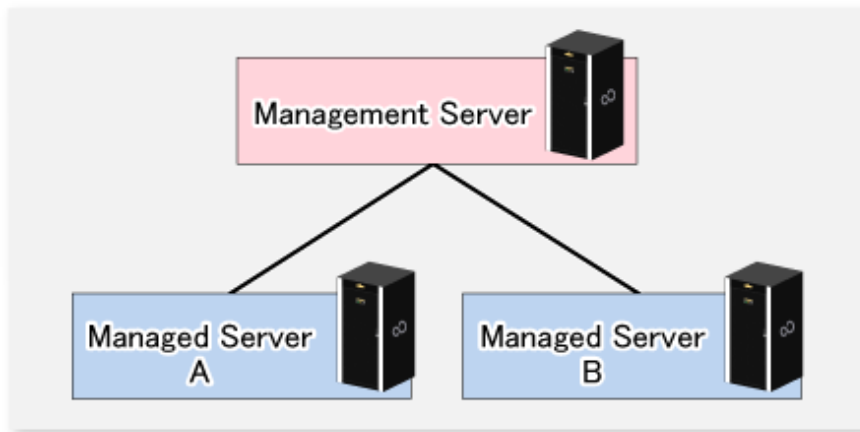
Example

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 7.2 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

7.1.2.1　Preliminaries

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

1. Determine the management information package backup target servers and the types of management information to be backed up.

2. Determine the management information package backup execution server.

3. Create a directory where the management information package backup execution server will store the backup data. The size of the directory must not be less than the total of the following sizes:

   - The required size for a database is the size of the database backup data multiplied by 1.2.
     For the backup data size, refer to "Maintaining Database" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the Management Server.

- The required size for the registries is the total of the data sizes of the registry backup data on the management information package backup target servers.
  For the backup data size, refer to "Maintaining 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 stgmgrinfoset 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 7.3 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/FJSVswstf/stgmgrinfo_policy.ini
	Cluster	/etc/opt/FJSVswstf/*logicalNodeName*/stgmgrinfo_policy.ini

Note

- Do not specify more than one Managed Server as a management information package backup execution server.

- When this server is used for executing transactions on the Managed Server in a clustered system, create a directory for storing backup data on a shared disk.

- For databases and backup management, backup commands are executed on the corresponding management information package backup target servers. In addition, for database backups and backup management (ie, backup management lists) backups, a temporary capacity that is approximately 2.2 times greater than the total size of the backups is required to save the backup data in an archive log file.

Table 7.4 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 will be used.

- The policy file cannot include any settings for backups of registries and of the policy file for management information package backup.

7.1.2.2   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 7.5 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 stgmgrinfoset 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 stgmgrinfobkup command on the management information package backup execution server to make backups of the registries on all of the Managed Server.

2. Execute the stgmgrinfobkup 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 stgmgrinfobkup 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.

7.1.2.3 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 stgmgrinfoset 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 stgarcext (Backup Data Expansion Command) in the *ETERNUS SF AdvancedCopy Manager Operation Guide (for Windows)*.

   - On a Solaris/Linux/HP-UX/AIX version server:

     Expand the backup of the backup management list or the backups of the backup management list and recovery control file by using the tar command supported by the operating system.

5. Restore the backup management list, or the backup management list and recovery control file on the target server. For details on restoring, refer to "Restoring Backup Management List" or "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 stgmgrinfoset 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 will be executed on the target server in binary mode. For the directory in which the pre-processing and post-processing scripts for backup management are executed (that is, the directory to which the scripts are to be copied), refer to "Pre-processing and Post-processing 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 stgmgrinfoset 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 stgmgrinfoset 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 will be executed on the target server. For the directory in which the pre-processing and post-processing scripts for replication management are executed (that is, the directory to which the scripts are to be copied), refer to "Appendix C Pre-processing and Post-processing of Replication" in the *ETERNUS SF AdvancedCopy Manager Operation Guide* for the operating system running on the target server.

5. On a Solaris/Linux/UP-UX/AIX 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 stgmgrinfoset 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 stgmgrinfoset 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 "7.1.2.1 Preliminaries".

7.2 Troubleshooting: Hardware Error During Backup

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

7.2.1 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)", "snapshop(failed)", "restore(failed)", or "?????" in the **Status** column.

- The swsttrkstat 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.

7.2.2 Troubleshooting

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

Figure 7.2 Troubleshooting Flow (for Faults During Backup)
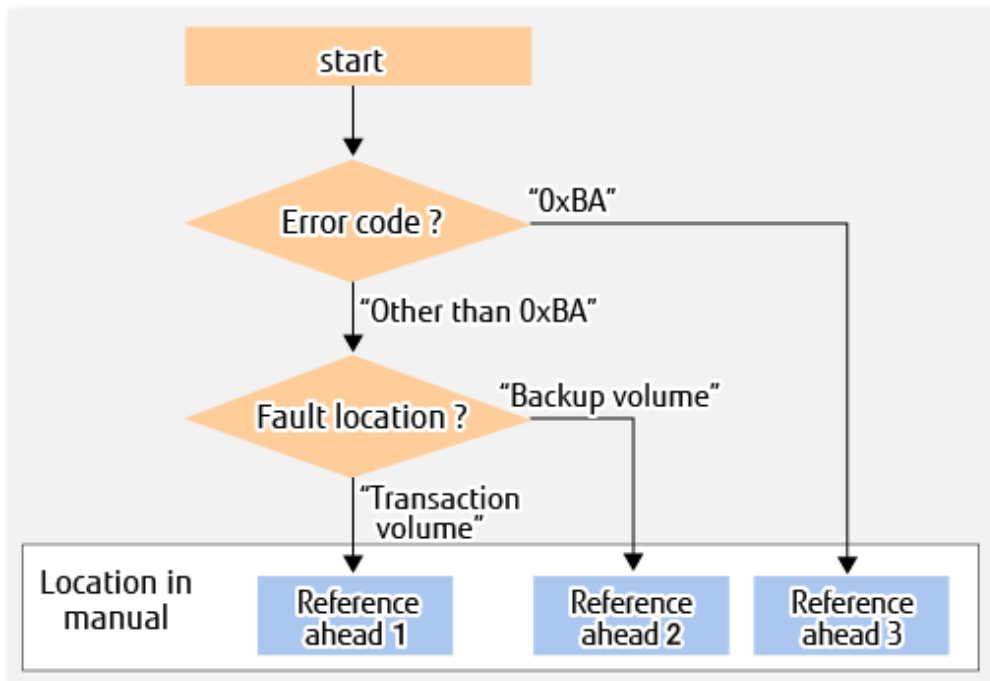
Reference ahead 1: 7.2.2.1 Hardware Error on Transaction Volume
Reference ahead 2: 7.2.2.2 Hardware Error on Backup Volume
Reference ahead 3: 7.2.2.3 Troubleshooting If Bad Sector Occurred in Transaction Volume

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- Refer to "7.2.1 Overview" for details of the **Status** column and "Fault location".

If the **Status** column is "?????", check if the copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt") using ETERNUS Web GUI.
If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
In other cases, take the action checked in the following points.

- If 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 7.6 Meanings of Error Codes

Error Code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) **Note**: If a bad sector is created in a transaction volume when a) or b) applies, the ETERNUS Disk storage system automatically changes the copy processing to the error suspend state. This prevents a restart of QuickOPC or EC/REC resume and prevents the backup volume from being overwritten with invalid transaction volume data.
Other than 0xBA	An error other than the above occurred.

7.2.2.1 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.

7.2.2.2 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 swstsrsemtch 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 swstdevinfoset command to delete the backup volume in which the error occurred.

6. Execute the swstdevinfoset command to register a new backup volume. If the backup volume on which the error occurred is to be repaired and be reused and if the device information has been modified, perform the following actions:

- When AdvancedCopy Manager is being operated using the Web Console, refer to "Add/Reload Device" in the *ETERNUS SF Web Console Guide* to reload the configuration and re-register the backup volume.

- When AdvancedCopy Manager is being operated using only Command Line Interface, execute the stgxfwcmsetdev command on the Management Server to reload the configuration and re-register the backup volume.

7. Re-execute the processing in which the error occurred.

7.2.2.3 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
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The transaction volume cannot be restored by this method, if there is no backup history information.
. . . .

7.3 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.

7.3.1 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.

7.3.2 Troubleshooting

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

Figure 7.3 Troubleshooting Flow (When Fault Occurs During Replication)

Note

- Refer to "7.3.1 Overview" for details of the **Status** column and "Fault location".

  If the **Status** column is "?????", check if the copy processing is in the error suspend status ("failed") or the hardware suspend status ("halt") using ETERNUS Web GUI.
  If the copy processing is in either of these states, take the action indicated in the above troubleshooting flow.
  In other cases, take the action checked in the following points.

    - If 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 7.7 Meanings of Error Codes

Error Code	Meaning
0xBA	If a) or b) below applies, a bad sector was created in the transaction volume. a. QuickOPC has not yet performed physical copying and tracking is in progress b. EC/REC is in the suspend status (replication established status) **Note**: If a bad sector is created in a transaction volume when a) or b) applies, the ETERNUS Disk storage system automatically changes the copy processing to the error suspend state. This prevents a restart of QuickOPC or EC/REC resume and prevents the copy destination volume from being overwritten with invalid copy source volume data.
0xBB	A lack of free space has occurred in the Snap Data Volume or Snap Data Pool.
Other than 0xBA and 0xBB	An error other than the above occurred.

7.3.2.1   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.

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.

2. If the processing cannot be cancelled by using the command, use ETERNUS Web GUI to cancel it.

3. Execute the swsrprecoverres command.

4. Execute the swsrpstat command to verify that no other errors have occurred.

5. Execute the swsrpdelvol command to delete the replication volume in which the error occurred.

6. Execute the swsrpsetvol command to register a new replication volume. If the replication volume on which the error occurred is to be repaired and be reused and if the device information has been modified, perform the following actions:

    - When AdvancedCopy Manager is being operated using the Web Console, refer to "Add/Reload Device" in the *ETERNUS SF Web Console Guide* to reload the configuration and re-register the replication volume.

    - When AdvancedCopy Manager is being operated using only Command Line Interface, execute the stgxfwcmsetdev command on the Management Server to reload the configuration and re-register the replication volume.

7. Re-execute the processing in which the error occurred.

7.3.2.2 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:

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.)

7.3.2.3 Troubleshooting When Lack of Free Space Has Occurred in Snap Data Volume or Snap Data Pool

A Snap Data Volume lack of free space occurs when the Snap Data Pool is not being used, whereas a Snap Data Pool lack of free space occurs when the Snap Data Pool is being used.
If a lack of free space occurs of Snap Data Volume or Snap Data Pool, refer to the following sections to recover it according to the Snap Data Pool usage condition:

  - When not using the Snap Data Pool : "Recovery of Insufficient Free Space in Snap Data Volume"

  - When using the Snap Data Pool : "Recovery of Insufficient Free Space in Snap Data Pool"

🅿 Point
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The use status of the Snap Data Pool can be checked by specifying "poolstat" subcommand in the swstsdv command.
. . . .

Recovery of Insufficient Free Space in Snap Data Volume

When a lack of free space has occurred in the Snap Data Volume, follow these steps to undertake recovery:

  - Cancel the processing in which the error occurred with the swsrpcancel command.

- If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The likely causes of a lack of free space in the Snap Data Volume are as follows:

a. The estimate of the physical size of the Snap Data Volume is not accurate.

b. The estimate of the physical size of the Snap Data Volume is accurate but, as a result of a large volume being updated in the Snap Data Volume when the SnapOPC/SnapOPC+ session does not exist, the physical capacity of the Snap Data Volume is being used up.

The usage status of the Snap Data Volume can be checked by specifying "stat" subcommand in the swstsdv command.

If "a." applies, re-estimate the physical size of the Snap Data Volume, and recreate the Snap Data Volume.
If "b." applies, use ETERNUS Web GUI or, specify "init" subcommand in the swstsdv command, and then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Volume.

Recovery of Insufficient Free Space in Snap Data Pool

When a lack of free space has occurred in the Snap Data Pool, follow these steps to undertake recovery:

- Cancel the processing in which the error occurred with the swsrpcancel command.

- If inter-server replication was being performed and cancellation is not possible from the active server, cancel processing from the inactive server.

- If processing cannot be cancelled using commands, use ETERNUS Web GUI to cancel it.

The likely causes of a lack of free space in the Snap Data Pool are as follows:

a. The estimate of the size of the Snap Data Pool is not accurate.

b. The estimate of the size of the Snap Data Pool is accurate but, as a result of a large volume being updated in the Snap Data Volume when the SnapOPC/SnapOPC+ session does not exist, the capacity of the Snap Data Pool is being used up.

The use status of the Snap Data Pool can be checked by specifying "poolstat" subcommand in the swstsdv command.

If "a." applies, re-estimate the size of the Snap Data Pool, and after increasing the size of the Snap Data Pool, recreate the Snap Data Volume.

If "b." applies, use ETERNUS Web GUI or, specify "init" subcommand in the swstsdv command, then initialize the Snap Data Volume.

Recreation of the partition (slice) is required after recreation/initialization of the Snap Data Pool.

7.3.2.4   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>
```

7.4 Changing Operating Environment

Server information batch change operations preserve the consistency of server information in systems managed by AdvancedCopy Manager. All Managed Server services and transactions in the systems that include a Management Server and Management Server transactions must be running when these changes are made.

📌 Note

- If the stgxfwcmmodsrv command is used to change IP addresses, or similar.

  Do not execute backup management commands or replication management commands at the Management Server that executes the stgxfwcmmodsrv command, nor at any of the Managed Servers managed by Management Server transactions, either before or during execution of stgxfwcmmodsrv command.

  - If the stgxfwcmmodsrv command terminates abnormally, implement recovery in accordance with the action indicated in the error message. If backup management or replication management commands are accidentally executed either before or during execution of the server information change commands.

  - If the backup management and replication management commands terminate abnormally, wait until the stgxfwcmmodsrv command terminates normally, then re-execute the backup management and replication management commands.

7.4.1 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.

7.4.2 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 a 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 the 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.

See
. . . .
For information about performing the above change in cluster operation, refer to "7.4.6.1 Changing IP Address of Managed Server Transaction".
. . . .

7.4.3   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.

   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 "7.4.6.2 Changing Port Number of Managed Server Transaction".
. . . .

7.4.4 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.

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.

See
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For information about performing the above change in a cluster operation, refer to "7.4.6.3 Changing Server Name of Managed Server Transaction".
....

7.4.5 Changing Device Configuration

Changing the device configuration refers to any of the following:

- Mount name change

- Change from File System operation to RawDevice operation

- Capacity change of partitions (mainly for re-creation of LUN mapping)

- Start position for change of partitions (mainly for re-creation of LUN mapping)

7.4.5.1 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 a Managed Server", for details on changing the device information.

5. Reset the deleted transaction or backup volume in the backup. Refer to "3.4.6 Setting Operation Type for Device", for details on adding the transaction volume or backup volume.

Point
....

If the device configuration is changed (in step 3 above) before the transaction and backup volumes are deleted (in steps 1 and 2), history information cannot be deleted, and synchronized backup processing cannot be cancelled. This could possibly prevent the deletion of the transaction and backup volumes.
In this case, set the emergency operation mode, and delete the history information or cancel synchronized backup processing.
For details of the emergency operation mode, refer to "swsthistdel" and "swstcancelsync".
....

7.4.5.2 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
. . . .
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".
. . . .

7.4.6 Changing Configuration in Cluster Operation

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

7.4.6.1 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 the 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.

7.4.6.2 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.

5. Refer to "Reload Server Configuration Information" in the *ETERNUS SF Web Console Guide* and reload the configuration information of the Managed Server.

7.4.6.3   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.

2. Refer to "Reload Server Configuration Information" in the *ETERNUS SF Web Console Guide* and reload the configuration information of the Managed Server

7.4.6.4   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 "7.1.2.1 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 "7.1.2.1 Preliminaries".

9. Change the server name.

   Perform the procedure described in "7.4.6.3 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 stgmgrinfoset command to register as its server.

7.4.6.5   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/*logicalNodeName*/swnode.ini.

   - Backup management list
     Make a backup of the backup management list.
     For details about how to do this, refer to "7.1.1.1.1 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 "7.1.2.1 Preliminaries".

3. Delete /etc/opt/swstorage/*logicalNodeName*/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 icon] **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/*logicalNodeName*/swnode.ini.

    - Backup management list
      Restore the backup management list.
      For details about how to do this, refer to "7.1.1.1.2 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 swsrprecoverres 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 "7.1.2.1 Preliminaries".

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

7.4.6.6   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/*logicalNodeName*/swnode.ini.

    - Backup management list
      Make a backup of the backup management list.
      For details about how to do this, refer to "7.1.1.1.1 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 "7.1.2.1 Preliminaries".

3. Delete /etc/opt/swstorage/*logicalNodeName*/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 "7.1.1.1.2 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 swsrprecoverres 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 "7.1.2.1 Preliminaries".

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

7.4.7 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*.

Chapter 8   Command References

This chapter describes using commands.

> 📝 **Note**
> ....
> Set the following paths in the PATH environment variable to execute the commands.
>
> - /usr/sbin
>
> - /usr/bin
> ....

8.1 Backup Management Commands

This section describes operations using Backup Management Commands.

> 📝 **Note**
> ....
> 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 8.1 Operating Environment for Executing Backup Management Commands

Command	Operating Environment of AdvancedCopy Manager

swstbackstat	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations:
	
	  - -h option specified
	
	  - No -h option and device name are specified

swstbackup	To execute this command on a Management Server with the -h option specified, the daemons and 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 and services of the Managed Server must be operating.
swstbkpoldel	To execute this command on a Managed Server, the daemons and services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.

swstbkpoldisp	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations:
	
	  - -h option specified
	
	  - No -h option and device name are specified

swstbkpolset	To execute this command on a Managed Server, the daemons and services of the Management Server must be operating.

Command	Operating Environment of AdvancedCopy Manager
	To execute this command on a Management Server with the -h option specified, the daemons and 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 and 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 and 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 and services of the Managed Server must be operating.
swstcanceltrk	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.

swstdevdisp	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations:
	
	  - -h option specified
	
	  - No -h option and device name are specified
	
	To execute this command with the -o option specified, the daemons and services of the Management Server must be operating.

swstdevinfoset	To execute this command on a Managed Server, the daemons and services of the Management Server must be operating. To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.

swstexecstat	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations:
	
	  - -h option specified
	
	  - No -h option and device name are specified

swsthistdel	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.

swsthistdisp	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations:
	
	  - -h option specified
	
	  - No -h option and device name are specified

swstresback	-
swstresrst	The Management Server daemon/services should be running. When the Managed Server runs on Windows, the daemons and 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 and services of the Management Server and target Managed Server must be operating.
swstreststat	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified

Command	Operating Environment of AdvancedCopy Manager
	- No -h option and device name are specified
swstsrsemtch	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.
	To execute this command on a Managed Server, the daemons and services of the Management Server must be operating.
	When the Managed Server runs on Windows, the daemons and services of the Managed Server must be always operating.
swststartsync	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.
	When the Managed Server runs on Windows, the daemons and services of the Managed Server must be operating.
swstsvrdisp	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.
swstsvrset	To execute this command on a Managed Server, the daemons and services of the Management Server must be operating.
	To execute this command on a Management Server with the -h option specified, the daemons and services of the Management Server and target Managed Server must be operating.
swstsyncstat	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified
swsttrkstat	The daemons and services of the Management Server and target Managed Server must be operating in order to execute this command, if the Management Server has either of the following parameter designations: - -h option specified - No -h option and device name are specified

---

 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 8.2 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swstsvrset	Required	Transaction operating node	-
swstsvrdisp	Required	Transaction operating node	-
swstdevinfoset	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	-
swsttrkstat	Required	Transaction operating node	-
swstsrsemtch	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 will depend on the existence of the -h option and device name. For details, refer to the following table.

Table 8.3 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 will be 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.

8.1.1 Environment Definition Commands

This section describes the environment definition commands for backup management.

8.1.1.1 swstsvrset (Managed Server Configuration Information Setting Command)

NAME

swstsvrset - sets configuration information of a Managed Server

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstsvrset
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstsvrset [-h Server-Name]
```

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 *Server-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.
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

- Set the configuration information of a Managed Server:

```
# /opt/FJSVswsts/bin/swstsvrset
swstsvrset completed
#
```

- Set the configuration information of a Managed Server named job1 from a Management Server:

```
# /opt/FJSVswsts/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

- swstdevinfoset

- swsthistdel

- swstcanceltrk

- swstresback

- swstresrst

- swstsrsemtch

8.1.1.2 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 Server-Name]
```

DESCRIPTION

This command displays configuration information of a Managed Server that has been set using the swstsvrset command.

The following information will be displayed:

Title	Description
Storage-Server	Displays a Managed Server name.

OPTIONS

-h *Server-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.
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
#
```

8.1.1.3 swstdevinfoset (Device Information Setting Command)

NAME

swstdevinfoset - sets the device information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstdevinfoset -t | -b | -o Device-Name
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstdevinfoset [-h Server-Name] -t | -b | -o Device-Name
```

DESCRIPTION

Set a volume that has been allocated to the ETERNUS Disk storage system, as a transaction or backup volume.

A transaction volume refers to a volume that stores transaction data to be backed up. A backup volume refers to a volume used to store a backup of this transaction data.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-t

Register the specified device as a transaction volume.
Cannot be specified at the same time as the -b and -o options.

-b

Register the specified device as a backup volume.
Cannot be specified at the same time as the -t and -o options.

-o

Deregister the specified device if it has been registered as a transaction or backup volume.
Cannot be specified at the same time as the -t and -b options.

OPERANDS

Device-Name

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/FJSVswsts/bin/swstdevinfoset -t /dev/dsk/c1t0d0
swstdevinfoset completed
#
```

- Register a device as a backup volume:

```
# /opt/FJSVswsts/bin/swstdevinfoset -b /dev/dsk/c1t0d2
swstdevinfoset completed
#
```

- Deregister a device that has been registered as a transaction volume:

```
# /opt/FJSVswsts/bin/swstdevinfoset -o /dev/dsk/c1t0d0
swstdevinfoset 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.

- 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.

- 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.

    - Please 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.

    - Please 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

    - swstdevinfoset

    - swstbkpolset

    - swstbkpoldel

    - swstbackup

    - swstrestore

    - swstcancelrest

    - swststartsync

    - swstcancelsync

    - swsthistdel

    - swstcanceltrk

    - swstsrsemtch

    - swstresback

    - swstresrst

8.1.1.4   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] [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstdevdisp [-h Server-Name] [-t] [-b [-u]] [-o] [Device-Name]
```

DESCRIPTION

This command displays information about a transaction or backup volume or any other definable device, which has been set using the swstdevinfoset command.

The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
Size	Displays the size of a partition allocated to a device. 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 *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-t

Displays information on a device that has been set as a transaction volume.
Displays device information on all the transaction volumes if the device name in an operand is omitted.

-b

Displays a device that has been set as a backup volume.
Displays device information on all the backup volumes if the device name in an operand is omitted.

-u

Changes the display format of the **Device-Mode** column.

-o

Displays all the devices other than those set as a transaction or backup volume.
Displays all the devices other than those set as a transaction or backup volume if the device name in an operand is omitted.

Information on a device that has been set as a transaction volume will be displayed if all of the -t, -b and -o options are omitted.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.4 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
:
#
```

8.1.1.5   swstbkpolset (Backup Policy Setting Command)

NAME

swstbkpolset - sets a backup policy

SYNOPSIS

To Execute on Managed Server

/opt/FJSVswsts/bin/swstbkpolset [-i *Interval-Days*] [-s *Save-Number*] [*Device-Name*]

To Execute on Management Server

/opt/FJSVswsts/bin/swstbkpolset [-h *Server-Name*] [-i *Interval-Days*] [-s *Save-Number*] [*Device-Name*]

DESCRIPTION

This command sets a backup policy (the number of preservation generations and the number of interval days).
The number of preservation generations is the number of generations of backup data that should be kept at one time. The number of interval days means the number of days from the execution of one backup until the next backup should be performed.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-i *Interval-Days*

Specifies the number of interval days. You can specify a value between 1 and 366. If this option is omitted during initial registration, 30 will be set as the default. If this option is omitted during update, the existing value will be inherited.

-s *Save-Number*

Specifies the number of preservation generations. You can specify a value between 1 and 31. If this option is omitted during initial registration, 2 will be set as the default. If this option is omitted during update, the existing value will be inherited.

OPERANDS

Device-Name

> Specify an AdvancedCopy Manager device name.
> Refer to "1.4 Managing Device on AdvancedCopy Manager" for the devices to be specified.
> If the device name is omitted, the backup policy will be set for all the transaction volumes.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- To set 3 as the save number of a transaction volume as a backup policy:

```
# /opt/FJSVswsts/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

    - swstdevinfoset

    - swstsrsemtch

    - swstresback

    - swstresrst

8.1.1.6   swstbkpoldisp (Backup Policy Display Command)

NAME

swstbkpoldisp - displays a backup policy

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstbkpoldisp [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbkpoldisp [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays a backup policy that has been set for a transaction volume.
The following information will be displayed:

Title	Description
Server	Displays a 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 *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

OPERANDS

Device-Name

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 will be 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)
#
```

8.1.1.7   swstbkpoldel (Backup Policy Deletion Command)

NAME

swstbkpoldel - deletes the backup policy

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstbkpoldel Device-Name
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbkpoldel [-h Server-Name] Device-Name
```

DESCRIPTION

An existing backup policy can be deleted using this command.
Delete the backup history information of the transaction volume prior to the execution of this command.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the
stgxfwcmdispsrv command.

OPERANDS

Device-Name

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

  - swstdevinfoset

  - swstsrsemtch

  - swstresback

  - swstresrst

8.1.2   Operation Commands

This section describes operation commands for backup management.

8.1.2.1   swstbackup (Backup Execution Command)

NAME

swstbackup - backup

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstbackup [-suspend|-T] Device-Name [-Xdevmap Device-Map-File]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstbackup [-h Server-Name] [-suspend|-T] Device-Name [-Xdevmap Device-Map-File]
```

DESCRIPTION

When using this command, the operation changes according to different states of the Advanced Copy that is being executed.

- When synchronous processing (EC) is not performed
  Snapshot processing (OPC) is performed and the processing of information, such as the TimeStamp and backup volume of a copy target, is registered into backup history information.

- When synchronous processing (EC) is performed
  The state of synchronous processing is checked and, in the case of an equivalent maintenance state, backup synchronous processing is suspended. Information such as time and backup volume of a copy target is simultaneously registered into backup history information. A backup of this form is called synchronous high-speed backup. Note that it aborts when an equivalent maintenance state is not reached. To use the "Chapter 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 *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-Xdevmap *Device-Map-File*

Specifies a target backup volume to perform the snapshot fast backup. In the operand, specify a "device map file" in which a combination of a transaction volume and a target backup volume are described. If this option is not specified, the target backup volume will be automatically selected by the backup function. To execute this command on a remote basis using the -h option, specify a device map file (of a Managed Server) using an absolute pathname. A file name specified in Device-Map-File must not include any national character.

-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

Device-Name

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/FJSVswsts/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 will cause a generation overflow (this may occur when restoration is performed using the backup volume of the oldest history).

    - Any of the box information (box identifier, OLU number, EXTENT start position, and EXTENT size) of a transaction volume has been changed.

    - No unused backup volume was available for use as the copying destination.

    - The replication management function is executing a process for the target transaction volume.

    - The replication management function is executing a process for the target backup volume.

    - The replication management function is executing a process for backup records exceeding the number of preservation generations.

    - The 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.

- 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

  - swstdevinfoset

  - swstsrsemtch

  - swstresback

  - swstresrst

8.1.2.2   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 [Device-Name]
```

To be executed on Management Server

```
/opt/FJSVswsts/bin/swstbackstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the completion status of a backup that is being performed using the swstbackup command.

The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Backup-Disk	Displays a backup volume name. If no backup has been collected, "----" will be displayed.

Title	Description
Status	Displays a backup completion status using one of the following character strings: "----" : No backup has been collected (ie, no history exists). "succeeded" : Backup has been completed. "executing" : Copying using OPC is in progress. "failed" : Copying using OPC has been interrupted due to an error. "halt" : Copying using OPC is halt status. "?????" : Failed to get copy status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status column. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Server-Name*

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

Device-Name

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 will be 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/c1t0d0  /dev/dsk/c1t0d3 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 will display "succeeded" whether or not the backup has actually been successful.

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "7.2 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.

8.1.2.3   swstrestore (Restore Execution Command)

NAME

swstrestore - restore

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstrestore [-g Generation-No | -v Version-No] [-r Restore-Device-Name] Device-Name
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstrestore [-h Server-Name] [-g Generation-No | -v Version-No][-r Restore-Device-Name] Device-Name
```

DESCRIPTION

The data that exists in backup history information is restored using OPC.
When this command is executed, AdvancedCopy Manager performs the restoration pre-processing and post-processing scripts before and after copying data using OPC. For more information on customizing these scripts, refer to "Appendix A Pre-processing and Post-processing of Backup and Restoration".

You can restore data to a device that is not a transaction volume. When you do so, the device must not be registered as a transaction volume and the device must have the same amount of space available as the specified transaction volume.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-g *Generation-No*

Specifies the relative generation number of data to be restored.
Check the relative generation number using the swsthistdisp command.

-v *Version-No*

Specifies the absolute generation number of data to be restored.
Check the absolute generation number using the swsthistdisp command.

-r *Restore-Device-Name*

Specifies a restore destination device name to restore data to any device other than a transaction volume.

Note: If neither the -g or -v option is specified, the latest information from the information history management will be restored.

OPERANDS

Device-Name

Specifies 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/c1t0d0
/dev/dsk/c1t0d0 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/c1t0d0s6
Server Transaction-Disk Backup-Disk    Status    Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync -all /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk Status Execute
job2  /dev/dsk/c1t0d0  ----         ----    ----
# /opt/FJSVswsts/bin/swstrestore /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 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 will be overwritten. It is recommended that a backup volume should NEVER be specified as a restore destination device.

    - When you perform restoration immediately after starting backup where the actual copying using OPC is still in progress, (except when the combination of transaction volume and backup volume is the same for backup and restoration). A restoration should always be performed after the actual copying using OPC is completed. Alternatively, on a transaction volume on which a file system has been constructed, perform restoration according to the method described in the Point "In a transaction volume on which a file system has been constructed, restore a specific file" above.

    - 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.

- - 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

  - - swstdevinfoset

  - - swstsrsemtch

  - - swstresback

  - - swstresrst

8.1.2.4   swstcancelrest (Restore Cancellation Command)

NAME

swstcancelrest - cancels OPC-based restoration

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstcancelrest [-g Generation-No | -v Version-No] [-r Restore-Device-Name] [-
emergency] Device-Name
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstcancelrest [-h Server-Name][-g Generation-No | -v Version-No][-r Restore-
Device-Name] [-emergency] Device-Name
```

DESCRIPTION

This command cancels OPC-based restoration.

A hardware error will be displayed when 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 *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-g *Generation-No*

Specifies the relative generation number of data being restored.
This option cannot be specified at the same time as the -v option.
Check the relative generation number using the swstreststat command.

-v *Version-No*

Specifies the absolute generation number of data being restored.
This option cannot be specified at the same time as the -g option.
Check the absolute generation number using the swstreststat command.

-r *Restore-Device-Name*

Specifies the device name if data is restored to any other device than a transaction volume.
Check the device name using 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 will be cancelled if neither the -g or -v option is specified.

OPERANDS

Device-Name

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/c1t0d0
/dev/dsk/c1t0d0 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/c1t0d0
/dev/dsk/c1t0d0 swstcancelrest completed.
#
```

NOTES

- If you cancel OPC-based restoration using this command, the transaction volume will be in an incomplete state and can no longer be used because part of the data has already been overwritten by the copy process. Perform restoration again using the swstrestore command.

- You cannot cancel restoration if:

    - The history specified in the -g or -v option does not exist.

    - Restoration is not performed on the device specified in the -r option.

    - Restoration is not performed from the specified history. In this case, processing is terminated with an information message "swst0303 Restoration for specified restoration device is not performed". The end status after this message is a normal end.

    - 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

  - swstdevinfoset

  - swstsrsemtch

  - swstresback

  - swstresrst

8.1.2.5 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 Generation-No | -v Version-No] [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstreststat [-h Server-Name [-g Generation-No | -v Version-No] [Device-Name]
```

DESCRIPTION

This command displays the execution status of restoration.
The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Generation	Displays the relative generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Version	Displays the absolute generation number of restored backup data. "----" will be displayed if no generation number is specified in the -g or -v option and no backup history exists.
Backup-Disk	Displays the name of a backup volume from which data should be copied and restored. "----" will be displayed if restoration is not in progress.
Restore-Device	Displays a restoration target device name unless data is copied and restored to a transaction volume. "----" will be displayed if restoration is not in progress, or if data is restored to a transaction volume.
Status	Displays the execution status: "----" : No copying using OPC is in progress. "executing" : Copying using OPC is in progress. "succeeded" : Copying using OPC has been completed. "failed" : Copying using OPC has been interrupted due to an error. "halt" : Copying using OPC is halt status. "?????" : Failed to get copy status.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status column. Displays "----" unless "executing" is displayed.

OPTIONS

-h *Server-Name*

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 *Generation-No*

Specifies the relative generation number of data whose restore execution status is to be displayed.

-v *Version-No*

Specifies the absolute generation number of data whose restore execution status is to be displayed.

Note: The restore execution statuses of all the histories will be displayed if both the -g and -v options are omitted.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.4 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 will be 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 "7.2 Troubleshooting: Hardware Error During Backup" for information about this.

- If no generation number has been specified in the -v or -g option, the restore execution statuses of all the histories will be displayed. If, at this time, restoration is not in progress from any of the histories, "----" will be displayed in all the information columns other than "Server" and "Transaction-Disk".

- 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.

8.1.2.6   swsthistdisp (History Information Display Command)

NAME

swsthistdisp - displays the backup history information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swsthistdisp [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swsthistdisp [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays history information in relation to data that has been backed up.

The following information will be displayed:

Title	Description
Server	Displays a 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 will not be displayed if no backup history information exists.
Version	Displays an absolute generation number. This item will not be displayed if no backup history information exists.
Backup-Date	Displays a TimeStamp reflecting when backup has been completed. This item will not be displayed if no backup history information exists.
Backup-Disk	Displays the name of a backup volume to which data has been backed up. This item will not be displayed if no backup history information exists.
Status	Displays an actual copying execution status using one of the following character strings: "succeeded" : Copying using OPC has been completed. "executing" : Copying using OPC is in progress. "failed" : Copying using OPC has been interrupted due to an error. "halt" : Copying using OPC is halt status. "?????" : Failed to get copy status. This item will not be displayed if no backup history information exists.
Execute	Displays how much has been copied in percentage terms if "executing" is displayed in the Status column. Displays "----" unless "executing" is displayed. This item will not be displayed if no backup history information exists.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

OPERANDS

Device-Name

> 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 will be 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/c1t0d0  Mount-Point=/mnt/tran1 (vxfs)
Generation Version Backup-Date      Backup-Disk     Status     Execute
1          10      2000/11/12 22:00 /dev/dsk/c1t0d2 succeeded ----
2          9       2000/11/11 22:00 /dev/dsk/c1t0d4 succeeded ----
  :
#
```

NOTES

- If "failed", "halt", or "?????" is displayed in the Status column, a hardware error, etc. may have occurred. Refer to "7.2 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.

8.1.2.7   swsthistdel (History Information Deletion Command)

NAME

swsthistdel - deletes backup history information

SYNOPSIS

To Execute on Managed Server

> /opt/FJSVswsts/bin/swsthistdel -g *Generation-No| -v Version-No | -z* [-emergency] *Device-Name*

To Execute on Management Server

> /opt/FJSVswsts/bin/swsthistdel [-h *Server-Name]* -g *Generation-No| -v Version-No | -z* [-emergency]
> *Device-Name*

DESCRIPTION

This command deletes backup history information.
The backup volume of the deleted history is released and becomes an empty backup volume.

OPTIONS

-h *Server-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.

For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-g *Generation-No*

Specifies the relative generation number of backup history information to be deleted.
This option cannot be specified at the same time as the -v or -z option.
Check the relative generation number using the swsthistdisp command.

-v *Version-No*

Specifies the absolute generation number of backup history information to be deleted.
This option cannot be specified at the same time as the -g or -z option.
Check the absolute generation number using 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

Device-Name

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

    - swstdevinfoset

    - swstsrsemtch

    - swstresback

    - swstresrst

8.1.2.8 swststartsync (Backup Synchronous Processing Start Command)

NAME

swststartsync - starts backup synchronous processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swststartsync Device-Name [-Xdevmap Device-Map-File]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swststartsync [-h Server-Name] Device-Name [-Xdevmap Device-Map-File]
```

DESCRIPTION

This command starts backup synchronous processing (ie, it starts disk-to-disk copy using EC).

Even if it is already in use, the transaction volume where the synchronous processing started s well as the suspended backup volume can be used as backup destinations.

Except for the transaction volume where the synchronous processing started and the suspended backup volume, transaction volumes cannot be specified as backup destinations in the device map file.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-Xdevmap *Device-Map-File*

Specifies a target backup volume to perform the backup synchronous processing. In the operand, specify a device map file in which a combination of a transaction volume and a target backup volume is described. If this option is not specified, a target backup

volume will be automatically selected. To execute this command on a remote basis using the -h option, specify a device map file of a Managed Server using an absolute pathname. A file name specified in *Device-Map-File* must not include any national characters.

OPERANDS

Device-Name

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.

- If the backup volume is a volume group, do not execute the vgchange (1M) command to deactivate the volume group under synchronous processing (EC/REC) execution. If this occurs and the backup volume is inactive then it cannot be reactivated. Additionally, it will not be 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

  - swstdevinfoset

  - swstsrsemtch

  - swstresback

  - swstresrst

8.1.2.9   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 Server-Name] [-emergency] [-bd Backup-Device-Name | -all]
Device-Name
```

DESCRIPTION

The backup synchronous processing can be cancelled during copying by EC or under the equivalency maintained status.

The synchronous processing can be cancelled with the backup volume during copying by EC, under the equivalency maintained status, or while the Suspend state is set. Specifying cancellation of all of the synchronous processing cancels all of the backup synchronous processing including those in the Suspended state.

If the system detects an error while backup synchronous processing is being executed, copying in progress at that time terminates abnormally. In this case, use this command to cancel the backup synchronous processing. Use the swstsyncstat command to check for the error.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-emergency

Emergency operation mode is available for operations.
In such cases, EC sessions are neither confirmed nor cancelled.

-bd *Backup-Device-Name*

The synchronous processing on a specific backup volume can be cancelled.
Specify the copy destination backup volume name. In the operand, specify the AdvancedCopy Manager device name for the specified device.
Note that the backup volume name and the -all option cannot be specified together.

-all

All of the synchronous processing of the transaction volume can be specified to be cancelled. Note that this specification and the -bd option cannot be used together.

OPERANDS

Device-Name

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/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed.
#
```

- Cancelling backup synchronous processing of transaction volume in the emergency operation mode:

```
# /opt/FJSVswsts/bin/swstcancelsync -emergency /dev/dsk/c1t0d0
/dev/dsk/c1t0d0 swstcancelsync completed.
#
```

- Cancelling backup synchronous processing of the backup volume from the transaction volume:

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk     Status    Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0 -bd /dev/dsk/c1t0d2
/dev/dsk/c1t0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk     Status  Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend ----
#
```

- Cancelling all of the backup synchronous processing of the transaction volume:

```
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk     Status    Execute
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend   ----
job2  /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
# /opt/FJSVswsts/bin/swstcancelsync /dev/dsk/c1t0d0 -all
/dev/dsk/c1t0d0 swstcancelsync completed.
# /opt/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk Status Execute
job2  /dev/dsk/c1t0d0  ----         ----   ----
#
```

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

    - swstdevinfoset

    - swstsrsemtch

    - swstresback

    - swstresrst

8.1.2.10 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 [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstsyncstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

The execution status of the backup synchronous processing is displayed (during copying, under the equivalency maintained status, or in the suspended status).
If one transaction volume has multiple EC sessions, then the statuses of all of these EC sessions are displayed.
The table below lists the meaning of each title.

Title	Description
Server	Displays the name of the Managed Server.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Backup-Disk	Displays the name of the backup volume. When backup synchronous processing is not being executed, the system displays "----".
Status	Displays the status of backup synchronous processing: "----" : Backup synchronous processing is not being executed. "executing" : Backup synchronous processing is being executed but equivalency maintained status has not been established. "equivalent" : Equivalency maintained status is established. "suspend" : Suspend status is established. "failed" : Backup synchronous processing was abnormally terminated. "nosession" : No session exists (eg, due to inconsistent resource information). "halt" : Backup synchronous processing is halt status. "?????" : Failed to get copy status.
Execute	Displays the progress of the backup synchronous processing as a percentage (0 to 100%). "----" is displayed when the status is Suspend and at times when the backup synchronous processing is not running.

OPTIONS

-h *Server-Name*

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

Device-Name

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/FJSVswsts/bin/swstsyncstat /dev/dsk/c1t0d0
Server Transaction-Disk Backup-Disk     Status     Execute
job1   /dev/dsk/c1t0d0  /dev/dsk/c1t0d3 suspend    ----
job1   /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing 75%
#
```

- To display the status of backup synchronous processing for all of the transaction volumes:

```
# /opt/FJSVswsts/bin/swstsyncstat
Server Transaction-Disk Backup-Disk     Status      Execute
job1   /dev/dsk/c1t0d0  /dev/dsk/c1t0d1 suspend     ----
job1   /dev/dsk/c1t0d0  /dev/dsk/c1t0d2 executing   75%
job1   /dev/dsk/c1t0d0  /dev/dsk/c1t0d4 suspend     ----
job1   /dev/dsk/c1t0d1  /dev/dsk/c1t0d3 equivalent 100%
job1   /dev/dsk/c1t0d5  /dev/dsk/c1t0d7 failed      ----
job1   /dev/dsk/c1t0d6  ----            ----        ----
#
```

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 "7.2 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 swstsrsemtch 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.

8.1.2.11   swstexecstat (Execution Status Display Command)

NAME

swstexecstat - displays the execution status of other commands executed

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstexecstat [-j] [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstexecstat [-j] [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the execution status of other commands executed on a transaction volume. The execution status of OPC/EC will be displayed if OPC/EC is being executed.
The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
Last-Backup-Date	Displays the time when the last backup execution command was accepted.
Interval	Displays how many days have passed after the specified number of interval days since the last backup date has been exceeded. This item will be displayed as "DELAY=number-of-days-passing". "OK" will be displayed if the number of interval days has not been exceeded.
Status	Displays whether any of the following commands is being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. - swstbkpolset - 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	Displays the name of the command being executed or the progress of copying. "----" : Neither a command nor OPC/EC is being executed. "swststartsync" : The backup synchronous processing start command is being processed. "swstcancelsync" : The backup synchronous processing cancel command is being processed. "swstbackup" : The backup execution command is being processed. "swstrestore" : The restore execution command is being processed. "swstcancelrest" : The restore cancellation command is being processed. "swstbkpolset" : The backup policy setting command is being processed. "swstbkpoldel" : The backup policy deletion command is being processed. "swsthistdel" : The history information deletion command is being processed. "swstcanceltrk" : The tracking cancel command is being processed. "sync(xxx%)" : EC progress rate. "sync(failed)" : EC ended abnormally. "sync(halt)" : EC is halt status. "snapshot(xxx%)" : The progress of OPC backup. "snapshot(failed)" : OPC backup ended abnormally. "snapshot(halt)" : OPC backup is halt status. "restore(xxx%)" : The progress of restoration. "restore(failed)" : OPC restoration ended abnormally. "restore(halt)" : OPC restoration is halt status. "?????" : Failed to get copy status. During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.

If multiple processes are performed on transaction volumes (for example, when the backup synchronous processing start command is issued while a real copy of the snapshot backup is being handled), the display in the Execute column conforms to the following rules:

- The display of a command name takes priority if both copying and command executions are in progress.

- When a disk copy of the snapshot backup and a disk copy of the backup synchronous processing are being handled simultaneously, the progress of the disk copy of the backup synchronous processing is displayed. A disk copy for restoration is not performed during disk copy of the snapshot backup or backup synchronous processing due to a restriction of ETERNUS Disk storage system.

The following information will be displayed when -j option is specified:

Title	Description
Server	Displays a Managed Server name.
Device	Displays the AdvancedCopy Manager device name.
Execute-Date	Displays the command execution date and time (TimeStamp).
Status	Displays whether any of the following commands are being executed on a transaction volume. If so, "EXEC" will be displayed. Otherwise, "IDLE" will be displayed. - swstbkpolset - 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	Displays the name of the command being executed or the progress of copying. "----" : Neither a command nor OPC/EC is being executed. "swststartsync" : The backup synchronous processing start command is being processed. "swstcancelsync" : The backup synchronous processing cancel command is being processed. "swstbackup" : The backup execution command is being processed. "swstrestore" : The restore execution command is being processed. "swstcancelrest" : The restore cancellation command is being processed. "swstbkpolset" : The backup policy setting command is being processed. "swstbkpoldel" : The backup policy deletion command is being processed. "swsthistdel" : The history information deletion command is being processed. "swstcanceltrk" : The tracking cancel command is being processed. "sync(xxx%)" : EC progress rate. "sync(failed)" : EC ended abnormally. "snapshot(xxx%)" : The progress of OPC backup. "snapshot(failed)" : OPC backup ended abnormally. "restore(xxx%)" : The progress of restoration. "restore(failed)" : OPC restoration ended abnormally. "restore(halt)" : OPC restoration is halt status. "?????" : Failed to get copy status. During synchronous high-speed backup with -suspend specified, no operation ("----") is indicated in the Execute column.

OPTIONS

-h *Server-Name*

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

Device-Name

Specifies the AdvancedCopy Manager device name corresponding to a transaction volume.
If this operand is omitted, the execution statuses of all the transaction volumes will be displayed.

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/c1t0d0 2000/12/11 12:20 OK       IDLE   /mnt/trans1 (vxfs)   ----
job1  /dev/dsk/c1t0d5 2000/12/10 12:20 DELAY=1  IDLE   /mnt/usr1 (hfs)      sync(22%)
job1  /dev/dsk/c1t0d6 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/c1t0d0 2000/12/11 12:20 IDLE   /usr1 (ufs)          ----
job1  /dev/dsk/c1t0d2 2000/12/10 12:20 IDLE   /usr2 (ufs)          sync(22%)
job1  /dev/dsk/c1t0d5 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 "7.2 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.

8.1.2.12   swstcanceltrk (Tracking Cancel Command)

NAME

swstcanceltrk - stops tracking processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstcanceltrk [-copy | -emergency] Device-Name (-bd Backup-Device-Name | -all)
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstcanceltrk [-h Server-Name] [-copy | -emergency] Device-Name (-bd Backup-Device-Name | -all)
```

DESCRIPTION

This command stops tracking processing.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-copy

Specifies that physical copying, if active, should also be stopped (the OPC session should be cancelled).
This option cannot be specified for a backup volume that has already contained a backup history. For a volume whose copy destination volume has contained a backup history, delete the history information in advance using the swsthistdel command.

-emergency

Specifies that the command should operate in the emergency operation mode.
The command does not check tracking processing and does not stop tracking processing or the OPC session.

-bd *Backup-Device-Name*

Stops tracking processing for the specified backup volume. Specify the target backup volume name as an operand. This option cannot be specified at the same time as the -all option.

-all

Stops the entire tracking processing specified for the transaction volumes. This option cannot be specified at the same time as the -bd option.

OPERANDS

Device-Name

Specify an AdvancedCopy Manager device name.
Refer to "1.4 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

    - swstdevinfoset

    - swstsrsemtch

    - swstresback

    - swstresrst

8.1.2.13   swsttrkstat (Tracking Status Display Command)

NAME

swsttrkstat - displays the status of tracking processing

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swsttrkstat [Device-Name]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swsttrkstat [-h Server-Name] [Device-Name]
```

DESCRIPTION

This command displays the status of tracking processing.
When multiple types of synchronous processing are running on one transaction volume, the command displays the statuses of all types of tracking processing.
The displayed data is explained below.

Title	Description
Server	Displays a Managed Server name.
Transaction-Disk	Displays the AdvancedCopy Manager device name of a transaction volume.
Backup-Disk	Displays a backup volume name. Displays "----" when the volume is not in the tracking status.
Status	Displays the execution status. "----" : Not in the process of tracking "executing" : In the process of physical copying and tracking "tracking" : In the process of tracking "failed" : Physical copying or tracking terminated abnormally

Title	Description
	"nosession" : No session exists. (eg, resource information is inconsistent.) "?????" : Failed to get copy status.
Execute	Displays the progress of copying as a percentage when "executing" is displayed in the Status column. "----" is displayed when "tracking" is displayed in the Status column.
Update	Displays the amount of updated data after logical copying as a percentage when "tracking" is displayed in the Status column. "----" is displayed when "executing" is displayed in the Status column.

OPTIONS

-h *Server-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.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

OPERANDS

Device-Name

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/swsttrkstat /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/swsttrkstat
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 "7.2 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 swstsrsemtch 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.

8.1.3   Maintenance Commands

This section describes the backup management maintenance commands.

8.1.3.1   swstsrsemtch (Resource Match Command)

NAME

swstsrsemtch - recovers resource information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsts/bin/swstsrsemtch [-x]
```

To Execute on Management Server

```
/opt/FJSVswsts/bin/swstsrsemtch [-x] [-h Server-Name]
```

DESCRIPTION

This command recovers resource information if a system failure, etc. has made the resource information inconsistent.

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-x

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/swstsrsemtch
swstsrsemtch completed
#
```

NOTES

- This command can only be executed if none of the following commands are running:

    - swstsvrset

    - swstbkpolset

    - swstbkpoldel

8.1.3.2   swstresback (Resource Backup Command)

NAME

swstresback - backup of backup management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresback Backup-Directory
```

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

Backup-Directory

Specifies the name of a directory to which the backup management file will be 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

  - swstdevinfoset

  - swsthistdel

  - swstcanceltrk

  - swstresback

  - swstresrst

  - swstsrsemtch

8.1.3.3   swstresrst (Resource Restore Command)

NAME

swstresrst - restore of backup management file

SYNOPSIS

```
/opt/FJSVswsts/bin/swstresrst Backup-Directory
```

DESCRIPTION

A backup management file is restored from the specified directory.

- Managed resources information
  Management information, such as Managed Server configuration information.

OPERANDS

Backup-Directory

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

    - swstbkpoldel

    - swstbackup

    - swstrestore

    - swstcancelrest

    - swststartsync

    - swstcancelsync

    - swstdevinfoset

    - swsthistdel

    - swstcanceltrk

    - swstresback

    - swstresrst

    - swstsrsemtch

8.2 Configuration Management Commands

This section explains the operation of the configuration management command. This manages the information on a server device which performs backup and replication, or is a candidate for being used for backup or replication.

📋 Note

. . . .

Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 8.4 Operating Environment for Executing Configuration Management Commands

Command	Operating Environment of AdvancedCopy Manager
stgcmmodnode	To execute this command on a Management Server (Management Server transaction), the Management Server (Management Server transaction) must be operating.
stgenvdisp	This command is executable when both Management Server (Management Server transaction) and Managed Server (Managed Server transaction) are not operating. Note that when the cluster service (which is named differently in respective clustered systems) is not in cluster operation, this command cannot display certain information.
stgmgrinfoset	The package-backup-of-the-management-information execution server must be operating.

Command	Operating Environment of AdvancedCopy Manager
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 8.5 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
stgcmmodnode	Required	Transaction operating node	-
stgenvdisp	Not required	Transaction operating node	-
stgmgrinfobkup	Required	Transaction operating node	-
stgmgrinfodisp	Required	Transaction operating node	-
stgmgrinfoset	Required	Transaction operating node	-
stgxfwcmsetmode	Required	Transaction operating node	-

8.2.1   stgcmmodnode (Management Server Information Change Command)

NAME

stgcmmodnode - changes or displays Management Server information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgcmmodnode [-i IP-Address] [-p PORT-Number] [-n Server-Name]
```

DESCRIPTION

This command has the following two functions:

- Displays Management Server information specified on the Managed Server on which this command is currently executed

- Changes Management Server information.

This command changes the following information on a Management Server:

- IP address of a Management Server

- PORT number used by a communication 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:

- "7.4.1 Changing IP Address of Management Server"

- "7.4.3 Changing Port Number of Management Server or Managed Server"

- "7.4.4 Changing Server Name of Management Server or Managed Server"

OPTIONS

None

    Displays the server information currently being managed.

-i *IP-Address*

    Specifies the IP address of a Management Server, to change the IP address of the Management Server.

-p *PORT-Number*

    Specifies the port number of a Management Server, to change the port number of the Management Server.

-n *Server-Name*

    Specifies the server name of a Management Server to change the server name of the Management Server. This option cannot be specified if this command is executed on a Management Server.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Display server information:

```
# /opt/FJSVswstf/bin/stgcmmodnode
swstf2413 IP Address = 10.10.10.10
swstf2413 PORT Number = 1226
swstf2413 Storage Management Server's Name = fujitsu-storage-management-server
#
```

- Change the IP address of a Management Server to 10.12.13.14:

```
# /opt/FJSVswstf/bin/stgcmmodnode -i 10.12.13.14
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 will occur 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.

-

8.2.2   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.

8.2.3   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.

8.2.4   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.

8.2.5   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.

8.2.6   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.

8.2.7   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.

8.2.8   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.

8.2.9   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.

8.2.10   stgenvdisp (Environment Information Display Command)

NAME

stgenvdisp - displays the values of the environment settings

SYNOPSIS

```
/opt/FJSVswstf/bin/stgenvdisp [-n Server-Name]
```

DESCRIPTION

This command displays the values of the environment settings in AdvancedCopy Manager.
The contents of the displayed information are described below.

Title	Description
Server type	The server type is displayed as follows:

Title	Description
	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 : MSCS or WSFC 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 *Server-Name*

   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     : 10.10.10.10
  Communication          : 1226
-------------------------------------------------------------------------
  Version                : V16.1
  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     : 10.10.10.10
  Communication          : 11000
-------------------------------------------------------------------------
  Server type            : Server
  Cluster system         : GENERAL
  Node type              : Secondary
  Node name              : nodeagt2
  Service name           : agent_service2
  Mount point            : /acmagt2disk
  Manager IP address     : 10.10.10.10
  Communication          : 12000
-------------------------------------------------------------------------
  Server type            : Server
  Node name              : Local-Service
  Manager IP address     : 10.10.10.10
  Communication          : 1226
-------------------------------------------------------------------------
  Version                : V16.1
  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.

8.2.11 stgmgrinfoset (Management Information Package Backup Server Registration/Deletion Command)

NAME

stgmgrinfoset - registers. deletes or displays the management information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfoset [-del | -d Directory-Name -c management-server-encoding]
```

DESCRIPTION

This command can be used to register, delete or display information about the management information package backup execution server(the server on which 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 *Directory-Name*

Specify the absolute path to the directory where the backup data is to be stored.
Only alphanumeric characters and underscores can be used in the directory name.

-c *management-server-encoding*

Specify the encoding designated when the Management Server was installed. Specify ASCII.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Register the management information package backup execution server:

(assume that the path to the directory where backup data is to be stored is /stgbkupdata, and the encoding used on the Management Server is ASCII):

```
# /opt/FJSVswstf/bin/stgmgrinfoset -d /stgbkupdata -c ASCII
swstf3000 The server which performs package backup of the management information on AdvancedCopy
Manager was registered.
#
```

- Delete the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfoset -del
swstf3001 The server which performs package backup of the management information on AdvancedCopy
Manager was deleted. Delete a directory. Directory=/stgbkupdata
#
```

- Display information about the management information package backup execution server:

```
# /opt/FJSVswstf/bin/stgmgrinfoset
Directory    : /stgbkupdata
Manager code : ASCII
#
```

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.

8.2.12   stgmgrinfobkup (Management Information Package Backup Command)

NAME

stgmgrinfobkup - backup the management information

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfobkup [-n Server-Name] [-t Backup-Type]
```

DESCRIPTION

This command backup the management information stored on the Managed Server and the Management Server.

OPTIONS

-n *Server-Name*

Creates backups of the management information stored on the specified server.
If this option is not specified, the management information on all Managed Server (including the Management Server) is backed up.

-t *Backup-Type*

Specifies the types of data that are to be backed up. Specify one of the values listed below. Do not specify more than one value in the -t option:

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 "7.1.2.1 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 Web Console operations while this command is running. Conversely, do not execute this command while another AdvancedCopy Manager command or a Web Console operation is running.

- Do not execute this command again if it is already running.

- If this command was executed under one of the following circumstances from a Managed Server on which AdvancedCopy Manager Version 14.2 or earlier is installed, backup of authentication data will not be implemented.

  - When AuthData was specified in the -t option

  - When the value "YES" was specified for the AuthData key in the Management Server section of the policy file for batch backup of management data

- To save backup data to a tape or similar external medium, save all files and directories under the backup data storage directory.

- Registry backups are made only when RegiData is specified in the -t option. A registry backup will not be made if the -t option is not specified.

- A backup of the policy file for management information package backup is made only when MgrInfoData is specified in the -t option. No backup is made when the -t option is not specified. Additionally, specify the name of the management information package backup execution server in the -n option.

- If the version of Management Server is lower than that of Managed Server, back up the management information on Management Server.

8.2.13 stgmgrinfodisp (Management Information Package Backup Status Display Command)

NAME

stgmgrinfodisp - displays the status of execution of the stgmgrinfobkup

SYNOPSIS

```
/opt/FJSVswstf/bin/stgmgrinfodisp [-n server-name]
```

DESCRIPTION

This command displays the status of execution of the stgmgrinfobkup 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) 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)

Item	Description
	yy/mm/dd hh:mm:ss
MgrInfoData	Date and time at which the management information package backup command created a backup of the policy file for management information package backup (ie, the date and time that the management information package backup command was executed)
	yy/mm/dd hh:mm:ss

OPTIONS

-n *Server-Name*

Specifies the name of the server where the backup status is to be output.
If this option is not specified, the status of backups on the Managed Server for which the management information package backup command was executed is displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

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.

8.2.14 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 using the new devices included with HP-UX 11iv3 or later (/dev/(r)disk/disk#) or legacy devices (/dev/(r)dsk/c#t#d#). 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 device.
off : Use a new device.
disp : Check the current setup status.

Information Output When "disp" Is Specified

leg : on Use a legacy device
leg : off Use a new device.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Set configuration so that a legacy 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.

- This command cannot be executed with HP-UX 11iv2 or earlier.

- If no legacy devices exist, it is not possible to set the configuration so that legacy devices are used.

8.2.15   stgrepocnv (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.

8.3   Replication Management Commands

This section describes operations using Replication Management Commands.

Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the different commands.

Table 8.6 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, Windows services required by the Management Server and target Managed Server must be operating. When the Managed Server runs on Windows and is in EC operation, Windows services required by the copy destination Managed Server must be running (except when the -m or -t option is specified). For inter-server replication in the equivalency maintain state, the associated server must be operating (except when the -m option is specified).
swsrpchsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpdelvol	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. For inter-server replication, Windows services required by the Managed Server in communication must be running (except when the -d option is specified).
swsrprecbuffstat	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrprecbuffset	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpmake	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows and is engaged in intra-server replication and EC operation, Windows services required by the Managed Server must be running. For inter-server replication, Windows services required by the Managed Server in communication must be running (except when the -m or -t option is specified).
swsrprecoverres	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows, Windows services required by the Managed Server must be running. To specify the -r option, Windows services required by the Management Server must be running.
swsrprevsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpsetvol	To execute this command on a Managed Server, Windows services required by the Management Server must be running. To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.

Command	Operating Environment of AdvancedCopy Manager
	For inter-server replication, Windows services required by the Managed Server in communication must be running.
swsrpstartsync	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running. When the Managed Server runs on Windows, Windows services required by the Managed Server must be running. For inter-server replication, the associated server must be running (except a case where the -m option is specified).
swsrpstat	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.
swsrpvolinfo	To execute this command on a Management Server with the -h option specified, Windows services required by the Management Server and target Managed Server must be running.

⬡ **Note**

In Cluster Operation

In cluster operation, execute a command by taking the following steps:

1. If necessary, specify the logical node name to the transaction in environment variable SWSTGNODE. Specify the environment variable as follows:

   ```
   # 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 8.7 Commands When Cluster Operation Is Used

Command	Environment Variable	Command Execution Node	Remarks
swsrpsetvol	Required	Transaction operation node	-
swsrpvolinfo	Required	Transaction operation node	-
swsrpdelvol	Required	Transaction operation node	-
swsrprecbuffstat	Required	Transaction operation node	-
swsrprecbuffset	Required	Transaction operation node	-
swsrpstartsync	Required	Transaction operation node	-
swsrpmake	Required	Transaction operation node	-
swsrpstat	Required	Transaction operation node	-
swsrpcancel	Required	Transaction operation node	-
swsrpchsync	Required	Transaction operation node	-
swsrprevsync	Required	Transaction operation node	-
swsrprecoverres	Required	Transaction operation node	-

8.3.1 Environment Definition Commands

This section describes environment definition commands for replication management.

8.3.1.1 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 a Server

```
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u] [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

For Replication Between Servers

```
/opt/FJSVswsrp/bin/swsrpsetvol [-n] [-u]  -o (ORG|REP|BOTH) [-Xgroup Group-Name] Original-
Volume-Name Replica-Volume-Name
```

To Execute on Management Server

For Replication on a Server

```
/opt/FJSVswsrp/bin/swsrpsetvol [-h Server-Name] [-n] [-u] [-Xgroup Group-Name] Original-Volume-
Name Replica-Volume-Name
```

For Replication Between Servers

```
/opt/FJSVswsrp/bin/swsrpsetvol [-h Server-Name] [-n] [-u] -o (ORG|REP|BOTH) [-Xgroup Group-Name]
Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

This command sets the replication source volumes and replication destination volumes that will be used in a replication operation. Execute this command to declare that the replication operation will performed using the specified replication volumes.

OPTIONS

-h *Server-Name*

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

- swsrpprevsync

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 *Group-Name*

Specifies that the copy source and copy destination volumes will be registered in a group.
If the specified group does not exist, a new group is created. Otherwise, the specified copy source and copy destination volumes are added to an existing group.
The characters that can be used for the group name are single-byte alphanumeric characters, the minus sign (-), underscore (_), number sign (#) and period (.). The first character must be a single-byte alphanumeric character. Up to 64 characters can be used.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "*Volume-Name*@*Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

Replica-Volume-Name

Specifies a replication destination volume name.
For the volume names of other servers, use the format "*Volume-Name*@*Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Set replication volume information by specifying volume/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 replication between servers.
    - 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 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

  - swsrpchsync

  - swsrprevsync

  - swsrprecoverres

8.3.1.2   swsrpvolinfo (Replication Volume Information Display Command)

NAME

swsrpvolinfo - displays the replication volume information

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpvolinfo [-L] [Original-Volume-Name]
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpvolinfo [-h Server-Name] [-L] [Original-Volume-Name]
```

DESCRIPTION

This command displays the replication volume information registered by the swsrpsetvol command.
The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Original-Volume	Displays a replication source volume name.
Size	Displays the volume size. 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.

Title	Description
	uni-direction : One-way copying from a replication source volume to a replication destination volume is allowed. bi-direction : Bidirectional copying is allowed.
Op-Server	Displays the operation server of a pair of replication volumes. original : The replication source server is the operation server. replica : The replication destination server is the operation server. both : Sets both the copy-source server and copy-destination server as operation servers.
Group (Only when the -L option is specified)	Displays the group name. "----"is displayed if the copy source and destination volumes are not registered in a group.

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-L

Specifies that information will be displayed using the extended format.
For the items displayed by this option, refer to the table in the description above.
The items that are displayed may be expanded to support new functions provided by future versions.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "Volume-Name@Managed-Server-Name."
Specifies the AdvancedCopy Manager device name for the volume name.
Displays all the replication volume information for the specified replication source volume. If this operand is omitted, all the replication volume information existing on the Managed Server on which this command is executed is displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Direct that all the replication volume information on a Management Server is to be displayed on Managed Server SRC-SV:

```
# /opt/FJSVswsrp/bin/swsrpvolinfo –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

8.3.1.3   swsrpdelvol (Replication Volume Information Deletion Command)

NAME

swsrpdelvol - deletes the replication volume

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpdelvol [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpdelvol [-h Server-Name] [-e] [-d] Original-Volume-Name Replica-Volume-Name
```

DESCRIPTION

This command deletes the replication volume information that has been set.
If copy processing is being performed on a replication volume that is to be deleted, execute the command after the copy processing has stopped.

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
When performing the server-to-server replication, specify the name of the operation server configured with the swsrpsetvol command.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-e

Emergency mode is available for operations.
Specifies deleting replica volume information without checking the execution state of an Advanced Copy. Use this option only when it is clear that the Advanced Copy has not executed.

-d

Specifies that no communication should take place between the linked servers in replication between servers. When this option is specified, replication volume information is deleted without communication taking place between the linked servers.
Use the option only when recovery of one of the linked servers cannot be expected.
The option is valid only for replication between servers.
The option can be used on the server not specified as the operation server.

OPERANDS

Original-Volume-Name

Specifies a replication source volume name.
For the volume names of other servers, use the format "*Volume-Name*@*Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

Replica-Volume-Name

Specifies a replication destination volume name.
For the volume names of other servers, use the format "*Volume-Name*@*Managed-Server-Name*".
Specifies the AdvancedCopy Manager device name for the *Volume-Name*.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Delete replication volume information on Managed Server SRC-SV:

```
# /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

8.3.1.4   swsrprecbuffstat (REC Buffer Information Display Command)

NAME

swsrprecbuffstat - displays information for the REC buffer

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrprecbuffstat [-L] Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrprecbuffstat [-h Server-Name] [-L] Volume-Name
```

DESCRIPTION

This command displays information for the REC buffer used by ETERNUS Disk storage system when REC is performed in Consistency mode.
The following information will be displayed:

Title	Description
BoxID	The box identifier for the box connected to the server where the command was executed.
ID	The ID for the REC buffer.
Use	The attribute (usage) for the REC buffer. SEND : REC buffer for sending data RECV : REC buffer for receiving data

Rate	The usage rate of the REC buffer as a percentage.
	
	 If "Use" Is SEND
	
	     Displays the usage rate of the REC buffer as a percentage. This will never be 0%, even if REC is not being performed in Consistency mode.
	
	 If "Use" Is RECV
	
	     "0%" will always be displayed.
	
	 "----" will be displayed if the REC buffer cannot be used.

RemoteBoxID	The box identifier for the box performing a remote copy.

DiskBuff	Displays the REC Disk buffer status only when -L option is specified:
	
	   - --- : REC buffer is used for receiving
	
	   - active : REC Disk buffer is available for use
	
	   - invalid : REC Disk buffer is not set
	
	   - warning(code=xx) : REC Disk buffer is available for use but there is a disk fault
	
	   - inactive(code=xx) : REC Disk buffer cannot be used
	
	   - not_support : REC Disk buffer is not supported
	
	 The following codes are displayed at code=xx in the case of warning or inactive:
	
	   - 04 : Rebuild or other recovery operation is in progress (REC Disk buffer is available for use)
	
	   - 05 : RAID that comprises the REC Disk buffer has a fault
	
	   - 06 : The REC Disk buffer RAID group is being formatted
	
	   - 07 : Copy destination does not support REC Disk buffer
	
	   - 08 : A RAID that comprises the REC Disk buffer has no redundancy

DiskRate	Displays the busy rate as a percentage if the REC Disk buffer state is "active" or "warning" only when -L option is specified. If the REC Disk buffer is not being used, 0% is displayed. In cases other than the above, "---" is displayed.

OPTIONS

-h *Server-Name*

   When executing on the Management Server, specify the name of the target Managed Server.
   When executing on the target Managed server, it is not necessary to specify this option.
   For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the
   stgxfwcmdispsrv command.

-L

   This option specifies to display in extended format.
   For the items displayed by this option, refer to the table in the description above.
   Note that additional items corresponding to new functions in future versions might be displayed in future when this option is
   specified.

OPERANDS

Volume-Name

   Specifies the name of a volume that has been registered as a replication volume.
   You can only specify volumes that are connected to the Managed Server where the command is executed.

   Specifies the AdvancedCopy Manager device name as the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Display information for the REC buffer used by the REC, and replication is performed within the Managed Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use   Rate RemoteBoxID                          DiskBuff DiskRate
1  SEND 25%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB B active   50%
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                          DiskBuff DiskRate
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA --- ---
#
```

- 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/c1t2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                          DiskBuff DiskRate
1  SEND 25%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB active   0%
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB --- ---
#
```

  [Command executed on Managed Server "Server2"]

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d20@Server2 -L
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID                          DiskBuff DiskRate
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA --- ---
2  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA 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/c1t2d10@Server1 -L
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID                              DiskBuff        DiskRate
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB warning(code=08) 0%
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB ---             ---
3  SEND 12%  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC active          50%
4  RECV 0%   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC ---             ---
5  SEND 12%  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD invalid         ---
6  RECV 0%   EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE ---             ---
7  SEND 12%  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF inactive(code=05) ---
8  SEND 12%  GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG active          0%
#
```

NOTES

- Information is displayed only for boxes that contain replication volumes for the server where the command was executed.

  If inter-box replication is being performed between servers, then the command must be executed on both servers involved in the replication in order to check information for the REC buffers in both boxes.

- It will take a short time for changes to REC buffer settings to take effect, during which time the buffer may become unusable (the Rate column will be displayed as "----"). In this case, wait about one minute and then execute the command again.

- This command cannot be executed while the following command is running:

  - swsrprecoverres

8.3.1.5   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} Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrprecbuffset [-h Server-Name] -Xbuffid buffer-id -Xbuffuse {SEND|RECV}
Volume-Name
```

DESCRIPTION

This command changes the settings of the REC buffer used by ETERNUS Disk storage system when REC is performed in Consistency mode.
For information about the setting method of REC buffer, refer to "User's Guide Setup / Maintenance" of ETERNUS Web GUI.

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-Xbuffid *buffer-id*

> Specifies the ID for the REC buffer.

-Xbuffuse {SEND|RECV}

> Specifies the usage for the REC buffer.

> SEND : REC buffer for sending data
> RECV : REC buffer for receiving data

OPERANDS

Volume-Name

> Specifies the name of a volume that has been registered as a replication volume.
> You can only specify volumes that are connected to the Managed Server where the command is executed.

> Specifies the AdvancedCopy Manager device name as the volume name.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Change the attributes for the REC buffer used by the REC, and replication is being performed within the Managed Server "Server1":

```
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse RECV /dev/dsk/c1t2d10@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  RECV 0%   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
ID Use  Rate RemoteBoxID
1  SEND 12%  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
#
```

- 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/c1t2d10@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
ID Use  Rate RemoteBoxID
1  SEND 25%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 1 -Xbuffuse SEND /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffset -Xbuffid 2 -Xbuffuse RECV /dev/dsk/c1t2d11@Server1
swsrprecbuffset completed
# /opt/FJSVswsrp/bin/swsrprecbuffstat /dev/dsk/c1t2d11@Server1
BoxID = AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

```
ID Use  Rate RemoteBoxID
1  SEND 12%  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
2  RECV 0%   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
#
```

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 will take a short time for changes to buffer settings to take effect, during which time the REC buffer will become unusable. Do not perform REC operations during this time.

- This command cannot be executed while any of the following commands are running:

    - swsrpsetvol

    - swsrpdelvol

    - swsrpstartsync

    - swsrpmake

    - swsrpstat

    - swsrpcancel

    - swsrpchsync

    - swsrprevsync

    - swsrprecoverres

8.3.2   Operation Commands

This section describes operation commands for replication management.

8.3.2.1   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] From-Volume-Name To-Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpstartsync [-h Server-Name] [[-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] From-Volume-Name To-Volume-Name
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstartsync [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] [-Xreverse] -Xgroup Group-Name
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstartsync [-h Server-Name] [-y [-a | -v]| -k | -i] [-g] [-m] [-Xskip | -Xremain] [-t] [-Xda] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

Start the synchronous replication processing (copying between disks by EC and REC).
It will copy all the data from the source volume to the destination volume at the start of the synchronization process, or if run as a restart of the synchronization process it will just copy updated data to the destination volume. Use this command at the start of operation or when you want to reflect updated data (differences) from the equivalency maintenance state.

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
When performing the server-to-server replication, specify the name of the operation server configured with the swsrpsetvol command.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-y

Specifies inter-box synchronization in synchronous mode. This option is valid only when total copy is started for inter-box replication.
Specify this option together with the -a option to start the split mode for inter-box synchronization in Automatic Split mode.
Specify this option together with the -v option to start the mode in Manual Split mode.
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 *Group-Name*

Specifies that synchronous processing must be started for each group.

-Xreverse

Specifies that synchronous processing must be started for each group in the reverse direction (from replica volumes to original volumes).
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 medium to the copy destination volume.

-Xda

Disables update (WRITE) and access (READ) to the replication destination volume from the synchronous processing start until the replication has been completed.
This option is valid only when synchronous processing is started.
If the option is omitted, only update (WRITE) to the replication destination volume is disabled.

OPERANDS

From-Volume-Name

Specifies a replication source volume name.
Specifies the replication source volume or the replication destination volume set with the swsrpsetvol command.
Specifies the AdvancedCopy Manager device name for the volume name.

To-Volume-Name

Specifies a replication destination volume name.
Specifies the replication source volume or the replication destination volume set with 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 will be terminated immediately if an error occurs.

- When the replication to be performed satisfies either of the following two conditions, please perform drive letter release or unmount of the copy target volume before executing a command.

    - When a replication is performed between different OSs

    - When the sizes of replication source volume and replication destination volume differ

    - 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 8.8 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 will not be 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 "9.1.1 General Notes" for notes about starting replication.

- An error will occur if the synchronous process is restarted with -Xda option. When changing the access permission for replication destination volume, please first cancel the current replication processing with the swsrpcancel command and then restart this command.

- This command will terminate abnormally with the following error message if the -Xda option is set for an ETERNUS Disk storage system that does not support the Destination Access Permission function.

```
swsrp0719 EC cannot be run. Error=17(not support.)
```

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol

  - swsrpdelvol

  - swsrprecoverres

8.3.2.2 swsrpmake (Replication Creation Command)

NAME

swsrpmake - creates a replication volume

SYNOPSIS

To Execute on Managed Server

Synchronized Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j | -Xconcur]) From-Volume-Name To-Volume-Name
```

Snapshot Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-T | -C | -P]) From-Volume-Name To-Volume-Name
```

To Execute on Management Server

Synchronized Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-h Server-Name] [-m] [-f] [-t] ([-j | -Xconcur]) From-Volume-Name
To-Volume-Name
```

Snapshot Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-h Server-Name] [-m] [-f] [-t] ([-T | -C | -P]) From-Volume-Name
To-Volume-Name
```

To Execute on Managed Server: Group Specification

Synchronized Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-j | -Xconcur]) [-Xreverse] -Xgroup Group-Name
```

Snapshot Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-m] [-f] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-Xreverse] -Xgroup
Group-Name
```

To Execute on Management Server: Group Specification

Synchronized Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-h Server-Name] [-m] [-f] [-t] ([-j | -Xconcur]) [-Xreverse] -
Xgroup Group-Name
```

Snapshot Replication

```
/opt/FJSVswsrp/bin/swsrpmake [-h Server-Name] [-m] [-f] [-t] ([-T | -C | -P]) [-Xconcur-opc] [-
Xreverse] -Xgroup Group-Name
```

DESCRIPTION

When synchronization processing (EC) is not performed, this command will start snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) to create a replication volume.

When synchronization processing is performed, check whether the status of the processing is in the equivalency maintenance state. If so, suspend the synchronization processing and create a replication volume. The status in which synchronization processing is suspended is referred to as the replication established status. After this command is executed, the replication destination volume can be accessed.

This command executes the replication pre-processing and post-processing before a replication is created. For details of these processes, refer to "Appendix C Pre-processing and Post-processing of Replication".

OPTIONS

-h *Server-Name*

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 will be forcibly suspended even if the execution status of copying is "sync: Total copy or incremental copy is being performed" or "halt: Hard suspend status" in synchronization processing of intra-box replication. This option can only be used for intra-box replication; if attempted for intra-box replication, an error will occur.
When this option is specified, the data in the destination volume is not guaranteed.
Additionally, when this option is specified, pre-processing and post-processing for the source and destination volumes are not performed. When restarting synchronous processing (REC) between boxes, execute the swsrpstartsync command with the -t option specified.

-T

Specifies that differential snapshot processing will be executed.
This option cannot be specified while synchronous processing is performed.
This option is valid only for a replication within the ETERNUS Disk storage system and when the ETERNUS Disk storage system supports the QuickOPC function.
For a snapshot replication without specifying this option, ordinary snapshot processing (OPC without using the QuickOPC function) is started. This option must be specified to perform the replication operation using differential snapshots.

-Xgroup *Group-Name*

Specifies that a replication will be created for each group.

-Xreverse

Specifies that a replication will be created for each group in the reverse direction (i.e., from replica volumes to original volumes).
This option is valid only when the -Xgroup option is specified.

-Xconcur

    Specifies that a replication will be created using the concurrent suspend function.

    If this option is used, the size of the copy destination volume must be the same or larger that that of the copy source volume.

Xconcur-opc

    Specifies that a replication will be created using the concurrent OPC function.

-C

    Specifies that SnapOPC will be started.
    This option is only valid for intra-box replications and for ETERNUS Disk storage system that supports the SnapOPC function.
    In order to execute SnapOPC, the copy destination volume must be a Snap Data Volume.

-P

    Specifies to start SnapOPC+.
    This option is only valid with intra-box replications and for ETERNUS Disk storage system that supports the SnapOPC+ function.
    In order to execute SnapOPC+, the copy destination volume must be a Snap Data Volume.
    An error occurs in the following cases:

      - The same SnapOPC+ session exists at the copy source volume and the copy destination volume.

OPERANDS

From-Volume-Name

    Specifies a replication source volume.
    Specifies the replication source volume or the replication destination volume that was set with the swsrpsetvol command.
    Specifies the AdvancedCopy Manager device name for the volume name.

To-Volume-Name

    Specifies a replication destination volume.
    Specifies the replication source volume or the replication destination volume that was set with 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/DX80 S2 (for firmware version numbers before V10L30)

        - ETERNUS DX90/DX90 S2 (for firmware version numbers before V10L30)

        - ETERNUS DX400/DX400 S2 series (for firmware version numbers before V10L30)

        - ETERNUS DX8000/DX8000 S2 series (for firmware version numbers before V10L30)

- If the -Xgroup option is specified, processing will be terminated without creating a copy if the operation statuses of the replication volumes being processed include both snapshot-type replication and synchronous-type replication. Additionally, if the -Xgroup option is specified, replication volumes are processed in order, but processing will be terminated immediately if an error occurs.

- Note the following when you specify the -Xconcur-opc option:

    - Specify this option together with the -Xgroup option.

    - If an error is detected by the preliminary check for the replication volumes to be processed, processing will be terminated without creating a copy.
      Refer to the following table for details of the preliminary checks:

Type	Details of 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
When the operation status of the replication volume in the group is in one of the following:	1. Copying that is in progress is terminated.

Operation Status (Display by swsrpstat -L)	Copy Operation

- 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".)
	2. Define the concurrent OPC. Snapshot processing is newly started with the concurrent OPC specified.t

QuickOPC

Operation Status (Display by swsrpstat -L)	Copy Operation

When the operation status of the replication volume in the group is in one of the following:
 	
- The concurrent OPC is defined.
  (Status is "readying".)
 	
- Copy is not executed.
  (Status is "----" and Trk is "----".)
 	
- Snapshot processing is in progress and tracking is not executed.
  (Status is "snap" and Trk is "off".)
 	
- SnapOPC is processing
  (Status is "copy-on-write")
 	
- SnapOPC+ is processing
  (Status is "copy-on-write(active)" or "copy-on-write(inactive)")
 	
- Error suspend status
  (Status is "failed".)
	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.

When the operation status of the replication volume in the group is in one of the following: - Snapshot processing is in progress and tracking is in progress. (Status is "snap" and Trk is "on".)	Differential snapshot processing is restarted with the concurrent OPC specified.

Operation Status (Display by swsrpstat -L)	Copy Operation
- Tracking is in progress. (Status is "----" and Trk is "on".)	

- When the replication to be performed satisfies either of the following conditions, please perform drive letter release or dismount of the copy target volume before executing a command.

    - When a replication is performed between different OSs

    - When the sizes of replication source volume and replication destination volume differ

    - 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 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 and SnapOPC+ can be executed.

    Additionally, when restoring data from a Snap Data Volume, note that there must be a SnapOPC session between the copy source volume and the copy destination volume (Snap Data Volume).

- If this command is executed during snapshot processing, snapshot processing is restarted.
  Refer to the following table for details of copy operation:

Table 8.9 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 "9.1.1 General Notes" for notes on creating replication.

- This command cannot be executed while any of the following commands are running:

    - swsrpsetvol

    - swsrpdelvol

    - swsrprecoverres

8.3.2.3 swsrpstat (Operation Status Display Command)

NAME

swsrpstat - displays the operation status

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpstat [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O] [Original-Volume-
Name]
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpstat [-h Server-Name] [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O]
[Original-Volume-Name]
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstat [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O] -Xgroup Group-Name
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpstat [-h Server-Name] [ [-L] [-Xdate] [-Xda] | [-Xall] ] [-E] [-H] [-O] -
Xgroup Group-Name
```

DESCRIPTION

This command displays the operation status of the specified volume. If a volume is not specified, the operation status of each replication volume is displayed.
The following information will be displayed:

Title	Description
Server	Displays a Managed Server name.
Original-Volume	Displays a replication source volume name.
Replica-Volume	Displays a replication destination volume name.
Direction	Displays the copy direction if a copy session exists. regular : Copying from the replication source to the replication destination is being performed. reverse : Copying from the replication destination to the replication source is being performed. ---- : Copying is not being performed.
Status	Displays the execution status. ---- : Copying is not being performed. readying : The concurrent OPC has been defined. sync : Total copy or incremental copy is being performed. equivalent : Equivalency maintained status. replicated : Replication established status. copy-on-write : SnapOPC processing is being performed. copy-on-write(active) : SnapOPC+ processing is being performed (most recent snap generation). copy-on-write(inactive) : SnapOPC+ processing is being performed (past snap generation). failed : Error suspend status. failed(badsector) : There is a bad sector in the copy source. failed(overflow) : There is insufficient Snap Data Volume or Snap Data Pool capacity. failed(other) : The error suspend status is neither failed(badsector) or failed(overflow). halt : Hard suspend status. halt(sync) : Hard suspend status (hard suspend status has been entered during a REC total copy or differential copy). halt(equivalent) : Hard suspend status (hard suspend status has been entered during an REC equivalency maintenance state). halt(use-buffer) : A line fault occurred and the REC buffer is in use. (*1) halt(use-disk-buffer) : A line fault occurred and the REC Disk buffer is in use. (*1) snap : OPC or QuickOPC processing is being performed. ????? : Failed to get copy status. *1: "halt(use-buffer)" and "halt(use-disk-buffer)" are output when the following two conditions are fulfilled: - The -H option was specified, and - In inter-server replication, this command was executed on the replication source server of REC.
Execute	Displays the copy progress rate as a percentage. "----" is displayed during SnapOPC or when no copying is being performed.
Trk	Displays whether tracking processing is in progress. on : Tracking processing is in progress. off : Tracking processing is not in progress. ---- : Snapshot processing is not being performed.

Title	Description
Update	Displays the percentage of data that has been updated since the last copy was created, in the cases shown below. For SnapOPC+, this displays the percentage of data that has been updated since the previous snap generation. - When the Status column is "----" and the Trk column is "on" (that is, tracking is in progress and the physical copy is not being executed). - When the Status column is "copy-on-write" (that is, when SnapOPC processing is in progress) - When the Status column is "copy-on-write(active)" (that is, when SnapOPC+ (most recent snap generation) is being performed) - When the Status column is "copy-on-write(inactive)" (that is, when SnapOPC+ (past snap generation) is being performed) Displays "----" during physical copying or when tracking is not in progress.
Rcv	Indicates the Recovery mode for Inter-ETERNUS synchronization. auto : Automatic Recovery mode manual : Manual Recovery mode ---- : Inter-ETERNUS synchronous replication (REC) is not performed.
Split	Indicates the Split mode for Inter-ETERNUS synchronization. auto : Automatic Split mode manual : Manual Split mode ---- : Inter-ETERNUS synchronous replication (REC) is not performed using the Synchronous mode.
Xfer	Indicates the Transfer for Inter-ETERNUS synchronization. sync : Synchronous mode async : Through mode stack : Stack mode consist : Consistency mode ---- : Inter-ETERNUS synchronous replication (REC) is not performed.
Snap-Gen	When SnapOPC+ is performed, displays the snap generation number. When SnapOPC+ is not performed, "----" is displayed. 1 is the oldest snap generation, and the snap generation number increases until the most recent generation is reached.
Copy-DA (Copy Destination Access)	Displays the access permission for the replication destination volume. on : Access is not being permitted. off : Access is being permitted. When an ETERNUS Disk storage system does not support the Destination Access Permission function or the SDX objects is specified with the units of logical volumes, 'off' is displayed.
Date	If a copy session exists, a timestamp in the [yyyy/mm/dd hh:mm:ss] format is displayed for the last status transition of the copy session as described below. The timestamp is relative to the time zone settings of the specified storage system. [For the OPC and QuickOPC] - Starting the logical copy (Execution the "swsrpmake" or "swsrpmake -T") - Changing to error suspend status (The Status is "failed") [For the SnapOPC and SnapOPC+] - Starting the logical copy (Execution the "swsrpmake -C" or "swsrpmake -P") - Changing to error suspend status (The Status is "failed")

Title	Description
	[For the EC]
	- Suspend (Execution the "swsrpmake")
	- Concurrent suspend (Execution the "swsrpmake -Xconcur")
	- Changing to error suspend status (The Status is "failed")
	[For the REC]
	- Starting the REC by initial copy skip function (Execution the "swsrpstartsync -Xskip")
	- Suspend (Execution the "swsrpmake") (*1)
	- Concurrent suspend (Execution the "swsrpmake -Xconcur")
	- Changing to error suspend status (The Status is "failed")
	- Changing to hard suspend status (The Status is "halt")
	*1: When a forced suspend is performed on a REC session in hardware suspend condition, the timestamp of the last execution is initialized as "----/--/-- --:--:--". When a forced suspend is performed while copy is executing, its timestamp is not updated.
	"----/--/-- --:--:--" is displayed in the following situations:
	- There is no copy session (Status column is "----")
	- Copy status could not be obtained from the storage system (Status column is "?????")
	- Transition between no copy session and start of a synchronous EC/REC initial copy (swsrpstartsync) is started under the condition of no copy session.
	- The REC session is recovered automatically from the hardware suspend status (The Status is "halt")
	- The storage system where last execution timestamp function is not supported
	- The SDX objects being set per logical volume

OPTIONS

-h *Server-Name*

When executing on the Management Server, specify the name of the target Managed Server.
When executing on the target Managed server, it is not necessary to specify this option.
For the server name, accurately specify the same letters, including upper and lower case, as the server name displayed with the stgxfwcmdispsrv command.

-L

Specifies that display will be in extension format.
For the items displayed by this option, refer to the table in the description above.

-E

An option which when set will display the operational status in the opposite direction only (from the copy destination to the copy source).
If this option is not set, the operation status will always be displayed in the normal direction (from the copy source to the copy destination) when a bi-directional OPC physical copy is taking place.
In case this option is set, the operational status in the normal direction will not be displayed. Only the operational status in the opposite direction will be displayed.
This option can be used to check the operational status of an OPC session performed in the opposite direction if a QuickOPC/ SnapOPC session in the normal direction exists.

-Xgroup *Group-Name*

> Specifies that the operation statuses are displayed by the group.
> If this option is set, all the operational statuses relating to the specified group will be displayed.

-H

> Changes the Status column display method used when a REC enters a hard-suspend (halt) status.
> If this option is specified, then "halt (sync)" will be displayed when hard-suspend status occurs during a total copy or a differential copy. "halt (equivalent)" will be displayed when hard-suspend status occurs during an equivalency maintenance state.
> If the transfer mode is Consistency mode and a REC Disk buffer is set, "halt(use-disk-buffer)" will be displayed when issue of a hard suspend causes transfer data to be saved to the REC Disk buffer.
> If the transfer mode is Consistency mode and a REC buffer is set, "halt(use-buffer)" will be displayed when issue of a hard suspend causes transfer data to be saved to the REC buffer.

-O

> Changes the error suspend(failed) status Status column display method.
> If this option is specified, the display will be as follows:
> There is a bad sector: "failed(badsector)"
> When there is insufficient Snap Data Volume or Snap Data Pool capacity: "failed(overflow)"
> All other cases: "failed(other)"

-Xda

> Displays the access permission settings for copy destination volume.

-Xdate

> Displays the timestamp of the last copy session status transition.

-Xall

> Displays the all information.
> For the items displayed by this option, refer to the example following.
> Note that the items displayed by this option may be subject to change in a future release.

OPERANDS

Original-Volume-Name

> Specifies a replication source volume name.
> For the volume names of other servers, use the format "*Volume-Name@Managed-Server-Name*".
> Specifies the AdvancedCopy Manager device name for the *Volume-Name*.
> Displays all operation statuses for the specified replication source volume.
> If this operand is omitted, all the operation statuses of the Managed Server on which this command is executed are displayed.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Direct that all the replication operation statuses for Managed Server (SRC-SV) be displayed on the Management Server:

```
# /opt/FJSVswsrp/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/FJSVswsrp/bin/swsrpstat -h SRC-SV -L
Server Original-Volume        Replica-Volume         Direction Status                 Execute
Trk  Update Rcv  Split Xfer  Snap-Gen
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular   replicated            ----
---- ----   auto ----  async ----
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV regular   ----                  ----
on  6%      ---- ----  ---- ----
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@TARG-SV reverse   snap                  45%
off  ----   ---- ----  ---- ----
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d1@TARG-SV regular   copy-on-write(inactive) ----
off  0%     ---- ----  ---- 1
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d2@TARG-SV regular   copy-on-write(inactive) ----
off  5%     ---- ----  ---- 2
SRC-SV /dev/dsk/c1t1d0@SRC-SV /dev/dsk/c1t1d3@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/FJSVswsrp/bin/swsrpstat -h SRC-SV -Xall
Server Original-Volume        Replica-Volume         Direction Status      Execute Trk  Update Rcv
Split Xfer  Snap-Gen Copy-DA Date
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular   replicated ----    ---- ----   auto
----  async ----     on      2010/10/20 22:00:45
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV ----      ----       ----    on  6%      ----
---- ---- ----     off     2010/10/20 22:10:39
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@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/FJSVswsrp/bin/swsrpstat -h SRC-SV -Xdate
Server Original-Volume        Replica-Volume         Direction Status      Execute Date
SRC-SV /dev/dsk/c1t2d0@SRC-SV /dev/dsk/c1t2d0@TARG-SV regular   replicated ----    2010/10/20
22:00:45
SRC-SV /dev/dsk/c1t2d1@SRC-SV /dev/dsk/c1t2d1@TARG-SV ----      ----       ----    2010/10/20
22:10:39
SRC-SV /dev/dsk/c1t2d2@SRC-SV /dev/dsk/c1t2d2@TARG-SV reverse   snap       45%     2010/10/21
22:00:23
#
```

NOTES

- When the execution status (the status displayed in the "Status" column) is "failed", "halt", or "?????", refer to "7.3 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

8.3.2.4　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]} From-Volume-Name To-
Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpcancel [-h Server-Name] [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} From-
Volume-Name To-Volume-Name
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpcancel [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} [-Xreverse] -Xgroup
Group-Name
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpcancel [-h Server-Name] [-c] {([-f] [-t] [-m] [-b])|[-T]|[-Xforce]} [-
Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command stops snapshot processing (OPC/QuickOPC/SnapOPC/SnapOPC+) and synchronization processing (EC) of the specified replication volume. Use this command when an error is detected during the replication operation and when you want to stop replication processing.

OPTIONS

-h *Server-Name*

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 will not be executed.
Use this option only when AdvancedCopy Manager does not execute pre-processing and post-processing of the copy destination volume and unique pre-processing and post-processing scripts are inserted before and after (respectively) the AdvancedCopy Manager command, or when you judge that copy pre-processing and post-processing are unnecessary (e.g., for a database constructed on a raw device).

-b

Specifies that the inter-box copy operation in the halt status be stopped.
For replication on a single server, the copying is cancelled for both boxes.
For replication between servers, the copying is cancelled only for the box connected to the server on which this command was executed.
Use the option only for a copy operation in the halt status and whose recovery is not expected to be done successfully.
The option is valid only for a copy operation in the HALT status.
The option can be used on the server that is not specified as the operation server.

If this option is specified together with the -Xgroup option, copy processing is only stopped for sessions in the group whose status is halt.

-T

Specifies that differential snapshot processing will be terminated.
This option only terminates tracking processing and does not terminate snapshot processing (OPC physical copying) when it is in progress. This option releases the OPC session if snapshot processing (i.e., OPC physical copying) is complete.
This option can only be used while physical copying or tracking is in progress.

If this option is specified together with the -Xgroup option, only tracking processing within the group is stopped.

-Xgroup *Group-Name*

Specifies that copy processing will be stopped for each group.

-Xreverse

Specifies that copy processing that is being executed in the reverse direction (from replica volumes to original volumes) will be stopped
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

From-Volume-Name

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.

To-Volume-Name

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 a server, the command stops normally when cancellation of the copying succeeds in either of the boxes.

- Copy processing cannot be performed if:

  - The specified replication source volume and replication destination volume have not been set as replication volumes.

  - The copy processing is not performed for the specified replication source and replication destination volumes.

  - For server-to-server replication, the Managed Server on which the command is executed is not the operation server of the replication volume.

  - For server-to-server replication, communication with a destination server fails.

  - 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 will be performed for each active replication volume, but processing will be terminated without cancelling replication in the following case:

  - If no replication volumes have been copied

  - 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 will be terminated immediately if an error occurs.

- When stopping SnapOPC+ sessions, the oldest snap generation must be stopped first.
  Specify the -Xforce option to forcibly stop the second and subsequent snap generations. However, note that this option stops the specified snap generation and all earlier snap generations.
  If the -Xforce and -Xgroup options are specified at the same time, the SnapOPC+ sessions in the group are stopped, and all the snap generations and snap generations before it in the group are also stopped.

- The volume information for the specified volume is not checked (check for matching of the volume information in the management list and the actual physical information). The operation is cancelled unconditionally using the volume information in the management list.

- The following processing is performed depending on the operation status of the specified replication source volume and replication destination volume.

Table 8.10 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 8.11 Processing When -T Option Is Not Specified

Operation Status (Display by swsrpstat -L)	Processing
Reverse copy	Processing is interrupted.
Not in operation (Status is "----" and Trk also is "----".)	Processing is interrupted.
Total or difference copying is in progress. (Status is "sync".)	Synchronous processing is terminated. The destination volume cannot be used.
Equivalency maintained status (Status is "equivalent".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Replica created status (Status is "replicated".)	Synchronous processing is terminated. The destination volume can be used as a replica.
Snapshot processing is in progress. (Status is "snap")	Synchronous processing is terminated. The destination volume cannot be used. Tracking processing, if in progress, is also terminated.
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 8.12 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

8.3.2.5   swsrpchsync (Synchronization Mode Change Command)

NAME

swsrpchsync - changes the operation mode

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrpchsync [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|
Manual}] From-Volume-Name To-Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrpchsync [-h Server-Name] [-F {Sync|Async|Stack|Consist}] [-R{Auto|Manual}]
[-S {Auto|Manual}] From-Volume-Name To-Volume-Name
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpchsync [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}] [-S {Auto|
Manual}] [-Xreverse] -Xgroup Group-Name
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrpchsync [-h Server-Name] [-F {Sync|Async|Stack|Consist}] [-R {Auto|Manual}]
[-S {Auto|Manual}] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command changes the operation mode of inter-box synchronization (transfer mode, recovery mode, or split mode).

OPTIONS

-h *Server-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 *Group-Name*

Changes the operation mode of inter-box synchronous processing for each group (transfer mode, recovery mode, or split mode).

-Xreverse

Specifies that the operation mode of synchronous processing that is being executed in reverse direction (from replica volumes to original volumes) will be changed.
This option is valid only when the -Xgroup option is specified.

OPERANDS

From-Volume-Name

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.

To-Volume-Name

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/FJSVswsrp/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/FJSVswsrp/bin/swsrpchsync -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 swsrpchsync completed
:
#/opt/FJSVswsrp/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   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/swsrpchsync -F Async -Xgroup GRP1
GROUP=GRP1 swsrpchsync 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 will be terminated immediately if an error occurs.

- This command cannot be executed while any of the following commands are running:

  - swsrpsetvol

  - swsrpdelvol

  - swsrprecoverres

8.3.2.6   swsrprevsync (Synchronization Reverse Command)

NAME

swsrprevsync - reverses the copying direction of synchronization

SYNOPSIS

To Execute on Managed Server

```
/opt/FJSVswsrp/bin/swsrprevsync From-Volume-Name To-Volume-Name
```

To Execute on Management Server

```
/opt/FJSVswsrp/bin/swsrprevsync [-h Server-Name] From-Volume-Name To-Volume-Name
```

To Execute on Managed Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrprevsync [-Xreverse] -Xgroup Group-Name
```

To Execute on Management Server: Group Specification

```
/opt/FJSVswsrp/bin/swsrprevsync [-h Server-Name] [-Xreverse] -Xgroup Group-Name
```

DESCRIPTION

This command reverses the copying direction of synchronization when in suspended status.

OPTIONS

-h *Server-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.

-Xgroup *Group-Name*

Changes the direction of synchronous processing for each group.

-Xreverse

Specifies that the direction of synchronous processing that is being executed in reverse direction (i.e., from replica volumes to original volumes)will be inverted.
This option is valid only when the -Xgroup option is specified.

OPERANDS

From-Volume-Name

Specifies a copy source volume name. (as the destination in the reverse direction)
Specifies the replication source volume or the replication destination volume set with the swsrpsetvol command.
Specifies the AdvancedCopy Manager device name for the volume name.

To-Volume-Name

Specifies a copy destination volume name. (as the source in the reverse direction)
Specifies the replication source volume or the replication destination volume set with 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/c1t2d3@TARG-SV /dev/dsk/c1t2d3@SRC-SV
FROM=/dev/dsk/c1t2d3@SRC-SV,TO=/dev/dsk/c1t2d3@TARG-SV swsrprevsync completed
#/opt/FJSVswsrp/bin/swsrpstat /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 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 will be terminated immediately if an error occurs.

- If the -Xgroup option is specified, processing is not performed for those sessions in the group where the direction has already been changed.

- This command cannot be executed while any of the following commands are running:

    - swsrpsetvol

    - swsrpdelvol

    - swsrprecoverres

8.3.3 Maintenance Commands

This section describes the maintenance commands for replication management.

8.3.3.1 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 Server-Name] [-r] [-p]
```

DESCRIPTION

This command executes recovery to make replication management information consistent if a system failure or other problem has made the replication management information inconsistent.

OPTIONS

-h *Server-Name*

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 replication between servers, this command must be executed both on the Managed Server on which the processing was performed and on the Managed Server with which communication is being made.

- If this command is executed for the copy source volume and the copy destination volume in the status where 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

8.4 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".

8.4.1   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
```

P Point

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In order to verify if the communication daemon has been launched normally, please 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
```

. . . .

8.4.2   Starting and Stopping AdvancedCopy Manager Daemons

The daemons listed below are started and stopped together:

Table 8.13 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
```

8.5   SnapOPC/SnapOPC+ Support Commands

This section explains the commands can be used to execute SnapOPC/SnapOPC+.

Note

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Operating Environment for Command Execution

The table below lists the requirements for the operating environment in which to execute the respective commands.

Table 8.14 Operating Environment When Executing SnapOPC/SnapOPC+ Support Commands

Command	Operating Environment of AdvancedCopy Manager
swstestupdate	-
swstsdv	-

. . . .

⊡ Note

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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 8.15 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	-

. . . .

8.5.1 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/FJSVswsts/bin/swstestupdate start Volume-Name
```

To Look Up Update Volume (Displaying Status of Monitor Session)

```
/opt/FJSVswsts/bin/swstestupdate status Volume-Name
```

To Finish Update Volume Measurements (Cancelling Monitor Session)

```
/opt/FJSVswsts/bin/swstestupdate stop Volume-Name
```

DESCRIPTION

This command measures the physical capacity of a Snap Data 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 will be displayed:

Title	Description
Volume-Name	The volume name.
Update	The amount of data that has been updated since measurements started in the number of blocks (1 block = 512 bytes).
	Displays "----" if there is no 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

Volume-Name

- Specifies the volume name.
  Specify a copy source volume that is used with SnapOPC/SnapOPC+ operations

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Measure the update volume:

```
(Start taking measurements by starting a monitor session)
#/opt/FJSVswsts/bin/swstestupdate start /dev/dsk/c1t2d10
/dev/dsk/c1t2d10 swstestupdate completed

(First measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
Volume-Name      Update
/dev/dsk/c1t2d10 644333

(Second measurement)
#/opt/FJSVswsts/bin/swstestupdate status /dev/dsk/c1t2d10
Volume-Name      Update
/dev/dsk/c1t2d10 1045000

(Stop taking measurements by cancelling the monitor session)
# /opt/FJSVswsts/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 ETERNUS Disk storage system device does not support the SnapOPC/SnapOPC+ function.

  - 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).

8.5.2 swstsdv (Snap Data Volume Operation/Reference Command)

NAME

swstsdv - Initialize or display the Snap Data Volume

SYNOPSIS

To Initialize Snap Data Volume

```
/opt/FJSVswsts/bin/swstsdv init Volume-Name
/opt/FJSVswsts/bin/swstsdv init -G Access-Volume-Name LU-Number
```

To Display Snap Data Volume Status

```
/opt/FJSVswsts/bin/swstsdv stat Volume-Name
/opt/FJSVswsts/bin/swstsdv stat -G Access-Volume-Name LU-Number
```

To Display Snap Data Pool Status

```
/opt/FJSVswsts/bin/swstsdv poolstat -G Volume-Name
```

DESCRIPTION

Snap Data Volume initialization/status display and Snap Data Pool status display are all possible. Specify one of the following subcommands according to the contents you want to operate on, and then execute the subcommand.

Snap Data Volume Initialization

Specify "init" as the subcommand to initialize the Snap Data Volume.
Initialize the Snap Data Volume when SnapOPC/SnapOPC+ is not running.
All the data in the Snap Data Volume is destroyed in the initialization of the Snap Data Volume. For this reason, the following procedure is recommended.
(Creation of the Access volume and collection of the LU-Number must be completed before logical volume manager operations.)

1. If there is necessary data in the Snap Data Volume, back it up in advance using the relevant OS command.

2. Initialize the disk management information.
   Set the target Snap Data Volume (physical disk) outside logical volume manager management when there is a logical volume manager operation.

3. Initialize the Snap Data Volume using this command.
   Initialize the information using the Access volume when there is a logical volume manager operation.

Snap Data Volume Status Display

Specify "stat" as the subcommand to display Snap Data Volume logical capacity, physical capacity, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
LUN	Displays the logical unit number on the ETERNUS Disk storage system. The format used for the display is "<decimal>(<hexadecimal>)".
Rate	Displays the Snap Data Volume usage as a percentage (%).
Logical	Displays the Snap Data Volume logical capacity. The unit used for display is 'sector'.
Physical	Displays the Snap Data Volume physical capacity. The unit used for display is 'sector'.
Used	Displays the amount of Snap Data Volume used space. The unit used for display is 'sector'. The capacity for both Copy usage (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Volume, Copy usage (*1) is displayed. The unit used for display is 'sector'.

Title	Description
Host	For the space used in the Snap Data Volume, Host usage (*1) is displayed. The unit used for display is 'sector'.
Pool	Displays the Snap Data Pool usage allocated to the Snap Data Volume. The unit used for display is 'sector'.

*1:
Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.
Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

Snap Data Pool Status Display

Specify "poolstat" as the subcommand to display the Snap Data Pool total amount, used space capacity, and unused space capacity.

The contents that are displayed are as follows:

Title	Description
BoxID	Displays the Box ID.
Pool-Type	Displays the Snap Data Pool type. Normal Encrypted
Rate	Displays the Snap Data Pool usage rate (%).
Total	Displays the Snap Data Pool total amount. The unit used for display is 'sector'.
Used	Displays the Snap Data Pool used space capacity. The unit used for display is 'sector'. The capacity for both Copy usage (*1) and Host usage (*1) is displayed.
Copy	For the space used in the Snap Data Pool, Copy usage (*1) is displayed. The unit used for display is 'sector'.
Host	For the space used in the Snap Data Pool, Host usage (*1) is displayed. The unit used for display is 'sector'.
Free	Displays the Snap Data Pool unused space capacity. The unit used for display is 'sector'.

*1:
Copy usage: Usage in which the update occurs while SnapOPC/SnapOPC+ is running.
Host usage: Update of Snap Data Volume while SnapOPC/SnapOPC+ is not running.

OPTIONS

Specific Options of Snap Data Volume Initialization(init)

-G *Access-Volume-Name*

Specifies the Access volume.
For details on Access volume, refer to "Creating Access Volume".

Specific Options of Snap Data Volume Status Display(stat)

-G *Access-Volume-Name*

Specifies the Access volume.
For details on Access volume, refer to "Creating Access Volume".

Specific Options of Snap Data Pool Status Display(poolstat)

-G *Volume-Name*

Specifies the ETERNUS Disk storage system volume.
If a Snap Data Volume is specified with insufficient capacity however, an error occurs in the command. In this case, specify an Access volume for which there is sufficient capacity.
For details on Access volume, refer to "Creating Access Volume".

OPERANDS

Specific Operands of Snap Data Volume Initialization(init)

Volume-Name

Specifies the volume name (AdvancedCopy Manager device name) of the Snap Data Volume to be initialized.
If a partition (slice) has been specified, the Logical Unit (disk) on which the partition (slice) exists is initialized.

LU-Number

Specifies the logical unit number in the ETERNUS Disk storage system.
This value is specified as a decimal.

Specific Operands of Snap Data Volume Status Display(stat)

Volume-Name

Specifies the Snap Data Volume volume name (AdvancedCopy Manager device name).
If a partition (slice) has been specified, the information about the Logical Unit (disk) on which the partition (slice) exists is displayed.

LU-Number

Specifies the logical unit number in the ETERNUS Disk storage system.
This value is specified as a decimal.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Snap Data Volume is initialized:

```
# /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.

8.6 Troubleshooting Data Collection Command

This section explains the command used to collect troubleshooting data when an AdvancedCopy Manager fault occurs.

8.6.1 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_ttmmss.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 ttmmss, tt is the hour, mm is minutes, and ss is seconds.

OPERANDS

dirname

Directory where the troubleshooting data is stored.
Specify a directory with plenty free space (500MB or more) is recommended. Regard 500MB as a rough guide, since the size of the troubleshooting data will vary depending on the system environment and conditions. If there is not enough free space, then this command will terminate abnormally without collecting troubleshooting data.
Specify an existing directory, otherwise this command will terminate abnormally without collecting troubleshooting data.

EXIT STATUS

=0: Completed successfully
>0: Terminated abnormally

EXAMPLES

- Collect data to the /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 9   Notes on Operations

This chapter provides notes on the operations of AdvancedCopy Manager.

9.1 Notes on Backup and Replication Operation

This section provides notes on backup and replication.

9.1.1   General Notes

This section provides general notes on backup and replication.

9.1.1.1   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

9.1.1.2   Consistency of Data on Volumes

Table 9.1 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.

9.1.1.3   Fetching Device Information

Before starting either the backup or replication operation, The "3.4.4 Fetching device information on a Managed Server" that is managed by all Managed Servers using the Web Console. The time taken to complete this operation is proportional to the total number of devices defined on the selected Managed Servers. If many devices are involved, perform this operation while the CPU or I/O load on the system is low.

As a guide, about 0.5 seconds are required per device (i.e., disk) when there is no load on the system.

9.1.1.4   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.

9.1.1.5   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.

9.1.1.6 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, please 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 will stop if the commands are executed on a failed device

2. Execute the backup or replication command again.

9.1.1.7 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.

9.1.1.8 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.

9.1.1.9 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 9.2 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)

9.1.1.10 Notes on Executing Copy from Logical Unit (Disk) to Slice (Partition) Using Replication Function

Do not create a file system on a copy destination volume (slice).

9.1.1.11 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.

9.1.1.12 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.

9.1.1.13 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.

9.1.1.14 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 will become 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.

9.1.2 Notes on Snapshot High-speed Backup

This section provides notes on snapshot backup operation.

Number of Required Backup Volumes

Snapshot high-speed backup requires as many backup volumes as the number of specified backup generations. Accordingly, snapshot backup is disabled if:

- All the specified number of generations have been backed up, and

- There is no new volume that can be used as a backup volume.

Simultaneous Backups

Performing snapshot high-speed backup simultaneously with the same transaction volume specified will perform two backups in parallel.
However, performing snapshot high-speed backup simultaneously more often than the number of preservation generations will cancel the backup operations starting from the oldest one. In other words, you cannot perform more simultaneous backups than the specified number of generations.

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 will be displayed and the command terminates in an error.

If the error cannot be resolved by responding to the message, we recommend you change the operating method of Advanced Copy or reconfigure the system.

If you cannot change the operating method of Advanced Copy or reconfigure the system, create a file (check.ini) that sets the sequence of data updates across multiple volumes. Then, disable sequence preservation before you retry Concurrent OPC. The sequence of data updates will not be preserved across multiple volumes.

Create check.ini in the following path of the server on which to execute the swsrpmake command:

- In a non-cluster environment

```
/etc/opt/FJSVswsrp/data/DEFAULT
```

- In a cluster environment

```
/etc/opt/FJSVswsrp/logicalNodeName/data/DEFAULT
```

Table 9.3 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 will be disabled. By setting any value other than "No", preservation of the sequence will be enabled.

[Example for disabling sequence preservation]

```
[check]
ConcurOPCCascade=No
```

P Point
. . . .

For any of the below ETERNUS Disk storage systems, Concurrent OPC can be executed regardless of sequence preservation of data updates. However, the sequence of data updates will not be preserved across multiple volumes.

- ETERNUS DX80/DX80 S2 (for firmware version numbers before V10L30)

- ETERNUS DX90/DX90 S2 (for firmware version numbers before V10L30)

- ETERNUS DX400/DX400 S2 series (for firmware version numbers before V10L30)

- ETERNUS DX8000/DX8000 S2 series (for firmware version numbers before V10L30)

. . . .

9.1.3   Notes on Synchronous High-speed Backup

This section provides 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/REC) execution. If this occurs and the backup volume is inactive then it cannot be re-activated. Additionally, it will not be 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.

9.1.4   Notes on Restoration

This section provides notes on restoring data.

Timing of Restoration

If data on a transaction volume has been updated since the latest backup, then if a restore is performed from the backup volume, recently updated data will be overwritten.

Figure 9.1 Notes on Restoration of AdvancedCopy Manager
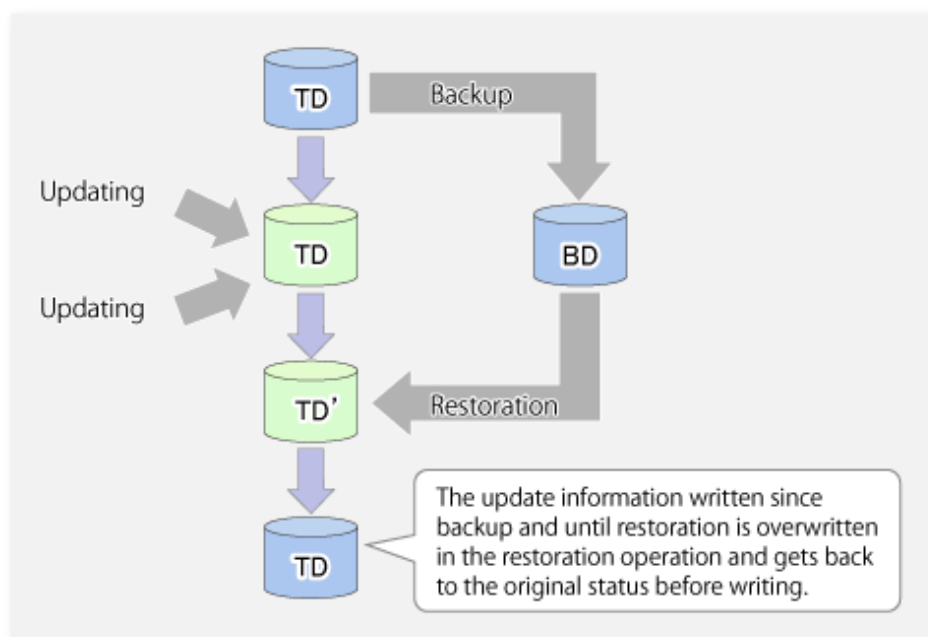
TD: Transaction volume
BD: Backup volume

9.1.5   Notes on Synchronous Replication

This section provides 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 will not be 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.

9.1.6   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.

9.1.7   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 swstsrsemtch 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/REC) 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 swstsrsemtch command as a recovery measure.

- To use synchronous high-speed backup, do not register a backup to any cluster transaction.

- You must perform backups on the active server of the service group because AdvancedCopy Manager is placed into the service group and operates as a part of it.
  You cannot make a backup from a standby node or another service group.

- To perform backup/restoration using AdvancedCopy Manager, you usually must unmount transaction volumes beforehand and mount the volumes later.
  If the mount point of transaction volumes have been registered to a cluster transaction, set the mount point resource online or offline from the cluster transaction instead of mounting or unmounting the volumes. Alternatively, modify the backup/restoration pre-processing and post-processing scripts so that the transaction volumes are set offline or online instead of being unmounted or mounted.
  Moreover, the Volume is immediately placed offline/online for a mount point resource whereas there will be a time delay when

mount/unmount is used. Therefore, please add into the pre-processing script, after the statement where the success or failure value of offline/online is returned, 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.

9.1.7.1 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 the 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 "8.1 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 "8.1 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.

9.1.8   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 will be a time delay when mount/unmount is used. Therefore, please add into the pre-processing script, after the statement where the success or failure value of offline/online is returned, 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.

9.1.8.1 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 "8.3 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.

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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 "8.3 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.

9.1.9   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 the Web Console that no ODX session exists on the copy destination volume and then re-execute the command.

If the error is not resolved, 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 9.2 Use in Combination with ODX
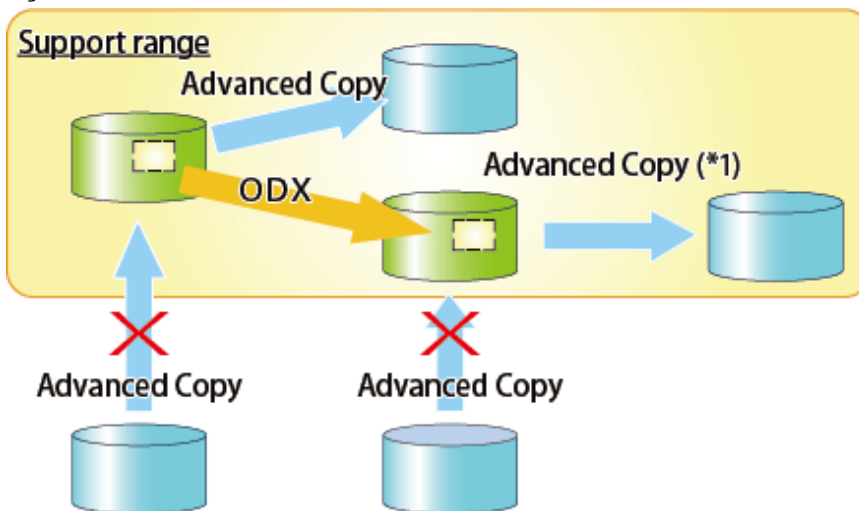
*1: In the following ETERNUS Disk storage systems whose firmware version number is V10L50 or earlier, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which ODX session is running.

- ETERNUS DX80/DX80 S2

- ETERNUS DX90/DX90 S2

- ETERNUS DX400/DX400 S2 series

- ETERNUS DX8000/DX8000 S2 series

9.1.10   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 the Web Console that no XCOPY session exists on the copy destination volume and then re-execute the command.

Figure 9.3 Use in Combination with XCOPY
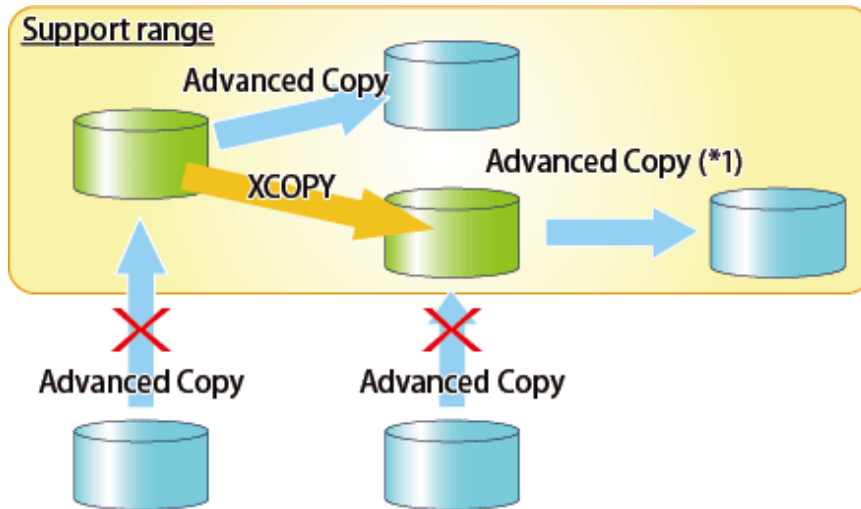
*1: In the following ETERNUS Disk storage systems whose firmware version number is V10L50 or earlier, Advanced Copy cannot be performed by AdvancedCopy Manager with respect to the volume on which XCOPY session is running.

- ETERNUS DX80/DX80 S2

- ETERNUS DX90/DX90 S2

- ETERNUS DX400/DX400 S2 series

- ETERNUS DX8000/DX8000 S2 series

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

This appendix provides information on pre-processing and post-processing of backup and restoration.

A.1 Overview

Pre-processing and post-processing of backup or restoration are started before and after backup or restoration when a backup or restore command is executed.

This processing is required by AdvancedCopy Manager to back up or restore a transaction volume.

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 swstsrsemtch (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, 2002-2009
 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, 2002-2009
 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: vxpvtrans="`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
$1}' | /usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
105:        if [ "$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/rdsk\" -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
2>&1
118:            fi
119:            if [ $? = 0 ]
120:            then
121:                /usr/bin/rm -f $err_log_path/$dev.vgcfgrestore
122:                reststatus=1
123:                break
124:            fi
125:        done
126:        if [ "$SWSTGNODE" != "" ]
127:        then
128:            /usr/sbin/vgchange -c y $bk_device > /dev/null 2>&1
129:            /usr/sbin/vgchange -a e $bk_device > /dev/null 2>&1
130:        else
131:            /usr/sbin/vgchange -a y $bk_device > /dev/null 2>&1
132:        fi
133:        if [ $reststatus = 0 ]
134:        then
135:            exit 31
136:        fi
137:  fi
138: fi
139:
140: # No processing
141: # When device was not mounted --- 3
142: # When devices of volume group was not mounted --- 6
143: # When the transaction disk is a VxVM physical volume --- 7
144: if [ "$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:            if [ $? != 0 ]
```

```
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" ]
```

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```
300: #        then
301: #            fs="hfs"
302: #            lvname="/dev/vgXX/rXXXXX"
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.

- Please 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 (PpcBackup.post) once for each additional logical volume.

- If the operating volume was not unmounted in the pre-processing script then the fsck command will need 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, please 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 will be a time delay before access is actually prevented when mount/unmount is used.
Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The sleep and df commands can be used to delay the mount/ unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]
Changing Unmount Processing of Backup Pre-processing Script (OpcBackup.pre)

[lines 115, 124, 181 and 193]

(before change)	`/usr/sbin/umount $mount_point`
(after change)	`/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName`

[Example]
Adding Unmount Wait Processing to Backup Pre-processing Script (OpcBackup.pre)

[lines 145 and 213]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing Mount Processing of Backup Post-processing Script (OpcBackup.post)

[lines 164, 168, 170, 183, 187, 189, 224 and 233]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $lvname $lv_mount_point`

(after change)	`/opt/VRTSvcs/bin/hares -online resourceName -sys systemName`

[Example]
Adding Mount Wait Processing to Backup Post-processing Script (OpcBackup.post)

[lines 209 and 252]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

A.3 Pre-processing and Post-processing of Restoration

In AdvancedCopy Manager, restore processing must be performed while transaction volumes are unmounted.

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 will be 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 swstsrsemtch 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, 2002-2009
 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: vxpvtrans="`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/"$dev".fstype"
54: elif [ "$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/"$dev".fstype"
61: elif [ "$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, 2002-2009
 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 $device | /usr/bin/grep "/dev/vx/dmp/"`"
46: if [ "$trans" != "" ]
47: then
48:     dev_type="physical"
49:     dev="`echo $device | /usr/bin/sed -e "s/\/dev\/dsk\///" -e "s/\/dev\/disk\//_hppv_/"`"
50:     post_file="/etc/opt/FJSVswsts"$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 $1}'
| /usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
 95:    if [ "$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/rdsk\" -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 will need 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, please customize the script.

  In a clustered system, the respective nodes comprising the cluster must have volume group configuration information.

- Please 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 will be a time delay before access is actually prevented when mount/unmount is used.

Please note that once the online/offline command is issued there will be a delay before the mount/unmount command can be executed. The "sleep" and "df" commands can be used to delay the mount/ unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]
Changing Unmount Processing of Restore Pre-processing Script (OpcRestore.pre)

> [lines 80, 89, 139 and 148]

(before change)	`/usr/sbin/umount $mount_point`
(after change)	`/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName`

[Example]
Adding Unmount Wait Processing to Restore Pre-processing Script (OpcRestore.pre)

> [lines 110 and 169]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing Mount Processing of Restore Post-processing Script (OpcRestore.post)

> [lines 152, 156, 158, 171, 175, 177, 223 and 232]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $lvname $lv_mount_point`

(after change)	`/opt/VRTSvcs/bin/hares -online resourceName -sys systemName`

[Example]
Adding Mount Wait Processing to Restore Post-processing Script (OpcRestore.post)

> [lines 197 and 251]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

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 will make 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
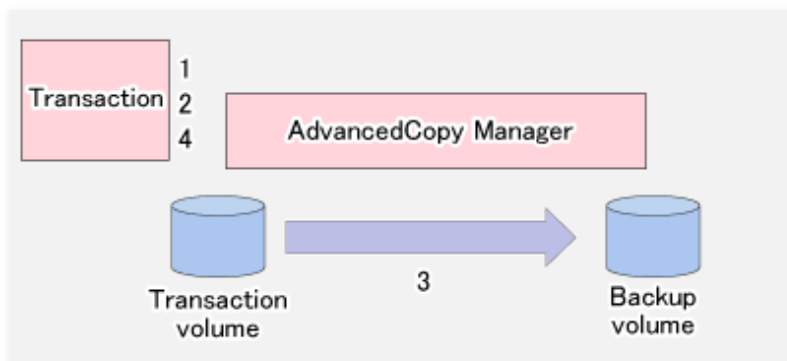
B.1.2　Restoration Procedure

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
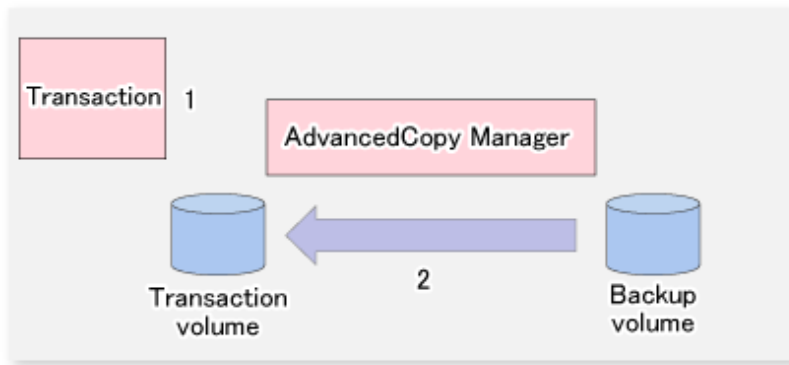
B.2 Sample Scripts for Oracle

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/FJSVswsts/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

- spredolog.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/rlvol170
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/FJSVswsts/bin

# 1) Acquisition of Oracle table space information
sqldata() invocation --- Acquire Oracle table space information

# 2) Acquisition of Oracle log information
sqllog() invocation --- Acquire Oracle log information

# 3) Acquisition of Oracle control information
sqlcont() invocation --- Acquire Oracle control information

# 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/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 $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	O--*1	X
swsrpmake	Equivalency maintenance	Source	O	O
		Destination	X	O--*2
swsrpcancel	Equivalency maintenance	Source	O	O

Command	Copy Status	Source/Destination	Pre-processing	Post-processing
		Destination	X	O--*2
	Replication establishment	Source	X	X
		Destination	X	X
	Copying	Source	X	X
		Destination	X	X
swsrpmake	Copy not started	Source	O	O
		Destination	O	O

O : 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 replication between servers, these scripts are executed by remote execution using TCP/IP in the pre-processing and post-processing of a volume that is not connected.

The operation image before and after processing is shown in the following figure.

Figure C.1 Synchronized Replication Processing
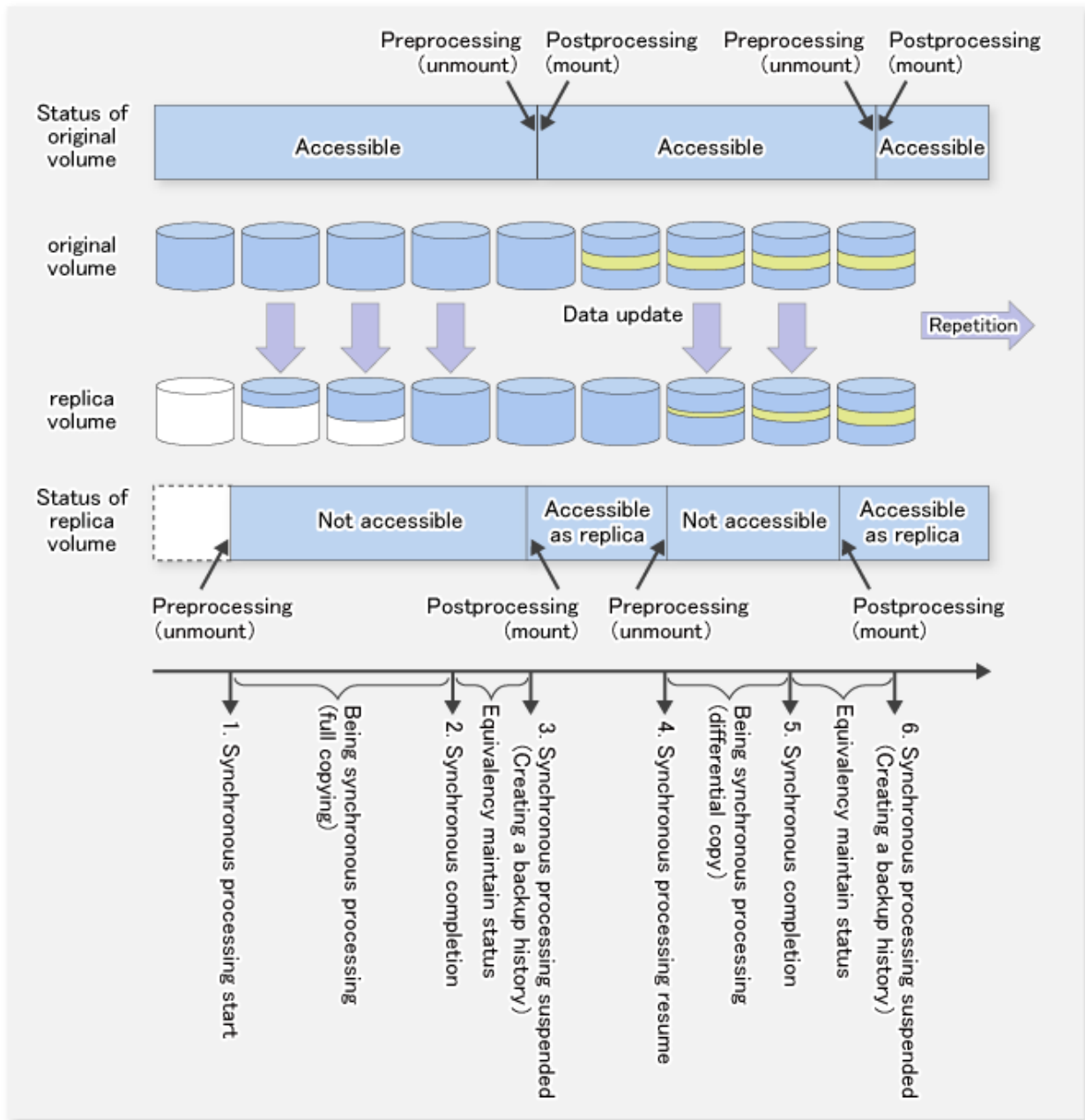
If processing other than the standard pre-processing and post-processing is required in the pre-processing and post-processing, customize the scripts.

When customizing a script, strictly observe the following rules regarding error codes:

Table C.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. Please customize these scripts according to the processing requirements.

For Non-clustered System

```
/etc/opt/FJSVswsrp/sh
```

For Clustered System

```
/etc/opt/FJSVswsrp/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, 2002-2009
 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: 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/"$dev".spre"
40:     fstype_file="/etc/opt/FJSVswsrp/"$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, 2002-2009
 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, 2002-2009
 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>&1
 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, 2002-2009
 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 $1}' | /
usr/bin/grep -e \"/dev/rdsk\" -e \"/dev/rdisk\"`"
87:     if [ "$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/rdsk\" -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/XXXXX"
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 will 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 will need 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 will be a time delay before access is actually prevented when mount/unmount is used.

Please note that once the offline/online command is issued there will be a delay before the mount/unmount command can be executed. The "sleep" and "df" commands can be used to delay the mount/unmount until after the process that sets the volumes online or offline has completed.

The examples below show how the pre-processing and post-processing scripts are modified.

[Example]
Changing Unmount Processing of Source Volume Pre-processing Script (RepSrc.pre)

[lines 77, 87, 137 and 146]

(before change)	`/usr/sbin/umount $mount_point`
(after change)	`/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName`

[Example]
Adding Unmount Wait Processing to Source Volume Pre-processing Script (RepSrc.pre)

[lines 106 and 165]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing Unmount Processing of Destination Volume Pre-processing Script (RepDst.pre)

[lines 71, 81, 121 and 130]

(before change)	`/usr/sbin/umount $mount_point`
(after change)	`/opt/VRTSvcs/bin/hares -offline resourceName -sys systemName`

[Example]
Adding Unmount Wait Processing to Destination Volume Pre-processing Script (RepDst.pre)

[lines 100 and 149]

(addition)	`while /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing Mount Processing of Source Volume Post-processing Script (RepSrc.post)

[lines 98, 102, 104, 117, 121, 123, 157 and 166]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $lvname $lv_mount_point`

(after change)	`/opt/VRTSvcs/bin/hares -online resourceName -sys systemName`

[Example]
Adding Mount Wait Processing to Source Volume Post-processing Script (RepSrc.post)

[lines 143 and 185]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

[Example]
Changing Mount Processing of Destination Volume Post-processing Script (RepDst.post)

[lines 165, 169, 171, 188, 190, 224 and 233]

(before change)	`/usr/sbin/mount $device $mount_point`
	`/usr/sbin/mount -F $fs $device $mount_point`
	`/usr/sbin/mount -F $fs $lvname $lv_mount_point`

(after change)	`/opt/VRTSvcs/bin/hares -online resourceName -sys systemName`

[Example]
Adding Mount Wait Processing to Destination Volume Post-processing Script (RepDst.post)

[lines 210 and 252]

(addition)	`while ! /usr/bin/df -l "$device">/dev/null 2>&1; do :; done`

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, REC) with a long suspend time.

- Replication management

  - Snapshot type high-speed replication (OPC) with no access to the copied volume as the backup destination for a long period of time.

  - Suspend/Resume functionality of synchronous type high-speed replication with a long suspend time.

An overview of the system structure is as follows:

Figure D.1 Overview of System Structure
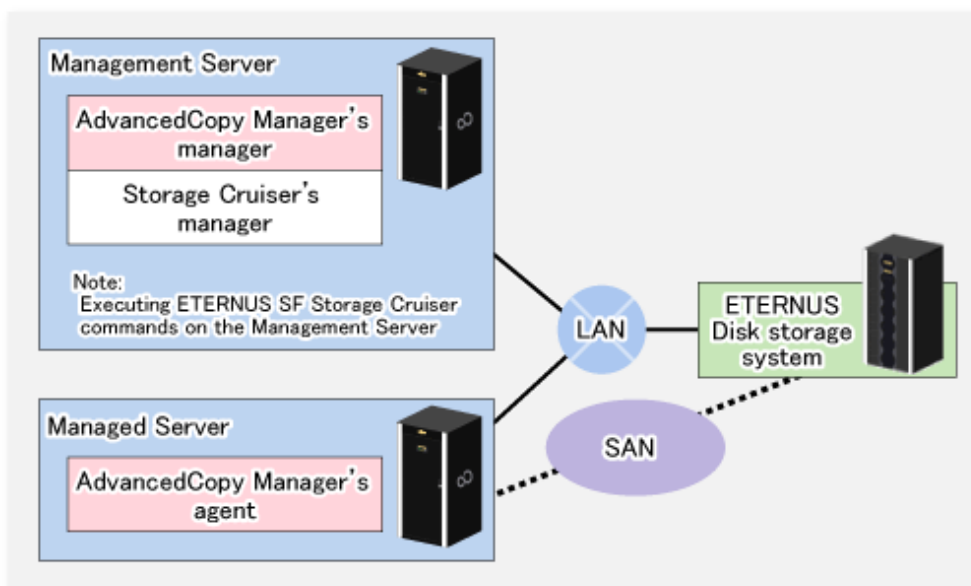
D.1   Environment Settings

This section describes how to configure the environment.

D.1.1   Settings for ETERNUS Disk Storage System

Settings in the 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.
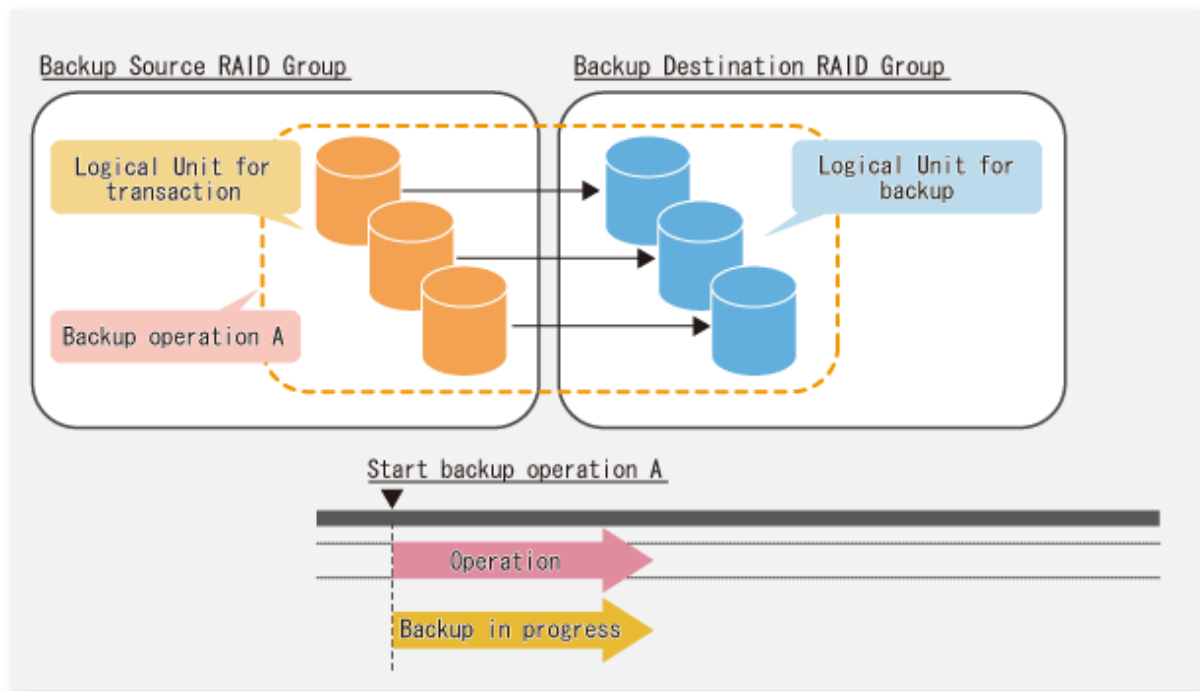

The example below illustrates the case where Logical Units for both backup operation B and for business operations are included in the backup destination RAID group, in addition to the Logical Units for backup operation A. As a result, although backup operation A has ended, the Logical Units for backup operation B and for business applications are required to be running.
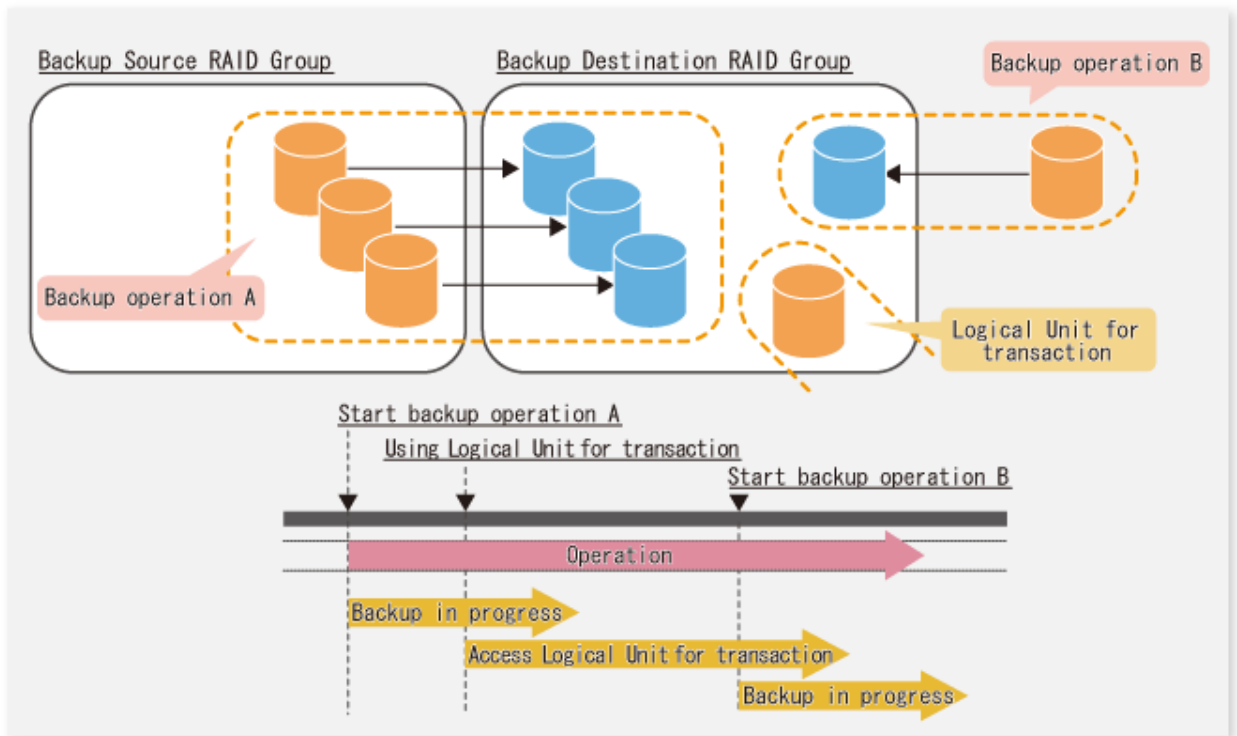
Point

A backup destination RAID group must be created at each generation if a backup over multiple generations is performed.
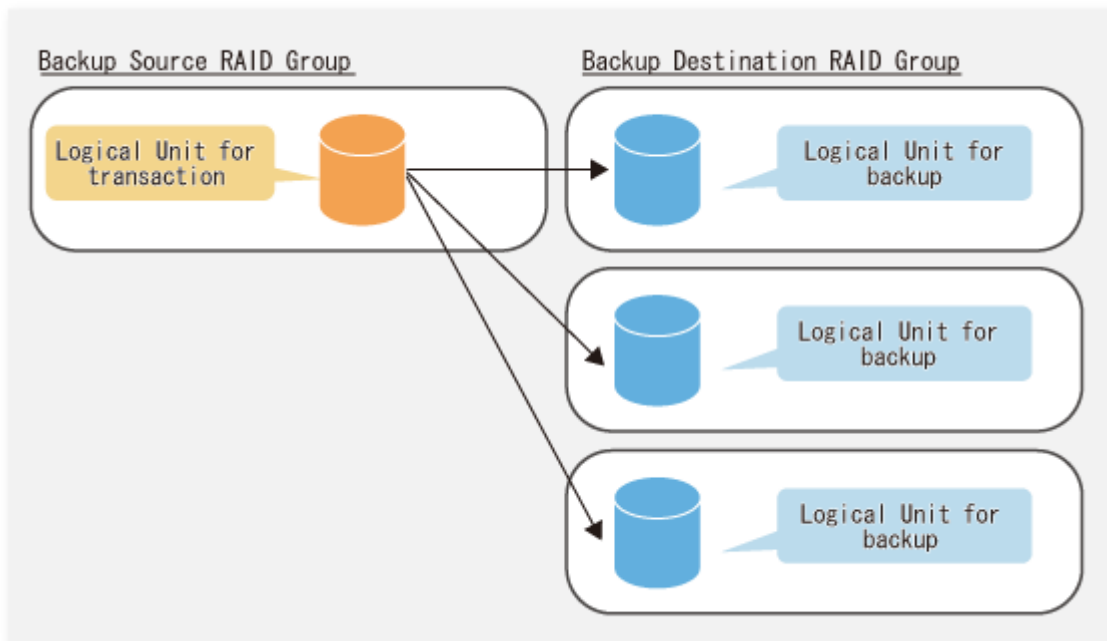
Note

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. This procedure is to be followed for 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

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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.

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